Eastwood&Partners
CONSULTING ENGINEERS
St Andrews House, 23 Kingfield Road, Sheffield, S11 9AS
Tel: 0114 255 4554 mail@eastwoodandpartners.com www.eastwoodandpartners.com

STRUCTURAL ASSESSMENT AND CONDITION SURVEY

Water-Cum-Jolly Footbridge, Cressbrook, SK17 8SA

for

PEAK DISTRICT NATIONAL PARK AUTHORITY

E&P Job Number: 45374

Prepared by: A. Marshall

Checked by: J. Morris

Issue	Date	Status/Comments
Issue 1	September 2020	Final

Also at:- Centaur House, Ancells Business Park, Ancells Road, Fleet, Hampshire GU51 2UJ Tel: 01252 360 580

CONTENTS

EXECUTIVE SUMMARY

1. This report presents the findings of a structural assessment and condition survey carried out by Eastwood & Partners (Consulting Engineers) Ltd for, and on the instructions of, Peak District National Park Authority.

2. Peak District National Park Authority requirements of Eastwood & Partners are to inspect and assess the current footbridge to determine its suitability in supporting a pedestrian loading of 5kN/m2, together with a simple assessment of dynamic response. The intention is to estimate the remaining functional lifespan of the bridge (if any) with recommendations and budget costs for repair and/ or replacement of structural elements if required.

3. The survey consisted of a visual inspection of accessible areas only. The survey did not include; inspection from within the river; inspection of hidden structures (i.e. due to vegetation); opening up of structures; or below ground investigation.

4. The main span bridges the river from the stone abutment at the western end to the stone pier close to the eastern bank. The smaller span continues from the pier to the eastern bank. The bridge construction consists of two steel I-beams supporting a timber bridge deck, with timber parapets. The bridge is understood to be around 30 years old.

5. There is visual evidence of fairly widespread degradation of the original timber decking and support joists. The more recent upper deck relies on the lower deck for support. Where the structural integrity of the original timber joists/ deck has been degraded, this provides inappropriate support for the more recent deck. In view of the defects observed, we recommend full replacement of the bridge deck. Given the environment in which the bridge is located, it would be prudent to consider more durable composite decking boards, or such like, in lieu of traditional timber to ensure longevity. A further inspection of the currently hidden steelwork is recommended as it becomes exposed upon removal of the bridge deck.

6. Parapets will need remediation or replacement to ensure compliance with current regulations. For example, the top rail of the current parapet measures 870mm in height above deck level which is below requirements.

7. Any previous paint coatings to the steel beams have deteriorated to the point where they no longer provide adequate protection against corrosion. It is difficult to establish a generic level of corrosion/ delamination/ pitting for the steel beams, yet our assessment is that loss of

flange and/ or web thickness, due to corrosion, likely varies from anywhere between zero and 3mm. Any loss of steel due to corrosion ultimately reduces the sectional properties of the steelwork. This in turn decreases the structural capacity, whilst increasing the susceptibility to deflection and dynamic response.

8. Calculations confirm that the steel bridge structure in its original (circa 1990's) configuration complied with all relevant design checks, when a 5kN/m2 live load was applied globally.

9. Based upon a global 5kN/m2 live load on the bridge in its current configuration, any loss of section around the full perimeter greater than 1mm thickness, gives rise to a natural frequency in the beams less than the accepted 5Hz. If loss of section increases beyond 2mm thickness around the perimeter, then structural capacity starts to become compromised.

10. As a comparison, if there are 6 persons (at 150kg per person) located mid-span on the bridge, and a 3mm loss of thickness is considered around the beam perimeter, then the bridge is close to its structural capacity. We, therefore, recommend as a minimum the bridge capacity be limited to 6 people to ensure it does not become overstressed when considering the most onerous levels of corrosion. The natural frequency under this scenario, however, is around 3.5Hz which may be considered too low.

11. Depending on what level of natural frequency can be tolerated, it may be preferable to limit further the number of people on the bridge at any one time. For example, when considering a 2mm loss of thickness around the full perimeter, the following natural frequencies have been calculated for various load scenarios;

    - deck live load limited to 1 person mid-span (150kg); natural frequency = 4.95Hz
    - deck live load limited to 2 persons mid-span (300kg); natural frequency = 4.90Hz
    - deck live load limited to 3 persons mid-span (450kg); natural frequency = 4.85Hz
    - deck live load limited to 4 persons mid-span (600kg); natural frequency = 4.80Hz

    Whilst falling slightly short of the recommended 5Hz limit, these frequencies may be considered acceptable.

12. The degree of fixity between the 4No steel traverse beams and the upper flange of the main bridge beams needs to be assessed to ensure full lateral restraint is provided. This is very important for the validity of our calculations, and can only be properly inspected once the bridge deck has been removed.

13. We recommend all vegetation be removed from around the bridge supports to enable a thorough structural inspection.

14. In its current condition, the bridge structure will continue to degrade further over time, with increasing loss of strength and susceptibility to deflection and vibration. To limit ongoing deterioration, the steelwork needs to be cleaned (grit blasted or chemically cleaned) and repainted. Given the unique and challenging location of the bridge, we estimate budget costs for this work could be in the region of £50,000 to £80,000. Further advice and costings should be sought from specialist contractors. Liaison with the Environment Agency will also be required. It is recommended that remediation work is carried out within the next 2 years.

