Build Vision
Consulting Engineers

PLOTS 1 TO 23

CHARMINSTER DRIVE, CRUMPSALL

REMEDIATION VALIDATION REPORT

Client:

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

Consultant:

Build Vision Ltd
Consulting Engineers
Suite 1, Westleigh House
Wakefield Road
Denby Dale
Huddersfield
HD8 8QJ

Job No: 1139

Revision C – Revised to inc. Plots 21-23 June 2017

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1. INTRODUCTION

1.1.1. The Build Vision Site Investigation Report Ref: 1139, dated March 2015 should be referred to for further information.

1.1.2. The Site Conceptual Model indicated that there are Source-Pathway-Receptor pollution linkages present on the site and therefore the following remediation measures were required to mitigate the risks identified.

2. REMEDIATION STRATEGY

2.1. Contamination

2.1.1. The results of samples of the general made ground tested indicate elevated levels of PAH's and TPH's in the made ground and a significantly elevated arsenic level in TP5 1.5m. The elevated PAH's and TPH's could be due to ash, the organic content of the clay fill or fuel spillage and seepage into the sand, clay, stone, concrete and brick fill beneath the concrete hardstanding areas. The elevated arsenic level is consistent with the ash and clinker identified in TP5 from 1.4m to 2.0m. The risk to end user receptors and construction workers is therefore considered low to medium.

2.1.2. The results of the samples of groundwater tested do not indicate any significant elevated levels of contaminants above assessment levels and therefore the risk to the groundwater is considered low.

2.1.3. The sulphate and pH results indicate Aggressive Chemical Environment for Concrete (ACEC) Classification DS-1 AC-1. The risk to structures is therefore considered low. Buried concrete and services should be designed in accordance with the guidance given in BRE Special Digest 1: Concrete in aggressive ground.

2.1.4. The levels exceed the assessment levels for Water Supply Pipes and the risk to services is therefore considered medium. The advice of service providers should be obtained to ensure that appropriate measures are taken to protect services from contamination and aggressive ground conditions.

2.1.5. Remediation measures to prevent contact with the contaminated made ground identified are required for end user receptors. The general made ground should be removed or capped by hard cover and minimum 600mm capping layers to gardens, comprising

minimum 150mm granular capillary break layer or geotextile membrane and the remainder as 'inert' subsoil and/or topsoil.

2.1.6. Validation sampling of any imported material will be required and should comprise 1 sample per 200m^3 of greenfield source topsoil or 50m^3 of brownfield source topsoil and subsoil with 3 no. samples minimum of any source of material. Delivery tickets and waste transfer notes will be required for all material imported and disposed off site.

2.1.7. Should any contamination not identified by the site investigation be encountered during the construction period, the engineer should be notified immediately.

2.1.8. Construction workers should adopt appropriate health and safety measures on site and undertake soil gas monitoring prior to and during man entry of below ground voids or confined spaces, as detailed in HSE guidance.

2.1.9. Dust suppression measures should be adopted during all earthworks.

2.1.10. Surface water control measures should be adopted during construction to limit runoff and infiltration through exposed made ground and to limit siltation of the surface drainage.

2.2. Landfill Gas

2.2.1. No Methane levels, Carbon Dioxide levels up to 6.1%, Oxygen level down to 13.6% and gas flows up to <0.1 l/hr were identified. The maximum GSV for the site is 0.0061 but Carbon Dioxide levels are greater than 5%, which falls into CS2 and NHBC Amber 1 in accordance with CIRIA C665 and BS 8485. These results are consistent with the clay, sand, gravel, stone, brick and concrete fill identified beneath the site.

2.2.2. Gas protection measures in accordance with CS2 and NHBC Amber 1 from BS 8485 should be installed in the substructure. For residential, a score of 3 is required, this can be achieved by providing reinforced concrete cast in-situ, beam and block or pre-cast concrete floor slabs with low permeability gas membranes with taped joints and sealed entries using specialist approved gas prevention tape and underfloor ventilated voids.

2.2.3. Validation of the installation of the gas membrane will be required with photographic evidence of gas taped sealed joints/entries and/or certificates of inspection by a specialist.

3. REMEDIATION VALIDATION

3.1. Contamination

3.1.1. A reduced level strip and cut and fill exercise was carried out on the site to achieve the proposed levels for the new development. Waste transfer notes for material removed from site are enclosed in Appendix A.

3.1.2. Wiggett Construction Ltd. have confirmed that no evidence of contamination other than the made ground identified in the site investigation was identified during the construction works.

3.1.3. Topsoil was imported on to site for use in the capping layers to the garden and soft landscaped areas from Huperade Ltd. Bridgehouse Farm, Brooks Drive, Timperley. Huperade manufacture topsoil from greenfield source topsoil, organic material and sand. Waste transfer notes and delivery notes are enclosed in Appendix A.

3.1.4. Build Vision Consulting Engineers attended site and recorded 13 no. validation trial pits in the garden areas for plots 1 to 23, complying with guidance on validation rates of 1 no. per 2 to 3 plots requirements. The trial pits identified topsoil to depths of 300mm to 450mm over stone, sand and clay to depths of minimum 600mm. The validation trial pit location plan and photos are enclosed in Appendix A.

3.1.5. Build Vision obtained 3 no. samples of the topsoil from the 600 cu.m stockpile of topsoil on site for testing and the samples were tested for a general soil suite including asbestos, heavy metals, PAHs and TPHs. The topsoil test results were all below residential assessment levels, therefore the topsoil is considered suitable for use in garden areas. The test results and assessment are enclosed in Appendix A.

3.1.6. PE Barrier pipes were provided for water supply pipes in accordance with the water pipe risk assessment enclosed in Appendix A.

3.1. Landfill Gas

3.1.1. Gas protection measures have been provided and validated in accordance with CS2 and NHBC Amber 1 from BS8485 as shown on the foundation drawings and photos enclosed in Appendix B.

4. CONCLUSIONS

4.1.1. 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.

4.1.2. The development is complete and is considered suitable for use.

APPENDIX A

CONTAMINATION REMEDIATION VALIDATION

- Validation Trial Pit Location Plan
- Validation Trial Pit Photo's
- Waste Transfer Notes for removal of material off site
- Waste Transfer Notes for Topsoil
- Topsoil Test Results and Assessment
- Water Supply Pipe Risk Assessment



REV	DATE	AMENDMENT	BY	CHKD
H	07/05/15	Updated in accordance with latest plot layouts	TR	GG
J	09/06/15	Erroneous floor level corrected to plots 9 & 10, floor levels to plots 17 & 18 amended in line with structural engineer's details	TR	GG
K	02/07/15	Plot and site levels amended in line with structural engineer's drawings	TR	GG

HNA architects
Architecture | Planning | Design

PROJECT:	Charminster Drive, Crumpsall
CLIENT:	Wiggett Construction Ltd.
DRAWING:	Site Layout Plan
DRAWN BY: TR	CHECKED BY: GG
DATE: 02/07/15	SCALE: 1:200 @ A1
STATUS: Construction	DRAWING No: 1072/100
REVISION: K	

TRIAL PIT PHOTOGRAPHS

TRIAL PIT 1







TRIAL PIT PHOTOGRAPHS

TRIAL PIT 2







TRIAL PIT PHOTOGRAPHS

TRIAL PIT 3







TRIAL PIT PHOTOGRAPHS

TRIAL PIT 4







TRIAL PIT PHOTOGRAPHS

TRIAL PIT 5







TRIAL PIT PHOTOGRAPHS

TRIAL PIT 6







TRIAL PIT PHOTOGRAPHS

TRIAL PIT 7







BV

GAS PROTECTION PHOTOGRAPHS

VALIDATION TRIAL PIT 8







BV

GAS PROTECTION PHOTOGRAPHS

VALIDATION TRIAL PIT 9







GAS PROTECTION PHOTOGRAPHS

VALIDATION TRIAL PIT 10







BV

GAS PROTECTION PHOTOGRAPHS

VALIDATION TRIAL PIT 11







VALIDATION TRIAL PIT PHOTOGRAPHS

VALIDATION TRIAL PIT 12







VALIDATION TRIAL PIT PHOTOGRAPHS

VALIDATION TRIAL PIT 13







DHI Excavations Ltd

177 Walkden Road, Worsley, Manchester M28 7QH

Serial No. DHI/ 000549

Duty of Care - Controlled Waste Transfer Note

SIC Code: 41.20/2.

