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LACOCK ABBEY, WILTSHIRE

WORKS TO RE-BUILD DEFECTIVE CHIMNEY

JUSTIFICATION AND HERITAGE IMPACT STATEMENT



November 2025

Partners

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1. Introduction

A structural engineer was engaged to assess the structural stability and condition of one of the chimneys at Lacock Abbey due to concern over its condition. The report was prepared by Hockley & Dawson, a firm of structural engineers specialising in historic buildings. Corroding iron cramps causing jacking to the chimney were identified as the issue. If left unaddressed this has the potential to cause the chimney to collapse.

2. Site Location and Setting

Lacock Abbey is situated to the east of Lacock Village and forms part of the National Trust Lacock Estate. The Abbey is set within woodland grounds.

3. Building Description and Development

Lacock Abbey was founded as an Augustinian Abby by Ela, Countess of Salisbury in the C13. Following the Dissolution of the monasteries, the Abbey was converted into a dwelling by Sir William Sharington in the C16. It was during this period that the octagonal tower and Renaissance chimneys were added. Further alterations to the house and grounds were undertaken by John Ivory Talbot in the C18 including creation of the Gothic entry hall, the ha-ha terrace and the formal water gardens to the north (source: Lacock Conservation Management Plan by Land Use Consultants, 2012).

Lacock Abbey and Stableyard are listed Grade I.

The chimney that is the subject of this Listed Building Consent Application serves a fireplace in the Upper East Bedroom on the first floor of Lacock Abbey. The room is on the visitor route and has a well-preserved historic interior (see Fig. 1).



Fig 1. The Upper East Bedroom and fireplace

4. Condition of Chimney

The structural engineer's report highlights cracks and open joints in the stonework to the lower portion of the chimney and identifies the cause as corroding iron cramps. A section of stonework has fractured due to the cramps expanding and has broken off. The engineer advises that the scale and proportions of the chimney categorise it as a slender structure meaning it would not take much movement or rotation to cause it to become unstable. The open joints and cracks in the stonework will allow water ingress further accelerating the corrosion of the cramps.

5. Proposed Repairs

The structural engineer's recommendation is to carefully dismantle the chimney, set aside the stone for re-use, and to re-build the chimney using stainless steel cramps. While open joints could be filled and the sections of damaged stone repaired, this would not resolve the underlying issue of corroding cramps. Corrosion and jacking would re-occur and the joints would open again and the structural integrity of the chimney would continue to be undermined. This leaves no other option than to re-build the chimney as this is the only way of accessing and replacing all of the iron cramps.

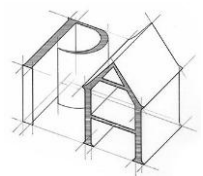


It is proposed that the chimney would be carefully dismantled, the existing iron cramps removed and the existing mortar cleaned off. The chimney would then be re-built re-using as much of the existing stone as possible in an appropriate lime mortar to match the existing. Any new stone required would also be to match the existing.

6. Justification and Impact Assessment

If the chimney is not re-built and the issue of corroding cramps is left unattended the chimney could ultimately collapse. This would cause far greater damage to the historic fabric of Lacock Abbey than the proposed re-building. The chimney could fall through the adjacent historic roof slopes and damage the well-preserved historic interiors below. There is also a health and safety concern given the visitor route passes through the rooms beneath the chimney. It is considered that in light of the engineer's assessment that there are no other viable options to repair the chimney.

The proposed re-building would be carried out on a like-for-like basis. Once re-built, the chimney would not be visibly different in any way (other than any new stone and the new mortar not yet having 'weathered in'). As much of the historic stone would be re-used as possible. If this work is not undertaken, further fracturing to the stone of the chimney is likely to occur meaning more historic fabric would be lost.

