

RESIDENTIAL APARTMENTS DEVELOPMENT

AT MAYES GARDENS

MANCHESTER M4 7FN

REMEDIATION VALIDATION REPORT

Client:

Multi Build UK Ltd.
Green Lane
Heywood
OL10 2EW

Consultant:

Build Vision Ltd
Consulting Engineers
Middle Cottage
Ben Kaye Row
Holmfirth
HD9 1EF

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1. INTRODUCTION

- 1.1.1. The Build Vision Remediation Strategy Report Ref: 1308, dated July 2022 should be referred to for further information.

2. REMEDIATION VALIDATION

2.1. Contamination

- 2.1.1. The remediation strategy recommended that a watching brief should be carried out by the contractor during the cut and fill and all excavation works and should any contamination not identified by the site investigation be encountered during the construction period, in particular any organic or hydrocarbon contamination, the engineer should be notified immediately and that the made ground present in proposed soft landscaped areas should either be removed or capped by minimum 300mm capping layers, comprising minimum 100mm granular capillary break layer or geotextile membrane and the remainder as 'inert' subsoil and topsoil.
- 2.1.2. GNL Construction Ltd. carried out the cut and fill and reduced level excavations across the whole of the site to formation level to achieve the levels for the proposed development and provide the plot construction and access road and hard pavement construction build ups and capping layers to the gardens.
- 2.1.3. GNL and Multi Build Ltd. have confirmed that no evidence of contamination other than the made ground identified in the site investigation has been identified during the construction works.
- 2.1.4. GNL have provided minimum 300mm capping layers comprising of topsoil over geotextile membranes to the soft landscaped areas.
- 2.1.5. Topsoil has been imported from a greenfield source at fields at Cocker Mill Lane in Cowlshaw, Oldham on to site for use in the capping layers and the waste transfer note is enclosed in Appendix A.
- 2.1.6. With regards to the soil sampling density, the soft landscaped areas are very small and therefore 3 no. minimum samples comply with the sampling frequency of the greenfield source of 1 per 200 cu.m and 3 no. minimum recommended in the remediation strategy.
- 2.1.7. DHI obtained 3 no. samples from the stockpile of topsoil to be used in the soft landscaped areas and the samples were tested for a general soil suite including heavy metals, PAHs and

TPHs and the results of these have been assessed using 1% soil organic matter residential land use with plant uptake and inhalation pathway Tier 1 assessment levels for soil. The topsoil test results were all below residential and inhalation assessment levels and therefore the risk is considered low and the topsoil is considered suitable for use in soft landscaped areas. The test results and assessment are enclosed in Appendix A.

2.1.8. GNL excavated 2 no. validation trial pits in the soft landscaped areas in January 2023 complying with guidance on validation rates of 1 no. per 2 to 3 plots requirements. The trial pits identified 450mm to 600mm of topsoil over geotextile membranes to the soft landscaped areas in locations S1 and S2. In the narrow strip S3 soft landscaped areas shown, GNL have provided 450mm of topsoil over the kerb and edge kerb concrete bedding and backings as shown in the S3 photos. The validation trial pit location plan and photos are enclosed in Appendix A.

2.1. Landfill Gas

2.1.1. No landfill gas monitoring was carried out due to the size of the development. No organic material has been identified and as the made ground is underlain by low permeability clay drift deposits, indicating no pathways from off-site sources, the risk from landfill gases at the site is considered low.

2.1.2. However, as the development is modular construction fabricated prior to delivery and assembly on site, the developer has installed precautionary gas protection measures during fabrication and on site in accordance with CS2 and NHBC Amber 1 from CIRIA C665 and BS 8485 as shown on the foundation drawings, manufacturers details and photos enclosed in Appendix B.

3. CONCLUSIONS

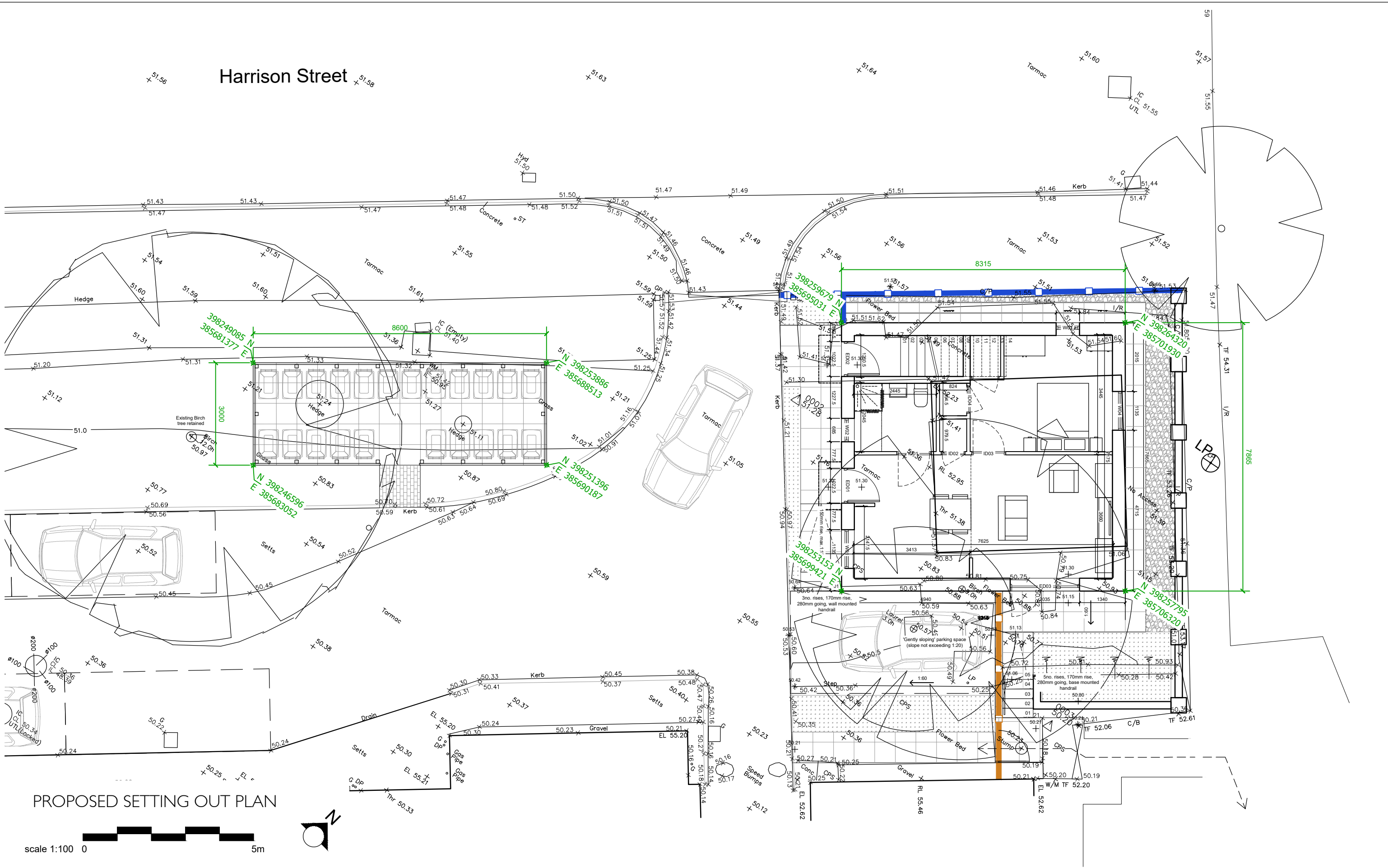
3.1.1. The remediation measures carried out have reduced the risk to end user receptors from the sources of the contamination and gases by effectively eliminating the pathway of direct contact/ingestion and migration.

3.1.2. The remediation measures carried out for the development are complete and considered suitable for use.

APPENDIX A

CONTAMINATION REMEDIATION VALIDATION

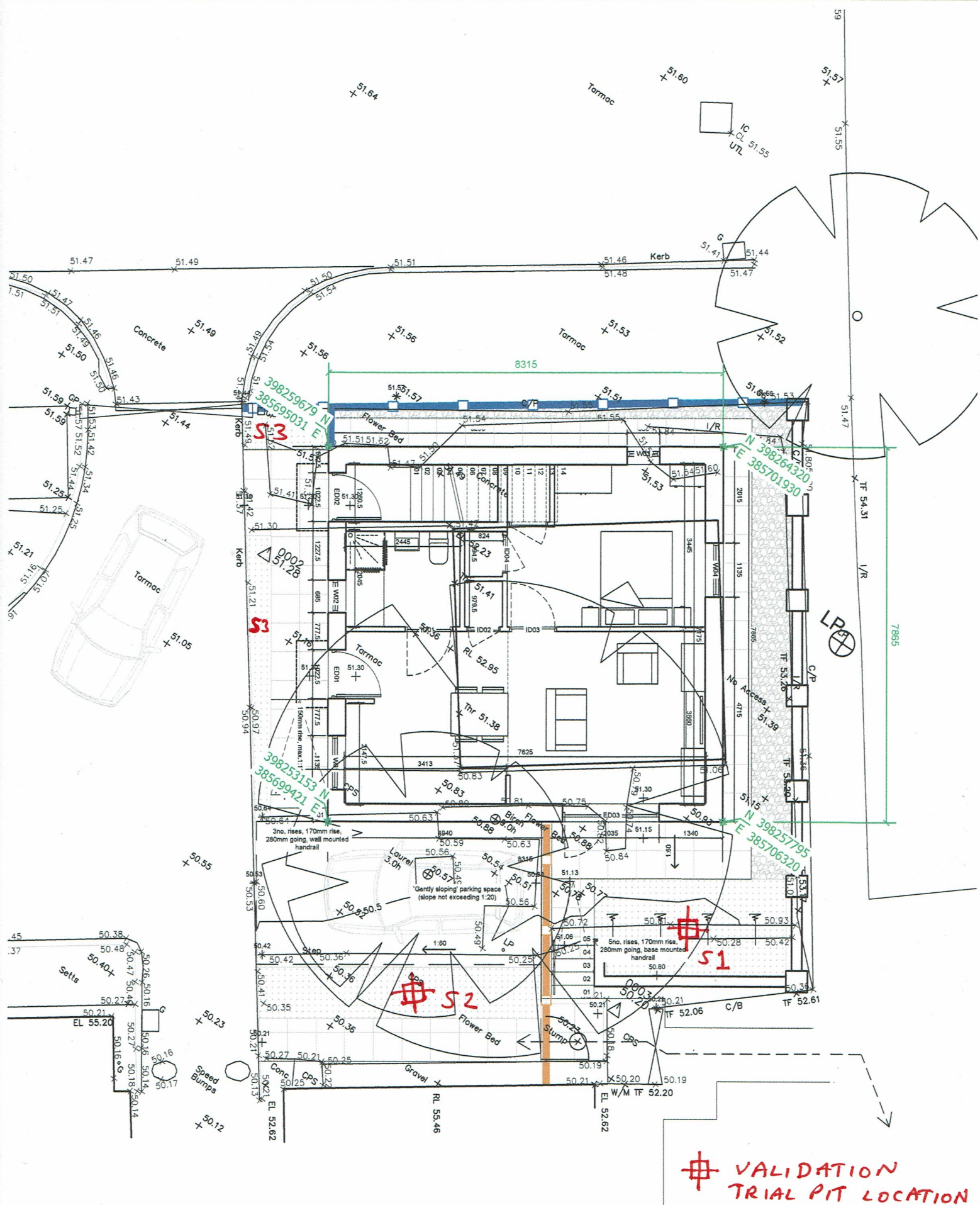
- § Site Layout
- § Validation Trial Pit Location Plan
- § Validation Trial Pit Photo's
- § Waste Transfer Note for topsoil
- § Topsoil Test Results and Assessment



PROPOSED SETTING OUT PLAN



Rev:	Date:	By:	Remarks:	Client:	Project:	Scale:	Description:
P01	09.05.22	JS	Issued for site setting out.	Edward Mayes Trust	Mayes Gardens Apartments	1:100@A3	Setting Out Plan
				Triangle Architects		Drawn: JS	Project/Drawing No.
				Triangle Architects, Raven House, 113 Fairfield Street, Manchester, M12 6EL Tel: 0161 272 3500 studio@trianglearchitects.co.uk www.trianglearchitects.co.uk www.twitter.com/TriangleArch		Checked:	18-019/G-01-03
							Rev. P01



