

Purpose

This sketch summarises the output from a structural assessment undertaken by Buro Happold (BH) to assess whether the existing New Warehouse (NW) structure is adequate to resist temporary loads imposed by the proposed scaffolding scheme.

Summary: the existing NW structure has been determined to be adequate to resist proposed loads as long as the following conditions are both met:

1. Strengthening brackets described in this sketch are installed prior to the proposed temporary roof being installed,
2. Additional ties between the scaffold and NW building are added to all vertical scaffold bays, following the line of the purlins internally, as shown in Fig 1 below. This typically required 5 no. additional ties per structural bay.
3. All assumptions and notes included below are reviewed and considered to be accurate by all other parties, with no scope gaps. This requires confirmation by scaffolding contractor, scaffolding designer and client.

A separate building control calculation package and listed building consent design note have also been prepared and will be issued separately.

Key Assumptions & Notes

NB - these assumptions and notes underpin the analysis carried out by BH as checking engineers for the NW temporary assessment. If any of these are determined to be inaccurate or change during the course of the installation of the scaffolding this must be raised for review as the conclusions reached during the assessment may no longer be valid.

- Checks are based on the current proposed scaffolding design, as shown in Bespoke scaffold design drawings 24-BSD-944-01, 02, 03 & 04, all rev P02. Updated loads were also issued to BH for review on 02.05.24, which have then been incorporated into the assessment. These will be reflected on updated drawings issued following rev C04 of this sketch.

- Checks are based on the loads stated on the above scaffold design drawings, specifically on drawing 24-BSD-944-04. These loads are understood to be factored ULS loads including all relevant loadcases and combinations to Eurocodes. No additional or alternative load conditions have been checked.

- Design responsibilities are as per the table opposite. BH's scope is limited to the responsibilities stated and allowance needs to be made for all other aspects noted to be included by the relevant party.

- BH's scope for assessing temporary conditions is strictly limited to assessing the existing NW for scaffolding loads as set out in this sketch. All other temporary assessments remain the responsibility of the relevant works contractors. See BH drawings for full details.

Sketch Contents:

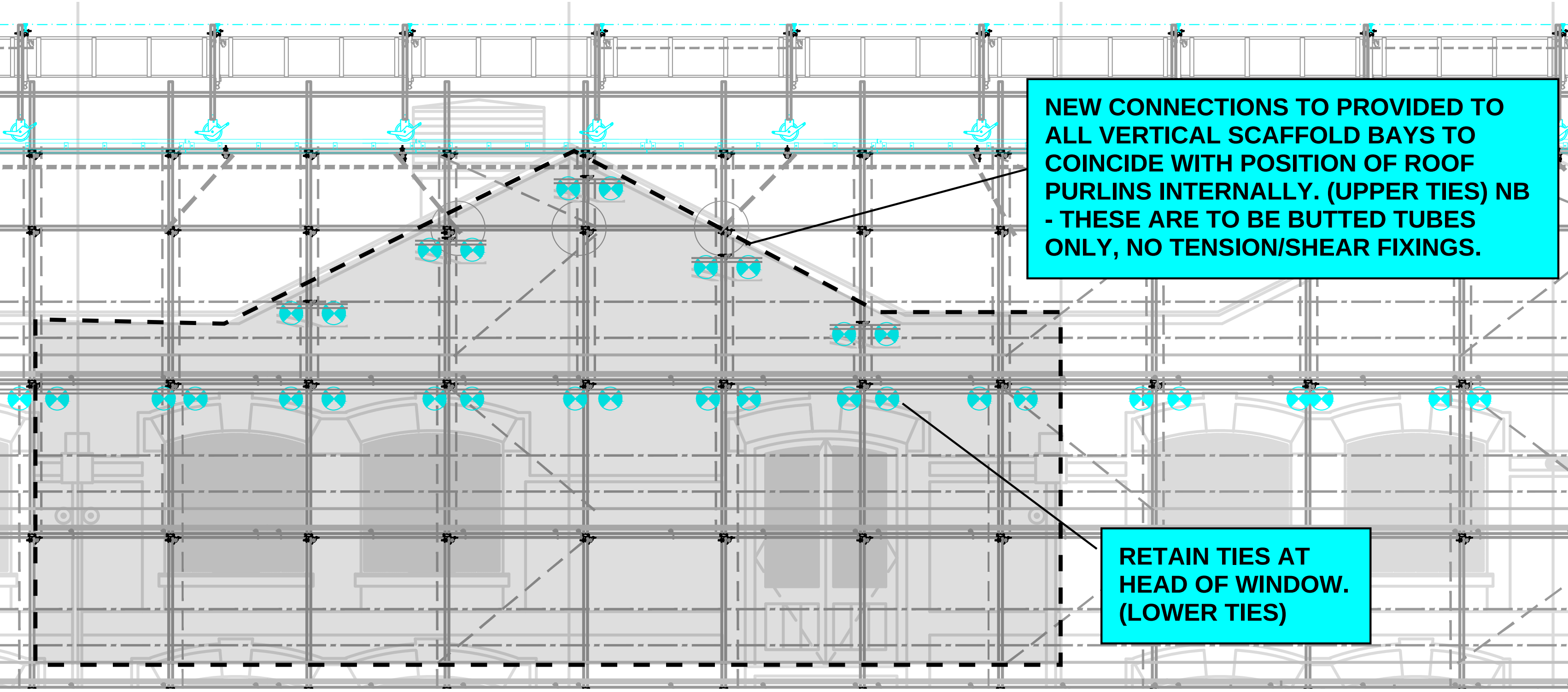
- Pg 1 - Notes
- Pg 2 - Key plan for strengthening brackets
- Pg 3 - Bracket details - bracket type A.1
- Pg 4 - Bracket details - bracket type A.2
- Pg 5 - Bracket details - bracket type B

Revisions note:
Rev C04 - 10.05.24 - Updated to include larger bolts to type A, new bracket type A2 for ridge positions, revised details for type B.

