STATEMENT ON GAS PROTECTION

AT

LAND AT FALHOUSE LANE

WHITLEY

ON BEHALF OF

MR SHAUN TRANTER

ARP GEOTECHNICAL LTD

CHARTERED CONSULTING ENGINEERS

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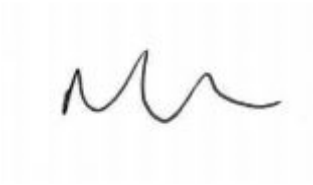
CLIENT: MR SHAUN TRANTER

JOB NUMBER: TRN/01

PROJECT: LAND AT FALHOUSE LANE, WHITLEY

REPORT TYPE: STATEMENT ON GAS PROTECTION

REPORT REFERENCE: TRN/01sgp

	Name	**Signature**
Prepared By:	Owain Gwilym BSc MSc FGS	
Authorised By:	Mike Harper BSc (Hons) MSc CEnv MIEnvSc	

ISSUE	**DATE**	**STATUS**
1	12TH JANUARY 2026	V1 FINAL

1.0 Introduction

1.1 This document has been prepared to provide information for the Client and other interested parties, such as the Regulatory Authorities, outlining how gas protection measures on the site will be implemented and the installation verified as satisfactory. The document should be agreed, prior to implementation, with the relevant Regulatory Authorities, usually the Local Planning Authority and NHBC or other building control provider.

2.0 The Site

2.1 The ARP Geotechnical Ltd Stage 2 Geo-Environmental Report, dated 28th January 2021 under reference TRN/01r2a, makes an assessment of contamination, along with other aspects.

2.2 The conceptual site model is for residential dwelling with private gardens.

2.3 A Coal Mining Stability Risk Assessment was undertaken by ARP Geotechnical Ltd (Ref: TRN/01/JR, dated 28th November 2014), for the larger site area, and this concluded that there is the potential for shallow coal mine workings to affect the stability of the site, and a rotary borehole investigation was recommended. There are two adits within the site boundary, referenced 421417-007, and 421417-041.

2.4 The recommended intrusive Coal Mining Investigation was undertaken on the 8th April 2021 and reported on letter TRN/01/OGnml4, dated 19th April 2021. At the time of this investigation trial trenching was also undertaken to attempt to locate the adit indicated on site.

2.5 The site comprises a basal concrete slab at surface in the northwest of the site, from demolition of the former barn/shed. An area of bitmac hardstanding is present beyond the northeastern end of the slab, which aerial photographs show was used as a helipad. Gravel hardstanding leads from the concrete/bitmac area to the site entrance. A circular brick paved area is also present in the south of the site, presumed also be a former helipad. The remaining site is covered by lawns.

2.6 The geological maps show the site to be underlain by Undifferentiated Strata (mudstone, siltstone and minor sandstone) of the Pennine Lower Coal Measures Formation. No superficial deposits are shown to be present on the site. One fault is shown to cross the west of the site, trending approximately north-northwest to south-southeast. The western side of the fault is estimated to have been downthrown by around 3m.

2.7 There are no watercourses on or adjacent to the site. The nearest watercourse downslope is Falhouse Beck, at 125m to the southeast. The site is not in an area at risk from river flooding.

2.8 While the site is situated in an intermediate radon probability area (1–3%) where protection is not strictly mandated in England and Wales, Characteristic Situation 2 (CS2) gas protection measures will be implemented. This approach proactively mitigates radon risk and ensures compliance with potential conveyancing requirements. The CS2 measures specified in Section 4.0—including a verified gas-resistant membrane and ventilated sub-floor—provide a superior level of protection that exceeds the requirements for Basic Radon Protection. The Envirocheck does not record any active or historical landfills within 250m of the site, however, historical maps have indicated a quarry was once present 20m to the southeast, presumed to have been backfilled. Furthermore, an adit is located within the building footprint which is a potential pathway for mine gas from depth.

2.9 Ordnance Survey archive maps show that there is no evidence of any development on the site prior to the construction of the existing building in the western corner, by 1982. The surrounding area has extensive mining and quarrying, with a quarry present 20m to the southeast from 1893, probably backfilled between 1982 and 1989.

2.10 The initial phase of investigation identified made ground to between 1.2m and 1.5m depth, locally absent. Beneath the made ground first to stiff residual cohesive soils were encountered to between 1.5m and 2.56m which in turn were underlain by granular residual soils. Solid bedrock as mudstone and sandstone was identified at several location at depth of between 2.1m and 2.56m.

2.11 The rotary investigation revealed overburden (considered to predominantly comprise cohesive residual soils and made ground) to depths of between 1.2m and 2.9m. This was found to overlie sequences of mudstone and sandstone, to the base of the boreholes at 15m depth. In the western fault block, an intact coal seam, approximately 1.2m thick, was identified in BH1 (at 3.1m to 4.2m depth) and BH5 (at 3.7m to 4.5m depth). No workings were encountered. In the eastern fault block, no coal seams or workings were identified within the full depth of boreholes BH2, BH3 and BH4, which were taken to depths of between 15m and 30m. However, coal was identified in TT2 at between 2m and 2.7m (full depth not proven).

