



EXECUTIVE SUMMARY

1. LIMITATIONS

MembraneTestingSolutions Ltd (MTS Ltd) have prepared this 3rd party ground gas/vapour mitigation design strategy and verification plan in accordance with the instructions of Sevenoaks Environmental Consultants Limited (The Client) under the terms of the appointment for the 3rd party ground gas/vapour mitigation system design, installation inspection, testing, validation & reporting.

This 3rd party ground gas/vapour mitigation strategy design and verification plan is limited to the proposed gas/vapour protection measures installed to the new buildings meeting industry and current best practices. MTS Ltd have provided ground gas/vapour mitigation design proposals for this site, therefore professional Indemnity liability is limited to £2M for our gas/vapour mitigation design and validation works and to ensure the specified gas/vapour mitigation measures meet site specific contaminants.

This 3rd party ground gas/vapour mitigation strategy design and verification plan has been prepared in accordance with the information currently received, along with industry best practices and in conjunction with the relevant best practice and guidance documents listed below, of which our MD was a contributor and member of the steering committee for the Ciria C735 publication “Good practice on the testing and verification of protection systems for buildings against hazardous ground gases” (2014). MTS Ltd were also a contributor and part funder on the steering committee for the new CIRIA 795 project, Retrospective Fitting of Gas Protective Measures to Existing Buildings released in December 2020, and CIRIA 801 – Ground Gas - a site managers guide released in December 2021.

We are pleased to advise that our Managing Director Mr Barrie Ackroyd has successfully completed the Validation & Integrity Testing Course provided by the British Geomembrane Association for validation, which is also backed by the CITB. Membrane Testing Solutions Ltd are a member of the British Geomembrane Association and are pleased to advise we are registered with Constructionline, CQMS/SSIP, The Radon Council, The Property Care Association, CL:Aire and we are proud to be a founding member of the British Verification Council (BVC) of which Mr Ackroyd is now Chairperson.

Mr Ackroyd has achieved the Level 3 Assessors Award for the NVQ Level 4 qualification in Validation of Ground Gas Protection Systems, we are also pleased to advise he has successfully achieved CL:Aire accreditation as a Specialist in Gas Protection Validation (SGPV). Our Senior Validation Surveyor Mr Michael Anthony Smith has qualified in the NVQ Level 4 for Verification of Ground Gas Protection Systems (assessed by others) and has achieved CL:Aire TGPV accreditation.



Guidance Reference Documents:

Ground Gas Handbook “NHBC Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present” (2007)
 Ciria C665 “Assessing risks posed by hazardous ground gases to buildings” (2007)
 Ciria C716 “Remediating and mitigating risks from volatile organic compound (VOC) vapours from land affected by contamination” (2012)
 Ciria C735 “Good practice on the testing and verification of protection systems for buildings against hazardous ground gases” (2014)
 Ciria C748 “Guidance on the use of plastic membranes as VOC vapour barriers” (2014)
 BS 8485:2015+A1:2019 “Code of practice for the design of protective measures for methane and carbon dioxide ground gasses for new buildings” (2019)
 Ciria C795 “Retrofitting hazardous ground gas protection measures in existing or refurbished buildings” (2020)
 Ciria C801 “Ground Gas – a site managers guide” (2021)



2. BACKGROUND INFORMATION

MembraneTestingSolutions Ltd (MTS Ltd) were approached by Mr Alistair Stocks of Sevenoaks Environmental Consultancy Ltd via telephone and subsequent email on the 1st September 2022 @ 17:11 having worked with ourselves on numerous projects previously.

The project includes the redevelopment of 6no properties, comprising of a block of 4 terraced properties and 2no detached bungalows.

The site is located at: The Former St. Johns Ambulance Station, Armoury Drive, Gravesend, Kent, DA12 1NB.

Sevenoaks Environmental Consultancy Ltd performed a site investigation on site and also produced a Gas Risk Assessment Addendum letter report which showed a GSV of 0.0292l/hr which corresponds to a CS1 (C665) however given that Carbon Dioxide concentrations were recorded in excess of 5% a precautionary approach was recommended to raise the site characteristic situation 2 (C665).

However, given the site was formerly used as a garage with an above ground tank and also part of a barracks, along with a recent gas pipe leak to the northern part of the site, a hydrocarbon resistant barrier was also recommended to be included within the design of the ground floor slabs.

On the basis of the information received, MTS Ltd provided the client with a quotation for the 3rd party gas/vapour mitigation design using gas/vapour resistant materials for the project, along with a quotation for 3rd party inspection, testing and validation of the installed vapour/gas mitigation measures.

MTS Ltd have subsequently been commissioned by the client to only provide a ground gas/hydrocarbon vapour mitigation design and verification plan for the project but at the current time an order for 3rd party independent validation has not been received.

The following is our gas/vapour mitigation design proposal and verification plan for the gas/vapour protection measures included in the design.

3. GROUND GAS & VAPOUR RISK ASSESSMENT

MTS Ltd received an addendum letter report performed by Sevenoaks Environmental Consultancy Ltd for the site which is as follows;

- Ground Gas Risk Assessment Addendum Letter Report, Ref: 4551 22 07 11 Ltr Rpt 01 rev A AS SP dated 11th July 2022

Below is a precis of the contents of this addendum letter;



145a Hastings Road
Pembury
Tunbridge Wells
Kent, TN2 4JU

Tel: 01892 822 999

www.sevenoaksenvironmental.co.uk
enquiries@sevenoaksenvironmental.co.uk



Samuel Parry,
The Longley Group,
Unit 4 Brook Court,
Blakeney Road,
Beckenham,
Kent,
BR3 1HG

11th July 2022

Our Ref: 4551 22 07 11 Ltr Rpt 01 Rev A AS SP

Dear Samuel,

SITE: Armoury Drive, Gravesend, DA12 1NB
SERVICE: Ground Gas Risk Assessment Addendum Letter Report

Introduction

The work covered in this report was undertaken on behalf of The Longley Group, in accordance with Sevenoaks Environmental Consultancy Ltd's (SEC) proposal dated January 2022 (Ref: 4551 22 01 05 Ltr 01 FPA 01 REV A LB CW). This addendum provides comment on the environmental ground gas monitoring carried out as part of the previous site investigation and should be read in conjunction with the Preliminary Geo-Environmental Site Investigation Report (Ref: 4551 22 04 21 Rpt 06 Rev B EH CW) previously provided.

The site was noted to form an approximately 'L' shaped plot previously occupied by a former St John's Ambulance Garage and a Water Tower Structure with associated tarmac hardstanding (See attached Figures 1 & 2 – Site Location Plan and Existing Site layout Plan). The approved proposed development associated with the planning application (Ref: 2020/0561) is understood to involve the construction of 1 No. 2-storey block of flats to the western end of the site and 2No. detached bungalows to the eastern end with gardens and areas of soft landscaping (see attached Figure 3 – Proposed Development Plan).

As part of the Geo-Environmental Site Investigation referred to above, SEC were instructed to carry out 9no. environmental ground gasses and groundwater monitoring visits. Details of the standpipes installed and their response zone backfill / materials have been provided in the relevant attached Exploratory Hole Records. Also see attached the Exploratory Hole Location Plan.

Assessment

9 No. rounds of environmental ground gas monitoring was carried out between 9th March 2022 and 7th July 2022 and included 2no. rounds of monitoring undertaken at periods of low atmospheric pressure to help inform a preliminary ground gas risk assessment given consideration of the potential on site sources of ground gas that have been identified which include the following:



- Made Ground associated with the sites former use as a garage and its potential use for storage and leaks of oils/paints/fuels and identified to contain elevated concentrations of PAHs;
- Former site use as a garage with an above ground tank and as part of a barracks;

Off-site sources of potential contamination identified primarily included an infilled chalk pit ~167m north east (1954 – 1981), tanks 76m north east (1954 – 1993) and 49m south east (1954 – 1978)

Based on the rounds of monitoring conducted, concentrations of carbon dioxide were recorded to be typically below 5% although the highest concentration recorded was 7.3% by Vol (WS05). Methane concentrations were generally low although spikes up to ~45% (WS05 monitoring round No. 5) were recorded. This spike in methane was identified for the first few seconds of monitoring at WS05 and then the methane concentration reduced back down to 0% by Vol. During the other visits concentrations of Methane were not recorded to be elevated, except for visit No. 6 where another methane spike was recorded for a few seconds before returning to 0% by Vol. No elevated concentrations of VOCs were recorded and flow rates were recorded up to a maximum of 0.4l/hr (WS01 and WS05) (see attached Environmental Monitoring data).

Of potential relevance it is known that a gas main leak occurred nearby to the north of the site, which was reportedly repaired in the early part of 2022. However during the environmental ground gas monitoring visits and also prior to the conduct of the previous Site Investigation (which was after the reported repair was made) a strong methane odour has been observed within the manhole located adjacent to the north of the site in Albert Murray Close which is also incidentally close by to WS05.

Discussion and Recommendations

The results of the environmental ground gas monitoring indicate that a ground gas screening value of 0.0292 l/hr is applicable to the site. This corresponds with Characteristic Situation 1 of the current CIRIA C665 guidance. However, given that carbon dioxide concentrations have been recorded in excess of 5%, spikes of highly elevated methane have been recorded on site and the apparently persistent methane which continues to collect within a manhole adjacent to the site possibly associated with the gas main leak adjacent to the north of the site, it is recommended that a precautionary approach be adopted with respect to potential ground gas risks on site. Accordingly it is recommended that Characteristic Situation 2 of CIRIA C665 Guidance should be adopted for the site.

Based upon the assumption that the proposed building will comprise a Type A Building as described in the BS 8485:2015 guidance i.e. private housing with small sized rooms, it is recommended that at least 2 No. different design measures be employed within the design of the proposed building in order to reach a minimum gas protection score of 3.5 points. Inclusion of a passively vented sub-floor void and low permeability hydrocarbon resistant gas protection membrane within the design would achieve the required points (however please refer to Tables 5, 6 and 8 of the BS 8485:2015 guidance for



further details). Please note that all joints and penetrations should be appropriately sealed and that protective measures should be fitted appropriately in accordance with the manufacturer's specification and current guidance including BRE414 and BS8485.

At an early design stage prior to construction a Verification Plan detailing the gas protection materials' specifications, methodology of installation, installation design and the installers qualifications and experience should be produced by a suitably qualified independent specialist for submission to the Regulators for their approval prior to installation of the protection measures to avoid proceeding at risk. A suitably qualified independent specialist should also produce a Validation Report in accordance with C735 for the membrane installation to certify the installation of the protective measures complies with the requirements of the Verification Plan.

It is recommended that the existing monitoring boreholes should be retained until the ground gas risk assessment has been approved by the Regulators.

Potential residual risks should be mitigated by the implementation of a Discovery Strategy on site during the redevelopment works which should include for the immediate reporting of any potential indicators of ground or water contamination (e.g. cement bonded asbestos sheeting fragments, ash/clinker or hydrocarbon odours) for additional separate assessment by an Environmental Consultant. Additionally groundworkers should wear appropriate PPE/RPE, work in well ventilated areas, avoid confined spaces, avoid contact with soil and groundwater, not smoke, adopt high standards of personal hygiene, and operate with due care.

It is also noted that the recommendations made in the previous Geo-Environmental Site Investigation report remain applicable and are reiterated below for reference;

- That prior to the proposed development, all general rubbish and drums of fuel should be appropriately removed from site and disposed of at suitably licensed facilities (all waste disposal documents to be retained);
- That the existing potentially coal tar rich tarmac surfacing be disposed of from site to suitably licensed waste management facilities as hazardous waste under waste code 17 03 01. All waste disposal documentation should be retained for inclusion within a future Validation Report. To help facilitate appropriate waste disposal from site, the tarmac surfacing should be carefully excavated and segregated from the underlying material under the supervision of an Environmental Consultant;
- That a watching brief be maintained by an Environmental Consultant during the removal of the hardstanding across the site and in particular the ground slab of the former buildings. Confirmatory validation samples should be recovered for analysis to confirm an absence of impact associated with contaminants of concern including metals, PAHs, hydrocarbons and asbestos;
- That remedial excavation be conducted to remove the lead and asbestos impacted Made Ground identified on site for appropriate disposal to suitably licensed facilities. Remedial excavation should be overseen by an Environmental Consultant and be certified by soil validation sample analysis from the sides and base of the remedial excavation. Any imported backfill material (e.g. engineered fill / aggregate, subsoil or topsoil) should be chemically validated in relation to suitability for use on site as part of the proposed development, including the review of the supplier's chemical batch data prior to import and chemical analysis of validation samples following importation to site;



- That an asbestos picking exercise be conducted during the excavation of asbestos impacted material locally to TP01 and TP03, to remove fragments of cement bonded asbestos sheeting for separate disposal. Asbestos picking should be conducted by Category A & B Asbestos Awareness trained operatives and to help mitigate potential Health and Safety risks appropriate PPE / RPE should be worn by operatives during the remedial excavation and asbestos picking, including disposable suits and RPE;
- That all waste arisings should be disposed of from site appropriately in accordance with EA WM3 guidance. The impacted Made Ground should be disposed of as Non-Hazardous waste under waste code 17 05 04 and picked asbestos containing material fragments as Hazardous waste under waste code 17 06 05. All arisings should be segregated based on waste stream types and according to waste classification. All waste disposal tickets should be retained;
- That a “clean” cover system be provided to a minimum thickness of 475mm across landscaped / garden areas. The cover system should comprise the provision of a high visibility marker layer (permeable geotextile or similar) overlain by imported certified “clean” topsoil to the required minimum thickness. Subject to existing and proposed site levels it may be necessary to remove some existing soils to facilitate the cover system. Prior to delivery of any imported topsoil to site, the supplier’s chemical batch data should be provided to an Environmental Consultant for review and following provision of the cover system to landscaped areas it should be validated by an Environmental Consultant. This should include chemical analysis of a representative number of imported cover system validation samples based on a minimum frequency of 1 validation sample per garden / landscaped area as a minimum or 1 sample per 50m³ per material source for larger areas. In addition the thickness of cover system should be certified;
- That the water supply pipework included within the design of the proposed development should be chemically resistant barrier pipe. Alternatively the water supplier should be contacted to confirm chemically resistant barrier pipe is not required;
- That groundworkers should wear appropriate PPE/RPE, work in well ventilated areas, avoid confined spaces, avoid contact with soil and groundwater, not smoke, adopt high standards of personal hygiene, and operate with due care;
- That a Discovery Strategy should be implemented on site during the redevelopment work which should include for the immediate reporting of any potential indicators of ground or water contamination e.g. asbestos fragments, ash / clinker or hydrocarbon odours for separate assessment by an Environmental Consultant;
- That prior to the conduct of any remedial work, a Remedial Method Statement should be approved by the Regulators; and
- That any remedial work conducted on site as part of the proposed development should be certified and documented within a Validation Report produced by an Environmental Consultant.



Kind Regards

Damian Jones
Managing Director
d.jones@sevenoaksenvironmental.co.uk

Enc.

Site Location Plan
Existing Site Layout Plan
Proposed Site Layout
Exploratory Hole Location Plan
Exploratory Hole Records
Environmental Monitoring
General Limitations and Exceptions

End of Precis Text

In accordance with the above, MTS Ltd have developed this ground gas/vapour mitigation measures design and verification plan based on the low levels of ground gas and flow rates, but to also include hydrocarbon vapour protection in line with the CIRIA C716 and C748 best practice documents.

4. BS 8485:2015+A1:2019 COMPLIANCE

Using the tabled contents of the BS 8485:2015+A1:2019 document, along with the CS2 'Low Risk' site classification, we are able to calculate the above points score for the ground gas mitigation measures, which is achieved by the following:

Table 3, Building Type	Table 4, Gas Protection Score by CS and Type of Building	Table 5, Gas Protection Scores for the Structural Barrier	Table 6, Gas Protection Scores for Ventilation Protection Measures	Table 7, Gas Protection Score for the Gas Resistant Membrane
Type 'A' Private	CS2 + Type A = 3.5 Points Required	Suspended Slab I.E Beam and Block Slab = 0 Points	Passive ventilation of the underfloor void to 'Good Performance' = 1.5 Points	Gas membrane installed and validated in accordance with CIRIA C735 = 2.0 Points

Total 'MINIMUM' Points Score from the above = (T6 = 1.5 + T7 = 2.0) = **3.5 Points Achieved**, which meets the requirements of the BS 8485:2015+A1:2019 document.

However, the BS 8485:2015+A1:2019 should not be used to calculate a points score for hydrocarbon vapour mitigation design measures as this document is only for Carbon Dioxide and Methane, as is noted in the following precis text;



Annex H (informative) Volatile organic compounds (VOCs)

H.1 General

This British Standard does not consider the risks associated with VOC gases, primarily as the methods of measurement and risk assessment do not fully align with those for other ground gases (see BS 8576). However, as there are similarities in the methodology for mitigation of the effects of VOCs entering indoor or ambient air spaces, this annex is included to give the reader a background to the subject and to suggest further reading.

Therefore, our design includes for a proprietary gas and vapour resistant membrane to be placed across the complete footprint of the properties, of fully welded and tested seam construction. Gas and vapour resistant DPC's will be installed using hot air hand welding seaming techniques, with detailing provided using gas resistant self-adhesive tape joints around corner/door reveal detailing and service pipes.

5. DESIGN DRAWINGS

MTS Ltd received drawings inclusive of proposed ground floor plans and section details for the project. MTS Ltd have also produced a number of ground gas/vapour mitigation drawings for this site, which will enable all parties to understand how the vapour mitigation measures are to be remediated and how to install the specified products.

Copies of the drawings noted below are appended in Appendix. B of this report.

Sevenoaks Environmental Drawing:

- 4551-03 Rev 01 – Site Location Plan

ADM-BPTW Drawings:

- ADM-BPTW-01-ZZ-DR-A-1701-P02 – 2B4P Flats Floor Plan Layouts
- ADM-BPTW-02-ZZ-DR-A-1702-P04 – 182P Bungalow Floor Plan Layouts

Architectural Design Lab Ltd Drawing:

- DL-SUB-01 Rev - - Substructure Details, Ground Floor – Ground 150mm Below FFL

MTS Ltd Drawings:

- 22852-01 – Typical Perimeter Wall (Un-Ventilated) Gas Mitigation Section Detail
- 22852-02 – Typical Perimeter Wall (Ventilated) Gas Mitigation Section Detail
- 22852-03 – Typical Door Threshold Detail
- 22852-04 – Typical Internal Wall DPC Detail With Under Floor Wall Ventilation
- 22852-05 – Typical Service Pipe Sealing Detail
- 22852-06 – Typical Party Wall Gas Resistant DPC Detail

6. MATERIAL SPECIFICATIONS

MTS Ltd take pride in specifying the very best in material performance and value for money. Therefore in this instance, we have specified JUTA UK Ltd products which we consider to be a primary membrane manufacturer in the UK.



JUTA perform full materials testing on all of their products with all test results being made available for review if required. Therefore, we have extreme confidence in their products, and in this instance we have specified the most appropriate material specifications, which also offer robustness of the materials to withstand the construction process and remain serviceable for the lifetime of the building design.

Therefore, the recommended materials are to be supplied by the following manufacturer:

JUTA UK Limited
Melton Grove Works
Blackpool Road
Lytham
FY8 5PL

Tel: 01772 754 177
Contact: Mr Patrick Flood
Email: info@juta.co.uk
Web: www.juta.co.uk

The proposed gas/vapour resistant materials for this project are as follows;

- JUTA GP DPC
- JUTA GP5 Gas Barrier Membrane
- JUTA GP Bitumen Primer
- JUTA GP SAM (Gas Resistant Self-Adhesive Membrane)

The above Material Specifications may be found appended in Appendix. C of this report.

We have not allowed for any tapes for jointing of the above products as hydrocarbon vapour membranes should be heat welded where possible. Butyl double sided jointing tapes may be affected by hydrocarbon vapours/solvents; therefore we have recommended welded joints where possible.

As the gas resistant materials are to include for hydrocarbon resistance, these materials should be installed by NVQ level 2 qualified operatives who employ twin seam and hot air hand welding seaming techniques, which is in accordance with the CIRIA C716, C735 & C748 best practice documents.

7. MEMBRANE INSTALLATION CONTRACTORS

MTS Ltd confirm as the project includes for gas and vapour resistant membranes, these material types should be installed by specialist NVQ Level 2 qualified gas membrane installation operatives, or at least overseen by someone who holds his qualification, which is in accordance with the CIRIA C716, C735, C748 & BS 8485:2015+A1:2019 best practice documents.

The relevant qualification for gas membrane installations is as follows;

Cskills Awards L2 NVQ Diploma in sub-structure work occupations (construction) – Installation of gas membranes:
<http://tinyurl.com/lj8w7ay>

MTS Ltd would recommend client employs specialist NVQ qualified operatives, and we offer a list of very competent installation companies below;



GB Lining Services Limited
195 Witham Road
Black Notley
Braintree
Essex
CM77 8ND

Contact: Mr Brett Bowles
Tel: 01376 551 022
Mobile: 07864 701 359
Email: brettbowlesgbliningltd@btinternet.com

MB Membranes Ltd
7 Cecil Court
Harlow
Essex
CM18 7QR

Contact: Mr Neil McNamara
Tel: 01279 444 300
Email: neil@mbmembranes.co.uk

Prestige Air Technology Limited
Landews Meadow
Green Lane
Challock
Ashford
Kent
TN25 4BL

Contact: Mr Andy Collins
Tel: 01233 740 844
Email: andy@prestigeair.com

MTS Ltd have validated these companies' workmanship on numerous occasions and consider them all to be premier specialist installers within the UK. They all also employ fully welded seaming techniques where ever able whereby reducing the potential failure of butyl taped joints.

8. PROPOSED GAS/VAPOUR MITIGATION DESIGN

The proposed ground gas/vapour mitigation measures for the site will include the following:

1. The ground floor slabs are to be constructed using a concrete beam and block system with a minimum 150mm ventilated void below. Periscopic airbricks will be installed on opposing sides of each property and at the maximum distance of 3m centres and no more than 450mm from the corners. Any internal underfloor obstructive walls will have openings left within the walls to allow for free and unhindered air flow through the complete underfloor void and decompartmentalising any otherwise unventilated floor areas. This system will provide a passive ventilation system of 'Good Performance' whereby meeting a minimum points score of 1.5 as defined by Table 6 of the BS 8485:2015+A1:2019 best practice document.
2. It is assumed the method of construction will be perimeter and infill whereby the gas/vapour resistant DPC's will be installed to the perimeter and internal walls/party walls and left laying on the beam and block floor



- slab by 150mm to connect onto at a later date. All membrane seams to be welded wherever possible corner seams overlain with gas resistant self-adhesive membrane.
3. Any service pipes that are close to walls are to be completed at the DPC stage to ensure the detailing is maintained as easy as possible.
 4. The properties are then constructed and made watertight. The gas/vapour membrane is to be installed to each property internal areas immediately prior to insulation and screed.
 5. The existing beam and block floor slabs are to be thoroughly cleans and any dips, hollows filled and any sharp protrusions removed.
 6. A proprietary and high-performance gas/hydrocarbon vapour barrier membrane is to be installed above the beam and block floor slabs, which will cover the entire internal room footprint of each property. The Juta GP5 gas membrane will be welded together and also to the existing GP DPC laying on the floor.
 7. Any damage on the GP DPC will be repaired using welded patches of parent DPC membrane or using patches of GP SAM extending 50mm in all directions from the extent of any damage.
 8. Any service pipe entries are to be sealed using JUTA GP SAM 150mm up the service pipe and 150mm onto the JUTA gas/vapour resistant membrane.
 9. At door threshold the GP5 membrane is to be taken up the perimeter masonry and terminates on top of the external masonry.
 10. Any holes in the gas/vapour membrane must be repaired using the parent membrane with welding seaming actions or patches of GP SAM.
 11. The gas/vapour resistant DPC's and membranes are to be validated once the membrane installation has been completed, where the whole installation is to be offered for validation and without any operatives being admitted into the property until validation/testing has taken place.
 12. Upon completion and sign off by the validation surveyor, the membrane must be cordoned off and only ongoing floor finishes installation operations are permitted above the unprotected materials. All foot traffic is to be kept off the exposed membrane. Or: The gas/vapour membrane is protected using approved walkways reducing foot traffic during insulation installation operations.
 13. A final sign off validation report will be produced at the end of the installation process and submitted to the local authority for clearing planning conditions pertaining to gas/vapour contamination.

9. PROPOSED INSPECTION, TESTING AND VALIDATION REGIME

It is proposed the installed gas/vapour protective materials installed are to be 3rd party independently inspected, tested and validated in accordance with the Ciria C735 best practice document by a competent and qualified validation surveying company, namely Membrane Testing Solutions Ltd.

Due to the perceived moderate gas/vapour risk associated with the site but with installation of vapour mitigation measures by NVQ Level 2 specialist installation operatives, installed above the beam and block floor slabs it is proposed to apply a 'Reduced Level' of validation processes on this project.

All aspects of the vapour mitigation measures will be checked and validated in some manner, inclusive of specialist membrane installation and 3rd party inspection, testing and validating the gas/vapour membrane inclusive of checking service pipe sealings and the like.

We have allowed for up to 4no site validation visits to validate the gas/vapour membranes in the following manner:

- The surveyor will mark up a drawing with the position and numbers of periscopic air bricks on a layout drawing and ensure compliance with the 3m maximum centres design criteria. Whilst on site we will also inspect the void depth below the beam and block floor to ensure compliance with the minimum 150mm void depth.
- We have allowed for 2no site visits to inspect test and validate the GP DPC's to the 6no properties which we consider appropriate for the detailing to be installed on site and in the following manner;
- 1no visit for plots 1-4 and 1no visit for plots 5 & 6 inclusive.



- Upon completion of the construction process and all 6no plots are watertight, the gas mitigation measures will be installed to plot 1-4 which will be validated over 1no visit, with the two bungalows (plots 5 & 6) being validated over the final and 4th visits (or Visa Versa dependant on client build programme).
- It is proposed MTS Ltd employ a detailed visual inspection and seam pick probe testing to 100% of site seams, in line with ASTM D4437-2018 test method.
- QA certification and record of vapour mitigation measure forms will be completed and submitted to the client for confirmation of validation pass of which these documents will be included within our final sign off validation report.
- Produce a final sign off validation report along with inclusion of installers QA documentation and photographic evidence taken by MTS Ltd on site, to further include 1no CL:Aire Residential Declaration of Conformity certificate to include for all 6no plots on site.

MTS Ltd consider the above proposed site visits will provide what is considered sufficient inspection, testing and validation practices to ensure that the gas/vapour mitigation measures are installed in accordance with the design, material specifications and industry best practices.

No membranes will be validated and signed off by MTS Ltd until a minimum acceptable standard has been achieved, whereby ensuring the membrane installation is suitably managed to achieve maximum confidence to the suitability of the installed materials.

Should any site inspections prove to be unacceptable and prove such on a continual basis, MTS Ltd reserve the right to increase our site inspection validation visit numbers, to ensure that the installed materials are sufficiently managed ensuring the materials are fit for purpose and future occupant's health and safety is maintained.

9.1 INSPECTION, VALIDATION & TESTING METHOD STATEMENT

1. The Validation Surveyor will be suitably experienced and qualified to carry out a detailed visual inspection and seam integrity testing of the installed gas/vapour membrane system.
2. All membrane areas will be subject to independent, inspection validation and seam integrity testing.
3. The Validation Surveyor will visually inspect 100% of the installed gas/vapour protection measures to the areas submitted for inspection.
4. Seam pick testing will be performed to 100% of all site seams provided for inspection, inclusive of service pipe seals and welded/taped joints etc. ensuring all seams are suitably bonded/adhered. Seam pick testing comprises of a hand-held implement with a wooden handle and 6mm diameter x 250mm long shaft terminating in a point at 90° to the main shaft. The point of the seam pick test is drawn down the length of the seam seeking intrusion of the implement into the seam whereby indicating a defect. This testing method is also used for difficult detailing or intricate works such as around pipe sealing details etc. This test method also complies to the ASTM D4437 2018 test criteria.
5. Any faults/rips/tears/punctures or un-bonded seams will be "number marked" and recorded for repair on a defect position plan. Repair methods will be agreed with the installation contractor.
6. All repairs will be re-inspected for suitability, with photographic evidence given in the final report provided at the end of the contract.
7. Upon completion of the test and re-test of any subsequent repairs found, the gas/vapour membrane area will be signed off and certified as integral.
8. The Validation Surveyor will complete a "Independent Inspection & Validation Certificate of Conformance" for each plot and photographic evidence will be taken. The project survey sheets and photographic logs will be incorporated in the final report submission.
9. Upon completion of the validation/integrity test inspection, a validation certificate stating the outcome of the inspection whether being a pass or fail will be issued. When the inspection test shows a pass, the membrane should be immediately protected using the manufacturers recommended system, otherwise follow-on construction works are suitably risk assessed to ensure the geomembrane remains intact and undamaged during the construction phase. Should the inspection outcome prove a failure, the failure points are to be remediated in the agreed manner and re-inspected by the Validation Surveyor at a future agreed date/time.



The Validation Surveyor Will:

- Perform all visual detailed and intimate Inspections:
- Perform seam testing to 100% of site seams:
- Mark and identify any repairs required:
- Re-inspect and re-test the repairs:
- Complete the project survey sheets:
- Take photographs for inclusion in the final validation report:
- Produce a final validation report at the end of the installation process, to include 1no CL:Aire Residential Declaration of Conformance for the 6no plots.

10. CONCLUSIONS AND RECOMMENDATIONS

As a result of our proposed 3rd party independent inspection, testing & validation process, MTS Ltd conclude the gas/vapour mitigation measures prescribed for this site will be inspected, tested and validated in accordance with the MTS Ltd proposed gas/vapour mitigation design, materials specifications and industry best practice installation requirements.

Therefore, MTS Ltd believe the proposed gas/vapour mitigation measures prescribed for this project will be sufficiently managed to maintain maximum confidence to the proficiency of the installed mitigation system, therefore we conclude that the materials installed on this project will ultimately be appropriate to the 'Moderate Vapour Risk' and will be "validated in accordance with the CIRIA C735" best practice document.