15. A replacement bridge should also be considered. Access to the site is difficult, so any replacement bridge will need to take account of this. A new bridge could provide an opportunity for a variety of designs and appearances, which may help with marketing, should outside funding be necessary. It may also provide an opportunity for local artists to be involved in a new look bridge, appropriate to the surroundings. We estimate budget costs for a replacement bridge could be in the region of £80,000 to £120,000.

1.0 INTRODUCTION

1.1 Terms of Reference

This report presents the findings of a structural assessment and condition survey carried out by Eastwood & Partners (Consulting Engineers) Ltd for, and on the instructions of, Peak District National Park Authority. Any other parties using the information in this report do so at their own risk and any duty of care is excluded

1.2 Context

Peak District National Park Authority requirements of Eastwood & Partners are as follows;

- Carry out an inspection for assessment in line with Highways England Standard CS450 & CS454 (plus other referenced standards within those documents)
- Production of an inspection and assessment report including a drawing of the current structure
- Carry out a simple assessment of the load carrying capacity of the existing structure, including its suitability to take 5kN/m2 pedestrian loading, plus a simple dynamic check to determine its natural frequency is within acceptable limits (5Hz or above)
- If the timber elements are found to be in a very poor condition the assessment should only look at the capacity of the steel elements with an estimation of remaining functional lifespan subject to timber elements being replaced and the steel beams having sufficient residual carrying capacity
- A brief set of recommendations and estimated budget costs should be included covering options for repair (if any) and replacement of both timber and steel elements, whilst considering the access difficulties

1.3 Scope of Survey

Our survey of the footbridge was undertaken on 10th September 2020. The aim was to record general condition, identify any defects of structural concern, and measure key structural elements. Collection and assimilation of this information allows for appropriate structural assessments to be undertaken.

1.4 Limitations of Survey

The survey consisted of a visual inspection of accessible areas only. The survey did not include; inspection from within the river; inspection of hidden structures (i.e. due to vegetation); opening up of structures; or below ground investigation.

2.0 BRIEF DESCRIPTION OF THE BRIDGE

2.1 Bridge Location

The bridge is located across the River Wye in Cressbrook; postcode SK17 8SA, and centered on grid reference 417212:372810.

Bridge Location

2.2 Bridge History

From conversations on site, we understand the bridge was constructed around 30 years ago. Historical maps viewed prior to 1975 do not show any other bridge structure in this area. The weir adjacent to the bridge does, however, appear on maps dating back to the 1890's. It seems probable, therefore, that this is the only bridge to have been constructed over the river in this particular location.

2.3 Bridge Construction

View looking from the South

The bridge orientation is skewed slightly in the east to west direction and comprises two spans with an overall length of around 19.2m. The main span (approximately 15m) bridges the river from the western abutment to the pier close to the eastern bank. The smaller span (around 4.2m) continues from the pier to the eastern bank.

The bridge construction comprises two steel I-beams at around 1.05m centres supporting a timber bridge deck above, with a deck width of approximately 1.2m.

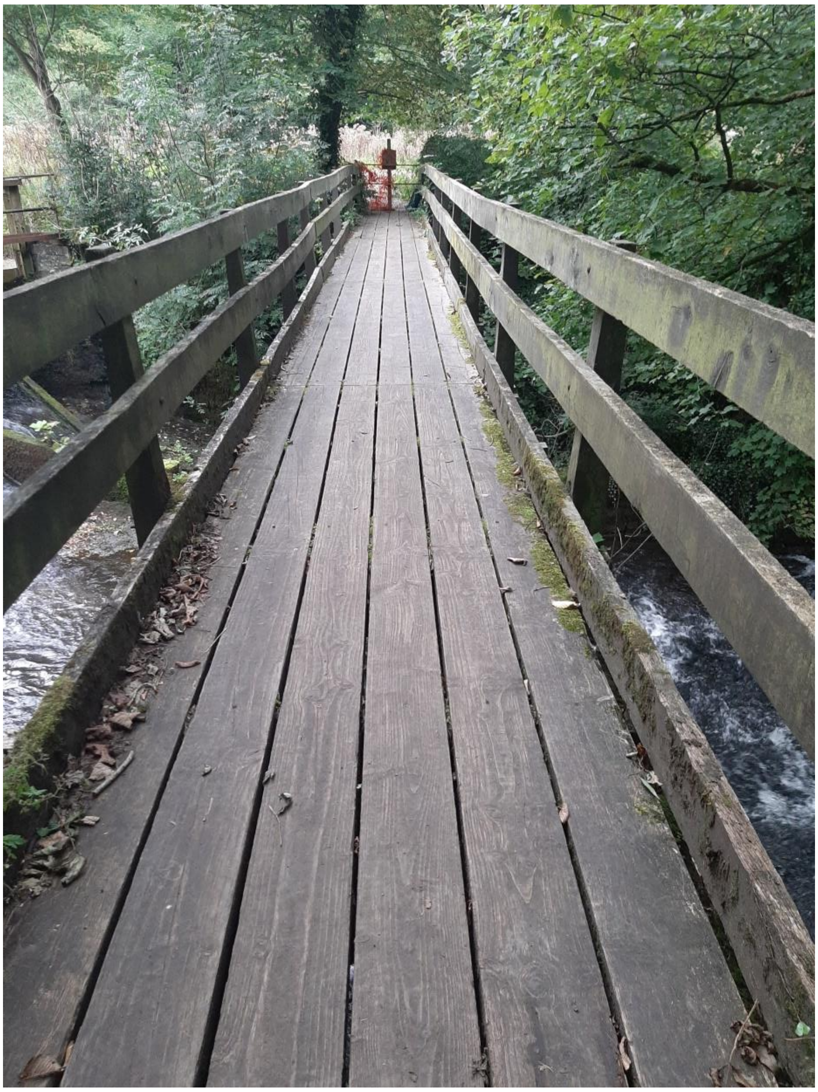
The parapets consist of timber uprights at approximately 2.0m centres which are tied together both below the steel beams, and to the bridge at deck level. Three timber boards span horizontally between the uprights to form the necessary edge protection. The top of the parapet is around 870mm form the top of deck level.