Official use only

A Description of the waste

1. How is the waste contained?
   ☑ Loose ☐ Skips ☐ Sacks ☐ Drums ☐ Other (Specify): .....
2. Describe the waste being transferred: INERT SPOIL
   Classification code: 17-05-04
3. Quantity 2000 kg / (Tonnes) / m3 / sacks / drums / other (specify): .....
4. Analysis attached / not attached (delete as necessary)

B Producer of the waste

1. Full name (print): GNL CONSTRUCTION LTD.
2. Company name, address and postcode: 324 STYAL RD, HEALD GREEN, CHESHIRE
3. Which of the following are you? (Please tick one or more boxes)

A	☑ Waste producer ☐ Waste importer ☐ 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: .....

C Carrier of the waste

1. Full name (print): DHI Excavations Ltd
2. Company name, address and postcode: 177 Walkden Road, Worsley, Manchester M28 7QH

☑ Registered carrier (give number): CB/BM3787KJ

We have fulfilled our obligations with regards to the waste heirachy regulations

D First Transfer (producer to carrier)

1. Place of transfer: CHARMINSTER DRIVE, CRUMPSALL, MANCHESTER, M8 5QA
2. Date of transfer: 1ST SEPT 2015 TO 1ST SEPT 2016.
   (for multiple transfers give between dates, see notes)
3. Name and address of broker arranging transfer (if applicable): .....
4. Produc[redacted]
   Name
   Signed:

E Disposer of the waste

1. Full name (print): ASTLEY SAND + AGGREGATES
2. Company name, address and postcode: MORLEY QUARRY, MORLEY LANE, ASTLEY, MANCHESTER, M29 7EW.
3. Which of the following are you? (Please tick one or more boxes)
   ☑ Holder of waste disposal / management licence (give number): EPR/LP3597SR/V000[illegible]2
   Issued by: EA
   ☐ Exempt from licence requirements (give reason): .....

F Second Transfer (carrier to disposer)

1. Place of transfer: MORLEY QUARRY, ASTLEY, M29 7EW.
2. Date of transfer: 1ST SEPT 2015 TO 1ST SEPT 2016.
   (for multiple consignments give between dates)
3. Name and address of broker arranging transfer (if applicable): .....
4. Carriers representatives: Disposers representatives:
   Name (print[redacted]
   Signed: .....
   Company na[redacted]

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 this note applies.

White - DHI copy, **Blue** - Disposers copy, **Yellow** - Producers copy, **Pink** - Spare

DHI Excavations Ltd

177 Walkden Road, Worsley, Manchester M28 7QH

Serial No. DHI/

Duty of Care - Controlled Waste Transfer Note

SIC Code: 41.20/2.

Official use only

A — Description of the waste

1. How is the waste contained?
   ☑ Loose ☐ Skips ☐ Sacks ☐ Drums ☐ Other (Specify):
2. Describe the waste being transferred: INERT TOP SOIL TO BS 3882:2015. Classification code:
3. Quantity 400 kg / (Tonnes) / m3 / sacks / drums / other (specify):
4. Analysis attached / not attached (delete as necessary)

B — Producer of the waste

1. Full name (print): HUPERADE
2. Company name, address and postcode: BRIDGEHOUSE FARM, BROOKS DRIVE, TIMPERLEY, CHESHIRE WA15 7DQ.
3. Which of the following are you? (Please tick one or more boxes)

A	☑ ~~Waste producer~~ SOIL PRODUCER	☐ Waste importer	☐ 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:	

C — Carrier of the waste

1. Full name (print): DHI Excavations Ltd
2. Company name, address and postcode: 177 Walkden Road, Worsley, Manchester M28 7QH

☑ Registered carrier (give number): CB/BM3787KJ

We have fulfilled our obligations with regards to the waste heirachy regulations

D — First Transfer (producer to carrier)

1. Place of transfer: BROOKS DRIVE, TIMPERLEY, WA15 7DQ.
2. Date of transfer: 9/6/16 TO 8/6/17.
   (for multiple transfers give between dates, see notes)
3. Name and address of broker arranging transfer (if applicable):
4. Producers [redacted]
   Name (pri
   Signed:

E — Disposer of the waste

1. Full name (print): GNL CONSTRUCTION LTD.
2. Company name, address and postcode: 324 STYAL RD, HEALD GREEN, CHESHIRE,
3. Which of the following are you? (Please tick one or more boxes)
   ☐ Holder of waste disposal / management licence (give number): N/A. Issued by:
   ☐ Exempt from licence requirements (give reason):

F — Second Transfer (carrier to disposer)

1. Place of transfer: CHARMINSTER DRIVE, CRUMPSAL, M/C, M8 5QA.
2. Date of transfer: 9/6/16 TO 8/6/17.
   (for multiple consignments give between dates)
3. Name and address of broker arranging transfer (if applicable):
4. Carriers representatives: Disposers representatives: [redacted]
   Name (pri
   Signed:
   Company r

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 this note applies.

White - DHI copy, **Blue** - Disposers copy, **Yellow** - Producers copy, **Pink** - Spare

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Scientific Analysis Laboratories Ltd

Certificate of Analysis

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Report Number: 579259-1

Date of Report: 07-Jul-2016

Customer: Build Vision Ltd
Suite 1
Westleigh House
Wakefield Road
Denby Dale
Huddersfield
HD8 8QJ

Customer Contact: M/S Sarah Griggs

Customer Job Reference: 1139/SJG/PG
Customer Site Reference: Charminster Drive Crumpsall
Date Job Received at SAL: 21-Jun-2016
Date Analysis Started: 22-Jun-2016
Date Analysis Completed: 07-Jul-2016

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with Section 25 of the SAL Quality Manual

UKAS TESTING
1549

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked and authorised by :
Emma Spear
Project Manager

Issued by :
Emma Spear
Project Manager

[redacted]

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SAL Reference: 579259
Project Site: Charminster Drive Crumpsall
Customer Reference: 1139/SJG/PG

Soil Analysed as Soil
MCERTS Preparation

SAL Reference	**579259 001**	**579259 002**	**579259 003**
Customer Sample Reference	**1139-SP1**	**1139-SP2**	**1139-SP3**
Date Sampled	**20-JUN-2016**	**20-JUN-2016**	**20-JUN-2016**
Type	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**

Determinand	Method	Test Sample	LOD	Units			
Moisture @105C	T162	AR	0.1	%	**23**	**23**	**16**
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1

SAL Reference: 579259
Project Site: Charminster Drive Crumpsall
Customer Reference: 1139/SJG/PG

Soil Analysed as Soil
Build Vision Standard

SAL Reference	**579259 001**	**579259 002**	**579259 003**
Customer Sample Reference	**1139-SP1**	**1139-SP2**	**1139-SP3**
Date Sampled	**20-JUN-2016**	**20-JUN-2016**	**20-JUN-2016**
Type	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**

