Commercial-in-Confidence
Report No: 23005/R01/RevA
March 2024

STRUCTURAL REPORT ON MANOR FARMHOUSE AVEBURY SN8 1RF

SFK Document No:	R01 RevA
Status:	

	Name	*Signature*	*Date*
Prepared by:	Richard Swift	[redacted]	20.03.2024

Revision Record

Rev	*Date*	Summary of Changes	By	Chk
A	*20/03/24*	Minor corrections Addition of Considered Alternatives	RS	RS

SFK Consulting
Trinity House, 2nd Floor
123 Winchester Road
Southampton
Hants SO53 2DR
Tel: 023 8251 6969
Email: admin@sfkconsulting.co.uk
Website: www.sfkconsulting.co.uk

The National Trust
Wiltshire and Dorset
Tisbury Office
Place Farm Courtyard
Wiltshire
SP3 6LW

REPORT ON MANOR FARMHOUSE AVEBURY SN8 1RF

C O N T E N T S

Page

1. INTRODUCTION 1
2. BRIEF DESCRIPTION OF THE BUILDING 2
3. DESCRIPTION OF THE IDENTIFIED STRUCTURAL ISSUES 3
4. RECOMMENDATIONS 4
5. CONSIDERED ALTERNATIVES TO THE PROPOSED SOLUTION 5
6. CAVEAT 6

Appendix A Drawings – Figures 100 to 112, Figure 200 to 201
Appendix B Data sheets for pattress plates and stainless steel masonry fixing
Appendix C Photographs

1. INTRODUCTION

The National Trust is submitting a Listed Building Consent application to Wiltshire Council for urgently needed repairs, including measures to counteract substantial and ongoing structural issues with the high walls (front and rear) of Manor Farmhouse, part of the Trust estate at Avebury (Wiltshire).

The property is a Grade II listed building. It is also within the World Heritage Site and Scheduled Monument at Avebury, as well as being in the Conservation Area.

The National Trust requested SFK Consulting to investigate the cracking of brickwork in the front and rear elevations of the Manor House in January 2023.

Richard Swift (Partner) of SFK Consulting visited site with Colin Bogle of the National Trust.

2. BRIEF DESCRIPTION OF THE BUILDING

The list description ascribes Manor Farmhouse to the 18th century.

The tiled roof replaces an earlier thatched roof after a fire around 1900.

According to the Archaeologist Graham Keevill the farmhouse was probably built just before 1724 with 4 bays and an asymmetrical entrance. There were stacks at either gable end.

The Farmhouse accommodation is on 3 floors, with the second floor bedrooms within a mansard roof form.

3. DESCRIPTION OF THE IDENTIFIED STRUCTURAL ISSUES

The initial concern arose over the observation of the movement cracks in the brickwork over the arched window above the front entrance door on the south elevation. The corbelled brickwork at the head of the wall appears to be rotating outwards. (See photograph P1)

An inspection at the rear (north) of the building indicates a similar movement at the west end of this elevation. (See photograph P2)

Internally, there are several patterns of cracking in the internal lateral division walls, close to the front (south) wall at first and second floor levels. (See photograph P3)

Photograph P4 indicates the interior of the top of the mansard roof with an intermediate purlin and horizontal collars.

Figure 100 shows a typical cross section through the building.

Figure 100 also indicates the presence of door openings on all 3 floors of the building through most of the internal partitions and close to the front (south) wall.

Additionally, the first and second floor structures consist of primary transverse beams at approximately 2.5 m centres and the common floor joists span between the primary beams, parallel to the long external walls of the north and south elevations. The consequence of this, is that the lateral restraint afforded to the front and rear (south and north) walls is minimal against wind loads and lateral roof loads.

These two factors have resulted, we consider, to the movement which is occurring to the wall head described above.

The movement cracks have been observed by the family living in the building for many years. However, the concern has increased because the pattern of cracking has grown and the width of some of the cracks in the plaster internally has also increased. It is considered therefore that early introduction of remedial measures is now required.

4. RECOMMENDATIONS

It is recommended that three number steel tie bars should be introduced across the building at the level corresponding with the head of the long external brick walls. Their positions will be determined by the internal layout of the internal partition walls in order to minimise their visual impact.

The use of circular pattress plates will afford lateral restraint to prevent further outward movements. The positions and levels of the pattress plates will be governed by the detail of the Corbelled brickwork on the external faces of the wall. See Figures 102 and 108.

Additional to the tie bars, it is proposed to install drilled stainless steel self-drill, self-tap masonry fixings into the bed joints of the brickwork at fixed locations to be agreed on site. These fixings will not be visible.

The proposal for these is shown on Figures 110 and 111.

5. CONSIDERED ALTERNATIVES TO THE PROPOSED SOLUTION

Alternative 1 – Stiffening of mansard roof eaves detail timber framing.

It was hoped that significant lateral resistance to horizontal movement could be provided by stiffening up the eaves detail of the mansard roof timber structure.

This proposal is shown in Figure 200.

It would involve applying plywood timber diaphragms to every other frame along the length of the roof on each side of the building. It would require the removal of much of the internal plastered walls of this element of structural walls.

It would be very disruptive to the family.

For this reason it was dismissed.

Alternative 2 – Introduction of horizontal ties above the level of the attic floor.

Figure 201 shows the position of the horizontal tie above the level of the attic floor.

The steel ties would be notched into the top of the common floor joists, beneath the floor boards of the attic space.

Unfortunately, this level of tie bar would be very high on the external wall and because of the corbelled brickwork would require an end-restraint detail which is very difficult to form.

For this reason it was dismissed.

6. CAVEAT

We have not inspected elements of the structure which were hidden or inaccessible.

The roof, upper walls and above were inspected from ground level.

The roof space was partially inspected from the hatch on the landing.



