MEMORANDUM

Date	17 September 2015
Reference	UA007705-19-ECV-MEM-HYD-1503 rev A01
From	Richard Shimell
To	Ian Grimes, Daniel Perez
Copies	Toby Skeels, James Buckley, Tom Faith, Andy Barnes
Subject	Alton Station – Heritage Footbridge Condition Report - Addendum

To Ian and Daniel,

Hyder Consulting Ltd were commissioned to undertake a visual condition survey of the heritage footbridge structure at Alton Station. Hyder produced a memorandum on the bridge condition, UA007705-19-ECV-MEM-HYD-1502 rev A01 dated 09 April 2015, following a daytime visual survey. The document made a number of recommendations and conclusions to identify a scope of works and repairs to allow the bridge to be retained to the start of Network Rail (NR) Control Period 6 (CP6).

The scope of remedial works required to increase the life of the bridge structure was included in Osborne's contract in conjunction with Alton Station Franchised Station renewal works on Platform 2. A specialist timber supplier, Sumo, was commission to undertake the repair works. In preparation to start the works, it is understood that further intrusive inspections of the bridge were undertaken by Sumo. This was done by:

- removing paint on platforms trestle supports and drilling to check for rot extent
- opening one internal panel
- using an endoscope camera through drilled inspection holes

These survey by Sumo identified an increased extent of wood rot in the main trestle legs and also additional wood rot within the main span, including in the single panel opened adjacent to the staircase on Platform 1, where the wooden member beneath the window had significant wet rot. This additional information resulted in an on-site decision to close the footbridge to public throughout the Platform 2 Franchised Station renewals works. Public access was maintained through the modern AfA footbridge situated further towards the London end of the station.

Following this decision, Hyder were asked to provide further advice on whether the original scope of work had grown and if the original conclusions with regards to extending the short-term use of the bridge to CP6 were unchanged. To inform this Hyder re-visited the bridge to inspect the internal panel, obtained feedback from Sumo of the outcome of their surveys and reviewed a video and photographic survey by Osborne undertaken through internal panel inspection holes. This memo presents this additional information and provides conclusions and recommendation on the scope of bridge repairs.

Kind regards,

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Asset Information

The complete list of stations and assets under consideration in the study are shown in the table below.

Station	ELR	Mileage	Asset
Alton	PAA2	49m 13ch	Heritage Footbridge

The heritage footbridge structure is a wooden through bridge supported from four-post braced columns located on Platforms 1 and 2. The footbridge bottom chords are partially strengthened with steel T-sections from the supports to approximately one third span.

The footbridge is fully enclosed with a semi-circular corrugated roof. Archive drawings suggest the footbridge is 1.4m wide. The footbridge has wooden handrails throughout and the treads and risers are generally in good condition (stair woodworm has been previously identified), with yellow nosings to indicate landings and white nosing in-between. It is glazed throughout with only a few broken/missing panes. The bridge is clad with painted tongue and groove boards externally beneath the glazing and has thin painted wooden internal cladding panels.

Additional Survey Information

Following the decision to close the heritage footbridge at Alton Station to the public, more information was needed to allow a review of the bridge condition to judge if original repair recommendations were sufficient to retain the bridge into CP6. The area of focus was the main span of the structure, which was hidden by internal cladding panels on the first survey. Three additional sources of information were obtained:

1. Additional Sumo survey information
2. Day time visual inspection by Hyder on 30 July 2015 to review behind staircase panel
3. Photographic and video camera survey through drilled inspection holes in the panels by Osborne

Sumo Survey Information

It is understood from Osborne that in preparation to undertake contracted repair scope of works on Alton Footbridge, Sumo, a timber specialist subcontractor commissioned to perform the bridge repairs, undertook further inspections in July 2015.

Where repairs had been identified on the platform trestle legs, Sumo removed paint and drilled through members to ascertain the extent and depth of the rot. The rot on diagonal trestle members was more extensive than first identified based on purely visual inspections.

