

# Bolham Weir

## Fish Passage Improvements

### Summary & Supporting Information Planning Application



Part of the Strategic Exe Weirs  
program





# Strategic Exe Weirs

**Westcountry Rivers Trust** is an environmental charity established in 1995 to restore, protect and improve the rivers, streams, and water environments in the region for the benefit of wildlife and people.

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## 1. Introduction

Westcountry Rivers Trust (WRT) and the River Exe and Tributaries Association (RETA) are improving migratory access for threatened and iconic fish species in the River Exe. Migratory fish in the South West hold socioeconomic value, are integral to the ecological function of local rivers, and are classed as Species of Principal Importance. Strategic Exe Weirs (SEW) is supported by the Environment Agency (EA) as contributing to national efforts to protect and restore native fish populations and proper ecological function of resident rivers. Improving migration over obstacles is a key action under DEFRA's Salmon Five Point Approach. The Government's 25 Year Environment Plan<sup>1</sup>, specifically Goal 3 'Thriving Plants and Wildlife' promotes action in the freshwater environment to recover threatened, iconic or economically important species, and to prevent human-induced extinction or loss of known threatened species in England.

The Mid Devon Local Plan 2013-2033<sup>2</sup> recognises the National Planning Policy Framework (2012) which states local planning authorities have responsibility to ensure developments protect and enhance the natural environment, help improve biodiversity and work towards mitigating and adapting to climate change. Policy S9 (f) promotes development that will support opportunities for protecting and enhancing species populations and linking habitats, while paragraph 2.56 specifically highlights the support of mitigation that work towards Water Framework Directive objectives. Paragraph 4.86 under policy DM26 recognises the long-term decline of biodiversity in the UK in part due to habitat fragmentation, which Policy DM27 highlights conservation and enhancement of biodiversity where possible in part through improved linking of habitats.

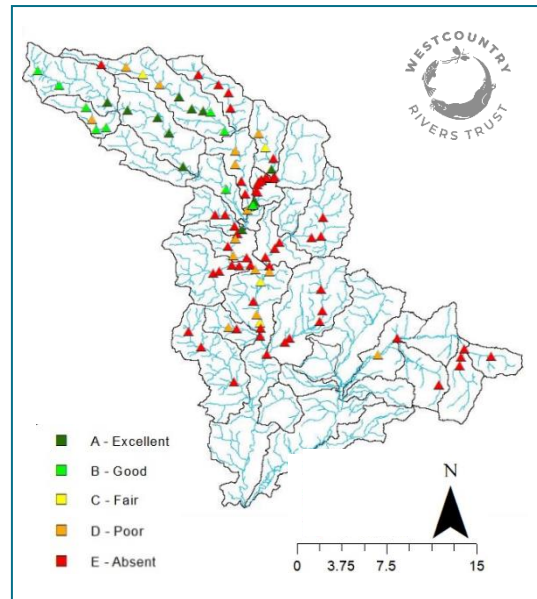
Bolham Weir was highlighted by an options appraisal and constraints assessment as a target project site for the SEW programme. This document accompanies the planning application for a technical fish pass, and a fish screen, maintenance walkway and fish chute to improve migration at Bolham Weir for native fish species to meet national environmental conservation targets.

The project is funded in 2024 by Natural England (NE) as part of the Species Recovery Programme to help reverse declining freshwater migratory fish.

## 1.1 Project Background

Migratory fish populations have declined globally by 76%, or 93% if considering Europe alone<sup>3</sup>. This is reflected in the River Exe by the EA assessment of salmon stocks as At Risk<sup>4</sup> and not currently long-term sustainable. Reasons for this decline include direct pressure on habitats, barriers to open migration, and indirect pressures from climate change such as more extreme rainfall patterns reducing migration windows.

To complete the life cycle migratory fish require access to and from multiple habitats. WRT annual Fry Index Surveys (FIS) indicate the River Barle SSSI and upper River Exe in Exmoor National Park as productive spawning habitats upholding Atlantic salmon (*Salmo salar*) recruitment in the River Exe (Figure 1). It is highly important to provide maximum opportunity for successful migration to and from this key habitat for long term survival of culturally iconic and socioeconomically important migratory fish.



**Figure 1:** WRT FIS results 2021 for Atlantic salmon in the Exe catchment, indicating Exmoor rivers as highly important for recruitment.

## 1.2 River Exe Weirs

The River Exe catchment contains multiple weirs originally built to supply water to mills. Some weirs still supply active abstraction licences, while others no longer serve an active purpose. All are acting to cumulatively reduce migratory fish travelling to and from viable recruitment habitat (Figure 2).

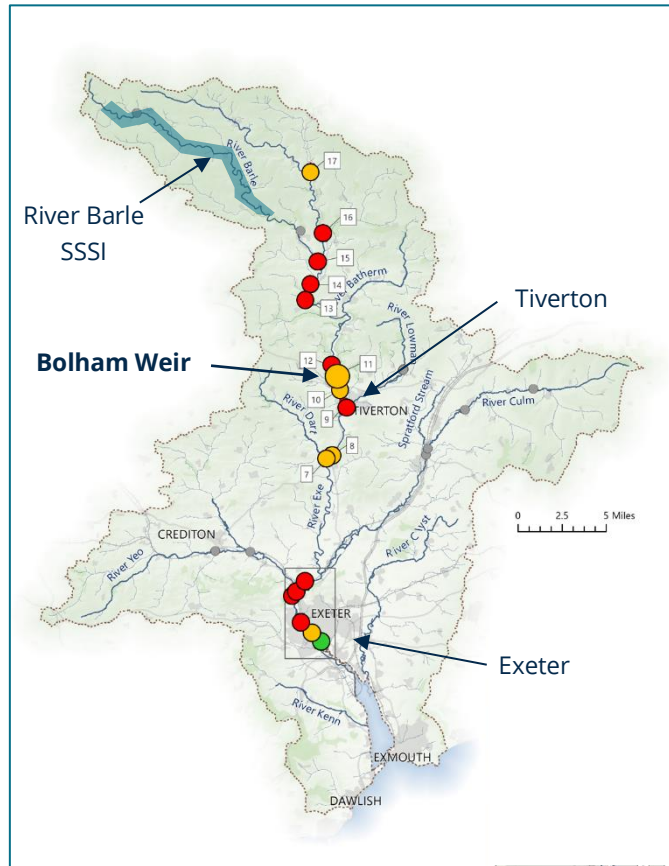
The effects of weirs on migratory fish can be complex<sup>5</sup>. Naturally the River Exe is an open water course that would permit migration in almost all flow conditions. The presence of multiple weirs notably reduces the flow window for successful migration, forcing the river to operate as a spate river for migratory fish.