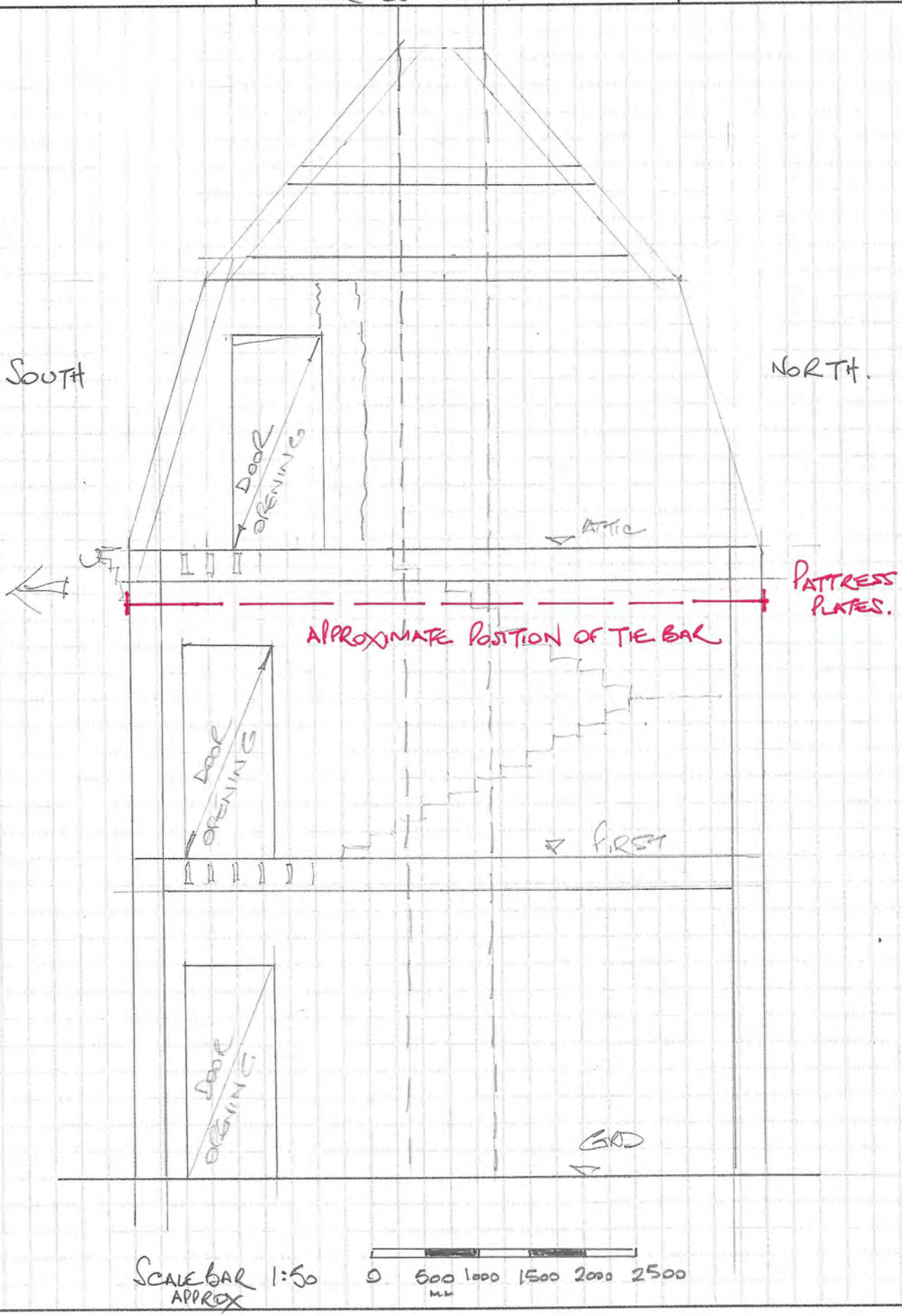
Signed: .....
R Swift, MSc, CEng, MICE, Grad Dipl Cons AA

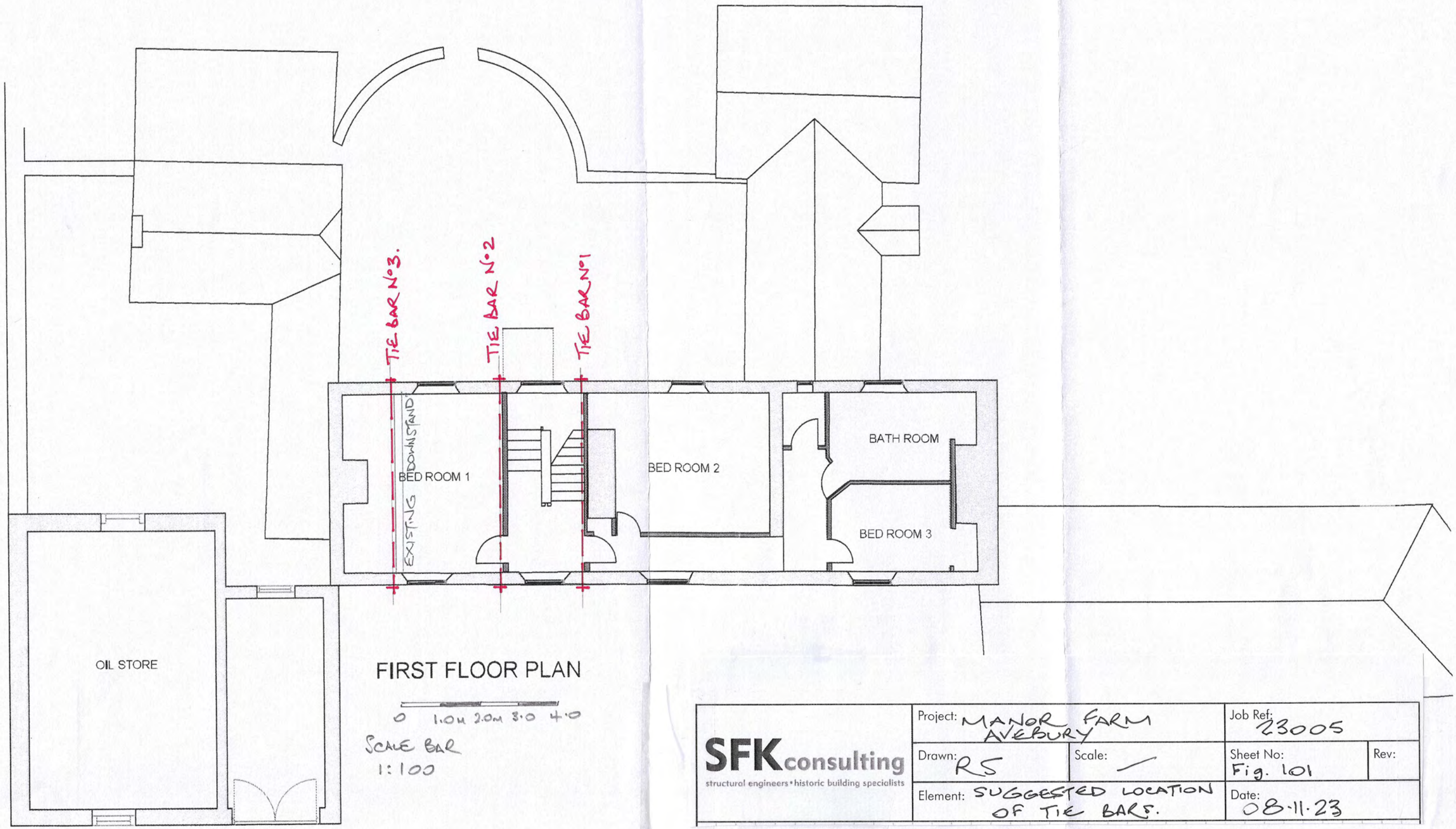
SFK consulting

APPENDIX A
Drawings

SFK consulting
structural engineers • historic building specialists

Project: MANOR FARM AVEBURY		Job Ref: 23005	
Drawn: RS	Scale: NTS.	Sheet No: Fig 100	Rev:
Element: APPROXIMATE CROSS SECTION.		Date: 01.11.23	





FIRST FLOOR PLAN

0 1.0M 2.0M 3.0 4.0

SCALE BAR 1:100

SFK consulting structural engineers • historic building specialists	Project: MANOR FARM AVEBURY		Job Ref: 23005
	Drawn: RS	Scale: —	Sheet No: Fig. 101 / Rev:
	Element: SUGGESTED LOCATION OF TIE BARS.		Date: 08.11.23

Fig.102.



