

RESIDENTIAL DEVELOPMENT AT
MIDGE HALL, 687 BURY ROAD, BAMFORD, ROCHDALE
REMEDICATION VALIDATION REPORT
FOR PLOTS 1 TO 7

Client:

Wiggett Construction Ltd.
Viking House
449 Middleton Road
Chadderton
Oldham
OL9 9LB

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 Phase 2 Site Investigation Report Ref: 1250, dated March 2020 and the completed landfill gas survey results enclosed in Appendix B should be referred to for further information.

2. REMEDIATION VALIDATION

2.1. Contamination

- 2.1.1. The remediation strategy recommended further investigation should be carried out in the southeast corner of the site where there were previously several outhouses and garages to confirm if there was any visible or olfactory evidence of hydrocarbons and if present the extent of these to be determined and removed.
- 2.1.2. The demolition contractor D Hughes Demolition Ltd. confirmed that during demolition of the outhouses and garage buildings in the southeast corner of the site, there was no visible or odours of hydrocarbons identified within the buildings or on the concrete floor slabs or in the sand beneath when they were grubbed up and crushed. Site clearance photos taken during and after the demolition and site clearance works are enclosed in Appendix A.
- 2.1.3. 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.
- 2.1.4. GNL and Wiggett Construction 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.
- 2.1.5. The remediation strategy confirmed that the contaminated ash fill identified in TP1 should either be removed or capped with hard cover or minimum 600mm capping layers to rear gardens and in proposed front gardens and soft landscaped areas by minimum 450mm capping layers, comprising minimum 150mm granular capillary break layer or geotextile membrane and the remainder as 'inert' subsoil and topsoil.
- 2.1.6. GNL have provided minimum 600mm capping layers to the rear gardens of plots 1 to 3 where the ash fill identified in TP1 was located. No ash fill was identified in the garden areas for plots 4 to 7, sand and soil were present.

- 2.1.7. 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 remainder of the garden areas and the waste transfer notes are enclosed in Appendix A.
- 2.1.8. With regards to the soil sampling density, the rear garden areas of plots 1 to 3 where the capping layers have been provided measure 424 sq.m and based on 0.6m depth, the volume = 254 cu.m. The remaining garden areas measure 740 sq.m and based on 0.15m depth of soil, the volume = 111 cu.m. The total volume = 365 cu.m, 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.
- 2.1.9. DHI obtained 3 no. samples from the stockpile of topsoil to be used in the gardens 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 garden areas. The test results and assessment are enclosed in Appendix A.
- 2.1.10. GNL excavated 3 no. validation trial pits in the garden areas for plots 1 to 3 in June 2022 complying with guidance on validation rates of 1 no. per 2 to 3 plots requirements. The trial pits identified topsoil to depths of 600mm over geotextile membranes.
- 2.1.11. The validation trial pit location plan and photos are enclosed in Appendix A.
- 2.1.12. PE Barrier pipes have been provided for water supply pipes in accordance with the water pipe risk assessment enclosed in Appendix A.

2.1. Landfill Gas

- 2.1.1. The completed landfill gas survey results identified methane levels up to 0.0%, carbon dioxide levels up to 6.0%, oxygen levels down to 3.5% and gas flows up to 0.1 l/hr. The maximum GSV for the site is 0.006 which falls into CS1 and NHBC Green, but as carbon dioxide levels were above 5% and depleted oxygen levels were identified, the risk from landfill gases was considered low to medium and precautionary gas protection measures were recommended in accordance with CS2 and NHBC Amber 1 from CIRIA C665 and BS 8485. For residential, a score of 3.5 is required, this can be achieved by providing beam

and block floor slabs with low permeability gas membranes with taped joints and sealed entries using specialist approved gas prevention tape and underfloor ventilated voids. Methane gas membranes with integrated aluminium core were recommended to be installed with reasonable level of workmanship in line with current good practice.

- 2.1.2. Gas protection measures have been provided and validated in accordance with CS2 and NHBC Amber 1 from BS8485 as shown on the foundation drawings, manufacturers details, invoices, delivery notes and photos enclosed in Appendix B.

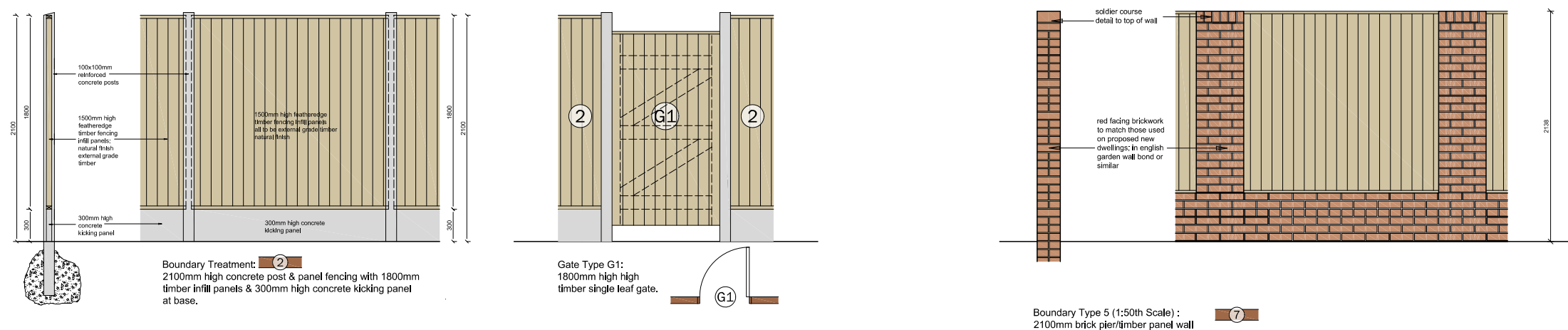
3. CONCLUSIONS

- 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 Plots 1 to 7 of the development are complete and considered suitable for use.

APPENDIX A

CONTAMINATION REMEDIATION VALIDATION

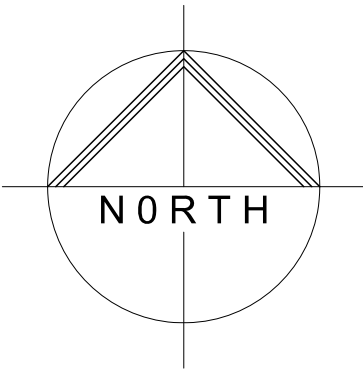
- § Site Layout
- § Site Clearance photos
- § Validation Trial Pit Location Plan
- § Validation Trial Pit Photo's
- § Waste Transfer Notes for topsoil
- § Topsoil Test Results and Assessment
- § Water pipe risk assessment



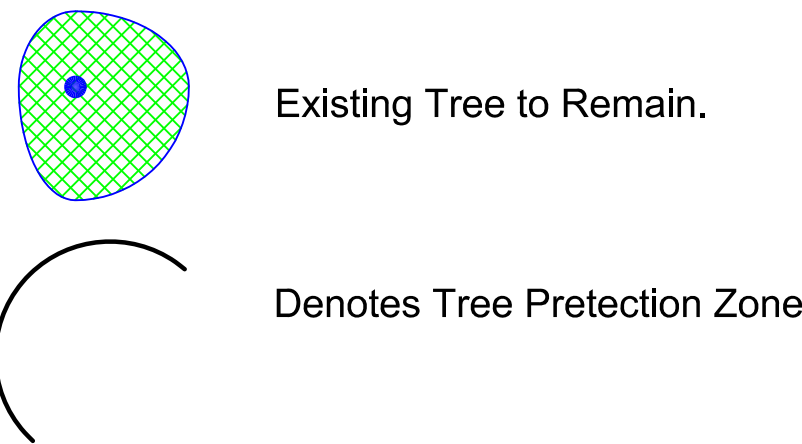
Accommodation Schedule:

Plot 1 - 5Bed 7 Person. 1,800sq.ft
Plot 2 - 5Bed 7 Person. 1,800sq.ft
Plot 3 - 4Bed 6 Person. 1,496sq.ft
Plot 4 - 5Bed 7 Person. 1,800sq.ft
Plot 5 - 5Bed 7 Person. 1,800sq.ft
Plot 6 - 5Bed 7 Person. 1,800sq.ft
Plot 7 - 4Bed 6 Person. 1,496sq.ft

Total Floor Area (Excl Garages)
= 11,992 sq.ft.



Existing Trees:



Key:



For More Detailed Information Regarding
Existing Trees. See Urban Green Drawing
Ref: UG_1193_ARB-TTP_01

NB: Landscaping shown is indicative only; to be in
accordance with separate landscape proposal/layout
drawing and specification by specialists.



K	4/03/20	FFL Amended to S.Engineers levels	GG	---
J	10/02/20	Drainage Points added to dwellings	GG	---
H	30/09/19	Plots 4-7 repositioned away from West boundary	GG	---
G	27/09/19	Plot 7 amended to C1 Type, bins relocated, levels added, external works altered.	GG	---
F	02/09/19	Plot 1 & 5 amended to House Type A2	GG	---
E	23/08/19	Private Driveway amended to show 1250mm footpath/service strip.	GG	---
D	21/08/19	Access road amended to Private Driveway, Bin stores relocated.	GG	---
C	04/07/19	Trees to be removed deleted. Note added referring to existing tree details. Key added	GG	---
B	5/6/19	Amended to clients comments	GG	---
A	16/5/19	Layout amended to Planning officers comments.	GG	---
REV	DATE	AMENDMENT	BY	CHKD

HNAarchitects
Architecture | Planning | Design

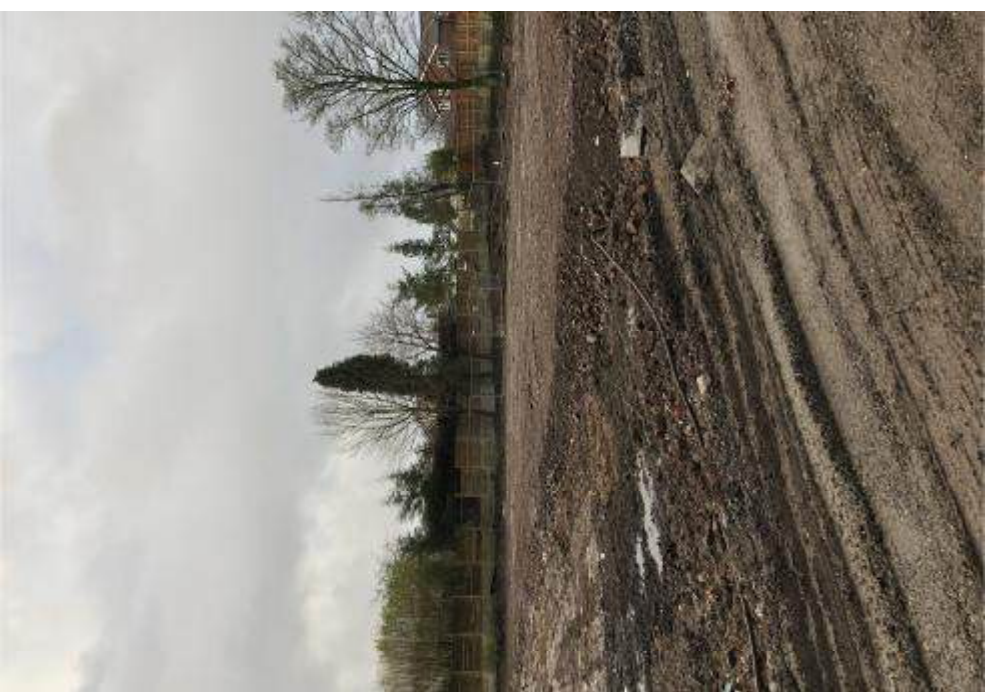
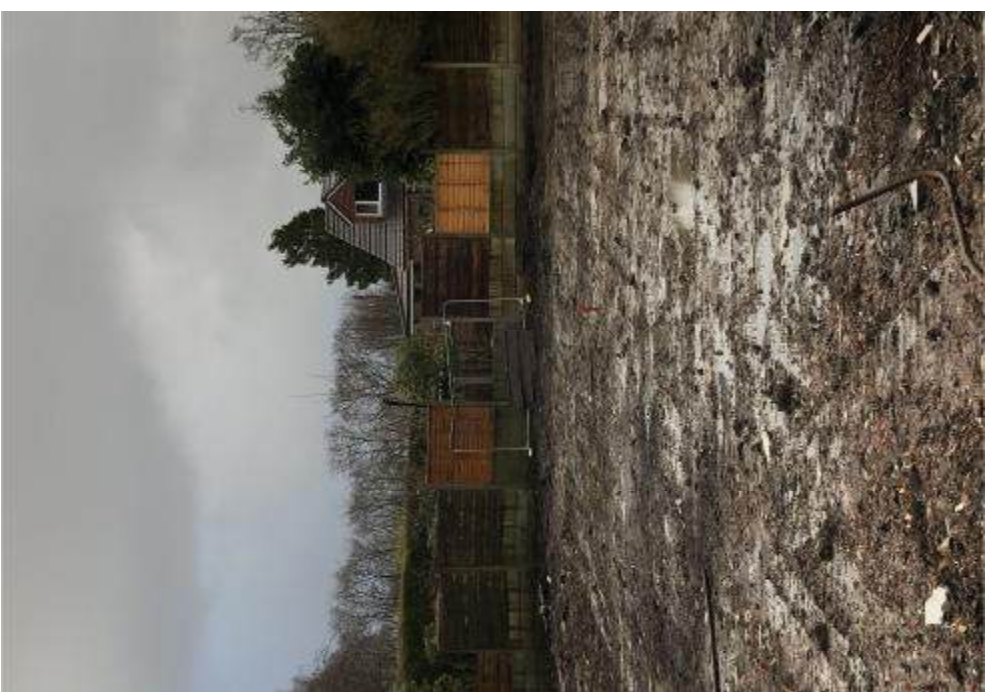
PROJECT:	Midge Hall, Bury Road, Bamford			
CLIENT:	Wiggett Construction			
DRAWING:	Proposed Site Layout - SK9			
DRAWN BY:	GG	CHECKED BY:	---	DATE: April 19
STATUS:	Planning	DRAWING NO:	1253/SK9-001	SCALE: 1:200 @ A1
				REVISION: K

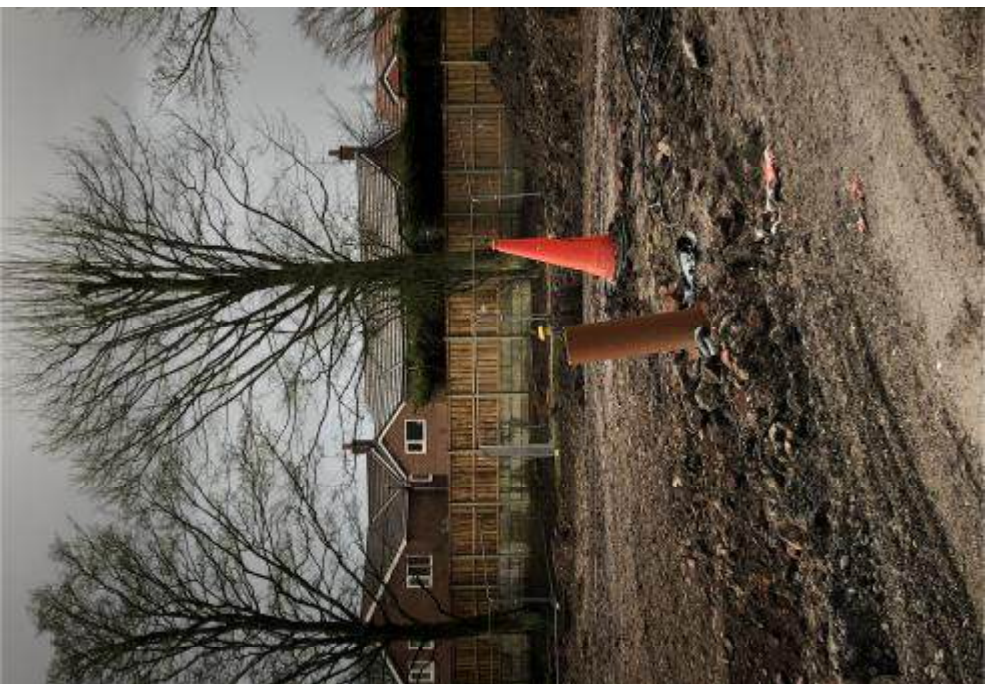
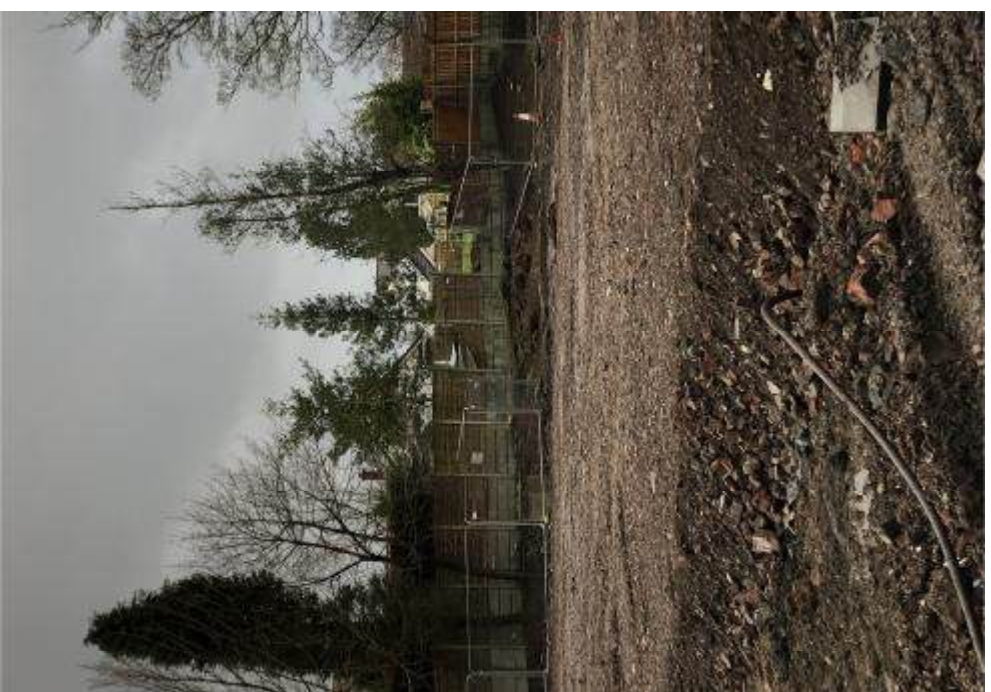
DO NOT SCALE.
COPYRIGHT REMAINS WITH HNA ARCHITECTS LTD.
HOLLINWOOD BUSINESS CENTRE, ALBERT STREET, OLDHAM, OL8 3QL
TEL: 0161 688 3820
E-MAIL: garry@hna-architects.co.uk : michael@hna-architects.co.uk

