

Investigation Report



Birmingham Testing and Scanning Ltd
22nd April 2020
www.bi-tas.com

Structure Details:

Structure/Project Name: Beckenham Public Hall

Site Address/Location: 4 Bromley Road, Beckenham, BR3 5JE

Client Reference (if applicable): BWB-BEC-001 Issue B

Report Prepared By:

Name: Michael J Hughes

Title: Director

Date: 22nd April 2020

Signed:



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22nd April 2020



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Glossary of Terms

Within this report we use several abbreviations for ease of writing. To avoid confusion, abbreviations you may encounter are listed below:

EM – Electromagnetic

GPR – Ground Penetrating Radar

RC – Reinforced Concrete

MC – Mass Concrete

PC – Pre-cast

SSoW – Safe System of Work

RAMS – Risk Assessment and Method Statement

Approx. – Approximate(ly)

NW/SW/NE/SE – Compass directions (NorthEast, SouthWest etc.)



Summary

Birmingham Testing and Scanning Ltd was commissioned by BWB on behalf of their client at Bisset Adams Architecture in April of 2020 to carry out investigation and GPR scanning works at Beckenham Public Hall.

As part of the commissioned investigation works, Bi-TAS was instructed to determine, as accurately as possible without carrying out any destructive or intrusive works, the construction type and material thicknesses of the building including any floor slabs, walls, beams, columns and structural elements within the building.

Bi-TAS undertook a mixture of visual survey, measurement and GPR scanning to attempt to determine the construction. A further visit may be required to carry out intrusive works, but this will be decided in conjunction with BWB following this report.



Location

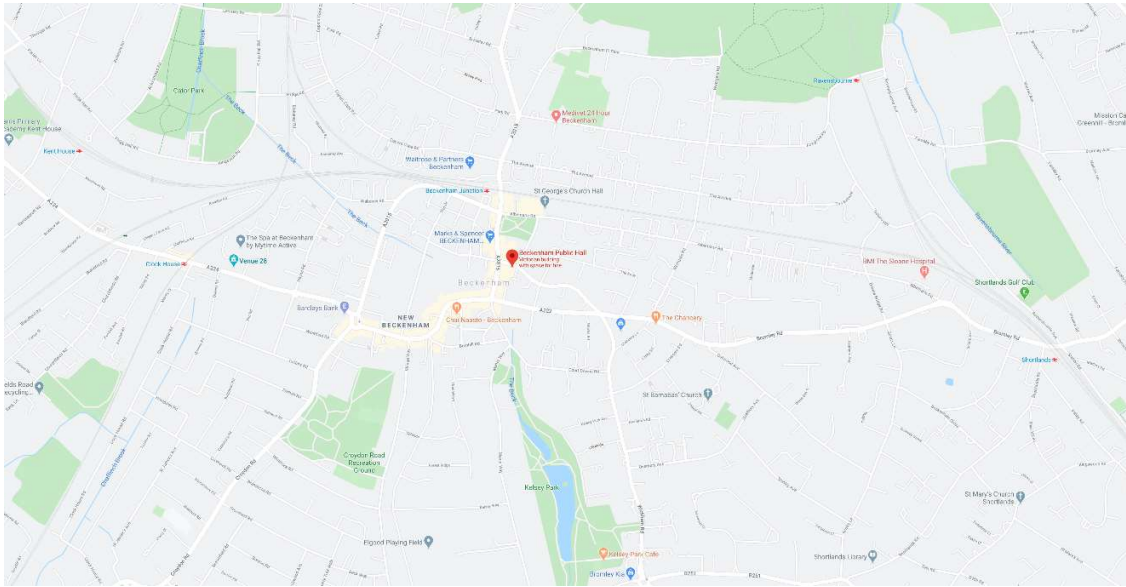


Figure 001 – Location plan, 1cm:100m scale

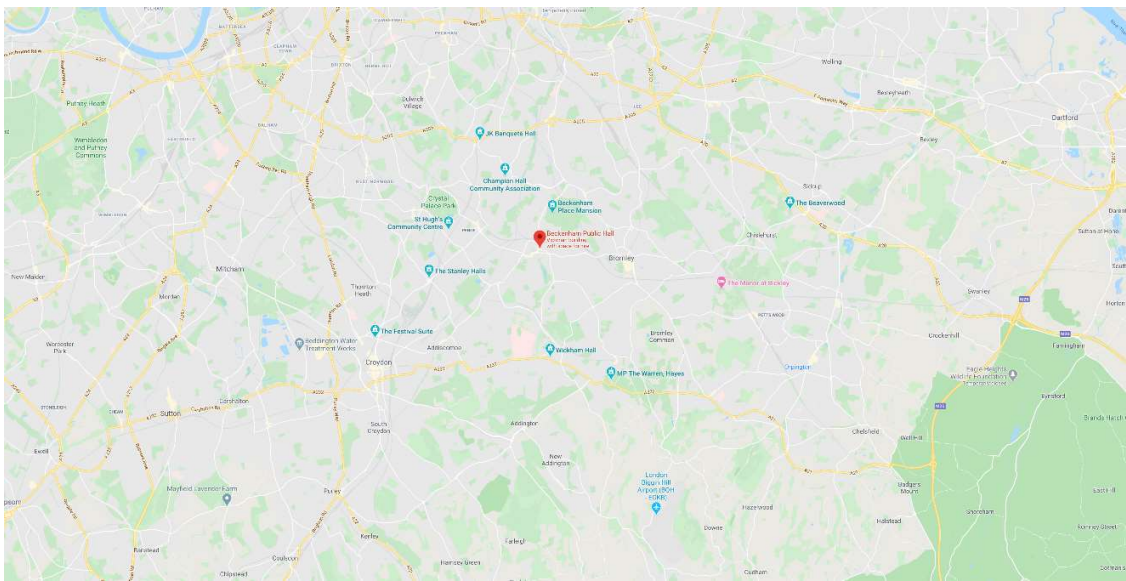


Figure 002 – Location plan, 1cm:1km scale

Scanning Images and Analysis

The site works were carried out on Monday 20th and Tuesday 21st April 2020.

The operatives from Bi-TAS were Gavin Jennings and Mischa Nicklin, with Gavin Jennings acting as the lead operative.

A Proceq GPR Live handheld GPR tool with iPad Pro was used to carry out the GPR scanning works and cover survey.

The GPR scans used were “line scans” in which the tool is run over the surface of the base material, detecting density changes and presenting a cross sectional image on the monitor in a perpendicular direction to the direction of the scan. These images are included in the report below together with photographs for ease of reference.

To assist with the interpretation of these images, the top of the image represents the concrete or base material surface, with chainage in m along the X-Axis and depth in cm along the Y-Axis.

In interpreted format, density changes appear as colour changes.

In raw format, reflections are shown as either parabola curves for rounded objects or flat lines for a uniform density change (i.e. between materials).

For ease of reference, we have split each floor plan into “areas” to make it easier to describe and explain our findings. These areas are labelled on Figures 003, 004, 005 and 006.



Basement

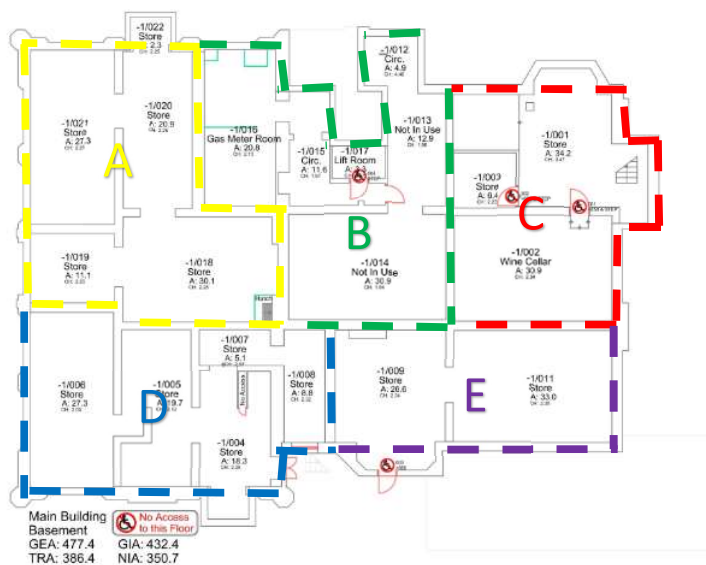


Figure 003 – Basement building plan with areas designated

Area A



Photograph 001 – General view of Basement area A



Photograph 002 – View of soffit with beams and cross bracing





Photograph 003 – Steel I Beam situated on masonry piers

- We were able to physically measure the joists below the floor, which were 280mm deep by 50mm wide for the majority, with a few measuring 230mm x 65mm. They were at 360-380mm centres.
- Timber cross bracing was found towards the ends of the beam spans (see Photograph 002). This was constructed with 50mm thick timber.
- The internal brick walls were measured as 360mm thick
- Steel beam running along edge of wall sited on masonry piers. Steel beam had flange thickness of 8mm, and was 210mm x 135mm.



Area B



Photograph 004 – General view of Basement Area B



Photograph 005 – View of steel I beam running onto padstones within wall in Area B





Photograph 006 – General view to underside of stairs within Area B

- We were able to physically measure the joists below the floor, which were 280mm deep by 50mm wide for the majority, with a few measuring 230mm x 65mm. They were at 360-380mm centres.
- Timber cross bracing was found towards the ends of the beam spans (see Photograph 002). This was constructed with 50mm thick timber.
- The internal brick walls were measured as 360mm thick
- The steel beam observed was measured as 210mm x 235mm wide with a flange thickness of approximately 8mm.
- The stairs were bolted onto a steel frame support measuring 180 x 100 x 10mm



Area C

Photograph 007 – General view of floor construction and beams beneath in Area C

- Access to the area was not possible. The area was cordoned off as “out of bounds due to health and safety reasons”.
- Visually, we could see the floor construction was similar to other areas, but with an additional set of beams beneath. Full access would need to be granted to measure the beam cross sections. They appeared to be made of steel I beams (See Photograph 007).

Area D



Photograph 008 – General view of construction in Area D



Photograph 009 – Timber construction of floor in Area D



- We were able to physically measure the joists below the floor, which were 280mm deep by 50mm wide for the majority, with a few measuring 230mm x 65mm. They were at 360-380mm centres.
- Timber cross bracing was found towards the ends of the beam spans (see Photograph 002). This was constructed with 50mm thick timber.
- The internal brick walls were measured as 360mm thick
- An area of the structure a steel corrugated structure was erected. This was supported on beams measuring 105 x 75mm which were sited on steel cylindrical columns measuring approximately 75mm diameter (see Photograph 008).



Area E

There was no access to this area on the time of our visit, even with the access granted from “The Club”.