The main span is supported on a stone abutment at the western end and stone pier towards the eastern end, both built off the river bed. The western abutment is also built into and protrudes from the existing embankment. Both supports are rectangular in plan.

The shorter eastern span may be supported on the natural ground at the eastern end, but this could not be verified due to access limitations.

3.0 VISUAL INSPECTION

3.1 Bridge Deck



View looking from the Western end

The deck was noted to consist of two layers, with the current deck overlying the original, giving an overall depth of circa 275mm. The top deck comprises 6No 150mm wide by 50mm deep timber boards supported by 75 x75mm timber joists at approximately 900mm centres, bolt fixed to the timber handrail uprights at each end. The original deck below consists of 5No 200mm wide x 50mm deep timber boards supported on 65mm x 100mm deep timber joists at typically 800mm centres. The joists bear directly onto the top flange of the steel bridge beams.

View at Western Abutment showing deck build-up

View at top of Pier showing deterioration of timber

Generally, the more recent timber boards were in reasonable condition. However, some isolated boards were noted to be rotten at the ends, and were not securely fixed to the joists below in these locations. Whilst being unsafe due to their lack of fixity, they also present a trip hazard.

The original timber bridge deck was viewed to be in poor state overall. As the more recent deck overlays the earlier deck, it was not possible to fully inspect the condition of the original from above. Where observation was possible from below, however, the timber was noted to be very rotten in places. This is perhaps not surprising given the age of the timber forming the deck is around 30 years.

3.2 Bridge Beams

Measurements of the steel I-sections confirmed the original beams to be 406x178x54UB's. Previous protective treatment to the steelwork was evident, particularly on the beam webs, yet this was noted to have delaminated on nearly all surfaces. The exposed metal was showing varying degrees of corrosion, some of which was observed to be significant in places.

View looking towards the Western Abutment – flaking paintwork on steel

Four smaller I-Beams were noted to be supported on the top flange of the main span beams, at what appeared to be approximately 3m centres. These beams could not be accessed for measurement or inspection, yet they were seen to sit within the space created by the 65mm x 100mm deep timber joists – indicating beams of similar depth. It is assumed that the purpose of these traverse beams is to provide lateral restraint to the top (compression) flange of the bridge beams at these positions (assuming positive fixity between the two steels remains).

End of southern beam on Western Abutment – delamination of steel (top flange)

Underside of bridge – flaking paintwork/ exposed steel

Span towards Eastern bank

Steel sat on pier – flaking paintwork/ exposed steel

3.3 Bridge Beam Support Fixings

Beams were observed to be fixed to the western abutment and pier, via 10mm thick plate across the top flange anchored into the support with 2No 16mm diameter threaded rods either side of the beams. Due to lack of accessibility, it was not possible to see the fixing detail at the eastern end bridge support.

Bridge beam support fixing – Western Abutment, southern side

Bridge beam support fixing – Pier

3.4 Abutment (Western End)

View from the south, on the western bank

The abutment at the western end was measured to be approximately 2.4m x 2.0m in plan area with a maximum height of around 3.2m from river bed level. It was observed to have been faced in stone with mortar. The nature of the infill is not known.

The abutment is built directly off underlying natural rock forming the river bed. Other than vegetation around the southern edge penetrating mortar joints, the structure appeared to be reasonably sound with no visual signs of distress. However, localised deterioration may have occurred where roots have penetrated the structure. Until vegetation is removed, it is not possible to determine the extent, if any.

View from the North

View from the South

A recess measuring approximately 300mm wide x 300mm deep was noted at the top of the northern face of the abutment. This appears to allow space for the timber handrail structure below the steel beams in this location. Vegetation growth was visible at the top of the abutment, below the bridge.