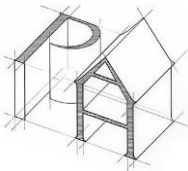


APPENDIX A - PHOTOSHEET

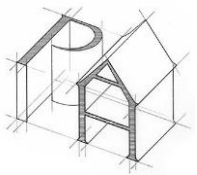
Photosheet

November 2025

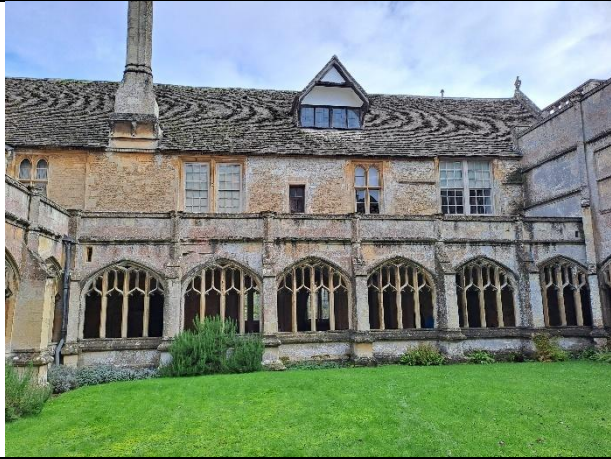
General Elevations	
	
East elevation of Abbey – chimney stack where works are proposed (referred to as ‘chimney’ below) visible, third stack from left.	South east elevation of Abbey – (‘chimney’ stack not visible from this angle).
	
South elevation of Abbey – (‘chimney’ stack not visible).	South-west corner of Abbey, (‘chimney’ stack not visible).



	
North elevation, viewed from north west – ('chimney' stack not visible).	North elevation, east end – ('chimney' stack not visible).
Images of Chimney to be Repaired/Rebuilt	
	
South end of Abbey east elevation – 'chimney' visible, first stack visible to left of tower in foreground.	South end of Abbey east elevation – 'chimney' visible, third stack from left.
	
View of east elevation roofs, from tower at south east corner. 'Chimney' stack second from left, with two clay pots.	View of roof and chimneys from south east by tower. 'Chimney' stack is third from left.



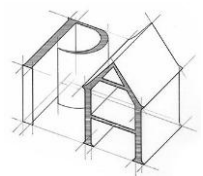
	
View of 'chimney' stack from north.	View of 'chimney' stack from north.
	
South side of 'chimney' stack – iron cramps causing movement and fracturing in stonework.	Sections of fractured stone fallen from 'chimney'. On going corrosion of the iron cramps likely to cause more loss and instability.



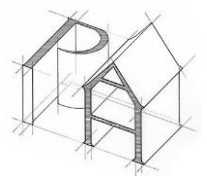
View from Cloister courtyard, looking east.
'Chimney' where works are proposed is not visible.



View from main courtyard looking south east.
Multiple chimney stacks visible but the 'chimney' where works are proposed is not visible.



APPENDIX B – STRUCTURAL ENGINEER'S REPORT



CHIMNEY STABILITY AND CONDITION REPORT

at

Lacock Abbey

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1.0 BRIEF

- 1.1 We were asked by Vitruvius Ltd. on behalf of the National Trust to visit the above property and visually investigate the structural condition of a chimney in the south east corner (see Appendix A for chimney location).

A Site inspection was made on 31st March 2023.

- 1.2 Whilst our investigation work has been taken far enough to satisfy the requirements of the brief, it has, of necessity, not been exhaustive. The findings cannot therefore be warranted to apply to areas of the property not inspected or investigated.
- 1.3 This report is intended for the use of the clients, Vitruvius Ltd. and the National Trust, and no liability can be accepted for use by any third party.

2.0 PHOTOGRAPHS

- 2.1 A set of survey photographs may be seen in Appendix B.

3.0 CONDITION SCHEDULE

- 3.1 The lower section of the chimney had several cracks and open joints in the stone. These issues were visible on all faces of the chimney.
- 3.2 The pattern of deterioration was symptomatic corroding cramps within the stonework, which was corroborated by the removal of loose broken stonework (see photographs).
- 3.3 The upper section of the chimney was not inspected in close detail, however cracking and open joints were not clearly visible. The approximate dimensions of the upper section of the chimney were based on laser measurements taken from the valley box gutter. These dimensions have been used for the preliminary stability analysis.
- 3.4 The scale and proportions of the chimney categorise it as a slender structure. It would therefore not take much movement or rotation within the lower section to place the centre of mass outside of the middle third of the base, and thus declare it to be unstable.