This effect is particularly notable for the iconic Atlantic salmon, a capital breeder relying on reserves for the return migration from the sea to freshwater spawning grounds. The effect of weirs acting to delay migration has been specifically proven for the River Exe<sup>6</sup>.

When populations were healthy and abundant, sufficient numbers of fish successfully migrated to fully utilise available spawning habitat. Now that migratory fish populations are severely declining it is essential all viable spawning stock has open access to the highest quality habitat to maximise successful recruitment. Research has shown quantity and quality of juvenile fish is important for sustainable marine survival<sup>7,8</sup>. Therefore, alongside enabling free access to spawning areas we must also ensure every opportunity for successful migration to marine habitats.

However, climate change affected rainfall patterns, water abstraction, and land management are producing ever more extreme high and low flow events, further reducing the flow window for successful migration over weirs. This is particularly notable when multiple weirs act together for a cumulative impact. Only by addressing each weir can the flow window be suitably increased to restore natural movement of migratory fish, and work towards a sustainable future for the river.

Furthermore, restoring the natural movement of migratory fish will act to protect populations from other negative impacts, such as isolated pollution events, increasing water temperatures in lower reaches, poaching at known hotspots, and unnaturally high predation pressure. By allowing natural and wider dispersion in the catchment the impacts of such risks are much reduced on a population scale with resulting increased ecological integrity of the River Exe. For more information, please see the Strategic Exe Weirs website: <https://wrt.org.uk/strategic-exe-weirs/>



**Figure 2:** River Exe catchment highlighting barriers on the main stem of the river - Exeter to Exmoor. Strategic Exe Weirs uses a traffic light system to illustrate the severity of each weir as a migration barrier.

