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TECHNICAL NOTE

Validation Report (Construction Phase) – Blocks G, G1 and H (Phase 1), Free Wharf, Brighton Road, Shoreham-by-Sea (planning ref. AWDM/1497/17)

Issue Record			
Project No.	1375		
Document Ref.	1375_TN_240429_ValRpt (final)		
Issue Date	29/04/2024		
Client	HG Construction Limited		
Author / Issued By	P Taylor		29/04/2024

1 Introduction

Symbiotic Solutions Limited (SSL) was commissioned by HG Construction Limited (The Client) to prepare a remediation validation report for the construction phase remediation works undertaken for Blocks G / G1 and H at the site at Free Wharf, Brighton Road, Shoreham-by-Sea, West Sussex. A site location plan is presented in Appendix 1.

The overall site is permitted for the development (ref. AWDM/1497/17) of 10 (no.) buildings, to provide 540 (no.) new homes, 2,707sqm of commercial floorspace at ground floor level within use classes, A1 (retail), A3 (cafes and restaurants), B1 (business) and D1 (non-residential institutions). The development also includes 512 parking spaces, the reconstruction of the river wall, construction of mooring pontoons and observation platform, provision of a riverside pedestrian/cycle route, areas of semi-private and publicly accessible open space, internal access roads, 596 cycle parking spaces and associated ancillary areas. The permitted development layout is shown in Appendix 1.

This report covers the remediation works / remediation validation works for Blocks G / G1 and H of the development (north-eastern area of the site) in support of discharge of Condition 10 (land contamination / remediation scheme verification report) of the planning consent (ref. AWDM/1497/17).

The final landscaping layout for Blocks G, G1 and H (Phase 1) were permitted under ref. AWDM/0182/22; the relevant drawings are also included in Appendix 1. Soft landscaping is present at ground level the first-floor podium level of Block G / G1 and the roof levels of Blocks G / G1 and H.

The approved (planning ref. AWDM/0255/19) remediation strategy and validation plan for the site was set out in:

- GeoDyne report, Remediation Method Statement, Project ref. 31149, dated 30th May 2019.

It is noted that the Remediation Method Statement split the remediation works into enabling works (pre-construction) and construction phase works. The enabling works phase included earthworks / works to remove and validate known tanks and hotspots; identify, remove and validate potential hotspots; construct the piling mat; and a watching brief for unexpected ground conditions (including contamination). These works were undertaken by Wates Construction and validated by GESL. The GESL validation report listed below was submitted and approved for partial discharge under planning ref. ADWM/0637/21.

- GESL report, Interim MMP Verification Report for the Land at Free Wharf, Brighton Road, Shoreham-by-Sea, BN43 6SA, ref. GE18319/INTMMPVR1.2/MAR21, v1.1, dated 16th March 2021.

It is further noted that whilst the GESL report identified that the whole site area had not been complete (understood to be the western end of the site near the Humphreys Gap road entrance) and that within the area covered by that report an area under an existing haul road (not removed at that time) was likely to overly elevated hydrocarbon concentrations, these and the areas where enabling works were not completed are not be within the Blocks G / G1 and H (Phase 1) area.

The construction phase remediation measures are summarised in Section 2.

2 Summary of Site Investigation and Remediation Strategy

2.1 Summary of Site Investigation / Post Remediation Site Conditions

The site investigation identified elevated concentrations of lead, arsenic, PAH and localised potentially elevated SVOC compounds in the general site made ground relative to a residential site usage. Asbestos fibres were also identified in a small number (2 no.) of samples. The natural strata were considered to be 'uncontaminated' for the proposed end use.

The site investigation also targeted potential areas of concern associated with USTs, ASTs, a former oil storage area and tarmacadam works. No significantly elevated TPH concentrations were identified in the soils tested. The tanks and soils associated with the oil storage works etc have been removed / investigated as set out in the GESL MMP validation report (R.2). No significant contamination was identified remaining in the Block G / G1 and H (Phase 1) area.

Whilst the site investigation did identify some metal, TPH and PAH impact on the shallow (perched) groundwater it concluded that there was unlikely to be any significant risks to the wider controlled waters environment (aquifer beneath the site and the adjacent River Adur).

The updated gas risk assessment presented in the Geodyne RMS concluded that the site was classified as CS2 and that gas protection measures would be required – with the exact measures to be determined based on the final layouts.

2.2 Summary of Remediation and Validation Strategy

In summary it was considered that the that (construction phase) remediation to address the potential contamination linkages identified could be achieved by implementation of the following elements:

- A watching brief during the site works (in particularly during ground works) for evidence of unexpected or exceptional contamination.
- Soil capping layers to be installed in areas of soft standing (public open space) – to comprise a 0.6m clean soil layer (topsoil + subsoil).
- Gas protection measures to meet the requirements for a CS2 classification.
- Underground services must be installed to the service providers specification.

3 Summary of Remediation and Validation Works Undertaken

3.1 Watching Brief

It is understood that (correspondence in Appendix 2) the Client, or Client's contractors have not encountered any evidence of unexpected or otherwise exceptional contamination during the works undertaken.

3.2 Capping Layer in soft Landscaping Areas

The soft landscaping layout are included in Appendix 1.

The soft standing areas have been installed by the client's contractors.

SSL visited site on the 6th March 2024 to inspect and obtain soil samples from the soft standing areas at the site. The inspection and sampling locations are indicated on Figure 1 and representative photographs are included in Appendix 3.

The site observations indicate at least 0.6m in the ground floor level planters and around 0.5m in the first floor and roof level planters (placed over an engineered base so the depths are not critical from a remediation point of view). The topsoil was described as grey-brown slightly clayey sandy silty soil with occasional gravel and visually consistent between all locations.

6 (no.) samples of the topsoil, 4 (no.) from the ground floor level planters (sample refs. 1375/Val001 – 004; locations on Figure 1) and 2 (no.) from the soils used in the podium level (first floor) planters were obtained and submitted for laboratory analysis in line with the remediation method statement requirements. The sample results (report ref. 24-02659) are included in Appendix 3. The results have been compared to generic assessment criteria for residential end-use without plant uptake (included in Appendix 3). All determinands pass the relevant screening criteria for residential land use without plant uptake.

Overall, it is also considered that on the basis of the site observations and soil testing undertaken that the planting areas have been completed in line with the remediation strategy and that the soils used are physically and chemically suitable for use.

3.3 Water Pipe

The water supply installation drawings are included in Appendix 4. MDPE barrier pipe was specified for the incoming below ground service pipework.

Photographs of the pipework during installation (showing brown line on blue pipe for barrier pipe) and the delivery note for the barrier pipe are included in Appendix 4.

3.4 Gas Protection Measures

The gas protection design drawings are included in Appendix 5.1. The gas protection measures were installed by Kelmac Waterproofing Limited (specialist installers) and independent verification was carried out by GeoShield Limited. The Geoshield verification plan and verification reports (R001 – R005) are included in Appendix 5.2.

The verification process concluded that the gas protection measures had been installed to the design and to the appropriate standards and verified in line with CIRIA 735.

4 Conclusions

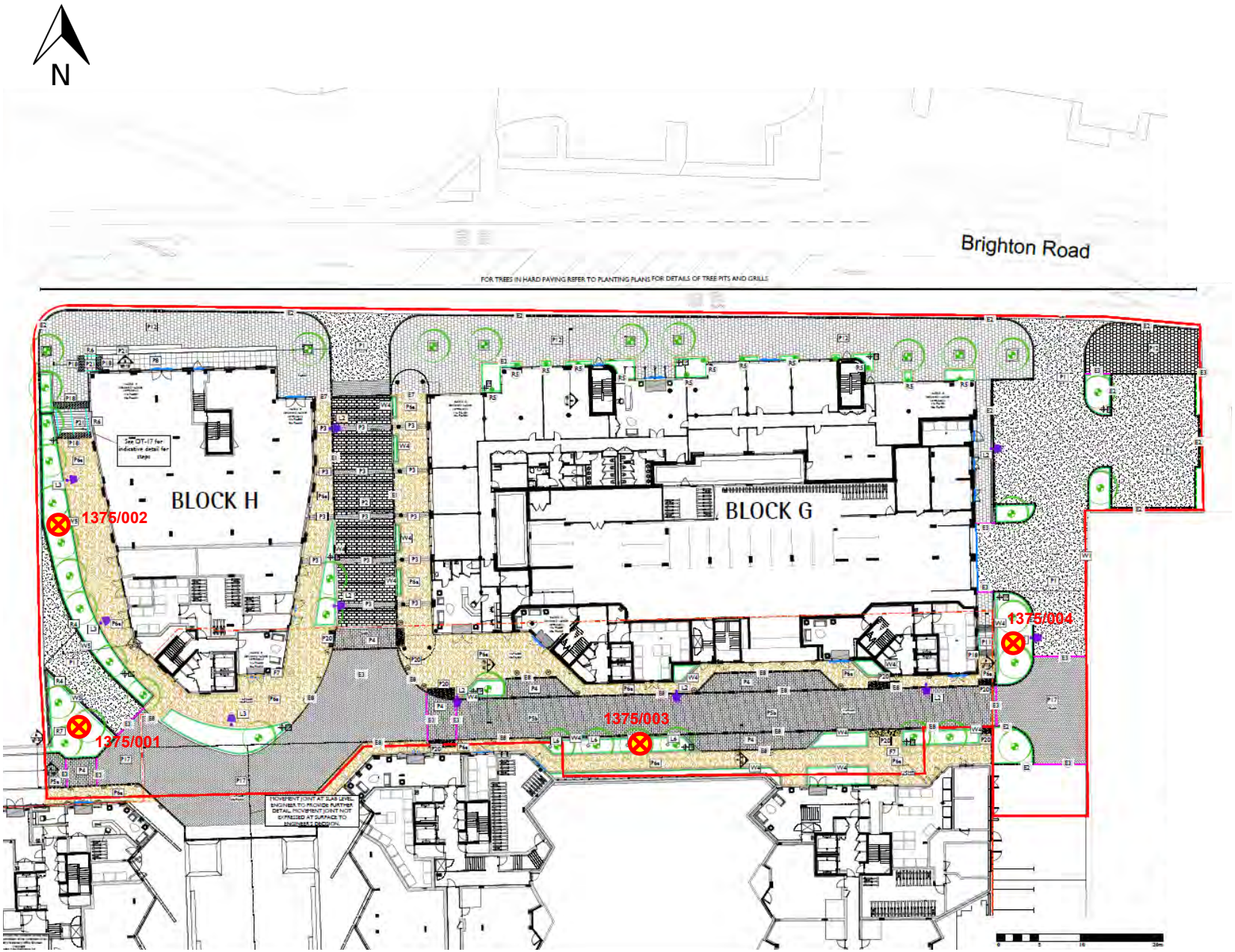
On the basis of the site observations, laboratory results and the information supplied it is considered that the remediation actions required at the site in relation to the general watching brief for evidence of further or unexpected contamination, the works to reinstate soils into the planting areas, installation of water pipe and installation of gas protection measures have been completed in line with the approved remediation strategy.

5 References

R.1. GeoDyne report, Remediation Method Statement, Project ref. 31149, dated 30th May 2019.

R.2. GESL report, Interim MMP Verification Report for the Land at Free Wharf, Brighton Road, Shoreham-by-Sea, BN43 6SA, ref. GE18319/INTMMPVR1.2/MAR21, v1.1, dated 16th March 2021.

FIGURE 1: Validation Inspection and Sampling Plan



Legend:

Validation Inspection and Sampling Location (ground floor)

Notes:

Samples 005—007 taken from planters on first floor podium level

Site:

Free Wharf, Brighton Road, Shoreham -by-Sea

Title:

Validation Inspection and Sampling Plan

Client:

HG Construction Limited

Drawing: 1375_TN_240422_Figure1

Date: April 2024

Scale: Not to scale / as shown

Drawn by: PT

Checked by: NT

Project No: 1375

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APPENDIX 1: PLANNING DRAWINGS



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Notes:
The Legal Site Boundary indicated on this drawing differs from the Application Boundary, which has been extended north to include the existing kerb line to Brighton Road, and also extended south into the river.
Please read this drawing in conjuction with 'Existing Site - Application Boundary 2052-00-DR-0002-P01'

Rev: P02	**Date:** 18.01.18	**Drw:** EC	**Chk:** SR	
East boundary revised.				
Rev: P01	**Date:** 29.09.2017	**Drw:** RA	**Chk:** EC	
Issued for Planning Submission.				

Do not scale off this drawing
Report all errors and omissions to the Architect
Dimensions to be checked on site
Plot date: 18/01/2018 18:19:49

Client:
Southern Housing Group

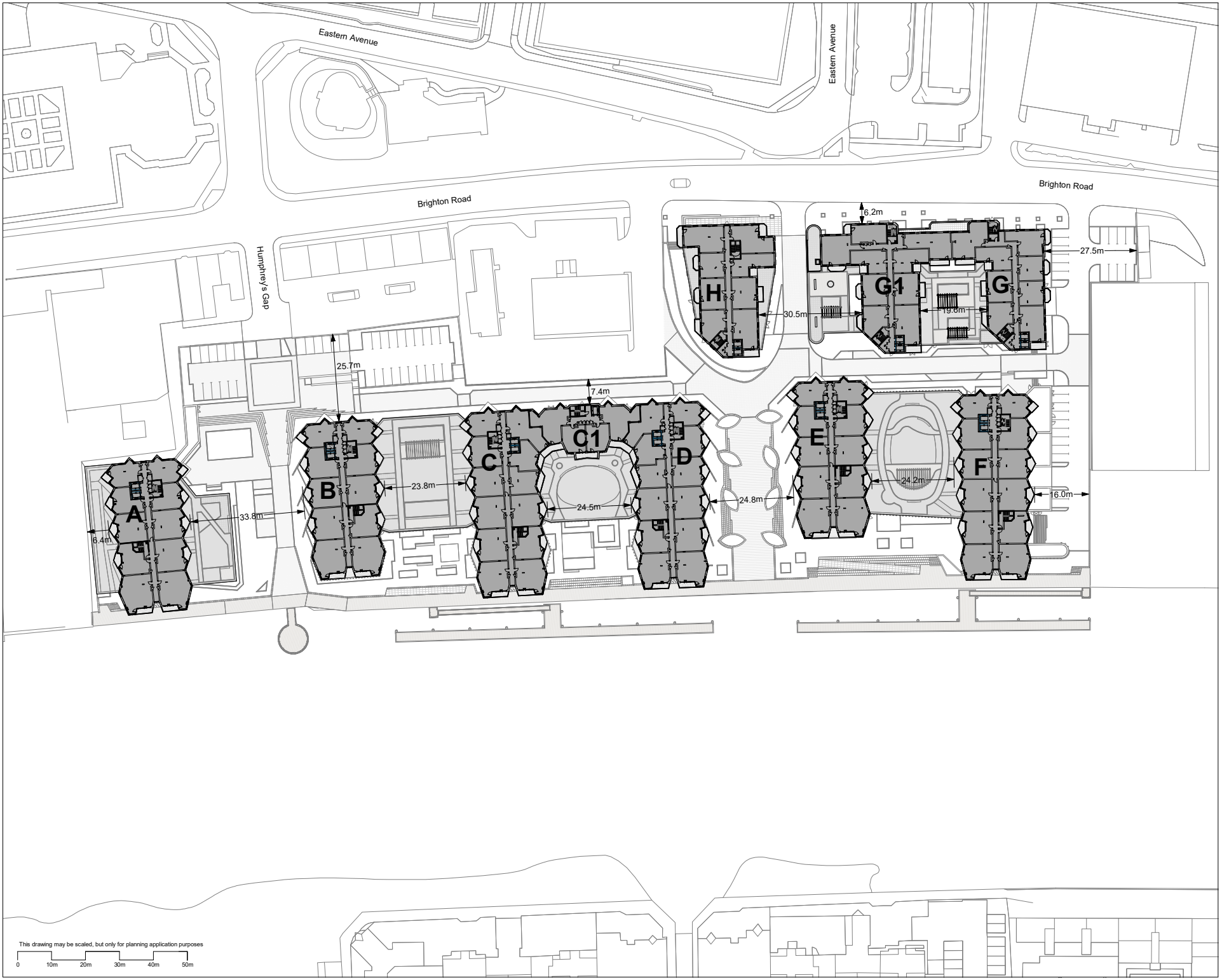
Project:
Free Wharf, Shoreham-By-Sea

Title:
Existing Site Location Plan

Drawing status:
For Planning

CZWG

Scale @ A1
1 : 1000
Drawing No: 2052-00-DR-0001
Rev: P02



N

CZWG

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Notes:
All dimensions are approximate

Notes:
All elevation values are expressed in meters and relate to their height Above Ordanance Datum (Newlyn)
All trees shown here are indicative. Please refer to Landscape Architect's masterplan for further details on tree/shrubs position and size.

Rev: P03	**Date:** 18.01.18	**Drw:** EC	**Chk:** SR
Pontoon to east boundary revised.			
Rev: P02	**Date:** 05.01.18	**Drw:** EC	**Chk:** SR
Revisions to scheme submitted for Planning			
Rev: P01	**Date:** 29.09.2017	**Drw:** RA	**Chk:** EC
Issued for Planning Submission.			

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Report all errors and omissions to the Architect
Dimensions to be checked on site
Plot date: 18/01/2018 18:20:08

Client:
Southern Housing Group

Project:
Free Wharf, Shoreham-By-Sea

Title:
Site Wide Block Plan

Drawing status:
For Planning

CZWG

Scale @ A1
1 : 500

Drawing No: 2052-00-DR-0003

Rev: P03



Key

Studio	Retail (A1/A2/A3/A4)	Private Balcony	Concierge	Cycle Store (Rest. /Cafe)	Hub Storage	Plant-Access	Plant-Generator	Refuse Store (Rest.)
1b2p	Restaurant (A3)	Private Terrace	Core-Entrance	Cycle Store (Rest.)	Core-Stair	Plant-Access Void	Refuse Store (Office)	Refuse Store (Retail)
2b3p	Office (B1)	Car Park	Core-Lobby	Cycle Store (Retail)	Lightwell	Plant-Com Unit Air Handling	Plant-Substation	Refuse Store
2b4p	Yacht Facility (B1)	Concierge WC	Cycle Store (Office)	Core-Store	Cycle Store	Plant-Mech Vent	Refuse Store (Rest. / Cafe)	Resident's Storage

This drawing may be scaled, but only for planning application purposes

0 10m 20m 30m 40m 50m

N

CZWG

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Notes:
All elevation values are expressed in meters and relate to their height Above Ordanance Datum (Newlyn)
All trees shown here are indicative. Please refer to Landscape Architect's masterplan for further details on tree/shrubs position and size.
The road junction proposals shown here are indicative. Please refer to the Transport Consultant's documentation for further details.

Rev: P03	Date: 18.01.18	Drw: EC	Chk: SR	
East pontoon revised.				
Rev: P02	Date: 05.01.18	Drw: EC	Chk: SR	
Revisions to scheme submitted for Planning				
Rev: P01	Date: 29.09.2017	Drw: RA	Chk: EC	
Issued for Planning Submission.				

Do not scale off this drawing
Report all errors and omissions to the Architect
Dimensions to be checked on site
Plot date: 18/01/2018 18:20:50

Client:
Southern Housing Group

Project:
Free Wharf, Shoreham-By-Sea

Title:
Site Wide Ground Floor GA Plan

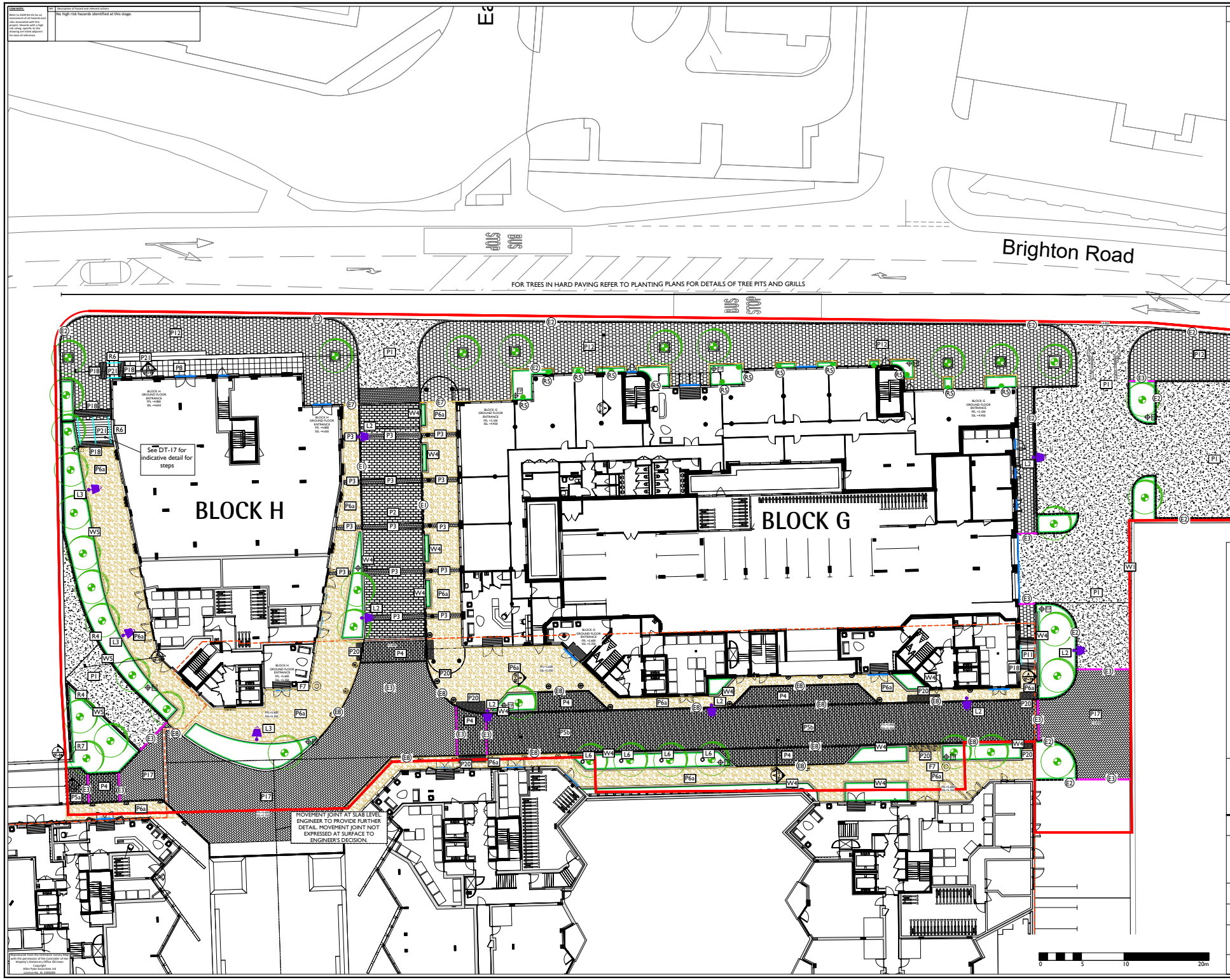
Drawing status:
For Planning

CZWG

Scale @ A1
1 : 500

Drawing No: 2052-00-DR-0110

Rev: P03



CONSULTING	Description of hazard and relevant actions
Refer to 2639-PH-01 for an assessment of all hazards and risks associated with this project. Hazards with a high risk rating specific to this drawing are listed adjacent for ease of reference.	No high risk hazards identified at this stage.

APAL FILE REFERENCE
2639-PH1-LA-01 LVL 0

Notes

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North

Based on drawing by CZWG
Drawing number 2052-00-DR-0110-T01 Site Wide Ground Floor GA Plan, 2052-00-DR-0111-T01 Site Wide Level 01 GA Plan, 2052-00-DR-0115-T01 Site Wide Level 05 GA Plan, 2052-00-DR-0116-T01 Site Wide Level 06 GA Plan.

Based on drawing by Hoare Lea
Drawing number HL Sketch Free Wharf

For drawing Legend please refer to document 2639-PH1-LA-00

DRAWING IS FOR DISCHARGE OF PLANNING CONDITIONS ONLY AND SUBJECT TO DETAILED DESIGN FOR CONSTRUCTION.

NOTES:

- All levels are preliminary and final levels are the responsibility of the lead architect.
- Lighting locations are approximate and final locations are to be provided by the lighting engineer.
- All building thresholds are to have a channel drain to comply with NHBC to engineers specification.
- All drainage to engineer's specification.

Rev	Description	Date	Drawn	Checked

Drawing Status
CONDITION DISCHARGE

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Client HG Construction	Scale 1:200@A1
Project Free Wharf Phase 1	By/Chk SB/VF
Drawing Title Landscape Layout Plan Ground Floor GA	Date 14/01/22
Drawing Number 2639-PH1-LA-01	Revision *

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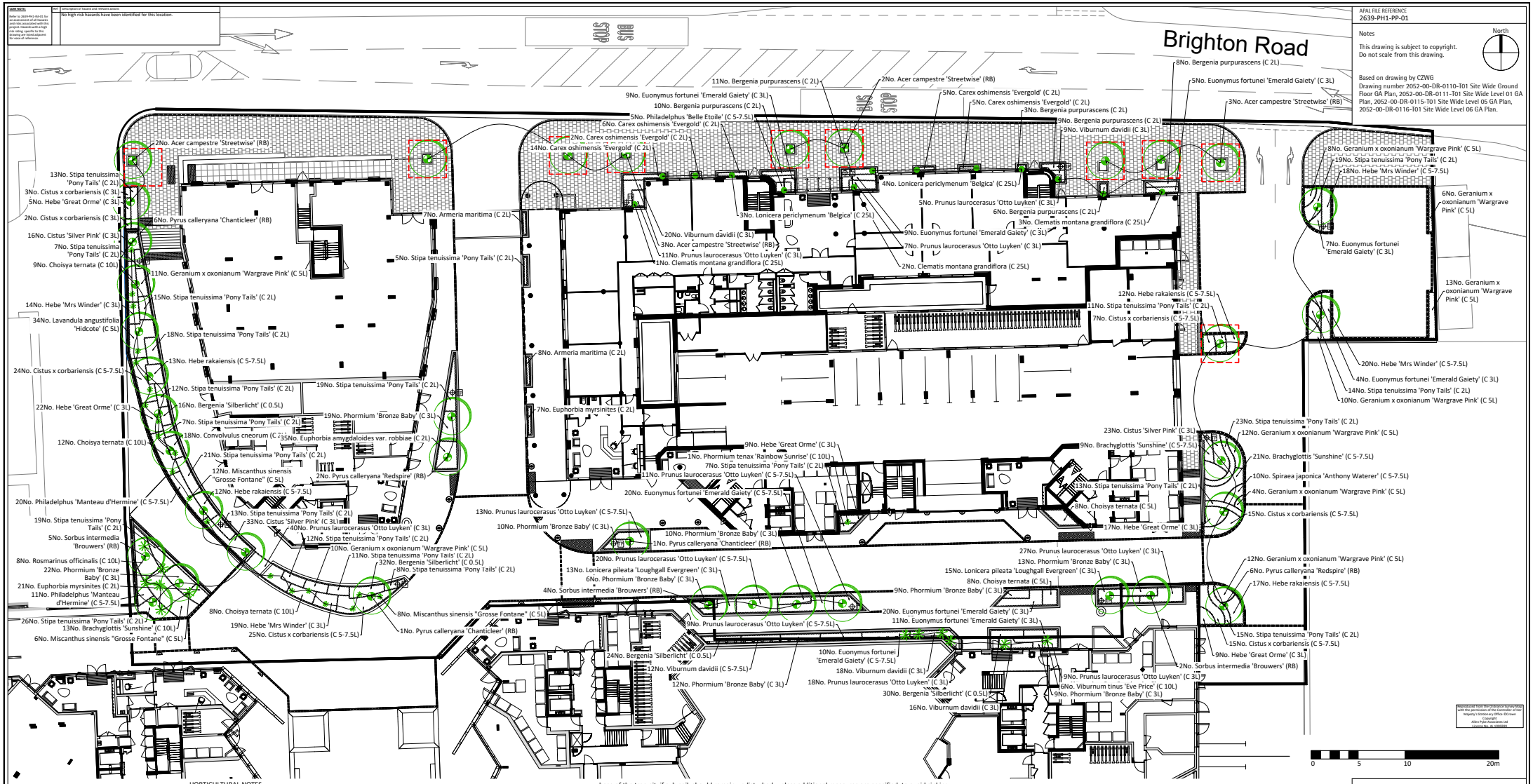

LEGEND

- Proposed tree
- Proposed multi-stemmed tree
- Proposed mixed planting
- Hedge
- Indicative location and extent of RootSpace structural tree pit system (GreenBlue Urban), based on min volume of 30 m3 per tree. See 2639-DT-72. Final extent/volume to be specified by supplier based on tree species. Trees along x road to be fitted with Monza tree grille. Tree pit detail to be co-ordinated with specialist.

HORTICULTURAL NOTES

- All work to be carried out to the satisfaction of the Landscape Architect. No planting position shall be altered without the approval of the Landscape Architect.
- Engineer to confirm foundation details in accordance with practice note 4.2 of the NHBC guide. All tree locations subject to assessment by structural engineer with regadrs to foundation depths.
- Planting will commence during the first planting season (mid Nov-mid March) after substantial completion of the site. Should planting commence outside the dormant period (October to mid-March), allow for all bare root stock to be supplied container grown and an intensive watering regime.
- All topsoil and subsoil is to be analysed by a qualified soil scientist and the findings supplied in report form including recommendations to bringing soils up to specification. The soil survey shall include analysis of representative topsoil and subsoil samples (sample numbers to be determined by the soil scientist) in accordance with the testing schedule. Test results without soil scientist's analysis for compliance against the specification and recommendations will not be acceptable.
- The soil profile for landscape areas shall be as follows: Shrub areas - 300mm / 300mm Subsoil; Tree pits – 300mm Topsoil / 600mm-800mm Subsoil (depending on size of rootball). Topsoil to BS 3882:2015, Subsoil to BS 8601:2013. All landscaped areas to be free draining.
- Contractors to ensure all planting beds and tree pits are free draining. Prior to topsoiling all compacted ground is to be fully de-compacted and deep ripped (400-600mm) to allow good drainage.
- All areas where soil is to be incorporated over formerly hard areas or compacted ground, these are to be excavated a further 300mm, or as required to remove all sub-base aggregate and backfilled to below topsoil level with free draining subsoil to match PH of topsoil used on site. Following settlement of subsoil, top up areas and cultivate to depth of topsoil.
- Contractor to only work with or over topsoil when dry to avoid compaction and the need for lengthy remedial operations to re-create a friable, free-draining soil.
- Trees to be selected and planted in accordance with BS 8545:2014. Tree pits in soft areas should be no deeper than the existing rootball or container depth and should have a diameter at least 75mm greater than the root system. The base of the tree pit, if sub-soil, should remain undisturbed, unless additional measures are specified, to avoid sinking of the rootball. Sides of the tree pit should be scarified to promote lateral root growth. The rootflare should be proud of the soil and easily visible after planting. Tree stock should be supplied with nursery line marked on tree if available from nursery and line planted flush with ground level. Existing soil horizons (where visible/apparent) should be replicated as far as practicable.
- Unless specified otherwise, trees are to be secured by stakes: 14-16cm girth trees and below by single stake and 18-20cm girth trees and larger to be double staked. Multi-stem trees to be secured with single angled stake to main leader. Trees to be secured at low level (500mm) with biodegradable ties. Stakes to be placed outside of the rootball and extend at least 450mm into the ground. Once the tree has established stakes are to be removed (minimun 5 years).
- Each new tree pit shall incorporate a seep hose system to facilitate a hose being inserted to avoid unnecessary water loss. All trees planted in grass shall be fitted with mower/strimmer guards or mulched with a min 500mm diameter circle of mulch away from the main stem/trunk to protect stem/trunk from strimmer damage.
- Where trees are to be planted in close proximity to public services such as foul, surface and mains water, an appropriate root barrier such as ReRoot600 to 2000 or equivalent is to be installed to a depth below invert levels of services. Root barrier to be located as far from the tree as possible to maximise root growth and stability of the tree.
- Where manhole covers are located in shrub beds or hedge planting ensure that plants are spaced appropriately so they are not immediately adjacent to the cover.
- All preparations, both hard and soft under/around trees to be retained must be carried out by hand to protect roots.
- Climbers to be planted min 250mm away from supporting structure, nursery canes removed and attached to climber support using appropriate ties. Climber supporting structure to be vine eyes and horizontal and vertical, lightly tensioned, stainless-steel wires. Height and dimensions dependent on location and climber species. Load and suitability for facades to be confirmed by structural engineer.
- For most average growth climbers such as Clematis, support to be horizontal and vertical stainless steel wires at 350mm intervals horizontally and 200mm intervals vertically, 100mm clearance to buildings/structure. When stainless steel, fully tensioned systems are specified use: Jakob Wire system or equivalent, Tel: 0845 1300 135. Where strong growing and twining varieties of climbers are used refer to supplier's recommendations for distances of wires. Load and suitability for facades to be confirmed by structural engineer.
- All plant material procedures are to conform to the relevant British Standards (3936/4428) codes of practice and the specification.
- All shrubs are to be furnished with at least 3 strong breaks and supplied container grown. Shrubs to be planted in holes big enough to accommodate the plant without damaging the roots (min. 300mm³). Plants to be firmed, watered in and dead/damaged branches removed after planting.
- The use of pesticides (herbicides, insecticides, fungicides and slug pellets etc) should be discouraged to prevent cumulative fatal effects to animals via the food chain, particularly invertebrates, birds and/or mammals. Any pesticides used should be non-residual.
- A slow release fertilizer shall be applied after planting in accordance with manufacturer's instructions.
- All plant beds where access to ground floor windows is required are to have 400mm gravel strip offset from building facades. Gravel to be pea shingle or similar approved.
- All planted areas to be mulched with a medium grade bark mulch such as Melcourt Amenity Bark Mulch, 3-35mm, or similar to a minimum depth of 50mm after plants have been well watered. Where perennials are used a fine composted mulch such as Melcourt Composted Fine Bark or similar shall be applied to a depth of 50mm Care must be taken not to smother the plants.
- Where appropriate hedge species shall be pruned by up to one third to promote bushy growth.
- Any tree, shrub or area of grass shall be replaced within a period of five years if they die within the next planting season after planting with another such plant of similar size and species.

Some Risk Identified

Refer to 2639-PH1-RA-01 for an assessment of all hazards and risks associated with this drawing. Hazards with no risk rating: specific to this drawing are listed adjacent for ease of reference.

Ref	Description of hazard and relevant actions
	No high risk hazards have been identified for this location.

APAL FILE REFERENCE
2639-PH1-PP-01

Notes

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North

Based on drawing by CZWG
Drawing number 2052-00-DR-0110-T01 Site Wide Ground Floor GA Plan, 2052-00-DR-0111-T01 Site Wide Level 01 GA Plan, 2052-00-DR-0115-T01 Site Wide Level 05 GA Plan, 2052-00-DR-0116-T01 Site Wide Level 06 GA Plan.

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Drawing Status
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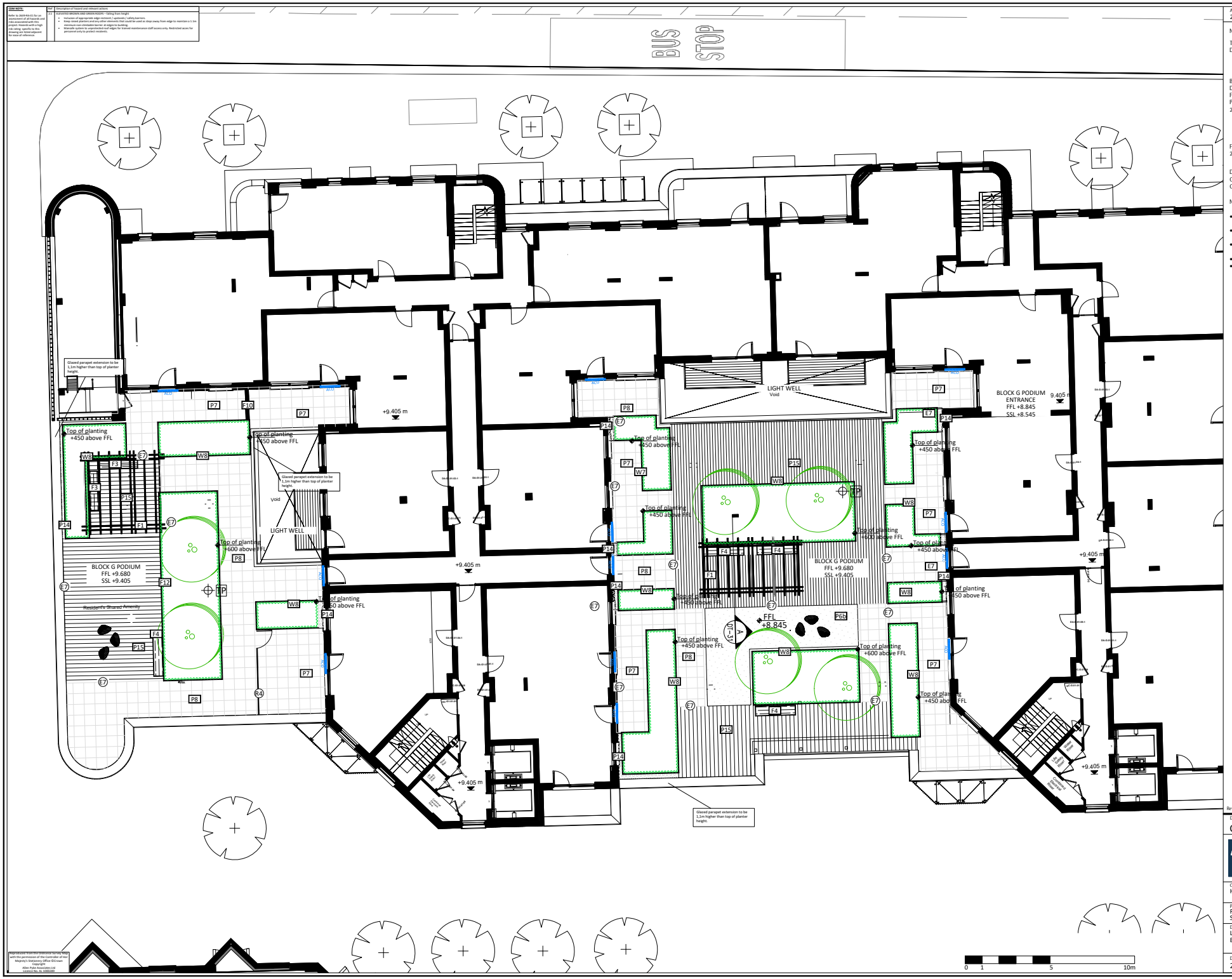
Client: HG Construction
Scale: 1:200@A1

Project: Free Wharf PH1 Shoreham-by-Sea
By/Chk: SS/SB

Drawing title: Planting Plan Ground Level
Date: 01/05/19

Drawing Number: 2639-PH1-PP-01
Revision: *



GENERAL NOTES:

Refer to 2639-RA-01 for an assessment of all hazards and risks associated with this drawing. Where there is a risk rating, specific to this drawing are listed adjacent for ease of reference.

Rev	Description of issued and relevant actions
P2	ELEVATED BROWN AND GREEN ROOFS – Tabling from height • Inclusion of appropriate edge restraint / upstands / safety barriers. • Keep raised planters and any other elements that could be used as steps away from edge to maintain a 1.1m • Inclusion of permanent edge protection to roof edge. • Manhole system to unprotected roof edges for trained maintenance staff access only. Restricted acces for personnel only to protect residents.

