



## Bintry Mill Trout Fishery

Proposed bed raising and bank improvements to the River Wensum above Yarrow Bridge

# Risk assessment and method statement



This proposal concerns the raising of a section of river bed to create a new stretch of fast flowing water over clean gravel to facilitate the spawning of trout and coarse fish known to inhabit the river.

**Location**

The location of the proposed project is the River Wensum in Norfolk, immediately above the Yarrow Bridge. Location map references are: TF98984 23327 to TF 99061 23279, postcode NR20 5LD.

The affected area is marked in red on the map opposite.

**The river**

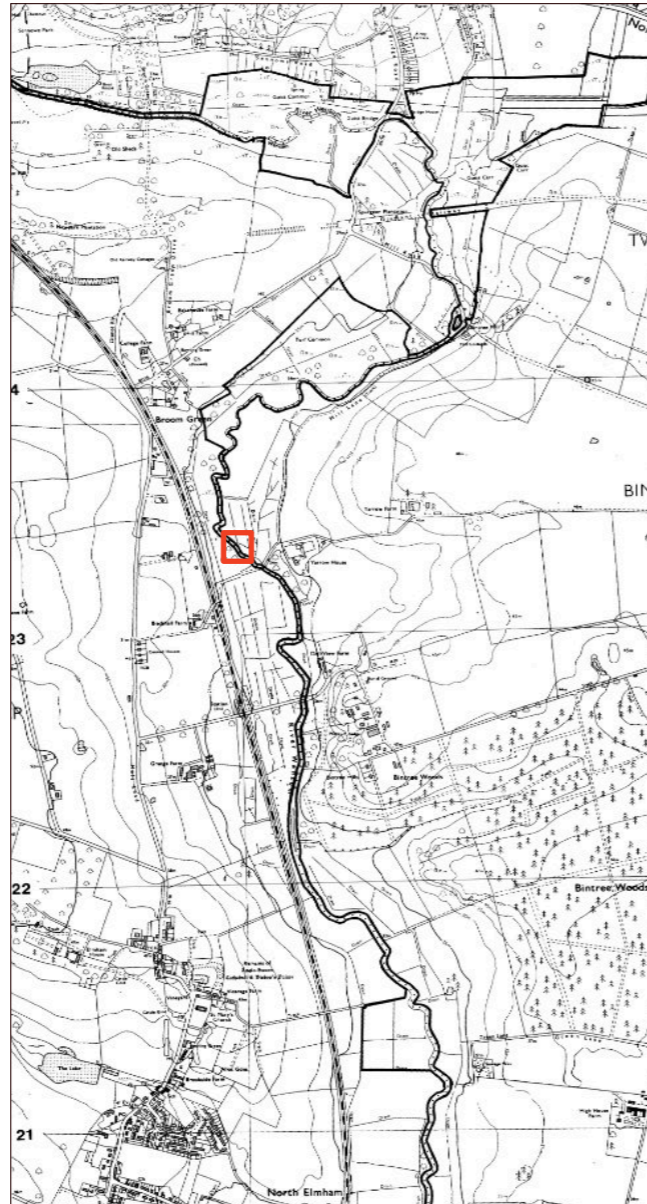
The river itself is a Special Area of Conservation (SAC) and has SSSI conservation status. The Bintry Mill Trout Fishery have a 40 year track record of sound and sensitive management, which has maintained and improved the wildlife habitat and environment along the stretch of water we control.

**Flooding and the surrounding area**

The surrounding land is mostly low lying water meadows used for the grazing of cattle and occasionally, sheep. It is prone to flooding and the meadows are largely under water during winter months, as illustrated opposite.

