
Structural Report

Kendrick School – Gardeners Shed

For

Kendrick School

41-43 London Road

Reading

Berkshire

RG1 5BN

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Issue

Issue	Reason for Issue	Date
1.0	First Issue	08 April 2024

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1.0 Introduction

Michael Aubrey Partnership Ltd (MAPL) are a practice of Consulting Engineers, who have been instructed to investigate damage to the “gardeners shed” on the site of Kendrick School.

MAPL’s brief is as follows:

- Attend site to inspect the defects present.
- Provide a report confirming the likely reason as to why movement has occurred, and the recommended remedial or further investigation works required to address these issues.

Andrew Wiggett undertook a visual inspection at the property on 27 March 2024.

A visual inspection is limited to assessing readily observable parts of the structure and finishes for signs that may indicate underlying structural problems. No ‘opening up’ of the structure is carried out. Any dimensions taken are purely for descriptive purposes. Structural calculations are not carried out unless specifically agreed.

It should be noted that this report is for the sole use of the named client and is confidential to them and their professional advisors. Any other persons rely on the report at their own risk.

2.0 Observations

2.1 Property Description

Type:	Outbuilding
Storeys:	One
Construction:	Traditional pitched tiled roof, timber posts with infill panel to front, masonry wall to one side. Other side, and rear wall, are formed by the large masonry walls on the site.
Age:	Victorian
Previous Alterations:	Formerly open structure has had timber panels infilled to the front to form an enclosed building. Date unknown.
Topography:	Not significant

2.2 Survey Observations

Please refer to Appendix A for the survey observations and photographs.

3.0 Discussion

3.1 Areas of damage

3.1.1 The roof is sagging, and the brick wall to the side is cracked. Timber to the front has visually displaced. Roof tiles show signs of damage.

3.2 Side wall

3.2.1 The side wall is a 215mm thick solid masonry wall. It appears to be built into the boundary wall at the rear, but the rest of the wall is unrestrained. Its only stiffness is derived from the small 45 degree bend at the front end.

3.2.2 It has cracked around the window area, likely due to the action of the wooden eaves (see section 3.5). following the crack, the masonry above the crack appears to have moved outwards, suggesting that roof spread has pushed the top of the wall/wall plate outwards since it is no longer restrained by the mortar.

3.2.3 On the end of the wall, it is leaning outwards significantly – presumed due to the force from the roof spread. The top of the wall is about 50-60mm out of plumb. The wall has likely cracked below ground level to allow this outward rotation.

3.3 Roof spread

3.3.1 The roof is of cut timber construction. The rafters run from the eaves to the ridge, with no midspan purlin or other ties running across the building. The ridge is formed from a single thin member (unable to reach to measure) which is inadequate to function as a true ridge beam taking vertical load, and nor is it built in to the rear wall. It is acting as a ridge board – merely allowing the two opposing rafters to rest against each other. (timber collars are also present on most, but not all, rafters)

3.3.2 The two opposing sides of the roof are leaning on each other (and the front section leaning against this) much like a house of cards, the roof faces are placing a horizontal thrust on to the walls.

3.3.3 It is this thrust which is believed to have damaged the side wall. The boundary walls are thicker and more able to resist this thrust, so all movement has been forced onto the side wall.

3.3.4 In addition to the spread, many of the roof rafters appear to be suffering from rot – presumed to be from the roof tiles leaking.

3.4 Roof left side eaves timber member and gutter

3.4.1 At “eaves” level on the left side, there is a timber beam running along the side of the wall. This supports the base of the rafters, as they are at a lower level than the top of the wall.

3.4.2 This beam has suffered from severe rot and deflection (likely as a result of the rot).

3.4.3 It may have been repaired or replaced, and is, or was at some point, propped at midspan by the vertical upright of the shelving. Unfortunately this prop only bears onto the ground.

3.4.4 The deflection has caused the gutter to not function as intended. Vegetation can be seen growing in the wall. Water leaks will have further damaged the timber. Vegetation and water can cause long term damage to the wall and mortar.

3.4.5 The deflection of the horizontal member will have redistributed the stresses in the roof, possibly contributing to the roof spread.

3.5 Front timber eaves

3.5.1 The front timber eaves beam has dropped due to the movement of the timber posts (see section 3.6).

3.5.2 This timber has see-sawed over the top of the masonry, lifting off from the top of the wall and causing cracking in the wall.

3.6 Front timber posts and wall

3.6.1 The timber posts have sunk by approximately 100mm. Originally these posts were open (with no infill timber walls) and based on construction practices of the time, the posts would have a separate foundation, which would be quite basic.

3.6.2 The posts would likely be founded on a flat slate or single brick, and this is likely to be at a shallower depth than the footing (which is likely stepped brick) of the masonry wall. The rear and left wall are a retaining wall, above the lower level adjacent carpark, and have a far deeper foundation. Given its relative size and thickness, and no signs of damage, the boundary wall is considered immovable/fixed from the point of view of the shed.

