ROSSENDALE BOROUGH COUNCIL

ITEM NO. A3

Subject:	Hareholme Viaduct		**Status:**	For Publication	
Report to:	Full Council		**Date:**	28 February 2024	
Report of:	Facilities & Safety Manager		**Lead Member:**	Resources	
Key Decision:	☐ Forward Plan ☐		General Exception ☐	Special Urgency ☐	
Equality Impact Assessment:	Required:		No	Attached:	No
Biodiversity Impact Assessment:	Required:		No	Attached:	No
Contact Officer:	Jane Riley		**Telephone:**	01706 252515	
Email:	janeriley@rossendalebc.gov.uk				

1. RECOMMENDATION(S)

1.1 Full Council to approve the addition of a further £36,050 to the existing Hareholme Viaduct capital scheme, to carry out additional necessary works as set out below, to be funded by borrowing or capital receipts.

2. EXECUTIVE SUMMARY

- Extensive repair work is currently being carried out on Hareholme Viaduct in a scheme valued at £400,330, approved by Full Council on 13 September 2023.
- The removal of vegetation and trees enabled a more detailed inspection of the viaduct and revealed that more extensive repairs were required.
- The scheme was modified by Michael Pooler Associates structural engineers, to address the repairs required and to redesign the surface water drainage to incorporate the original cast iron drainage channels, which were revealed during the ongoing works.
- The Scheme is nearing completion and there is a remaining budget of £2,000
- In order to complete the scheme, approval of recommendations is required to lay a 60mm bituminous macadam surface at an additional cost of £26,450, to maintain the good condition of the structure and to ensure minimal ongoing maintenance costs.
- The remaining weathered pointing will require replacement and approval is required to carry this work out as an addition to the scheme whilst the scaffolding is in situ, at a cost of £9,600
- An approach has been made to Lancashire County Council (LCC) for a contribution towards the cost of the bituminous macadam surface. A decision is awaited.
- Application of a bituminous macadam surface and replacing the remaining weathered pointing will secure the longevity of the considerable repair works carried out to date.

3. BACKGROUND

3.1 Hareholme viaduct is a former railway bridge, which currently supports part of the Valley of Stone Greenway Cycle Route (Route 92). Deterioration of the structure was reported in 2021 and a structural report was carried out by Michael Pooler Associates, advising repair works.

3.2 A structural civil engineering scheme to repair the deterioration of the viaduct and to prevent potential collapse was designed by Michael Pooler Associates, and the scheme was tendered.

3.3 A total budget for the scheme of £400,330 was approved by Full Council on 13 September 2023, together with approval for the appointment of Lee Ashworth Ltd as the Principal Contractor, following their tender submission, which was evaluated as providing best value.

3.4 Work commenced in October 2023, and revealed the full extent of the deterioration to the viaduct and also uncovered the original drainage system.

3.5 The deterioration of the structure was greater than originally assessed, and the scheme was modified to incorporate use of the original drainage channels into the design and to address the additional repair works required. There is a remaining contingency of £2,000 to complete the scheme.

3.6 In order to complete the deck surface, Michael Pooler Associates has advised that a 65 mm bituminous macadam surface is essential to maintain the good condition of the structure and to ensure minimal ongoing maintenance costs.

3.7 An approach has been made to Lancashire County Council to contribute to the costs of the completion of surfacing works, from the Valley of Stone Gateway funding.

3.8 Approximately 50% of the pointing of the brickwork has been completed as part of the scheme. Michael Pooler Associates advised that the remainder of the weathered pointing will need to be replaced within 5 years, and that it would be cost effective to complete these works as part of this scheme. The cost of the additional pointing works is £9,600.

4. DETAILS

4.1 Work on the scheme commenced in October 2023 with the removal of trees and vegetation, enabling a more detailed examination of the viaduct. This revealed considerably more defects and anomalies in the structure than had previously been evident.

4.2 The surface of the former railway line was bituminous macadam and flexible rubber coating, which was laid approximately 10 years ago as part of works to the cycleway. There was no obvious mechanism for drainage of the deck. When the deck surface was removed as part of this scheme, the original 100mm cast iron drainage channels within the structure were exposed. These inlets on the deck had been covered with road stone and rendered ineffective.

4.3 The opinion of Michael Pooler Associates was that the deterioration of the viaduct spandrels had accelerated in the last 10 years, and was consistent with the absence of any provision for effective drainage of the bridge deck when the surface was renewed. This had allowed ingress of surface water through the structure, resulting in the freeze/thaw cycles, causing spalling to the barrels of the viaduct and bulging of the stonework.

4.4 Michael Pooler Associates modified the scheme to incorporate renovation of the original drainage channels and to address the full extent of the repair works required to ensure the adequate provision for effective drainage of the deck. The new design has provided 2 levels of protection for the structure. The first is the installation of a central drainage channel, which enables surface water to flow into the original drains within the structure, through the barrels of the bridge. The second is an impermeable membrane laid over the whole of the deck, which filters into surface water drain at the Rawtenstall end of the viaduct.