2.12 In order to attempt to expose the adit, trenches were excavated along the northern edge of the existing slab at the approximate location of the adit (421417-007) indicated on the Coal Authority's records. During the excavation of trench TT1, unstable made ground comprising gravel and cobbles of mudstone, was encountered in the western end of the trench from ground level down to 3.1m depth. This material was collapsing in, leaving apparent natural strata behind, so that the appearance was that of a loosely backfilled potential adit or workings. A rotary borehole (BH6) was undertaken approximately 1m south of the area of unstable ground identified in TT1. Soft made ground was encountered in BH6 to 4.1m depth, underlain by hard strata proven to 6m depth. No evidence of near surface worked ground was identified in TT2 which was excavated up to the edge of the proposed building footprint, but intact coal was encountered from 2m depth down to the base of the excavation at 2.6m depth.

2.13 Contamination testing of the made ground revealed marginal exceedance of arsenic at 38mg/kg above the screening value of 37mg/kg. The marginal exceedance was not considered to be a risk to future occupants of the site; therefore, no remediation measures were required.

2.14 Gas monitoring has been undertaken over six separate visits. The site has been classified as Characteristic Situation 2, due to carbon dioxide, meaning ground gas mitigation measures are required. Details of the gas monitoring and risk assessment are provided in the ARP Letter Ref: TRN/01/DMBnml5, dated 24th June 2021. The required gas protection measures to be installed are discussed below.

3.0 Foundations

3.1 As this potential adit is located within the proposed building footprint, the most efficient solution to deal with the adit is to carry out a reduced level excavation in this area, to effectively move the feature beyond the edge of the footprint. As a part of the works, it is recommended that the rest of the footprint of the proposed building is also subjected to a reduced level excavation, to expose the top of the coal seam on the western fault block, and the natural strata/top of the coal seam on the eastern fault block. This is to ensure that all potential underground coal workings affecting the proposed building are revealed. Any backfilled/collapsed workings, and the suspected adit, could be selectively chased out to beyond the perimeter and backfilled with appropriate compaction. Piled foundations could then be utilised, extending through the rock or backfill, to below the base of the adit/workings/coal seam. Piles, if used, will need to be designed by a specialist piling contractor.

3.2 Foundations could also be constructed by means of trench fill foundations to the base of the excavations (ensuring that all foundation loads are seated on similar material and deepened where necessary to achieve this).

3.3 Another alternative would be to take out the whole building footprint to a similar level and place a compacting fill material into the excavation in layers, to enable a pseudo raft foundation to be utilised. The chosen foundation option will need to be approved by the warrant provider.

3.4 The above works should be inspected at suitable intervals by a Geotechnical Engineer/Engineering Geologist, to enable a Validation Report to be issued to the regulatory authorities, indicating that the risk of ground instability from mining has been suitably mitigated.

4.0 Design of Gas Protection Measures

4.1 In accordance with BS 8485:2015+A1:2019 "Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings", the building type proposed for the site will fall into the category of a "Type A" building. For a CS2 classification, 3.5 protection points are required to be achieved from tables 5, 6 and 7 of the standard, for Type A buildings.

At this stage the foundation and floor slab arrangement for the proposed development has not been finalised. The section below will discuss the gas protection measures required for the likely options to achieve the required 3.5 pts.

Option 1 – Beam and Block floor system (piles or trench fill foundation)

4.2 With regard to Table 5 (Structural Barrier), a beam and block floor system would contribute no points to the protection score.

4.3 With regard to Table 7 (Gas Resistant Membrane) there will be a gas barrier provided to the proposed building. The barrier will comprise a proprietary gas protection membrane designed by the manufacturer to be resistant to the transmission of carbon dioxide and methane. The membrane must comply with BS 8485:2015+A1:2019 (this should be stated on the chosen products specification sheet). Appropriated products from the manufacturer will be used to maintain the integrity of the barrier at points such as service entries. This contributes 2 points to the required score of 3.5 protection points.

4.4 Table 6 refers to the points achieved by the various ventilation techniques available. A clear under floor void of a minimum 150mm is required which would be passively vented by periscopic vents along the external walls. This is considered to provide "Good performance" and, as a result, meets the outstanding 1.5 points required from the above steps.

4.5 A typical detail for a gas barrier over a beam and block floor is enclosed.

Option 2 – Reinforced Raft Foundation

4.6 With regard to Table 5 (Structural Barrier), a cast insitu reinforced raft with minimal penetrations would contribute 1.5 points.