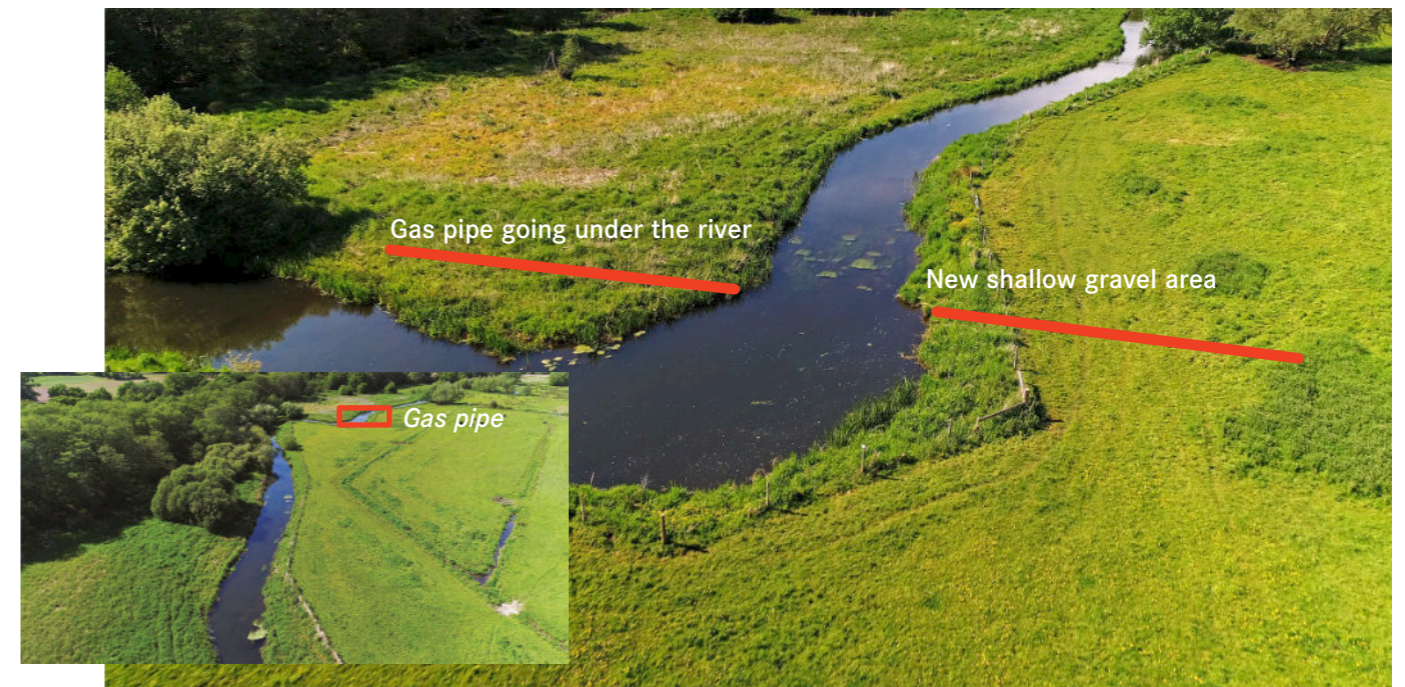
We do not anticipate that the proposed bed raising will have any significant impact on the drainage and flood characteristics of the surrounding meadows as there will be no additional barriers between the channel and the flood plain and the low lying reed beds on either side of the existing channel will be largely unaffected. In most times of high water, these low lying margins will be flooded and similar swampy areas along the river will usually absorb all but the highest rainfall. Being a chalk stream, this section of the Wensum is also less susceptible to sudden changes of level than other types of river.

