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THOMAS STREET, MANCHESTER

No. 7 KELVIN STREET
STRUCTURAL WORKS

Project No 1601-09
March 2021
Rev: P02
TST-REN-00-XX-RP-S-00001

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MEng, MA, CEng, MIStructE

date **12.03.2021**

approved **Patrick Clayton**
Meng, CEng, MIStructE

date **12.03.2021**

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Rev.	Description	Author	Checked	Date
P01	Draft for comment	T Moran	P Clayton	12.03.21
P02	Issued for information	T Moran	P Clayton	19.03.21

1.0 INTRODUCTION

This document outlines the recommended works at No. 7 Kelvin Street, Manchester to bring the building back to an acceptable level of structural integrity and serviceability. Suggested repair and enhancement details are presented in appendix A.

This document should be read in conjunction with the following Renaissance documents:

“No. 7 Kelvin Street: External elevations Visual Survey Photo Report” dated July 2018 and “7 Kelvin Street & 48-50 Thomas Street, Manchester- Structural Report” dated May 2016.

Geometry of the existing structure is based on measured survey drawings by ND Oliver dated March 2016.

1.1 Limitations

As noted in previous reports, the building has undergone emergency temporary propping which has rendered the interior inaccessible. The exterior is largely sheeted. As such, any deterioration further to that noted in the previous reports is unknown and suitable allowance should be made for extra repairs in addition to those noted in this report.

2.0 PROJECT DESRIPTION

This section gives a brief description of the proposed development with particular reference to Number 7 Kelvin Street.

2.1 Existing Building

Forming part of a larger project, Number 7 Kelvin Street is a three-storey building of traditional construction located in the Northern Quarter of Manchester city centre, comprising load-bearing brick masonry walls to the perimeter and timber floor construction consisting of timber beams supported by cast iron columns, in turn supporting timber joists. The roof is of traditional construction, comprising timber members with a slate roof covering.

The building is thought to date from the late-eighteenth or early-nineteenth century and previously functioned as one entity with the now-demolished adjacent buildings on Thomas Street.

The location of the building is indicated below.



Figure 2.0 – Site location ***(Image © Google)***

2.2 Building Condition

The building is generally in poor condition with evidence of long-term water ingress. Compounded with an apparent lack of routine maintenance, some structural elements show evidence of deterioration. Historic modifications are apparent, as are evidence of historic repairs / strengthening. Demolition of the adjoining buildings has caused some mechanical damage and removed any protection from the elements which they may have afforded.

2.3 Historic Significance

Number 7 Kelvin Street is a Grade 2 listed building on the National Heritage List for England, List number 1291627. It is included on the List as a “little-altered example of [an] early small-scale warehouse.” The building falls within the Smithfield Conservation Area, designated by Manchester City Council in 1987.

Part of the building can be seen in the photograph below in the right foreground, taken from Back Thomas Street looking northwest.



Figure 1.1 – Back Turner Street c.1918 ***(Image © Manchester Libraries)***

Reference should be made to the Heritage Statement by Steven Levrant Heritage Architecture dated July 2016 as well as the associated Addendum to the Statement dated July 2017.

3.0 STRUCTURAL PROPOSALS

This section should be read in conjunction with the drawings shown in Appendix 'A' and all available architectural information produced by 5Plus Architects in support of planning application ref. 113475/FO/2016 and associated Listed Building Consent application ref. 113476/LO/2016.

3.1 Structural Philosophy

As the building is Listed, any interventions should be appropriate for a structure with recognised and legally recognised heritage significance. Where possible, the proposed interventions will be positioned to minimise physical and visual intrusion into the internal spaces and external interventions will be kept to a minimum.

3.2 Superstructure

The proposed architectural scheme entails the retention of No. 7 Kelvin Street and the demolition of the other remaining structures on the site. Removal of the adjacent building will result in the end wall of No. 7 Kelvin Street becoming an external wall until such time that the proposed new buildings are constructed adjacent to it.

Number 7 Kelvin Street is proposed to become residential apartments following modification and removal of some internal walls; this may also necessitate the removal and replacement of some portions of floor currently supported by the removed elements.

The existing staircase linking Ground and First floors is to be removed; second floor is currently only accessible via a ladder and access hatch. A new staircase is to be constructed linking all floors requiring portions of the existing floor to be removed.

In various places the existing walls exhibit cracking. In these locations a brick stitching detail will be employed to tie together the wall to either side of the crack(s). To further enhance the robustness of the building, particularly the area of the Back Turner Street elevation to Kelvin Street, the primary floor and roof elements will be tied to the external walls.

Where demolition of 48-50 Thomas Street has taken place, the now-exposed wall will require local dismantling and rebuilding in various areas with the existing wall openings to be infilled, further enhancing the robustness of the building as a whole. On the Kelvin Street corner of this elevation a brick stitching detail will be employed over the full height.

3.3 Facades

The elevation to Kelvin Street is proposed to be left unchanged, with repointing of brickwork as necessary. Tie rods (held by pattress plates on the Back Turner Street elevation and internally) are proposed to be introduced to help restrain the left side of the loading bay (i.e. the Kelvin Street / Back Turner Street corner). A tie rod and pattress plate are already present at the underside of first floor in this position. A portion of the existing brickwork near the top of the gable on Kelvin Street is proposed to be dismantled and rebuilt as it is considerably out-of-plumb.

On the Back Turner Street elevation, the new pattress plates mentioned above are proposed to be introduced with existing pattress plates remaining in place. Repointing will be carried out as necessary. The architectural proposals entail the introduction of two new windows at Level 2 which would require new openings to be formed in this wall.

The remaining external walls (following completion of the adjacent buildings) are those that currently form the two sides of the lightwell and the part-gable resulting from the change in ridge level along Back Turner Street. These areas are unchanged, to be repointed as necessary.

3.4 Disproportionate Collapse

As the building is proposed to undergo a change of use it will need to satisfy the requirements of the Building Regulations for disproportionate collapse. The building will fall into Category 2A and as such should be provided with effective horizontal ties.

This tying will be provided by tying joists across supporting beams, providing connection between joists and supporting walls and providing ties between beam ends. The beam end ties will be provided by means of steel elements to the internal face of the adjacent walls; these members will in many cases also be used as waling beams to restrain the walls which show signs of historic movement.

