

BLACKETT-ORD CONSERVATION ENGINEERING

Email: engineering@blackett-ordconservation.co.uk

Tel: Appleby (017683) 52572

Technical Advice Note

Date: 30/09/25

Project: Bury Fusilier Museum

Job No: B55

Subject: Ventilation Tower

Author: EC

Check: CB-O

1. Introduction

The Bury Fusilier Museum is a Grade II listed former technical school in Bury, dated 1893. The building has a brick ventilation tower which now houses a lift. A high level rope access survey was carried out by Highlife Rope Access in May and June 2023. The survey consisted of an internal and external inspection of the tower. The report raised a concern with a corroding embedded iron band within the masonry. The band is positioned halfway up the sandstone mullions and jacking the stone and brickwork.

Blackett-Ord Conservation Engineering were commissioned to carry out an inspection of the embedded metal work and provide repair recommendations.

An inspection was carried out by Charles Blackett-Ord and Emma Cochrane on 6th August 2025. It was a clear sunny day. A visual inspection was carried out from external roof level using binoculars.

2. General Description

The ventilation tower is a brick tower, square on plan, with a flat roof with lead covering. The brickwork is one brick thick with header courses at every 4th course. There are sandstone arches with mullions on each elevation, which have extensive external metal strapping, with vertical bands at each corner, and three horizontal bands, top, middle and bottom. At the top of the tower there is a sandstone pediment with flat roof and lead covering.

3. Structural Defects

There is an embedded iron band in the brickwork approximately halfway up the sandstone mullions, approximately 1 no. brick course below the external horizontal strapping. The iron band is 60mm wide and is corroding causing jacking to the stonework, greater than 10mm on the north, east and west side. There is localised spalling to the stone. The wide bed joint has been pointed in cement mortar.

There are ferrous dowels within the sandstone mullions, in line with the embedded iron band, it's unclear if the dowels and band are connected. The dowels are corroding

causing 1 no. stone mullion to spall on the east side. There are mortar repairs to the stone mullions in this location which may be concealing ferrous dowels.

At the top of the stone mullions there are diagonal fractures indicative of corroding ferrous dowels. In some locations the mullion has been refaced with a mortar repair, which may be in response to spalling stone from ferrous fixings, or from erosion of the sandstone.

There's no visible evidence of ferrous dowels at the base of the stone mullions, but there are open bed joints.

4. Repair Recommendations

We would recommend that the corroding embedded iron band is removed. The course of brickwork above the band should be removed in sections, setting aside any sound bricks for reinstatement. The iron band can then be cut out and the bricks rebbed in an appropriate lime mortar. This should be repeated around the full perimeter of the tower. The band doesn't require replacement.

The ferrous dowels within the mullions in line with the embedded iron band should be removed and replaced as the iron band is being removed. We would recommend that a section of the stone mullion is cut out to enable the vertical dowel to be removed. A new piece of stone can be indented into the mullion, and tied back to the brickwork at the bottom bed joint. The tie could be a proprietary stainless steel cramp, from Ancon or similar. The head of the cramp would be bent up and secured to the brickwork using stainless steel threaded bar set in 2pt epoxy resin. The tail of the cramp would be bent down into a slot in the top of the existing stone mullion and secured in lime mortar.

It is likely that there are ferrous dowels at the top of the stone mullions where they meet the arch stone. We would recommend that further investigations are carried out to determine the location and detail of any dowels. The failing mortar repair could be removed from the top of the stone mullion near the joint, and any remaining cement mortar from the bed joints.

As there are signs of embedded ferrous dowels beginning to corrode with diagonal fractures and localised spalling, this will continue to progress given the age of the building and the environmental exposure. We would recommend that all dowels in these locations are removed and replaced, if necessary, whilst access is available. The repair would involve locally removing the ferrous dowel, replacing in stainless steel and indenting a new piece of stone, carefully matched to the existing.

5. Access

The repair works would likely require a scaffold around the perimeter of the tower with a working platform.

The working platform could be a suspended cradle hung from the flat roof of the ventilation tower. This would provide a safe working area for the Contractor to carry out the recommended repairs.

6. Conclusion

The ventilation tower has issues with corroding embedded metalwork which needs to be addressed. The metalwork is causing localised damage to the masonry, which will continue to progress given the age of the building and the environmental exposure.

The main issues are the embedded iron band within the brickwork and the ferrous dowels within the stone mullions. The metalwork can be removed externally. The iron band can be locally cut out and doesn't require replacement. The ferrous dowels within the stone mullions will need to be replaced with new stone indents.