Ground Floor

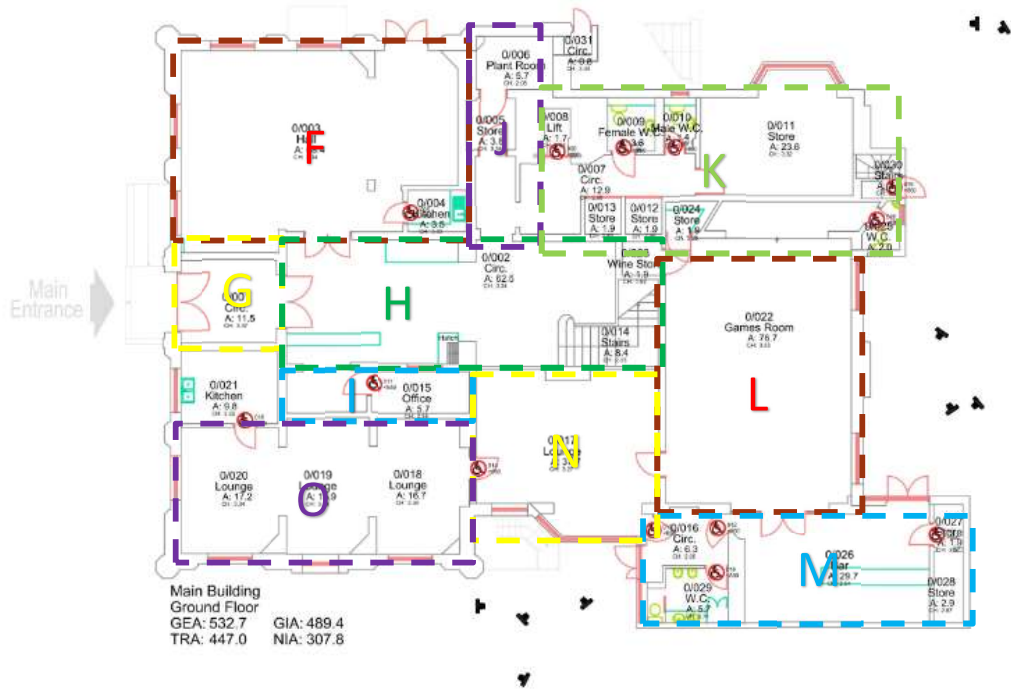


Figure 004 – Ground floor plan with areas designated

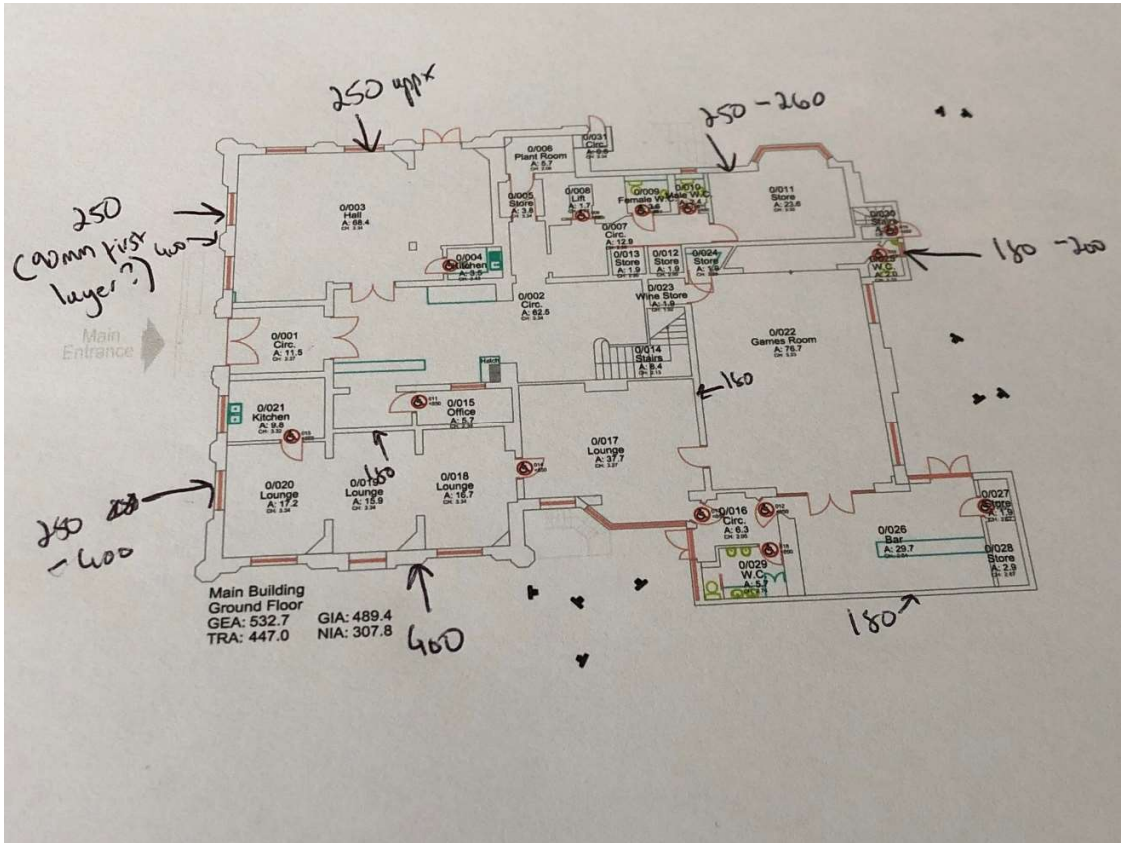


Figure 005 – Sketch of external wall widths from scan data

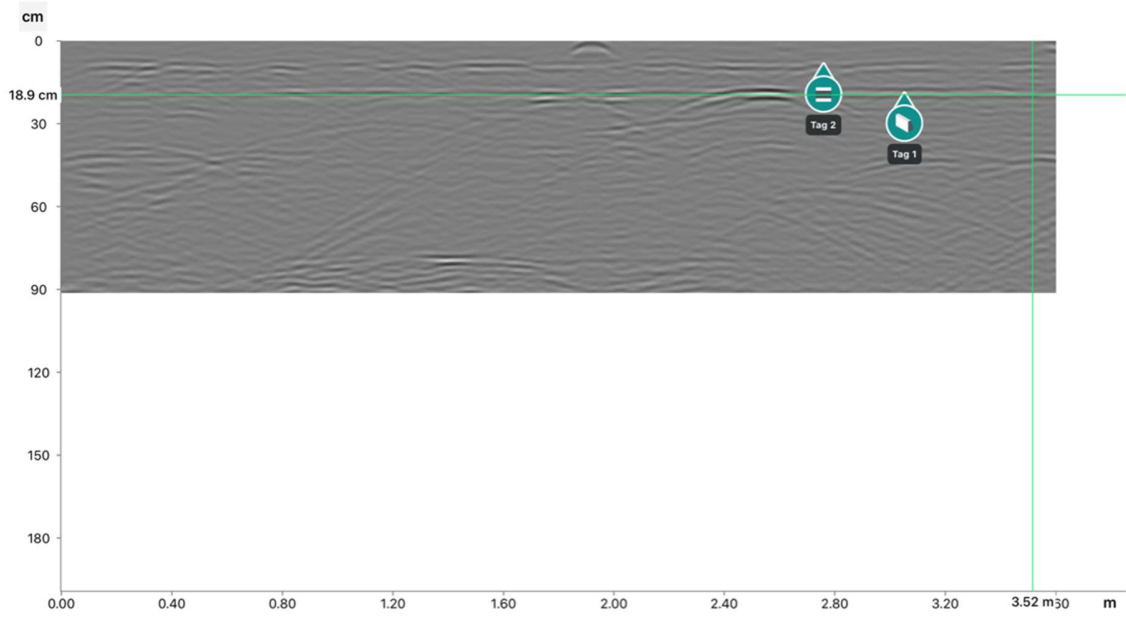
Area F

Photograph 010 – General view of column line in first floor Area F

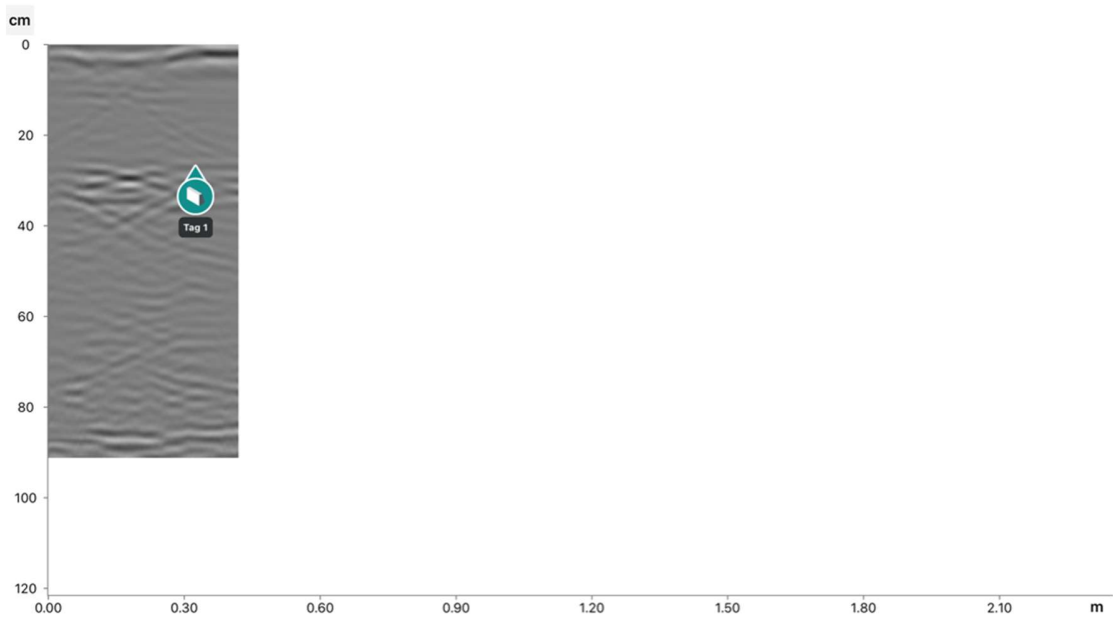


Photograph 011 – General view of beams and ceiling in Area F



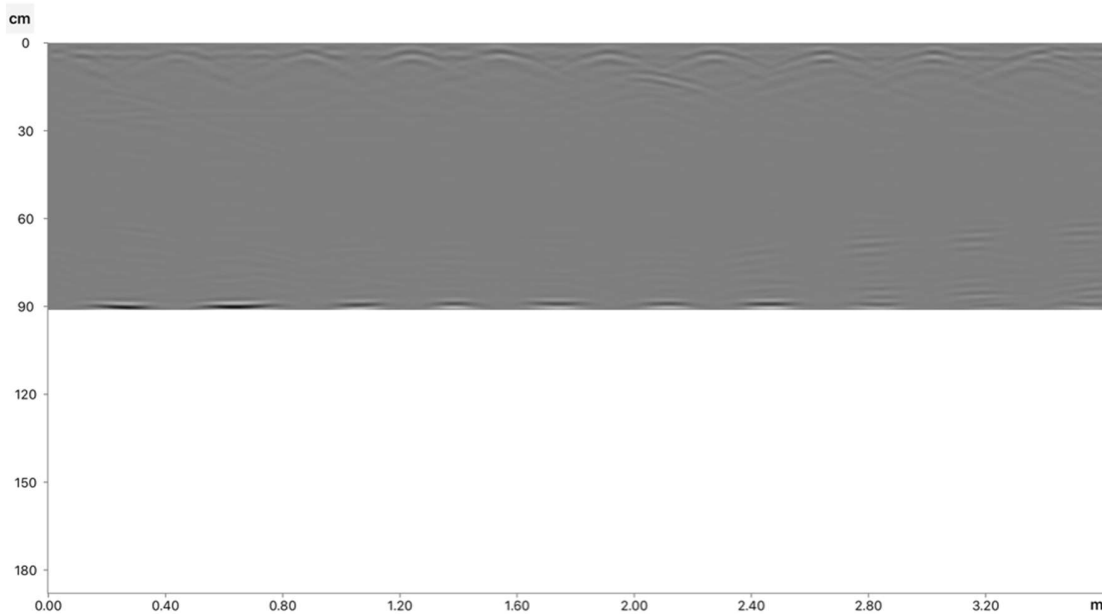


GPR scan of typical internal wall showing thickness and void

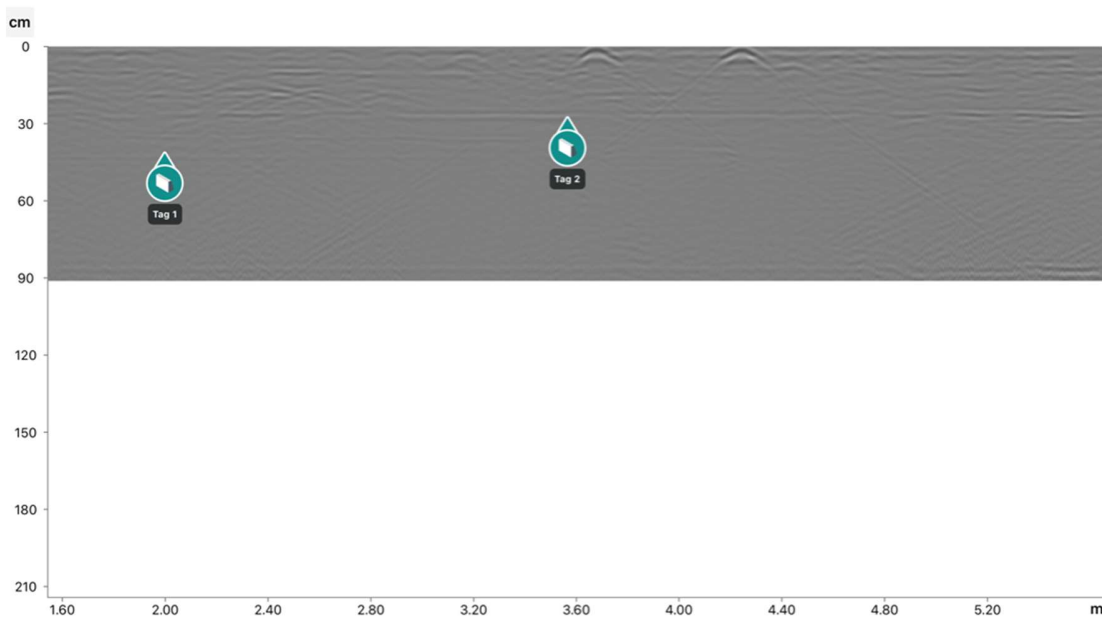


GPR scan across face of column showing masonry construction



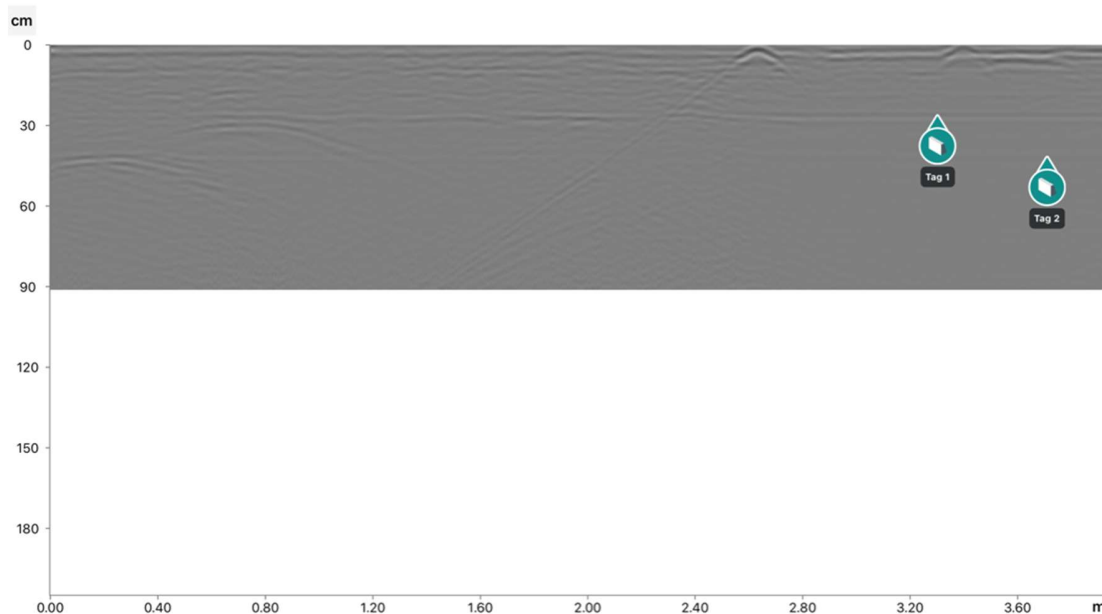


GPR scan of floor showing suspected timber construction



GPR scan of external wall showing thickness and flared thickness





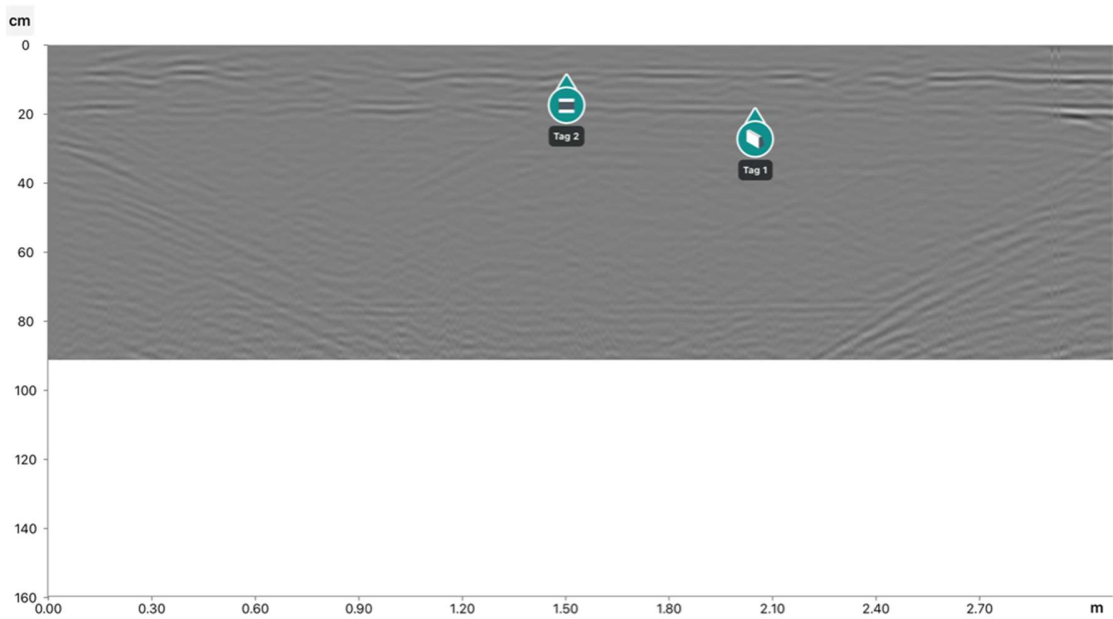
GPR scan of external wall showing thickness and flared thickness

- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between.
- Columns measure 400mm x 265mm including finishes. Scans shows column appears to be made up of a brickwork pier.