APAL FILE REFERENCE
2639-PH1-LA-02

Notes

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For drawing Legend please refer to document 2639-PH1-LA-00

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NOTES:

- All levels are preliminary and final levels are the responsibility of the lead architect.
- Lighting locations are approximate and final locations are to be provided by the lighting engineer.
- All building thresholds are to have a channel drain to comply with NHBC to engineers specification.
- All drainage to engineer's specification.
- Prior to construction, undertake a final review for latest Fire Regs compliance. Fire consultant to sign-off all materials.

Rev	Description	Date	Drawn	Checked

Drawing Status
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Client
HG Construction

Scale
1:100@A1

Project
Free Wharf Phase 1
Shoreham-by-Sea

By/Chk
SB/APA

Drawing title
Landscape Layout Plan
Block G Podium

Date
21/01/22

Drawing Number
2639-PH1-LA-02

Revision
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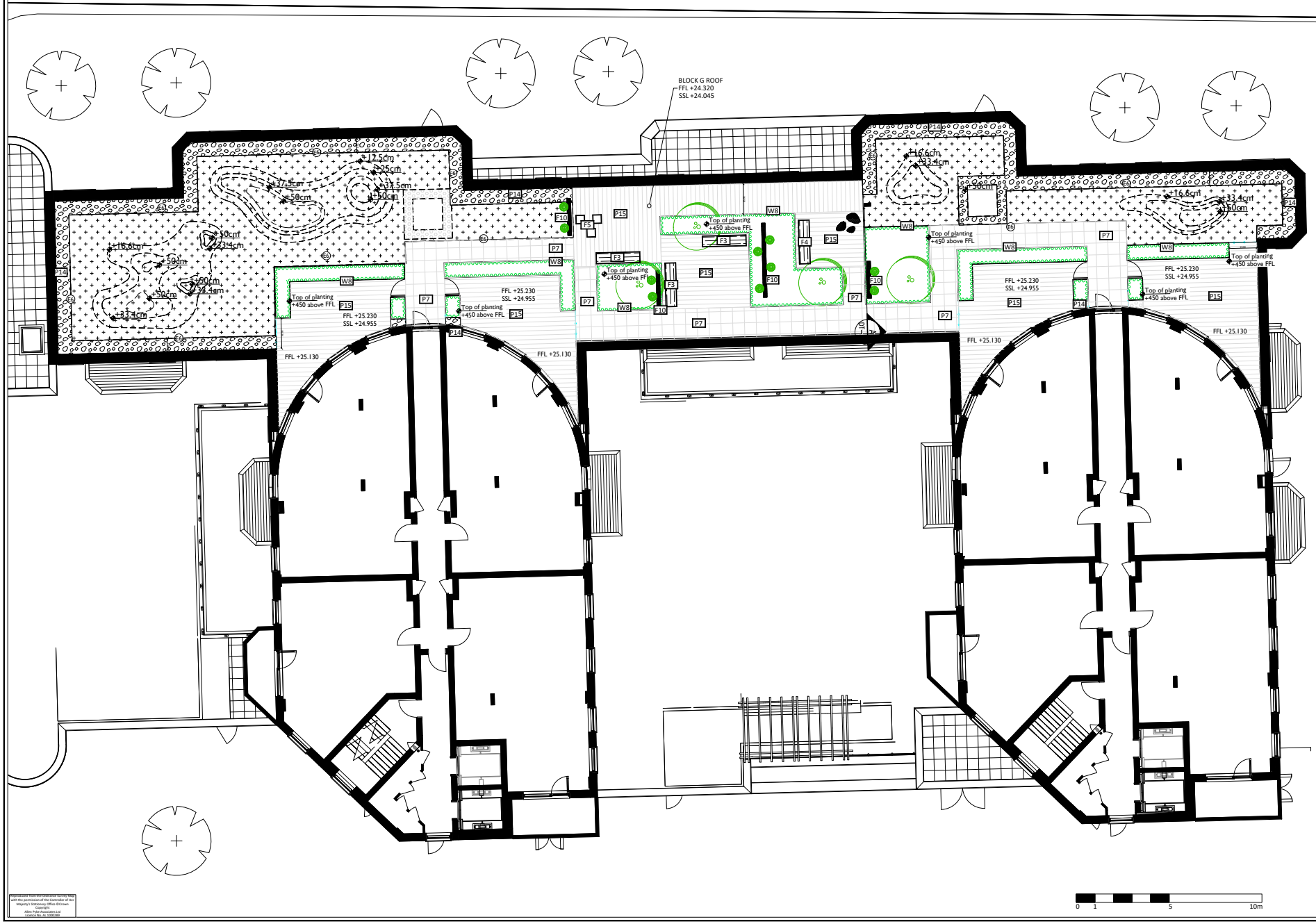
0 1 5 10m

CDM NOTE:	Ref	Description of hazard and relevant actions
Refer to 2639-RA-01 for an assessment of all hazards and risks associated with this drawing. Only hazards & risk rating specific to this drawing are listed adjacent for ease of reference.	2.1	ELEVATED BROWN AND GREEN ROOFS – falling from height • Inclusion of appropriate edge restraint / upstands / safety barriers. • Keep raised planters and any other elements that could be used as steps away from edge to maintain a 1.1m unprotected edge (minimum 600mm from edge). • Manhole systems to unprotected roof edges for trained maintenance staff access only. Restricted access for personnel only to protect residents.



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Notes

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Drawing number

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FOR DRAWING LEGEND SEE TO DRAWING 2639-PH1-LA-00

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- Lighting locations are approximate and final locations are to be provided by the lighting engineer.
- All building thresholds are to have a channel drain to comply with NHBC to engineers specification.
- All drainage to engineer's specification.
- Prior to construction, undertake a final review for latest Fire Regs compliance. Fire consultant to sign-off all materials.

Rev	Description	Date	Drawn	Checked

Drawing Status
CONDITIONS DISCHARGE

Allen Pyke
69A Lensfield Road,
Cambridge, CB2 1EN
T 01223 358055
www.allenpyke.co.uk
CAMBRIDGE • KINGSTON UPON THAMES
A registered practice of the Landscape Institute

Client HG Construction	Scale 1:50@A1
Project Free Wharf Phase 1	By/Chk SB/VF
Drawing Title Landscape Layout Plan Upper Roofs Block G Level 6	Date 14/01/22
Drawing Number 2639-PH1-LA-04	Revision *

Ref	Description of hazard and relevant actions
2.1	ELEVATED BROWN AND GREEN ROOFS – falling from height • Inclusion of appropriate edge restraint / upstands / safety barriers. • Keep raised planters and any other elements that could be used as steps away from edge to maintain a 1.1m unprotected roof edge exclusion zone (2m where possible). • Manhole systems to unprotected roof edges for trained maintenance staff access only. Restricted access for personnel only to protect residents.

GENM NOTE:
Refer to 2639-RA-01 for an assessment of all hazards and risks associated with this drawing. Residual risks and risk rating specific to this drawing are listed adjacent for ease of reference.

BLOCK H ROOF
FFL +22.750
SSL +22.475

P7
P14
P15
E6
F2
F3
F4
F10
W8
TP
Top of planting +450 above FFL

0 1 2 3 4 5m

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Allen Pyke Associates Ltd
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APAL FILE REFERENCE
2639-PH1-LA-03_04

Notes

This drawing is subject to copyright.
Do not scale from this drawing.

North

Based on drawing by CZWG
Drawing number 2052-00-DR-0110-T01 Site Wide Ground Floor GA Plan, 2052-00-DR-0111-T01 Site Wide Level 01 GA Plan, 2052-00-DR-0115-T01 Site Wide Level 05 GA Plan, 2052-00-DR-0116-T01 Site Wide Level 06 GA Plan.

FOR DRAWING LEGEND SEE TO DRAWING 2639-PH1-LA-00

DRAWING IS FOR DISCHARGE OF PLANNING CONDITIONS ONLY AND SUBJECT TO DETAILED DESIGN FOR CONSTRUCTION.

NOTES:

- All levels are preliminary and final levels are the responsibility of the lead architect.
- Lighting locations are approximate and final locations are to be provided by the lighting engineer.
- All building thresholds are to have a channel drain to comply with NHBC to engineers specification.
- All drainage to engineer's specification.
- Prior to construction, undertake a final review for latest Fire Regs compliance. Fire consultant to sign-off all materials.

Rev	Description	Date	Drawn	Checked

Drawing Status
CONDITIONS DISCHARGE

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CAMBRIDGE • KINGSTON UPON THAMES
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Client: HG Construction	Scale: 1:50@A1
Project: Free Wharf Phase 1	By/Chk: SB/VF
Drawing Title: Landscape Layout Plan Upper Roofs Block H Level 5	Date: 14/01/22
Drawing Number: 2639-PH1-LA-03	Revision: *

APPENDIX 2. CONTAMINATION STATEMENT

HG
CONSTRUCTION

(0)+44 1462 454 444
build@hgconstruction.co.uk
www.hgconstruction.co.uk

RE: Free Wharf Shoreham – Contamination Statement

To whom it may concern,

HG Construction confirm that throughout the duration of Free Wharf Phase 1, there was no unexpected or additional site contamination witnessed during the groundworks stage of the build.

Regards,

Greg Purkis

Commercial Director

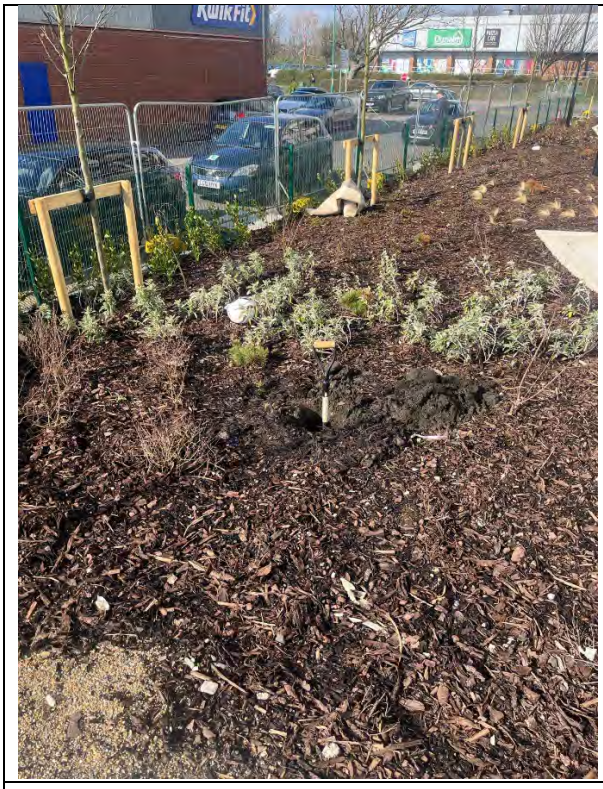
HG Construction Ltd | Reg no. 01617719
Vat no. 750 7260 42

LONDON
1st Floor, 99 Charterhouse Street,
Farringdon, London, EC1M 6HR

HERTS
4 Hunting Gate, Hitchin,
Hertfordshire, SG4 0TJ

HG

APPENDIX 3. SOIL CAPPING LAYER



Photograph 1. Validation inspection location 001 (see figure 1) (6/03/2024)



Photograph 2. Validation inspection location 001 (6/03/2024)



Photograph 3. Validation inspection location 002 (see Figure 1) (6/03/2024)



Photograph 4. Validation inspection location 002 (6/03/2024)



Photograph 5. Validation inspection location 002 (6/03/2024)



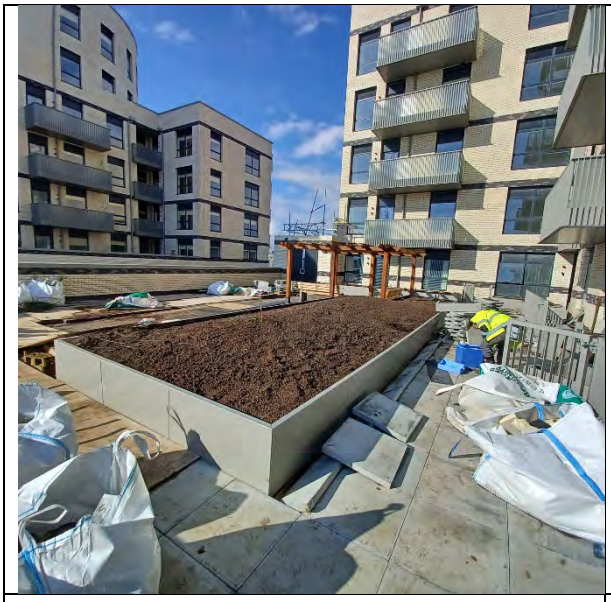
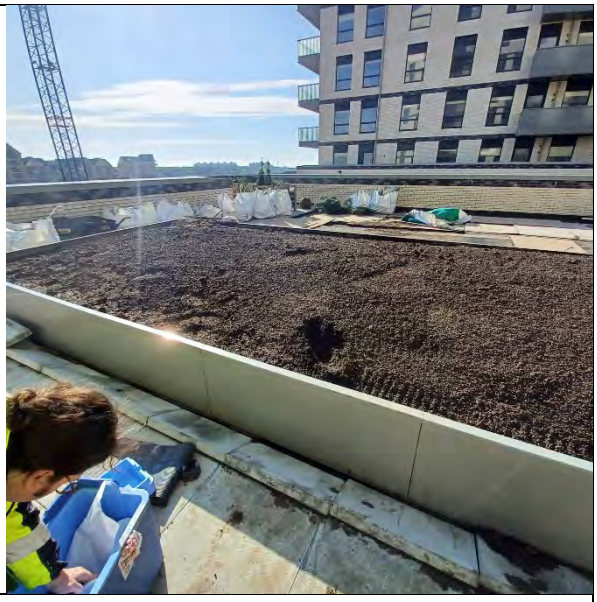
Photograph 6. Validation inspection location 003 (Figure 1) (6/03/2024)



Photograph 7. Validation inspection location 003 (6/03/2024)



Photograph 8. Validation inspection location 003 (6/03/2024)

	
Photograph 9. Planter on first floor podium level (6/03/2024)	Photograph 10. Planter on first floor podium level (6/03/2024)

Nick Tocher
Symbiotic Solutions Ltd
Unit A1
East Gores Farm
East Gores Road
Coggeshall
Essex
CO6 1RZ

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 24-02659

Site Reference:	Free Wharf, Shoreham
Project / Job Ref:	1375 (1614 on samples)
Order No:	1291/02128
Sample Receipt Date:	11/03/2024
Sample Scheduled Date:	14/03/2024
Report Issue Number:	1
Reporting Date:	20/03/2024

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 24-02659	~Date Sampled	06/03/24	06/03/24	06/03/24	06/03/24	06/03/24
Symbiotic Solutions Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Free Wharf, Shoreham	~TP / BH No	1375/Val001	1375/Val002	1375/Val003	1375/Val004	1375/Val005
~Project / Job Ref: 1375 (1614 on samples)	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 1291/02128	~Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 20/03/2024	DETS Sample No	704051	704052	704053	704054	704055

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	8.0	8.3	7.9	8.1	7.8
Total Cyanide	mg/kg	< 1	NONE	< 1	15	< 1	< 1	< 1
Total Sulphate as SO_4	mg/kg	< 200	MCERTS	511	257	690	727	651
Total Sulphate as SO_4	%	< 0.02	MCERTS	0.05	0.03	0.07	0.07	0.07
Sulphide	mg/kg	< 5	NONE	10	9	15	20	18
Organic Matter (SOM)	%	< 0.1	MCERTS	3.2	3.6	3.3	3.5	3.8
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	1.9	2.1	1.9	2	2.2
Arsenic (As)	mg/kg	< 2	MCERTS	13	15	11	9	10
W/S Boron	mg/kg	< 1	NONE	< 1	1.1	1.2	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	29	26	25	7	6
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	12	15	15	10	11
Lead (Pb)	mg/kg	< 3	MCERTS	21	24	24	12	10
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	18	19	14	8	7
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Zinc (Zn)	mg/kg	< 3	MCERTS	57	63	55	58	40
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
TPH (EPH EC10-EC40)	mg/kg	< 6	MCERTS	22	25	20	18	18

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)
~ Sample details provided by the customer

Normec DETS Limited '
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 24-02659	~Date Sampled	06/03/24				
Symbiotic Solutions Ltd	~Time Sampled	None Supplied				
~Site Reference: Free Wharf, Shoreham	~TP / BH No	1375/Val007				
~Project / Job Ref: 1375 (1614 on samples)	~Additional Refs	None Supplied				
~Order No: 1291/02128	~Depth (m)	None Supplied				
Reporting Date: 20/03/2024	DETS Sample No	704056				

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected				
pH	pH Units	N/a	MCERTS	8.3				
Total Cyanide	mg/kg	< 1	NONE	< 1				
Total Sulphate as SO_4	mg/kg	< 200	MCERTS	749				
Total Sulphate as SO_4	%	< 0.02	MCERTS	0.07				
Sulphide	mg/kg	< 5	NONE	26				
Organic Matter (SOM)	%	< 0.1	MCERTS	4.1				
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	2.4				
Arsenic (As)	mg/kg	< 2	MCERTS	12				
W/S Boron	mg/kg	< 1	NONE	< 1				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	1				
Chromium (Cr)	mg/kg	< 2	MCERTS	7				
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				
Copper (Cu)	mg/kg	< 4	MCERTS	12				
Lead (Pb)	mg/kg	< 3	MCERTS	12				
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1				
Nickel (Ni)	mg/kg	< 3	MCERTS	9				
Selenium (Se)	mg/kg	< 2	MCERTS	< 2				
Zinc (Zn)	mg/kg	< 3	MCERTS	45				
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2				
TPH (EPH EC10-EC40)	mg/kg	< 6	MCERTS	22				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)
~ Sample details provided by the customer

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-02659	~Date Sampled	06/03/24	06/03/24	06/03/24	06/03/24	06/03/24
Symbiotic Solutions Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Free Wharf, Shoreham	~TP / BH No	1375/Val001	1375/Val002	1375/Val003	1375/Val004	1375/Val005
~Project / Job Ref: 1375 (1614 on samples)	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 1291/02128	~Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 20/03/2024	DETS Sample No	704051	704052	704053	704054	704055

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.16	< 0.1	0.17	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.18	< 0.1	0.25	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	0.16	< 0.1	0.22	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.13	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.14	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

~ Sample details provided by the customer

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-02659	~Date Sampled	06/03/24				
Symbiotic Solutions Ltd	~Time Sampled	None Supplied				
~Site Reference: Free Wharf, Shoreham	~TP / BH No	1375/Val007				
~Project / Job Ref: 1375 (1614 on samples)	~Additional Refs	None Supplied				
~Order No: 1291/02128	~Depth (m)	None Supplied				
Reporting Date: 20/03/2024	DETS Sample No	704056				

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1				
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1				
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1				
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6				

~ Sample details provided by the customer

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 24-02659	~Date Sampled	06/03/24	06/03/24	06/03/24	06/03/24	06/03/24
Symbiotic Solutions Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Free Wharf, Shoreham	~TP / BH No	1375/Val001	1375/Val002	1375/Val003	1375/Val004	1375/Val005
~Project / Job Ref: 1375 (1614 on samples)	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 1291/02128	~Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 20/03/2024	DETS Sample No	704051	704052	704053	704054	704055

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	< 42

~ Sample details provided by the customer

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 24-02659	~Date Sampled	06/03/24				
Symbiotic Solutions Ltd	~Time Sampled	None Supplied				
~Site Reference: Free Wharf, Shoreham	~TP / BH No	1375/Val007				
~Project / Job Ref: 1375 (1614 on samples)	~Additional Refs	None Supplied				
~Order No: 1291/02128	~Depth (m)	None Supplied				
Reporting Date: 20/03/2024	DETS Sample No	704056				

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01				
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05				
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2				
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2				
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3				
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3				
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10				
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21				
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01				
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05				
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2				
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2				
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2				
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3				
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10				
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21				
Total >C5 - C35	mg/kg	< 42	NONE	< 42				

~ Sample details provided by the customer

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - BTEX / MTBE							
DETS Report No: 24-02659	~Date Sampled	06/03/24	06/03/24	06/03/24	06/03/24	06/03/24
Symbiotic Solutions Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Free Wharf, Shoreham	~TP / BH No	1375/Val001	1375/Val002	1375/Val003	1375/Val004	1375/Val005
~Project / Job Ref: 1375 (1614 on samples)	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 1291/02128	~Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 20/03/2024	DETS Sample No	704051	704052	704053	704054	704055

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	9	22	14	20	20
p & m-xylene	ug/kg	< 2	MCERTS	7	16	10	< 2	14
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	6
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

~ Sample details provided by the customer

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - BTEX / MTBE							
DETS Report No: 24-02659	~Date Sampled	06/03/24					
Symbiotic Solutions Ltd	~Time Sampled	None Supplied					
~Site Reference: Free Wharf, Shoreham	~TP / BH No	1375/Val007					
~Project / Job Ref: 1375 (1614 on samples)	~Additional Refs	None Supplied					
~Order No: 1291/02128	~Depth (m)	None Supplied					
Reporting Date: 20/03/2024	DETS Sample No	704056					

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2				
Toluene	ug/kg	< 5	MCERTS	< 5				
Ethylbenzene	ug/kg	< 2	MCERTS	19				
p & m-xylene	ug/kg	< 2	MCERTS	12				
o-xylene	ug/kg	< 2	MCERTS	< 2				
MTBE	ug/kg	< 5	MCERTS	< 5				

~ Sample details provided by the customer

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 24-02659	
Symbiotic Solutions Ltd	
~Site Reference: Free Wharf, Shoreham	
~Project / Job Ref: 1375 (1614 on samples)	
~Order No: 1291/02128	
Reporting Date: 20/03/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
704051	1375/Val001	None Supplied	None Supplied	22.6	Brown sandy loam
704052	1375/Val002	None Supplied	None Supplied	21.7	Brown sandy loam
704053	1375/Val003	None Supplied	None Supplied	21.4	Brown sandy loam with stones
704054	1375/Val004	None Supplied	None Supplied	22	Brown sandy loam
704055	1375/Val005	None Supplied	None Supplied	22.8	Brown sandy loam
704056	1375/Val007	None Supplied	None Supplied	24.7	Black sandy loam with stones

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S
~ Sample details provided by the customer

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 24-02659
Symbiotic Solutions Ltd
~Site Reference: Free Wharf, Shoreham
~Project / Job Ref: 1375 (1614 on samples)
~Order No: 1291/02128
Reporting Date: 20/03/2024

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received
~ Sample details provided by the customer

Generic Assessment Criteria for the Assessment of Risk to Human Health					
Determinand	**RwHP[1] (mg/kg)**	**RwoHP[1] (mg/kg)**	**POS_{resi}[1] (mg/kg)**	**Commercial (mg/kg)**	**Source**
Asbestos	ND	ND	ND	< 0.001%	
Metals and Metalloids					
Arsenic	37	40	79	640	LQM / CIEH (2015) S4UL[2]
Barium	-	1300	-	22000	CL:AIRE (2010)[3]
Beryllium	1.7	1.7	2.2	12	LQM / CIEH (2015) S4UL[2]
Boron	290	11000	21000	240000	LQM / CIEH (2015) S4UL[2]
Cadmium	11	85	120	190	LQM / CIEH (2015) S4UL[2]
Chromium (III)	910	910	1500	8600	LQM / CIEH (2015) S4UL[2]
Chromium (VI)	6	6	7.7	33	LQM / CIEH (2015) S4UL[2]
Copper	2400	7100	12000	68000	LQM / CIEH (2015) S4UL[2]
Lead	200	310	630	2300	Defra (2014) C4SL[4]
Mercury - Elemental	1.2	1.2	16	58 (25.8)vap	LQM / CIEH (2015) S4UL[2]
Mercury - Inorganic	40	56	120	1100	LQM / CIEH (2015) S4UL[2]
Mercury - Methyl	11	15	40	320	LQM / CIEH (2015) S4UL[2]
Nickel	130	180	230	980	LQM / CIEH (2015) S4UL[5]
Selenium	250	430	1100	12000	LQM / CIEH (2015) S4UL[2]
Vanadium	410	1200	2000	9000	LQM / CIEH (2015) S4UL[2]
Zinc	3700	40000	81000	730000	LQM / CIEH (2015) S4UL[2]
Phenol – At 1% Soil Organic Matter					
Phenol	120	440^{dir} (460)	440^{dir} (10000)	440^{dir} (26000)	LQM / CIEH (2015) S4UL[2]
Polyaromatic Hydrocarbons (USEPA 16) – At 1% Soil Organic Matter					
Naphthalene	2.3	2.3	4900	190 (76.4)sol	LQM / CIEH (2015) S4UL[2]
Acenaphthylene	170	2900 (86.1)^{sol}	15000	83000 (86.1)sol	LQM / CIEH (2015) S4UL[2]
Acenaphthene	210	3000 (57.0)^{sol}	15000	84000 (57.0)sol	LQM / CIEH (2015) S4UL[2]
Fluorene	170	2800 (30.9)^{sol}	9900	63000 (30.9)sol	LQM / CIEH (2015) S4UL[2]
Phenanthrene	95	1300 (36.0)^{sol}	3100	22000	LQM / CIEH (2015) S4UL[2]
Anthracene	2400	31000 (1.17)^{vap}	74000	520000	LQM / CIEH (2015) S4UL[2]
Fluoranthene	280	1500	3100	23000	LQM / CIEH (2015) S4UL[2]
Pyrene	620	3700	7400	54000	LQM / CIEH (2015) S4UL[2]
Benzo(a)anthracene	7.2	11	29	170	LQM / CIEH (2015) S4UL[2]
Chrysene	15	30	57	350	LQM / CIEH (2015) S4UL[2]
Benzo(b)fluoranthene	2.6	3.9	7.1	44	LQM / CIEH (2015) S4UL[2]
Benzo(k)fluoranthene	77	110	190	1200	LQM / CIEH (2015) S4UL[2]
Benzo(a)pyrene	2.2	3.2	5.7	35	LQM / CIEH (2015) S4UL[2]
Indeno(1,2,3-	27	45	82	500	LQM / CIEH (2015) S4UL[2]

Generic Assessment Criteria for the Assessment of Risk to Human Health					
Determinand	**RwHP[1] (mg/kg)**	**RwoHP[1] (mg/kg)**	**POS$_{resi}$[1] (mg/kg)**	**Commercial (mg/kg)**	**Source**
cd)pyrene					
Di-benzo(a,h)anthracene	0.24	0.31	0.57	3.5	LQM / CIEH (2015) S4UL[2]
Benzo(ghi)perylene	320	360	640	3900	LQM / CIEH (2015) S4UL[2]
Coal Tar (BaP surrogate marker)	*0.79*	*1.2*	*2.2*	15	LQM / CIEH (2015) S4UL[2]
Total Petroleum Hydrocarbons (LQM Banding) – At 1% Soil Organic Matter					
Aliphatic EC5 - EC6	42	42	570000 (304)^{sol}	3200 (304)sol	LQM / CIEH (2015) S4UL[2]
Aliphatic >EC6 - EC8	100	100	600000	7800 (144)sol	LQM / CIEH (2015) S4UL[2]
Aliphatic >EC8 - EC10	27	27	13000	2000 (78)sol	LQM / CIEH (2015) S4UL[2]
Aliphatic >EC10 - EC12	130 (48)^{vap}	130 (48)^{vap}	13000	9700 (48)sol	LQM / CIEH (2015) S4UL[2]
Aliphatic >EC12 - EC16	1100 (24)^{sol}	1100 (24)^{sol}	13000	59000 (24)sol	LQM / CIEH (2015) S4UL[2]
Aliphatic >EC16 - EC35	65000 (8.48)^{sol}	65000 (8.48)^{sol}	250000	1600000	LQM / CIEH (2015) S4UL[2]
Aliphatic >EC35 - EC44	65000 (8.48)^{sol}	65000 (8.48)^{sol}	250000	1600000	LQM / CIEH (2015) S4UL[2]
Aromatic >EC5 - EC7	70	370	56000	26000 (1220)sol	LQM / CIEH (2015) S4UL[2]
Aromatic >EC7 - EC8	130	860	56000	56000 (869)vap	LQM / CIEH (2015) S4UL[2]
Aromatic >EC8 - EC10	34	47	5000	3500 (613)vap	LQM / CIEH (2015) S4UL[2]
Aromatic >EC10 - EC12	74	250	5000	16000 (364)sol	LQM / CIEH (2015) S4UL[2]
Aromatic >EC12 - EC16	140	1800	5100	36000 (169)sol	LQM / CIEH (2015) S4UL[2]
Aromatic >EC16 - EC21	260	1900	3800	28000	LQM / CIEH (2015) S4UL[2]
Aromatic >EC21 - EC35	1100	1900	3800	28000	LQM / CIEH (2015) S4UL[2]
Aromatic >EC35 - EC44	1100	1900	3800	28000	LQM / CIEH (2015) S4UL[2]
Ali + Aro >EC44 - EC70	1600	1900	3800	28000	LQM / CIEH (2015) S4UL[2]
BTEX + MTBE – At 1% Soil Organic Matter					
Benzene	0.087	0.38	72	27	LQM / CIEH (2015) S4UL[2]
Toluene	130	880 (869)^{vap}	56000	56000 (869)vap	LQM / CIEH (2015) S4UL[2]
Ethylbenzene	47	83	24000	5700 (518)vap	LQM / CIEH (2015) S4UL[2]
o-Xylene	60	88	41000	6600 (478)sol	LQM / CIEH (2015) S4UL[2]
m-xylene	59	82	41000	6200 (625)sol	LQM / CIEH (2015) S4UL[2]
p-xylene	56	79	41000	5900 (576)sol	LQM / CIEH (2015) S4UL[2]

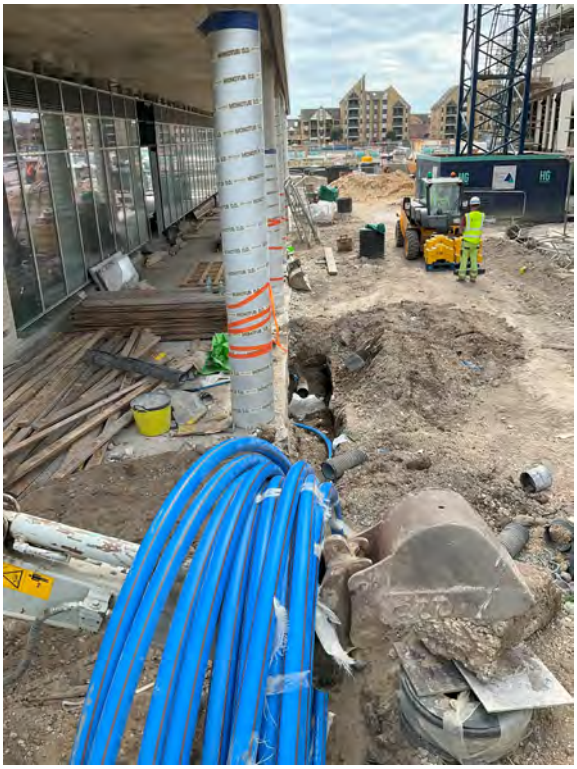
Generic Assessment Criteria for the Assessment of Risk to Human Health					
Determinand	**RwHP[1] (mg/kg)**	**RwoHP[1] (mg/kg)**	**POS_{resi}[1] (mg/kg)**	**Commercial (mg/kg)**	**Source**
MTBE (Methyl *tert*-butyl ether)	49	73	-	7900	CL:AIRE (2010)[3]

Notes:
[sol] GAC exceed the solubility saturation limit which is presented in brackets; consideration of the CSM may be required
[vap] GAC exceed the vapour saturation limit which is presented in brackets; consideration of the CSM may be required
[sat] GAC exceed a soil saturation limit (not specified) which is presented in brackets; consideration of the CSM may be required
[dir] GAC is based on tolerable direct contact concentration; long term health protection value presented in brackets
(1) RwHP = Residential land use including significant production and consumption of home-grown produce; RwoHP = Residential land use without significant production and consumption of home-grown produce; POS_{resi} = Public open space in close proximity to residential properties
(2) Nathanial, C.P. *et al*. (2015), The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham. Note that the LQM / CIEM S4ULs update and replace the former LQM / CIEH GAC on the basis of new toxicological and refined modelling data. The S4ULs also cover the Environment Agency SGV substances with the inclusion of updated toxicological and modelling data.
(3) CL:AIRE, 'Soil Generic Assessment Criteria for Human Health Risk Assessment', 2010.
(4) Defra (2014), 'SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination - Policy Document Companion Document', Defra, December 2014; CL:AIRE Report 'SP1010 - Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, Rev 2, September 2014; Defra erratum note, Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination - SP1010, Erratum (December 2014).
(5) Nathanial, C.P. et al. (2015), The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham. Nickel update (August 2015).

Defra Category 4 Screening Levels (C4SL)[1,2]						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotments (mg/kg)**	**Commercial (mg/kg)**	**POS1 (mg/kg)**	**POS2 (mg/kg)**
Arsenic	37	40	49	540	79	170
Benzene	0.87	3.3	0.18	98	140	230
Benzo(a)pyrene	5.0	5.3	5.7	77	10	21
Cadmium	22	150	3.9	410	220	880
Chromium (VI)	21	21	170	49	21	250
Lead	200	310	80	2300	630	1300

Notes:
(1) Defra (2014), 'SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination - Policy Document Companion Document', Defra, December 2014; CL:AIRE Report 'SP1010 - Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, Rev 2, September 2014; Defra erratum note, Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination - SP1010, Erratum (December 2014).
(2) The C4SLs presented in this table apply to the standard land uses set out in the above references. The values are derived using the CLEA framework for a sandy loam soil with 6% soil organic matter. Un-adjusted C4SLs should not be used where the site conditions or land use scenarios differ significantly from these characteristics.

APPENDIX 4. WATER PIPE



Water supply pipe during installation



Water supply pipe during installation



Water supply pipe during installation



Main water supply connection into the building – showing barrier pipe usage

Invoice To:-	Delivery Address:-	Originating Branch:-
AFAN LANDSCAPES LTD WATER STREET MARGAM PORT TALBOT SA13 2PA	Method of Dispatch: COLLECTED	GATWICK - BURDENS - QBE CODE:QBE BRITISH RAIL NEW YARD GATWICK ROAD CRAWLEY WEST SUSSEX RH10 9RE TEL:01293 872400

COPY

Wolseley UK Limited. Registered in England & Wales. Registered No. 636445. Registered Office: 2 Kingmaker Court, Warwick Technology Park, Gallows Hill, Warwick CV34 6DY. VAT Registration No. GB 362 0233 93 Jersey GST No. 0007261 Northern Ireland No XI62023393

Product Code	Description	Quantity Sent	Unit	Price	Per	Terms	VAT Rate	Nett Value
P28507	GPS 63MMX50M P-LINE COIL SDR11 ORIGINAL TICKET 173100 WAS RAISED ON WRONG A/C BY TM	5	EA	972.900		NETT	20.00	4,864.50

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Carriage & Packing	£ 0.00	Total excluding VAT	£ 4,864.50	Total VAT	£ 972.90	**INVOICE TOTAL**	£ 5,837.40

Page 1 of 1

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If you do receive any form of correspondence notifying you of a change of bank account details please do not reply and contact us as above.

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APPENDIX 5.1. GAS PROTECTION MEASURES - DESIGN

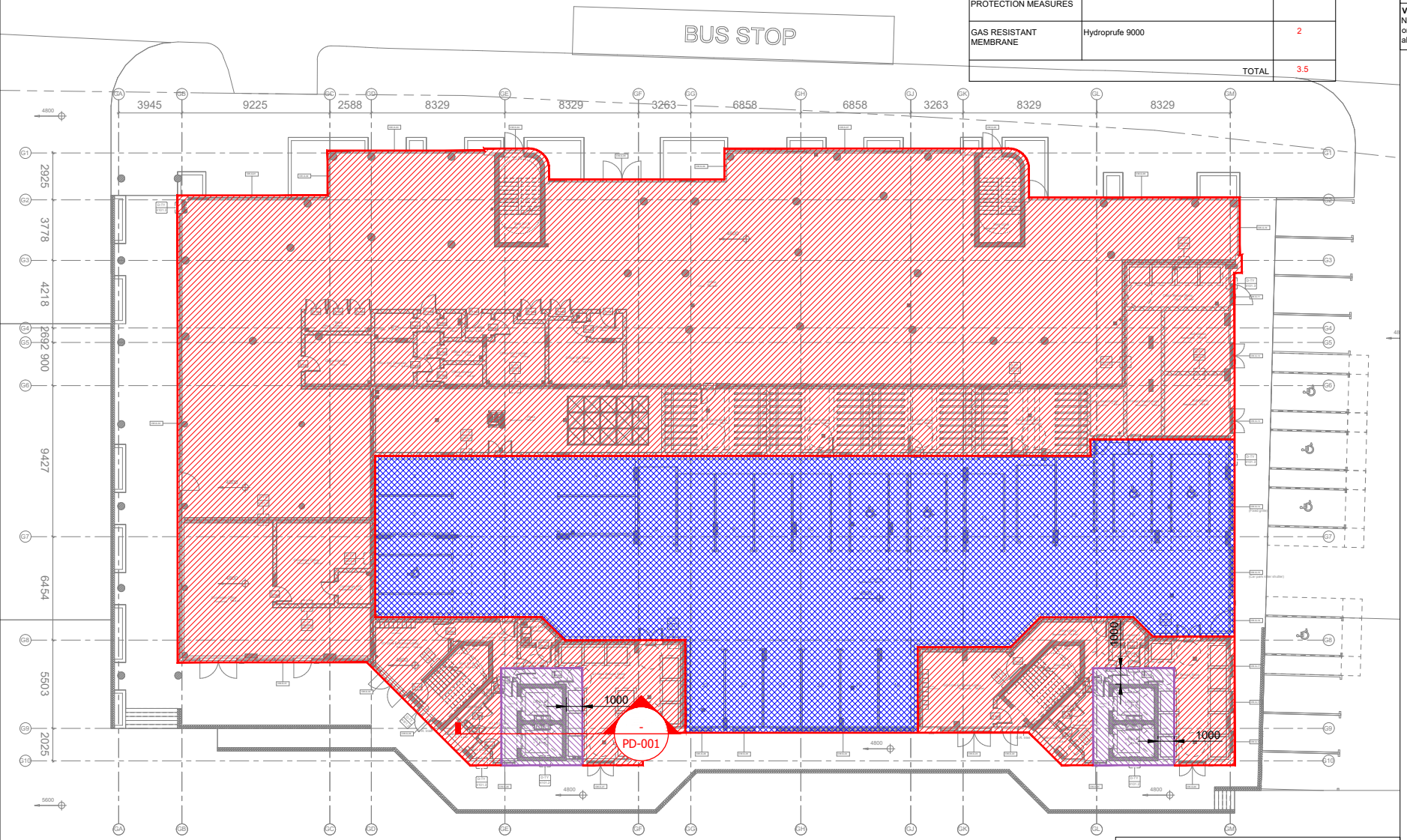
Important design notes:

-

PROTECTION MEASURES FOR GROUND GASES - BS 8485:2015+A1:2019

GAS PROTECTION REQUIREMENTS		
BUILDING TYPE	CS VALUE	POINTS REQ.
B	CS2	3.5

GAS PROTECTION MEASURES		
ELEMENT / SYSTEM	SPECIFICATION	POINTS
STRUCTURAL BARRIER	Cast in situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations	1.5
VENTILATION PROTECTION MEASURES	N/A	0
GAS RESISTANT MEMBRANE	Hydroprufe 9000	2
	TOTAL	3.5



KEY

Click on product names to access technical information

Grade 3
Hydroprufe LG, Hydroseal FX & Hydrocrete Concrete

Damp Proofing
Hydroprufe 9000

Ventilated Carpark
No Gas Protection or Waterproofing allowed for

Conditions

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This drawing must be read in conjuction with the relevant datasheets and BS 8102:2009 and BS 8485:2015 if appropriate.
This drawing has been prepared as a guide to assist with the installation of the products.
This drawing requires the approval of the designer of the structure.
It is the responsibility of the designer to ensure that any design decisions, made by others that have an impact on the waterproofing design are brought to the attention of the waterproof designer.
It is the responsibility of the designer of the structure to ensure that the details shown on this drawing match the construction drawings.