**VALIDATION
TRIAL PIT LOCATION**

Client:
Edward Mayes Trust

Project:
Mayes Gardens Apartments

Scale: 1:100@A3
Date: May 22
Description:
Setting Out Plan

**TRIANGLE
ARCHITECTS**

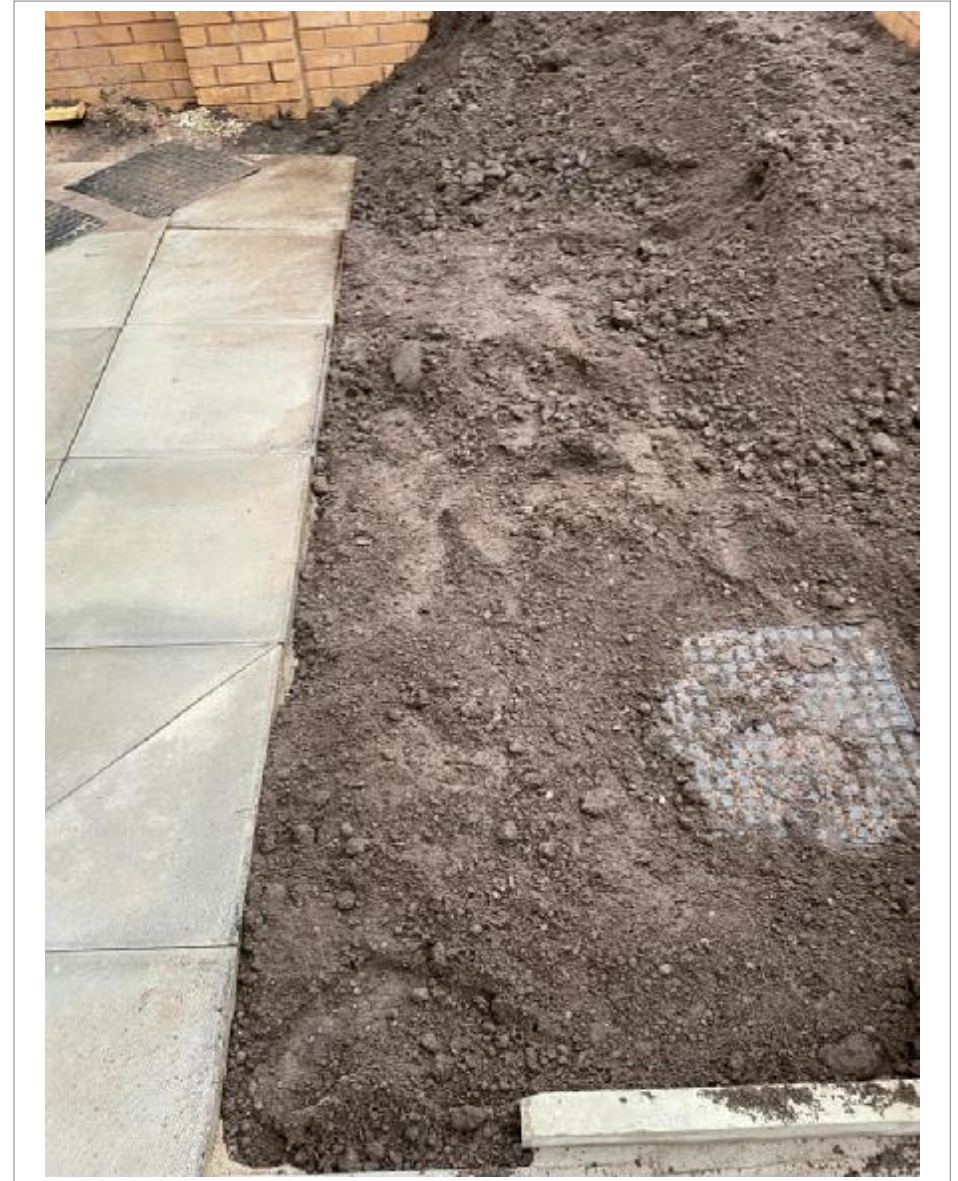
Triangle Architects, Raven House, 113 Fairfield Street, Manchester, M12 6EL Tel: 0161 272 3500
studio@trianglearchitects.co.uk www.trianglearchitects.co.uk www.twitter.com/TriangleArch