4.7 With regard to Table 7 (Gas Resistant Membrane) there will be a gas barrier provided to all the proposed building. The barrier will comprise a proprietary gas protection membrane designed by the manufacturer to be resistant to the transmission of carbon dioxide and methane. The membrane must comply with BS 8485:2015+A1:2019 (this should be stated on the chosen products specification sheet). Appropriated products from the manufacturer will be used to maintain the integrity of the barrier at points such as service entries. This contributes 2 points to the required score of 3.5 protection points.

4.8 A typical detail for a gas barrier over a raft foundation is enclosed.

4.9 Once a final solution is chosen, a detailed foundation design drawing will be provided.

5.0 Validation/Verification of Gas Protection Measures

5.1 The document published by The Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG), "Verification Requirements for Gas Protection Systems – Technical Guidance for Developers, Landowners and Consultants (Version 1.1 December 2016)" provides details on how the installation of the gas protection measures will be independently verified.

5.2 Key Point 4 on Page 7 of the guidance states that the level of verification required will be determined by the qualifications and experience of the installer. Verification should always be carried out by an appropriate independent person such as an experienced and suitably trained consultant or third party qualified and experienced installer.

5.3 For a low risk (CS2) gas regime, an independent inspection/validation will still be required, before the membrane is covered by any screed or insulation.

5.4 When the membrane is installed by a general builder/groundworker, the first plot will need to be validated and then 1 in 10 plots (with a minimum of 5) will need to be subsequently validated. Where the installation is to be carried out by a qualified and experienced installer (minimum one operative to hold NVQ Level 2 in Gas Protection), the first plot will need validating and then 1 in 20 plots (with no minimum) will need to be subsequently validated. In both cases, all plots that are not independently validated will require photographs to be taken and kept as evidence. It should be ensured that the NHBC or other building control provider agrees to these validation frequencies as, on occasions, higher frequencies have been requested than those required by YALPAG and the local Planning Authority.

5.5 If available for inspection on site, ARP will inspect the sub-floor void for any debris/obstructions and measure the dimension of the void space. This is not always available for inspection on site visits and if this is the case, it is recommended that site personnel obtain evidence of this.

5.6 The membranes/barriers will need to be installed in accordance with the manufacturer's instructions, with the appropriate laps and sealing as specified by the manufacturer.

5.7 The independent inspection will take place before any screed or insulation is placed, and check for the items included on the Verification Proforma in Appendix 5 of the YALPAG document. In basic terms, this will allow the following to be confirmed:

- That appropriate products are being used,
- That all the floor area is covered,
- If visible, that the membrane/barrier crosses the cavity wall,
- That all the laps are sufficient, and are appropriately sealed,
- That each service entry is appropriately sealed,
- That external vents are at the appropriate spacing and are not blocked by debris,
- That there are no visible punctures or tears in the membrane.

5.8 Photographs will be taken for inclusion within the Validation Report.

5.9 Any defects identified whilst on site will be reported to the Site Manager so that a repair may be made before the barrier is covered. The repair may be made whilst the Validating Engineer is present on site, so that the validation can be completed. If a repair is not possible at that time, it will need to be confirmed by inspection at a later date and should, therefore, remain visible until after inspection.

