

Cowbridge Road Ely Bridge Flood Risk Management Scheme - Frequently Asked Questions

What is Natural Resources Wales proposing to do?

Natural Resources Wales (NRW) is undertaking vital works in and around the River Ely to reduce the risk of flooding in Ely and Fairwater.

Our recent studies have shown that flood risk increases significantly when Cowbridge Road bridge (A48) over the River Ely is partially blocked with debris, particularly trees and other large objects. If the bridge is kept clear, more water is able to pass beneath and downstream, reducing the risk of flooding to the surrounding area.

In 2017 and 2018, we completed tree management works to try to reduce the likelihood of dead trees and branches floating down the river, but further work is needed to manage the flood risk. In 2020, we constructed an access ramp immediately upstream of Cowbridge Road bridge to give access to our operatives to remove blockages at times of low river flows. However, there is no safe way for our operatives to remove large blockages at times of high river flows.

Our plan is to construct a tree catcher upstream of Wroughton Place. The structure is designed to catch trees and other large floating debris safely before it can make its way down to the bridge. As water levels rise during a flood, debris trapped by the poles will float on the water surface, allowing water to pass beneath and continue downstream. Construction will begin at the end of May 2021.

The proposals comprise:

- Seven circular poles spaced 4 metres apart in two staggered rows. This is to target larger floating debris that would otherwise become trapped at the bridge.
- Riverbank and riverbed erosion-protection rock stones will be placed next to and around the poles. The riverbed level will remain similar to existing levels.
- A ramp, processing hardstanding area and fence. This is to allow our operatives to remove the floating debris.
- Fixed CCTV to allow our operatives to monitor the structure.
- Native species will be planted to screen the area and provide habitat for wildlife.

With the tree catcher in place, we estimate about 490 properties will be protected during a one in 100 annual chance of flooding.

Why is a flood scheme needed?

Flooding is devastating to people's homes and livelihoods and it's our job to manage flood risk across Wales.

There is a history of flooding in this area. Our studies found flood risk will increase without action. This is why we're working to take feasible steps to reduce the chance of flooding.

In September 2008, some 27 properties were flooded near the bridge, and properties were also flooded in 2011, 2012 and 2020. However, the potential scale of flooding could be far greater without further action. Studies investigating historic flood events found the Cowbridge Road bridge to be prone to blockages from floating debris. Widespread flooding was recorded as far as Victoria Park in 1927 and 1960.

In 2017, the downstream private Mill development set-back the flood bund along the eastern riverbank and removed remnants of the former Arjo Wiggins weir. This increased the downstream river capacity and reduced upstream flood risk.

However, our recent studies found a partial blockage of the Cowbridge Road bridge (A48) over the River Ely by trees and other large floating objects reduces the river capacity and significantly increase flood risk to properties. River water backs up from the Cowbridge Road bridge, overflows the riverbank low spot at Wroughton Place. As river levels increase, flood waters flow along Station Terrace before heading (southeast) along the railway to properties as far away as Fairfield Avenue and Victoria Park Road West.

With a partial blockage at Ely Bridge some 40 properties in the immediate vicinity have a high chance of flooding (1 in 30 chance in any year). Around 495 properties across a wide area towards Victoria Park have a medium chance of flooding (up to 1 in 100 chance in any year).

The bridge is prone to blockages because of its skewed central pier and low clearance above the river. As river levels rise, the low underside of the bridge traps debris below the water level, reducing the capacity for water to flow under the bridge. There is currently no safe way for our operatives to remove large blockages at times of high river flows.

If the bridge is kept clear, more water is able to pass beneath and downstream, reducing the risk of flooding to the surrounding area. With the bridge kept clear and a partial blockage at the tree catcher, no properties have a high chance of flooding and only 5 properties have a medium chance of flooding.

Will the tree poles create a dam?

No, the tree poles will trap floating debris. As river levels rise, this floating debris caught by the round poles can rise. River flows can pass underneath and continue downstream.