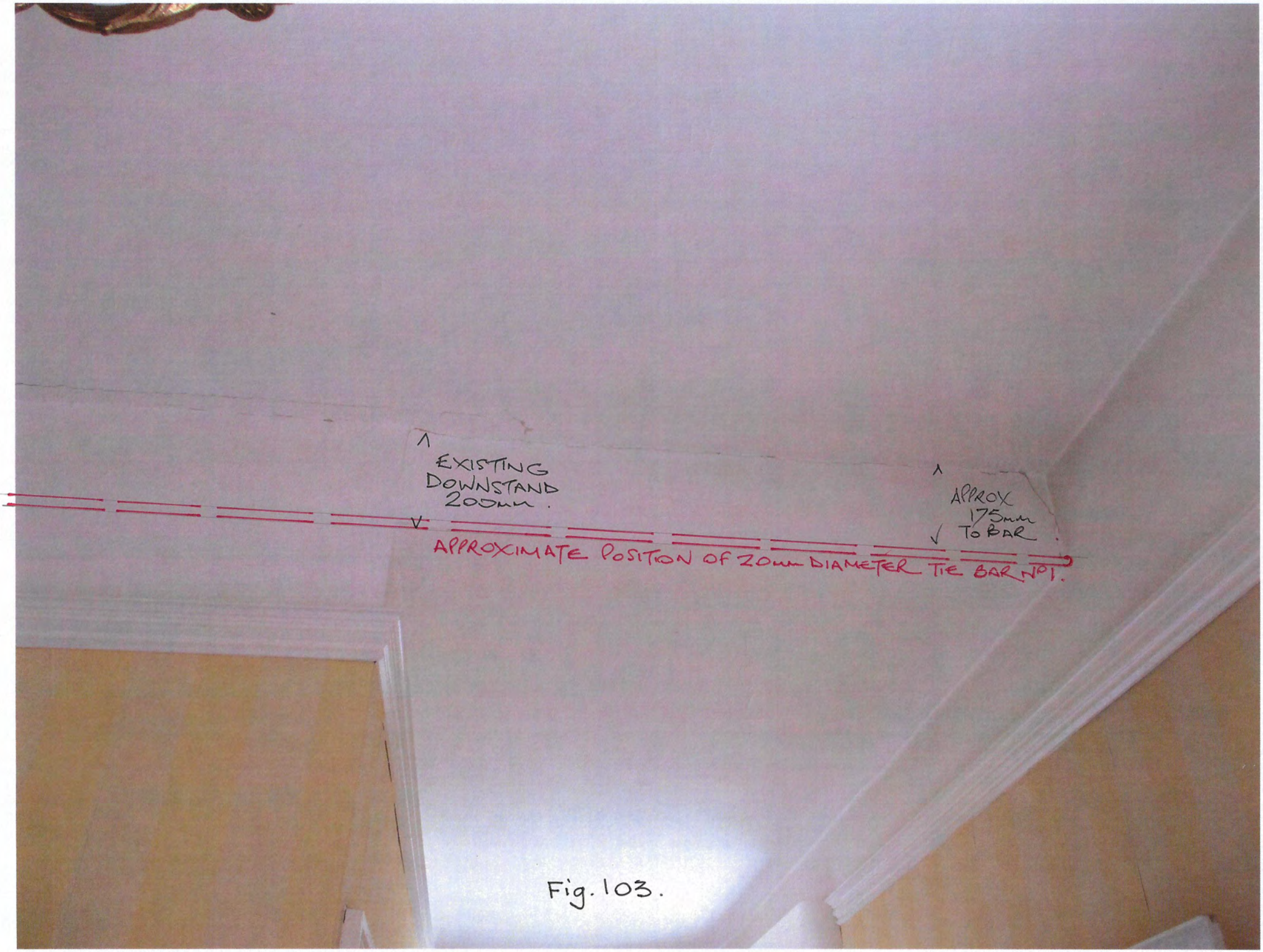

EXISTING
DOWNSTAND
200mm.
APPROX
175mm
TO BAR
APPROXIMATE POSITION OF 20mm DIAMETER TIE BAR NO1.

Fig. 103.

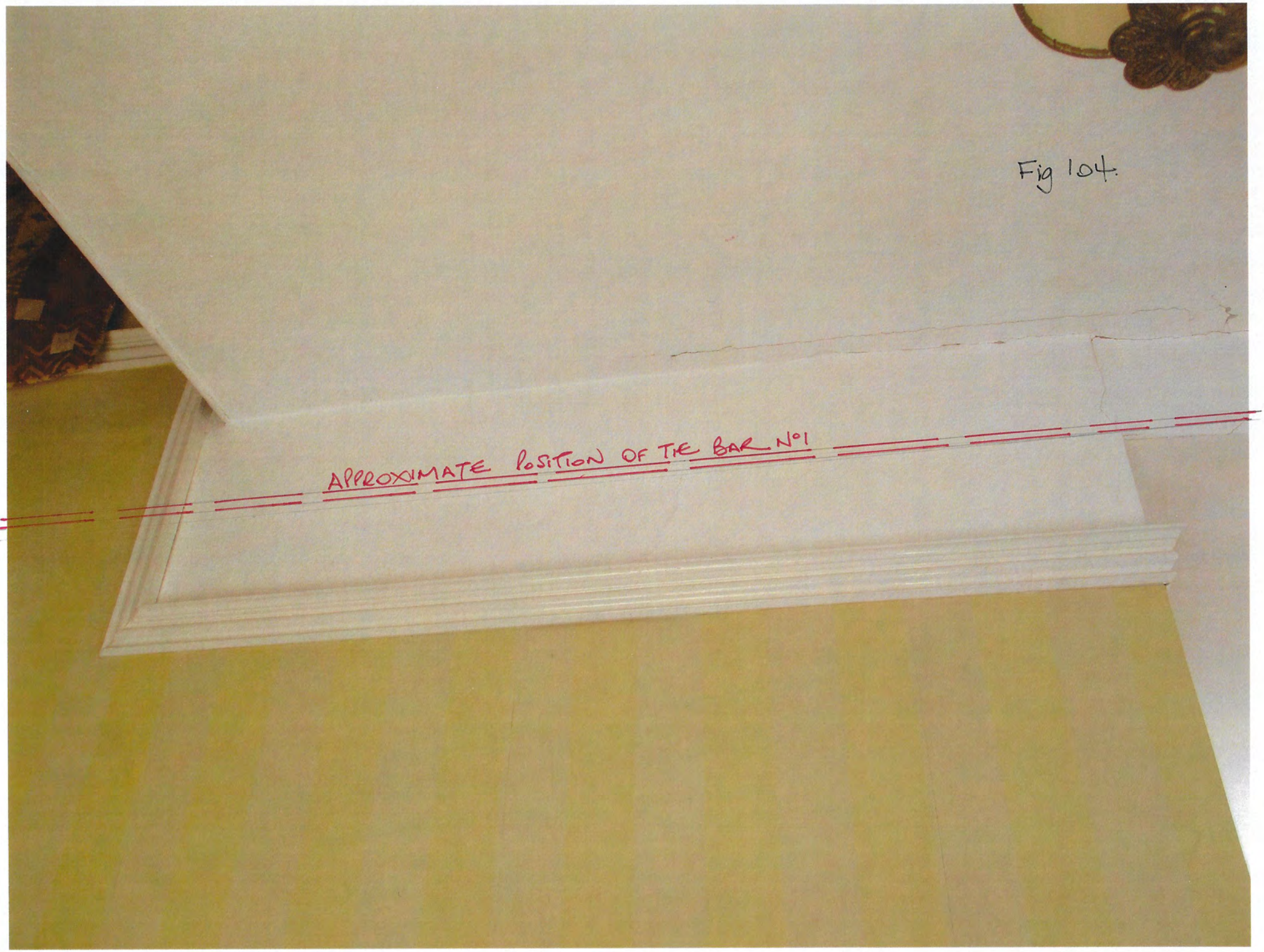


Fig 104.