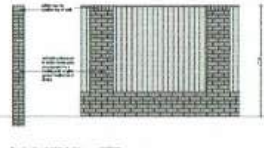
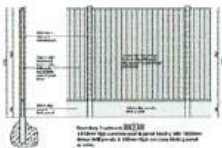












Accommodation Schedule:

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Plot 3 - 4Bed 6 Person.	1,496sq.ft
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Total Floor Area (Excl Garages)
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Existing Trees:



Key:



For More Detailed Information Regarding
Existing Trees, See Urban Green Drawing
Ref: UG_1193_ARB-TTP_01

NB: Landscaping shown is indicative only; to be in
accordance with separate landscape proposal/layout
drawing and specification by specialists.



H	14/03/08	FF1, amended to D.E. highway levels	GO	---
J	10/02/08	Drainage Points added to drawings	GO	---
H	06/02/08	Plots 4-7 repositioned away from West boundary	GO	---
G	27/08/07	Plot 4 amended to C1 Type, 18m reduced. Roads added, central access altered.	GO	---
F	02/02/07	Plot 1 & 2 amended to House Type A2	GO	---
E	23/08/07	Private Driveway amended to show 1200mm kerbside/curb side.	GO	---
D	21/08/07	Access road amended to Private Driveway, 18m access reduced.	GO	---
C	04/07/07	Trees to be removed deleted. Note added relating to existing tree details. Key added	GO	---
B	04/07	Amended to client comments	GO	---
A	15/07/07	Layout amended to Planning officers comments.	GO	---
REV	DATE	AMENDMENT	BY	CHKD

HNA architects
Architects & Planners Ltd

PROJECT	Midge Hall, Bury Road, Bamford
CLIENT	Wiggett Construction
DRAWING	Proposed Site Layout - SK9
DRAWN BY	GG
CHECKED BY	---
DATE	Apr 19
SCALE	1:200 @ A1
SHEET	Planning
PROJECT NO	1254/08/001
DATE	---
BY	---

VALIDATION TRIAL PIT
LOCATION

VALIDATION TRIAL PIT PHOTOGRAPHS



PLOTS 1 TO 3 REAR GARDENS

Project No: 1250



PLOTS 1 TO 3 REAR GARDENS

Date: 10.06.2022

VALIDATION TRIAL PIT PHOTOGRAPHS



TRIAL PIT P1R

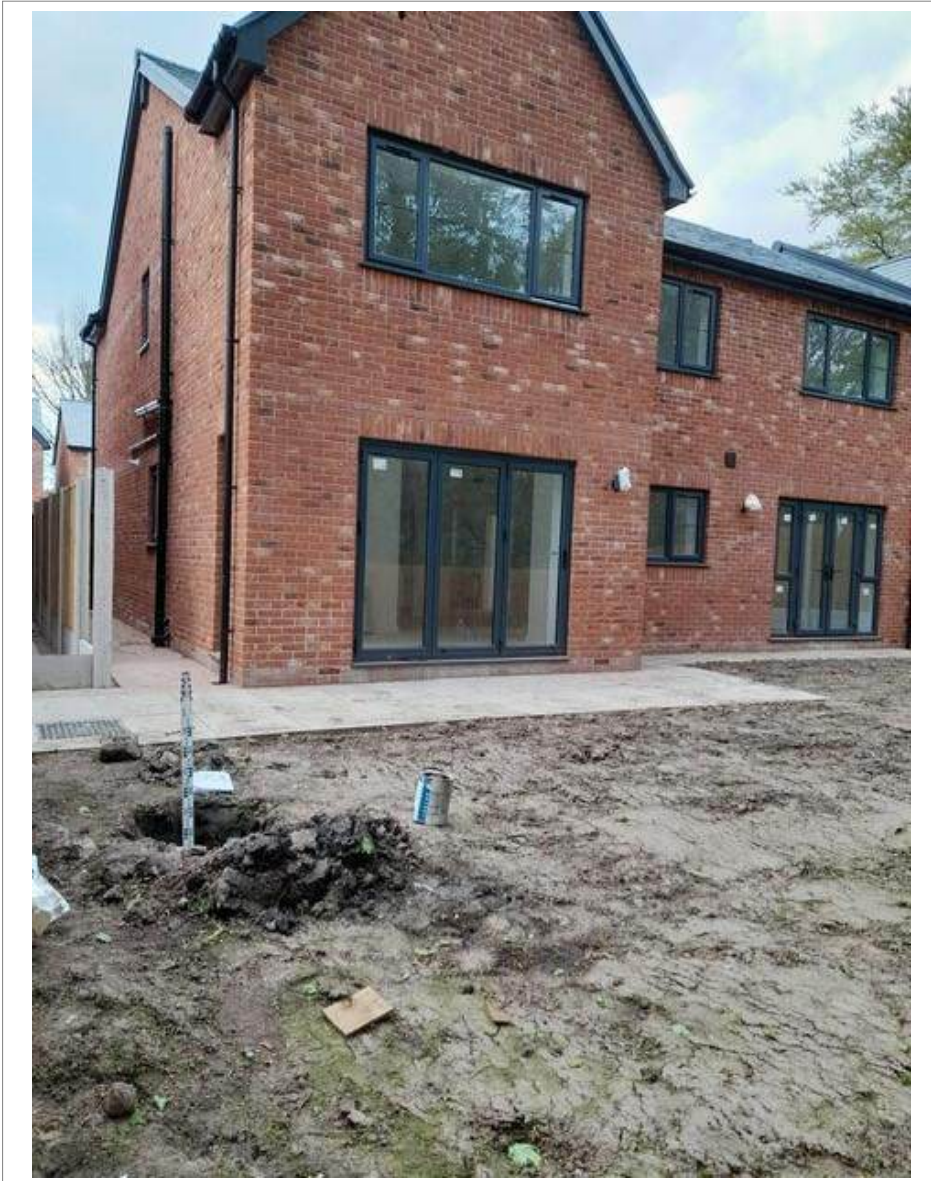
Project No: 1250



TRIAL PIT P1R

Date: 10.06.2022

VALIDATION TRIAL PIT PHOTOGRAPHS



TRIAL PIT P2R

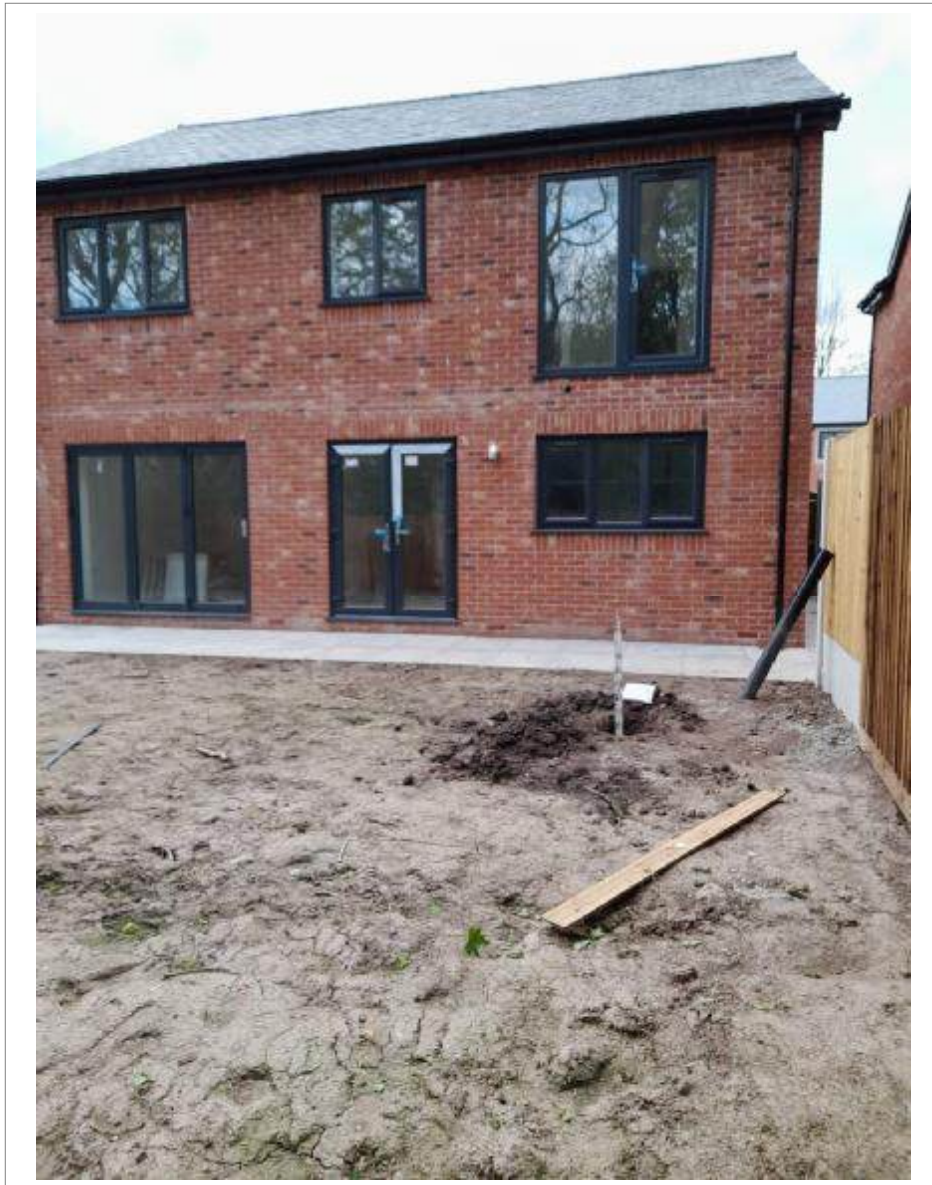
Project No: 1250



TRIAL PIT P2R

Date: 10.06.2022

VALIDATION TRIAL PIT PHOTOGRAPHS

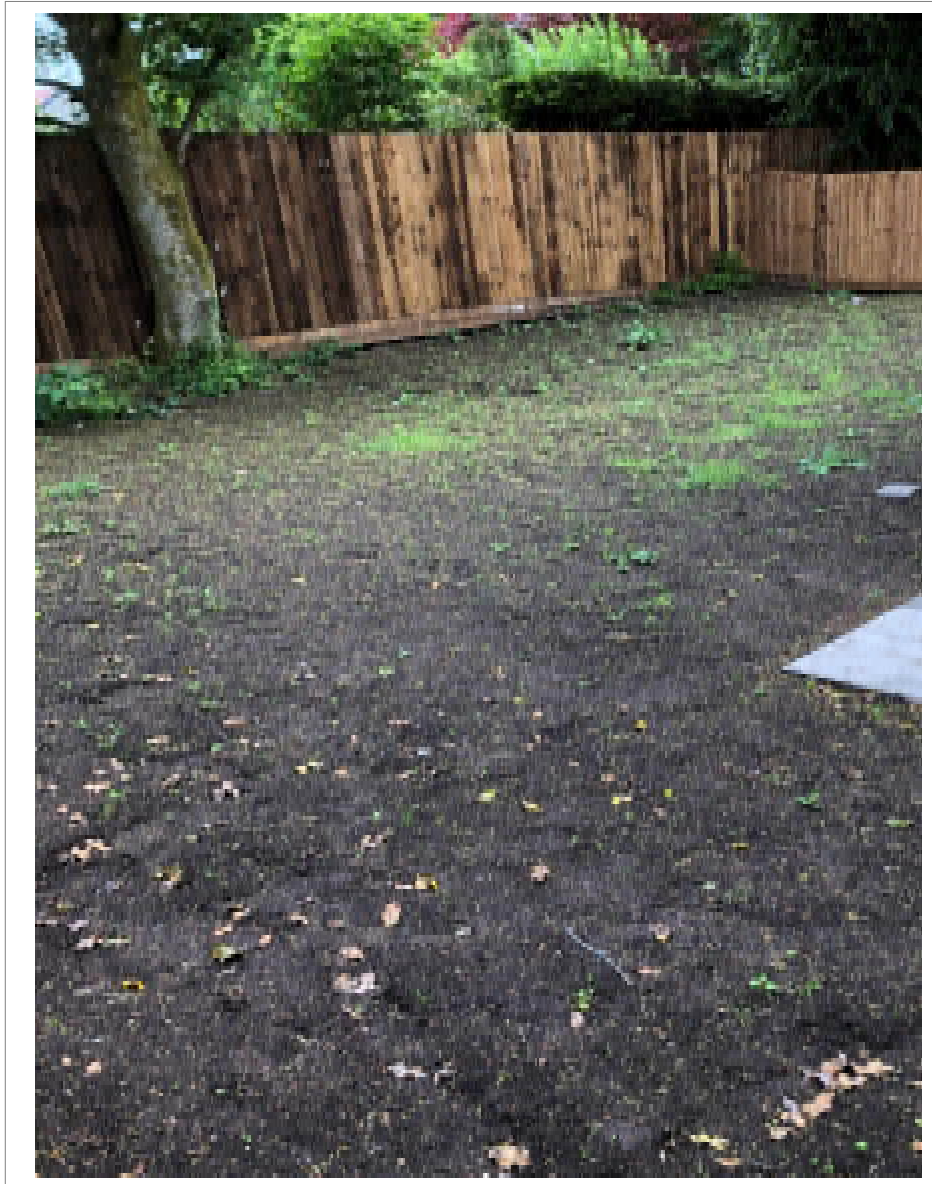


TRIAL PIT P3R



TRIAL PIT P3R

VALIDATION TRIAL PIT PHOTOGRAPHS



PLOTS 4 TO 7 REAR GARDENS

Project No: 1250



PLOTS 4 TO 7 REAR GARDENS

Date: 10.06.2022

VALIDATION TRIAL PIT PHOTOGRAPHS



PLOTS 4 TO 7 REAR GARDENS

Project No: 1250



PLOTS 4 TO 7 REAR GARDENS

Date: 10.06.2022

DHI Excavations Ltd 11 - 13 Church Street, Farnworth, Bolton. BL4 8AG		Serial No. DHI/	
Duty of Care - <u>Supply of Topsoil</u>		SIC Code: <u>41.20/2</u>	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: <u>Topsoil AS per ANALYSIS</u> <u>SUPPLIED</u> Classification code: <u>17-05-04</u>		
B Producer Details	3. Quantity: <u>200</u> kg/Tonnes/m3 Group number:		
	4. The Landfill Tax (Qualifying Material) order schedule 2011 ☐ Applicable		
	1. Full name (print): <u>DHI EXCAVATIONS LTD</u>		
	2. Company name, address and postcode: <u>AS PART C</u>		
C Carrier Details	3. Which of the following are you? (Please tick one or more boxes)		
	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 ☐ Exempt from carrier registration Reason:		
D First Transfer (producer to carrier)	1. Full name (print): <u>DHI Excavations Ltd</u>		
	2. Company name, address and postcode: <u>11 - 13 Church Street, Farnworth, Bolton. BL4 8AG</u>		
	☒ Registered carrier (give number): <u>CBDU181466</u> SIC: <u>43120</u>		
	We have fulfilled our obligation with regards to the waste hierarchy regulations 12 of Waste (England and Wales) Regulations 2011		
E Disposer Details	1. Place of transfer: <u>COCKLE MILL LANE, COWLISHAW, OLDHAM, OL2 7BX</u>		
	2. Date of transfer: <u>FEB 2022 TO SEPT 2022</u> (for multiple transfer give between dates, see notes)		
	3. Name and address of broker arranging transfer (if applicable):		
	4. Producers representatives Carriers representatives Name (print): <u>WCL No.</u> Signed: <u>SEAN KINGSTON</u> Signed:		
F Second Transfer (carrier to disposer)	1. Full name (print): <u>GNL CONSTRUCTION LTD</u>		
	2. Company name, address and postcode: <u>324 STYAL RD, HOALD GREEN, CHICADE, SK8 3ES</u>		
	3. Which of the following are you? (Please tick one or more boxes)		
	☐ Holder of waste disposal / management licence (give number): <u>N/A</u> Issued by: <u>N/A</u> ☐ Exempt from licence requirements (give reason):		
F Second Transfer (carrier to disposer)	1. Place of transfer: <u>MIDGE HALL, BURY RD, BAMEFORD, OL11 4AU</u>		
	2. Date of transfer: <u>FEB 2022 TO SEPT 2022</u> (for multiple consignments give between dates)		
	3. Name and address of broker arranging transfer (if applicable):		
	4. Carriers representatives Disposers representatives Name (print): <u>SEAN KINGSTON</u> Name (print): <u>GARY GOLDRICK</u> Signed: <u>[Signature]</u> Signed: <u>[Signature]</u> Company name: <u>DHI Excavations Ltd</u> Company name: <u>GNL CONSTRUCTION LTD</u>		

