

SF/KL/E14804

21st December 2023

The City of Edinburgh Council
Waverley Court
4 East Market Street
Edinburgh
EH8 8BG

For the attention of [REDACTED]
By email - [REDACTED]@edinburgh.gov.uk



Will Rudd Davidson (Edinburgh) Ltd
Consulting Civil & Structural Engineers

43 York Place
Edinburgh EH1 3HP

T: 0131 557 5255

E: edinburgh@ruddconsult.com

www.ruddconsult.com

29 - 35 Baberton Mains Avenue, Edinburgh Fire Damage

Introduction

Will Rudd Davidson were requested by the City of Edinburgh Council to attend site to carry out an emergency inspection and provide structural advice on the morning of the 2nd of December following a reported explosion on the late evening of the 1st December 2023 at no. 33 Baberton Mains Avenue, Edinburgh.

Will Rudd Davidson attended site on the morning of the 2nd of December and have been on site since then until hand back of the site, to support the Contractor and multiple agencies in carrying out the initial clear up, facilitate the police and HSE investigation, and to assess the extent of the damage from the fatal major incident.

From the initial assessment, the following properties were identified to have been significantly affected by the incident having been closer to the explosion.

- 29 Baberton Mains Avenue
- 31 Baberton Mains Avenue
- 33 Baberton Mains Avenue
- 35 Baberton Mains Avenue

By way of noting the scale of the incident, debris in the form of sealed double-glazed unit was found to have been propelled some 100m north from the point of the explosion onto adjacent grassland. Properties in the surrounding vicinity of the explosion appeared to have suffered damage to roof coverings, windows and doors, as a result of the impact of the blast and debris from the incident such as roof tiles which were thrown by the blast. However, no immediate structural stability concerns were raised beyond those, four listed above. It is understood that the owners of the properties outwith the four listed have been (or will be) advised to have their properties checked over by a suitable qualified and experienced building professional. Typically, items for checking would include; windows and doors which should be checked over to ensure that full structural integrity of the components has been maintained and that the components are securely fixed back to the surrounding structure. At high level the roof tile coverings should be checked for integrity including any chimney pots, Gutters should be checked for any debris and cleared and all rainwater good should be checked to ensure that it is robustly secured back. The list is not exhaustive and the experienced building professional should be able to advise on further building related matters and bring in a chartered structural engineer if deemed appropriate...



29 – 35 Baberton Mains Avenue, Edinburgh

The Scottish Fire Service reported and logged asbestos containing material within the debris of the site on the night of the explosion. The required environmental clean carried out by the specialist asbestos contractor under the direction of the Council is out-with the scope of this report.

This report focuses commentary on the structural condition of the four properties in question, summarises the temporary works carried out to date, and proposes conclusions & recommendations on necessary structural engineering aspects for the consideration of the owners and their advisers, following hand-back of the site by the City of Edinburgh Council.

Observations

(Refer Appendix A for Photographic Record; Refer Appendix B for Record Drawings)

The structures under consideration are terraced 2 storey residential properties. There is a bank of 6 terraced properties in one block that comprise the odd numbered 23 to 33 Baberton Mains Avenue. There is a further block of two similar properties at 35 and 37 Baberton Mains Avenue that forms a semi-detached block that is slightly set back from the previously noted terrace.

All the four properties in question appeared to have been constructed to the same design, albeit handing of the plan layouts was evident between adjacent properties. The properties comprise traditional loadbearing masonry construction with brick outer and block inner cavity walls and solid brick party walls, tiled, pitched proprietary roof trusses, and timber upper floors, with a solid ground floor.

The trusses span front to back and are supported on the front and back walls.

The timber 1st floor spans side-to-side bearing onto the party walls. From localised exposed joist ends, indications were that the floor plate was anchored to wall plates fixed to the party wall.

The explosion is understood to have occurred within No. 33, which is the end of terrace property.

Full collapse and disintegration has occurred to the property at 33 and the damage to it and the adjacent properties are summarised below.

29 Baberton Mains Avenue

This property is located 2 properties away from the explosion location. It has suffered what appears to minor damage with slight cracking at the party wall with No. 31. However, the degree of damage should be fully assessed in the fullness of time by a suitably qualified structural engineer.

When viewed within the roof space, the party wall continues to the underside of the roofline and appears intact.