- 3.5 The open joints and cracks within the stonework allow for water ingress which would accelerate any corrosion of the cramps and allow the issue of corrosion to spread to other cramps within the lower section of the chimney.
- 3.6 The roof structure was inspected within both adjacent roof areas (the larger roof to the west, courtyard side of the chimney, and the smaller roof to the eastern, external side of the chimney). Both roofs appeared to be in a reasonable condition overall. There were signs of historical local water ingress, but these had been dealt with.
- 3.7 The galleried rooftop walkway over the southern elevation had sections of broken and damaged stonework beneath the balustrade (see photograph). The underlying cause of this was unclear, and adjacent stonework appeared to be in a reasonable structural condition. As with the chimney, any cracking of the stonework would allow for water ingress which could cause ongoing issues if there are any ferrous fixings within the stone.

4.0 ANALYSIS

- 4.1 Failure of the chimney structure could either occur through loss of material, instability through rotation, or a combination of both issues.
- 4.2 The corroding cramps had already caused the loss of material (corners of stone blocks) to break away in two sections, as shown on the photographs. Significant continued loss of material could impact on the overall structural base and reduce the middle third position of stability. In such a case, the following comments regarding the rotational stability would need to be reviewed.
- 4.3 The sketches shown in Figure 4 show the centres of mass of the upper chimney section in relation to the middle third of the base under various scenarios of rotation. Given that there are cramps within multiple joints and levels, the sketch showing incremental rotation would be more realistic. As shown, with four corroding cramp positions, each causing jacking of 6mm, the open joints at the face would be 7mm. All three centre of mass positions analysed would remain within the middle third. However, if there were any additional joints with the same expansion, or multiple joints with a lesser expansion, the chimney could become unstable.

- 4.4 The above comments are on the theoretical assumption that all the jacking would occur on one face (east or west) only. In reality the chimney is already showing open joints on all four elevations.
- 4.5 Open joints throughout the structure would reduce the overall lateral resistance of the panels, making the chimney more susceptible to overturning via wind forces.

5.0 CONCLUSIONS

- 5.1 The cramps within the stonework will continue to corrode which will cause ongoing cracking to the chimney structure.
- 5.2 Whilst open joints could be filled, the continued corrosion of the cramps would cause ongoing cracking and jacking, reopening the joints. This would continue the cycle of corrosion and destabilisation.
- 5.3 Measurements were taken of the adjacent roof truss structures with the view to analyse whether some form of temporary stabilisation could be introduced to restrain the chimney. As shown on the sketch in Appendix A, the difference in the height and scale of the adjacent roofs would make even stabilisation very difficult. At lower levels lateral restraints could be introduced, however this would have a minimal impact on providing restraint to the exposed upper section of the chimney. Introducing such restraints would also require penetrating through the roof finishes. Such action would both potentially damage the historic roof fabric, and risk water ingress through otherwise weatherproof finishes.
- 5.4 The damage to the stonework below the galleried walkway was not considered to be symptomatic of any ongoing issue, and assumed to be local to that area.

6.0 RECOMMENDATIONS

- 6.1 Temporary stabilisation of the chimney would be difficult and not without risk to otherwise stable sections of the roof structure.
- 6.2 The chimney should be carefully dismantled to expose all ferrous cramps. These cramps should then be removed, and any significantly broken stonework replaced. All undamaged sections of stone should be cleaned back and set aside for reuse.
- 6.3 All new fixings within the stonework should be stainless steel.
- 6.4 Temporary support of the upper section of the chimney may be possible if the ferrous fixings are all accessible with localised stone removal. However it should be noted that given the pattern and extent of the open joints it is assumed that these fixings occur throughout the lower section, and on all faces.
- 6.5 The localised damage to the galleried should be carefully removed and the backing, undamaged section cut back to a clean face. Replacement stone facing should be fixed using stainless steel resin anchors.