Sumo also drilled round holes approximately 75mm diameter and then used a digital black and white endoscope camera to check if there was rot behind the internal bridge panels. Furthermore Sumo opened a panel on Platform 1 between the intermediate landing and the main span on the country elevation of the bridge (see Figure 1).

A brief report was obtained from Sumo following the surveys which stated that they found “various minor rot behind the panels on the upright posts and stair stringer”. However, it was observed that “without removing the panels, we [Sumo] cannot see the extent of the rot”. The endoscopic camera did not record video and no further data was available to Hyder to review other than these observational comments.

Visual Inspection

Hyder engineers conducted a daytime site visit on 30 July 2015, principally to look behind the panel Sumo opened adjacent to the Platform 1 stairs. The panel had a significantly rotten timber member, spanning between vertical members beneath the window sill. This location is shown in Figure 1.

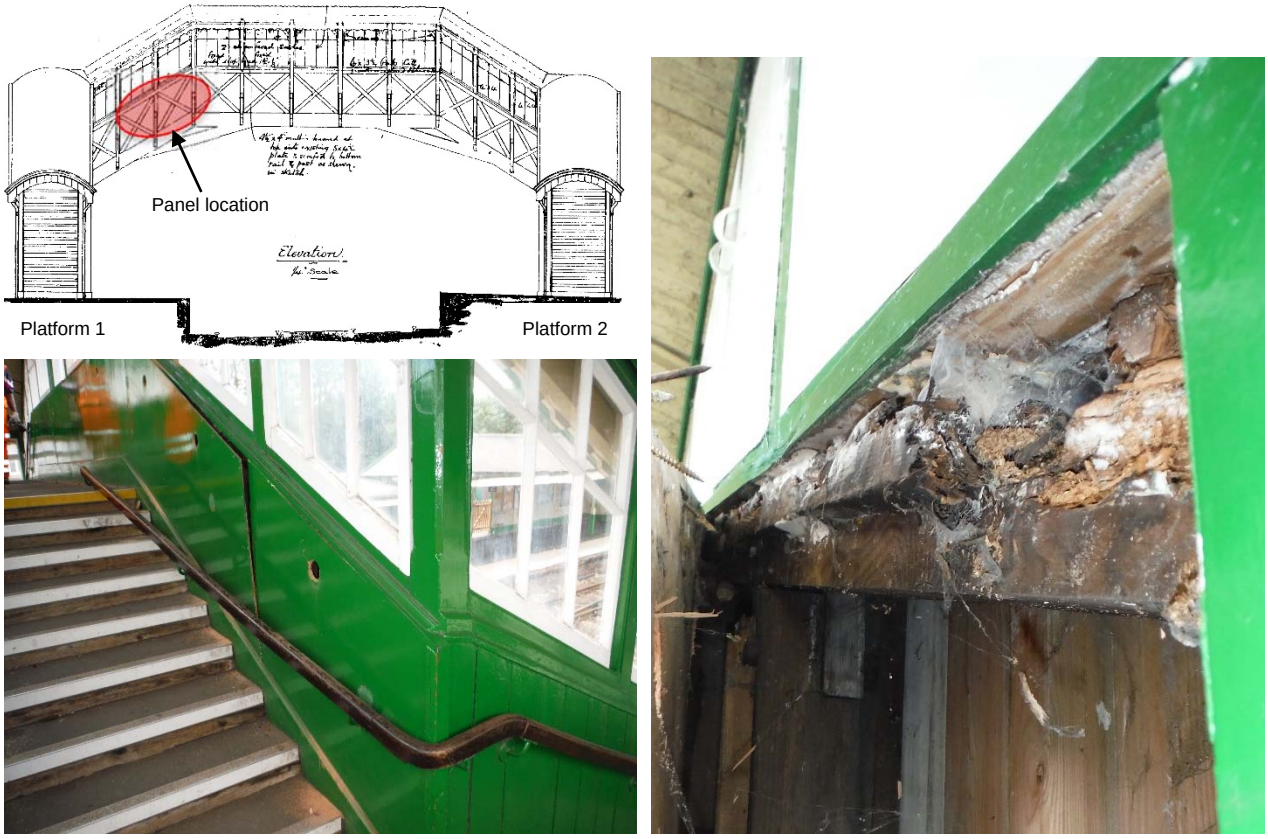

Figure 1: Location and rotten timber behind internal panel