No. 31 has suffered partial collapse and major structural damage, with significant loss of roof and first floor structure. The party wall between 29 & 31 was substantially obscured by debris and lack of safe access for visual assessment, so the overall stability of the party wall between 29 and 31 could not be assured.

Consequently, the decision was taken, as a precautionary measure, to vertically prop the ends of the roof trusses and the 1st floor joists within no 29.

29 – 35 Baberton Mains Avenue, Edinburgh

31 Baberton Mains Avenue

This property was directly adjacent to the explosion and suffered significant collapse, with most of the roof, first floor and perimeter and internal wall structure having been lost.

The front elevation remains, which is continuous with the elevation to No. 29, but has substantial cracking and is leaning out, at risk of uncontrolled collapse at first floor level. The Contractor has removed as much loose material as possible, to mitigate this.

As a further precaution a raking shore has been installed at the front to mitigate against the external leaf suffering further damage beyond the extent of no. 31, should any further instability occur to the front elevation to no 31. Eg. in the event of high wind.

The remaining roof trusses and roof covering, over the property at no. 31 are deemed unstable, and will require removal as will the first floor as soon as it is practical to do so. The property is presumed to need careful hand demolition likely from cherry picker access such to that the integrity of 29 is maintained.

33 Baberton Mains Avenue

No 33 was the source of the explosion and has collapsed and disintegrated. It will require a full rebuild.

35 Baberton Mains Avenue

The cavity gable wall to the south of No. 35 appears to have absorbed significant energy from the blast and is now deemed unstable. There is major inward bulging to the gable wall by an estimated 100mm and major cracking, which is particularly evident on the inner face of the wall which has become crazed with random panels of size of some 1m² being created. This is visible internally within the stairwell, which is adjacent to the gable. We would deem this wall at significant risk of collapse, which causes a risk to anyone in the immediate fall zone facility adjacent to the gable.

An exclusion zone has been highlighted for the purposes of guiding the clear up exercise to date.,

The gable should be carefully taken down and other parts of the structure until a time as only sound parts of the structure remain before building back the missing parts of the structure so as to preserve the structural integrity of the remainder of the property and that of the neighbouring property at number 37.

29 – 35 Baberton Mains Avenue, Edinburgh

Conclusions & Recommendations

At the time of handover by the City of Edinburgh Council back to the respective owners, the properties in question remained out of bounds, due to the significant ongoing health & safety issues associated with the damage and instabilities resulting from the explosion incident.

The cordoned area should be retained and the area within treated as a controlled secure demolition site.

We would recommend that a competent Contractor continues the removal process and making safe of all areas of instability, or where it is proposed to leave structure in the temporary condition prior to planned demolition, these areas should be securely cordoned off and signage clearly applied, in line with HSE requirements and best practice relating to unsafe buildings.

The party wall between no. 29 and 31 should be reassessed, in the temporary condition, as it will effectively become an external gable wall, subject to additional external wind pressures. A Structural Engineer should further carry out a detailed structural inspection of the 4 properties listed here and also their immediate neighbours at no 27 and 37 and establish the vertical and horizontal tying of the roof, floor and wall elements and ensure that adequate lateral and horizontal restraints are in place. Additional lateral and vertical strapping should be in line with normal practice for gable and loadbearing masonry construction should be considered. The careful taking down of any damaged elements should be continued such that an assured base can be used for the reconstruction of the damaged and destroyed properties.

The roof tiles should be checked at the periphery of the dountakings, to ensure they are secure.

We trust this is sufficient for your present purposes and allows matters to proceed.

Yours faithfully,



Director
For Will Rudd Davidson Ltd

Encls.