- Beams were undetectable due to plasterboard boxing and air void – unknown construction at this stage.
- Scans show assumed timber floor below with regular centres showing plank width of approximately 300mm. Plank thickness of approximately 30mm.
- South and East external walls appear to be 250mm with 400mm wide flaring

Area G

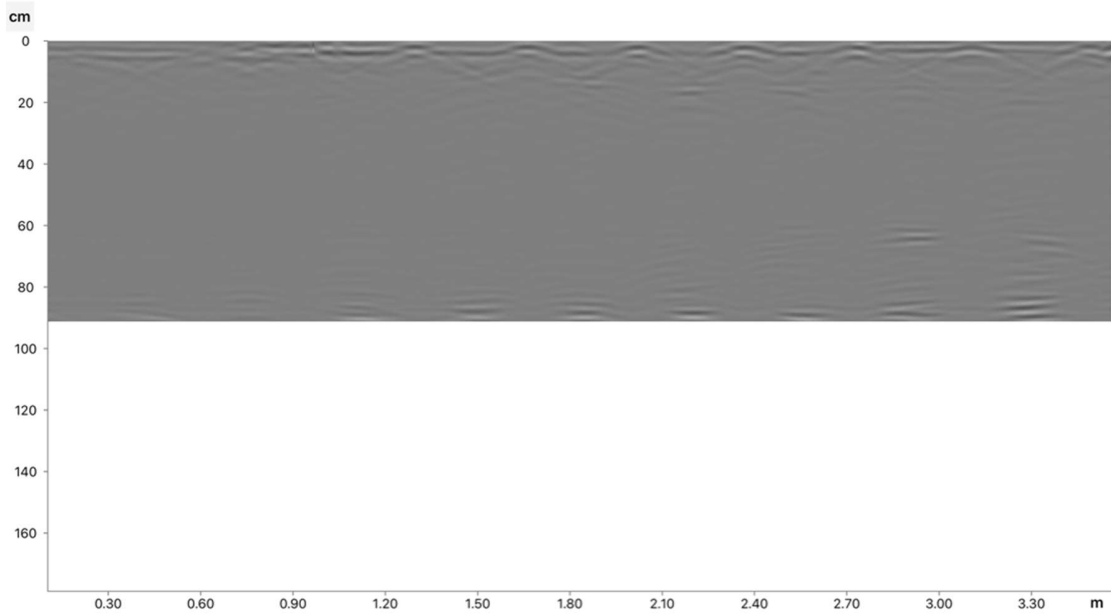


Photograph 012 – General view of “lobby” Area G



GPR scan showing typical wall thickness with void





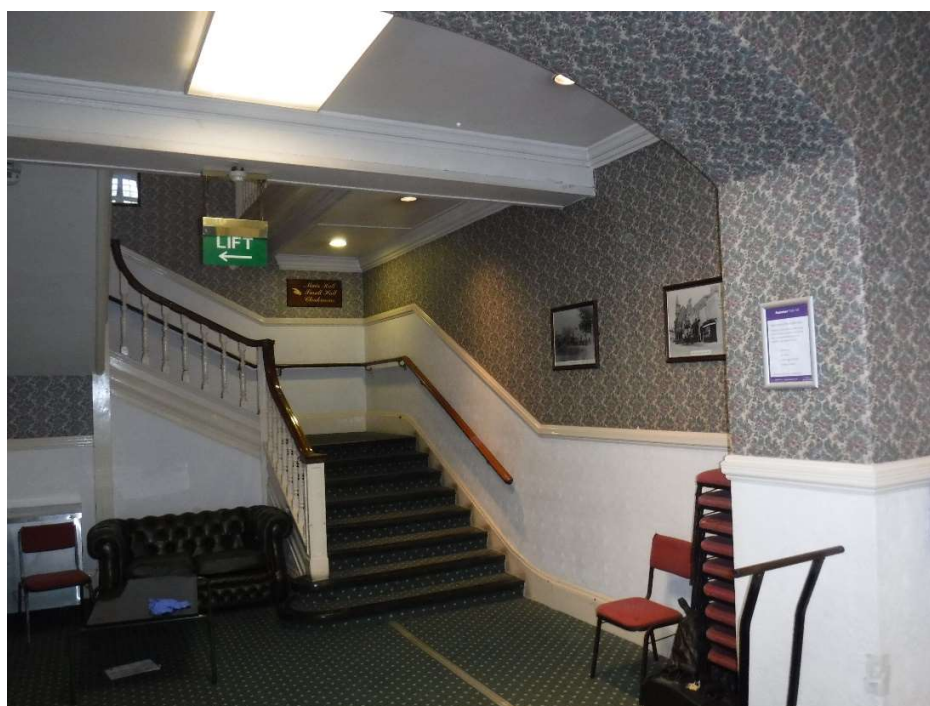
GPR scan to floor below showing suspected wooden floor

- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between.
- Floor and ceiling suggest timber flooring, with planks approximately at 300mm centres (suggesting 300mm width) and an approximate plank thickness of 30mm.

Area H

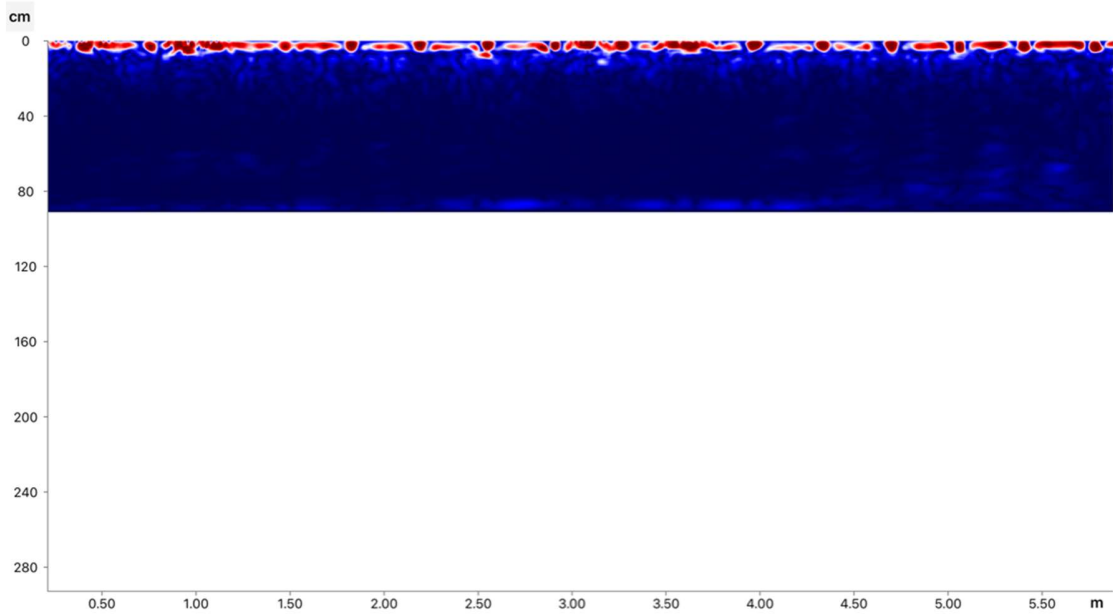


Photograph 013 – General view of Area H

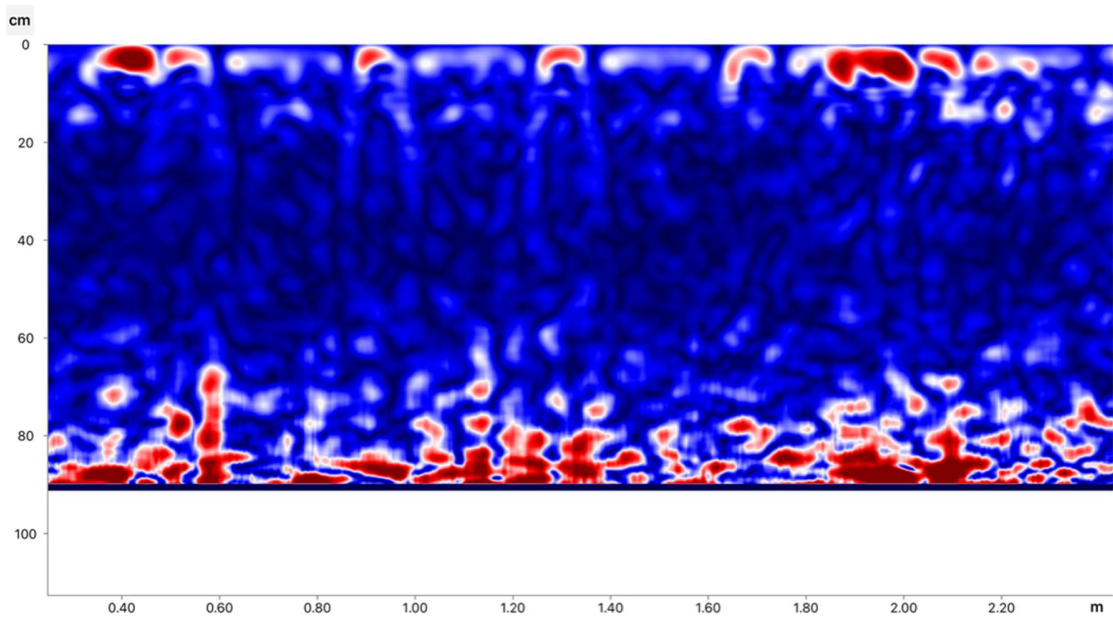


Photograph 014 – General view of Area H



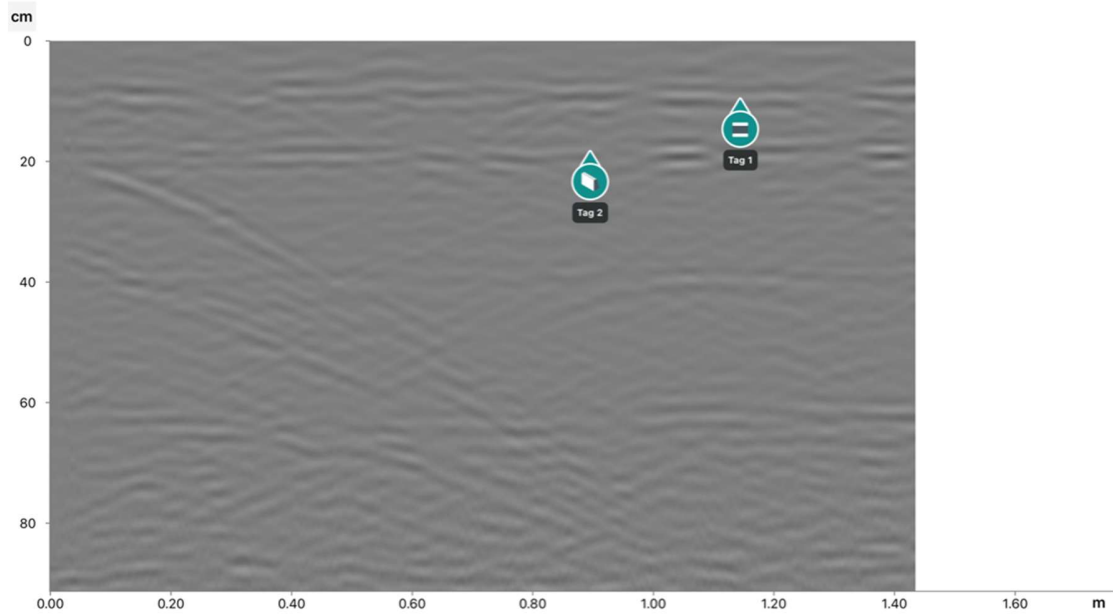


GPR scan of floor showing floor make up similar to other areas (suspected timber)