4.5 In order to complete the surfacing of the deck area, two options were proposed – 60mm bituminous tarmacadam or compacted limestone hardcore. Whilst the compacted limestone is a cheaper option, it is a porous surface and would not primarily direct surface water into the new drainage system. The water absorbed through the surface of the limestone would collect on the surface of the impermeable membrane and filter into the land drain at the southern end of the viaduct. The collection of water on top of the membrane could also result in freeze/thaw

action with the potential to result in earlier destruction of the protective membrane. The cost of the limestone option is £5350.00.

4.6 In order for the effective drainage of surface water on the deck, the Structural Engineer's recommendation is that a 60 mm bituminous macadam surface to the whole of the deck area is essential to maintain the good condition of the structure and to ensure minimal ongoing maintenance costs. As the bituminous tarmacadam is only slightly porous, this will ensure that surface water will run effectively into the drainage systems.

4.7 As the deck of the viaduct forms part of the Valley of Stone Greenway, Lancashire County Council (LCC) has been approached to contribute to the shortfall in the scheme for providing a bituminous macadam surface from the Valley of Stone funding. A decision is awaited.

4.8 The significant rebuilding works within the scheme have resulted in approximately 50% of the pointing of the viaduct being replaced. Due to the weathered condition of the remaining pointing, it would be prudent to replace the remaining pointing to ensure the longevity of the considerable works undertaken to date. Access to the viaduct has required scaffolding and the scheme has been carried out under an Environmental Permit. If this work were to be deferred, the cost of the scaffolding, permit and site welfare required would far outweigh the cost of the pointing works. The cost for completion of the additional pointing works as part of the scheme is £9,600.00.

5. RISK

All the issues raised and the recommendation(s) in this report involve risk considerations as set out below:

5.1 Completion of the surfacing of the viaduct deck is required to complete the scheme. If the surface is completed with compacted limestone, there is a greater risk of water soaking through the surface and collecting on the top of the protective membrane. This could reduce the life of the protective membrane, would need earlier replacement and would require increased maintenance of the surface drainage system.

5.2 Completion of the surface with bituminous macadam is a higher cost option, but would ensure the longevity of the works completed, the effective functioning of the drainage systems and assist in the ease of ongoing maintenance.

5.3 There is potential to acquire funding for the shortfall to complete surfacing of the deck via LCC, but there is a risk that the funding available may not meet the shortfall.

5.4 If the additional pointing is not carried out whilst the scaffolding is in place, there is a risk that the cost of completing the work in the future would be prohibitive and will not be completed, thus undermining the works completed within this scheme. There is a significant cost-benefit in carrying out the works whilst the scaffolding and Environmental permit is in place.

6. FINANCE

6.1 The current Capital Programme includes a budget of £400k for the Hareholme Viaduct remedial works scheme. This proposal will increase the total scheme cost to £436k.

6.2 The assumed life of the asset after carrying out the repairs is deemed to be 40 years, after factoring in the cost of borrowing and the minimum revenue provision (MRP) the total scheme will add an extra cost of c£33k per annum to the revenue budget. However officers will give consideration as to the optimum funding arrangements, which may include: use of capital receipts, internal borrowing and any other requirements for PWLB borrowing.

6.3 A capital contribution from LCC, should the request be successful, would reduce the ongoing revenue cost for the Council.

7. LEGAL

These works are necessary to ensure the Council asset is protected and maintained in the most cost effective manner. The additional works will be a variation to the existing contract and will be agreed in writing.

8. POLICY AND EQUALITIES IMPLICATIONS

There are no policy or equalities implications.

9. REASON FOR DECISION

9.1 Full Council to approve completion of the deck surface with 65mm bituminous macadam to ensure effective protection of the viaduct.

9.2 Full Council to approve replacement of the remaining weathered pointing, whilst the scaffolding is in situ.

9.2 Full Council to approve an unfunded budget increase of £36,050 to complete the required works. If the approach to LCC for a contribution is successful, the additional expenditure will be partially funded.

Background Papers	
Document	Place of Inspection
Report to Full Council – Repairs to Hareholme Viaduct 13 September 2023	C4%20Repairs%20to%20Hareholme%20Viaduct (rossendale.gov.uk)
Report by Michael Pooler, Structural Engineer 22 February 2024	Attached.

MICHAEL POOLER ASSOCIATES
CONSULTING CIVIL & STRUCTURAL ENGINEERS

310 Newchurch Road,
Bacup, Lancashire, OL13 0UJ.
Tel: 01706 876195
Fax: 01706 879524
E-mail: enquiries@m-p-a.co.uk

MP/CH/8121

26 February 2024

Rossendale Borough Council
The Business Centre
Futures Park
Bacup
OL13 0BB

For the attention of Jane Riley

Dear Jane,

Hareholme Viaduct, Rossendale

Further to our discussions with regard to the structural defects and the recommended additional cost on Hareholme Viaduct, I would make the following comments.

The railway was constructed in 1848 (single track) the original nine arch Viaduct of single-track width was subsequently enlarged (1880) to the present size to accommodate a two-track system. The railway line was closed in 1964 and was subsequently converted to a Bridleway and Trackway, possibly between 2005 – 2010.