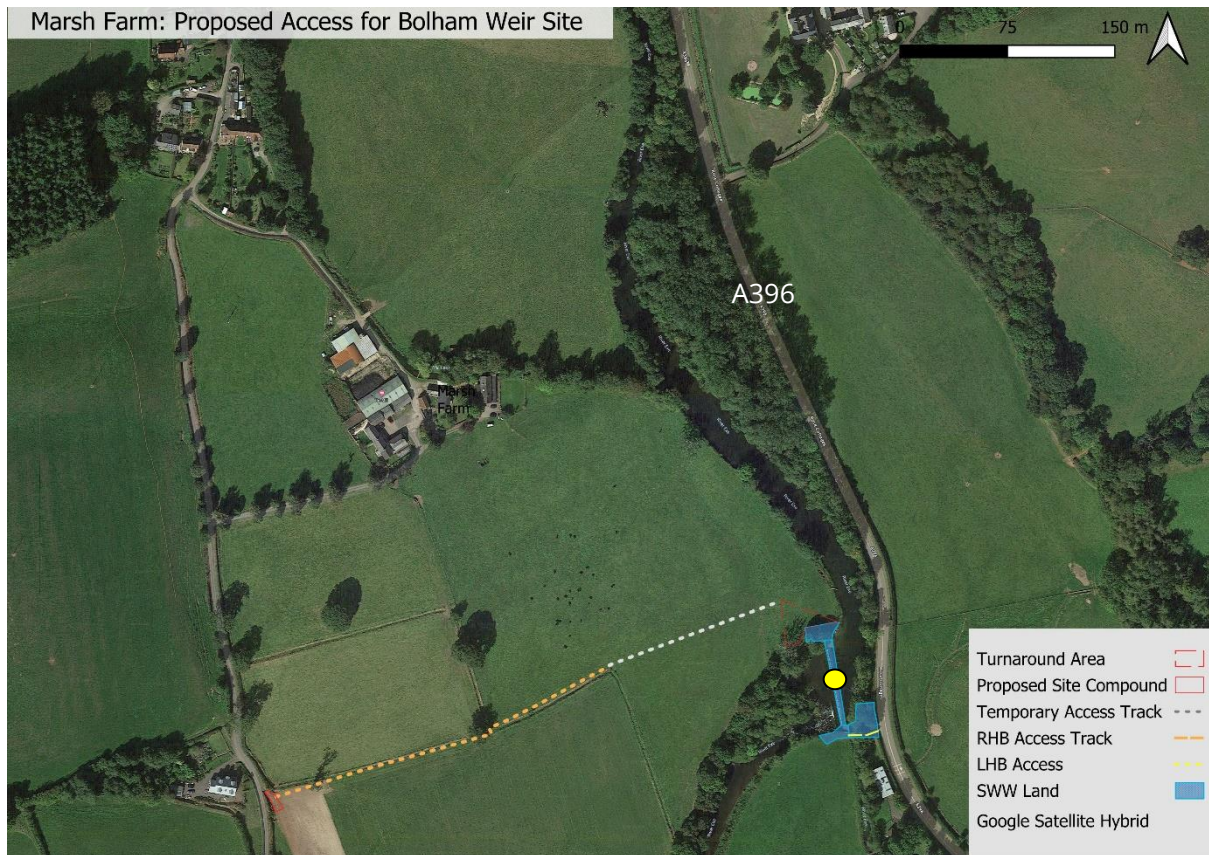
## 2. Bolham Weir

### 2.1 Site Details

|                              |   |
|------------------------------|---|
| <b>Location (OS NGR):</b>    | SS 94854 15314  |
| <b>Location Description:</b> | Adjacent to A396 northwest of Bolham village, Devon.  |
| <b>Watercourse:</b>          | River Exe (WFD WBID: GB108045015050 Exe Barle to Culm)  |
| <b>Current Site Use:</b>     | Improved pasture (RHB), Improved pasture (LHB)  |
| <b>Site Area:</b>            | <0.5ha  |
| <b>Topography:</b>           | Right hand bank: Flat floodplain access to site from Washfield road.<br>Left hand bank: Flat floodplain access to site of A396, concrete track and vertical bank to weir.                       |
| <b>Structure Type:</b>       | Single stage sloping weir, primarily modern concrete construction, with stilling basin.   |
| <b>Current Fish Passage:</b> | Temporary baulk pass on right hand side, assessed as inadequate for long term security of migration for protected species.  |
| <b>Ownership:</b>            | All construction is within the ownership of South West Water (SWW) property. WRT are leading construction phase improvements for migration and the end construction 'asset' will belong to SWW. |
| <b>Authorisation:</b>        | SWW have authorised WRT to act on behalf of SWW in all statutory permission applications including Planning Permission and Environmental Permit.  |

### 2.2 Site Access

The site can be accessed by foot from the east via direct access from the A396, or from the north via Marsh Farm and riparian floodplain field. Machinery access is via the same routes (Figure 3), although access from the east is over a width limiting agricultural bridge over the leat associated with Bolham Weir. Access to Marsh Farm is via single track lanes and may require some traffic control. Access arrangements have been made through WRT, and will be fully agreed between WRT, the appointed Contractor, and the surrounding owners. Right hand bank access will be across fields south of Marsh Farm to the riverbank through existing gateways.



**Figure 3:** Location of Bolham Weir. Yellow circle indicates NGR SS 94854 15314. Contains Google Satellite Data ©2024 CNES/Airbus. Crown copyright and database rights 2024.

The access route to the Northwest of the site will be via existing gateways through two fields annotated by the orange dashed line.

The track will be reinforced with stone to facilitate a period of higher use by construction traffic, and it will be fenced off from the farm stock.

A temporary track (grey dashed line) will be used during construction and taken up upon egress.



## 2.3 Fish Passage Assessment

### 2.3.1 Upstream Migration

Successful upstream migration over Bolham Weir by adult salmon is currently limited to unnaturally small flow windows. Limiting factors at this site include height and slope of the weir, lack of sufficient water depth on the face of the weir, and challenging hydrological conditions caused by the smooth modern construction and the stilling basin (Plate 1). Technical assessment indicated Bolham Weir is acting to impede the upstream migration of protected fish species Atlantic salmon (*Salmo salar*) and lamprey (*Lampetra fluviatilis*, *Lampetra planeri*, and *Petromyzon marinus*), species listed under annex II of the Habitats Directive 1992 and noted Priority Species of Principal Importance under S41 of NERC 2006, European eel (*Anguilla anguilla*) as protected under the Eel (England and Wales) Regulations 2009 and noted species of Principal Importance, and brown/sea trout (*Salmo trutta*) noted Priority Species of Principal Importance.



**Plate 1:** Bolham weir under different flow conditions. Left: Q45 flows revealing water depth on weir face still very shallow under prime migratory flows. Right: Q10 flows revealing strong laminar flows presenting challenging swimming conditions for all but larger more capable salmonid specimens.

### 2.3.2 Downstream Migration

The influence of Bolham Weir on river flows acts to direct downstream migrating fish towards the leat offtake. The leat has potential to add significant delays to downstream movement, and may increase risks from piscivores, infrastructure, or significantly reduced flows removing environmental stimulus to continue (Plate 2). It is strongly advised the leat entrance is screened with effective by-wash facilities to safely encourage migrating fish to continue in the main river.



**Plate 2:** The weir actively directs downstream migrating fish to the leat offtake (left) which may increase risk to downstream migrating fish. For example, easy access for wading avian predators and lack of cover (right).

### 3. Assessment Summaries

A list of supporting documents is provided in Appendix A.

#### 3.1 Abstraction Licence

**Table 1:** Details of active abstraction licences related to Bolham Weir infrastructure.

| Licence       | Type    | Water per day (m <sup>3</sup> ) | Max rate (m <sup>3</sup> sec <sup>-1</sup> ) | Conditions   |
|---------------|---------|---------------------------------|--|--|
| 14/45/02/2336 | Pump    | 2,700 - 32,000                  | 0.371  | For public supply. Where naturalised flows at Thorverton GS $\leq 3.158\text{m}^3\text{ s}^{-1}$ limited to $2,700\text{m}^3\text{ d}^{-1}$ , except for water released from Wimbleball reservoir up to $32,000\text{m}^3\text{ d}^{-1}$ . |
| 14/45/02/2342 | Surface | 7,000                           | 0.082  | To preserve the ecology of the watercourse and protected interests.  |

#### 3.2 Preliminary Ecological Appraisal

This subsection provides a summary of the report produced by Colmer Ecology in March 2024 commissioned by WRT. For the full report please refer to document '2024-08\_R\_Bolham Weir PEA Final'.

There are no statutory conservation designations directly affected by the proposed site. The Barle SSSI on Exmoor lists Atlantic salmon, brown trout, grayling (*Thymallus thymallus*) and European eel as noted species of interest, especially salmon and trout where the Barle SSSI acts as highly important spawning and nursery habitat. These species require open migration along the River Exe corridor for unimpeded access to the Barle SSSI. The current project will have a net biodiversity benefit for these species and thus for the Barle SSSI.

Fish passes contribute to Biodiversity Net Gain (BNG) on a catchment scale. The improvement in connectivity for freshwater fish species contributes to a holistic recovery of fish populations in previously harder to reach locations and reduces the fragmentation of habitat. With improved connectivity comes improved access to higher quality habitat and an increased fecundity, or chances of survival for juvenile salmonids. The actual percentage improvement will fluctuate on a site-by-site basis; but cumulatively and collectively (as per the aim of the Strategic Exe Weirs programme) the benefits will compound and increase.