As such, it is Membrane Testing Solutions Ltd recommendation to the Local Authority/Project Stakeholders to sign off this gas/vapour mitigation design and verification plan as;

"APPROVED FOR CONSTRUCTION"

END OF REPORT

11. APPENDICES

Appendix A – Validation Surveyors/Installer Certificates of Competence

Mr Barrie Ackroyd (MTS Ltd)
Mr Michael Smith (MTS Ltd)
Mr Robert Boosey (MTS Ltd)
Mr Carl Orr (MTS Ltd)

Appendix B – Design Drawings

Sevenoaks Environmental Drawing;

- 4551-03 Rev 01 – Site Location Plan

ADM-BPTW Drawings;

- ADM-BPTW-01-ZZ-DR-A-1701-P02 – 2B4P Flats Floor Plan Layouts
- ADM-BPTW-02-ZZ-DR-A-1702-P04 – 182P Bungalow Floor Plan Layouts



Architectural Design Lab Ltd Drawing;

- DL-SUB-01 Rev - - Substructure Details, Ground Floor – Ground 150mm Below FFL

MTS Ltd Drawings;

- 22852-01 – Typical Perimeter Wall (Un-Ventilated) Gas Mitigation Section Detail
- 22852-02 – Typical Perimeter Wall (Ventilated) Gas Mitigation Section Detail
- 22852-03 – Typical Door Threshold Detail
- 22852-04 – Typical Internal Wall DPC Detail With Under Floor Wall Ventilation
- 22852-05 – Typical Service Pipe Sealing Detail
- 22852-06 – Typical Party Wall Gas Resistant DPC Detail

Appendix C – JUTA Material Specifications

- JUTA GP DPC
- JUTA GP5 Gas Barrier Membrane
- JUTA GP Bitumen Primer
- JUTA GP SAM (Gas Resistant Self-Adhesive Membrane)

Appendix D – Project Survey Sheets

Gas Protection Inspection & Validation Record (Example)

Independent Inspection & Validation - Certificate of Conformance (Example)

CL:Aire Residential Declaration of Conformance (Example)



APPENDIX A

Validation Surveyors Certificates of Competence



This is to certify that

Barrie Ackroyd

Has successfully attended a
Technical Course
in

Gas Membrane Installations

This in support of the Quality Controls
Of Inspection and Validation
Of Gas Membrane Installations

This certificate is awarded by:



Date: 30/10/14



Course content detailed overleaf

Gas Membrane Installation Technical Course for Inspectors & Validators

Training Modules Attended

Practical & Knowledge

- Components of Gas Protection Systems with Venting
- Verification
- Gas Membrane Installation Techniques
- Introduction to Integrity Testing (Practical)
- Introduction to Integrity Testing (Theory)
- Risk Assessment and Validation Plan
- Site Inspections and Pro-formas
- Validation Report
- On Site Assessment

CERTIFICATE of ACCREDITATION

This is to certify that

Barrie Ackroyd

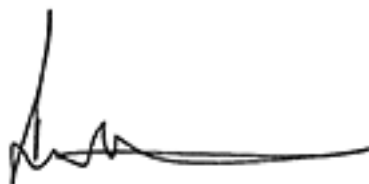
has been awarded the following accreditation

Gas Protection Verification Scheme (GPVS) ***Specialist (SGPV)***

Certificate No.: 435qQb4axS

Issued: 19 November 2020

Valid for 4 years from the above date



Richard Froggatt
CL:AIRE Chairman



Certificate of Achievement

(Full Award)

This is to certify that

Michael Anthony Smith

has been assessed as meeting the required level of competence for all
the units necessary to achieve the full award

**ABBE Level 4 NVQ Diploma in Verification of Ground Gas Protection
Systems**

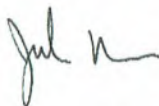
603/3266/9

Units achieved:

Mandatory Units

K/617/0687, M/617/0688, K/617/0690, M/617/0691,
A/617/0693, F/617/0694, J/617/0695

Signed :



Professor Julian Beer, Chair of ABBE Board

Date:

23/01/2020

Candidate Registration No : 0000036770 Certificate Issue No : 142188

ofqual
REGULATED
register.ofqual.gov.uk



00026189

Certificate of Unit Achievement

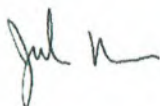
This is to certify that

Michael Anthony Smith

has been assessed as meeting the following units of competence
which form part of an accredited qualification

K/617/0687	Design Principles and Application for Construction in the Built Environment
M/617/0688	Materials for Construction in the Built Environment
K/617/0690	Health, Safety and Welfare in the Construction Environment
M/617/0691	Principles of Construction and Maintenance of Buildings
A/617/0693	Confirming Work Meets Quality Standards in the Workplace
F/617/0694	Verification and Inspection of Ground Gas Protection Systems
J/617/0695	Principles of Regulatory Control Procedures and Legislation

Signed :



Professor Julian Beer, Chair of ABBE Board

Date:

23/01/2020

Candidate Registration No : 0000036770 Certificate Issue No : 142185



00026186

CERTIFICATE of ACCREDITATION

This is to certify that

Michael Smith

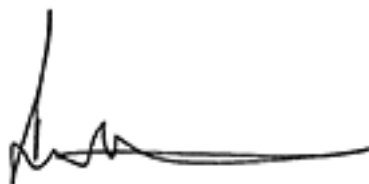
has been awarded the following accreditation

Gas Protection Verification Scheme (GPVS)
Technician (TGPV)

Certificate No.: 2UEiQm05Uq

Issued: 8 April 2021

Valid for 4 years from the above date



Richard Froggatt
CL:AIRE Chairman



Certificate of Attendance

Continuing Professional Development

This is to certify that

Robert Boosey

Has attended and passed the course
Verification of Gas Protection Systems

on

26th February 2019

at

Doncaster Membrane Installations Limited, Adwick
Park, Manvers, S63 5AB

Contact time: 6.5 hours

Trainers: Michael Corban & Gordon Cave:



Richard Froggatt, CL:AIRE Chairman

CL:AIRE

Registered address: 32 Bloomsbury Street, London, WC1B 3QJ

Telephone: +44 (0)2072 964250

Email: enquiries@claire.co.uk Website: www.claire.co.uk

CL:AIRE is a Charitable Company Limited by Guarantee / Registered in England No. 3740059 /
Entrust Enrolment No. 119820 / Registered Charity No. 1075611

CL:AIRE TRAINING

Certificate of Attendance

Continuing Professional Development

This is to certify that

Carl Orr

Has attended and passed the course
Verification of Gas Protection Systems

on

8th October 2019

at

Doncaster Membrane Installations Limited, Adwick
Park, Manvers, S63 5AB

Contact time: 6.5 hours

Trainers: Michael Corban & Gordon Cave:



Richard Froggatt, CL:AIRE Chairman

CL:AIRE

Registered address: 32 Bloomsbury Street, London, WC1B 3QJ
Telephone: +44 (0)2072 994250

Email: enquiries@claire.co.uk Website: www.claire.co.uk

CL:AIRE is a Charitable Company Limited by Guarantee / Registered in England No. 3740059 /
Entrust Enrolment No. 119820 / Registered Charity No. 1075611

CL:AIRE TRAINING



APPENDIX B

Design Drawings



Crown Copyright.
 Licence Number 100040584. All rights reserved.
 This map is not to be relied upon for accuracy and is for identification purposes only

SITE: Armory Drive, Gravesend

SCALE: NTS

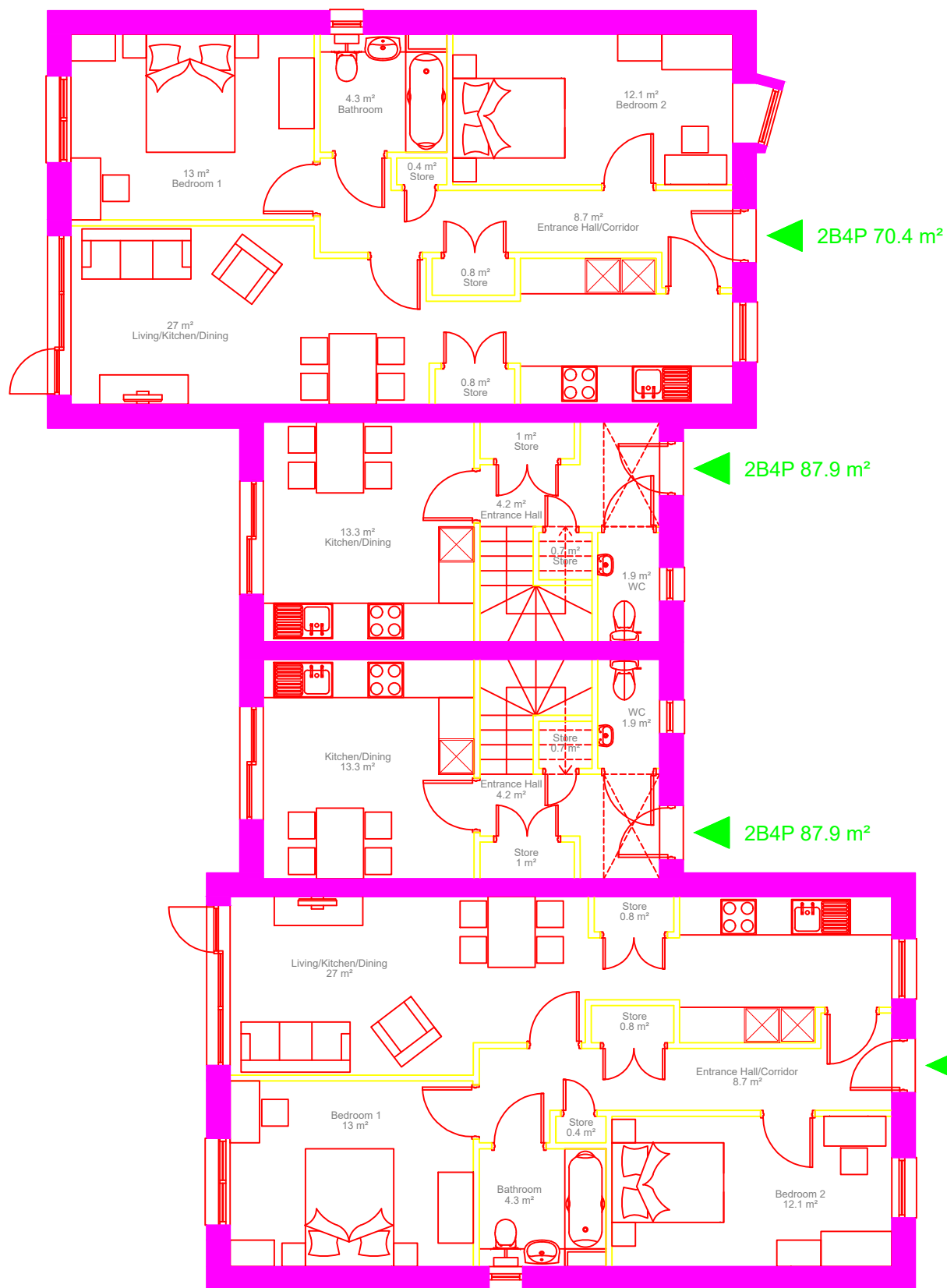
JOB NO: 4551

FIGURE TITLE: Site Location Plan

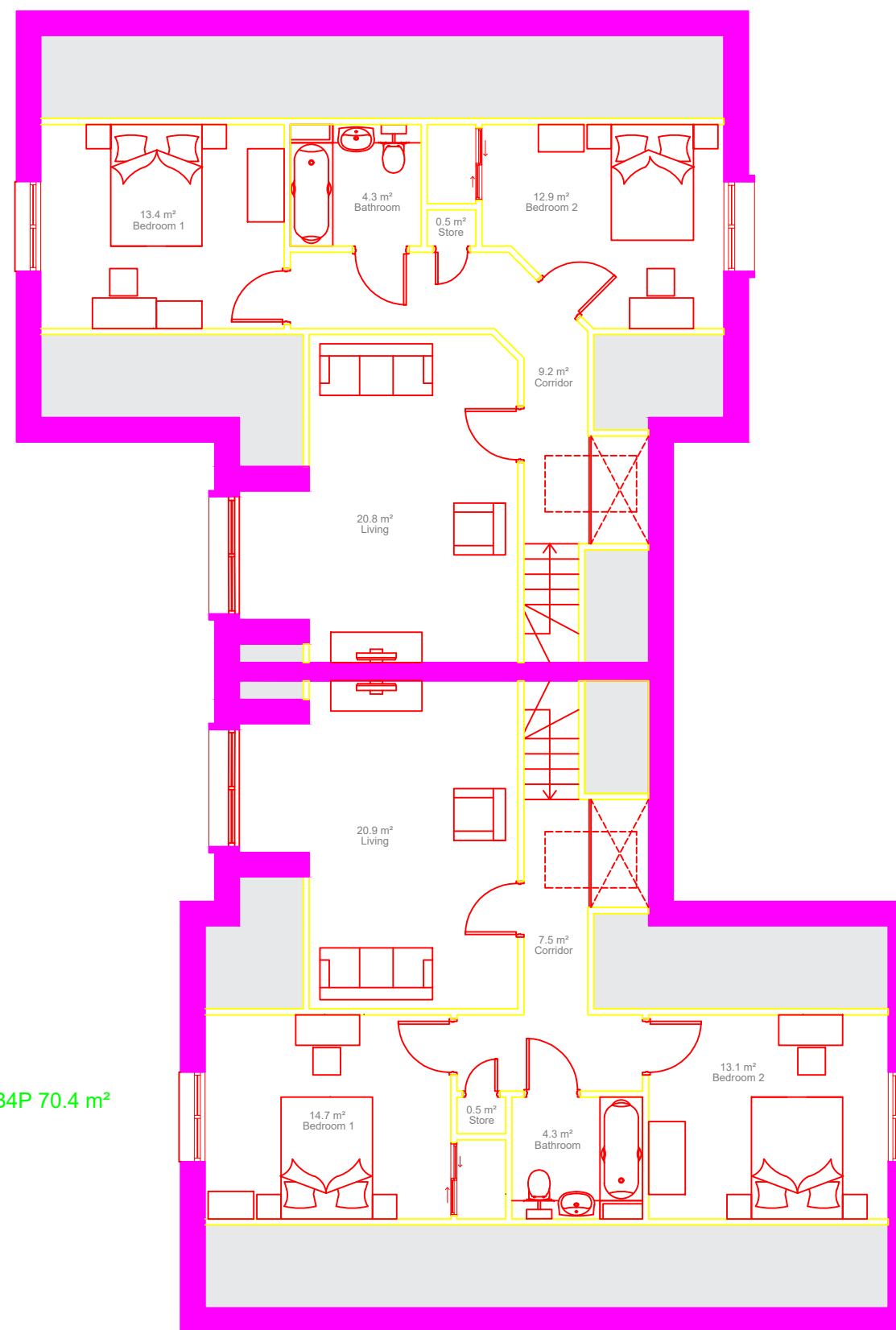
REV: 01

FIGURE NO: 03

**SEVENOAKS
 ENVIRONMENTAL
 CONSULTANCY**



Ground Floor Plan

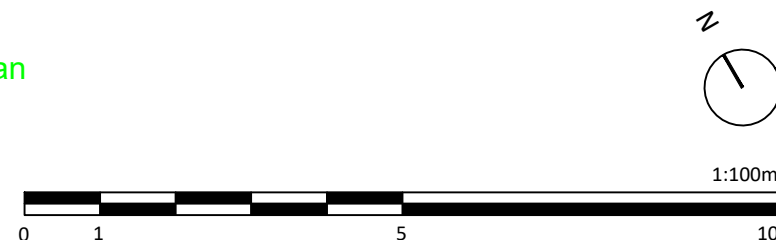


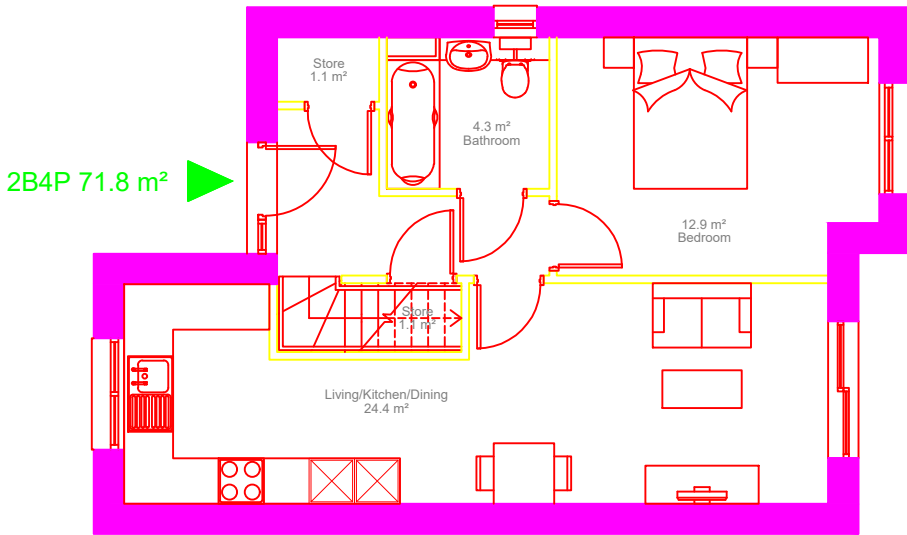
First Floor Plan

P01 S3 06.03.20 2B4P Flat layouts S3
P02 S3 28.05.20 Minor Amendments S3

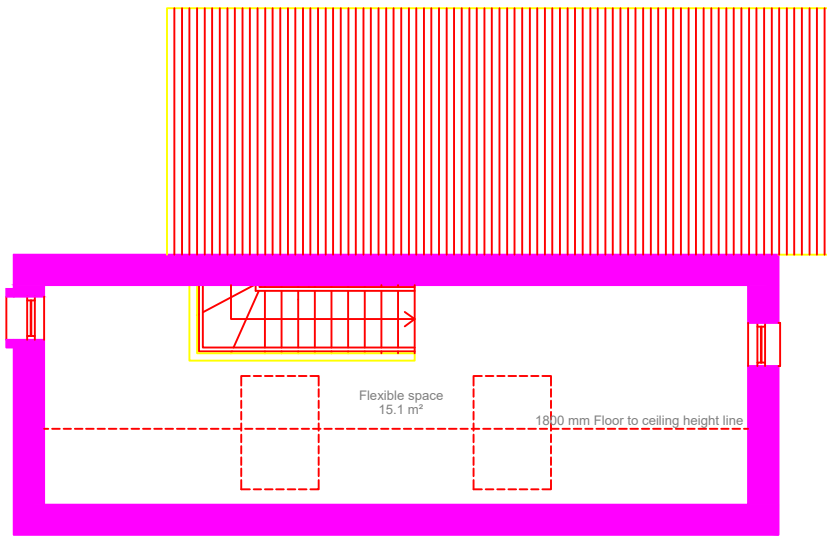
Gravesham Borough Council
18-334 Albert Murray Close
2B4P Flats Floor Plan Layouts
ADM-BPTW-01-ZZ-DR-A-1701 P02 S4
18-334 02 MS 1:100 @ A3

PLANNING ISSUE





Ground Floor Plan



First Floor Plan

P01	S3	19.03.20 1B2P Bungalow Flat Layout	MS
P02	S3	16.04.20 Minor amendments to the Flat Layout	MS
P03	S3	01.05.20 Minor amendments to the Flat Layout	MS
P04	S3	28.05.20 Minor Amendments	MS

Gravesham Borough Council

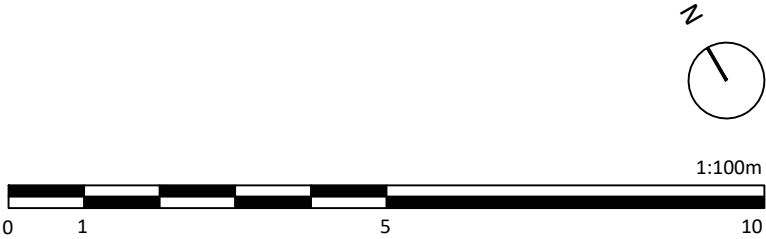
Albert Murray Close

1B2P Bungalows Floor Plan Layout

AMD-BPTW-02-ZZ-DR-A-1702 P04 S4

18-334 02 MS 1:100 @ A3

PLANNING ISSUE



Refer to Energy Strategy for External wall U value

100mm, 3.5 N/mm² medium density concrete blockwork.

12.5mm plasterboard on dabs with 3mm skim coat finish to manufacturers recommendations.

Continuous dab to plasterboard

Apply expanding foam sealant tape or sealant to back and under the skirting prior to fixing

30mm White EPS Perimeter Insulation at 0.038 W/mK

Zedex CPT DPC or similar approved on inside face of block wall

75mm C25/30 structural concrete with a maximum aggregate size of 10mm

150mm Ridgid floor insulation as per construction specification.

Visqueen 1200 guage DPM or similar approved lapped with DPC

100mm medium density block infill

175mm depth concrete beam.

Refer to Energy Strategy for Floor U value

Proprietary 215x65mm Air bricks with telescopic extension sleeve to ventilate floor void as indicated on Housetype working drawings

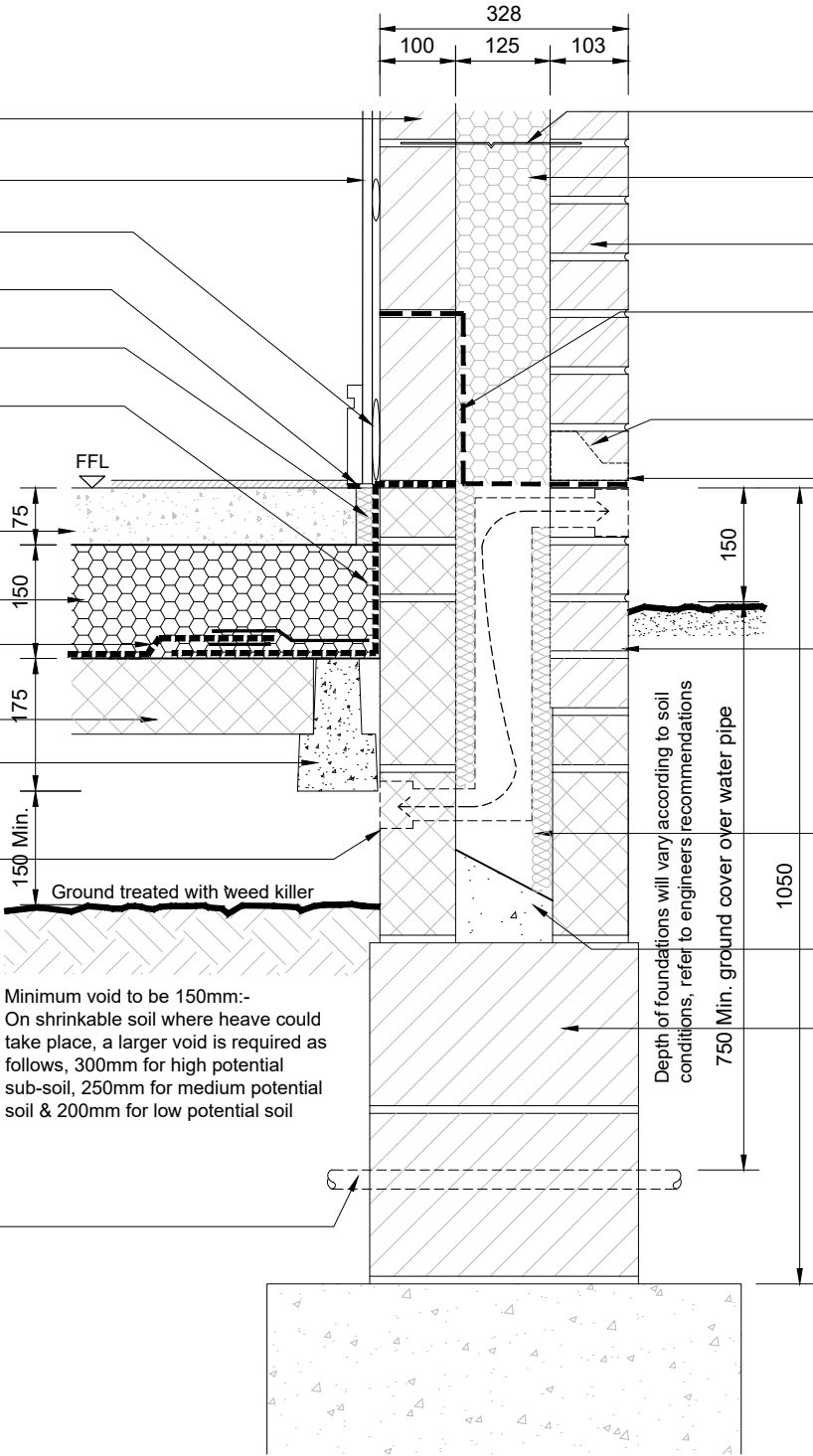
Use sulphate resisting cement below DPC where specified by the engineer. Weak mix concrete to within 225mm of lowest DPC.

Foundations in accordance with Structural Engineers drawings
Depth of foundations will vary according to soil conditions, refer to engineers recommendations

Indicative 25mmØ main.

Trench blocks may be reduced in lieu of trench fill provided the engineer is satisfied that the services can adequately exit the structure.

Note: Safe working practice for working within trench - banking back to ground conditions natural angle of repose.



Typical Foundation Detail - Beam in Section
Ground level 150mm below FFL

The Beam & Block system must be installed in strict accordance with the manufacturers instructions.

StaiFix HRT4 Wall ties or similar approved @ 900mm horizontal centres and 450mm vertical centres.

125mm Knauf Supafil Party Fulfill cavity blown insulation or similar approved

103mm Brickwork

Loose laid cavity tray integral with DPC locally over telescopic airvents (extended min 150mm either side)

"Pistol" weep holes @ 450mm centres

Zedex CPT DPC or similar approved, min 150mm from Ground in accordance with BS 8102:2009

Facing brickwork is to start minimum of 2 No. courses below finish ground level. Brickwork below DPC to be Class F2/S2 or to BS EN 771 with high durability mortar.

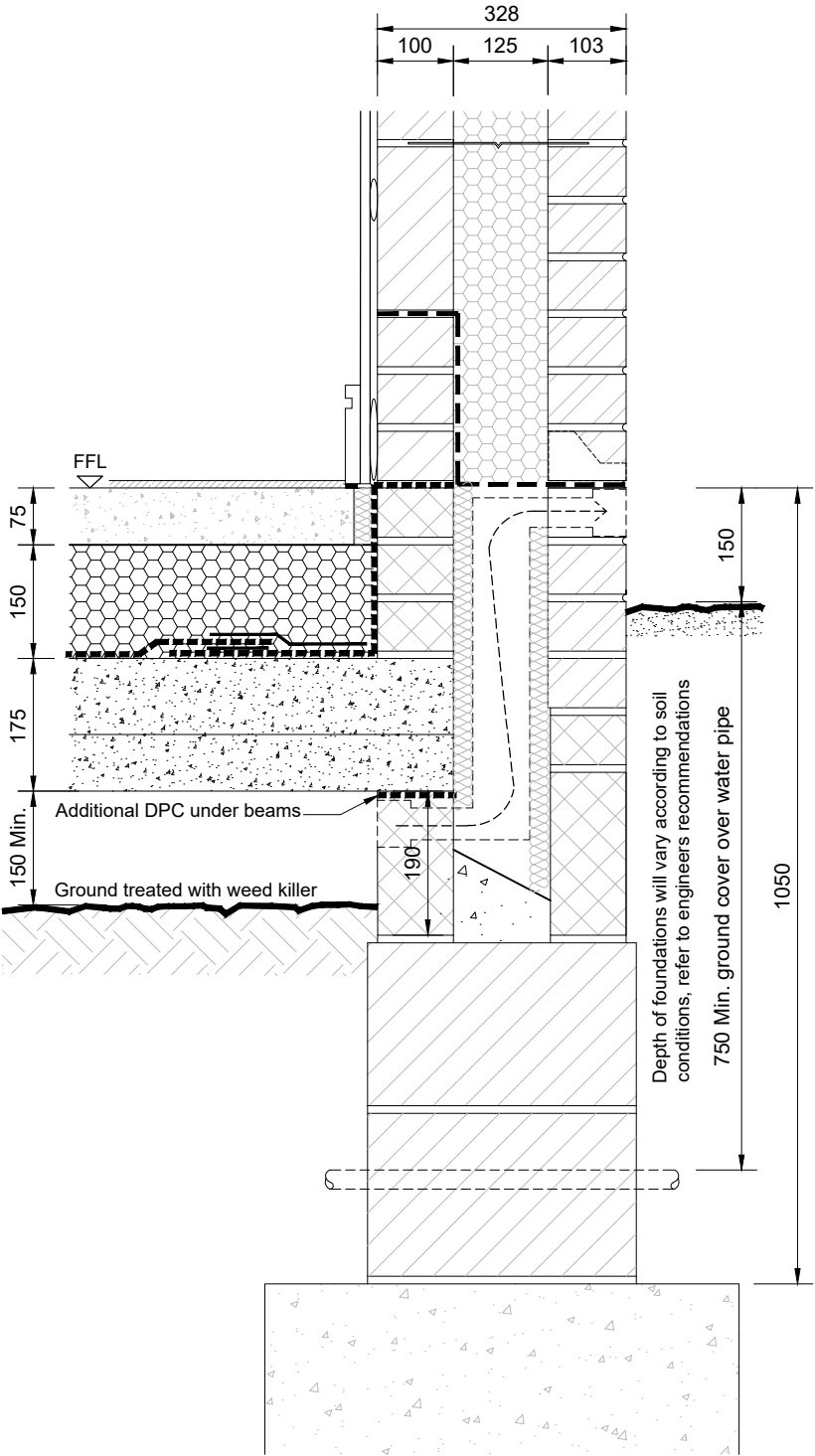
100mm Knauf Dritherm Earthwool 32 cavity slab or similar approved. Min. 225 below bottom of floor insulation.

Lean mix cavity fill

330mm wide foundation block or 2 leaves of 100mm 7.0N/mm² concrete blockwork as per construction specification.

NHBC Standards States:
Chapter 5.2.10 (b) Ventilation of Under Floor Voids

Voids should be ventilated by openings providing not less than 1500mm² per metre run or of external wall or 500mm² per m² of floor area, which ever gives the greater opening area. Ventilation openings should be provided on at least two opposite sides. Where this is not possible, effective cross ventilation from opposite sides should be provided by a combination of opening and air ducts. See vent schedule



Typical Foundation Detail - Beam in Elevation
Ground level 150mm below FFL -
Showing beams spanning onto blockwork

Typical Detail - Ground Level 150mm below FFL



50mm @ A3

Scale 1:10 100mm 200mm 300mm 400mm 500mm

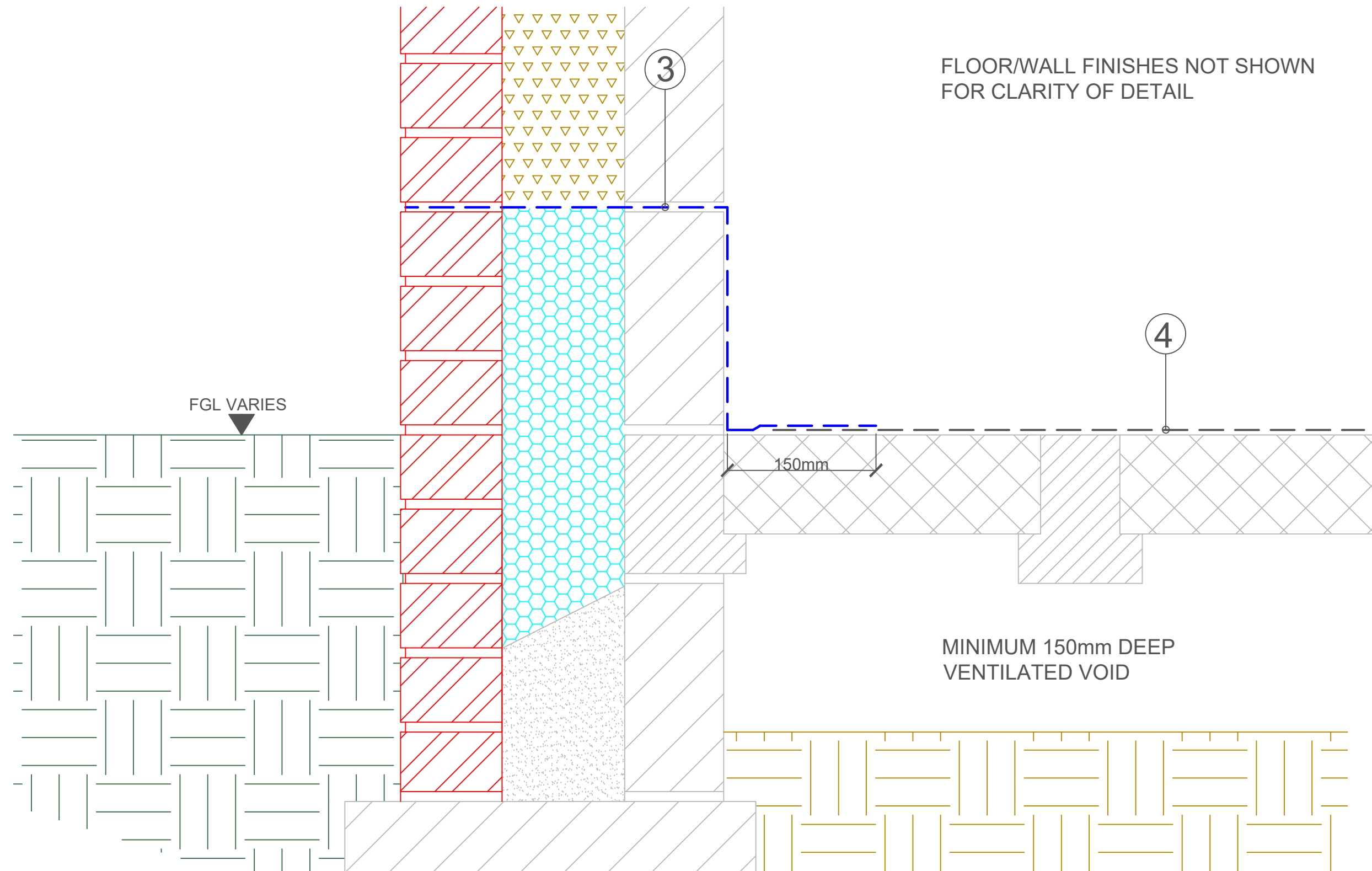
DRAWING STATUS:

APPROVAL

GENERAL NOTES

1. DO NOT SCALE
2. All dimensions are in millimeters unless stated otherwise

REV	AMENDMENTS	BY	DATE
 Architectural Design Lab Ltd. Lombard House 12 - 17 Upper Bridge Street Canterbury Kent CT1 2NF Tel . no : 01227 634600 Email : mail@adl15.com			
Drawn :	RB	Date :	MAY 2022
Scale :	1:10	Checked :	MG
Title : SUBSTRUCTURE DETAILS GROUND FLOOR GROUND 150mm Below FFL			
Job :	ARMOURY DRIVE, GRAVESEND		
Dwg. No :	DL-SUB-01	Rev :	-
Dwg file name:	A3		
Copyright Reserved Architectural Design Lab Limited			



TYPICAL PERIMETER WALL DETAIL (UN-VENTILATED) KEY TO MATERIALS

1. PERISCOPIC AIRBRICK VENT SETS INSTALLED AT MAXIMUM 3M CENTRES AROUND EACH PROPERTY
2. CAVITY TRAY SPECIFICATION 'BY OTHERS'
3. JUTA GP DPC, OF FULLY WELDED SEAM CONSTRUCTION
4. JUTA GP5 GAS BARRIER MEMBRANE OF FULLY WELDED SEAM JOINTS WITH 50mm WELD ONTO DPC

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with MTS.DVP.852-BA 3rd Party Design, Testing & Verification Plan.



Warning Health & Safety Information!

This drawing relates to the low/moderate ground gas risk and hydrocarbon vapour issues on this site.

In conjunction with the CDM 2015 regulations we confirm that the site is within an area where ground gas and hydrocarbon vapours may be present, therefore whilst remedial measures may have been performed, there is a residual low risk, caution should be taken when working with contaminated soils.

Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas/vapour mitigation details;

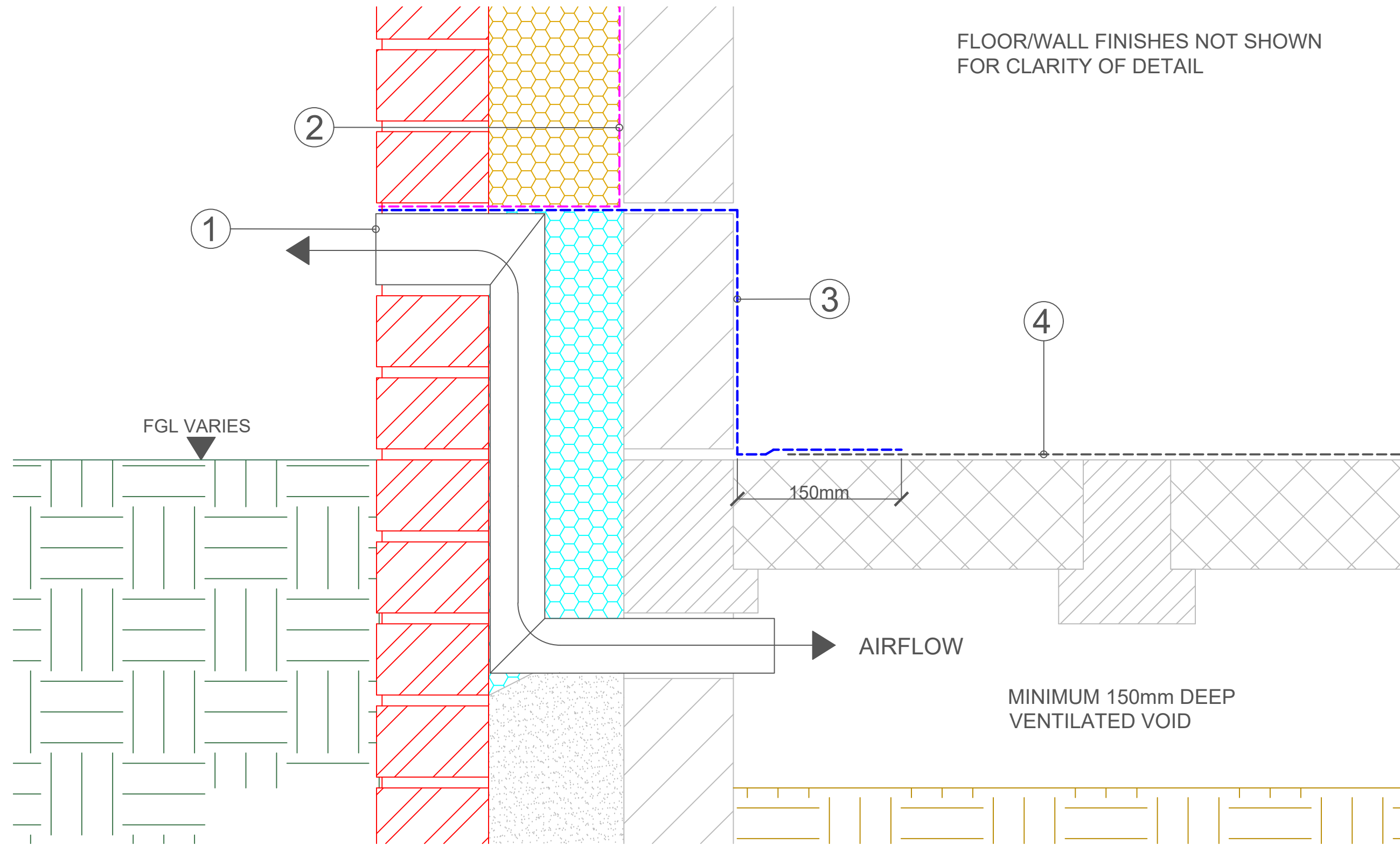
22852-01
22852-02
22852-03
22852-04
22852-05
22852-06

No.	Revision/Issue	Date



Project Name and Address	
Former St. Johns Ambulance Station, Armoury Drive, Gravesend, DA12 1NB	
Drawing Title	
Typical Perimeter Wall (Un-Ventilated) Gas Mitigation Section Detail	

Project 22852-01	Sheet Rev -
Date 11/10/2022	Drawn By B.Ackroyd
Scale Not to Scale	Size A3



TYPICAL PERIMETER WALL DETAIL (VENTILATED)

KEY TO MATERIALS

1. PERISCOPIC AIRBRICK VENT SETS INSTALLED AT MAXIMUM 3M CENTRES AROUND EACH PROPERTY
2. CAVITY TRAY SPECIFICATION ABOVE AIRBRICKS 'BY OTHERS'
3. JUTA GP DPC, OF FULLY SEALED SEAM CONSTRUCTION
4. JUTA GP5 GAS BARRIER MEMBRANE OF FULLY WELDED SEAM JOINTS WITH 50mm WELD ONTO EXISTING DPC

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with MTS.DVP.852-BA 3rd Party Design, Testing & Verification Plan.