Determinand	Method	Test Sample	LOD	Units			
Arsenic	T6	M40	2	mg/kg	**7**	**8**	**12**
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1
Cadmium	T6	M40	1	mg/kg	<1	<1	<1
Chromium	T6	M40	1	mg/kg	**10**	**10**	**15**
Chromium (trivalent)	T85	AR	2	mg/kg	**10**	**10**	**15**
Chromium VI	T6	AR	1	mg/kg	<1	<1	<1
Copper	T6	M40	1	mg/kg	**33**	**34**	**44**
Lead	T6	M40	1	mg/kg	**64**	**64**	**97**
Mercury	T355	AR	0.001	mg/kg	**0.018**	**0.004**	**0.004**
Nickel	T6	M40	1	mg/kg	**10**	**12**	**17**
Selenium	T6	M40	3	mg/kg	<3	<3	<3
Zinc	T6	M40	1	mg/kg	**57**	**57**	**87**
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1
pH	T7	AR			**7.9**	**7.8**	**7.6**
Phenols(Mono)	T546	AR	1	mg/kg	<1	<1	<1
SO4(Total)	T6	M40	0.01	%	**0.08**	**0.07**	**0.10**
SO4(2:1)	T6	AR	100	mg/l	<100	<100	<100
Sulphide	T4	AR	10	mg/kg	<10	<10	**23**
TPH (C6-C10)	T54	M105	0.10	mg/kg	<0.10	<0.10	<0.10
TPH (C10-C21)	T8	M105	1	mg/kg	(13) <1	(13) **1**	(13) <1
TPH (C21-C40)	T8	M105	1	mg/kg	(13) <1	(13) **2**	(13) <1
Total Petroleum Hydrocarbons	T8	M105	1	mg/kg	(13) <1	(13) **3**	(13) **1**

SAL Reference: 579259
Project Site: Charminster Drive Crumpsall
Customer Reference: 1139/SJG/PG

Soil Analysed as Soil
Miscellaneous

SAL Reference	**579259 001**	**579259 002**	**579259 003**
Customer Sample Reference	**1139-SP1**	**1139-SP2**	**1139-SP3**
Date Sampled	**20-JUN-2016**	**20-JUN-2016**	**20-JUN-2016**
Type	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**

Determinand	Method	Test Sample	LOD	Units			
Asbestos ID	T27	AR			N.D.	N.D.	N.D.
Soil Organic Matter	T287	M40	0.1	%	**4.8**	**4.9**	**5.7**

SAL Reference: 579259
Project Site: Charminster Drive Crumpsall
Customer Reference: 1139/SJG/PG

Soil Analysed as Soil
BTEX, MTBE

				SAL Reference	**579259 001**	**579259 002**	**579259 003**
				Customer Sample Reference	**1139-SP1**	**1139-SP2**	**1139-SP3**
				Date Sampled	**20-JUN-2016**	**20-JUN-2016**	**20-JUN-2016**
				Type	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Methyl tert-Butyl Ether	T209	M105	10	µg/kg	<10	<10	<10
Benzene	T209	M105	10	µg/kg	(13) <10	(13) <10	(13) <10
Toluene	T209	M105	10	µg/kg	<10	<10	<10
EthylBenzene	T209	M105	10	µg/kg	<10	<10	<10
M/P Xylene	T209	M105	10	µg/kg	<10	<10	<10
O Xylene	T209	M105	10	µg/kg	<10	<10	<10

SAL Reference: 579259
Project Site: Charminster Drive Crumpsall
Customer Reference: 1139/SJG/PG

Soil Analysed as Soil
Total and Speciated USEPA16 PAH

				SAL Reference	**579259 001**	**579259 002**	**579259 003**
				Customer Sample Reference	**1139-SP1**	**1139-SP2**	**1139-SP3**
				Date Sampled	**20-JUN-2016**	**20-JUN-2016**	**20-JUN-2016**
				Type	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Naphthalene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1	<0.1	**0.1**
Fluorene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	**0.3**	**0.2**	**0.5**
Anthracene	T207	M105	0.1	mg/kg	<0.1	**0.1**	**0.3**
Fluoranthene	T207	M105	0.1	mg/kg	**0.7**	**0.5**	**0.7**
Pyrene	T207	M105	0.1	mg/kg	**0.7**	**0.4**	**0.6**
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	**0.3**	**0.2**	**0.3**
Chrysene	T207	M105	0.1	mg/kg	**0.3**	**0.2**	**0.3**
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	**0.4**	**0.3**	**0.5**
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	**0.2**	**0.2**	**0.3**
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	**0.1**
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	<0.1	**0.1**	**0.2**
PAH(total)	T207	M105	0.1	mg/kg	**3.0**	**2.2**	**3.8**

Index to symbols used in 579259-1

Value	Description
AR	As Received
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
N.D.	Not Detected
13	Results have been blank corrected.
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos was sub-contracted to REC Asbestos.

Method Index

Value	Description
T8	GC/FID
T287	Calc TOC/0.58
T6	ICP/OES
T207	GC/MS (MCERTS)
T27	PLM
T85	Calc
T162	Grav (1 Dec) (105 C)
T209	GC/MS (Head Space)(MCERTS)
T355	CVAFS
T7	Probe
T546	Colorimetry (CF)
T2	Grav
T4	Colorimetry
T54	GC/MS (Headspace)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Moisture @105C	T162	AR	0.1	%	N	001-003
Retained on 10mm sieve	T2	M40	0.1	%	N	001-003
Arsenic	T6	M40	2	mg/kg	M	001-003
Boron (water-soluble)	T6	AR	1	mg/kg	N	001-003
Cadmium	T6	M40	1	mg/kg	M	001-003
Chromium	T6	M40	1	mg/kg	M	001-003
Chromium (trivalent)	T85	AR	2	mg/kg	N	001-003
Chromium VI	T6	AR	1	mg/kg	N	001-003
Copper	T6	M40	1	mg/kg	M	001-003
Lead	T6	M40	1	mg/kg	M	001-003
Mercury	T355	AR	0.001	mg/kg	N	001-003
Nickel	T6	M40	1	mg/kg	M	001-003
Selenium	T6	M40	3	mg/kg	M	001-003
Zinc	T6	M40	1	mg/kg	M	001-003
Cyanide(Total)	T546	AR	1	mg/kg	M	001-003
pH	T7	AR			M	001-003
Phenols(Mono)	T546	AR	1	mg/kg	M	001-003
SO4(Total)	T6	M40	0.01	%	N	001-003
SO4(2:1)	T6	AR	100	mg/l	N	001-003
Sulphide	T4	AR	10	mg/kg	N	001-003
TPH (C6-C10)	T54	M105	0.10	mg/kg	N	001-003
TPH (C10-C21)	T8	M105	1	mg/kg	N	001-003
TPH (C21-C40)	T8	M105	1	mg/kg	N	001-003
Total Petroleum Hydrocarbons	T8	M105	1	mg/kg	M	001-003
Asbestos ID	T27	AR			SU	001-003
Soil Organic Matter	T287	M40	0.1	%	N	001-003
Methyl tert-Butyl Ether	T209	M105	10	µg/kg	M	001-003
Benzene	T209	M105	10	µg/kg	M	001-003
Toluene	T209	M105	10	µg/kg	M	001-003
EthylBenzene	T209	M105	10	µg/kg	M	001-003
M/P Xylene	T209	M105	10	µg/kg	M	001-003
O Xylene	T209	M105	10	µg/kg	M	001-003
Naphthalene	T207	M105	0.1	mg/kg	M	001-003
Acenaphthylene	T207	M105	0.1	mg/kg	U	001-003
Acenaphthene	T207	M105	0.1	mg/kg	M	001-003
Fluorene	T207	M105	0.1	mg/kg	M	001-003
Phenanthrene	T207	M105	0.1	mg/kg	M	001-003
Anthracene	T207	M105	0.1	mg/kg	U	001-003
Fluoranthene	T207	M105	0.1	mg/kg	M	001-003
Pyrene	T207	M105	0.1	mg/kg	M	001-003
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	M	001-003
Chrysene	T207	M105	0.1	mg/kg	M	001-003
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	M	001-003
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	M	001-003
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	M	001-003
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	M	001-003