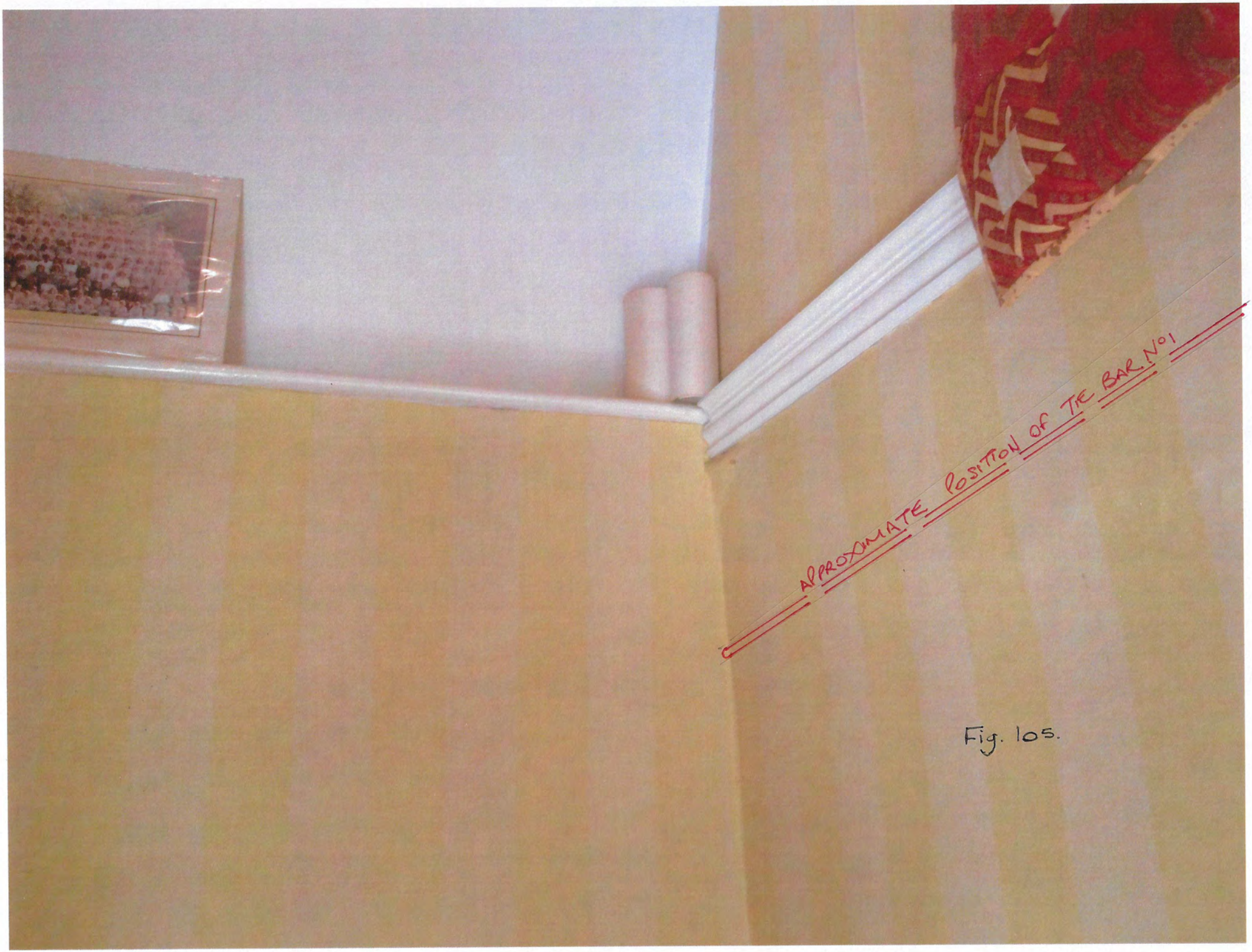


Fig. 105.