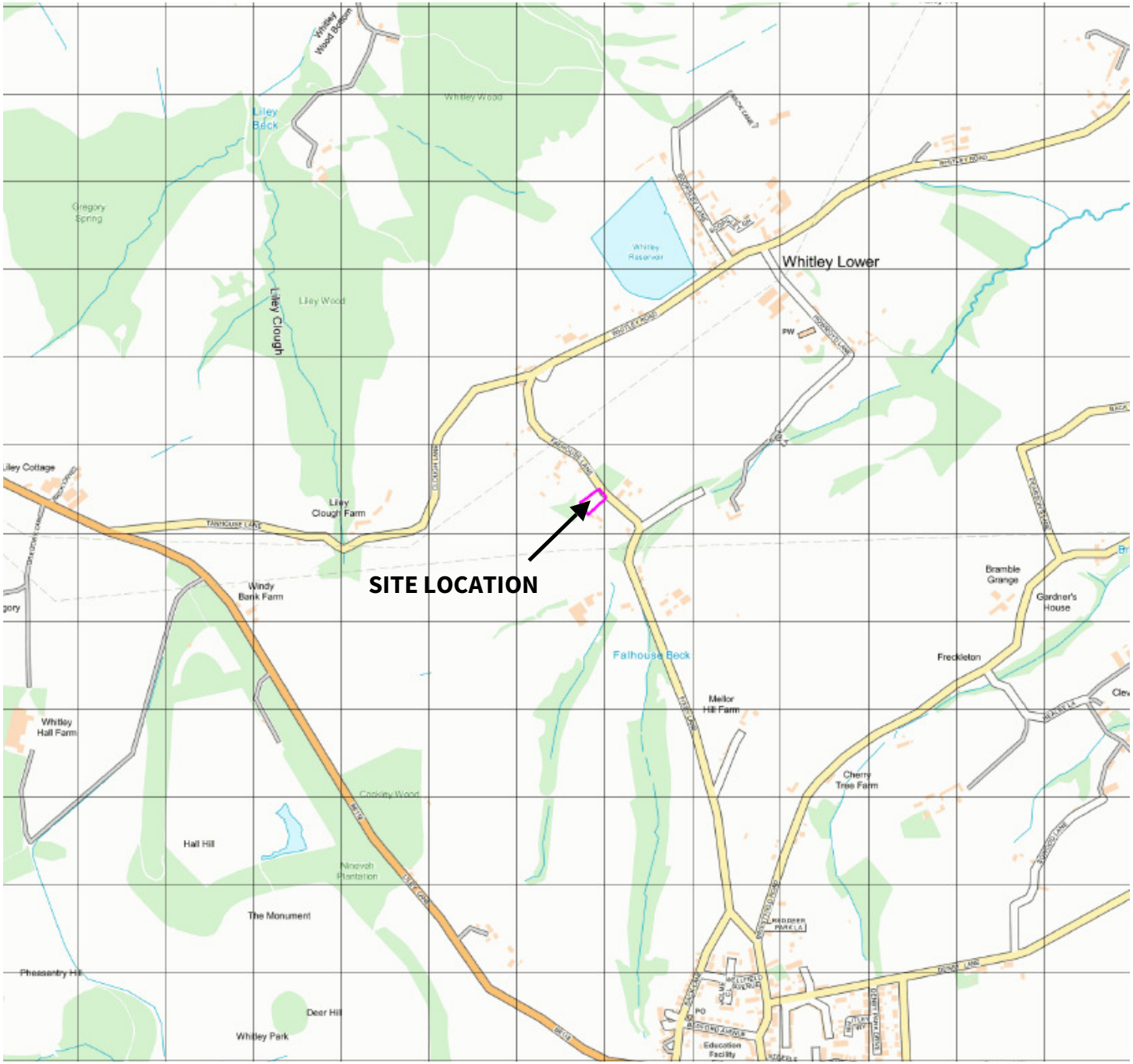
5.10 Assuming the Engineer carrying out the inspections will be from ARP Geotechnical Ltd; the inspections will be carried out by a graduate in a relevant discipline who will have been trained in-house in the verification of gas protection measures.

5.11 The results of an inspection will be reported in letter format shortly after the site visit, and this will contain all the observations made and have photographs attached. This will enable the scheme to progress and sales of properties to continue throughout the construction of the development.

5.12 On completion of the development, the discharge of any associated planning condition may be achieved by submission of all the interim validation letters or issuing the information as a single combined Validation Report.

