Pontcysyllte Aqueduct Access Improvements – Heritage Impact Statement

Application Type

This Heritage Impact Statement has been prepared to support the planning application for improving the stepped access alongside the east elevation of the Pontcysyllte Aqueduct, which is located within a formally designated Conservation Area and a World Heritage Site.

Context

The existing stepped access (thought to have been installed before the inscription of the World Heritage Site in 2009) is failing in a number of places and has been identified for replacement to ensure safe access to the public right of way that runs directly from the Tŷ Mawr Country Park underneath the aqueduct. The access steps are captured within the setting of the Pontcysyllte Aqueduct, which is currently dual designated at Grade I and as a scheduled monument.

Location

The location of the proposed access improvements are identified on the location plan below, which is along the east elevation of the aqueduct leading down to the public right of way.

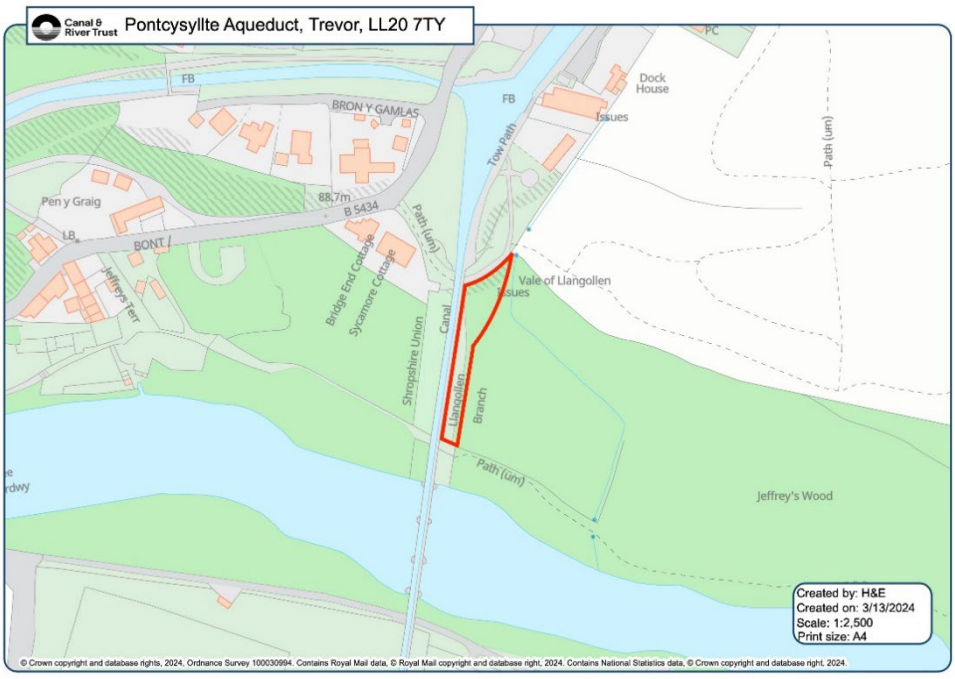


Figure 1: Access steps along the east elevation of the aqueduct (area marked in red).

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Statutory Legislation

Planning (Listed Buildings and Conservation Areas) Act 1990

Planning law relating to listed buildings and conservation areas in England & Wales is set out in the Planning (Listed Buildings and Conservation Areas) Act 1990.