Warning Health & Safety Information!

This drawing relates to the low/moderate ground gas risk and hydrocarbon vapour issues on this site.

In conjunction with the CDM 2015 regulations we confirm that the site is within an area where ground gas and hydrocarbon vapours may be present, therefore whilst remedial measures may have been performed, there is a residual low risk, caution should be taken when working with contaminated soils.

Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas/vapour mitigation details;

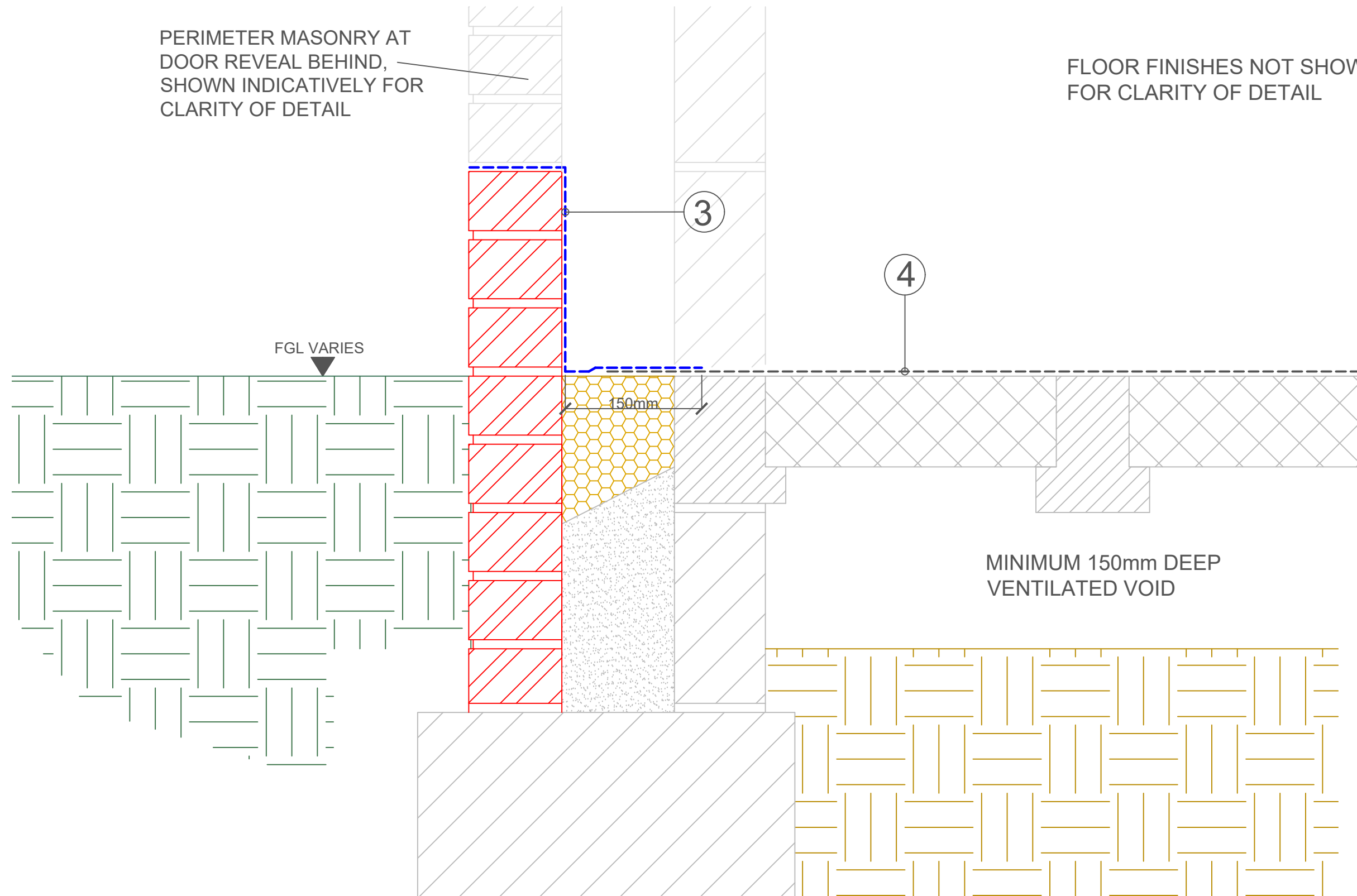
22852-01
22852-02
22852-03
22852-04
22852-05
22852-06

No.	Revision/Issue	Date



Project Name and Address	
Former St. Johns Ambulance Station, Armoury Drive, Gravesend, DA12 1NB	
Drawing Title	
Typical Perimeter Wall (Ventilated) Gas Mitigation Section Detail	

Project	22852-02	Sheet	Rev -
Date	11/10/2022	Drawn By	B.Ackroyd
Scale	Not to Scale	Size	A3



TYPICAL DOOR THRESHOLD DETAIL

KEY TO MATERIALS

1. PERISCOPIC AIRBRICK VENT SETS INSTALLED AT MAXIMUM 3M CENTRES AROUND EACH PROPERTY
2. CAVITY TRAY SPECIFICATION ABOVE AIRBRICKS 'BY OTHERS'
3. JUTA GP DPC, OF FULLY SEALED SEAM CONSTRUCTION
4. JUTA GP5 GAS BARRIER MEMBRANE OF FULLY WELDED SEAM JOINTS WITH 50mm WELD ONTO EXISTING DPC

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with MTS.DVP.852-BA 3rd Party Design, Testing & Verification Plan.



Warning Health & Safety Information!

This drawing relates to the low/moderate ground gas risk and hydrocarbon vapour issues on this site.

In conjunction with the CDM 2015 regulations we confirm that the site is within an area where ground gas and hydrocarbon vapours may be present, therefore whilst remedial measures may have been performed, there is a residual low risk, caution should be taken when working with contaminated soils.

Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas/vapour mitigation details;

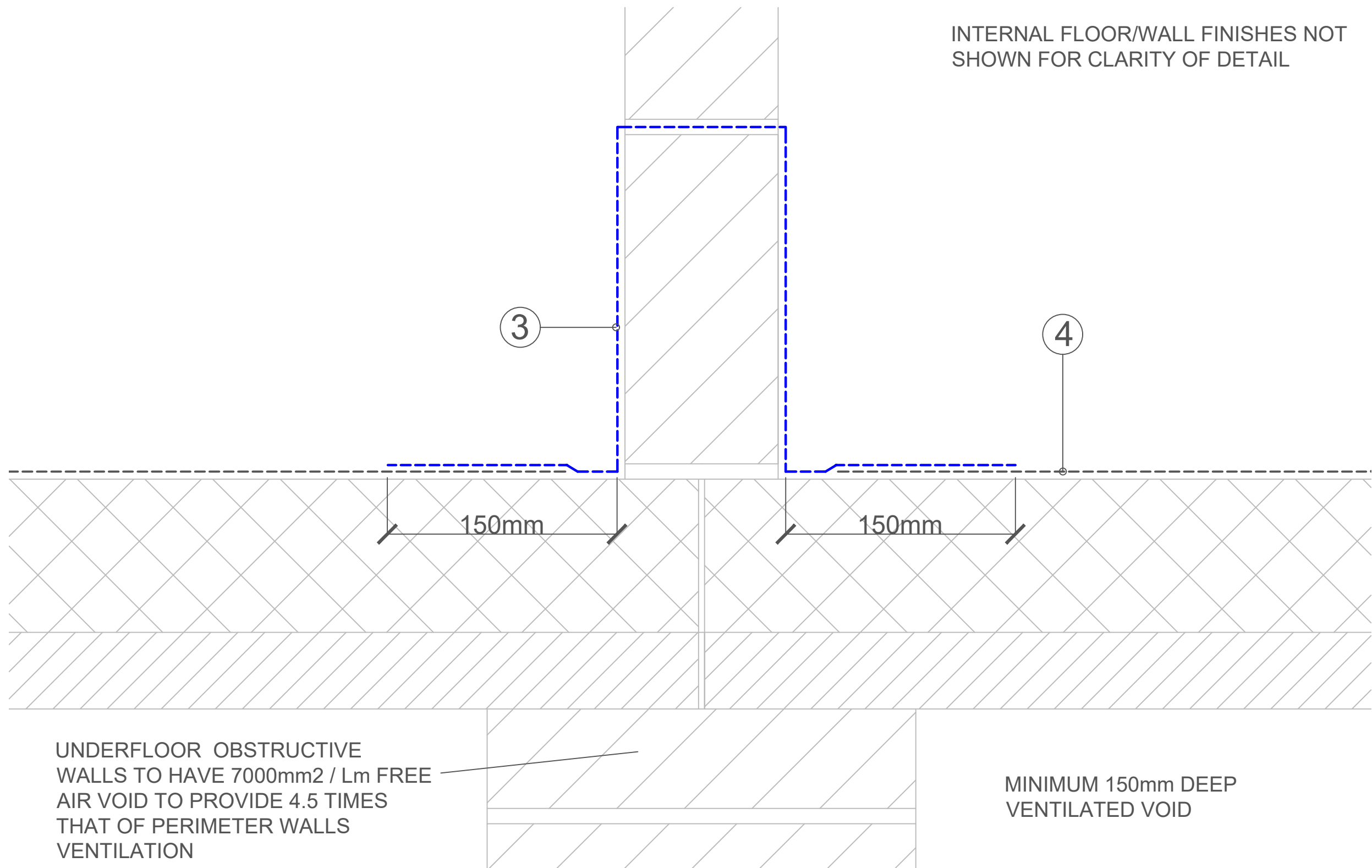
22852-01
22852-02
22852-03
22852-04
22852-05
22852-06

No.	Revision/Issue	Date



Project Name and Address	
Former St. Johns Ambulance Station, Armoury Drive, Gravesend, DA12 1NB	
Drawing Title	
Typical Door Threshold Detail	

Project 22852-03	Sheet Rev A
Date 11/10/2022	Drawn By B.Ackroyd
Scale Not to Scale	Size A3



INTERNAL WALL DPC DETAIL

KEY TO MATERIALS

1. PERISCOPIC AIRBRICK VENT SETS INSTALLED AT MAXIMUM 3M CENTRES AROUND EACH PROPERTY
2. CAVITY TRAY SPECIFICATION 'BY OTHERS'
3. JUTA GP DPC, OF FULLY WELDED SEAM CONSTRUCTION
4. JUTA GP5 GAS BARRIER MEMBRANE OF FULLY WELDED SEAM JOINTS WITH 50mm WELD ONTO DPC
5. JUTA GP SAM (GAS RESISTANT SELF-ADHESIVE MEMBRANE)

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with MTS.DVP.852-BA 3rd Party Design, Testing & Verification Plan.

Warning Health & Safety Information!

This drawing relates to the low/moderate ground gas risk and hydrocarbon vapour issues on this site.

In conjunction with the CDM 2015 regulations we confirm that the site is within an area where ground gas and hydrocarbon vapours may be present, therefore whilst remedial measures may have been performed, there is a residual low risk, caution should be taken when working with contaminated soils.

Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas/vapour mitigation details;

22852-01
22852-02
22852-03
22852-04
22852-05
22852-06

No.	Revision/Issue	Date

Firm Name and Address

Membrane Testing Solutions

The Studio, Pennington House,
Pennington Street, Haverhill,
Essex SG9 6JH

Office: 01455 557 2284
Out of Hours Contact:
Telephone: 01455 557 2285
Mobile: 07815 555555
Email: info@mtsolutions.co.uk

www.mtsolutions.net

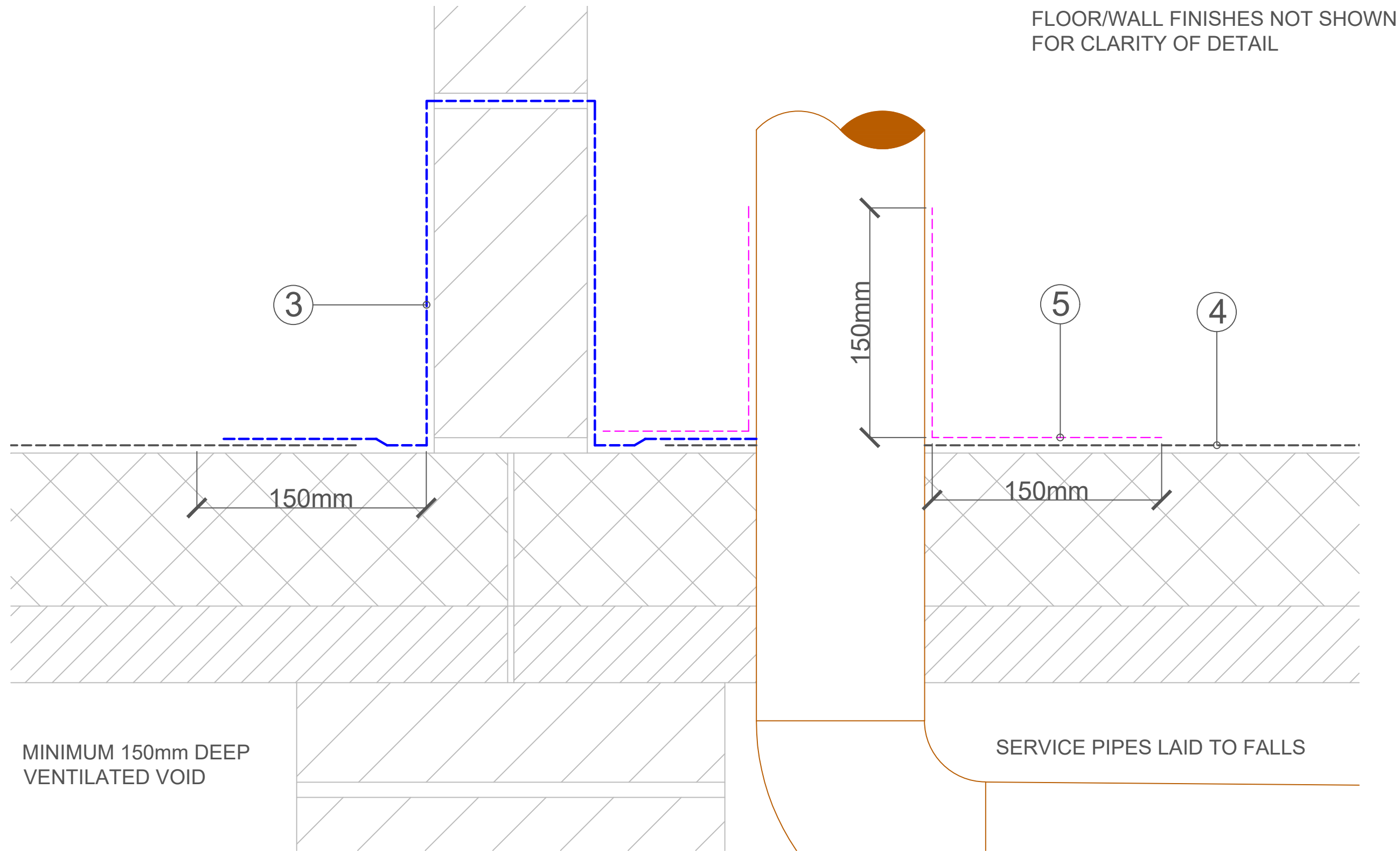
Project Name and Address

Former St. Johns Ambulance Station,
Armoury Drive, Gravesend,
DA12 1NB

Drawing Title

Typical Internal Wall DPC Detail
With Under Floor Wall Ventilation

Project 22852-04	Sheet Rev -
Date 11/10/2022	Drawn By B.Ackroyd
Scale Not to Scale	Size A3



SERVICE PIPE SEALING DETAIL

KEY TO MATERIALS

1. PERISCOPIC AIRBRICK VENT SETS INSTALLED AT MAXIMUM 3M CENTRES AROUND EACH PROPERTY
2. CAVITY TRAY SPECIFICATION 'BY OTHERS'
3. JUTA GP DPC, OF FULLY WELDED SEAM CONSTRUCTION
4. JUTA GP5 GAS BARRIER MEMBRANE OF FULLY WELDED SEAM JOINTS WITH 50mm WELD ONTO DPC
5. JUTA GP SAM (GAS RESISTANT SELF-ADHESIVE MEMBRANE)

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with MTS.DVP.852-BA 3rd Party Design, Testing & Verification Plan.



Warning Health & Safety Information!

This drawing relates to the low/moderate ground gas risk and hydrocarbon vapour issues on this site.

In conjunction with the CDM 2015 regulations we confirm that the site is within an area where ground gas and hydrocarbon vapours may be present, therefore whilst remedial measures may have been performed, there is a residual low risk, caution should be taken when working with contaminated soils.

Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas/vapour mitigation details;

22852-01
22852-02
22852-03
22852-04
22852-05
22852-06

No.	Revision/Issue	Date

Firm Name and Address



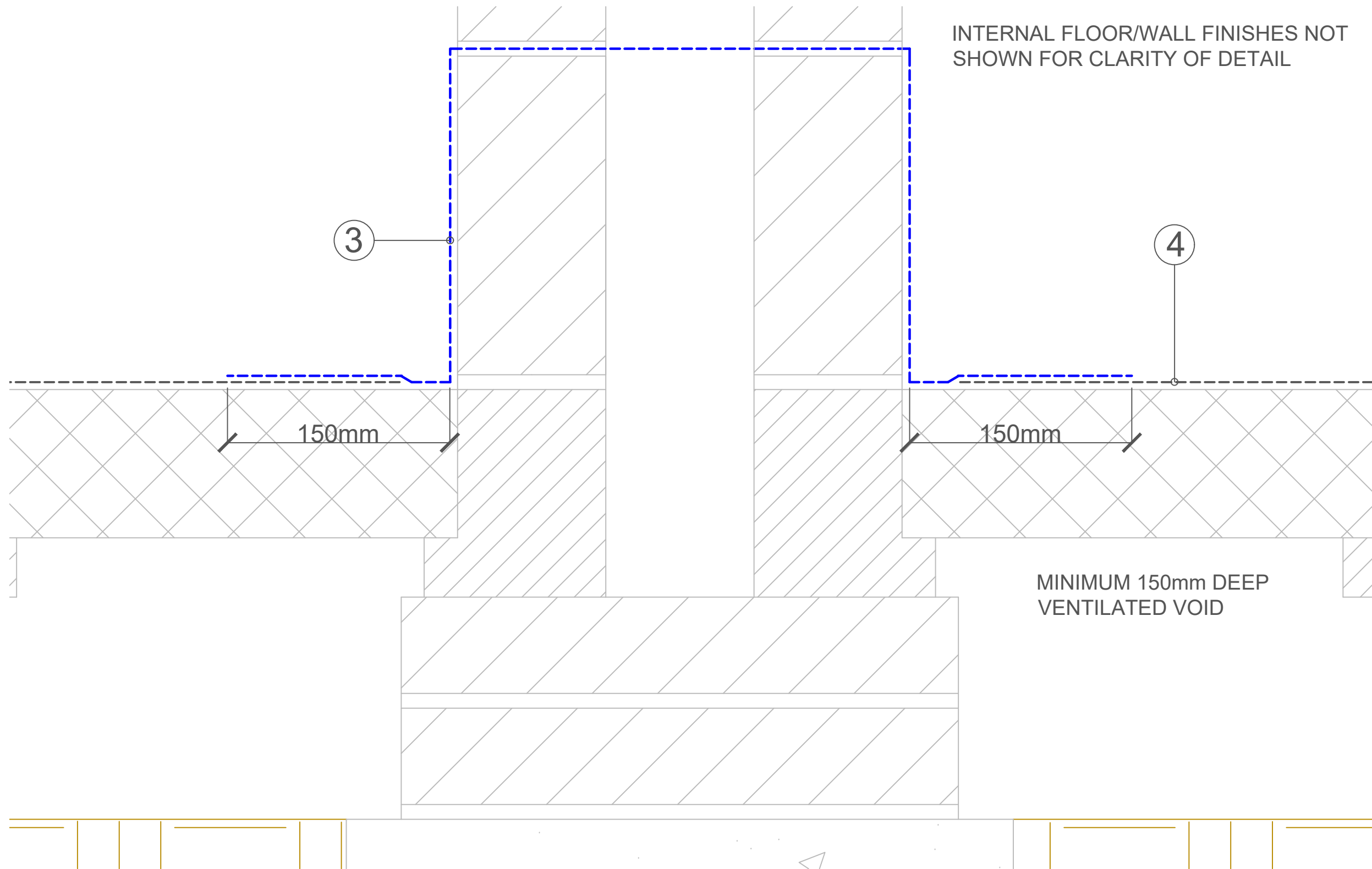
Project Name and Address

Former St. Johns Ambulance Station,
Armoury Drive, Gravesend,
DA12 1NB

Drawing Title

Typical Service Pipe
Sealing Detail

Project 22852-05	Sheet Rev -
Date 11/10/2022	Drawn By B.Ackroyd
Scale Not to Scale	Size A3



General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with MTS.DVP.852-BA 3rd Party Design, Testing & Verification Plan.

Warning Health & Safety Information!

This drawing relates to the low/moderate ground gas risk and hydrocarbon vapour issues on this site.

In conjunction with the CDM 2015 regulations we confirm that the site is within an area where ground gas and hydrocarbon vapours may be present, therefore whilst remedial measures may have been performed, there is a residual low risk, caution should be taken when working with contaminated soils.

Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas/vapour mitigation details;

22852-01
22852-02
22852-03
22852-04
22852-05
22852-06

No.	Revision/Issue	Date

Firm Name and Address

The Studio, Portage House,
Riverside Drive, London,
E16 1JH

0203 4845 117 (24hr)
0203 4845 118 (24hr)
www.mtsid.net

Project Name and Address

Former St. Johns Ambulance Station,
Armoury Drive, Gravesend,
DA12 1NB

Drawing Title

Typical Party Wall Gas Resistant
DPC Detail

Project 22852-06	Sheet Rev -
Date 14/10/2022	Drawn By B.Ackroyd
Scale Not to Scale	Size A3



APPENDIX C

Material Specifications



GP® TITANTECH® DPC

GP® TITANTECH® DPC - Gas and Hydrocarbon Resistant DPC is a unique single layer, embossed High Performance DPC. GP® TITANTECH® DPC is specifically designed and manufactured to perform as a Methane, Carbon dioxide, VOC, Radon and Moisture resistant damp proof course.

Thickness	1.0 mm
Width	1.3 m
Length	20 m
Weight	921 g/m ²

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

GP® TITANTECH® DPC complies with the latest codes of practice as published by BRE, CIRIA and BSI (BS EN 14909, BS8485:2015 and C748). Suitable for use as a High Performance DPC for vertical and horizontal applications. Superior adhesion to mortar is essential for buildings of 3+ storey height.

JUTA GP® TITANTECH® DPC has an embossed surface to create superior mortar adhesion which is essential when being used in 3+ storey applications. JUTA GP® TITANTECH® DPC is compliant to BS EN 14909:2012 and can be used in both vertical and horizontal applications.

Handling

Roll weights can be in excess of 5 kg and hence appropriate care and equipment is required for unloading and handling.





Feature	Characteristics	Test Method	GP® TITANTECH® DPC
Physical Properties	Thickness	EN 1849-2	1.0 mm
	Width	EN 1849-2	1.3 m
	Length	EN 1849-2	20 m
	Weight	EN 1849-2	921 g/m ²
Hydraulic Properties	Water Vapour Permeation	EN 1932	0.08 g/m ² /day
	Resistance to Water Penetration	EN 13967, EN 1928	Pass
	Watertightness	EN 1928	Pass
Mechanical Properties	Resistance to Static Load	EN 12730 - B	20 kg
	Tensile Strength (MD)	EN 12311-1	24 N/mm ²
	Tensile Strength (CMD)	EN 12311-1	22 N/mm ²
	Tensile Elongation (MD)	EN 12311-1	398%
	Tensile Elongation (CMD)	EN 12311-1	446%
	Puncture Resistance	EN 12236	1.25 kN
	Resistance to Tearing (nail shank) MD	EN 12310-1	700 N
	Resistance to Tearing (nail shank) CMD	EN 12310-1	750 N
Durability and Chemical Resistance	Transmission rate of volatile liquids - Diesel	ISO 6179:2010 (B)	0.096 g/m ² /h
	Transmission rate of volatile liquids - Xylene	ISO 6179:2010 (B)	4.845 g/m ² /h
	Transmission rate of volatile liquids - Toulene	ISO 6179:2010 (B)	6.695 g/m ² /h
	Transmission rate of volatile liquids - Petrol	ISO 6179:2010 (B)	5.172 g/m ² /h
	Heat Ageing	EN 1926	Pass
	Chemical Resistance	EN 1847	Pass
	Resistance to Fire	EN 13501-1	Class F
	Resistance to Low Temperature	EN 495-5	Pass @ -40°C
Gas Permeability	Methane Permeability	BS EN ISO 15105-1	28 ml/m ² /day/atm
	Carbon Dioxide Permeability	BS EN ISO 15105-1	<28 ml/m ² /day/atm
	Radon Permeability	K124/02/95	9.5x10 ⁻¹² /m ² /s
Compliance and Certification	CE Mark - EN13967:2012		
	NHBC Standards Compliant		
	BS EN 14909:2012 Compliant		
	BS 8485:2015 Compliant		

Feature	Pre-Compression (N/mm ²)	Characteristic Shear Strength (N/mm ²)
Characteristic Shear Strength	0.2	0.14
	0.6	0.34
	1.0	0.52



Storage

Rolls of JUTA GP® TITANTECH® DPC should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged but should be protected from exposure to UV. JUTA GP® TITANTECH® DPC is classified as non-hazardous and is chemically inert such that it will not react with any acid or alkali environment in which it is used.

JUTA UK

For additional information or assistance, please contact JUTA UK directly.

Installation

JUTA GP® TITANTECH® DPC must be installed in accordance with the guidelines laid out in BS8215:1991, BS8000: part 3 and BS 5628. It can be used in most common floor constructions and is installed in a similar manner to damp proof membrane. For external walls the DPC should be applied 150mm above the adjoining surface and should be linked to a DPM or Gas Resistant DPM in solid floors. The DPC should be applied to a fresh bed of mortar, completely free of projections that may puncture the material or impede the DPC from lying flat.

Joining and Sealing

Sheets of JUTA GP® TITANTECH® DPC must be clean, dry and free from dirt and grease before application of joining tape. JUTA GP® DPC may also be heat welded to the underlying Gas resistant membrane.

Accessory Products

JUTA GP® TITANTECH® DPC is an accessory product for use in combination with GP® 1, GP® 2, GP® H, GP®SAM and GP® TITANTECH® gas protective membranes. It is also compatible with a range of DPM and other DPC materials.

Juta GP[®] 5 Gas Barrier is a multi-layer composite of virgin polyethylene (PE) giving exceptional resistance to the passage of Ground gas and Organic Vapours. It also acts as a high performance DPM.

- Juta GP[®] 5 is suitable for the following applications:
- VOC contaminated sites (Site specific assessment required)
 - Carbon dioxide and methane affected sites in accordance with BS8485:2015+A1:2019 & NHBC
 - Radon affected sites in accordance with BRE211:2015
 - Damp protection in accordance with Building Regulations Part C.

JUTA GP [®] 5			
Characteristics	Test Method	Unit	JUTA GP [®] 5
Physical Properties			
Thickness	EN 1849-2	mm	0.4
Width	EN 1849-2	m	Various
Length	EN 1849-2	m	Various
Weight	EN 1849-2	g/M ²	400
Hydraulic Properties			
Resistance to Water Penetration	EN 1928 (A)	-	Pass
Mechanical Properties			
Resistance to Static Load	EN 12730	Kg	>20
Tensile Strength (MD)	EN 12311-2 (A)	N/50mm	>300
Tensile Strength (CMD)	EN 12311-2 (A)	N/50mm	>300
Resistance to Tearing (Nail Shank) MD	EN 12310-1	N	>230
Resistance to Tearing (Nail Shank) CMD	EN 12310-1	N	>230
Impact Resistance	EN12691-B	mm	500
Puncture Resistance	A5TM D 4833	N	>160
Puncture Resistance	EN12236	kN	1.60
Reaction to Fire	EN 13501-1	-	E
Vapour Permeability			
Methane Permeability	B5 EN ISO 15105-1	ml/m ² /day/atm	0.12
Carbon Dioxide Permeability	B5 EN ISO 15105-1	ml/m ² /day/atm	1.53
Hydrogen Permeability	B5 EN ISO 15105-1	ml/m ² /day/atm	68.7
Benzene Permeability	B5 EN ISO 15105-2	ml/m ² /day	0.41
Oxygen Permeability	B5 EN ISO 15105-2	ml/m ² /day	<3
Radon Permeability	K124/02/95	m ² /s	1.0 x 10 ⁻¹²
Fuel Vapour Permeability			
Petrol	B5 EN ISO 15105-2	/mol/(m ² .s.Pa)	(ave.) 3.4 x 10 ⁻¹³
Diesel	B5 EN ISO 15105-2	/mol/(m ² .s.Pa)	(ave.) 3.4 x 10 ⁻¹³
Durability			
Durability watertightness after artificial ageing	EN1928	-	Pass
Durability watertightness against chemicals	EN1928	-	Pass
Compliance and Certification			
CE Mark - EN13967:2012			
NHBC Standards Compliant			
B5 8485:2015 + A1 2019 Accordant			

Additional Information

HANDLING

Roll weights can be in excess of 20kg and hence appropriate care and equipment is required for unloading and handling.

STORAGE

Rolls of JUTA GP® 5 should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV.

INSTALLATION

JUTA GP® 5 should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015.

JOINTING AND SEALING

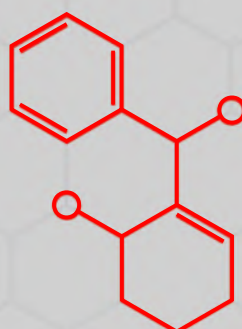
It is recommended JUTA GP® 5 be heat welded where possible, with welding carried out by competent personnel with suitable qualifications in accordance with best practice, and guidance contained within BS 8485:2015. JUTA GP® 5 should be overlapped by at least 100mm. If taping joints, only suitable tape must be used, ensuring application with a silicone roller to remove trapped air. JUTA pre-formed details, or Self Adhesive Gas Membrane are available for sealing around protuberances.

ACCESSORY PRODUCTS

-  JUTA GP® DPC
-  JUTA GP® Tape
-  JUTA GP® Self Adhesive Membrane
-  JUTA GP® Primer
-  JUTA GP® Top Hats and Preformed Corners
-  JUTA GP® Protection Fleece
-  JUTA GP® Void Vent (25/40mm)

PLEASE CONTACT JUTA UK DIRECTLY FOR MORE INFORMATION ON JUTA GP® 5

Contact us to find out more information.
info@juta.co.uk | 01772 754177 | JUTA.CO.UK
Melton Grove Works, Church Road, Lytham, FY8 5PL

**JUTA**

riba
product
selector



Juta UK Ltd,
Melton Grove Works,
Church Road,
Lytham,
Lancashire.
FY8 5PL

Tel: 01772754177
Email: info@juta.co.uk
Web Site: www.juta.co.uk

Our Ref: JUTA GP® 5- New Product

28th October 2021

Dear selected customer,

The following is commercially sensitive, and is issued as confidential. This is not for general circulation.

Following current high demand for our GP® membranes, and increasing concern around the suitability and interpretation of guidance around aluminised foil membranes as gas barriers in large commercial warehousing projects (sheds) - we are accelerating the launch of our next generation gas barrier. We are always listening to market demands, and seeking to improve our product offerings, and achieve greater levels of sustainability throughout our supply chains.

GP®5 is our newest iteration of gas membrane technology, and offers an improvement over existing aluminised foil gas barriers with enhanced resistance to damage from in-situ service stress. We are releasing the GP®5 through selected long term trusted customers only - this is not on general sale, and is positioned to give specialist approved gas membrane installaiton companies access to new technology, and as always, keep ahead of the curve.

B58485:2015 + A1 2019 Table 7 was updated to include benchmark physical characteristics for 'gas membranes' - Notably the minimum requirement for above slab membranes (typically block and beam - housing) as 370gsm and 0.4mm thick between any scrim. As we know the biggest cause of damage to membranes is subgrade condition and follow on trades. Many of the membranes used as gas resistant membranes rely on the aluminium core providing the gas resistance - but as an industry, we have become lazy, and simply look for the <40ml value as 'compliance'. Less thought for their suitability or functionality in the application setting is occurring, and protection of the membrane is often omitted. Durability is a consideration of any design.

