



Technical Note

Project:	A465 Neath Masonry Arch Foundation Coring		
Subject:	Heritage Impact Statement		
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1. Description of Proposed Work

On behalf of the South Wales Trunk Road Agent (SWTRA), Atkins has been commissioned to oversee the drilling of 4nr vertical cored boreholes to the A465 masonry bridge spanning the River Neath.

The cored boreholes will extend from the bridge deck through the bridge foundations, and under the two bridge piers and the 2 abutments – see Figure 1 below:

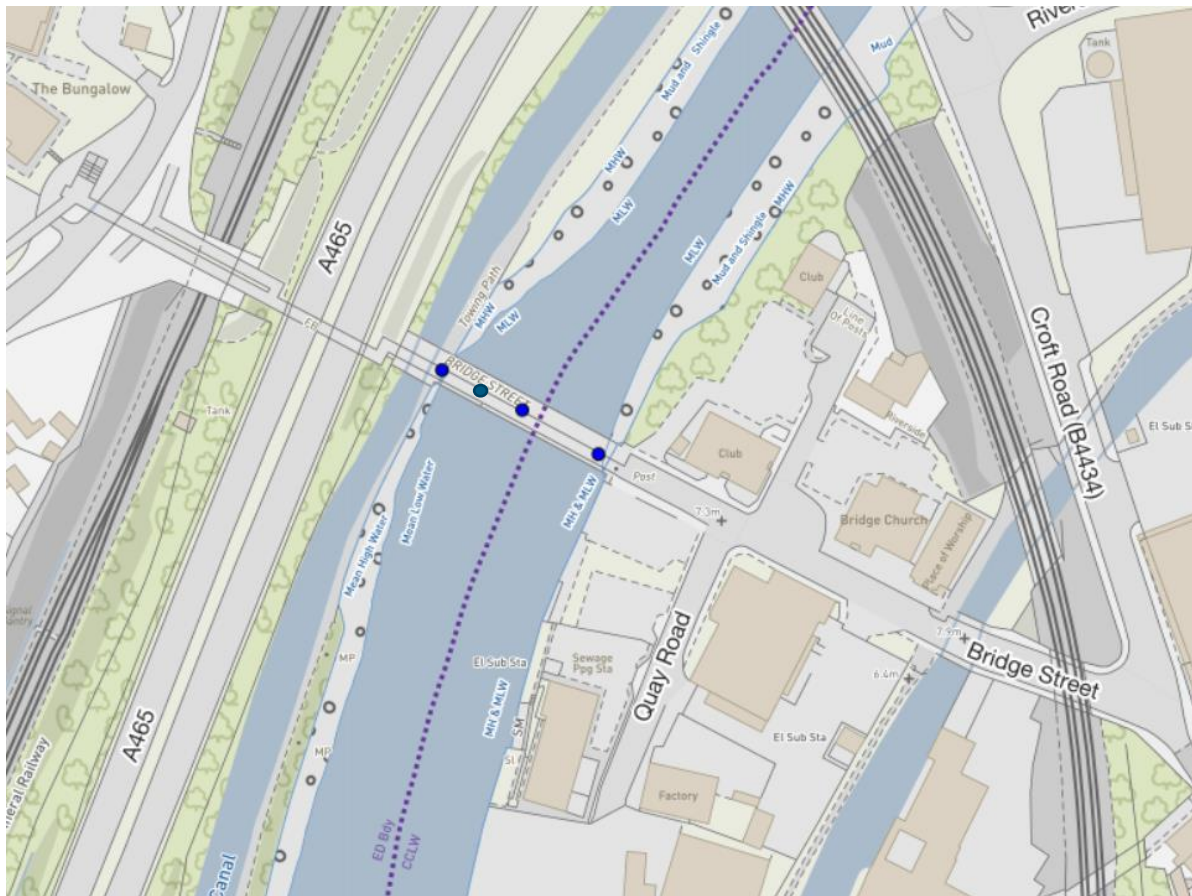
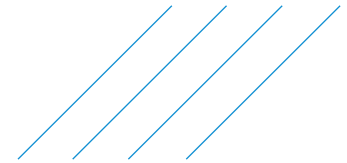


Figure 1 – Site Location of A465 Neath Masonry Arch

Although the structure does not support the A465 Trunk Road itself, the arch supports a Footbridge, which allows pedestrian access from Bridge Street to the east of the A465 to Neath Abbey Road, to the west. The structure can be seen in Figure 2 below.