Important Notes

Envirocure 90 Curing Agent to be applied to all concrete surfaces once pour is complete and shuttering removed. Premtard TF to be applied to all kicker joints and Premtard MF to be applied to all other construction joints.

All substructure construction joints must have waterbar installed with a minimum of 75mm concrete cover (internal, non-retaining construction joints do not require waterbar).

Rev	Date	Description	Dwn	Chk
P03	08/03/22	As Clouded	DM	KW
P02	07/12/21	Issued for Information	AC	JM
P01	02/12/21	Issued for Information	AC	JM

Scale
Not to Scale

NOTE: All laps between products are 150mm unless otherwise annotated

UNDERLAID DRAWING DETAILS	
ORIGINATOR	ALAN CAMP ARCHITECTS
TITLE	GENERAL ARRANGEMENT BLOCK G L00
DRAWING NO.	3117-ACA-G-00-DR-A-1111
REVISION	C01

Client
KELMAC WATERPROOFING

Project
FREE WHARF

Title
DAMP PROOFING AND GAS PROTECTION - GENERAL ARRANGEMENT - BLOCK G

FIS Drawing No
J2515-GA-001

Date
02/12/2021

Revision
P03

Drawn
AC

Checked
JM

DRAFT
Not for Construction, for discussion only

This drawing is designed to achieve the following environment in accordance with BS 8102: 2009

DAMP PROOFING & GAS PROTECTION

FIS
PREMCRETE
Seymour House | Mayflower Close | Chandlers Ford
Eastleigh | Hampshire | SO53 4AR
Tel: 02380 276166 | sales@fisproducts.co.uk

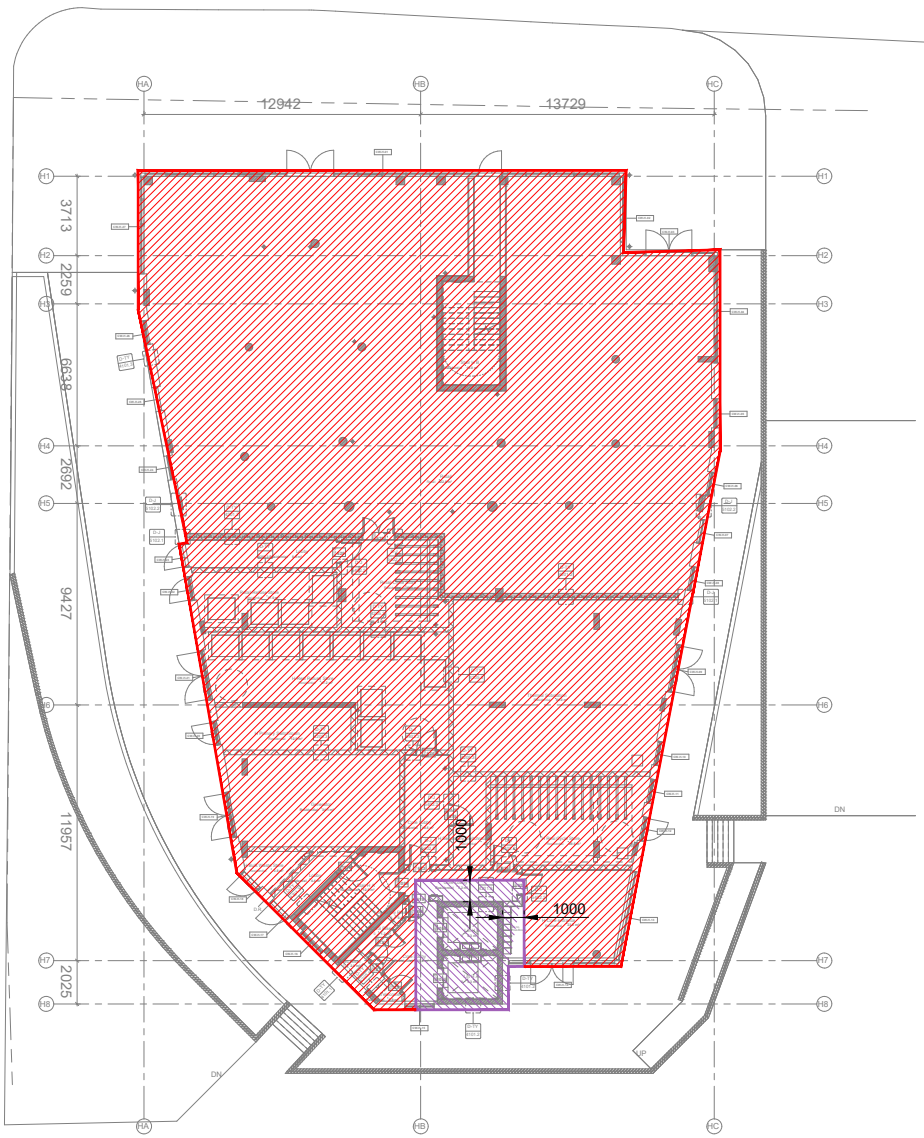
Important design notes:

-

PROTECTION MEASURES FOR GROUND GASES - BS 8485:2015+A1:2019

GAS PROTECTION REQUIREMENTS		
BUILDING TYPE	CS VALUE	POINTS REQ.
B	CS2	3.5

GAS PROTECTION MEASURES		
ELEMENT / SYSTEM	SPECIFICATION	POINTS
STRUCTURAL BARRIER	Cast in situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations	1.5
VENTILATION PROTECTION MEASURES	N/A	0
GAS RESISTANT MEMBRANE	Hydroprufe 9000	2
	TOTAL	3.5



KEY

Click on product names to access technical information

Grade 3
Hydroprufe LG, Hydroseal FX & Hydrocrete Concrete

Damp Proofing
Hydroprufe 9000

Conditions

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This drawing has been prepared as a guide to assist with the installation of the products.
This drawing requires the approval of the designer of the structure.
It is the responsibility of the designer to ensure that any design decisions, made by others that have an impact on the waterproofing design are brought to the attention of the waterproof designer.
It is the responsibility of the designer of the structure to ensure that the details shown on this drawing match the construction drawings.

Important Notes

Envirocure 90 Curing Agent to be applied to all concrete surfaces once pour is complete and shuttering removed. Premtard TF to be applied to all kicker joints and Premtard MF to be applied to all other construction joints.

All substructure construction joints must have waterbar installed with a minimum of 75mm concrete cover (internal, non-retaining construction joints do not require waterbar).

UNDERLAID DRAWING DETAILS	
ORIGINATOR	ALAN CAMP ARCHITECTS
TITLE	GENERAL ARRANGEMENT BLOCK H L00
DRAWING NO.	3117-ACA-H-00-DR-A-1121
REVISION	C01

Rev	Date	Description	Dwn	Chk
P02	08/03/22	As Clouded	DM	KW
P01	02/12/21	Issued for Information	AC	JM

Scale
Not to Scale

DRAFT
Not for Construction, for discussion only

This drawing is designed to achieve the following environment in accordance with BS 8102: 2009

DAMP PROOFING & GAS PROTECTION

NOTE: All laps between products are 150mm unless otherwise annotated

Client
KELMAC WATERPROOFING

Project
FREE WHARF

Title
DAMP PROOFING AND GAS PROTECTION - GENERAL ARRANGEMENT - BLOCK H

FIS Drawing No
J2515-GA-002

Date
02/12/2021

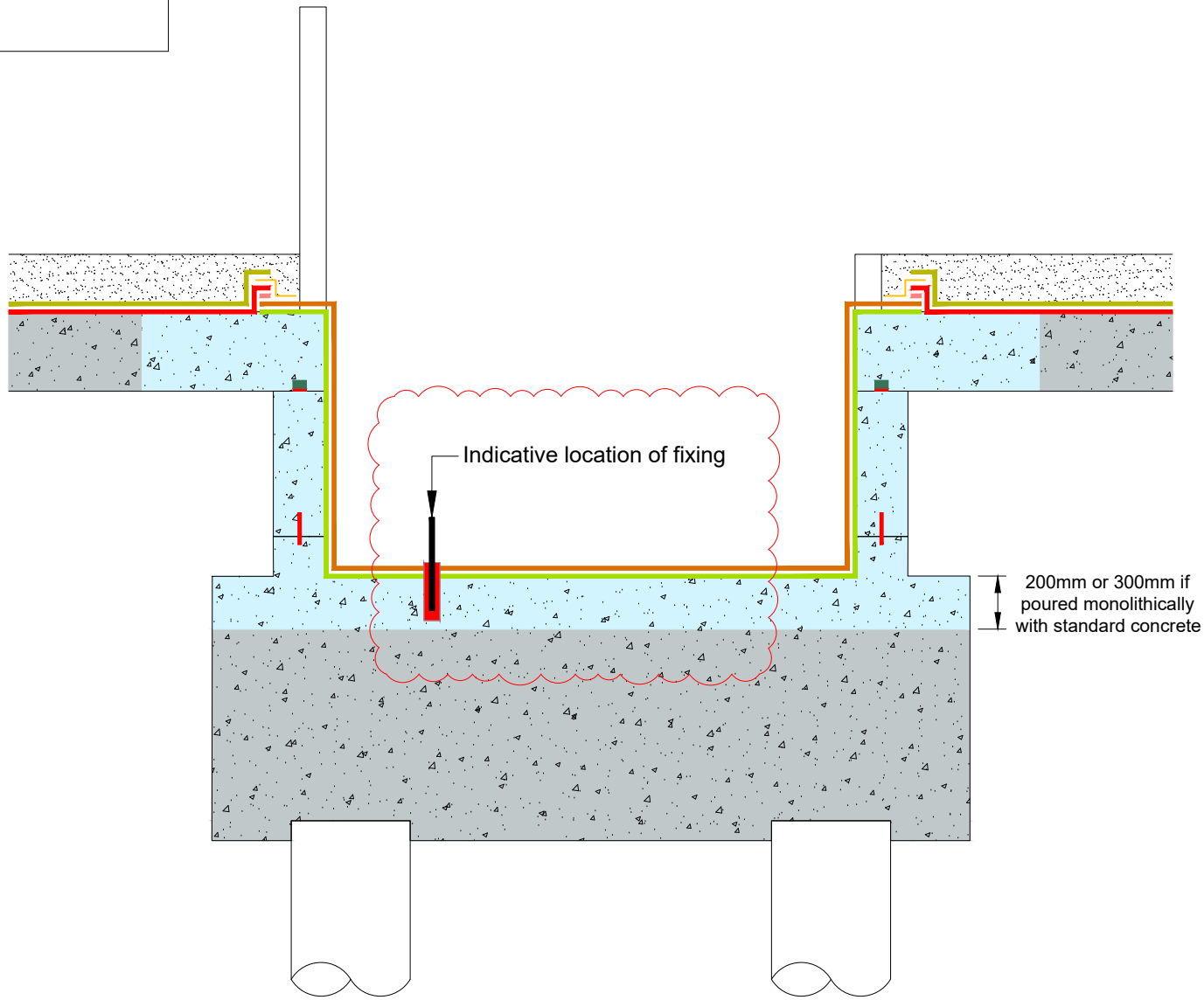
Revision
P02

Drawn
AC

Checked
JM

FIS PREMCRETE
Seymour House | Mayflower Close | Chandlers Ford
Eastleigh | Hampshire | SO53 4AR
Tel: 02380 276166 | sales@fisproducts.co.uk

Important design notes:
-



KEY

Click on product names to access technical information

- Hydroprufe 9000
- Hydroprufe LG 0.7-1.2mm quartz aggregate to be broadcast into coating where concrete connection is required (0.5kg per 1m²)
- Hydroseal FX
- Protection Board 300
- Hydroprufe HCR Butyl Tape
- HCR Foil Girth Tape
- Epodure EP600
- Hydrostop BR on Hydrostop WSM
- Cemflex VB
- Hydrocrete Concrete
- Standard Concrete to Structural Liner Wall / Slab

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It is the responsibility of the designer of the structure to ensure that the details shown on this drawing match the construction drawings.

Important Notes

Envirocure 90 Curing Agent to be applied to all concrete surfaces once pour is complete and shuttering removed. Premtard TF to be applied to all kicker joints and Premtard MF to be applied to all other construction joints.

All substructure construction joints must have waterbar installed with a minimum of 75mm concrete cover (internal, non-retaining construction joints do not require waterbar).

Rev	Date	Description	Dwn	Chk
P04	08/06/22	As Clouded	DM	KW
P03	08/03/22	As Clouded	DM	KW
P02	06/12/21	As Clouded	DM	AC
P01	03/12/21	Issued for Information	AC	JM

NOTE: All laps between products are 150mm unless otherwise annotated

Client
KELMAC WATERPROOFING

Project
FREE WHARF

Title
TYPICAL SECTION THROUGH LIFTPIT WITH DEEP BASE

FIS Drawing No
J2515-TD-001

Date
03/12/2021

Revision
P04

Drawn
AC

Checked
JM

Scale
NTS

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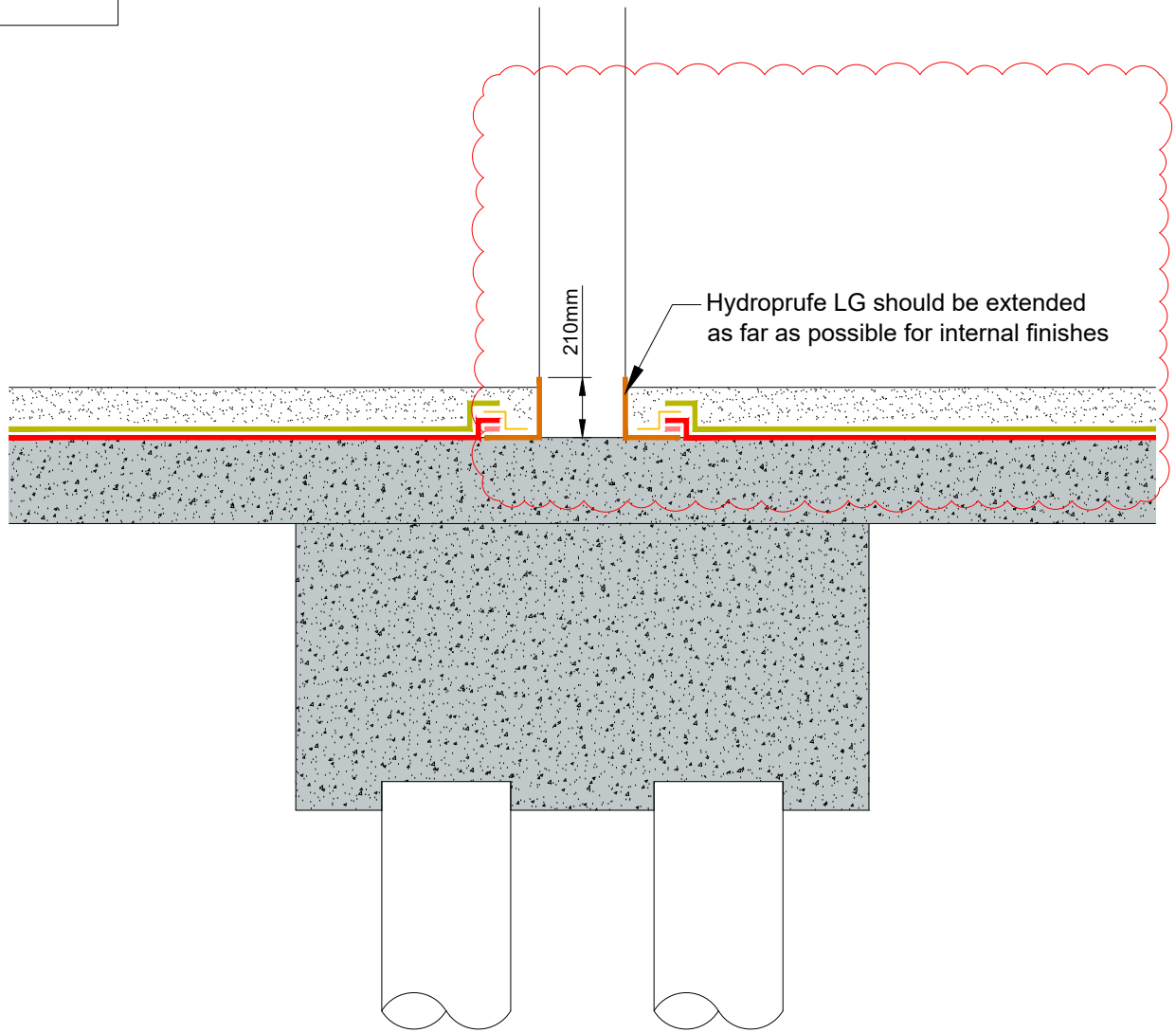
GRADE 3 & GAS

Important design notes:
-



KEY

Click on product names to access technical information

- Hydroprufe 9000
- Hydroprufe LG
  0.7-1.2mm quartz aggregate to be broadcast into coating where concrete connection is required (0.5kg per 1m²)
- Protection Board 300
- Hydroprufe / HCR Butyl Tape
- HCR Foil Girth Tape
- Standard Concrete

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Important Notes

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All substructure construction joints must have waterbar installed with a minimum of 75mm concrete cover (internal, non-retaining construction joints do not require waterbar).

Hydroseal Sealer to be applied to all surfaces prior to installing Hydroflow HP. Hydroprufe Primer to be applied to substrate prior to the application of Hydroflow Corner Tape.

If the design incorporates high density insulation under Hydroflow HP20 then it should be fixed to substrate at a minimum of 5 fixings per sheet.

Rev	Date	Description	Dwn	Chk
P04	08/06/22	As Clouded	DM	KW
P03	08/03/22	As Clouded	DM	KW
P02	06/12/21	As Clouded	DM	AC
P01	03/12/21	Issued for Information	AC	JM

NOTE: All laps between products are 150mm unless otherwise annotated

Client
KELMAC WATERPROOFING

Project
FREE WHARF

Title
TYPICAL SECTION THROUGH PILECAP

FIS Drawing No
J2515-TD-002

Date
03/12/2021

Revision
P04

Drawn
AC

Checked
JM

Scale
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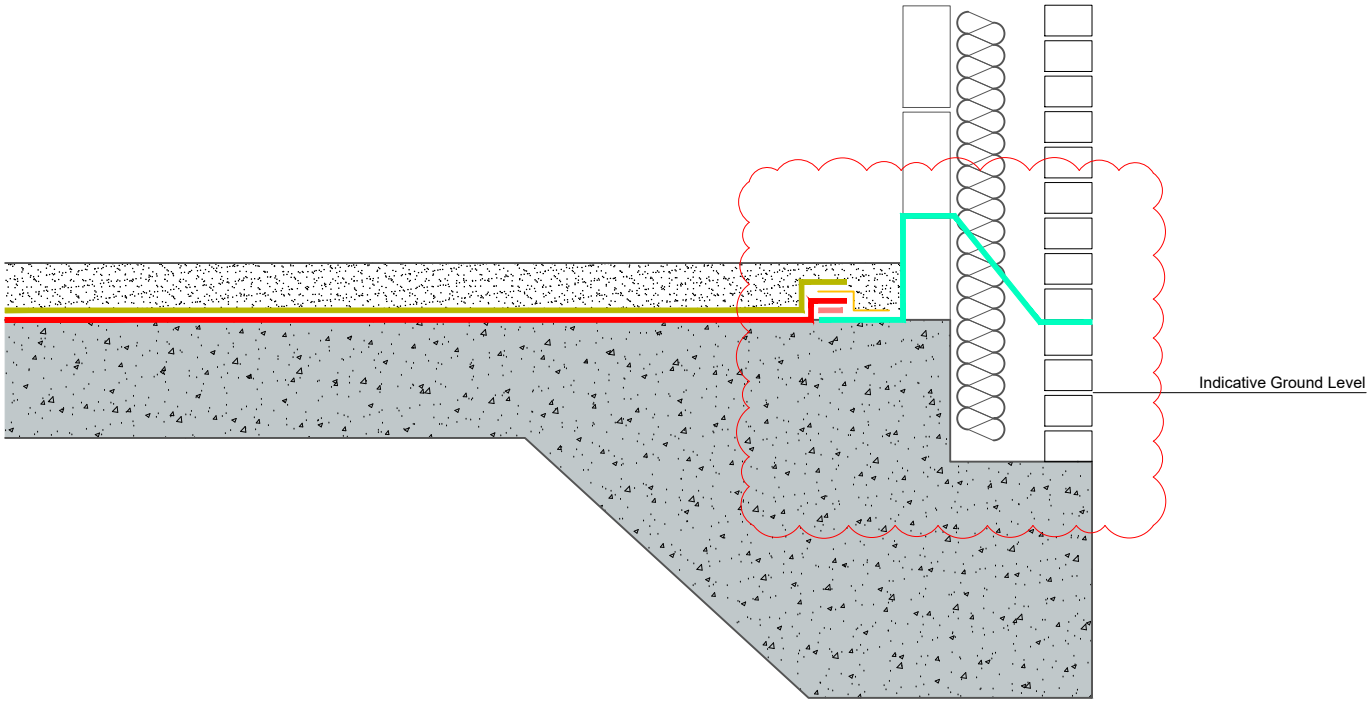
DAMP PROOFING & GAS PROTECTION

Important design notes:

-



KEY

Click on product names to access technical information

- Hydroprufe 9000
- Hydroprufe DPC
- Protection Board 300
- HCR Foil Girth Tape
- Teknocem HBR 50 x 50mm Fillet
- Standard Concrete to Structural Liner Wall / Slab

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Rev	Date	Description	Dwn	Chk
P04	08/03/22	As Clouded	DM	KW
P03	07/12/21	As Clouded	AC	AC
P02	06/12/21	As Clouded	DM	AC
P01	03/12/21	Issued for Information	AC	JM

NOTE: All laps between products are 150mm unless otherwise annotated

Client
KELMAC WATERPROOFING

Project
FREE WHARF

Title
SLAB EDGE WATERPROOFING DETAIL

FIS Drawing No
J2515-TD-003

Date
03/12/2021

Revision
P04

Drawn
AC

Checked
JM

Scale
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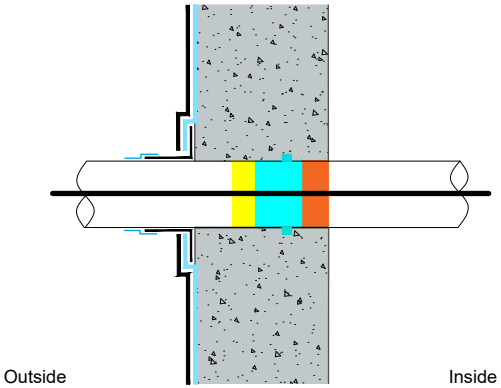
This drawing is designed to achieve the following environment in accordance with BS 8102: 2009

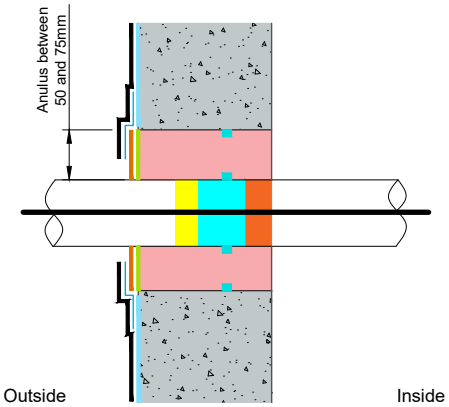
DAMP PROOFING & GAS PROTECTION

Important design notes:

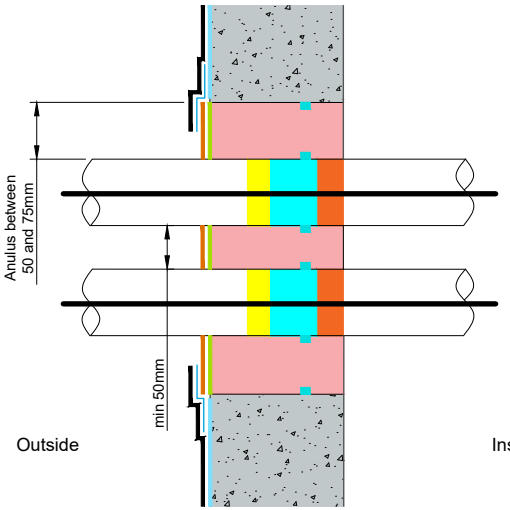
- Site photographs of all service penetrations to be uploaded to Premtrac prior to pouring concrete. Allow sufficient time for FIS to review and QC check.
- If annulus around the penetrations is greater than 75mm Teknocem LA should be used instead of Hydroprufe EP.
- Where multiple pipes are cast together, a minimum distance of 50mm should be maintained between pipes.
- All laps between products are 150mm unless otherwise annotated.
- Hydroplug System is typically installed by follow on contractors, not groundworker, once M&E works are fully installed.
- Hydroplug System is not covered under warranty once installed.
- Hydroplug Sealing Kit only applicable for service penetrations.



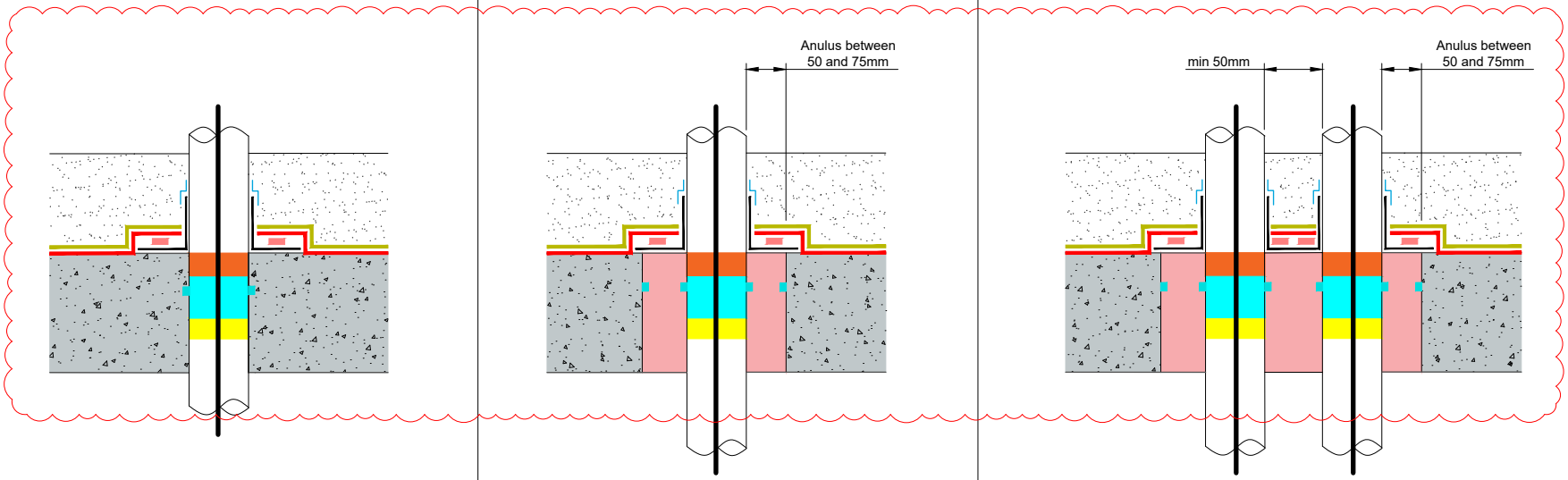
TYPICAL CAST IN PENETRATION DETAIL



TYPICAL BOX OUT PENETRATION DETAIL



TYPICAL BOX OUT PENETRATION DETAIL FOR MULTIPLE PIPES



KEY

Click on product names to access technical information

- Hydroprufe 9000
- Hydroprufe LG 0.7-1.2mm quartz aggregate to be broadcast into coating where concrete connection is required (0.5kg per 1m²)
- Hydroseal FX
- Protection Board 300
- Protection Board 600
- Hydroprufe Detail Tape
- Hydroprufe / HCR Butyl Tape
- Hydroprufe Tophat
- Hydroplug Foam
- Hydroplug Paste
- Hydroplug Mortar
- Hydroprufe EP or Teknocem LA
- Hydrostop WS10
- Standard Concrete to Structural Liner Wall / Slab

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Rev	Date	Description	Dwn	Chk
P02	06/12/21	As Clouded	DM	AC
P01	03/12/21	Issued for Information	AC	JM

Scale: Not to Scale

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This drawing is designed to achieve the following environment in accordance with BS 8102: 2009

DAMP PROOFING & GAS PROTECTION

Client: KELMAC WATERPROOFING

Project: FREE WHARF

Title: TYPICAL PENETRATION DETAILS FOR BOX OUT AND CAST IN PIPES AND SERVICES

FIS Drawing No: J2515-TD-004

Date	Revision
03/12/2021	P02
Drawn	Checked
AC	JM

FIS PREMCRETE
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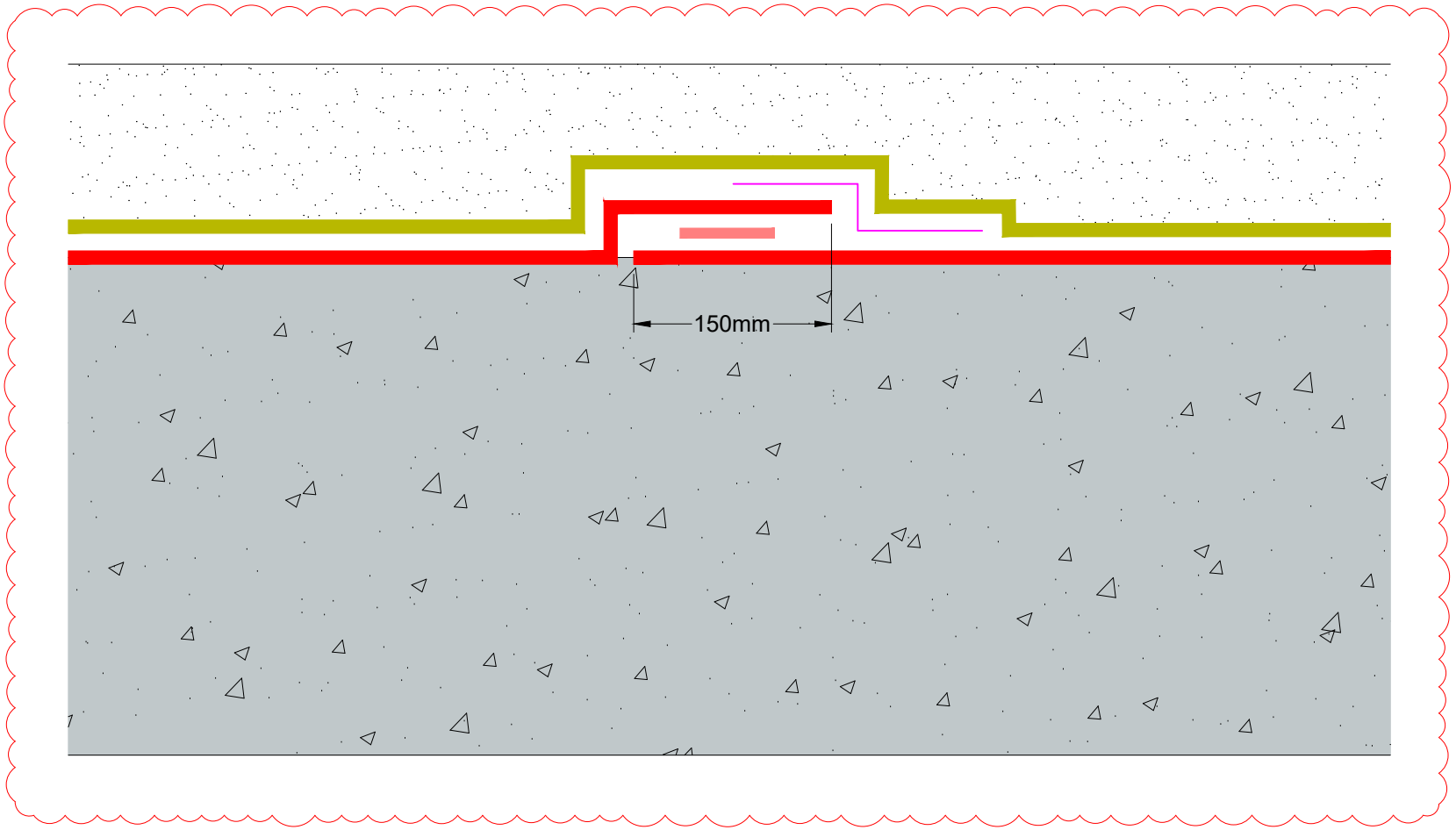
Important design notes:

-



KEY

Click on product names to access technical information

- Hydroprufe 9000
- Protection Board 300
- Hydroprufe / HCR Butyl Tape
- Foil Girth Tape
- Standard Concrete to Structural Liner Wall / Slab

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Rev	Date	Description	Dwn	Chk
P02	06/12/21	As Clouded	DM	AC
P01	03/12/21	Issued for Information	AC	JM

NOTE: All laps between products are 150mm unless otherwise annotated

Client
KELMAC WATERPROOFING

Project
FREE WHARF

Title
TYPICAL MEMBRANE LAP JOINT DETAIL

FIS Drawing No
J2515-TD-005

Date
03/12/2021

Revision
P02

Drawn
AC

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Scale
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DAMP PROOFING & GAS PROTECTION

APPENDIX 5.2. GAS PROTECTION MEASURES - VERIFICATION

GeoShield Verification Plan

PROJECT DESCRIPTION

Kelmac Waterproofing Limited,
Free Wharf - Blocks G1, G2 & H,
Brighton Road,
Shoreham-By-Sea,
BN43 5

The proposed development for which gas protection measures are required involves the redevelopment of the site to be a large retail unit with associated areas of hardstanding and soft landscaping. The entire site comprises two buildings - Blocks G & H.

In accordance with BS8485:2015 + A1 2019 for a type B building and the building must conform to a Characteristic Specification (CS) rating of 2, so mitigation will need to be 3.5 points.

Geoshield have adopted the highest design and verification principles associated with BS8485:2015 + A1 2019, BR 211, Public Health England, NHBC Technical Extra April 2016 and CIRIA 735.

This pre-verification plan reviews the design to ensure it is compliant with the developer and planning authority requirements and in conjunction with the relevant investigation report in accordance with BS8485:2015 + A1 2019.

In summary, the design does achieve a required level of attention to detail with its robust specific gas membrane design (2.0 points), the structural barrier of a reinforced cast in-situ monolithic ground bearing concrete slab with minimal penetrations (1.5 points).

The pre-verification plan confirms how the installation will be tested in accordance with CIRIA735. The verification visits will be documented in verification reports during the project that are suitable for submission to the local planning authority in order to satisfy and discharge planning consent.

All faults identified during inspection and verification site visits of the ground gas membrane will be a required remediation before sign off.

GeoShield Verification Plan

PROJECT DESCRIPTION

Pre-Verification Plan

GeoShield are appointed by the Client to carry out independent validation, verification and integrity testing of the ground gas protection system on site. The Pre-Verification plan sets out the requirements and procedures that GeoShield will adopt to ensure that the installation is in line with the proposed design, relevant UK standards and guidance.
GeoShield take no responsibility for any warranties to third parties for the design of the system or the installation.

Limitations

The Pre-Verification plan prepared by GeoShield Limited is limited to the proposed ground gas protection measures installed. The Pre-Verification plan has been prepared in line with the relevant UK Standards and Guidance (BS8485:2015+A1:2019 & CIRIA 735) alongside the information made available to GeoShield by the Client. The conclusions made in the report are considered to be correct at the time of writing, but additional information provided/discovered may require amendments to the Plan. GeoShield recognises that changes to relevant standard and guidance may occur at any time which may cause the conclusions made to be incorrect - GeoShield do not accept any responsibility or liability for the implications of such changes.

The Pre-Verification plan does not in itself constitute verification that the membrane has been installed in accordance with this document. Validation and verification of the installed membrane will be covered in separate verification reports following physical inspection of the gas barrier and will include photographic evidence of the installation.

Waterproofing elements (where applicable) do not fall into the remit of this Pre-Verification plan or future inspections. GeoShield will provide the opinion on membrane's suitability for ground gas protection purposes – no liability is offered or implied for the waterproofing element which should be checked by others.

GeoShield Verification Plan

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Section 1:	Project Details	Page 1
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Section 3:	Project Information	Page 2
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GeoShield Verification Plan

PROJECT REFERENCE: GEO102445

PROJECT: Free Wharf - Blocks G1, G2 & H

PROJECT ADDRESS: Brighton Road,

Shoreham-By-Sea,

BN43 5

SPECIFICATION: Verified in accordance CIRIA 735.

Design in accordance with BS8485 2015 + 2019 for Methane and Carbon Dioxide.

Substrate prepared in-accordance with manufactures instructions and BS8485:2019.

FIS Hydroprufe 9000

FIS Hydroprufe LG

FIS Hydroprufe DPC

FIS Detail Tape

FIS Combi-Seal

FIS Protection Board 300

GeoShield Verification Plan

INFORMATION INCLUDED

31149 Sep 2012 Combined Report compressed

> Site has been classified as a CS2 gas regime rating

> 5.3 - Results of the Gas Monitoring

3117-ACA-ZZ-00-DR-A-1101 (Rev 1)

3117-ACA-H-00-DR-A-1121 Block H L00 General Arrangement (rev 1)

3117-ACA-G-00-DR-A-1111 Block G L00 General Arrangement (rev 1)

J2515-GA-001 (3)

J2515-TD-001 (2)

J2515-TD-002

J2515-TD-003 (2)

FIS Material Specification Technical Data Sheets

Radon Maps UK - (Map 1) Site Location & (Map 2) Nearby Location

Information presented to at the pre-verification stage assumed correct

Any change client will let GeoShield know or this Pre-verification Plan will be void.