In an effort to improve durability and long term performance in industrial site settings, we are introducing the GP®5, as a non-aluminised proprietary gas resistant damp proof membrane, which has fewer limitations on use than the GP®1.

Please rest assured that GP®5 proposed as a proprietary gas resistant damp proof membrane, is offered as one of the most competitive compliant gas membrane on the market, reserved primarily for use through specialist installers, to ensure our end users and clients achieve the best possible standard of install, with the best possible products, at the best possible price; ensuring protective barrier systems are provided with an anticipated design service life in excess of 60 years, which is both a sustainable and cost effective method of a critical geosynthetic application such as gas protection.

Where reinforcement is placed on top of gas membranes, protecting the membrane in consideration of the site conditions would be a requirement in order for design of protective measures to be in line with B58485. The geotextile we propose (geoNETEX A PP TT 300 UVLS) is CE marked for protection, and as such can also form part of our durability statement for protective measures, such that we can provide material warranty for a design service life of at least 60 years (This is a mandated requirement of building regulations). It is worth noting, that other geotextiles on the market offered for this function - do not hold relevant CE marking for this function.



Juta UK Ltd,
Melton Grove Works,
Church Road,
Lytham,
Lancashire.
FY8 5PL

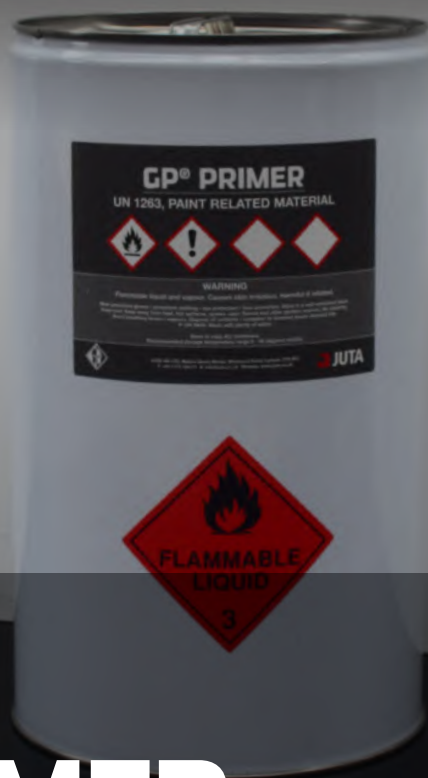
Tel: 01772754177
Email: info@juta.co.uk
Web Site: www.juta.co.uk

I attach for information our TDS, along with our LEED and REACH information and draft warranty.

I trust that this provides an acceptable solution, and maintains current demand for GP® products.
Should you have any queries on the above, please do not hesitate to contact the undersigned.

Best Regards
Patrick Flood

Technical Director
JUTA (UK) LTD
(patrick@juta.co.uk)



GP® PRIMER

GP® PRIMER is a quick drying, cold applied bituminous solution designed to penetrate and seal porous surfaces prior to the application of covering materials. Conforms to BS Code of practice 144, part 3.

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Uses

GP® PRIMER seals porous substrates and encourages the adhesion of bituminous waterproofing systems and sheet coverings. It may be applied successfully to a wide range of surfaces:

- Concrete
- Asbestos Cement
- Slate
- Metals (mild steel, Zinc, Lead)
- Lightweight Concrete screeds

Handling

GP® PRIMER is available in 5 litre and 25 litre containers.

Storage

Storage life indefinite in tightly sealed, undamaged containers.

Health and Safety

Refer to material safety data sheet (MSDS) for a full list of hazards.

Colour	Black
Metal Surfaces	6 - 11 m ² per litre coverage
Concrete	3 - 4 m ² per litre coverage
Bituminous	5 - 8 m ² per litre coverage





Feature	Characteristics
Colour	Black
Metal Surfaces	6 - 11 m ² per litre coverage
Concrete	3 - 4 m ² per litre coverage
Bituminous	5 - 8 m ² per litre coverage
Drying Time	Allow to dry completely before subsequent installation begins. Drying time is dependent on ambient air temperature, atmospheric conditions and porosity of the substrate. Average drying time at 20°C is between 2 - 6 hours.

JUTA UK

For additional information or assistance, please contact JUTA UK directly.

Application

Apply by brush or spray. Surface should be clean, ie. free from all oil, grease, dirt, dust and loose debris. On metal surfaces all loose rust should be removed using a wire bristled brush and where advanced signs of corrosion are evident these areas should initially be treated with a rust inhibitor. Surfaces should preferably be dry although GP® PRIMER will adhere to damp but not wet surfaces. GP® PRIMER should be applied evenly across the surface in one generous coating.



GP® SAM

GP® SAM, gas protection self adhesive membrane, is a bituminous gas proof and water proof sheet, composed of self-adhesive SBS polymer modified bitumen incorporating GP® 1 with an upper surface finish of black reinforced LDPE, and a lower surface finish of siliconized release film. GP® SAM is used for the gas/ waterproofing of underground structures where harmful ground gasses are anticipated, and as a self adhesive accessory to GP® 1.

Thickness	1.2 mm
Width	0.9 m or 0.3 m
Length	20 m
Weight	1100 g/m ²

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Handling

Roll weights can be in excess of 20 kg (approx 33 kg/roll) and hence appropriate care and equipment is required for unloading and handling. This product is non-toxic nor flammable.

Storage

Rolls of GP® SAM should be stored on in a cool, dry place, and be protected from exposure to rain, sun, heat and cold temperatures prior to installation. Exposure to sunlight for extended period of time could cause difficulty with removal of the release film.





Feature	Characteristics	Test Method	GP® SAM
Physical Properties	Thickness	EN 1849-2	1.2 mm
	Width	EN 1849-2	0.9 or 0.3 m
	Length	EN 1849-2	20 m
	Weight	EN 1849-2	1100 g/m ²
Hydraulic Press	Water Tightness	EN 1928	Pass
	Water Vapour Transmission	EN 1931	0.013 g/m ² /day
Mechanical Properties	Tensile Strength (MD/CMD)	EN 12311-2 (A)	500 N/50mm
	Elongation (MD/CMD)	EN 12311-2 (A)	> 12 %
	Resistance to Static Load	EN 12370	20 kg
	Joint Strength	EN 12317-2	> 30 N
	Durability and Water Tightness (Ageing and Chemicals) 60 kPa	EN 1847	Pass
	Resistance to Nail Tear (MD/CMD)	EN 12310-1	> 300 N
	Resistance to Fire	EN 13501	F Euro Class
Gas Permeability	Methane Permeability	EN ISO 15105-1	< 0.68 ml/m ² /day/atm
	Carbon Dioxide Permeability	EN ISO 15105-1	< 2.81 ml/m ² /day/atm
	Radon Permeability	K124/02/95	8.0 x 10 ⁻¹⁵ m ² /S
Compliance and Certification	CE Mark - EN13967:2012 + A1:2017 Type (A/T)		
	BS 8485:2015 Compliant (Methane and Carbon Dioxide Barrier)		

JUTA UK

Please contact JUTA UK Directly for more information on GP® SAM

Installation

GP® SAM should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015, and/or BS 8102:2009.

It is recommended that GP® SAM is not applied in temperatures below 10°C, in colder weather the material can be warmed slightly to aid adhesion.

Accessory Products

- GP® Primer
- GP® Protection Board
- GP® Protection Fleece



APPENDIX D

Project Survey Sheets

Gas Protection Inspection & Validation Record

One record sheet to be completed for each plot inspected by a SUITABLY QUALIFIED independent consultant/engineer

Project Number:		Design Source Ref:		Specification Source/Ref:		Other Documents Attached	Y/N	
Site Name/Location:		Building Use:	Residential	Commercial	Other (Describe)			
Plot Numbers:		Building Description:	No. of Storeys =	Detached	Semi-Detached	Terrace	Apartment Block	
Compiled By:		Gas Protection Type	Active/Passive	Foundation Type:	Suspended Floor/Raft/Other			

Ventilated sub-floor (if present)	Inspection date/time:	Inspected by:	Photographed:	Y/N
Y/N	Notes/Recommendations (see guide below)			
	1. Void Former Type			
	2. Height of Void Space			
	3. Venting Media			
	4. Pipe Size & Spacing			
	5. External Wall Airbricks			
	6. Internal Sleeper Walls			
	7. External Vent Trenches/Ducts			

Gas Barrier	Inspection Date/Time:	Inspected by:	Photographed:	Y/N
Y/N	Notes/Recommendations			
	8. Membrane Type			
	9. Extent of Coverage			
	10. Underside of Membrane			
	11. Slab/Membrane Condition			
	12. Laps & Joints			

Signed:

Date:

INDEPENDENT INSPECTION & VALIDATION CERTIFICATE OF CONFORMANCE

DATE:

PROJECT NAME:

CONTRACT NO:

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified independent consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL)

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of **MembraneTestingSolutions Ltd**

Name:

Dated:

Signed for on behalf of The Client: Name:

Dated:

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

Telephone: 0844 557 3786 • email: sales@mtsltd.net • www.mtsltd.net



Gas Protection Verification Declaration

Site

Site Name test2
Site Address 2 Test Street, Exampleville

GPVS Declaration Reference 0420-C5395

Brief Description of Site

Site description goes here.

Site Type Residential
Plot Number(s) 456 - 458

Document

Verification Report Title test2
Verification Report Identifier N/A
Named Client N/A

EXAMPLE



GPVS Declaration

SGPV Details

SGPV Name	Helen McLennan
SGPV Accreditation No.	SGPV0000
Telephone	05 55 69 72 43
Email	helen.mclennan@claire.co.uk
Organisation	Testers Ltd
Address	10 Testing Road, Little Testing, TF5 1GR

Declaration

I, Helen McLennan, confirm that I am the person described in the SGPV Accredited Person details section and hold a current valid registration as a SGPV Accreditation No. SGPV0000 under the Gas Protection Verification Accreditation Scheme.

I have reviewed the verification report described in the Document Details section and I am satisfied that:

1. The work has been carried out to an acceptable standard.
2. The work has been verified by suitably experienced and qualified personnel.
3. The level of verification is proportionate to the level of risk identified in the Site Investigation report/Gas risk assessment.
4. The interpretations and conclusions are reasonable.
5. The verification strategy is in line with industry guidance.
6. I am competent to sign this Declaration and that
 - a. I am fully aware and comply with the Scheme's Code of Conduct
 - b. The work of this review and Declaration are within the limits of my knowledge, competence and professional capacity.

Note: The document that has been reviewed was prepared by the organisation named for the benefit of the named Client who has reliance upon it. Any professional liability arising from any proven negligent act or omission by the Company carrying out the work and publishing the document rests with that Company and not with the GasA Registered Person or the GPVS.

Signed:

Date:

Name:

[Block capitals]



0420-C5395

GROUND GAS/VAPOUR MITIGATION MEASURES,
3rd PARTY INDEPENDENT INSPECTION,
TESTING & VALIDATION REPORT:

FOR MATERIALS INSTALLED AT:

FORMER ST. JOHN'S AMBULANCE STATION,
ARMOURY DRIVE, GRAVESEND
KENT, DA12 1NB

Document Reference No: MTS.VR.852-BA

Client: Sevenoaks Environmental Consultancy Ltd

Dated: July 2024



Gas Protection Verification Declaration

Site

Site Name	Former St. Johns Ambulance Station, Gravesend.
Site Address	Former St. Johns Ambulance Station, Armoury Drive, Gravesend, Kent, DA12 1NB
GPVS Declaration Reference	0724-J0234

Brief Description of Site

This project includes the construction of 6no residential properties comprising of 2no detached and a block of 4 terraced plots. The site is a former St. Johns ambulance garage with above an ground fuel storage tank. The site had suffered a gas pipe leak, therefore a gas/vapour resistant membrane was specified in the site investigation report. MTS Ltd performed gas/vapour mitigation design which was installed by PrestigeAir Technologies Ltd using NVQ Level 2 qualified operatives with welded joints where possible. The project was 100% validated on site by our NVQ Level 4 qualified and CL:Aire TGPV accredited validation surveyor proving a pass in full. This declaration relates to plots 1-6 inclusive being verified in line with the contents of the CIRIA C735 best practice document.

Site Type	, Residential
Plot Number(s)	Plot No's 1-6 Inclusive

Document

Verification Report Title	Ground Gas/Vapour Mitigation Measures, 3rd Party Independent Inspection, Testing & Validation Report
Verification Report Identifier	MTS.VR.852-BA dated 23.7.2024
Named Client	Sevenoaks Environmental Consultancy Ltd

Accredited Person Details

SGPV Name	Barrie Ackroyd
SGPV Registration No.	SGPV0002
Telephone	07884 210081
Email	sales@mtsltd.net
Organisation	Membrane Testing Solutions Ltd
Address	Parsonage House, Parsonage Street, Halstead, CO9 2JR

Declaration

I, Barrie Ackroyd, confirm that I am the person described in the Accredited Person details section and hold a current valid registration as a SGPV, Accreditation No. SGPV0002 under the Gas Protection Verification Accreditation Scheme.

I have reviewed the verification report described in the Document Details section and I am satisfied that:

1. The work has been carried out to an acceptable standard.
2. The work has been verified by suitably experienced and qualified personnel.
3. The level of verification is proportionate to the level of risk Identified in the site investigation report/Gas risk assessment.
4. The interpretations and conclusions are reasonable.
5. The verification strategy is in line with industry guidance.
6. I am competent to sign this Declaration and that
 - a. I am fully aware and comply with the Scheme's Code of Conduct
 - b. The work of this review and Declaration are within the limits of my knowledge, competence and professional capacity.

Note: The document that has been reviewed was prepared by the organisation named for the benefit of the named Client who has reliance upon it. Any professional liability arising from any proven negligent act or omission by the Company carrying out the work and publishing the document rests with that Company and not with the SGPV Accredited Person or the GPVS.

Signed:



Date:

23.7.2024

Name:

[Block capitals]

BARRIE ACKROYD



0724-J0234



Client Name: Sevenoaks Environmental Consultancy Ltd
Reference: MTS.VR.852-BA
Issue: **FINAL**
Date: 23rd July 2024

Approval Status: **PASS In FULL**

Prepared by: Debbie Duffin
Position: Report Author

Checked by: Barrie Ackroyd
Position: Managing Director

A handwritten signature in black ink, appearing to read 'Barrie', positioned above a dotted line.

This 3rd party ground gas/vapour mitigation, testing & validation report has been prepared by Membrane Testing Solutions Ltd with all reasonable skill, care & diligence within the terms of the contract with the client, incorporation of our General Terms & Conditions of Business & considering the resources devoted to us by agreement with the client.

We disclaim any responsibility to the client & others in respect of any matters outside the scope of the above.

This 3rd party ground gas/vapour mitigation, testing & validation report is confidential to our client & we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on this report at its own risk.



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Appendix A – Validation Surveyors Certificates of Competence

Mr Barrie Ackroyd (MTS Ltd)
Mr Michael A Smith (MTS Ltd)

Appendix B – Design Drawings**Sevenoaks Environmental Drawing;**

- 4551-03 Rev 01 – Site Location Plan

ADM-BPTW Drawings;

- ADM-BPTW-01-ZZ-DR-A-1701-P02 – 2B4P Flats Floor Plan Layouts
- ADM-BPTW-02-ZZ-DR-A-1702-P04 – 182P Bungalow Floor Plan Layouts

Architectural Design Lab Ltd Drawing;

- DL-SUB-01 Rev - - Substructure Details, Ground Floor – Ground 150mm Below FFL

MTS Ltd Drawings;

- 22852-01 – Typical Perimeter Wall (Un-Ventilated) Gas Mitigation Section Detail
- 22852-02 – Typical Perimeter Wall (Ventilated) Gas Mitigation Section Detail
- 22852-03 – Typical Door Threshold Detail
- 22852-04 – Typical Internal Wall DPC Detail With Under Floor Wall Ventilation
- 22852-05 – Typical Service Pipe Sealing Detail
- 22852-06 – Typical Party Wall Gas Resistant DPC Detail

Appendix C – Material Specifications

- JUTA GP DPC
- JUTA GP5 Gas Barrier Membrane
- JUTA GP Bitumen Primer
- JUTA GP SAM (Gas Resistant Self-Adhesive Membrane)

Appendix D – Project Survey Sheets

Gas Protection Inspection & Validation Record
Independent Inspection, Testing & Validation - Certificate of Conformance

Appendix E – Digital Copy of this Report & Site Photographs

(All contained on USB Storage Device)



EXECUTIVE SUMMARY

1. LIMITATIONS

MembraneTestingSolutions Ltd (MTS Ltd) have prepared this 3rd party ground gas/vapour mitigation independent inspection, testing, & validation Report in accordance with the instructions of Sevenoaks Environmental Consultancy Ltd (the Client) under the terms of the appointment for the 3rd party ground gas/vapour mitigation system design, installation inspection, testing, validation & reporting.

This 3rd party ground gas/vapour mitigation independent inspection, testing & validation report is limited to the proposed ground gas/vapour protection measures installed to the building meeting industry & current best practices. MTS Ltd have provided ground gas mitigation design proposals for this site, therefore professional Indemnity liability is limited to £2M for our validation works only & to ensure the specified ground gas/vapour mitigation measures meet site specific contaminants.

This 3rd party ground gas/vapour mitigation independent inspection, testing & Validation Report has been prepared in accordance with the information currently received, along with industry best practices & in conjunction with the relevant best practice & guidance documents listed below, of which our MD was a contributor & member of the steering committee for the Ciria C735 publication “Good practice on the testing & verification of protection systems for buildings against hazardous ground gases” (2014). MTS Ltd were also a contributor & part funder on the steering committee for the CIRIA 795 project, Fitting of Gas Protective Measures to Existing Buildings (2020) & also the new Ciria C801 Hazardous ground gas – a site management guide released in December 2021.

We are pleased to advise that our Managing Director Mr Barrie Ackroyd has successfully completed the Validation & Integrity Testing Course provided by the British Geomembrane Association for validation, which is also backed by the CITB. Membrane Testing Solutions Ltd are a member of the British Geomembrane Association, CQMS/SSIP, The Radon Council, The Property Care Association, CL:Aire & we are proud to be a founding member of the British Verification Council (BVC).

Mr Ackroyd has achieved the Level 3 Assessors Award for the NVQ Level 4 qualification in Validation of Ground Gas Protection Systems, Level 4 NVQ Diploma in Verification of Ground Gas Protection Systems, we are also pleased to advise he has successfully achieved CL:Aire accreditation as a Specialist in Gas Protection Validation (SGPV), & our Senior Validation Surveyor Mr Michael Anthony Smith has qualified in the NVQ Level 4 for Verification of Ground Gas Protection Systems (assessed by others) & has achieved CL:Aire TGPV accreditation.



Guidance Reference Documents:

Ground Gas Handbook “NHBC Guidance on evaluation of development proposals on sites where methane & carbon dioxide are present” (2007)

Ciria C665 “Assessing risks posed by hazardous ground gases to buildings” (2007)

Ciria C716 “Remediating & mitigating risks from volatile organic compound (VOC) vapours from land affected by contamination” (2012)

Ciria C735 “Good practice on the testing & verification of protection systems for buildings against hazardous ground gases” (2014)

Ciria C748 “Guidance on the use of plastic membranes as VOC vapour barriers” (2014)

BS 8485:2015+A1:2019 “Code of practice for the design of protective measures for methane & carbon dioxide ground gasses for new buildings” (2019)

Ciria C795 “Retrofitting hazardous ground gas protection measures in existing or refurbished buildings” (2020)

Ciria C801 – Hazardous ground gas – a site management guide (2021)



2. BACKGROUND INFORMATION

MembraneTestingSolutions Ltd (MTS Ltd) were approached by Mr Alistair Stocks of Sevenoaks Environmental Consultancy Ltd via telephone & subsequent email on the 1st September 2022 @ 17:11 having worked with ourselves on numerous projects previously.

The project included the redevelopment of 6no properties, comprising of a block of 4 terraced properties & 2no detached bungalows. The site is located at:

The Former St. Johns Ambulance Station, Armoury Drive, Gravesend, Kent, DA12 1NB.

Sevenoaks Environmental Consultancy Ltd performed a site investigation on site & also produced a Gas Risk Assessment Addendum letter report which showed a GSV of 0.0292l/hr which corresponds to a CS1 (C665) however given that Carbon Dioxide concentrations were recorded in excess of 5% a precautionary approach was recommended to raise the site characteristic situation 2 (C665).

However, given that the site was formerly used as a garage with an above ground tank & also part of a barracks, along with a recent gas pipe leak to the northern part of the site, a hydrocarbon resistant barrier was also recommended to be included within the design of the ground floor slabs.

On the basis of the information received, MTS Ltd provided the client with a quotation for the 3rd party gas/vapour mitigation design using gas/vapour resistant materials for the project, along with a quotation for 3rd party inspection, testing & validation of the installed vapour/gas mitigation measures.

MTS Ltd were initially commissioned by the client to provide a ground gas/hydrocarbon vapour mitigation design & verification plan only for the project. We issued our Ground Gas/Vapour Mitigation Design & 3rd Party Independent Inspection, Testing & Verification Plan ref: MTS.DVP.852-BA dated 14th October 2022 to the Client for submission to the local authority.

We were later employed by the Client to provide our 3rd party independent validation services on this project.

The following is our final report of the 3rd party independent inspection, testing & validation performed by MTS Ltd on this project.

3. GROUND GAS MONITORING

MTS Ltd received an addendum letter report performed by Sevenoaks Environmental Consultancy Ltd for the site which is as follows;

- Ground Gas Risk Assessment Addendum Letter Report, Ref: 4551 22 07 11 Ltr Rpt 01 rev A AS SP dated 11th July 2022

Below is a precis of the contents of this addendum letter;



145a Hastings Road
Pembury
Tunbridge Wells
Kent, TN2 4JU

Tel: 01892 822 999

www.sevenoaksenvironmental.co.uk
enquiries@sevenoaksenvironmental.co.uk



Samuel Parry,
The Longley Group,
Unit 4 Brook Court,
Blakeney Road,
Beckenham,
Kent,
BR3 1HG

11th July 2022

Our Ref: 4551 22 07 11 Ltr Rpt 01 Rev A AS SP

Dear Samuel,

SITE: Armoury Drive, Gravesend, DA12 1NB
SERVICE: Ground Gas Risk Assessment Addendum Letter Report

Introduction

The work covered in this report was undertaken on behalf of The Longley Group, in accordance with Sevenoaks Environmental Consultancy Ltd's (SEC) proposal dated January 2022 (Ref: 4551 22 01 05 Ltr 01 FPA 01 REV A LB CW). This addendum provides comment on the environmental ground gas monitoring carried out as part of the previous site investigation and should be read in conjunction with the Preliminary Geo-Environmental Site Investigation Report (Ref: 4551 22 04 21 Rpt 06 Rev B EH CW) previously provided.

The site was noted to form an approximately 'L' shaped plot previously occupied by a former St John's Ambulance Garage and a Water Tower Structure with associated tarmac hardstanding (See attached Figures 1 & 2 – Site Location Plan and Existing Site layout Plan). The approved proposed development associated with the planning application (Ref: 2020/0561) is understood to involve the construction of 1 No. 2-storey block of flats to the western end of the site and 2No. detached bungalows to the eastern end with gardens and areas of soft landscaping (see attached Figure 3 – Proposed Development Plan).

As part of the Geo-Environmental Site Investigation referred to above, SEC were instructed to carry out 9no. environmental ground gasses and groundwater monitoring visits. Details of the standpipes installed and their response zone backfill / materials have been provided in the relevant attached Exploratory Hole Records. Also see attached the Exploratory Hole Location Plan.

Assessment

9 No. rounds of environmental ground gas monitoring was carried out between 9th March 2022 and 7th July 2022 and included 2no. rounds of monitoring undertaken at periods of low atmospheric pressure to help inform a preliminary ground gas risk assessment given consideration of the potential on site sources of ground gas that have been identified which include the following:



- Made Ground associated with the sites former use as a garage and its potential use for storage and leaks of oils/paints/fuels and identified to contain elevated concentrations of PAHs;
- Former site use as a garage with an above ground tank and as part of a barracks;

Off-site sources of potential contamination identified primarily included an infilled chalk pit ~167m north east (1954 – 1981), tanks 76m north east (1954 – 1993) and 49m south east (1954 – 1978)

Based on the rounds of monitoring conducted, concentrations of carbon dioxide were recorded to be typically below 5% although the highest concentration recorded was 7.3% by Vol (WS05). Methane concentrations were generally low although spikes up to ~45% (WS05 monitoring round No. 5) were recorded. This spike in methane was identified for the first few seconds of monitoring at WS05 and then the methane concentration reduced back down to 0% by Vol. During the other visits concentrations of Methane were not recorded to be elevated, except for visit No. 6 where another methane spike was recorded for a few seconds before returning to 0% by Vol. No elevated concentrations of VOCs were recorded and flow rates were recorded up to a maximum of 0.4l/hr (WS01 and WS05) (see attached Environmental Monitoring data).

Of potential relevance it is known that a gas main leak occurred nearby to the north of the site, which was reportedly repaired in the early part of 2022. However during the environmental ground gas monitoring visits and also prior to the conduct of the previous Site Investigation (which was after the reported repair was made) a strong methane odour has been observed within the manhole located adjacent to the north of the site in Albert Murray Close which is also incidentally close by to WS05.

Discussion and Recommendations

The results of the environmental ground gas monitoring indicate that a ground gas screening value of 0.0292 l/hr is applicable to the site. This corresponds with Characteristic Situation 1 of the current CIRIA C665 guidance. However, given that carbon dioxide concentrations have been recorded in excess of 5%, spikes of highly elevated methane have been recorded on site and the apparently persistent methane which continues to collect within a manhole adjacent to the site possibly associated with the gas main leak adjacent to the north of the site, it is recommended that a precautionary approach be adopted with respect to potential ground gas risks on site. Accordingly it is recommended that Characteristic Situation 2 of CIRIA C665 Guidance should be adopted for the site.

Based upon the assumption that the proposed building will comprise a Type A Building as described in the BS 8485:2015 guidance i.e. private housing with small sized rooms, it is recommended that at least 2 No. different design measures be employed within the design of the proposed building in order to reach a minimum gas protection score of 3.5 points. Inclusion of a passively vented sub-floor void and low permeability hydrocarbon resistant gas protection membrane within the design would achieve the required points (however please refer to Tables 5, 6 and 7 of the BS 8485:2015 guidance for



further details). Please note that all joints and penetrations should be appropriately sealed and that protective measures should be fitted appropriately in accordance with the manufacturer's specification and current guidance including BRE414 and BS8485.

At an early design stage prior to construction a Verification Plan detailing the gas protection materials' specifications, methodology of installation, installation design and the installers qualifications and experience should be produced by a suitably qualified independent specialist for submission to the Regulators for their approval prior to installation of the protection measures to avoid proceeding at risk. A suitably qualified independent specialist should also produce a Validation Report in accordance with C735 for the membrane installation to certify the installation of the protective measures complies with the requirements of the Verification Plan.

It is recommended that the existing monitoring boreholes should be retained until the ground gas risk assessment has been approved by the Regulators.

Potential residual risks should be mitigated by the implementation of a Discovery Strategy on site during the redevelopment works which should include for the immediate reporting of any potential indicators of ground or water contamination (e.g. cement bonded asbestos sheeting fragments, ash/clinker or hydrocarbon odours) for additional separate assessment by an Environmental Consultant. Additionally groundworkers should wear appropriate PPE/RPE, work in well ventilated areas, avoid confined spaces, avoid contact with soil and groundwater, not smoke, adopt high standards of personal hygiene, and operate with due care.

It is also noted that the recommendations made in the previous Geo-Environmental Site Investigation report remain applicable and are reiterated below for reference;

- That prior to the proposed development, all general rubbish and drums of fuel should be appropriately removed from site and disposed of at suitably licensed facilities (all waste disposal documents to be retained);
- That the existing potentially coal tar rich tarmac surfacing be disposed of from site to suitably licensed waste management facilities as hazardous waste under waste code 17 03 01. All waste disposal documentation should be retained for inclusion within a future Validation Report. To help facilitate appropriate waste disposal from site, the tarmac surfacing should be carefully excavated and segregated from the underlying material under the supervision of an Environmental Consultant;
- That a watching brief be maintained by an Environmental Consultant during the removal of the hardstanding across the site and in particular the ground slab of the former buildings. Confirmatory validation samples should be recovered for analysis to confirm an absence of impact associated with contaminants of concern including metals, PAHs, hydrocarbons and asbestos;
- That remedial excavation be conducted to remove the lead and asbestos impacted Made Ground identified on site for appropriate disposal to suitably licensed facilities. Remedial excavation should be overseen by an Environmental Consultant and be certified by soil validation sample analysis from the sides and base of the remedial excavation. Any imported backfill material (e.g. engineered fill / aggregate, subsoil or topsoil) should be chemically validated in relation to suitability for use on site as part of the proposed development, including the review of the supplier's chemical batch data prior to import and chemical analysis of validation samples following importation to site;



- That an asbestos picking exercise be conducted during the excavation of asbestos impacted material locally to TP01 and TP03, to remove fragments of cement bonded asbestos sheeting for separate disposal. Asbestos picking should be conducted by Category A & B Asbestos Awareness trained operatives and to help mitigate potential Health and Safety risks appropriate PPE / RPE should be worn by operatives during the remedial excavation and asbestos picking, including disposable suits and RPE;
- That all waste arisings should be disposed of from site appropriately in accordance with EA WM3 guidance. The impacted Made Ground should be disposed of as Non-Hazardous waste under waste code 17 05 04 and picked asbestos containing material fragments as Hazardous waste under waste code 17 06 05. All arisings should be segregated based on waste stream types and according to waste classification. All waste disposal tickets should be retained;
- That a "clean" cover system be provided to a minimum thickness of 475mm across landscaped / garden areas. The cover system should comprise the provision of a high visibility marker layer (permeable geotextile or similar) overlain by imported certified "clean" topsoil to the required minimum thickness. Subject to existing and proposed site levels it may be necessary to remove some existing soils to facilitate the cover system. Prior to delivery of any imported topsoil to site, the supplier's chemical batch data should be provided to an Environmental Consultant for review and following provision of the cover system to landscaped areas it should be validated by an Environmental Consultant. This should include chemical analysis of a representative number of imported cover system validation samples based on a minimum frequency of 1 validation sample per garden / landscaped area as a minimum or 1 sample per 50m³ per material source for larger areas. In addition the thickness of cover system should be certified;
- That the water supply pipework included within the design of the proposed development should be chemically resistant barrier pipe. Alternatively the water supplier should be contacted to confirm chemically resistant barrier pipe is not required;
- That groundworkers should wear appropriate PPE/RPE, work in well ventilated areas, avoid confined spaces, avoid contact with soil and groundwater, not smoke, adopt high standards of personal hygiene, and operate with due care;
- That a Discovery Strategy should be implemented on site during the redevelopment work which should include for the immediate reporting of any potential indicators of ground or water contamination e.g. asbestos fragments, ash / clinker or hydrocarbon odours for separate assessment by an Environmental Consultant;
- That prior to the conduct of any remedial work, a Remedial Method Statement should be approved by the Regulators; and
- That any remedial work conducted on site as part of the proposed development should be certified and documented within a Validation Report produced by an Environmental Consultant.



Kind Regards

Damian Jones
Managing Director
d.jones@sevenoaksenvironmental.co.uk

Enc.

Site Location Plan
Existing Site Layout Plan
Proposed Site Layout
Exploratory Hole Location Plan
Exploratory Hole Records
Environmental Monitoring
General Limitations and Exceptions

End of précised text

It has been assumed by MTS Ltd that the project has been allowed to progress through to the construction stage.

Based on the information received from the Client & noted presence of Hydrocarbon Vapours, MTS Ltd have assumed to mitigate against a site Characteristic Situation 2, in accordance with CIRIA C665.

4. BS 8485:2015+A1:2019 COMPLIANCE

Using the tabled contents of the BS 8485:2015+A1:2019 document, the gas mitigation measures installed may be calculated by the following table;

<u>Table 3,</u> Building Type	<u>Table 4,</u> Gas Protection Score by CS & Type of Building	<u>Table 5,</u> Gas Protection Scores for the Structural Barrier	<u>Table 6,</u> Gas Protection Scores for Ventilation Protection Measures	<u>Table 7,</u> Gas Protection Score for the Gas Resistant Membrane
Type A = Private	CS2 + Type A = Points required by the design = 3.5 Points	Precast suspended segmental subfloor (i.e. beam & block) = 0 Points	Passive ventilation of 'Good Performance' = 1.5 Points	Membrane installed & validated in accordance with the CIRIA C735 =2.0 Points

Total 'MINIMUM' Points Score Achieved from the Above = (T6 = 1.5 + T7 = 2.0) = **3.5 Points Achieved**, which meets the requirements of the BS 8485:2015+A1:2019 document.

However, the BS 8485:2015+A1:2019 should not be used to calculate a points score for hydrocarbon vapour mitigation design measures as this document is only for Carbon Dioxide & Methane, as is noted in the following precis text;

Annex H (informative) Volatile organic compounds (VOCs)



H.1 General

This British Standard does not consider the risks associated with VOC gases, primarily as the methods of measurement and risk assessment do not fully align with those for other ground gases (see BS 8576). However, as there are similarities in the methodology for mitigation of the effects of VOCs entering indoor or ambient air spaces, this annex is included to give the reader a background to the subject and to suggest further reading.

Therefore, our design included for a proprietary gas & vapour resistant membrane to be placed across the complete footprint of the properties, of fully welded & tested seam construction. Gas & vapour resistant DPC's were to be installed using hot air hand welding seaming techniques, with detailing provided using gas resistant self-adhesive tape joints around corner/door reveal detailing & service pipes.

5. PASSIVE VENTILATION SYSTEM

MTS Ltd confirm that a Passive Ventilation System of 'Good Performance' has been installed on this project.