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

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

Date Received: 19/05/2022 (am)

Project: Cowlishaw Topsoil

Cool Box Temperatures (°C): 14.7

Clients Project No: Stockpile 1

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

Chemtech Environmental Limited

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: 1250 Client: Wiggett Construction Ltd.
Project: Midge Hall

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													
								Asbestos	3	-	-		-	-	Potentially Suitable For Use	N.D.	N.D.	N.D.		
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															

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

Project No: 1250 Client: Wiggett Construction Ltd.
Project: Midge Hall

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

Supplementary guidance for the selection of water pipes in land potentially affected by contamination



Introduction

In January 2011, UK Water Industry Research (UKWIR) published "Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites" (Ref 10/WM/03/21; the 'UKWIR Guidance'). Its aim is to ensure that the correct materials are selected for water pipes and components to be used below ground in brownfield sites to protect the quality of drinking water whilst taking into account the service life of the water distribution system. It supersedes the Water Regulations Advisory Scheme (WRAS) Information and Guidance Note 9-04-03 "Laying Pipes in Contaminated Land" which has been withdrawn.

The UKWIR Guidance is for use by developers, self-lay organisations, water companies and consultants when planning, designing and constructing water mains and/or services in brownfield sites. It defines brownfield sites as "land or premises that have previously been used or developed. They may also be vacant or derelict. However, they are not necessarily contaminated." The UKWIR Guidance states that it does not apply to greenfield sites; however, we consider this supplementary guidance and the relevant sections of the UKWIR guidance as being equally suitable for application to those greenfield sites considered to be potentially affected by contamination. Where greenfield sites are not affected by contamination a preliminary risk assessment (see below) will suffice.

The UKWIR Guidance also states that there should be no departure from its provisions "*except where formally approved by the Water Company, such departure being technically justifiable or representing advances in knowledge or product development*".

We have adopted the UKWIR Guidance in principle and produced this company specific supplementary guidance (the 'UUW Guidance') which includes the Risk Assessment for Water Pipes (the 'RA').

This guidance does not cover operative safety, health exposure modelling or accidental pipe damage.

Risk Assessment for Water Pipes in Land Potentially Affected by Contamination

Any application for new water supplies to a development (construction of new properties, or renovation or conversion of existing buildings) in land potentially affected by contamination shall include a completed RA.

As a minimum a desk study (preliminary risk assessment) shall be provided with the RA in accordance with the framework in Environment Agency publication "Model Procedures for the Management of Land Contamination" (ref: CLR11) that sets out whether the land through which the pipes are to be laid may be affected by contamination. The application of the source, pathway, receptor concept will be an integral part of any pipeline risk assessment. For each potential source (the contamination) and each potential receptor (the water pipe), consideration shall be given to whether a potential pathway between source and receptor exists, or may exist in the future, linking the two. There are normally only three pathways by which contamination may come into contact with water pipes. These are direct contact with the soil or backfill, an excessive vapour phase or a contaminated groundwater regime. If none of these conditions exist on site (adopting the source, pathway, receptor concept) then it is likely that extended and/or targeted soil testing will not be required and a simple risk assessment will suffice. For those sites where land may be affected by contamination appropriate testing shall be undertaken on the materials within which the pipes are to be laid, whether that be existing ground materials, remediated materials or imported capping materials. The testing requirements are as described in the following section.

The signatories of the Water Supply Application Form and the RA must ensure that all assessments of land condition have been carried out in accordance with applicable current standards and guidelines by or under the direction of a suitably qualified competent person.

We require the competent person to be a) a chartered member of an appropriate professional body (such as the Institution of Civil Engineers, the Geological Society of London or the Royal Institution of Chartered Surveyors) with relevant experience of investigating contaminated sites or b) a Specialist in Land Condition (SiLC) with appropriate geo-environmental experience.

Testing Requirements

The soil, rock and if appropriate groundwater tests that are required on all sites where the potential for organic contamination has been identified in the desk study and where water pipes are proposed to be laid must be accredited by United Kingdom Accreditation Service (UKAS) as a minimum and where commercially available the Environment Agency's Monitoring Certification Service (MCERTS). These accredited tests should be undertaken for:

Banded hydrocarbons EC5-EC10, EC10-EC16, EC16-EC40 (Total aliphatic and aromatic hydrocarbons for each banding may be summed). Aliphatic/aromatic fractionation and subsequent banding may be required should a more detailed site specific risk assessment be undertaken. The bandings have been amended to take into account readily available laboratory tests. The equivalent carbon number (EC) is used to assess petroleum hydrocarbon mixtures rather than the actual number of carbon atoms in the molecule in line with guidance issued by the Environment Agency (2005).

Volatile organic compounds (VOCs) (method by head space or purge & trap GCMS) with tentative identification of compounds greater than 20µg/kg. The method used should be capable of detecting a wide range of compounds listed in US EPA Method 8260C or similar. The method should include analysis of naphthalene.

BTEX (Benzene, toluene, ethyl benzene and xylenes) plus MTBE (Methyl-tertiary butyl ether) (by head space GCMS)

Semi-Volatile Organic Compounds (SVOCs) (method by GCMS) with tentative identification of compounds greater than 20µg/kg. The method used should be capable of detecting the compounds listed in US EPA Method 8270D or similar. The total concentration of SVOCs excludes polycyclic aromatic hydrocarbons, ethers, nitrobenzene, ketones, aldehydes, phenols, cresols and chlorinated phenols. Phenols, cresols and chlorinated phenols which are detected by the SVOC analysis are given their own assessment criteria.

We do not consider Table G1 and Table 3.1 of the UKWIR Guidance to be a definitive guide for assessing total concentrations. Table 1 in the RA below replaces Table 3.1 of the UKWIR Guidance.

Where previous site uses include the use, storage, treatment, disposal or manufacture of any of the following, appropriate testing for these substances will be required:

Ethers, nitrobenzene, ketones, aldehydes and amines. Note that the presence of amines on any site at the proposed pipe depth +/- 1.0m precludes the use of polyethylene. The methods of analysis and method of calculation of total concentrations of these compounds will need to be agreed with UUW.

To comply with the testing requirements, the suites of tests that are required on all brownfield sites where wrapped steel, wrapped ductile iron or copper pipes are to be laid as minimum must include:

pH, Conductivity and redox potential

Sufficiency of Testing

Water pipes are normally laid at between 0.75 and 1.35m from finished ground level to crown of pipe. Samples taken and tested must represent both a) the soil in which the water pipes are to be laid and b) the soil down to at least 500mm below the underside of the proposed pipe. Where the proposed depth of the pipes is unknown at the time of application, soil samples representative of the ground condition between surface level and 1.5m below finished ground level shall be taken as a minimum. Where appropriate (see UKWIR Guidance) groundwater sampling and groundwater monitoring will also be

necessary. Photo-ionisation detection (PID) monitoring along the proposed route of the pipeline may be employed, though this does not provide a definitive guide to the suitability of water pipe materials.

Where required a sufficient number of test results should be obtained from the material in which the pipes are to be laid. CLAIRE/CIEH 2008 "Guidance on comparing soil contamination data with a critical concentration" may be used, where appropriate, to justify the number of soil samples tested; however, this statistical model should not be used on heterogeneous materials or used to average test results from different types of materials.

Further guidance on representative sampling is contained within BS10175:2011 Code of Practice for the Investigation of Potentially Contaminated Sites, the Department of the Environment's Contaminated Land Research Report "Sampling strategies for contaminated land" prepared by The Centre for Research into the Built Environment, Nottingham Trent University (Ref: CLR 4; 1994) and the Environment Agency's "Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination" (ref: R&D Technical Report P5-066/TR; 2000).

Where remediation has been carried out on the site, the test results obtained from validation samples will be used in the assessment. Where a horizontal capping system has been or will be employed using materials spread across a site, sufficient samples will need to be taken to characterise the capping material used and the results presented to UUW. However, the sufficiency of sampling on the horizontal capping system, in which the pipeline will be placed, may be assessed on the basis of the source, quantity and type of materials used.

Detection Limits

Only positive concentrations, ie those above the limit of detection should be used in summation of VOC and SVOC (or other test groups of compounds ie phenols, cresols and chlorinated phenols). Laboratory methods shall provide a minimum limit of detection of 10µg/kg for each individual VOC or SVOC (or other test groups of compounds) quantitatively detected in accordance with the methods described above. For tentatively identified compounds (TICs), only those compounds with a concentration of 20µg/kg or greater shall be used in the summation of VOC and SVOC (or other test groups of compounds).

Protective Measures

Where polyethylene, ductile iron, steel or copper pipes are to be laid on a brownfield site or other land potentially affected by contamination (whether or not it has been remediated) and where the concentrations exceed the generic guideline values set out in Table 1 of the RA, the developer shall provide either:

- a) a robust risk assessment to show how any contaminants will not significantly impact on proposed water supplies or buried assets over the lifetime of the assets; or
- b) more suitable pipe materials; or
- c) an engineering solution to protect the pipe work backed up by an adequate assessment of the risk.

Liquid free phase product (e.g. oil or free solvent layers) shall not remain in the ground or groundwater in the vicinity of water pipes, whether barrier pipe or any other pipe materials are used.

When designing pipe routes on land potentially affected by contamination, new preferential contamination pathways along the route of new water pipes shall not be created. Particular measures may be required to prevent the possible migration of contamination through pipe bedding and into controlled waters.

References

BS10175:2011 "Investigation of Potentially Contaminated Sites Code of Practice"

CLAIRE/CIEH "Guidance on comparing soil contamination data with a critical concentration" 2008

Department of the Environment Contaminated Land Research Report "Sampling strategies for contaminated land" prepared by The Centre for Research into the Built Environment, Nottingham Trent University (Ref: CLR 4) 1994

Environment Agency "Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination" (ref: R&D Technical Report P5-066/TR) 2000

Environment Agency "Model Procedures for the Management of Land Contamination" (ref: CLR11), 2004

Environment Agency P5-080/TR3 "The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils", 2005

UK Water Industry Research (UKWIR) "Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites" (Ref 10/WM/03/21)" January 2011

Water Regulations Advisory Scheme (WRAS) Information and Guidance Note 9-04-03 "Laying Pipes in Contaminated Land" 2002



About us

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United Utilities Water PLC, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Warrington WA5 3LP.
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Risk Assessment for Water Pipes (RA)



The risk assessment for water pipes will help you choose appropriate materials for your development. We are happy to deal with a risk assessment for water pipes in advance of any formal application for a new water supply.

If you need any help completing the form please call us on 0845 026 4296.

When completing this form electronically, the larger text boxes will expand in height if required.

Section 1: Development Details

Development Name <i>(if it has one)</i>	
Development Address	Midge Hall, 687 Bury Road, Rochdale, OL11 4AU
OS Grid Reference <i>(mid point)</i>	357390E, 395270N
Developers Name	Build Vision / Wiggett Construction Ltd
UW reference number <i>(for UU use only)</i>	

Please provide details below of the current and historical use of the site and adjacent sites.

If your supporting information has details of the current and historical site use, please reference below the relevant sections of your report.

On site historical uses: fields, Midge Hall house, several domestic garages (SE corner), outbuildings (now demolished).

Offsite historical uses: Fields, residential properties.

Current on site use: vacant, surfaced in crushed hardcore from the demolition. Trees and shrubs located along the perimeter.

Current offsite use: residential properties (north, south, west), woodland and stream (east).

Further details provided in Sections 1.4 and 1.5 of Phase 2 Site Investigation Report referenced Job No. 1250, dated March 2020.

Section 2: Preliminary Risk Assessment

Has your desk study and site walkover identified any land potentially affected by contamination?	☒ Yes ☐ No
--	---

If the site is potentially affected by contamination but you have not completed any intrusive site investigation please provide details below of the rationale behind the intended pipe selection.

If your supporting information has details of the rationale behind the intended pipe selection, please reference below the relevant sections of your report.

N/A

Section 3: Intrusive Site Investigation	
Have you completed any intrusive site investigation?	☒ Yes ☐ No
Date(s) when the site investigation(s) undertaken	September 2019, February-March 2020.
At what level has groundwater been encountered?	4.45-5.10 metres below ground level or ☐ Not encountered
Table 1 (Pipeline Selection Risk Assessment Summary (PSRAS)) below classifies testing required where the preliminary risk assessment has identified land potentially affected by contamination. Please provide details below of any test groups which have not been tested and the rationale for not testing. <i>If your supporting information has details of the rationale behind not testing any particular test groups, please reference below the relevant sections of your report.</i>	
VOCs (excl. naphthalene), SVOCs, phenols, cresols, chlorinated phenols, ethers, nitrobenzene, ketones, aldehydes, amines. No source of these contaminants identified during the ground investigation. No visual or olfactory evidence of gross contamination identified during the ground investigation. Made ground was generally reworked material with ash and colliery spoil.	
If the intrusive site investigation has identified concentrations above the PE threshold (see PSRAS) and your intended pipe selection is PE please provide details below of the rationale behind the intended pipe selection. <i>If your supporting information has details of the rationale behind the intended pipe selection, please reference below the relevant sections of your report.</i>	
TPH and naphthalene exceedances above PE threshold located in upper made ground strata above recommended depth of new potable water pipes. However, the made ground strata extends beyond the typical potable depth and as it was similar made ground it is possible similar concentrations will be encountered. Based on that LKC recommend barrier pipe.	

Section 4: Site Remediation	
Please provide details below of any site remediation (which may include a change in site levels) already completed. <i>If your supporting information has details of the site remediation already completed, please reference below the relevant sections of your report.</i>	
N/A	
Has the PSRAS (Table 1) been completed using appropriate data after remediation?	☐ Yes ☐ No ☒ N/A
Please provide details below of any proposed site remediation and an analysis of whether this will affect your intended pipe selection. <i>If your supporting information has details of any proposed site remediation and whether this will affect your intended pipe selection, please reference below the relevant sections of your report.</i>	
An environmental cover system is proposed for soft landscaped areas. This will not affect the intended pipe selection. Drilling and grouting works to remediate shallow coal mining. This will not affect the intended pipe selection. Gas protection measures to Characteristic Situation 2, Amber 1. This will not affect the intended pipe selection.	

Section 5: Final Use of Site

Please provide details below of any chemicals (including fuel) to be stored on site and any other future contamination risks which may affect your intended pipe selection.

If your supporting information has details of potential contamination risks which may affect your intended pipe selection, please reference below the relevant sections of your report.

Residential development therefore chemical storage not anticipated.

What water pipe materials are intended to be used on site?

☐ PE ☒ PE Barrier Pipe Type A ☐ PE Barrier Pipe Type B
Other (please specify):

Section 6: Additional Information

Please use the section below to provide any additional details to support your intended pipe selection.

If your supporting information has additional information to support your intended pipe selection, please reference below the relevant sections of your report.