GeoShield Verification Plan

NAME OF SURVEYOR: Liam White

VERIFICATION COMPANY: GeoShield Limited

Icon Business Centre

4100 Park Approach

Thorpe Park

Leeds, LS15 8GB

CONTACT NUMBER: 07584 222 519

EMAIL ADDRESS: lwhite@geoshield.co.uk

ORDER NUMBER: To be confirmed

PER VISIT: YES: ☐ NO: ☐ PROJECT: YES: ☐ NO: ☐

GeoShield Verification Plan

SPECIFICATION

GeoDyne

Geotechnical & Environmental Consultants

Brighton Road
Shoreham

Combined Phase I Desk Study and Initial Phase II Exploratory Investigation

For

Optimisation Developments Ltd

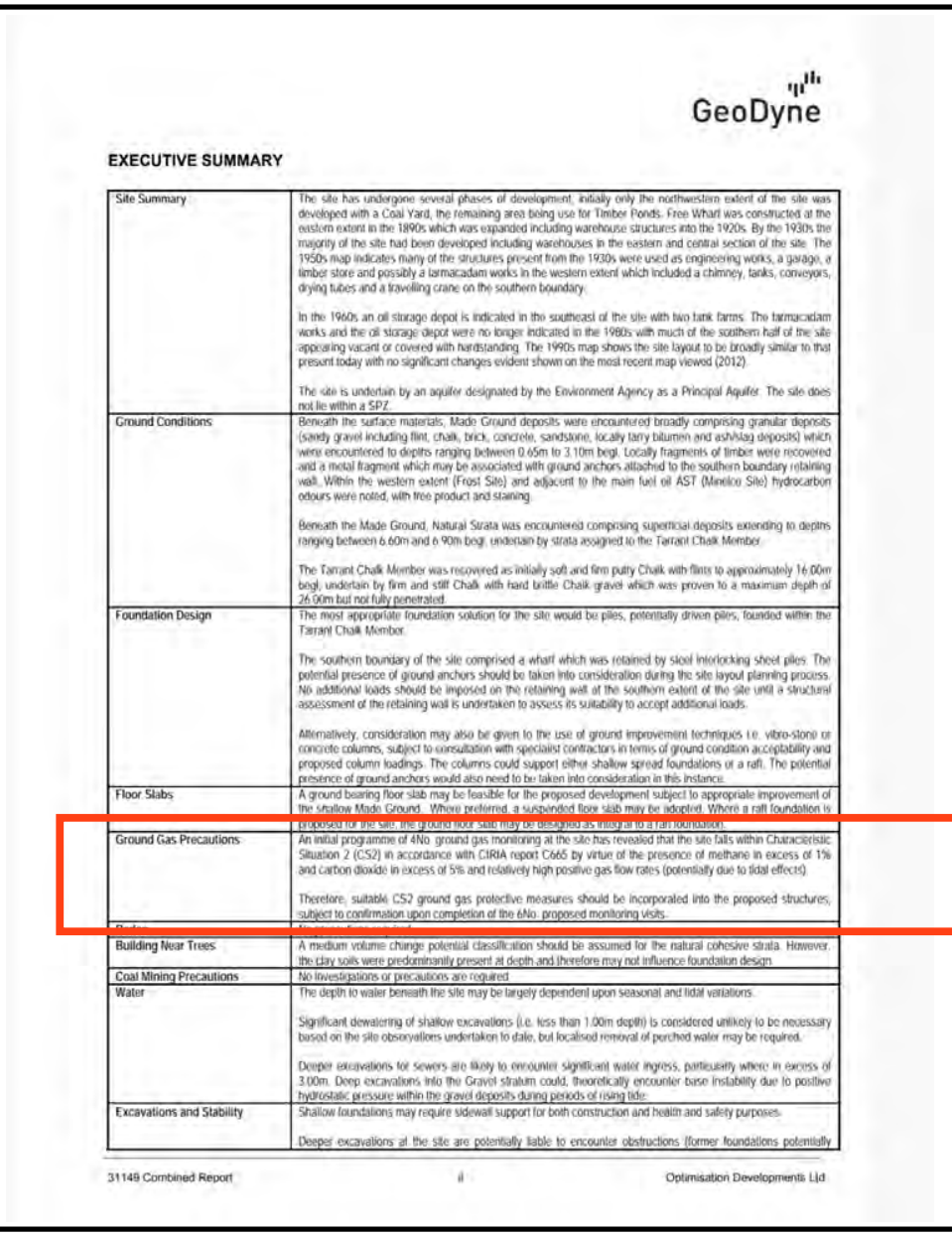
GeoDyne Limited
The Granary, Church Lane, Thrumpton, Nottingham, NG11 0AX
Tel: 0115 983 0006 Fax: 0115 983 0009 email: info@geodyne.co.uk

Title Reference & Description:

31149 Sep 2012 Combined Report compressed

GeoShield Verification Plan

SPECIFICATION



GeoDyne

EXECUTIVE SUMMARY

Site Summary	The site has undergone several phases of development, initially only the northwestern extent of the site was developed with a Coal Yard, the remaining area being use for Timber Ponds. Free Wharf was constructed at the eastern extent in the 1890s which was expanded including warehouse structures into the 1920s. By the 1930s the majority of the site had been developed including warehouses in the eastern and central section of the site. The 1950s map indicates many of the structures present from the 1930s were used as engineering works, a garage, a timber store and possibly a tarmacadam works in the western extent which included a chimney, tanks, conveyors, drying tubes and a travelling crane on the southern boundary. In the 1960s an oil storage depot is indicated in the southeast of the site with two tank farms. The tarmacadam works and the oil storage depot were no longer indicated in the 1980s with much of the southern half of the site appearing vacant or covered with hardstanding. The 1990s map shows the site layout to be broadly similar to that present today with no significant changes evident shown on the most recent map viewed (2012). The site is underlain by an aquifer designated by the Environment Agency as a Principal Aquifer. The site does not lie within a SPZ.
Ground Conditions	Beneath the surface materials, Made Ground deposits were encountered broadly comprising granular deposits (sandy gravel including flint, chalk, brick, concrete, sandstone, locally tarry bitumen and ash/slag deposits) which were encountered to depths ranging between 0.65m to 3.10m begl. Locally fragments of timber were recovered and a metal fragment which may be associated with ground anchors attached to the southern boundary retaining wall. Within the western extent (Frost Site) and adjacent to the main fuel oil AST (Mineco Site) hydrocarbon odours were noted, with free product and staining. Beneath the Made Ground, Natural Strata was encountered comprising superficial deposits extending to depths ranging between 6.60m and 6.90m begl, underlain by strata assigned to the Tarrant Chalk Member. The Tarrant Chalk Member was recovered as initially soft and firm putty Chalk with flints to approximately 16.00m begl, underlain by firm and stiff Chalk with hard brittle Chalk gravel which was proven to a maximum depth of 26.90m but not fully penetrated.
Foundation Design	The most appropriate foundation solution for the site would be piles, potentially driven piles, founded within the Tarrant Chalk Member. The southern boundary of the site comprised a wharf which was retained by steel interlocking sheet piles. The potential presence of ground anchors should be taken into consideration during the site layout planning process. No additional loads should be imposed on the retaining wall at the southern extent of the site until a structural assessment of the retaining wall is undertaken to assess its suitability to accept additional loads. Alternatively, consideration may also be given to the use of ground improvement techniques i.e. vibro-stone or concrete columns, subject to consultation with specialist contractors in terms of ground condition acceptability and proposed column loadings. The columns could support either shallow spread foundations or a raft. The potential presence of ground anchors would also need to be taken into consideration in this instance.
Floor Slabs	A ground bearing floor slab may be feasible for the proposed development subject to appropriate improvement of the shallow Made Ground. Where preferred, a suspended floor slab may be adopted. Where a raft foundation is proposed for the site, the ground floor slab may be designed as integral to a raft foundation.
Ground Gas Precautions	An initial programme of 4No. ground gas monitoring at the site has revealed that the site falls within Characteristic Situation 2 (CS2) in accordance with CIRIA report C665 by virtue of the presence of methane in excess of 1% and carbon dioxide in excess of 5% and relatively high positive gas flow rates (potentially due to tidal effects). Therefore, suitable CS2 ground gas protective measures should be incorporated into the proposed structures, subject to confirmation upon completion of the 6No. proposed monitoring visits.
Building Near Trees	A medium volume change potential classification should be assumed for the natural cohesive strata. However, the clay soils were predominantly present at depth and therefore may not influence foundation design.
Coal Mining Precautions	No investigations or precautions are required.
Water	The depth to water beneath the site may be largely dependent upon seasonal and tidal variations. Significant dewatering of shallow excavations (i.e. less than 1.00m depth) is considered unlikely to be necessary based on the site observations undertaken to date, but localised removal of perched water may be required. Deeper excavations for sewers are likely to encounter significant water ingress, particularly where in excess of 3.00m. Deep excavations into the Gravel stratum could, theoretically encounter base instability due to positive hydrostatic pressure within the gravel deposits during periods of rising tide.
Excavations and Stability	Shallow foundations may require sidewall support for both construction and health and safety purposes. Deeper excavations at the site are potentially liable to encounter obstructions (former foundations potentially

Title Reference & Description:

31149 Sep 2012 Combined Report compressed

Site has been classified as a CS2 gas regime rating.

GeoShield Verification Plan

SPECIFICATION

GeoDyne

5.0 GROUND GAS AND WATER MONITORING

5.1 Introduction

The results of the Phase I Desk Study enquiries and the Phase II exploratory investigation not revealed potential sources of ground gas (i.e. methane or carbon dioxide). Therefore, a programme of ground gas monitoring was considered to be required at the site.

5.2 Monitoring Installations

Eight boreholes (BH1, BH2B, BH3, WS1, WS2, WS10, WS15 and WS17) were installed with combined ground gas and water monitoring wells in order to facilitate a programme of monitoring.

The full set of ground gas and water level monitoring data completed to date is presented in Appendix IX of this report. We would comment that during the monitoring exercise it was noted that the gas flow measurements were potentially being influenced by tidal effects. Therefore, the results sheets in Appendix IX are presented in two parts, the first sheet providing details of the gas concentrations and the second sheet providing details of the gas flow. We would comment that potential tidal effects on gas flow were only noted in the installations within the cable percussive boreholes.

5.3 Results of the Gas Monitoring

An initial four weekly gas monitoring visits have been undertaken at the site to date. The gas monitoring results are summarised in Table 3 below. Upon completion of the extended programme of monitoring, an addendum report will be issued.

TABLE 3 – SUMMARY OF GAS MONITORING DATA

Parameter	Minimum % by volume (v/v)	Maximum % by volume (v/v)
Methane	0.0	1.2
Carbon Dioxide	0.2	17.5
Oxygen	0.1	20.1
Flow (l/h)	-2.6 (Low Tide)	+12.3 (Rising Tide)

- Methane was detected in concentrations ranging between 0.0% and 1.2% v/v during the monitoring visits undertaken.
- Carbon Dioxide was detected in concentrations ranging between 0.1% and 17.5% v/v during the monitoring visits undertaken.
- Oxygen was encountered at concentrations ranging between 0.1% and 20.1 v/v during the monitoring visits undertaken.
- A positive measurable flow of ground gas was recorded to a maximum of 12.3 l/h during a rising tide.
- Water was recorded within the boreholes over the 4No. monitoring visits undertaken ranging between 1.49m and 4.90m begl. We would comment that the wide range in water levels revealed may be a result of tidal effects.

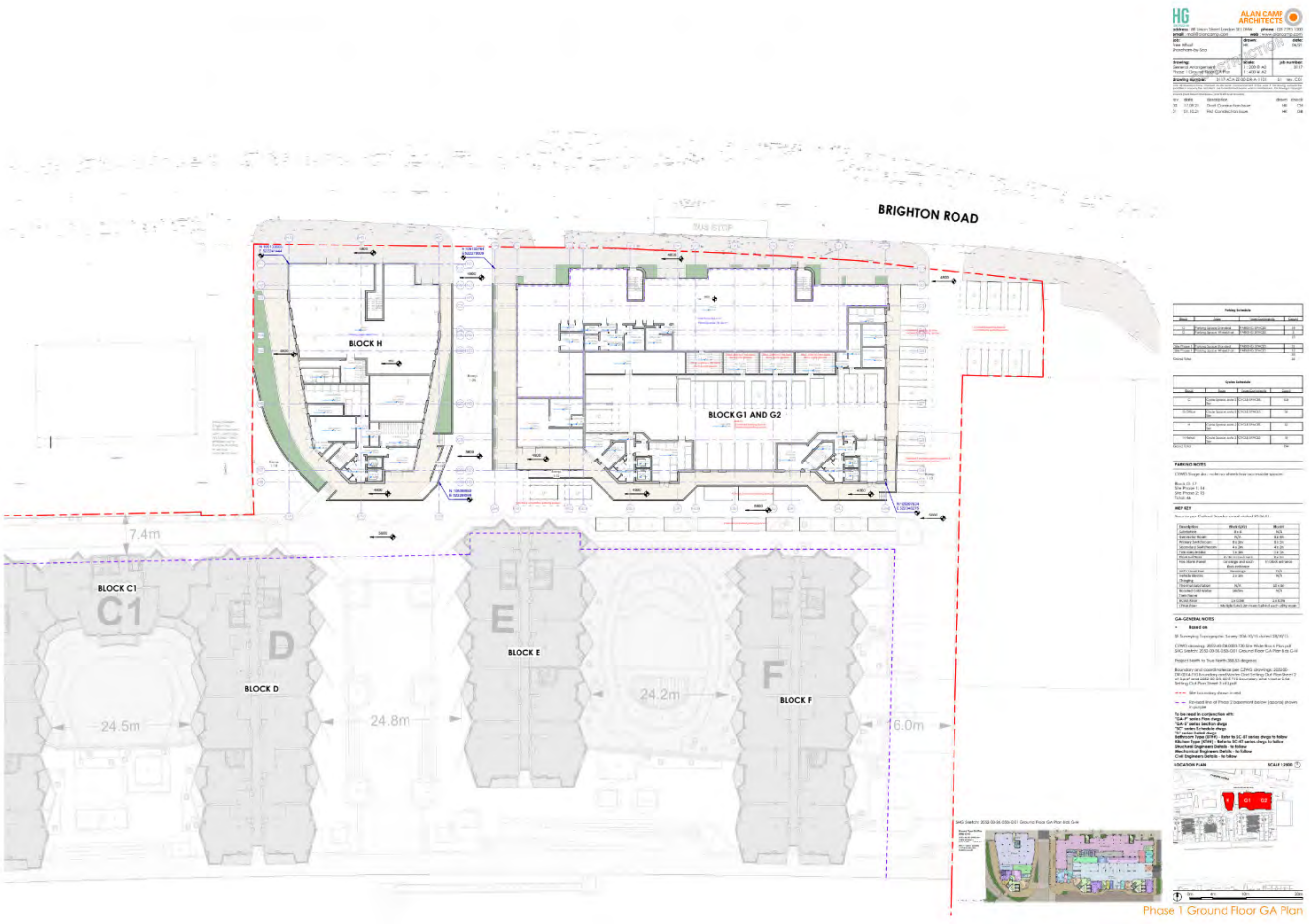
Title Reference & Description:

31149 Sep 2012 Combined Report compressed

5.3 - Results of the Gas Monitoring

GeoShield Verification Plan

SPECIFICATION

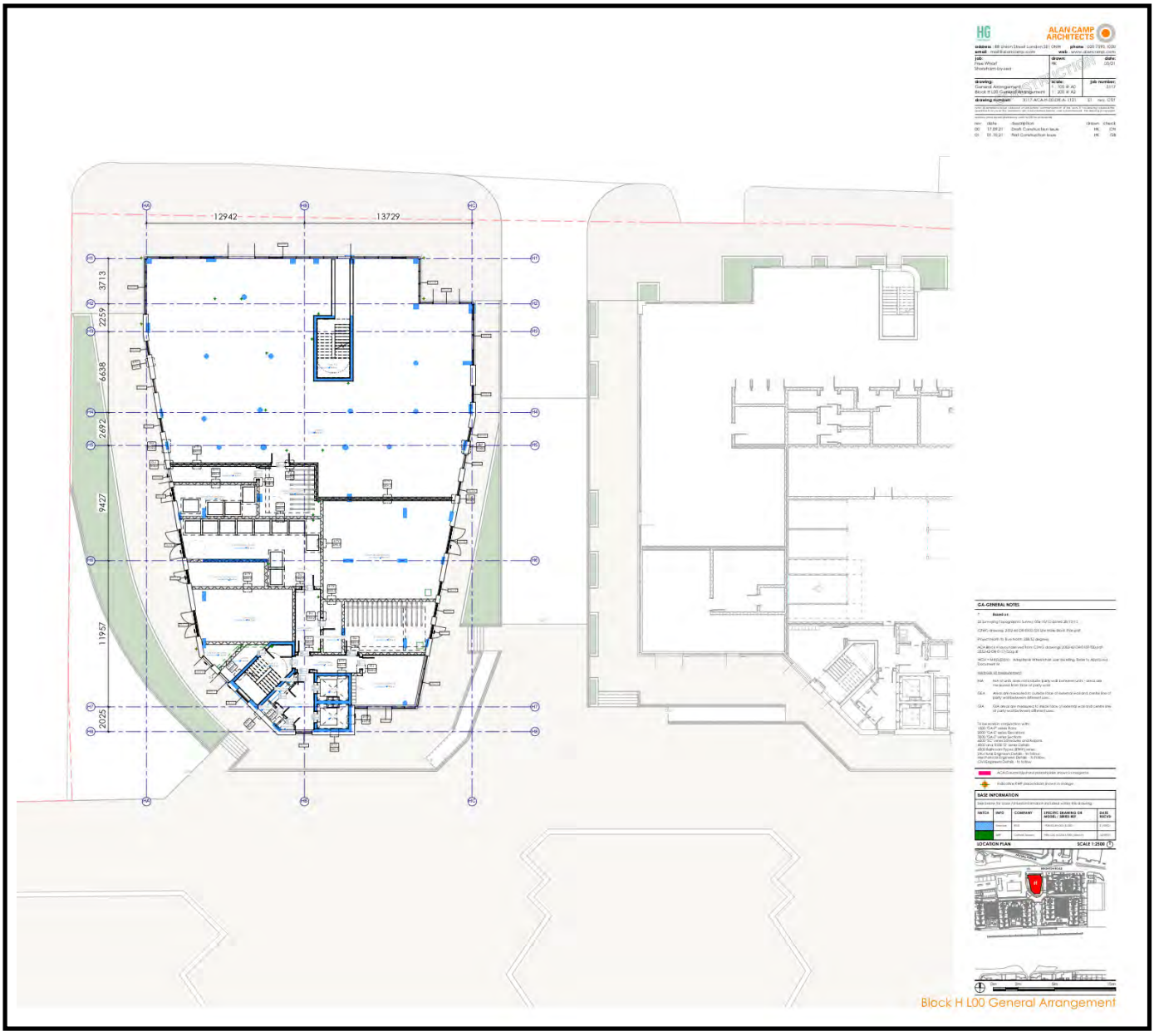


Title Reference & Description:

3117-ACA-ZZ-00-DR-A-1101 (Rev 1)

GeoShield Verification Plan

SPECIFICATION

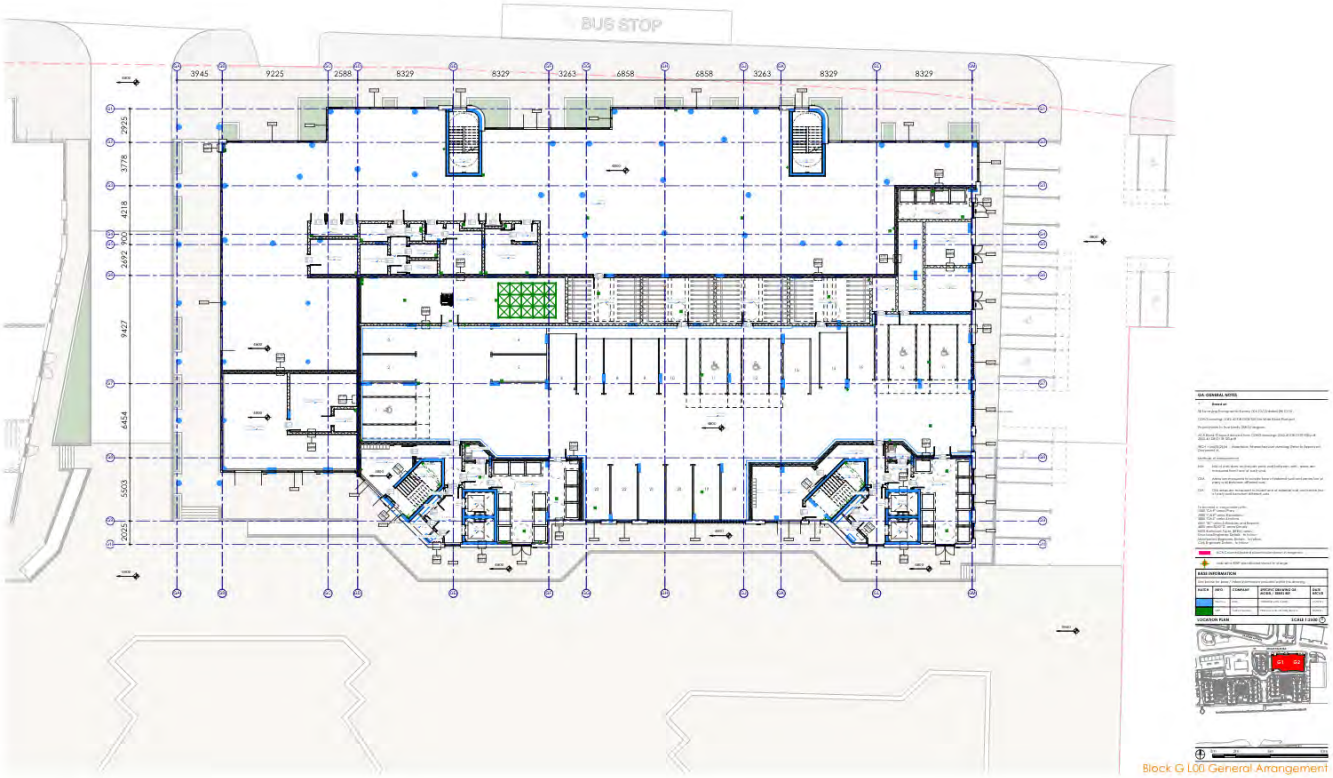


Title Reference & Description:

3117-ACA-H-00-DR-A-1121 Block H L00 General Arrangement (rev 1)

GeoShield Verification Plan

SPECIFICATION

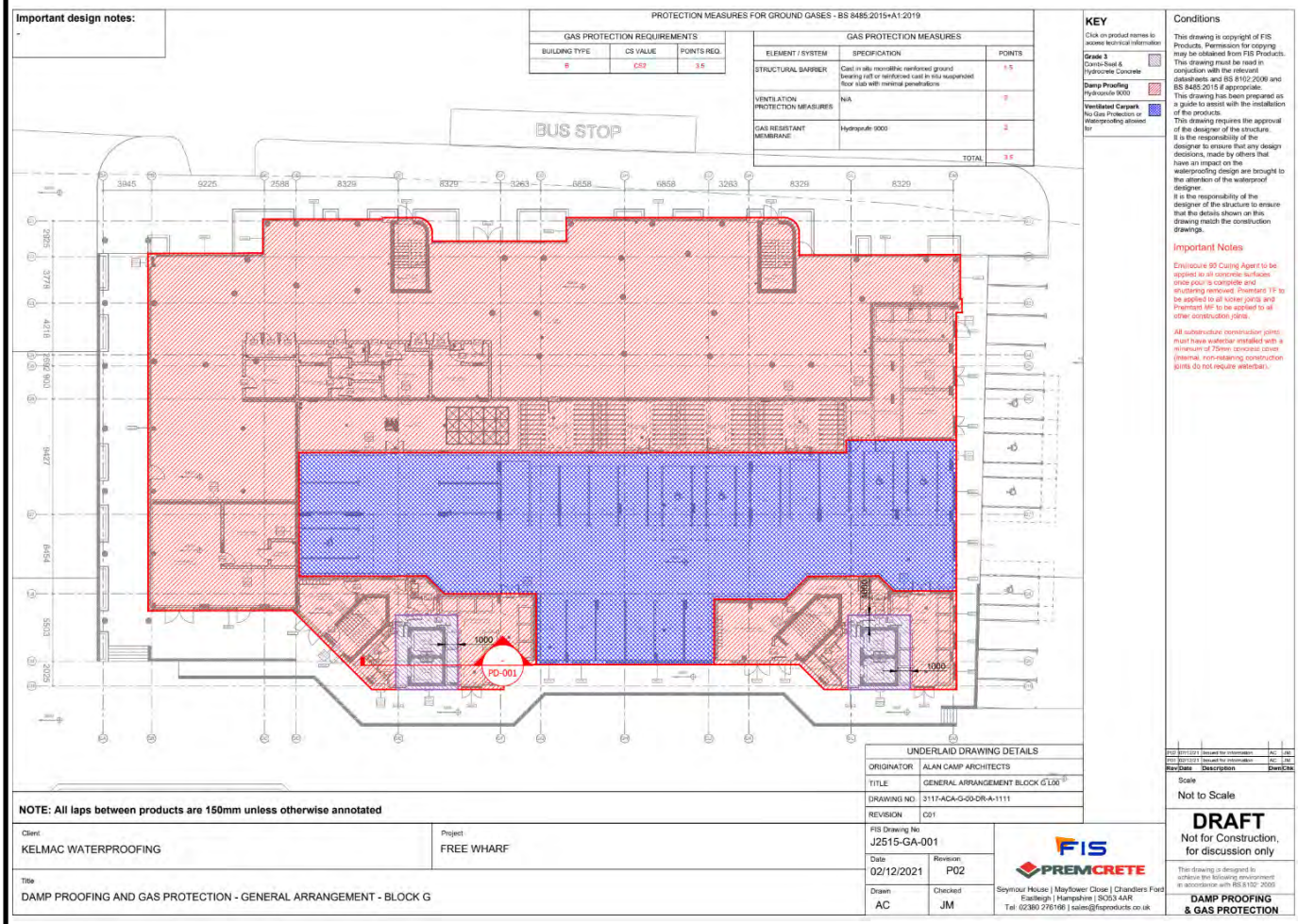


Title Reference & Description:

3117-ACA-G-00-DR-A-1111 Block G L00 General Arrangement (rev 1)

GeoShield Verification Plan

SPECIFICATION

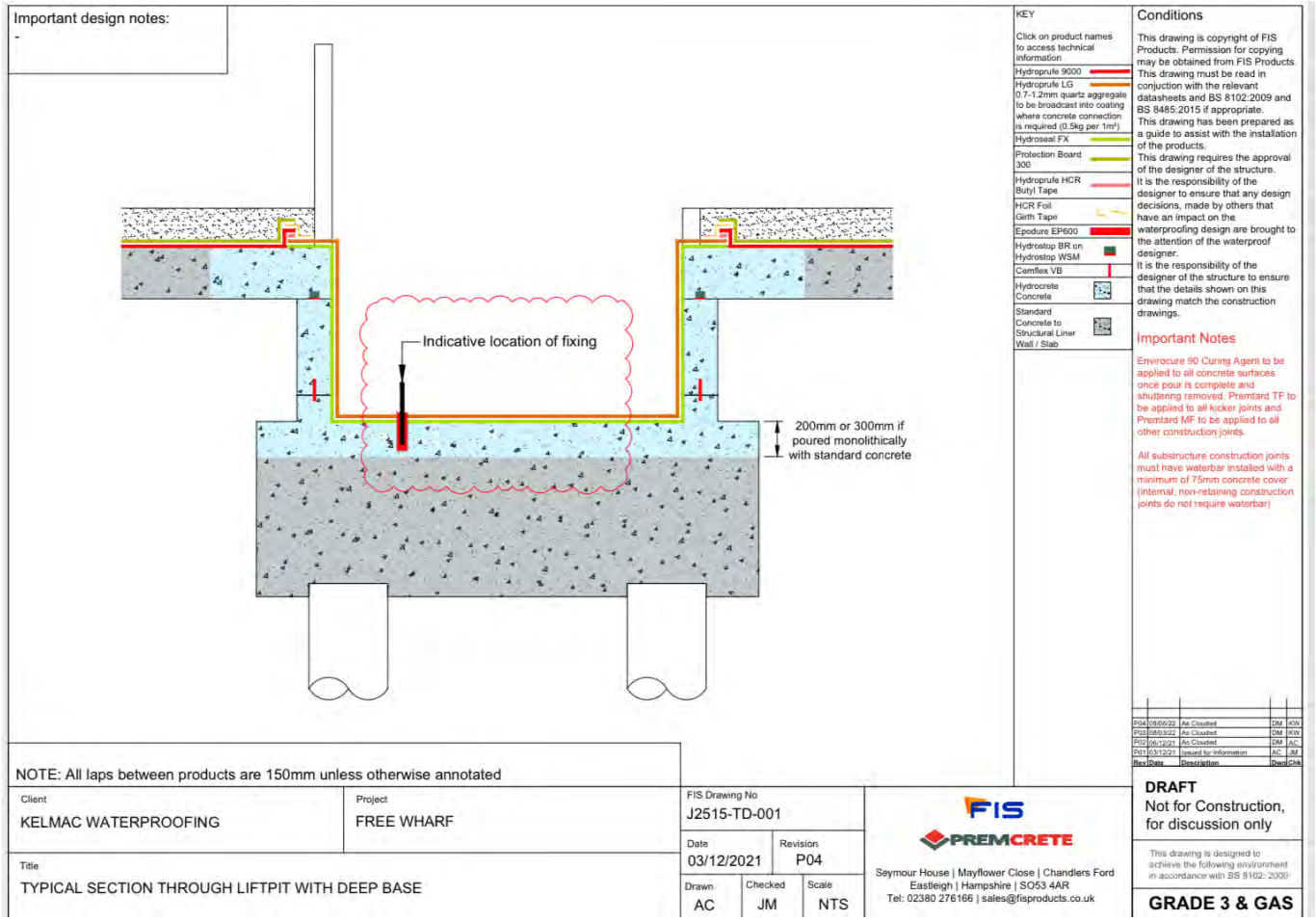


Title Reference & Description:

J2515-GA-001 (3)

GeoShield Verification Plan

SPECIFICATION

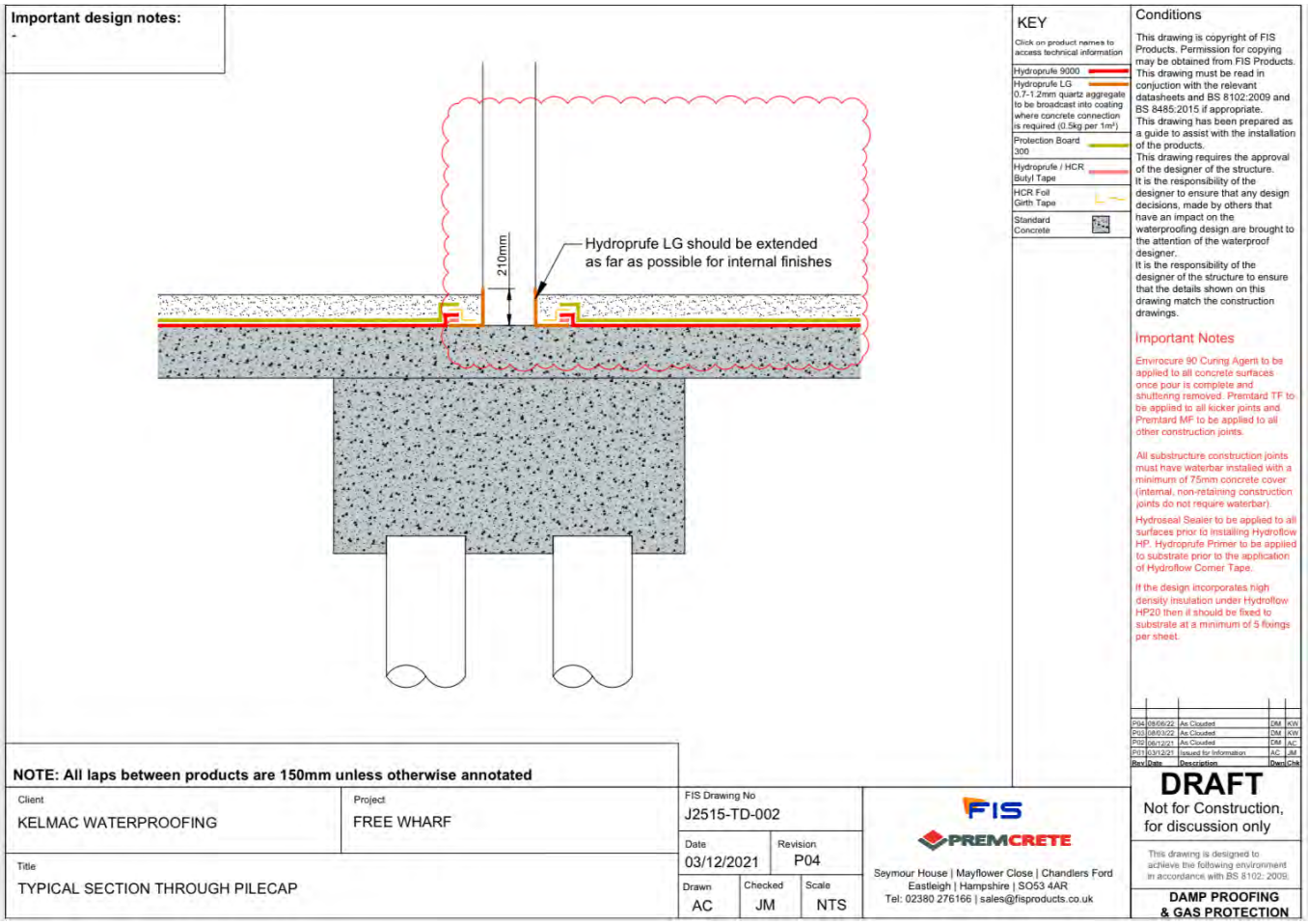


Title Reference & Description:

J2515-TD-001 (2)

GeoShield Verification Plan

SPECIFICATION

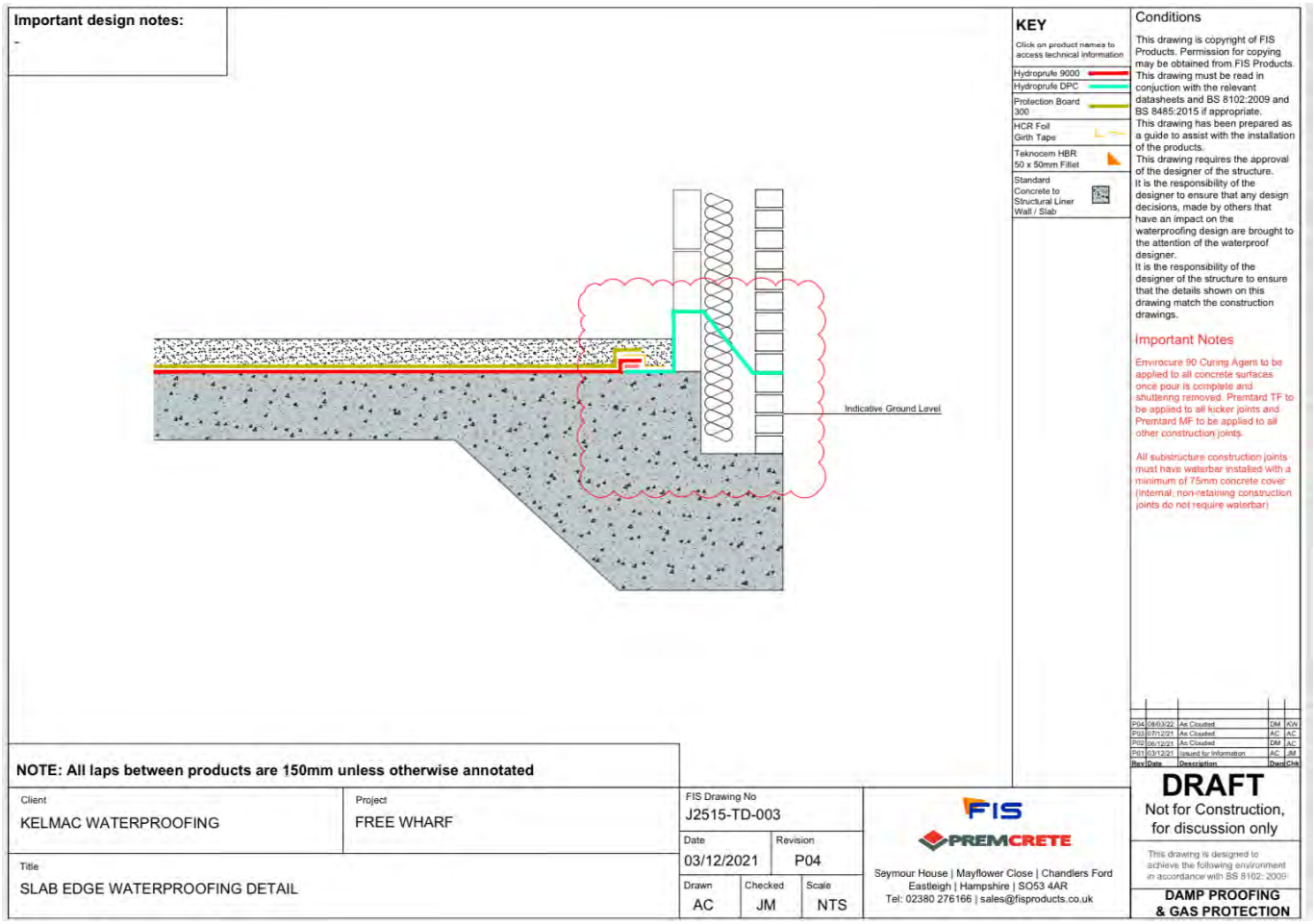


Title Reference & Description:

J2515-TD-002

GeoShield Verification Plan

SPECIFICATION

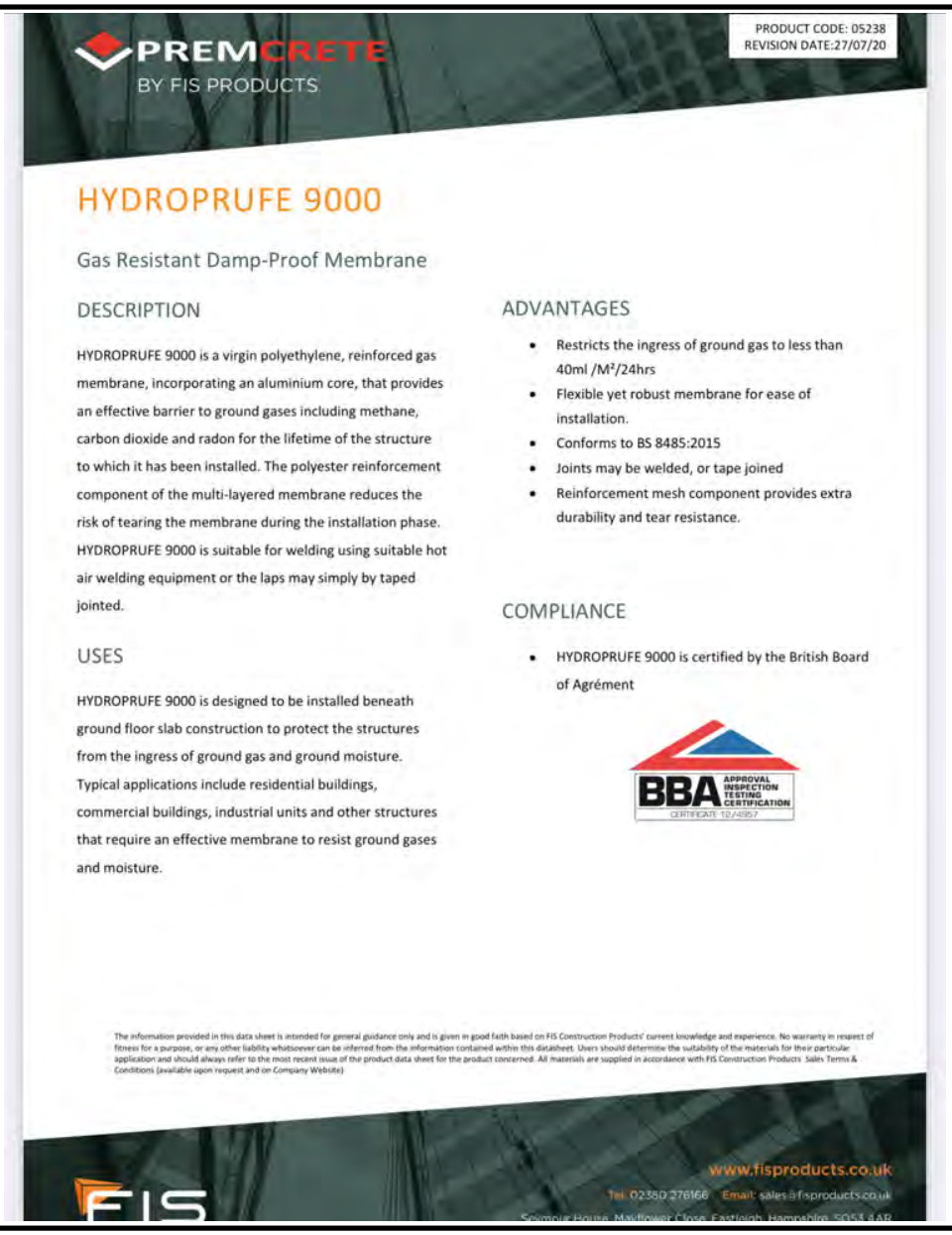


Title Reference & Description:

J2515-TD-003 (2)

GeoShield Verification Plan

SPECIFICATION



PREMCRETE
BY FIS PRODUCTS

PRODUCT CODE: 05238
REVISION DATE:27/07/20

HYDROPRUFE 9000

Gas Resistant Damp-Proof Membrane

DESCRIPTION

HYDROPRUFE 9000 is a virgin polyethylene, reinforced gas membrane, incorporating an aluminium core, that provides an effective barrier to ground gases including methane, carbon dioxide and radon for the lifetime of the structure to which it has been installed. The polyester reinforcement component of the multi-layered membrane reduces the risk of tearing the membrane during the installation phase. HYDROPRUFE 9000 is suitable for welding using suitable hot air welding equipment or the laps may simply by taped jointed.