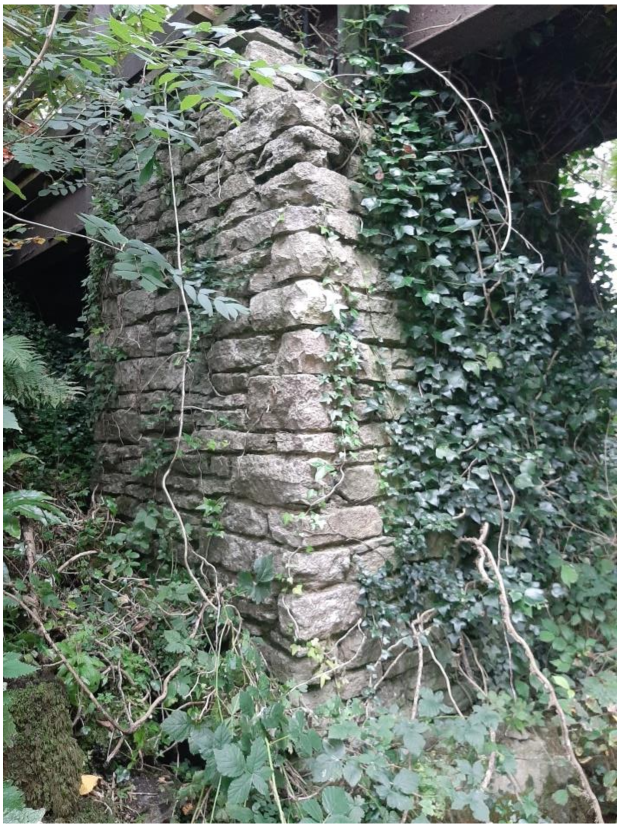
Recess at top of Northern face of abutment

3.5 Pier (Adjacent to the eastern bank)

The pier was measured to be approximately 2.0m x 1.4m in plan area with a height of around 2.0m from founding level. The abutment has been faced in stone and mortar. As with the western abutment, the nature of the infill is not known.

The pier was noted to be overgrown with considerable vegetation around each face. This creates the risk of roots penetrating the joints, leading to possible localised damage of the structure. Vegetation will need to be removed in its entirety to allow a more thorough structural inspection.

North-east corner



North-west corner

Western face

South-west corner

Southern face

3.6 Parapets

The bridge parapets comprise 100mm x100mm timber uprights at around 2m centres. Three horizontal timbers span between the uprights, acting as edge protection. The top of the parapet is approximately 870mm above deck level. This falls short of current minimum requirements for pedestrian bridges.

Where good visibility was possible, the condition of the timber appeared reasonable, with no obvious signs of structural distress

4.0 STRUCTURAL ASSESSMENT

It is difficult to establish a generic level of corrosion/ delamination/ pitting for the steel beams, as the degree of deterioration varies across the spans. Our assessment is that loss of flange and/ or web thickness, due to corrosion, could vary from anywhere between zero and 3mm.

Any loss of steel will reduce the sectional properties of the beams, with a consequential loss of strength and increased susceptibility to deflection/ vibration. In order to be able to analytically quantify the effects of corrosion on structural performance, we consider it appropriate to undertake a number of assessments based on varying degrees of corrosion.

The following assessment compares the structural performance of the original bridge construction against the condition of the bridge as it is now, taking into account different degrees of corrosion to the steel beams.

4.1 Original Bridge Structure

The original bridge comprised timber decking spanning between timber joists which were supported at each end by the 2No 406x178x54UB steel bridge beams. In terms of structural assessment, the bridge beams are considered to be simply supported at each end and continuous across the pier, located approximately 4.2m from the eastern side. Lateral restraint to the larger 15m span is provided at around 3m centres via steel traverse beams bolted to the top flange

Assuming the bridge was originally designed for a live load of 5kN/m2, and a dead load of around 0.24kN/m (based upon our estimations of the weight of the decking and parapet), the following has been calculated;

- Maximum dead load deflection = 7.0mm
- Maximum live load deflection = 23.2mm (span/ 646)
- Natural frequency approximately = 5.9Hz (greater than 5Hz)
- Maximum bending stress in beam approximately 42% of capacity

The steel structure in its original configuration complies with all relevant design checks under 5kN/m2 live loading throughout.

4.2 Current Bridge Configuration (5kN/m2 Live Load)

Analysis has also been undertaken based upon the bridge configuration at present, with a reduction in sectional properties arising from; 1mm, 2mm & 3mm loss of thickness to the flanges and webs, due to corrosion.

The support conditions considered for the original bridge structure assessment remain relevant, as do lateral restraint to the top flange. The condition of the fixings at restraint positions will, however, need to be verified at some point to ensure they have not been compromised due to corrosion.

Based upon the original design live load allowance of 5kN/m2, and an estimated dead load of around 0.43kN/m (to include the secondary decking), the results of this analysis are as below;

4.2.1 1mm loss of thickness around the full perimeter

- Maximum dead load deflection = 11.1mm
- Maximum live load deflection = 29.5mm (span/ 508)
- Natural frequency approximately = 4.8Hz (less than 5Hz)
- Maximum bending stress in beam approximately 69% of capacity

4.2.2 2mm loss of thickness around the full perimeter

- Maximum dead load deflection = 14.9mm
- Maximum live load deflection = 39.4mm (span/ 384)
- Natural frequency approximately = 4.14Hz (less than 5Hz)
- Maximum bending stress in beam approximately 96% of capacity

4.2.3 3mm loss of thickness around the full perimeter

- Maximum dead load deflection = 22.6mm
- Maximum live load deflection = 59.4mm (span/ 253)
- Natural frequency approximately = 3.37Hz (less than 5Hz)
- Maximum bending stress in beam approximately 176% of capacity