GPR scan to underside of soffit showing suspected timber joists





GPR scan to wall showing masonry thickness with void

- Floor and ceiling suggest timber flooring, with planks approximately at 300mm centres (suggesting 300mm width) and an approximate plank thickness of 30mm.
- Ceiling appears to have joists at 360mm centres, which is in line with findings in the basement.
- Beams and arch were boarded, meaning impossible to determine construction due to air gap.
- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between.

Area I

Photograph 015 – General view of back office in Area I

- No additional findings to main area in Area H – similar construction

Area J

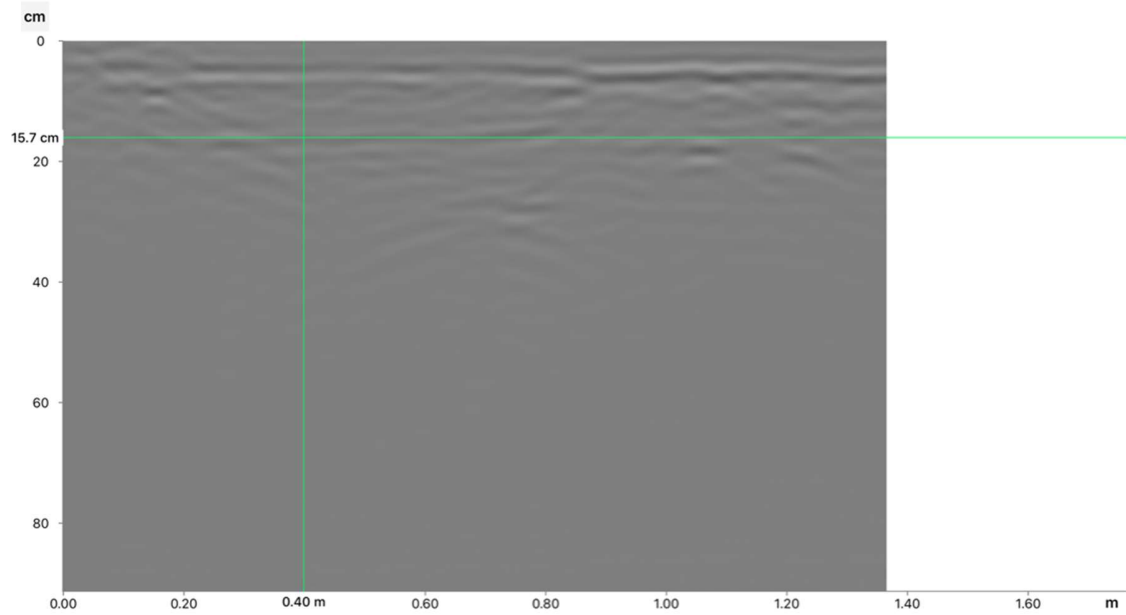


Photograph 016 – General view of Area J



Photograph 017 – General view of boiler room at rear of Area J





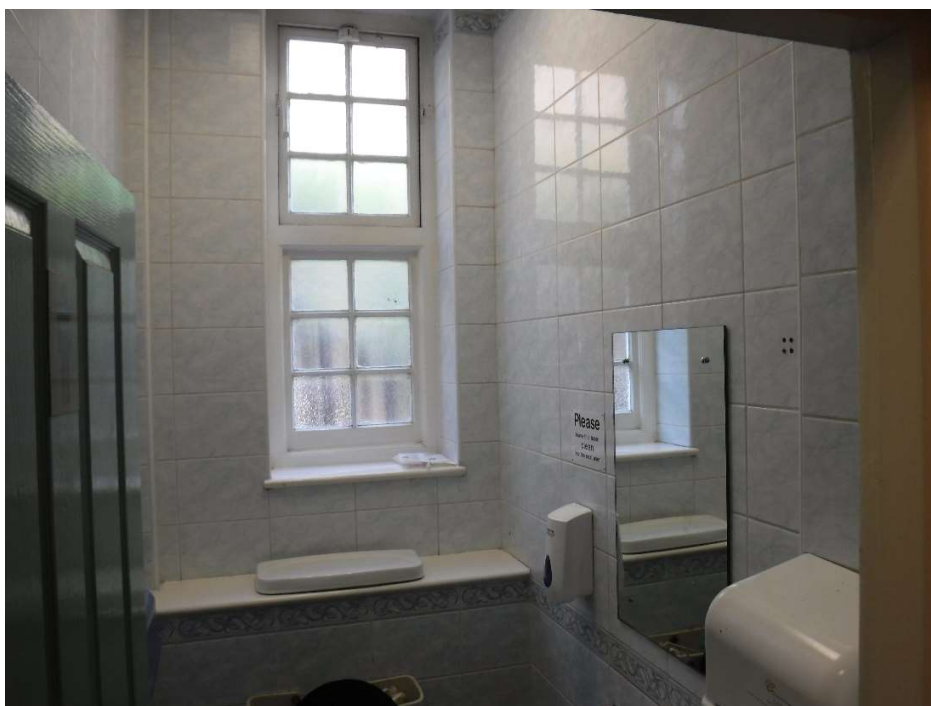
GPR scan of boiler room floor

- Similar construction on walls and soffit of corridor, but what appears to be a mass concrete screed within the boiler room. The total floor thickness appeared to be around 150mm.