USES

HYDROPRUFE 9000 is designed to be installed beneath ground floor slab construction to protect the structures from the ingress of ground gas and ground moisture. Typical applications include residential buildings, commercial buildings, industrial units and other structures that require an effective membrane to resist ground gases and moisture.

ADVANTAGES

- Restricts the ingress of ground gas to less than 40ml /M²/24hrs
- Flexible yet robust membrane for ease of installation.
- Conforms to BS 8485:2015
- Joints may be welded, or tape joined
- Reinforcement mesh component provides extra durability and tear resistance.

COMPLIANCE

- HYDROPRUFE 9000 is certified by the British Board of Agrément

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 12/4957

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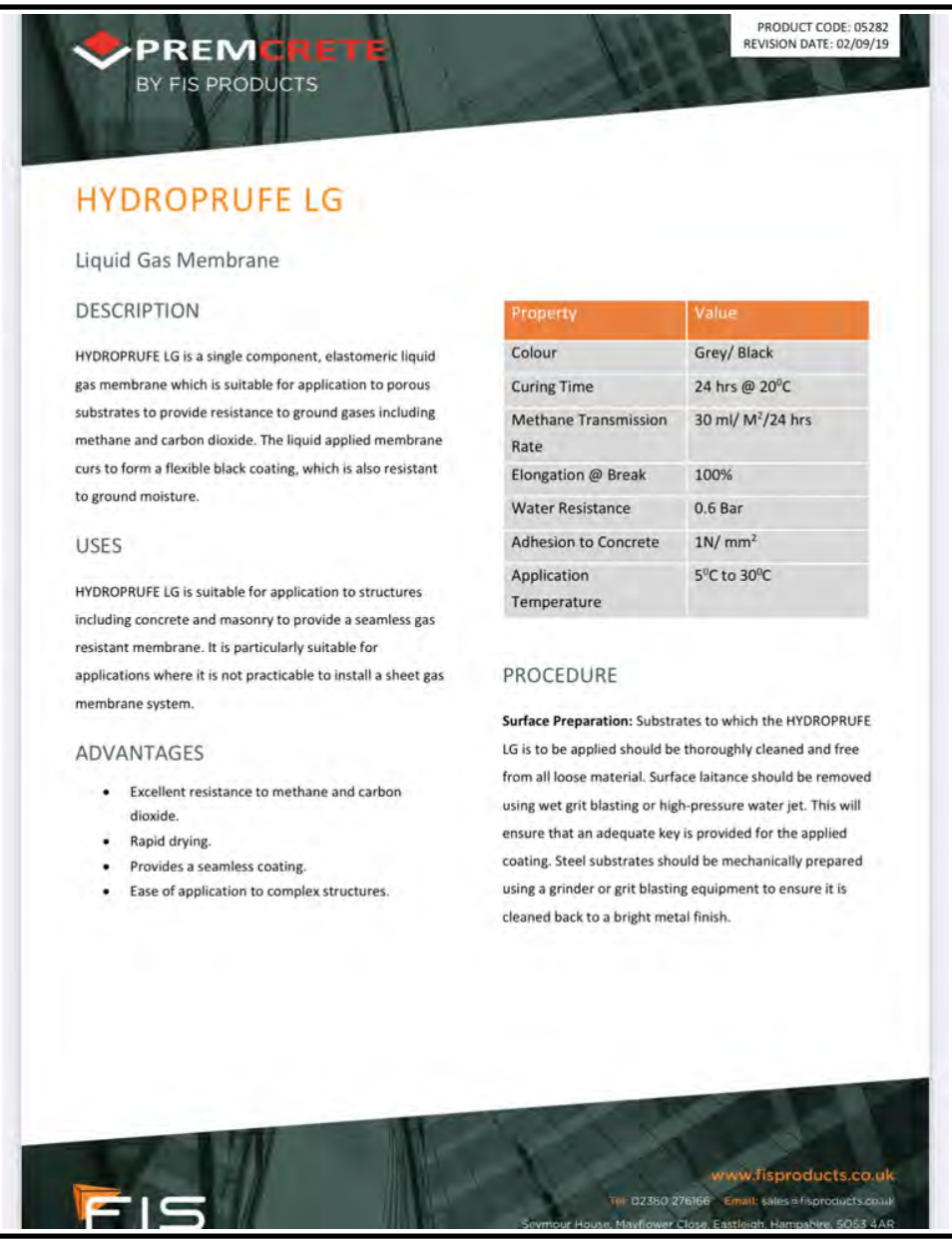
Seymour House, Mayflower Close, Eastleigh, Hampshire, SO53 4AR

Title Reference & Description:

FIS Premcrete Hydroprufe 9000 Technical Data Sheet

GeoShield Verification Plan

SPECIFICATION



PREMCRETE
BY FIS PRODUCTS

PRODUCT CODE: 05282
REVISION DATE: 02/09/19

HYDROPRUFE LG

Liquid Gas Membrane

DESCRIPTION

HYDROPRUFE LG is a single component, elastomeric liquid gas membrane which is suitable for application to porous substrates to provide resistance to ground gases including methane and carbon dioxide. The liquid applied membrane curs to form a flexible black coating, which is also resistant to ground moisture.

USES

HYDROPRUFE LG is suitable for application to structures including concrete and masonry to provide a seamless gas resistant membrane. It is particularly suitable for applications where it is not practicable to install a sheet gas membrane system.

ADVANTAGES

- Excellent resistance to methane and carbon dioxide.
- Rapid drying.
- Provides a seamless coating.
- Ease of application to complex structures.

Property	Value
Colour	Grey/ Black
Curing Time	24 hrs @ 20°C
Methane Transmission Rate	30 ml/ M^2/24 hrs
Elongation @ Break	100%
Water Resistance	0.6 Bar
Adhesion to Concrete	1N/ mm^2
Application Temperature	5°C to 30°C

PROCEDURE

Surface Preparation: Substrates to which the HYDROPRUFE LG is to be applied should be thoroughly cleaned and free from all loose material. Surface laitance should be removed using wet grit blasting or high-pressure water jet. This will ensure that an adequate key is provided for the applied coating. Steel substrates should be mechanically prepared using a grinder or grit blasting equipment to ensure it is cleaned back to a bright metal finish.

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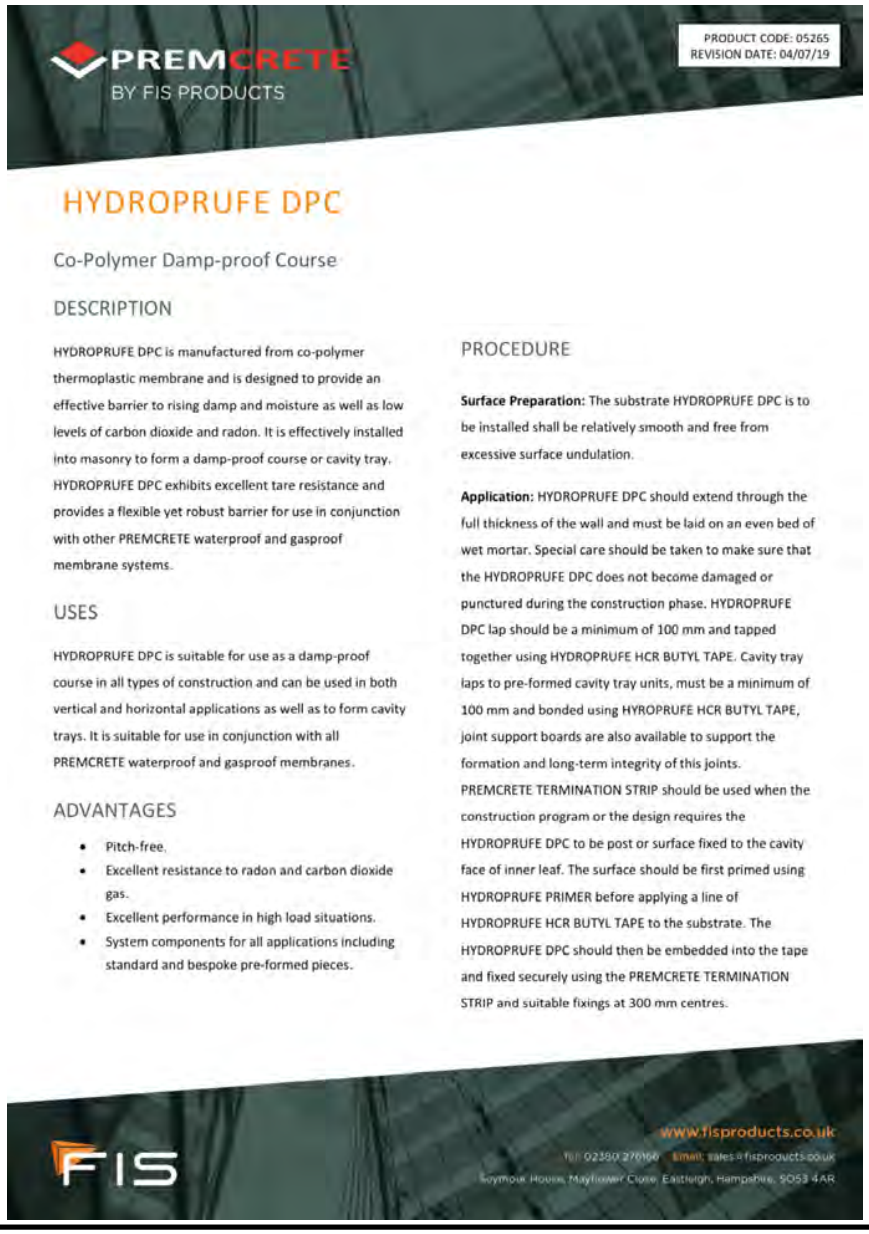
Title Reference & Description:

FIS Hydroprufe LG Technical Data Sheet

GeoShield Verification Plan

SPECIFICATION



PREMCRETE
BY FIS PRODUCTS

PRODUCT CODE: 05265
REVISION DATE: 04/07/19

HYDROPRUFE DPC

Co-Polymer Damp-proof Course

DESCRIPTION

HYDROPRUFE DPC is manufactured from co-polymer thermoplastic membrane and is designed to provide an effective barrier to rising damp and moisture as well as low levels of carbon dioxide and radon. It is effectively installed into masonry to form a damp-proof course or cavity tray. HYDROPRUFE DPC exhibits excellent tare resistance and provides a flexible yet robust barrier for use in conjunction with other PREMCRETE waterproof and gasproof membrane systems.

USES

HYDROPRUFE DPC is suitable for use as a damp-proof course in all types of construction and can be used in both vertical and horizontal applications as well as to form cavity trays. It is suitable for use in conjunction with all PREMCRETE waterproof and gasproof membranes.

ADVANTAGES

- Pitch-free.
- Excellent resistance to radon and carbon dioxide gas.
- Excellent performance in high load situations.
- System components for all applications including standard and bespoke pre-formed pieces.

PROCEDURE

Surface Preparation: The substrate HYDROPRUFE DPC is to be installed shall be relatively smooth and free from excessive surface undulation.

Application: HYDROPRUFE DPC should extend through the full thickness of the wall and must be laid on an even bed of wet mortar. Special care should be taken to make sure that the HYDROPRUFE DPC does not become damaged or punctured during the construction phase. HYDROPRUFE DPC lap should be a minimum of 100 mm and tapped together using HYDROPRUFE HCR BUTYL TAPE. Cavity tray laps to pre-formed cavity tray units, must be a minimum of 100 mm and bonded using HYROPRUFE HCR BUTYL TAPE, joint support boards are also available to support the formation and long-term integrity of this joints. PREMCRETE TERMINATION STRIP should be used when the construction program or the design requires the HYDROPRUFE DPC to be post or surface fixed to the cavity face of inner leaf. The surface should be first primed using HYDROPRUFE PRIMER before applying a line of HYDROPRUFE HCR BUTYL TAPE to the substrate. The HYDROPRUFE DPC should then be embedded into the tape and fixed securely using the PREMCRETE TERMINATION STRIP and suitable fixings at 300 mm centres.

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Title Reference & Description:

FIS Premcrete Hydroprufe DPC Technical Data Sheet

GeoShield Verification Plan

SPECIFICATION



PREMCRETE
BY FIS PRODUCTS

PRODUCT CODE: 05692P
REVISION DATE: 05/07/21

COMBI-SEAL PLUS

VOC-Resistant Waterproof Membrane

DESCRIPTION

COMBI-SEAL PLUS comprises of a high-density polyethylene membrane (HDPE) and non-woven, polymer impregnated geotextile, cross laminated to produce a durable, pre-applied membrane which will resist hydrocarbons, VOCs, ground gases and water. The membrane utilises PREMCRETE APAN™ technology to produce an active membrane which will self-heal and effectively resist water pressure in the event of minor punctures or defects. The composite membrane will restrict gas vapour transmission to less than 40ml/day/M² in accordance with BS 8485:2015. COMBI-SEAL PLUS is a highly chemical resistant membrane which ensures that the integrity of the membrane is secure even in the presence of aggressive chemicals. The textured profile of the membrane ensures an integral bond to the structure to which it is applied.

USES

COMBI-SEAL PLUS is a pre-applied VOC resistant waterproof membrane for basement construction, lift pits, concrete retaining walls and other structures which extend below ground where resistance to hydrocarbons, ground gases and water is required. COMBI-SEAL PLUS may also be used to protect ground floor slabs, particularly where a good integral bond is required to the underside of the concrete slab or where a clay heave board has been installed. COMBI-SEAL PLUS achieves two points when correctly installed in accordance with table 7 of BS 8485:2015.

ADVANTAGES

- Resistant to a wide range of chemicals.
- Self-healing APAN™ waterproofing technology.
- Forms strong adhesive bond to freshly placed concrete.
- Lightweight but robust membrane.
- High tear resistance.

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44 Macadam Way, West Portway, Andover, SP10 3XW

Title Reference & Description:

FIS Premcrete Combi-Seal Plus Technical Data Sheet

GeoShield Verification Plan

SPECIFICATION



PREMCRETE
BY FIS PRODUCTS

PRODUCT CODE: 05214
REVISION DATE: 18/06/19

HYDROPRUFE TAPES

High Adhesion Membrane Tapes

DESCRIPTION

HYDROPRUFE HCR BUTYL TAPE is a double-sided tape which is used for the effective sealing of damp-proof and gas-proof membranes. It is applied as a 30mm wide tape with a release paper on one side.

HYDROPRUFE HCR GIRTH TAPE is a single-sided reinforced tape supplied as 50mm wide roll for the effective sealing of lap joints to prevent displacement during concrete pours.

HYDROPRUFE DETAIL TAPE is a tape which is used to ensure the continuity of gas and damp-proof membranes, particularly at complex junctions and when terminating the membrane.

USES

HYDROPRUFE HCR TAPES are suitable for use in conjunction with HYDROPRUFE 9000, HYDROPRUFE 7000 and HYDROPRUFE DPM for the effective sealing of adjacent sheets of membrane.

ADVANTAGES

- Good adhesion to all membranes.
- Long lasting seal achieved.
- Butyl component provides effective barrier to ground gas.

APPLICATION

HCR BUTYL TAPE: HYDROPRUFE HCR BUTYL TAPE should be applied 50mm from the edge of the membrane. The release paper should be left in place until the adjacent sheet has been positioned. The release paper can then be removed and the membrane should be firmly joined together by applying pressure preferably by using a lap joint roller.

HYDROPRUFE HCR GIRTH TAPE: Once the adjacent sheets have been sealed using HCR BUTYL TAPE then the lap should be over-taped using HCR GIRTH TAPE ensuring an effective seal to prevent displacement of the lap joint during concrete pour.

PACKAGING

HCR BUTYL TAPE: 30mm x 30 M Roll 10 rolls per box

HCR GIRTH TAPE: 95mm x 50 M 12 rolls per box.

DETAIL TAPE: 150mm x 15M 4 rolls per box

STORAGE

HYDROPRUFE HCR TAPE should be stored in clean dry conditions at temperature between 10°C and 30°C.

HEALTH & SAFETY

See separate material safety datasheet.

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Title Reference & Description:

FIS Hydroprufe Tapes Technical Data Sheet

GeoShield Verification Plan

SPECIFICATION



PREMCRETE
BY FIS PRODUCTS

PRODUCT CODE: 050023
REVISION DATE: 03/09/19

PROTECTION BOARD 300

Lightweight Protection Board

DESCRIPTION

PROTECTION BOARD 300 is a 2mm thick fluted polypropylene board which is designed to protect waterproof and gasproof membranes from the risk of puncture.

Property	Value
Length	2.4 M
Width	1.2 M
Thickness	2 mm

USES

PROTECTION BOARD 300 may be installed on top of waterproof and gas resistant membranes to protect from the risk of puncture during the construction face. It may also be used for the protection of membranes during back fill.

ADVANTAGES

- Rapid and easy installation.
- Flexible and easily cut.
- Water resistant.
- Cost effective.

PROCEDURE

Application: If the PROTECTION BOARD 300 is to be installed directly against vertically applied membrane, then it should be adhered to the membrane using PREMCRETE DOUBLE SIDED TAPE. Joints should be tapped with a suitable high adhesion tape to prevent displacement during back field. Where PROTECTION BOARD 600 is to be installed on horizontally applied membranes to protect from damage during steel fixing and the construction face, then the board should be loose laid on top of the installed membrane and the joints should be taped to prevent displacement during concrete placement.

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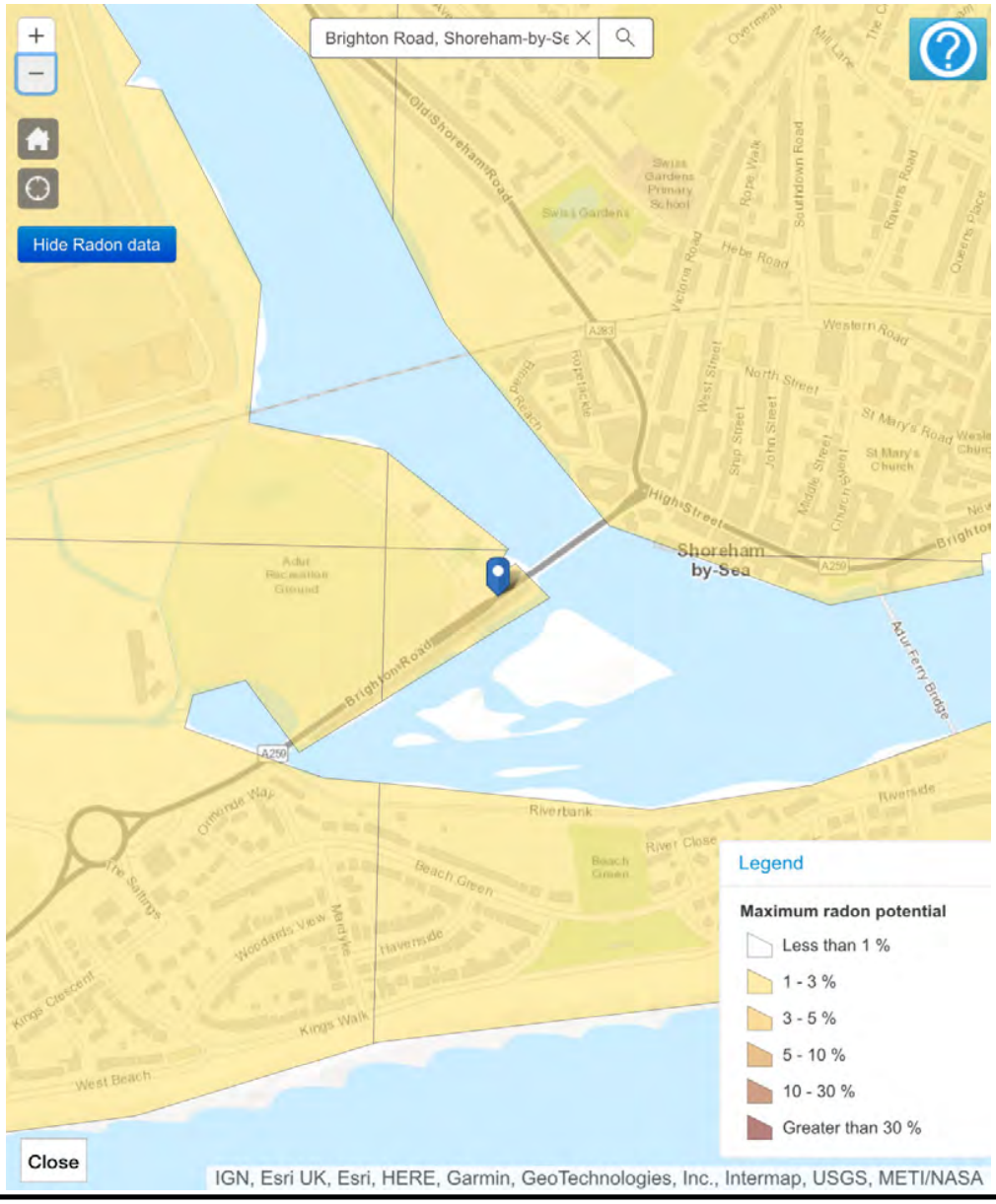
Title Reference & Description:

FIS Premcrete Protection Board 300 Technical Data Sheet

GeoShield Verification Plan

RADON MAPS UK - (Map 1) Site Location



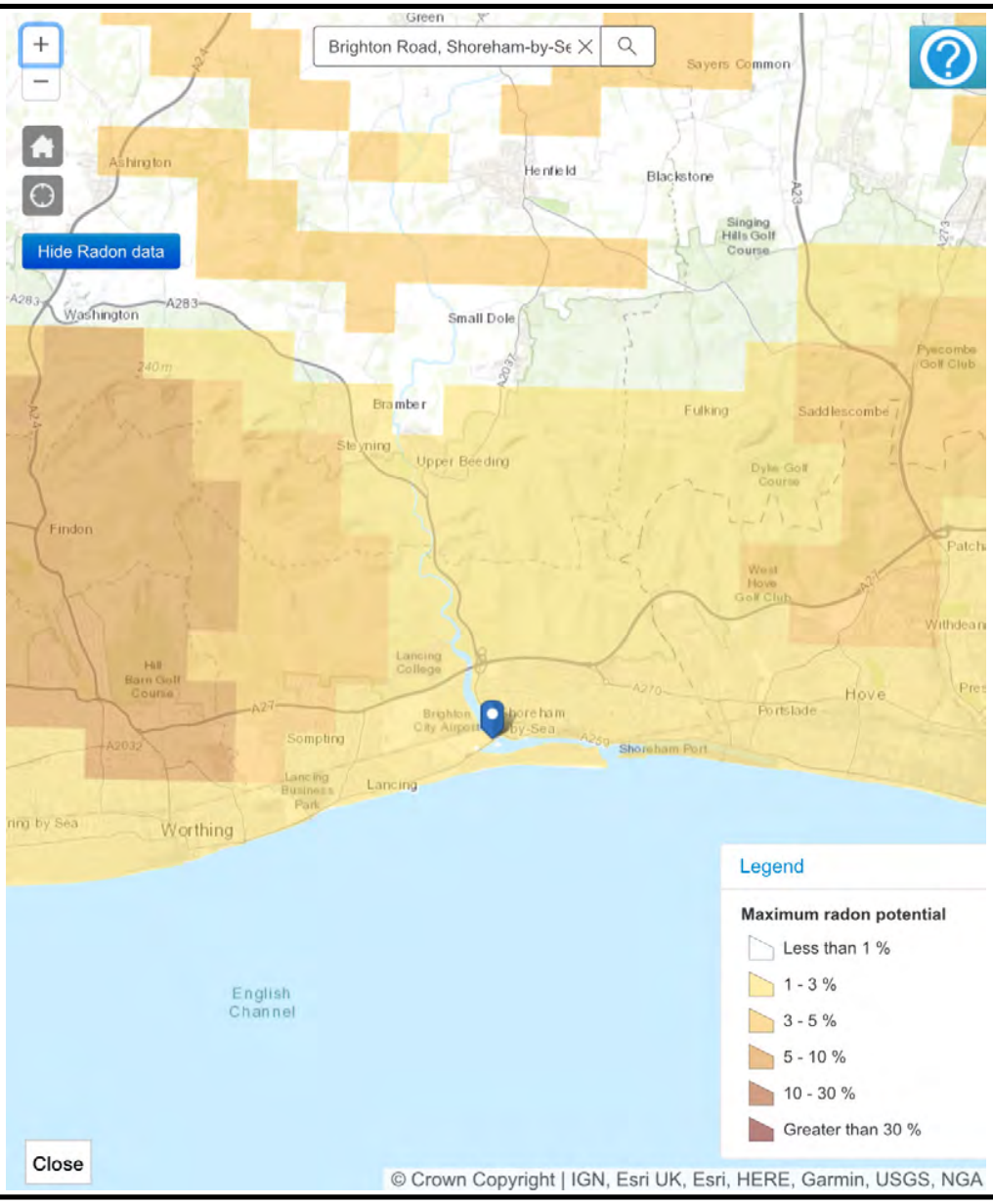
Maximum Radon Potential: 1-3%

Description: No Radon protection measures are required.

Postcode: BN43 5

GeoShield Verification Plan

RADON MAPS UK - (Map 2) Nearby Location



Maximum Radon Potential:	1-3%
Description:	No Radon protection measures are required.

GeoShield Verification Plan

CLIENT DETAILS

CLIENT CONTACT:	Dominic McNulty
CONTACTS ROLE:	
MOBILE PHONE:	07583 723 660
EMAIL ADDRESS:	info@kelmacwaterproofing.com

CLIENT CONTACT:	
CONTACTS ROLE:	
MOBILE PHONE:	
EMAIL ADDRESS	
NOTES:	

GeoShield Verification Plan

APPLICATOR'S DETAILS

APPLICATOR NAME:	
COMPANY:	Kelmac Waterproofing
APPLICATOR TEL:	
APPLICATOR EMAIL:	

APPLICATOR NAME:	
COMPANY:	
APPLICATOR TEL:	
APPLICATOR EMAIL:	

NOTES: The name of the installers are unknown at this point so the installers will either be identified at the pre-verification meeting or the first site visit.

GeoShield Verification Plan

HEALTH AND SAFETY

INDUCTION:	YES		NO:	✔
INDUCTION TIME:				

CSCS CARD:	YES	✔	NO:	
CSCS CARD NUMBER:	13466546			

METHOD STATEMENT:	YES	✔	NO:	
RISK ASSESSMENT:	YES	✔	NO:	
COSHH:	YES	✔	NO:	

SITE SPECIFIC HAZARDS: Materials falling from height

Slips, trips and falls

Excavations

Confined spaces

Plant

GeoShield Verification Plan

APPLICATOR'S DETAILS

TRAINING LEVEL:

SPECIALIST CONTRACTOR:	YES	✔	NO	
NVQ LEVEL 2:	YES		NO	✔
NVQ LEVEL 4:	YES		NO	✔
COMPETENT APPLICATOR :	YES	✔	NO	

REASON FOR VISIT:

DURING INSTALLATION:	✔	UNDERSLAB VENTILATION	
PRE - POUR:	✔	DPC MEMBRANE CONNECTION	✔
TESTING:	✔	OTHER (PLEASE SPECIFY):	✔

NOTES: See method statement for breakdown of site visits.

NOTES: it will be deemed that these waterproofing specialists from Kelmac are at an appropriate skill level for the job of installing the ground gas protection measures.

GAS REGIME

In accordance with guidance from CIRIA 735 and BS8485:2019:		In accordance with the NHBC Traffic Light System:	
CS2	✔	Green	
CS3		AMBER 1	
CS4		AMBER 2	
CS5 or above		RED	
VOC			

Radon gas protection measures specify to the guidance from the BR 211 document:

RADON BASIC		RADON FULL	

Building Type:	TYPE B
POINTS REQUIRED UNDER BS8485:2019	3.5 POINTS

POINTS GAINED FROM BS8485:2019

Score for Structural Barrier:	1.5 POINTS
Grade 2 Basement:	N/A
Grade 3 Basement:	N/A
Score for Venting:	0 POINTS
Car Park:	N/A
Score for Membrane:	2.0 POINTS
POINTS ACHIEVED UNDER BS8485 2019:	3.5 POINTS

GeoShield Verification Plan

TESTING PROCEDURES

VISUAL: PICK & PROBE/MECHANICAL POINT STRESS TEST:	✔
NON-DESTRUCTIVE COMPRESSED AIR LANCE TEST:	✔
NON-DESTRUCTIVE SMOKE TEST:	
DESTRUCTIVE JOINT TESTING:	
NON-DESTRUCTIVE TRACER GAS TESTING:	
DIELECTRIC POROSITY TEST:	
PUMP TEST FOR "Twinny" WELD	

NOTES: From the risk assessment GeoShield will initially conduct a visual

NOTES: and pick and probe testing regime for this project.

NOTES: Air lance testing with be conducted to test the installed membrane in

NOTES: accordance with CIRIA 735.

NOTES:

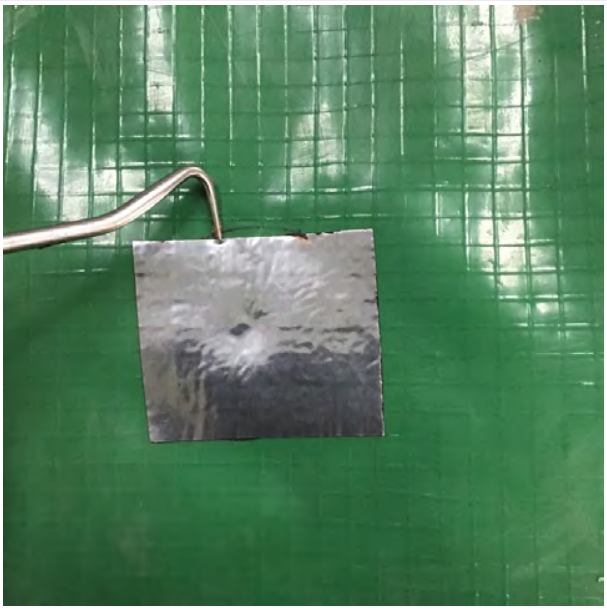
NOTES: Only if the application falls below the accepted standard will other testing

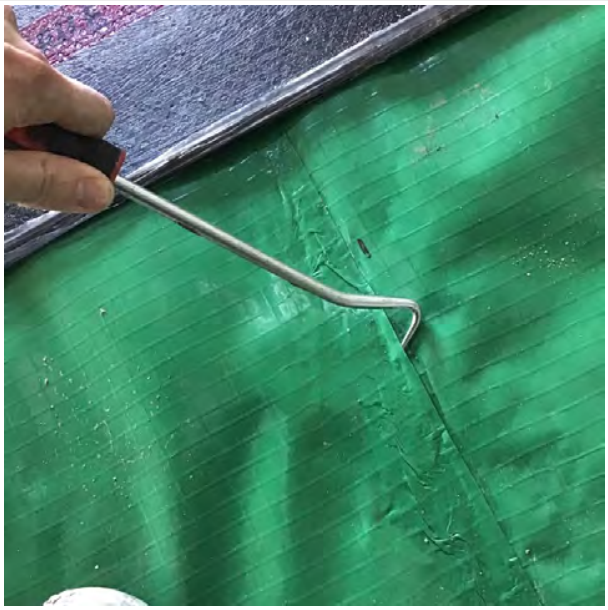
NOTES: be used.

GeoShield Verification Plan

SPECIFICATION

Mechanical Point Stress/ ‘Pick and Probe’ Testing





CIRIA 735

4.3.2 - Mechanical point stress tests involve running a blunt instrument (e.g. a screwdriver) along the edge of a seam to identify any unbonded seams. This method is not as effective as air lancing but it can be especially useful in hard to reach areas where it is not possible to air lance.

The instrument used should not puncture the gas membrane. This method is less appropriate for materials that are easily punctured where an air lance test is more suitable (although if a gas membrane can be easily punctured its suitability as a membrane is open to question).

GeoShield Verification Plan

SPECIFICATION

Air Lance Testing





CIRIA 735

4.3.3 - Air lance testing identifies unbonded areas of seam by directing a high pressure jet of air at the seam. The air is at a minimum pressure of 345kPa via a 4.8mm nozzle and is located no more than 50mm from the seam being tested.

In order to achieve the requirements of ASTM D4437-08:2013 bespoke specialist equipment is required to maintain the required pressure.

GeoShield Verification Plan

RISK ASSESSMENT

SITE SPECIFIC CIRCUMSTANCES	1	2	3	4	5
Complexity of Design			✔		
Repetition of Design		✔			
Experience of Workforce	✔				
Gas Regime	✔				
Project Management Experience	✔				
Installation Conditions (exposed?)		✔			
Robust Project Specific Gas Design	✔				

TYPE OF RISK	RANGE	RISK
High Risk	23 - 30	
Medium High Risk	19 - 22	
Medium Risk	15 - 18	18
Medium Low Risk	11 - 14	
Low Risk	0 - 10	

GeoShield have classed this project as a medium risk.

GeoShield will lay all parameters down for standards at the pre-verification meeting to

assist both the installer and the main contractor.

GeoShield Verification Plan

VERIFICATION REPORT

These items will be included in the report

NUMBER 1	GAS MEMBRANE SPECIFICATION
NUMBER 2	ELEMENTS OF THE GAS MEMBRANE
NUMBER 3	DATE, TIME and WEATHER CONDITIONS
NUMBER 4	PLANS and DETAILS ISSUED
NUMBER 5	INSTALLATION PHOTOS RELATING TO GRID LINES
NUMBER 6	REPORTING DEFECTS AND LOGGING IN REMEDIATION LOG
NUMBER 7	AREAS OF LIMITATION (areas unable to inspect)
NUMBER 8	LOGGING AND REPORTING RESULTS OF TESTING

VERIFICATION REPORT ISSUE

HARD COPY:	YES	✔	NO		EMAIL:	YES	✔	NO	
DROP BOX LINK:	YES	✔	NO		FLASH DRIVE:	YES		NO	✔

GeoShield Verification Plan

GEOSHIELD COMPETENCE

>GeoShield was founded in 2015.

>GeoShield solely verifies, they are fully independent of installers, manufacturers and geotechnical companies.

>GeoShield follow guidance in CIRIA 735 (sufficient experience, membership of relevant professional organisations). GeoShield are members of the BVC, BGA, ERA, The RADON Council, and UKRA.

>Currently GeoShield hold the Chairmanship of the British Verification Council.

>Two employees are NSAC Level 3 Assessors for the NVQ 2 Gas Membrane install.

>GeoShield were key in forming the NVQ 4 Verification qualification in which 2 Verification Officers are undertaking this qualification.

>GeoShield have the only qualified Assessor for the NVQ 4 Verification qualification.

>GeoShield Verification officers currently keep up to date CPDs.

>All GeoShield Verification Officers have a full understanding of gas membrane install, including 3 experienced (NVQ 2) Installers in the GeoShield team.

>GeoShield Verification Officers are all independent carrying their own air compressors. Other testing equipment GeoShield have access to are 2 x Buckley Dielectric Testing machines and also inert gas testing equipment.

GeoShield Verification Plan

VERIFICATION PLAN

METHOD STATEMENT	
EXPECTED VISITS:-	10 site visits are deemed necessary for verification, however
extra visits may be considered for potential remediations before sign off.	
TESTING:-	Mechanical Point Stress (Pick & Probe) testing on taped areas.
Air lance testing will be conducted where access allows for use of equipment.	
PURPOSE:-	Geoshield are 3rd party gas membrane verifiers and in order for this
project to be compliant with BS8485:2019 and in accordance with CIRIA 735,	
this project will NOT achieve sign off for gas membrane installation unless	
independent verification is carried out.	
REPORTING:-	Each site visit be accompanied with a written and electronic report.
Any remediations either completed on the visit or outstanding for a later date will	
be recorded and logged, sign off will not be achieved for each section area until	
all remediations has been completed. This will be fully recorded at all times.	

GeoShield Verification Plan

VERIFICATION PLAN

METHOD STATEMENT	
GROUND GAS RISK:-	From detail design drawings this project has been classified as a Type B building and a CS2 rating in accordance with BS8485:2019. This will require to mitigate a minimum score of 3.5 points. This will be achieved by 3rd party verification, slab or ground type and ventilation provision. A combination of which will achieve the necessary requirements.
GAS MEMBRANE PROTECTION:-	It is essential that upon satisfactory install of gas membrane and after verification work is completed. In addition warning labels will be issued by Geoshield to advise on the need to restrict access to the installed area by follow on trades and their due diligence. This will help to reduce potential damage caused. This is essential before the final slab or screed is poured over the membrane.
FINAL:-	Geoshield will liaise with the projects site supervision and all relevant parties prior to the installation start. This plan will be presented and reviewed, all points made clear as previously stated. Any alterations will be listed at the end of this plan as an all party agreed way forward.

GeoShield Verification Plan

VERIFICATION PLAN

METHOD STATEMENT

VERIFICATION STRATEGY:

Percentage Strategy:	1st 10 Plots (100%), 11-50 Plots (1:5) & 51 or > (1:10)	
Percentage Strategy:	100% Verification for VOC/Hydrocarbons	
Verification Percentage on site:	100%	Not Specified

Remarks: Block G1 & G2 - 2 Nr Lift Pit, 3 Nr horizontal membrane & 2 Nr perimeter detailing

Block H - 1 Nr Lift Pit, 1Nr horizontal mentioned & 1 Nr perimeter detailing

It is recommended that the installers are present at the time of testing so any remediations can be rectified. If remediations are not rectified the nature of the faults found will determine whether or not extra visits are required to test remediations.

Protection Type:-	Protection Board	✔	Protection Fleece	
Insulation		Remarks:	FIS Protection Board 300	

GeoShield Verification Plan

SUBSTRATE METHOD STATEMENT

SUBSTRATE TYPE:

Block and Beam Construction	Yes		No	✔			
Minimum Preparation	Swept Clear	Yes		No			
Minimum Preparation	Vacuuming	Yes		No			
Minimum Preparation	Compressed air to remove	Yes		No			
Minimum Preparation	Remove Mortar Droppings	Yes		No			
Stone Substrate	Yes		No	✔			
Minimum Preparation	Minimum 25mm Sand Blinding	Yes		No			
Minimum Preparation	Limestone Dust	Yes		No			
Minimum Preparation	Compacted Substrate	Yes		No			
Minimum Preparation	No large stones	Yes		No			
Concrete Substrate	Yes	✔	No				
Minimum Preparation	No Hollows	Yes	✔	No			
Minimum Preparation	Troweled Surface	Yes	✔	No			
Remarks:	A reinforced cast in-situ monolithic ground bearing concrete slab						
with minimal penetrations.							

