Introduction to the project, project timeline and why a fish pass is required

INTRODUCTION

Welcome to the public engagement event for Dowies Mill Weir Fish Pass. The purpose of this event is to update you on the development of the fish pass design. This will help us take everything into account and ensure public opinion is taken on board in the development of the fish pass.

PURPOSE OF THIS ENGAGEMENT

- Present the work done to date to consider options
- Provide information on the fish pass design process
- Present the proposed rock ramp option
- Explain the next steps for this project

PROJECT BACKGROUND

The design of a fish pass at Dowies Mill Weir has evolved throughout several studies, going back at least as far as 2010 as shown in the timeline below. In 2017, engineering consultant JBA developed a weir removal option, which involved replacing the weir and pool of water upstream with a naturalised channel. Subsequent public engagements in 2019 indicated that there were objections to weir removal from the local community.

In response to the feedback from the local community, the City of Edinburgh Council (CEC) commissioned engineering consultant AECOM to look into alternative options. The outcome of the most recent report in 2021 was that a rock ramp would be the next best option from a fish passage perspective. Compared to removing the weir, a rock ramp would compromise on fish passage. However key benefits of the rock ramp are that it maintains the historical weir structure and the character of the slow-flowing water upstream.



PROJECT TIMELINE



Conception and Cost Benefit 2011

- High-level review of fish passage options at 25 structures along the river by engineering consultant Atkins.
- Range of options considered at Dowies Mill Weir.
- Initial recommended solution was a technical fish pass, subject to further assessment.



Options Appraisal 2011-2015

- Next stage of the project by Atkins.
- Options appraisal based on investigations, land surveys and flood assessments carried out following the previous stage.
- Preferred option for Dowies Mill Weir was removal of the weir, as the poor condition of the weir presents a significant risk to any engineering works.
- Alternative option was a low cost easement that would need to be monitored to see if it would work.



Detailed Design of Weir Removal Option 2017

- The City of Edinburgh Council decided to progress the design of weir removal as this would be the most effective option for fish passage and remove the liability associated with keeping the deteriorating weir structure.
- Engineering consultant JBA carried out the design, which included removing the weir and creating a series of pools and rapids in place of the Mill Pond.



WHY IS A FISH PASS REQUIRED?

Dowies Mill Weir was constructed in the 1600s to impound water for Dowies Mill. The mill has long since been demolished but the weir has remained. There is an existing fish pass on the eastern riverbank built into the weir structure however this is not working well for fish passage because of the large steps in the water and turbulent flow.

The Scottish Environment Protection Agency (SEPA) has identified that the barrier presents an obstacle to fish migration and impacts on both the habitat connectivity and natural movement of materials such as gravels in the river.

In turn, these pressures contribute to the poor Water Framework Directive (WFD) status assigned to the Almond. Improving fish passage at Dowies Mill Weir will therefore have environmental benefits and help improve the status of the River Almond.

Imagery ©2021 Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The Geoinformation Group, Map data ©2021 **Aerial View of Dowies Mill Weir**



Structural Inspection of Weir 2018

- The City of Edinburgh Council wanted to better understand liability associated with keeping the weir in place.
- Structural engineers from AECOM carried out an inspection of the weir and listed the repairs that would be required to improve the condition of the weir.
- The inspection showed areas of the weir that were in very poor condition.



Stakeholder Events for Dowies Mill 2019

- The City of Edinburgh Council held an exhibition and gathered feedback on the proposed weir removal option.
- 63% of people who provided a response did not support the removal of the weir. Concerns raised include heritage, visual impacts and flood risk.
- Separately, feedback was received from COLAB. COLAB represent local community groups and they asked the City of Edinburgh Council to consider the low cost easement option the work by Atkins in 2015.



Low Cost Easement Appraisals 2020

 The City of Edinburgh Council asked AECOM to develop and assess the feasibility of low cost easement options.

- AECOM's report concluded that easement options would be unlikely to create good fish passage benefits.
- The report suggested that there could be other options that would be much better for fish passage than the easement options. It was recommended that a new options appraisal was carried out.