Drawn: JS
Checked:
Project/Drawing No.
18-019/G-01-03

VALIDATION TRIAL PIT PHOTOGRAPHS



S1

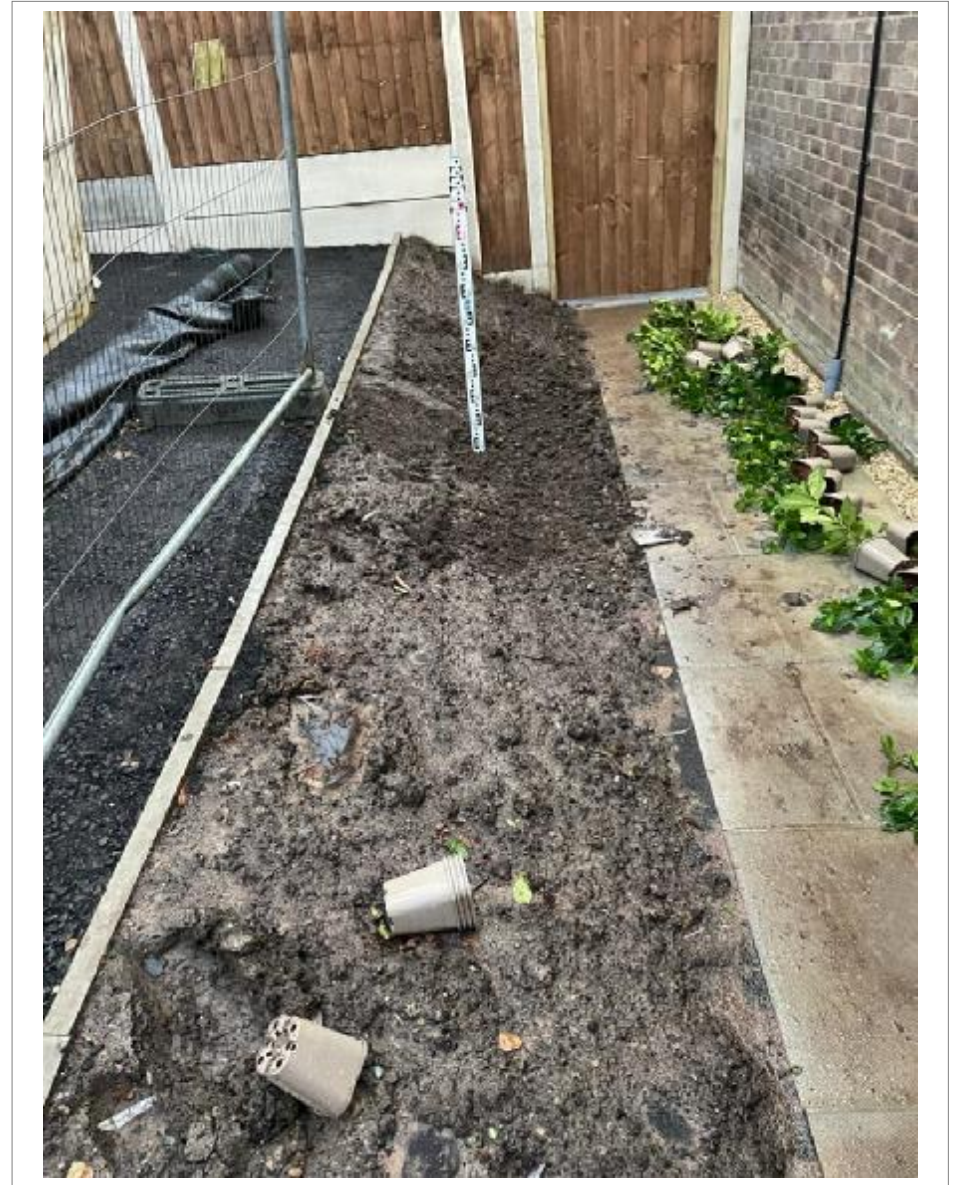


S1

VALIDATION TRIAL PIT PHOTOGRAPHS



TRIAL PIT S1

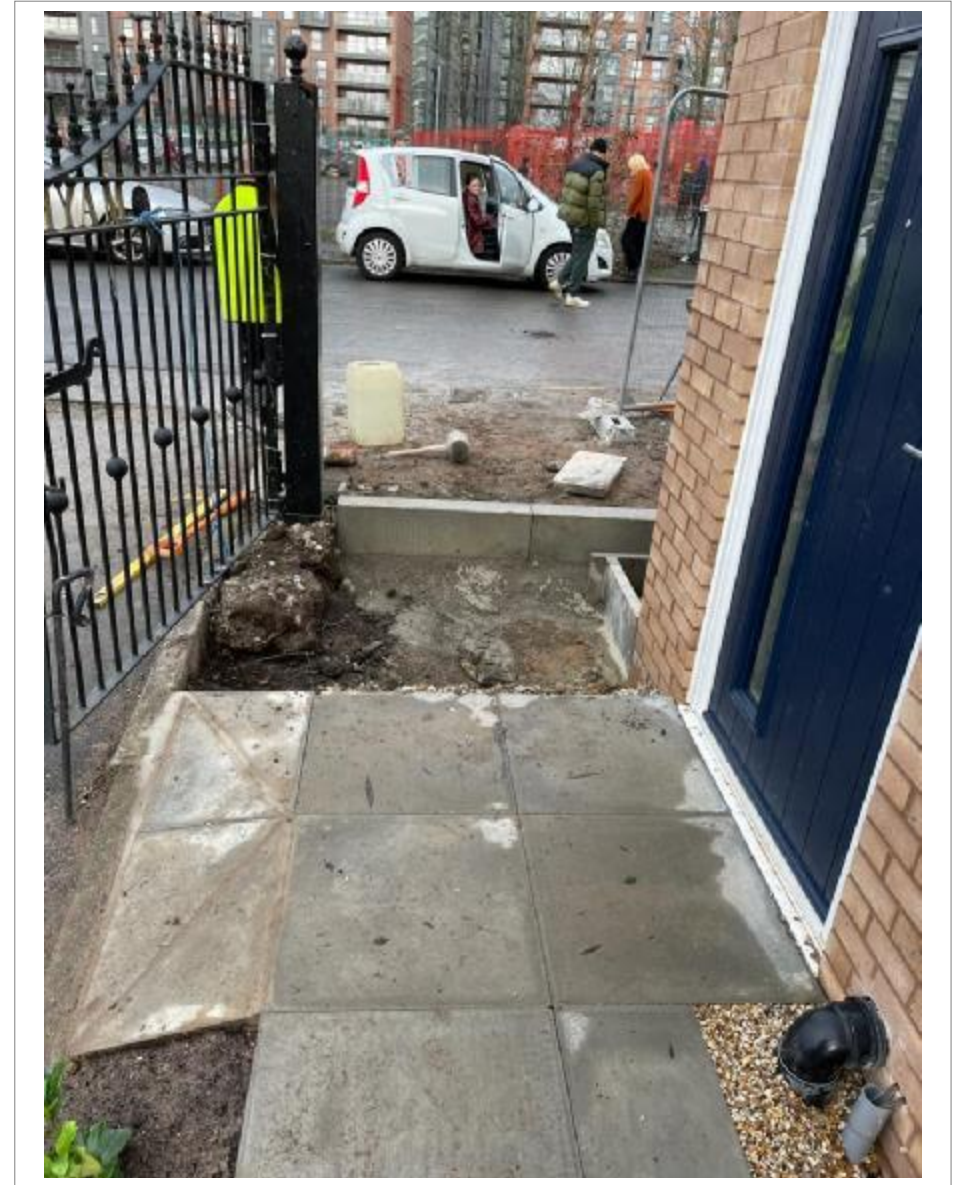


S2

VALIDATION TRIAL PIT PHOTOGRAPHS

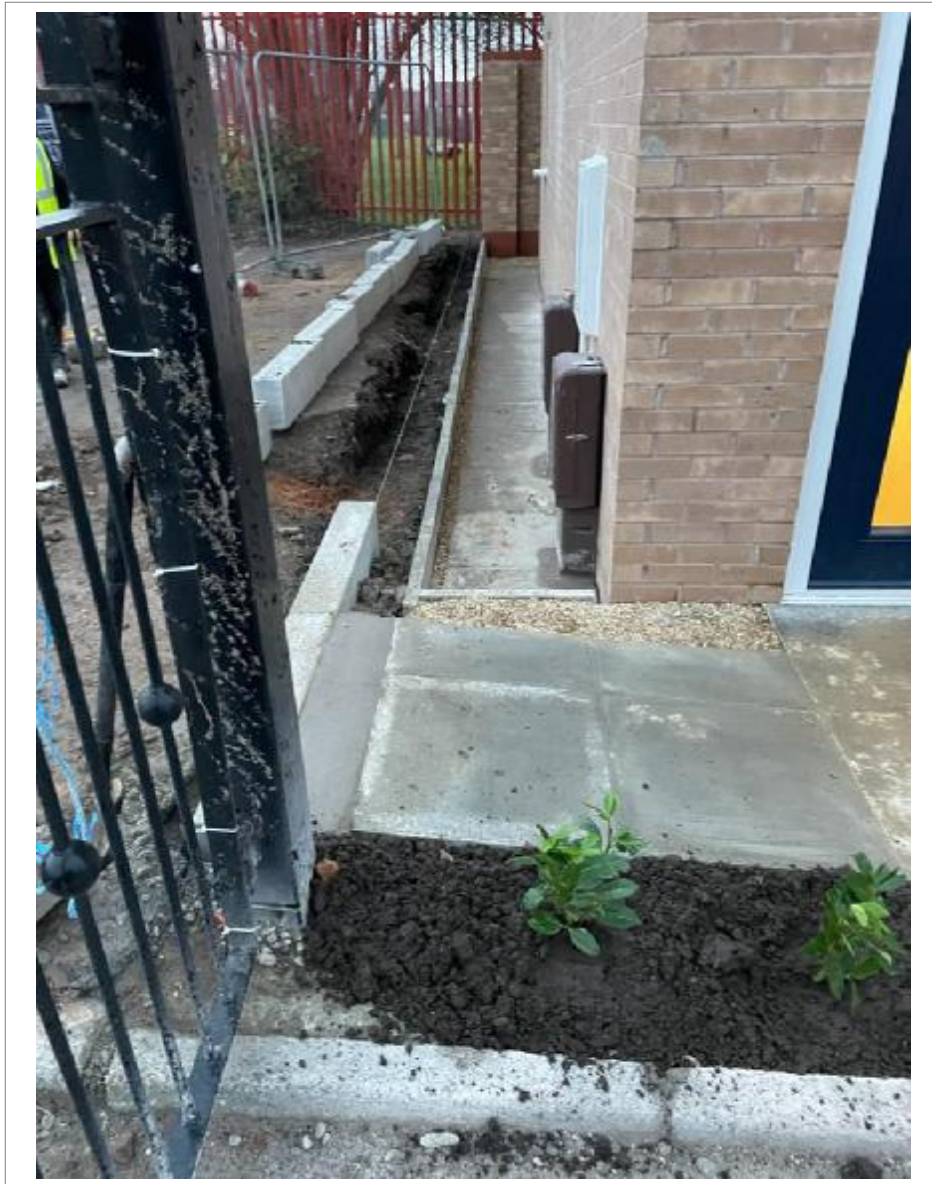


TRIAL PIT S2

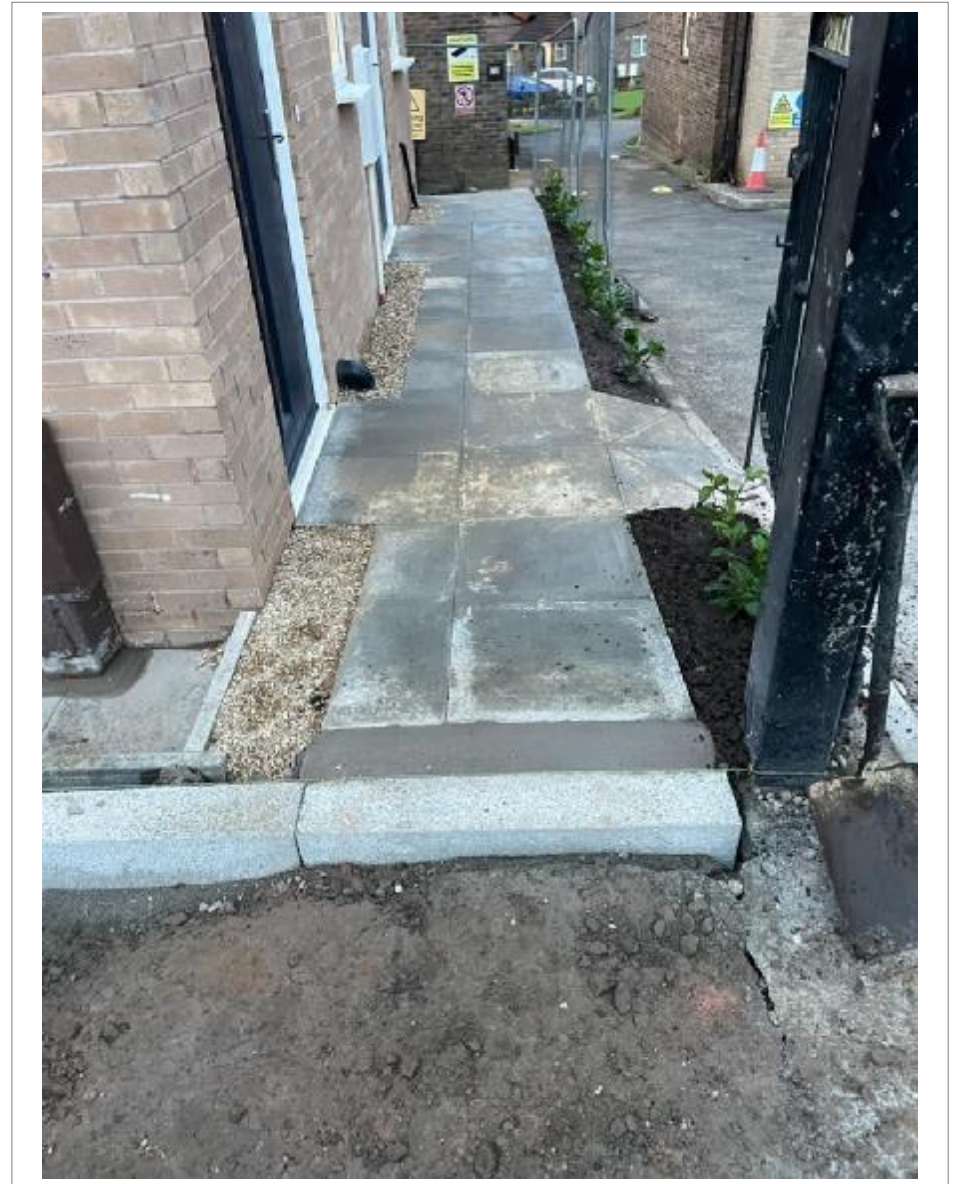


S3

VALIDATION TRIAL PIT PHOTOGRAPHS



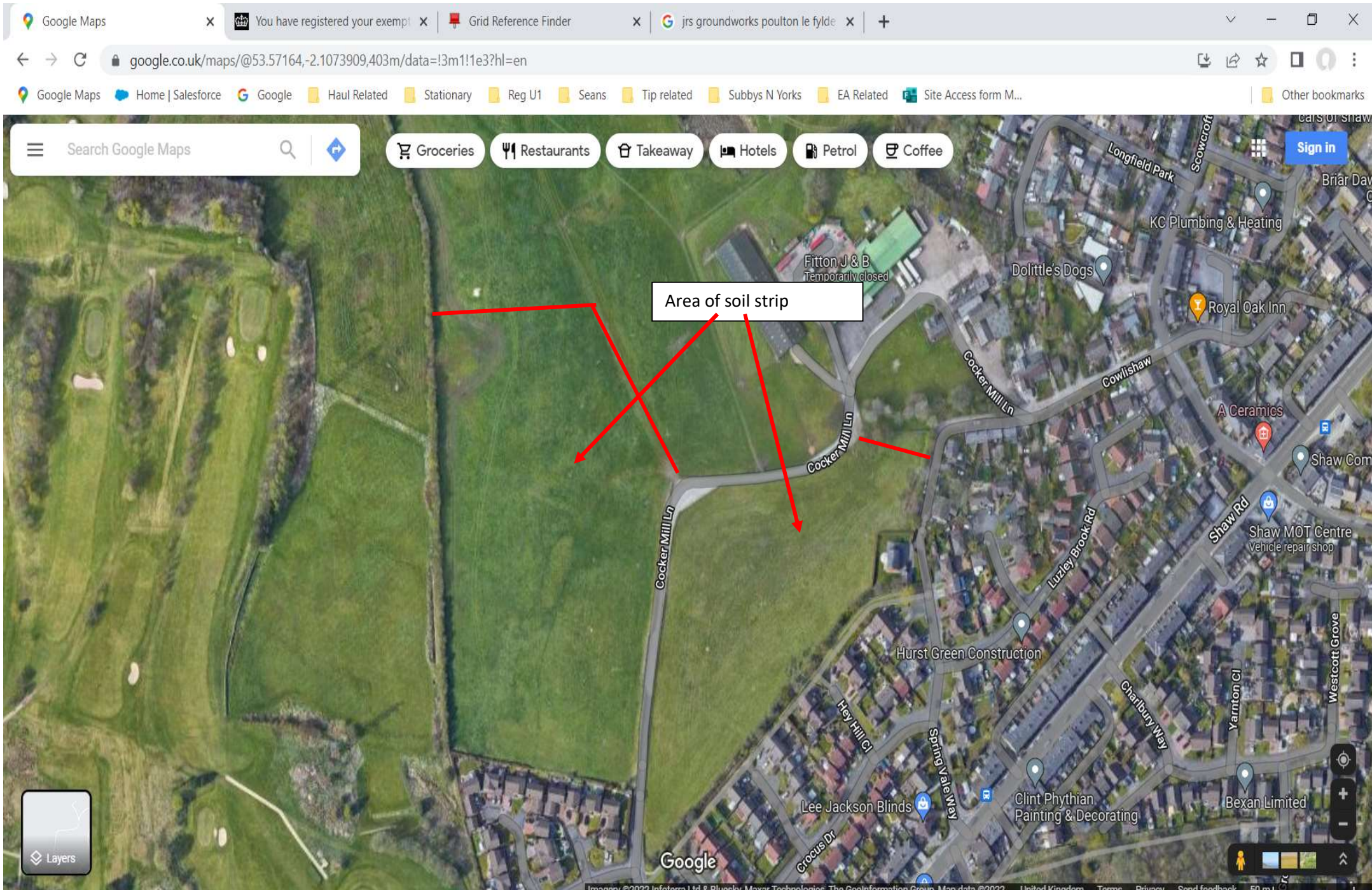
S3



S3

DHI Excavations Ltd 11 - 13 Church Street, Farnworth, Bolton. BL4 8AG		Serial No. DHI/ MAYES / 01															
Duty of Care - Controlled Waste Transfer Note		SIC Code: 41.20/2	Official use only														
A Description of the waste	1. How is the waste contained? ☒ Loose ☐ Skips ☐ Sacks ☐ Drums ☐ Other (Specify):																
	2. Describe the waste being transferred Classification code: 17-05-04																
	3. Quantity: 20 kg/Tonnes /m3 Group number:																
	4. The Landfill Tax (Qualifying Material) order schedule 2011 ☐ Applicable																
B Producer Details	1. Full name (print): DHI EXCAVATIONS LTD.																
	2. Company name, address and postcode: 11-13 Church St Farnworth Bolton BL4 8AG.																
	3. Which of the following are you? (Please tick one or more boxes)																
	<table border="0"> <tr> <td>A</td> <td>☐ Waste producer</td> <td>☒ Soil Producer</td> <td>☐ Waste collection/disposal authority</td> <td>☐ Broker</td> </tr> <tr> <td>B</td> <td colspan="2">☐ Holder of disposal / management licence</td> <td colspan="2">☐ Exempt from carrier Licence / Carrier number(s) Issued by:</td> </tr> <tr> <td>C</td> <td colspan="2">☐ Exempt from licensing requirements Reason:</td> <td colspan="2">☐ Exempt from carrier registration</td> </tr> </table>			A	☐ Waste producer	☒ Soil Producer	☐ Waste collection/disposal authority	☐ Broker	B	☐ Holder of disposal / management licence		☐ Exempt from carrier Licence / Carrier number(s) Issued by:		C	☐ Exempt from licensing requirements Reason:		☐ Exempt from carrier registration
A	☐ Waste producer	☒ Soil Producer	☐ Waste collection/disposal authority	☐ Broker													
B	☐ Holder of disposal / management licence		☐ Exempt from carrier Licence / Carrier number(s) Issued by:														
C	☐ Exempt from licensing requirements Reason:		☐ Exempt from carrier registration														
C Carrier Details	1. Full name (print): DHI Excavations Ltd																
	2. Company name, address and postcode: 11 - 13 Church Street, Farnworth, Bolton. BL4 8AG																
D First Transfer (producer to carrier)	☒ Registered carrier (give number): CBDU181466 SIC: 43120																
	We have fulfilled our obligation with regards to the waste hierarchy regulations 12 of Waste (England and Wales) Regulations 2011																
	1. Place of transfer: COCKER MILL lane Royton Oldham OL2 6LQ																
	2. Date of transfer: (for multiple transfer give between dates, see notes)																
E Disposer Details ☐ Waste ☐ Soils	3. Name and address of broker arranging transfer (if applicable): WCL No.																
	4. Producers representatives Carriers representatives Name (print): Simon Harrison Signed: [Signature]																
	1. Full name (print): GNL Construction LTD.																
	2. Company name, address and postcode: 324 Styal Rd Heald Green Cheadle SK8 3RS																
F Second Transfer (carrier to disposer)	3. Which of the following are you? (Please tick one or more boxes) ☐ Holder of waste disposal / management licence (give number): Issued by: N/A ☐ Exempt from licence requirements (give reason): N/A																
	1. Place of transfer: MAYES Gardens Harrison St MCR M47FN																
	2. Date of transfer: 19/12/22 19/12/22 (for multiple consignments give between dates)																
	4. Carriers representatives Disposers representatives Name (print): Simon Harrison Signed: [Signature] Company name: DHI Excavations Ltd Name (print): GARY GOLDRICH Signed: [Signature] Company name: GNL Construction																

Important: This page must be retained by you, on a register held by you, for at least two years from the date of the last transfer to which the note applies.
 White - DHI copy, Blue - Disposer copy, Yellow - Producer copy, Pink - Spare



Area of soil strip as indicated above: OL2 6LQ

INTERIM ANALYTICAL TEST REPORT

Envirolab Job Number: 22/04911
Issue Number: Int-2
Date: 30 May, 2022

Client: DHI Excavations
11-13 Church Street
Farnworth
Bolton
BL4 8AG.

Project Manager: Sean Kingston
Project Name: Cowlshaw Topsoil
Project Ref: Stockpile 1
Order No: N/A
Date Samples Received: 19/05/22
Date Instructions Received: 19/05/22
Date Analysis Completed: 27/05/22

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 22/04911

Client Project Name: Cowlshaw Topsoil

Client Project Ref: Stockpile 1

Lab Sample ID	22/04911/1							Units	Limit of Detection	Method ref
Client Sample No	SP1S1									
Client Sample ID	SP1 Sample 1									
Depth to Top										
Depth To Bottom										
Date Sampled	19-May-22									
Sample Type	Soil									
Sample Matrix Code	4A									
% Stones >10mm _A	<0.1							% w/w	0.1	A-T-044
pH _D ^{M#}	5.70							pH	0.01	A-T-031s
Sulphate (acid soluble) _D ^{M#}	700							mg/kg	200	A-T-028s
Cyanide (free) _A ^{M#}	<1							mg/kg	1	A-T-042sFCN
Cyanide (total) _A ^{M#}	<1							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2							mg/kg	0.2	A-T-050s
Arsenic _D ^{M#}	18							mg/kg	1	A-T-024s
Barium _D	107							mg/kg	1	A-T-024s
Cadmium _D ^{M#}	0.7							mg/kg	0.5	A-T-024s
Copper _D ^{M#}	45							mg/kg	1	A-T-024s
Chromium _D ^{M#}	21							mg/kg	1	A-T-024s
Lead _D ^{M#}	106							mg/kg	1	A-T-024s
Mercury _D	<0.17							mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	18							mg/kg	1	A-T-024s