6. DESIGN DRAWINGS

MTS Ltd received drawings for this project inclusive of proposed layout & ground level details;

Sevenoaks Environmental Drawing;

- 4551-03 Rev 01 – Site Location Plan

ADM-BPTW Drawings;

- ADM-BPTW-01-ZZ-DR-A-1701-P02 – 2B4P Flats Floor Plan Layouts
- ADM-BPTW-02-ZZ-DR-A-1702-P04 – 182P Bungalow Floor Plan Layouts

Architectural Design Lab Ltd Drawing;

- DL-SUB-01 Rev - - Substructure Details, Ground Floor – Ground 150mm Below FFL

MTS Ltd Drawings;

- 22852-01 – Typical Perimeter Wall (Un-Ventilated) Gas Mitigation Section Detail
- 22852-02 – Typical Perimeter Wall (Ventilated) Gas Mitigation Section Detail
- 22852-03 – Typical Door Threshold Detail
- 22852-04 – Typical Internal Wall DPC Detail With Under Floor Wall Ventilation
- 22852-05 – Typical Service Pipe Sealing Detail
- 22852-06 – Typical Party Wall Gas Resistant DPC Detail

The drawings are appended in Appendix. B of this report.

7. MATERIAL SPECIFICATIONS

The ground gas resistant materials installed are as follows;

- JUTA GP DPC
- JUTA GP5 Gas Barrier Membrane
- JUTA GP Bitumen Primer
- JUTA GP SAM (Gas Resistant Self-Adhesive Membrane)

The above Material Specifications may be found appended in Appendix. C of this report.



8. ACCEPTED GROUND GAS MITIGATION DESIGN

The proposed ground gas/vapour mitigation measures for the site will include the following:

1. The ground floor slabs are to be constructed using a concrete beam & block system with a minimum 150mm ventilated void below. Periscopic airbricks will be installed on opposing sides of each property & at the maximum distance of 3m centres & no more than 450mm from the corners. Any internal underfloor obstructive walls with have openings left within the walls to allow for free & unhindered air flow through the complete underfloor void & decompartmentalising any otherwise unventilated floor areas. This system will provide a passive ventilation system of 'Good Performance' whereby meeting a minimum points score of 1.5 as defined by Table 6 of the BS 8485:2015+A1:2019 best practice document.
2. It is assumed the method of construction will be perimeter & infill whereby the gas/vapour resistant DPC's will be installed to the perimeter & internal walls/party walls & left laying on the beam & block floor slab by 150mm to connect onto at a later date. All membrane seams to be welded wherever possible corner seams overlain with gas resistant self-adhesive membrane.
3. Any service pipes that are close to walls are to be completed at the DPC stage to ensure the detailing is maintained as easy as possible.
4. The properties are then constructed & made watertight. The gas/vapour membrane is to be installed to each property internal areas immediately prior to insulation & screed.
5. The existing beam & block floor slabs are to be thoroughly cleaned & any dips, hollows filled & any sharp protrusions removed.
6. A proprietary & high-performance gas/hydrocarbon vapour barrier membrane is to be installed above the beam & block floor slabs, which will cover the entire internal room footprint of each property. The Juta GP5 gas membrane will be welded together & also to the existing GP DPC laying on the floor.
7. Any damage on the GP DPC will be repaired using welded patches of parent DPC membrane or using patches of GP SAM extending 50mm in all directions from the extent of any damage.
8. Any service pipe entries are to be sealed using JUTA GP SAM 150mm up the service pipe & 150mm onto the JUTA gas/vapour resistant membrane.
9. At door threshold the GP5 membrane is to be taken up the perimeter masonry & terminates on top of the external masonry.
10. Any holes in the gas/vapour membrane must be repaired using the parent membrane with welding seaming actions or patches of GP SAM.
11. The gas/vapour resistant DPC's & membranes are to be validated once the membrane installation has been completed, where the whole installation is to be offered for validation & without any operatives being admitted into the property until validation/testing has taken place.
12. Upon completion & sign off by the validation surveyor, the membrane must be cordoned off & only ongoing floor finishes installation operations are permitted above the unprotected materials. All foot traffic is to be kept off the exposed membrane. Or: The gas/vapour membrane is protected using approved walkways reducing foot traffic during insulation installation operations.
13. A final sign off validation report will be produced at the end of the installation process & submitted to the local authority for clearing planning conditions pertaining to gas/vapour contamination.

9. GAS MEMBRANE INSTALLATION CONTRACTOR

MTS Ltd confirm that as the project was classed as CS2 'low Risk' (C665) the Client employed specialist NVQ Level 2 qualified gas membrane installers who were able to perform welded joints in-line with the NVQ Level 2 qualification syllabus. The specialist installers employed by the client are as follows;

Prestige Air Technology Ltd
Landews Meadow, Green Lane, Challock, Ashford, TN25 4BL
Contact: Mr Andy Collins
Tel: 01233 740844
Email: andy@prestigeair.com



The above company employ a full workforce who are specialist NVQ Level 2 qualified operatives.

Cskills Awards L2 NVQ Diploma in sub-structure work occupations (construction) – Installation of gas membranes: <http://tinyurl.com/lj8w7ay>

10. APPROVED INSPECTION, TESTING & VALIDATION REGIME

It was proposed that the installed gas protective materials were to be 3rd party independently inspected, tested & validated in accordance with the Ciria C735 best practice document by a competent & qualified validation surveying company, namely Membrane Testing Solutions Ltd.

Due to the perceived CS2 'low' gas risk & presence of Hydrocarbon Vapours associated with the site, along with installation of ground gas mitigation measures by specialist installation operatives, it was proposed to apply a 'lower Level' of validation processes on this project.

The gas mitigation measures were validated during 3no Site Visits that met with the installation programme. It was proposed that our validation processes included 100% detailed visual inspection & seam pick probe testing of installed membrane seams submitted for inspection, all in accordance with the CIRIA C735 best practice document.

No membranes were validated & signed off by MTS Ltd until a minimum acceptable standard was achieved, ensuring the membrane installation was suitably managed to achieve maximum confidence in the suitability of the installed materials.

10.1 INSPECTION, VALIDATION & TESTING METHOD STATEMENT

1. The area presented for inspection & validation is to be classified as the test zone.
2. The gas membrane installation zone shall be 100% visually inspected for any defects, inclusive of material manufacturing faults, localised mechanical damage, installation process imperfections, seam imperfections & the like. Any defects will be marked on the gas/vapour membrane using spray line marker paint, sequentially numbered & marked on a membrane defect plan.
3. Any seam defects will be marked on the gas/vapour membrane, sequentially numbered & marked on a membrane defect plan.
4. Any material/seam defects are to be repaired by the installation contractor using the manufacturers recommended repair methods, with the repairs visually re-inspected by the validation surveyor.
5. On completion of the inspections the gas/vapour membrane test area will then be signed off & certified as integral.
6. Protective cover material may then be applied to the surface of the membrane as indicated by the materials manufacturer prior to follow on construction works commencing.
7. On satisfactory completion of the inspection works MTS Ltd will provide an area sign off certificate being signed by the client's responsible person or someone acting on their behalf.
8. Upon completion of the inspection works for the project, MTS Ltd will prepare & complete a Final Sign Off Report inclusive of photographic record for the Client for submission to the local Authority for clearing of the planning conditions pertaining to ground gas contamination.

The Validation Surveyor:

- Performed a detailed visual & intimate Inspections:
- Performed seam testing the membrane seams:
- Marked & identified any repairs required:
- Re-inspected & re-tested any repairs:
- Completed the project surveysheets:
- Took photographs for inclusion in the final validation report:
- Produced a final Validation Report at the end of the installation process:



11. MTS LTD VALIDATION PROCESS

MTS Ltd performed the following validation process at the Former St. John's Ambulance Station in accordance with the following;

Event no.	Date	Type of Event	Plot(s)	Works	Outcome
1	05/05/2023	Site Visit	Plot 1	JUTA Gas Resistant DPC	PASS in FULL
			Plot 2		
			Plot 3		
			Plot 4		
			Plot 5		
			Plot 6		
2	28/09/2023	Site Visit	Plot 5	Gas/Vapour Membrane Infill	PASS in FULL
			Plot 6		
3	23/02/2024	Site Visit	Plot 1	Gas/Vapour Membrane Infill	PASS in FULL
			Plot 2		
			Plot 3		
			Plot 4		

The Project Survey sheets can be found appended in Appendix D of this report.

12. INDICATIVE INSTALLATION & VALIDATION TESTING PHOTOGRAPHS

MTS Ltd took a number of photographs throughout the duration of our validation process, the photos shown within this report are an excerpt of the photographs received & taken on site by MTS Ltd which are indicative of the installed membrane & validation processes performed by us on this project.



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INSTALLATION & VALIDATION PHOTOGRAPHS INDEX

No.	Description	No.	Description
1	Plot 1 - Overview of DPC Membrane installation to perimeter & internal walls	2	Plot 6 - Overview of DPC Membrane installation to perimeter & internal walls
3	Plot 5 - Typical DPC Membrane edge detail installed across cavity closer	4	Plot 2 - Sealing detail to DPC membrane where internal meets external wall using GP SAM
5	Plot 3 - Typical sealing detail to service pipe penetration through DPC Membrane using GP SAM	6	Plot 4 - Sealing detail where internal wall terminates within plot using GP SAM
7	Plot 1 - Overview of infill membrane installation	8	Plot 1 - Typical sealing detail to internal column using GP SAM
9	Plot 1 - Typical Membrane edge detail where infill membrane is welded to DPC. Defects identified by MTS Ltd & remediated using GP SAM	10	Plot 1 - Overview of infill membrane installation
11	Plot 1 - Installation to door threshold & remediation patches of GP SAM applied to defects identified	12	Plot 2 - Overview of infill membrane installation
13	Plot 2 - Typical sealing detail to service pipe penetrations & remediated defects using GP SAM	14	Plot 2 - Installation to door threshold & remediation patches of GP SAM applied to defects identified
15	Plot 3 - Overview of infill membrane installation	16	Plot 3 - Typical sealing detail to service pipe penetration using GP SAM
17	Plot 3 - Installation to door threshold & remediation patches of GP SAM applied to defects identified	18	Plot 4 - Overview of infill membrane installation
19	Plot 4 - Installation to door threshold & defects identified by MTS Ltd for remediation	20	Plot 4 - Remediation patches of GP SAM applied to identified defects & marked as 'P' for 'Pass' by MTS Ltd
21	Pick & probe test methodology used by MTS Ltd to check welded membrane joins	22	Plot 1 - External view of plot
23	Plot 5 - Overview of infill membrane installation	24	Plot 5 - Membrane installation around corner showing welded join between DPC & infill membranes



No.	Description	No.	Description
25	Plot 5 - Installation to door threshold & remediation patches of GP SAM applied to defects identified	26	Plot 6 - Membrane installation around corner showing welded join between DPC & infill membranes with remediation patches of GP SAM to defects identified
27	Plot 6 - Typical sealing detail to service pipe penetrations using GP SAM	28	Plot 6 - Overview of infill membrane installation

13. CONCLUSIONS & RECOMMENDATIONS

As a result of our 3rd party independent inspection, testing, & ground gas/vapour mitigation management operations performed by MTS Ltd, we conclude that the materials we have inspected were installed to a good standard, to such a degree we are satisfied that the installed ground gas/vapour mitigation measures were in accordance with the design, material specifications & industry installation best practices.

We confirm that the inspections & testing performed on the installed gas/vapour Barriers, has passed the 3rd party independent inspection, validation & testing process, which is all in accordance with the CIRIA C735, C795 & BS 8485:2015 best practice documents.

MTS Ltd therefore recommend that in accordance with the inspection, testing & validation works performed & managed by ourselves on this project, the local authority/relevant project stakeholders to sign off this ground gas mitigation validation sign off report as;

“APPROVED FOR SIGN OFF”

END OF REPORT

14. APPENDICES

Appendix A – Validation Surveyors Certificates of Competence

Mr Barrie Ackroyd (MTS Ltd)
Mr Michael A Smith (MTS Ltd)

Appendix B – Design Drawings

Sevenoaks Environmental Drawing;

- 4551-03 Rev 01 – Site Location Plan

ADM-BPTW Drawings;

- ADM-BPTW-01-ZZ-DR-A-1701-P02 – 2B4P Flats Floor Plan Layouts
- ADM-BPTW-02-ZZ-DR-A-1702-P04 – 182P Bungalow Floor Plan Layouts

Architectural Design Lab Ltd Drawing;

- DL-SUB-01 Rev - - Substructure Details, Ground Floor – Ground 150mm Below FFL

MTS Ltd Drawings;

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- 22852-02 – Typical Perimeter Wall (Ventilated) Gas Mitigation Section Detail
- 22852-03 – Typical Door Threshold Detail
- 22852-04 – Typical Internal Wall DPC Detail With Under Floor Wall Ventilation



- 22852-05 – Typical Service Pipe Sealing Detail
- 22852-06 – Typical Party Wall Gas Resistant DPC Detail

Appendix C – Material Specifications

- JUTA GP DPC
- JUTA GP5 Gas Barrier Membrane
- JUTA GP Bitumen Primer
- JUTA GP SAM (Gas Resistant Self-Adhesive Membrane)

Appendix D – Project Survey Sheets

Gas Protection Inspection & Validation Record
Independent Inspection, Testing & Validation - Certificate of Conformance

Appendix E – Digital Copy of this Report & Site Photographs

(All contained on USB Storage Device)



APPENDIX A

Validation Surveyors – Certificates of Competence

Certificate of Achievement

(Full Award)

This is to certify that

Barrie Anthony Ackroyd

has been assessed as meeting the required level of competence for all
the units necessary to achieve the full award

**ABBE Level 4 NVQ Diploma in Verification of Ground Gas Protection
Systems**

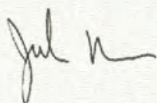
603/3266/9

Units achieved:

Mandatory Units

K/617/0687, M/617/0688, K/617/0690, M/617/0691,
A/617/0693, F/617/0694, J/617/0695

Signed :



Professor Julian Beer, Chair of ABBE Board

Date:

17/01/2023

Candidate Registration No : 0000039497 Certificate Issue No : 154133

ofqual
REGULATED
register.ofqual.gov.uk

Certificate of Unit Achievement

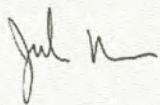
This is to certify that

Barrie Anthony Ackroyd

has been assessed as meeting the following units of competence
which form part of an accredited qualification

M/617/0688	Materials for Construction in the Built Environment
J/617/0695	Principles of Regulatory Control Procedures and Legislation
F/617/0694	Verification and Inspection of Ground Gas Protection Systems
K/617/0687	Design Principles and Application for Construction in the Built Environment
A/617/0693	Confirming Work Meets Quality Standards in the Workplace
M/617/0691	Principles of Construction and Maintenance of Buildings
K/617/0690	Health, Safety and Welfare in the Construction Environment

Signed :



Professor Julian Beer, Chair of ABBE Board

Date:

17/01/2023

Candidate Registration No : 0000039497 Certificate Issue No : 154132



This is to certify that

Barrie Ackroyd

Has successfully attended a
Technical Course
in

Gas Membrane Installations

This in support of the Quality Controls
Of Inspection and Validation
Of Gas Membrane Installations

This certificate is awarded by:



Date: 30/10/14



Course content detailed overleaf

Gas Membrane Installation Technical Course for Inspectors & Validators

Training Modules Attended

Practical & Knowledge

- Components of Gas Protection Systems with Venting
- Verification
- Gas Membrane Installation Techniques
- Introduction to Integrity Testing (Practical)
- Introduction to Integrity Testing (Theory)
- Risk Assessment and Validation Plan
- Site Inspections and Pro-formas
- Validation Report
- On Site Assessment

CERTIFICATE of ACCREDITATION

This is to certify that

Barrie Ackroyd

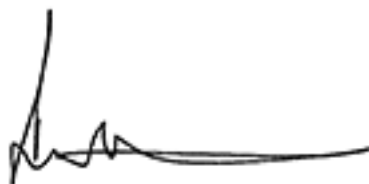
has been awarded the following accreditation

Gas Protection Verification Scheme (GPVS)
Specialist (SGPV)

Certificate No.: 435qQb4axS

Issued: 19 November 2020

Valid for 4 years from the above date



Richard Froggatt
CL:AIRE Chairman



Certificate of Achievement

(Full Award)

This is to certify that

Michael Anthony Smith

has been assessed as meeting the required level of competence for all
the units necessary to achieve the full award

**ABBE Level 4 NVQ Diploma in Verification of Ground Gas Protection
Systems**

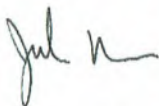
603/3266/9

Units achieved:

Mandatory Units

K/617/0687, M/617/0688, K/617/0690, M/617/0691,
A/617/0693, F/617/0694, J/617/0695

Signed :



Professor Julian Beer, Chair of ABBE Board

Date:

23/01/2020

Candidate Registration No : 0000036770 Certificate Issue No : 142188

ofqual
REGULATED
register.ofqual.gov.uk



00026189

Certificate of Unit Achievement

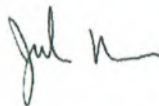
This is to certify that

Michael Anthony Smith

has been assessed as meeting the following units of competence
which form part of an accredited qualification

K/617/0687	Design Principles and Application for Construction in the Built Environment
M/617/0688	Materials for Construction in the Built Environment
K/617/0690	Health, Safety and Welfare in the Construction Environment
M/617/0691	Principles of Construction and Maintenance of Buildings
A/617/0693	Confirming Work Meets Quality Standards in the Workplace
F/617/0694	Verification and Inspection of Ground Gas Protection Systems
J/617/0695	Principles of Regulatory Control Procedures and Legislation

Signed :



Professor Julian Beer, Chair of ABBE Board

Date:

23/01/2020

Candidate Registration No : 0000036770 Certificate Issue No : 142185



00026186

CERTIFICATE of ACCREDITATION

This is to certify that

Michael Smith

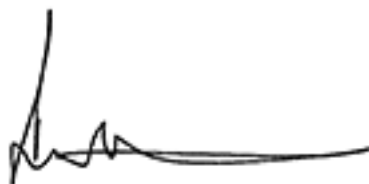
has been awarded the following accreditation

Gas Protection Verification Scheme (GPVS)
Technician (TGPV)

Certificate No.: 2UEiQm05Uq

Issued: 8 April 2021

Valid for 4 years from the above date



Richard Froggatt
CL:AIRE Chairman





APPENDIX B

Design Drawings



Crown Copyright.
Licence Number 100040584. All rights reserved.
This map is not to be relied upon for accuracy and is for identification purposes only

SITE: Armory Drive, Gravesend

SCALE: NTS

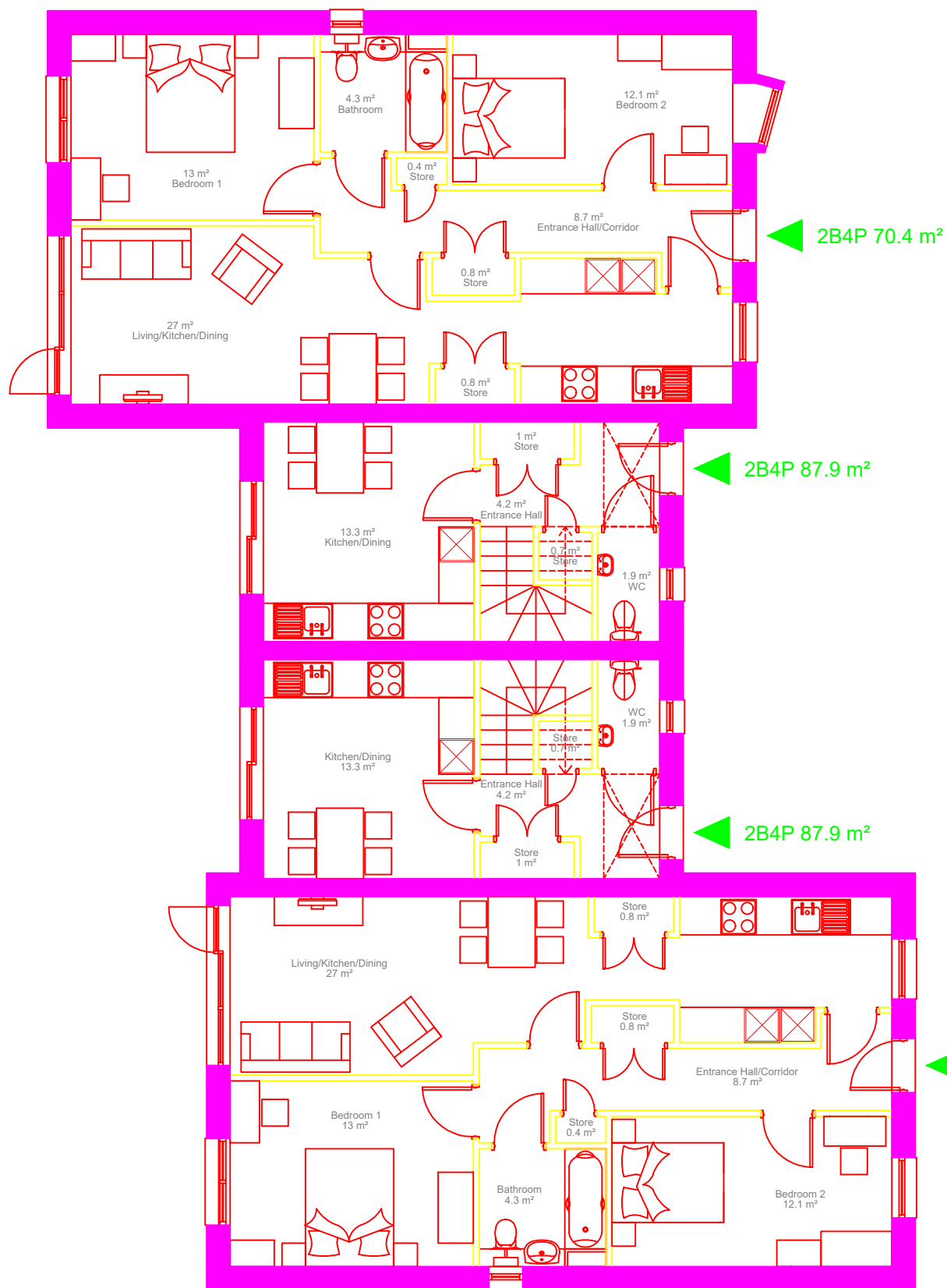
JOB NO: 4551

FIGURE TITLE: Site Location Plan

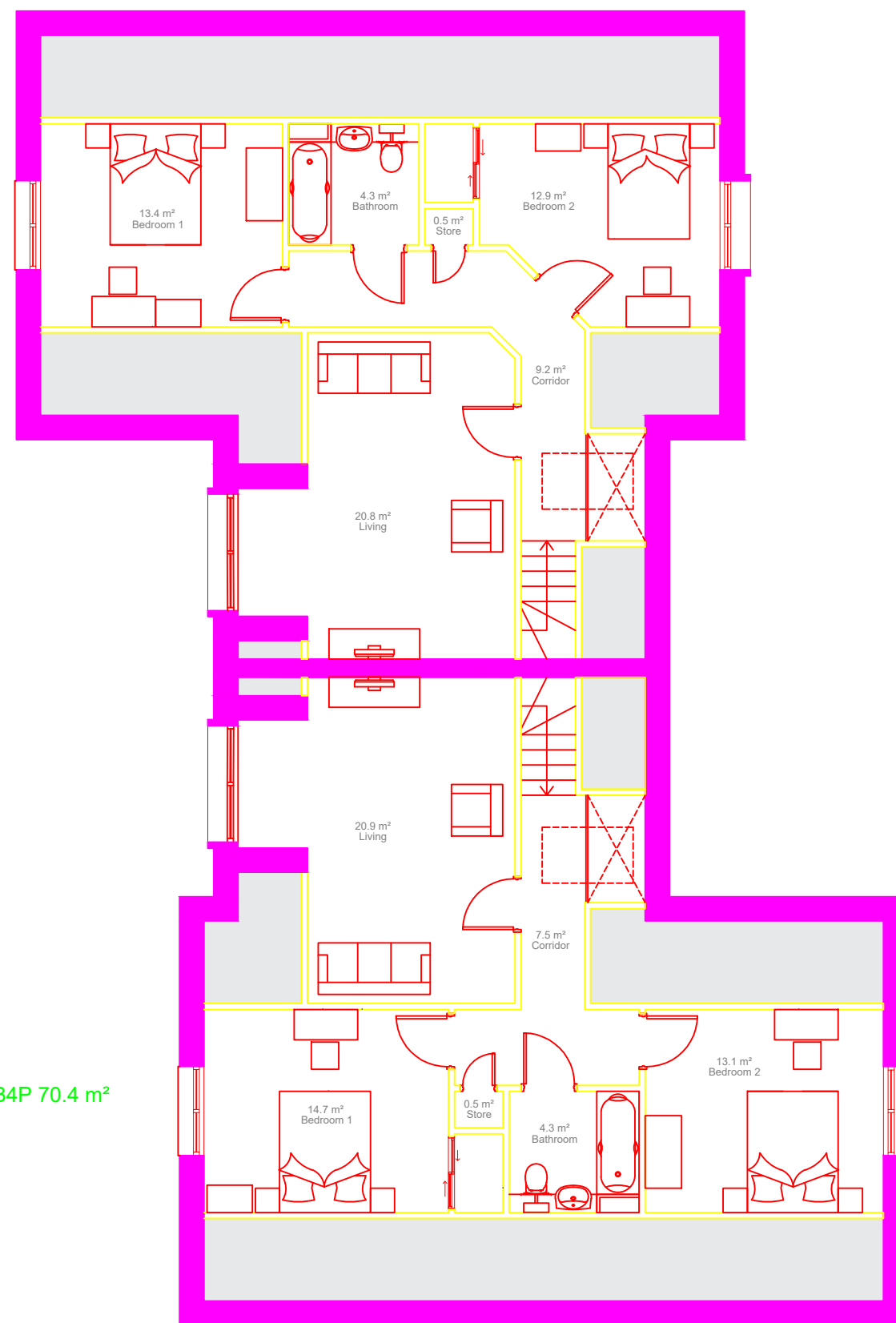
REV: 01

FIGURE NO: 03

**SEVENOAKS
ENVIRONMENTAL
CONSULTANCY**



Ground Floor Plan



First Floor Plan

P01	S3	06.03.20 2B4P Flat layouts	S3
P02	S3	28.05.20 Minor Amendments	S3

Gravesham Borough Council

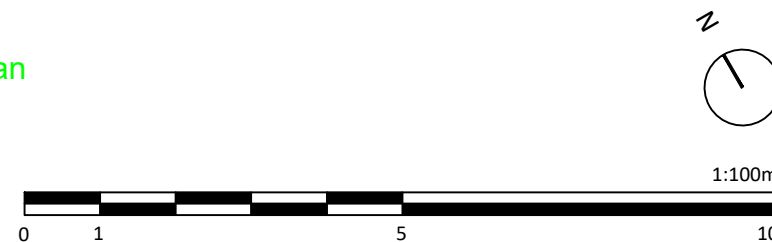
18-334 Albert Murray Close

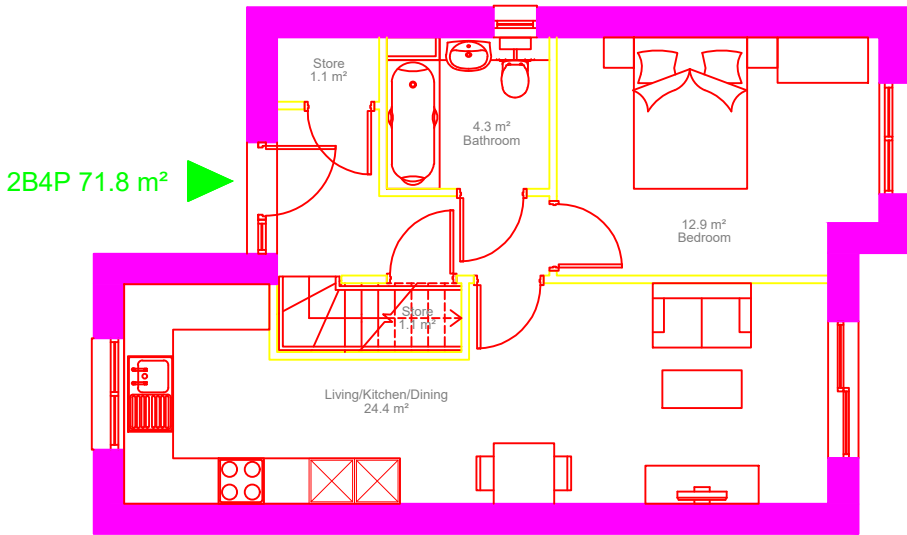
2B4P Flats Floor Plan Layouts

ADM-BPTW-01-ZZ-DR-A-1701 P02 S4

18-334 02 MS 1:100 @ A3

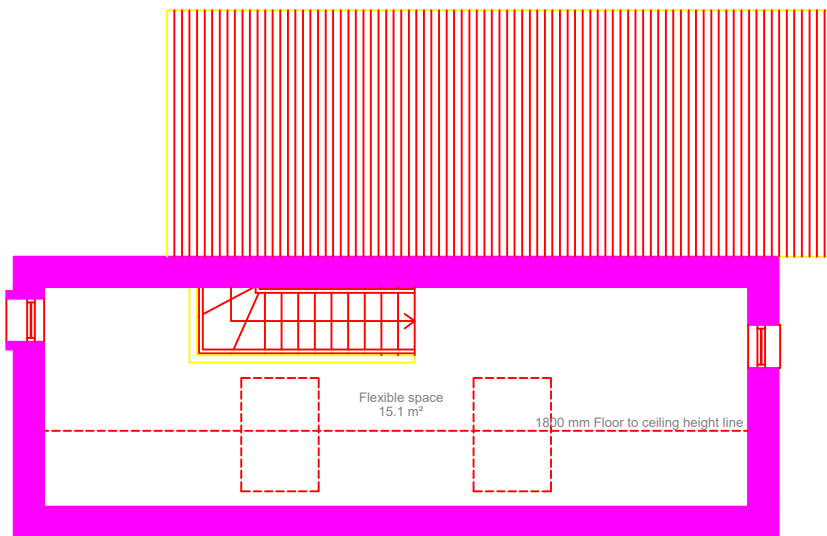
PLANNING ISSUE





2B4P 71.8 m²

Ground Floor Plan



First Floor Plan

P01	S3	19.03.20 1B2P Bungalow Flat Layout	MS
P02	S3	16.04.20 Minor amendments to the Flat Layout	MS
P03	S3	01.05.20 Minor amendments to the Flat Layout	MS
P04	S3	28.05.20 Minor Amendments	MS

Gravesham Borough Council

Albert Murray Close

1B2P Bungalows Floor Plan Layout

AMD-BPTW-02-ZZ-DR-A-1702 P04 S4

18-334 02 MS 1:100 @ A3

PLANNING ISSUE



Refer to Energy Strategy for External wall U value

100mm, 3.5 N/mm² medium density concrete blockwork.

12.5mm plasterboard on dabs with 3mm skim coat finish to manufacturers recommendations.

Continuous dab to plasterboard

Apply expanding foam sealant tape or sealant to back and under the skirting prior to fixing

30mm White EPS Perimeter Insulation at 0.038 W/mK

Zedex CPT DPC or similar approved on inside face of block wall

75mm C25/30 structural concrete with a maximum aggregate size of 10mm

150mm Ridgid floor insulation as per construction specification.

Visqueen 1200 guage DPM or similar approved lapped with DPC

100mm medium density block infill

175mm depth concrete beam.

Refer to Energy Strategy for Floor U value

Proprietary 215x65mm Air bricks with telescopic extension sleeve to ventilate floor void as indicated on Housetype working drawings

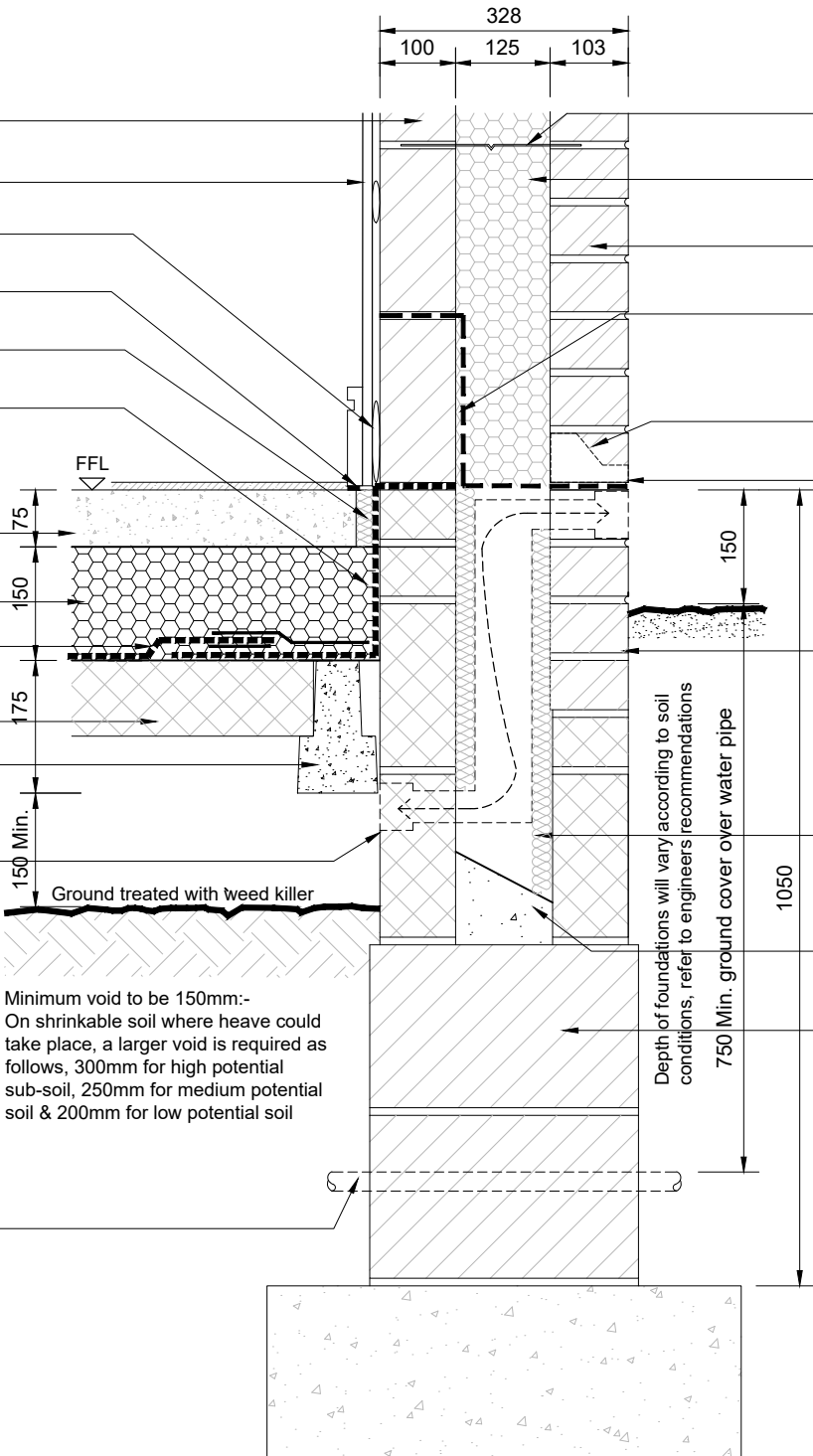
Use sulphate resisting cement below DPC where specified by the engineer. Weak mix concrete to within 225mm of lowest DPC.