4.0 RECOMMENDATIONS

This section briefly outlines the recommended actions in relation to the structural proposals.

4.1 Initial Actions

It is recommended that the existing temporary propping system be checked at the earliest opportunity and any loose boards, sheeting or propping members be made good.

The demolition rubble which has been used as backfill to part of the basement of 48-50 Thomas Street may be surcharging the basement walls and it is recommended that this be partially removed. Removal will also be necessary to allow inspection of, and works to the basement areas below No. 7 Kelvin Street.

4.2 Recommendations for Further Investigations

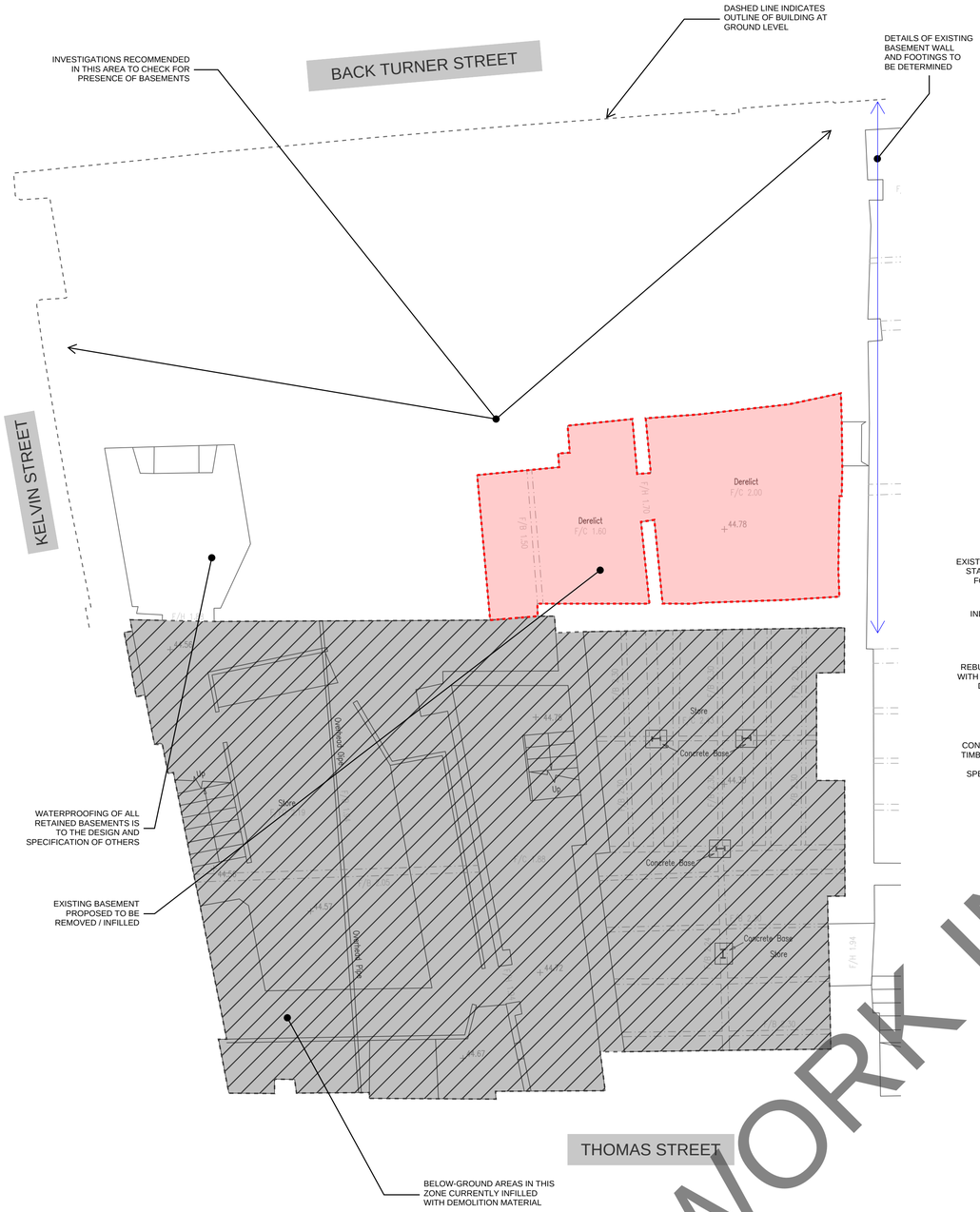
As recommended previously, a timber survey should be carried out by a specialist in order to determine the condition of all existing timber structural elements, in order to allow repair / rectification details to be confirmed.