The visual survey continued by looking through the drilled inspection holes on the internal cladding panels to attempt to determine the bridge structure, as initial findings suggested differences to archive information, such as an absence of the cross bracing beneath the windows (as shown in the archive drawing displayed in Figure 1). Whilst the location and size of the holes limited the extent of information to be gained, no cross bracing was observed behind any panel and some structural form could be identified, including perceived main diagonal and horizontal elements, as illustrated in Figure 2 (and shown further in Figure 15).

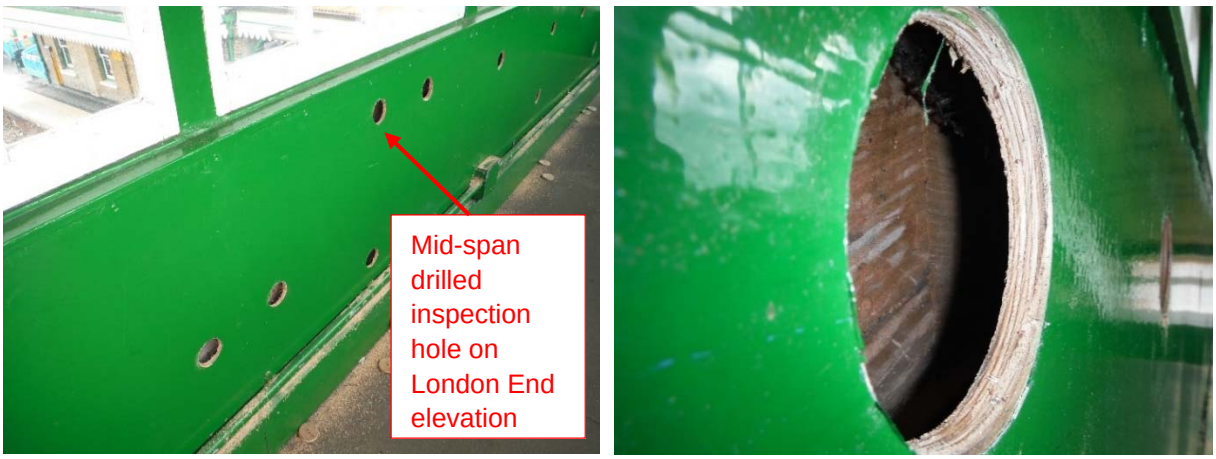

Figure 2: Drilled inspection hole showing diagonal member transition into horizontal member

Further internal cladding panels were not removed at this time due to the risk to operational lines beneath the bridge and potential disturbance to external cladding.

Photographic & Video Survey

To assist with the assessment of the bridge, Osborne performed a video survey behind the panels by drilling larger inspection holes and filming through them to see if rot could be identified on the main span. The survey numbered the panels as shown in Figure 3.