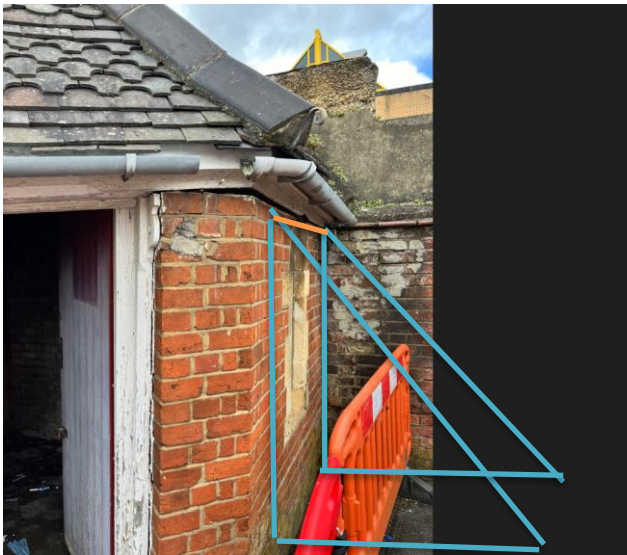
3.6.3 While the original external floor finish is unknown, the current ground is covered in tarmac. This is impermeable and likely at a higher level than the original floor, which can channel rainwater towards the base of the timber posts, causing rot just below ground.

3.7 Roof stabilisation for demolition

3.7.1 The roof is spreading and changes to the load could result in collapse.

3.7.2 Reading has not had significant settled snow for several years but the possibility remains. The roof should be taken down before next winter.

3.7.3 Temporary works/scaffolding for allowing access to the roof should also act as a buttress against the side wall preventing lateral movement and thus preventing further roof spread during works. Buttressing should restrain both the wall and the timber wall plate.



3.7.4

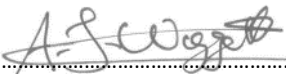
3.7.5 Buttressing should not be considered a permanent solution as it does not address the issues of timber rot or foundation movement. Additionally it restricts vehicular access to the swimming pool area.

3.7.6 Tiles should be removed from the roof in a symmetrical manner – for example starting at the bottom and removing the bottom tiles all the way around, before working upwards.

Leaving one face of the roof tiled and the other with no weight on it will cause further instability.

4.0 Conclusion and Recommendations

- 4.1.1 There are significant issues with the masonry side wall which has cracked and rotated outwards; the timber roof which is spreading outwards as it is not laterally restrained by anything except the damaged side wall, and has some rotten members including the damaged beam against the wall on the left hand side due to the gutter leaking; the front timber has moved significantly; the timber posts have rotted and sunk; the foundations while unknown have exhibited differential movement and based on historical construction practices are assumed to be insufficient.
- 4.1.2 Almost every structural component of the shed including the foundations (*aside from the left and rear masonry walls which are the larger boundary walls*) have moved, are severely deteriorated, or both.
- 4.1.3 The building should be demolished before it collapses.
- 4.1.4 The roof suffering from spreading will be susceptible to additional or changing loads. Demolition should be completed before next winter. Tiles should be removed in a symmetrical manner.

Signed: 

Andrew J Wiggett MA MEng CEng MIStructE

For and on behalf of Michael Aubrey Partnership Ltd

Signed: 

John M Staves BSc(Hons) CEng FIStructE

Date: 11 April 2024

Appendix A – Observations

Item	Description	Photograph
A1	Right side wall is cracked around window diagonally and vertically where it meets the corbeling at the return wall; and timber wall plate has lifted off. Some tiles displaced.	
A2	Above the crack, the wall has been pushed outwards 10-15mm (towards camera)	
A3	Roof timbers have small collars at ridge level (connection unknown) but no ties at eaves level and no ceiling. All lateral restraint is provided by the side wall.	

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Item	Description	Photograph
A4	On the left wall, rotting timbers and prior timber repair, which is itself sagging.	
A5	Rotting timbers. Visible daylight at front suggests that the gutter is not working at all, and all rainwater from half the roof is entering the shed.	
A6	Prior repair (circled) appears to have shifted	

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Item	Description	Photograph
A7	Prior mortar repair on inside face suggests further outward movement of the right side wall has been covered up.	
A8	Timber posts extend below current ground level. Vegetation growth suggests that rainwater is channelled this way by the impermeable tarmac.	
A9	Wallplate lifting off wall due to posts sinking	

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Item	Description	Photograph
A10	Wall is leaning outwards by about half a brick end (50mm) over its height.	
A11	Timber eaves beam sagging at timber posts, estimated 100mm drop.	
A12	Shelving acts as a prop to the rotting beam	

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Item	Description	Photograph
A13	Beam is no longer supported at end	
A14	Gutter not draining and full of vegetation	

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Michael Aubrey Structural Engineers

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