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	M	001-003
PAH(total)	T207	M105	0.1	mg/kg	U	001-003

Contaminant Analysis of Samples

The Model Procedures of CLR 11 provide guidance on key information sources with respect to potential contamination arising from past land uses of a site. In particular, the now withdrawn CLR (Environment Agency 2002b), the DoE Industry Profile documents and ISO10381-5 provide good summaries of priority pollutants for UK sites. Additionally, the Environment Agency (2004b) has produced a list of priority pollutants for ecological risk assessment. These documents have been used, with the findings of the Phase 1 investigation, to scope the analyses of chemicals of potential concern. It should be noted that whilst CLR 8 was withdrawn in August 2008 it was not replaced and its findings are still considered useful.

Generic Risk Assessment Criteria for Human Health

Generic assessment criteria (GAC) are criteria derived using largely generic assumptions about the characteristics and behaviour of sources, pathways and receptors. These assumptions will be conservative in a defined range of conditions. The Contaminated Land Exposure Assessment (CLEA) framework uses Soil Guideline Values (SGV) in assessing risks to human health from exposure to soils contaminated with selected contaminants.

The original Soil Guideline Values were all withdrawn in August 2008 and the Agency has started a programme of publishing replacements using its 'new approach' which involves a number of changes to the way exposure is assessed. This was started using the CLEA 1.04 software. The current version is CLEA 1.06.

A significant change in the new approach is to publish SGVs only at 6% soil organic matter (SOM) content. This appears to be counter productive because in cases where the SGV varies with the SOM, the published SGV report states that "at a lower SOM, they may not be sufficiently protective". The SGV introduction report Using Soil Guideline Values states that in such circumstances a new GAC can be produced by adjusting the SGV.

Furthermore, the SGVs are no longer published for the residential without plant uptake land use.

Consequently, the approach taken by Build Vison is to take the various input parameters from the SGV reports and produce GACs for various SOM and for the residential without plant uptake land use, using CLEA 1.06. The GACs adopted for the standard CLEA land uses are given in Table A together with the source of the GAC. The table also lists GACs for open space (see below).

The absence of published SGVs for certain chemicals of potential concern has been addressed by the derivation of GAC using generic assumptions about the characteristics and behaviour of sources, pathways and receptors and the CLEA 1.06 software. Input data have been derived wither from published GAC lists (EIC/AGS/CL:AIRE and LQM/CIEH) or by in-house research of the recommended data sources.

Please note also that CLEA 1.06 allows for other variations, most notably of soil type (9 options) and building type (5 residential options). The defaults are a sandy loam soil, a small terraced house in the residential setting and a pre-1970s office block in the commercial setting. These are generally conservative and the resultant SGV/GAC are protective of other combinations (unlike the default SOM mentioned above). It is not practical to include all permutations in Table A and in the cases where specific GACs have been derived, this is referred to in the text of the report and the relevant values included in the assessment tables.

Lead is a special case as the former SGV was not based on the CLEA model, but equations utilising blood lead concentrations. There is currently no guidance on how to risk assess lead but it is understood that a new methodology is being formulated which will allow the use of CLEA. Consequently, the former SGVs for lead have been retained until this has been clarified.

Further details including data sources can be obtained on request.

Human Health GAC's for Soil

Build Vision
Consulting Engineers

Human Health Generic Assessment Criteria (mg/kg)