Selenium _D ^{M#}	1							mg/kg	1	A-T-024s
Vanadium _D ^{M#}	33							mg/kg	1	A-T-024s
Zinc _D ^{M#}	81							mg/kg	5	A-T-024s
Vinyl Chloride (Chloroethene) _A [#]	<1							µg/kg	1	A-T-006s
trans 1,2-Dichloroethene _A [#]	<1							µg/kg	1	A-T-006s
1,1-Dichloroethane _A [#]	<1							µg/kg	1	A-T-006s
cis 1,2-Dichloroethene _A [#]	<1							µg/kg	1	A-T-006s
1,1,1-Trichloroethane _A [#]	<1							µg/kg	1	A-T-006s
Carbon Tetrachloride _A [#]	<1							µg/kg	1	A-T-006s
1,2-Dichloroethane _A [#]	<2							µg/kg	2	A-T-006s
Trichloroethene _A [#]	<1							µg/kg	1	A-T-006s
1,1,2-Trichloroethane _A [#]	<1							µg/kg	1	A-T-006s
Tetrachloroethene _A [#]	<1							µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane _A	<1							µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane _A	<1							µg/kg	1	A-T-006s

Envirolab Job Number: 22/04911

Client Project Name: Cowlshaw Topsoil

Client Project Ref: Stockpile 1

Lab Sample ID	22/04911/1							Units	Limit of Detection	Method ref
Client Sample No	SP1S1									
Client Sample ID	SP1 Sample 1									
Depth to Top										
Depth To Bottom										
Date Sampled	19-May-22									
Sample Type	Soil									
Sample Matrix Code	4A									
Asbestos in Soil (inc. matrix)										
Asbestos in soil ^o	NAD									A-T-045
Asbestos Matrix (visual) ^o	-									A-T-045
Asbestos Matrix (microscope) ^o	-									A-T-045
Asbestos ACM - Suitable for Water Absorption Test? ^o	N/A									A-T-045

Envirolab Job Number: 22/04911

Client Project Name: Cowlshaw Topsoil

Client Project Ref: Stockpile 1

Lab Sample ID	22/04911/1							Units	Limit of Detection	Method ref
Client Sample No	SP1S1									
Client Sample ID	SP1 Sample 1									
Depth to Top										
Depth To Bottom										
Date Sampled	19-May-22									
Sample Type	Soil									
Sample Matrix Code	4A									
PAH-16MS										
Acenaphthene _A ^{M#}	0.06							mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01							mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.07							mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.20							mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.17							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.24							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.10							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07							mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.25							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04							mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.56							mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.04							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.10							mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03							mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.37							mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.53							mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	2.69							mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/04911

Client Project Name: Cowlshaw Topsoil

Client Project Ref: Stockpile 1

Lab Sample ID	22/04911/1							Units	Limit of Detection	Method ref
Client Sample No	SP1S1									
Client Sample ID	SP1 Sample 1									
Depth to Top										
Depth To Bottom										
Date Sampled	19-May-22									
Sample Type	Soil									
Sample Matrix Code	4A									
Topsoil quality BS3882:2015 (without classification)										
% Coarse Fragment Content >2mm _A	0.0							N/A	0	A-T-044
% Coarse Fragment Content >20mm _A	0.0							N/A	0	A-T-044
% Coarse Fragment Content >50mm _A	0.0							N/A	0	A-T-044
Carbonate as CaCO _{3D}	<0.8							% w/w	0.83	CO3s
pH _D	5.89							pH	0.01	A-T-031s
Electrical conductivity (CaSO ₄ extract) _D	2070							µs/cm	10	A-T-037s
Loss on ignition (440°C) _D	8.0							% w/w	0.6	A-T-030s
Extractable phosphorus _D	12							mg/l	5	A-T-EXTMETS
Extractable Potassium (available) _D	80							mg/l	10	A-T-EXTMETS
Extractable Magnesium (available) _D	77							mg/l	10	A-T-EXTMETS
% Visible Contaminants >2mm _A	0.0							N/A	0	A-T-044
% Visible Contaminants Plastics _A	0.0							N/A	0	A-T-044
Sharps, number (in 1kg of sample) _A	0							N/A	0	A-T-044

Envirolab Job Number: 22/04911

Client Project Name: Cowlshaw Topsoil

Client Project Ref: Stockpile 1

Lab Sample ID	22/04911/1									
Client Sample No	SP1S1									
Client Sample ID	SP1 Sample 1									
Depth to Top										
Depth To Bottom										
Date Sampled	19-May-22									
Sample Type	Soil									
Sample Matrix Code	4A									
TPH CWG with Clean Up *C1										
Ali >C5-C6 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1							mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	1							mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	15							mg/kg	1	A-T-055s
Total Aliphatics _A	16							mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<1							mg/kg	1	A-T-055s
Aro >C10-C12 _A	<1							mg/kg	1	A-T-055s
Aro >C12-C16 _A	1							mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	6							mg/kg	1	A-T-055s
Aro >C21-C35 _A	14							mg/kg	1	A-T-055s
Total Aromatics _A	21							mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	37							mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01							mg/kg	0.01	A-T-022s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in *italic font* they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

EPH CWG results have humics mathematically subtracted through instrument calculation

TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: DHI Excavations, 11-13 Church Street, Farnworth, Bolton, BL4 8AG.

Project No: 22/04911

Project: Cowlshaw Topsoil

Date Received: 19/05/2022 (am)

Clients Project No: Stockpile 1

Cool Box Temperatures (°C): 14.7

NO DEVIATIONS IDENTIFIED with respect to sampling dates or containers received.