APPENDIX A

SITE LOCATION PLAN AND AERIAL PHOTOGRAPH

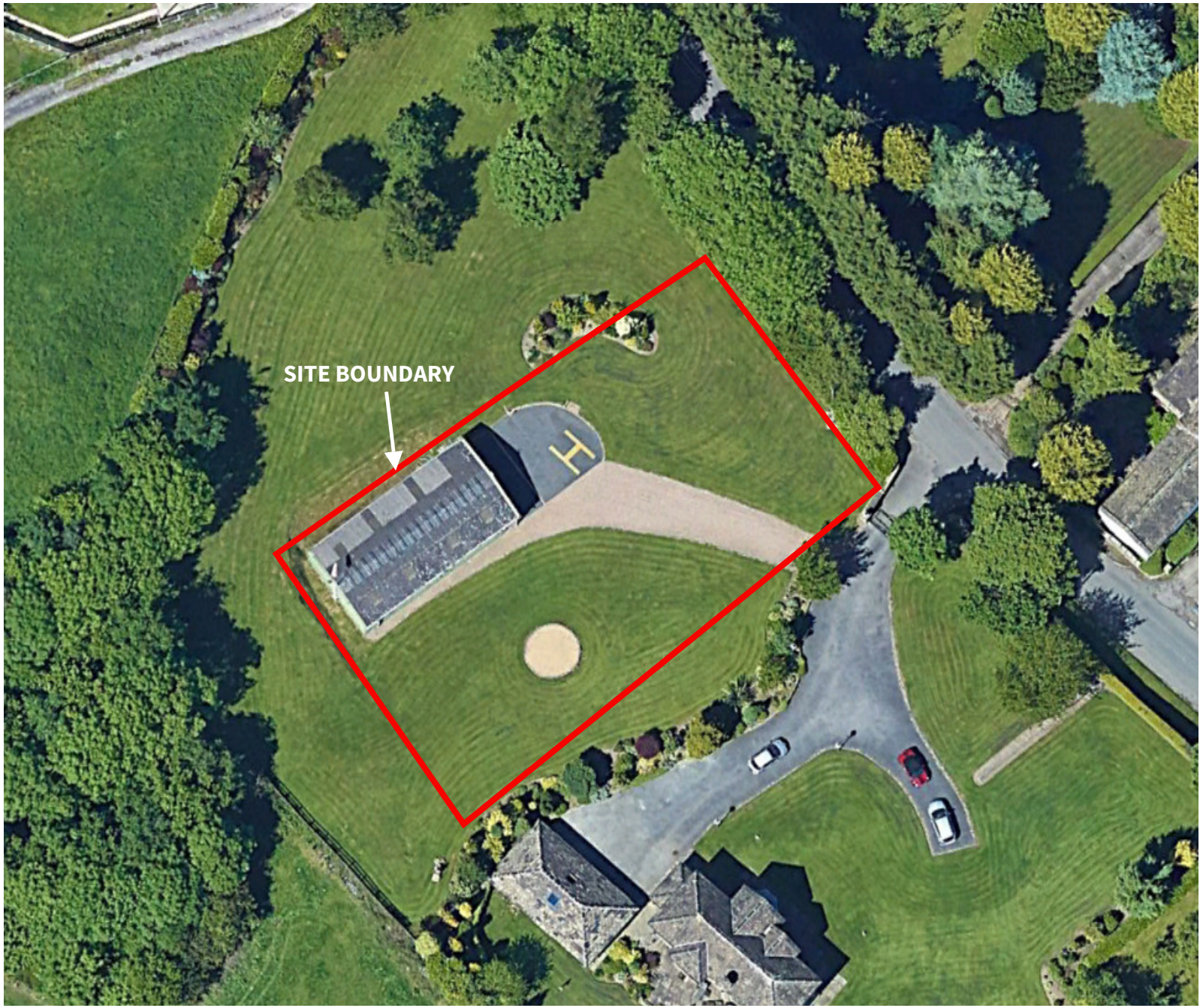


0m 600m

Approximate Scale

ARP NORTH WEST LTD
CHARTERED CONSULTING ENGINEERS
2nd Floor · 3 Hardman Square · Manchester M3 3EB
Telephone : 0113 245 8498 · E-Mail : manchester@arpnorthwest.co.uk

Project	LAND AT FALHOUSE LANE WHITLEY
Client	MR TRANTER
Title	SITE LOCATION PLAN
Date	DECEMBER 2020
Drawn	DMB
Scale	AS SHOWN
Job No.	**TRN/01**



0m 19m

Approximate Scale

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Telephone : 0113 245 8498 • E-Mail : manchester@arpnorthwest.co.uk

Project
LAND AT FALHOUSE LANE
WHITLEY

Client
MR TRANTER

Title
AERIAL PHOTOGRAPH

Date
DECEMBER 2020

Drawn	Scale
DMB	AS SHOWN

Job No.
TRN/01

APPENDIX B

PROPOSED LAYOUT

STEPHEN A.WELCER. m.c.i.a.t.
Architectural Technician and
Surveyor.
217, Wakefield Road
Normanton.
Wakefield.
WF6 1BP
West Yorkshire.

Tel./ Fax. 01924 890012
Mob. 0798 9964611
e-mail. stevewelcer@btinternet.com

VOLUMES.

EXISTING BUILDING.	764.00 cu.m.
PROPOSED NEW DWELLING.	575.00 cu.m.
PROPOSED NEW GARAGE	125.00 cu.m
TOTAL DEVELOPMENT – 575x125 cu.m.	700.00 cu.m.

The Old Forge

FALHOUSE LANE.

PROPOSED
NEW DWELLING.

TURNING
SPACE.

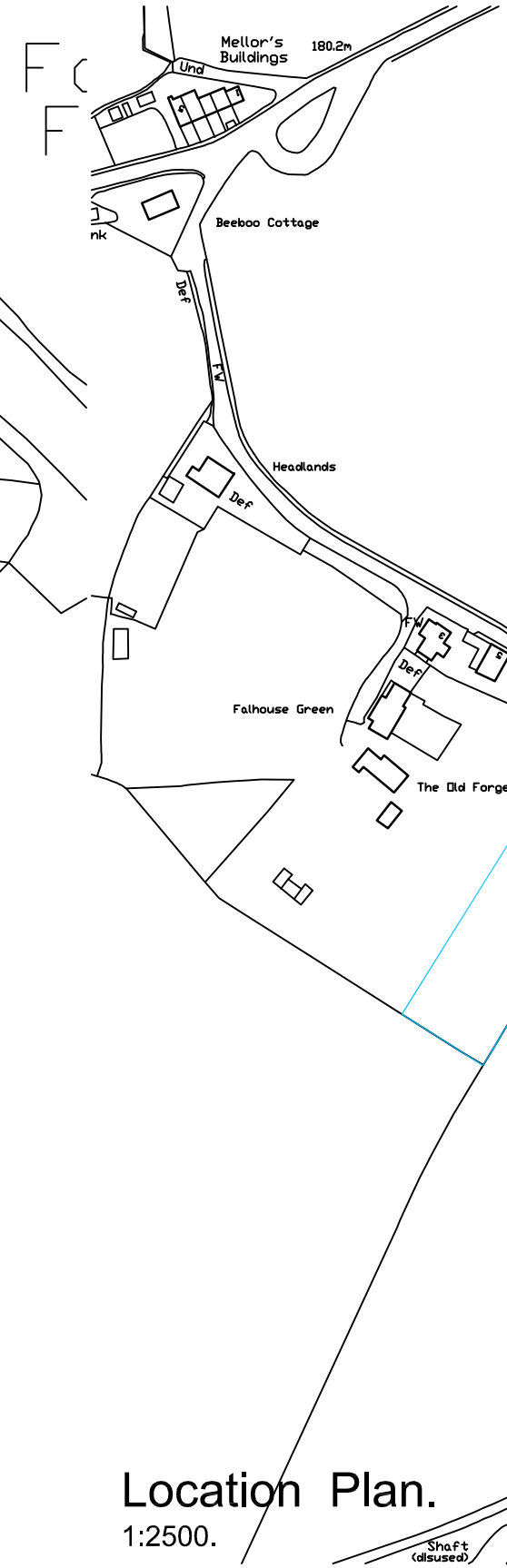
BIN
STORE.