Area K



Photograph 018 – General view of Area K

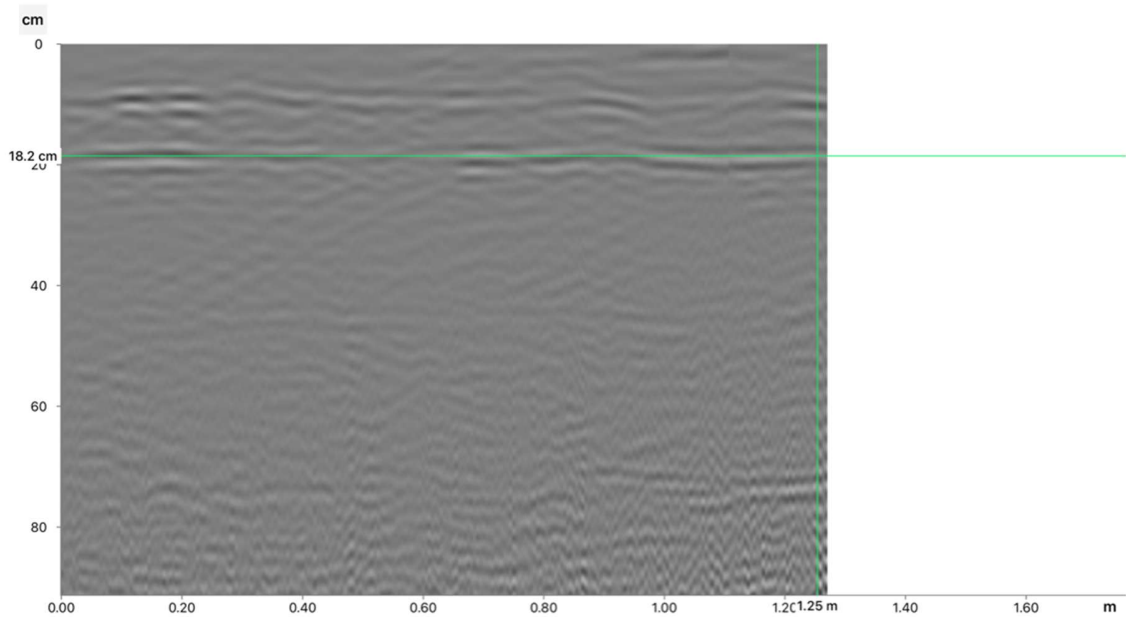


Photograph 019 – General view of Area K



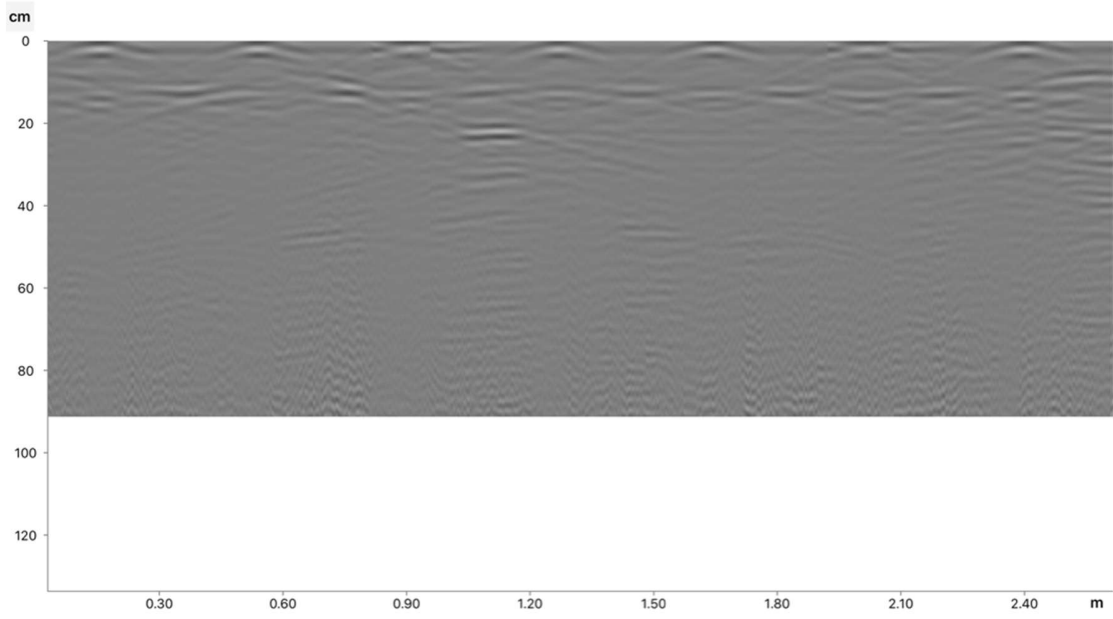


Photograph 020 – General view of Area K

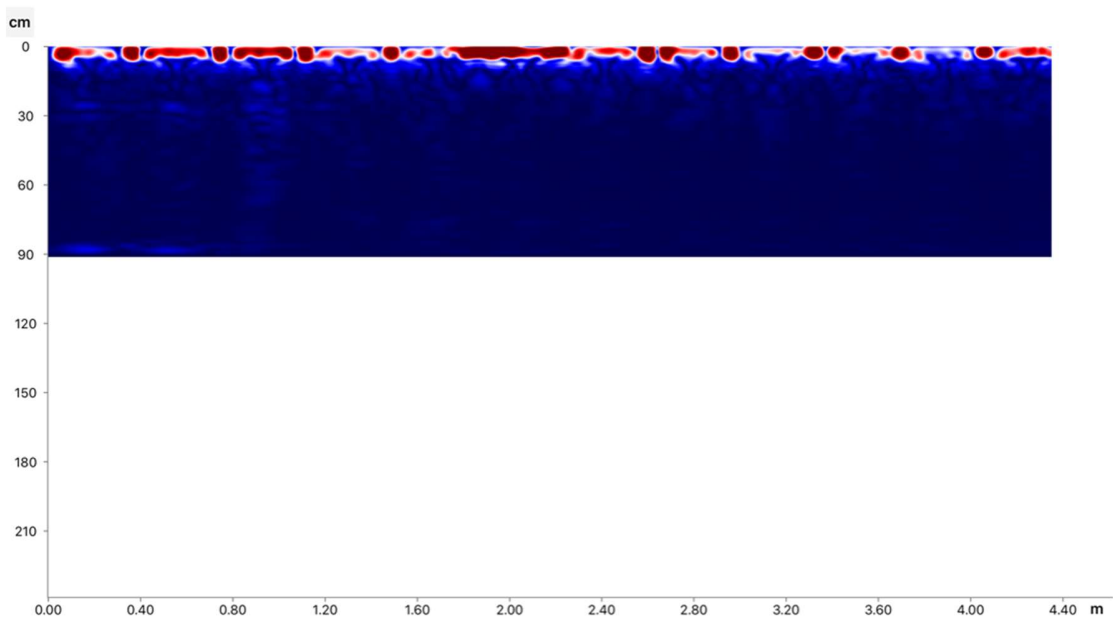


GPR scan showing wall thickness and void



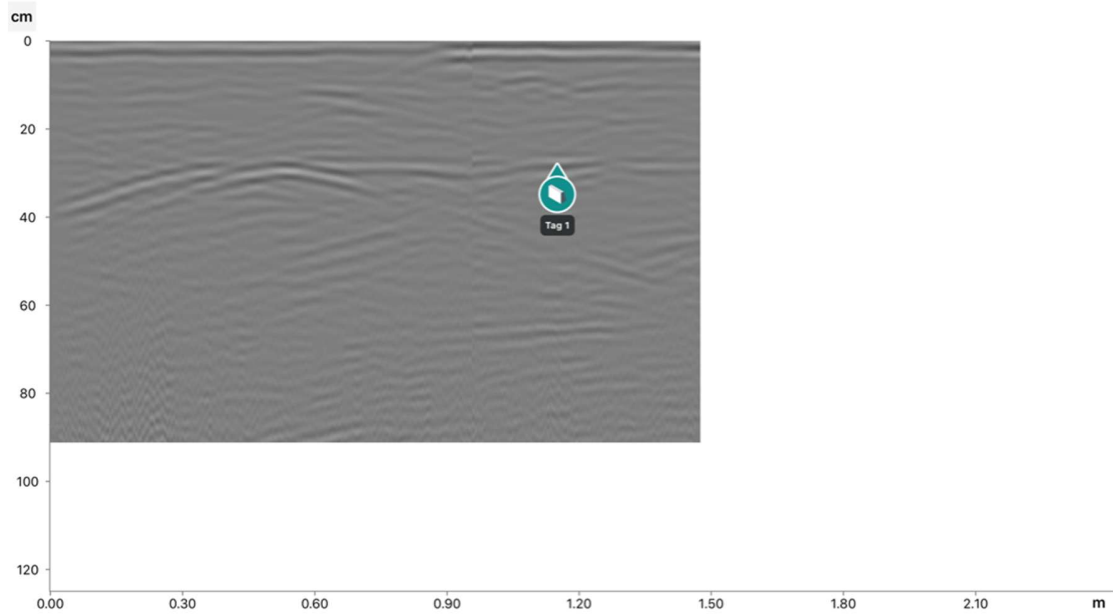


GPR scan of soffit showing suspected timber joists



GPR scan of floor showing suspected timber floorboards





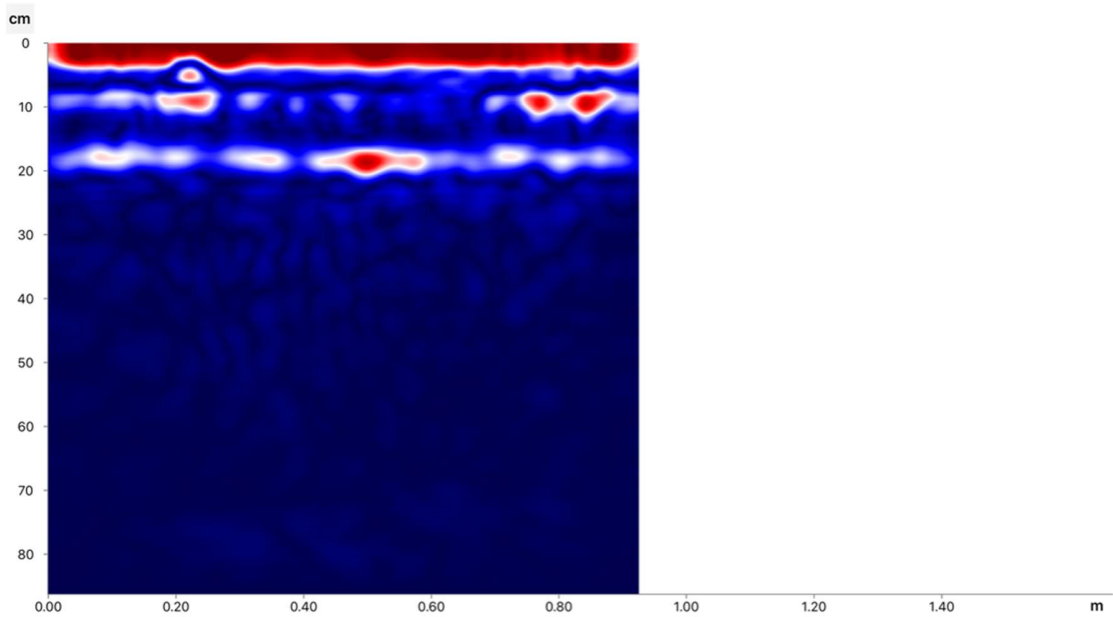
GPR scan of external wall showing thickness

- Floor and ceiling suggest timber flooring, with planks approximately at 300mm centres (suggesting 300mm width) and an approximate plank thickness of 30mm.
- Ceiling appears to have joists at 360mm centres, which is in line with findings in the basement.
- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between.

Area L

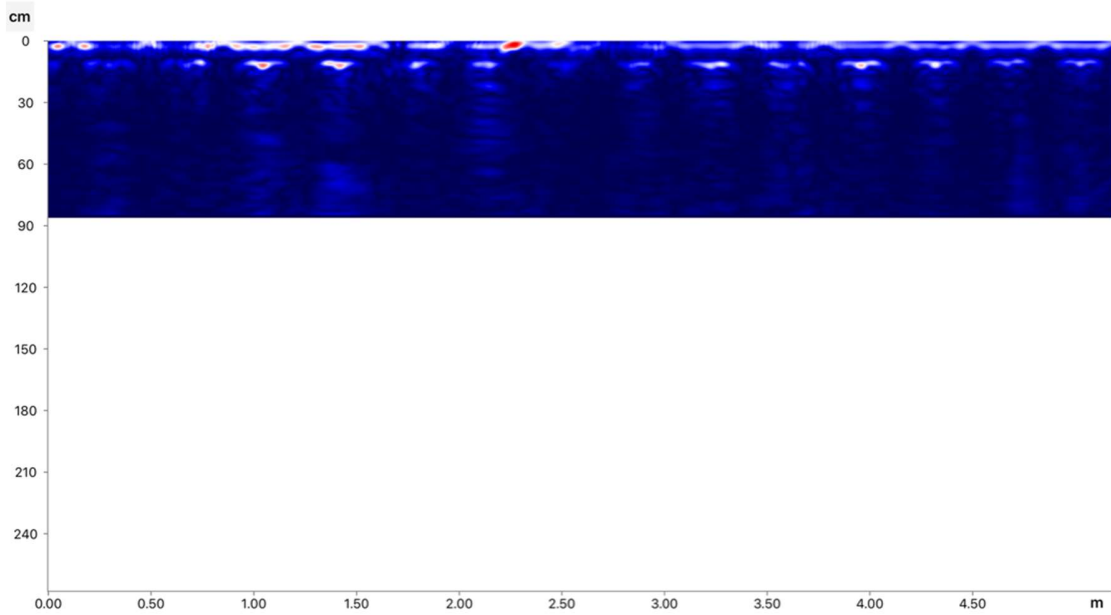


Photograph 021 – General view of Area L



GPR scan showing wall thickness with void





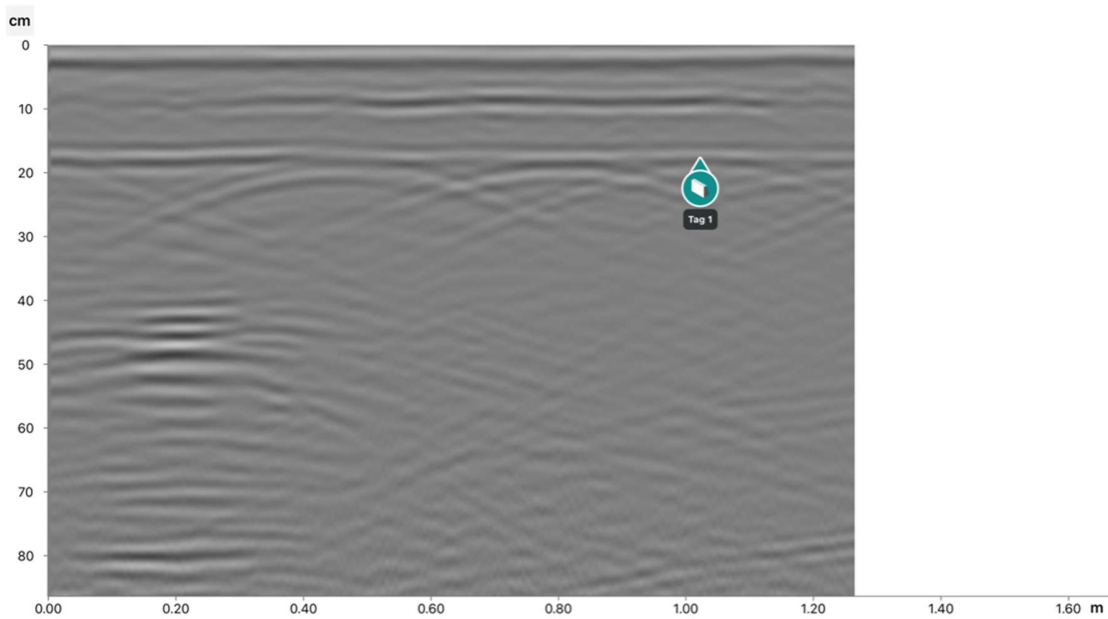
GPR scan showing suspected timber joists and floor make up

- Floor and ceiling suggest timber flooring, with planks approximately at 300mm centres (suggesting 300mm width) and an approximate plank thickness of 30mm.
- Ceiling appears to have joists at 360mm centres, which is in line with findings in the basement.
- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between.

Area M



Photograph 022 – General view of Area M



GPR scan of external wall

- Findings consistent with Area L and Area N
- External wall showing thickness of around 180mm