*Below: We propose to raise the river bed between the wooded area at the top of the photo and the gate shown at the bottom. The extensive low lying area to the left is regularly flooded in times of high rainfall, as is the margin on the right (both in red). The new, raised bed will encourage flood water to spread to surrounding areas, reducing downstream pressure.*



*Above: In this image the main channel is to the right of the picture, with the proposed project site just behind the trees in the distance (marked in red). The water levels, although higher than normal in the very wet winter of 2023/24, are typical of the flood pattern, with the slightly higher dredging spoil immediately adjacent to the river channel and low lying land to the left. The only residence close to the site is Yarrow House (shown on the map, left), but is well above even last winter's excessive flood levels. It certainly would not be affected by this project.*

*Below: This bend is approximately 100 metres upstream of the site of the proposed works. Recent work here (summer 2023) involved the laying of a new gas pipe under the river bed. The contractors raised the bed with gravel as part of the process, and even over such a short distance (marked in red) it can be seen that the increased flow has resulted in beneficial weed growth and is a known fish holding spot. We are proposing a similar exercise, but over a distance of 50 - 70 metres. From this photo one can also see that the low lying True Right Hand Bank (TRHB) is a natural spill over area which will readily absorb excess water.*



### The site

The site of the proposed project is just upstream of Yarrow Bridge on the true right hand bank. There is a car park adjacent to the road (see parked vehicle right) which the contractors propose to use as a staging area for stone and gravel which will be transported to the river bank, only a few yards away.

### The river bank

The river bank along this stretch is soft during times of high rainfall, but firm enough for a tractor and flail at most other times. The bank has been regularly mowed at least 3 times a year for the past five years and is judged to be firm enough for tracked, but not wheeled vehicles by the contractors.

Our original proposal suggested that they use telehandlers, but this has since been dismissed as impractical.

### The process

The stone and gravel will be deposited in the car park area shown and transported to a number of spots along the bank as shown below. A tracked tipper with a 9 ton maximum capacity will be used to transport the materials to the final site. This will ensure minimum disturbance to the ground.

A 20 ton 360 digger will then place the gravel into the channel as far out as possible along the length of the proposed gravel run. Experience with a similar project on the County School beat last year has shown that the 360 is capable of getting gravel out to about 3/4 of the channel, with the final touches being raked out by hand over the following days and weeks to achieve the desired result.

*Below:* The materials will be deposited in regularly spaced heaps by the tracked dumper along the bank as shown (red circles). A 360 digger will then place the large stone into the channel as far out as possible. The 360 will work between 6 and 10 metres from the edge of the bank, roughly following the existing track left by the grass cutting tractor.



*Top:* The car park adjacent to the road where all stone will be delivered.

*Above:* This is the tracked dumper which will transport the stone to the river bank. At 9 tons capacity it is large enough to be useful without causing more than superficial damage to the ground.



*Top:* The 360 is able to deposit stone and gravel to about ¾ of the way across the channel from pre-delivered piles arranged along the bank. This minimises damage from the digger and speeds up the process.

*Above:* The 360 can arrange the stone to facilitate hand raking afterwards. Using a long reach digger was considered, but rejected due to the excess damage it might cause. Preserving the grazing as much as possible was important to the landowner.

### Previous experience

In the spring of 2023 the club carried out a similar exercise on the County School beat, approximately half a mile downstream. We propose to repeat the methods we used at County School on the current, proposed project as they are not only proven to be effective in terms of speed and efficiency, but also shown to cause minimum damage to the river bank.

The 360 will probably not be able to get as close to the water's edge as in the photos shown here, due to the reed growth at Yarrow, but experience has shown that with careful supervision the digger can distribute the gravel sufficiently to allow the rest to be raked out by hand. This is time consuming, but does enable us to shape the gravel glide with greater precision.

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*Below:* The proposed new gravel area at Yarrow is shown here. Experience at County School has shown that the effects of the increased flow will be felt up to 100 yards downstream, with scouring occurring for some distance below the gravel.



**The materials**

We propose the use of 2 sizes of stone, larger quarry reject stone ranging from 40mm to 100mm in approximate diameter to smaller gravel which will need to be 10mm to 20mm to facilitate fish spawning activities. There seems little gain in introducing a third category as the size variation within these categories should suffice to be large enough for long term stability on the one hand and small enough to be moved by spawning fish.