Section 66 of the Act deals with the responsibilities of local planning authorities – the decision makers - when dealing with planning applications that could impact on heritage assets and states that:

'*In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses*'.[1]

Section 72 of the same Act states that, in relation to conservation areas:

'*…with respect to any buildings or other land in a conservation area, of any of the provisions mentioned in subsection (2), special attention shall be paid to the desirability of preserving or enhancing the character or appearance of that area*'.[2]

Statutory Guidance

Planning Policy in Wales

Planning Policy in Wales (2024) provides the Welsh Government's National Planning Policy for the conservation of the historic environment; in respect of information requirements it states that:

'Applicants for listed building consent must be able to justify their proposals, show why the alteration or demolition of a listed building is desirable or necessary and consider the impact of any change upon its significance. This must be included in a heritage impact statement, which will be proportionate both to the significance of the building and to the degree of change proposed.' [3]

[1] Planning (Listed Buildings and Conservation Areas) Act 1990 c.9 section 66
[2] Ibid (section 72)
[3] Planning Policy in Wales, 2024, Edition 12 (section 6.1.13)

'The setting of a historic asset includes the surroundings in which it is understood, experienced and appreciated, embracing present and past relationships to the surrounding landscape. Its extent is not fixed and may change as the asset and its surroundings evolve. Setting is not itself a historic asset, though land within a setting may contain other historic assets.' [4]

Non-statutory Guidance

The Setting of Historic Assets in Wales

Cadw also provide a similar but more detailed definition of setting…

'The setting of a historic asset can include physical elements of its surroundings. These may be boundary walls, adjacent fields or functional and physical relationships with other historic assets or natural features.' [5]

Historic Information

Ellesmere Canal

The Ellesmere Canal was originally proposed and authorised through an Act of Parliament in 1793 and was designed to link the rich limestone and coal quarries to the wider the canal network and the major ports of Bristol and Liverpool. Principally engineered by two of the most important canal engineers of the 19th century (William Jessop and Thomas Telford), the canal was finally completed in 1805 with the opening of the Pontcysyllte Aqueduct and the adjoining trans-shipment wharf at Trevor Basin. The plan had originally been more ambitious in terms of expansion, with the canal travelling further north to Wrexham, however, only small branches from the basin were ever cut including the Llangollen branch, which provided a much-needed water source from the River Dee west of Llangollen at Horseshoe Falls.

Pontcysyllte Aqueduct

The structure was opened in 1805 and took ten years to build. It was designed by Thomas Telford and William Jessop. An extract from the Statement of Outstanding Universal describes the structure as '…a highly innovative monumental civil engineering structure, made using metal arches supported by high, slender masonry piers. It is the first great masterpiece of the civil engineer Thomas Telford and formed the basis of his outstanding international reputation. It bears witness to the production capacities of the British iron making industry, which were unique at that time'.

It spans 307m (1000ft) on 18 tapered masonry piers and stands at 38.5 metres (126ft) above the River Dee. The canal is channelled through a cast iron trough supported by 19 arches. The towpath is supported over the canal on cast iron standards. The towpath side is protected by a cast iron handrail.

Cadw's designation description describes the Pontcysyllte Aqueduct as:

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[4] Planning Policy Wales, 2017, *Technical Advice Note 24 – The Historic Environment* (Annex D: Glossary of Terms)
[5] Cadw, 2017, *Setting of Historic Assets in Wales (page 2)*

Built between 1795 and 1808, the Pontcysyllte Aqueduct and Canal comprise an exemplary group of civil engineering features from the heroic phase of transport improvement that accompanied the Industrial Revolution. The Principal Engineer for the canal was William Jessop (1745-1814), one of the most important canal and dock engineers of the day. The General Agent was Thomas Telford (1757-1834), then a little-known county surveyor, but to become the most prolific civil engineer of the early nineteenth century. Owing to its particular daring and elegance, the Pontcysyllte Aqueduct is regarded as a spectacular masterpiece of waterways engineering and an influential pioneer of iron construction.

The monument is of national importance as the masterpiece of two exceptional figures from the heroic phase of civil engineering in the late eighteenth and early nineteenth centuries, reflecting the crucial developments within inland navigation, civil engineering and the use of iron. It is an outstanding example of the pivotal importance of transport improvement to the Industrial Revolution. As the largest civil engineering projects of their day, canal construction projects were responsible for numerous organisational and technical innovations. Pontcysyllte Aqueduct and Canal is an exemplary manifestation of the innovations which produced the British canals system and were carried forward into the development of later railways, roads and industrial projects. In organisation, innovations included principles of contract management, delegation of duties within engineering teams and the professional independence of engineers. In technology, innovations included hollow masonry and new waterproofing methods to reduce weight, composite use of cast iron and stone, earthwork calculations, construction railways, barrow inclines and cut-and-cover tunnels.