Contaminant	Source of GAC	Human health-residential with plant uptake (1% SOM)	Human health-residential with plant uptake (2.5% SOM)	Human health-residential with plant uptake (6% SOM) Default for SGV	Human health-residential without plant uptake (1% SOM)	Human health-residential without plant uptake (2.5% SOM)	Human health-residential without plant uptake (6% SOM)	Human health-allotments (1% SOM)	Human health-allotments (2.5% SOM)	Human health-allotments (6% SOM) Default for SGV	Human health-commercial (1% SOM)	Human health-commercial (2.5% SOM)	Human health-commercial (6% SOM) Default for SGV	Human health-open space (1% SOM)	Human health-open space (2.5% SOM)	Human health-open space (6% SOM)
General Suite																
Arsenic	SGV report + CLEA 1.06	37	37	37	40	40	40	43	43	43	640	640	640	79	79	79
Boron	LQM/CIEH + CLEA 1.06	290	290	290	11000	11000	11000	45	45	45	240000	240000	240000	21000	21000	21000
Cadmium	SGV report + CLEA 1.06	11	11	11	85	85	85	1.9	1.9	1.90	190	190	190	120	120	120
Chromium (III)	LQM/CIEH + CLEA 1.06	910	910	910	910	910	910	18000	18000	18000	8600	8600	8600	1500	1500	1500
Chromium (VI)	LQM/CIEH + CLEA 1.06	6	6	6	6	6	6	1.8	1.8	1.8	33	33	33	7.7	7.7	7.7
Copper	LQM/CIEH + CLEA 1.06	2400	2400	2400	7100	7100	7100	520	520	520	68000	68000	68000	12000	12000	12000
Lead	SGV 10 (old method)	450	450	450	450	450	450	450	450	450	750	750	750	450	450	450
Lead	CLEA 1.06 (not yet in use)	220	220	220	220	220	220	590	590	590	5100	5100	5100	11000	11000	11000
Mercury, inorganic	SGV report + CLEA 1.06	40	40	40	56	56	56	19	19	19	1100	1100	1100	120	120	120
Mercury elemental	SGV report + CLEA 1.06	1.2	1.2	1.2	1.2	1.2	1.2	21	21	21	25.8	25.8	25.8	16	16	16
Mercury Methyl	SGV report + CLEA 1.06	11	11	11	15	15	15	6	6.0	6.0	320	320	320	40	40	40
Nickel	SGV report + CLEA 1.06	130	130	130	180	180	180	53	53	53	980	980	980	230	230	230
Selenium	SGV report + CLEA 1.06	250	250	250	430	430	430	88	88	88	12000	12000	12000	1100	1100	1100
Zinc	LQM/CIEH + CLEA 1.06	3700	3700	3700	40000	40000	40000	620	620	620	730000	730000	73000	81000	81000	81000
Cyanide (free)	CLEA 1.06	750	750	750	760	760	760	2300	2300	2300	16000	16000	16000	21000	21000	21000
Phenol	SGV report + CLEA 1.06	120	200	380	440	690	1200	23	42	83	440	690	1300	440	690	1300
Acenaphthene	LQM/CIEH + CLEA 1.06	210	480	1000	3000	4700	6000	34	85	200	84000	97000	100000	15000	15000	15000
Acenaphthylene	LQM/CIEH + CLEA 1.06	170	420	920	2900	4600	6000	28	69	160	83000	97000	100000	15000	15000	15000
Anthracene	LQM/CIEH + CLEA 1.06	2400	5400	11000	31000	35000	37000	380	950	2200	520000	540000	540000	74000	74000	74000
Benzo(a)anthracene	LQM/CIEH + CLEA 1.06	7.2	11	13	11	14	15	2.9	6.5	13	170	170	180	29	29	29
Benzo(a)pyrene	LQM/CIEH + CLEA 1.06	2.2	2.7	3.0	3.2	3.2	3.2	0.97	2	3.5	35	35	36	5.7	5.7	5.7
Benzo(b)fluoranthene	LQM/CIEH + CLEA 1.06	2.6	3.3	3.7	3.9	4	4	0.99	2.1	3.9	44	44	45	7.1	7.2	7.2
Benzo(ghi)perylene	LQM/CIEH + CLEA 1.06	320	340	350	360	360	360	290	470	640	3900	4000	4000	640	640	640
Benzo(k)fluoranthene	LQM/CIEH + CLEA 1.06	77	93	100	110	110	110	37	75	130	1200	1200	1200	190	190	190
Chrysene	LQM/CIEH + CLEA 1.06	15.0	22.0	27	30	31	32	4.1	9.4	19	350	350	350	57	57	57
Dibenz(ah)anthracene	LQM/CIEH + CLEA 1.06	0.24	0.28	0.3	0.31	0.32	0.32	0.14	0.27	0.43	3.5	3.6	3.6	0.57	0.57	0.58
Fluoranthene	LQM/CIEH + CLEA 1.06	280	560	890	1500	1600	1600	52	130	290	23000	23000	23000	3100	3100	3100
Fluorene	LQM/CIEH + CLEA 1.06	170	400	860	2800	3800	4500	27	67	160	63000	68000	71000	9900	9900	9900
Indeno(123cd)pyrene	LQM/CIEH + CLEA 1.06	27	36	41	45	46	46	9.5	21	39	500	510	510	82	82	82
Naphthalene	LQM/CIEH + CLEA 1.06	2.3	5.6	13	2.3	5.6	13	4.1	10	24	190	460	1100	4900	4900	4900
Phenanthrene	LQM/CIEH + CLEA 1.06	95	220	440	1300	1500	1500	15	38	90	22000	22000	23000	3100	3100	3100
Pyrene	LQM/CIEH + CLEA 1.06	620	1200	2000	3700	3800	3800	110	270	620	54000	54000	55000	7400	7400	7400
VOCs-BTEX & MTBE																
Benzene	SGV report + CLEA 1.06	0.087	0.17	0.37	0.38	0.7	1.4	0.017	0.034	0.075	27	47	90	72	72	73
Toluene	SGV report + CLEA 1.06	130	290	660	869	1900	3900	22	51	120	869	1920	4360	56000	56000	56000
Ethylbenzene	SGV report + CLEA 1.06	47	110	260	83	190	440	16	39	91	518	1220	2840	518	1220	2840
Xylene o-	SGV report + CLEA 1.06	60	140	330	88	210	480	28	67	160	478	1120	2620	478	1120	2620
Xylene m-	SGV report + CLEA 1.06	59	140	320	82	190	450	31	74	170	625	1470	3460	625	1470	3460
Xylene p-	SGV report + CLEA 1.06	56	130	310	79	180	430	29	69	160	576	1350	3170	576	1350	3170
MTBE	EIC/AGS/CLA:IRE + CLEA 1.06	49	84	160	73	120	220	23	44	90	7900	13000	24000	240000	240000	240000
TPH Fractions																
TPH ali EC05-EC06	LQM/CIEH + CLEA 1.06	42	78	160	42	78	160	730	1700	3900	304	558	1150	570000	590000	600000
TPH ali >EC06-EC08	LQM/CIEH + CLEA 1.06	100	230	530	100	230	530	2300	5600	13000	144	322	736	600000	610000	620000
TPH ali >EC08-EC10	LQM/CIEH + CLEA 1.06	27	65	150	27	65	150	320	770	1700	78	190	451	13000	13000	13000
TPH ali >EC10-EC12	LQM/CIEH + CLEA 1.06	48	118	283	48	118	283	2200	4400	7300	48	118	283	13000	13000	13000
TPH ali >EC12-EC16	LQM/CIEH + CLEA 1.06	24	59	142	24	59	142	11000	13000	13000	24	59	142	13000	13000	13000
TPH ali >EC16-EC35	LQM/CIEH + CLEA 1.06	65000	92000	110000	65000	92000	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000
TPH ali >EC35-EC44	LQM/CIEH + CLEA 1.06	65000	92000	110000	65000	92000	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000
TPH aro EC05-EC07	LQM/CIEH + CLEA 1.06	70	140	300	370	690	1400	13	27	57	1120	2260	4710	56000	56000	56000
TPH aro >EC07-EC08	LQM/CIEH + CLEA 1.06	130	290	660	860	1800	3900	22	51	120	869	1920	4360	56000	56000	56000
TPH aro >EC08-EC10	LQM/CIEH + CLEA 1.06	34	83	190	47	110	270	8.6	21	51	613	1500	3580	5000	5000	5000
TPH aro >EC10-EC12	LQM/CIEH + CLEA 1.06	74	180	380	250	590	1200	13	31	74	364	899	2150	5000	5000	5000
TPH aro >EC12-EC16	LQM/CIEH + CLEA 1.06	140	330	660	1800	2300	2500	23	57	130	36000	37000	38000	5100	5100	5000
TPH aro >EC16-EC21	LQM/CIEH + CLEA 1.06	260	540	930	1900	1900	1900	46	110	260	28000	28000	28000	3800	3800	3800
TPH aro >EC21-EC35	LQM/CIEH + CLEA 1.06	1100	1500	1700	1900	1900	1900	370	820	1600	28000	28000	28000	3800	3800	3800
TPH aro >EC35-EC44	LQM/CIEH + CLEA 1.06	1100	1500	1700	1900	1900	1900	370	820	1600	28000	28000	28000	3800	3800	3800
TPH >EC44-EC70	LQM/CIEH + CLEA 1.06	1600	1800	1900	1900	1900	1900	1200	2100	3000	28000	28000	28000	3800	3800	3800
Dioxins, furans & dioxin-like-PCBs																
Total Dioxins, furans & DL-PCB (aerial dep)	SGV report + CLEA 1.06	0.0085	0.0087	0.0087	0.0099	0.0099	0.0099	0.0073	0.008	0.0083	0.24	0.24	0.24	0.15	0.15	0.15
Non-dioxin-like PCBs																
PCB-28	CLEA 1.06	0.20	0.27	0.32	0.39	0.39	0.39	0.058	0.13	0.23	9.0	9.0	9.0	3	3	3
PCB-52	CLEA 1.06	0.20	0.28	0.34	0.39	0.39	0.39	0.062	0.14	0.28	9.0	9.0	9.0	3	3	3
PCB-101	CLEA 1.06	0.34	0.37	0.38	0.39	0.39	0.39	0.03	0.53	0.76	9.0	9.0	9.0	3	3	3
PCB-138	CLEA 1.06	0.36	0.37	0.38	0.39	0.39	0.39	0.41	0.67	0.89	9.0	9.0	9.0	3	3	3
PCB-153	CLEA 1.06	0.36	0.38	0.38	0.39	0.39	0.39	0.51	0.77	0.96	9.0	9.0	9.0	3	3	3
PCB-180	CLEA 1.06	0.37	0.38	0.39	0.39	0.39	0.39	0.60	0.87	1.1	9.0	9.0	9.0	3	3	3

NOTES

if >1,000,000 is calculated, 1,000,000 is adopted.

where calculated GAC exceeds saturation value in CLEA - saturation value adopted for GAC

Risk Parameter: Human Health - residential with plant uptake (1.0% SOM) **Project No:** 1139 **Client:** Wiggett Construction Ltd