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Existing Fish Pass at Dowies Mill Weir



Appraisal of Alternative Options 2021

- The City of Edinburgh Council asked AECŎM to look into options that would allow the weir to be retained but still provide good fish passage benefits.
- The outcome of this study was that a rock ramp would be the next best option for fish passage after weir removal.
- Other options considered included a bypass channel, partial rock ramp, larinier baffle pass, technical pool pass, and alterations to the weir.



Rock Ramp Outline Design 2021

- The City of Edinburgh Council asked AECOM to develop the rock ramp option so that it could be put forward to the local community and key stakeholders.
- AECOM has completed outline designs and that is what you will see on these information boards.
- The design work included designing for fish passage while considering flood risk, planning policy requirements, ecology, heritage, impacts on riverbank stability and the stability of the weir.

DOWIES MILL WEIR FISH PASS – PROJECT BACKGROUND Wider project background, other sites and insight



LIMEFIELD WEIR TECHNICAL PASS



BEFORE







BEFORE

AFTER







WIDER PROJECT BACKGROUND

The Almond Barriers Project is a catchment-scale fish passage restoration project and is a partnership between SEPA, the City of Edinburgh Council, and West Lothian Council.

- A number of historical weirs are present along the main stem of River Almond. These originate back to the industrial heritage of the area but most, if not all, are no longer serving their original function. The weirs prevent fish from migrating up to their natural spawning grounds. This limits the ecology in the river.
- Seven key barriers were identified by SEPA for improving fish passage, one of which is Dowies Mill Weir. Works have now been carried out at six of the weirs, so Dowies Mill Weir is the last one that needs to be addressed. In addition to these seven barriers, Seafield Weir is an example of weir removal that was undertaken by Forth Rivers Trust.
- The aim of the wider project is to open up more than 200 km of quality habitat for migratory fish. Without addressing fish passage at Dowies Mill Weir, the benefits of the works upstream would be limited.
- Dowies Mill Weir is located in the lower reaches of the catchment and is one of the closest barriers to the outfall of the River Almond into the Firth of Forth Estuary identified by SEPA. Therefore, if this barrier is removed, this opens up connectivity to the wider River Almond catchment upstream.

INSIGHTS FROM THE OTHER RIVER ALMOND FISH PASSES

Fair-a-Far: Highlighted how challenging it can be to work in the River Almond. The River Almond walkway was kept open through the works, maximising public access. The aim would be to ensure public access is maintained during works at Dowies Mill Weir. The rock ramp designers are considering how they can make the construction as easy as possible for the contractor to minimise the amount of time they need to spend in the river. Mid Calder: Challenging access to site via a wastewater treatment works was well managed by considering the needs and working with Veolia, the company that operates the site. Collaboration with other local stakeholders was also important. Works at Dowies Mill Weir will need to be carried out in consideration of the needs of local landowners and residents. Rugby Club: This was a natural solution that vegetated well. All material excavated on the site was ultimately reused in the construction of the channel, with no material needing to be removed from the site. The aim would be to do the same for Dowies Mill Weir to maximise the sustainability of the works.

Howden: The areas of the Howden rock ramp where diversity of flow has been created have naturalised well - this is the approach that would be applied to the proposed rock ramp at Dowies Mill Weir as much as possible to allow natural functioning.

Kirkton: Simplifying the design of the fish pass and making use of off-site fabrication minimised the time the contractor had to spend in the river and the challenges of working in the river were successfully managed.

Limefield: Improving public access has improved the interaction between the public with the river, highlighting the heritage and ecology of the site. Dowies Mill Weir is an area of significant amenity value with important heritage features. There may be opportunities to improve public access to the river.

HOWDEN WEIR ROCK RAMP



BEFORE

RUGBY CLUB WEIR BYPASS CHANNEL



AFTER

BEFORE

DURING

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DOWIES MILL WEIR FISH PASS – THE PROPOSAL

The rock ramp proposal at Dowies Mill Weir and key outline design elements

WHAT IS A ROCK RAMP?

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A rock ramp is a rocky slope constructed on the downstream side of an existing weir, forming a semi-natural riverbed. This is the same design approach as the rock ramp constructed at Howden. A rock ramp addresses the local desire to retain the character of the river upstream of the weir, whilst providing an effective and natural solution for fish passage. The rock ramp is estimated to have a construction cost of £1.3 million.