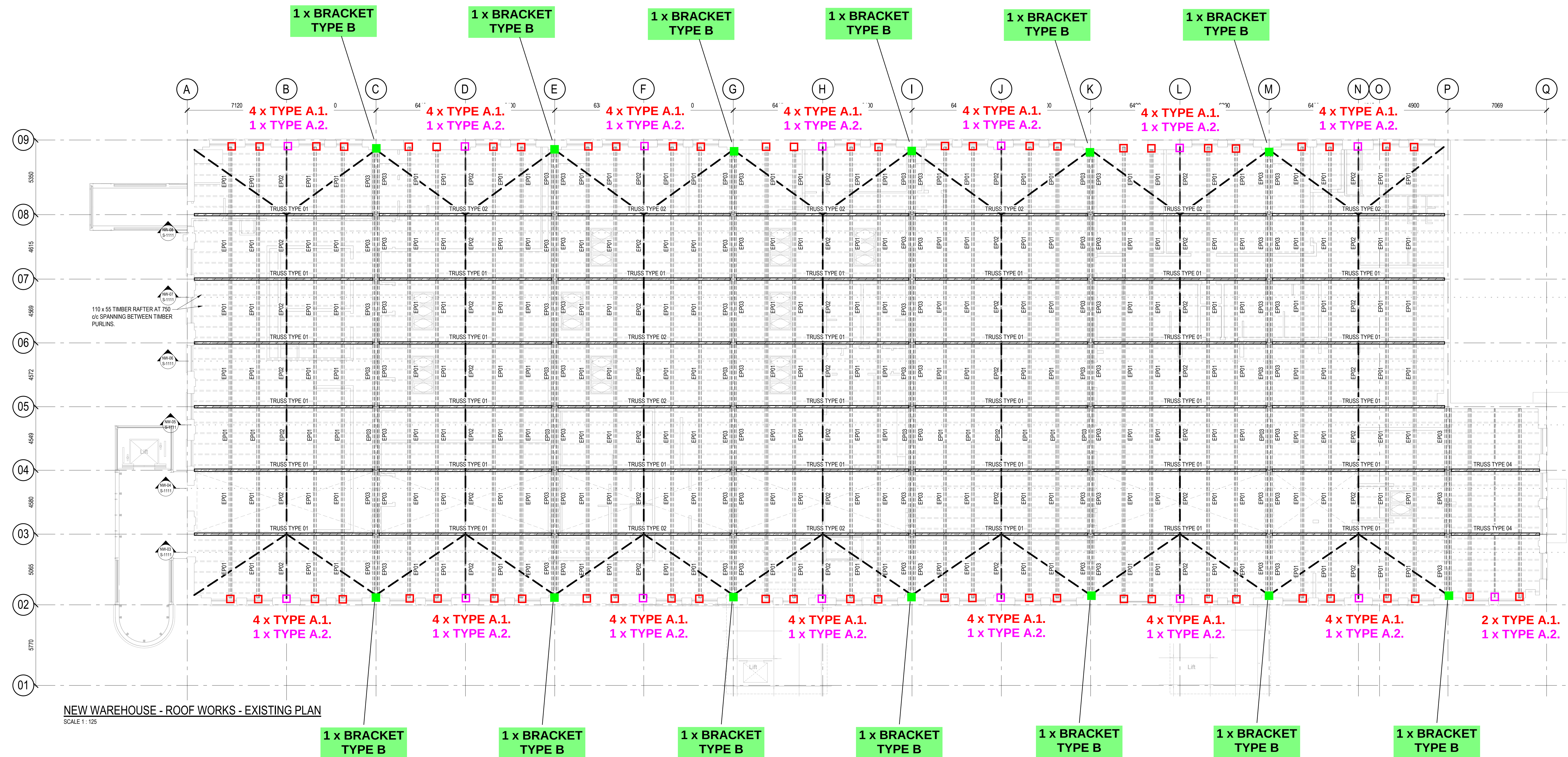
Responsibility Matrix

BH responsibilities	Third party responsibilities	
	Scaffold designer / contractor	Main works contractor / other
Carry out analysis of the existing NW building structure for specific temporary load case provided by scaffolding designer. No interpretation of loading has been carried out and no allowance is made for additional or alternative loads arising from any change within the scaffolding.	Production of construction stage scaffolding design, compliant with all relevant Eurocode and other UK design guidance.	Assessment of all other temporary loading conditions, and design/detailing of any required temporary works.
Report on findings and clarify any required strengthening or temporary works.	Provide ULS design loads imposed onto NW structure from proposed scaffolding. This should include all relevant design loads and combinations, plus considerations listed below.	Fabrication and final installation of required NW bracketry, as specified by BH. NB - this should also include the production of fabrication drawings.
Develop construction stage designs for bracketry required to strengthen NW diaphragm for temporary loading. Issued as sketched design intent, fabrication drawings by others.	Scaffold design must account for any relevant requirements for sensitivity of support conditions at connection to existing building, relative stiffness between supports and/or framing members and any requirements for robustness and redundancy within the scaffolding. In particular it's suggested that redundancy within the ratchet straps system is proven to be adequate.	Site measure / final coordination of bracketry to suit site conditions.
Review of fabrication drawings against design intent.	Develop construction sequence for scaffolding and temporary roof, and ensure that temporary loads onto existing building are no higher than in final case (loads which are communicated on scaffold drawings).	Develop construction sequence for scaffolding and temporary roof, and ensure that temporary loads onto existing building are no higher than in final case (loads which are communicated on scaffold drawings).
Produce design note and sketches to support listed building consent application associated with scaffolding works.	Design and specification of any ties into existing building, including overseeing / carrying out any required testing.	
Produce calculation package for assessment / required works for submission to building control. For the works covered in this sketch only.		