29 – 35 Baberton Mains Avenue, Edinburgh

Appendix A | Photographic Records

29 – 35 Baberton Mains Avenue, Edinburgh

29 Baberton Mains Avenue



29 – 35 Baberton Mains Avenue, Edinburgh



29 – 35 Baberton Mains Avenue, Edinburgh



29 – 35 Baberton Mains Avenue, Edinburgh



29 – 35 Baberton Mains Avenue, Edinburgh

31 Baberton Mains Avenue



29 – 35 Baberton Mains Avenue, Edinburgh

23 - 29 Baberton Mains Avenue



29 – 35 Baberton Mains Avenue, Edinburgh

29 – 31 Baberton Mains Avenue
Temporary Shoring to Front Elevation



29 – 35 Baberton Mains Avenue, Edinburgh



29 – 35 Baberton Mains Avenue, Edinburgh

35 Baberton Mains Avenue

Unstable gable wall

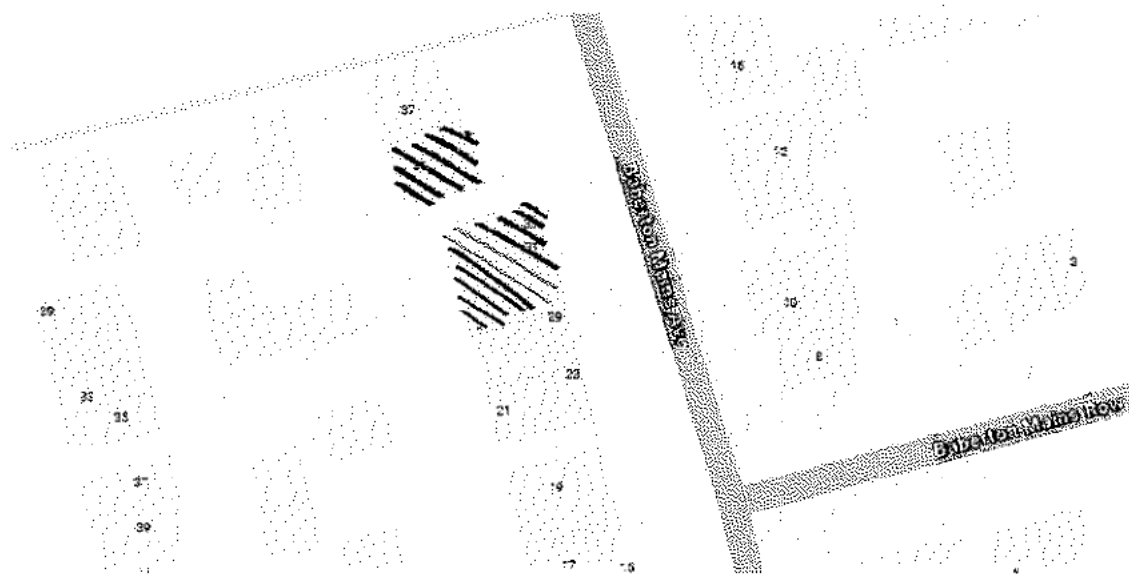


29 – 35 Baberton Mains Avenue, Edinburgh



29 – 35 Baberton Mains Avenue, Edinburgh

Appendix B | Record Drawings



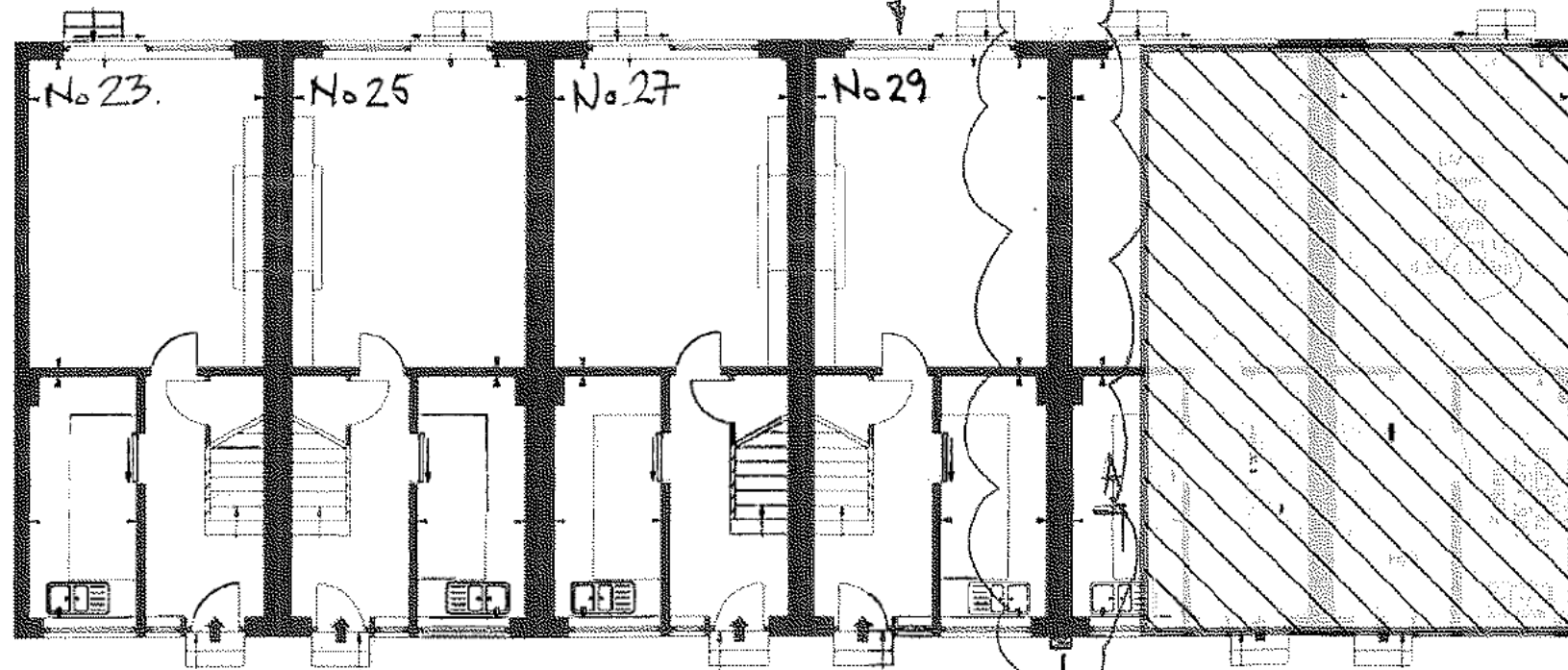
KEY PLAN

FOR INTERNAL
PROPPING TO
No. 29 REFER
DRG SK03

STRUCTURALLY
AFFECTED
PROPERTIES

NOTE:
PARTY WALL TO BE
EXTERNAL WALL IN
TEMPORARY CONDITION
SUPPLEMENTARY LATERAL
RESTRAINT IS ANTICIPATED
(BY OTHERS).

NOTE:
GABLE TO No 35 IS UNSTABLE.
NO PERSONNEL TO ENTER
EXCLUSION UNTIL FURTHER RISK
ASSESSMENT OR MITIGATION
MEASURES ARE IN PLACE.



FOR TEMPORARY