GeoShield Verification Plan

PRE-CONTRACT MEETING

Items for discussion at the Pre-Contract meeting:-	
>Induction Procedure	
>Identification of Installation team and point of contact	
>Identification of Project Management team	
>Identification of Sub-Contractors associated with membrane installation	
>Validation of Membrane and Design Specification	
>Verification Procedure	
>Notifications for Verification	
>Preparation of Substrate	
>Program of Works	
>Utility Entry	
>Protection of Membrane	
>Remediation Procedure	
>Testing Procedures	
>Sign off Procedure	
>Installer PI	

All information is assumed correct at time of issue.

DATE:	

GeoShield Verification Plan

ON-SITE SUMMARY RISK ASSESSMENT

BS8485 Building Type		1		2		3		4	5
Profile of Project (school, warehouse)		1		2		3		4	5
Past History of Contractor		1		2		3		4	5
Past History of the Installer		1		2		3		4	5
Installers hold NVQ 2		1		2		3		4	5
Specific Gas Design		1		2		3		4	5
Design conforms to BS8485		1		2		3		4	5
Materials conform to BS8485		1		2		3		4	5
Verification follows CIRIA 735		1		2		3		4	5
BS8485 Gas Classification		1		2		3		4	5
VOC		1		2		3		4	5
Complexity of Design		1		2		3		4	5
Repitition of Design		1		2		3		4	5
Installation Environment		1		2		3		4	5
Substrate Design		1		2		3		4	5
Membrane Protection		1		2		3		4	5

Low Risk		Low - Medium	
Medium		Medium - High	
High			

GeoShield Verification Plan

PRE-CONTRACT MEETING SUMMARY

As discussed in this Pre Verification Plan, the installation and verification of the FIS products. All details and drawings in this verification plan have been discussed so now the installers must run through how they will install the FIS products. The intended method and manufacturers specification have been discussed in relation to the details provided for the project. Methods for preparation before installation have been laid out so the workers are made aware of the standards required to gain consent from the local authorities in order to satisfy and discharge planning consent. In addition to this aftercare of the FIS products such as the Hydroprufe 9000, 8000, DPC Combi-Seal, Hydroprufe Tapes during, after installation, and after verification.

Finally GeoShield have discussed the site visits that are required and what testing and verification will be carried out to the highest standard and verification principles associated with CIRIA 735 and BS8485:2015 + A1 2019.

GeoShield Verification Plan

PRE-CONTRACT MEETING SUMMARY

A proforma quality assurance document will be discussed during the Pre-Verification meeting and training undertaken with the management team for non verified areas.

The Pre-Verification meeting will be led by Geoshield and should include all relevant parties who have an impact on the installation and future protection. Geoshield will provide guidance and strategy for all parties.

The site specific checklist will be covered as well as the risk assessment.

This site has been classified as a CS2 gas regime rating.

Any design alterations will be discussed and included in a revised Pre-Verification Plan.

Any specification changes must also be included in a revised Pre-Verification Plan.

All items will be minuted by the Geoshield representative.

This Pre-Verification plan follows all current guidance and the aim is to make all parties aware of the ramifications of poor installation and their responsibilities if they damage the membrane.

GEOSHIELD Verification Report

PROJECT REFERENCE:	GEO102445
REPORT NUMBER:	001
PROJECT:	Free Wharf - Blocks G1, G2 & H
PROJECT ADDRESS:	Brighton Road

Shoreham-By-Sea

BN43 5ZE

MEMBRANE SPECIFICATION:	Verified in accordance CIRIA 735.

Design in accordance with BS8485 2015 + 2019 for Methane and Carbon Dioxide.

Substrate prepared in-accordance with manufactures instructions and BS8485:2019.

FIS Hydroprufe 9000, FIS Hydroprufe 8000

FIS Hydroprufe DPC, FIS Hydroprufe LG

FIS Detail Tape, FIS Hydroseal FX

FIS Combi-Seal Tape, HCR Butyl Tape, FIS HCR Girth Tape

FIS Protection Board 300

GEOSHIELD Verification Report

MEMBRANE SPECIFICATION:

DESIGN DETAILS:

31149 Sep 2012 Combined Report compressed

> Site has been classified as a CS2 gas regime rating

> 5.3 - Results of the Gas Monitoring

3117-ACA-ZZ-00-DR-A-1101 (Rev 1)

3117-ACA-H-00-DR-A-1121 Block H L00 General Arrangement (rev 1)

3117-ACA-G-00-DR-A-1111 Block G L00 General Arrangement (rev 1)

J2515-GA-001 (3)

J2515-TD-001 (2)

J2515-TD-002

J2515-TD-003 (2)

FIS Material Specification Technical Data Sheets

Radon Maps UK - (Map 1) Site Location & (Map 2) Nearby Location

GEOSHIELD Verification Report

VERIFICATION OFFICER: James Hall

VERIFICATION COMPANY: GeoShield Limited

Icon Business Park, 4100 Park Approach

Thorpe Park, LEEDS

West Yorkshire

LS15 8GB

CONTACT NUMBER: 07795 994117

EMAIL ADDRESS: jhall@geoshield.co.uk

ORDER NUMBER:

PER VISIT: YES: ☐ NO: ☑ PROJECT: YES: ☑ NO: ☐

GEOSHIELD Verification Report

CLIENT DETAILS

CLIENT CONTACT:	Dominic McNulty
CONTACTS ROLE:	
MOBILE PHONE:	07583 723 660
EMAIL ADDRESS:	info@kelmacwaterproofing.com

CLIENT CONTACT:	
CONTACTS ROLE:	
MOBILE PHONE:	
EMAIL ADDRESS	
NOTES:	
NOTES:	
NOTES:	

GEOSHIELD Verification Report

APPLICATION TEAM LEADERS

APPLICATOR NAME:	Dominic McNulty
COMPANY:	Kelmac Waterproofing
APPLICATOR TEL:	07583 723 660
APPLICATOR EMAIL:	

APPLICATOR NAME:	
COMPANY:	Kelmac Waterproofing
APPLICATOR TEL:	
APPLICATOR EMAIL:	

NOTES:	It will be deemed that these waterproofing specialists from Kelmac are at
NOTES:	an appropriate skill level for the job of installing the ground gas protection
NOTES:	measures.
NOTES:	

GEOSHIELD Verification Report

AREA SURVEYED: Block G1-G2 & Block H, Perimeter & Internal DPC

SITE CONDITIONS:

WEATHER: Overcast

TEMPERATURE: 18c

MEMBRANE TEMPERATURE: N/A

RELATIVE HUMIDITY: N/A

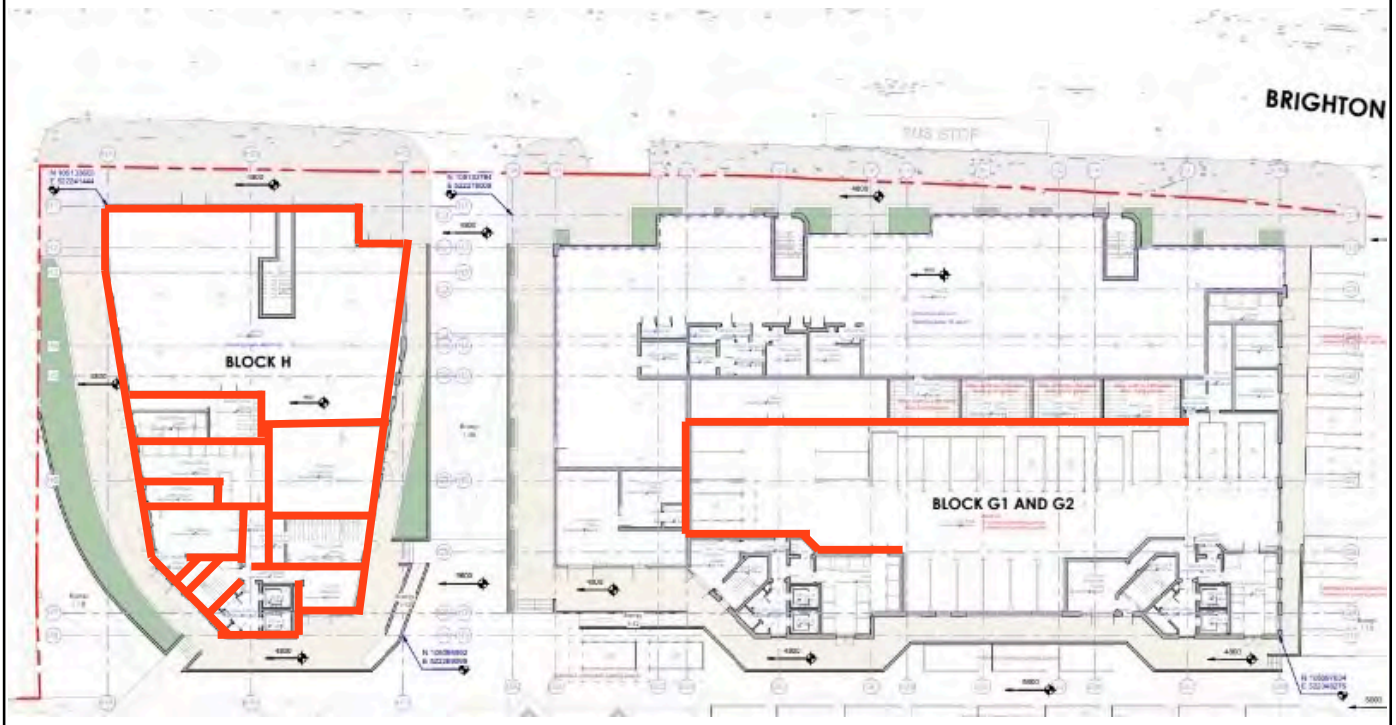
TIME: 09:45-11:45 REPORT NUMBER: 001

DATE: 09/06/2022

ACCOMPANIED Dominic McNulty@Kelmac Waterproofing

GEOSHIELD Verification Report

VERIFICATION LAYOUT



This photograph above displays the site layout and where today's

installation and verification visit was conducted are the areas

highlighted in red.

GEOSHIELD Verification Report

OVERVIEW PHOTOGRAPHS



The photograph above displays the overview photo of where today's

installation and verification inspection took place.

Block G1-G2 Perimeter DPC Car Park Elevation.

GEOSHIELD Verification Report

OVERVIEW PHOTOGRAPHS



This photograph above shows the overview perspective

of where the installation and verification was required.

Block H Perimeter DPC.

GEOSHIELD Verification Report

VERIFICATION ITEM ONE

LOCATION/GRID LINE: Block G1-G2 & Block H.

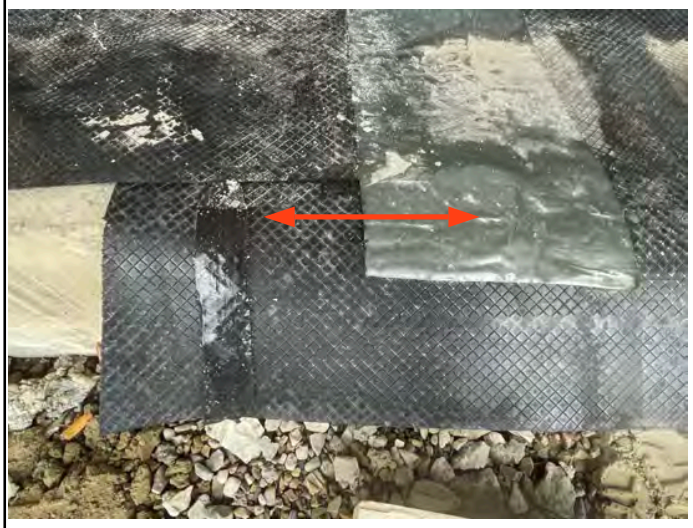
NOTES: Installation of Hydroprufe DPC-

Today's visit to Free Wharf was to inspect two areas were KelmacWaterproofing have

successfully installed FIS Hydroprufe DPC to Block H perimeter & internal walls and have

installed FIS Hydroprufe DPC to Block G1-G2 Perimeter car pack elevation, this is shown





in the photograph above left. All laps between adjacent sheets of DPC were tape jointed

using HCR butyl tape & HCR Girth Tape to ensure the continuous seal shown above right.

GEOSHIELD Verification Report

VERIFICATION ITEM ONE



This photograph above is displaying a mechanical point stress test, also known as the pick & probe test, being conducted upon a successfully sealed dual taped lap joint between the adjacent sheets of FIS Hydroprufe DPC. This testing process was carried out across all lap joints with no faults identified. Verified in accordance with CIRIA 735.

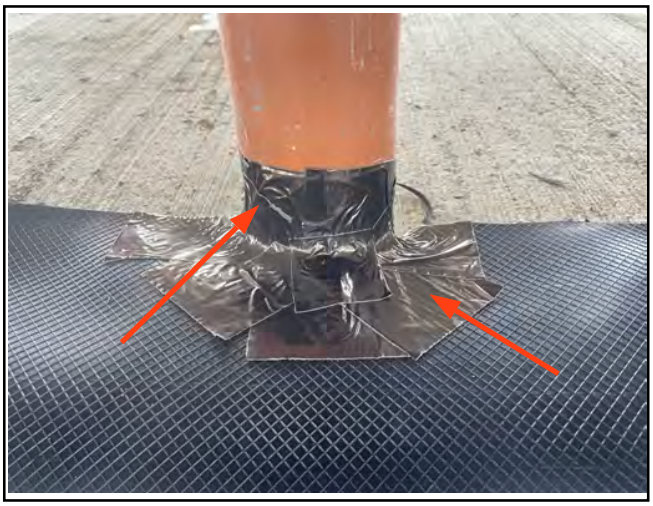
GEOSHIELD Verification Report

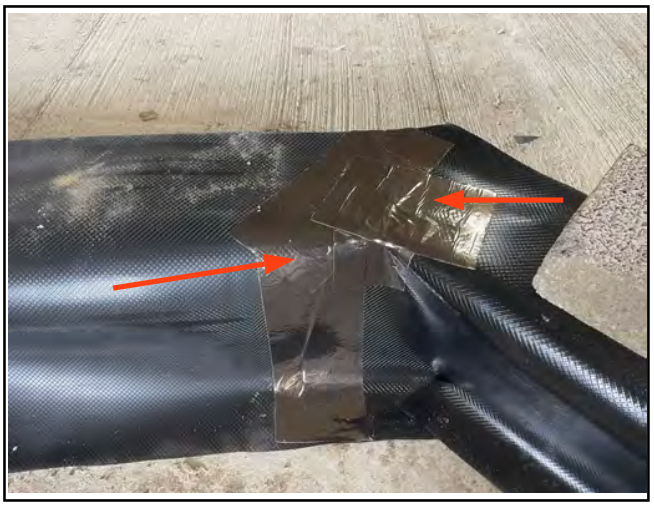
VERIFICATION ITEM TWO

LOCATION/GRID LINE: Block G1-G2 & Block H

NOTES: Sealed detailings-

During today's inspection visit there was a number of corner and pipe penetrations that required sealing as per design drawings and FIS manufacturers specifications and was achieved throughout. The photograph below on the left displays a sufficiently sealed





pipe penetration with the perimeter installation, that was sealed using patches of HCR Girth Tape to create the continuous seal between adjacent membranes. The photograph above the right shows successfully sealed corner detailing using 150mm strips of HCR Girth Tape, as well as to create the top hat detailing, with the adequate heat applied to ensure the continuous seal. Installed to manufacturers specifications.

GEOSHIELD Verification Report

VERIFICATION ITEM TWO



The photograph above displays the mechanical point stress test, better known as the Pick and Probe test, being carried out to a successfully sealed corner detailing within the perimeter DPC installation. During the thorough visual pick & probe testing process no faults or defects were identified. Tested & verified in accordance with CIRIA 735.

GEOSHIELD Verification Report

VERIFICATION ITEM THREE

LOCATION/GRID LINE: Block G1-G2 & Block H

NOTES: Column detailing-

Throughout the verification inspection there were numerous concrete columns that required sealing. Kelmac Waterproofing have sufficiently applied Hydroprufe LG to each concrete column adhering to the design drawings from FIS by applying the LG to a





minimum of 200mm up the face of each column shown in the photograph above left.

The photo above right displays the sealing of a concrete column detailing; this was achieved by cutting Hydroprufe DPC tightly around each and using HCR Girth Tape to ensure the continuous seal with heat and roller pressure applied throughout.

GEOSHIELD Verification Report

VERIFICATION ITEM THREE



This photograph above displays the mechanical point stress test being conducted

upon a successfully sealed concrete column detailing, known as the pick & probe.

The adherence between the adjacent membranes used have ensured the complete

continuous seal was achieved. No faults and verified in accordance with CIRIA 735.

GEOSHIELD Verification Report

ADDITIONAL PHOTOGRAPHS



This photograph displays the

FIS Hydroprufe LG.



The photograph above displays the

FIS Hydroprufe DPC.



This photo shows the HCR Butyl Tape

used to seal all detailings.

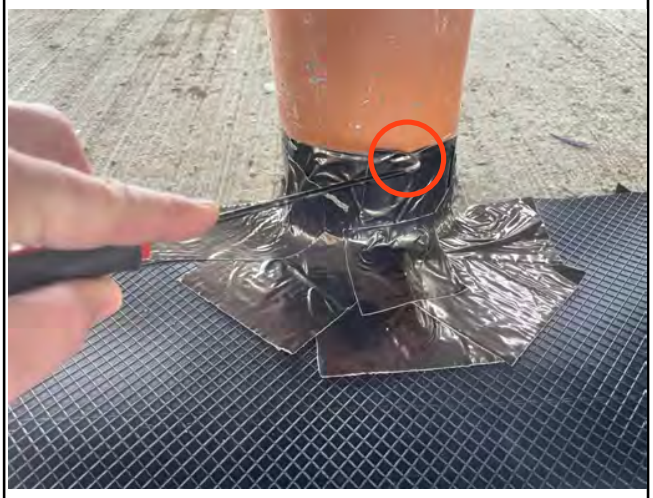


Kelmac are storing all materials

in a container away from the elements.

GEOSHIELD Verification Report

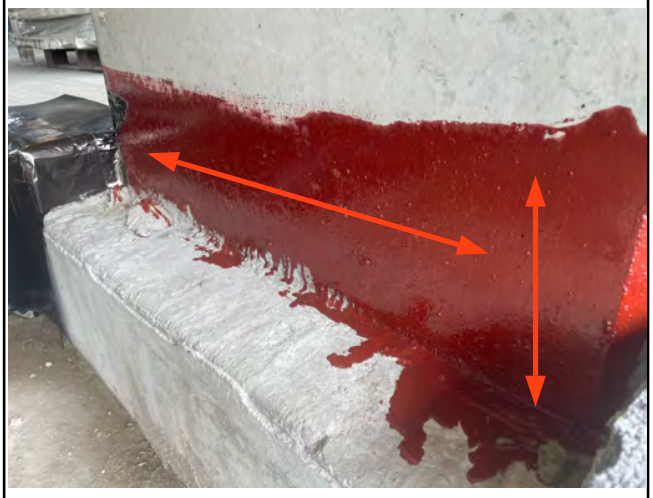
ADDITIONAL PHOTOGRAPHS



Pick and Probe test carried out upon a successfully sealed pipe penetration.



Sufficiently sealed corner detailing with pick and probe, no faults identified.



This shows Hydroprufe LG has been applied to all concrete columns.



Pick and Probe test conducted to a sealed column detailing. No faults.

GEOSHIELD Verification Report

ADDITIONAL PHOTOGRAPHS



An additional overview of perimeter DPC block G1-G2 car park elevation.



Internal walls to block H lined with FIS Hydroprufe DPC.



Pick & probe test conducted upon a sealed column, No faults identified.



Perimeter DPC Block H West Elevation.

GEOSHIELD Verification Report

REMEDIATION LOG

Date	Nr	Remediation Description	Y/N
09/06/2022	001	No faults or defects identified during today's inspection visit.	✔

GEOSHIELD Verification Report

GAS MEMBRANE TESTING

VISUAL:	YES	✔	NO		SMOKE TEST:	YES		NO	✔
COMPRESSED AIR:	YES		NO	✔	DIELECTRIC	YES		NO	✔
DESTRUCTIVE:	YES		NO	✔	OTHER:	YES	✔	NO	

Testing checklist attached: YES NO

Gridline/Plot Sign off

Gridline/Plot Sign off	Block H Perimeter & Internal Walls DPC.	✔
Gridline/Plot Sign off	Block G1-G2 Perimeter DPC to Car Park Elevation.	✔
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		

GEOSHIELD Verification Report

GAS MEMBRANE LAP TESTING

LAP I.D	WELDED/TAPED	TEST UNDERTAKEN	PASSED
1	Taped	Pick&Probe	Y
2	Taped	Pick&Probe	Y
3	Taped	Pick&Probe	Y
4	Taped	Pick&Probe	Y
5	Taped	Pick&Probe	Y
6	Taped	Pick&Probe	Y
7	Taped	Pick&Probe	Y
8	Taped	Pick&Probe	Y
9	Taped	Pick&Probe	Y
10	Taped	Pick&Probe	Y
11	Taped	Pick&Probe	Y
12	Taped	Pick&Probe	Y

GEOSHIELD Verification Report

VERIFICATION SUMMARY

Today's verification visit to Free Wharf, Shoreham was the first inspection that was required onsite. This is where Kelmac Waterproofing are the specialist installers and carrying out the installation, the installers have successfully lined the perimeter and internal walls of Block H & lined Block G1-G2 Perimeter DPC to Car Park Elevation using Hydroprufe DPC. All laps between adjacent sheets were dual taped jointed with HCR Butyl Tape & HCR Girth Tape. Throughout the two Blocks all concrete columns had received a coat of Hydroprufe LG 200mm up from the floor. Detailings within the installation were sealed using HCR Girth Tape. This has all been installed to FIS drawings & manufacturers specifications, a thorough visual pick & probe was conducted with no evidence of faults. Verified in accordance with CIRIA 735.

GEOSHIELD SIGNATURE:



DATE:	09/06/2022

GEOSHIELD Verification Report

PROJECT REFERENCE:	GEO102445
REPORT NUMBER:	002
PROJECT:	Free Wharf - Blocks G1, G2 & H
PROJECT ADDRESS:	Brighton Road

Shoreham-By-Sea

BN43 5ZE

MEMBRANE SPECIFICATION:	Verified in accordance CIRIA 735.

Design in accordance with BS8485 2015 + 2019 for Methane and Carbon Dioxide.

Substrate prepared in-accordance with manufactures instructions and BS8485:2019.

FIS Hydroprufe 9000, FIS Hydroprufe 8000

FIS Hydroprufe DPC, FIS Hydroprufe LG

FIS Detail Tape, FIS Hydroseal FX

FIS Combi-Seal Tape, HCR Butyl Tape, FIS HCR Girth Tape

FIS Protection Board 300

GEOSHIELD Verification Report

MEMBRANE SPECIFICATION:

DESIGN DETAILS:

31149 Sep 2012 Combined Report compressed

> Site has been classified as a CS2 gas regime rating

> 5.3 - Results of the Gas Monitoring

3117-ACA-ZZ-00-DR-A-1101 (Rev 1)

3117-ACA-H-00-DR-A-1121 Block H L00 General Arrangement (rev 1)

3117-ACA-G-00-DR-A-1111 Block G L00 General Arrangement (rev 1)

J2515-GA-001 (3)

J2515-TD-001 (2)

J2515-TD-002

J2515-TD-003 (2)

FIS Material Specification Technical Data Sheets

Radon Maps UK - (Map 1) Site Location & (Map 2) Nearby Location

GEOSHIELD Verification Report

VERIFICATION OFFICER: John Cornish

VERIFICATION COMPANY: GeoShield Limited

Icon Business Park, 4100 Park Approach

Thorpe Park, LEEDS

West Yorkshire

LS15 8GB

CONTACT NUMBER: 07493 769477

EMAIL ADDRESS: jhall@geoshield.co.uk

ORDER NUMBER:

PER VISIT: YES: ☐ NO: ☑ PROJECT: YES: ☑ NO: ☐

GEOSHIELD Verification Report

CLIENT DETAILS

CLIENT CONTACT:	Dominic McNulty
CONTACTS ROLE:	
MOBILE PHONE:	07583 723 660
EMAIL ADDRESS:	info@kelmacwaterproofing.com

CLIENT CONTACT:	
CONTACTS ROLE:	
MOBILE PHONE:	
EMAIL ADDRESS	
NOTES:	
NOTES:	
NOTES:	

GEOSHIELD Verification Report

APPLICATION TEAM LEADERS

APPLICATOR NAME:	Dominic McNulty
COMPANY:	Kelmac Waterproofing
APPLICATOR TEL:	07583 723 660
APPLICATOR EMAIL:	

APPLICATOR NAME:	
COMPANY:	Kelmac Waterproofing
APPLICATOR TEL:	
APPLICATOR EMAIL:	

NOTES:	It will be deemed that these waterproofing specialists from Kelmac are at
NOTES:	an appropriate skill level for the job of installing the ground gas protection
NOTES:	measures.
NOTES:	

GEOSHIELD Verification Report

AREA SURVEYED: Block G1-G2 & Block H, Perimeter & Internal DPC

Block G1-G2 & Block H - Lift Pits.

SITE CONDITIONS:

WEATHER: Sunny

TEMPERATURE: 23c.

MEMBRANE TEMPERATURE: N/A

RELATIVE HUMIDITY: N/A

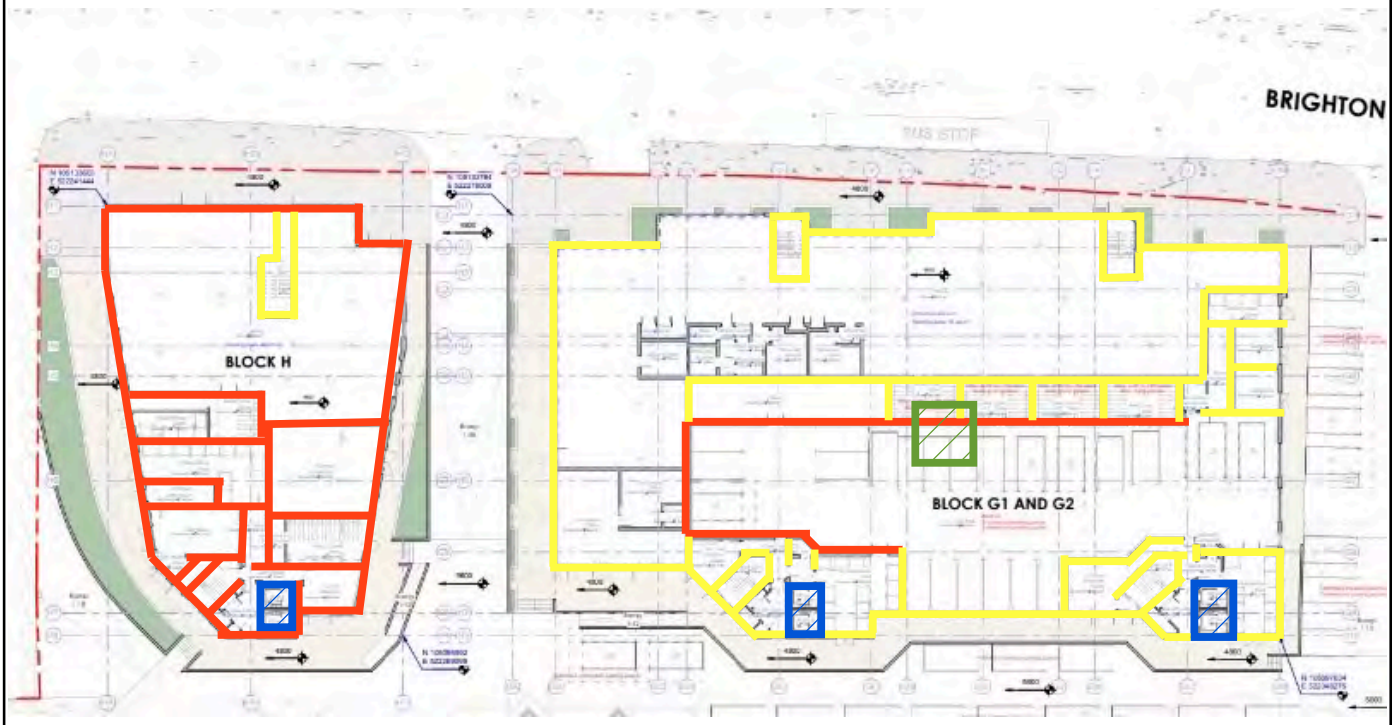
TIME: 10:00-12:00 REPORT NUMBER: 002

DATE: 21/07/2022

ACCOMPANIED Dominic McNulty@Kelmac Waterproofing

GEOSHIELD Verification Report

VERIFICATION LAYOUT



The lift pits highlighted in blue and perimeter/internal walls highlighted in yellow

shows where verification took place during this visit. Some of the internal/perimeter

walls of G1 and G2 + the crane base highlighted in green required further installation.

GEOSHIELD Verification Report

OVERVIEW PHOTOGRAPHS



The photograph above shows an example of sealed lift pits which have

been sealed and signed off during this visit.

GEOSHIELD Verification Report

OVERVIEW PHOTOGRAPHS



The photograph above shows an overview of a section of the perimeters where

the installers have installed the FIS Hydroprufe DPC.

GEOSHIELD Verification Report

VERIFICATION ITEM ONE

LOCATION/GRID LINE: Block G1-G2 & Block H, Perimeter & Internal DPC

NOTES: Installation of the FIS Hydroprufe DPC.

The first photograph below shows an overview of the FIS Hydroprufe DPC which has been installed to the perimeters/internal walls. The second photograph below shows an example of a sealed lap.





A pick and probe test carried out to a sealed lap of the FIS Hydroprufe DPC. A strong seal has been achieved. Verified in accordance with CIRIA 735.

GEOSHIELD Verification Report

VERIFICATION ITEM TWO

LOCATION/GRID LINE: Block G1-G2 & Block H, Perimeter & Internal DPC

NOTES: Columns sealed.

The first photograph below shows an example of a column which has been sealed to the FIS Hydroprufe DPC. The installers have first applied a coat of the Hyrdroprufe LG to each column.





Next the installers have sealed the column to the FIS Hydroprufe DPC using strips of the 150mm HCR girth tape. The installers have applied heat to the tape to ensure a sufficient seal has been achieved. The second photograph above shows a pick and probe test carried out to the seal achieved. All except one column have been sealed correctly. Verified in accordance with CIRIA 735.

GEOSHIELD Verification Report

VERIFICATION ITEM TWO



The photograph above shows a pick and probe test carried out to an internal column.

A strong seal has been achieved.

Verified in accordance with CIRIA 735.

GEOSHIELD Verification Report

VERIFICATION ITEM THREE

LOCATION/GRID LINE: Block G1-G2 & Block H - Lift Pits.

NOTES: Lift pits sealed.

The first photograph below shows the FIS Hydroseal FX which has been applied to each of the lift pits first. This is as per the FIS lift pit detail. The installers have applied a sufficient layer of the FX.





The lift pit base and walls have been completely sealed up to the floor level and no areas of concrete can be seen through the FX. The installers have then allowed the Hydroseal FX to dry.

GEOSHIELD Verification Report

VERIFICATION ITEM THREE



Once the FX has dried the installers have then applied an even coat of the FIS

Hydroprufe LG as per the detail.

GEOSHIELD Verification Report

ADDITIONAL PHOTOGRAPHS



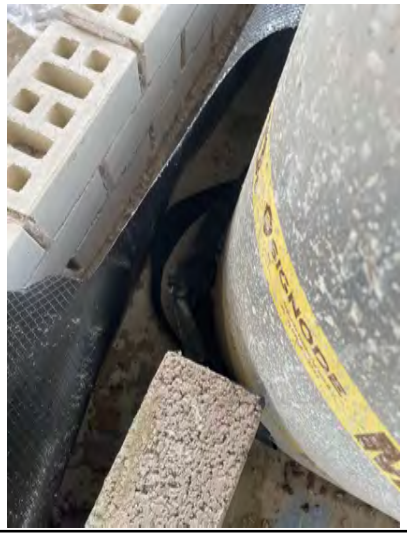
Additional overview photograph of the Hydroseal FX applied to lift pits.



Hydroprufe LG used to seal lift pits and column details.



Once crane base is removed walls will need to be built and DPC installed.



One column needing to be resealed.

GEOSHIELD Verification Report

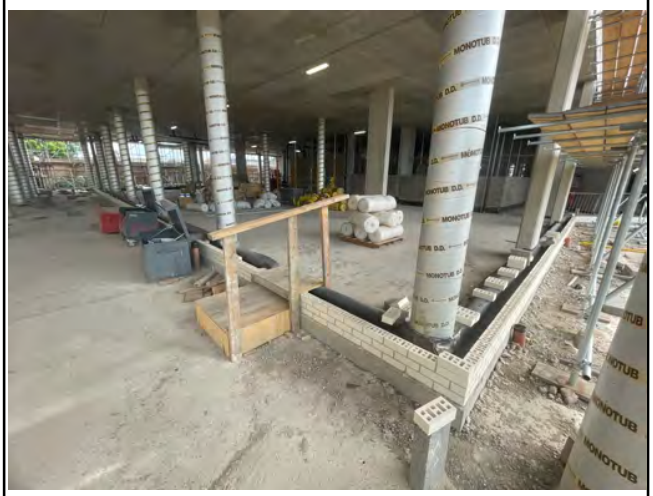
ADDITIONAL PHOTOGRAPHS



Car park area entrance.



Additional sealed column.



Additional overview photograph of DPC.



Hydroprufe LG sealed to Hydroprufe DPC.

GEOSHIELD Verification Report

REMEDIATION LOG

Date	Nr	Remediation Description	Y/N
09/06/2022	001	No faults or defects identified during today's inspection visit.	✔
21/07/2022	002	1. 5% of Block H1 internal wall GRDPC still needs to be installed	
		and verified.	
		2. One concrete column needs to be resealed to the perimeter	
		GRDPC as the seal achieved has been disturbed.	
		3. Crane base area will need to be sealed once it has been	
		removed.	

GEOSHIELD Verification Report

GAS MEMBRANE TESTING

VISUAL:	YES	✔	NO		SMOKE TEST:	YES		NO	✔
COMPRESSED AIR:	YES		NO	✔	DIELECTRIC	YES		NO	✔
DESTRUCTIVE:	YES		NO	✔	OTHER:	YES	✔	NO	

Testing checklist attached: YES NO

Gridline/Plot Sign off

Gridline/Plot Sign off	Block H Perimeter & Internal Walls DPC.	✔
Gridline/Plot Sign off	Block G1-G2 Perimeter DPC to Car Park Elevation.	
Gridline/Plot Sign off	Block G1-G2 & Block H - Lift Pits.	✔
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		

GEOSHIELD Verification Report

GAS MEMBRANE LAP TESTING

LAP I.D	WELDED/TAPED	TEST UNDERTAKEN	PASSED
1	Taped	Pick&Probe	Y
2	Taped	Pick&Probe	Y
3	Taped	Pick&Probe	Y
4	Taped	Pick&Probe	Y
5	Taped	Pick&Probe	Y
6	Taped	Pick&Probe	Y
7	Taped	Pick&Probe	Y
8	Taped	Pick&Probe	Y
9	Taped	Pick&Probe	Y
10	Taped	Pick&Probe	Y
11	Taped	Pick&Probe	Y
12	Taped	Pick&Probe	Y

GEOSHIELD Verification Report

VERIFICATION SUMMARY

This was the second visit to site where verification of the installation of the DPC to perimeter/internal walls and Hydroseal FX and Hydroprufe LG to all six lift pits was required. All laps of the FIS Hydroprufe DPC have been lapped a sufficient amount and sealed using double sided butyl tape and girth tape. All except one columns inspected during this visit has been sealed using hydroprufe LG and HCR girth tape. All six lift pits have been sealed using Hydroseal FX and Hydroprufe LG. Outstanding remediations will need to be rectified and further verification carried out.

Installed in accordance with BS 8485:2019.

Verified in accordance with CIRIA 735.

GEOSHIELD SIGNATURE:



DATE:	21/07/2022

GEOSHIELD Verification Report

PROJECT REFERENCE:	GEO102445
REPORT NUMBER:	003
PROJECT:	Free Wharf - Block H
PROJECT ADDRESS:	Brighton Road

Shoreham-By-Sea

BN43 5ZE

MEMBRANE SPECIFICATION:	Verified in accordance CIRIA 735.

Design in accordance with BS8485 2015 + 2019 for Methane and Carbon Dioxide.

Substrate prepared in-accordance with manufactures instructions and BS8485:2019.

FIS Hydroprufe 9000, FIS Hydroprufe 8000

FIS Hydroprufe DPC, FIS Hydroprufe LG

FIS Detail Tape, FIS Hydroseal FX

FIS Combi-Seal Tape, HCR Butyl Tape, FIS HCR Girth Tape

FIS Protection Board 300

GEOSHIELD Verification Report

MEMBRANE SPECIFICATION:

DESIGN DETAILS:

31149 Sep 2012 Combined Report compressed

> Site has been classified as a CS2 gas regime rating

> 5.3 - Results of the Gas Monitoring

3117-ACA-ZZ-00-DR-A-1101 (Rev 1)

3117-ACA-H-00-DR-A-1121 Block H L00 General Arrangement (rev 1)

3117-ACA-G-00-DR-A-1111 Block G L00 General Arrangement (rev 1)

J2515-GA-001 (3)

J2515-TD-001 (2)

J2515-TD-002

J2515-TD-003 (2)

FIS Material Specification Technical Data Sheets

Radon Maps UK - (Map 1) Site Location & (Map 2) Nearby Location

GEOSHIELD Verification Report

VERIFICATION OFFICER: Adam Oak

VERIFICATION COMPANY: GeoShield Limited

Icon Business Park, 4100 Park Approach

Thorpe Park, LEEDS

West Yorkshire

LS15 8GB

CONTACT NUMBER: 07502 343063

EMAIL ADDRESS: aoak@geoshield.co.uk

ORDER NUMBER:

PER VISIT: YES: ☐ NO: ☑ PROJECT: YES: ☑ NO: ☐

GEOSHIELD Verification Report

CLIENT DETAILS

CLIENT CONTACT:	Dominic McNulty
CONTACTS ROLE:	
MOBILE PHONE:	07583 723 660
EMAIL ADDRESS:	info@kelmacwaterproofing.com

CLIENT CONTACT:	
CONTACTS ROLE:	
MOBILE PHONE:	
EMAIL ADDRESS	
NOTES:	
NOTES:	
NOTES:	

GEOSHIELD Verification Report

APPLICATION TEAM LEADERS

APPLICATOR NAME:	Paul
COMPANY:	Kelmac Waterproofing
APPLICATOR TEL:	
APPLICATOR EMAIL:	

APPLICATOR NAME:	
COMPANY:	Kelmac Waterproofing
APPLICATOR TEL:	
APPLICATOR EMAIL:	

NOTES:	It will be deemed that these waterproofing specialists from Kelmac are at
NOTES:	an appropriate skill level for the job of installing the ground gas protection
NOTES:	measures.
NOTES:	

GEOSHIELD Verification Report

AREA SURVEYED: Block H - Infills red highlighted area

SITE CONDITIONS:

WEATHER: Overcast

TEMPERATURE: 11c.