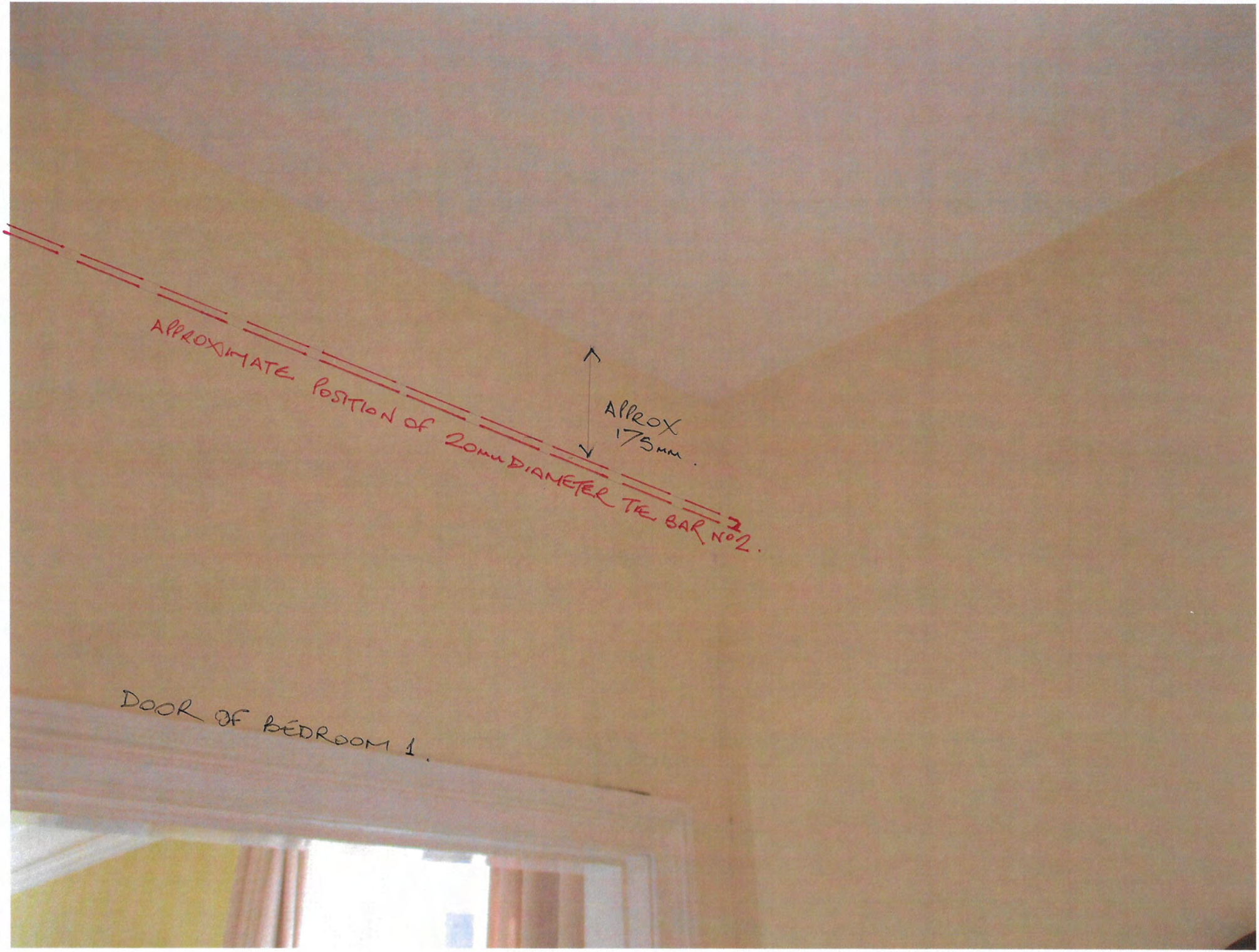
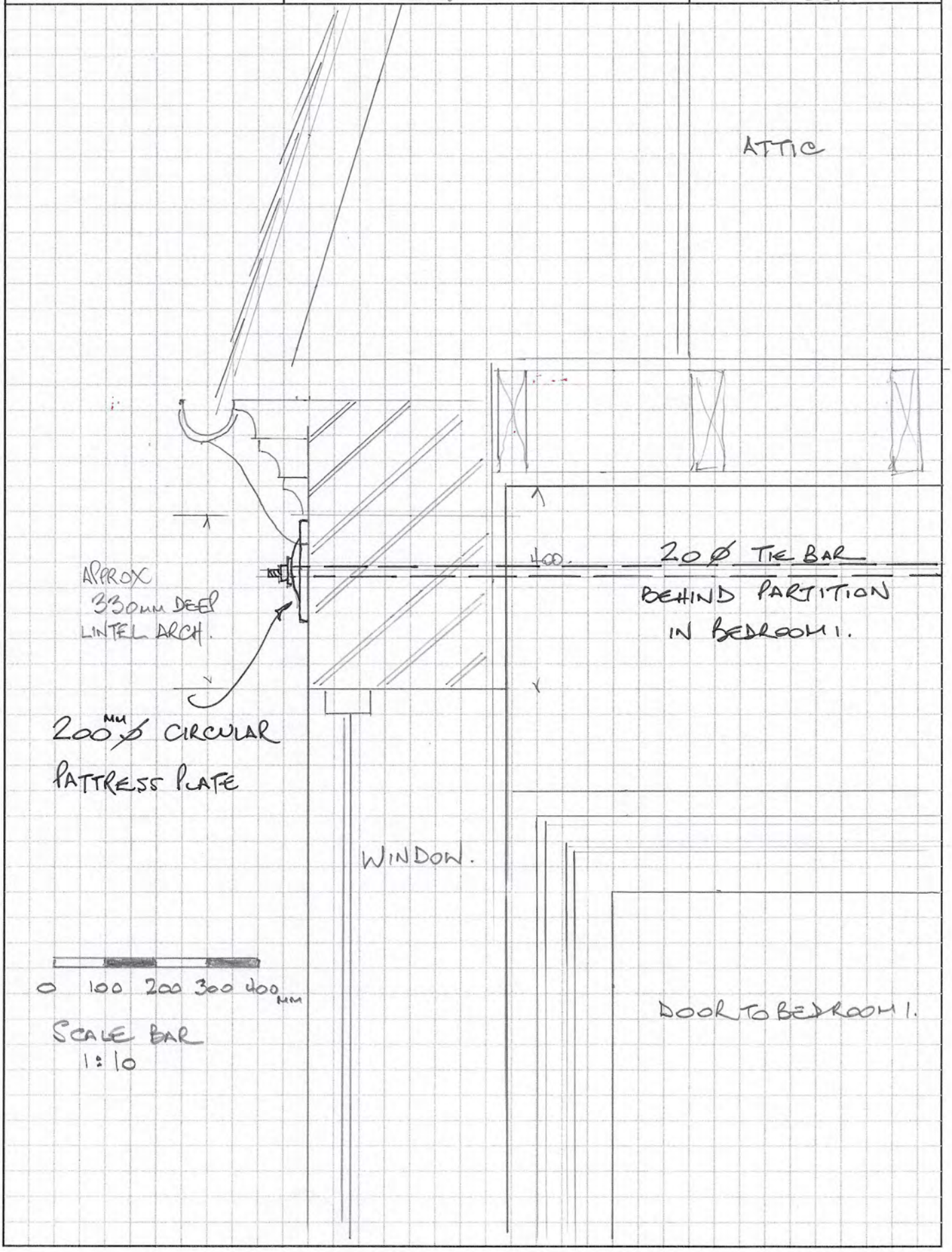

APPROXIMATE POSITION of 20mm DIAMETER TIE BAR No 2.
APPROX 175mm.
DOOR OF BEDROOM 1.

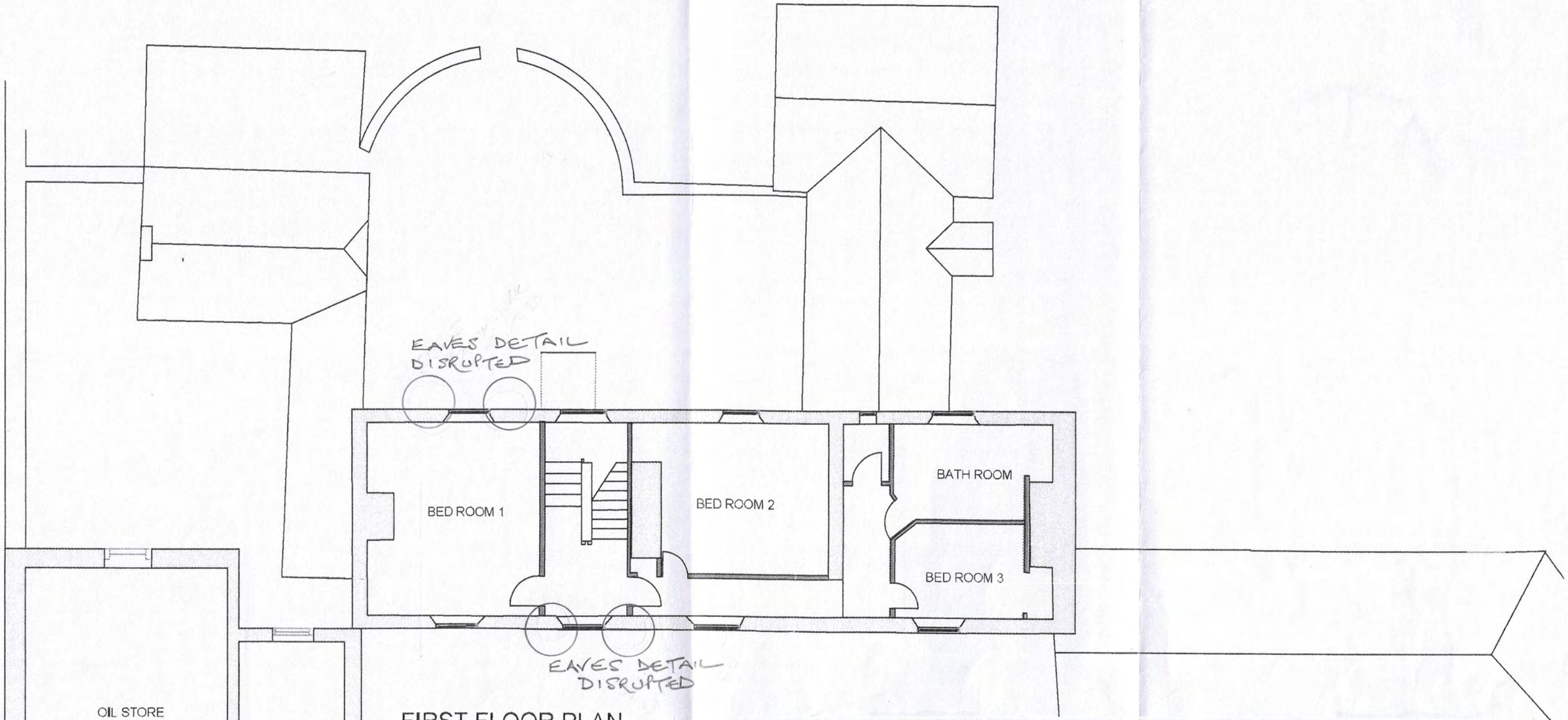
Fig 106.