**The river bed**

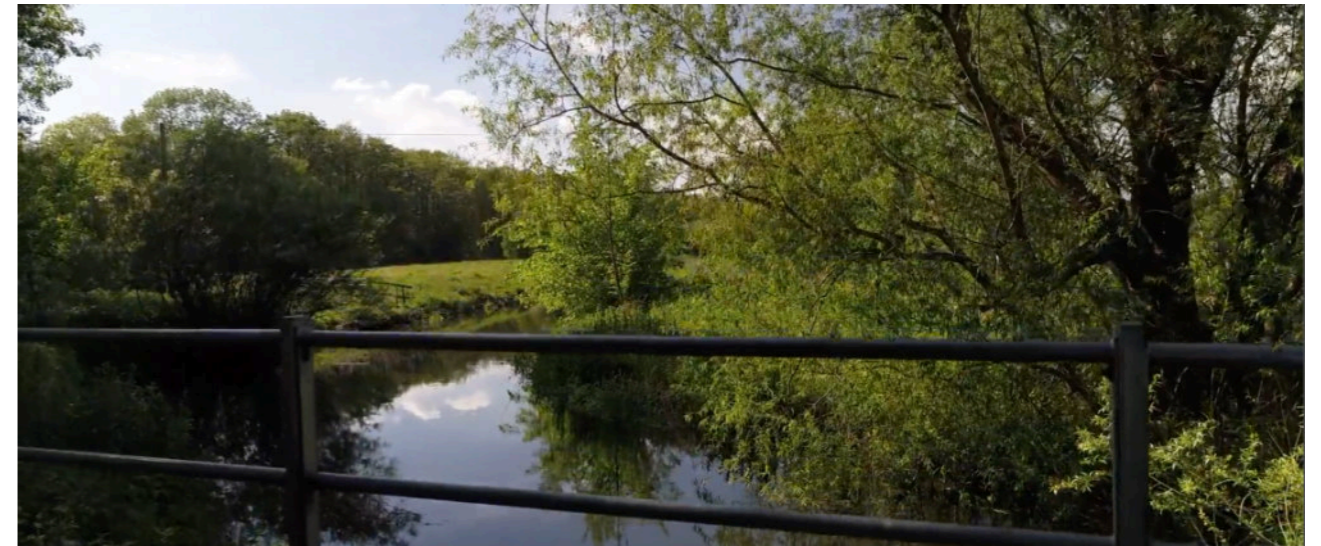
The river bed along this stretch is characteristic of over widening and dredging in the past, although there seems little evidence of dredging spoil deposits along the banks. There is, however, the usual combination of relatively firm bottom in the

This project will hopefully help to create some new spawning gravels to replace those lost by the silt pollution.

Previous experience has shown that extra stone will be required along the banks to mitigate losses due to the deeper silt and some bank reinforcement may be required to minimise erosion.

*Right: Previous experience has shown that the effects of the increased flow will be felt for a significant distance downstream. In this instance, the beneficial effects should achieve scouring as far as the bridge. This will create a whole new stretch of improved flow, connecting the new gravel to the previous restoration areas immediately below the bridge.*

*Below: Softer silt near the banks may require more stone than the middle of the channel to counteract any propensity for erosion.*



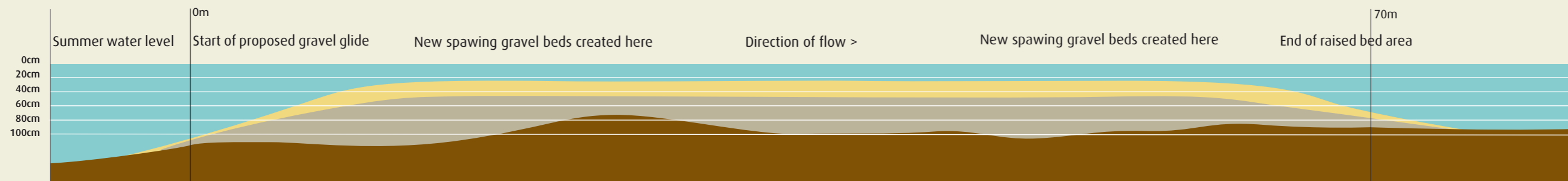
**River Wensum, Yarrow beat:** proposed improvement works to create new gravel fish spawning beds, improve flow and access to the river, as well as improve flood drainage.