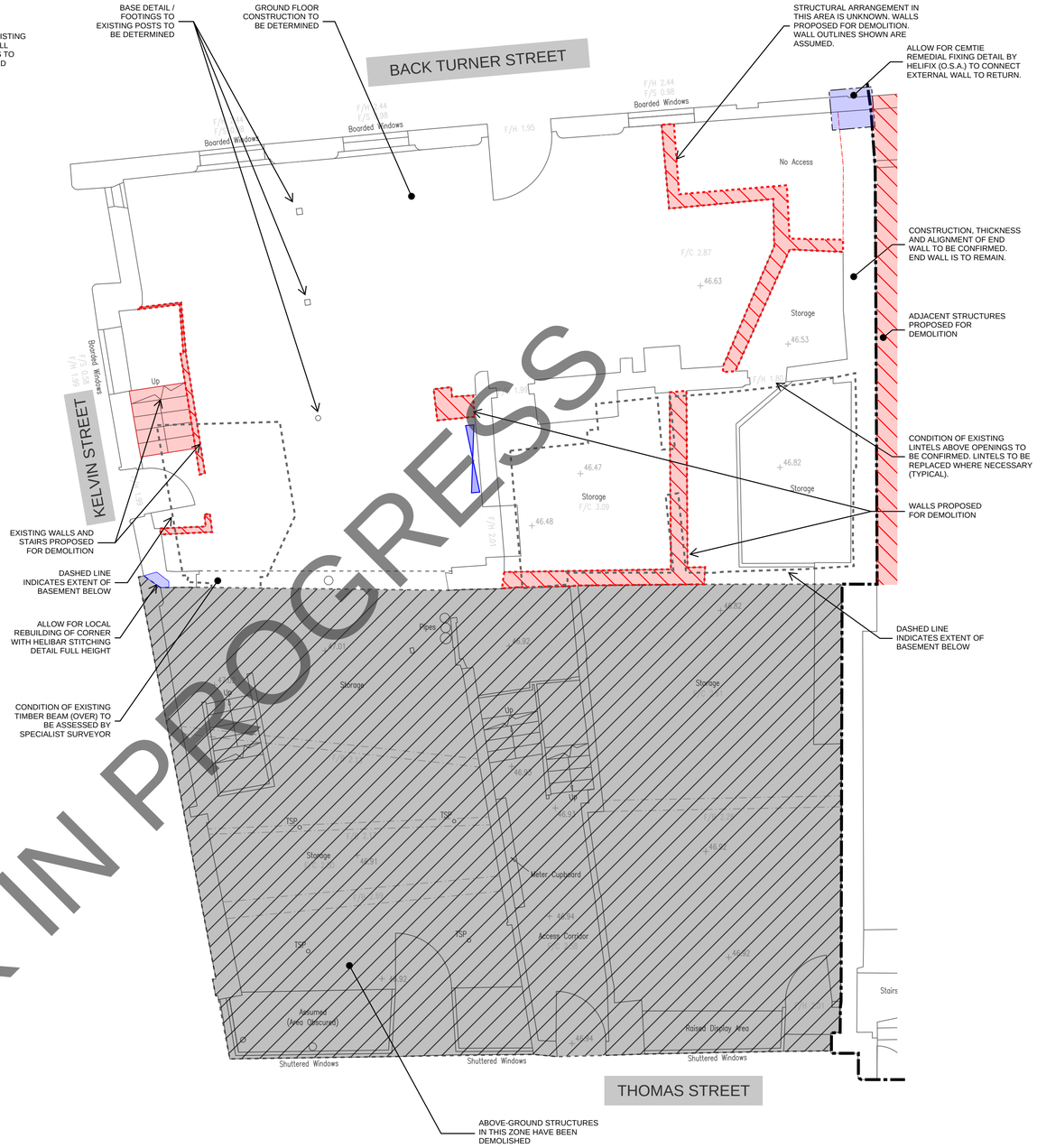
No basement is thought to be present below No. 7 Kelvin Street however it is strongly recommended that this be checked by opening up some small holes in the ground floor. The base / footing details of the existing columns (which have apparently been introduced to enhance the load-carrying capacity of the floor, or to rectify deficiency from decay or damage) should be investigated also.

Some areas of ground floor are not covered by the measured survey that is available, seemingly due to these areas being inaccessible at the time of survey. These areas should be opened up and surveyed to allow the structural works in these areas to be confirmed.

APPENDIX A

STRUCTURAL DRAWINGS





BASEMENT

GROUND FLOOR

THE BUILDING IS CURRENTLY IN A DERELICT CONDITION AND IS SUPPORTED BY TEMPORARY PROPPING. ALL WORKS WILL REQUIRE CAREFUL CONSIDERATION OF METHODS AND SEQUENCING TO ALLOW FOR CONTINUED SUPPORT / RESTRAINT OF THE BUILDING FABRIC DURING CONSTRUCTION. STABILITY OF STRUCTURAL ELEMENTS AND THE BUILDING AS A WHOLE MUST BE MAINTAINED AT ALL TIMES.

NOTES:

1. REFER TO DRAWING S-00-010 FOR GENERAL NOTES.
2. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECT'S AND OTHER CONSULTANTS' DRAWINGS AND INFORMATION.
3. DO NOT SCALE FROM THIS DRAWING. USED MARKED DIMENSIONS ONLY.
4. ALL STEELWORK TO BE S355 UNLESS NOTED OTHERWISE.
5. ALL NEW TIMBER TO BE GRADE C24 UNLESS NOTED OTHERWISE
6. ALL DIMENSIONS ARE TO BE CHECKED ON SITE PRIOR TO FABRICATION OR CONSTRUCTION COMMENCING.
7. THE EXISTING STRUCTURAL ARRANGEMENT IS TO BE VERIFIED ON SITE PRIOR TO FABRICATION OR CONSTRUCTION AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER.

DENOTES HELIBAR CRACK STITCHING DETAIL TO WALLS. EXTENT TBC ON SITE, ASSUME FULL HEIGHT (FLOOR-CEILING) U.N.O.

TB DENOTES NEW TIMBER BEAMS, SIZE TBC.

WB DENOTES STEEL WALING BEAM, SIZE TBC. ALLOW FOR 260x90 PFC

TIE DENOTES STEEL TIE MEMBER, SIZE TBC. ALLOW FOR 150x90 PFC

WORK IN PROGRESS

Rev:	Description:	Date:	By:	Chkd:

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Carvers Warehouse
77 Dale Street
Manchester
M1 2HG

Project:

THOMAS STREET, MANCHESTER

Drawing Title:

No. 7 KELVIN STREET STRUCTURAL WORKS: SHEET 1

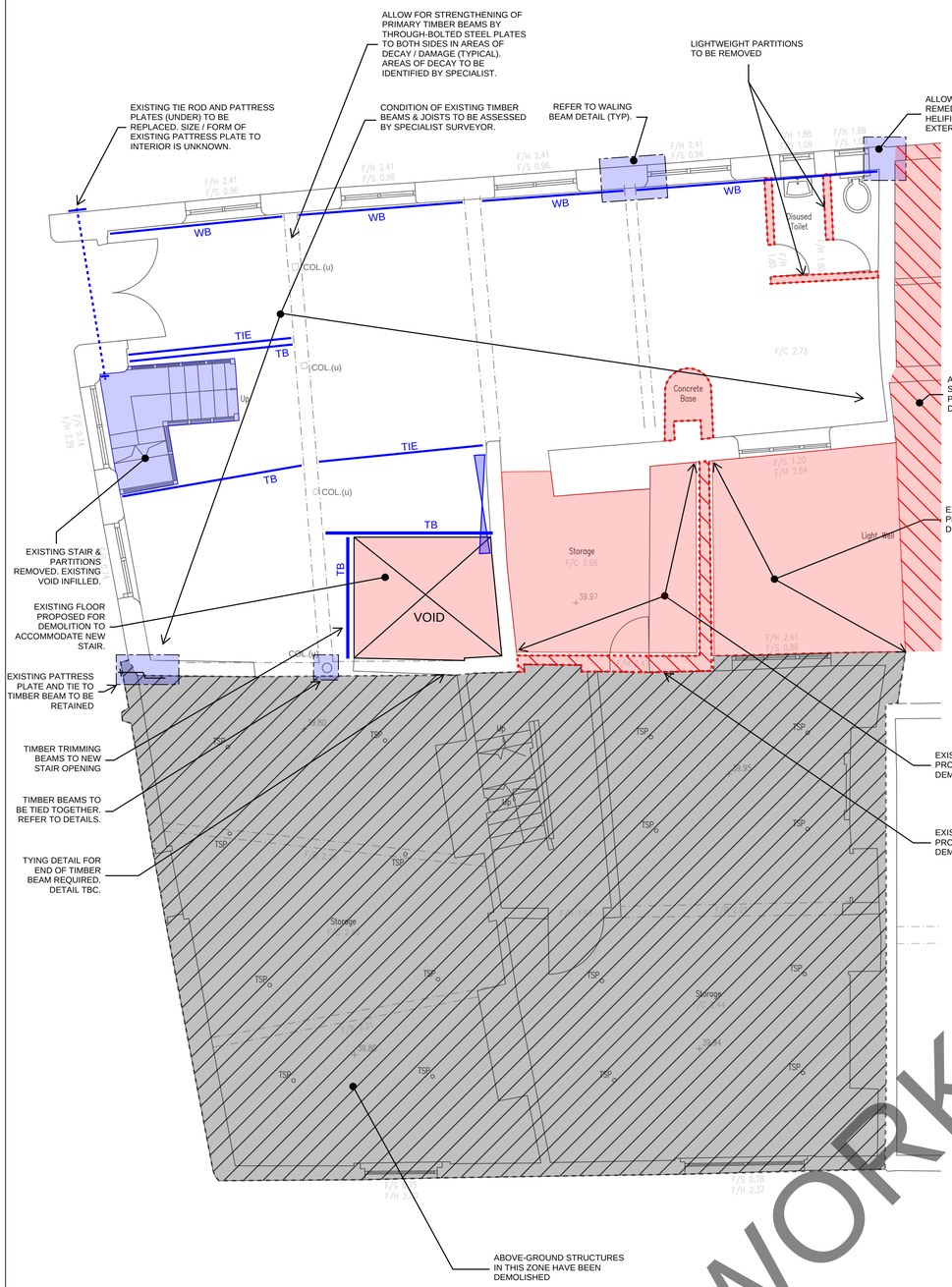
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A1	MAR'21	TJM	TJM	PC

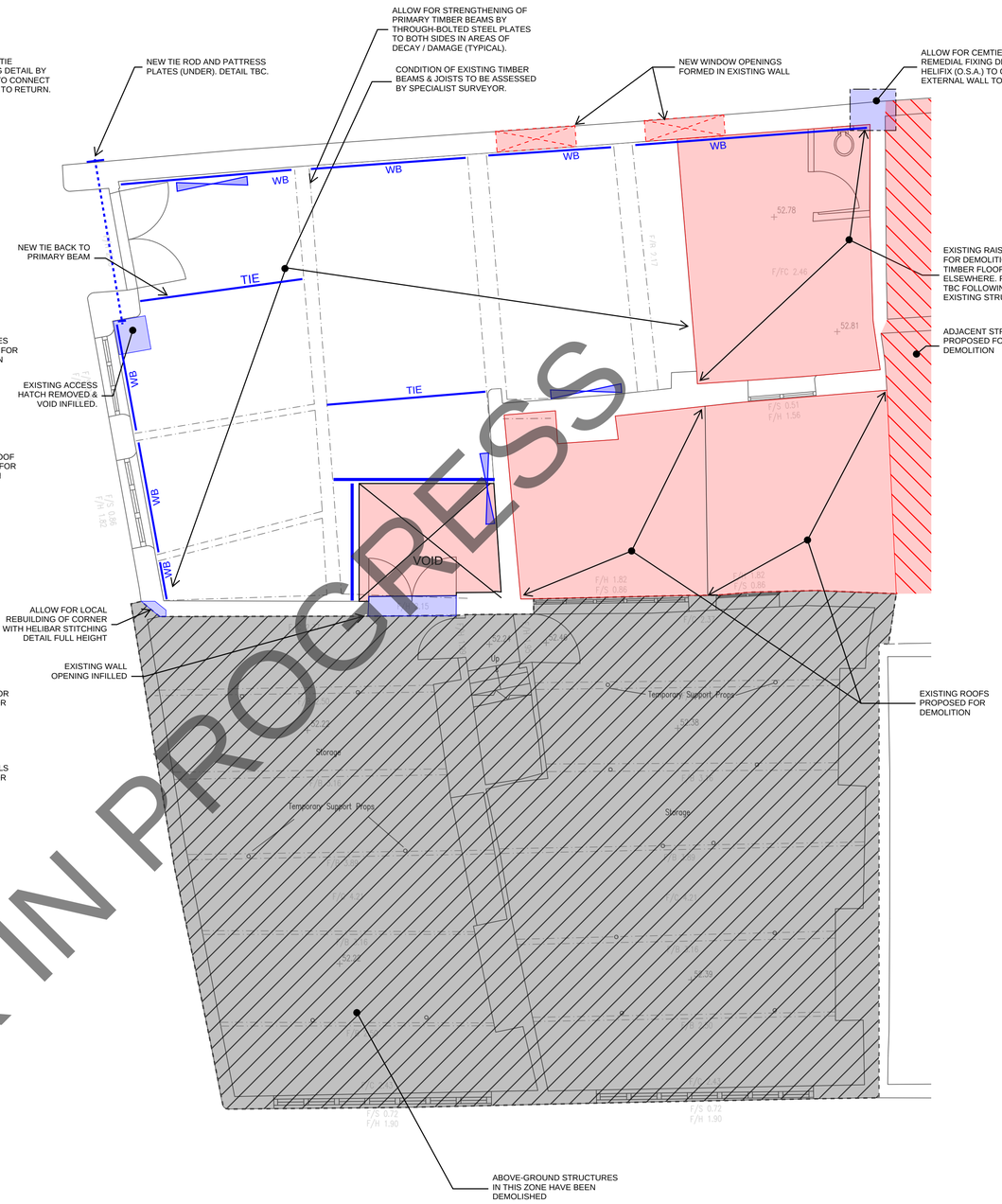
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Project: Originator: Volume: Level: Type: Role: Category/Number: Rev:

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FIRST FLOOR



SECOND FLOOR

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Project:

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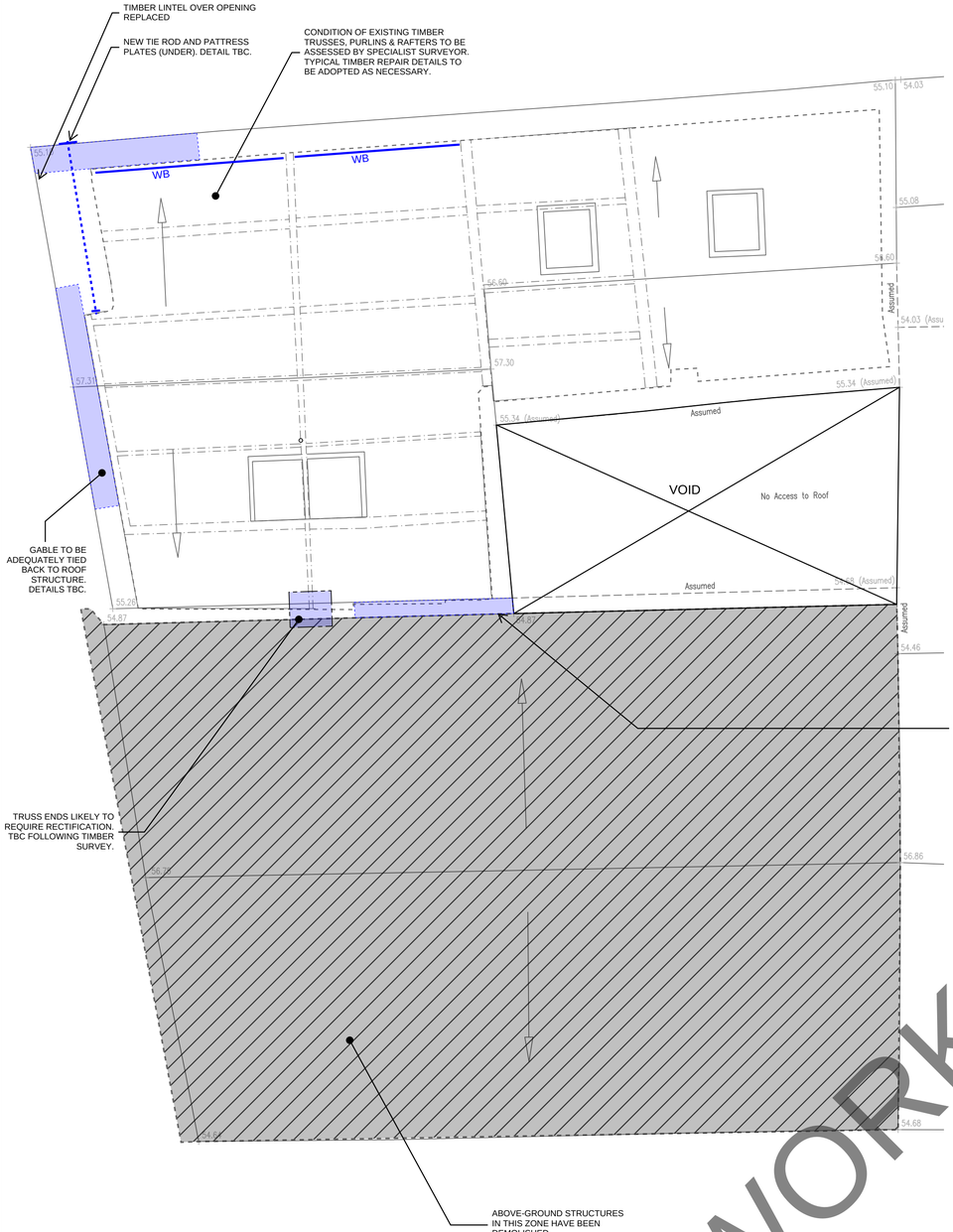
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ROOF

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Drawing Title:

No. 7 KELVIN STREET STRUCTURAL WORKS: SHEET 3

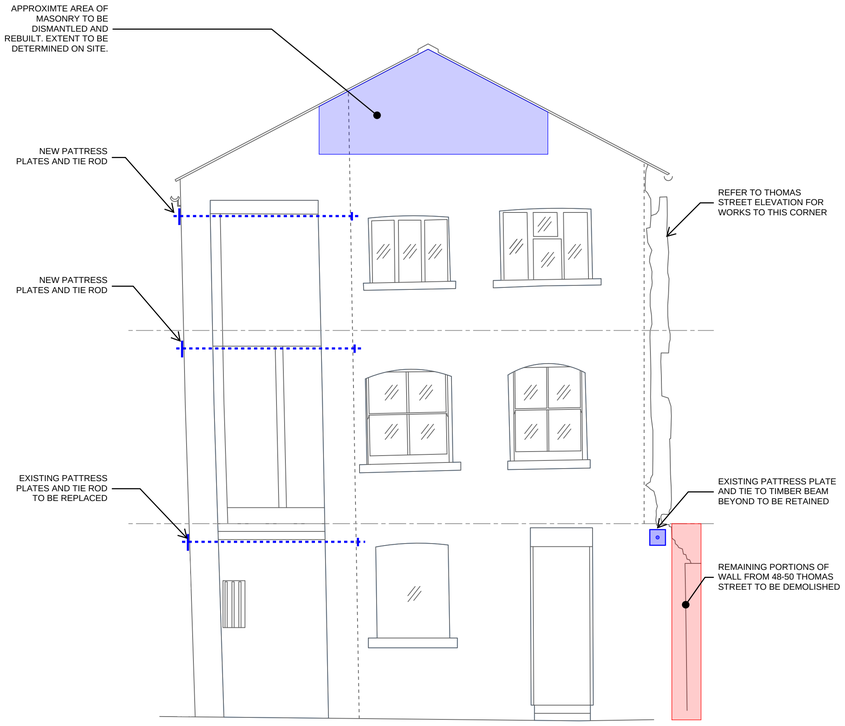
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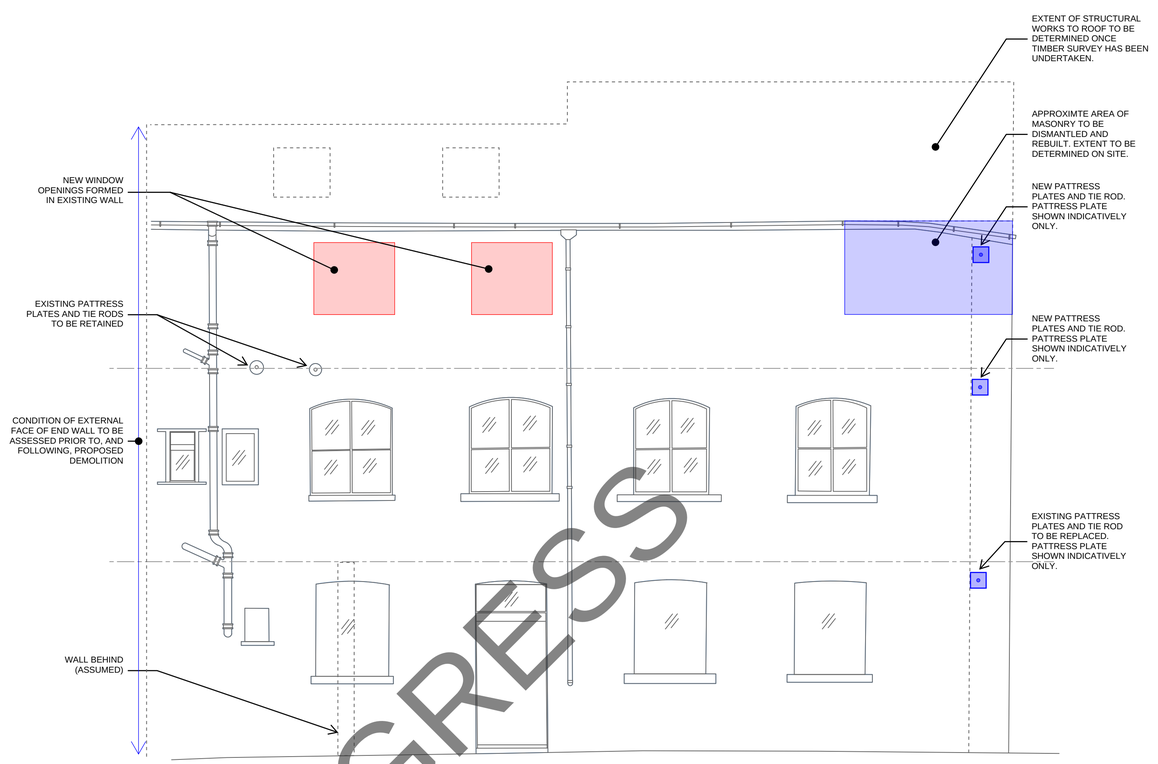
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KELVIN STREET ELEVATION

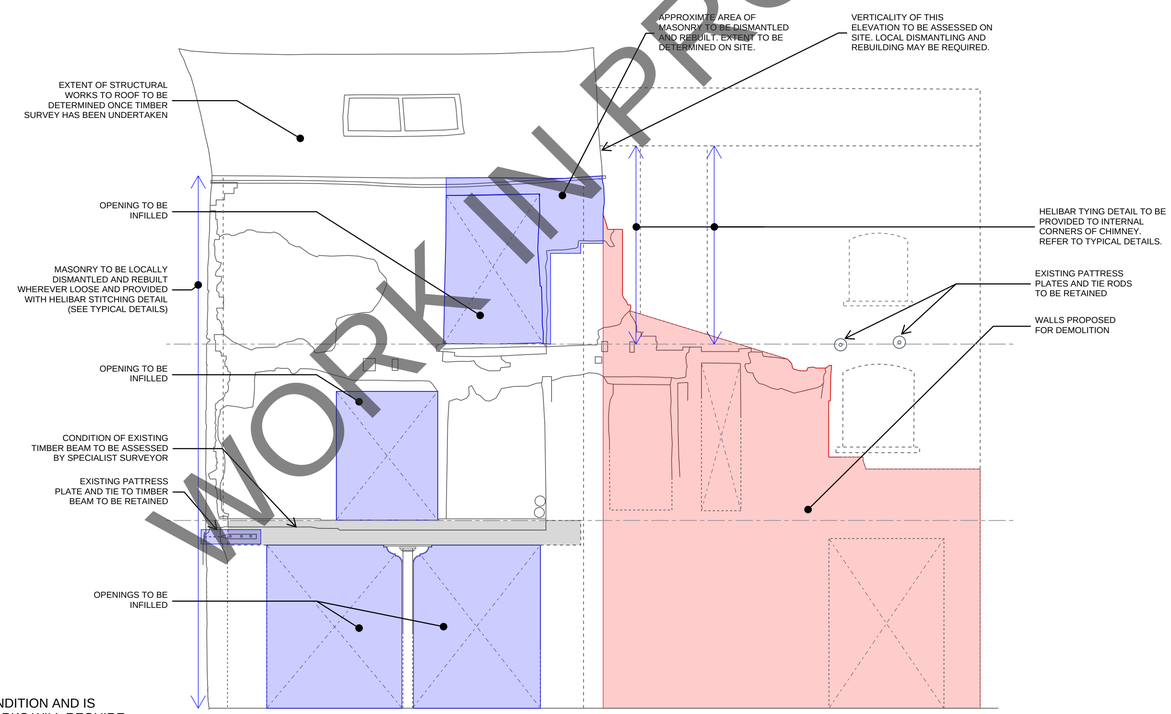


BACK TURNER STREET ELEVATION

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THOMAS STREET ELEVATION
(FOLLOWING DEMOLITION OF 48-50 THOMAS STREET)