Considering the made ground strata extends beyond the typical potable depth and as it was similar made ground it is possible similar concentrations will be encountered. Based on that LKC recommend barrier pipe

Section 7: Risk Assessor

Name and relevant qualifications of person directing the risk assessment for water pipes	Dr. Paul Quimby (PhD, BSC Hons, Chartered Scientist)
Name and address of risk assessor's company	LK Group, Unit 29 Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Date risk assessment performed	24.02.2021

Section 8: Declaration

I confirm I have completed this form and provided supporting information in accordance with 'UKWIR Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' and U UW's Supplementary Guidance. I also confirm that if any further site investigation is needed and carried out, I will be required to submit an additional Risk Assessment for Water Pipes with the relevant supporting information. I understand that failure to supply any of the required information may delay my application being processed.

Name	Dr. Paul Quimby	Company	LK Group
Phone Number	0161 763 7200	Date	24.02.2021

Please e-mail the completed form and supporting information to water.connections@uuplc.co.uk. Alternatively you can fax a paper version to 01925 678926 or post to us at United Utilities Water, Metering and Connections, Ullswater House, Lingley Mere, Warrington, WA5 3LP.



About us

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Table 1 - Pipe Selection Risk Assessment Summary (PSRAS)

- 1) Testing must be undertaken on the materials within which the pipes are to be laid, whether that be existing ground materials, remediated materials or imported capping materials. Please use the appropriate testing data to complete Table 1 below.
- 2) If more than one pipe selection is being made, for example, for pipes in different areas of a large site, a completed PSRAS is required for each selection.

What materials have been tested to populate Table 1 below?

☒ Existing ground materials ☐ Remediated materials ☐ Imported capping materials

All concentrations in mg/kg								
Test Group	Testing Required?	PE threshold	Metal Pipes/ Barrier Pipe	Laboratory Detection Limit	Testing UKAS accredited Y/N	Maximum concentration at proposed pipeline depth See Note [2]	Maximum site concentration See Note [3]	Locations and depths where concentrations exceed proposed pipeline threshold
Total VOCs	Where Preliminary Risk Assessment (PRA) has identified land potentially affected by contamination	0.5	Pass	<0.03-0.1	Y	<0.1-0.03	1.5	1.5 (BH1 0.00-0.50m)
Total BTEX & MTBE		0.1	Pass	<0.001	Y	0.0225	-	-
Total SVOCs (excluding PAHs and those substances marked with an *)		2	Pass	-	-	-	-	-
EC5-EC10 aliphatic and aromatic hydrocarbons		2	Pass	<1.0-5.0	Y	<1.0	<5	<5 (TP1 0.00-0.10m, TP2 0.00-0.10m, TP3 0.00-0.10m, TP4 0.00-0.10m, TP5 0.00-0.10).
EC10-EC16 aliphatic and aromatic hydrocarbons		10	Pass	<1.0-2.0	Y	6.6	43	17 (TP2 0.00-0.10m), 43 (TP3 0.00-0.10m), 39 (TP4 0.00-0.10m).
EC16-EC40 aliphatic and aromatic hydrocarbons		500	Pass	<1.0-5.0	Y	88	384	-
Phenols* (from SVOC analysis)		2	Pass	-	-	-	-	-
Cresols and chlorinated phenols* (from SVOC analysis)		2	Pass	-	-	-	-	-
Ethers*	Only where identified	0.5	Pass	-	-	-	-	-
Nitrobenzene*		0.5	Pass	-	-	-	-	-
Ketones*		0.5	Pass	-	-	-	-	-
Aldehydes*		0.5	Pass	-	-	-	-	-
Amines		Fail	Pass	-	-	-	-	-
Corrosive	Conductivity, Redox and pH	Pass	See Note [1]	-	-	-	-	-

Note [1] Threshold: For wrapped steel, corrosive if pH<7 and conductivity > 400µS/cm. For wrapped ductile iron corrosive if pH<5, Eh not neutral and conductivity > 400µS/cm. For copper, corrosive if pH<5 or >8 and Eh positive.

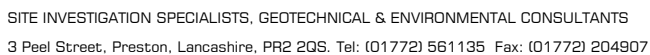
Note [2] Water pipes are normally laid at 0.75-1.35m below finished ground level.

Note [3] Also state if liquid free product is present in soil or groundwater.

APPENDIX B

GAS PROTECTION MEASURES REMEDIATION VALIDATION

- § Completed Landfill Gas Monitoring Results
- § Foundation Layout Drawings
- § Gas Membrane Details
- § Gas Membrane Delivery Notes
- § Gas Protection Measures Photos



Job Number:
6903B

Sheet:
1 / 1

Site: MIDGE HALL, BURY ROAD, BAMFORD, GREATER MANCHESTER

Client: WIGGETT CONSTRUCTION LIMITED

Engineer: BUILD VISION CONSULTING ENGINEERS

[illegible]

Remarks: Elevated levels of methane and carbon dioxide and depleted levels of oxygen are shown in ***bold/italics*** .
* Unable to monitor - Access was arranged but the site was locked on arrival

LEGEND:

↔ DENOTES SPAN OF 175mm DEEP BEAM AND BLOCK FLOOR TO SPECIALIST DESIGN SUPPLY & DETAILS

FLOOR TO BE DESIGNED FOR THE FOLLOWING LOADINGS:

DEAD LOAD = 1.80kN/m² (FINISHES EXCLUDING SELF WEIGHT)

LIVE (IMPOSED) LOAD = 1.50kN/m² (DOMESTIC) + 0.80 kN/m² (FOR PARTITIONS) = 2.30 kN/m²

↔ DENOTES SPAN OF 175mm DEEP BEAM AND BLOCK FLOOR TO SPECIALIST DESIGN SUPPLY & DETAILS

FLOOR TO BE DESIGNED FOR THE FOLLOWING LOADINGS:

DEAD LOAD = 1.80kN/m² (FINISHES EXCLUDING SELF WEIGHT)

LIVE (IMPOSED) LOAD = 2.50kN/m² (GARAGE) & 9.00 kN (GARAGE POINT LOAD)

APPLIES TO PLOT 4 ONLY
GROUND BEAM TO BE PROVIDED WITH 100mm CLAY HEAVE VOID FORMER TO UNDERSIDE OF GROUND BEAM ONLY (i.e. NOT SIDES)

APPLIES TO PLOT 4 ONLY
GROUND BEAM TO BE PROVIDED WITH 100mm CLAY HEAVE VOID FORMER TO UNDERSIDE OF GROUND BEAM ONLY (i.e. NOT SIDES)

APPLIES TO PLOT 4 ONLY
GROUND BEAM TO BE PROVIDED WITH 100mm CLAY HEAVE VOID FORMER TO UNDERSIDE OF GROUND BEAM ONLY (i.e. NOT SIDES)

APPLIES TO PLOT 4 ONLY
GROUND BEAM TO BE PROVIDED WITH 100mm CLAY HEAVE VOID FORMER TO UNDERSIDE OF GROUND BEAM ONLY (i.e. NOT SIDES)

FINISHED FLOOR LEVELS:
DWELLING: 0.000 (DATUM)
GARAGE: -0.150

FOUNDATION PLAN
(SHOWING SPANS OF BEAM & BLOCK FLOOR)
SCALE 1:50

CLAY HEAVE PROTECTION: (PLOT 4 ONLY)

APPLIES TO PLOT 4 ONLY

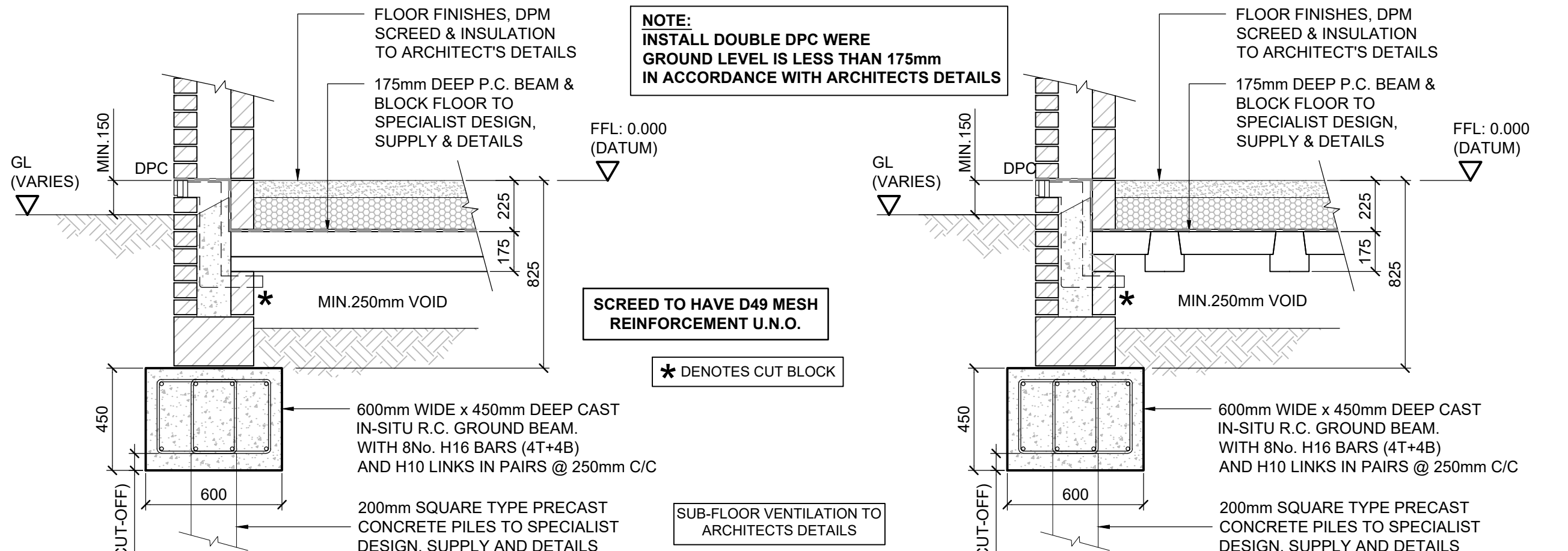
DENOTES GROUND BEAMS TO BE PROVIDED WITH PROPRIETARY CLAY HEAVE PROTECTION MEASURES (VOID FORMER) AS FOLLOWS:
INTERNAL SIDE OF GROUND BEAMS = 25mm VOID FORMER
UNDERSIDE OF GROUND BEAMS = 100mm VOID FORMER
VOID FORMER TO BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER AND NHBC RECOMMENDATIONS

PILING NOTES: (PLOT 4 ONLY)

PILES TO BE DESIGNED WITH AN ADEQUATE FACTOR OF SAFETY TO RESIST UPLIFT FORCES ON THE SHAFT DUE TO HEAVE AND BE SUITABLY REINFORCED FOR THE LENGTH OF THE MEMBER GOVERNED BY THE HEAVE DESIGN. SUFFICIENT ANCHORAGE SHOULD BE PROVIDED BELOW THE DEPTH OF DESICCATED SOIL. SLIP LINERS MAY BE USED TO REDUCE UPLIFT BUT THE AMOUNT OF REDUCTION IS SMALL, AS FRICTION BETWEEN MATERIALS CANNOT BE ELIMINATED. THE JOINT DESIGN OF THESE PILES SHOULD BE CAPABLE OF TRANSMITTING TENSILE HEAVE FORCES

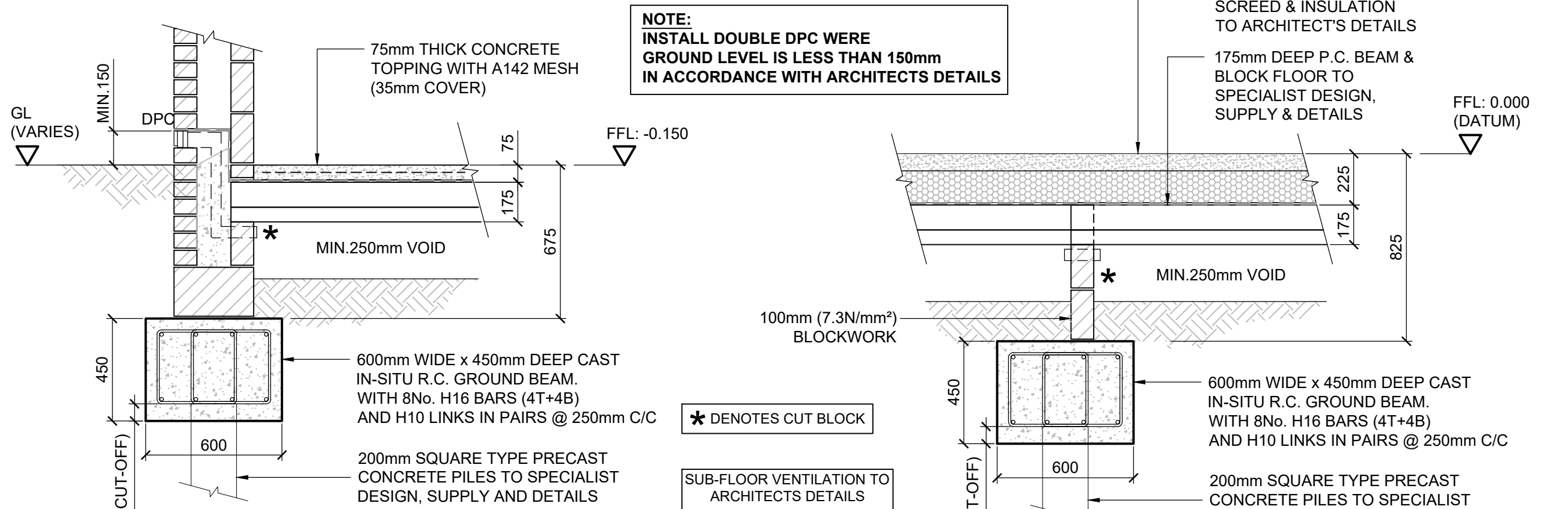
REMEDIAL WORKS: (GROUTING)

THE PHASE II INTRUSIVE SITE INVESTIGATION REPORT (Ref. 2020.03 1250 BV Phase 2 Site Investigation Report complete) BY 'BUILD VISION CONSULTING ENGINEERS' HAS IDENTIFIED FRACTURED MUDSTONE AND COAL AT DEPTHS BETWEEN 5.5 - 10.0m BGL. POSSIBLE COLLAPSED WORKINGS TO BE DRILLED AND GROUTED BY GROUTING SPECIALIST WITH A COAL AUTHORITY PERMIT