Figure 2 – A465 Neath Masonry Arch



2. Objective for Proposed Coring Investigation Work

Bridges founded in a river can be subject to scour; especially after high flows during storms. After undertaking a Scour Risk Management Strategy in accordance with Welsh Government's BD97/12, the structure was assigned a Scour Risk Rating of 2. This was primarily a result of the structure having an unknown foundation depth and unknown riverbed properties.

Without clarification of the Scour Risk Rating (SRR), the potential scour risk remains high, with the Level 2 Assessment indicating total scour depths of 4.89m and 4.84m at the piers and abutments, respectively. If realised, this may lead to structural instability and subsequent failure.

As a consequence of the high risk rating, Atkins proposed foundation coring to ascertain the bridge foundation and riverbed properties. The foundation and river bed properties will then enable a more certain assessment of the stability of the structure.

3. Special Architectural / Historic Significance

3.1. Cadw Listed Structure Reference 11866.

History – The road bridge was erected in the 1790's to replace an earlier bridge at this historic river crossing. A timber bridge was recorded near here by John Leland in the 16th century; a later bridge being of timber and stone. The bridge was designed by David Edwards, son of the famous bridge builder Rev William Edwards of Pontypridd, and built by direct labour under the guidance of surveyor Thomas Edwards.

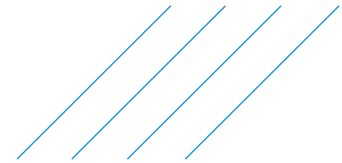
The bridge was ramped, but about 1850, the north west end was raised to accommodate the building of the Low Level Railway. The original line can be seen in the masonry of the bridge and the adjoining bridge over the Tennant Canal.

Footpaths on cantilevers were added in 1869 by the contractor William Jones of Westernmoor; enabling the full 6.5m width of the original bridge to be used by vehicles. The bridge was closed to traffic in the later 20th century, when the A465 dual-carriageway was built and a raised footbridge constructed on it, to connect Cadoxton Road with the Neath side of the river.

Exterior – The road bridge is well-finished coursed rubble stone with dressed stone voussoirs to three almost semi-circular arches. The outer arches are nearly 11m wide and the centre arch over 15m wide; with pointed cutwaters to both sides. Later parapets with cement block coping and 20th century deck, walled on north west end; now carrying a raised footbridge.

The bridge is constructed square to the abutments with spans of: 10.85m, 15.27m, and 10.93m with an overall length between abutments of 43.55m. The: arch barrels, spandrel walls, and piers are constructed of stone masonry and are supported on stone masonry abutments. It is these piers and abutments that are to be affected by the proposed works.

Reason for Designation - Listed for the special interest of the late 18th century bridge, which is well preserved beneath the modern alterations. Group value with the adjoining bridge over Tennant Canal.



Tennant Canal (not part of the coring investigation) – The Neath Masonry Arch bridge spans both the River Neath and Tennant Canal near Neath in South Wales. The latter was the brainchild of George Tennant who wanted to link the River Neath with the River Tawe. Work started on the canal in 1821 and eventually ran from the mouth of the River Tawe, near Swansea to Aberdulais Basin, where it met the Neath Canal.

4. Assessing Beneficial Impact

Coring at both the abutments and piers will enable the foundation depth and riverbed deposits to be established and subsequently allow the Scour Risk Rating (SRR) to be assessed more accurately.

Scour could lead to partial collapse, with in addition to the loss of the historic fabric, would lose a public footbridge over the river, plus electric and telecon services under the bridge deck.

Based on the SRR, a management plan will be put in place to ensure that structural integrity is not compromised.

5. Assessing Harmful Impact and Proposed Solution

To limit the potential for vibration damage to the structure from the drilling rig, the boreholes will be cored holes rather than more harmful percussive drilling techniques. A small diameter (100mm) core drill will be used to induce only relatively small vibrations on the structure. Light plant will be used to limit the loads on the bridge.

The cores are likely to contain: masonry, broken stone backfill, and past cementitious grout repairs. The core samples will be removed off site for laboratory analysis. As a result the cores and broken rock/gravel will not be able to be replaced down the boreholes. The boreholes will be backfilled with grout/slurry injected under low pressure to limit the flow; thereby maintaining the historic bridge fabric.

The coring investigation will be undertaken by a competent experience contractor and overseen by an engineer from Knights Brown Contractors. Atkins will supervise the works to ensure that the coring is undertaken in accordance with a prior agreed Method Statement.