4.2.4 Summary

Under a global 5kN/m2 live load condition in the current configuration;

- any loss of section around the full perimeter greater than 1mm thickness, gives rise to a natural frequency less than the accepted 5Hz
- if loss of section increases beyond 2mm thickness, then structural capacity starts to become compromised in addition to the natural frequency falling outside of acceptable limits
- when considering a 3mm loss of thickness around the full perimeter, the steel bridge beams are well in excess of maximum allowable bending stresses and fall outside acceptable limits for natural frequency

4.3 Proposed Bridge Configuration – *(150kg Point Load Mid-Span)*

In light of the above, it seems prudent to reduce the allowable live load on the bridge. Further analysis has, therefore, been undertaken where the bridge live loading is reduced and restricted to just 1 person (at 150kg), located mid-span of the main span. The dead load on the bridge beams has also been reduced to account for a replacement bridge deck and parapets (estimated dead load of 0.3kN/m). The results of this analysis are as below;

4.3.1 1mm loss of thickness around the full perimeter

- Maximum dead load deflection = 9.6mm
- Maximum live load deflection = 1.98mm (span/ 7575)
- Natural frequency approximately = 5.75Hz (greater than 5Hz)
- Maximum bending stress in beam approximately 19% of capacity

4.3.2 2mm loss of thickness around the full perimeter

- Maximum dead load deflection = 12.9mm
- Maximum live load deflection = 2.7mm (span/ 5555)
- Natural frequency approximately = 4.95Hz (almost 5Hz)
- Maximum bending stress in beam approximately 27% of capacity

4.3.3 3mm loss of thickness around the full perimeter

- Maximum dead load deflection = 19.6mm
- Maximum live load deflection = 4.0mm (span/ 3750)
- Natural frequency approximately = 4.02Hz (less than 5Hz)
- Maximum bending stress in beam approximately 45% of capacity

4.3.4 Summary

Under a single live point load of 150kg mid-span;

- a loss of section around the full perimeter greater than 1mm thickness, keeps the natural frequency within accepted limits,
- if loss of section around the full perimeter increases to 2mm thickness, the natural frequency falls just outside accepted limits,
- when considering a 3mm loss of thickness around the full perimeter, the steel bridge beams fall outside acceptable limits for natural frequency,
- The structural capacity of the bridge is not exceeded and remains safe up to a 3mm loss of thickness.

4.4 Proposed Bridge Configuration – *(900kg Point Load Mid-Span)*

A final analysis has been undertaken to assess the implications of having 6 persons (at 150kg/ person), located mid-span of the main span. The results of this analysis are as below;

4.4.1 1mm loss of thickness around the full perimeter

- Maximum dead load deflection = 9.6mm
- Maximum live load deflection = 11.9mm (span/ 1260)
- Natural frequency approximately = 5.47Hz (greater than 5Hz)
- Maximum bending stress in beam approximately 42% of capacity

4.4.2 2mm loss of thickness around the full perimeter

- Maximum dead load deflection = 12.9mm
- Maximum live load deflection = 15.9mm (span/ 943)
- Natural frequency approximately = 4.72Hz (almost 5Hz)
- Maximum bending stress in beam approximately 59% of capacity

4.4.3 3mm loss of thickness around the full perimeter

- Maximum dead load deflection = 19.6mm
- Maximum live load deflection = 23.9mm (span/ 628)
- Natural frequency approximately = 3.83Hz (less than 5Hz)
- Maximum bending stress in beam approximately 99% of capacity

4.4.4 Summary

Under a single live point load of 900kg mid-span;

- a loss of section around the full perimeter greater than 1mm thickness, keeps the natural frequency within accepted limits,
- if loss of section around the full perimeter increases to 2mm thickness, the natural frequency falls outside accepted limits,
- when considering a 3mm loss of section around the full perimeter, the steel bridge beams fall outside acceptable limits for natural frequency and are on the limit of structural capacity .

Based upon the above, there is sufficient structural capacity to allow six persons (150kg/ person) across the bridge at any one time when considering all scenarios, although the natural frequency is less than the accepted 5Hz when the loss of thickness around the full perimeter is in excess of 1mm.

5 CONCLUSIONS & RECOMMENDATIONS

5.1 Bridge Deck & Parapets

There is visual evidence of fairly widespread degradation of the original timber decking and support joists. Due to restricted access, it was not possible to quantify the full extent. Given the lower bridge deck structure is around 30years old, it is perhaps not surprising that elements of timber have rotted and degraded in places. Isolated areas of the upper deck boards have also deteriorated to a point where they are unsafe and replacement is necessary.

The more recent deck clearly relies on the lower deck for support. Where the structural integrity of the original timber joists/ deck has been degraded, this degree of support for the more recent deck cannot be guaranteed.

In view of the defects observed, we recommend replacement of the full bridge deck. Given the environment in which the bridge is located, it would be prudent to consider more durable composite decking boards, or such like, in lieu of traditional timber to ensure longevity.

The top of the current parapet measures 870mm in height above deck level, and does not, therefore comply with current regulations. Parapets will need remediation or replacement along with the deck, either in similar form to existing, or in a different material/ style.