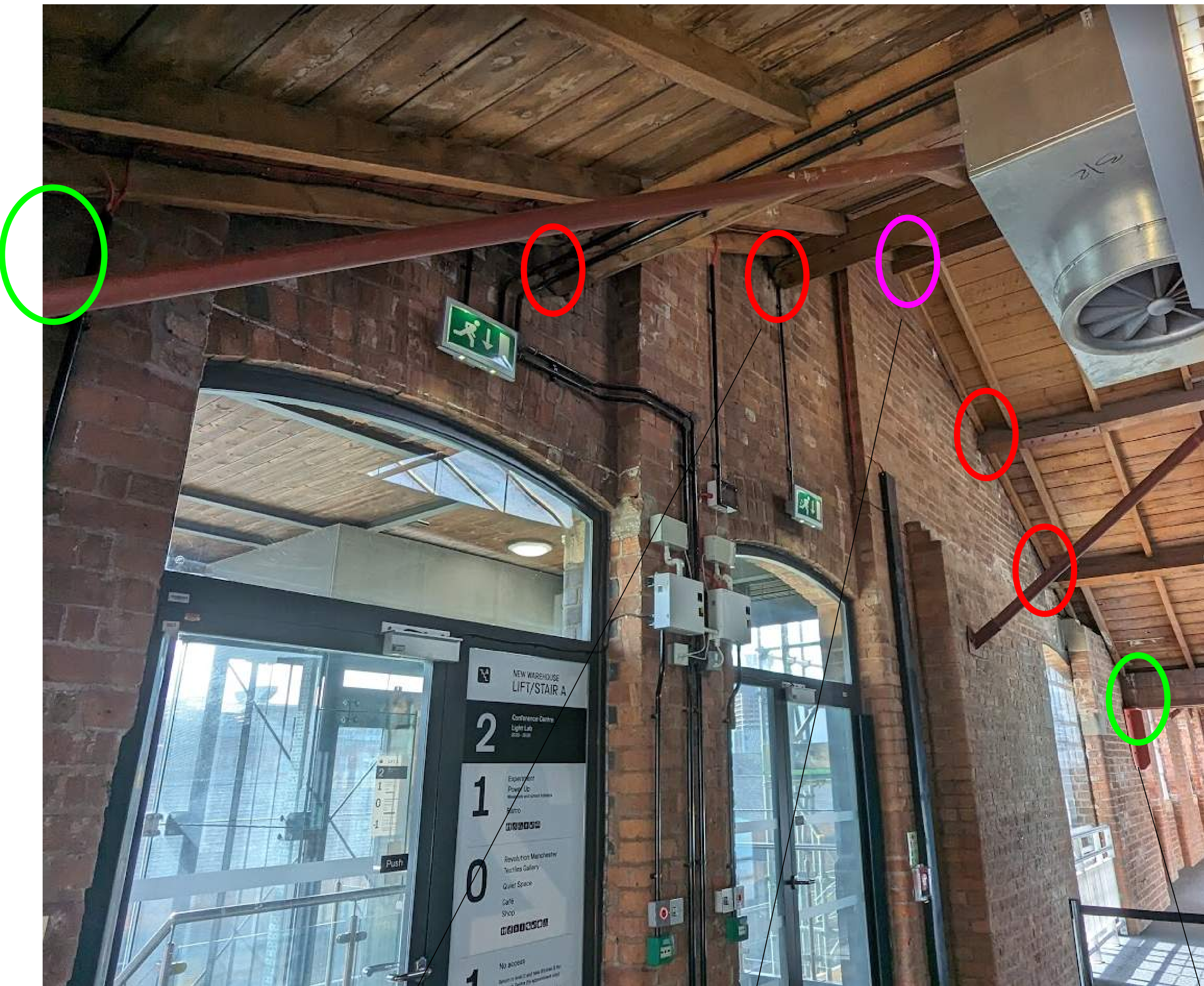
Fig 1 - Required additional ties



BRACKET TYPE KEY PLAN



BRACKET DETAIL A.1 - INCLINED PURLINS

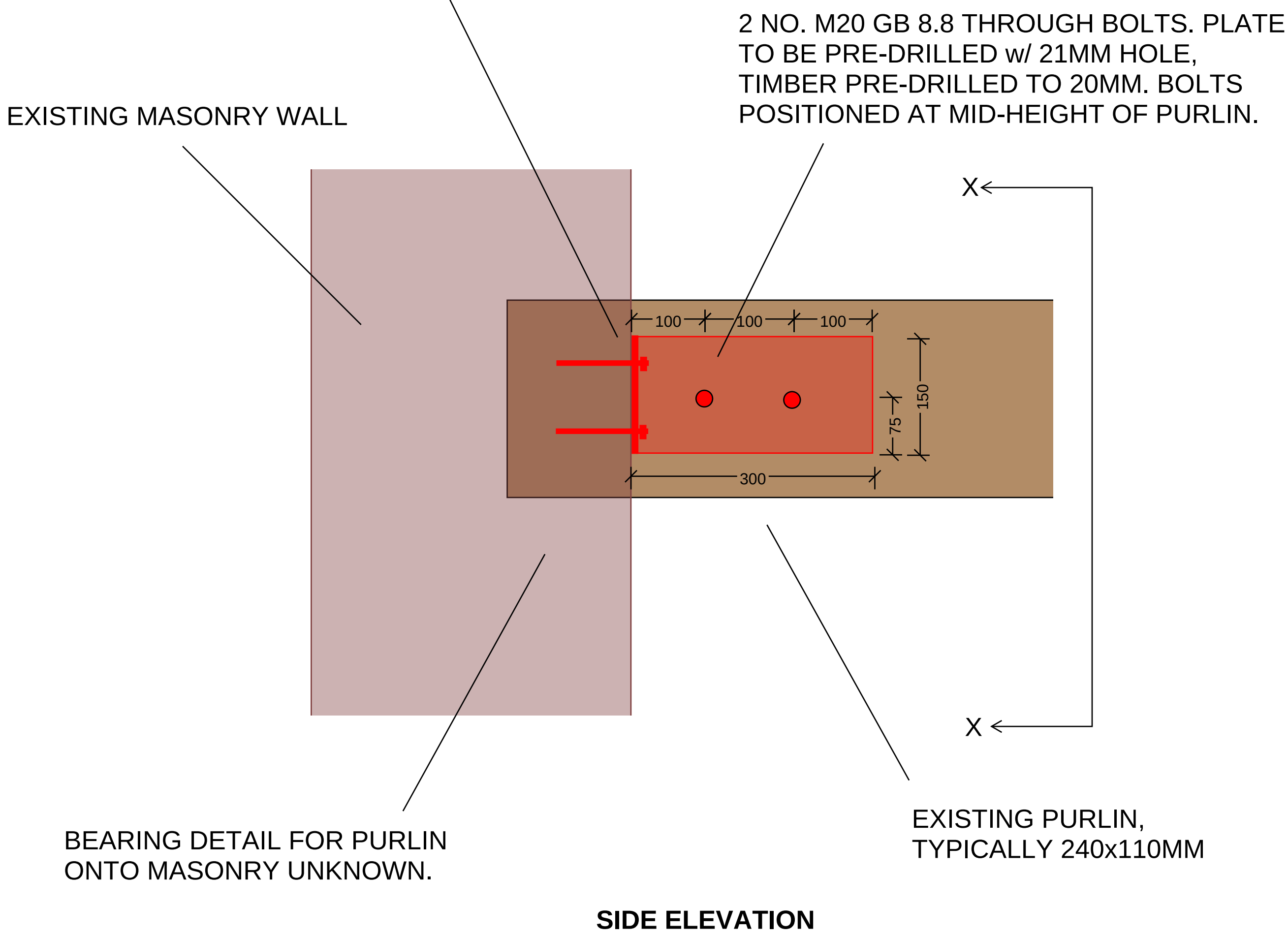


BRACKET DETAIL A.1 TO BE INSTALLED TO 4 NO. INCLINED PURLINS PER BAY. SEE PG 3.

BRACKET DETAIL A.2 TO BE INSTALLED TO RIDGE. SEE PG 4.

BRACKET DETAIL B TO BE INSTALLED AT VALLEY POSITIONS. SEE PG 5.

NEW 10MM THK STEEL L-BRACKET TO EACH FACE OF PURLIN. FACE FIXED TO MASONRY w/ 2 x 10MM DIAM HILTI HUS3 SCREW ANCHORS. TO BE INSTALLED IN FULL ACCORDANCE w/ HILTI GUIDANCE. 75MM EMBEDMENT. CONNECTION PROVIDES NOMINAL STRUCTURAL CAPACITY. BASED ON 4 x FIXINGS PER LOCATION, CAPACITY LIMITED BY PULL OUT OF INDIVIDUAL BRICKS AT c. 4KN.