SHORING REFER
DRG. SK02.

TEMPORARY
SHORING

GROUND FLOOR PLAN

GENERAL NOTES

- DO NOT SCALE FROM THIS DRAWING - IF IN DOUBT CONTACT PROJECT ENGINEER.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
- ALL LEVELS ARE IN METRES.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL AND SERVICES DRAWINGS.
- ALL SETTING OUT TO BE AS PER THE ARCHITECT'S DRAWINGS.
- THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS ON SITE AND IS RESPONSIBLE FOR ACCURATE SETTING OUT.
- THE CONTRACTOR IS TO CONFIRM THE EXISTING BOUNDARY AND SITE STRUCTURES ETC. PRIOR TO COMMENCING THE WORKS AND IMMEDIATELY INFORM THE SUPERVISING OFFICER SHOULD THESE BE AT VARIANCE WITH THE ASSUMPTIONS SHOWN ON THE DRAWING.

CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015

THE DESIGNS ON THIS DRAWING ARE PREPARED WITH CONSIDERATION OF THE NEED TO IDENTIFY HAZARDS AND GIVE REGARD TO THEIR ELIMINATION OR MINIMISATION. REFERENCE MUST BE MADE TO THE HEALTH AND SAFETY INFORMATION PREPARED BY THE PRINCIPAL DESIGNER.

ISSUE	DETAILS	DATE	BY	CHK
-------	---------	------	----	-----

W

Will Rudd Davidson (Edinburgh) Ltd
Consulting Civil & Structural Engineers
43 York Place
Edinburgh EH1 3HP
T: 0131 557 6255
E: edinburgh@ruddconsult.com
www.ruddconsult.com