5.2 Bridge Beams

Any previous paint coatings to the steel beams have deteriorated to the point where they no longer provide adequate protection against corrosion. Corrosion is widespread across all the steelwork, although the extent does seem to vary. Loss of steel due to corrosion ultimately reduces the sectional properties of the steelwork. This in turn decreases the structural capacity, whilst increasing the susceptibility to deflection and dynamic response.

Industry guidelines state if the fundamental natural frequency of vibration for an unloaded footbridge exceeds 5Hz, then vibration serviceability requirements are deemed to be satisfied. Calculations show the original bridge had a natural frequency of around 5.9Hz which is therefore within the acceptable limit.

Our analysis confirms that a loss of around 1mm of thickness, or more, from the full perimeter of the steel beam would cause the natural frequency to drop below 5Hz, under the 5kN/m2 pedestrian live load condition. When considering 2mm loss of thickness around the beam perimeter, then the structural capacity of the bridge also becomes critical under the same live load condition.

As the degree of section loss overall may well fall between 1 and 3mm in places, we recommend the bridge load capacity be reduced.

From a strength perspective, if there are 6 persons (150kg per person) located midspan on the bridge, and a 3mm loss of thickness is considered around the beam perimeter, then the bridge is close to its structural capacity. We, therefore, recommend as a minimum that the bridge capacity be limited to 6 people to ensure it does not become overstressed when considering the most onerous levels of corrosion. The natural frequency under this scenario, however, is around 3.5Hz which may be considered too low.

Depending on what level of natural frequency can be tolerated, it may be preferable to limit further the number of people on the bridge at any one time. For example, when considering a 2mm loss of thickness around the full perimeter, the following natural frequencies have been calculated for various load scenarios;

- deck live load limited to 1 person midspan (150kg); natural frequency = 4.95Hz
- deck live load limited to 2 persons midspan (300kg); natural frequency = 4.90Hz
- deck live load limited to 3 persons midspan (450kg); natural frequency = 4.85Hz
- deck live load limited to 4 persons midspan (600kg); natural frequency = 4.80Hz

Whilst falling slightly short of the recommended 5Hz limit, these frequencies may be considered acceptable.

The degree of fixity between the 4No traverse beams and the upper flange of the main bridge beams also needs to be assessed to ensure full lateral restraint is provided, as has been assumed in our calculations for lateral torsional buckling (strength). This is very important for the validity of our calculations, and can only be properly inspected once the bridge deck has been removed.

5.3 Bridge Support Abutment/ Pier

We recommend all vegetation be removed from around the bridge supports to enable a thorough structural inspection.

5.4 Remedial Work to the bridge

In its current condition, the bridge structure will continue to degrade further over time, with increasing loss of strength and susceptibility to deflection and vibration. To limit ongoing deterioration and the potential risk of more serious structural failure in the future, as a minimum, the steelwork needs to be remediated. This will be difficult given the environment in which the bridge is located, in particular access limitations and ensuring protection to the waterway at all times.

The following works are anticipated in order to refurbish the bridge;

- removal and disposal of the timber decking and parapets,
- Installation of temporary support structure and protective shrouding over the river,
- Grit blast or chemically clean the steelwork to remove rust and paint, prior to preparation for new protective coatings
- Possible localised repairs to steelwork
- Application of appropriate protective coatings
- Installation of new deck and handrailing

We estimate budget costs for this work would be in the region of £50,000 to £80,000. Further advice and costings should be sought from specialist contractors. Liaison with the Environment Agency will also be required. It is recommended that remediation work is carried out within the next 2 years.