BENEFITS OF A ROCK RAMP

- Multi-Species Variability: A rock ramp would not be as effective as weir removal but all species have a chance to use the pass because it's like a natural river bed. Other passes tend to focus on salmon and trout while the rock ramp allows all species to move around. The rock ramp is designed to have a variety of flow rates across the ramp allowing species to select the best route for them.
- Mill Pond Retained: The rock ramp is located downstream of the weir, meaning that the Mill Pond impoundment is retained upstream below Cramond Brig. The view created by this impoundment is highly valued by the public and the rock ramp will not change this.
- Weir Stability: Large parts of Dowies Mill Weir are in very poor condition. If Dowies Mill Weir were to fail, this could potentially put the upstream riverbanks, gas main and Cramond Brig at risk of erosion and damage. Rock ramps can support weirs preventing them from failing and washing downstream. The construction of a rock ramp at Dowies Mill Weir would involve filling the voids and overhanging areas, and the presence of a large amount of rock downstream would reduce the risk of further damage to the weir. The construction of a rock ramp would therefore provide significant benefits to the weir and reduce the ongoing liability held by the City of Edinburgh Council.
- Low Maintenance: Compared with technical fish passes, less maintenance is required for a rock ramp and it will integrate with the natural environment. The resting pools may require maintenance in the long term.



Howden Weir – the new rock ramp ensured the protection to the bridge offered by the weir was maintained



Dowies Mill Weir- existing poor condition

REPRODUCED BY PERMISSION OF ORDNANCE SURVEY ON BEHALF OF HMSO. © CROWN COPYRIGHT AND DATABASE RIGHT 2022, ALL RIGHTS RESERVED, ORDNANCE SURVEY LICENCE **RESTING POOL REQUIRED FOR** EVERY 1M DROP IN ELEVATION. MINIMUM DEPTH 1.2M FOR LARGE SALMON LOW FLOW CHANNEL FOR LOW FLOWS WITH 0.3M MINIMUM DEPTH ROCK RAMP TO COVER THE WIDTH OF THE RIVER. GRADIENT = 3% TEMPORARY ACCESS ROUTE TO **BE REPLANTED**



LOW FLOW CHANNEL

Howden Rock Ramp – naturalised over time





Plan showing outline design for rock ramp fish pass



VEGETATED ISLANDS

Vegetated islands allow for habitat diversity for a range of species and mimic the existing diversity in habitats currently on the watercourse. The proposed ramp design includes rock islands formed using large woody debris already present with appropriate site planting. It is also expected that vegetation would naturally colonise the rock ramp over time (see image at Howden rock ramp).

Rugby Club Weir – vegetated erosion protection



Howden Weir – vegetated erosion protection







GRADIENT AND FOOTPRINT

Rock ramps can be any gradient up to 5%. The aim of the project is to create the best fish pass for fish, meaning the lowest possible gradient. The lowest gradient that can practically be achieved without an excessively large footprint is 3% at Dowies Mill Weir. This is better than the 5% gradient rock ramp at Howden Bridge in Livingston.

LOW FLOW CHANNEL

The low flow channel allows for fish passage during very low flow conditions i.e. during a period of dry weather when there is less flow in the river.

APPEARANCE AND FLOWS

The rock ramp mimics a natural riverbed and should have similar flow diversity as the current river downstream of the weir.

RESTING POOLS

Resting pools are included in the design so that fish can regain their energy as they move up the ramp.

The ramp is made up of various stone sizes, and the top layer of the rock ramp will be formed of large stones and have a rough surface to create diverse flow conditions for fish passage and withstand erosion during a flood. Below the top layer of rocks, smaller sized stones will be used with localised stability features (such as timber structures) to stabilise the rock ramp during all flow

The design minimises the use of concrete and maximises the reuse of materials already on site which will help to maintain natural systems. The large material would be removed from the channel during construction, and stockpiled until it can be utilised to form the rock ramp structure. Some material will need to be imported to raise the river bed above current levels and it is intended that





EROSION PROTECTION

Erosion protection will be in place to prevent the river banks being washed in to the river and protect the existing bank line.