Recommended actions from the Colmer Ecology report have been summarised in section 3.2.1. All rivers are Priority Habitats. The proposals will produce overall positive environmental enhancement in line with all environmental conservation measures. As a precaution to work taking place, all construction staff will undergo a site induction highlighting any environmental concerns.

Overall the ecological impact of the proposed works is considered to be positive for the river and Water Framework Directive (WFD), and likely to contribute to maintaining or improving WFD Ecological Status.

### 3.2.1 Recommended Actions

No further phase 2 surveys required for proposed works within the Bolham Weir site.

1. Cover dug trenches or provide mammal ladders and cover any piping to protect from trapping badgers, otters, hedgehogs or any other animals.
2. External lighting kept to minimum (LED <2,700 Kelvin), upward light ratio 0%, security lighting on short timers (1 minute). No permanent lighting post construction.
3. None of the trees within the site provided potential for roosting bats. Although outside the site and unlikely to be impacted, a mature ash had evidence of extensive die-back. Should this tree be impacted, a further assessment would be required.
4. Should removal of breeding bird habitat be required between 1<sup>st</sup>- September- 28<sup>th</sup> February inclusive, suitably qualified inspection is a must. If breeding birds are identified, an exclusion zone would be required and no clearance to take place until breeding has ceased.
5. Prior to any development a pre-construction otter and water vole presence/ likely absence survey must be conducted by a suitably qualified ecologist. Depending on the level of evidence found construction may need to be postponed and further licences may be needed.
6. Work in accordance with pollution prevention guidance. No fuel or potential pollutants to be stored near to water, with spill kits on site. Sediment control should be employed where appropriate, and contractors made aware of potential for pollution incidents incl. toolbox talks.
7. Contractors to be informed of invasive species risks and supplied with identification and prevention guidance. Due to the evidence of ash die-back a recommended exclusion zone should be set up around the lone standing ash with extensive die-back to prevent the accidental spread of fungal spores.
8. Tree root protection zones where appropriate must be adhered to, with appropriate signage and monitoring. Pruning/reductions to facilitate works to adhere to good silviculture practice.
9. In-river works to be performed outside of the fish breeding season. It is recommended in-river works be performed during June-September inclusive.
10. Construction access to the weir and true left bank was proposed via an existing track off the A396 and over an existing concrete bridge. Access at the true right-hand bank was proposed via tracks through Marsh Farm and across improved grassland. The temporary compound is proposed to the immediate north of the site, also on an area of improved grassland. Therefore, ground protection mats or suitable tracks should be installed to protect ground flora and prevent compaction.
11. As an additional ecological enhancement, a total of two bird boxes are to be fitted on retained boundary trees. Bird boxes to compromise either open fronted and/or traditional hole entrance boxes can be supplied ready-made or created from off-cuts from the proposed development (where possible).

12. If post development planting/landscaping was proposed, this shall be of native species and locally sourced, aiming to incorporate a varied vegetation structure. An ecologist should review and planting proposal in order to suggest a species of known ecological gain. Any trees removed will be replaced on a like- for-like basis within, or adjacent to the site.

### **3.2.2 Biodiversity Net Gain**

#### **Consideration for exemption**

Westcountry Rivers Trust (WRT) is a conservation charity that focuses on improving the natural environment by the very nature of its existence.

WRT deliver conservation projects across Devon and the south west on a catchment scale. All of the Trust's projects aim to enhance all habitat, and in particular improve rivers through better habitat, and improved water quality & quantity. This encompasses surrounding terrestrial habitat, improving habitat quality and diversity, being restored and improved to provide greater ecosystem function and benefit. Some of the conservation activities undertaken by WRT require planning permission, and as such we are required to consider Biodiversity Net Gain implications and requirements.

WRT are improving the Exe catchment by facilitating better and more natural timings for freshwater species migration through the Strategic Exe Weirs project. Biodiversity net gain (BNG) is a way of creating and improving natural habitats. BNG makes sure development has a measurably positive impact ('net gain') on biodiversity, compared to what was there before development. However, some aspects of net gain, such as the catchment scale, and the positive effects on obligate migratory species cannot be measured through the formal calculator or metric.

The Strategic Exe Weirs current activity is funded by Natural England's Species Recovery Programme on the merits of positive impact to species and biodiversity.

As WRT are submitting a planning application in respect of the proposed works, WRT are considered a developer. Developers must deliver a BNG of 10%. This means a development will result in more or better quality natural habitat than there was before development.

Our proposed works does not fall into the category of major developments as defined by Town and Country Planning (Development Management Procedure) (England) Order 2015, and as our proposal is less than an area of 1 hectare, the project falls into the small sites development class, and BNG does not apply until April 2024.

## **3.3 Water Framework Directive Assessment**

This subsection is a summary of a WFD assessment performed as part of the Environmental Permit application. The proposed works on the River Exe (Barle to Culm) are considered to be compliant with WFD objectives for the water body.

### **3.3.1 Ecology**

The River Exe (Barle to Culm) is currently at Moderate ecological status with a status objective of Good by 2027. The reasons stated for extending the deadline from 2015 is Disproportionate

burdens, reflecting the complex and diffuse nature of negative impacts within the catchment. The River Basin Management Plan (RBMP) for the South West region has identified river restoration as a measure for achieving good ecological status.

Though ecological category 'Fish' is not assessed for the Exe (Barle to Culm) WFD waterbody, the waterbody acts as the corridor towards the highly important spawning and recruitment habitat for protected migratory fish species and Priority Species of Principal Importance within upstream waterbodies. Therefore, the proposed fish passage improvement project aims to help achieving and/or retain the Good Ecological Status for Fish in connected WFD waterbodies, and work towards attaining Good Ecological Status for the Exe catchment holistically.

There is no expected change to overall ecological function of the immediate local river channel. The benefits of improving access to high quality spawning, recruitment habitat, and protected areas for migratory fish will give a net improvement and prevent deterioration to ecological status of this WFD waterbody.