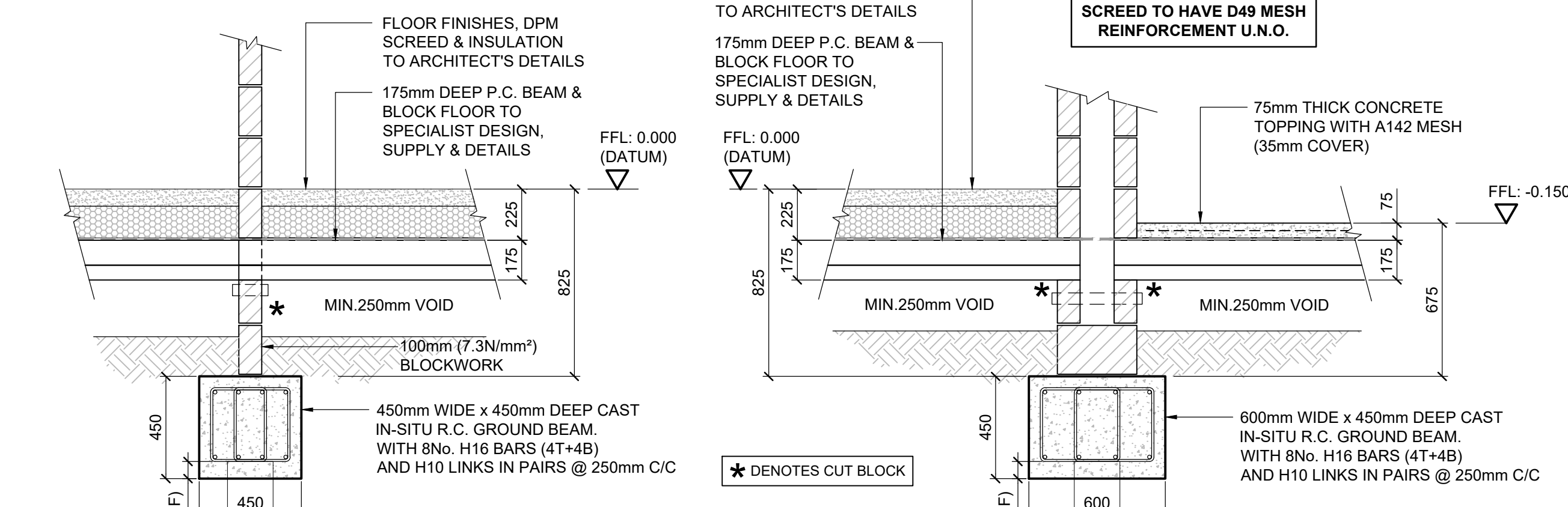
SECTION A - A
SCALE 1:20

SECTION B - B
SCALE 1:20



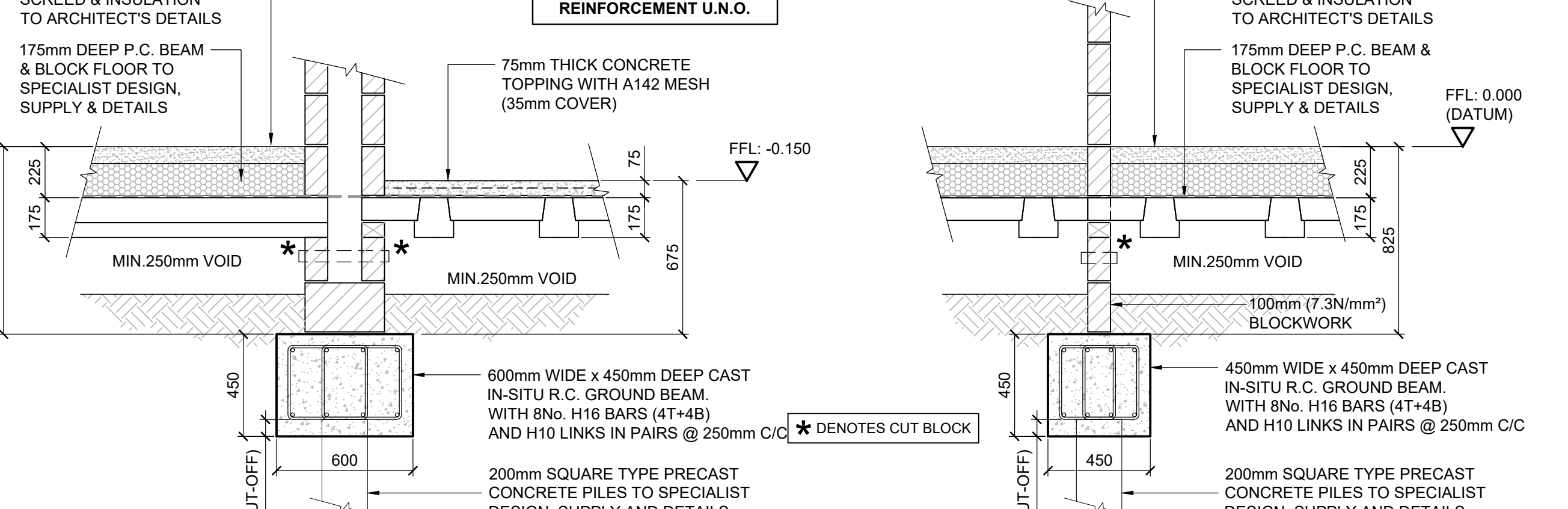
SECTION C - C
SCALE 1:20

SECTION D - D
SCALE 1:20



SECTION E - E
SCALE 1:20

SECTION F - F
SCALE 1:20



SECTION G - G
SCALE 1:20

SECTION H - H
SCALE 1:20

DO NOT SCALE FROM THIS DRAWING

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER HBL DRAWINGS ISSUED FOR THIS PROJECT
ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS OTHERWISE NOTED.
ALL LEVELS SHOWN IN METRES (m) UNLESS OTHERWISE NOTED.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

CONFLICTING INFORMATION SHOWN ON THE ENGINEERS DRAWINGS OR DISCREPANCIES BETWEEN THE INFORMATION GIVEN BY THE ENGINEER AND THAT PROVIDED BY OTHERS MUST BE REFERRED TO THE ENGINEER BEFORE WORK PROCEEDS.

DIMENSIONS MARKED 'DIMENSIONS TO BE CHECKED ON SITE' SHALL BE SUBJECT TO SITE MEASUREMENT BEFORE CONSTRUCTION PROCEEDS

FOUNDATIONS

THE BASE OF FOUNDATION EXCAVATIONS SHOULD BE INSPECTED ON COMPLETION TO ENSURE THE CONDITION OF THE SOIL COMPLIES WITH THAT ASSUMED IN DESIGN. SHOULD POCKETS OF INFERIOR MATERIAL BE PRESENT, BELOW SPECIFIED THICKNESS OF FOOTINGS, THEY SHOULD BE REMOVED TO REACH SUITABLE BEARING STRATUM, AND REPLACED WITH STRUCTURAL CONCRETE.

THE SURFACE OF FOUNDATION EXCAVATIONS SHOULD BE PROTECTED FROM DETERIORATION AND A 50mm THICK BLINDING LAYER OF CONCRETE PROVIDED WHERE FOUNDATIONS ARE NOT COMPLETED IMMEDIATELY.

CONCRETE

DESIGN CHEMICAL CLASS FOR CONCRETE IS DS-3 AND AC-2s

CONCRETE TO BE A DESIGNED MIX IN ACCORDANCE WITH THE REQUIREMENTS OF BS EN 206/1, BS 8500/2 AND BS 8110: PART 1:1997 DESIGNED MIX.
ORDINARY PORTLAND CEMENT TO BS 12.
COARSE & FINE AGGREGATE TO BS 882.
NOMINAL MAXIMUM SIZE OF AGGREGATE = 20mm
STRENGTH CLASS = RC35/40
MINIMUM CEMENT CONTENT = 300 kg/m³
RATE OF SAMPLING = 12m³

WORKABILITY - TARGET SLUMP = 50mm
MAXIMUM FREE-WATER/CEMENT RATIO = 0.60
NO ADDITIVES TO THE CONCRETE WILL BE ALLOWED UNLESS AGREED WITH THE ENGINEER

ALTERNATIVELY CONCRETE FOR FOUNDATION WORK TO BE A DESIGNATED MIX RC28/35 IN ACCORDANCE WITH THE REQUIREMENTS OF BS EN 206/1, BS 8500/2 AND BS 8110: PART 1:1997 DESIGNED MIX

CONCRETE TO BE WELL COMPACTED USING POKER VIBRATORS

ALL CONCRETE TO CONFORM TO BS EN 206-1:2000 AND BS 8500-2, DESIGNED TO COMPLY WITH THE REQUIREMENTS OF BRE SPECIAL DIGEST 1 - "CONCRETE IN AGGRESSIVE GROUND" AND THE CLASSIFICATIONS DETERMINED IN THE GROUND INVESTIGATION REPORT (DS3) AND TO BE MIN GRADE C32/40

MASONRY (BELOW DPC)

ALL MASONRY BELOW D.P.C. TO COMPRISE BRICKWORK (TO BS 3921:1985) WITH A MINIMUM COMPRESSIVE STRENGTH OF 20 N/mm² OR BLOCKWORK (TO BS 6073:PARTS 1 & 2:1981) WITH A MINIMUM DENSITY OF 1500kg/m³ AND A MINIMUM COMPRESSIVE STRENGTH OF 7.3N/mm².

ALL MASONRY BELOW D.P.C. LEVEL TO BE SET IN 1:0.0.25:3, S.R. CEMENT-LIME-SAND, MORTAR IN ACCORDANCE WITH BS 5628:PART 1:1992.

FOR PILE LAYOUT REFER TO DRAWING
No. 8073-HBL-XX-00-DR-S-0013.

FOR GROUND BEAM REINFORCEMENT
DETAILS REFER TO DRAWING No.
8073-HBL-XX-00-DR-S-0014.

ALL LEVELS, BUILDING & SETTING OUT
DIMENSIONS IN ACCORDANCE WITH
ARCHITECTS DRAWINGS AND DETAILS

C01	APR20	HM	ISSUED FOR CONSTRUCTION	DP	LOM
REV.	DATE	DRAWN	DESCRIPTION	CHKD	APPRD
STATUS DESCRIPTION				STATUS	
APPROVED				A1	

HBL Brook House
Weybrook Road,
Manchester M19 2QD
+44 (0)161 432 9977 | www.hbl.tld
Consulting Civil & Structural Engineers

PROJECT PROPOSED HOUSING DEVELOPMENT MIDGE HALL, BAMFORD, ROCHDALE			
DRAWING TITLE HOUSE TYPE 'A' FOUNDATION PLAN & DETAILS			
CLIENT WIGGETT CONSTRUCTION LTD			
HBL REF. 19/8073	DATE NOVEMBER 2019	SCALE(S) 1:50/1:20	A1
DRAWN D.PATEL	CHECKED L.MASSEY	APPROVED L.MASSEY	
DRAWING No. 8073-HBL-XX-00-DR-S-0010			REV. C01

LEGEND:

↔ DENOTES SPAN OF 175mm DEEP BEAM AND BLOCK FLOOR TO SPECIALIST DESIGN SUPPLY & DETAILS

FLOOR TO BE DESIGNED FOR THE FOLLOWING LOADINGS:

DEAD LOAD = 1.80kN/m² (FINISHES EXCLUDING SELF WEIGHT)

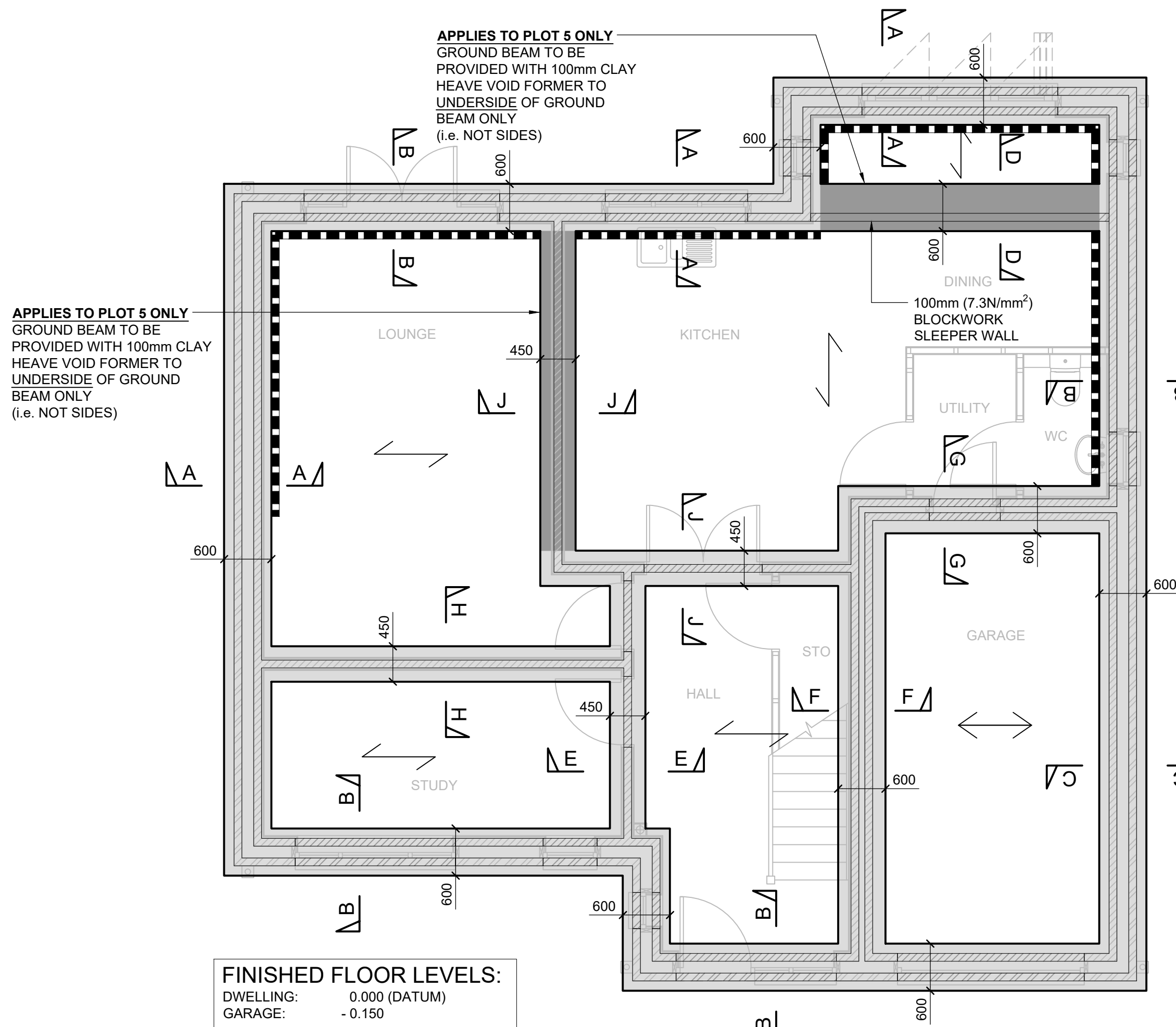
LIVE (IMPOSED) LOAD = 1.50kN/m² (DOMESTIC) + 0.80 kN/m² (FOR PARTITIONS) = 2.30 kN/m²

↔ DENOTES SPAN OF 175mm DEEP BEAM AND BLOCK FLOOR TO SPECIALIST DESIGN SUPPLY & DETAILS

FLOOR TO BE DESIGNED FOR THE FOLLOWING LOADINGS:

DEAD LOAD = 1.80kN/m² (FINISHES EXCLUDING SELF WEIGHT)

LIVE (IMPOSED) LOAD = 2.50kN/m² (GARAGE) & 9.00 kN (GARAGE POINT LOAD)