MAINTENANCE

There are several elements that will require ongoing monitoring, however compared to more technical fish passes a rock ramp is relatively low maintenance and debris is less likely to be a problem. Inspection requirements are expected to be frequent in the first few years following construction while revegetation and initial sedimentation processes occur. It may be necessary to make some adjustments to respond to natural changes, but it is expected that the rock ramp would quickly integrate with the natural environment, providing a long term fish passage solution.

DOWIES MILL WEIR FISH PASS – THE PROPOSAL

Other key considerations at Dowies Mill Weir, access for construction and next steps



PLANNING

The rock ramp proposed at Dowies Mill Weir would need to go through the planning process and pre-application consultation is already being carried out. The key considerations that would inform the planning permission decision are described on this slide.



ECOLOGY

The rock ramp design would minimise the impact on existing ecological features where possible, is designed to improve fish passage and includes mitigation where required. The impoundment from the existing weir would be retained which retains the specific bat micro-habitat. Any temporary access required for construction would be reinstated including planting of trees.



GEOMORPHOLOGY

Through mimicking the natural pool rapid sequence that exists within the River Almond, the rock ramp would add to the wider value and function of the river system and contribute to re-naturalisation. Where possible, the rock ramp make-up would reuse existing river material and avoid the use of hard structures. The design would also address areas of potential erosion through the use of vegetated erosion protection on the riverbanks.

ACCESS TO THE SITE FOR CONSTRUCTION

- The preferred access route is via the western bank on the privately-owned woodland/estate
- During construction a new temporary access track would be formed along the route of what is believed to have previously been an access track
- Some localised tree removal would be required and potentially removal of invasive plant species which have been identified on the riverbank
- After construction, new trees would be planted and the area would be reinstated.
- Dowies Mill Lane is the location of the River Almond Walkway, as well as serving as the only access to the local properties and it would therefore be preferable to keep this open during construction.
- · Initial inspection has indicated that Dowies Mill Lane is less suitable for primary site access due to spatial constraints and concerns regarding bank stability. It is considered that the works could be carried out without requiring access along Dowies Mill Lane.



Howden Weir – access track formed for construction



Howden Weir – reinstated access track following construction, showing restored mill lade and bridge

Stakeholder and Public Engagement

Pre-application planning consultation is being carried out with CEC planning team





LANDSCAPE

The crest of the rock ramp would be around the same level as the existing weir, meaning the water level upstream would not change significantly. Landscaping would be undertaken to maintain good access to the ash scattering site downstream of the weir. The proposed design includes forming islands using large woody debris already present on site with appropriate planting. Vegetation would also naturally grow on the rock ramp over time. Overall a rock ramp would be in keeping with the river setting of the local area.



HERITAGE

The weir represents one of the most visible surviving elements of the former mill complex and has both historical and archaeological interest. Remains of the mill are on the riverbank as shown in the picture to the left. The rock ramp located downstream of the existing weir would limit the physical impact of the fish pass and aims to minimise change to the setting of heritage assets in the vicinity of the weir.



FLOOD RISK

Flood risk has been raised as a key area of concern for the local community. Any construction within the river or floodplain has the potential to change flood risk, so a high-level assessment of was undertaken to see what effect the construction of the rock ramp would have. It was found that the risk of flooding to infrastructure and properties would not change, but that there would be changes to water levels downstream where the riverbed is being raised. Feedback from CEC and SEPA is that this is likely to be acceptable. A detailed flood risk assessment would be prepared and submitted as part of a planning application.





Indicative route of temporary access track



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Dowies Mill Weir – Preferred access route during construction



The City of Edinburgh Council would run a tender process to appoint a contractor to carry out the construction of the rock ramp

HOW CAN YOU PROVIDE YOUR FEEDBACK?

You can provide your feedback via the comment cards, to a member of the project team or by email dowiesfishpass@edinburgh.gov.uk

We are interested to know:

- What is your interest in the site?
- How do you interact with the site?
- What do you value about this location?
- What do you think is good about the proposed works?
- Are you in favour of the proposal?
- Do you have any concerns about the proposal?
- Do you have any suggestions we can add to the project to bring greater benefits to the community?

Spring/Summer 2023