Figure 2: Pontcysyllte Aqueduct (west elevation)

Heritage Significance

As indicated in Cadw's description above, the heritage significance of the Pontcysyllte Aqueduct largely derives from its place within the heroic stage of canal building during the late 18th and early 19th centuries. This stage in canal building was dominated by engineers such as Thomas Telford, who was partly responsible for designing the structure along with William Jessop. Their use of innovative design features (large masonry piers) and materials (cast-iron) adds much to our understanding of how engineers were solving the problems of building unique inland waterways in environments that were considered to be both challenging and difficult, such as the crossing of the Dee Valley (AONB), which is an integral component to the picturesque setting of the structure. The significance of the existing steps is considered to be very limited. They are a late 20th/early 21st century installation comprising timber risers and edging, with a backfill of loose stone and soil, probably formalising a previous informal 'desire line' track. Although of relatively low visual impact, they now provide a more formalised means of traversing the side of the valley from the aqueduct to the valley below, but have very little historic interest and their materiality suggests that they were only ever seen as a temporary solution.

Proposed works

The proposed works have been designed to replace the existing access with infrastructure that is more suitable in relation to both the landscape and its overall relationship with the aqueduct (see supporting Design & Access Statement). From initial discussions with the regional Cadw Inspector, it was identified that the location of the existing route was causing low-level incidental erosion to the aqueduct's sandstone piers (see Figure 3 & 4 below). In order to mitigate this issue, it was decided that the pathway should be re-routed to take the steps away from the structure at several 'pinch-points' in order to prevent further erosion. Along with the change in the route, it also proposed that the base material is upgraded, from compacted soil and gravel, to stone, and that a centrally positioned handrail is installed at certain points to provide a safer environment for traversing the stepped sections (see supporting Design & Access Statement). Following the production of an archaeological report by Heneb to determine the historical and archaeological potential of the site, and to better inform the level of mitigation that may be required as a result of the proposed works, a new on-site feature was discovered to the eastern side of the aqueduct, (see *Heneb: Clwyd-Powys Archaeological report 2018; Trevor Public Realm Desk Based Assessment, 2024*) and the alignment of the steps was revised to avoid these features, resulting in the need to create two lengths of retaining structure to stabilise the embankment. These will take the form of narrow-gauge gabion baskets carefully filled with hand selected stone to give the allusion of dry-stone walling.

The scheme has been designed in-line with the objectives of 'enhancing visitor attractions and dwell time' and 'improving accessibility' identified in the Trevor Basin and Surrounding Area Master Plan (2020).

Materials

Whilst it may have been desirable to use local Cefn Mawr stone for the facing surfaces of the steps, (as used for the sandstone piers) the local quarries could not supply either the volume or the type of stone required and therefore a complementary stone has been identified. The proposed

complementary stone is Crosland Hill, quarried at the Wellfield Quarry in Huddersfield, North Yorkshire, which is a 'buff' sandstone with naturally occurring variations (see Figure 6 below). This stone will be used specifically for the treads of each step, with Breedon self-binding gravel to each intermediate landing.

It is envisaged that the central handrail to each individual flight will comprise uprights of cast iron with a simple timber handrail. The upright balusters have been designed with subtle references to the form of the aqueduct balusters. The handrail itself will be of timber with socketed joints and a rounded finish to provide something pleasing to touch, and more in keeping with the natural environment in which it is situated. Due to the need for a retaining structure close to the existing viewing area at the top of the valley, beneath the aqueduct trough, a new railing is proposed to extend around from where the current stone wall ends, to the top of the principal new flight of steps. This will take the same form as the step handrails to ensure consistency.