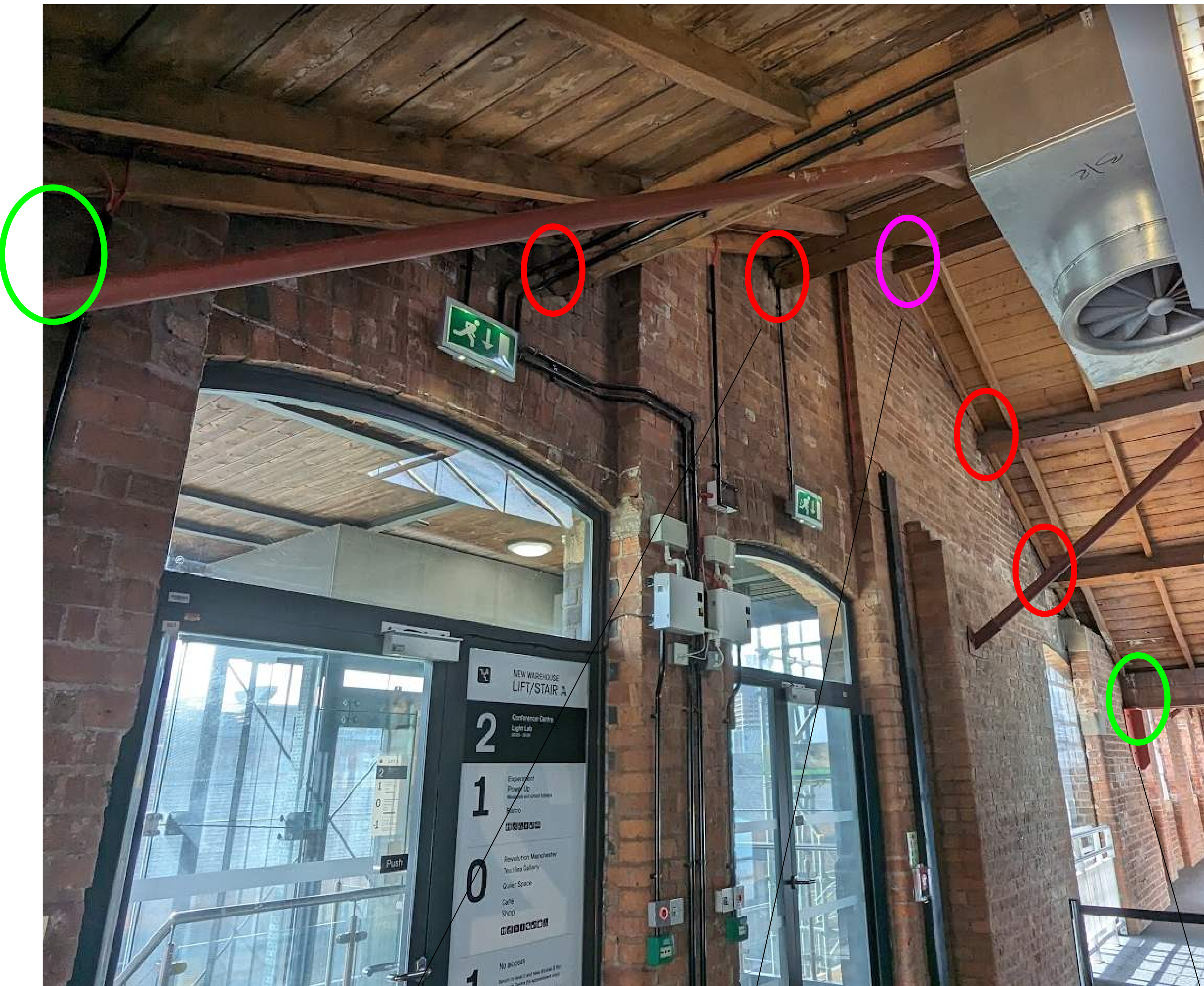
BRACKET A.1 DETAIL

NOTES:

- ALL STEELWORK TO COMPLY w/ BH STEELWORK SPECIFICATION
- 100x150 PLATES TO BE FIXED FLUSH AGAINST FACE OF MASONRY TO ENSURE DIRECT LOAD TRANSFER IN BEARING. PLATES TO BE SHIMMED IF REQUIRED TO ENSURE FULL CONTACT.
- BRACKET & BOLT TO BE PAINTED TO MATCH EXISTING RED STEELWORK IN NEW WAREHOUSE ROOF SPACE. CONFIRMED BY CONTRACTOR BASED ON SITE INSPECTION AS RAL 3009 OXIDE RED.
- BRACKETS ARE REQUIRED FOR TEMORARY CASE ONLY, BUT ARE INTENDED TO BE LEFT IN PLACE TO PROVIDE ADDITIONAL ROBUSTNESS FOR PERMANENT LOADS & TO PROVIDE FLEXIBILITY FOR FUTURE MAINTENANCE WORKS. TBC SUBJECT TO DISCUSSION w/ PLANNING.
- ALL CORNERS/EDGES OF PLATES TO BE ROUNDED/CHAMFERED TO MIN. 1MM RADIUS/CHAMFER.
- PLATES TO BE JOINED w/ 5MM CFW TO BOTH FACES OF JOINT.
- PLATED ASSEMBLY IS TO ACHIEVE 90DEG ANGLE BETWEEN PLATES. WELDING SEQUENCE TO BE DEVELOPED TO PREVENT WARPING. HIT & MISS MAY BE REQUIRED.
- ALL BOLTS TO BE FITTED w/ STANDARD HEX NUTS w/ 2 NO FULL THREADS PROJECTING.

BURO HAPPOLD	Project: Science and Industry Museum - Site wide Estate Capital Works 2		Project Number: 054704		Status: For Construction	
	Sketch Title: Temporary condition checks for new warehouse scaffolding	PG 3/4	Sketch Number: SIM-BHE-NW-XX-S-0003	Date: 28/03/24	Initials: DJC	Revision: C04