Note: If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3 (for water samples $5 \pm 3^{\circ}\text{C}$), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	22/04911/1
Client Sample No	SP1S1
Client Sample ID/Depth	SP1 Sample 1
Date Sampled	19/05/22
A-T-006s	24/05/2022
A-T-019s	24/05/2022
A-T-022s	25/05/2022
A-T-024s	27/05/2022
A-T-028s	26/05/2022
A-T-030s	25/05/2022
A-T-031s	25/05/2022
A-T-037s	25/05/2022
A-T-042sFCN	24/05/2022
A-T-042sTCN	24/05/2022
A-T-044	25/05/2022
A-T-045	20/05/2022
A-T-050s	24/05/2022
A-T-055s	25/05/2022
A-T-EXTMETS	27/05/2022
Calc	
Calc-no stones	
CO3s	26/05/2022
Gravimetry	26/05/2022

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report



ANALYTICAL TEST REPORT

Contract no: 110343

Contract name: Colishaw Topsoil, Royton

Client reference: Stockpile 1

Clients name: DHI Excavations

Clients address: 11-13 Church Street
Farnworth
Bolton
BL4 8AG

Samples received: 15 June 2022

Analysis started: 15 June 2022

Analysis completed: 17 June 2022

Report issued: 17 June 2022

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing
NAD	No Asbestos Detected

Approved by:

Megan Harris
Senior Reporting Administrator

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
110343-1	Sample 2	-	Clay with Roots	-	-	24.6
110343-2	Sample 3	-	Clay with Roots	-	-	24.9

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SOILS

Lab number			110343-1	110343-2
Sample id			Sample 2	Sample 3
Depth (m)			-	-
Date sampled			10/06/2022	10/06/2022
Test	Method	Units		
Arsenic (total)	CE127 ^M	mg/kg As	22	23
Barium (total)	CE127 ^M	mg/kg Ba	126	140
Cadmium (total)	CE127 ^M	mg/kg Cd	0.4	0.4
Chromium (total)	CE127 ^M	mg/kg Cr	79	65
Copper (total)	CE127 ^M	mg/kg Cu	41	43
Lead (total)	CE127 ^M	mg/kg Pb	104	110
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	<0.5
Nickel (total)	CE127 ^M	mg/kg Ni	24	24
Selenium (total)	CE127 ^M	mg/kg Se	1.7	1.8
Vanadium (total)	CE127 ^M	mg/kg V	46	44
Zinc (total)	CE127 ^M	mg/kg Zn	88	93
pH	CE004 ^M	units	6.1	6.0
Sulphate (total)	CE062 ^M	mg/kg SO ₄	541	566
Cyanide (free)	CE077	mg/kg CN	<1	<1
Cyanide (total)	CE077	mg/kg CN	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5
PAH				
Naphthalene	CE087 ^M	mg/kg	0.03	0.04
Acenaphthylene	CE087 ^M	mg/kg	<0.02	<0.02
Acenaphthene	CE087 ^M	mg/kg	0.09	0.06
Fluorene	CE087 ^U	mg/kg	0.05	0.04
Phenanthrene	CE087 ^M	mg/kg	0.74	0.53
Anthracene	CE087 ^U	mg/kg	0.14	0.13
Fluoranthene	CE087 ^M	mg/kg	1.02	0.83
Pyrene	CE087 ^M	mg/kg	0.94	0.77
Benzo(a)anthracene	CE087 ^U	mg/kg	0.43	0.37
Chrysene	CE087 ^M	mg/kg	0.51	0.43
Benzo(b)fluoranthene	CE087 ^M	mg/kg	0.50	0.43
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.19	0.15
Benzo(a)pyrene	CE087 ^U	mg/kg	0.39	0.35
Indeno(123cd)pyrene	CE087 ^M	mg/kg	0.31	0.28
Dibenz(ah)anthracene	CE087 ^M	mg/kg	0.05	0.05
Benzo(ghi)perylene	CE087 ^M	mg/kg	0.29	0.23
PAH (total of USEPA 16)	CE087	mg/kg	5.69	4.67
TPH				
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<1	<1
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	1	<1
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	2	<1

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SOILS

Lab number			110343-1	110343-2
Sample id			Sample 2	Sample 3
Depth (m)			-	-
Date sampled			10/06/2022	10/06/2022
Test	Method	Units		
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	8	4
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	<1	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6	<6
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<6	<6
EPH Aliphatic (>C16-C35)	CE250	mg/kg	<15	<15
EPH Aliphatic (>C35-C44)	CE250	mg/kg	<10	<10
Total Aromatic (>C5-C44)	CE225	mg/kg	<19	<19
Total Aliphatic (>C5-C44)	CE225	mg/kg	<19	<19
Total Aliphatic/Aromatic (>C5-C44)	CE225	mg/kg	<19	<19
Volatiles				
Vinyl chloride	CE174	mg/kg	<0.01	<0.01
1,1-Dichloroethene	CE174	mg/kg	<0.01	<0.01
Trans-1,2-Dichloroethene	CE174	mg/kg	<0.01	<0.01
Cis-1,2-Dichloroethene	CE174	mg/kg	<0.01	<0.01
1,1,1-Trichloroethane	CE174	mg/kg	<0.01	<0.01
Carbon tetrachloride	CE174	mg/kg	<0.01	<0.01
1,2-Dichloroethane	CE174	mg/kg	<0.01	<0.01
Trichloroethene	CE174	mg/kg	<0.01	<0.01
1,1,2-Trichloroethane	CE174	mg/kg	<0.01	<0.01
Tetrachloroethene	CE174	mg/kg	<0.01	<0.01
1,1,1,2-Tetrachloroethane	CE174	mg/kg	<0.01	<0.01
Subcontracted analysis				
Asbestos (qualitative)	\$	-	NAD	NAD

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE127	Barium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ba
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Vanadium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg V
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE062	Sulphate (total)	Acid extraction, ICP-OES	Dry	M	100	mg/kg SO ₄
CE077	Cyanide (free)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	As received		0.5	mg/kg PhOH
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE250	EPH Aromatic (>EC10-EC12)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC12-EC16)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC16-EC21)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC21-EC35)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC35-EC44)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE250	EPH Aliphatic (>C10-C12)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C12-C16)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C16-C35)	Solvent extraction, GCxGC-FID	As received		15	mg/kg
CE250	EPH Aliphatic (>C35-C44)	Solvent extraction, GCxGC-FID	As received		10	mg/kg
CE174	Vinyl chloride	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,1-Dichloroethene	Headspace GC-MS	As received		0.01	mg/kg
CE174	Trans-1,2-Dichloroethene	Headspace GC-MS	As received		0.01	mg/kg
CE174	Cis-1,2-Dichloroethene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,1,1-Trichloroethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Carbon tetrachloride	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,2-Dichloroethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Trichloroethene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,1,2-Trichloroethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Tetrachloroethene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,1,1,2-Tetrachloroethane	Headspace GC-MS	As received		0.01	mg/kg
CE225	Total Aromatic (>C5-C44)	Sum of Aliphatic & Aromatic VPH (>C5-C10) & EPH (>C10-C44)	As received		19	mg/kg
CE225	Total Aliphatic (>C5-C44)	Sum of Aliphatic & Aromatic VPH (>C5-C10) & EPH (>C10-C44)	As received		19	mg/kg
CE225	Total Aliphatic/Aromatic (>C5-C44)	Sum of Aliphatic & Aromatic VPH (>C5-C10) & EPH (>C10-C44)	As received		19	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
110343-1	Sample 2	-	N	
110343-2	Sample 3	-	N	

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

For soils and solids, analytical results are inclusive of stones, where applicable.

Risk Parameter: Human Health - residential with plant uptake (1.0% SOM)
Data set: ALL

Project No: 1308 Client: Multibuild UK Ltd
Project: Mayes Garden, Manchester

All values in mg/kg unless otherwise stated							Soil Type:	SOIL	SOIL	SOIL										
							Location:	S1	S2	S3										
							Depth:													
							Lab	S	S	S										
Chemicals of Potential Concern	No Samples	Min. Value	Max. Value	No. Samples >or = GAC	GAC	US ₉₅	Result of Significance Test													
								Potentially Suitable For Use	N.D.	N.D.	N.D.									
Asbestos	3	-	-		-	-														
General Suite																				
Arsenic	3	18	23		37		Potentially Suitable For Use	18	22	23										
Boron					290															
Cadmium	3	0.4	0.7		11		Potentially Suitable For Use	0.70	0.40	0.40										
Chromium (III)	3	21	79		910		Potentially Suitable For Use	21	79	65										
Chromium (VI)					6															
Copper	3	41	45		2400		Potentially Suitable For Use	45	41	43										
Lead	3	104	110		200		Potentially Suitable For Use	106	104	110										
Mercury, inorganic	3	0.17	0.5		40		Potentially Suitable For Use	0.17	0.50	0.5										
Mercury elemental	3	0.17	0.5		1.2		Potentially Suitable For Use	0.17	0.50	0.5										
Mercury Methyl	3	0.17	0.5		11		Potentially Suitable For Use	0.17	0.50	0.5										
Nickel	3	18	24		130		Potentially Suitable For Use	18	24	24										
Selenium	3	1	1.8		250		Potentially Suitable For Use	1	1.7	1.8										
Zinc	3	81	93		3700		Potentially Suitable For Use	81	88	93										
Cyanide (free)	3	1	1		24		Potentially Suitable For Use	1	1	1										
Phenol (total)	2	0.5	0.5		120		Potentially Suitable For Use		0.50	0.50										
Acenaphthene	3	0.06	0.09		210		Potentially Suitable For Use	0.06	0.09	0.06										
Acenaphthylene	3	0.01	0.02		170		Potentially Suitable For Use	0.01	0.02	0.02										
Anthracene	3	0.07	0.14		2400		Potentially Suitable For Use	0.07	0.14	0.13										
Benzo(a)anthracene	3	0.2	0.43		7.2		Potentially Suitable For Use	0.2	0.43	0.37										
Benzo(a)pyrene	3	0.17	0.39		2.2		Potentially Suitable For Use	0.17	0.39	0.35										
Benzo(b)fluoranthene	3	0.24	0.5		2.6		Potentially Suitable For Use	0.24	0.5	0.43										
Benzo(ghi)perylene	3	0.1	0.29		320		Potentially Suitable For Use	0.1	0.29	0.23										
Benzo(k)fluoranthene	3	0.07	0.19		77		Potentially Suitable For Use	0.07	0.19	0.15										
Chrysene	3	0.25	0.51		15		Potentially Suitable For Use	0.25	0.51	0.43										
Dibenz(a,h)anthracene	3	0.04	0.05		0.24		Potentially Suitable For Use	0.04	0.05	0.05										
Fluoranthene	3	0.56	1.02		280		Potentially Suitable For Use	0.56	1.02	0.83										
Fluorene	3	0.04	0.05		170		Potentially Suitable For Use	0.04	0.05	0.04										
Indeno(1,2,3,cd)pyrene	3	0.1	0.31		27		Potentially Suitable For Use	0.1	0.31	0.28										
Napthalene	3	0.03	0.04		2.3		Potentially Suitable For Use	0.03	0.03	0.04										
Phenanthrene	3	0.37	0.74		95		Potentially Suitable For Use	0.37	0.74	0.53										
Pyrene	3	0.53	0.94		620		Potentially Suitable For Use	0.53	0.94	0.77										
VOCs-BTEX & MTBE																				
Benzene	1	0.01	0.01		0.087		Potentially Suitable For Use	0.01												
Toluene	1	0.01	0.01		130		Potentially Suitable For Use	0.01												
Ethylbenzene	1	0.01	0.01		47		Potentially Suitable For Use	0.01												
Xylene o-	1	0.01	0.01		60		Potentially Suitable For Use	0.01												
Xylene m-	1	0.01	0.01		59		Potentially Suitable For Use	0.01												
Xylene p-	1	0.01	0.01		56		Potentially Suitable For Use	0.01												
MTBE	1	0.01	0.01		49		Potentially Suitable For Use	0.01												
TPH Fractions																				
TPH ali EC05-EC06	3	1	1		42		Potentially Suitable For Use	1	1	1										
TPH ali >EC06-EC08	3	1	1		100		Potentially Suitable For Use	1	1	1										
TPH ali >EC08-EC10	3	1	1		27		Potentially Suitable For Use	1	1	1										
TPH ali >EC10-EC12	3	1	6		48		Potentially Suitable For Use	1	6	6										
TPH ali >EC12-EC16	3	1	6		24		Potentially Suitable For Use	1	6	6										
TPH ali >EC16-EC35	3	11	16		65000		Potentially Suitable For Use	16	15	15										
TPH ali >EC35-EC44	2	10	10		65000		Potentially Suitable For Use		10	10										
TPH aro EC05-EC07	3	1	1		70		Potentially Suitable For Use	1	1	1										
TPH aro >EC07-EC08	3	1	1		130		Potentially Suitable For Use	1	1	1										
TPH aro >EC08-EC10	3	1	1		34		Potentially Suitable For Use	1	1	1										
TPH aro >EC10-EC12	3	1	1		74		Potentially Suitable For Use	1	1	1										
TPH aro >EC12-EC16	3	1	1		140		Potentially Suitable For Use	1	1	1										
TPH aro >EC16-EC21	3	11	6		260		Potentially Suitable For Use	6	2	1										
TPH aro >EC21-EC35	3	10	14		1100		Potentially Suitable For Use	14	8	4										
TPH aro >EC35-EC44	2	10	1		1100		Potentially Suitable For Use		1	1										
TPH >EC44-EC70					1600															
Dioxins, furans & dioxin-like-PCBs																				
Total Dioxins, furans & DL-PCB (aerial dep)					0.0085															
Non-dioxin-like PCBs																				
PCB-28					0.2															
PCB-52					0.2															
PCB-101					0.34															
PCB-138					0.36															
PCB-153					0.36															
PCB-180					0.37															