PROPOSED
NEW GARAGE.

EXISTING SINGLE STOREY
BUILDING TO BE DEMOLISHED.

Fallbrook

Site Layout.
1:500.



Location Plan.
1:2500.

Scale	1:500 - 1:2500 @ A3.
Date	DEC. 2014
Drawn by	SW
Checked by	-
Drawing no.	2014-76-03
Revision	

Drawing Title
SITE PLAN AND
LOCATION PLAN
AS APPROVED.

Project Title
PROPOSED DWELLING.
FALBROOK HOUSE.
FALHOUSE LANE. WHITLEY.
FOR MR. S. TRANTER.

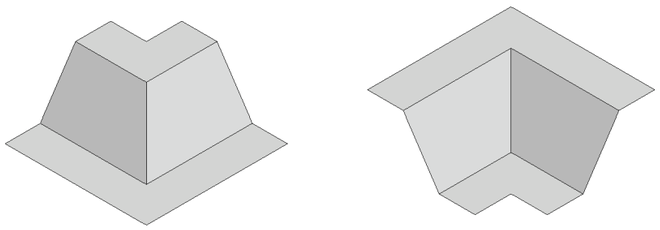
Property Address
FALBROOK HOUSE.
FALHOUSE LANE. WHITLEY.
WAKEFIELD.
WF12 0NJ.

A P P E N D I X C

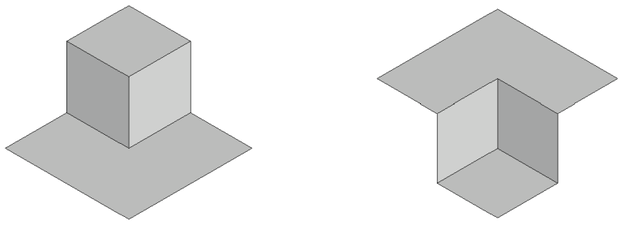
PROTECTION MEASURES

Key to materials:

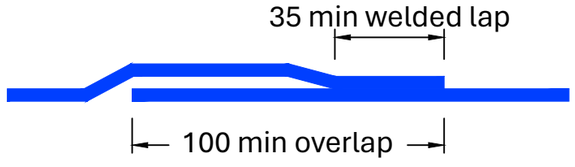
1	Visqueen Zedex CPT High Performance Damp Proof Course
2	Visqueen Ultimate Gas Damp Proof Course
3	Visqueen Vapour Check or Visqueen Vapour Barrier
4	VisqueenPro Double Sided Jointing Tape
5	Visqueen Gas Resistant Foil Lap Tape
6	Visqueen Gas Barrier
A	PFU-501 Preformed Units at corners