BRACKET DETAIL A.2 - RIDGE PURLINS

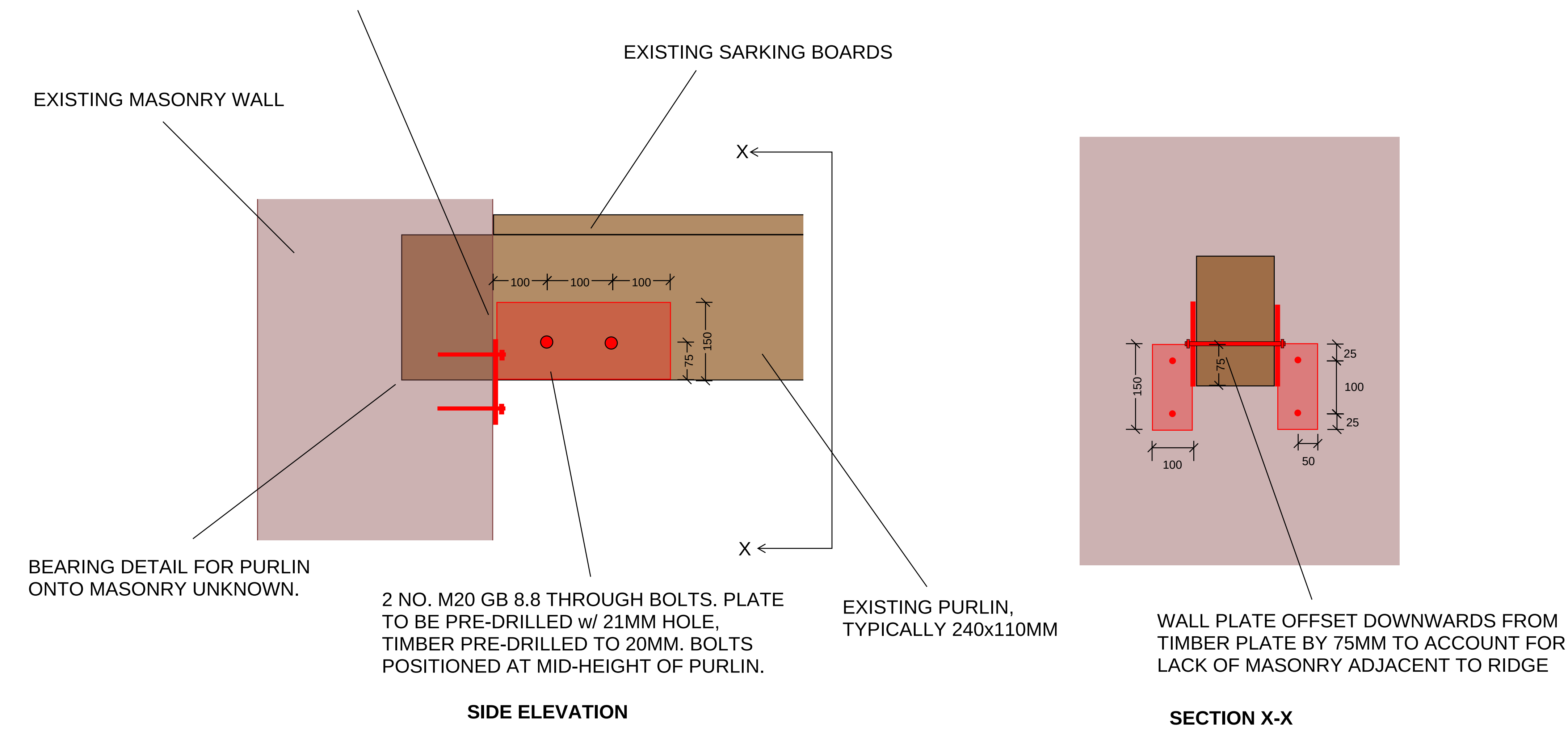


BRACKET DETAIL A.1 TO BE
INSTALLED TO 4 NO.
INCLINED PURLINS PER BAY.
SEE PG 3.

BRACKET DETAIL A.2
TO BE INSTALLED TO
RIDGE. SEE PG 4.

BRACKET DETAIL B TO BE
INSTALLED AT VALLEY
POSITIONS. SEE PG 5.

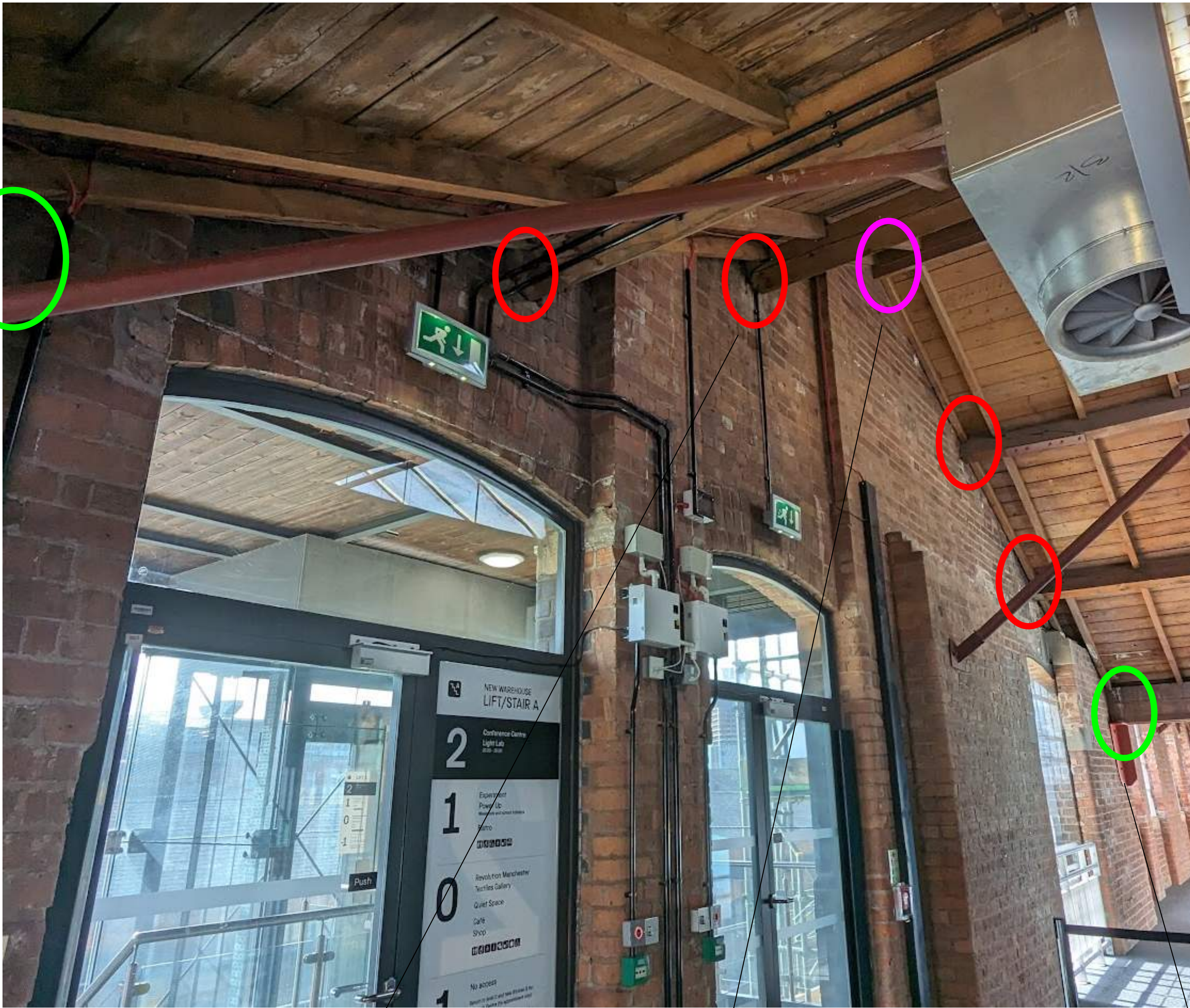
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BRACKET A.2 DETAIL