Photo 1 - East elevation of ventilation tower



Photo 2 - West elevation of ventilation tower



Photo 3 – Significant corrosion to embedded iron band in mortar joint (extract *Highlife Rope Access Report*)



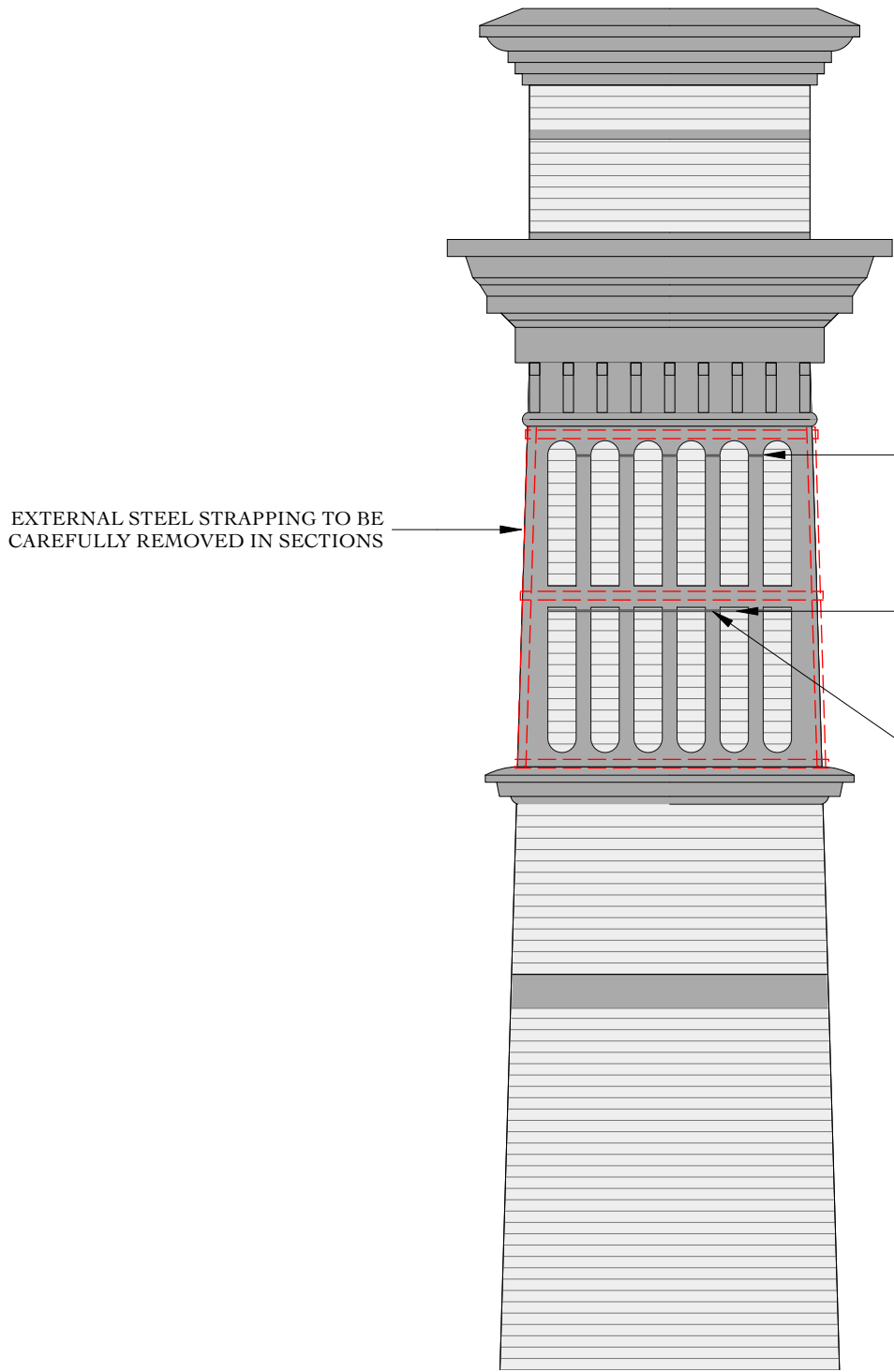
Photo 4 – Significant corrosion to ferrous dowel between stone mullions (extract *Highlife Rope Access Report*)



Photo 5 – Previous mortar repair to upper section of stone mullion (*extract Highlife Rope Access Report*)



Photo 6 – Diagonal fracture in upper section of stone mullion, likely from corroding ferrous fixing (*extract Highlife Rope Access Report*)