However, if the same floating debris is caught on the bridge pier, it is prevented from rising with river waters as it becomes trapped by the bridge deck above and so causes a partial blockage.

The tree poles design draws on a range of best practice guidance and lessons from other

similar successful schemes. The seven poles' layout and spacing has been designed to reduce the likelihood of trapping smaller floating debris that is unlikely to become trapped at Cowbridge Road Bridge:

- The poles are circular piles.
- The poles are spaced 4 metres apart.
- The poles are staggered into two rows.

Who will maintain the tree poles?

We plan for periodic maintenance throughout the life of the tree catcher to remove debris from the tree poles. CCTV will monitor the build-up of debris at the structure.

Why are the tree poles proposed to be located where they are?

Various locations upstream of Cowbridge Road bridge were appraised before the proposed location was selected.

Locations further upstream pose a risk to a series of abstraction adits (groundwater wells) located on either bank of the River Ely, linked to the Ely Wells pumping station. It is also noted that locations further away from the bridge increase the chance of debris entering the river between the two structures.

At the location proposed, the undeveloped flood plain west of the river is also significantly lower than the developed east riverbank, allowing more space for flood flows to pass the tree catcher. The flood plain becomes developed on both east and west banks downstream towards the bridge.

Locations downstream cannot be accessed to maintain the structure, with properties and development directly next to the riverbank.

What consultation has occurred to date?

A letter and flyer were sent to all residential properties on Wroughton Place on 21 January 2020. The flyer was provided to elected representatives on 24 January 2020, which provided details of the scheme proposals and details of planning and permitted development applications.

The construction of the tree catcher is lawful development, so does not require planning consent. Details can be found on the Cardiff Council planning portal <https://planningonline.cardiff.gov.uk/online-applications/>, reference 19/03060/MNR.

The access improvement works at the bridge required planning permission as the ramp will tie into the public highway (Wroughton Place). The local planning authority consulted on the application in January 2020 and the planning application was approved on 28 February 2020. The application can be viewed on the planning portal, reference 19/03046/MNR or in person at Cardiff Council's offices.

No objections were raised; either directly to the planning authority or to the NRW project-specific contact address provided.

Our appointed contractor Knights Brown issued a pre-construction flyer to all residents on Wroughton Place on 26 June 2020. This gave details of the proposals, the intended construction start date and public liaison contacts.

An online virtual meeting was arranged by NRW on 10 July 2020. Residents of Wroughton Place and elected representatives were invited. Our appointed designer, Arup, outlined the basis of the proposals. A number of queries and comments were received.

We will send a letter to all residential properties on Wroughton Place in advance of work beginning again on site.

What has happened in response to the comments raised at the July 2020 resident meeting?

- **General Queries**

Following questions on what the proposal will look like and how they will work, we prepared FAQs and a short video setting out details including an artist's impression fly-through – see <https://tinyurl.com/elybridgefloodscheme>

- **De-shoaling**

Surveys of the river silt/bed levels near the bridge allow us to monitor silt levels. Residents commented that shoal had been building under the eastern half of the bridge. A further survey was completed in summer 2020. Analysis concluded that targeted de-shoaling could offer some benefit but does not fully mitigate the blockage risk. We are investigating the feasibility of shoal removal with the asset owner, Cardiff Council, including confirming the arrangement and condition of the bridge abutments on the riverbank.

- **Independent Hydraulic Model Review**

Residents sought reassurance on the hydraulic modelling used as the basis for the development of the proposals.

We had approved the baseline (without proposals) model originally in 2012 and also reviewed the modelled proposals for a tree catcher in 2020. The baseline model had also been previously independently checked for adequacy for NRW by consultants Mott MacDonald and Eden Vale Young in 2013 as part of consenting process of the downstream private Mill development proposals.

We appointed JBA Consultants to independently review the modelling in 2021. They supported the modelling approach and findings. They recommended further tests to explore the sensitivity of predicted flood risk to how the model represents partial blockages at the bridges. The findings increases confidence in the predictions.