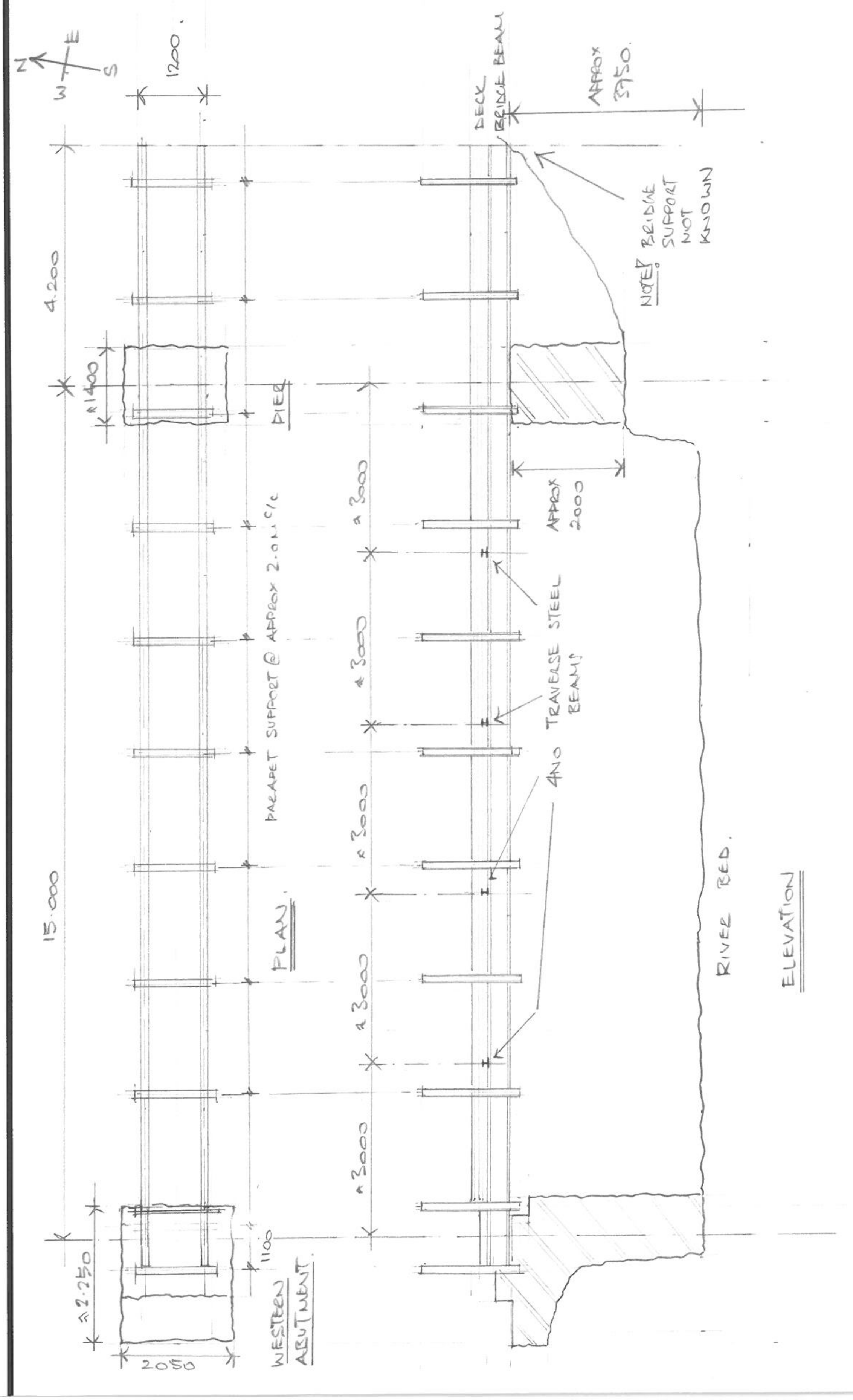
5.5 Replacement of the Bridge

Should it be deemed too costly or impractical to remediate the existing steelwork, a replacement bridge could be considered. Access to the site is difficult, so any replacement bridge would need to take account of this. One option could be a truss type bridge, brought to site in small sections, and assembled in-situ off the existing deck as temporary support. Once the new bridge is in place, the existing steels could be temporarily supported by the new structure, then cut into individual lengths, removed and taken away from site. This option, also gives scope for a variety of designs and appearances, should there be a marketing requirement for funding purposes. It may also provide an opportunity for local artists to be involved in a new look bridge, appropriate to the surroundings. We estimate budget costs for a replacement bridge could be in the region of £80,000 to £120,000.

APPENDIX A

EASTWOOD & PARTNERS
(Consulting Engineers) Ltd.

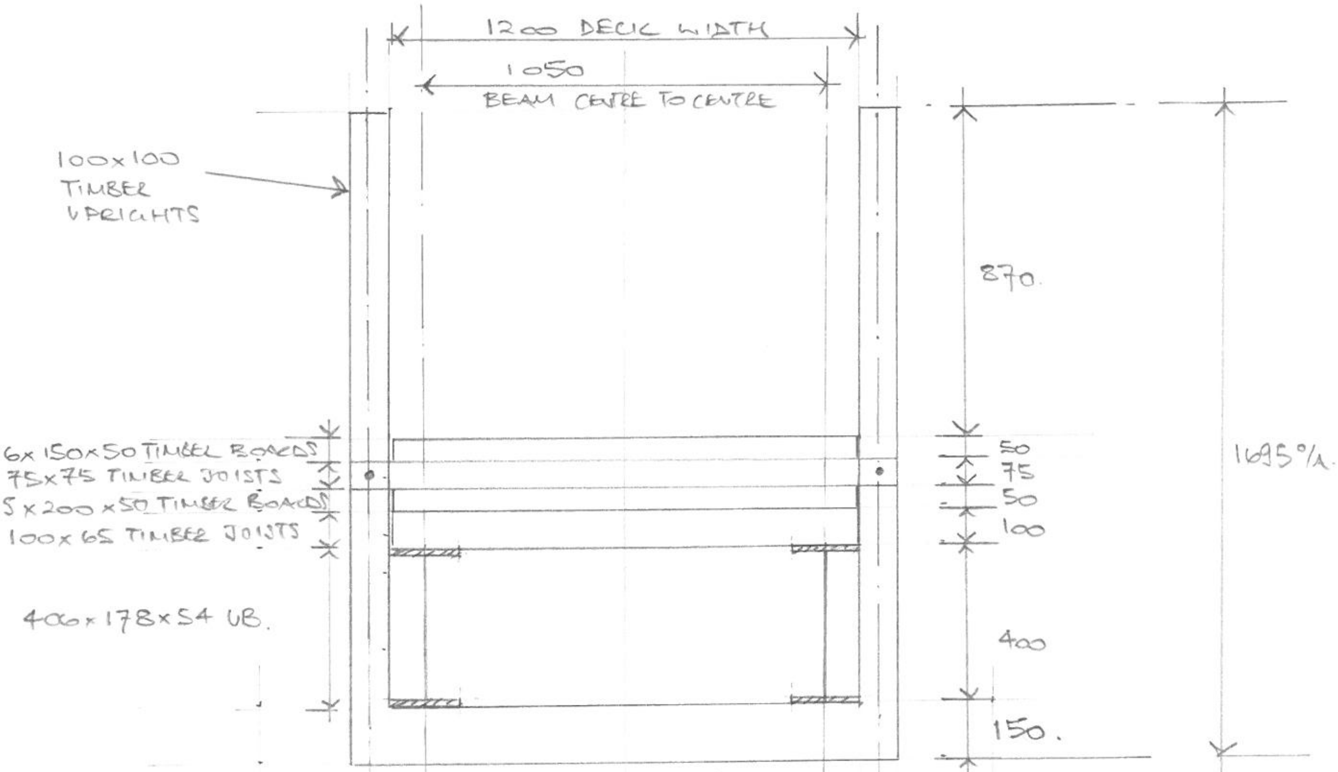
Sheet No. 45374 - SK01		
PROJECT : PEAK DISTRICT NATIONAL PARK AUTHORITY	**Job No.** 45374	**Date** SEPT 20
SUBJECT : WATER - CUM - JOLLY FOOTBRIDGE	**Prepared** AM	**Checked**