Foundations in accordance with Structural Engineers drawings
Depth of foundations will vary according to soil conditions, refer to engineers recommendations

Indicative 25mmØ main.

Trench blocks may be reduced in lieu of trench fill provided the engineer is satisfied that the services can adequately exit the structure.

Note: Safe working practice for working within trench - banking back to ground conditions natural angle of repose.



Typical Foundation Detail - Beam in Section
Ground level 150mm below FFL

The Beam & Block system must be installed in strict accordance with the manufacturers instructions.

StaiFix HRT4 Wall ties or similar approved @ 900mm horizontal centres and 450mm vertical centres.

125mm Knauf Supafil Party Fulfill cavity blown insulation or similar approved

103mm Brickwork

Loose laid cavity tray integral with DPC locally over telescopic airvents (extended min 150mm either side)

"Pistol" weep holes @ 450mm centres

Zedex CPT DPC or similar approved, min 150mm from Ground in accordance with BS 8102:2009

Facing brickwork is to start minimum of 2 No. courses below finish ground level. Brickwork below DPC to be Class F2/S2 or to BS EN 771 with high durability mortar.

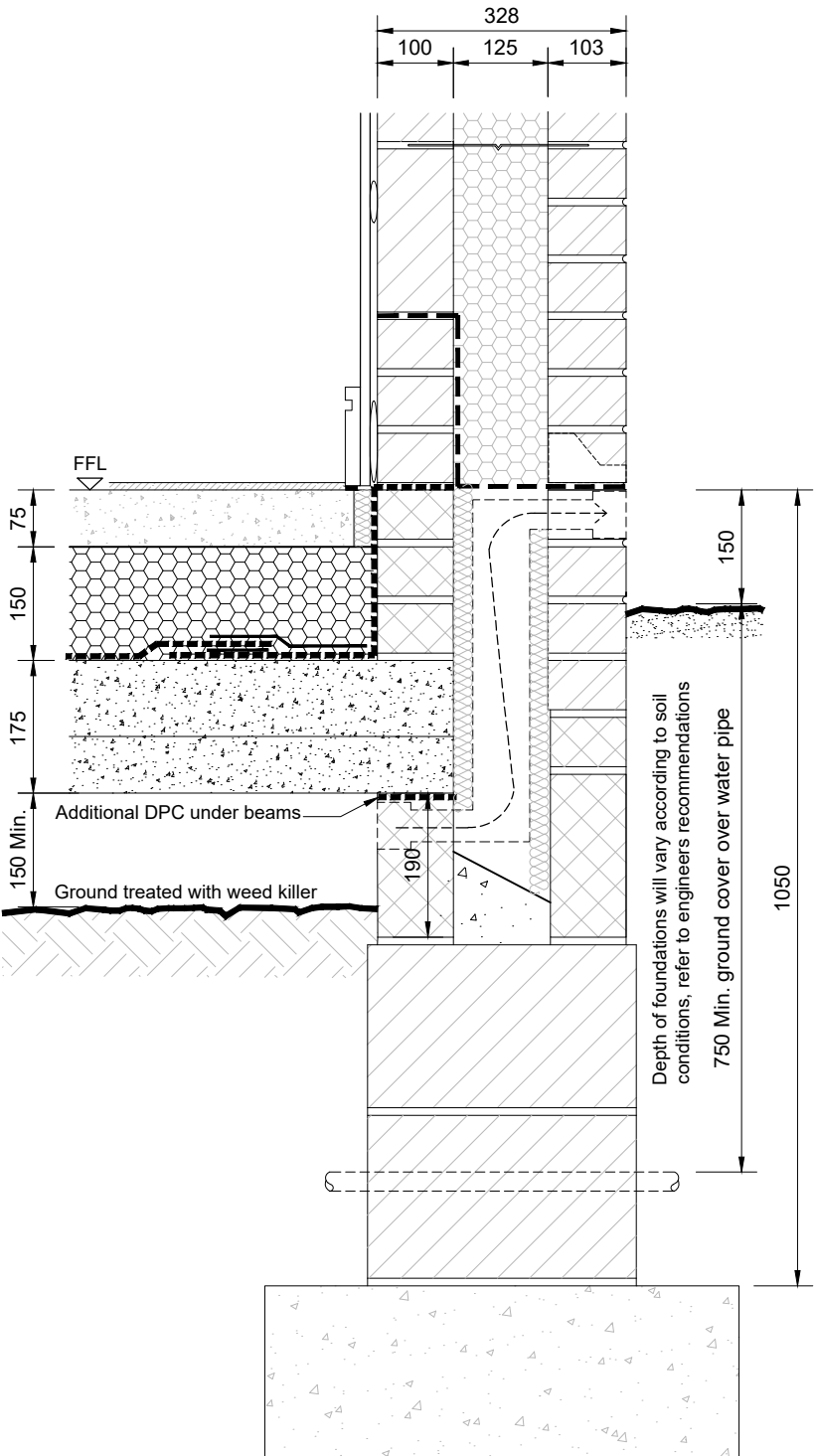
100mm Knauf Dritherm Earthwool 32 cavity slab or similar approved. Min. 225 below bottom of floor insulation.

Lean mix cavity fill

330mm wide foundation block or 2 leaves of 100mm 7.0N/mm² concrete blockwork as per construction specification.

NHBC Standards States:
Chapter 5.2.10 (b) Ventilation of Under Floor Voids

Voids should be ventilated by openings providing not less than 1500mm² per metre run or of external wall or 500mm² per m² of floor area, which ever gives the greater opening area. Ventilation openings should be provided on at least two opposite sides. Where this is not possible, effective cross ventilation from opposite sides should be provided by a combination of opening and air ducts. See vent schedule



Typical Foundation Detail - Beam in Elevation
Ground level 150mm below FFL -
Showing beams spanning onto blockwork

Typical Detail - Ground Level 150mm below FFL

50mm @ A3

Scale 1:10 100mm 200mm 300mm 400mm 500mm

DRAWING STATUS:

APPROVAL

GENERAL NOTES

1. DO NOT SCALE

2. All dimensions are in millimeters unless stated otherwise

REV	AMENDMENTS	BY	DATE

Architectural Design Lab Ltd.
Lombard House
12 - 17 Upper Bridge Street
Canterbury
Kent
CT1 2NF
Tel . no : 01227 634600
Email : mail@adl15.com

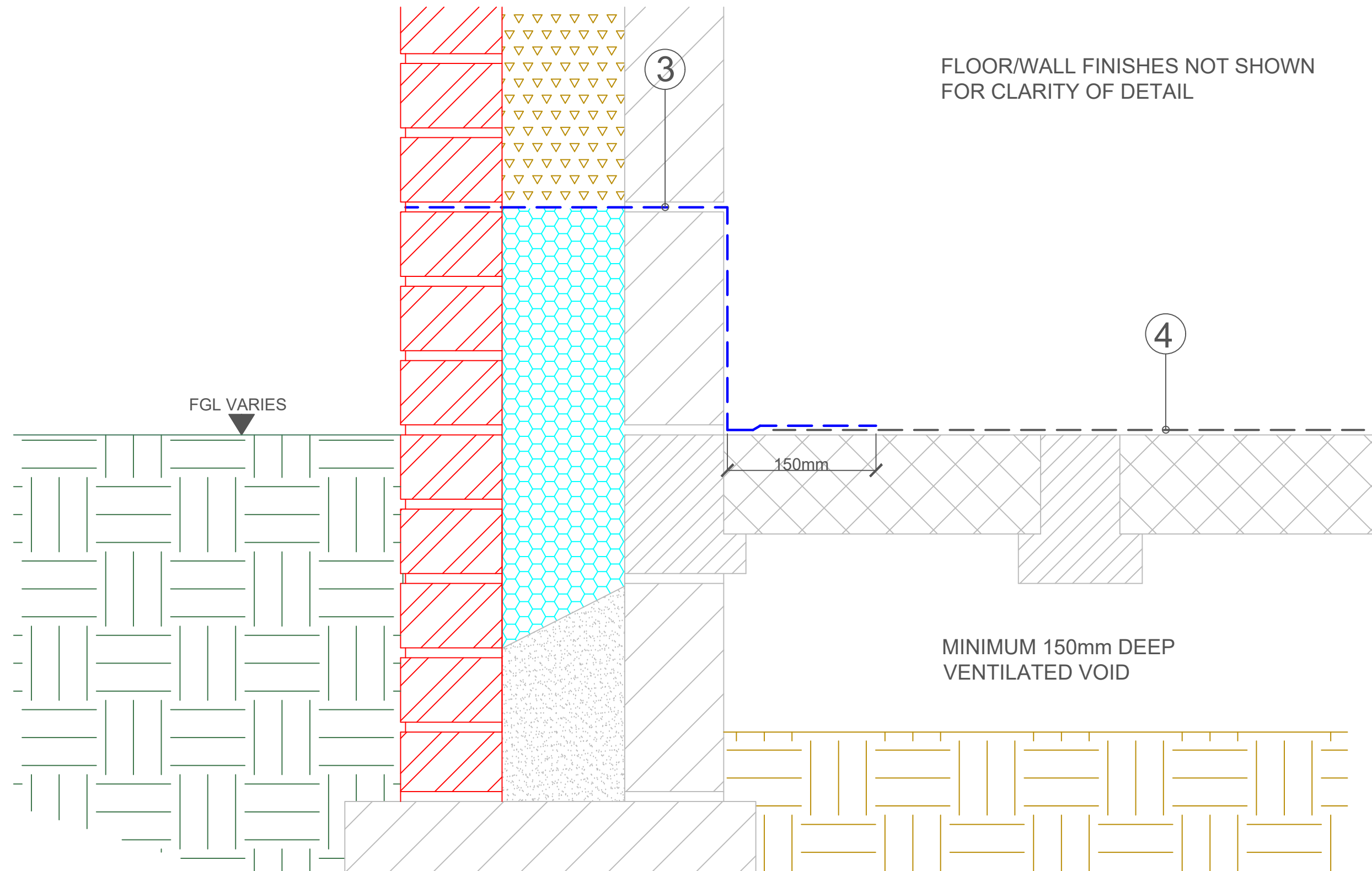
Drawn : RB	Date : MAY 2022
Scale : 1:10	Checked :JMG

Title :

SUBSTRUCTURE DETAILS
GROUND FLOOR
GROUND 150mm Below FFL

Job : ARMOURY DRIVE, GRAVESEND	Rev :
Org. No : DL-SUB-01	-
Dwg file name:	A3

Copyright Reserved
Architectural Design Lab Limited



TYPICAL PERIMETER WALL DETAIL (UN-VENTILATED) KEY TO MATERIALS

1. PERISCOPIC AIRBRICK VENT SETS INSTALLED AT MAXIMUM 3M CENTRES AROUND EACH PROPERTY
2. CAVITY TRAY SPECIFICATION 'BY OTHERS'
3. JUTA GP DPC, OF FULLY WELDED SEAM CONSTRUCTION
4. JUTA GP5 GAS BARRIER MEMBRANE OF FULLY WELDED SEAM JOINTS WITH 50mm WELD ONTO DPC

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with MTS.DVP.852-BA 3rd Party Design, Testing & Verification Plan.



Warning Health & Safety Information!

This drawing relates to the low/moderate ground gas risk and hydrocarbon vapour issues on this site.

In conjunction with the CDM 2015 regulations we confirm that the site is within an area where ground gas and hydrocarbon vapours may be present, therefore whilst remedial measures may have been performed, there is a residual low risk, caution should be taken when working with contaminated soils.

Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas/vapour mitigation details;

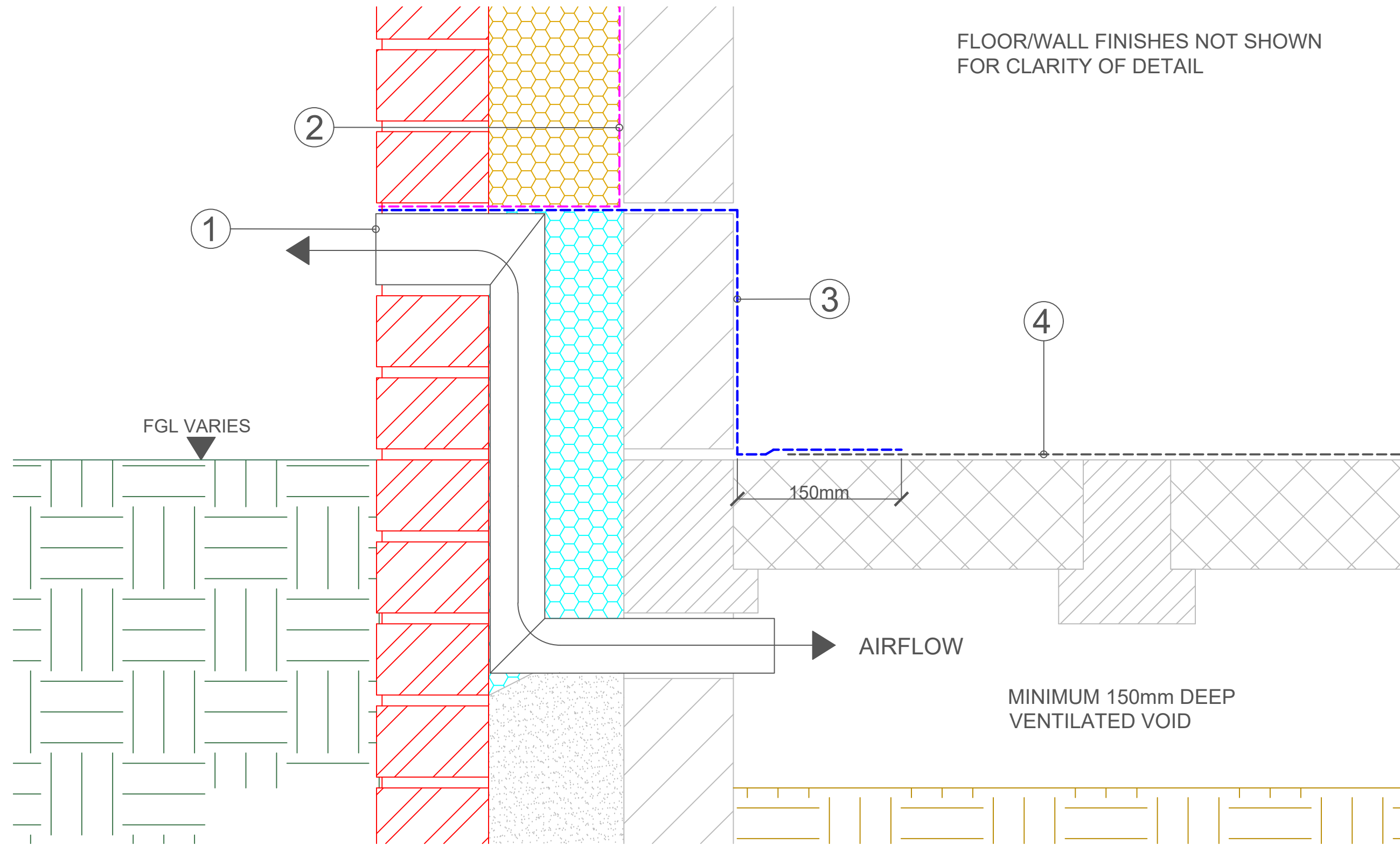
22852-01
22852-02
22852-03
22852-04
22852-05
22852-06

No.	Revision/Issue	Date



Project Name and Address Former St. Johns Ambulance Station, Armoury Drive, Gravesend, DA12 1NB	
Drawing Title Typical Perimeter Wall (Un-Ventilated) Gas Mitigation Section Detail	

Project 22852-01	Sheet Rev -
Date 11/10/2022	Drawn By B.Ackroyd
Scale Not to Scale	Size A3



TYPICAL PERIMETER WALL DETAIL (VENTILATED)

KEY TO MATERIALS

1. PERISCOPIC AIRBRICK VENT SETS INSTALLED AT MAXIMUM 3M CENTRES AROUND EACH PROPERTY
2. CAVITY TRAY SPECIFICATION ABOVE AIRBRICKS 'BY OTHERS'
3. JUTA GP DPC, OF FULLY SEALED SEAM CONSTRUCTION
4. JUTA GP5 GAS BARRIER MEMBRANE OF FULLY WELDED SEAM JOINTS WITH 50mm WELD ONTO EXISTING DPC

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with MTS.DVP.852-BA 3rd Party Design, Testing & Verification Plan.



Warning Health & Safety Information!

This drawing relates to the low/moderate ground gas risk and hydrocarbon vapour issues on this site.

In conjunction with the CDM 2015 regulations we confirm that the site is within an area where ground gas and hydrocarbon vapours may be present, therefore whilst remedial measures may have been performed, there is a residual low risk, caution should be taken when working with contaminated soils.

Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas/vapour mitigation details;

22852-01
22852-02
22852-03
22852-04
22852-05
22852-06

No.	Revision/Issue	Date

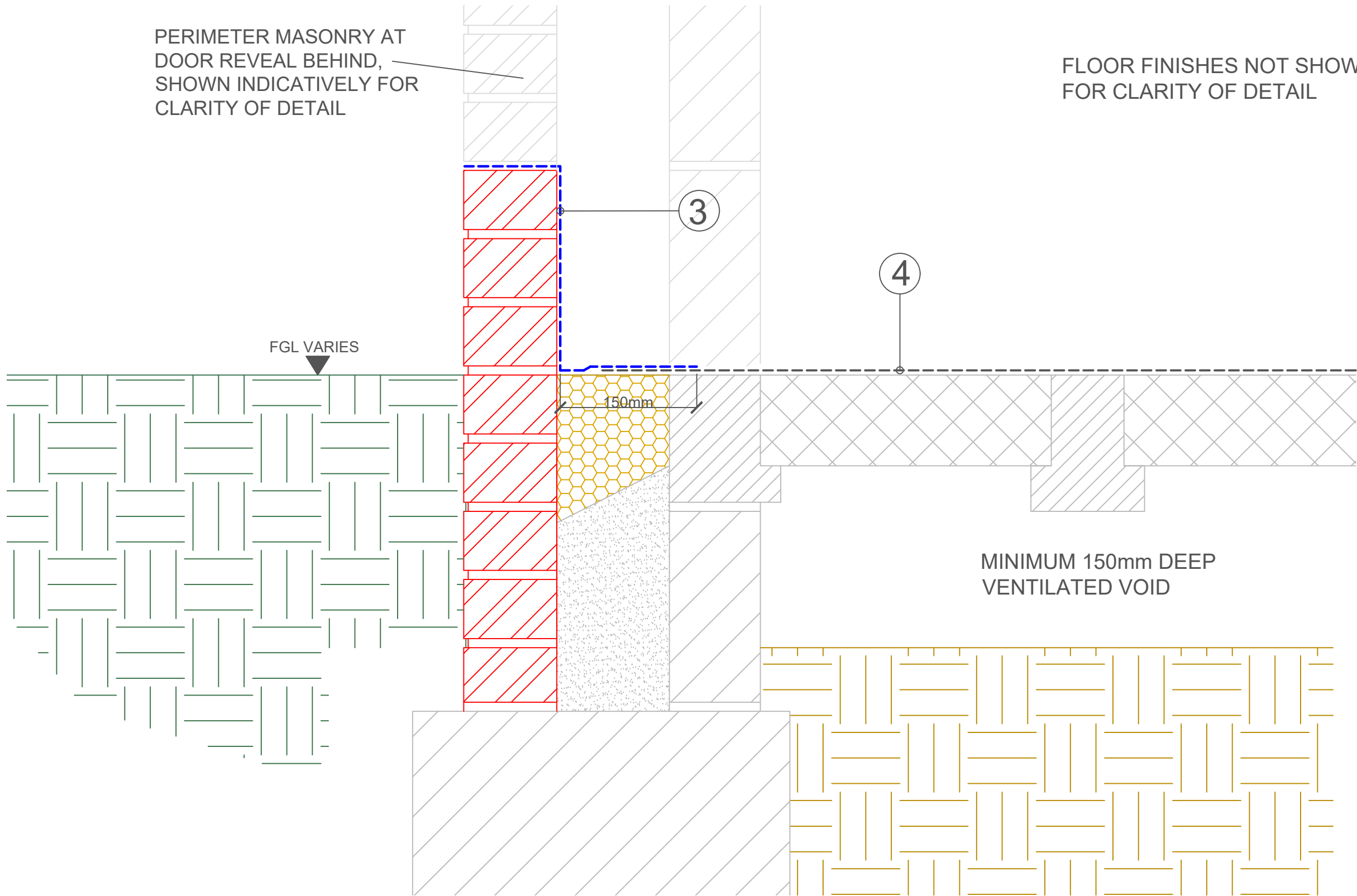


Project Name and Address	
Former St. Johns Ambulance Station, Armoury Drive, Gravesend, DA12 1NB	
Drawing Title	
Typical Perimeter Wall (Ventilated) Gas Mitigation Section Detail	

Project	22852-02	Sheet	Rev -
Date	11/10/2022	Drawn By	B.Ackroyd
Scale	Not to Scale	Size	A3

PERIMETER MASONRY AT
DOOR REVEAL BEHIND,
SHOWN INDICATIVELY FOR
CLARITY OF DETAIL

FLOOR FINISHES NOT SHOWN
FOR CLARITY OF DETAIL



TYPICAL DOOR THRESHOLD DETAIL

KEY TO MATERIALS

1. PERISCOPIC AIRBRICK VENT SETS INSTALLED AT MAXIMUM 3M CENTRES AROUND EACH PROPERTY
2. CAVITY TRAY SPECIFICATION ABOVE AIRBRICKS 'BY OTHERS'
3. JUTA GP DPC, OF FULLY SEALED SEAM CONSTRUCTION
4. JUTA GP5 GAS BARRIER MEMBRANE OF FULLY WELDED SEAM JOINTS WITH 50mm WELD ONTO EXISTING DPC

General Notes

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All dimensions to be checked on site.

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This drawing is to be read in conjunction with MTS.DVP.852-BA 3rd Party Design, Testing & Verification Plan.

Warning Health & Safety Information!

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The following drawings should be consulted for gas/vapour mitigation details;

22852-01
22852-02
22852-03
22852-04
22852-05
22852-06

No.	Revision/Issue	Date

Firm Name and Address

Membrane Testing Solutions

The Studio, Farmhouse House,
Preston Road, Farnham,
Surrey GU14 7JH

Office: 01484 512 1188
Out of Hours Contact:
01484 512 1188

www.mtsltd.net

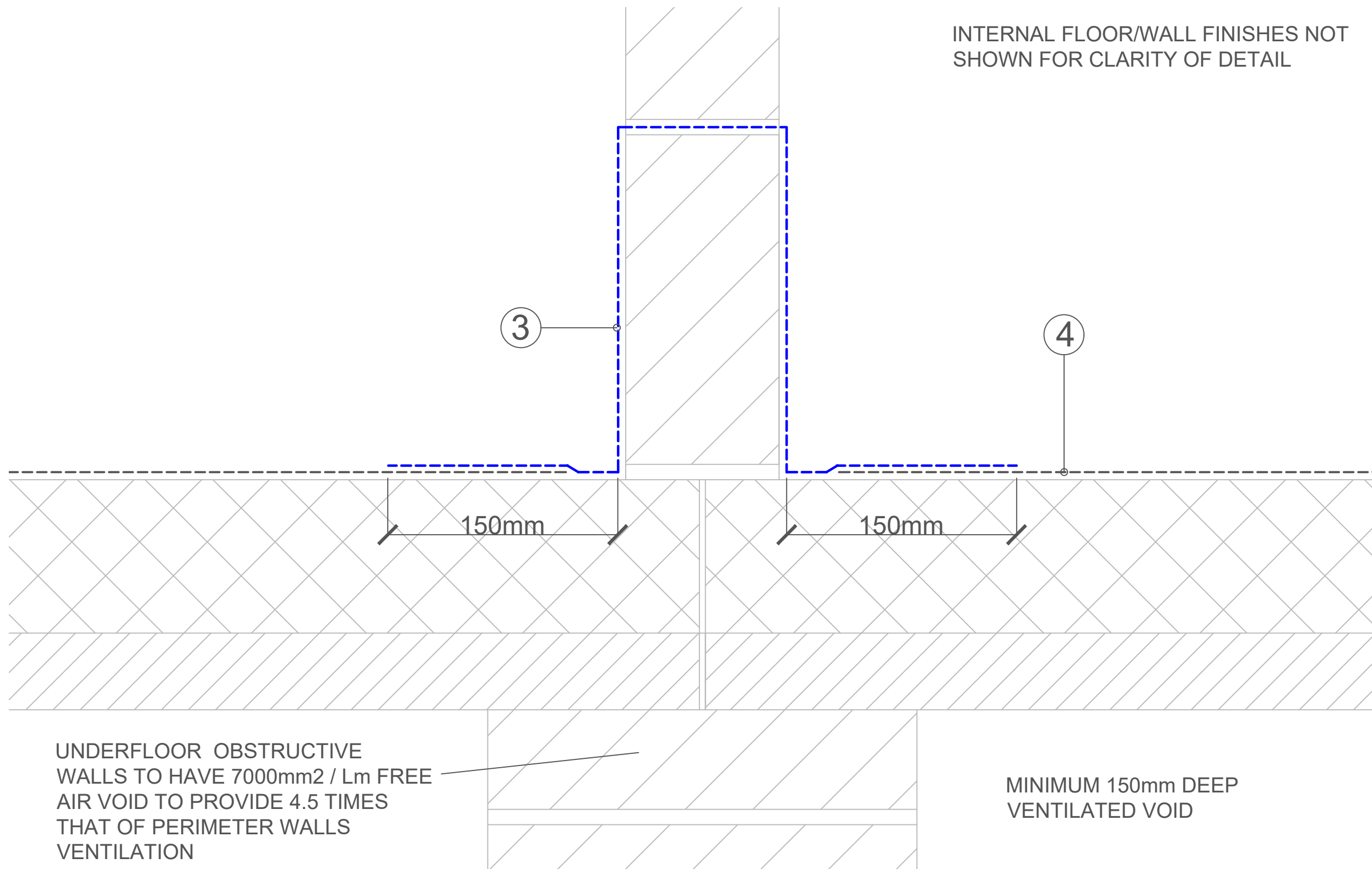
Project Name and Address

Former St. Johns Ambulance Station,
Armoury Drive, Gravesend,
DA12 1NB

Drawing Title

Typical Door Threshold Detail

Project 22852-03	Sheet Rev A
Date 11/10/2022	Drawn By B.Ackroyd
Scale Not to Scale	Size A3



INTERNAL WALL DPC DETAIL

KEY TO MATERIALS

- PERISCOPIC AIRBRICK VENT SETS INSTALLED AT MAXIMUM 3M CENTRES AROUND EACH PROPERTY
- CAVITY TRAY SPECIFICATION 'BY OTHERS'
- JUTA GP DPC, OF FULLY WELDED SEAM CONSTRUCTION
- JUTA GP5 GAS BARRIER MEMBRANE OF FULLY WELDED SEAM JOINTS WITH 50mm WELD ONTO DPC
- JUTA GP SAM (GAS RESISTANT SELF-ADHESIVE MEMBRANE)

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with MTS.DVP.852-BA 3rd Party Design, Testing & Verification Plan.

Warning Health & Safety Information!

This drawing relates to the low/moderate ground gas risk and hydrocarbon vapour issues on this site.

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Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas/vapour mitigation details;

22852-01
22852-02
22852-03
22852-04
22852-05
22852-06

No.	Revision/Issue	Date

Firm Name and Address

MembraneTestingSolutions

The Studio, Pennington House,
Pennington Street, Newcastle,
Essex CO1 1B

Office: 01454 222 224
Out of Hours Contact:
Telephone: 01454 222 224
Mobile: 01454 222 224
Email: info@mtsolutions.co.uk

www.mtsolutions.net

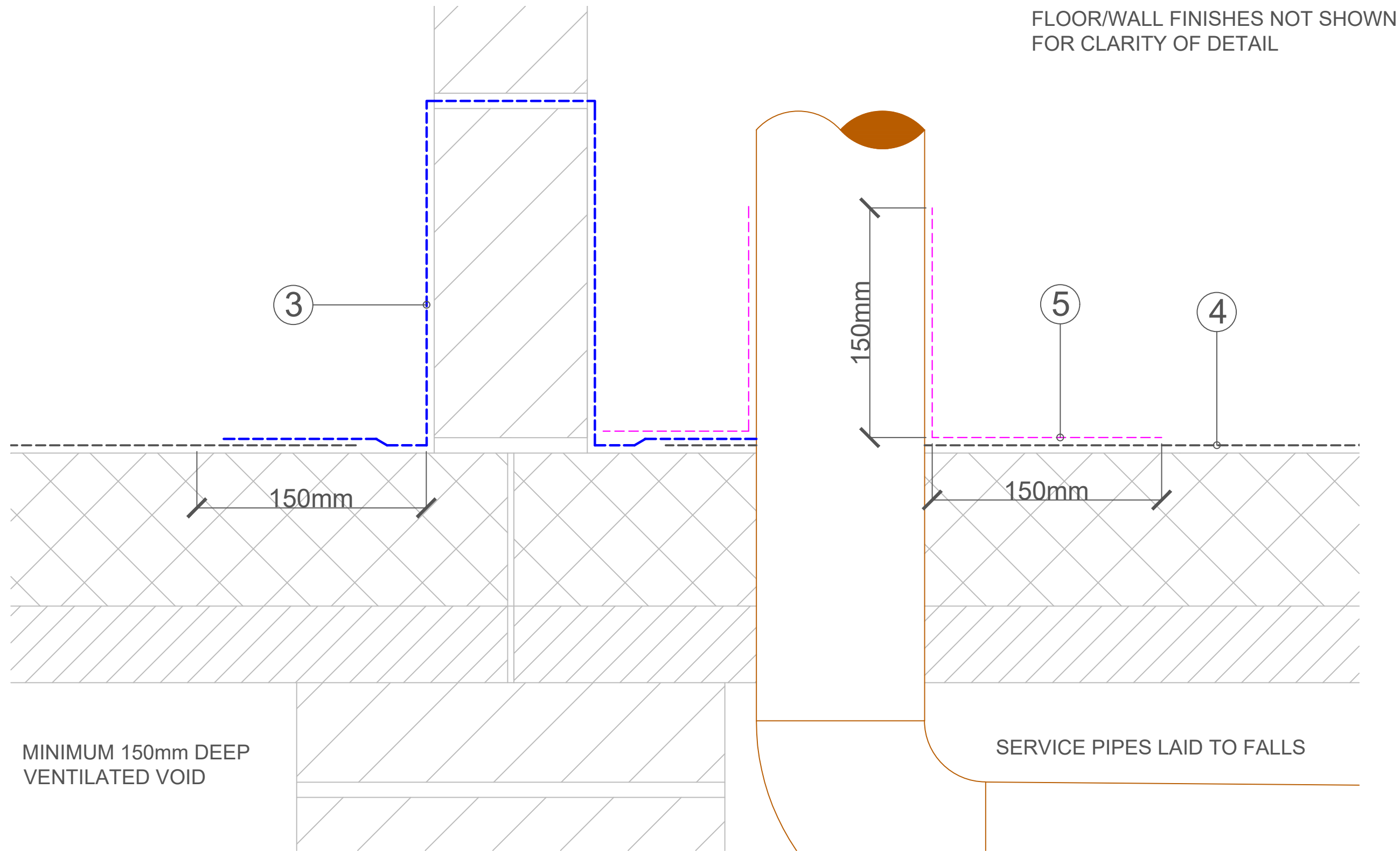
Project Name and Address

Former St. Johns Ambulance Station,
Armoury Drive, Gravesend,
DA12 1NB

Drawing Title

Typical Internal Wall DPC Detail
With Under Floor Wall Ventilation

Project 22852-04	Sheet Rev -
Date 11/10/2022	Drawn By B.Ackroyd
Scale Not to Scale	Size A3



SERVICE PIPE SEALING DETAIL

KEY TO MATERIALS

1. PERISCOPIC AIRBRICK VENT SETS INSTALLED AT MAXIMUM 3M CENTRES AROUND EACH PROPERTY
2. CAVITY TRAY SPECIFICATION 'BY OTHERS'
3. JUTA GP DPC, OF FULLY WELDED SEAM CONSTRUCTION
4. JUTA GP5 GAS BARRIER MEMBRANE OF FULLY WELDED SEAM JOINTS WITH 50mm WELD ONTO DPC
5. JUTA GP SAM (GAS RESISTANT SELF-ADHESIVE MEMBRANE)

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with MTS.DVP.852-BA 3rd Party Design, Testing & Verification Plan.

Warning Health & Safety Information!

This drawing relates to the low/moderate ground gas risk and hydrocarbon vapour issues on this site.