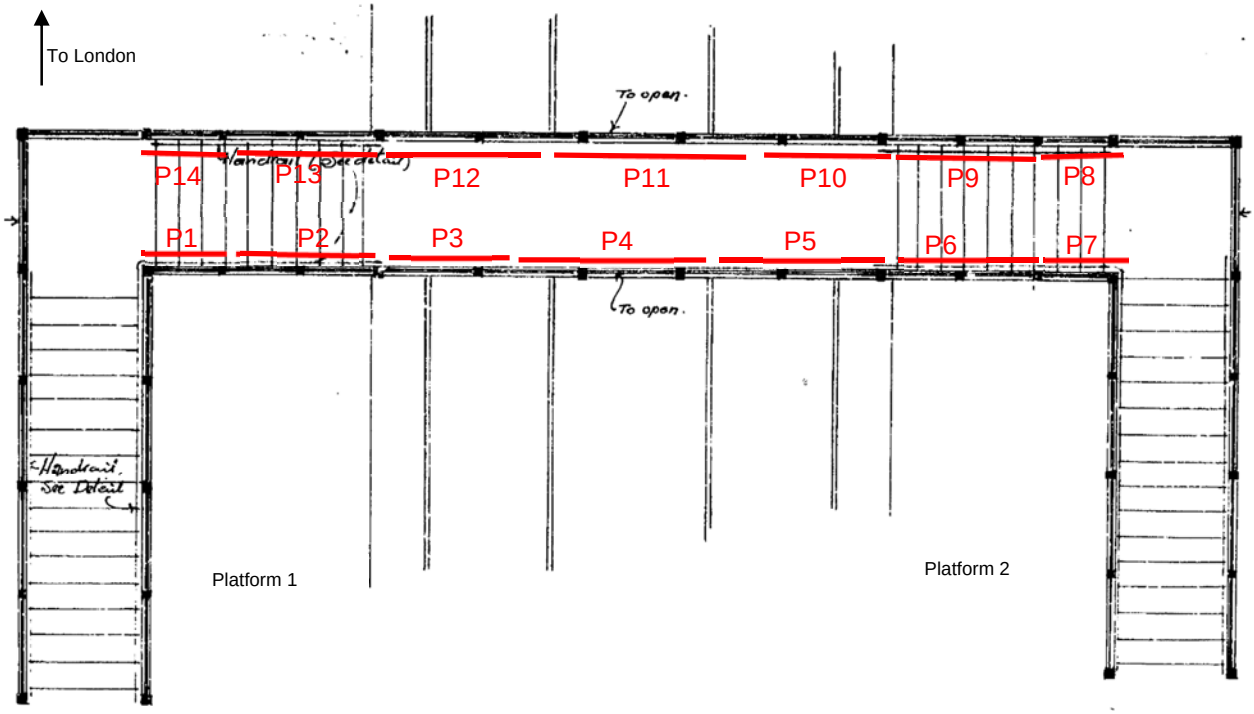

Figure 3: Internal panels numbering for video survey

The video did not provide sufficient lighting levels or image quality to determine any additional rot within the main span. No timbers with section loss were identified and it is unclear if the timbers were wet or dry at the time of filming.

The video was supported by a brief photographic survey with images behind the internal panels. The main observations from these photos are included in Figure 4 to Figure 13.

Figure 4: View down into Panel 1 and view down into Panel 2

Figure 5: View towards Platform 2 and view towards Platform 1 in Panel 3

Figure 6: View towards Platform 1 in Panel 4

Figure 7: View towards Platform 1 and a view looking up to the window sill in Panel 5