Area N

Photograph 023 – General view of Area N

- Findings consistent with Area L and Area M

Area O

Photograph 024 – General view of Area O

- Findings consistent with Areas L-N

First Floor

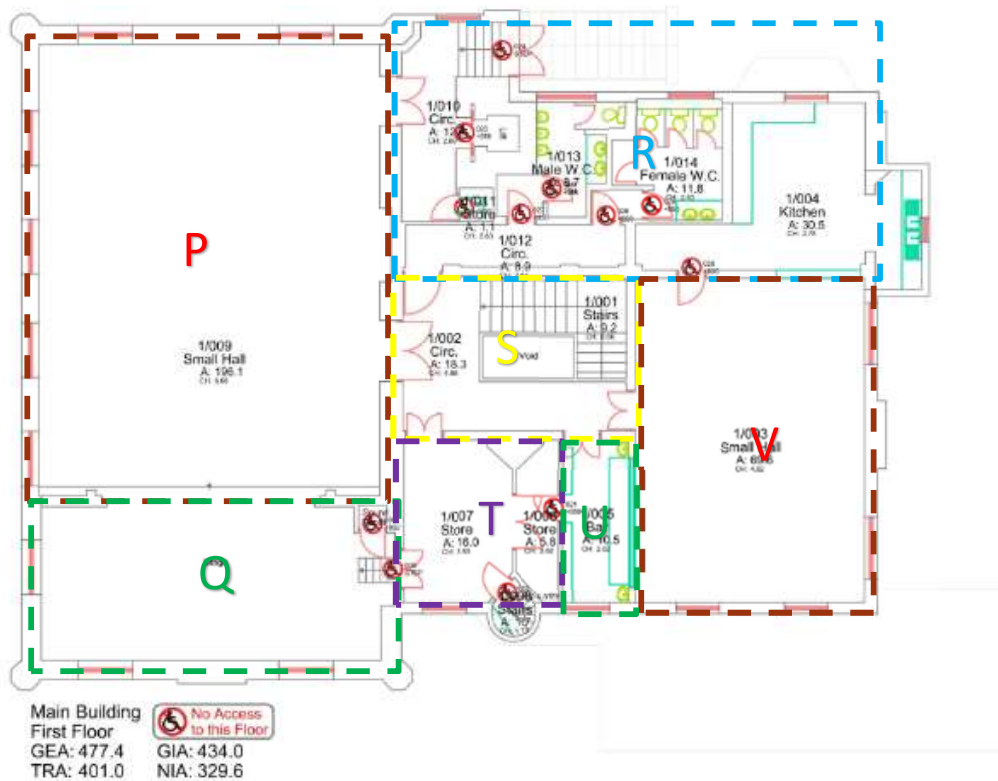


Figure 006 – First floor plan with areas designated

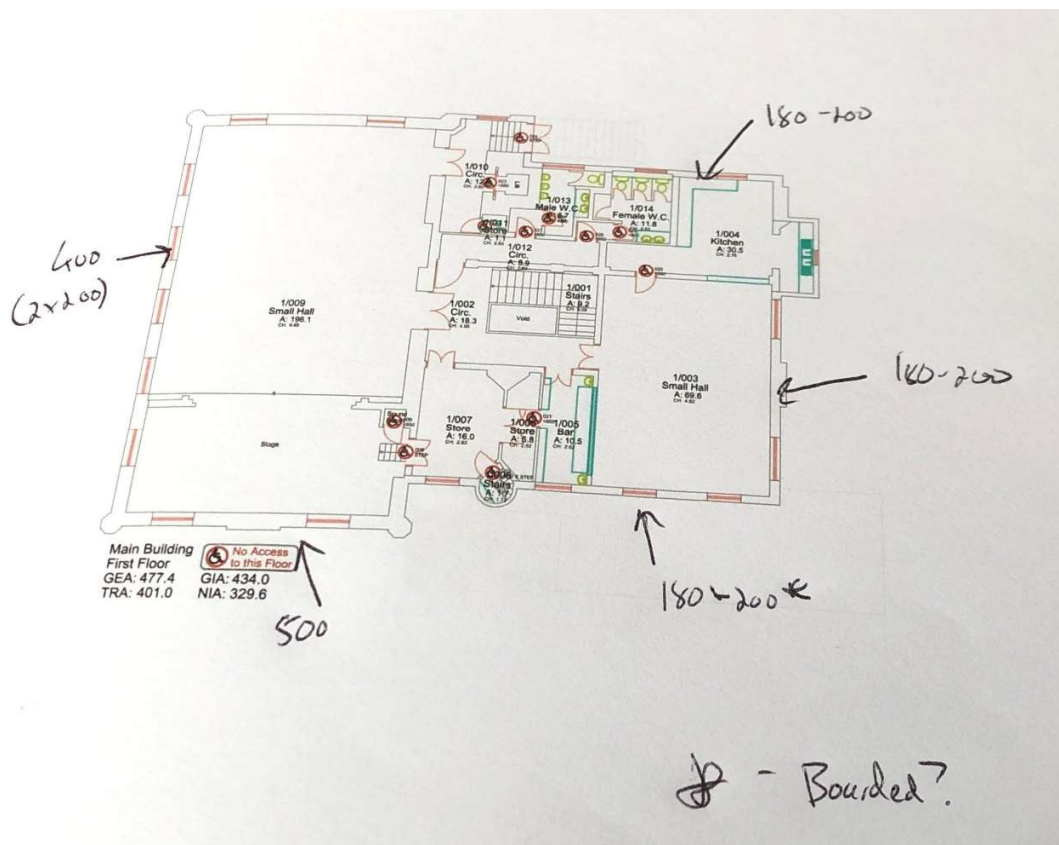


Figure 007 – First floor plan with external wall thicknesses from scan data

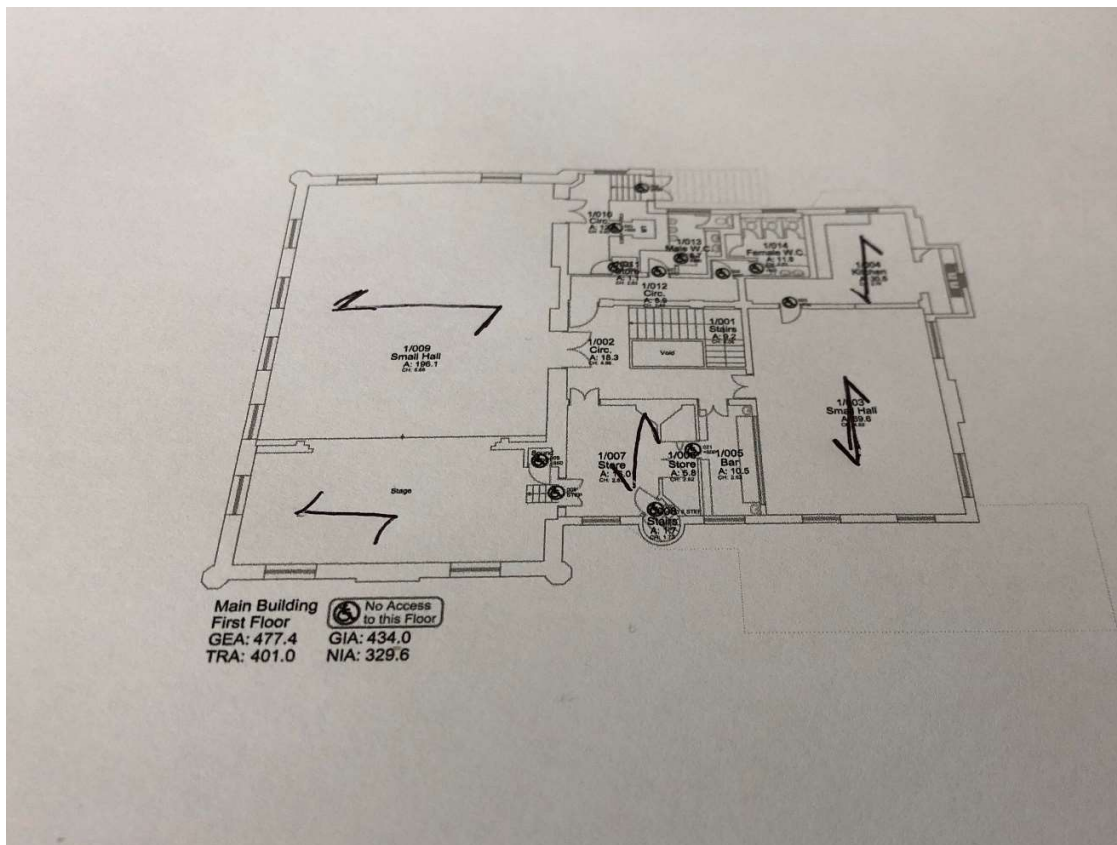


Figure 008 – Suspected floor spans of first floor

Area P

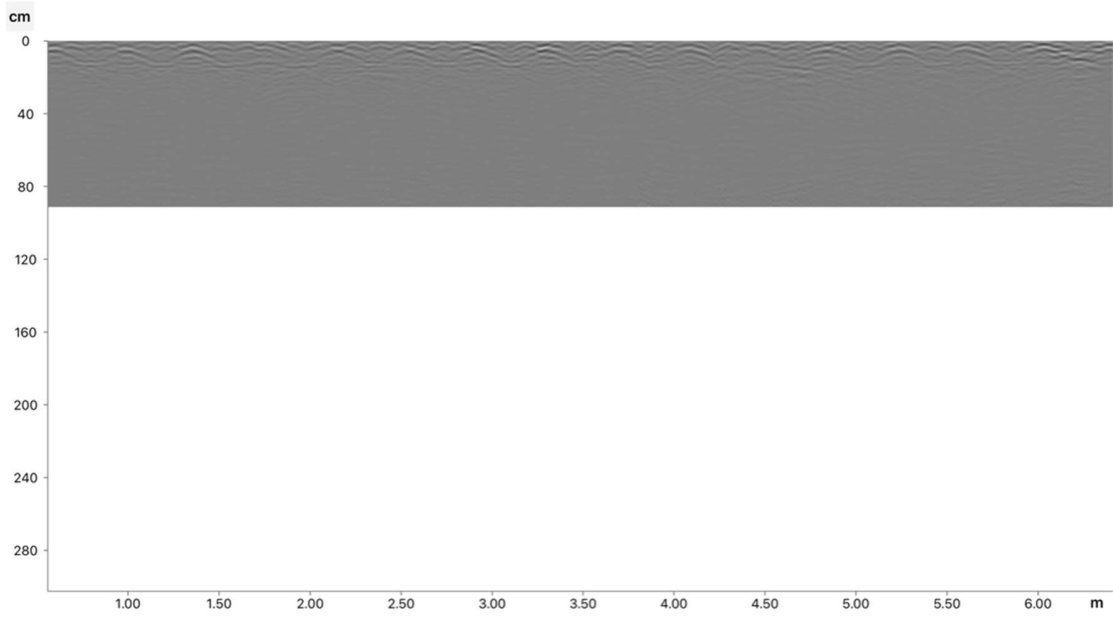


Photograph 025 – General view of Area P

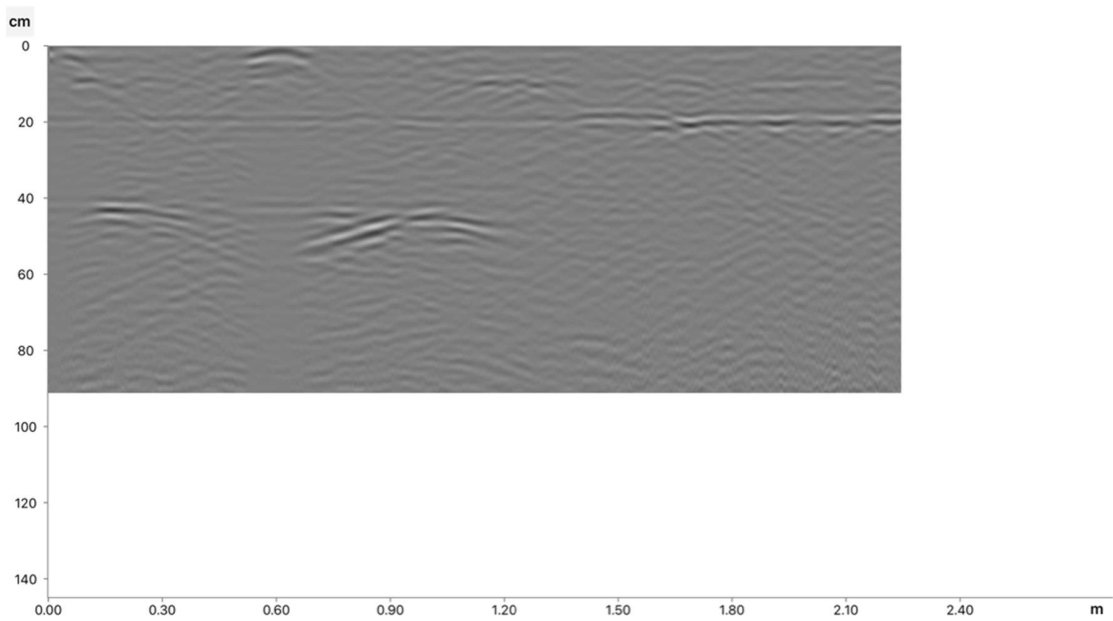


Photograph 026 – General view of ceiling within area P



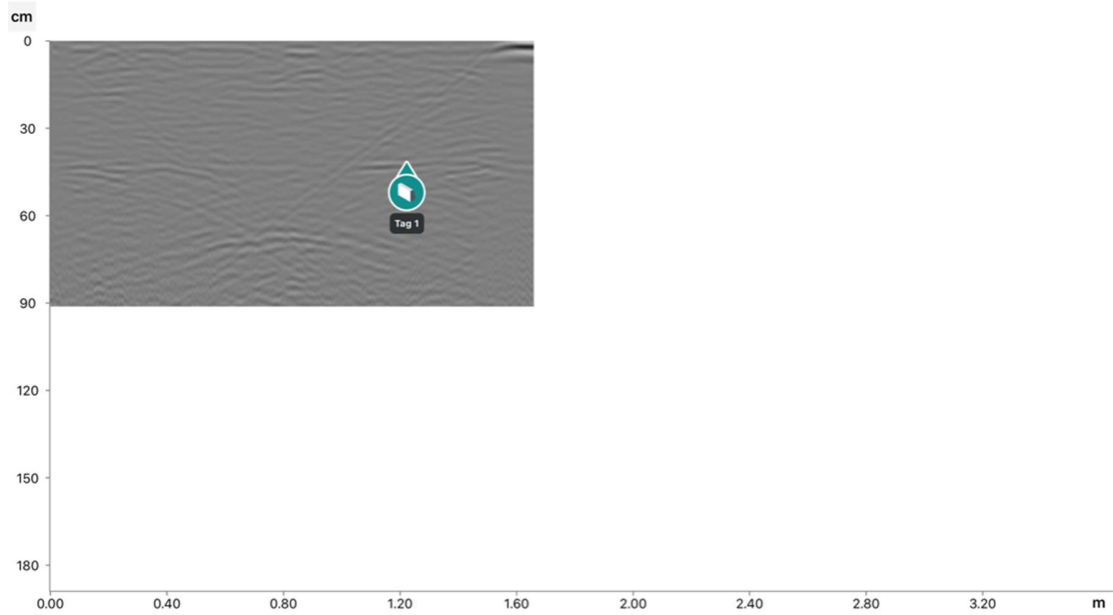


GPR scan of floor showing suspected timber floor make up in line with other areas of the building



GPR scan of wall showing thickness and void in line with other areas of the building