Concerns regarding the structure were first raised in August 2021 by operatives of Lydall Filtration Ltd who occupied the site between Newchurch Road, Waterfoot and the Viaduct. Resulting in a joint inspection by Rossendale Borough Council and Michael Pooler Associates which identified some bulging and step cracking in the spandrel walls (Arch 2 – 3) Report No. 8121 August 2021. Access to the structure was very difficult given the extensive tree growth throughout.

Initial repair schedules were carried out including the installation of pattress plates and some localised stone reconstruction during 2021-2022 although Covid restrictions at the time were present.

A further limited inspection during 2022 was carried out identifying further deterioration to several of the nine Arches resulting in receipt of tenders for the current repair scheme.

Following site clearance of the trees and construction of the access road and scaffolding, deck clearance confirmed a road surface of part bitumen and part rubberised Cycleway.

The bridge is approximately 9 linear metres long x 8 metres wide, incorporating nine radial arches spanning over part of the River Irwell, between arches No. 2 – 3.

Lancashire County Council/Rossendale Borough Council assume responsibility for maintenance of the former line for the purposes of Cycle Track/Bridleway from Rawtenstall to Bacup centre, probably from 1990 to the current time. Within the last 10 years some form of bituminous macadam has been part of the former track (North side) together with the incorporation of flexible compound laid to some of the track on the Southern side.

Whilst there was evidence of some miscellaneous drainage within the bridge decking there is no indication or remains of a functioning drainage system to drain the original bridge deck.

The arch located to the rear (Southern side) of Newchurch Road, behind the original former Electrical Works occupied at the time by Lydall subsequently now by Alkegen. It was only the observations from personnel from the factory that identified some form of cracking on the North facing spandrel wall between arches 2 – 3 in the form of step cracking in the masonry. The footprint beneath the bridge was heavily overgrown with mature trees and access to the ground level of the arch construction was difficult and compromised by the intense tree growth.

In 2021 the Local Authority attention was brought to the fact that cracking was identified in the arch resulting in an inspection by ourselves, carried out in 2021 Report No. 8121 With the consideration for lateral restraints in the form of two number pattress plates to repair/reinstate the deformed masonry.

The barrel of the arch was constructed on four courses of blue engineering brick which still preformed a satisfactory radial profile for the span of 9 metres and a rise in the order of 2 metres. Provisional repairs were recommended in Report No.8121, but further investigation, following tree removal under the current contract identified considerably more defects and anomalies in the structure as a whole.

I consider that the failure of the spandrel facing has been caused by the uncontrolled discharge of water following tarmacking, allowing water to seep through the bridge sub-strata into the masonry barrel below, allowing the sub-strata to be heavily saturated with water and vegetation matter, resulting in winter with the inevitable expansion of any water within the structure causing expansion and blowing of the header brickwork supporting the arch. The surface footprint of the bridge section is in the order of 700 square metres.

On the Southern side of the bridge the ground slopes significantly towards the bridge directing surface water down the Southern end of Highfield Road and discharging on the bridge decking on the East (chainage 0) and continues to follow the natural slope of the bridge towards the end, chainage 100 metres East to West (Bacup to Rawtenstall).

The normal mechanics of water penetration and frost expansion has caused severe spalling to the barrel arches of the bridge, resulting in modifications to the Scheme from those originally intended.

The current works are detailed on contract drawings and the Scope of Works description with further modifications to the final Scheme as the result of more detailed investigations when site access was possible, including exposing and utilization of the existing surface water drainage constructed on the original arches (South) through the barrel arch below. To installation of an impermeable water proof membrane extending for the full width and length of the arch following the fall of the structure with a surface water outlet located around chainage 100 (Western end, Rawtenstall) as a secondary drainage outlet, to prevent any further percolation of water into the barrels.

In addition, the decking has been profiled from both parapets to a central drainage channel utilising the seven outlets exposed and tested for retention from the original construction.

With regard to the question of the completion, I consider that the installation of the 60mm bituminous macadam as a road surface is essential for maintaining the good condition of the significant upgrading of the structure, consistent with minimal further maintenance costs. In upgrading the condition of the bridge and ensuring that the problems encountered within the last 10 – 15 years have been dealt with as practically as possible, the installation of a bituminous surfacing will direct surface water directly into the drainage system to ensure the integrity of the sub-strata in the long term.

Should the surfacing not be carried out we would be relying on the secondary waterproof membrane which in terms of water disposal is not as efficient as the intended surface profile to drainage outlets, approximately 10 metre centres (surfacing cost £26,450.00).

Similarly, during the works we have reconstructed significant parts of the parapet on the Western end (North parapet) where partial collapse of the parapet support was evident resulting in reconstruction of the parapet wall for a length in the order of 20 linear metres.

The other outstanding matter relates to the areas of weathered pointing which is in need of renewal (cost £9,600.00) given the present scaffolding is in-situ. Should the works be carried out in the future the scaffolding cost would be in the order of £12,000.00.

Should you have any queries regarding the interpretation of this letter please do not hesitate to contact me.

Yours faithfully
MICHAEL POOLER ASSOCIATES

Michael Pooler M.Sc. C. Eng. M.I.C.E. F. Cons. E.