Data set: ALL **Project:** Charminster, Crescent Rd. Crumpsall

All values in mg/kg unless otherwise stated

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	Soil Type:	Sandy Soil	Sandy Soil
									Location:	SP1	SP2	SP3
									Depth:			
									Lab	S	S	S
Asbestos	3	-	-		-	-	-	Potentially Suitable For Use		N.D.	N.D.	N.D.
General Suite												
Arsenic	3	7	12		37			Potentially Suitable For Use		7	8	12
Boron	3	<1	<1		290			Potentially Suitable For Use		<1	<1	<1
Cadmium	3	<1	<1		11			Potentially Suitable For Use		<1	<1	<1
Chromium (III)	3	10	15		910			Potentially Suitable For Use		10	10	15
Chromium (VI)	3	<1	<1		6			Potentially Suitable For Use		<1	<1	<1
Copper	3	33	44		2400			Potentially Suitable For Use		33	34	44
Lead	3	64	97		450			Potentially Suitable For Use		64	64	97
Lead	3	64	97		220			Potentially Suitable For Use		64	64	97
Lead (log)	3	1.8062	1.9868		2.3424			Potentially Suitable For Use		1.806	1.806	1.987
Mercury, inorganic	3	0.004	0.018		40			Potentially Suitable For Use		0.018	0.004	0.004
Mercury elemental	3	0.004	0.018		1.2			Potentially Suitable For Use		0.018	0.004	0.004
Mercury Methyl	3	0.004	0.018		11			Potentially Suitable For Use		0.018	0.004	0.004
Nickel	3	10	17		130			Potentially Suitable For Use		10	12	17
Selenium	3	<3	<3		250			Potentially Suitable For Use		<3	<3	<3
Zinc	3	57	87		3700			Potentially Suitable For Use		57	57	87
Cyanide (free)	3	<1	<1		750			Potentially Suitable For Use		<1	<1	<1
Phenol (total)	3	<1	<1		120			Potentially Suitable For Use		<1	<1	<1
Acenaphthene	3	<0.1	0.1		210			Potentially Suitable For Use		<0.1	<0.1	0.1
Acenaphthylene	3	<0.1	<0.1		170			Potentially Suitable For Use		<0.1	<0.1	<0.1
Anthracene	3	<0.1	0.3		2400			Potentially Suitable For Use		<0.1	0.1	0.3
Benzo(a)anthracene	3	0.2	0.3		7.2			Potentially Suitable For Use		0.3	0.2	0.3
Benzo(a)pyrene	3	0.2	0.3		2.2			Potentially Suitable For Use		0.2	0.2	0.3
Benzo(b)fluoranthene	3	0.3	0.5		2.6			Potentially Suitable For Use		0.4	0.3	0.5
Benzo(ghi)perylene	3	<0.1	0.2		320			Potentially Suitable For Use		<0.1	0.1	0.2
Benzo(k)fluoranthene	3	0.3	0.5		77			Potentially Suitable For Use		0.4	0.3	0.5
Chrysene	3	0.2	0.3		15			Potentially Suitable For Use		0.3	0.2	0.3
Dibenz(a,h)anthracene	3	<0.1	<0.1		0.24			Potentially Suitable For Use		<0.1	<0.1	<0.1
Fluoranthene	3	0.5	0.7		280			Potentially Suitable For Use		0.7	0.5	0.7
Fluorene	3	<0.1	<0.1		170			Potentially Suitable For Use		<0.1	<0.1	<0.1
Indeno(1,2,3,cd)pyrene	3	<0.1	0.1		27			Potentially Suitable For Use		<0.1	<0.1	0.1
Napthalene	3	<0.1	<0.1		2.3			Potentially Suitable For Use		<0.1	<0.1	<0.1
Phenanthrene	3	0.2	0.5		95			Potentially Suitable For Use		0.3	0.2	0.5
Pyrene	3	0.4	0.7		620			Potentially Suitable For Use		0.7	0.4	0.6
VOCs-BTEX & MTBE												
Benzene	3	<0.01	<0.01		0.087			Potentially Suitable For Use		<0.01	<0.01	<0.01
Toluene	3	<0.01	<0.01		130			Potentially Suitable For Use		<0.01	<0.01	<0.01
Ethylbenzene	3	<0.01	<0.01		47			Potentially Suitable For Use		<0.01	<0.01	<0.01
Xylene o-	3	<0.01	<0.01		60			Potentially Suitable For Use		<0.01	<0.01	<0.01
Xylene m-	3	<0.01	<0.01		59			Potentially Suitable For Use		<0.01	<0.01	<0.01
Xylene p-	3	<0.01	<0.01		56			Potentially Suitable For Use		<0.01	<0.01	<0.01
MTBE	3	<0.01	<0.01		49			Potentially Suitable For Use		<0.01	<0.01	<0.01
TPH Fractions												
TPH ali EC05-EC06	3	<0.1	0.09		42			Potentially Suitable For Use		<0.1	<0.1	<0.1
TPH ali >EC06-EC08	3	<0.1	0.09		100			Potentially Suitable For Use		<0.1	<0.1	<0.1
TPH ali >EC08-EC10	3	<0.1	0.09		27			Potentially Suitable For Use		<0.1	<0.1	<0.1
TPH ali >EC10-EC12	3	<1	1		48			Potentially Suitable For Use		<1	1	<1
TPH ali >EC12-EC16	3	<1	1		24			Potentially Suitable For Use		<1	1	<1
TPH ali >EC16-EC35	3	1.8	3		65000			Potentially Suitable For Use		1.8	3	1.8
TPH ali >EC35-EC44	3	<1	2		65000			Potentially Suitable For Use		<1	2	<1
TPH aro EC05-EC07	3	<0.1	0.09		70			Potentially Suitable For Use		<0.1	<0.1	<0.1
TPH aro >EC07-EC08	3	<0.1	0.09		130			Potentially Suitable For Use		<0.1	<0.1	<0.1
TPH aro >EC08-EC10	3	<0.1	0.09		34			Potentially Suitable For Use		<0.1	<0.1	<0.1
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	1.8	1		260			Potentially Suitable For Use		<1	1	<1
TPH aro >EC21-EC35	3	<1	2		1100			Potentially Suitable For Use		<1	2	<1
TPH aro >EC35-EC44	3	<1	2		1100			Potentially Suitable For Use		<1	2	<1
TPH >EC44-EC70					1600							
Dioxins, furans & dioxin-like-PCBs												
Total Dioxins, furans & DL-PCB (aerial dep)					0.0085							
Non-dioxin-like PCBs												
PCB-28					0.2							
PCB-52					0.2							
PCB-101					0.34							
PCB-138					0.36							
PCB-153					0.36							
PCB-180					0.37							

Legend: MG denotes Made Ground, NAT denotes Natural Ground

Risk assessment for water pipes (RA)

United Utilities
helping life flow smoothly

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 **0345 072 6067.**

Section 1: Development details	
Development Name *(if it has one)*	Charminster Drive
Development Address	Charminster Drive, Crumpsall
OS Grid Reference *(mid point)*	X384778 Y402056
Developers Name	Wiggett Construction Ltd.
UUW reference number *(for UU use only)*	

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.

BV SI Report, Ref: 1139, dated March 2015, Section 1: Fields, Catering warehouses

Section 2: Preliminary risk assessment	
Has your desk study and site walkover identified any land potentially affected by contamination?	[X] 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.

Section 3: Intrusive site investigation

Have you completed any intrusive site investigation?	[x] Yes [ ] No
Have you completed any none intrusive site investigation?	[x] Yes [ ] No
Date(s) when the site investigation(s) undertaken	D D 0 9 2 0 1 4 D D M M Y Y Y Y D D M M Y Y Y Y
At what level has groundwater been encountered?	1m - 3m 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.

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.

No testing for SVOC's, Nitrobenzene, Ethers, Ketones, Aldehydes, Amines as desk study did not identify as potential contaminants

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.