MEMBRANE TEMPERATURE: N/A

RELATIVE HUMIDITY: N/A

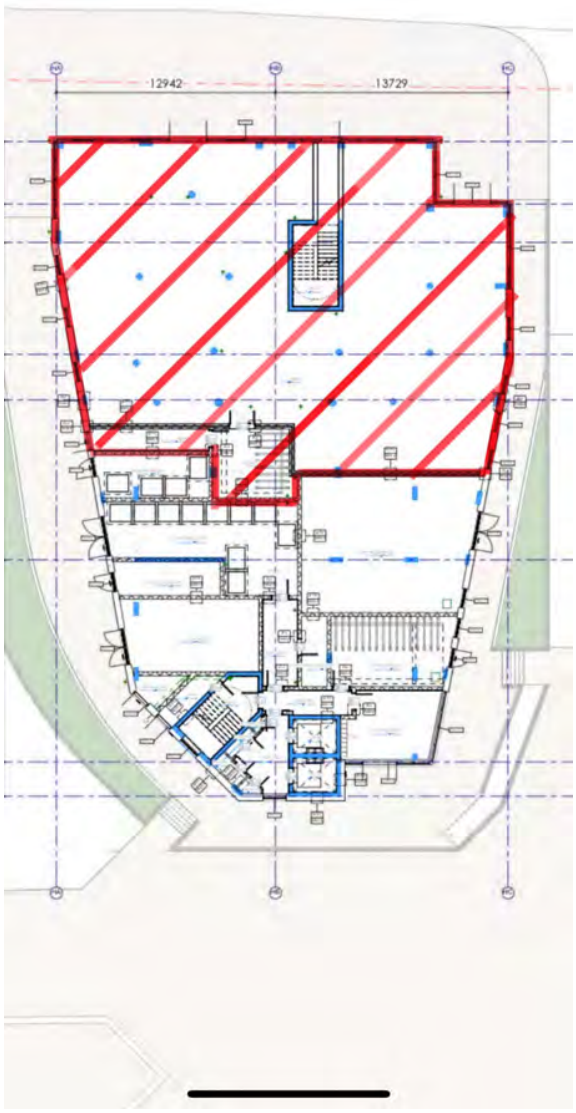
TIME: 08:30-12:00 REPORT NUMBER: 003

DATE: 09/02/2024

ACCOMPANIED Paul - Kelmac Waterproofing

GeoShield Verification Report

Verification Layout



The photograph above shows a plan layout of Block H.
The area highlighted in red is where today's verification inspection took place.

GeoShield Verification Report

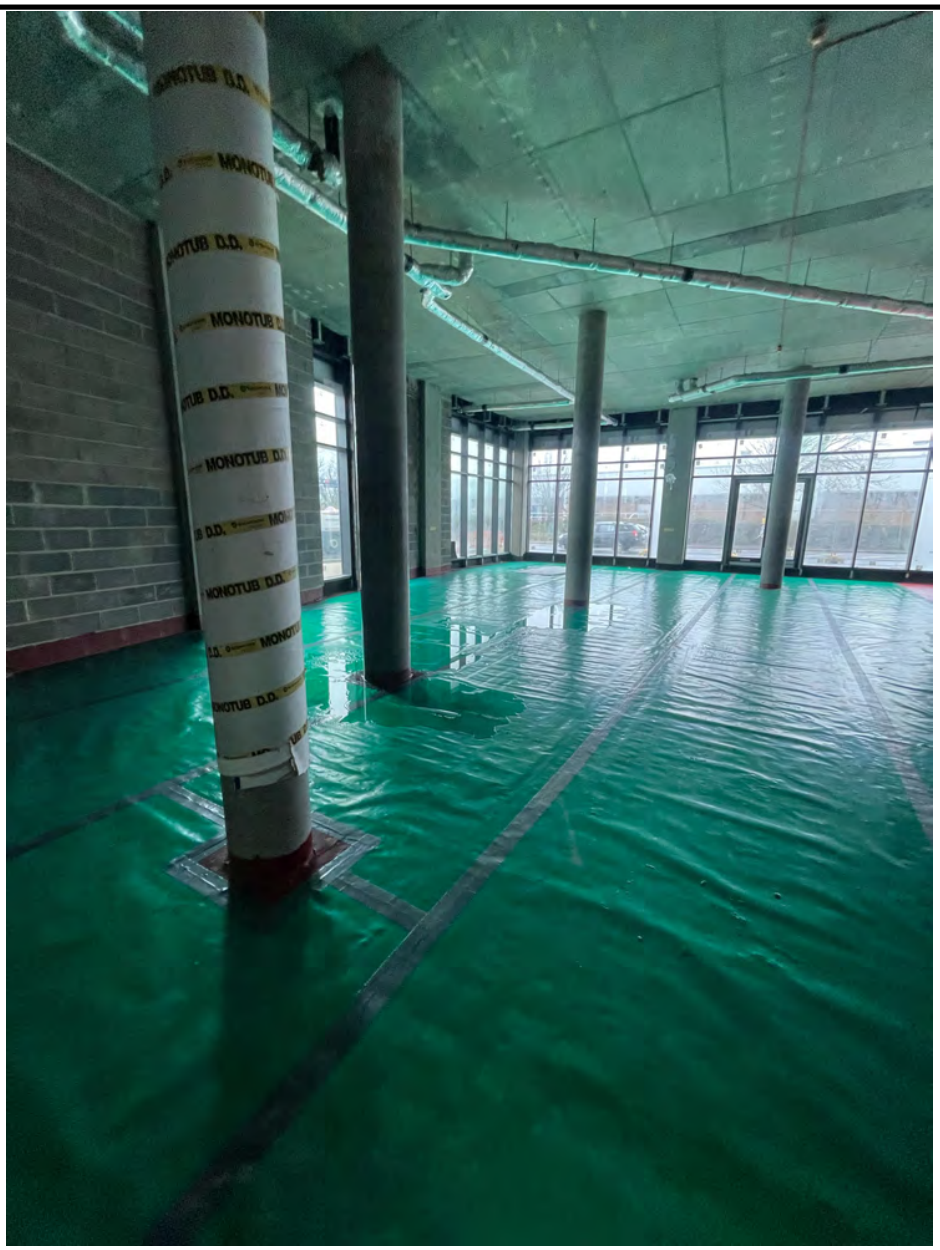
OVERVIEW



The photograph above shows an overview of where today's verification inspection took place.

GeoShield Verification Report

OVERVIEW



The photograph above shows an overview of where today's verification inspection took place.

GeoShield Verification Report

VERIFICATION ITEM ONE

LOCATION/GRID LINE: Area highlighted previously in red Hydroprufe 9000 Lap

Joints



NOTES:

The first photograph above shows that the membrane has been installed to the manufacturer's specification, a lap joint was lifted to expose the double sided butyl tape which has formed a tight seal between the layers of Hydroprufe 9000 gas barrier.



NOTES:

The photograph above shows the lap between the Hydroprufe 9000 which was tightly sealed using the hydroprufe double sided butyl tape with the laps being over sealed using the Hydroprufe HCR girth tape.

GeoShield Verification Report

VERIFICATION ITEM ONE



Additional overview of the installation of the Hydroprufe 9000.

VERIFICATION ITEM TWO

REMEDIATIONS:

Pipe penetrations



NOTES:

Pipe penetrations had insufficient coverage of the Hydroprufe LM, this was remediated on site by the application team.



NOTES:

Additional pipe penetration which has had additional coating of Hydroprufe LM.

GeoShield Verification Report

VERIFICATION ITEM TWO

LOCATION/GRID LINE: Pipe penetration and perimeter detailing



NOTES:

The above photograph shows a pick and probe test that was carried out to the perimeter detail of the Hydrprufe 9000, the Hydroprufe double sided butyl tape was sealed to the previously applied Hydroprufe LG and over sealed using the Hydroprufe HCR foil girth tape.



NOTES:

As can be seen from the photograph above the double sided butyl tape has been installed with the detail being completed to the design specification.

GeoShield Verification Report

VERIFICATION ITEM TWO



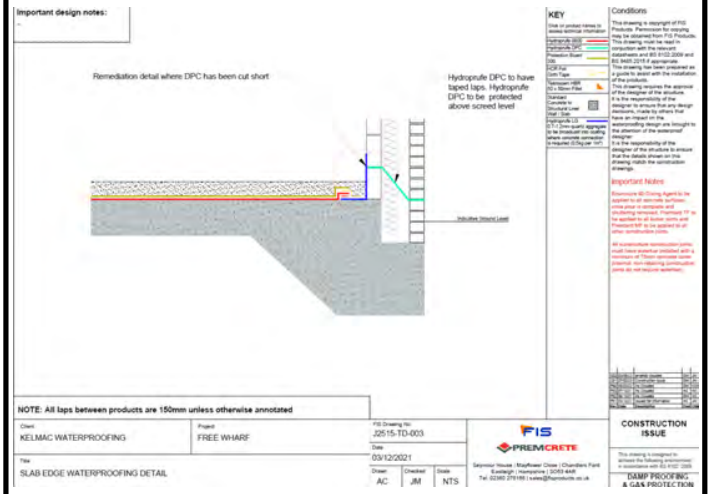
The photograph above shows a pipe penetration and perimeter detail that has been sealed using Hydroprufe LG as per the design specification.

GeoShield Verification Report

VERIFICATION ITEM THREE

LOCATION/GRID LINE: Perimeter detailing





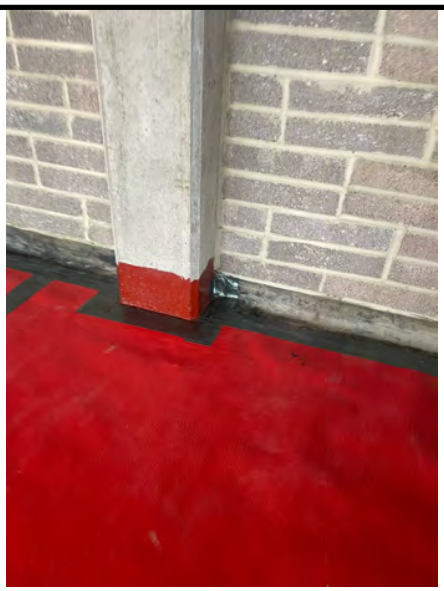
NOTES:

As areas of the previously installed DPC had been damaged the client has now lapped the Hydroprufe LM up the vertical face of the blockwork as per the additional detail.

NOTES:

The image above shows the remediation detail that has been provided by the client.

ADDITIONAL PHOTOGRAPHS



Additional photograph of the Hydroprufe 9000 installation detail to the previously installed DPC.



Pictured above are Premcrete materials that were being used on site.

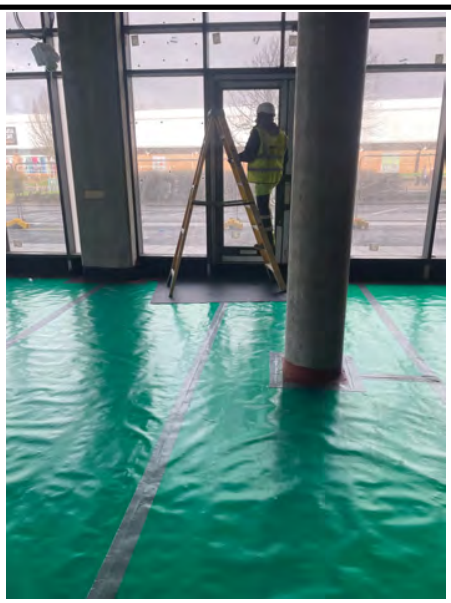
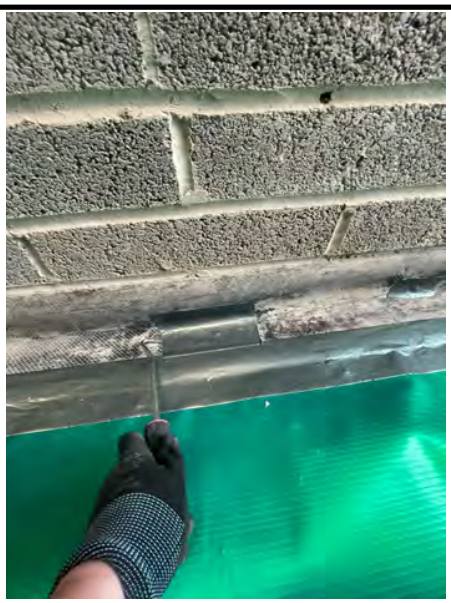
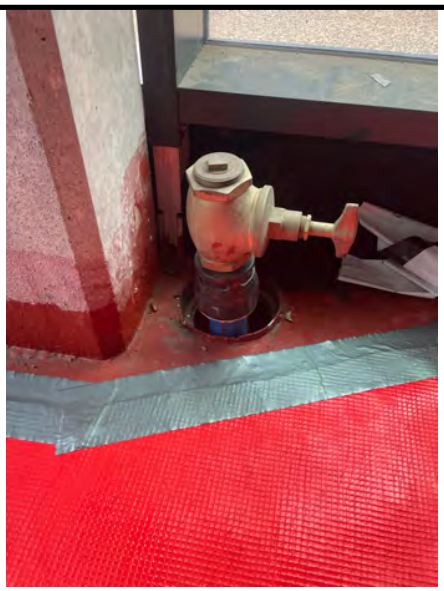


Image showing protection board being used by follow on trades.

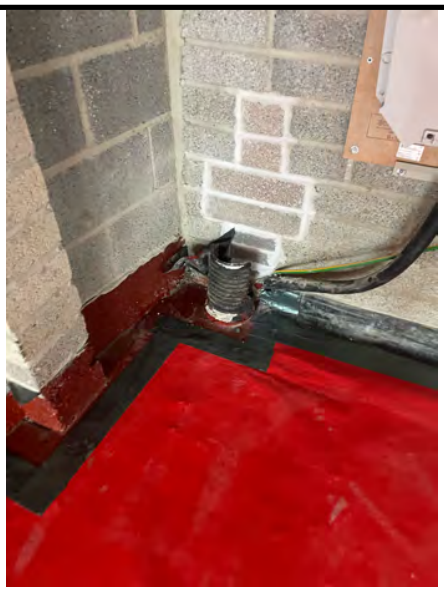


Pick and probe test being carried out to a repair that has been previously carried out.

ADDITIONAL PHOTOGRAPHS



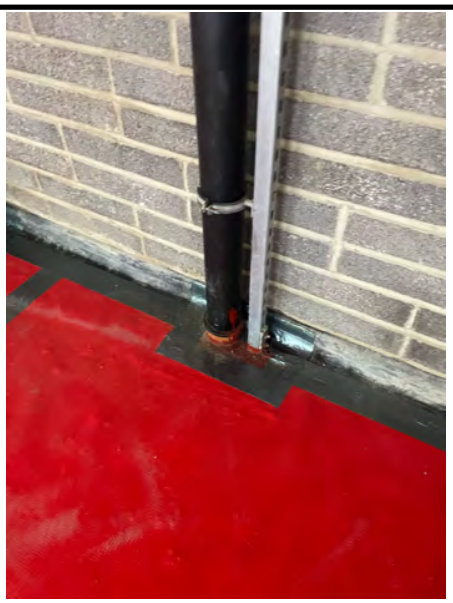
Limitation - Water mains pipe still yet to be sealed



Limitation - Mains electricity cable has damaged DPC detail, awaiting remediation design from client



Limitation - Pipe penetration has been installed in contact with the internal wall, awaiting remediation design from client



Limitation - Pipe penetration has been installed in contact with the internal wall, awaiting remediation design from client

GEOSHIELD Verification Report

REMEDIATION LOG

Date	Nr	Remediation Description	Y/N
09/06/2022	001	No faults or defects identified during today's inspection visit.	✔
21/07/2022	002	1. 5% of Block H1 internal wall GRDPC still needs to be installed	
		and verified.	
		2. One concrete column needs to be resealed to the perimeter	
		GRDPC as the the seal achieved has been disturbed.	
		3. Crane bass area will need to be sealed once it has been	
		removed.	✔
09/02/2024	03	Mains water penetration needs to be sealed.	
		Mains electricity penetration DPC detail to be remediation design.	
		2 x pipe penetrations in contact with internal wall awaiting	
		remediation design.	

GEOSHIELD Verification Report

GAS MEMBRANE TESTING

VISUAL:	YES	✔	NO		SMOKE TEST:	YES		NO	✔
COMPRESSED AIR:	YES		NO	✔	DIELECTRIC	YES		NO	✔
DESTRUCTIVE:	YES		NO	✔	OTHER:	YES	✔	NO	

Testing checklist attached: YES NO

Gridline/Plot Sign off

Gridline/Plot Sign off	Block H Perimeter & Internal Walls DPC.	✔
Gridline/Plot Sign off	Block G1-G2 Perimeter DPC to Car Park Elevation.	
Gridline/Plot Sign off	Block G1-G2 & Block H - Lift Pits.	✔
Gridline/Plot Sign off	Block H - area highlighted in Red.	✔
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		

GeoShield Verification Report

VERIFICATION SUMMARY

This was the third visit to site where verification of the installation of the Hydrprufe 9000 to the infills of the area highlighted in red.

The Hydroprufe 9000 has been tightly sealed using the Hydroprufe double sided butyl tape with the laps being over sealed using the Hydroprufe HCR girth tape.

Detailing to the Hydrprufe Liquid Gas Barrier has also been applied using the same method, a thorough mechanical stress point test (Pick and Probe test) was carried out in accordance with CIRIA 735.

All remediations were carried out on site by the application team.

Limitations - Three pipe penetrations were in contact with internal walls to which we are currently awaiting an updated detail from the client for remediation to these areas. One mains water pipe penetration was still to be sealed.

This area was verified and passed in accordance with CIRIA 735.

GEOSHIELD SIGNATURE:



DATE: 09-Feb-2024

GEOSHIELD Verification Report

PROJECT REFERENCE:	GEO102445
REPORT NUMBER:	004
PROJECT:	Free Wharf - Block H
PROJECT ADDRESS:	Brighton Road

Shoreham-By-Sea

BN43 5ZE

MEMBRANE SPECIFICATION:	Verified in accordance CIRIA 735.

Design in accordance with BS8485 2015 + 2019 for Methane and Carbon Dioxide.

Substrate prepared in-accordance with manufactures instructions and BS8485:2019.

FIS Hydroprufe 9000, FIS Hydroprufe 8000

FIS Hydroprufe DPC, FIS Hydroprufe LG

FIS Detail Tape, FIS Hydroseal FX

FIS Combi-Seal Tape, HCR Butyl Tape, FIS HCR Girth Tape

FIS Protection Board 300

GEOSHIELD Verification Report

MEMBRANE SPECIFICATION:

DESIGN DETAILS:

31149 Sep 2012 Combined Report compressed

> Site has been classified as a CS2 gas regime rating

> 5.3 - Results of the Gas Monitoring

3117-ACA-ZZ-00-DR-A-1101 (Rev 1)

3117-ACA-H-00-DR-A-1121 Block H L00 General Arrangement (rev 1)

3117-ACA-G-00-DR-A-1111 Block G L00 General Arrangement (rev 1)

J2515-GA-001 (3)

J2515-TD-001 (2)

J2515-TD-002

J2515-TD-003 (2)

FIS Material Specification Technical Data Sheets

Radon Maps UK - (Map 1) Site Location & (Map 2) Nearby Location

GEOSHIELD Verification Report

VERIFICATION OFFICER: Adam Oak

VERIFICATION COMPANY: GeoShield Limited

Icon Business Park, 4100 Park Approach

Thorpe Park, LEEDS

West Yorkshire

LS15 8GB

CONTACT NUMBER: 07502 343063

EMAIL ADDRESS: aoak@geoshield.co.uk

ORDER NUMBER:

PER VISIT: YES: ☐ NO: ☑ PROJECT: YES: ☑ NO: ☐

GEOSHIELD Verification Report

CLIENT DETAILS

CLIENT CONTACT:	Dominic McNulty
CONTACTS ROLE:	
MOBILE PHONE:	07583 723 660
EMAIL ADDRESS:	info@kelmacwaterproofing.com

CLIENT CONTACT:	
CONTACTS ROLE:	
MOBILE PHONE:	
EMAIL ADDRESS	
NOTES:	
NOTES:	
NOTES:	

GEOSHIELD Verification Report

APPLICATION TEAM LEADERS

APPLICATOR NAME:	Paul
COMPANY:	Kelmac Waterproofing
APPLICATOR TEL:	
APPLICATOR EMAIL:	

APPLICATOR NAME:	
COMPANY:	Kelmac Waterproofing
APPLICATOR TEL:	
APPLICATOR EMAIL:	

NOTES:	It will be deemed that these waterproofing specialists from Kelmac are at
NOTES:	an appropriate skill level for the job of installing the ground gas protection
NOTES:	measures.
NOTES:	

GEOSHIELD Verification Report

AREA SURVEYED: Block H - Infills Yellow highlighted area.

Block G - Infills Blue highlighted area.

SITE CONDITIONS:

WEATHER: Overcast

TEMPERATURE: 12c

MEMBRANE TEMPERATURE: N/A

RELATIVE HUMIDITY: N/A

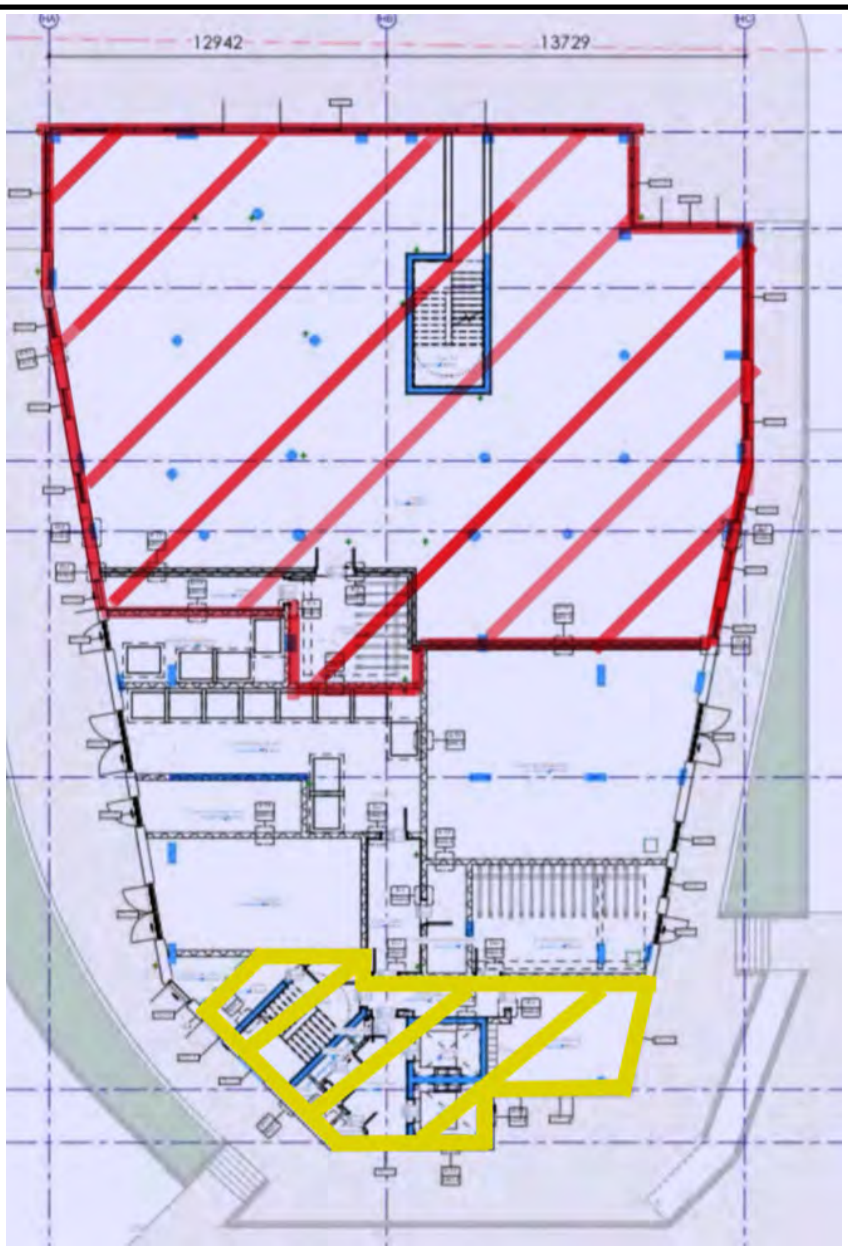
TIME: 09:30-12:00 REPORT NUMBER: 004

DATE: 11/03/2024

ACCOMPANIED Dominic - Kelmac Waterproofing

GeoShield Verification Report

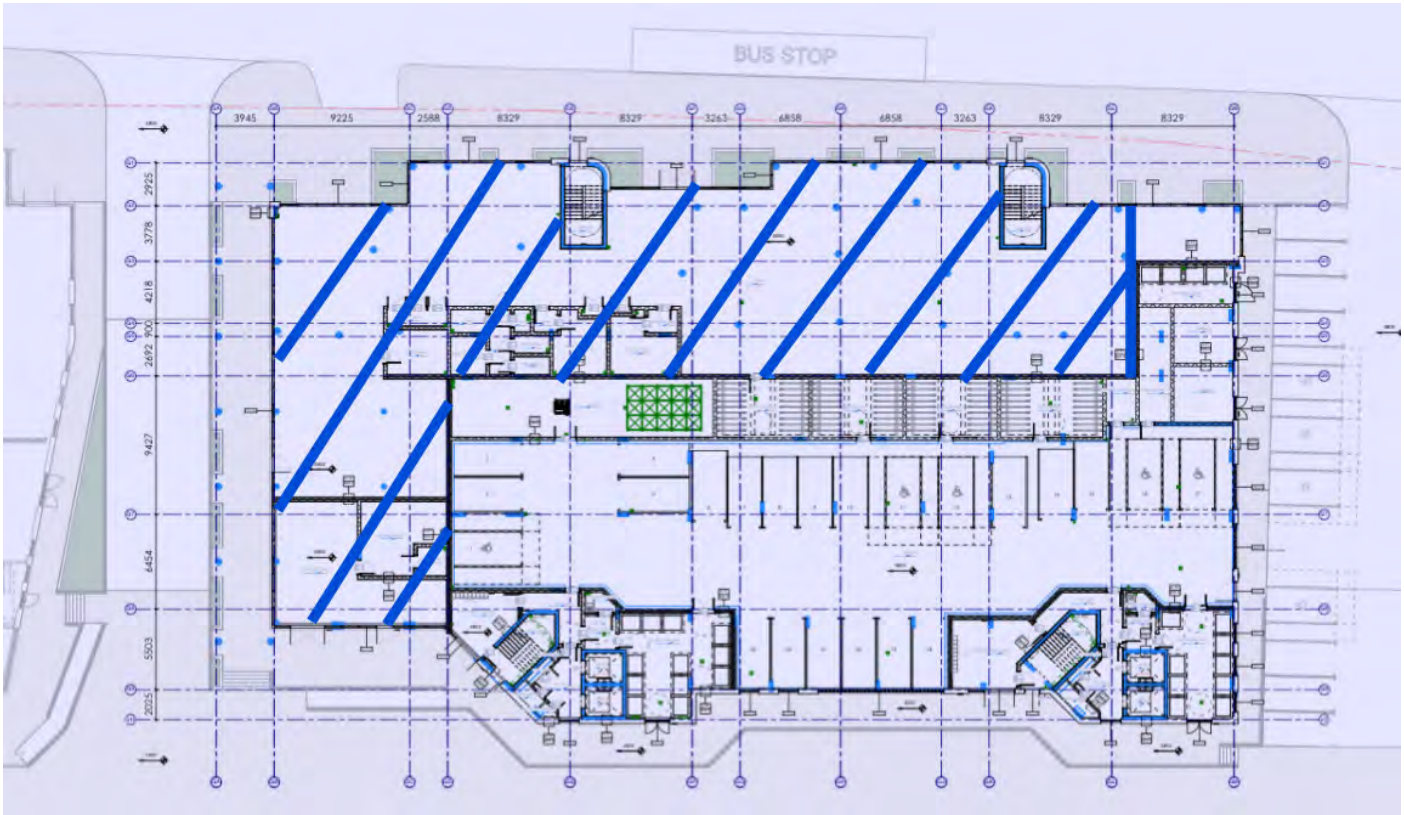
Verification Layout



The area highlighted in yellow above shows where the installers have installed the FIS Hydroprufe 9000 Gas Barrier to Block H.
Green and Red membrane shown in this report are both Hydroprufe 9000.

GeoShield Verification Report

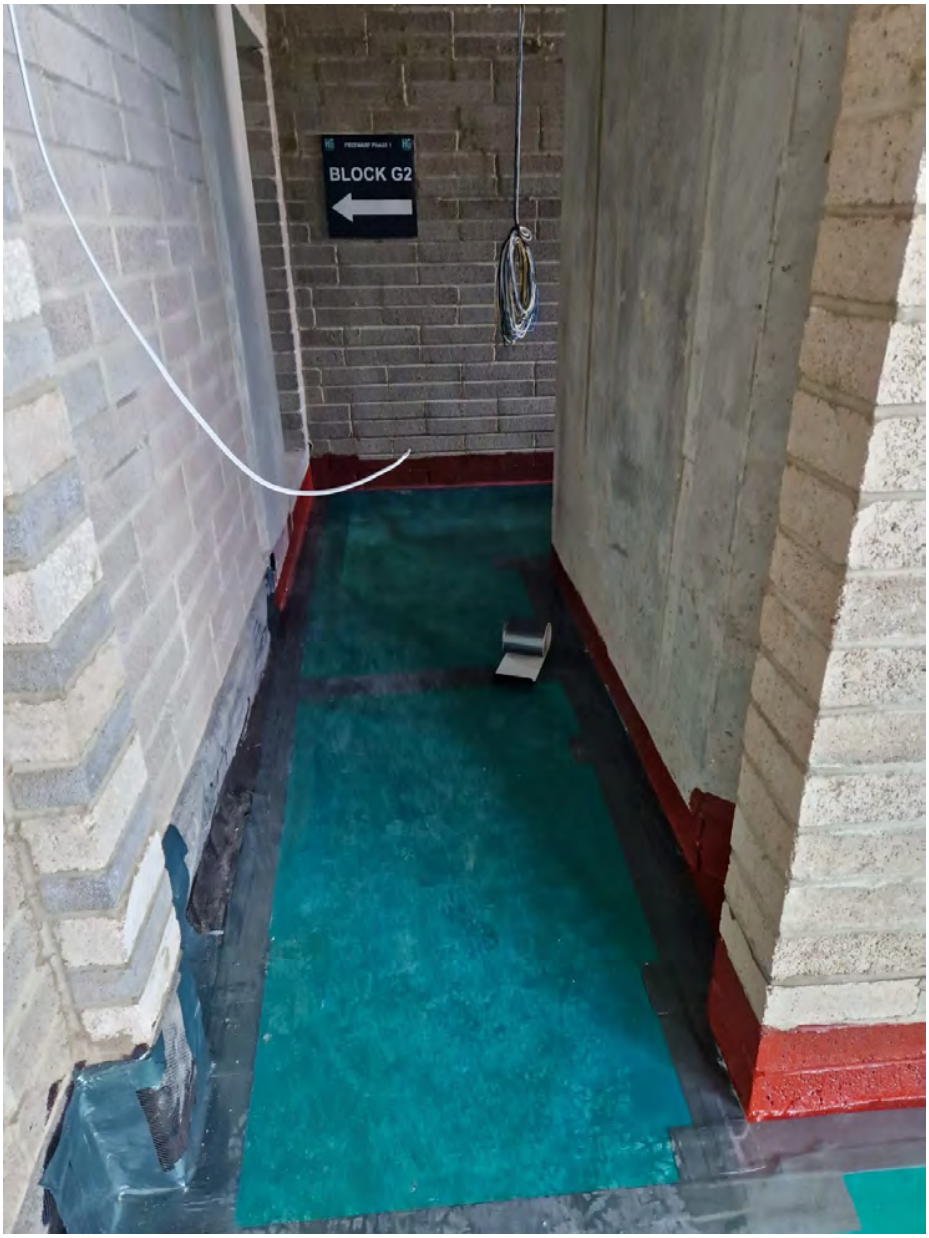
Verification Layout



The area highlighted in blue above shows where the installers have also installed the FIS Hydroprufe 9000 Gas Barrier. Block G shown above.

GeoShield Verification Report

OVERVIEW



The photograph above shows an overview of the FIS Hydroprufe 9000 Gas Barrier which has been installed to a section of Block H. Photographic evidence provided for Block H.

GeoShield Verification Report

OVERVIEW



The photograph above shows an overview of Block G where the FIS Hydroprufe 9000 Gas Barrier has been installed and verification carried out during this visit.

GeoShield Verification Report

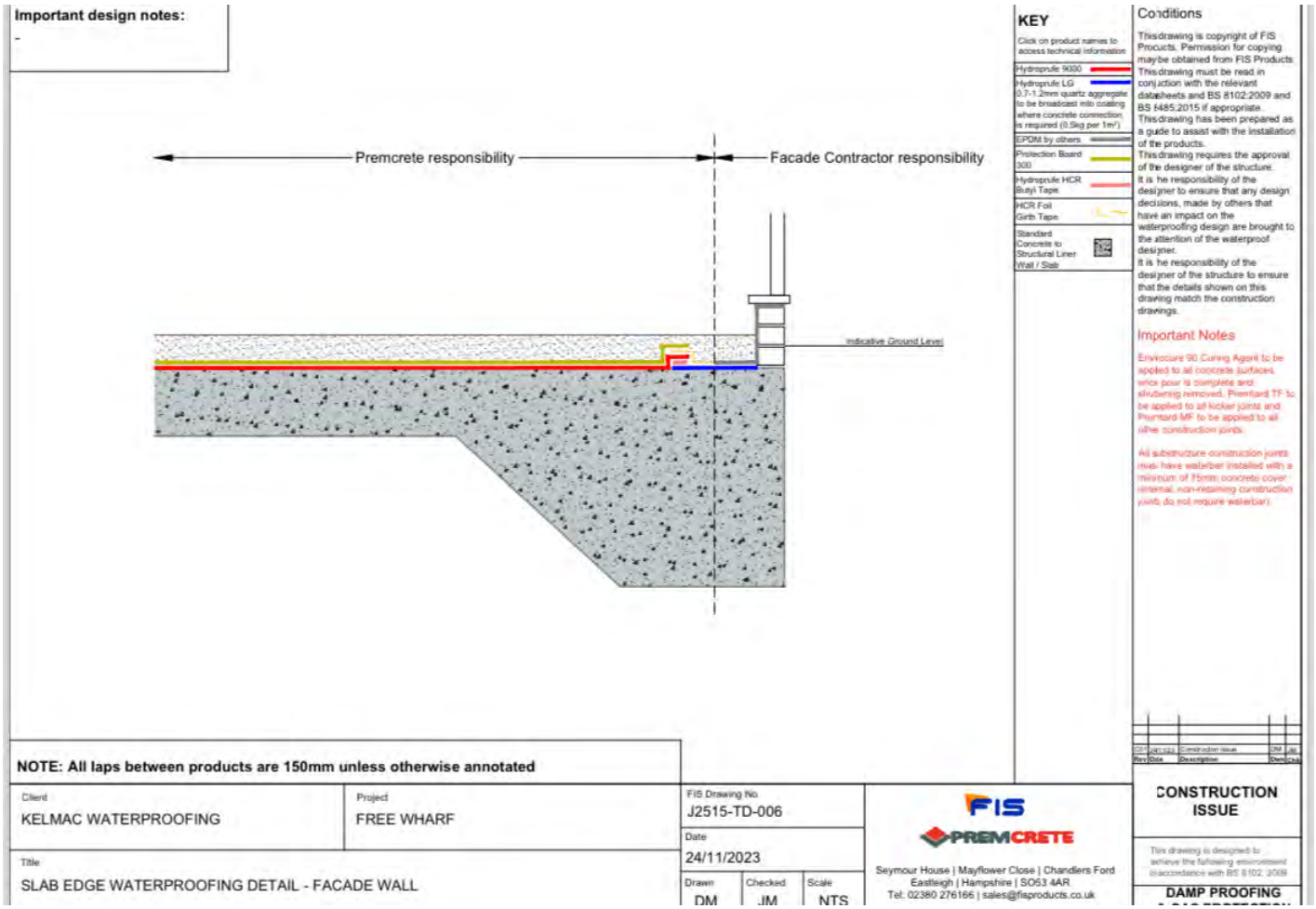
OVERVIEW



The photo above also shows Block G once the installers had installed the protection board over the FIS Hydroprufe 9000 Gas Barrier once verification took place.

GeoShield Verification Report

UPDATED DETAIL



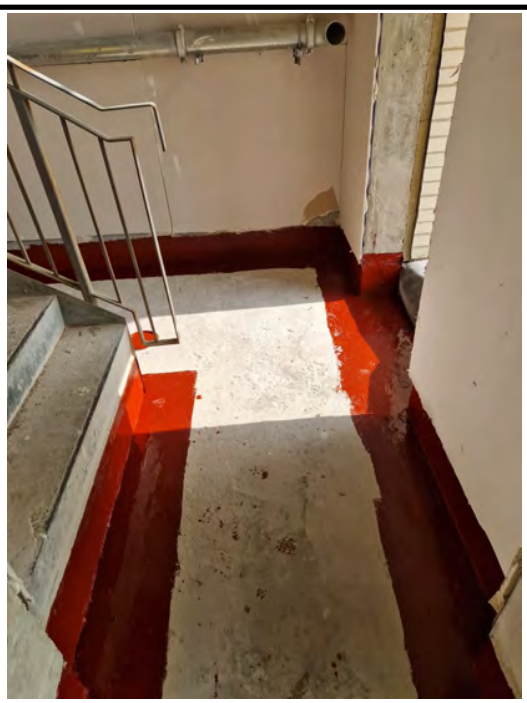
As shown above the perimeter detail has now been updated. EDPM installed by other will be lapped onto the FIS Hydroprufe LG which has been verified during this visit. Areas which have been inspected during this visit have been installed as per the design.

GeoShield Verification Report

VERIFICATION ITEM ONE

LOCATION/GRID LINE: Block H - Infills Yellow highlighted area.

Installation of the FIS Hydroprufe 9000 Gas Barrier.



NOTES:

The installers have first applied the FIS Hydroprufe LG to the perimeter and details such as the stair base. This has then been allowed to dry before adhering HCR tapes.



NOTES:

The photograph above shows the installers have applied the HCR double sided butyl tape to seal the FIS Hydroprufe 9000 Gas Barrier to the dry Hydroprufe LG. All laps of the FIS Hydroprufe 9000 Gas Barrier have then been lapped and double sided butyl tape also adhered in between laps.

GeoShield Verification Report

VERIFICATION ITEM ONE



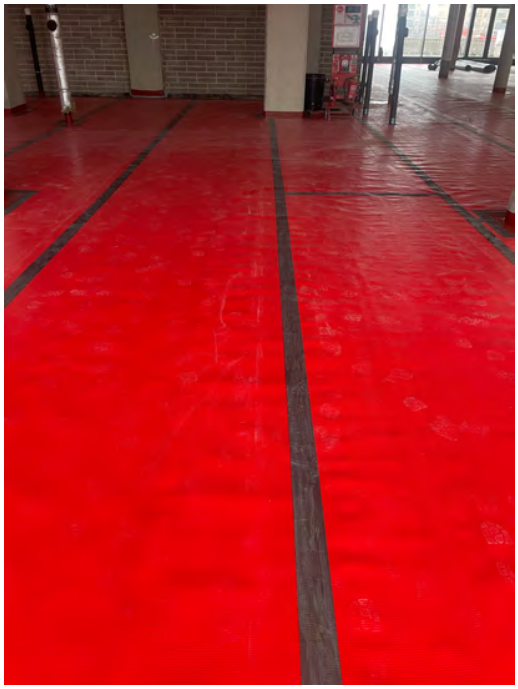
Once the perimeters and laps of the FIS Hydroprufe 9000 Gas Barrier have been sealed using the FIS Hydroprufe membrane had been sealed using the double sided butyl tape the installers have then used HCR girth tape to seal the overlaps of the gas barrier.