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The following drawings should be consulted for gas/vapour mitigation details;

22852-01
22852-02
22852-03
22852-04
22852-05
22852-06

No.	Revision/Issue	Date

Firm Name and Address

Membrane Testing Solutions

The Studio, Pennington House, Pennington Street, Haverhill, Essex, UK

Office: 01473 227 991
Cell of Home Contact: 01473 227 992
www.mtsltd.net

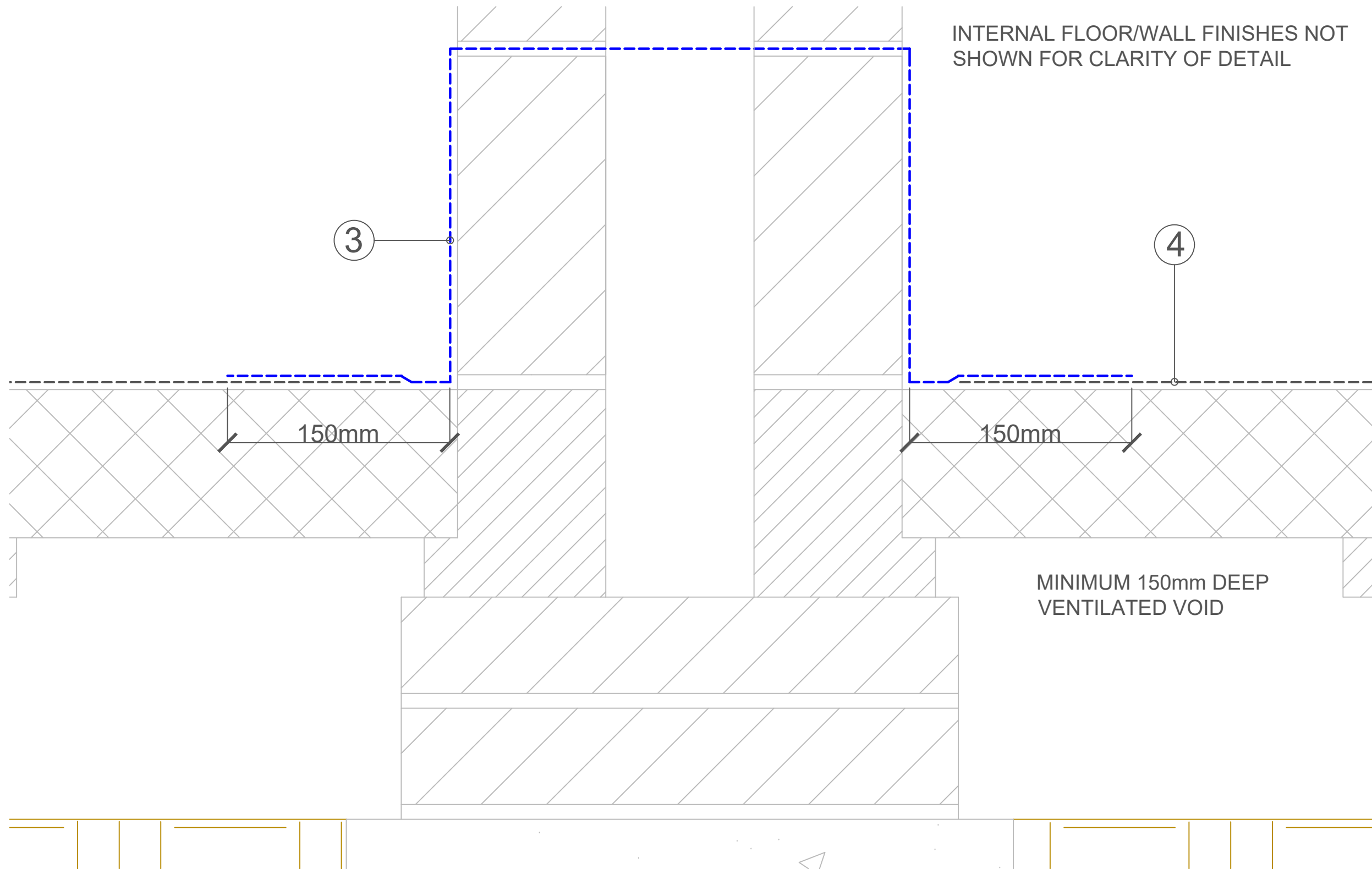
Project Name and Address

Former St. Johns Ambulance Station, Armoury Drive, Gravesend, DA12 1NB

Drawing Title

Typical Service Pipe Sealing Detail

Project	22852-05	Sheet	Rev -
Date	11/10/2022	Drawn By	B.Ackroyd
Scale	Not to Scale	Size	A3



KEY TO MATERIALS

1. PERISCOPIC AIRBRICK VENT SETS INSTALLED AT MAXIMUM 3M CENTRES AROUND EACH PROPERTY
2. CAVITY TRAY SPECIFICATION 'BY OTHERS'
3. JUTA GP DPC, OF FULLY WELDED SEAM CONSTRUCTION
4. JUTA GP5 GAS BARRIER MEMBRANE OF FULLY WELDED SEAM JOINTS WITH 50mm WELD ONTO DPC
5. JUTA GP SAM (GAS RESISTANT SELF-ADHESIVE MEMBRANE)

General Notes

Do not scale from this drawing.

All dimensions to be checked on site.

The installed/remediated gas protection system is to be fully inspected by an independent body in accordance with the CIRIA C735 document.

This drawing is to be read in conjunction with MTS.DVP.852-BA 3rd Party Design, Testing & Verification Plan.

Warning Health & Safety Information!

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Site operatives are to wash hands before eating, drinking, smoking or during any activity which could lead to the ingestion of contaminated materials.

The following drawings should be consulted for gas/vapour mitigation details;

22852-01
22852-02
22852-03
22852-04
22852-05
22852-06

No.	Revision/Issue	Date

Firm Name and Address

The Studio, Portage House,
Riverside Drive, Gravesend,
Kent DA11 0JH

01474 884444 117 2285
info@memtestingsolutions.co.uk
www.mtsd.net

Project Name and Address

Former St. Johns Ambulance Station,
Armoury Drive, Gravesend,
DA12 1NB

Drawing Title

Typical Party Wall Gas Resistant
DPC Detail

Project 22852-06	Sheet Rev -
Date 14/10/2022	Drawn By B.Ackroyd
Scale Not to Scale	Size A3



APPENDIX C

Material Specifications



GP® TITANTECH® DPC

GP® TITANTECH® DPC - Gas and Hydrocarbon Resistant DPC is a unique single layer, embossed High Performance DPC. GP® TITANTECH® DPC is specifically designed and manufactured to perform as a Methane, Carbon dioxide, VOC, Radon and Moisture resistant damp proof course.

Thickness	1.0 mm
Width	1.3 m
Length	20 m
Weight	921 g/m ²

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

GP® TITANTECH® DPC complies with the latest codes of practice as published by BRE, CIRIA and BSI (BS EN 14909, BS8485:2015 and C748). Suitable for use as a High Performance DPC for vertical and horizontal applications. Superior adhesion to mortar is essential for buildings of 3+ storey height.

JUTA GP® TITANTECH® DPC has an embossed surface to create superior mortar adhesion which is essential when being used in 3+ storey applications. JUTA GP® TITANTECH® DPC is compliant to BS EN 14909:2012 and can be used in both vertical and horizontal applications.

Handling

Roll weights can be in excess of 5 kg and hence appropriate care and equipment is required for unloading and handling.





Feature	Characteristics	Test Method	GP® TITANTECH® DPC
Physical Properties	Thickness	EN 1849-2	1.0 mm
	Width	EN 1849-2	1.3 m
	Length	EN 1849-2	20 m
	Weight	EN 1849-2	921 g/m ²
Hydraulic Properties	Water Vapour Permeation	EN 1932	0.08 g/m ² /day
	Resistance to Water Penetration	EN 13967, EN 1928	Pass
	Watertightness	EN 1928	Pass
Mechanical Properties	Resistance to Static Load	EN 12730 - B	20 kg
	Tensile Strength (MD)	EN 12311-1	24 N/mm ²
	Tensile Strength (CMD)	EN 12311-1	22 N/mm ²
	Tensile Elongation (MD)	EN 12311-1	398%
	Tensile Elongation (CMD)	EN 12311-1	446%
	Puncture Resistance	EN 12236	1.25 kN
	Resistance to Tearing (nail shank) MD	EN 12310-1	700 N
	Resistance to Tearing (nail shank) CMD	EN 12310-1	750 N
Durability and Chemical Resistance	Transmission rate of volatile liquids - Diesel	ISO 6179:2010 (B)	0.096 g/m ² /h
	Transmission rate of volatile liquids - Xylene	ISO 6179:2010 (B)	4.845 g/m ² /h
	Transmission rate of volatile liquids - Toulene	ISO 6179:2010 (B)	6.695 g/m ² /h
	Transmission rate of volatile liquids - Petrol	ISO 6179:2010 (B)	5.172 g/m ² /h
	Heat Ageing	EN 1926	Pass
	Chemical Resistance	EN 1847	Pass
	Resistance to Fire	EN 13501-1	Class F
	Resistance to Low Temperature	EN 495-5	Pass @ -40°C
Gas Permeability	Methane Permeability	BS EN ISO 15105-1	28 ml/m ² /day/atm
	Carbon Dioxide Permeability	BS EN ISO 15105-1	<28 ml/m ² /day/atm
	Radon Permeability	K124/02/95	9.5x10 ⁻¹² /m ² /s
Compliance and Certification	CE Mark - EN13967:2012		
	NHBC Standards Compliant		
	BS EN 14909:2012 Compliant		
	BS 8485:2015 Compliant		

Feature	Pre-Compression (N/mm ²)	Characteristic Shear Strength (N/mm ²)
Characteristic Shear Strength	0.2	0.14
	0.6	0.34
	1.0	0.52



GP® TITANTECH® DPC

Storage

Rolls of JUTA GP® TITANTECH® DPC should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged but should be protected from exposure to UV. JUTA GP® TITANTECH® DPC is classified as non-hazardous and is chemically inert such that it will not react with any acid or alkali environment in which it is used.

JUTA UK

For additional information or assistance, please contact JUTA UK directly.

Installation

JUTA GP® TITANTECH® DPC must be installed in accordance with the guidelines laid out in BS8215:1991, BS8000: part 3 and BS 5628. It can be used in most common floor constructions and is installed in a similar manner to damp proof membrane. For external walls the DPC should be applied 150mm above the adjoining surface and should be linked to a DPM or Gas Resistant DPM in solid floors. The DPC should be applied to a fresh bed of mortar, completely free of projections that may puncture the material or impede the DPC from lying flat.

Joining and Sealing

Sheets of JUTA GP® TITANTECH® DPC must be clean, dry and free from dirt and grease before application of joining tape. JUTA GP® DPC may also be heat welded to the underlying Gas resistant membrane.

Accessory Products

JUTA GP® TITANTECH® DPC is an accessory product for use in combination with GP® 1, GP® 2, GP® H, GP®SAM and GP® TITANTECH® gas protective membranes. It is also compatible with a range of DPM and other DPC materials.



Juta GP[®] 5 Gas Barrier is a multi-layer composite of virgin polyethylene (PE) giving exceptional resistance to the passage of Ground gas and Organic Vapours. It also acts as a high performance DPM.

- Juta GP[®] 5 is suitable for the following applications:
- VOC contaminated sites (Site specific assessment required)
 - Carbon dioxide and methane affected sites in accordance with BS8485:2015+A1:2019 & NHBC
 - Radon affected sites in accordance with BRE211:2015
 - Damp protection in accordance with Building Regulations Part C.

JUTA GP [®] 5			
Characteristics	Test Method	Unit	JUTA GP [®] 5
Physical Properties			
Thickness	EN 1849-2	mm	0.4
Width	EN 1849-2	m	Various
Length	EN 1849-2	m	Various
Weight	EN 1849-2	g/M ²	400
Hydraulic Properties			
Resistance to Water Penetration	EN 1928 (A)	-	Pass
Mechanical Properties			
Resistance to Static Load	EN 12730	Kg	>20
Tensile Strength (MD)	EN 12311-2 (A)	N/50mm	>300
Tensile Strength (CMD)	EN 12311-2 (A)	N/50mm	>300
Resistance to Tearing (Nail Shank) MD	EN 12310-1	N	>230
Resistance to Tearing (Nail Shank) CMD	EN 12310-1	N	>230
Impact Resistance	EN12691-B	mm	500
Puncture Resistance	A5TM D 4833	N	>160
Puncture Resistance	EN12236	kN	1.60
Reaction to Fire	EN 13501-1	-	E
Vapour Permeability			
Methane Permeability	B5 EN ISO 15105-1	ml/m ² /day/atm	0.12
Carbon Dioxide Permeability	B5 EN ISO 15105-1	ml/m ² /day/atm	1.53
Hydrogen Permeability	B5 EN ISO 15105-1	ml/m ² /day/atm	68.7
Benzene Permeability	B5 EN ISO 15105-2	ml/m ² /day	0.41
Oxygen Permeability	B5 EN ISO 15105-2	ml/m ² /day	<3
Radon Permeability	K124/02/95	m ² /s	1.0 x 10 ⁻¹²
Fuel Vapour Permeability			
Petrol	B5 EN ISO 15105-2	/mol/(m ² .s.Pa)	(ave.) 3.4 x 10 ⁻¹³
Diesel	B5 EN ISO 15105-2	/mol/(m ² .s.Pa)	(ave.) 3.4 x 10 ⁻¹³
Durability			
Durability watertightness after artificial ageing	EN1928	-	Pass
Durability watertightness against chemicals	EN1928	-	Pass
Compliance and Certification			
CE Mark - EN13967:2012			
NHBC Standards Compliant			
B5 8485:2015 + A1 2019 Accordant			

Contact us to find out more information.
info@juta.co.uk | 01772 754177 | JUTA.CO.UK
Melton Grove Works, Church Road, Lytham, FY8 5PL

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Additional Information

HANDLING

Roll weights can be in excess of 20kg and hence appropriate care and equipment is required for unloading and handling.

STORAGE

Rolls of JUTA GP® 5 should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV.

INSTALLATION

JUTA GP® 5 should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015.

JOINTING AND SEALING

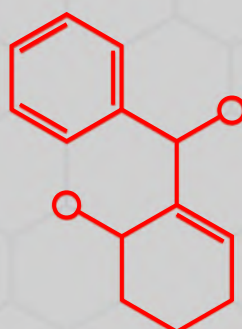
It is recommended JUTA GP® 5 be heat welded where possible, with welding carried out by competent personnel with suitable qualifications in accordance with best practice, and guidance contained within BS 8485:2015. JUTA GP® 5 should be overlapped by at least 100mm. If taping joints, only suitable tape must be used, ensuring application with a silicone roller to remove trapped air. JUTA pre-formed details, or Self Adhesive Gas Membrane are available for sealing around protuberances.

ACCESSORY PRODUCTS

-  JUTA GP® DPC
-  JUTA GP® Tape
-  JUTA GP® Self Adhesive Membrane
-  JUTA GP® Primer
-  JUTA GP® Top Hats and Preformed Corners
-  JUTA GP® Protection Fleece
-  JUTA GP® Void Vent (25/40mm)

PLEASE CONTACT JUTA UK DIRECTLY FOR MORE INFORMATION ON JUTA GP® 5

Contact us to find out more information.
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Juta UK Ltd,
Melton Grove Works,
Church Road,
Lytham,
Lancashire.
FY8 5PL

Tel: 01772754177
Email: info@juta.co.uk
Web Site: www.juta.co.uk

Our Ref: JUTA GP® 5- New Product

28th October 2021

Dear selected customer,

The following is commercially sensitive, and is issued as confidential. This is not for general circulation.

Following current high demand for our GP® membranes, and increasing concern around the suitability and interpretation of guidance around aluminised foil membranes as gas barriers in large commercial warehousing projects (sheds) - we are accelerating the launch of our next generation gas barrier. We are always listening to market demands, and seeking to improve our product offerings, and achieve greater levels of sustainability throughout our supply chains.

GP®5 is our newest iteration of gas membrane technology, and offers an improvement over existing aluminised foil gas barriers with enhanced resistance to damage from in-situ service stress. We are releasing the GP®5 through selected long term trusted customers only - this is not on general sale, and is positioned to give specialist approved gas membrane installaiton companies access to new technology, and as always, keep ahead of the curve.

B58485:2015 + A1 2019 Table 7 was updated to include benchmark physical characteristics for 'gas membranes' - Notably the minimum requirement for above slab membranes (typically block and beam - housing) as 370gsm and 0.4mm thick between any scrim. As we know the biggest cause of damage to membranes is subgrade condition and follow on trades. Many of the membranes used as gas resistant membranes rely on the aluminium core providing the gas resistance - but as an industry, we have become lazy, and simply look for the <40ml value as 'compliance'. Less thought for their suitability or functionality in the application setting is occurring, and protection of the membrane is often omitted. Durability is a consideration of any design.

In an effort to improve durability and long term performance in industrial site settings, we are introducing the GP®5, as a non-aluminised proprietary gas resistant damp proof membrane, which has fewer limitations on use than the GP®1.

Please rest assured that GP®5 proposed as a proprietary gas resistant damp proof membrane, is offered as one of the most competitive compliant gas membrane on the market, reserved primarily for use through specialist installers, to ensure our end users and clients achieve the best possible standard of install, with the best possible products, at the best possible price; ensuring protective barrier systems are provided with an anticipated design service life in excess of 60 years, which is both a sustainable and cost effective method of a critical geosynthetic application such as gas protection.

Where reinforcement is placed on top of gas membranes, protecting the membrane in consideration of the site conditions would be a requirement in order for design of protective measures to be in line with B58485. The geotextile we propose (geoNETEX A PP TT 300 UVLS) is CE marked for protection, and as such can also form part of our durability statement for protective measures, such that we can provide material warranty for a design service life of at least 60 years (This is a mandated requirement of building regulations). It is worth noting, that other geotextiles on the market offered for this function - do not hold relevant CE marking for this function.



Juta UK Ltd,
Melton Grove Works,
Church Road,
Lytham,
Lancashire.
FY8 5PL

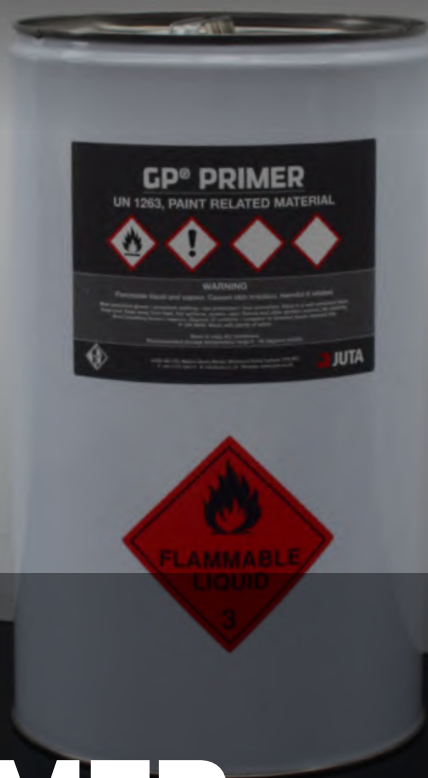
Tel: 01772754177
Email: info@juta.co.uk
Web Site: www.juta.co.uk

I attach for information our TDS, along with our LEED and REACH information and draft warranty.

I trust that this provides an acceptable solution, and maintains current demand for GP® products.
Should you have any queries on the above, please do not hesitate to contact the undersigned.

Best Regards
Patrick Flood

Technical Director
JUTA (UK) LTD
(patrick@juta.co.uk)



GP® PRIMER

GP® PRIMER is a quick drying, cold applied bituminous solution designed to penetrate and seal porous surfaces prior to the application of covering materials. Conforms to BS Code of practice 144, part 3.

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Uses

GP® PRIMER seals porous substrates and encourages the adhesion of bituminous waterproofing systems and sheet coverings. It may be applied successfully to a wide range of surfaces:

- Concrete
- Asbestos Cement
- Slate
- Metals (mild steel, Zinc, Lead)
- Lightweight Concrete screeds

Handling

GP® PRIMER is available in 5 litre and 25 litre containers.

Storage

Storage life indefinite in tightly sealed, undamaged containers.

Health and Safety

Refer to material safety data sheet (MSDS) for a full list of hazards.

Colour	Black
Metal Surfaces	6 - 11 m ² per litre coverage
Concrete	3 - 4 m ² per litre coverage
Bituminous	5 - 8 m ² per litre coverage





Feature	Characteristics
Colour	Black
Metal Surfaces	6 - 11 m ² per litre coverage
Concrete	3 - 4 m ² per litre coverage
Bituminous	5 - 8 m ² per litre coverage
Drying Time	Allow to dry completely before subsequent installation begins. Drying time is dependent on ambient air temperature, atmospheric conditions and porosity of the substrate. Average drying time at 20°C is between 2 - 6 hours.

JUTA UK

For additional information or assistance, please contact JUTA UK directly.

Application

Apply by brush or spray. Surface should be clean, ie. free from all oil, grease, dirt, dust and loose debris. On metal surfaces all loose rust should be removed using a wire bristled brush and where advanced signs of corrosion are evident these areas should initially be treated with a rust inhibitor. Surfaces should preferably be dry although GP® PRIMER will adhere to damp but not wet surfaces. GP® PRIMER should be applied evenly across the surface in one generous coating.



GP® SAM

GP® SAM, gas protection self adhesive membrane, is a bituminous gas proof and water proof sheet, composed of self-adhesive SBS polymer modified bitumen incorporating GP® 1 with an upper surface finish of black reinforced LDPE, and a lower surface finish of siliconized release film. GP® SAM is used for the gas/ waterproofing of underground structures where harmful ground gasses are anticipated, and as a self adhesive accessory to GP® 1.

Thickness	1.2 mm
Width	0.9 m or 0.3 m
Length	20 m
Weight	1100 g/m ²

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Handling

Roll weights can be in excess of 20 kg (approx 33 kg/roll) and hence appropriate care and equipment is required for unloading and handling. This product is non-toxic nor flammable.

Storage

Rolls of GP® SAM should be stored on in a cool, dry place, and be protected from exposure to rain, sun, heat and cold temperatures prior to installation. Exposure to sunlight for extended period of time could cause difficulty with removal of the release film.





Feature	Characteristics	Test Method	GP® SAM
Physical Properties	Thickness	EN 1849-2	1.2 mm
	Width	EN 1849-2	0.9 or 0.3 m
	Length	EN 1849-2	20 m
	Weight	EN 1849-2	1100 g/m ²
Hydraulic Press	Water Tightness	EN 1928	Pass
	Water Vapour Transmission	EN 1931	0.013 g/m ² /day
Mechanical Properties	Tensile Strength (MD/CMD)	EN 12311-2 (A)	500 N/50mm
	Elongation (MD/CMD)	EN 12311-2 (A)	> 12 %
	Resistance to Static Load	EN 12370	20 kg
	Joint Strength	EN 12317-2	> 30 N
	Durability and Water Tightness (Ageing and Chemicals) 60 kPa	EN 1847	Pass
	Resistance to Nail Tear (MD/CMD)	EN 12310-1	> 300 N
	Resistance to Fire	EN 13501	F Euro Class
Gas Permeability	Methane Permeability	EN ISO 15105-1	< 0.68 ml/m ² /day/atm
	Carbon Dioxide Permeability	EN ISO 15105-1	< 2.81 ml/m ² /day/atm
	Radon Permeability	K124/02/95	8.0 x 10 ⁻¹⁵ m ² /S
Compliance and Certification	CE Mark - EN13967:2012 + A1:2017 Type (A/T)		
	BS 8485:2015 Compliant (Methane and Carbon Dioxide Barrier)		

JUTA UK

Please contact JUTA UK Directly for more information on GP® SAM

Installation

GP® SAM should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015, and/or BS 8102:2009.

It is recommended that GP® SAM is not applied in temperatures below 10°C, in colder weather the material can be warmed slightly to aid adhesion.

Accessory Products

- GP® Primer
- GP® Protection Board
- GP® Protection Fleece



APPENDIX D

Project Survey Sheets



Gas Protection Verification Declaration

Site

Site Name	Former St. Johns Ambulance Station, Gravesend.
Site Address	Former St. Johns Ambulance Station, Armoury Drive, Gravesend, Kent, DA12 1NB
GPVS Declaration Reference	0724-J0234

Brief Description of Site

This project includes the construction of 6no residential properties comprising of 2no detached and a block of 4 terraced plots. The site is a former St. Johns ambulance garage with above an ground fuel storage tank. The site had suffered a gas pipe leak, therefore a gas/vapour resistant membrane was specified in the site investigation report. MTS Ltd performed gas/vapour mitigation design which was installed by PrestigeAir Technologies Ltd using NVQ Level 2 qualified operatives with welded joints where possible. The project was 100% validated on site by our NVQ Level 4 qualified and CL:Aire TGPV accredited validation surveyor proving a pass in full. This declaration relates to plots 1-6 inclusive being verified in line with the contents of the CIRIA C735 best practice document.

Site Type	, Residential
Plot Number(s)	Plot No's 1-6 Inclusive

Document

Verification Report Title	Ground Gas/Vapour Mitigation Measures, 3rd Party Independent Inspection, Testing & Validation Report
Verification Report Identifier	MTS.VR.852-BA dated 23.7.2024
Named Client	Sevenoaks Environmental Consultancy Ltd

Accredited Person Details

SGPV Name	Barrie Ackroyd
SGPV Registration No.	SGPV0002
Telephone	07884 210081
Email	sales@mtsltd.net
Organisation	Membrane Testing Solutions Ltd
Address	Parsonage House, Parsonage Street, Halstead, CO9 2JR

Declaration

I, Barrie Ackroyd, confirm that I am the person described in the Accredited Person details section and hold a current valid registration as a SGPV, Accreditation No. SGPV0002 under the Gas Protection Verification Accreditation Scheme.

I have reviewed the verification report described in the Document Details section and I am satisfied that:

1. The work has been carried out to an acceptable standard.
2. The work has been verified by suitably experienced and qualified personnel.
3. The level of verification is proportionate to the level of risk Identified in the site investigation report/Gas risk assessment.
4. The interpretations and conclusions are reasonable.
5. The verification strategy is in line with industry guidance.
6. I am competent to sign this Declaration and that
 - a. I am fully aware and comply with the Scheme's Code of Conduct
 - b. The work of this review and Declaration are within the limits of my knowledge, competence and professional capacity.

Note: The document that has been reviewed was prepared by the organisation named for the benefit of the named Client who has reliance upon it. Any professional liability arising from any proven negligent act or omission by the Company carrying out the work and publishing the document rests with that Company and not with the SGPV Accredited Person or the GPVS.

Signed:



Date:

23.7.2024

Name:

[Block capitals]

BARRIE ACKROYD



0724-J0234

INDEPENDENT INSPECTION & VALIDATION CERTIFICATE OF CONFORMANCE

DATE: 5.5.2023

PROJECT NAME: Former St.Johns Abulance, Gravesend.

CONTRACT NO: C852 - Plot 1 - Juta Gas Resistant DPC.

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS Ltd were requested to attend site to inspect/validate the membrane installed to the perimeter area. On initial inspection our validation surveyor noted that the membrane had been laid and formed well. Our surveyor then using a seam pick tool, inspected all seams which were overlapped with Juta GP tape, checking for integrity and adhesion. Then checking the DPC membrane for any damage or defects. All was installed well with only one defect found - 1 x Unsealed seam. The defect was marked up and immediately repaired. The repair was validated proving a pass. Photo evidence of all the above has been taken for inclusion into the final report. All membrane was installed to design specification and standards set out with both the Ciria C735, BS8485 best practice documents.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified independent consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL) **PASS IN FULL**

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of MembraneTestingSolutions Ltd

Name: Michael A Smith

Dated: 5.5.2023

Signed for on behalf of The Client:

Name: Alistair Stocks

Dated: 5.5.2023

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

Telephone: 0844 557 3786 • email: sales@mtsltd.net • www.mtsltd.net

INDEPENDENT INSPECTION & VALIDATION CERTIFICATE OF CONFORMANCE

DATE: 5.5.2023

PROJECT NAME: Former St.Johns Abulance, Gravesend.

CONTRACT NO: C852 - Plot 2 - Juta Gas Resistant DPC.

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS Ltd were requested to attend site to inspect/validate the membrane installed to the perimeter area. On initial inspection our validation surveyor noted that the membrane had been laid and formed well. Our surveyor then using a seam pick tool, inspected all seams which were overlapped with Juta GP tape, checking for integrity and adhesion and detail work at internal corners and the like for specifications etc. Then checking the DPC membrane for any damage or defects. All was installed well with no defects found. Photo evidence of all the above has been taken for inclusion into the final report. All membrane was installed to design specification and standards set out with both the Ciria C735, BS 8485 best practice documents.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified independent consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/~~FAIL~~) **PASS IN FULL**

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of **MembraneTestingSolutions Ltd**

Name: Michael A Smith

Dated: 5.5.2023

Signed for on behalf of The Client:

Name: Alistair Stocks

Dated: 5.5.2023

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

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INDEPENDENT INSPECTION & VALIDATION CERTIFICATE OF CONFORMANCE

DATE: 5.5.2023

PROJECT NAME: Former St.Johns Abulance, Gravesend.

CONTRACT NO: C852 - Plot 3 - Juta Gas Resistant DPC.

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS Ltd were requested to attend site to inspect/validate the membrane installed to the perimeter area. On initial inspection our validation surveyor noted that the membrane had been laid and formed well. Our surveyor then using a seam pick tool, inspected all seams which were overlapped with Juta GP tape, checking for integrity and adhesion. Then checking the DPC membrane for any damage or defects. All was installed well with only one defect found - 1 x Unsealed seam. The defect was marked up and immediately repaired. The repair was validated proving a pass. Photo evidence of all the above has been taken for inclusion into the final report. All membrane was installed to design specification and standards set out with both the Ciria C735, BS8485 best practice documents.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified independent consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL) **PASS IN FULL**

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of MembraneTestingSolutions Ltd

Name: Michael A Smith

Dated: 5.5.2023

Signed for on behalf of The Client:

Name: Alistair Stocks

Dated: 5.5.2023

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

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INDEPENDENT INSPECTION & VALIDATION CERTIFICATE OF CONFORMANCE

DATE: 5.5.2023

PROJECT NAME: Former St.Johns Abulance, Gravesend.

CONTRACT NO: C852 - Plot 4 - Juta Gas Resistant DPC.

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS Ltd were requested to attend site to inspect/validate the membrane installed to the perimeter area. On initial inspection our validation surveyor noted that the membrane had been laid and formed well. Our surveyor then using a seam pick tool, inspected all seams which were overlapped with Juta GP tape, checking for integrity and adhesion. Then checking the DPC membrane for any damage or defects. All was installed well with only one defect found - 1 x Unsealed seam. The defect was marked up and immediately repaired. The repair was validated proving a pass. Photo evidence of all the above has been taken for inclusion into the final report. All membrane was installed to design specification and standards set out with both the Ciria C735, BS8485 best practice documents.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified independent consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL) **PASS IN FULL**

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of **MembraneTestingSolutions Ltd**

Name: Michael A Smith

Dated: 5.5.2023

Signed for on behalf of The Client:

Name: Alistair Stocks

Dated: 5.5.2023

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

Telephone: 0844 557 3786 • email: sales@mtsltd.net • www.mtsltd.net

INDEPENDENT INSPECTION & VALIDATION CERTIFICATE OF CONFORMANCE

DATE: 5.5.2023

PROJECT NAME: Former St.Johns Abulance, Gravesend.

CONTRACT NO: C852 - Plot 5 - Juta Gas Resistant DPC.

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS Ltd were requested to attend site to inspect/validate the membrane installed to the perimeter area. On initial inspection our validation surveyor noted that the membrane had been laid and formed well. Our surveyor then using a seam pick tool, inspected all seams which were overlapped with Juta GP tape, checking for integrity and adhesion and detail work at internal corners and the like for specifications etc. Then checking the DPC membrane for any damage or defects. All was installed well with no defects found. Photo evidence of all the above has been taken for inclusion into the final report. All membrane was installed to design specification and standards set out with both the Ciria C735, BS 8485 best practice documents.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified independent consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL) **PASS IN FULL**

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of MembraneTestingSolutions Ltd

Name: Michael A Smith

Dated: 5.5.2023

Signed for on behalf of The Client:

Name: Alistair Stocks

Dated: 5.5.2023

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

Telephone: 0844 557 3786 • email: sales@mtsltd.net • www.mtsltd.net

INDEPENDENT INSPECTION & VALIDATION CERTIFICATE OF CONFORMANCE

DATE: 5.5.2023

PROJECT NAME: Former St.Johns Abulance, Gravesend.

CONTRACT NO: C852 - Plot 6 - Juta Gas Resistant DPC.

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS Ltd were requested to attend site to inspect/validate the membrane installed to the perimeter area. On initial inspection our validation surveyor noted that the membrane had been laid and formed well. Our surveyor then using a seam pick tool, inspected all seams which were overlapped with Juta GP tape, checking for integrity and adhesion and detail work at internal corners and the like for specifications etc. Then checking the DPC membrane for any damage or defects. All was installed well with no defects found. Photo evidence of all the above has been taken for inclusion into the final report. All membrane was installed to design specification and standards set out with both the Ciria C735, BS 8485 best practice documents.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified independent consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL) **PASS IN FULL**

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of **MembraneTestingSolutions Ltd**

Name: Michael A Smith

Dated: 5.5.2023

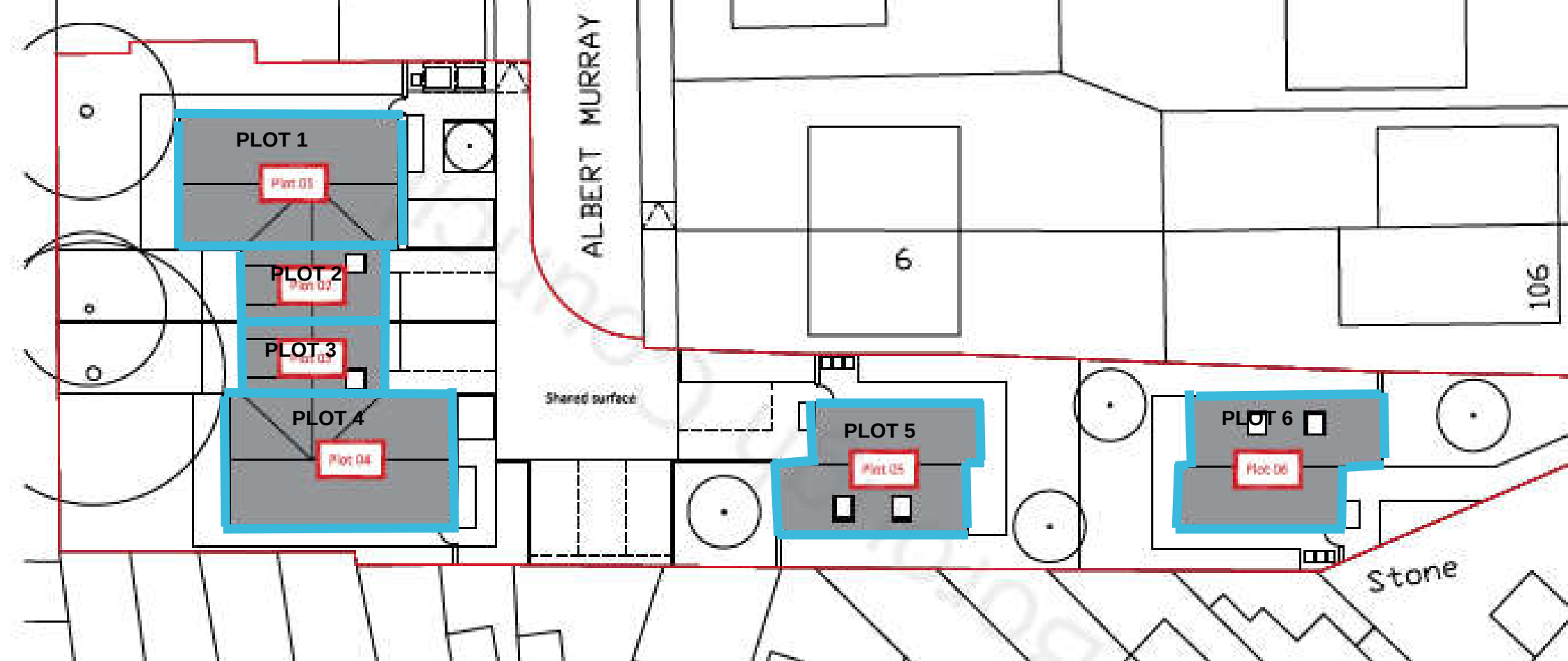
Signed for on behalf of The Client:

Name: Alistair Stocks

Dated: 5.5.2023

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

Telephone: 0844 557 3786 • email: sales@mtsltd.net • www.mtsltd.net



 - JUTA Gas Resistant DPC - MTS PASS - 5.5.2023

INDEPENDENT INSPECTION & VALIDATION CERTIFICATE OF CONFORMANCE

DATE: 28.9.2023

PROJECT NAME: Former St.Johns Abulance, Gravesend.