### **3.3.2 Hydrology & Geology**

The WBID is not designated artificial or heavily modified. The current status for both Hydrological Regime and Morphology is 'Supports Good'. Consultation with the EA geomorphological advisor confirmed that the proposals will not have negative impact on the geological function of the River Exe. The Flood Risk Assessment (see section 3.7) has confirmed that the hydrology of the site will not be significantly affected by the proposals. The hydrology will be slightly modified as part of this work. The position of the fish pass through the RHB will redirect flows through the pass to ensure function of the fish pass. The 'Hands Off Flow' will be agreed by a Transfer Licence (pending). The changes in local flow patterns will enable more effective attraction towards the fish pass outlet for target fish species. A minor reduction in river flows over the weir crest will result. This may have minor impact on transport patterns of sediments but will not reduce movement overall.

Influence on the flows will be very localised only and will have no negative impact on the hydrological or geological function of the site and surrounding channel.

### **3.3.3 Chemical**

To ensure compliance with environmental regulations, civil-engineering construction works will be performed in dry-working areas to minimise the risk of contaminants making contact with the water course. All materials will be fully cured (e.g. concrete and any appropriate adhesives) before dry-working area is dismantled. There will be no change to the chemical status of the waterbody as a result of these works.

### **3.3.4 Short term impacts**

There are short-term implications from a delivery aspect for this project. The construction of a fish pass requires work to take place in the river and for the use of concrete.

Potential and control methods for short term impacts have been assessed as part of the Environmental Risk Assessment (ERA) produced for the Environmental Permit application.

The appointed Contractor will adhere to the ERA and supply a Method Statement to avoid pollution of the watercourse during works, directed by the designer's Construction Sequence. The river will be bunded and construction to take place in the dry to ensure no direct pollution pathway to the water, including fish rescue if required. All works will take place in accordance with the pollution prevention guidelines.

### 3.4 Tree Protection Orders & Conservation Areas

The works proposed at Bolham weir are not within a conservation area, or subject to restrictions caused by Tree Protection Orders (TPOs).

Root Protection Areas (RPA) have been identified as appropriate to the planned operations. The right-hand bank (northern) presents with small RPAs for trees planned to be retained. The left-hand bank (southern) doesn't have any RPAs as all trees within proximity to the working area are separated from the works area by river channel. Routes are possible for the appropriate machinery and vehicles for the proposed construction.

Low pressure machinery with wide tracks is to be used where practicable. Details of recognised RPAs are supplied in Appendix B.

Four small trees are earmarked for removal to facilitate construction and these will be replaced with like-for-like species planting to compensate the removal. With surrounding landowner cooperation, more trees will be planted to provide further enhancement.

### 3.5 Archaeology: Heritage Impact Assessment

Consultation with the Devon County Archaeologist confirmed that Bolham Weir holds low archaeological interest, due to modern construction of the weir. A Heritage Impact Assessment is not required for this site, but a Written Scheme of Investigation is produced to mitigate any archaeological interest. The details of correspondence have been supplied in Appendix C.

Site operations will be subject to a written scheme of investigation and resulting watching brief for activities deemed at potential risk of disturbing heritage assets.

Noted Historic Environment Record (HER) features on or near to site include:

MDV126935: Stone built weir at the head of Bolham Leat. Depicted on 19th Century mapping.

MDV1355: Leat depicted on 19th Century mapping. Not protected

MDV62897: Hydro-Electric power plant at Bolham to supply Knightshayes Court.

The latter two features, MDV1355 + MDV62897, are downstream of the site and will be considered while working at the head of the leat.

### 3.6 Services/Utilities Enquiries

Preliminary service and utilities enquiries were performed by WRT in October 2019 to feed into feasibility studies and constraints assessment. Secondary services and utilities plant enquiries were performed by the awarded design contractor during the 2021-22 detailed design phase for this project. Notable findings include:

1. BT has underground services following the main A396, east of the weir which may require consideration for heavy machinery access.
2. Western Power Distribution have overhead powerlines feeding Marsh Farm that may require consideration for site access.
3. Southwest Water have an untreated main under the left hand bank upstream of the weir and partway down the leat, which may require consideration for machinery access.

It will be the appointed construction contractor's responsibility to ensure safe access and egress for personnel, vehicles and machinery for the site during construction works.

### 3.6.1 Recommended Actions

1. It is the responsibility of the appointed contractor to ensure safe access, egress and construction according to results of the services and utilities plant enquiries.
2. Dynamic site assessment, for example with the use of CAT scanning equipment, before and during ground works is recommended for all construction activities.

## 3.7 Flood Risk Assessment

This subsection provides a summary of the flood risk assessment (FRA) produced by FishTek Consulting in May 2021 for their own design, commissioned by WRT. For full details, please refer to the full FRA report. In conclusion, the FRA considers the impact on flood risk as negligible.

The project proposes no alteration to flows at Bolham weir. The fish pass will be installed within a field adjacent to the weir effectively "by-passing" the weir. The proposed Smolt Chute be excavated into the left hand extent of the structure and will not alter water surface elevation or flows upstream and downstream of Bolham weir. Neither of the proposed elements will have notable impact on upstream water levels.

All designs have been produced according to the existing Abstraction Licence, and therefore there will be no significant change to upstream water levels across the flow range. The abstraction licence is legally protected and therefore all works will allow continued performance of the abstraction licence. Downstream water levels will also not change as there will be no notable change to existing flow quantities or rates.

The spate nature of the upper River Exe highlights the need for a suitably robust revetment on the right-hand bank to protect the planned excavation from erosion post-construction. This has been suitably designed according to the expected flows and will become more robust over time as vegetation colonises to increase surface roughness and reduce water entry.

It is possible for organic debris to obstruct the fish pass channel or leat entrance. This situation already exists presently where clearance of debris falls within the remit of riparian owners. On completion of the proposed construction this remit will remain with the riparian owners. The proposed angled screen and maintenance walkway at the leat will reduce risk of blockage of the leat and will make the clearing task easier and safer in the future.