The proposed retaining structures will be narrow gauge wire baskets, (gabions) carefully hand filled with selected stone, (either Cefn-Mawr or Crosland Hill, to match the steps) roughly coursed to give the impression of dry stone walling (see Figure 5 below). These will be topped with carefully selected native vegetation to soften them and discourage access.

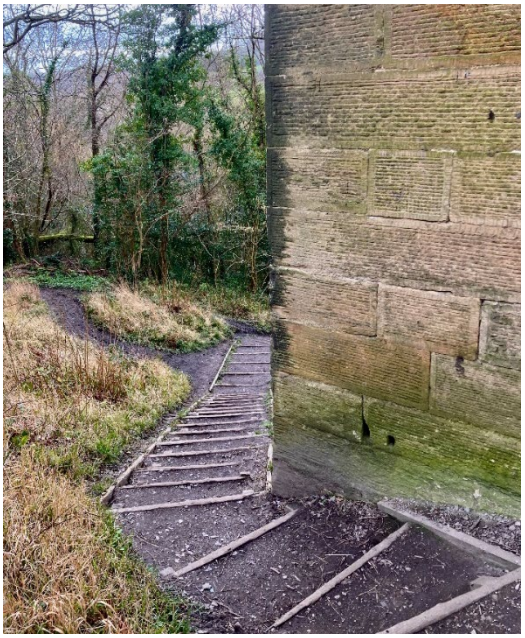




Figure 3 (left) Route of current steps. Figure 4 (right): Instances of erosion caused by the proximity of the steps.



Figure 5 indicative image of proposed gabion walling – note careful placing of stone in rough courses



Figure 6. Proposed complementary stone for steps, contrasted with the sandstone piers of the aqueduct.

Heritage Impact Assessment

Whilst the proposed works are not a direct intervention on the aqueduct itself, they do have the potential to affect the setting of the structure, and directly impact the extant non-designated heritage assets highlighted within the Heneb report (newly given PRN218243).

As Planning Policy Wales states in its definition of setting in relation to historic assets, 'The setting of a historic asset includes the surroundings in which it is understood, experienced and appreciated, embracing present and past relationships to the surrounding landscape. Its extent is not fixed and may change as the asset and its surroundings evolve.' This particular historic setting is currently in the process of evolving and well-timed interventions of this type present no long-term impact to the significance of the heritage asset and its setting, if well designed, maintained and used as instructed. In relation to the Conservation Area, this type of intervention should be viewed as an **enhancement**, especially if it serves a wider public benefit of providing safer access to the base of the aqueduct and the existing public right of way.

Any change of this type to the setting of a heritage asset will inevitably have some short-term impact on the setting and landscape, however, it is perceived that the change in the route of the stepped access will decrease any further erosion to the asset's sandstone piers, as well as providing a safer means by which to navigate the steep ascent and decent of the surrounding landscape. If the wider public benefit of the improvements are taken into account (as identified as objectives within the Masterplan), then the relatively small change in design and materials should be considered to be **positive**. In both instances, the overall impact on the significance of the heritage asset should be considered to be **neutral** as, due to both the independence of the design and the longer-term reversibility, no harm is perceived to be registered to the heritage significance of the structure or its setting.

With regard to the archaeological features highlighted within the 2024 Heneb report, (refer *Heneb: Clwyd-Powys Archaeological report 2018; Trevor Public Realm Desk Based Assessment, 2024*) measures have been taken to direct the proposed steps away from the newly discovered non-designated heritage asset PRN218243, as far as is possible, so as to leave them insitu and undisturbed, with the potential to interpret them in the future as understanding of their function improves. One outcome of moving the steps away from these features and, as a result, further up and into the slope, is that two lengths of retaining structure are required to maintain stability of the embankment. Having considered this requirement, and the setting of the aqueduct, a decision has been made to create two lengths of carefully constructed gabion walling, utilising thin gauge baskets filled with carefully selected and hand faced Cefn Mawr stone. We have been led to believe that sufficient quantities of Cefn Mawr stone can be obtained for this purpose, however, if this proves not to be the case then Crosland Hill stone from Wellfield Quarry in Huddersfield will be selected, to match the stone chosen for the steps.