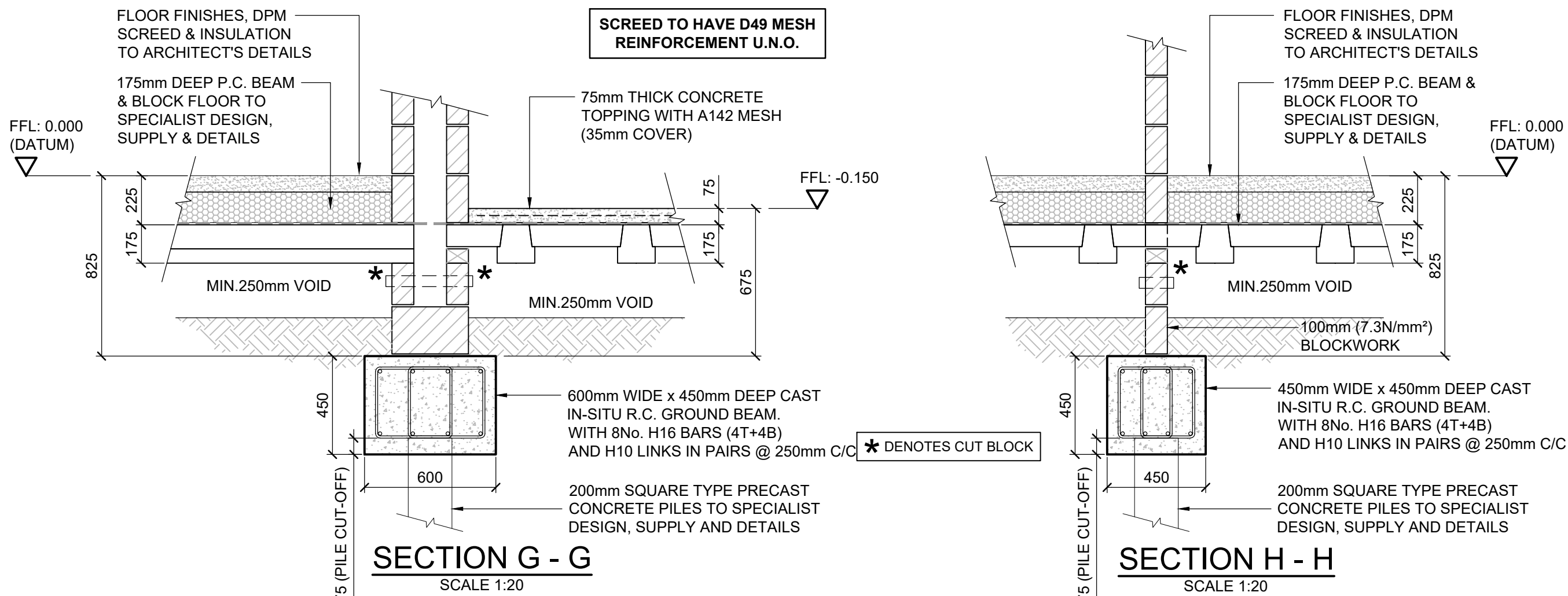
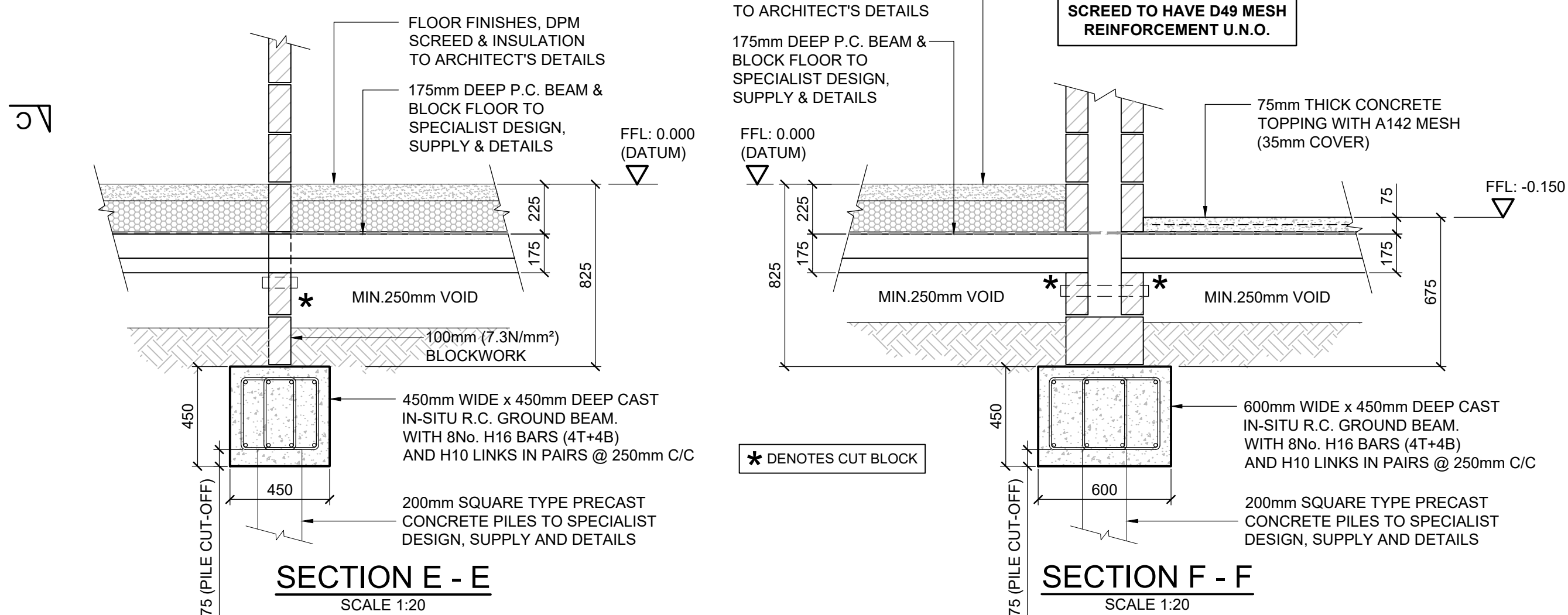
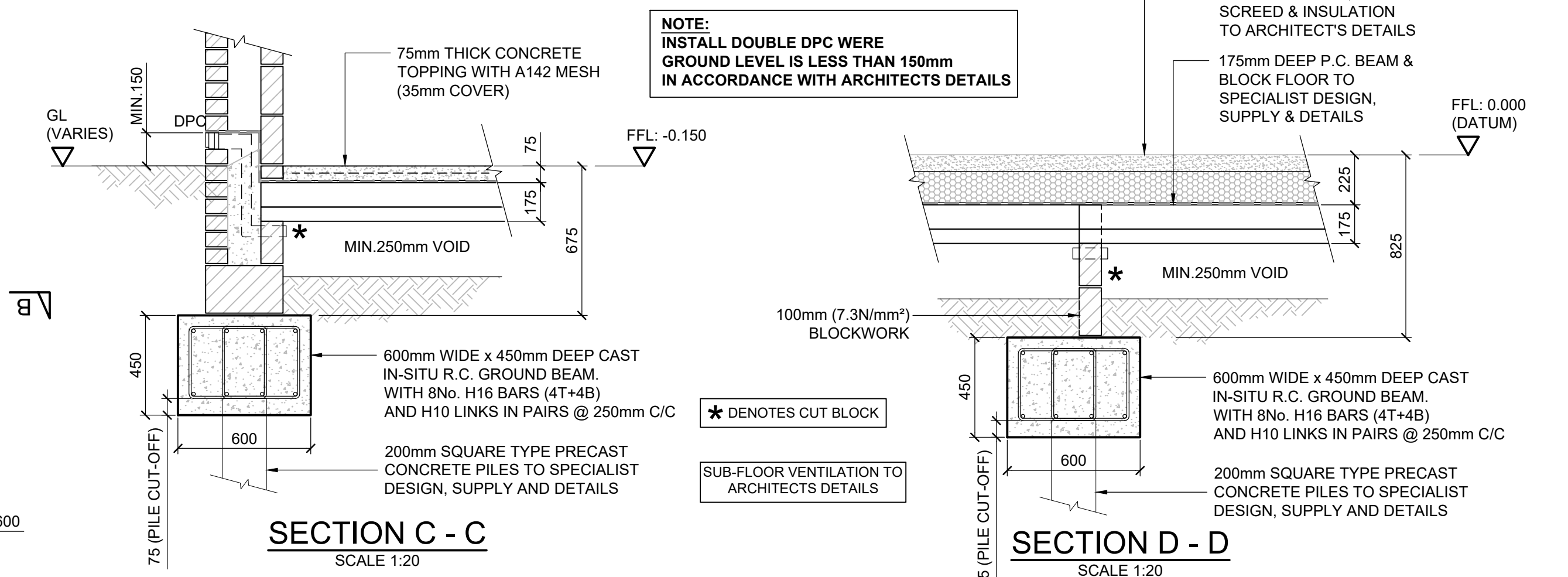
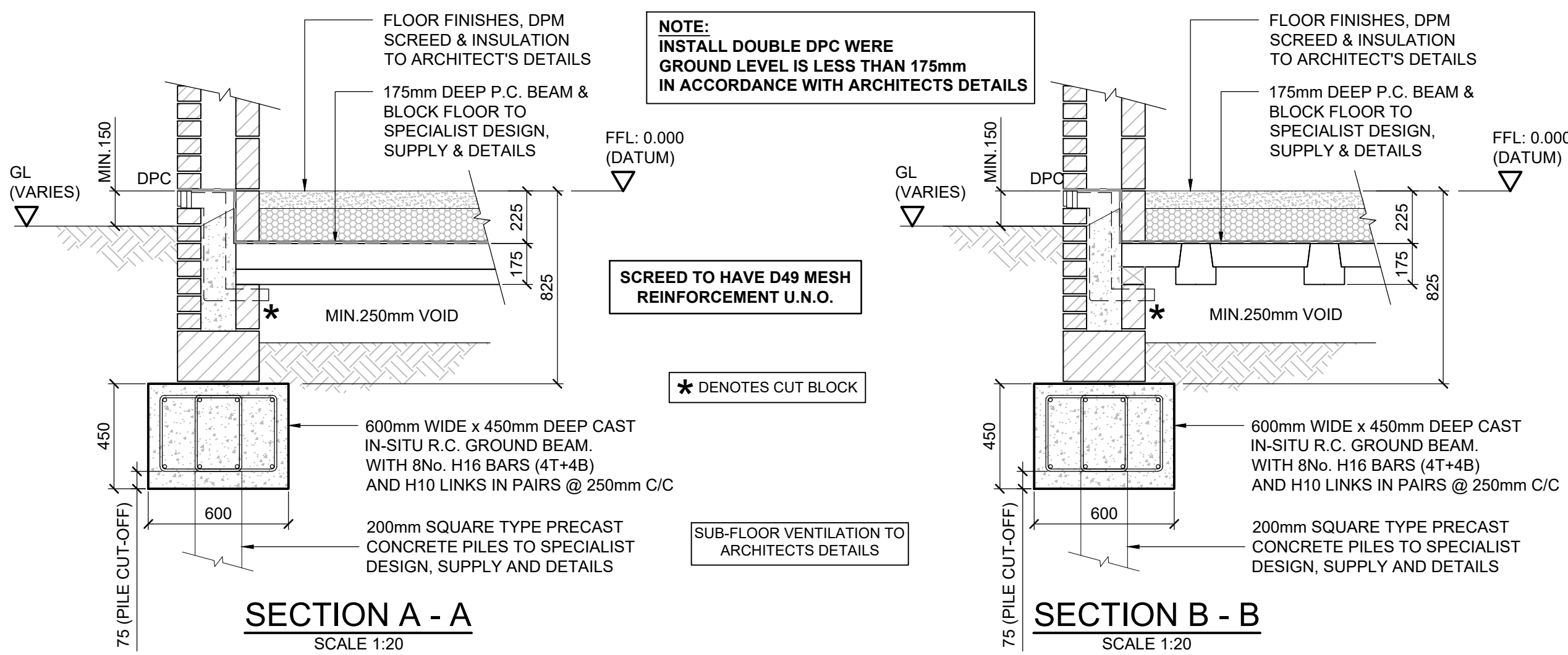


FOUNDATION PLAN
(SHOWING SPANS OF BEAM & BLOCK FLOOR)
SCALE 1:50

CLAY HEAVE PROTECTION: (PLOT 5 ONLY)

APPLIES TO PLOT 5 ONLY
DENOTES GROUND BEAMS TO BE PROVIDED WITH PROPRIETARY CLAY HEAVE PROTECTION MEASURES (VOID FORMER) AS FOLLOWS:
INTERNAL SIDE OF GROUND BEAMS = 25mm VOID FORMER
UNDERSIDE OF GROUND BEAMS = 100mm VOID FORMER
VOID FORMER TO BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER AND NHBC RECOMMENDATIONS

PILING NOTES: (PLOT 5 ONLY)
PILES TO BE DESIGNED WITH AN ADEQUATE FACTOR OF SAFETY TO RESIST UPLIFT FORCES ON THE SHAFT DUE TO HEAVE AND BE SUITABLY REINFORCED FOR THE LENGTH OF THE MEMBER GOVERNED BY THE HEAVE DESIGN. SUFFICIENT ANCHORAGE SHOULD BE PROVIDED BELOW THE DEPTH OF DESICCATED SOIL. SLIP LINERS MAY BE USED TO REDUCE UPLIFT BUT THE AMOUNT OF REDUCTION IS SMALL, AS FRICTION BETWEEN MATERIALS CANNOT BE ELIMINATED. THE JOINT DESIGN OF THESE PILES SHOULD BE CAPABLE OF TRANSMITTING TENSILE HEAVE FORCES

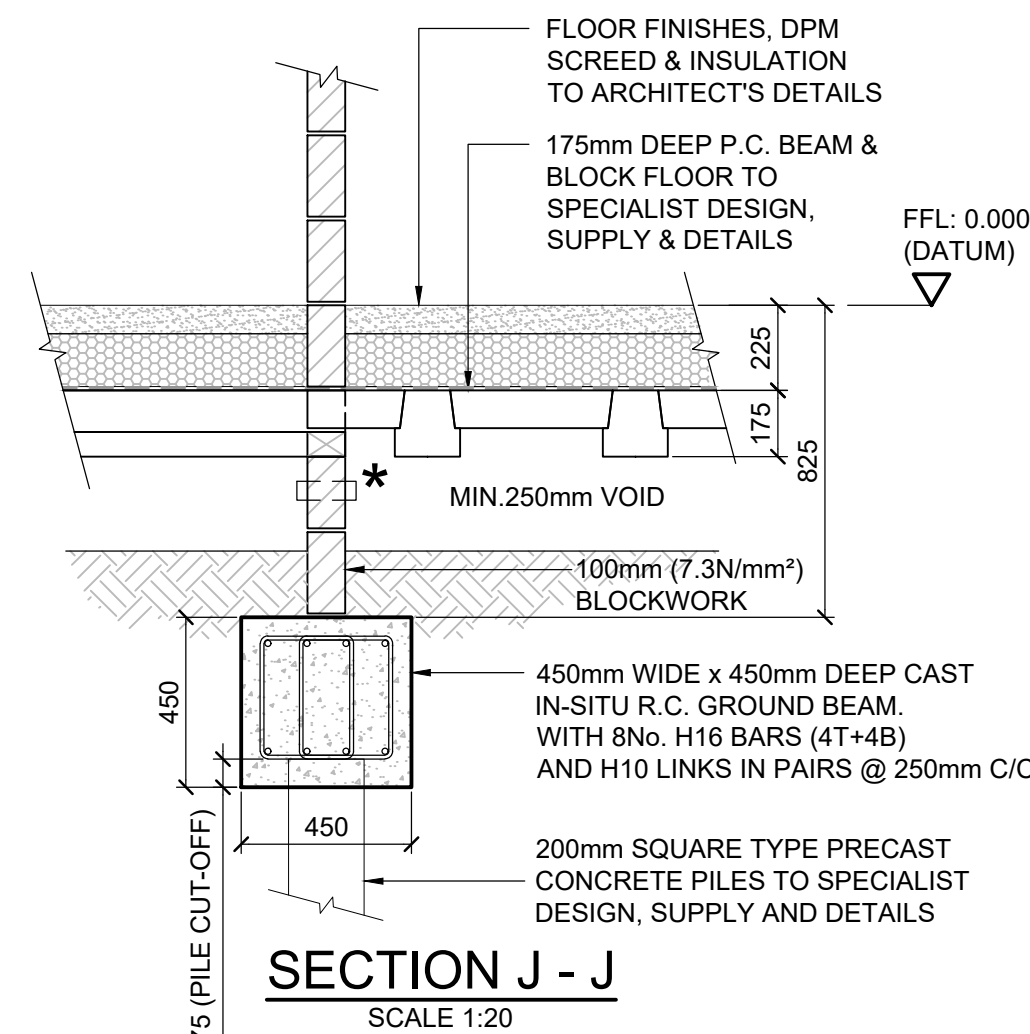


DO NOT SCALE FROM THIS DRAWING

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER HBL DRAWINGS ISSUED FOR THIS PROJECT

FOR GENERAL NOTES REFER TO HBL DRAWING No.8073-HBL-XX-00-DR-S-0010

REMEDIAL WORKS: (GROUTING)
THE PHASE II INTRUSIVE SITE INVESTIGATION REPORT (Ref. 2020.03 1250 BV Phase 2 Site Investigation Report complete) BY 'BUILD VISION CONSULTING ENGINEERS' HAS IDENTIFIED FRACTURED MUDSTONE AND COAL AT DEPTHS BETWEEN 5.5 - 10.0m BGL. POSSIBLE COLLAPSED WORKINGS TO BE DRILLED AND GROUTED BY GROUTING SPECIALIST WITH A COAL AUTHORITY PERMIT



FOR PILE LAYOUT REFER TO DRAWING No. 8073-HBL-XX-00-DR-S-0023.