## 3.8 Permissions, Permits & Licences

### 3.8.1 Stakeholder Permissions

WRT is an environmental charity working primarily in partnership with governing bodies, local authorities, other NGOs, and private landowners to deliver beneficial projects. As a charity WRT requires relevant permissions from all local stakeholders, including but not limited to riparian owners, tenants and land managers, fishing rights owners, and other vested interests, to deliver projects on land and in rivers not owned by the Trust.

Construction projects developed and managed by WRT are delivered on the basis that ownership will revert to the original pre-construction ownership and maintenance liability arrangements post-construction.

Stakeholders involved in the current project are detailed in Table 2. It is required for all relevant stakeholders to be fully briefed from project site conception and feasibility stage and involved throughout the project development. All appropriate stakeholders have been guided through the following process:

1. Project introduction and verbal consent gained to perform feasibility investigations, including all necessary preliminary surveys to produce a detailed options and constraints document.
2. A signed pre-design agreement to enable access for production of detailed designs, and performance of all necessary investigations to bring project to 'construction ready' status.
3. Regular consultation to produce acceptable designs for fish passage improvements.

**Table 2:** *Relevant stakeholders for the Bolham Weir fish passage improvement project being delivered under Strategic Exe Weirs programme.*

| Area                                      | Owner Details    | Agreement/s   |
|---|------------------|---|
| Weir owner                                | South West Water | Partnership Project Agreement; Permission to act as Agent for SWW.                      |
| Riparian owner, RHB                       | South West Water | Partnership Project Agreement; Permission to act as Agent for SWW.                      |
| Riparian access, RHB                      | Marsh Farm       | Access agreement with Land Agent.   |
| Riparian owner, LHB                       | South West Water | Access via SWW land   |
| Fishing rights owner, LHB (access rights) | Identified       | No formal agreement required as no impact. All stakeholders contacted and agreed works. |
| Fishing rights owner, RHB (access rights) | Identified       | No formal agreement required as no impact. All stakeholders contacted and agreed works. |

### 3.8.2 Natural England



The proposed project will impact on fish species migrating to the River Barle SSSI, including noted species of interest. This will be a positive impact on species locally and area wide. No further consultation is required with Natural England, although they are kept informed of the project as a part-funder of the environmental improvement.

### **3.8.3 Planning Permission**

Bolham Weir is within Mid Devon and is therefore subject to the local planning authority Mid Devon District Council (MDDC). Correspondence with the MDDC planning department confirmed that the proposed project is subject to a Full Planning Permission application.

This document has been produced as supporting information for the planning application.

### **3.8.4 National Fish Pass Panel**

Members of the National Fish Pass Panel (NFPP) have been involved in the concept design for this project. A site visit was held between NFPP members, the local EA Fisheries Technical Specialist, and the project officer on 9<sup>th</sup> October 2019. Improving fish passage with a technical super-active baffle fish pass of the Larinier fishway design was recommended as the most suitable solution against the apparent site constraints.

Outline designs were developed with consultation from the NFPP. Subsequent designs have received NFPP approval for local area officer assessment and final approval. The EA Fisheries Technical Specialist has been involved with the project since conception to ensure best practice.

### **3.8.5 Environmental Permit**

Bolham Weir is located within a watercourse designated as a Main River, and therefore under the jurisdiction of the Environment Agency Environmental Permit system.

A bespoke environmental permit is being submitted to the local Environment Agency office.

### **3.8.6 Transfer Licence**

A pre-application advice process was sought for the Environmental Permit with local EA officers. It was advised by the local Water Resources Officer that a full abstraction transfer licence would be required.

This project is regarded by WRT as applicable for an abstraction transfer licence. The proposed fish pass will not significantly alter the flows in the local area or significantly impact the water level upstream of the structure.

The existing abstraction licence limits any change to upstream water levels. The designs for this proposal have been produced according to the abstraction licence and will not notably affect upstream or downstream water levels. See results from the Flood Risk Assessment.

## **3.9 Pre-Planning Advice**

### **3.9.1 Archaeology**

It was established that Bolham Weir is of low archaeological interest, and a Heritage Impact Assessment was not required. The upstream of the two weirs has been replaced/overbuilt with a modern concrete structure. The downstream of the two weirs is fully reached at the left-hand side and the channel is slowly re-naturalising.

A Written scheme of investigation (WSI) was advised to direct any on-site watching brief during relevant construction activity.

### 3.9.2 Landscape

It was suggested that local stone of appropriate size be used for construction of revetments and 'riprap' extension of the weir toe at the northern end. Local stone is available from local quarries that will enable effective blending of the new construction to existing landscape, which will be specified to prospective contractors during the competitive construction tender process.

### 3.9.3 Trees

The supporting information from the design contractor mentioned removal of four trees to provide a clear area of ground for fish pass installation, however, proposed works at Bolham Weir are not within a conservation area, or subject to restrictions caused by TPOs. No further action necessary. Tree canopy downstream of the fish pass will be maintained to provide shading in the proposed holding pool.

WRT will work with neighbouring landowners to plant whips of native species to replace removed trees, as part of project finalisation and biodiversity gain during site demobilisation.

## 3.10 Non-applicable Assessments

The assessments detailed in Table 3, as specified in the Mandatory Documents list on the Planning Portal Supporting Documents section, are deemed non-applicable to the current proposals.

**Table 3:** Assessments listed as Mandatory Documents on the Planning Portal not applicable to the current proposal.

| Document                    | Reasons for not including  |
|-----------------------------|--|
| Foul Sewage Assessment      | The proposals do not contain any element of Foul Sewage, and therefore no such assessments have been performed.  |
| Lighting Assessment         | The proposals do not contain any element of external lighting installation, or any lighting post-construction.   |
| SuDS Supporting Information | The proposal does not include drainage elements, including surface or ground water, and therefore creation or connection to SuDS do not require consideration.   |
| Sustainability Appraisal    | A detailed sustainability appraisal has not been performed over and above the ecological assessments under WFD assessment, and the preliminary ecological appraisal. The proposals will have NET benefit for Priority Species and Priority Habitats.<br><br>It is not believed by WRT that further consideration is applicable for the proposed project. |

## 4. Project Proposal

The fish passage assessment concluded that improvements are required to maximise successful migration for native fish species both upstream and downstream over Bolham Weir.