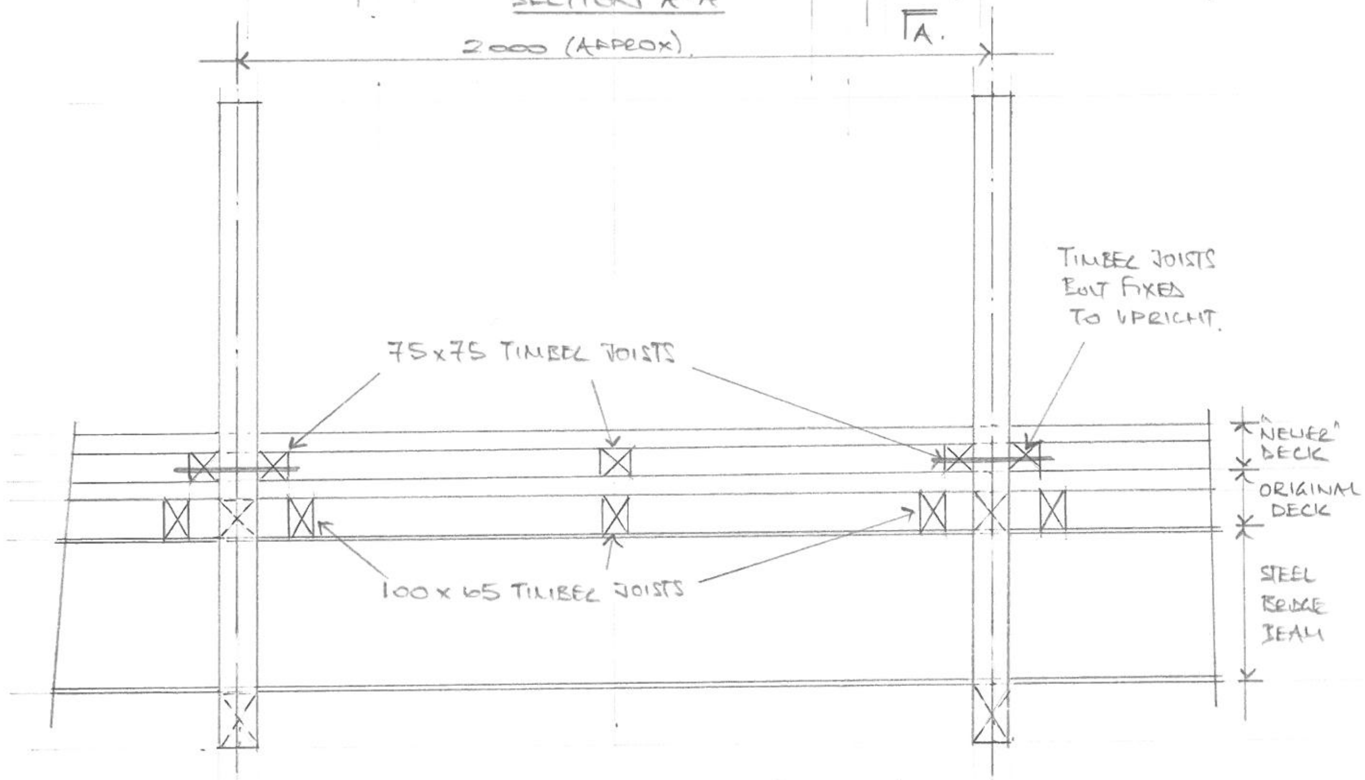
EASTWOOD & PARTNERS
(Consulting Engineers) Ltd.

Sheet No. 45374-SK02

PROJECT :	PEAK DISTRICT NATIONAL PARK AUTHORITY	**Job No.** 45374	**Date** SEPT '20
SUBJECT :	WATER-CUM-JOLLY FOOTBRIDGE	**Prepared** AM	**Checked**



SECTION A-A



ELEVATION ON BRIDGE (TYPICAL) A.