GeoShield Verification Report

VERIFICATION ITEM TWO

LOCATION/GRID LINE: Block G - Infills Blue highlighted area.

Installation of the FIS Hydroprufe 9000 Gas Barrier.



NOTES:

As with Block H the installers have also sealed the FIS Hydroprufe 9000 Gas Barrier in the same way in Block G. The installers have lapped all laps of the gas barrier 150mm and sealed each lap as per the manufacturers specification.



NOTES:

The installers have first used double sided butyl tape in between each lap as shown above. Next the installers have applied the HCR overlap girth tape. The installers have applied pressure to aid in the adherence of the tape.

GeoShield Verification Report

VERIFICATION ITEM TWO



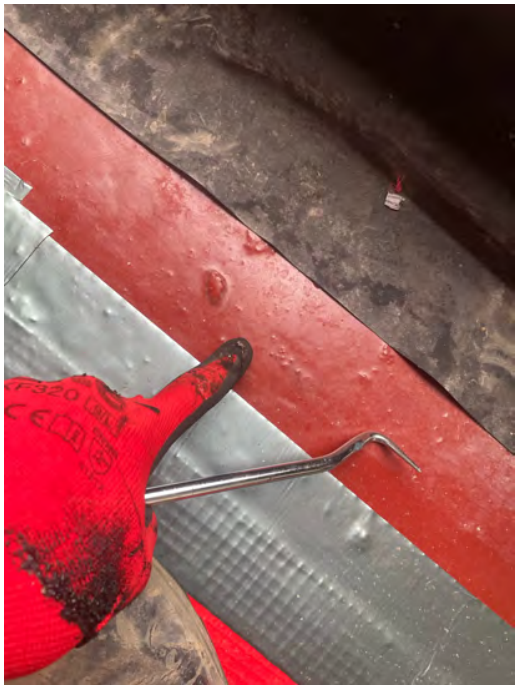
The photograph above shows a pick and probe test carried out to a sealed lap of the FIS Hydroprufe 9000 Gas Barrier. The installers have achieved a strong seal and no faults or defects were identified when carrying out pick and probe testing.
Verified in accordance with CIRIA 735.

GeoShield Verification Report

VERIFICATION ITEM THREE

LOCATION/GRID LINE: Block G - Infills highlighted in blue.

Perimeters sealed.



NOTES:

The first photograph above shows the installers have first applied the Hydroprufe LG. Once allowed to dry the installers have then adhered the FIS Hydroprufe 9000 Gas Barrier to the LG using double sided butyl tape and girth tape.



NOTES:

The photograph above shows a pick and probe test carried out to the seal achieved between the LG and the FIS Hydroprufe 9000 Gas Barrier. A strong seal has been achieved and no faults or defects were identified.
Verified in accordance with CIRIA 735.

GeoShield Verification Report

VERIFICATION ITEM FOUR

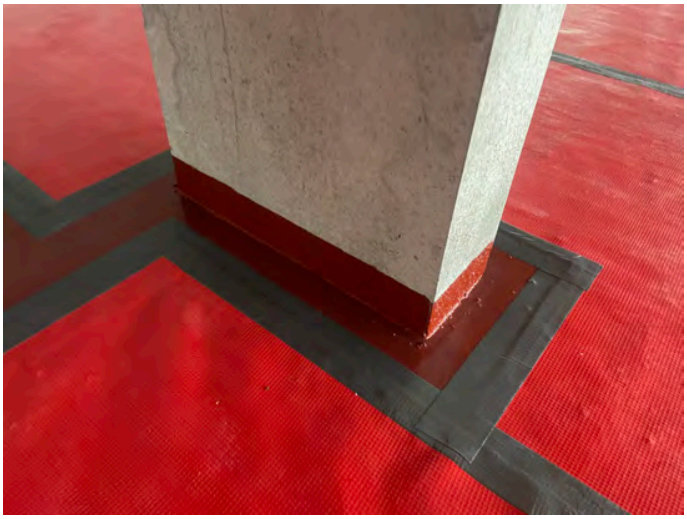
LOCATION/GRID LINE: Block G - Infills Blue highlighted area.

Pipe penetrations and columns sealed.



NOTES:

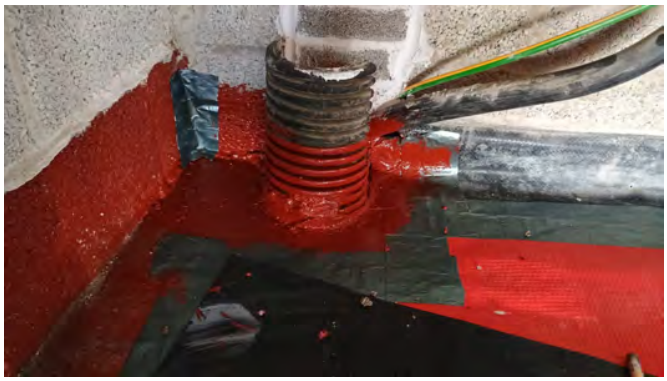
The photograph above shows an example of a pipe penetration which has been sealed using HCR Girth tape. The installers have achieved a strong seal. Some pipe penetrations have been sealed using LG. No faults identified when testing pipe penetrations.
Verified in accordance with CIRIA 735.



NOTES:

The photograph above shows an example of a sealed concrete column. The installers have first applied the Hydroprufe LG to the column and concrete around the base before sealing the FIS Hydroprufe 9000 Gas Barrier to the LG using HCR tapes.

ADDITIONAL PHOTOGRAPHS



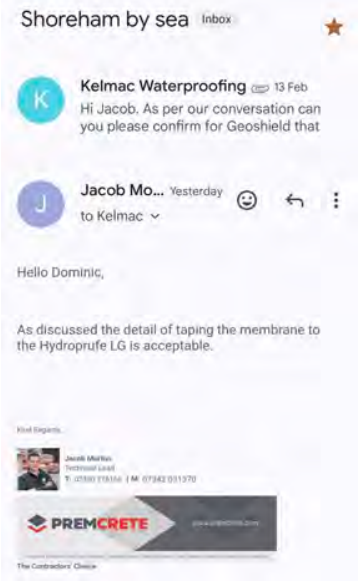
Electric mains pipe from previous report.



Water main pipe sealed from previous report.

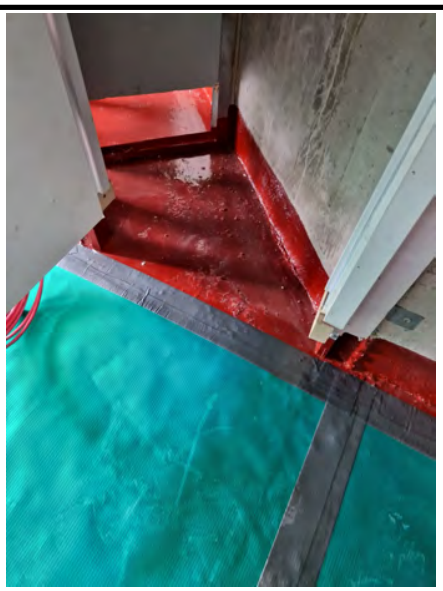


2 x pipe penetrations which have now been sealed since Premcrete have confirmed LG is sufficient.



Email confirmation that Hydroprufe LG is sufficient to seal penetrations.

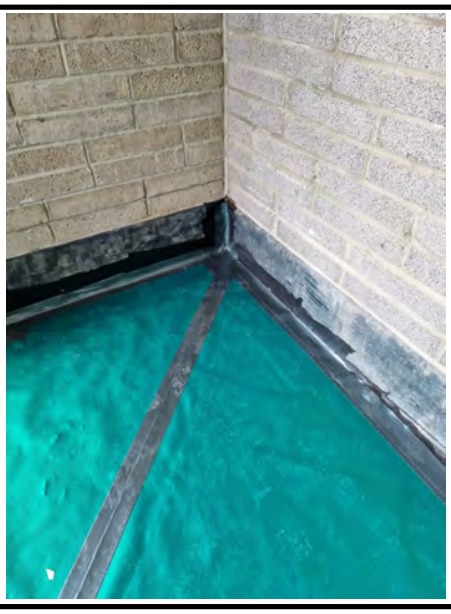
ADDITIONAL PHOTOGRAPHS



Additional sealed perimeters using LG, 9000 gas barrier and HCR tapes.



Additional sealed perimeter area.



Additional sealed perimeter DPC to the FIS Hydroprufe 9000 Gas Barrier.



Additional sealed perimeter section.

ADDITIONAL PHOTOGRAPHS



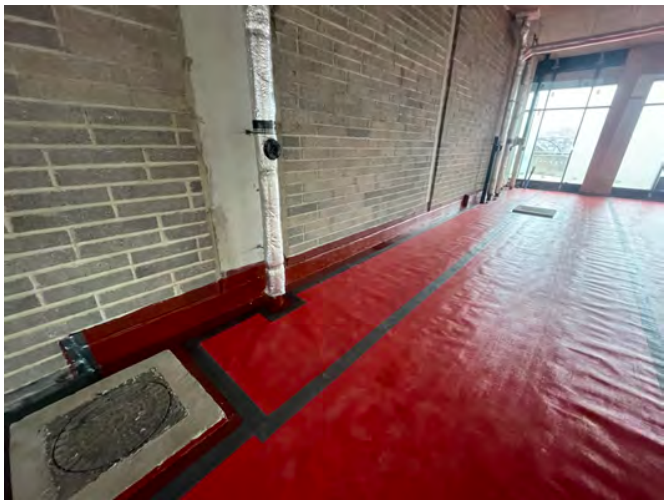
FIS Hydroprufe LG used to seal perimeter and details.



Pipe penetration sealed using Hydroprufe LG.

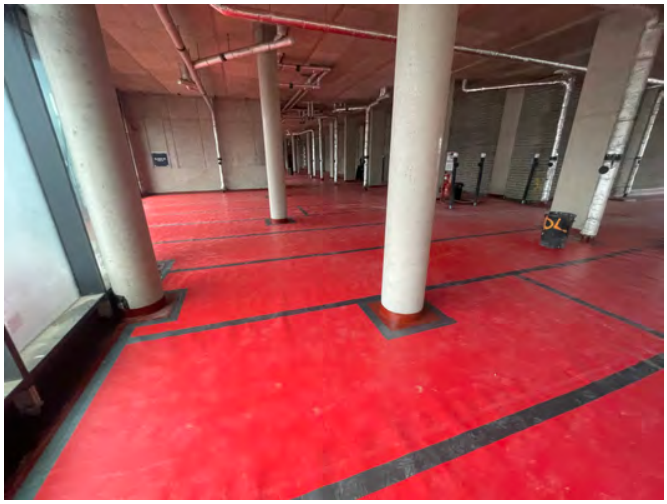


Additional sealed pipe penetration using LG and HCR tapes.

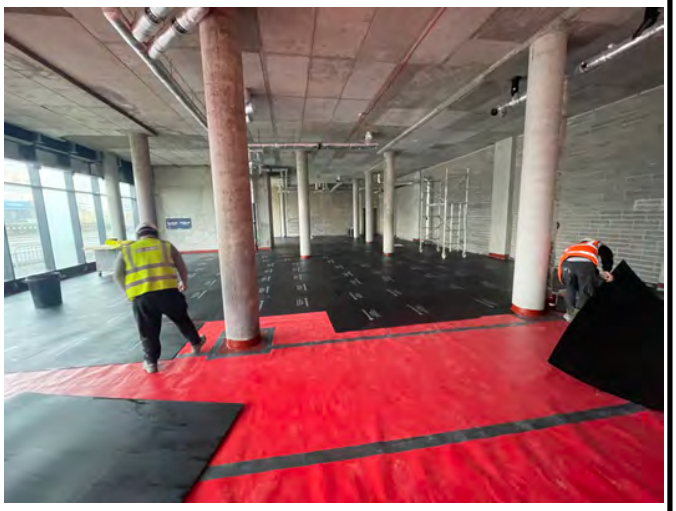


Additional overview photograph.

ADDITIONAL PHOTOGRAPHS



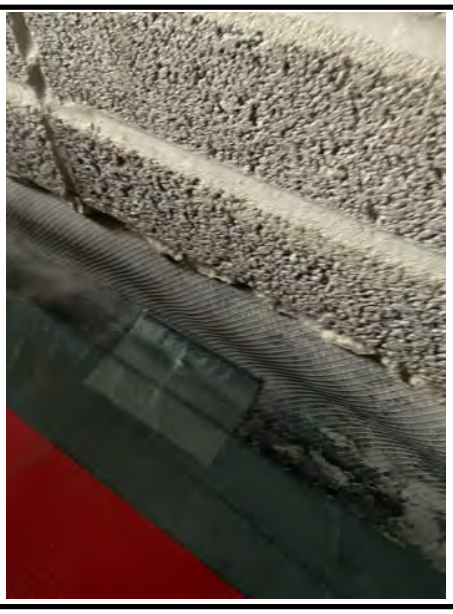
Additional overview photograph.



Additional overview photograph of protection board installed.



1 of 2 patch repairs carried out to the DPC using HCR Girth Tape.



2 of 2 patch repairs carried out to the DPC using HCR Girth Tape.

GEOSHIELD Verification Report

REMEDIATION LOG

Date	Nr	Remediation Description	Y/N
09/06/2022	001	No faults or defects identified during today's inspection visit.	✔
21/07/2022	002	1. 5% of Block H1 internal wall GRDPC still needs to be installed	✔
		and verified.	✔
		2. One concrete column needs to be resealed to the perimeter	✔
		GRDPC as the the seal achieved has been disturbed.	✔
		3. Crane bass area will need to be sealed once it has been	✔
		removed.	✔
09/02/2024	03	Mains water penetration needs to be sealed.	✔
		Mains electricity penetration DPC detail to be remediation design.	✔
		2 x pipe penetrations in contact with internal wall awaiting	✔
		Remediation design.	✔
11/03/2024	004	1. Report 2: Remediation 1 and 2 - New details for perimeters as	✔
		shown in this report means these remediations are obsolete.	✔
		2. Report 2: Remediation 3 - No longer necessary due to car park	✔
		no longer having membrane installed.	✔

GeoShield Verification Report

REMEDIATION LOG

Date	Nr	Remediation Description	Y/N
		3. Two patch repairs carried out during this visit using the HCR	✔
		tape to the DPC.	✔

GEOSHIELD Verification Report

GAS MEMBRANE TESTING

VISUAL:	YES	✔	NO		SMOKE TEST:	YES		NO	✔
COMPRESSED AIR:	YES		NO	✔	DIELECTRIC	YES		NO	✔
DESTRUCTIVE:	YES		NO	✔	OTHER:	YES	✔	NO	

Testing checklist attached: YES ☐ NO ☐

Gridline/Plot Sign off

Gridline/Plot Sign off	Block H Perimeter & Internal Walls DPC.	✔
Gridline/Plot Sign off	Block G1-G2 Perimeter DPC to Car Park Elevation.	✔
Gridline/Plot Sign off	Block G1-G2 & Block H - Lift Pits.	✔
Gridline/Plot Sign off	Block H - area highlighted in Red.	✔
Gridline/Plot Sign off	Block H - Infills Yellow highlighted area.	✔
Gridline/Plot Sign off	Block G - Infills Blue highlighted area.	✔
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		

GeoShield Verification Report

VERIFICATION SUMMARY

This was the 4th visit to site where verification of the installation of the FIS Hydroprufe 9000 Gas Barrier to Block G and H was required.

All laps of the FIS Hydroprufe 9000 Gas Barrier have been lapped a sufficient amount before using double sided butyl tape and lap tape. The FIS Hydroprufe 9000 Gas Barrier has also been sealed to the perimeter LG using HCR tapes as per the new design shown in this report.

Pipe penetrations have either been sealed using the HCR Girth tape or Hydroprufe LG before being sealed to the FIS Hydroprufe 9000 Gas Barrier using HCR tapes.

Concrete columns sealed using the LG before being sealed to the FIS Hydroprufe 9000 Gas Barrier using HCR tapes.

Protection board installed once verification was carried out to prevent the FIS Hydroprufe 9000 Gas Barrier being damaged.

This was passed and verified in accordance with CIRIA 735 and installed to BS8485:2015+A1 2019.

GEOSHIELD SIGNATURE:



DATE:	11-Mar-2024

GEOSHIELD Verification Report

PROJECT REFERENCE:	GEO102445
REPORT NUMBER:	005
PROJECT:	Free Wharf - Block G
PROJECT ADDRESS:	Brighton Road

Shoreham-By-Sea

BN43 5ZE

MEMBRANE SPECIFICATION:	Verified in accordance CIRIA 735.

Design in accordance with BS8485 2015 + 2019 for Methane and Carbon Dioxide.

Substrate prepared in-accordance with manufactures instructions and BS8485:2019.

FIS Hydroprufe 9000, FIS Hydroprufe 8000

FIS Hydroprufe DPC, FIS Hydroprufe LG

FIS Detail Tape, FIS Hydroseal FX

FIS Combi-Seal Tape, HCR Butyl Tape, FIS HCR Girth Tape

FIS Protection Board 300

GEOSHIELD Verification Report

MEMBRANE SPECIFICATION:

DESIGN DETAILS:

31149 Sep 2012 Combined Report compressed

> Site has been classified as a CS2 gas regime rating

> 5.3 - Results of the Gas Monitoring

3117-ACA-ZZ-00-DR-A-1101 (Rev 1)

3117-ACA-H-00-DR-A-1121 Block H L00 General Arrangement (rev 1)

3117-ACA-G-00-DR-A-1111 Block G L00 General Arrangement (rev 1)

J2515-GA-001 (3)

J2515-TD-001 (2)

J2515-TD-002

J2515-TD-003 (2)

FIS Material Specification Technical Data Sheets

Radon Maps UK - (Map 1) Site Location & (Map 2) Nearby Location

GEOSHIELD Verification Report

VERIFICATION OFFICER: Adam Oak

VERIFICATION COMPANY: GeoShield Limited

Icon Business Park, 4100 Park Approach

Thorpe Park, LEEDS

West Yorkshire

LS15 8GB

CONTACT NUMBER: 07502 343063

EMAIL ADDRESS: aoak@geoshield.co.uk

ORDER NUMBER:

PER VISIT: YES: ☐ NO: ☑ PROJECT: YES: ☑ NO: ☐

GEOSHIELD Verification Report

CLIENT DETAILS

CLIENT CONTACT:	Dominic McNulty
CONTACTS ROLE:	
MOBILE PHONE:	07583 723 660
EMAIL ADDRESS:	info@kelmacwaterproofing.com

CLIENT CONTACT:	
CONTACTS ROLE:	
MOBILE PHONE:	
EMAIL ADDRESS	
NOTES:	
NOTES:	
NOTES:	

GEOSHIELD Verification Report

APPLICATION TEAM LEADERS

APPLICATOR NAME:	Paul
COMPANY:	Kelmac Waterproofing
APPLICATOR TEL:	
APPLICATOR EMAIL:	

APPLICATOR NAME:	
COMPANY:	Kelmac Waterproofing
APPLICATOR TEL:	
APPLICATOR EMAIL:	

NOTES:	It will be deemed that these waterproofing specialists from Kelmac are at
NOTES:	an appropriate skill level for the job of installing the ground gas protection
NOTES:	measures.
NOTES:	

GEOSHIELD Verification Report

AREA SURVEYED: Block G - Stairwells

SITE CONDITIONS:

WEATHER: Overcast

TEMPERATURE: 13c

MEMBRANE TEMPERATURE: N/A

RELATIVE HUMIDITY: N/A

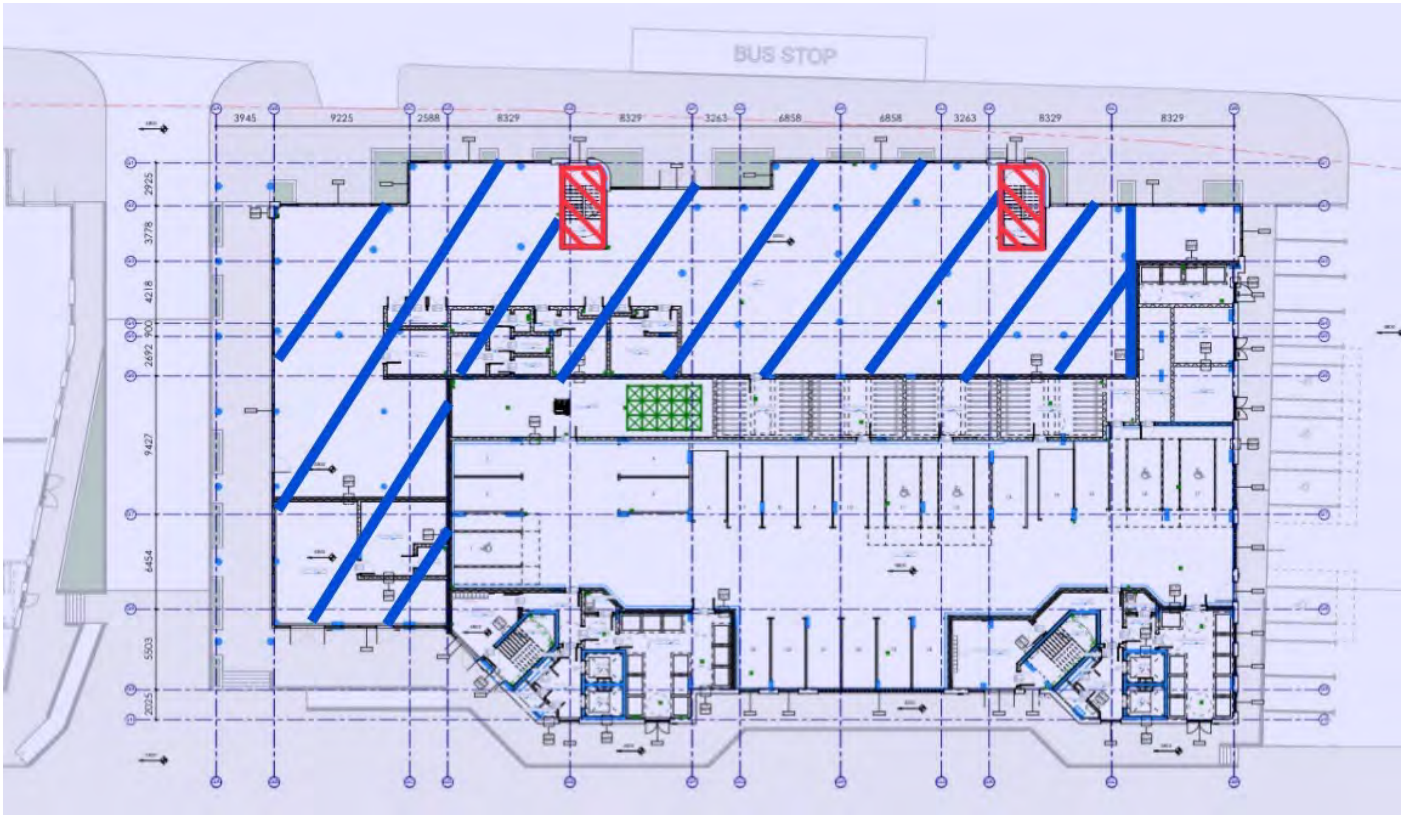
TIME: 10.30-11.45 REPORT NUMBER: 005

DATE: 21/03/2024

ACCOMPANIED

GeoShield Verification Report

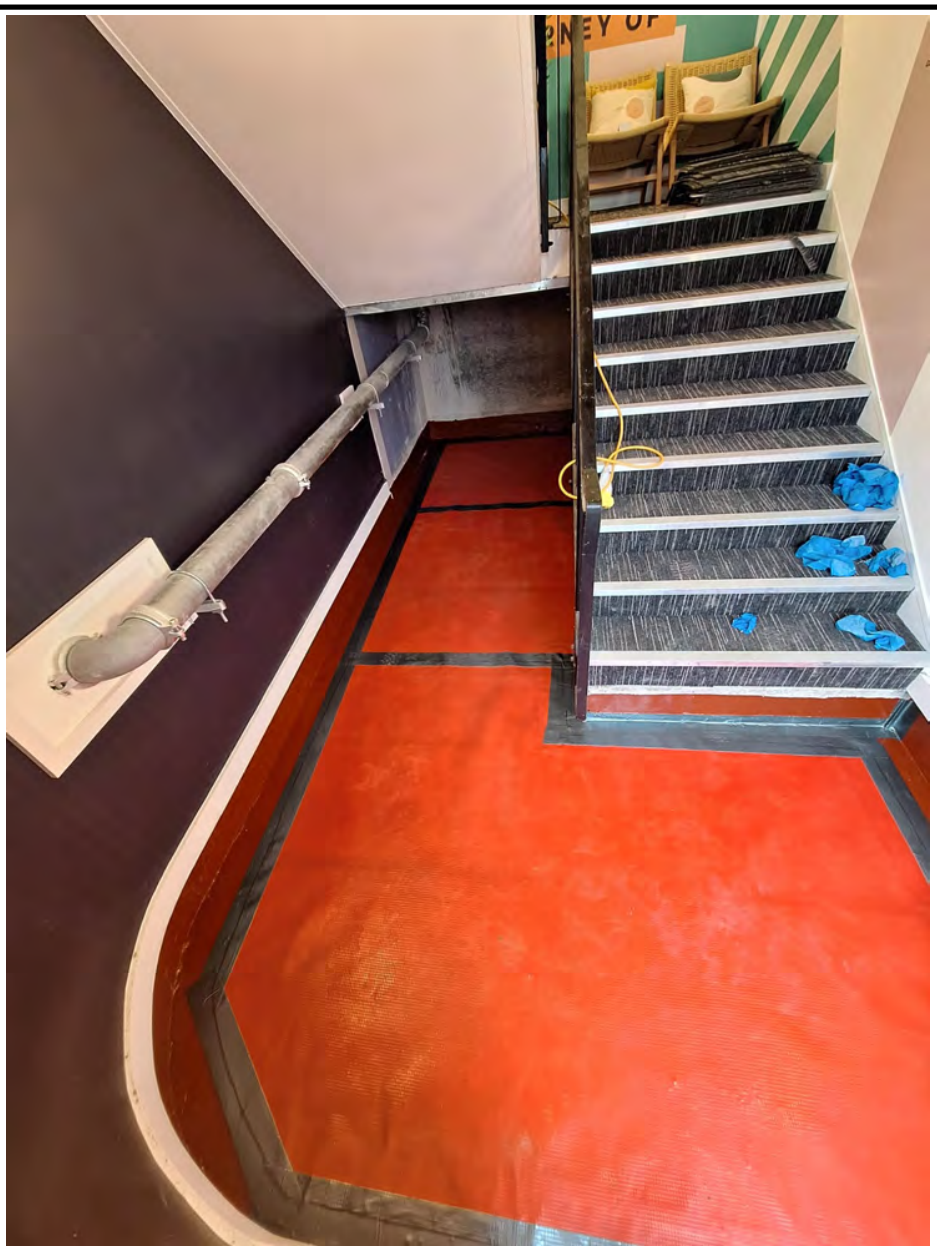
Verification Layout



The area highlighted in red above shows where the installation of the FIS Hydroprufe 9000 Gas Barrier was applied to Block G shown above.

GeoShield Verification Report

OVERVIEW



The photograph above shows an overview of the FIS Hydroprufe 9000 Gas Barrier which has been installed to the stairwells of Block G. Photographic evidence provided for Block G

GeoShield Verification Report

VERIFICATION ITEM ONE

LOCATION/GRID LINE: Block H - Infills Yellow highlighted area.

Installation of the FIS Hydroprufe 9000 Gas Barrier.



NOTES:

The photograph above shows where the installers have applied a liberal coating of the Hydrprufe LG to the perimeter to one of the stairwells.



NOTES:

The photograph above shows the installers have applied the HCR double sided butyl tape to the previously applied Hydroprufe LG. The application has been applied as per design.

GeoShield Verification Report

VERIFICATION ITEM ONE



The perimeters of the stairwells have been lapped 150mm to the upstand and also 150mm across the substrate with HCR Double sided butyl tape applied once the Hydrprufe LG has fully cured.

GeoShield Verification Report

VERIFICATION ITEM TWO

LOCATION/GRID LINE: Block G - Infills Red highlighted area.

Installation of the FIS Hydroprufe 9000 Gas Barrier.



NOTES:

The photograph above shows that the installers have applied the Hydrprufe 9000 to the stairwell infill areas ensuring a sufficient lap has been applied to the Hydrprufe LG.

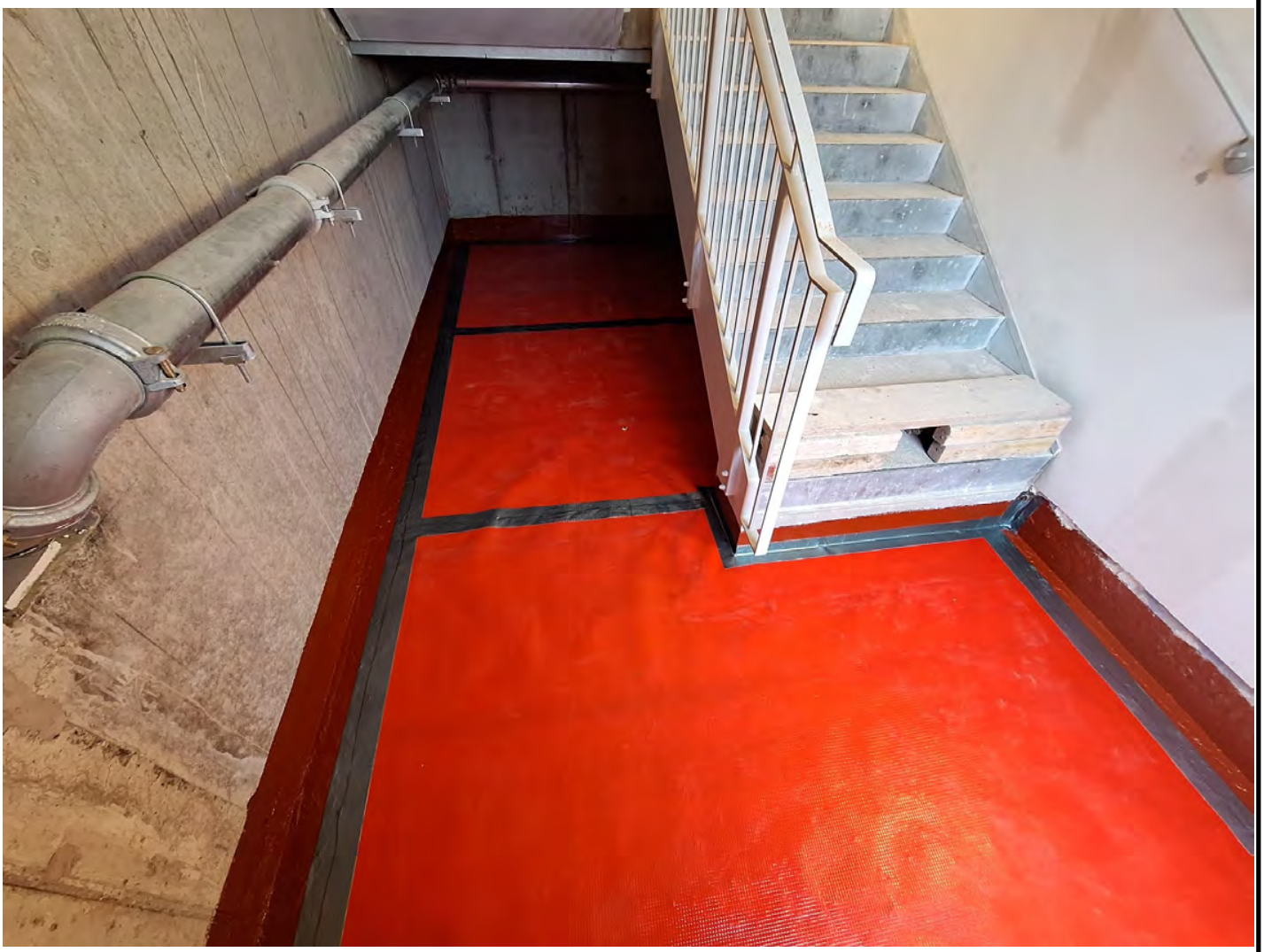


NOTES:

The HCR double sided butyl tape that was previously applied has been used to ensure a sufficient seal has been achieved between the Hydrprufe LG and the Hydrprufe 9000 with all over laps being sealed with FIS HCR foil girth tape.

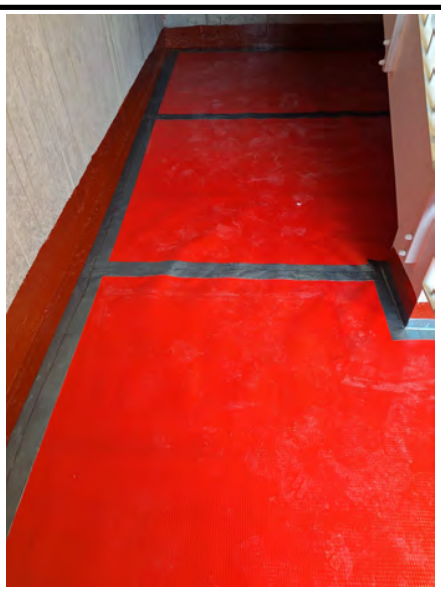
GeoShield Verification Report

VERIFICATION ITEM TWO

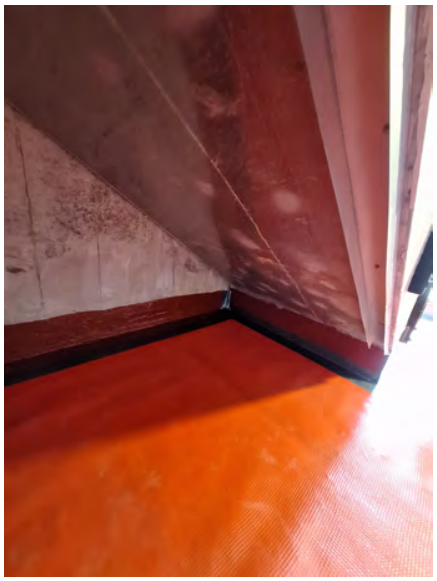


The photograph above shows an additional overview of one of the stairwells, as can be seen the installation has been carried out to design.

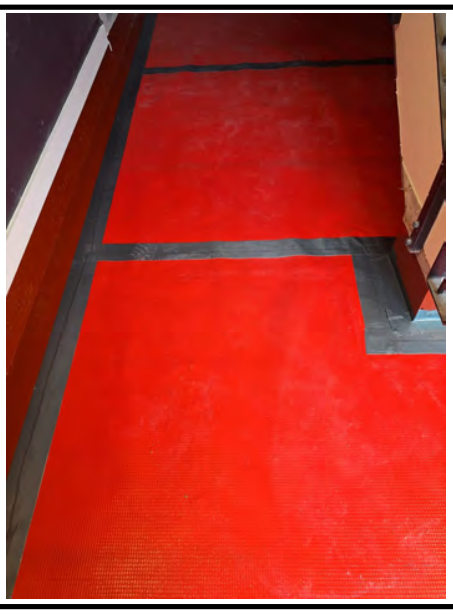
ADDITIONAL PHOTOGRAPHS



Additional overview photograph.



Additional overview photograph of protection board installed.



1 of 2 patch repairs carried out to the DPC using HCR Girth Tape.



2 of 2 patch repairs carried out to the DPC using HCR Girth Tape.

GEOSHIELD Verification Report

REMEDIATION LOG

Date	Nr	Remediation Description	Y/N
09/06/2022	001	No faults or defects identified during today's inspection visit.	✔
21/07/2022	002	1. 5% of Block H1 internal wall GRDPC still needs to be installed	✔
		and verified.	✔
		2. One concrete column needs to be resealed to the perimeter	✔
		GRDPC as the the seal achieved has been disturbed.	✔
		3. Crane bass area will need to be sealed once it has been	✔
		removed.	✔
09/02/2024	03	Mains water penetration needs to be sealed.	✔
		Mains electricity penetration DPC detail to be remediation design.	✔
		2 x pipe penetrations in contact with internal wall awaiting	✔
		Remediation design.	✔
11/03/2024	004	1. Report 2: Remediation 1 and 2 - New details for perimeters as	✔
		shown in this report means these remediations are obsolete.	✔
		2. Report 2: Remediation 3 - No longer necessary due to car park	✔
		no longer having membrane installed.	✔

GeoShield Verification Report

REMEDIATION LOG

Date	Nr	Remediation Description	Y/N
		3. Two patch repairs carried out during this visit using the HCR	✔
		tape to the DPC.	✔
21/03/2024	005	No faults noted.	✔

GEOSHIELD Verification Report

GAS MEMBRANE TESTING

VISUAL:	YES	✔	NO		SMOKE TEST:	YES		NO	✔
COMPRESSED AIR:	YES		NO	✔	DIELECTRIC	YES		NO	✔
DESTRUCTIVE:	YES		NO	✔	OTHER:	YES	✔	NO	

Testing checklist attached: YES NO

Gridline/Plot Sign off

Gridline/Plot Sign off	Block H Perimeter & Internal Walls DPC.	✔
Gridline/Plot Sign off	Block G1-G2 Perimeter DPC to Car Park Elevation.	✔
Gridline/Plot Sign off	Block G1-G2 & Block H - Lift Pits.	✔
Gridline/Plot Sign off	Block H - area highlighted in Red.	✔
Gridline/Plot Sign off	Block H - Infills Yellow highlighted area.	✔
Gridline/Plot Sign off	Block G - Infills Blue highlighted area.	✔
Gridline/Plot Sign off	Block G - Stairwells	✔
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		

GeoShield Verification Report

VERIFICATION SUMMARY

This was the fifth verification inspection of the installation of the FIS Hydroprufe 9000 Gas Barrier to Block G remaining stairwells.

The perimeters of the stairwells have had a liberal coating of the Hydroprufe LG ensuring a sufficient band to the upstands with the equivalent to the substrate.

HCR Double sided butyl tape has been applied to the fully cured Hydroprufe LG, Hydroprufe 9000 has then been applied to the infill areas and sealed using the double sided butyl tape.

All lap joints have then been sealed using the HCR Foil Girth Tape which in turn has ensured a strong and robust seal has been applied.

As can be seen in the photographs the installation has been carried out to a good standard that has been concurrent throughout the project.

The projects gas protection measures are now completed and the areas signed off.

This was passed and verified in accordance with CIRIA 735 and installed to BS8485:2015+A1 2019.

GEOSHIELD SIGNATURE:



DATE: 21-Mar-2024

GEOSHIELD

Verification Certificate

Date: 21 March 2024

Kelmac Waterproofing Limited

Free Wharf - Blocks G1, G2 & H
Brighton Road
Shoreham-By-Sea
BN43 5ZE

The documentation in this handover package shows that the installation of the Gas Membrane and ancillaries was installed to specification. Verified in accordance with BS 8485:2015+A1:2019 and CIRIA 735. All areas were verified, and remediation issues corrected.

Paul Colbeck
Director of Site Services