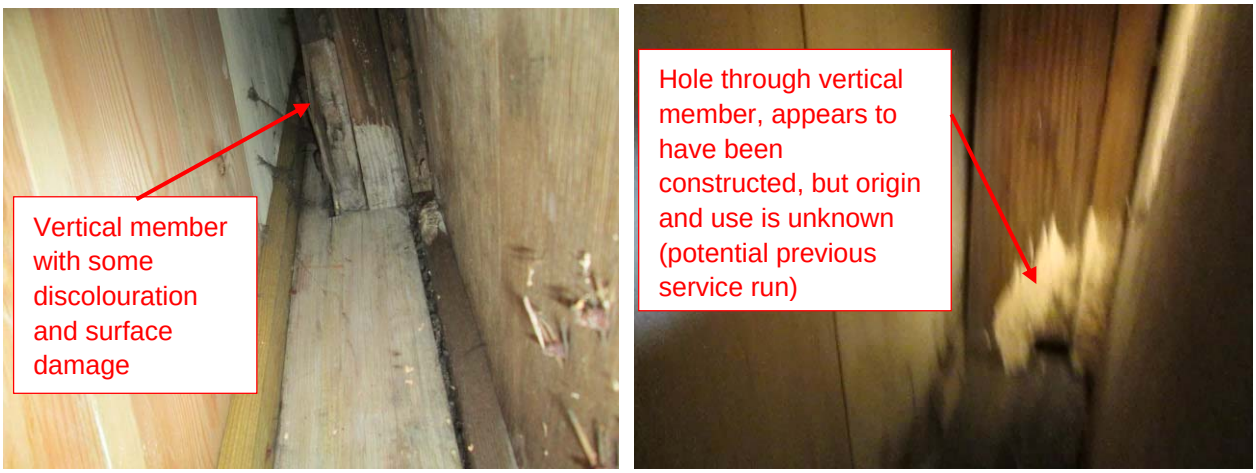

Figure 8: View towards Platform 1 in Panel 6 and a view towards Platform 1 in Panel 7

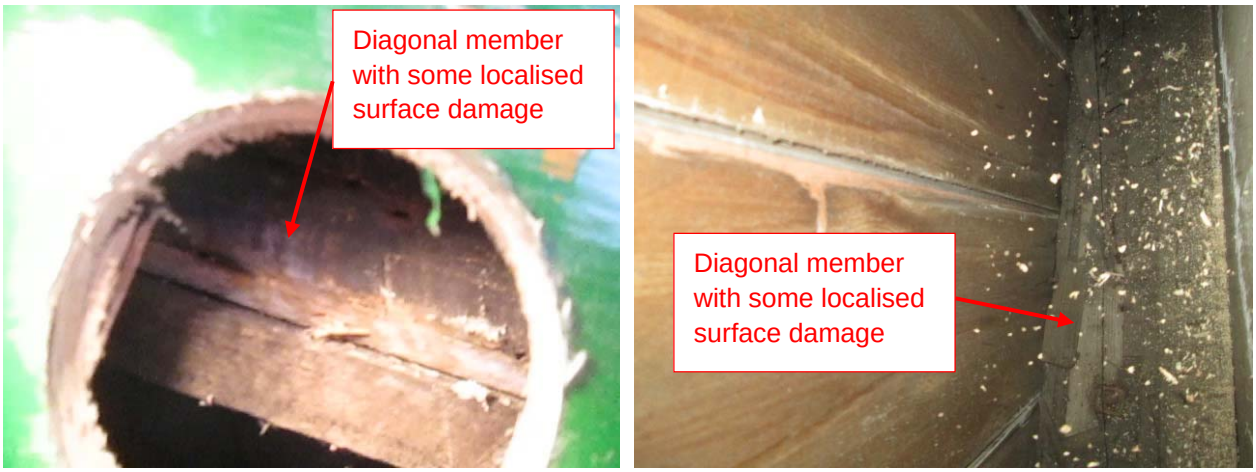

Figure 9: View through inspection hole at top of Panel 8 and a view down into Panel 8

Figure 10: View looking down towards Platform 2 and a view looking up towards Platform 2 in Panel 10