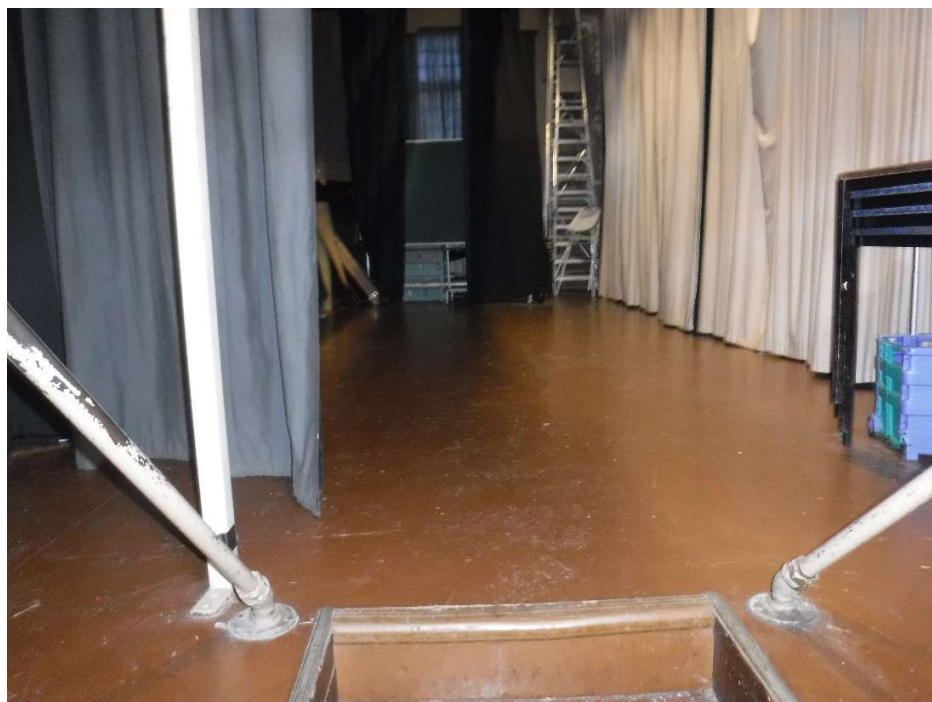




GPR scan of external wall showing thickness

- Floor scans suggest timber flooring, with planks approximately at 300mm centres (suggesting 300mm width) and an approximate plank thickness of 30mm.
- Floor appears to have joists at 360mm centres, which is in line with findings in the basement.
- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between.
- External wall of 400mm thickness

Area Q

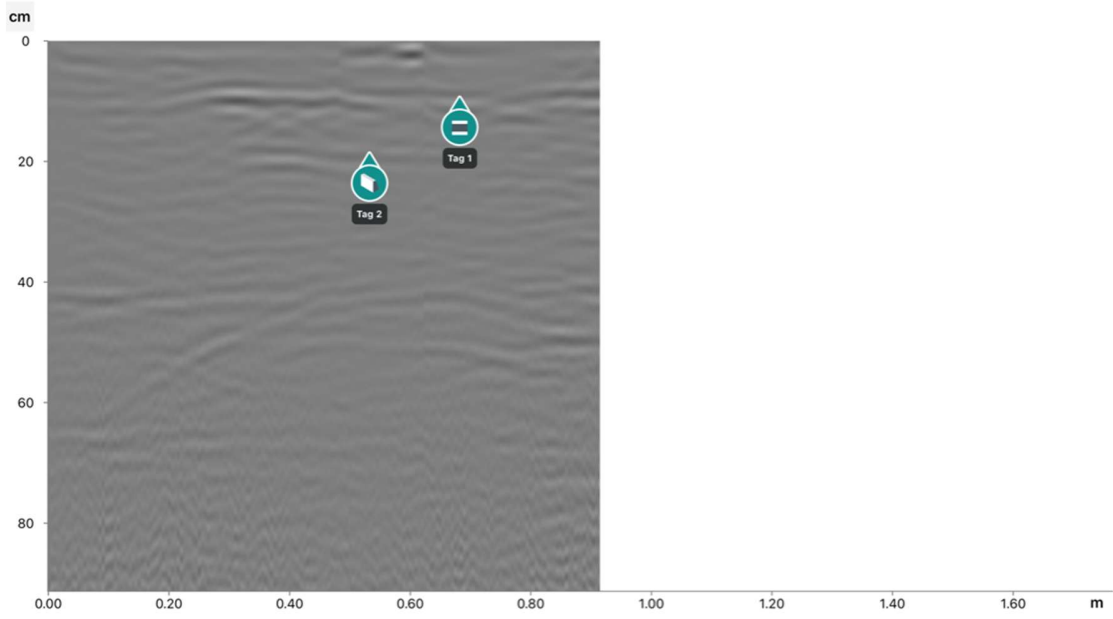


Photograph 027 – General view of “backstage area” Area Q

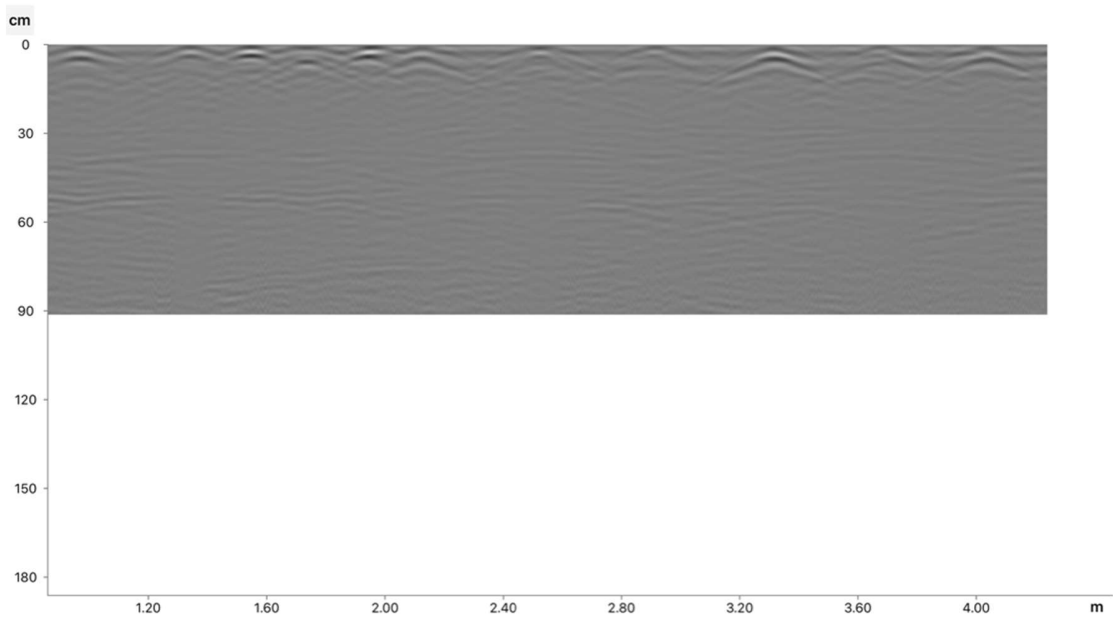


Photograph 028 - General view within Area Q



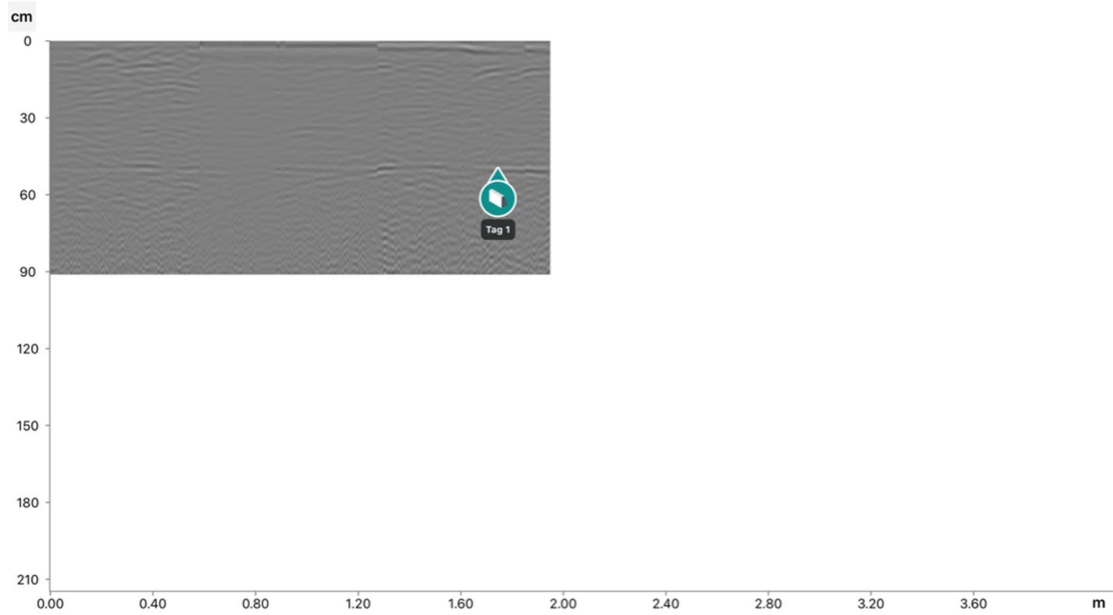


GPR scan showing typical wall thickness with void



GPR scan of floor showing suspected timber joists





GPR scan of external wall

- Floor scans suggest timber flooring, with planks approximately at 300mm centres (suggesting 300mm width) and an approximate plank thickness of 30mm.
- Floor appears to have joists at 360mm centres, which is in line with findings in the basement.
- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between.
- External wall appeared to be 500mm thick from scan data



Area R



Photograph 029 – General view within Area R



Photograph 030 – General view within Area R





Photograph 031 – General view of Area R

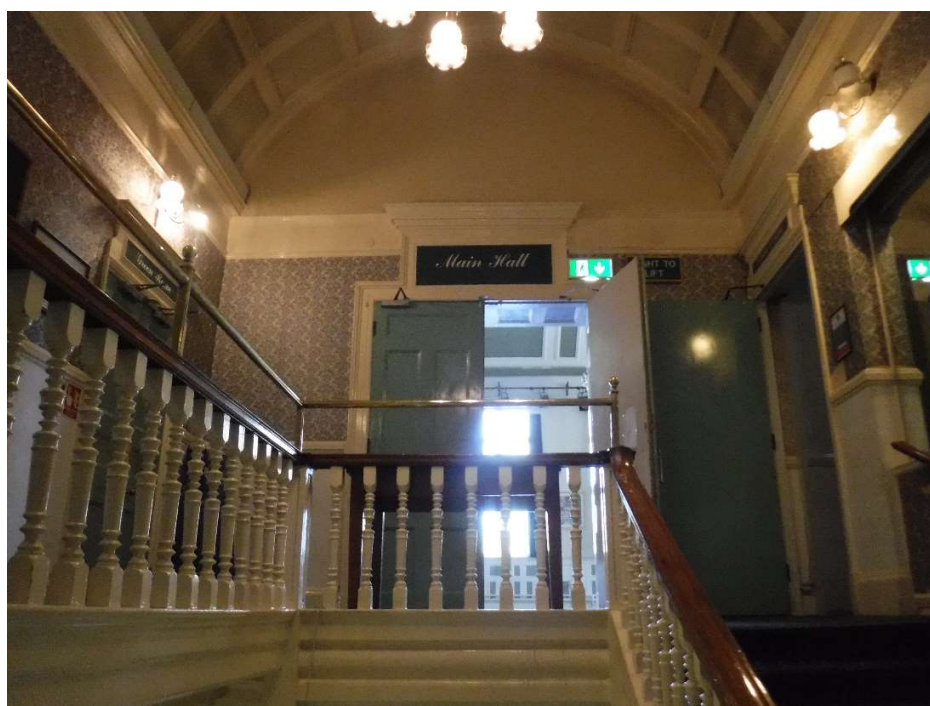
- Findings are consistent with other areas of the building
- Floor scans suggest timber flooring, with planks approximately at 300mm centres (suggesting 300mm width) and an approximate plank thickness of 30mm.
- Floor appears to have joists at 360mm centres, which is in line with findings in the basement.
- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between.