CLIENT:
**THE CITY OF EDINBURGH
COUNCIL**

PROJECT TITLE:
**BABERTON MAINS AVENUE.
EXPLOSION INCIDENT
STRUCTURAL RESPONSE**

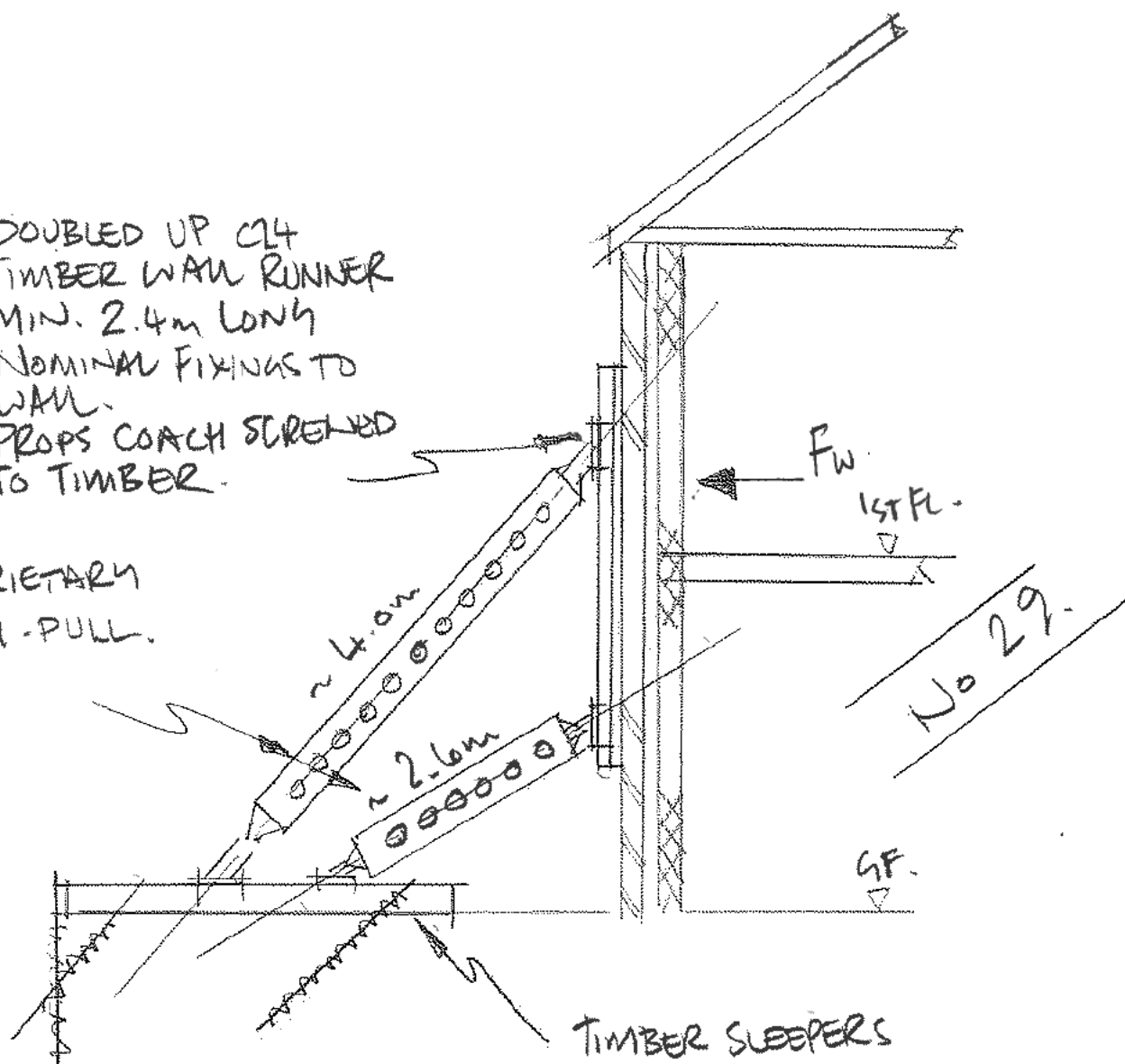
DRG TITLE:
**EXTERNAL PROPPING
TO No 29/31.
PARTY WALL.**

STATUS:	
DRAWN BY:	DATE DRAWN:
CHECKED BY:	DATE CHECKED:
SCALES: 1:100	SHEET SIZE:
PROJECT No: E14804	REV
DRAWING No: SK01.	

TEMPORARY
SHORING LOAD $F_w = 16 \text{ kN(CHAR)}$

DOUBLED UP C14
TIMBER WAIL RUNNER
MIN. 2.4m LONG
NOMINAL FIXINGS TO
WALL.
PROPS COACH SCREWED
TO TIMBER.