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BRACKET DETAIL B - VALLEY LOCATIONS, STANDARD ACCESS



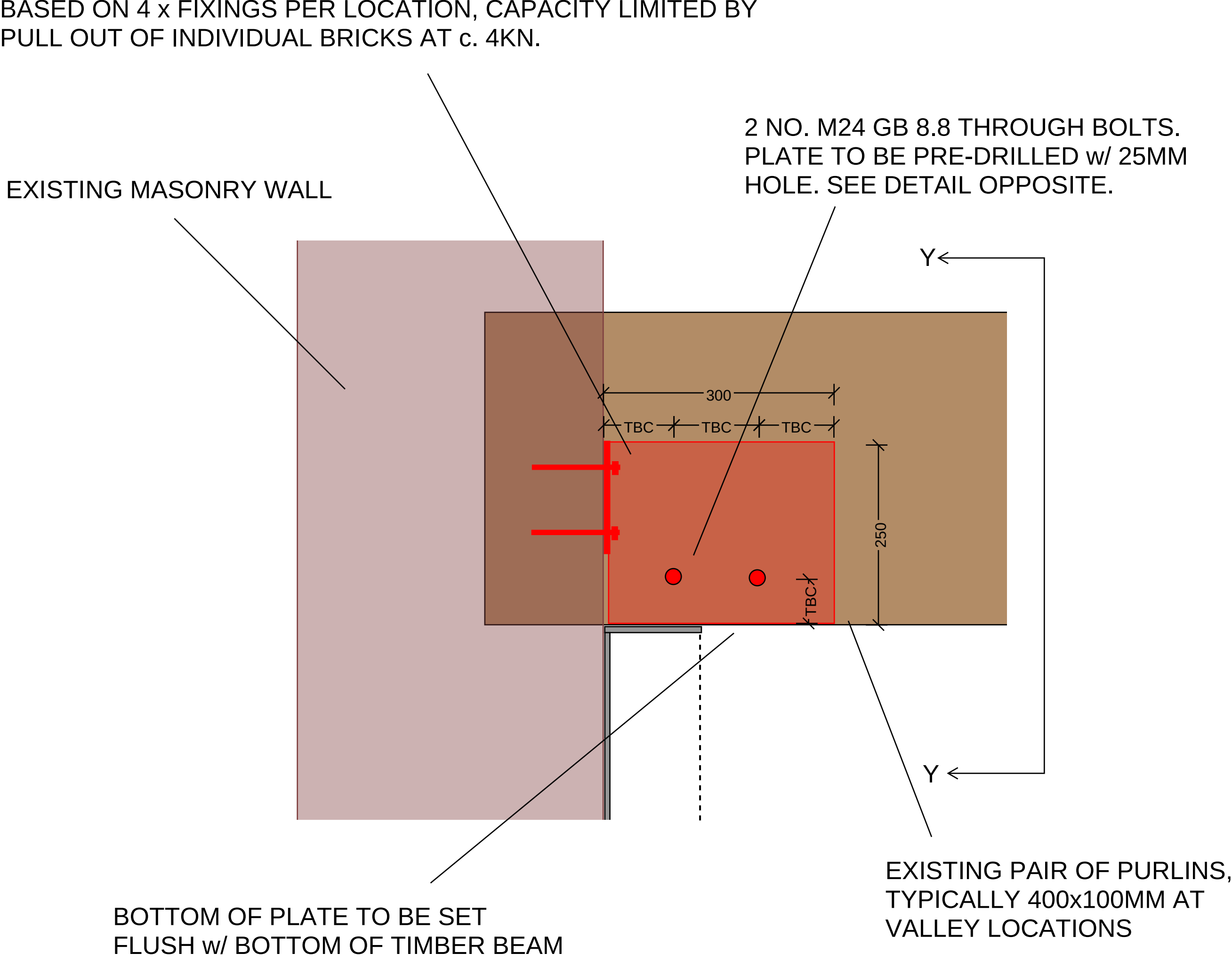
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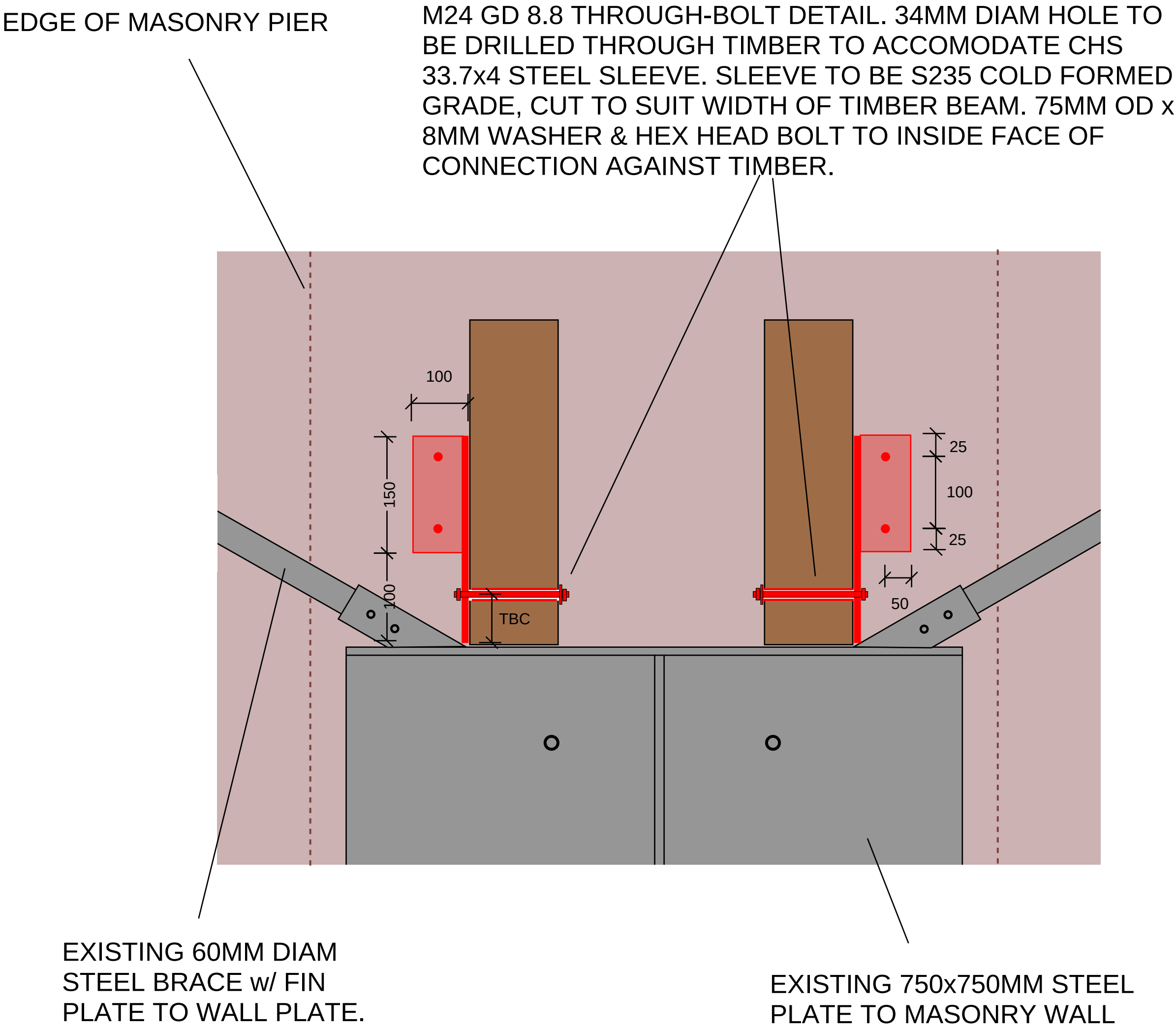
BRACKET DETAIL B TO BE INSTALLED AT VALLEY POSITIONS. SEE PG 5.