To achieve the desired goals of the Strategic Exe Weirs programme at the site Bolham Weir in accordance with the results of the Options and Constraints Assessment, it was decided by the project team to commission the design of a technical super-active baffle fish pass of the Larinier fishway design to improve upstream migration, with accompanying screening of the leat entrance and smolt chute to improve downstream migration, for native migratory fish.

For further details on the proposed project, please refer to accompanying design drawings in the supporting documents:

| Drawing   | Description   |
|-----------|---|
| 02925-300 | Site Location Plan (1: 1250 @ A1)                               |
| 02925-201 | Site Plan of fish pass - Larinier super-active baffle fish way. |
| 02925-202 | Fish Pass- Plans & Sections - Sheet 1 of 2                      |
| 02925-203 | Fish Pass- Plans & Sections - Sheet 2 of 2                      |
| 02925_301 | Site Plan of Smolt Screen & Smolt Notch                         |
| 02925_302 | Smolt Screen & Smolt Notch- Plans and Sections                  |

### 4.1 Larinier Fishway and Eel Pass

The proposals include locating a single flight 1830mm wide aluminium Larinier fishway (twin 900mm units) of approximately 7.5m in length with 150mm baffles located at the true right-hand extent. The fishway will be accompanied by an eel pass constructed from propriety Berry & Escot eel-tiles. This option was selected to minimise impacts on the weir structure, as the weir and leat feeds two amenity abstraction licences (see section 202-Fish/Eel Pass- Plan) The right-hand bank is to be regraded and reprofiled to accommodate the fishpass and a 900mm wide concrete maintenance walkway an existing concrete baulk exists at the right-hand side of the weir; this will need to be removed and profiled back to the weir glacis to promote a natural look at the site any stone used will be locally sourced, additionally, any ground or concrete works will be graded to blend with the existing structures and bankside. Biofouling and re-seeding will further help in the blending of the proposed structures into the local environment.

To accommodate the housing of Larinier fishway into the bankside without increasing erosion risk, and to maximise attraction efficiency a stilling basin is to be constructed at the downstream extent of the fishpass the downstream section of this is to be constructed with recycled concrete sleepers and reinforced with locally sourced riprap. A full depth notch (3200mm wide) is to be constructed at the downstream extent of the proposed basin through the weir apron. A second notch (1100mm wide) is to be constructed, on the weir apron, from sleepers this will be perpendicular to the weir structure and will create attraction flows towards the fish pass structure.

The proposed eel pass will run adjacent to the fishway, the surface will be roughed with Berry & Escott eel tiles, the installation of these tiles will extend out of the eel pass and into the downstream extent of the eel pass. This will aim to increase heterogeneity and dissipate flows allowing eels and smaller fish to navigate upstream.

Some minor tree removal will be necessary for safe site access and to enable the installation. These trees will be replaced with native tree whips in accordance with best practice and environmental Considerations.

## 4.2 Smolt Chute, Leat Screen and Walkway

The proposals include locating downstream migratory improvements including a smolt chute, smolt notch and seasonal leat screening infrastructure at the true left-hand extent (downstream end) of Bolham Weir. A smolt chute and notch that are to be installed into the exposed concrete weir this will be positioned adjacent to the existing leat penstock to ensure adequate attraction flows downstream. The chute will be constructed from recycled plastic sleepers, the notch feeding the smolt chute is to be constructed with mass concrete. Located downstream of the Smolt chute outlet will be a sill notch excavated into the concrete weir apron, this will aim to safely direct fish migrating downstream to the main river channel.

To guide downstream migrating fish away from the leat entrance and towards the chute, infrastructure will be installed to allow the safe installation of a seasonal mesh screen of 10mm aperture across the abstraction leat entrance. This is to avoid protected species from entering the leat where high risk of damage exists at Bolham Pumping station and associated spillways. The screen will be placed at an angle to reduce debris accumulation. Behind the screen will be an aluminium walkway, with safety rail and gated entrance, to enable safe installation, maintenance, and removal of the seasonal screen. The screen is expected to be in situ during mid-April to mid-June, the peak time for the Atlantic salmon smolt migration.



*Plate 4: Details of channel leading to leat inlet and channel immediately upstream of leat inlet. Abundant cover may attract eels towards the leat inlet. Location at the downstream end may attract downstream migrating fish.*

## References

- [1] HM Government (2018). *A green future: Our 25 year plan to improve the environment*. DEFRA: London
- [2] *Mid Devon Local Plan 2013-2033. Adopted July 2020*
- [3] Deinet, S. Scott-Gatty, K., Rotton, H., Twardek, W.M., Marconi, V., McRae, L., Baumgartner, L.J., Brink, K., Claussen, J.E., Cooke, S.J., Darwall, W., Eriksson, B.K., Garcia de Leaniz, C., Hogan, Z., Royte, J., Silva, L.G.M., Thieme M.L., Tickner, D., Waldman, J., Wannigan, H., Weyl, O.L.F. and Berkhuisen, A. (2020). The living planet index (LPI) for migratory freshwater fish - technical report. World fish migration foundation, The Netherlands.
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- [6] Solomon, D.J., Sambrook, H.T. and Broad, K.J. (1999). Salmon migration and river flow: Results of tracking radio tagged salmon in six different rivers in south west England. Environment Agency R&D Publication 4. Bristol
- [7] Russell, I.C., Aprahamian, M.W., Barry, J., Davidson, I.C. Fiske, P., Ibbotson, A.T., Kennedy, R.J., Maclean, J.C., Moore, A., Otero, J., Potter, E.C.E and Todd, C.D. (2012). The influence of the freshwater environment and the biological characteristics of Atlantic salmon smolts on their subsequent marine survival. *ICES Journal of marine science*. **69**: 1563-1573
- [8] Gregory, S.D., Ibbotson, A.T., Riley, W.D., Nevoux, M., Lauridsen, R.B., Russell, I.C., Britton J.R., Gillingham, P.K., Simmons, O.M. and Rivot, E. (2019) Atlantic salmon return rate increases with smolt length. *ICES journal of marine science*. **76(6)**: 1702-1712