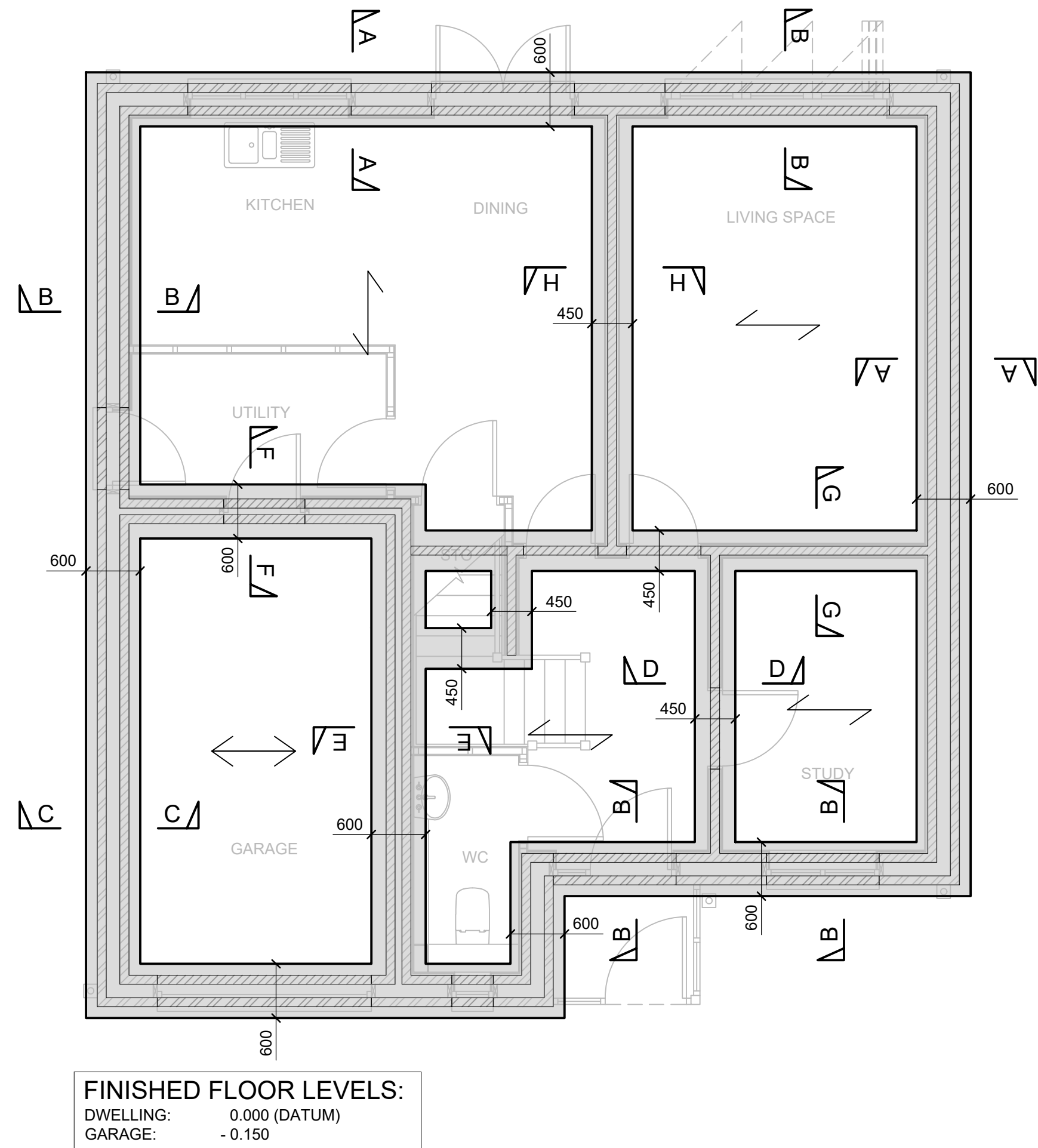
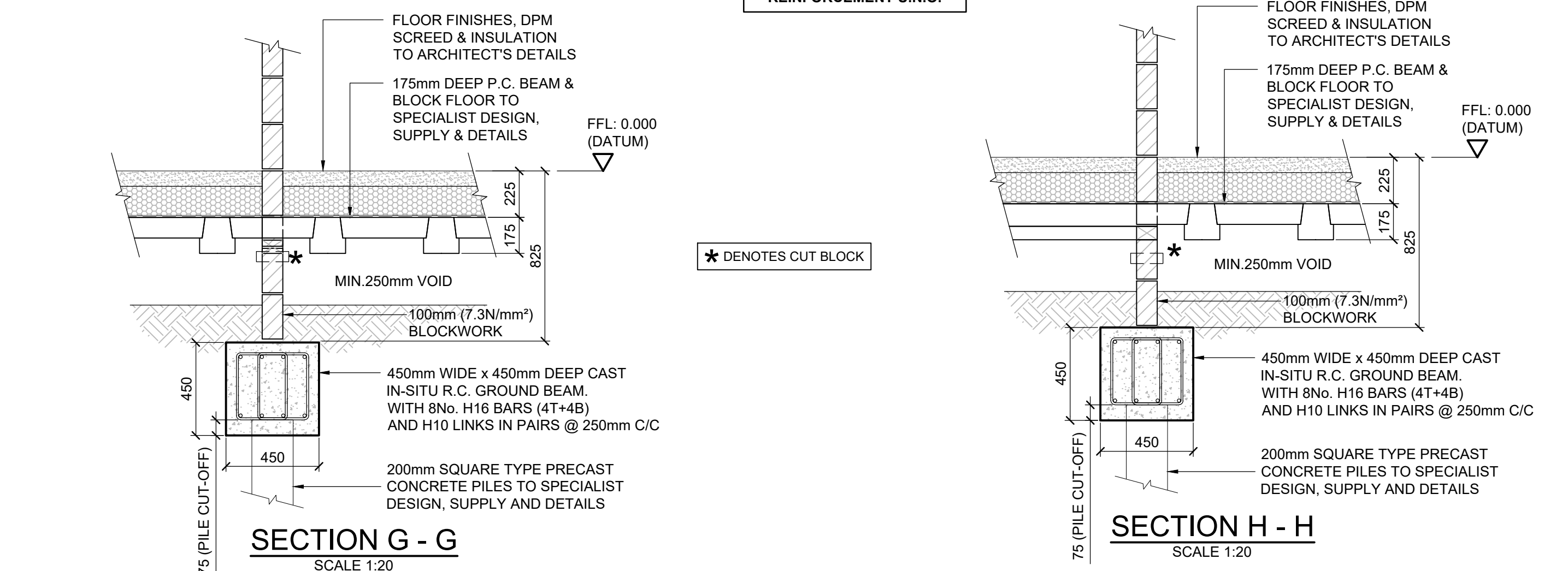
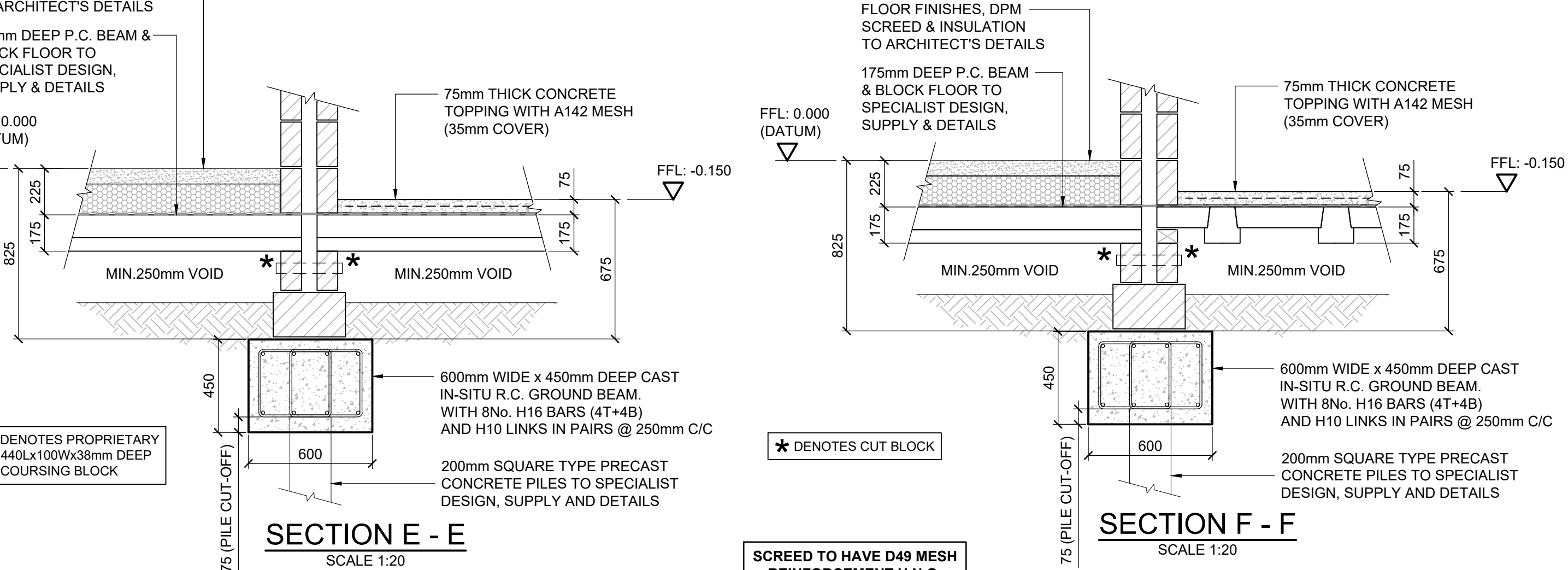
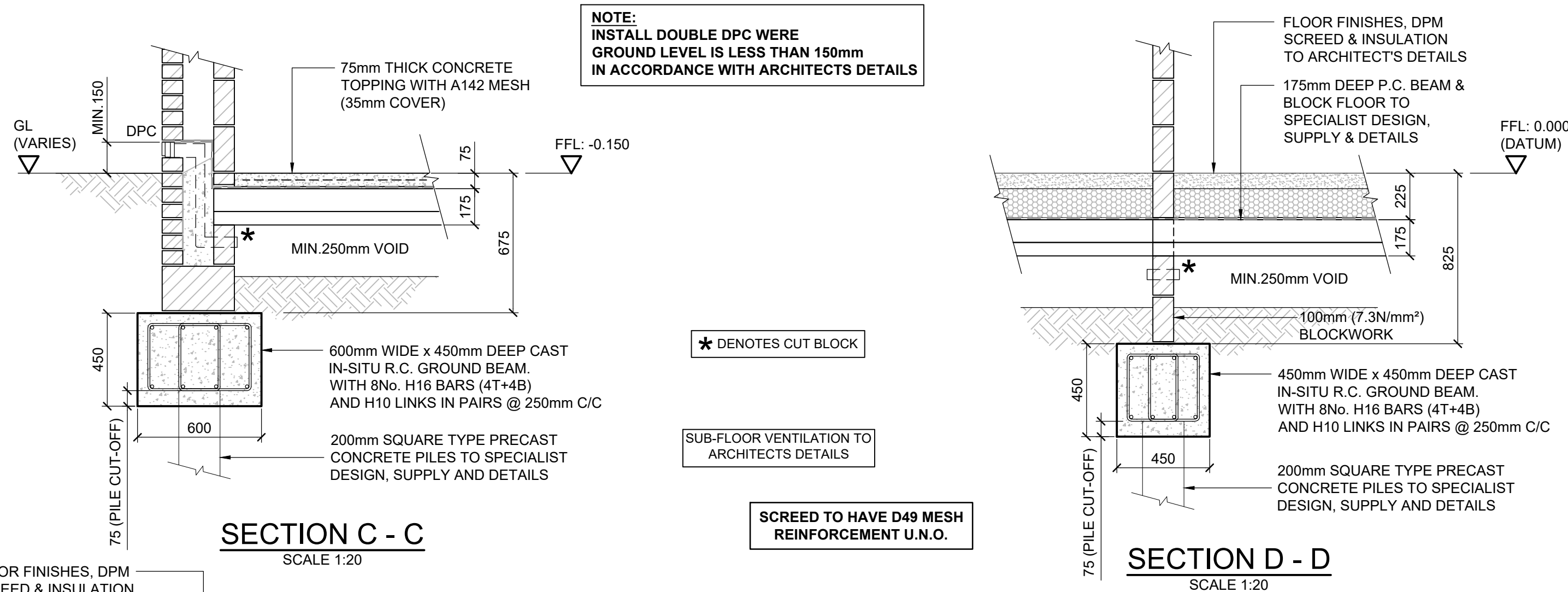
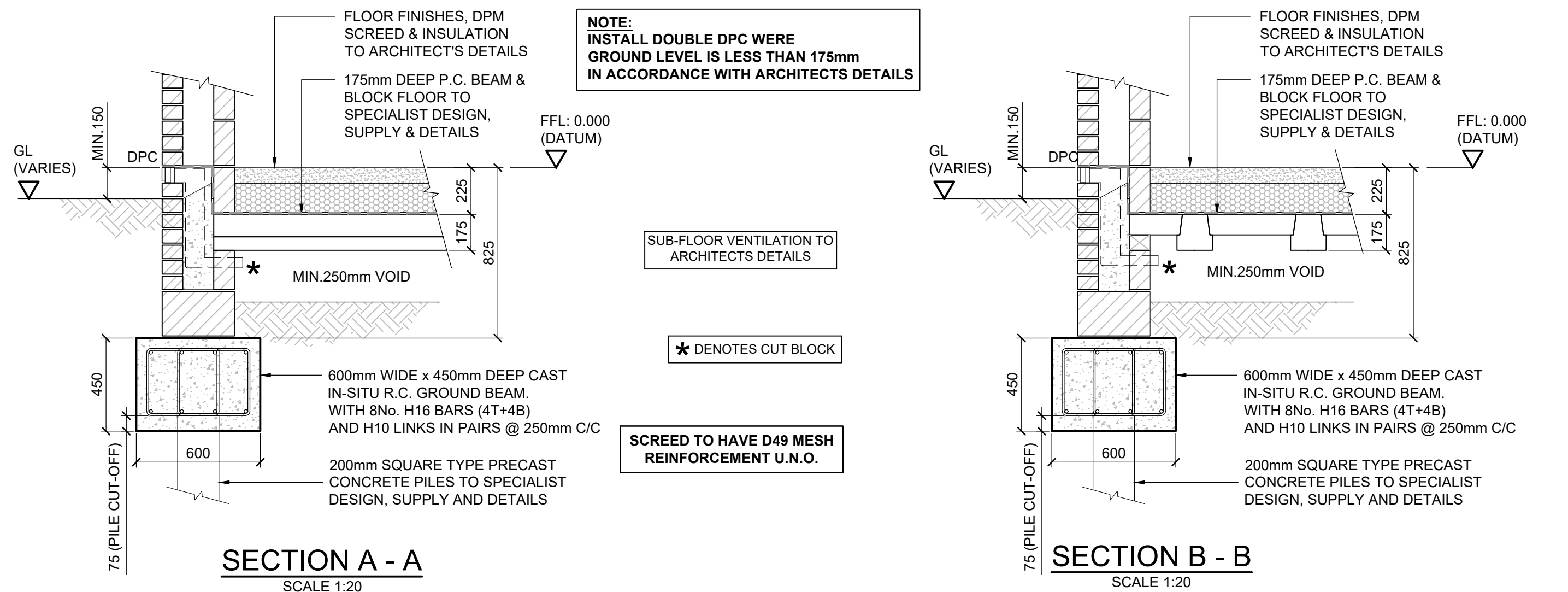
FOR GROUND BEAM REINFORCEMENT DETAILS REFER TO DRAWING No. 8073-HBL-XX-00-DR-S-0024.

ALL LEVELS, BUILDING & SETTING OUT DIMENSIONS IN ACCORDANCE WITH ARCHITECTS DRAWINGS AND DETAILS

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 DENOTES SPAN OF 175mm DEEP BEAM AND BLOCK FLOOR TO SPECIALIST DESIGN SUPPLY & DETAILS
FLOOR TO BE DESIGNED FOR THE FOLLOWING LOADINGS:
 DEAD LOAD = 1.80 kN/m^2 (FINISHES EXCLUDING SELF WEIGHT)
 LIVE (IMPOSED) LOAD = 1.50 kN/m^2 (DOMESTIC) + 0.80 kN/m^2 (FOR PARTITIONS) = 2.30 kN/m^2

 DENOTES SPAN OF 175mm DEEP BEAM AND BLOCK FLOOR TO SPECIALIST DESIGN SUPPLY & DETAILS
FLOOR TO BE DESIGNED FOR THE FOLLOWING LOADINGS:
 DEAD LOAD = 1.80 kN/m^2 (FINISHES EXCLUDING SELF WEIGHT)
 LIVE (IMPOSED) LOAD = 2.50 kN/m^2 (GARAGE) & 9.00 kN (GARAGE POINT LOAD)



FOUNDATION PLAN
(SHOWING SPANS OF BEAM & BLOCK FLOOR)
SCALE 1:50

**ALL LEVELS, BUILDING & SETTING OUT
DIMENSIONS IN ACCORDANCE WITH
ARCHITECTS DRAWINGS AND DETAILS**

C01	APR'20	HM	ISSUED FOR CONSTRUCTION	DP	LDM
REV.	DATE	DRAWN	DESCRIPTION	CHKD	APPRD
STATUS DESCRIPTION				STATUS	
APPROVED				A1	

HBL Brook House
Weybrook Road,
Manchester M19 2QD
+44 (0)161 432 9977 | www.hbl.ltd
Consulting Civil & Structural Engineers

PROJECT

PROPOSED HOUSING DEVELOPMENT
MIDGE HALL, BAMFORD, ROCHDALE

DRAWING TITLE	HOUSE TYPE 'C1' FOUNDATION PLAN & DETAILS
---------------	--

WIGGETT CONSTRUCTION LTD

HBL REF. 19/8073	DATE MARCH 2020	SCALE(S) 1.50:1=20	A1
DRAWN H.MAMAGANI	CHECKED D.PATEL	APPROVED L.MASSEY	
DRAWING No. 8073-HBL-XX-00-DR-S-0030			REV. C01

Capital Valley Plastics Ltd

Cwmavon Works
Nr Pontypool
Gwent NP4 8UW

Tel: 01495 772255 Fax: 01495 772251
e-mail: sales@capitalvalleyplastics.com
website: www.capitalvalleyplastics.com



Agrément Certificate

17/5387

Product Sheet 1

CAPITAL VALLEY PLASTICS GAS-RESISTANT MEMBRANE

RADBAR AMBER 2 FOIL BARRIER

This Agrément Certificate Product Sheet⁽¹⁾ relates to Radbar Amber 2 Foil Barrier, for use as a low-density polythene gas barrier and damp-proof membrane in concrete ground floors, above and below the slab not subject to hydrostatic pressure, to protect the building against moisture, radon, methane and carbon dioxide from the ground.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Resistance to water and water vapour — the membrane provides an effective barrier to the passage of liquid water and water vapour from the ground (see section 6).

Resistance to underground gases — the membrane is capable of restricting the ingress of radon, methane and carbon dioxide gases into the building (see section 7).

Resistance to puncture — the membrane has a high resistance to puncture and on a smooth or blinded surface will not be damaged by foot or site traffic (see section 8).

Durability — under normal service conditions the membrane will remain effective against the ingress of water and water vapour, and will restrict the ingress of radon, methane and carbon dioxide during the lifetime of the flooring construction in which it is installed (see section 13).