Legend: MG denotes Made Ground, NAT denotes Natural Ground

Risk Parameter: Residential SOM 1% Inhalation Pathway only for Volatile PAH's and
Data set: ALL

Project No: 1308 Client: Multibuild UK Ltd
Project: Mayes Garden, Manchester

All values in mg/kg unless otherwise stated								Soil Type:	SOIL	SOIL	SOIL								
								Location:	S1	S2	S3								
								Depth:											
								Lab	S	S	S								
Chemicals of Potential Concern	No Samples	Min. Value	Max. Value	No. Samples >or = GAC	GAC	Cheby chev US ₉₅	US ₉₅	Result of Significance Test											
General Suite																			
Napthalene	3	0.03	0.04		16			Potentially Suitable For Use	0.03	0.03	0.04								
VOCs-BTEX & MTBE																			
Benzene	1	0.01	0.01		0.27			Potentially Suitable For Use	0.01										
TPH Fractions																			
TPH ali EC05-EC06	3	1	1		30			Potentially Suitable For Use	1	1	1								
TPH ali >EC06-EC08	3	1	1		73			Potentially Suitable For Use	1	1	1								
TPH ali >EC08-EC10	3	1	1		19			Potentially Suitable For Use	1	1	1								
TPH ali >EC10-EC12	3	1	6		93			Potentially Suitable For Use	1	6	6								
TPH ali >EC12-EC16	3	1	6		782			Potentially Suitable For Use	1	6	6								
TPH aro EC05-EC07	3	1	1		266			Potentially Suitable For Use	1	1	1								
TPH aro >EC07-EC08	3	1	1		626			Potentially Suitable For Use	1	1	1								
TPH aro >EC08-EC10	3	1	1		33			Potentially Suitable For Use	1	1	1								
TPH aro >EC10-EC12	3	1	1		182			Potentially Suitable For Use	1	1	1								
TPH aro >EC12-EC16	3	1	1		2000			Potentially Suitable For Use	1	1	1								

Legend: MG denotes Made Ground, NAT denotes Natural Ground

APPENDIX B

GAS PROTECTION MEASURES REMEDIATION VALIDATION

- § Foundation Drawings
- § Gas Membrane Details
- § Gas Protection Measures Photos

GENERAL NOTES

FOUNDATIONS

1. All work is to be in accordance with the relevant BS Codes of Practice and the Specification.
2. Safe Bearing Pressure used in design = 200 kN/m^2 .
3. Formation level of foundation to be checked by Engineer and approved by Building Control Officer before the concrete is placed.
4. All soft areas are to be removed and replaced with strength class C8/10 concrete having a cube crushing strength of 10 N/mm^2 .
5. Formation level to be protected with 50mm thick concrete blinding. Details of blinding as (4) above.
6. Foundations to be strength class C28/35 concrete having a minimum cube crushing strength of 35 N/mm^2 at 28days
7. Minimum cement content to be 300 kg/m^3 and size of aggregate to be 10/20.
8. Cover to reinforcement, where used, to be 50mm minimum.

CDM NOTES

CONCRETE POUR

- Protective clothing to be used.
- Contractor to ensure formwork is designed for the appropriate structure and is suitably constructed.
- Contractor is to ensure excavation is suitably propped and supported.
- Excavation is to be suitably cordoned off.
- Contractor is to ensure no pooling of concrete occurs on metal composite decking sheets.

DEMOLITION WORKS

- Protective clothing to be used.
- Working area to be adequately cordoned off.
- Propping where necessary should be used and props installed to the manufactures specifications.
- All existing services to be identified and disconnected prior to demolition.

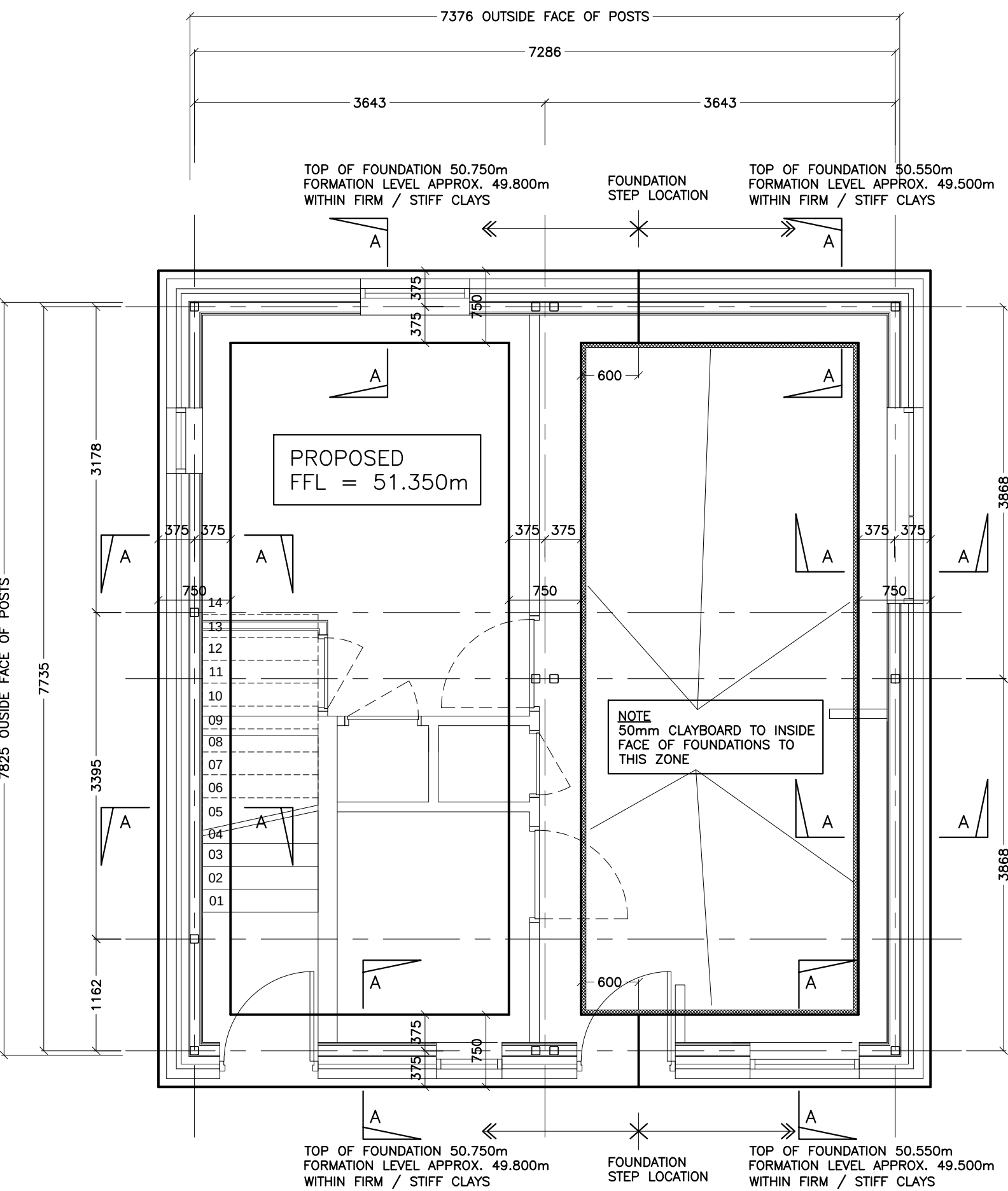
EXCAVATION WORKS

- Protective clothing to be used.
- Working area to be adequately cordoned off.
- Propping where necessary should be used and props installed to the manufactures specifications.
- All existing services to be identified, stopped up, prior to excavation works.
- Debris to be removed at regular intervals.
- Contractor to use suitable lifting and removal techniques.

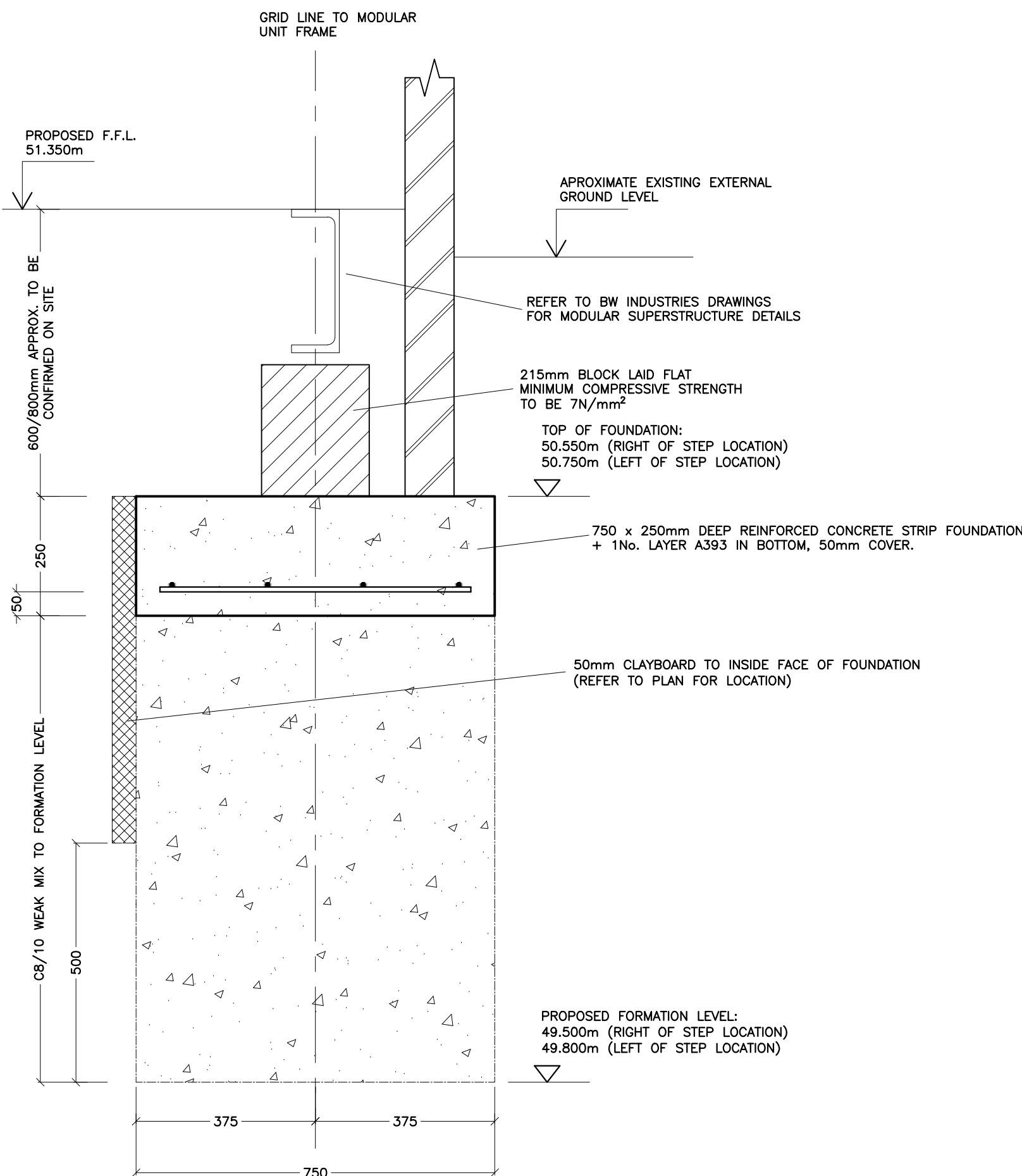
NOTE

DRAWING TO BE READ IN CONJUNCTION WITH ARCHITECTS DETAILS AND
BW INDUSTRIES DRAWINGS AND DETAILS.