APPENDIX A – Sketches

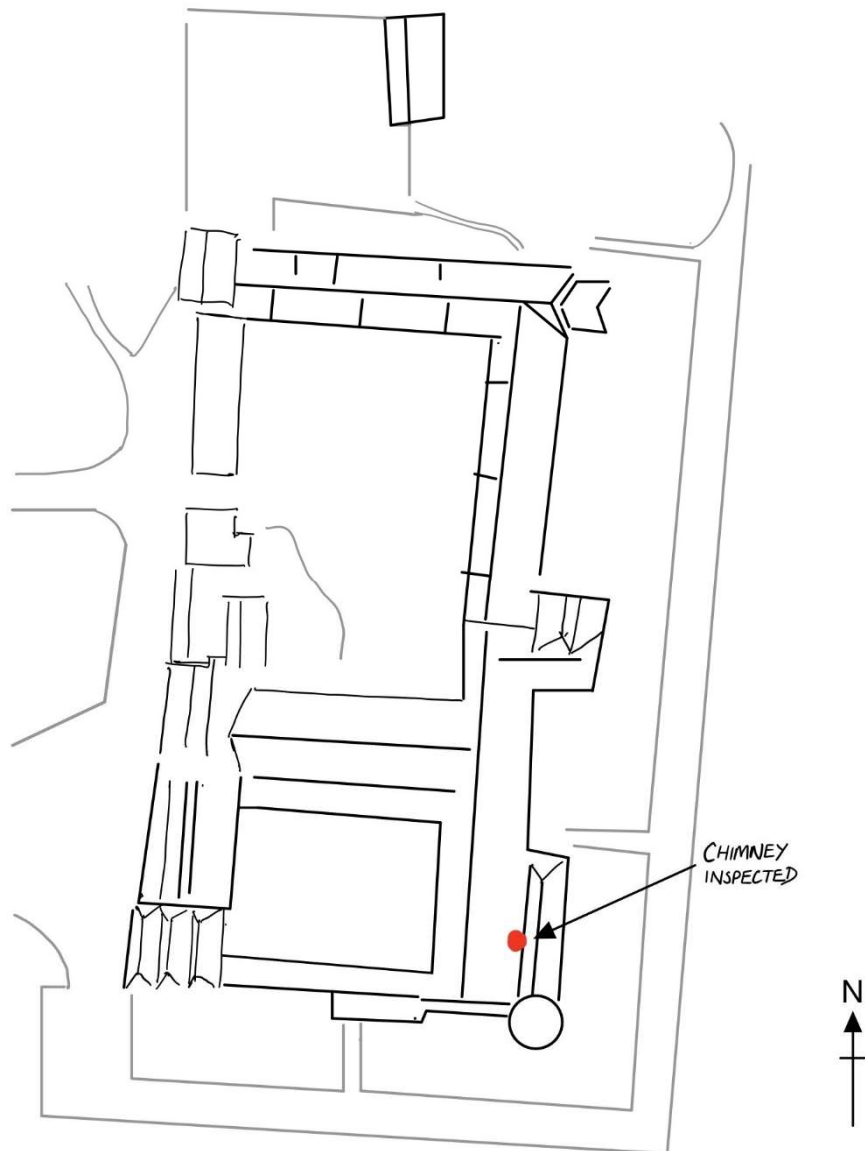


Figure 1 - Sketch of Site Plan, showing approximate location of chimney

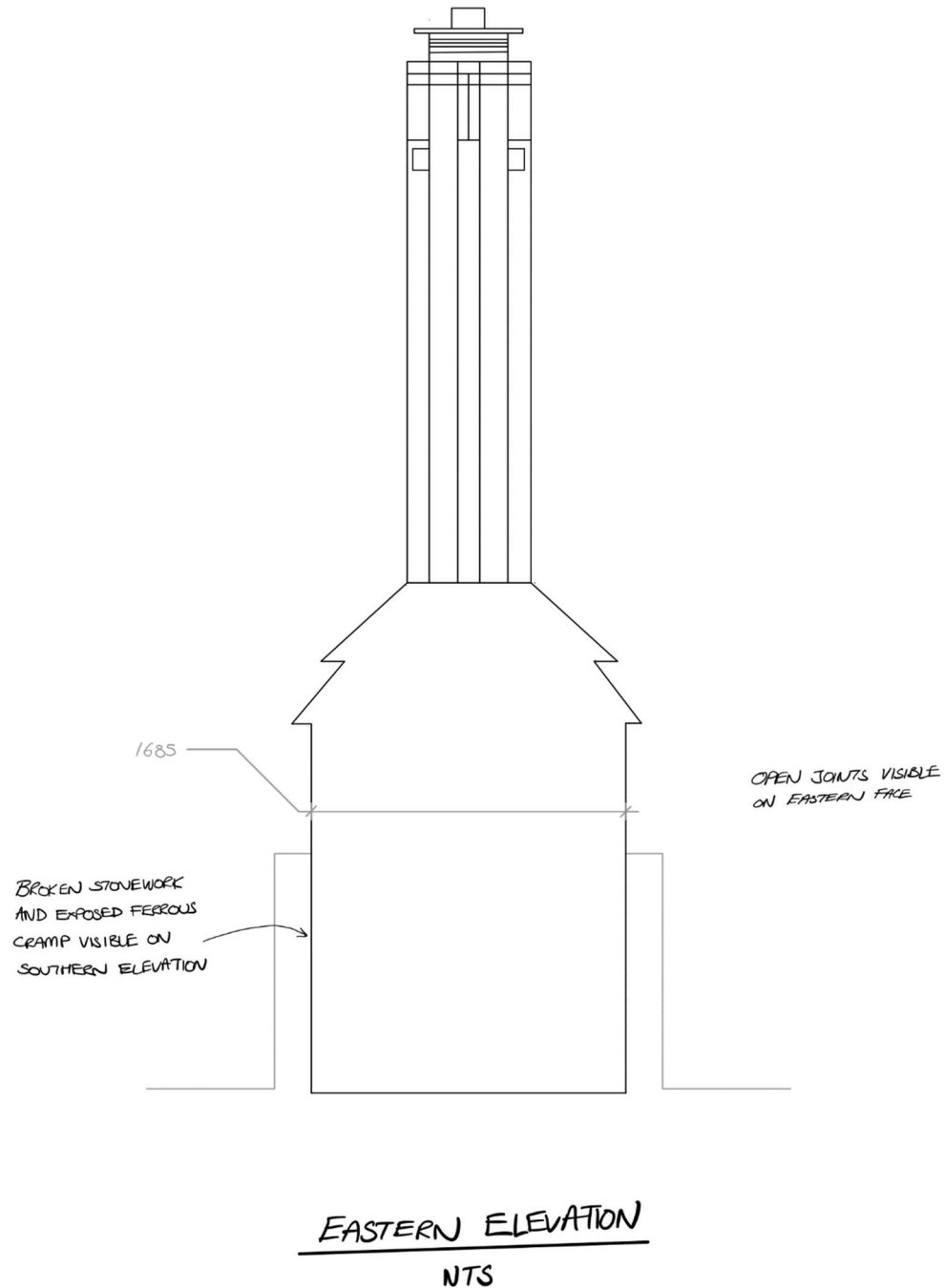


Figure 2 – Sketch of Eastern Elevation

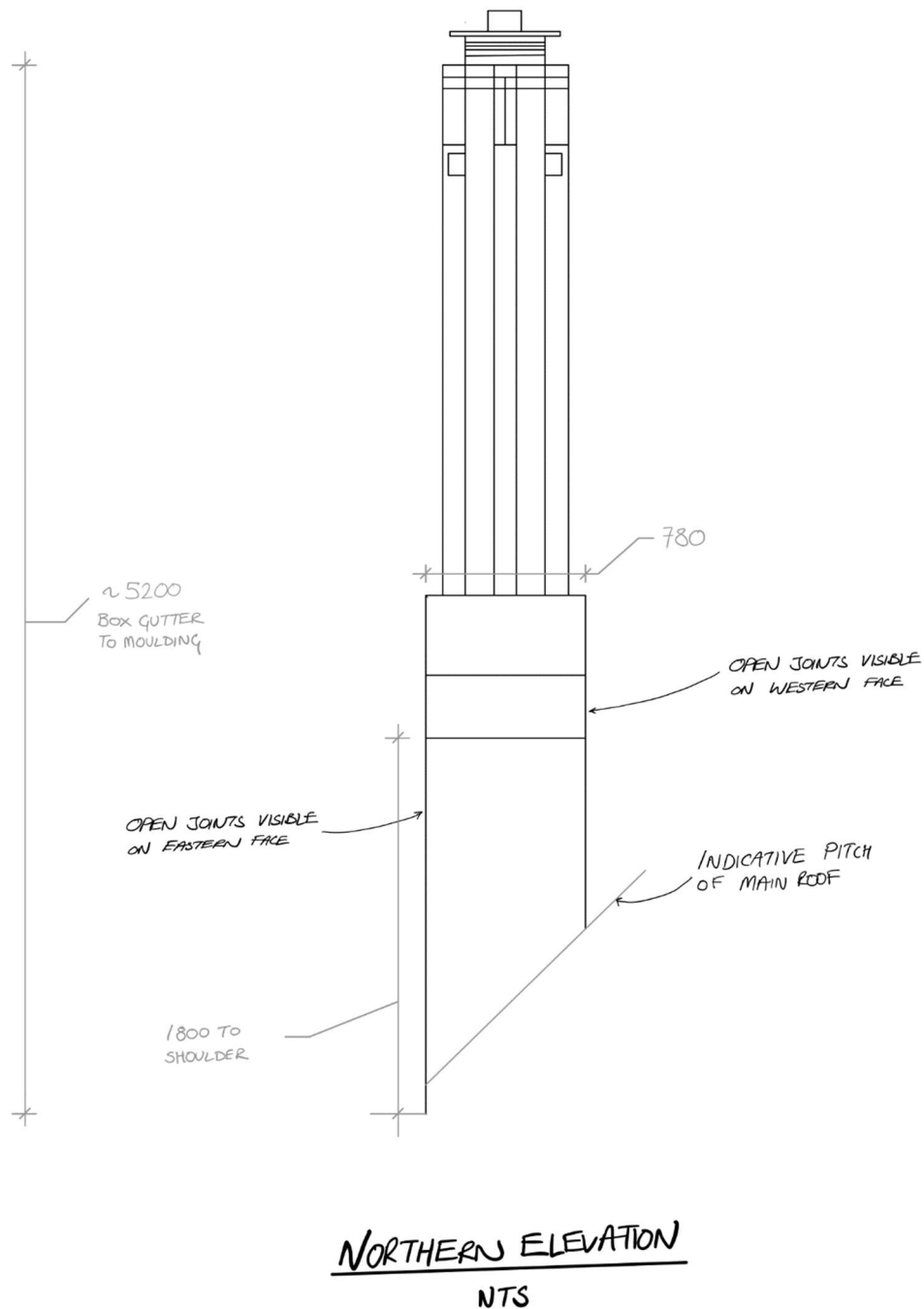


Figure 3 – Sketch of Northern Elevation

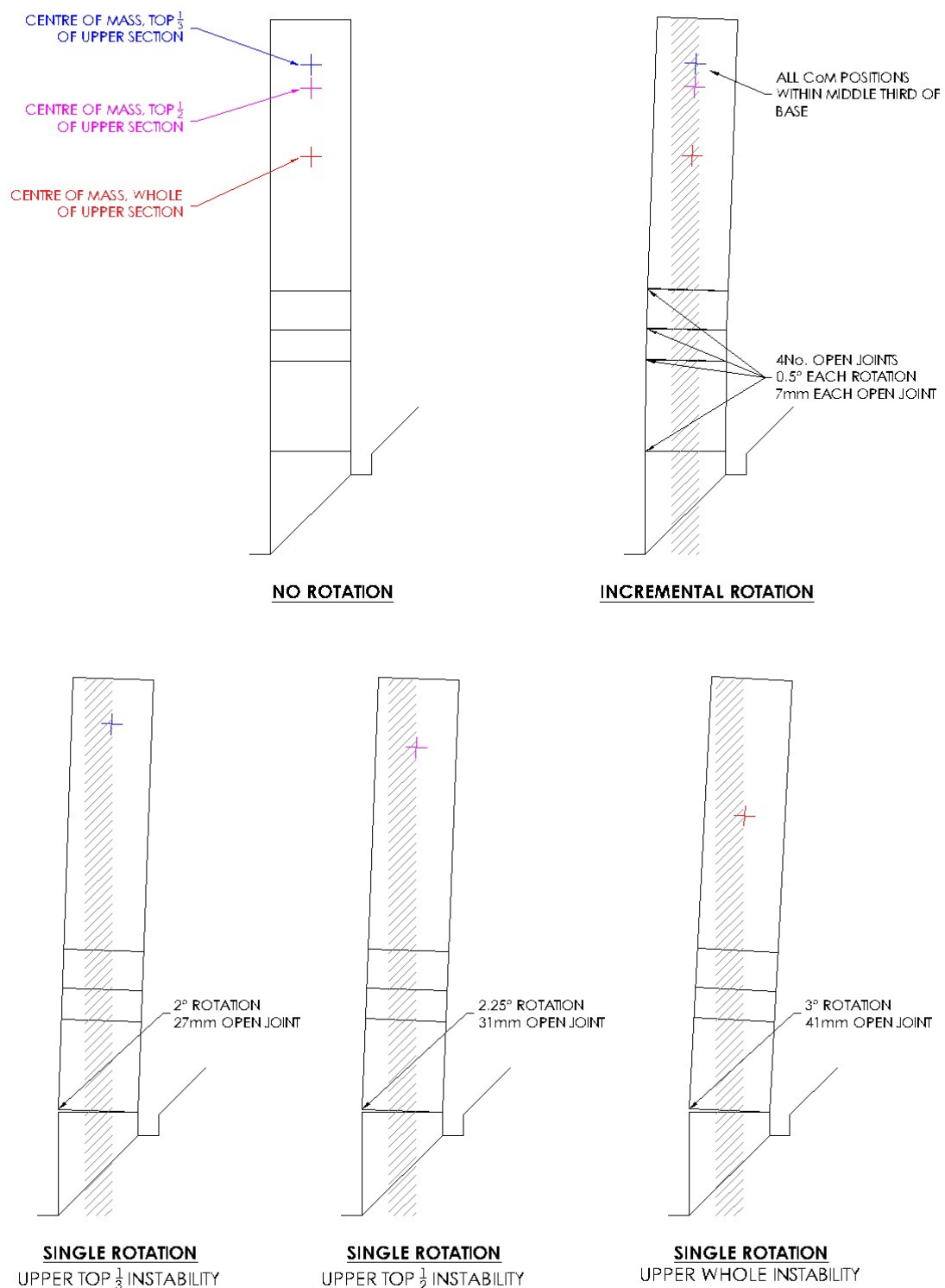


