KING SHAW ASSOCIATES

Penistone Proposed Development

Drop Arch Structures

Record of Site Inspection and Appraisal of Existing Structure

Drop Arches, Penistone Development

Record of Site Visit 09 April 2013

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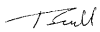
Signature:		Signature:	
Date:	12th April 2013	Date:	12th April 2013

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1 Introduction

Further to the instruction by e-mail on 04th April 2013 from Reliant Contractors, King Shaw Associates visited site on the 09th April 2013.

The purpose of this visit was to carry out a general inspection and appraisal of the primary structures of the Arches to ascertain their general condition and their current structural integrity. King Shaw Associates have not reviewed any of the other structures on the site

This report also provides our opinion as to the ability of the structures to be repaired and altered in accordance with the proposals and drawings drafted for later submission of a listed building and planning application submission to Barnsley Metropolitan Borough Council.

During our site visit we met Matthew Woodward Planning officer and Tony Wiles Conservation Officer for Barnsley planning department and held a short meeting with them to discuss their concerns in respect to the Arches and their expectation for information to be included within the Appraisal report

2 Description

The structure is formed as 6 arches running west to east, which retain the original railway embankment bed to the rear. The structure consist of 3.0m high cross walls with masonary arched structures limited to 1.3m wide strips to the front and rear, the remainder of he structure being open to the sky. The central section of each arch is removed to allow the coal to be dropped vertically down into the arch to be processed. To support the wagons over the arch there are 2 sets of pairs of large timber members 400mm wide by 500mm deep spanning between the cross walls. The arches are constructed in evenly coursed rock faced sandstone constructed in the 19th Century.



The arches have capping stones that measure 640mm wide whilst the width of the actual stonework piers is 700mm wide. The arches themselves spring from 300mm deep cut stone with the key stone itself projecting down by 60mm below the soffit of the Arch. The arches reduce in height as the general site ground level rises towards the West. The height at Arch 4 measured 3.0m from ground to top of capping stone



According to the Archaeological report these arches originally supported 2 rail tracks and on a number of arches the timber support cross beams are still insitu. Two timbers are located abutting the masonary arches with the paired timbers set 1.5m off these.

In arches 2 and 3 the stepping out of the foundation is visible and this measures a total of 400mm offset from the wall face of the cross wall. Reviewing the Geographical website this indicates that this is area is underlain with mudstones, siltstone and sandstone



3 Condition

The masonary elements themselves appear to be sound apart from the east end span which has suffered some settlement possibly caused by a thrust force from the timber buffers located above in this span. The cross timbers themselves are in various states of deteriation from sound timbers, to those where damp ingress at supports as resulted in timber failure; to those that have either collapsed or are in very poor condition.

The masonary appears sound with areas where the mortar has washed out of the joints and the rear retaining wall is very damp.

4 Appraisal & Recommendation

The structure is generally in a sound condition structurally apart from the front section of the east arch which springs off the east abutment. The arch has dropped and will require rebuilding plus as an added measure to reduce the arch thrust force by developing a support detail picking up the keystone on an RC beam replicating the existing timber beams.

Reviewing the planning drawings these indicate that it is the intention to roof the arches in with a water-tight construction allowing pedestrian access over the top of the arches. In respect to these proposed works indicated on “Yourspace” drawings, king Shaw Associates can confirm that the existing structure is capable of repair and conversion. It is not the intention to construct any new structures over the arches and to reflect the original hopper chute detail for the coal this is replicated by a tube allowing light into the arch under. Using this premise we have carried out a load assessment of the future proposed use against the original loading conditions with 2 full coal wagons sitting above an arch. This calculation is included in the Appendix.

The front section of the final arch will have to be re-built and to reduce the thrust force as part of the structure forming the deck a 400mm wide by 500mm deep reinforced concrete beam will be constructed with an integral support attached to the keystone of the Arch and supporting this.

As part of the scope of the future site soil investigation for the whole site should include carrying out Trial pitting in the arches to ascertain the actual foundation widths, their formation level and material the arches are sat on in order that a final calculation check can be carried out to establish bearing within permissible limits.

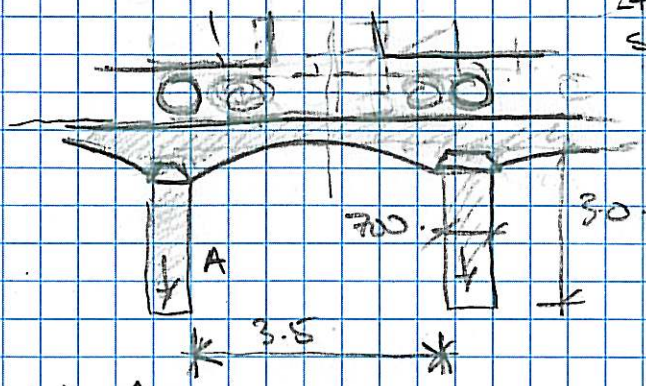
Appendix A

Structural calculation sheet 001

Demonstrating reduction of load from that when functioning as a Drop Arch verses proposed roofed over for pedestrian access

Project No	Project Name	Date	KING SHAW ASSOCIATES Consulting Engineers
J383	PENISTONE DEVELOPMENT	12:04:13	
Description		Engineer	
	LOAD COMPARATIVE	MS	
		Checked	Number 001. Revision

1.0 ORIGINAL



24T Coal wagons sitting over arches 3.66m between wheels.

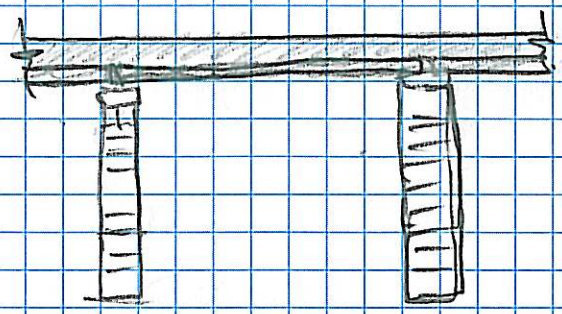
(A) Load from Arch = $3 \times 0.65 \times 20 + 0.65 \times 4.2 \times 20$.

= 93.6 kN.

(B) Wagon over Arch = = $93.6 + \frac{240}{2}$ = 213.6 kN/m.

(C) Wagon on Arch = $93.6 + \frac{240}{4}$ = 153.6 kN/m

2.0 PROPOSED.



New Deck.

100mm Screed	=	2.4 kN/m²
75mm Structural Topping	=	1.8
65mm pc Planks	=	1.6.
Finishes 75mm	=	1.8
Live load	=	2.0.
	=	9.56 kN/m².

Load in pier = $9.56 \times 4.2 + 3 \times 0.7 \times 20$

= 82.01 kN.

THEREFORE PROPOSED 50% OF HISTORICAL PRESENT