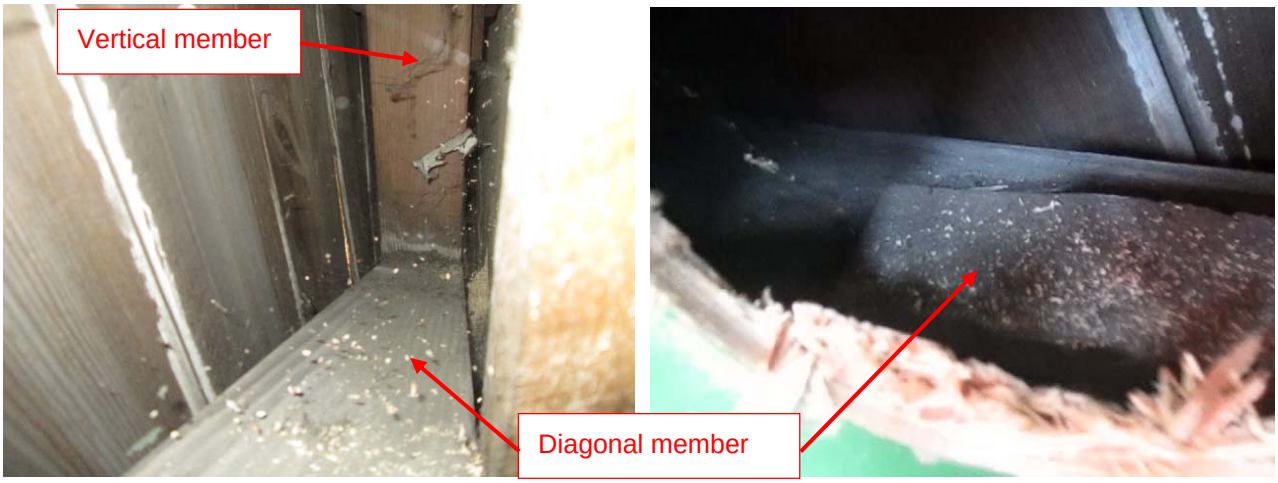

Figure 11: View towards Platform 2 and a view down in Panel 11

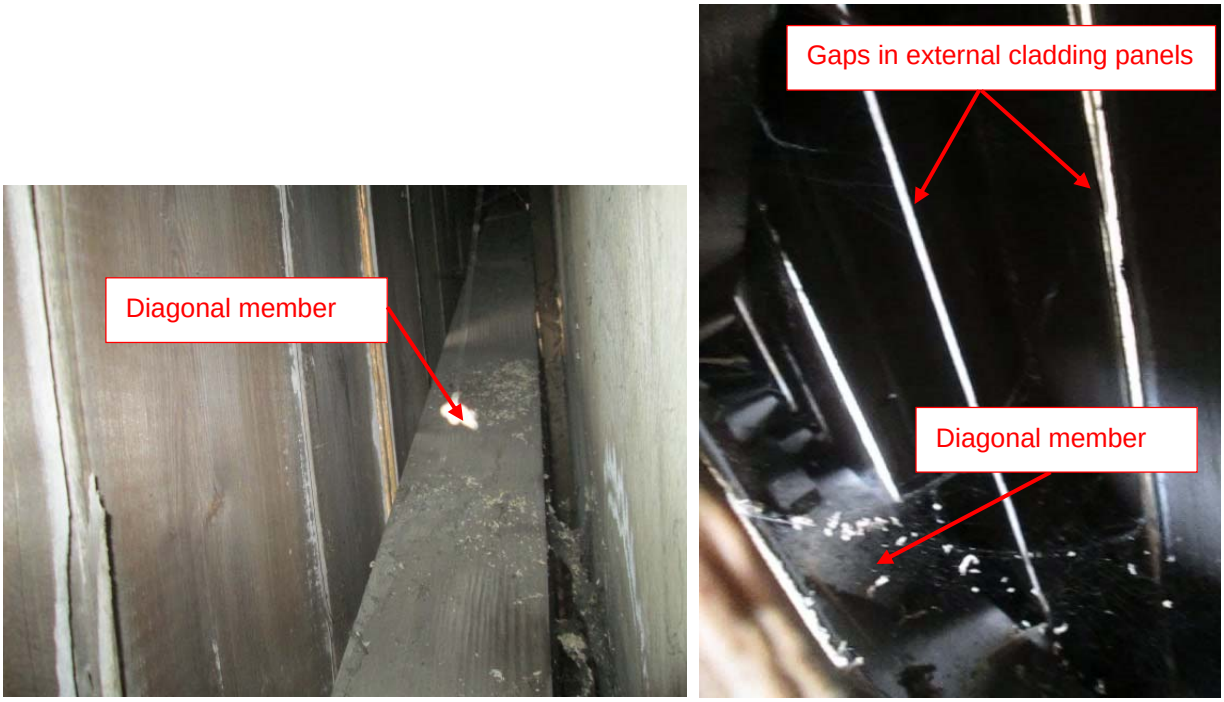

Figure 12: External views of Panel 12

Figure 13: View in Panel 13 & 14 (staircase)

The video and photographic evidence provided shows the diagonal members (transverse stair stringers) spanning from the support trestles do not form the bottom chord of the footbridge. These diagonal members continue up into the structure and another member spans horizontally across the tracks. This supports external observations and suggests metal bracing has been used to provide a link between these two structural members.