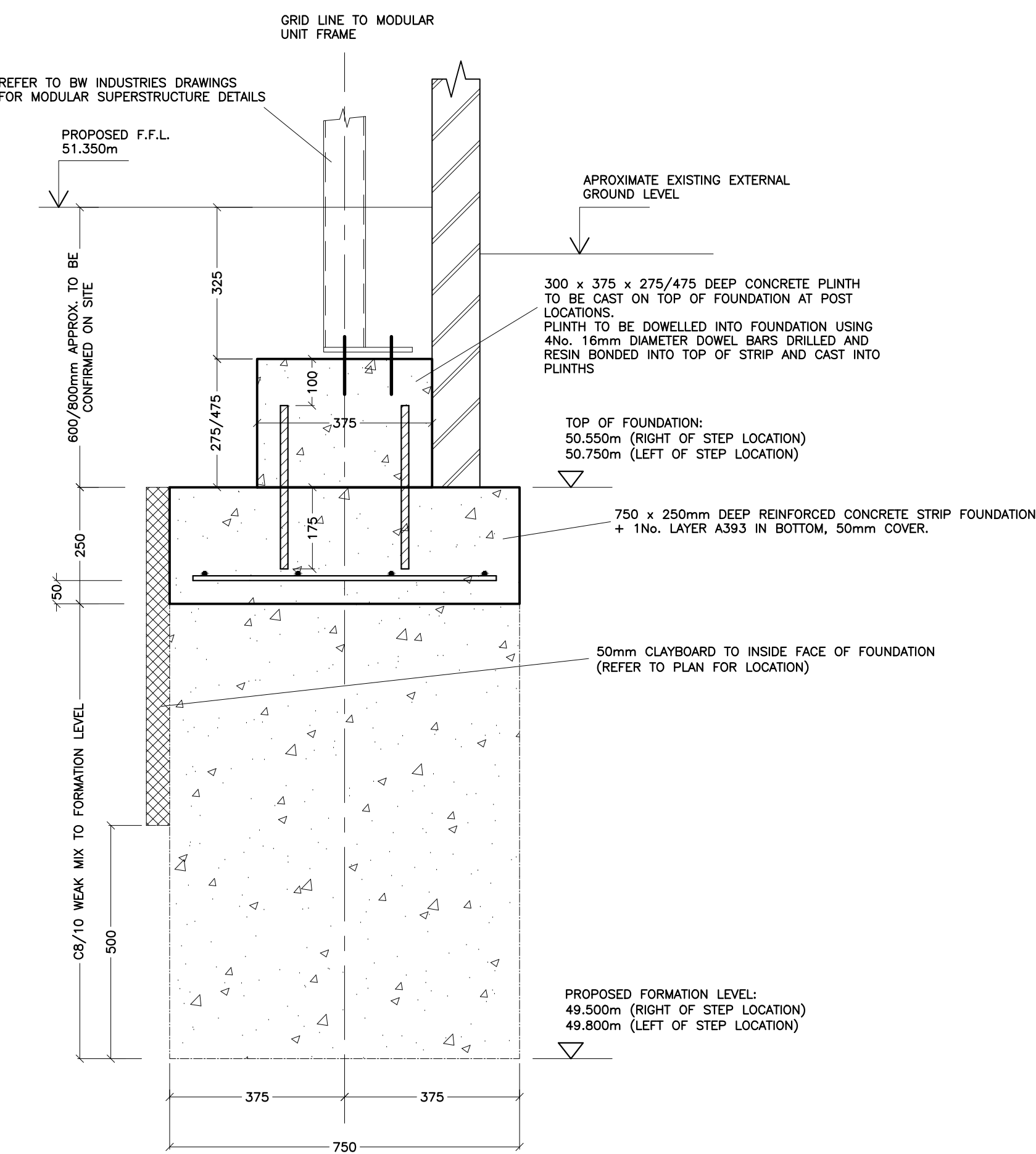
FOR SETTING OUT REFER TO BW INDUSTRIES DRAWINGS AND DETAILS.



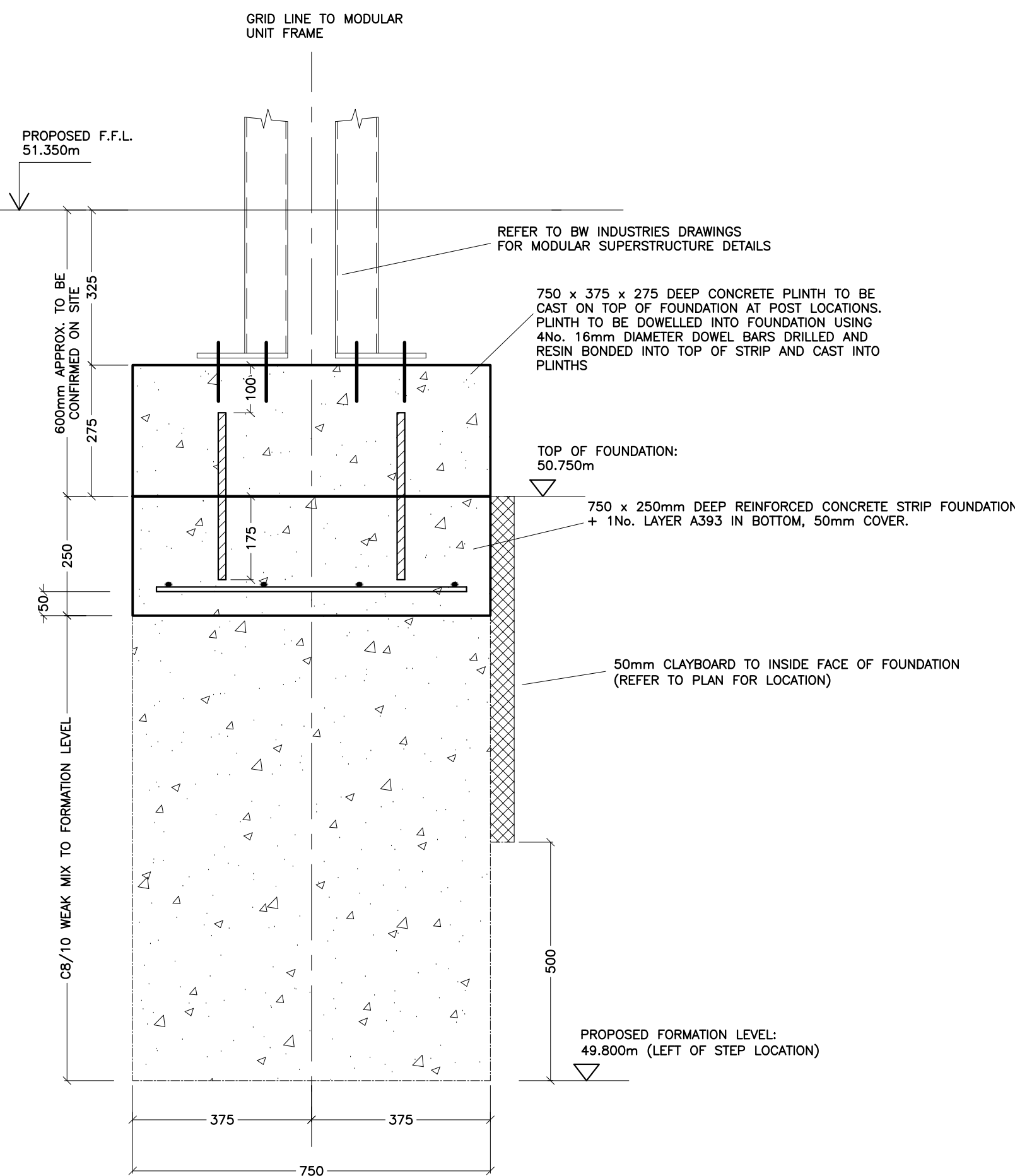
PLAN ON PROPOSED FOUNDATIONS TO MODULAR UNITS (1:50)



TYPICAL SECTION 'A-A' THROUGH
STRIP FOUNDATION (1:10)



TYPICAL SECTION 'A-A' THROUGH STRIP
FOUNDATION AT POST LOCATIONS (1:10)



TYPICAL SECTION THROUGH STRIP FOUNDATION AT POS
LOCATIONS TO CENTRAL GRID LINE (1:10)

This drawing is the property of Frederick G. Markland Associates Limited and should not be reproduced without written permission. Contractors are to check all levels and dimensions on site prior to commencement of works and report any discrepancies to the designers. Do not scale this drawing.

Client	
--------	--

Multi Build UK

Project Title

Mayes Gardens Apartments
Manchester.

Drawing Title

Proposed Foundation Details to 2 Storey Modular Building

Drawn By
NPC

Date
26/05/22

Checked By	CM
------------	----

Date	Issue
26/05/22	Information

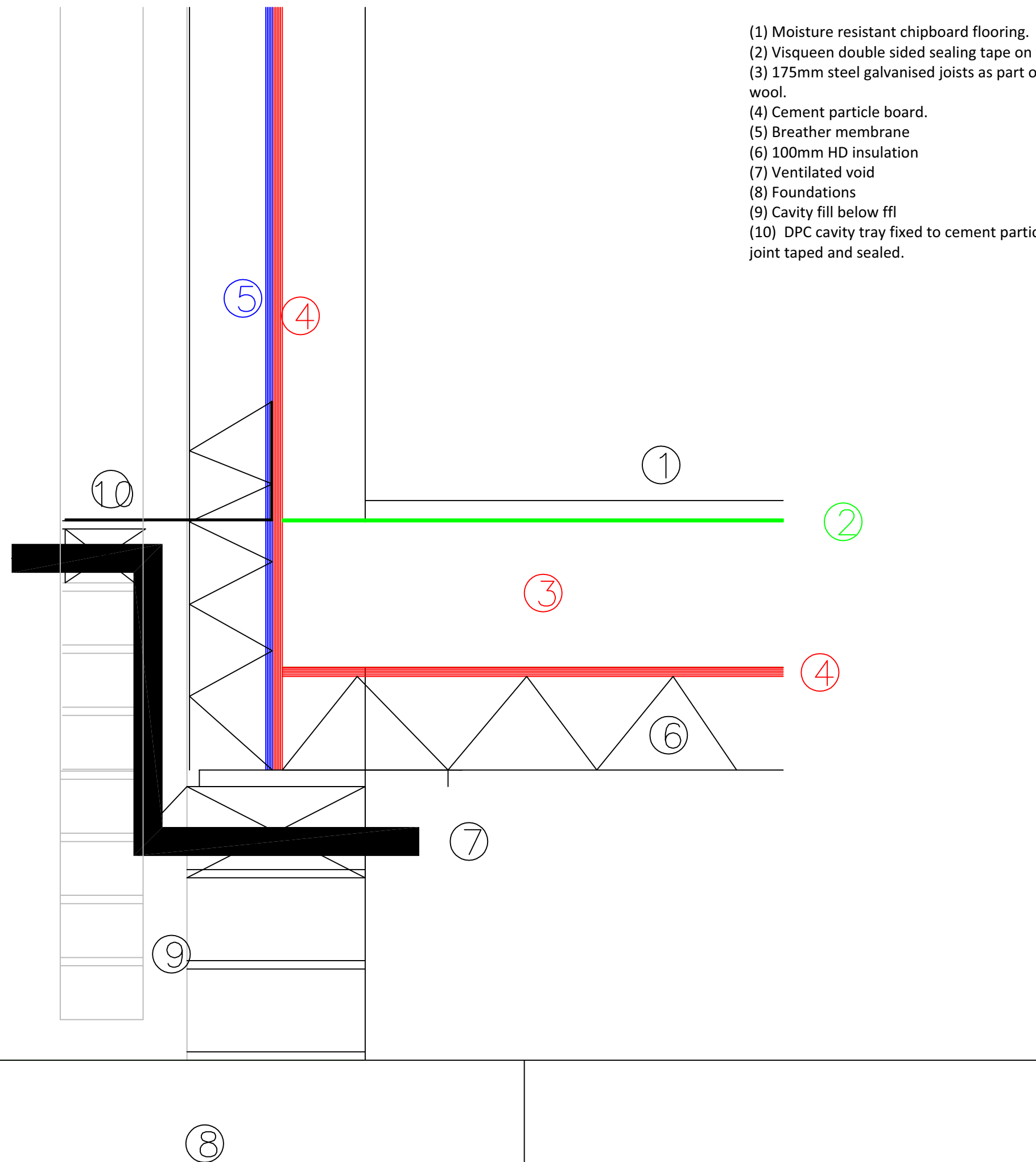
Job No.
Y22047

Drawing No.
01

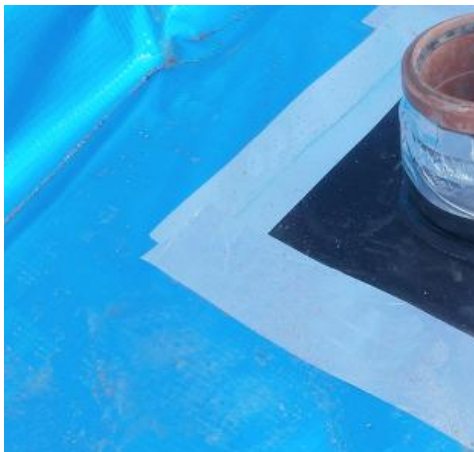


a Corby House 38A Chorley New Road Bolton BL1 4AP t 01204 531 208 f 01204 380 474 e fgmarkland@btconnect.com w www.fgmarkland.co.uk	Plot Style FGM Revision
--	---

- (1) Moisture resistant chipboard flooring.
- (2) Visqueen double sided sealing tape on top of visqueen gas membrane
- (3) 175mm steel galvanised joists as part of modular construction filled between with mineral wool.
- (4) Cement particle board.
- (5) Breather membrane
- (6) 100mm HD insulation
- (7) Ventilated void
- (8) Foundations
- (9) Cavity fill below ffl
- (10) DPC cavity tray fixed to cement particle sheathing board lap behind breather membrane joint taped and sealed.