Fig 107

SFK consulting structural engineers • historic building specialists	Project: MANOR FARM AVEBURY		Job Ref: 23005	
	Drawn: RS	Scale: 1:10	Sheet No: Fig 108	Rev:
	Element: POSSIBLE TIE BAR DETAIL		Date: 01.11.23	





FIRST FLOOR PLAN

0 1m 2m 3m 4m
SCALE BAR
1:100

SFK consulting structural engineers • historic building specialists	Project: MANOR FARM AVEBURY		Job Ref: 23005
	Drawn: RS	Scale:	Sheet No: Fig 109 / Rev:
	Element: DISRUPTED EAVES DETAIL		Date: 08.11.23


POSSIBLE RESTRAINT
ANCHORS. TO WALL HEAD.
SOUTH ELEVATION.
ADDITIONAL TO TIE BARS.

Fig
110

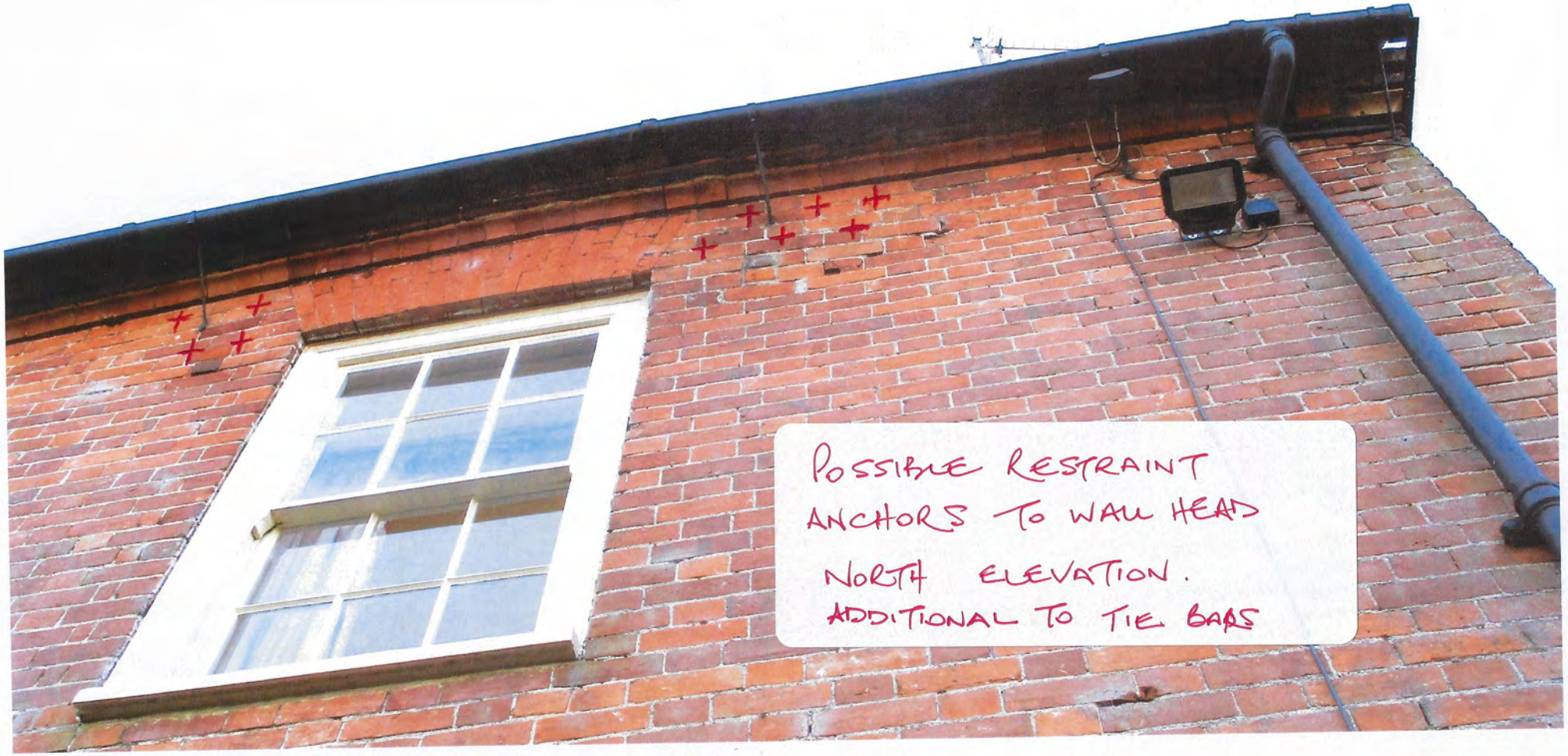

POSSIBLE RESTRAINT
ANCHORS TO WALL HEAD
NORTH ELEVATION.
ADDITIONAL TO TIE BARS

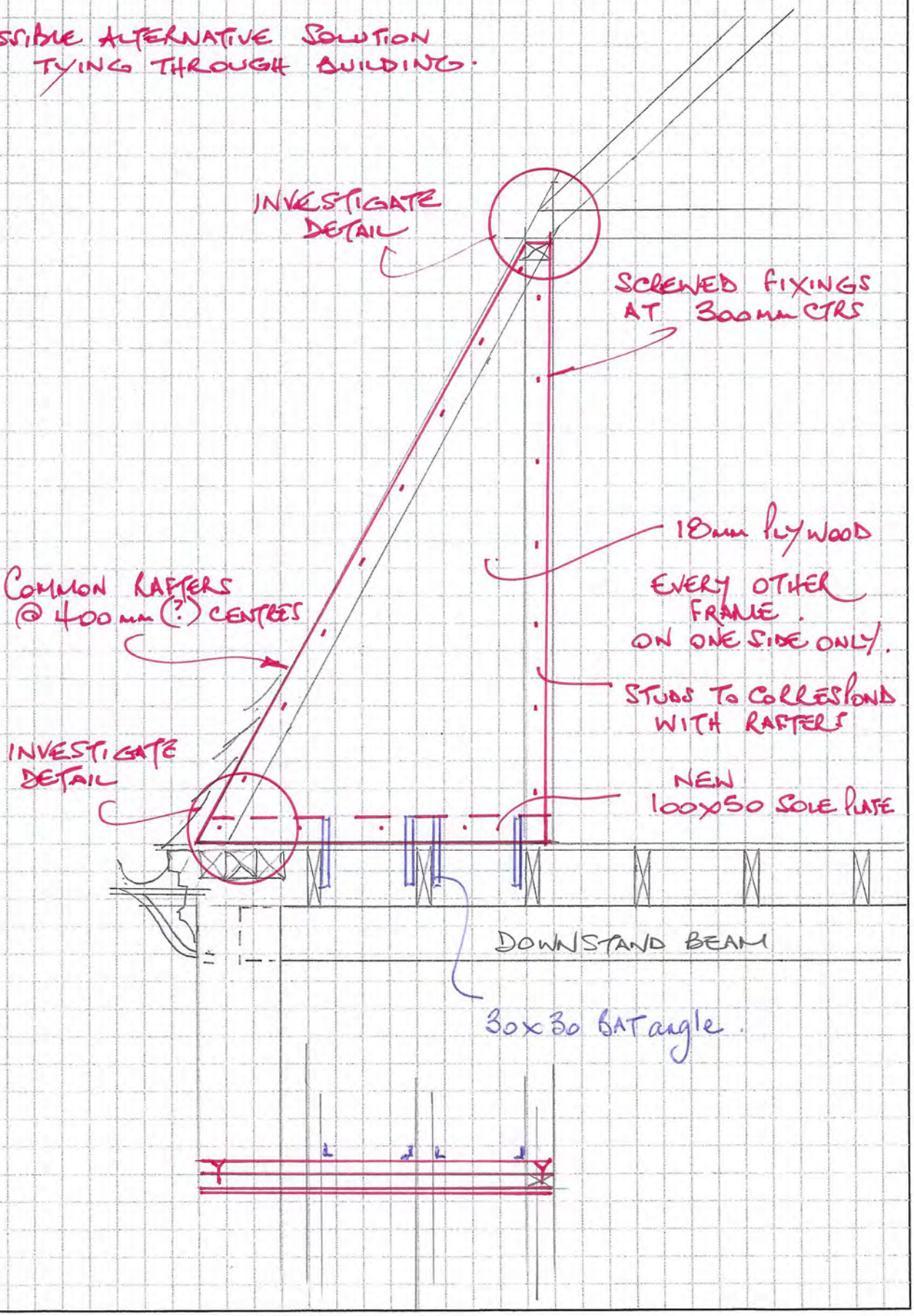
Fig. III



Fig. 112

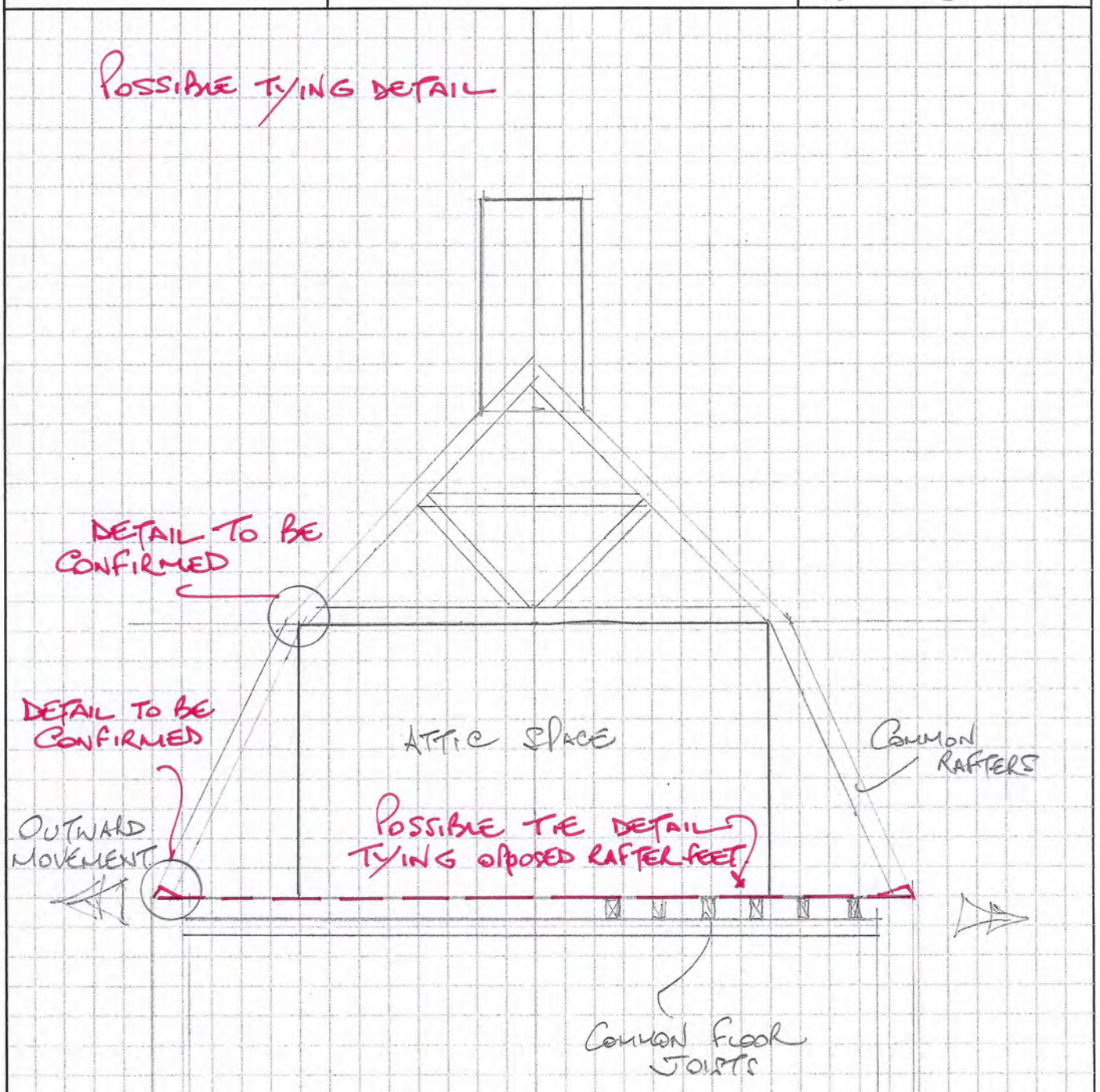
SFK consulting structural engineers • historic building specialists	Project: MANOR FARM AVEBURY		Job Ref: 23005	
	Drawn: RS	Scale: 1:20 APPROX	Sheet No: FIGURE 200	Rev:
	Element: POSSIBLE ALTERNATIVE SOLUTION TO TYING THROUGH.		Date: 12.01.23	

POSSIBLE ALTERNATIVE SOLUTION TO TYING THROUGH BUILDING.