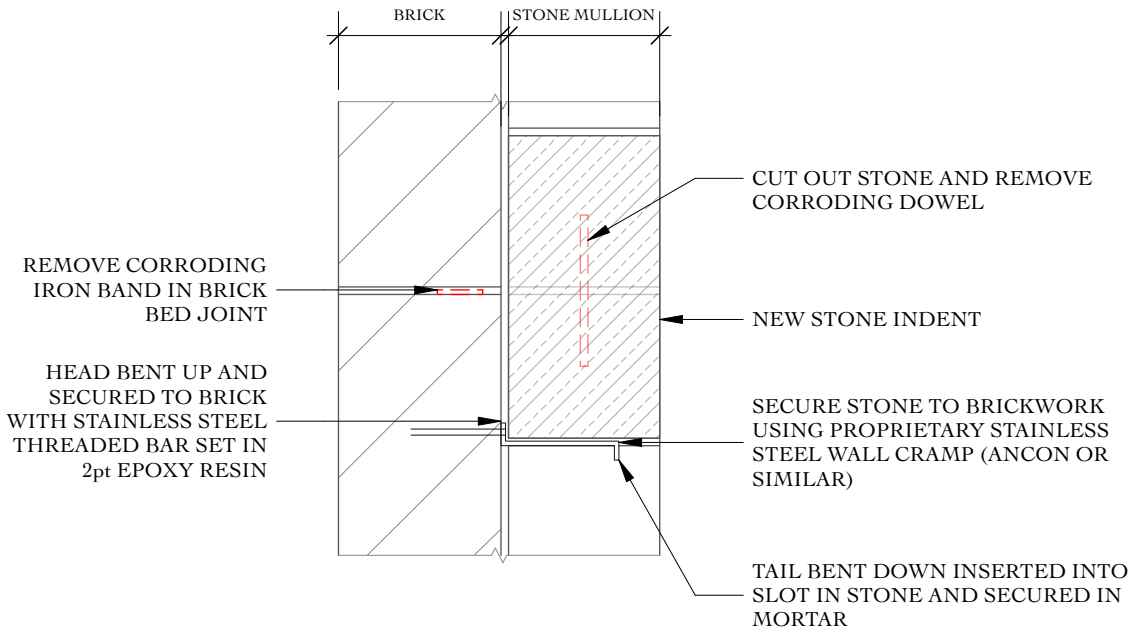


EXTERNAL STEEL STRAPPING TO BE CAREFULLY REMOVED IN SECTIONS

LIKELY LOCATION OF FERROUS DOWEL BETWEEN STONE MULLION AND ARCH STONE
FURTHER INVESTIGATION - LOCALLY REMOVE PREVIOUS MORTAR REPAIR FROM STONE MULLION TO DETERMINE CONDITION OF REMAINING STONE AND LOCATION OF FERROUS METALWORK

EMBEDDED IRON BAND, 60mm WIDE, IN BED JOINT OF BRICKWORK. BAND IS CORRODING AND CAUSING RUST JACKING TO MASONRY REPAIR - REMOVE SHORT LENGTH OF BRICK COURSE ABOVE IRON BAND, CUT OUT IRON BAND AND REBED BRICK. REPEAT REPAIR AROUND FULL PERIMETER OF TOWER.

EMBEDDED VERTICAL FERROUS DOWEL THROUGH BED JOINT OF STONE MULLIONS
REPAIR - CUT OUT SECTION OF STONE MULLION AND REMOVE DOWEL. NEW STONE INDENT WITH PROPRIETARY STAINLESS STEEL CRAMP, REFER TO DETAIL A



REMOVE CORRODING IRON BAND IN BRICK BED JOINT

HEAD BENT UP AND SECURED TO BRICK WITH STAINLESS STEEL THREADED BAR SET IN 2pt EPOXY RESIN

CUT OUT STONE AND REMOVE CORRODING DOWEL

NEW STONE INDENT

SECURE STONE TO BRICKWORK USING PROPRIETARY STAINLESS STEEL WALL CRAMP (ANCON OR SIMILAR)

TAIL BENT DOWN INSERTED INTO SLOT IN STONE AND SECURED IN MORTAR

DETAIL A - NEW INDENT
1:10



GENERAL NOTES

1. Do not scale from this drawing. Use figured dimensions only. Unless otherwise stated all drawing units are in millimetres. Levels are in meters.
2. This drawing to be read in conjunction with all other relevant consultant/specialist drawings and specifications.
3. Check levels/dimensions quoted on drawing against those on site before finalising.
4. For setting out dimensions, see Architect's drawings (uno).
5. Report any discrepancies before affected work commences.
6. We are not the Principal Designer for the construction works, unless a separate formal appointment has been agreed.
7. This drawing remains copyright of Blackett-Ord Conservation Ltd. Copy/distribute only with consent of the Author.

SURVEY

1. This drawing has been produced from base drawings provided by Chambers Conservation

CONDITION SURVEY

 **Blackett-Ord Conservation
ENGINEERING**

33 Chapel Street, Appleby, Cumbria CA16 6QR - Telephone: 017683 52572
Email: engineering@blackett-ordconservation.co.uk

Bury Fusiliers Museum

Tower - Repairs

Drawing No: B55-100	Rev: -	Scale: 1:10, 1:50 @ A3
Date: 30th September 2025	Drawn by: EC	Checked by: CB-O