2 No. PROPRIETARY
STEEL PUSH-PULL
PROPS.



SHORE BASES BOLTED/
COACH SCREWED TO
TIMBER SLEEPERS

TIMBER SLEEPERS
FORMING BASE TO
PROPPING ANCHORED
WITH MIN. 4 No.
490mm LONG S50-10-0490.
SPRAXIG GROUND ANCHORS

SECTION A-A.

GENERAL NOTES

- DO NOT SCALE FROM THIS DRAWING - IF IN DOUBT CONTACT PROJECT ENGINEER.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
- ALL LEVELS ARE IN METRES.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL AND SERVICES DRAWINGS.
- ALL SETTING OUT TO BE AS PER THE ARCHITECT'S DRAWINGS.
- THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS ON SITE AND IS RESPONSIBLE FOR ACCURATE SETTING OUT.
- THE CONTRACTOR IS TO CONFIRM THE EXISTING BOUNDARY AND SITE STRUCTURES ETC. PRIOR TO COMMENCING THE WORKS AND IMMEDIATELY INFORM THE SUPERVISING OFFICER SHOULD THESE BE AT VARIANCE WITH THE ASSUMPTIONS SHOWN ON THE DRAWING.

CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015

THE DESIGNS ON THIS DRAWING ARE PREPARED WITH CONSIDERATION OF THE NEED TO IDENTIFY HAZARDS AND GIVE REGARD TO THEIR ELIMINATION OR MINIMISATION. REFERENCE MUST BE MADE TO THE HEALTH AND SAFETY INFORMATION PREPARED BY THE PRINCIPAL DESIGNER.

ISSUE	DETAILS	DATE	BY	CHK

Will Rudd
Will Rudd Davidson (Edinburgh) Ltd
Consulting Civil & Structural Engineers
43 York Place
Edinburgh EH1 3HP
T: 0131 557 5255
E: edinburgh@ruddconsult.com
www.ruddconsult.com

CLIENT:

**THE CITY OF EDINBURGH
COUNCIL**

PROJECT TITLE:

**BABERTON MAINS AVENUE.
EXPLOSION INCIDENT
STRUCTURAL RESPONSE**

DRG TITLE:

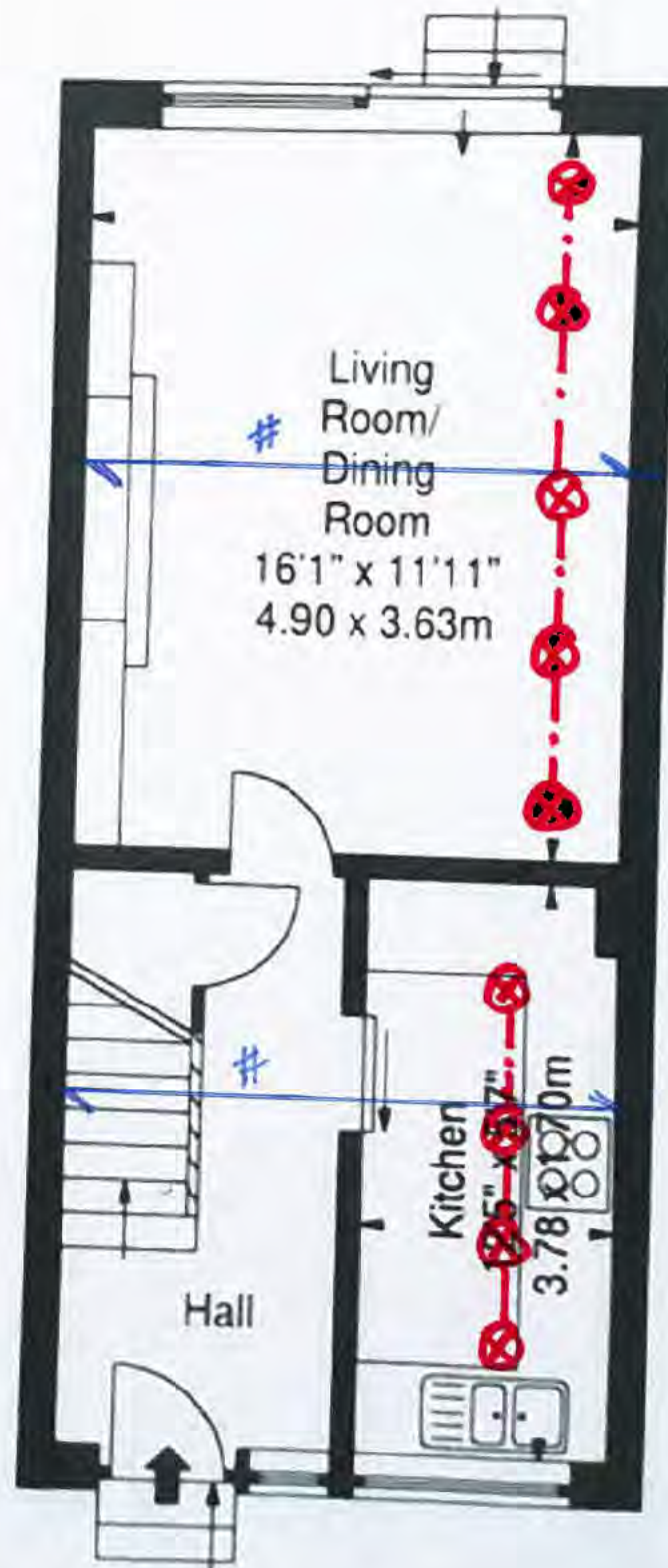
**EXTERNAL PROPPING
SECTION A-A.**

STATUS:

DRAWN BY:	DATE DRAWN:
CHECKED BY:	DATE CHECKED:
SCALES:	SHEET SIZE:

PROJECT No: **E14804.**

DRAWING No: **SK02** REV **A.**



Ground Floor



First Floor

ANTICIPATED SPAN DIRECTION
OF FLOOR JOISTS
(GF TO BE CHECKED ON SITE)

*
DENOTES SPAN OF GANG
NAIL TRUSSES (OVER)

•
•
•
DENOTES TYPE 2 ACROW
PROPS WITH DOUBLED 200x50
TIMBER HEADER BETWEEN.
NOTE:
TIMBER SOLS PLATE TO BE
600mm LONG ORIENTATED
PERPENDICULAR TO SUPPORTING
JOISTS BELOW.

GENERAL NOTES

- DO NOT SCALE FROM THIS DRAWING - IF IN DOUBT CONTACT PROJECT ENGINEER.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
- ALL LEVELS ARE IN METRES.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL AND SERVICES DRAWINGS.
- ALL SETTING OUT TO BE AS PER THE ARCHITECT'S DRAWINGS.
- THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS ON SITE AND IS RESPONSIBLE FOR ACCURATE SETTING OUT.
- THE CONTRACTOR IS TO CONFIRM THE EXISTING BOUNDARY AND SITE STRUCTURES ETC. PRIOR TO COMMENCING THE WORKS AND IMMEDIATELY INFORM THE SUPERVISING OFFICER SHOULD THESE BE AT VARIANCE WITH THE ASSUMPTIONS SHOWN ON THE DRAWING.

CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015

THE DESIGNS ON THIS DRAWING ARE PREPARED WITH CONSIDERATION OF THE NEED TO IDENTIFY HAZARDS AND GIVE REGARD TO THEIR ELIMINATION OR MINIMISATION. REFERENCE MUST BE MADE TO THE HEALTH AND SAFETY INFORMATION PREPARED BY THE PRINCIPAL DESIGNER.

ISSUE	DETAILS	DATE	BY	CHK



Will Rudd Davidson (Edinburgh) Ltd
Consulting Civil & Structural Engineers
43 York Place
Edinburgh EH1 3HP
T: 0131 527 5235
E: edinburgh@ruddconsult.com
www.ruddconsult.com

CLIENT:

**CITY OF EDINBURGH
COUNCIL**

PROJECT TITLE:

**BABERTON MAINS AVENUE
EXPLOSION INCIDENT
STRUCTURAL RESPONSE**

DRG TITLE:

**INTERNAL PROPPING.
No. 29
BABERTON MAINS AVENUE**

STATUS:

DRAWN BY: [Redacted]	DATE DRAWN: 13.12.23
----------------------	----------------------

CHECKED BY:	DATE CHECKED:
-------------	---------------

SCALES: NTS	SHEET SIZE: A3
-------------	----------------

PROJECT No: **E14804**

DRAWING No: SK03	REV: -
-------------------------	--------