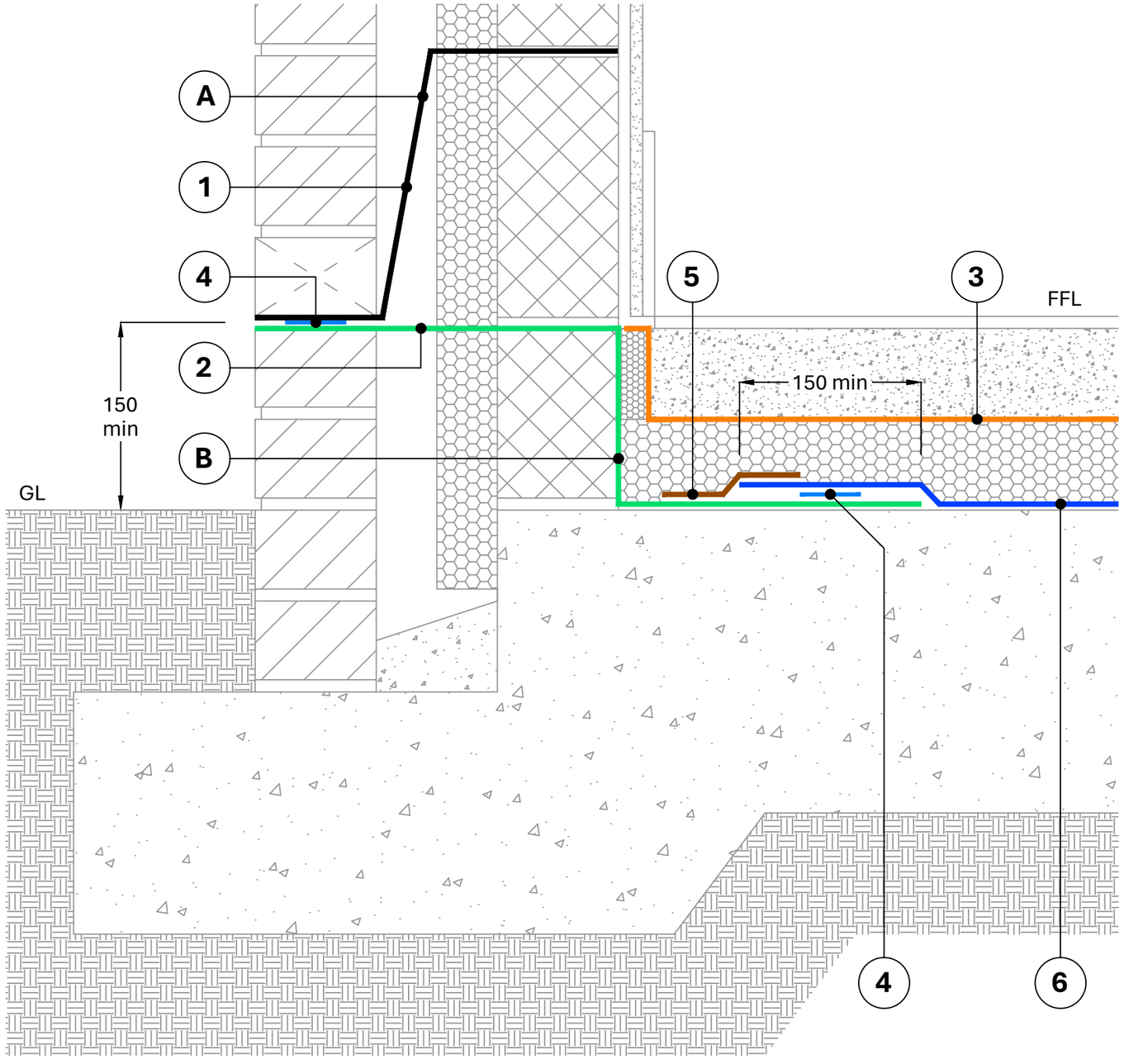


B	PFU-553 Preformed Units at corners



Gas Barrier Welded Joint





Section View

CRITICAL GUIDANCE NOTES

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Drawing not to scale, use figured dimensions only. All figured dimensions are in millimetres.

British Standards are regularly updated. Visqueens' Guidance Details meet recommendations in place on date drawn.

Protection such as pressure relief or ventilation measures (not shown) may be necessary to meet the requirements of British Standards and industry guidance.

Some Visqueen membranes can be installed with welded lap joints.

Visqueen Preformed Units are available to assist complex detailing, such as internal and external corners.

Contact Visqueen Technical Services for further information.

Guidance Detail

Drawing No: GB-64

Drawn by: JR

Approved: SD

Date drawn: September 2024

Visqueen provide a Contract Design Service where project specific drawings can be produced. Contact Visqueen Technical Services for further information.