CONTRACT NO: C852 - Plot 5 Infill - Juta GP5 Membrane.

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS Ltd were requested to attend site to inspect/validate the membrane installed to the infill and attached to the previously installed GR DPC. On initial inspection our validation surveyor noted that the membrane had been installed and welded well. Our surveyor then using a seam pick tool, inspected all welded seams, checked all membrane for damage or punctures and then inspected all GP tape, checking for integrity and adhesion. All was installed well with only two punctures found. The defects were marked up and immediately repaired. The repairs were validated proving a pass. Photo evidence of all the above has been taken for inclusion into the final report. All membrane was installed to design specification and standards set out with both the Ciria C735, BS 8485 best practice documents.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified independent consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/~~FAIL~~) **PASS IN FULL**

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of **MembraneTestingSolutions Ltd**

Name: Michael A Smith

Dated: 28.9.2023

Signed for on behalf of The Client:

Name: Brendan Davis

Dated: 28.9.2023

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

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Gas Protection Inspection & Validation Record

One record sheet to be completed for each plot inspected by a SUITABLY QUALIFIED independent consultant/engineer

Project Number:	C736	Design Source Ref:		Specification Source/Ref:		Other Documents Attached	Y/ N	Sign Off Cert	
Site Name/Location:	Gravesend	Building Use:	Residential ☒	Commercial		Other (Describe)			
Plot Numbers:	5	Building Description:	No. of Storeys =	2	Detached	Yes	Semi-Detached	Terrace	Apartment Block
Compiled By:	Michael A Smith	Gas Protection Type	Active/Passive	Passive	Foundation Type:	Suspended Floor/Raft/Other			Suspended

Ventilated sub-floor (if present)	Inspection date/time:	28.9.2023	Inspected by:	M A Smith	Photographed:	Y/N	No
--	-----------------------	-----------	---------------	-----------	---------------	-----	----

Y/N		Notes/Recommendations (see guide below)
	Void Former Type	Yes
	Height of Void Space	Yes
	Venting Media	N/A
	Pipe Size & Spacing	N/A
	External Wall Airbricks	Yes
	Internal Sleeper Walls	Yes
	External Vent Trenches/Ducts	N/A

Gas Barrier	Inspection Date/Time:	28.9.2023	Inspected by:	M A Smith	Photographed:	Y/N	Yes
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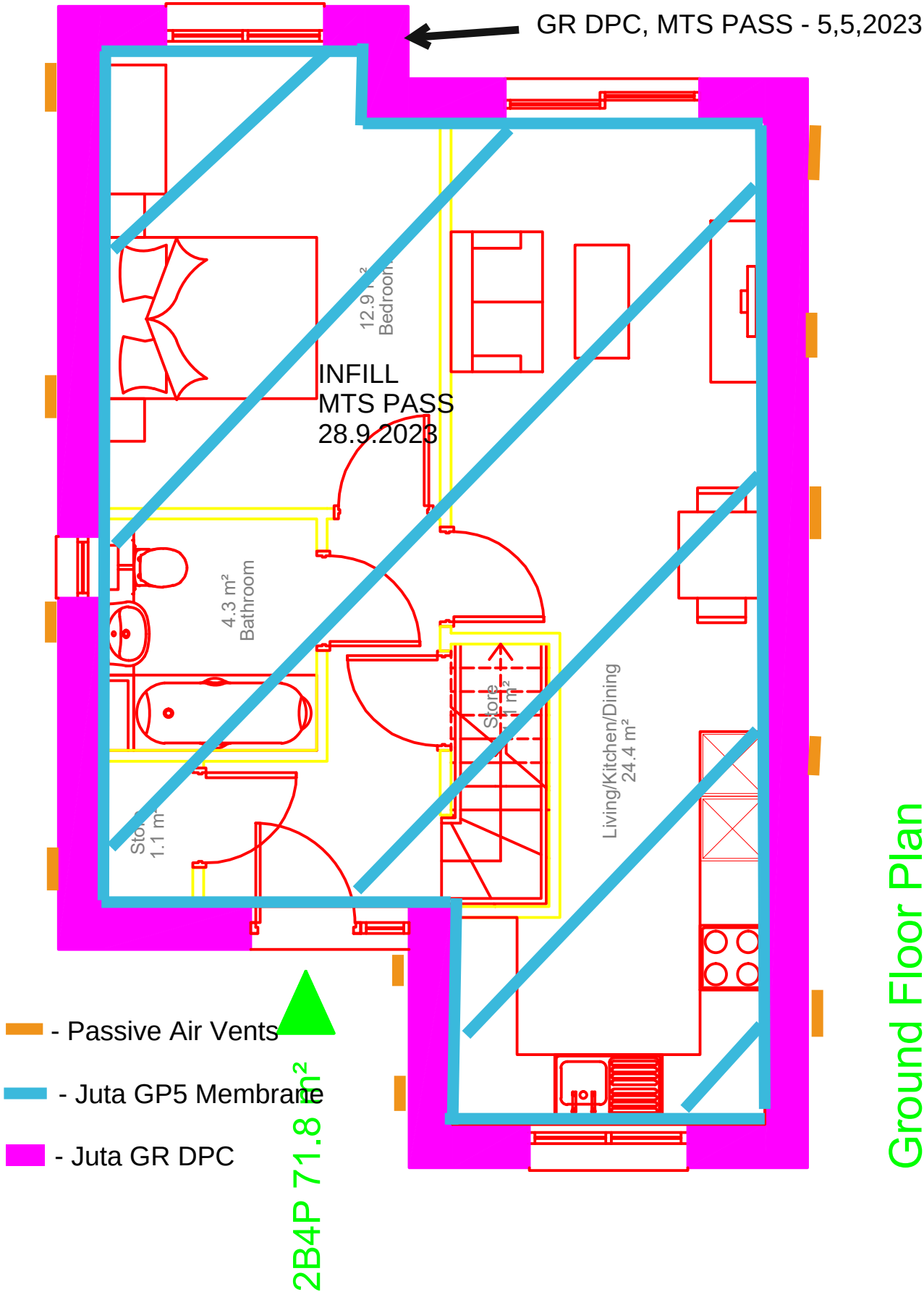
Y/N		Notes/Recommendations
	Membrane Type	YES
	Extent of Coverage	YES
	Underside of Membrane	N/A
	Slab/Membrane Condition	YES
	Laps & Joints	YES

Signed:

Date:


28.9.2023

Plot 5



Ground Floor Plan

INDEPENDENT INSPECTION & VALIDATION CERTIFICATE OF CONFORMANCE

DATE: 28.9.2023

PROJECT NAME: Former St.Johns Abulance, Gravesend.

CONTRACT NO: C852 - Plot 6 Infill - Juta GP5 Membrane.

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS Ltd were requested to attend site to inspect/validate the membrane installed to the infill area and welded to the previously installed GR DPC. On initial inspection our validation surveyor noted that the membrane had been welded well. Our surveyor then using a seam pick tool, inspected all seams for integrity, checking the membrane for damage or punctures and the GFP tape for integrity and adhesion and for specifications etc. All was installed well with a few puncture defects found and one seam defect. These were marked up and immediately repaired by the installers. All repairs were validated proving a pass. Photo evidence of all the above has been taken for inclusion into the final report. All membrane was installed to design specification and standards set out with both the Ciria C735, BS 8485 best practice documents.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified independent consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL) **PASS IN FULL**

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of MembraneTestingSolutions Ltd

Name: Michael A Smith

Dated: 28.9.2023

Signed for on behalf of The Client:

Name: Brendan Davis

Dated: 28.9.2023

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

Telephone: 0844 557 3786 • email: sales@mtsltd.net • www.mtsltd.net

Gas Protection Inspection & Validation Record

One record sheet to be completed for each plot inspected by a SUITABLY QUALIFIED independent consultant/engineer

Project Number:	C736	Design Source Ref:		Specification Source/Ref:		Other Documents Attached	Y/ N	Sign Off Cert	
Site Name/Location:	Gravesend	Building Use:	Residential ☒	Commercial		Other (Describe)			
Plot Numbers:	6	Building Description:	No. of Storeys =	2	Detached	Yes	Semi-Detached	Terrace	Apartment Block
Compiled By:	Michael A Smith	Gas Protection Type	Active/Passive	Passive	Foundation Type:	Suspended Floor/Raft/Other			Suspended

Ventilated sub-floor (if present)	Inspection date/time:	28.9.2023	Inspected by:	M A Smith	Photographed:	Y/N	No
--	-----------------------	-----------	---------------	-----------	---------------	-----	----

	Y/N	Notes/Recommendations (see guide below)
Void Former Type	Yes	1. Suspended Beam & Block Floor
Height of Void Space	Yes	2. 250 mm Void Height
Venting Media	N/A	3.
Pipe Size & Spacing	N/A	4.
External Wall Airbricks	Yes	5. Front = 0 / Rear = 0 / Right = 5 / Left = 5 / Total = 10
Internal Sleeper Walls	Yes	6. One
External Vent Trenches/Ducts	N/A	7.

Gas Barrier	Inspection Date/Time:	28.9.2023	Inspected by:	M A Smith	Photographed:	Y/N	Yes
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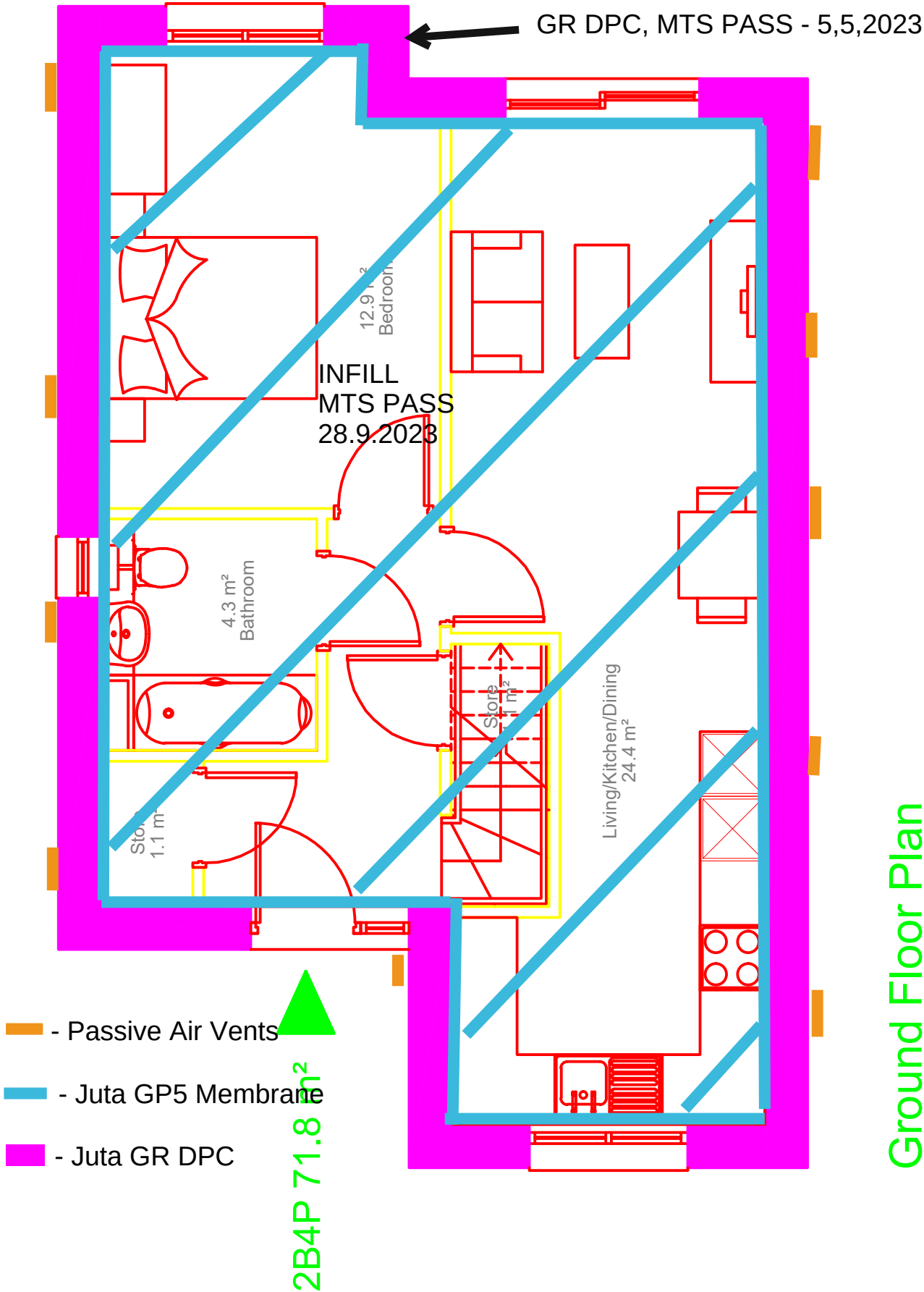
	Y/N	Notes/Recommendations
Membrane Type	YES	8. Juta GP5 Membrane, Full Line Out - crossing all cavaties
Extent of Coverage	YES	9. GRPC & Infill
Underside of Membrane	N/A	10. Not protected
Slab/Membrane Condition	YES	11. Good clean condition
Laps & Joints	YES	12. Welded with Self Adhesive Membrane at service entries & corners, door entries.

Signed:

Date:


28.9.2023

Plot 6



Ground Floor Plan

INSPECTION TESTING & VALIDATION CERTIFICATE OF CONFORMANCE

DATE: 23.2.2024

PROJECT NAME: FORMER ST. JOHNS AMBULANCE STATION, GRAVESEND

CONTRACT NO: C852 - PLOT No.1 GAS/VAPOUR MEMBRANE INFILL

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS ITD attended site under instruction to provide 3rd party independent inspection, testing and validation of the installed JUTA GP5 gas/vapour membrane. We confirm the seaming process was the hand held hot air welding system with GP SAM patches where necessary. We noted there were numerous punctures in the existing DPC's which had not been repaired prior to our inspection, along with minor seaming de-bonds and heat weld burn throughs. Our verifier performed 100% seam pick probe testing of all welded and taped seams, marking up any issues with a small dot of marker spray paint, adjacent to the defect but not directly on it as GP SAM does not stick to the paint. Upon completion of the validation process, Prestigeair Ltd immediately repaired the defects using patches of GP SAM and upon completion of the repairing process our verifier checked the bond using the seam pick process which all passed in full. The gas membrane was marked up as a pass and photographs were taken for record purposes. The defect repair positions were marked up on a drawing for inclusion within our final sign off validation report. Photographs were also taken of the defects and repairs again for inclusion within our final sign off report. Airbrick positions were also recorded on the plot layout plan.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL) PASS IN FULL

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of MembraneTestingSolutions Ltd



Name: BARRIE ACKROYD

Dated: 23.2.2024

Signed for on behalf of The Client:

Name: STEVE - SITE MANAGER

Dated: 23.2.2024

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

Telephone: 0844 557 3786 • email: sales@mtsltd.net • www.mtsltd.net

INSPECTION TESTING & VALIDATION CERTIFICATE OF CONFORMANCE

DATE: 23.2.2024

PROJECT NAME: FORMER ST. JOHNS AMBULANCE STATION, GRAVESEND

CONTRACT NO: C852 - PLOT No.2 GAS/VAPOUR MEMBRANE INFILL

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS ITD attended site under instruction to provide 3rd party independent inspection, testing and validation of the installed JUTA GP5 gas/vapour membrane. We confirm the seaming process was the hand held hot air welding system with GP SAM patches where necessary. We noted there were numerous punctures in the existing DPC's which had not been repaired prior to our inspection, along with minor seaming de-bonds and heat weld burn throughs. Our verifier performed 100% seam pick probe testing of all welded and taped seams, marking up any issues with a small dot of marker spray paint, adjacent to the defect but not directly on it as GP SAM does not stick to the paint. Upon completion of the validation process, Prestigeair Ltd immediately repaired the defects using patches of GP SAM and upon completion of the repairing process our verifier checked the bond using the seam pick process which all passed in full. The gas membrane was marked up as a pass and photographs were taken for record purposes. The defect repair positions were marked up on a drawing for inclusion within our final sign off validation report. Photographs were also taken of the defects and repairs again for inclusion within our final sign off report. Airbrick positions were also recorded on the plot layout plan.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL) PASS IN FULL

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of MembraneTestingSolutions Ltd



Name: _____
BARRIE ACKROYD

Dated: _____
23.2.2024

Signed for on behalf of The Client:

Name: _____
STEVE - SITE MANAGER

Dated: _____
23.2.2024

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

Telephone: 0844 557 3786 • email: sales@mtsltd.net • www.mtsltd.net

INSPECTION TESTING & VALIDATION CERTIFICATE OF CONFORMANCE

DATE: 23.2.2024

PROJECT NAME: FORMER ST. JOHNS AMBULANCE STATION, GRAVESEND

CONTRACT NO: C852 - PLOT No.3 GAS/VAPOUR MEMBRANE INFILL

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS ITD attended site under instruction to provide 3rd party independent inspection, testing and validation of the installed JUTA GP5 gas/vapour membrane. We confirm the seaming process was the hand held hot air welding system with GP SAM patches where necessary. We noted there were numerous punctures in the existing DPC's which had not been repaired prior to our inspection, along with minor seaming de-bonds and heat weld burn throughs. Our verifier performed 100% seam pick probe testing of all welded and taped seams, marking up any issues with a small dot of marker spray paint, adjacent to the defect but not directly on it as GP SAM does not stick to the paint. Upon completion of the validation process, Prestigeair Ltd immediately repaired the defects using patches of GP SAM and upon completion of the repairing process our verifier checked the bond using the seam pick process which all passed in full. The gas membrane was marked up as a pass and photographs were taken for record purposes. The defect repair positions were marked up on a drawing for inclusion within our final sign off validation report. Photographs were also taken of the defects and repairs again for inclusion within our final sign off report. Airbrick positions were also recorded on the plot layout plan.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL) PASS IN FULL

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of MembraneTestingSolutions Ltd



Name: _____
BARRIE ACKROYD

Dated: _____
23.2.2024

Signed for on behalf of The Client:

Name: _____
STEVE - SITE MANAGER

Dated: _____
23.2.2024

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

Telephone: 0844 557 3786 • email: sales@mtsltd.net • www.mtsltd.net

INSPECTION TESTING & VALIDATION CERTIFICATE OF CONFORMANCE

DATE: 23.2.2024

PROJECT NAME: FORMER ST. JOHNS AMBULANCE STATION, GRAVESEND

CONTRACT NO: C852 - PLOT No.4 GAS/VAPOUR MEMBRANE INFILL

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS ITD attended site under instruction to provide 3rd party independent inspection, testing and validation of the installed JUTA GP5 gas/vapour membrane. We confirm the seaming process was the hand held hot air welding system with GP SAM patches where necessary. We noted there were numerous punctures in the existing DPC's which had not been repaired prior to our inspection, along with minor seaming de-bonds and heat weld burn throughs. Our verifier performed 100% seam pick probe testing of all welded and taped seams, marking up any issues with a small dot of marker spray paint, adjacent to the defect but not directly on it as GP SAM does not stick to the paint. Upon completion of the validation process, Prestigeair Ltd immediately repaired the defects using patches of GP SAM and upon completion of the repairing process our verifier checked the bond using the seam pick process which all passed in full. The gas membrane was marked up as a pass and photographs were taken for record purposes. The defect repair positions were marked up on a drawing for inclusion within our final sign off validation report. Photographs were also taken of the defects and repairs again for inclusion within our final sign off report. Airbrick positions were also recorded on the plot layout plan.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL) PASS IN FULL

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of MembraneTestingSolutions Ltd



Name: _____
BARRIE ACKROYD

Dated: _____
23.2.2024

Signed for on behalf of The Client:

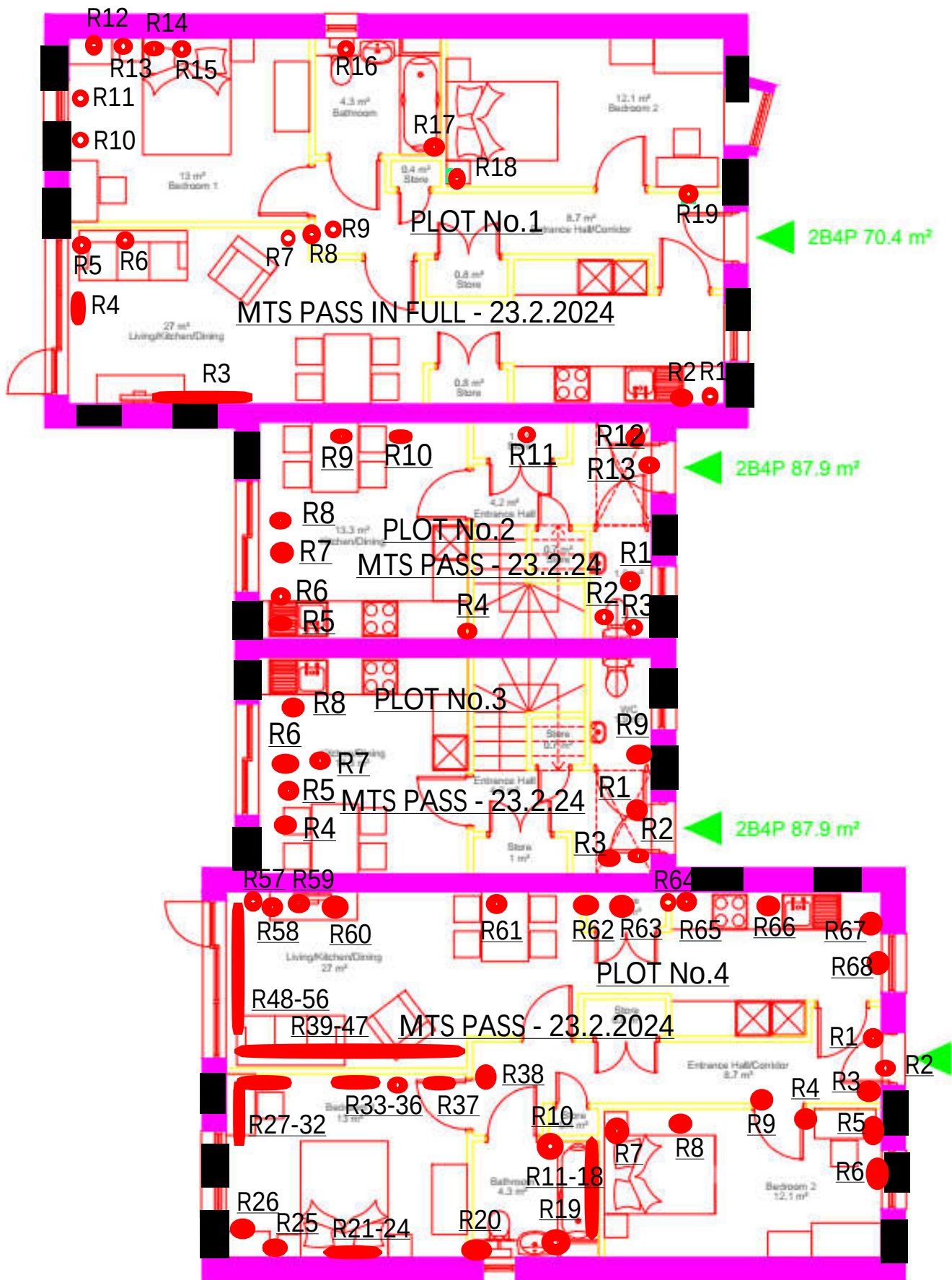
Name: _____
STEVE - SITE MANAGER

Dated: _____
23.2.2024

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

Telephone: 0844 557 3786 • email: sales@mtsltd.net • www.mtsltd.net

PLOT NO.s 1 - 4 - FORMER St. JOHNS AMBULANCE STATION GRAVESEND



Ground Floor Plan

■ = AIRBRICK POSITIONS

● = DEFECT/REPAIR POSITIONS



APPENDIX E

Digital Copy of this Report & Site Photographs
(All Contained on USB Storage Device)

Appendix L

Confirmation of Plastic Air Bricks



Unit 4, Brook Court
Blakeney Road
Beckenham
Kent, BR3 1HG
T: +44 (0) 203 846 879
E: info@longleygroup.co.uk

Sevenoaks Environmental Consultancy Ltd
145a Hastings Road,
Pembury,
Tunbridge Wells,
Kent,
TN2 4JU

15th July 2024

Armoury Drive – Air Bricks

Dear Rianna,

As requested as part of the remediation strategy and discharge of planning condition 6, we formally confirm that all air bricks that have been installed to plots 1-6 at Armoury Drive, have been changed over from clay to plastic, and in line with email recommendations from Sevenoaks Environmental dated 1st March 2024.

All plastic air bricks now have the required levels of air flow of approximately 6000mm².

Please see below some examples of what has been installed across all plots.



Certificate Number 19871
ISO9001, ISO14001, ISO 45001



Unit 4, Brook Court
Blakeney Road
Beckenham
Kent, BR3 1HG
T: +44 (0) 203 846 879
E: info@longleygroup.co.uk



All works have been undertaken in line with our quality standards and have been signed off by Building Control.

If you need anything else, please let me know.

Regards

Paul Jones
Head Of Operations
Longley Group



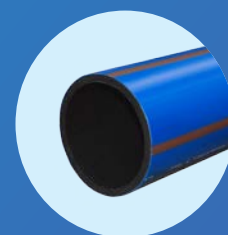
Certificate Number 19871
ISO9001, ISO14001, ISO 45001

Appendix M

Chemically Resistant Barrier Pipe Specification

Protecta-Line pipe

A multi-layered PE pipe with an embedded aluminium barrier layer. It is designed to safely transport drinking water in land which is contaminated or has the potential to be contaminated in the future.



Range / pressure rating

OD (mm)	SDR	Pressure rating	Material
25	11	12.5 bar	PE80
32			
63	11	16 bar	PE100
90 to 180	11	16 bar	PE100
	17	10 bar	PE100
225 to 630	11	16 bar	PE100
	17	10 bar	PE100

Colours

Material	Description	Colour
PE80	Black core and light blue outer with brown stripes.	 
PE100	Black core and dark blue outer with brown stripes.	 

Pipe diameter ≤ 180mm pipe has four brown stripes; > 180mm pipe has eight brown stripes.

Standards / approvals

The Water Supply Regulation 31/33	BS EN 12201-2	WRAS Approved	BS 8588
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Certification

		
1606501 1511343 1505514 1302025	BS EN 12201-2 KM 508224	BS 8588 KM 695717

Lengths

Pipes ≤ 180mm in diameter are available in coiled lengths of 25m, 50m or 100m.

Pipes 63mm – 630mm in diameter are also available in straight lengths of 6 or 12m.

Other lengths may be produced at customer's request.

Protecta-Line pipe

Markings

As a minimum requirement, the following information is marked indelibly and linearly at intervals along the pipe:

• Manufacturers identification:	GPS	• Material designation:	PE100 or PE80
• System:	Protecta-Line	• Nominal size:	180mm (example)
• Pipe composition:	PE Pipe with AL Barrier	• SDR value:	Water
• Standard and pipe type::	BS 8588 TYPE A	• Continuous pressure rating at 20°C	10 bar (example)

The pipes are marked with the following three times per metre:

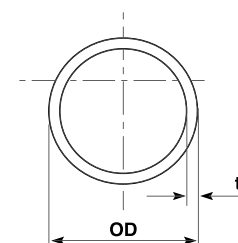
- Application: **Water**

Batch number format

8 Digit Code	Extruder Number	Shift Number	Week Number	Year
	1 & 2	3 & 4	5 & 6	7 & 8
	01-23	01 - 14	01 - 52	01-99

Pipe dimensions – water applications (BS EN 12201-2)

Size* (mm)	SDR	Mix OD (mm)	Max OD (mm)	Mean Bore (mm)	Min t (mm)	Max t (mm)	Approx Weight (kg/m)
25	11	26.2	27.4	20.0	3.0	3.7	0.3
32	11	33.3	34.5	26.0	3.7	4.4	0.4
63	11	64.3	65.6	50.9	6.5	7.6	1.3
90	11	92.2	93.5	72.9	9.3	10.7	2.6
	17	92.2	93.5	78.8	6.5	7.5	1.9
110	11	112.2	113.5	89.2	11.1	12.7	3.7
	17	112.2	113.5	96.3	7.7	8.8	2.7
125	11	127.2	128.5	101.2	12.5	14.2	4.7
	17	127.2	128.5	109.6	8.5	9.8	3.4
160	11	163.2	165.1	130.4	15.8	17.9	7.6
	17	163.2	165.1	141.1	10.7	12.4	5.4
180	11	183.3	185.4	146.8	17.6	20.0	9.5
	17	183.3	185.4	158.8	11.9	13.7	6.8
225	11	227.3	229.5	182.5	21.7	24.4	14.5
	17	227.3	229.5	197.4	14.6	16.6	10.3
250	11	252.3	254.9	203	23.9	26.8	17.7
	17	252.3	254.9	219.6	16.0	18.3	12.4
280	11	282.3	285.1	227.4	26.6	29.8	22.0
	17	282.3	285.1	245.9	17.8	20.1	15.4
315	11	317.3	320.2	255.7	29.8	33.3	27.6
	17	317.3	320.2	276.6	19.9	22.4	19.3
355	11	357.3	360.6	288.3	33.4	37.3	34.8
	17	357.3	360.6	311.6	22.3	25.1	24.3
400	11	402.3	405.8	324.8	37.5	41.8	43.9
	17	402.3	405.8	351.3	24.9	27.9	30.4
450	11	452.3	456.1	365.4	42.1	46.8	55.3
	17	452.3	456.1	395.2	27.9	31.2	38.2
500	11	502.3	506.4	406	46.6	51.8	67.9
	17	502.3	506.4	439.0	30.9	34.5	46.9
560	11	562.3	566.8	454.9	52.0	57.7	84.7
	17	562.3	566.8	491.8	34.4	38.4	58.4
630	11	632.3	637.2	511.6	58.4	64.8	106.9
	17	632.3	637.2	553.2	38.6	43.0	73.6



* The size is the nominal core pipe outside diameter. Other diameters, SDRs and lengths can be made subject to a minimum order value.

Appendix N

Tardis Disposal Ticket

WASTE TRANSFER NOTE

0800 7310589



A Registered Waste Carrier (Wet Waste European Code 20.03.04)

Waste Carrier Licence No.	CB/DU84986	Contract No.	D179949
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Order No.	730-027	Depot	THURROCK
Date Of Transfer	06/02/2023	Vehicle Reg	BD21AFE
Time On Site	06/02/2023 17:42:09	Depot Depart Time	06/02/2023 05:49:09
Waste Transfer No.	11739138	Depot Arrive Time	06/02/2023 17:36:11

Site Contact	MARK 07765864335 02038468793	Customer Name	THE LONGLEY GROUP
Site Name	THE LONGLEY GROUP	Invoice Address	UNIT 4 BROOK COURT
Site Address	THE LONGLEY GROUP - FORMER AMBULANCE STATION ARMOURY DRIVE GRAVESEND DA12 1LT		BLAKENEY ROAD BECKENHAM KENT BR3 1HG

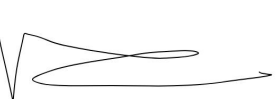
-POST TANKER WASHOUT (INTERNAL USE, DRIV 1

AM ON SITE - TANKER TO REMOVE NON HAZ WASTE EWC 16 10 02- DESCRIPTION OF WASTE TIP @MCGOVERNS AMBERLEY WAY TW4 6BH, PO022970
APPROX 5000 LITRES TO BE REMOVED DEPOT TO DEPOT NOTE ALL TIMES AND QUANTITIES REMOVED SITE ENTRANCE IS 9 ALBERT MURRAY CLOSE -D

Name & Address of Disposal Site	FINAL EMPTIES PLEASE ENSURE TANKS ARE EMPTIED FULLY, AND THE FOLLOWING IS CHECKED AND SIGNED?		
Logger Transaction Number		SPOKE TO	
Waste Quality		TIME OF CALL	
Tanker Wash Out			
Tanker Dig Out			
Solid Percentage %			

Description of Waste Removed from Site (Notes - SIC 37.00)	(Human waste water collection & transport if different)
Quantity Removed From Site/Delivered (water) To Site (Gallons) 0.87	

BY SIGNING THE BELOW I CONFIRM THAT I HAVE FULFILLED MY DUTY TO APPLY THE WASTE HIERARCHY AS
REQUIRED BY REGULATION 12 OF THE WASTE (ENGLAND AND WALES) REGULATIONS 2011

Customer Signature		Drivers Signature	
			
Name	frank	Name	Frank Glyde
Representing	the Longley		

Permit, Licence or Exemption details available upon request
Download Waste Carriers Licence www.tardishire.co.uk
Copies of completed Waste Transfer Notes MUST be kept for 2 Years
WATER SUPPLIED IS NOT DRINKING WATER