Justification Statement

It is evident that the existing steps have become life expired, as well as their proximity to several of the sandstone piers being responsible for a low level of incidental damage to the stonework through their continuous heavy use. The existing steps are too narrow to allow people to easily pass one another in transit which is resulting in an informal widening of the margins and the creation of gulleys which increase the rate of erosion of the slope. The steps have become irregular in height, and their depth makes them difficult to navigate for those of limited mobility, especially without an attendant handrail. The proposed stone steps and handrail will help to regularise the access provision to the valley floor, and make it more accessible to those who would otherwise have struggled to make the ascent/descent by making the steps of equal rise and going, with landings provided between flights. The central handrail, to the flights only, will increase safety whilst also improving the ability to pass along the route, reducing the likelihood of having to 'step off' causing erosion to the areas immediately adjacent. Relocating the path of the steps, away from the stone piers, will reduce the levels of incidental erosion of the historic asset whilst still allowing visitors to experience the sheer scale of the structure from close range. The recent discovery of the remains of a previously uncatalogued structure to the eastern side of the aqueduct has led to the decision to relocate the steps away from these remnants resulting in the need to provide lengths of retaining structure to stabilise the embankment. Having considered a number of options, these will take the form of gabion baskets, hand filled with carefully selected stone. Unlike retaining walls of masonry or timber, these are self-supporting at a batter of 6 degrees and therefore will require minimal excavation or footings, resulting in less ground disturbance. Great care will be taken to ensure that the wires are of such narrow gauge as is possible, and that the gabions are hand filled and faced with a stone to match the aqueduct and steps, giving the impression of dry stone walling, which is felt appropriate to the rural setting.

Whilst it is recognised that the proposed steps and retaining structures will initially have a greater visual impact on the setting of the aqueduct, the materials have been carefully selected to blend in with the local environment and the listed/scheduled structure without becoming overbearing, and the installation will become less intrusive as the materials weather and patinate. Care has also been taken with the design of to ensure that the proposal is not unduly formalised, or appears to confuse

the visitor by looking as if it were installed contemporaneously with the aqueduct itself, which would imply a greater level of significance.

The steps provide an important link between the aqueduct and the river valley below, providing a unique opportunity to view the historic structure from a different viewpoint within a wider landscaped setting. They form part of an existing Public Right of Way, Footpath LLA/35, linking Allt-y-bont and the village centre with footpath LLA/34 which follows the northern bank of the River Dee from Cysylltau Bridge to the Tref-y-nant Brook. Therefore, retaining safe and appropriate passage down the valley side, which reduces the physical impacts upon the historic asset, is seen as a necessary requirement, which the current provision is no longer able to serve.

References

Cadw, Setting of Historic Assets in Wales, 2017

Planning (Listed Buildings and Conservation Areas) Act 1990

Planning Policy Wales, Edition 12, 2024

Planning Policy Wales, Technical Advice Note 24 – The Historic Environment, 2017

Trevor Basin and Surrounding Area Master Plan, 2020.