Tel: 0333 202 6800
enquiries@visqueen.com
www.visqueen.com

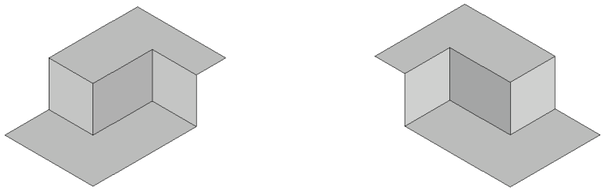
VISQUEEN GAS BARRIER

BARRIER ABOVE SLAB RAFT FOUNDATION AT EXTERNAL MASONRY WALL

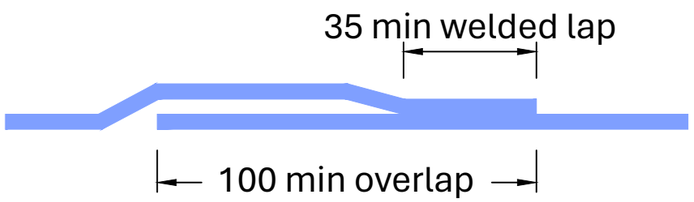
VISQUEEN
A Berry Global Brand

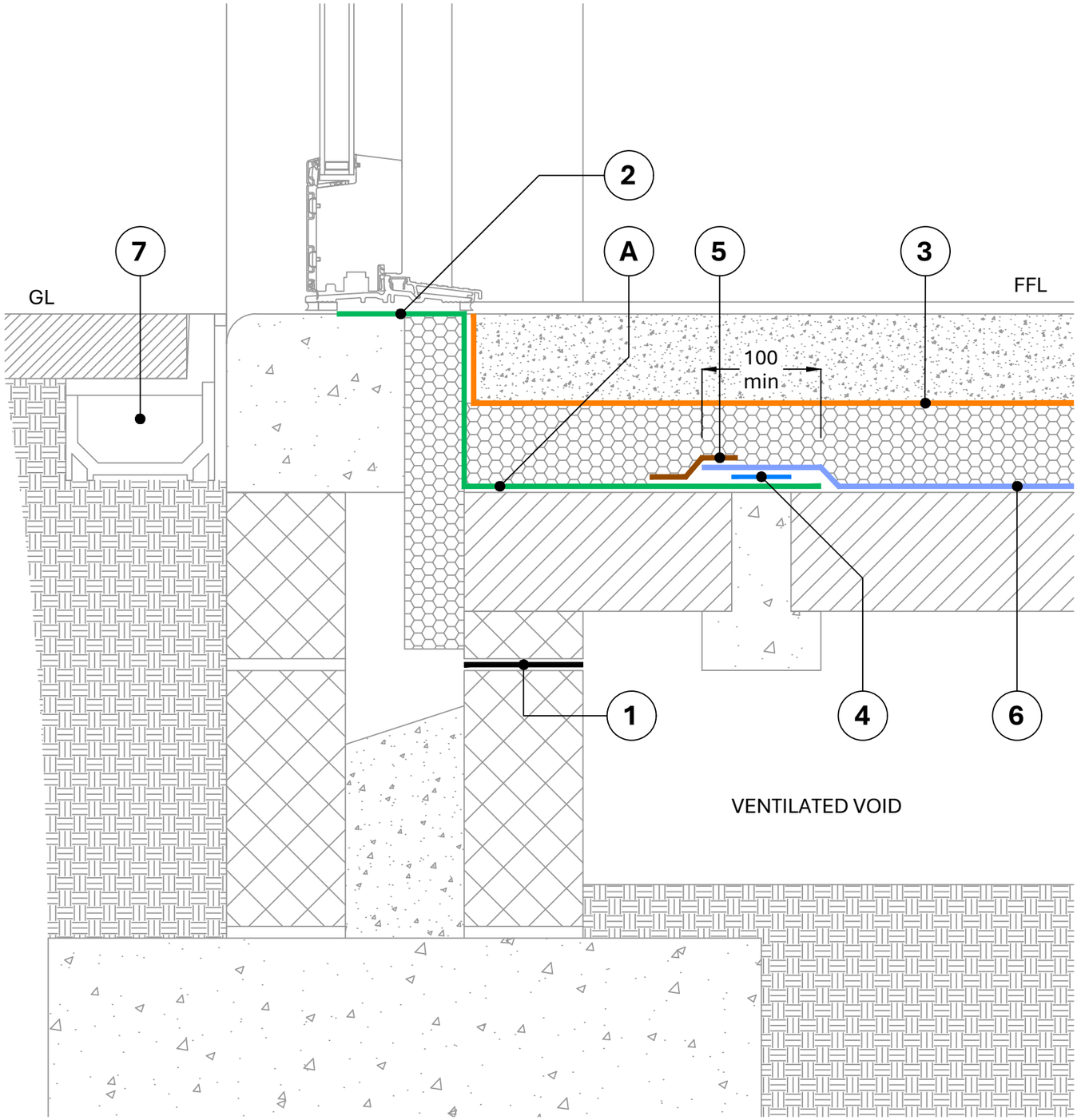
Key to materials:

1	Visqueen Zedex CPT High Performance Damp Proof Course
2	Visqueen Ultimate Gas Damp Proof Course
3	Visqueen Vapour Check or Visqueen Vapour Barrier
4	VisqueenPro Double Sided Jointing Tape
5	Visqueen NF-60 or NF-150 Lap Tape as per specification
6	Visqueen Gas Barrier NF-400
7	Proprietary slot drain by others
A	PFU-206 Preformed Units at door threshold



Gas Barrier NF-400 Welded Joint





Section View

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Guidance Detail

Drawing No: NF400-12

Drawn by: JR

Approved: SD

Date drawn: August 2024

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Tel: 0333 202 6800
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VISQUEEN GAS BARRIER NF-400

BARRIER ABOVE SLAB BEAM & BLOCK FLOOR AT LEVEL THRESHOLD

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