**Section one : along the length of the proposed works**

The proposal is to create one gravel glide spanning the full width of the channel and a minimum of 70m long.

The stretch of river in question has been identified as one of the most suitable for bed raising as the river bed is relatively shallow.

- Mean river level measured July 2024
- Top layer of graded stone
- Bottom layer of reject stone
- Existing river bed



© Bintry Mill Trout Fishery: August 8th 2024

These diagrams are for illustration purposes only and issued as part of our ongoing river improvement programme.

centre of the channel and deeper, treacherous silt along the edges. There is also an overall coating of sandy silt which is up to 300mm deep in places. Some of this is historic, having been evident for some 30 years at least, but some is undoubtedly a result of a major breach in the river bank upstream above Bintry Mill which occurred 3 years ago.

The breach was left unattended for over two years, despite repeated pleas to the Environment Agency by BMTF and offers to fix it at our own expense. This resulted in a new channel being carved across the meadows and massive silt deposits downstream.



*Left: The final gravel/stone layer will be graded to try and achieve a variety of sizes sufficient to provide suitable spawning gravel for brown trout, chub, dace, perch and roach. Our previous bed raising project at County School has created a permanent home for large numbers of fry of all species, which has in turn attracted predators such as kingfishers, egrets, pike and larger trout and chub which will also feed on the fry.*

*Our experience is that weed growth from the banks will quickly provide new fry sanctuaries, as will woody debris where applicable.*

## Summary

We are proposing to raise the river bed with stone and gravel along a section of the river to increase flow and provide new spawning grounds for wild fish. The affected area is immediately upstream of a half mile stretch which was similarly restored 30 years ago and there has been no flooding directly associated with that work. The entire area is composed of extensive flood plain which acts as a safety valve in times of high rainfall. In our view there is no long term additional flood risk associated with this project.

We believe that there is also no real prospect of any short term flood risk associated with the works as the channel will never be blocked or diverted. The stone will be deposited into the river over a period of approximately 3 days and then slowly raked into a level bed over the course of the following week. This is the technique we employed in our bed raising project of 2023 and it is proven to keep disturbance to an absolute minimum, while maintaining the river flow and allowing free passage of all fish.

The work will not be carried out at a time of high rainfall, but will instead be scheduled for the summer of 2025 when ground conditions will be at their best.

## Protecting the banks

The section of bank in question is regularly mowed with a tractor and flail, so in high summer will be short grass where the vehicles pass. Only tracked vehicles will be used to ensure that no long term damage is caused to the bank. Bog mats will be used if necessary, but the contractors do not believe they will be needed.

The reed beds will be unaffected as stone will be passed over them to drop into the river and obviously the reeds on the opposite bank will remain untouched.

As previously stated, the flow and level of the river will not be altered by the work described here, but in any case there are no buildings or other infrastructure in the area that could be affected.

*Below: In the 1990s the Environment Agency restored the stretch of river immediately below Yarrow bridge to form the superb stretch of chalk stream it is today. Our aim is to do whatever is within our means to carry on this work. The projects at County School and above the bridge, although much less ambitious, will nevertheless significantly improve the habitat value of these stretches of water.*

*Right: The new gravel glide at County School has totally transformed that stretch of river.*

*Below: In 2023 club members reinforced the low lying bank and lowered a section of the dredging spoil bank to re-connect the river with its floodplain. Years of poaching by grazing cattle had damaged the bank, which had to be fenced and re-built in some areas.*

*Bottom: The river as it is now, just one season later. The next step is to plant some trees inside the fence for shade and bank stability.*



## Risk assessment summary

The table below illustrates our assessment of all possible risks associated with this project.