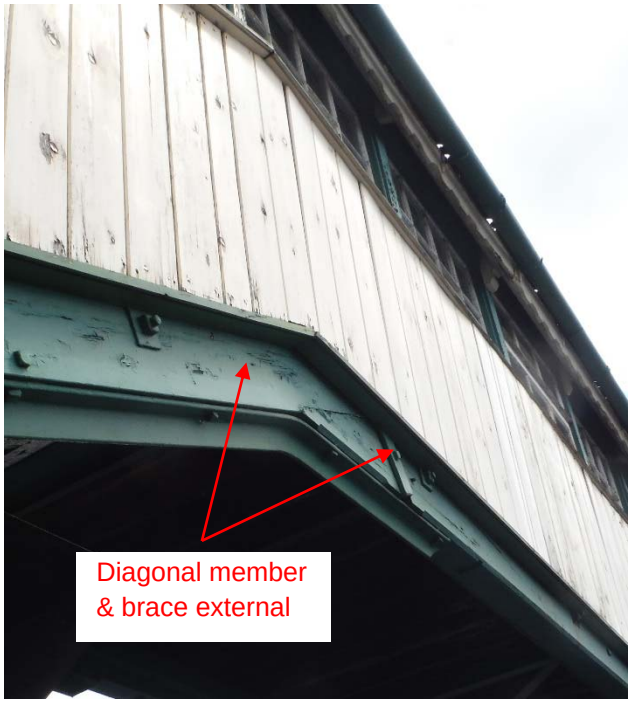

Figure 14: View from Platform 1 of external main span diagonal member which continues under the stairs up between the internal panels and external cladding. A metal brace appears to pass above this diagonal member, as shown in Figure 5 and Figure 10 and fix externally into the main horizontal member

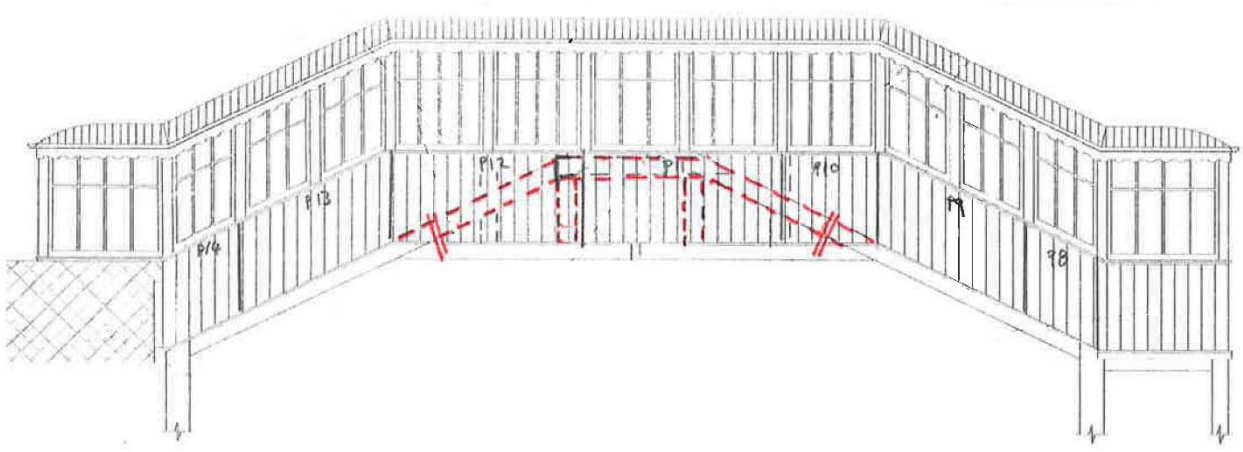

Figure 15: Believed structural form of Alton Footbridge from photos and video evidence