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

Barrier Pipes proposed

Section 4: Site remediation

Please provide details below of any site remediation (which may include a change in site levels) already completed.

If your supporting information has details of the site remediation already completed, please reference below the relevant sections of your report.

None

Has the PSRAS (Table 1) been completed using appropriate data after remediation?	[ ] Yes [ ] No [x] N/A

Please provide details below of any proposed site remediation and an analysis of whether this will affect your intended pipe selection.

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.

Hard cover and 600mm capping layers to gardens - will not affect 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.

None

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

None

Section 7: Risk assessor

Name and relevant qualifications of person directing the risk assessment for water pipes	Martin Griggs BSc(Hons),CEng,MICE,MIStructE
Name and address of risk assessor's company	Build Vision Consulting Engineers Westleigh House Suite 1, Wakefield Road, Denby Dale, Huddersfield, HD8 8QJ
Date risk assessment performed	05/10/2015

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 UUW'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	Martin Griggs	Company	Build Vision Consulting Engineers
Telephone	01484 868257	Date	05/10/2015

Please email the completed form and supporting information to **DeveloperServicesWater@uuplc.co.uk**. Alternatively you can fax a paper version to **01925 677973** or post to us at United Utilities Water, Developer Services, Windermere House, Lingley Mere, Warrington WA5 3LP.

United Utilities
helping life flow smoothly

About us

United Utilities is the North West's water company. We keep the taps flowing and toilets flushing for seven million customers every day. From Crewe to Carlisle, we work hard behind the scenes to help your life flow smoothly.

United Utilities Water Limited, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Warrington WA5 3LP.
Registered in England and Wales. Registered Number 2366678.

03/15/SD/6445b

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	0.1	Y	0.18	0.18	
Total BTEX & MTBE		0.1	Pass	0.01	Y	<0.01	<0.01	
Total SVOCs (excluding PAHs and those substances marked with an *)		2	Pass	not tested				
EC5-EC10 aliphatic and aromatic hydrocarbons		2	Pass	0.1	Y	<0.1	<0.1	
EC10-EC16 aliphatic and aromatic hydrocarbons		10	Pass	1	Y	620	620	TP2 0.3m, TP5 0.3m, TP6 0.4m
EC16-EC40 aliphatic and aromatic hydrocarbons		500	Pass	1	Y	450	450	
Phenols* (from SVOC analysis)		2	Pass	1	Y	<0.3	<0.3	
Cresols and chlorinated phenols* (from SVOC analysis)		2	Pass	not tested				
Ethers*	Only where identified	0.5	Pass	not tested				
Nitrobenzene*		0.5	Pass	not tested				
Ketones*		0.5	Pass	not tested				
Aldehydes*		0.5	Pass	not tested				
Amines		Fail	Pass	not tested				
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.

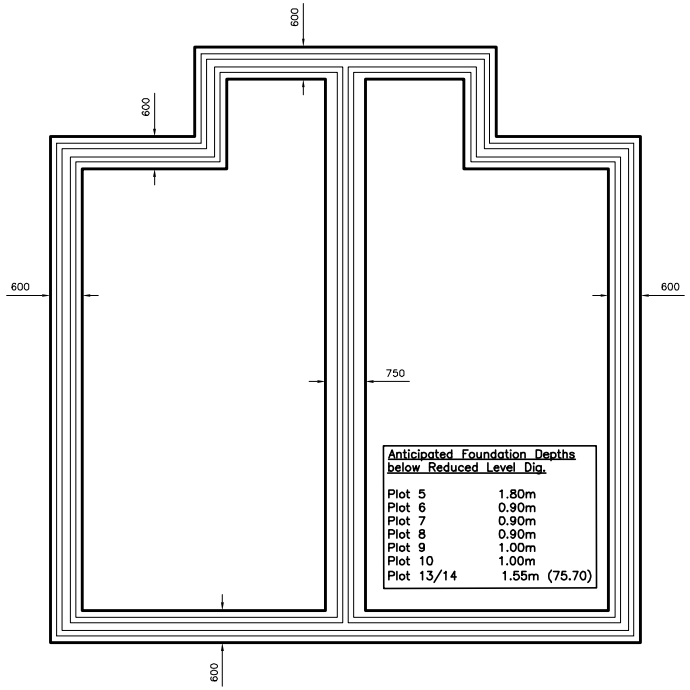
Note [2] Water pipes are normally laid at 0.75-1.35m below finished ground level.

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

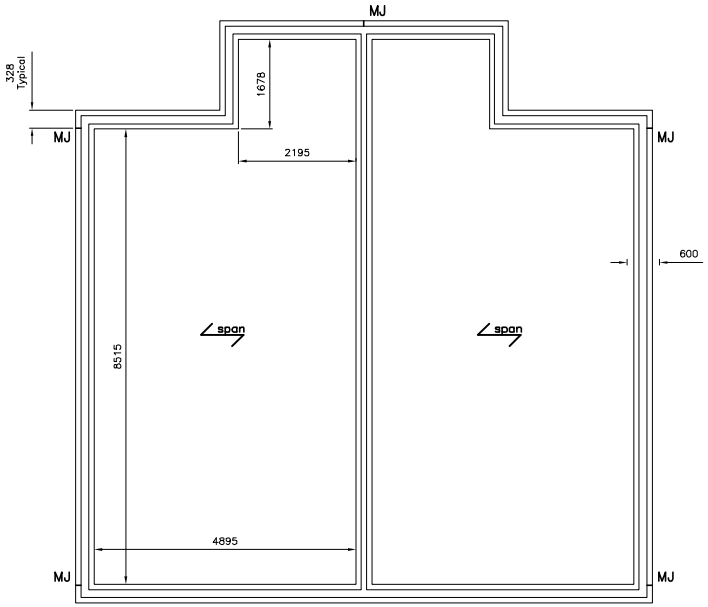
APPENDIX B

GAS PROTECTION MEASURES REMEDIATION VALIDATION

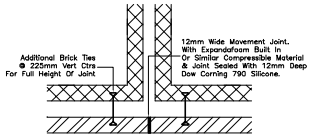
- Foundation Layout Drawings
- Gas Membrane Details
- Gas Membrane Orders/Delivery Notes
- Gas Protection Measures Photos



Foundation Layout



Ground Floor Layout



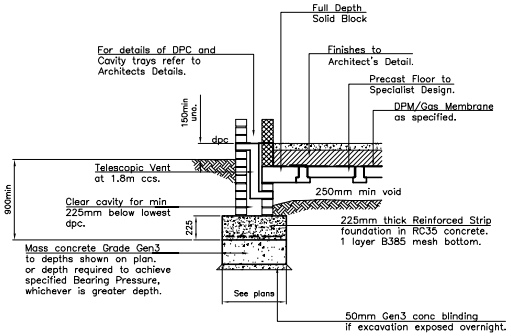
Typical movement joint in external brickwork – max spacing to be 12m measured around all corners. (Architect to show all joints on Elevations)

All Foundations depths indicated on plan are for minimum depths. Foundations are to go down deeper if suitable ground is not encountered at depths shown. Min Depth Of All Foundations To Be 900mm From External Level.