The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 22 February 2017

John Albon – Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body – Number 113.

The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbaccerts.co.uk
Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

THIS IS NOT A VALID AGRÉMENT CERTIFICATE.

THE BBA ACCEPTS NO REPOSIBILITY NOR LIABILITY FOR ANY CONCLUSIONS DRAWN FROM, NOR DECISIONS BASED ON, THIS DOCUMENT.

Regulations

In the opinion of the BBA, Radbar Amber 2 Foil Barrier, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	C1(2)	Site preparation and resistance to contaminants
Comment:	The product can contribute to a structure satisfying this Requirement. See section 7.1 of this Certificate.	
Requirement:	C2(a)	Resistance to moisture
Comment:	When properly installed in a correctly-designed structure, the product forms an effective barrier to the movement of water within the ground floor slab, enabling compliance with this Requirement. See sections 6.1 and 6.2 of this Certificate.	
Regulation:	7	Materials and workmanship
Comment:	The product is of an acceptable material. See section 13.1 and the <i>Installation</i> part of this Certificate.	



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:	The product can contribute to a construction satisfying this Regulation. See section 13.1 and the <i>Installation</i> part of this Certificate.	
Regulation:	9	Building standards applicable to construction
Standard:	3.1	Site preparation — harmful and dangerous substances
Standard:	3.2	Site preparation — protection from radon gas
Comment:	The product will enable a floor to satisfy the requirements of these Standards, with reference to clauses 3.1.2 ⁽¹⁾⁽²⁾ , 3.1.6 ⁽¹⁾⁽²⁾ , 3.1.7 ⁽¹⁾⁽²⁾ , 3.1.8 ⁽¹⁾⁽²⁾ , 3.2.1 ⁽²⁾ and 3.2.2 ⁽¹⁾⁽²⁾ . See section 7.1 of this Certificate.	
Standard:	3.4	Moisture from the ground
Comment:	When properly installed in a correctly-designed structure, the product forms an effective barrier to the movement of water within the ground floor slab, enabling compliance with this Standard, with reference to clauses 3.4.2 ⁽¹⁾⁽²⁾ , 3.4.4 ⁽¹⁾⁽²⁾ and 3.4.6 ⁽¹⁾⁽²⁾ . See sections 6.1 and 6.2 of this Certificate.	
Standard:	7.1(a)	Statement of sustainability
Comment:	The product can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.	
Regulation:	12	Building standards applicable to conversions
Comment:	Comments in relation to the product under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .	
(1) Technical Handbook (Domestic)		
(2) Technical Handbook (Non-Domestic).		



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The product is acceptable. See section 13.1 and the <i>Installation</i> part of this Certificate.

Regulation:	26	Site preparation and resistance to contaminants
Comment:		The product can contribute to a structure satisfying the requirements of this Regulation. See section 7.1 of this Certificate.
Regulation:	28	Resistance to moisture and weather
Comment:		When properly installed in a correctly-designed structure, the product forms an effective barrier to the movement of water within the ground floor slab, enabling compliance with this Regulation. See sections 6.1 and 6.2 of this Certificate.

Construction (Design and Management) Regulations 2015 Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 1 *Description* (1.2) of this Certificate.

Additional Information

NHBC Standards 2017

NHBC accepts the use of Radbar Amber 2 Foil Barrier, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapters 4.1 *Land quality — managing ground conditions* and 5.1 *Substructure and ground bearing floors*.

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard EN 13967 : 2012. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Radbar Amber 2 Foil Barrier is a multilayer, low-density polyethylene membrane, reinforced with a polypropylene reinforcing grid with an integral aluminium foil.

1.2 The membrane has the following nominal characteristics:

Thickness* (mm)	0.6 (overall)
Roll length* (m)	various
Roll width* (m)	various
Mass per unit area* ($\text{g}\cdot\text{m}^{-2}$)	350
Tensile strength* ($\text{N}\cdot 50\text{ mm}^{-1}$)	
MD	600
CD	480
Elongation*	
MD	20
CD	20
Nail tear resistance*	
MD	330
CD	400
Watertightness*	pass
Colour	
upper surface	various
lower surface	various.

1.3 Ancillary products for use with the membrane include:

- Radbar Double-sided Jointing Tape – for joints and laps
- Radbar Single-sided Overlap Tape.

1.4 Ancillary products for use with the membrane but outside the scope of the Certificate include:

- Radbar Top Hats — to seal around entry points to the membrane
- Radbar Internal Corner Cloaks — prefabricated corner details
- Radbar External Corner Cloaks — prefabricated corner details
- Radbar Primer — used to provide adhesion for application of bitumen enhanced geomembranes
- Radbar Void Vent 25 — cusped HDPE drainage core with a non-woven polypropylene geotextile separator/filter bonded to one side
- Radbar Void Vent 40 — cusped HDPE drainage core with a non-woven polypropylene geotextile separator/filter bonded to one side
- Radbar Protection Fleece — to form a protective layer to prevent damage to the membrane
- Radbar GR-SAM — gas-resistant self-adhesive membrane.

2 Manufacture

2.1 The product is manufactured by an extrusion/coating process.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control being operated by the manufacturer are being maintained.

3 Delivery and site handling

3.1 Rolls are wrapped in polythene film. Each roll has a leaflet enclosed describing the product and installation details. The BBA logo and Certificate number are printed on the leaflet and pallet label.

3.2 The rolls must be stacked on a flat surface, kept under cover and protected from sunlight and mechanical damage.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Radbar Amber 2 Foil Barrier.

Design Considerations

4 Use

4.1 Radbar Amber 2 Foil Barrier is satisfactory for use as a gas-resistant barrier to restrict the ingress of radon, methane and carbon dioxide gases into buildings from landfill and naturally-occurring sources.

4.2 Buildings in areas of risk should be constructed in accordance with the recommendations of BRE Report BR 211 : 2015 *Radon: Guidance on protective measures for new buildings*, and following the guidance set out in BS 8485 : 2015.

4.3 The product is also satisfactory for use as a damp-proof membrane in accordance with CP 102 : 1973, Section 2 and BS 8000-4 : 1989.

5 Practicability of installation

The membrane is designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

6 Resistance to water and water vapour



6.1 The membrane, including joints, provides an effective barrier to the passage of liquid moisture from the ground.

6.2 When installed in accordance with the following documents, the membrane will comply with the minimum sheet thickness detailed in the national Building Regulations:

England and Wales — Approved document C, Requirement C2(a), Section 4.6

Scotland — Mandatory Standard 3.4, clauses 3.4.2, 3.4.4 and 3.4.6

Northern Ireland — Regulation 28(a).

6.3 The membrane is impervious to water and provides a waterproof layer capable of accepting minor structural movements without damage.

7 Resistance to underground gases



7.1 The product will restrict the ingress of radon, methane and carbon dioxide gases into buildings from landfill and naturally-occurring sources and meet the performance criteria for a gas resistant membrane as defined in BS 8485 : 2015.

7.2 Measured gas permeability/diffusion values on unjointed membrane are given in Table 1.

Table 1 Gas permeability of Radbar Amber 2 Foil Barrier

Gas	Method	Result
Methane	BS ISO 15105-1	$<0.09 \text{ ml} \cdot \text{m}^2 \cdot \text{day}^{-1} \cdot \text{atm}^{-1}$
Carbon dioxide	BS ISO 15105-1	$<0.09 \text{ ml} \cdot \text{m}^2 \cdot \text{day}^{-1} \cdot \text{atm}^{-1}$
Radon	K124/02/95	$8.0 \times 10^{-15} \text{ m}^2 \cdot \text{s}^{-1}$

7.3 BRE Report BR 211 : 2015 recommends a 300 μm thick polyethylene sheet as the minimum required thickness for a radon gas-resistant membrane. It is generally accepted that other materials with comparable or higher gas resistance are suitable, provided they can withstand the construction process. In the opinion of the BBA, the product meets these criteria.

8 Resistance to puncture

8.1 The membrane can be punctured by sharp objects, and care should be taken when handling building materials over the exposed surface.

8.2 Provided there are no sharp objects present on the membrane's surface prior to and during installation of the protective layer, the product will not be damaged by normal foot traffic.

9 Compatibility with other materials

The membrane contains an aluminium foil interplay which may be subject to corrosion by alkaline conditions if damage to the membrane and exposure occurs. However, under normal circumstances, the polyethylene faces of the membrane are compatible with other materials and products typically used in the same areas, with the exception of those containing pitch.

10 Underfloor heating

There will be no adverse effect on the membrane from underfloor heating under normal service conditions. In other circumstances, the Certificate holder's advice should be sought.

11 Effects of temperature

When the membrane is loose-laid and the joints are taped, the installation temperature should not be below 5°C.

12 Maintenance

As the product is confined under concrete and has suitable durability (see section 13), maintenance is not required. However, any damage occurring before enclosure must be repaired (see section 16).

13 Durability



13.1 The membrane will, in normal circumstances, remain effective against the ingress of water and water vapour, and will restrict the ingress of radon, methane and carbon dioxide during the lifetime of the building.

13.2 Long periods of exposure to ultraviolet light will reduce the effectiveness of the membrane.

Installation

14 General

14.1 Radbar Amber 2 Foil Barrier must be installed and fixed in accordance with the Certificate holder's instructions, the relevant clauses of BR 211 : 2015 and following the guidance of BS 8485 : 2015.

14.2 The membrane can be installed in all normal site conditions, provided that the air temperature is not below 4°C to prevent the risk of surface condensation.

15 Procedure

15.1 The product must only be applied to surfaces that have a smooth finish, ie they should be free from voids, projections and mortar deposits. Surfaces should be dry and free from dust and frost.

15.2 Concrete surfaces should be dense. Vertical surfaces of brickwork and blockwork must be dry and rendered to provide an even surface. Brickwork or blockwork not rendered must be flush pointed to give a smooth surface without sudden changes in level.

15.3 The membrane is rolled out with the coloured surface uppermost (white side down), ensuring that it is properly aligned. All end and side overlaps should be a minimum of 150 mm and prepared in accordance with the Certificate holder's instructions.

15.4 When the membrane is laid below the concrete slab, it should be loose-laid to accommodate any small movements.

15.5 All surfaces must be dried thoroughly prior to joining. Roll edges can be welded, or taped. A strip of the tape is unrolled over the membrane with its nearest edge 50 mm from the membrane edge. The protective paper is removed from the butyl tape prior to rolling an adjacent run of the membrane, which must be carefully unrolled over the jointing tape, ensuring a 100 mm overlap.

15.6 All service penetrations and direction changes should be properly detailed in accordance with the Certificate holder's instructions. Service ducts should be vented to prevent the possibility of gas accumulating in confined spaces.

15.7 The continuity of the gas protection must extend over the footprint of the building, and the gas membrane must be sealed to a gas-resistant damp-proof course.

15.8 The membrane should be covered by a screed or other protective layer, such as Radbar Protection Fleece, as soon as possible after installation. If blockwork protection is used, care must be taken to avoid damage to the membrane during construction.

15.9 The membrane installation should be subject to third-party independent validation, in accordance with BS 8485 : 2015.

16 Repair

Any damage to the product must be repaired using a patch of the membrane, and laps welded or sealed with double-sided tape and secured with the butyl tape. All patched areas must extend a minimum of 150 mm from the damaged area. If required by the local authority, repair work should be confirmed by an independent validation report, as all gas membrane installation should be subject to third-party validation in accordance with BS 8485 : 2015.

Technical Investigations

17 Tests

17.1 An assessment was made of data to EN 13967 : 2012 in relation to:

- tensile strength and elongation
- nail tear resistance
- watertightness
- resistance to static loading.

17.2 Tests were carried out to determine:

- thickness, width, density and mass per unit area
- dimensional stability, low temperature flexibility and water vapour permeability
- tensile strength and elongation on controls and after 12 weeks heat ageing at 70°C, and after 100 hours UVB exposure
- watertightness on controls and after 12 weeks heat ageing at 70°C
- nail tear strength on controls and after 12 weeks heat ageing at 70°C
- resistance of joints to air pressure
- tensile strength of joints on controls and after 12 weeks heat ageing at 70°C

to assess:

- product characteristics
- durability of the product and joints.

18 Investigations

18.1 An evaluation was made of the results of the test data regarding permeability of radon, methane and carbon dioxide.

18.2 A site visit was conducted to assess practicability of installation.

18.3 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

Bibliography

BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

BS 8485 : 2015 *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*

BS ISO 15105-1 : 2007 *Plastics — Film and sheeting — Determination of gas-transmission rate — Differential-pressure methods*

CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*

EN 13967 : 2012 *Flexible sheets for waterproofing — Plastic and rubber damp proof sheets including plastic and Rubber basement tanking sheet — Definitions and characteristics*

19 Conditions

19.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

19.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

19.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

19.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

19.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

19.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.



BEESLEY & FILDES LTD

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Web Site: www.beesleyandfildes.co.uk
Email: creditcontrol@beesleyandfildes.co.uk

Collection Note

Branch

Walkden Depot
Louisa Street
Walkden
Manchester
M28 3GA
Tel: 0161 713 1200

Order processed by:

ajohnstone
67483400
03/11/2020

Order No

Order Date

Customer

Your Ref

Delivery

Sale Type

Our Ref

KE096
Joe/E-mail
On 03/11/2020
Collected

Invoice Address

JD Kelly Floors
Ropers Barn
Vallets Lane
Bolton
BL1 6DY

FAO

Special Instructions

Notes

Page 1 of 1

Item	Description	Qty	Weight			
1	3503VIS130 - VISQUEEN 2000G YELLOW GAS(A1) BARRIER (80m2) REF RS058893	5.00	0.000			
2	3503VIS105 - ROLL VISQUEEN GR DETAILING STRIPS 300MM X 10MTR REF RS061529	4.00	0.000			
3	3503VIS020 - 1000mm X20m ZEDEX CPT COMMERCIAL DPC BLACK REF RS063351	6.00	0.000			
4	3503VIS040 - 300MM X 20L/MTR ZEDEX CPT COMMERCIAL DPC-BLACK REF RS063343	4.00	0.000			
5	=====					
6	3501POL370 - Radbar Detailing Strip 300Mm X 10M	20.00	0.000			
7	3501POL375 - Radbar Amber 2 Gas Foil Barrier 2M X 50M Roll	10.00	0.000			

Received on behalf of JD Kelly Floors

Signature

Name

Date

subject to our terms and conditions of sale. Further copies available on request.





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Collection Note

Branch

Walkden Depot
Louisa Street
Walkden
Manchester
M28 3GA
Tel: 0161 713 1200

Order processed by: rybradshaw
Order No: 67845900
Order Date: 03/12/2020
Customer: KE096
Your Ref: 2244
Delivery: On 03/12/2020
Sale Type: Collected
Our Ref:

Invoice Address

JD Kelly Floors
Ropers Barn
Vallets Lane
Bolton
BL1 6DY

FAO

Special Instructions

Notes

Page 1 of 1

Item	Description	Qty	Weight			
1	3501POL370 - Radbar Detailing Strip 300Mm X 10M	20.00	0.000			
2	3501POL375 - Radbar Amber 2 Gas Foil Barrier 2M X 50M Roll	8.00	0.000			

Received on behalf of JD Kelly Floors

Signature Name

Date

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Branch

Walkden Depot
Louisa Street
Walkden
Manchester
M28 3GA
Tel: 0161 713 1200

Delivery Address

JD Kelly Floors
Ropers Barn
Vallets Lane
Bolton
BL1 6DY

JD Kelly Floors
Ropers Barn
Vallets Lane
Bolton
BL1 6DY

Order processed by:

a:johnstone

Order No

67854470

Order Date

04/12/2020

Customer

KE096

Your Ref

JOE

Delivery

On 08/12/2020

Page 1 of 1

Special Instructions	Notes

Item	Description	Quantity	Per	Pick & Tick
1	zz_3501POL365_0001 - EACH; RADBAR SEALANT 300ml	8	Each	☐
2	zz_zz_3902IBS062_0009_0001 - DELIVERY CHARGE	1	Each	☐

Signature _____

Name

Date _____

Subject to our terms and conditions of sale. Further copies available on request.



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Collection Note

Branch

Walkden Depot
Louisa Street
Walkden
Manchester
M28 3GA
Tel: 0161 713 1200

Invoice Address

JD Kelly Floors
Ropers Barn
Vallets Lane
Bolton
BL1 6DY

Order processed by: ajohnstone
Order No 67914000
Order Date 10/12/2020
Customer KE096
Your Ref Joe
Delivery On 11/12/2020
Sale Type Collected
Our Ref

FAO

Page 1 of 1

Special Instructions

Notes

Item	Description	Qty	Weight			
1	3501POL375 - Radbar Amber 2 Gas Foil Barrier 2M X 50M Roll	10.00	0.000			

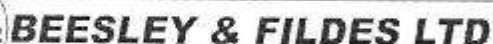
Received on behalf of JD Kelly Floors

Signature Name

Date

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