## Appendix A: Supporting Documents

| <b>Nº</b> | <b>Document</b>                          | <b>Produced By:</b>                              |
|-----------|--|--|
| 1         | Summary & Supporting Information         | Westcountry Rivers Trust                         |
| 2         | Design Drawings                          | FishTek Consulting                               |
| 3         | Flood Risk Assessment                    | FishTek Consulting                               |
| 4         | Fish Passability Assessment 2017         | FishTek Consulting<br>(Summarised by WRT)        |
| 5         | Preliminary Ecological Appraisal         | Colmer Ecology                                   |
| 6         | Heritage Written Scheme of Investigation | South West Archaeology                           |
| 7         | Bolham Weir Photographs                  | Westcountry Rivers Trust                         |
| 8         | Bolham Root Protection Areas             | Westcountry Rivers Trust                         |
| 9         | MDCC Pre-application Advice              | Mid-Devon District Council<br>Planning Authority |

## Appendix B: Root Protection Areas

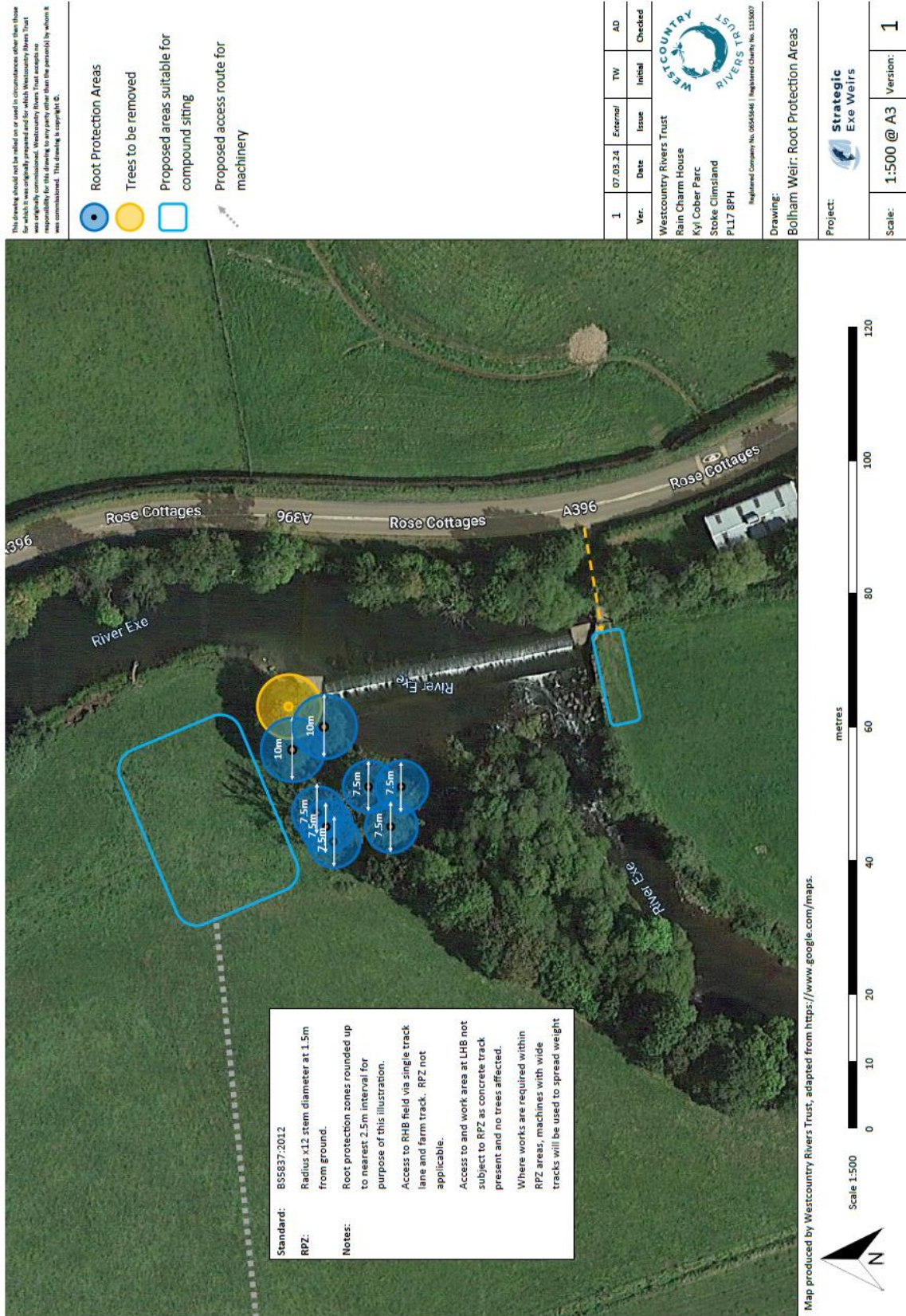


Figure A: Root protection areas for the true right hand bank:



## Appendix C: Correspondence with Devon County Archaeologist

**From:** Bill Horner

**Sent:** 27 August 2021 11:03

**To:** Phil Turnbull

**Subject:** RE: WRT: Bolham & Bickleigh Bridge Weirs

"Dear Phil,

Thanks for sending through the plans.

Bolham Weir is a heritage asset. I don't think that a heritage impact assessment will be needed, but I would recommend a programme of archaeological monitoring and recording of the groundworks for the fish pass. A written Scheme of Investigation for this should be submitted with any planning application, or it can be secured as a planning condition."

(End of correspondence)