Area S



Photograph 032 – General view of Area S

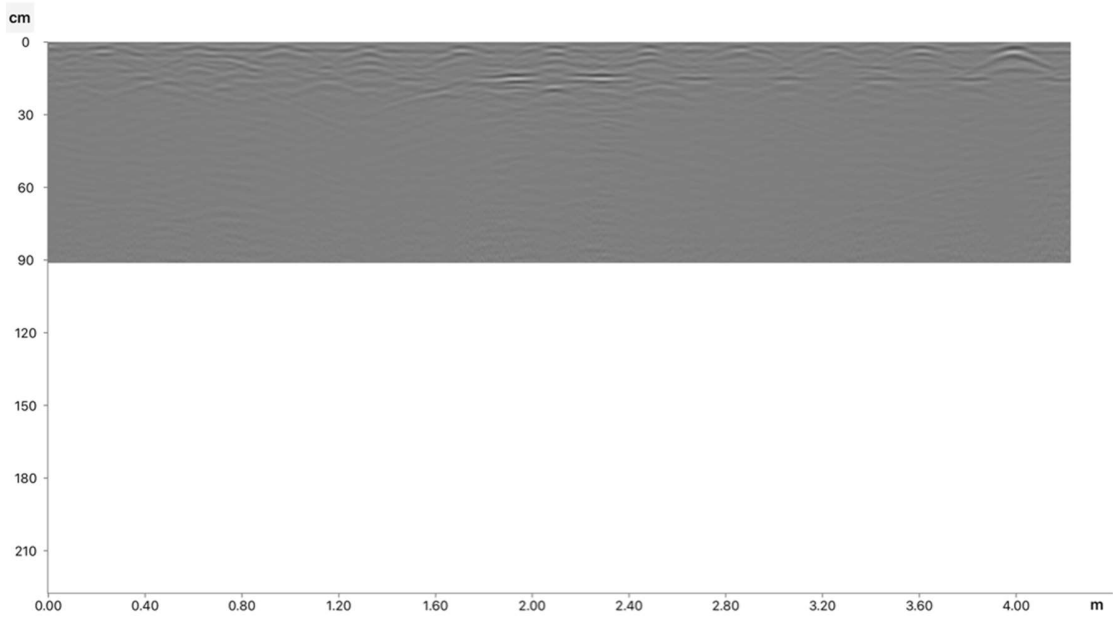


Photograph 033 – General view of Area S



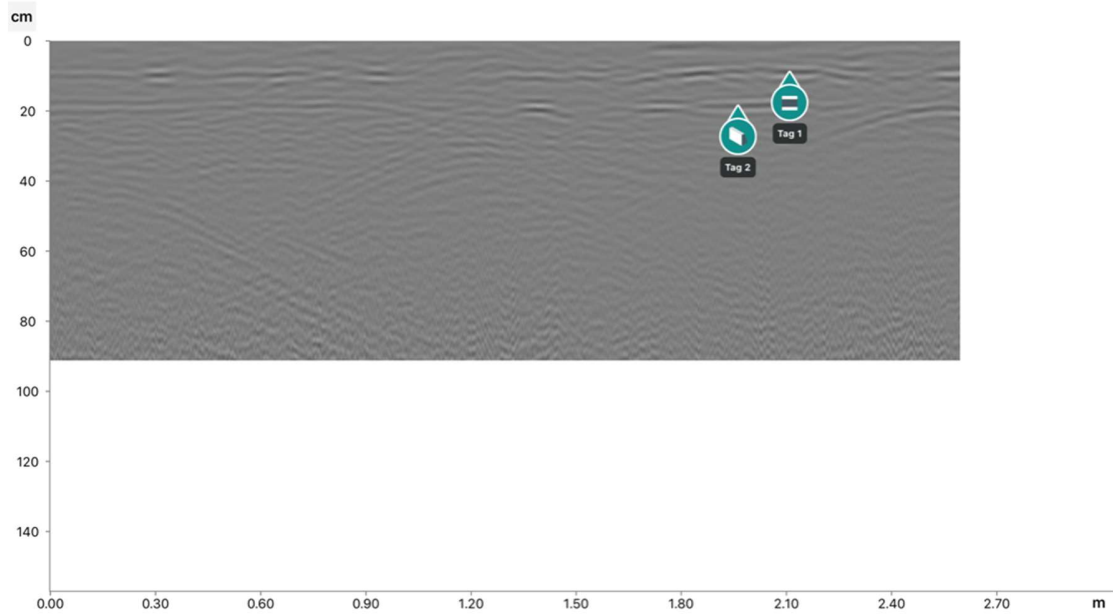


Photograph 034 – General view of Area S ceiling



GPR scan of stair landing showing similar timber construction





GPR scan of wall showing typical masonry with void construction

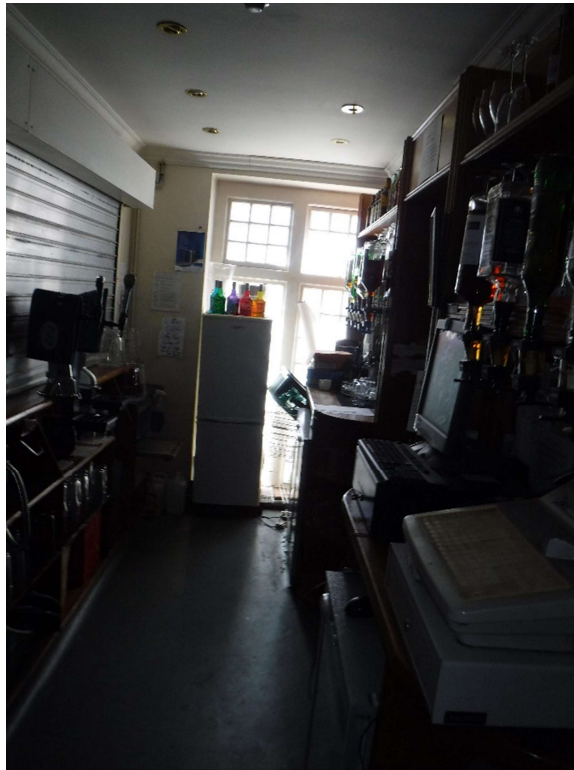
- Findings are consistent with other areas of the building
- Floor scans suggest timber flooring, with planks approximately at 300mm centres (suggesting 300mm width) and an approximate plank thickness of 30mm.
- Floor appears to have joists at 360mm centres, which is in line with findings in the basement.
- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between.

Area T

Photograph 035 – General view of Area T

- Findings are consistent with other areas of the building
- Floor scans suggest timber flooring, with planks approximately at 300mm centres (suggesting 300mm width) and an approximate plank thickness of 30mm.
- Floor appears to have joists at 360mm centres, which is in line with findings in the basement.
- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between



Area U

Photograph 036 – General view of Area U

- Findings are consistent with other areas of the building
- Floor scans suggest timber flooring, with planks approximately at 300mm centres (suggesting 300mm width) and an approximate plank thickness of 30mm.
- Floor appears to have joists at 360mm centres, which is in line with findings in the basement.
- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between.



Area V

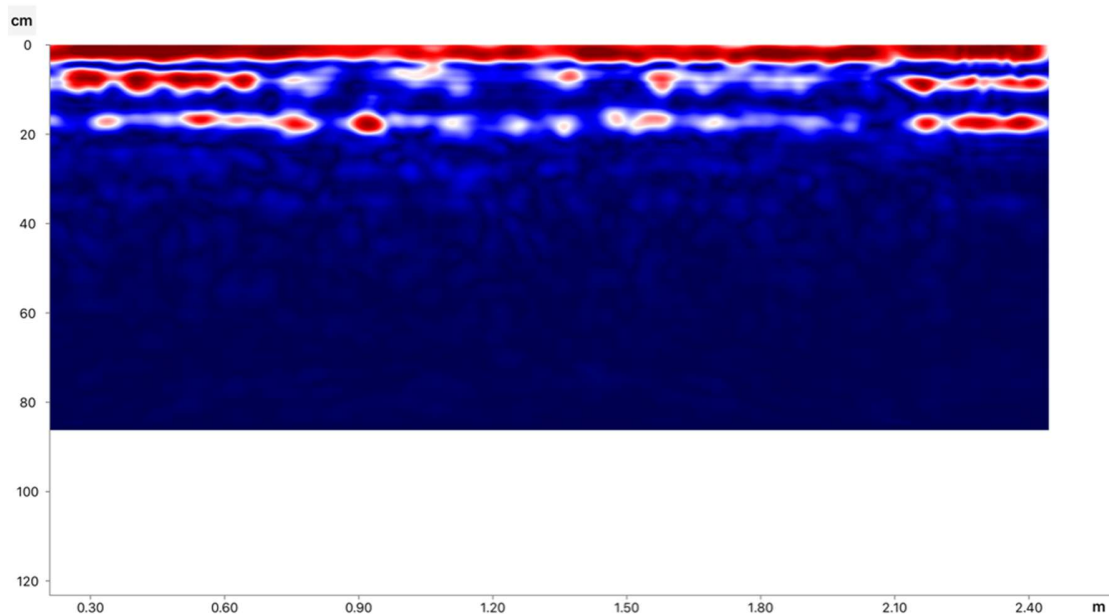


Photograph 037 – General view of Area V

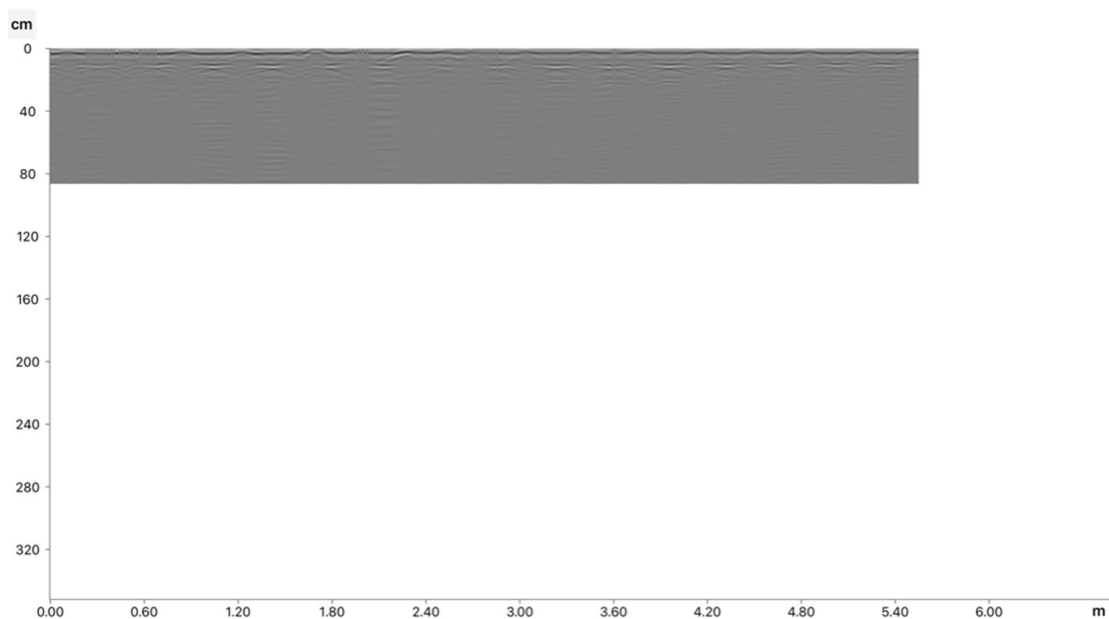


Photograph 038 – General view of Area V Soffit





GPR scan of wall showing typical thickness and void



GPR scan of floor showing typical suspected timber joist construction

- Findings are consistent with other areas of the building
- Floor scans suggest timber flooring, with planks approximately at 300mm centres (suggesting 300mm width) and an approximate plank thickness of 30mm.
- Floor appears to have joists at 360mm centres, which is in line with findings in the basement.
- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between.

Second Floor

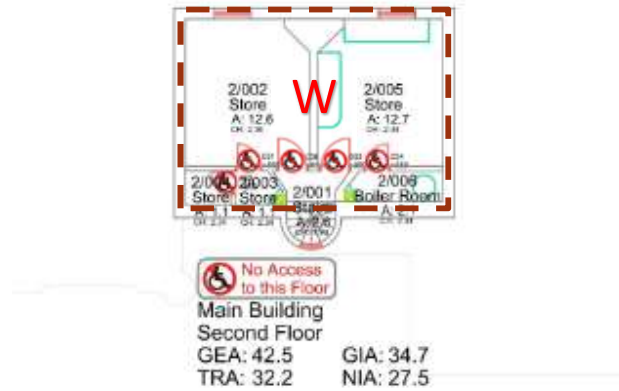
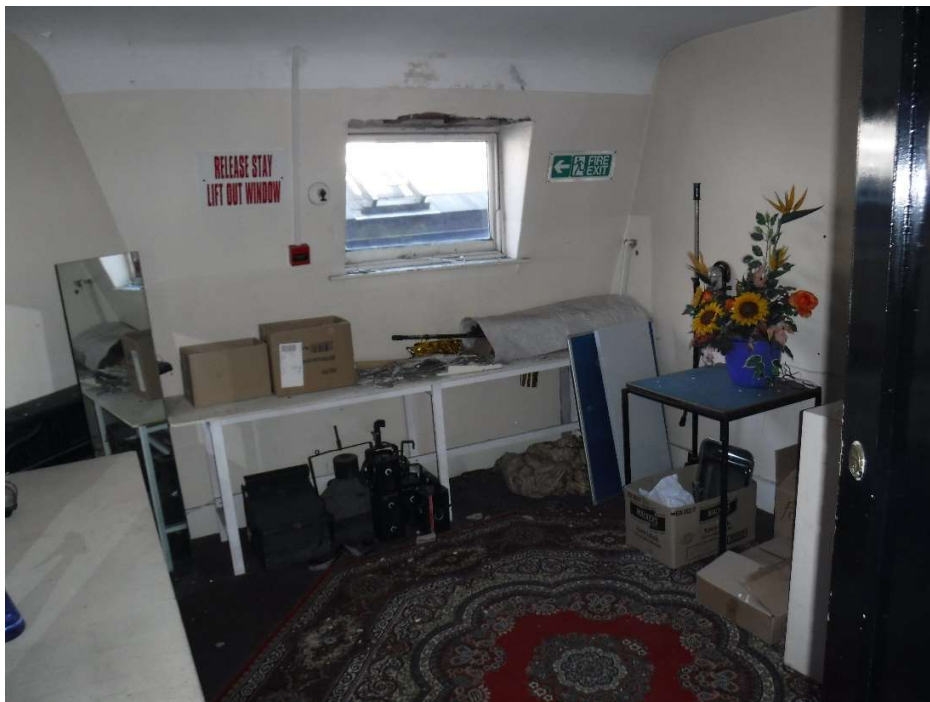


Figure 006 – Second floor plan

Area W



Photograph 039 – General view of Area W





Photograph 040 – General view of Area W

- Findings are consistent with other areas of the building
- Floor scans suggest timber flooring, with planks approximately at 300mm centres (suggesting 300mm width) and an approximate plank thickness of 30mm.
- Floor appears to have joists at 360mm centres, which is in line with findings in the basement.
- Internal walls scanned were double skin masonry, 180mm thick total, 75mm thick per skin with 30mm void between.