- **Design feedback**

We are reviewing if we can reduce the size of the vehicle turning area next to the ramp

and install further native planting to increase visual screening. We are also investigating if ground levels at Birdies Lane could be slightly increased to marginally reduce the existing 'flow path' during extreme floods, without increasing flood risk elsewhere.

What alternative options were considered and discounted?

We've undertaken studies since 2008 to comprehensively assess the case for flood risk management in the area. This has included the detailed appraisal of flood risk management measures including:

- options to slow the flow upstream;
- containing flood levels with various forms of raised defences such as walls and bunds;
- measures to convey flooding through channel widening, dredging or bridge removal, and
- property flood resilience measures.

As part of the Ely Mill development, the developer created a set-back flood channel along the eastern riverbank and removed the remnants of the Arjo Wiggins weir in 2017. This work reduced the existing risk of flooding upstream.

However, other measures appraised were found to be uneconomical and the blockage risk to Ely Bridge remains.

Raising Cowbridge Road Bridge or removing the central pier were investigated. However, the costs and risks associated with this were found to be significantly prohibitive. Raising the carriageway is made even more complex by the carriageway approaches/junctions and also by the many strategic utilities which use the structure.

Dredging has a limited effect due to the amount of water during a flood and it also has the potential to cause erosion which may undermine riverbank structures.

Multiple studies since 2008 have investigated **containing flood waters** with various forms of raised defences such as walls and bunds. However, such measures were found to be not feasible/beneficial. A raised defence would be necessary along the whole of the Wroughton Place riverbank to avoid water simply outflanking any structure. This has had to be discounted due to the significant cost, impact and complexity. Any works will maintain the existing peak ground levels (i.e. will not create a 'flow path').

What is the impact of Cardiff Bay Barrage on the River Ely at Cowbridge Road?

Flood modelling considers the downstream water level in the Bay. Testing (including calibration against observed flood levels) found that water levels in the Bay had no impact upon predicted flood levels upstream of the former Arjo Wiggin's sluice. The Cowbridge Road bridge is too far upstream of the River Ely.

Where have tree catchers been used elsewhere?

Tree catchers or tree poles are a proven method to reduce the risk of blockage from

larger floating debris. The Morpeth (Northumberland) scheme includes tree poles. However, these are arranged in a straight line, unlike the staggered arrangement proposed upstream of Cowbridge Road Bridge which will also reduce smaller debris accumulation. Staggered tree poles have been found to be effective at reducing culvert blockage risk at Pickering in Yorkshire.

In more rural locations, such as St Clears (Pembrokeshire), floating booms are used.

How will the Japanese Knotweed present within the site be managed?

Unfortunately, knotweed is rife along the Ely river corridor in this area. During the works, our contractor will be responsible for the management of knotweed within the site they occupy. Their working methods have been detailed within their 'Invasive Non-Native Species (INNS) Management Plan' which has since been accepted by NRW.

Prior to NRW accessing site, the management of knotweed was the responsibility of the landowner. However, as NRW is continuing dialogue with the landowner with the intention of entering into a lease agreement, it is possible that NRW will take on the future knotweed management/eradication within the area of the proposed tree catcher.

What about antisocial behaviour?

The proposals consider anti-social behaviour:

- The tree poles position, finishing and form prevent climbing.
- The site will be fenced off with 1.8 metre high security fencing and gate.
- Once established, planting will partly obscure the view of the structure from surrounding properties and the footpath.

Further queries?

For more information, please visit our website

<https://tinyurl.com/elybridgefloodscheme>

If you have any queries about the proposals or would like to be kept informed of progress, please contact us at the project email address:

elytreecatcher@naturalresourceswales.gov.uk

If you have any queries in relation to the construction work on site, please get in touch with our contractors Knights Brown:

Email: Talktous@knightsbrown.co.uk

Office: 01656 667601

Public Liaison: 07818 432183

May 2021