Hazard	Receptors	Pathway	Probability of exposure	Potential consequences	Severity of risk	Actions to mitigate risk
Flooding as a result of temporary works in the main channel of the river	Surrounding water meadows	Overland flow from river	The work will be carried out at a time of low water levels, so probability of risk is assessed at less than 5%	Minor temporary waterlogging of adjacent flood plain	Low to non-existent	Carry out work at a time of low water levels and complete within two weeks
Damage to adjacent river banks from contractors' vehicles.	Adjacent river bank (TRHB)	Contractors' vehicles travelling along river bank	Minor, but temporary damage will result from caterpillar tracks chewing up grass, but this will grow back within weeks.	Minor temporary damage to grass	Highly probable	Use only tracked vehicles; minimise movement by planning stone deposit sites in advance; stick to one predetermined track; repair divots by hand. Use bog mats if necessary.
Long term damage to river bank from contractors' vehicles	Adjacent river bank (TRHB)	Contractors' vehicles getting bogged down or collapsing the river bank	As all vehicles involved will be tracked and not excessively large the risk of this happening is low, assessed at less than 10%	Damage to river bank requiring repair or support	Very low	Use only tracked vehicles; minimise movement by planning stone deposit sites in advance; stick to one predetermined track; keep all vehicles well away from the river bank by marking out perimeter; carry out the work only when conditions are suitable. Use bog mats if necessary.
Impoundment or 'backing up' as a result of the works, or while work is being carried out	Adjacent river bank (TRHB) and surrounding water meadows	Overland flow from river	Can safely be assessed as almost nil	Major flooding of the immediate area	It is hard to see how this could be possible	Ensure that the channel is never blocked and rake out the gravel slowly and carefully to ensure controllable results.
Damage or disturbance to wildlife nesting sites	Adjacent river bank (TRHB)	Damage to undergrowth from vehicles	The project will be carried out at the end of the main nesting season to minimise disturbance to nesting birds, so the risk of disturbance is low, assessed at 15%	Destruction of nests or burrows	Very low as the immediate river bank is in regular use	Carry out the works at the end of the nesting season, probably July/August; ensure that the bank is regularly mowed along the projected vehicle tracks in advance; minimise spread of deposited stone; complete the works as quickly as possible.
Damage or disturbance to nearby residents, buildings or other infrastructure from flooding or vehicle movement	Yarrow House and Blackhall Farm	Overland flow from river or damage by vehicles driving along the road	Yarrow House is approximately 350 yards from the site and is situated well above the river. Blackhall Farm is about ¼ of a mile away and above the flood plain, so any flood risk is very low. Vehicle traffic will pass on the road in front of the farm but not affect the farm itself or any of the nearby cottages. We assess any risk as very low.	Flooding of property or structural damage from vehicles	It is hard to see how this could be possible. Low to non-existent	All vehicle movements will be kept to a minimum. Delivery of digger and dumper on a low loader; approximately 6 deliveries of stone; collection by low loader. Flood risk will be avoided by ensuring that the channel is not blocked.
Pollution of the river or surrounding environment due to the materials deposited in the river, machinery malfunction, or other related chemical spillage.	The river water and flow, potentially a long way downstream and the surrounding land; potential seepage into the river or associated ditches and drains.	Silt sediment resulting from materials placed into the river; machine or diesel oil from mechanical processes; additional non organic substances used as part of the process	Tried and tested materials and processes mean probability risk is very low. 0 - 2%	Poisoning of watercourses; silting of river bed	All stone used is chemically inert and a tried and tested material for such projects. There may be some slight sand or earth residue, but this is minimal and quickly dispersed. No additional chemical processes are involved; no direct contact between river and machinery.	Only natural stone of various sizes is used. If any additional bank support work is required it will be carried out using chestnut clefts, hemp based twine and bound faggots made from hazel switches. Machinery will never come closer than 5 metres to the river edge.