The photos behind the panels illustrated evidence of water ingress, such as discolouration and damage to window sills, and signs of some surface damage to members. From this evidence, these defects are judged to be non-structural and no significant rot within the main span has been identified. However no touching inspection has been performed and unclear if the timbers were wet or dry, soft or hard. Gaps to external cladding panels were previously identified and panels should be re-fixed as required.

Conclusion

It is judged based on this additional information that the original remedial works presented in the Hyder memo UA007705-19-ECV-MEM-HYD-1502 rev A01 dated 09 April 2015, and developed into a scope of works for the Osborne contract at Alton Station are sufficient to extend the bridge design life into CP6. This conclusion is based on engineering judgement of the additional evidence presented, rather than a structural assessment.

The RAM remitted scope of remedial works, developed from the original Hyder inspection and subsequent Osborne supply chain engagement with Sumo, were identified as follows (taken from Alton Stage 2 contract):

- Undertake permanent repairs to existing trestle legs on Platform 1 and 2 where section loss has occurred.
  - Surface decay not exceeding 15mm depth – 2 part filler finished smooth in preparation for decorations
  - Decayed timber not exceeding 40% section loss – chop out defective timber to sound surface and undertake scarf repair using Douglas Fir bolted and plated
  - Section loss exceeding 40% - cut out defective timber to a minimum of 150mm beyond extent of rot, replace section with Douglas Fir to match existing. Slot mortice tennon joints, or doweled tennon jointing between new and existing timber as appropriate
- Patch repair to spalling and corrosion of reinforcement to Platform 1 concrete base
- Patch repair corrugated roofing with code 4 lead dressed to existing sheeting
- Re-fix external vertical TG&V cladding in various location (allow to replace timber studwork behind cladding
- Treat woodworm to stair risers
- Replace broken glass
- Service existing rainwater goods and leave free flowing to eliminate over run
- Chop out rotten sections of window sill and replace with new C24 treated timber
- Fabricate and install new painted steel flashing to cover and protect existing external sill to prevent further water ingress to bridge span
- Reinforce existing joints to timber sashes as required using galvanised steel plates
- Re-seal externally between sashes and frames
- Scrape back areas of loose paint
- Paint all bare timber with ‘Sadolin Superdec’ or similar opaque timber protection pigmented to match existing

These remedial works should be undertaken in conjunction with the identified maintenance activities also recommended in the memo. Access to Platform 2 can be maintained via the AfA footbridge during the works.

The following is recommended based on the additional information available:

1. Previously identified trestle leg repairs should be performed based on extents found in Sumo intrusive survey findings.
2. The rotten timber member beneath the window sill discovered beneath the panel shown in Figure 1 should be replaced.
3. The internal panels which have been drilled for inspection are to be replaced.

Consideration should be given to:

1. Sumo did report the endoscopic survey identified areas of rot and some photos show evidence of surface damage of some timbers. There is evidence of water ingress through the main span (such as discolouration to timbers and damage to window sills) which is consistent which observations in the original remedial repair memo which noted roof and gutter repairs were required. The extent and severity of these defects should be explored and repairs assessed as part of the works, as it is currently unclear if the timbers are dry or damp or exhibit any soft spots.

2. Further inspection behind the internal panels would allow improved understanding of the structural members and loading pathways of the bridge. It is noted that there are discrepancies between archive information and the structural form observed through reviewing photos and video evidence. As such, structural modelling and assessment of the footbridge would benefit the understanding of the existing structure and provide more accurate assessment of its load capacity.

It is noted that if the footbridge needed to be re-opened with a known load capacity then a structural assessment would need to be undertaken.