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Project:

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No. 7 KELVIN STREET STRUCTURAL WORKS: SHEET 4

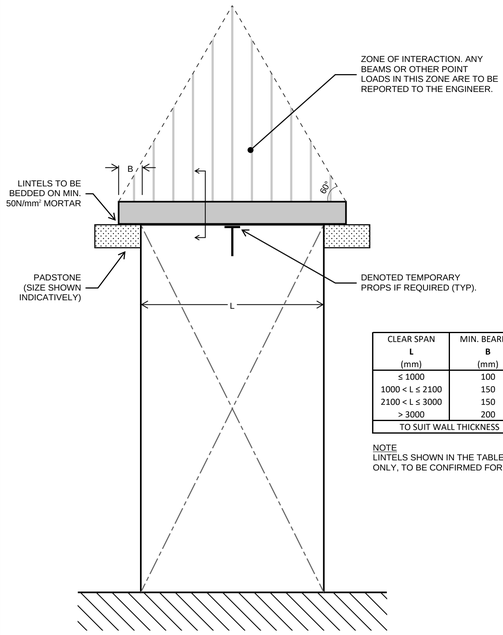
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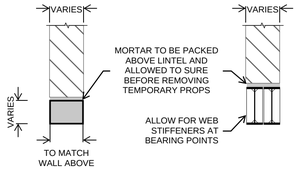
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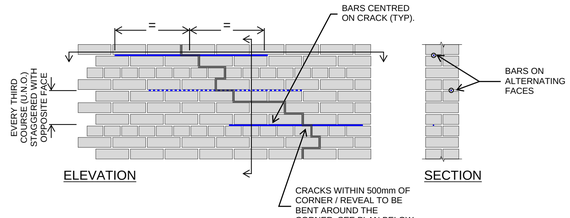




CLEAR SPAN L (mm)	MIN. BEARING B (mm)	PRECAST REF. (o.s.a.)	PRECAST REF. (o.s.a.)	STEEL SIZE	STEEL SIZE
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1000 < L ≤ 2100	150	NAYLOR R7	NAYLOR S5	2/178x102x19 UB	178x102x19 UB
2100 < L ≤ 3000	150	NAYLOR S8	NAYLOR R8	2/203x102x23 UB	203x102x23 UB
> 3000	200	CONTACT ENGINEER		CONTACT ENGINEER	
TO SUIT WALL THICKNESS		215mm	140mm	215mm	102mm

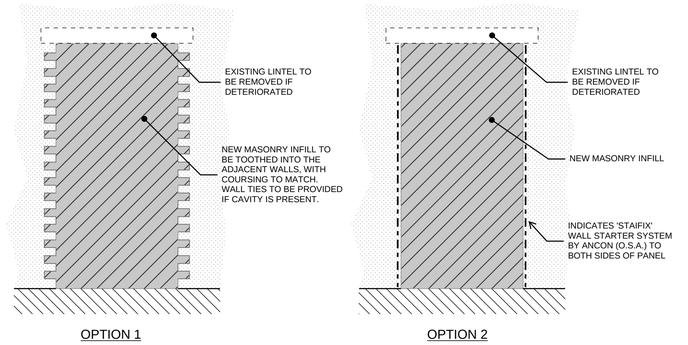
NOTE
LINTELS SHOWN IN THE TABLE ABOVE ARE FOR INFORMATION ONLY, TO BE CONFIRMED FOR EACH NEW WALL OPENING

TYPICAL LINTEL DETAILS



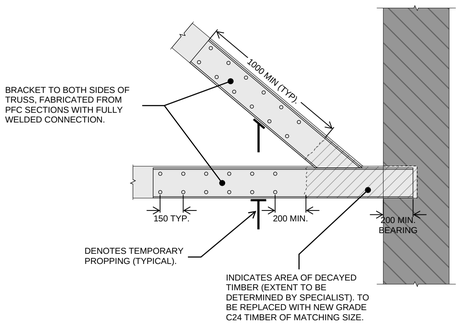
NOTE
BARS ARE TO BE 6mm ø HELIBAR (O.S.A.), MIN. 1000 LONG INSTALLED IN ACCORDANCE WITH MANUFACTURER'S DETAILS.

TYPICAL CRACK STITCHING DETAIL



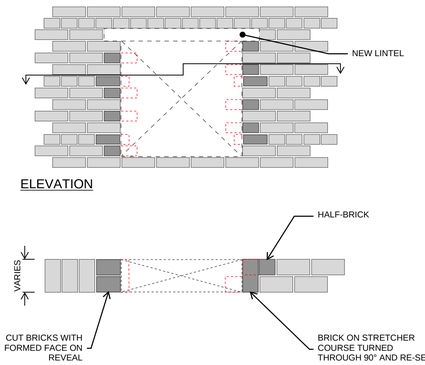
NOTE
OPTION #1 IS TO BE ADOPTED UNLESS ADVISED OTHERWISE BY THE ENGINEER

TYPICAL WALL INFILL DETAILS

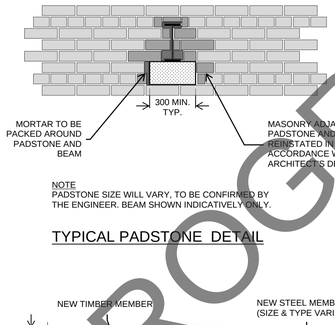


NOTE
SIZE OF PFC IS TO BE CONFIRMED, DEPENDENT ON TIMBER SECTION SIZE. SIZE AND NUMBER OF FIXINGS TBC.