PROJECT
Mayes gardens
section substructure
Finshed floor
Date
June 2022
Scale
NTS
Drwg. No.
MBUK/001
Rev.



VISQUEEN
BUILDING PRODUCTS



- **BBA approved, fully complies with BS8485:2015**
- **Low permeability to methane, radon and carbon dioxide**
- **Approved for use in NHBC Amber 2 applications**
- **Multi-layer reinforced LDPE membrane with aluminium core**
- **High puncture and tear resistance**

Description

Visqueen Gas Barrier is a 400 gsm multi-layer reinforced polyethylene membrane with an integral 20 micron aluminium foil that is approved for use in BS8485:2015 and NHBC Amber 2 applications. For ease of identification on site Visqueen Gas Barrier is coloured blue on one side and silver on the reverse. The barrier combines strength and performance with flexibility and easy installation. Visqueen Gas Barrier also acts as a damp proof membrane.

BS8485:2015

When risk assessing under BS8485:2015 for sites which are effected by methane and carbon dioxide then the Visqueen Gas Barrier is an ideal solution.

The membrane has been modified to be 400 gsm with the multi layer structure greatly enhanced to improve its puncture and impact performance.

Visqueen utilise a 20 microns foil to avoid issues associated with thinner (12microns) foils.

Application

The Building Regulations require that proper precautions be taken to prevent danger to health and safety when building on contaminated land. Visqueen Gas Barrier offers a safe solution for the protection of buildings against methane, radon, stythe (a gas commonly found from disused mines, also known as blackdamp), and carbon dioxide, when installed in accordance with the relevant codes of practice such as BRE, CIRIA and the Chartered Institute of Environmental Health Ground Gas Handbook

Typically these are sites previously used as coalfields, landfill or are contaminated industrial sites.

The membrane should be installed blue side up

System components

- Visqueen Double Sided Jointing Tape
- Visqueen Gas Resistant (GR) Foil Tape
- Visqueen Top Hat Units
- Visqueen TreadGUARD1500
- Visqueen Detailing Strip

Installation Guidelines

Visqueen Gas Barrier and ancillary components must be installed in accordance with the recommendations of Building Research Establishment BRE 414 "Protective measures for housing on gas contaminated land" and CIRIA C665 "Assessing risks posed by hazardous ground gases to buildings", NHB C guidelines, and the Chartered Institute of Environmental Health Ground Gas Handbook. The product is not intended for use where there is a risk of hydrostatic pressure. **The membrane should be installed blue side up**



The membrane should be installed on a compacted sand blinding layer or smooth concrete float finish. In areas where high levels of unsupported membrane occur it is recommended that Visqueen Pre Applied Membrane is used. To avoid slip or shear planes and high compressive loadings it is not recommended to take the membrane through the wall. In order to provide a continuous barrier across the cavity Visqueen Gas Resistant DPC should be taken through the blockwork and incorporated below the damp proof course cavity tray in the outer leaf.

Laps can be joined together by either using the Visqueen Gas Barrier jointing system or welded by our specialist on-site contractors.

Jointing and Sealing

Visqueen Gas Barrier should be overlapped by at least 150mm (Welded membranes can be by less than 150mm as long as the joint integrity is not compromised) and bonded with Visqueen Double Sided Tape. The joint should be secured with Visqueen Foil Backed Girth Jointing Tape. Ensure that the membrane is clean and dry at the time of jointing

Airtight seals should be formed around all service entry points. Visqueen Pre-formed Top Hat Units must be used for sealing service entry pipes. The base of the top hat should be sealed using Visqueen Double Sided Tape and Visqueen Foil Backed Girth Jointing Tape is used to secured the joint

Punctures

If the membrane is punctured or perforated, then a patch of material with identical thickness should be lapped at least 150mm beyond the limits of the puncture and bonded with Visqueen Double Sided Jointing Tape and seal with Visqueen Foil Backed Jointing Tape. Alternatively a patch can be formed using Visqueen Detailing Strip and lapped at least 150mm beyond the limits of the puncture. External and Internal corners should be round and reinforced with Visqueen Detailing Strip. Where this is not possible and the 3 dimensional shapes are complex it is recommended a pre-formed unit is used.

NB. In demanding site conditions use Visqueen GR Lap Tape as a high performance alternative to Visqueen Foil Jointing Tape.

Ventilation

When medium to high levels of ground gases are present or when the generation of gases still occurs, then an open void beneath the ground floor should be constructed, as ventilation beneath the ground floor will dilute and disperse the gases to atmosphere. Open voids are normally restricted to beam and block floors or other precast concrete floor systems, an alternative for providing ventilation to in situ concrete floor slabs is to install a Visqueen Ventilation System.

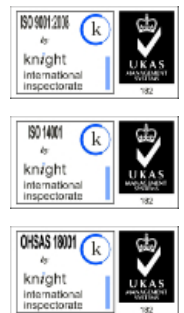
Covering

Visqueen Gas Barrier should be covered by a protective layer as soon as possible after installation. Care should be taken to ensure that the membrane is not punctured, stretched or displaced when applying a screed or final floor covering. A minimum thickness of 50mm screed is recommended. When reinforced concrete is to be laid over the barrier the wire reinforcements and spacers must be prevented from contacting the barrier.

It is recommended that the barrier is covered with Visqueen Protection Boards or screed before positioning the reinforcement. When underfloor heating is being installed, it is recommended that the barrier is positioned between the blinded hardcore and insulation. This will protect the insulation from moisture and avoid any risk of overheating the membrane.

Storage and Handling

Visqueen Gas Barrier is classified as non-hazardous when used in accordance with the relevant Code of Practice (CP 1021973). The product is chemically inert and is not affected by acids and alkalis that may be present in the



sub-soils. The material is not recommended for uses where it will be exposed to long periods of outdoor weathering as exposure to ultraviolet light will embrittle the product. Weathering will not occur when the membrane is installed in accordance with CP102 1973. Care should be taken to avoid accidental damage when handling the membrane on site. When the weather is cold, Visqueen Double Sided Jointing Tape and Visqueen Foil Backed Girth Jointing Tape should be kept in a warm, dry place until needed. Installation is not recommended below 5°C.

Technical Data and CE Mark

Visqueen Gas Barrier complies with the requirements and clauses of EN 13967 - Flexible sheets for waterproofing - Plastic and rubber damp proof sheets including plastic rubber basement tanking sheet - Definitions and characteristics.

British Board of Agreement performed the initial inspection of the manufacturing plant and of factory production control and the continuous surveillance, assessment and evaluation of factory production control, and issued the certificate of constancy of conformity of the factory production control 0836-CPR-13/F060 applies.



Product Data

Gas Barrier
CE Mark to EN 13967

Product Data

heading	Characteristic	Test method	Units	Compliance criteria	Value or Statement
	Visible defects	EN 1850 -2	-	Pass/Fail	Pass
	Length	EN 1848-2	m	-0%/+10%	25 or 50
	Width	EN 1848-2	m	-0%/+10%	2
	Thickness	EN 1849-2	mm	-10%/+10%	0.52
	Mass	EN 1849-2	g/m2	-7%/+7%	400
	Tensile Strength - MD	EN EN12311	N	>MLV	350
	Tensile Strength - CD	EN EN12311	N/mm2	>MLV	350
	Tensile Elongation - MD	EN EN12311	%	>MLV	17
	Tensile Elongation - CD	EN EN12311	%	>MLV	15
	Joint Strength	EN12317-2	N	>MLV	332
	Watertightness 2kPa	EN 1928	-	Pass/Fail	Pass
	Resistance to impact	EN 12691	mm	>MLV	200
	Dart Impact	BS 2782	g	MDV	731
	Low temperature flexibility	EN 495-5	oC	-40	Pass
	Durability against ageing	EN 1296 and EN 1928	-	Pass/Fail	Pass
	Durability Chemical Resistance	EN 1847	-	Pass/Fail	Pass
	Resistance to tearing (nail shank) CD	EN 12310-1	N	MDV	358
	Resistance to tearing (nail shank) MD	EN 12310-1	N	MDV	368
	Resistance to static loading	EN 12730	Kg	>MLV	Pass 20
	Water vapour transmission - resistance	EN 1931	MNs/g	MDV	7000
	Water vapour transmission - permeability	EN 1931	g/m2/d	MDV	0.03
	Reaction to Fire	EN 13501-1	Class	MDV	F
BS8485:2015 testing requirements					
	Mass	EN 1849-2	g/m2	Average >370	400
	Methane Permeability	ISO15105-1	mls/m2/d/atm	Pass/Fail	<40 Pass
	Puncture CBR	BS EN ISO 12236	N	MDV	1114
	Impact resistance	EN12691	mm	MDV	1000
	Tensiles Yield strength MD	ASTM D4885-01	kN/m	MDV	12.5
	Tensiles Yield strength CD	ASTM D4885-02	kN/m	MDV	7.3
	Yield elongation MD	ASTM D4885-03	%	MDV	18
	Yield elongation CD	ASTM D4885-04	%	MDV	19
	Tear resistance - trouser method A - MD	BS ISO 34-1	kN/m	MDV	48.2
	Tear resistance - trouser method A - CD	BS ISO 34-1	kN/m	MDV	44.8
	Tear resistance - angle method B - MD	BS ISO 34-1	N	MDV	53.5
	Tear resistance - angle method B - CD	BS ISO 34-1	N	MDV	60.6





Visqueen Building Products

Visqueen is the market leader in the manufacture and supply of structural waterproofing and gas protection systems. Visqueen offers the complete package - a proven, reliable range backed by a technical support service that goes unmatched in the market - everything you would expect from a reputable and ethical company.

System Accessories

To ensure full waterproofing protection please use the following certified system components:

- Visqueen High Performance (HP) Tanking Primer
- Visqueen TreadGUARD1500
- Visqueen Protect&Drain
- Visqueen Top Hat Unit

Downloads Library

- Technical Datasheet
- Declaration of Performance
- Visqueen's Guide to CE Marking

Find your local stockist

Search our directory of Visqueen specification Stocking Centres to locate your nearest Visqueen Partner.

Distributor Support

Our specification Stocking Centres can access a free library of sales support tools, bespoke catalogues and more, [click here](#).

Technical support throughout your project

We are specialists in our field and can help you specify the correct solutions with the necessary performance levels, in accordance with building regulations.

- Nationwide site support team
- Specification advice
- Installation guidance & project sign off
- System design including CAD details