Heneb: Clwyd-Powys Archaeological report 2018; Trevor Public Realm Desk Based Assessment, 2024

Appendix

Listing Description

PONTCYSYLLTE AQUEDUCT

Reference Number: 1601

Grade I

History

Pontcysyllte Aqueduct was built between 1795 and 1805 to carry the Ellesmere Canal across the valley of the River Dee. It is widely regarded as the most spectacular achievement of waterway engineering in Britain and a pioneer of cast iron construction. The initial Ellesmere Canal scheme, promoted by Act of Parliament in 1793, was one of the most ambitious ever devised. It planned to link the Mersey (at what was to become Ellesmere Port) with the Dee at Chester, then Wrexham and the North Wales coalfield, the Shropshire town of Ellesmere, and eventually with the Severn at Shrewsbury. The Pontcysyllte Aqueduct was a vital feature in this scheme in crossing the valley of the Dee. However, in the final scheme, Wrexham and Shrewsbury were not reached, and the industrial district around Trevor instead became the terminus of a southerly route from Chester via Nantwich and Whitchurch. The construction of the aqueduct was already well under way when this change of plan occurred; otherwise Trevor would probably have been reached instead by cheaper tramroads. The original purpose of the aqueduct on a through route was replaced simply by its giving access to the terminus and to a branch and water feeder from Llangollen. The principal engineer for the canal was William Jessop (1745-1814), one of the most important canal and dock engineers of the day. The General Agent was Thomas Telford (1757-1834), then a little known county surveyor, but to become the most prolific civil engineer of the early nineteenth century. Jessop's initial plan was to cross the valley on a massive embankment and a masonry aqueduct of exceptional height. Owing to the difficulties of building such a structure, it was proposed for a time to build a lower aqueduct with locks down on either side. The decision in 1795 to continue at the original height made it desirable that weight should by minimised, and the aqueduct was designed with hollow masonry piers and spans of cast iron. Wide attention was paid to the potential of cast iron for use in bridges and aqueducts during 1795, though it was still novel as a structural material. By the time that Pontcysyllte was completed in 1805, it was the third iron canal aqueduct to be built in the world. Owing to its particular daring and elegance, however, it was by far the most influential. It was the subject of much popular praise and set the model for many aqueducts and iron bridges which followed. The relative roles of Jessop and Telford in the design of the aqueduct are disputed, though in the past credit has been given largely to Telford, who almost completely excised mention of Jessop from his autobiography and other papers. Current interpretations suggest that both men played important roles, but that Jessop, as principal engineer, was ultimately responsible. The idea of building the aqueduct at such a height was Jessop's, and the idea of building it in cast iron may have come from either Jessop or Telford, since both were closely acquainted with new thinking on the subject in civil engineering and the iron industry. The design of the trough was probably by Telford in conjunction with William Hazledine, the noted ironmaster who supplied and erected it.

The masonry piers were designed by Jessop and executed by John Simpson and John Wilson. Matthew Davidson was superintendent of the construction and may also have had an important role in the detailed design.

Exterior

An aqueduct of 19 spans, which crosses the River Dee at a height of 38m. It is 307m in length. The spans are of cast iron plates which are bolted at their flanges. The trough containing the water is constructed of segmental plates with radiating flanges to the outside. The upright flanges are swept to their greatest thickness where they meet the base flanges, which are emphasized to create the architectural impression of a string course. Four cast iron arches support each span of the trough from below, the outer two being cast as ribbed plates which continue the lines of the trough ribs to suggest classical arch voussoirs, with a 'keystone' to the centre. On the east side, a towing path is supported over the waterway by curving cast iron posts and beams and wrought iron ties, leaving space for the movement of water underneath as boats pass. A cast iron handrail with vertical railings is fixed to the outside ot the towpath. There is no handrail on the western side of the trough. The 18 piers are constructed of finely dressed stone, hollow in their upper parts. They taper towards the top in both dimensions, and end at trough level. There are small cornices from which the arches spring. The four piers in the River Dee have pronounced cutwaters. There are massive curving abutments at both ends, with handrails continued onto them. A cast iron plaque on the river bank pier on the Froncysyllte side of the Dee records the purposes of the canal enterprise and the laying of the first stone on 25 July 1795.

Reason for Designation

Listed at grade I for its important contribution to the development of canal engineering and the structural use of cast iron, and as an internationally renowned monument of the Industrial Revolution.

Scheduled Ancient Monument: DE 175.