TYPICAL ROOF TRUSS RECTIFICATION DETAIL

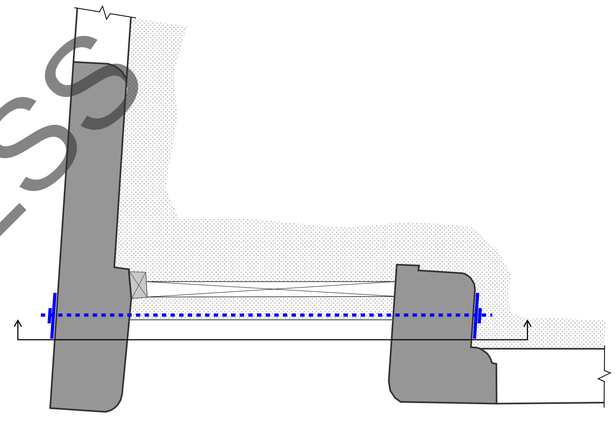


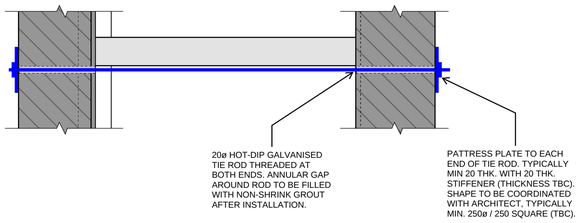
TYPICAL WALL OPENING DETAIL



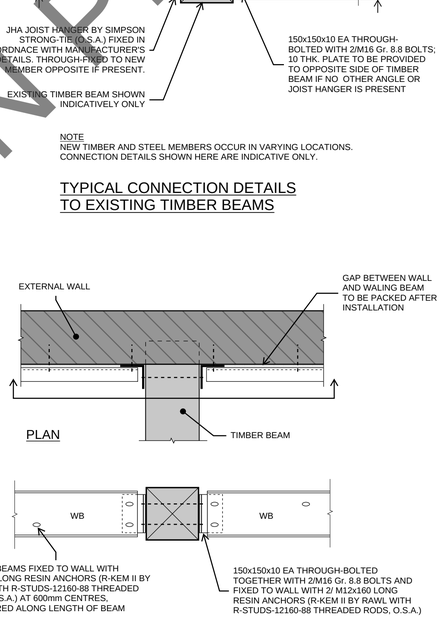
NOTE
PADSTONE SIZE WILL VARY. TO BE CONFIRMED BY THE ENGINEER. BEAM SHOWN INDICATIVELY ONLY.

TYPICAL PADSTONE DETAIL



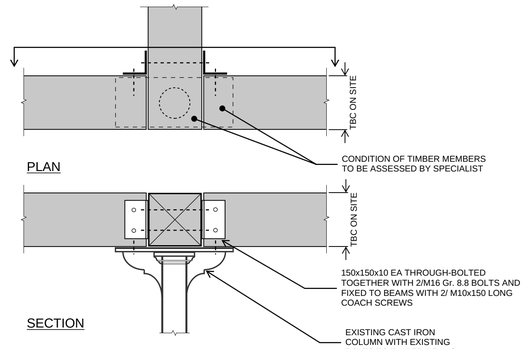


TIE ROD / PATTRESS PLATE DETAIL

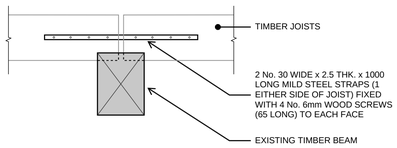


NOTE
NEW TIMBER AND STEEL MEMBERS OCCUR IN VARYING LOCATIONS. CONNECTION DETAILS SHOWN HERE ARE INDICATIVE ONLY.

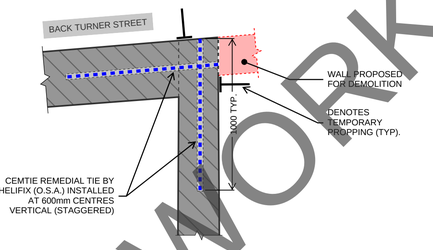
TYPICAL CONNECTION DETAILS TO EXISTING TIMBER BEAMS



TYING DETAIL FOR EXISTING TIMBER BEAMS (THOMAS STREET ELEVATION)



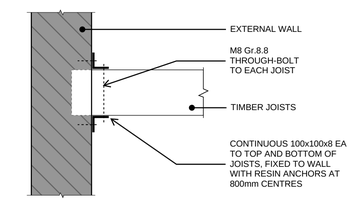
TYPICAL TYING DETAIL AT BEAMS SUPPORTING TIMBER JOISTS



NOTE
WALL CONSTRUCTION, JOINTS AND COURSING ARE TO BE INVESTIGATED BEFORE ANY DEMOLITION OF ADJOINING BUILDINGS OR INSTALLATION OF REMEDIAL TIES

REMEDIAL TYING DETAIL BETWEEN RETURN WALLS

TYPICAL WALING BEAM DETAILS



TYPICAL JOIST TYING DETAIL AT EXTERNAL WALLS

NOTES:

1. REFER TO DRAWING S-00-010 FOR GENERAL NOTES.
2. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECT'S AND OTHER CONSULTANTS' DRAWINGS AND INFORMATION.
3. DO NOT SCALE FROM THIS DRAWING. USED MARKED DIMENSIONS ONLY.
4. ALL STEELWORK TO BE S355 UNLESS NOTED OTHERWISE.
5. ALL NEW TIMBER TO BE GRADE C24 UNLESS NOTED OTHERWISE
6. ALL DIMENSIONS ARE TO BE CHECKED ON SITE PRIOR TO FABRICATION OR CONSTRUCTION COMMENCING.
7. THE EXISTING STRUCTURAL ARRANGEMENT IS TO BE VERIFIED ON SITE PRIOR TO FABRICATION OR CONSTRUCTION AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER.

Rev:	Description:	Date:	By:	Chkd:

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Carvers Warehouse
77 Dale Street
Manchester
M1 2HG

Project:

THOMAS STREET, MANCHESTER

Drawing Title:

No. 7 KELVIN STREET STRUCTURAL WORKS: DETAILS

Status:

Size:	Date:	Drawn by:	Designed by:	Checked by:
A1	MAR'21	TJM	TJM	PC

Scale:	Project No:
1:20	1601-09

Project: Originator: Volume: Level: Type: Role: Category/Number: Rev:

WORK IN PROGRESS

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