SFK consulting
structural engineers • historic building specialists

Project: MANOR FARM AVEBURY		Job Ref: 23005.	
Drawn: RS	Scale: 1:50 APPROX	Sheet No: FIGURE 201	Rev:
Element: TYPICAL CROSS SECTION		Date: 12.01.23	



APPENDIX B
Data Sheet

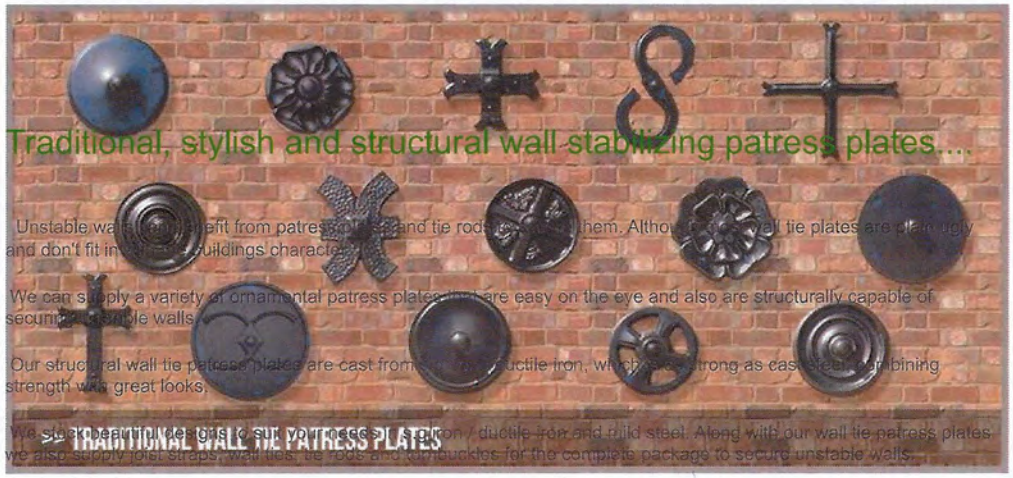
NEED SOME ADVICE?

Call us on +44 (0)1283 565299
or info@redgwick.co.uk

Find out more



on our shipping*



Feel free to review our range of wall tie plates in our wall plate catalogue or our accessories in our fixings catalogue for more details.

TRADITIONAL STRUCTURAL PATRESS WALL TIE PLATES



BUTTON WALL TIE PATRESS PLATE

- Decorative yet subley designed.
- Supplied in a matte black paint finish.
- Cast in Spheroidal Graphited Iron (Ductile Iron) 27/12

MORE INFO



BULLS EYE PATRESS WALL TIE PLATE

- A traditional design with structural integrity.
- Available in both 8 inch and 11 inch diameter.
- Cast strong Ductile iron (Spheroidal Graphited Iron).

MORE INFO



'S' WALL TIE PATRESS PLATE

- An enhancing design for period style structures.
- Beautifully finished in matte black paint for durability.

MORE INFO



SHAMBLES CROSS PATRESS WALL TIE PLATE

- A favorite to complement period listed buildings.
- Manufactured in 18 inch or 24 inch in size.

MORE INFO



- A captivating design with excellent structural strength properties.
- Cast in Spheroidal Graphited Iron (Ductile Iron) to grade 27/12.
- Finished in a flat black paint finish.

MORE INFO

© TONY REDGWICK LTD

- An imposing and overall eye grabbing design.
- Can be used as the perfect decorative patress plate to break up the visual monotony large walls.

MORE INFO





OAK LEAF CLUSTER PATRESS WALL TIE PLATE

- A timeless and capitvating design of wall patress plate.
- Finished in a matte black paint finish.
- Cast in Spheroidal Graphited Iron (Ductile Iron) grade 27/12.

MORE INFO



MILL RIND WALL PATRESS PLATE TIE

- A sterdy and strong design that allows incredible wall restraint.
- Can be used to assist walls of large sizes from buckeling.
- Cast in Spheroidal Graphited Iron (Ductile Iron) grade 27/12.

MORE INFO

WHAT TO DO?

If you have any queries on our structual fixings or wall stabilizing products including technical details on the items, uses on buldings and walls or shipping information you may find what you are looking for on our FAQ page.

The TECHNICAL page of this website may also help when deciding on wall ties, tie rods and patress plates.

To obtain intial quotations please use our QUOTE page or CONTACT US page with your requirements.

Alternatively you can CALL US on +44 (0)1283 565299 and an assistant will gladly help you with your queries, questions and orders.

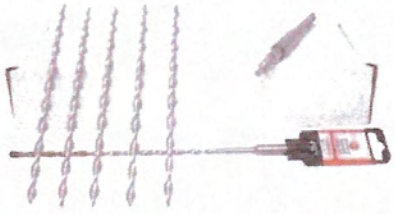


>>Fixings & Accessories



>>Technical Information

* Restrictions apply



Easi-Fix Helical Drive Replacement Wall Tie Kit Mini

★★★★★ 2 | Read Reviews

Everything you need to quickly tie facades together apart from a drill! Our mini helical drive kit is a faster, easier and more reliable way to restore structural stability in a range of materials.

Read More

£95.00 Ex VAT
£114.00 Inc VAT

Please select the length required:

-- Please Select --

Qty - 1 +

Add to Basket

Description

Helical Drive Wall Tie Kit

The Easi-Fix Helical Drive Wall Tie Kit is a quick and easy way to tie building facades together, returning structural stability. Once installed the Easi-Fix Helical Drive Tie provides a mechanical connection between a masonry façade and its backup material. It is also highly effective at connecting multiple widths of brick, block, concrete and even timber.

Our DIY helical drive wall tie kit is designed to cover approximately 20 metres at a coverage rate of 2.5 drive ties per m^2.

Uses of Helical Drive Tie

The 304 stainless-steel finned helical tie included in this mini kit can be used for the following:

- anchoring building facades to structural members
- stabilising multiple width brick walls
- remedial wall ties to re-tie a wide range of differing materials like air-crete blocks, clay bricks, stone, concrete blocks and timber studs.

Included in the helical drive wall tie kit:

- 50 x Easi-Fix Helical Drive Wall Ties
- 1 x Easi-Fix Helical Drive Tie SDS Install Tool
- 1 x 6mm x 450mm Armeg SDS Drill bit (use 7mm for engineering bricks)

Important note: to use this mini drive tie kit you will require an SDS-Plus shank hammer drill that can work on hammer mode only.

Installing Helical Remedial Wall Ties

Easi-Fix helical drive wall ties are simple to install. You need to drill a 6mm pilot hole (7mm for engineering bricks) into the substrate. This will need to pass through the outer leaf across the cavity and at least 70mm into the inner leaf.

The unique Helical Drive Tie SDS Install Tool (provided in our DIY helical kit) is then used to drive the helical tie in using an SDS-Plus shank hammer drill that can work on hammer mode only. As the tie is driven into the substrate, the fins of the tie undercut the masonry twisting the tie into the masonry. This provides an expansion-free anchorage that will withstand tension and compression loads.

For more detailed installation instructions, visit the download tab. You can also read our guide to replacing wall ties for more information.

Important note: If you have a dense substrate such as engineering bricks, it may be necessary to drill a 8mm countersunk hole into the substrate approximately 10mm so the head of the tie can be completely lost in the substrate and does not protrude from the surface.

Easi-Fix - Specialist Solutions. Made possible.

If you have any questions about helical drive wall ties, the right remedial wall tie you need or how to replace failed wall ties then contact our technical experts on 0117 982 3282.

At Permagard, we stock a wide range of structural repair products and are always happy to offer advice. Our Easi-Fix range is trusted by professionals to provide the confidence you need when it comes to structural repair.

Features

SFK consulting

APPENDIX C
Photographs



P1



P2



P3



P4