Figure 4 - Sketch of Chimney Instability (rotation only)

APPENDIX B – Photographic Record



Higher level of base section, north elevation.
Open horizontal joints in the stone.



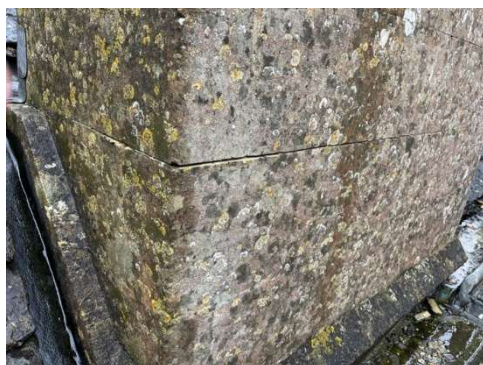
Lower level, north elevation.
Open horizontal joints in the stone.



East elevation.
Open vertical joints in the stone



Lower level, east elevation.
Diagonal cracking across corner of
stone, offset from edge of chimney.
Open horizontal joints above.



South east corner.
Open horizontal joints continuing
around face of chimney. Diagonal
cracking across stone – see next
photograph.



South elevation.
Expansion of corroding cramp
causing fractures in the stone. Corner
of stone loose and removed.



Closer image of the corroding
cramp, showing continued cracking
to internal section of stone.



West elevation.
Open stone joints leading down to cracked stone.



Upper section of chimney over.
Top moulding approximately 5.2m above valley gutter (base of exposed chimney).



Corroding cramp causing fractures in stone and loss of material.



Damaged section of stone below edge of galleried roof to south of inspected chimney.