NOTE ON OBSTRUCTIONS & VARIATION IN BRACKET LAYOUT
B-TYPE BRACKETS NEED TO ACCOMODATE LOCAL OBSTRUCTIONS AT SEVERAL VALLEY POSITIONS. THESE INCLUDE BRACING MEMBERS, DIFFERENT EXTENTS OF MASONRY AVAILABLE TO FIX INTO, & PARTITIONS & BUILDING SERVICES. TO WORK AROUND THESE OBSTRUCTIONS & AVOID SEPARATE BRACKET TYPES FOR EACH LOCATION, THE PROPOSED DESIGN INCLUDES FLEXIBILITY IN THE POSITION OF FIXINGS TO ALLOW INSTALLATION IN MULTIPLE LOCATIONS. THE STANDARD BRACKET SHOWN WILL BE SITE-TESTED AT ALL RELVANT POSITIONS AND POSITION OF FIXINGS DETERMINED TO SUIT SITE CONDITIONS. IT MAY BE NECESSARY TO MAKE MINOR MODIFICATIONS TO PLATE GEOMETRY TO ACCOMODATE OBSTRUCTIONS IN SOME LOCATIONS. IN ALL CASES THE INSTALLED BRACKETS WILL ACHIEVE THE DESIGN INTENT SHOWN HERE.

NEW 10MM THK OFFSET STEEL L-BRACKET TO EACH FACE OF PURLIN. FACE FIXED TO MASONRY w/ 2 x 10MM DIAM HILTI HUS3 SCREW ANCHORS. TO BE INSTALLED IN FULL ACCORDANCE w/ HILTI GUIDANCE. 75MM EMBEDMENT. CONNECTION PROVIDES NOMINAL STRUCTURAL CAPACITY. BASED ON 4 x FIXINGS PER LOCATION, CAPACITY LIMITED BY PULL OUT OF INDIVIDUAL BRICKS AT c. 4KN.



SIDE ELEVATION



SECTION Y-Y

BRACKET B DETAIL

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INSTALLATION OF BRACKETS WILL REQUIRE LOCALISED BREAKING OUT OF NON-STRUCTURAL MODERN PARTITIONS.

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