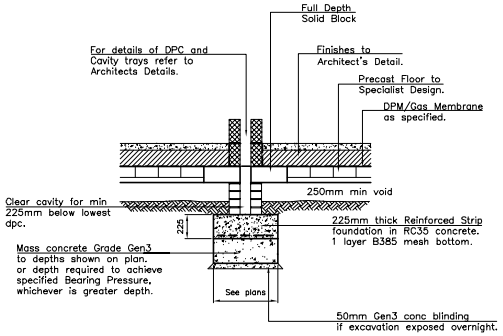
All Structural Concrete To Be Designated Mix RC28/35 Cement Content = 300kg/m³ Water/Cement ratio = 0.55 Aggregate Size = 20mm

In Accordance With Building Regulations Approved Document C4. Two Opposing External Walls Should Have Ventilation Openings Placed So That The Ventilating Air Will Have A Free Path Between Opposite Sides And To All Parts. The Openings Should Be Large Enough To Give An Actual Opening Of At Least Equivalent To 1500mm For Each Metre Run Of Wall. For Position Of Air Vents Refer To Architectural Elevations.

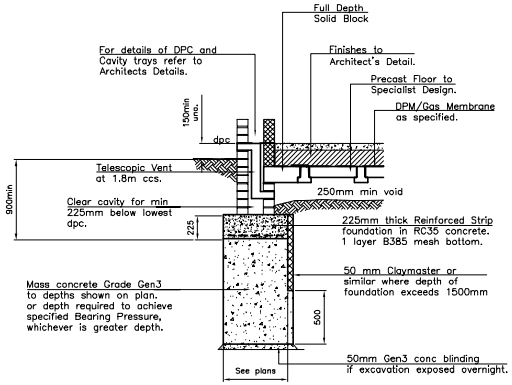
DPM/Gas Membrane.
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The membrane is to be 2000g non–recycled polyethylene providing resistance to Carbon Dioxide and Radon. The membrane is to be sealed to all dpcs providing the same resistance as the membrane and the dpc and/or membrane is to cross all cavities inside the external face of the building. All joints, laps and service entries are to be sealed with an appropriate self adhesive tape and the joint shall provide the required resistance. Suitable products are available from Visqueen but equivalent products by other manufacturers may be used subject to the Engineers prior approval.



Typical External Section



Typical Party Wall Section



Typical External Section
Depth > 1.5m See Site Plan

NOTES

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Local soft spots to be reported to Engineer.

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All mass fill concrete shall be grade GEN3

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Superimposed Load	1.50 kN/m²
Partition Load	0.50 kN/m²
Finishes inc screed	1.75 kN/m²
Point Load as specified on Plan	

Key:
Sleeper walls

Direction of pcc unit span

PC units to have minimum 70mm bearing on all supports. To achieve tolerances a 140mm wall is not adequate for 2 Wideslab and bearings and PC beams for beam and block must be staggered on a 100mm wall.

Rev	Date	By	Checked	Remarks
B	Mar 16	MJG		Foundation Depths Revised
A	Jul 15	MJG		Foundation Depths Added

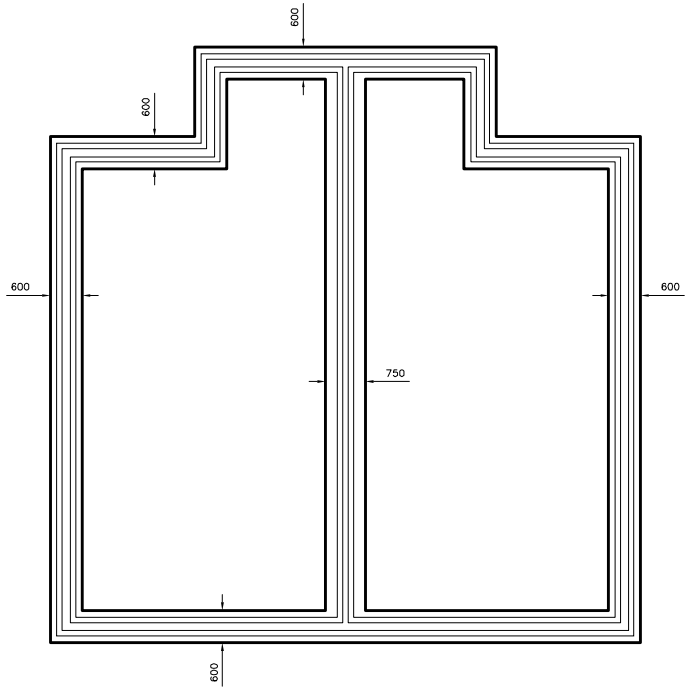
Project
Charminster Road
Crumpsall

Client
Wiggett Construction Ltd

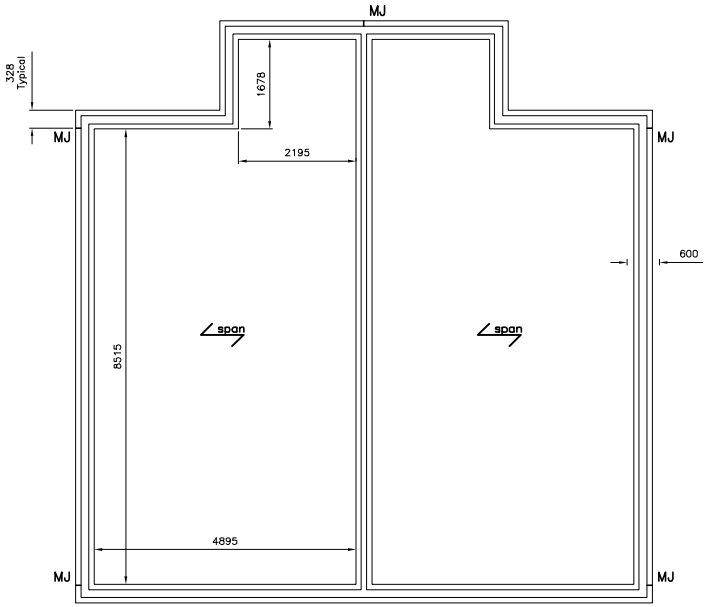
Drawing
House Type A1/A2
Foundation and Ground Floor Layout and Details

Number		Rev
1139/01		B
Scale	Drawn	Checked	Date
1:50(A1)	MJG		May 15

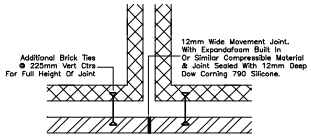
Build Vision
Consulting Engineers
Suite 1, Westleigh House, Wakefield Road, Denby Dale, Huddersfield HD8 8QJ
Tel. 01484 868257 email: mail@bvconsulting.co.uk



Foundation Layout



Ground Floor Layout



Typical movement joint in external brickwork – max spacing to be 12m measured around all corners. (Architect to show all joints on Elevations)

DPM/Gas Membrane.
Gas Protection Measures will be required.
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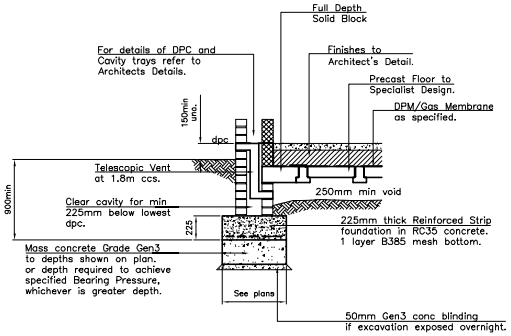
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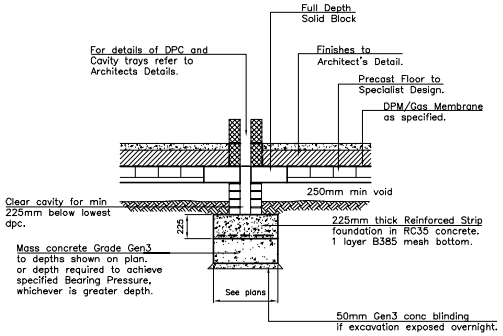
Foundation Depths

Plots 15/16	1.50 (75.70)
Plots 17/18	2.09 (74.51)
Plots 21–22	1.45 (75.30)

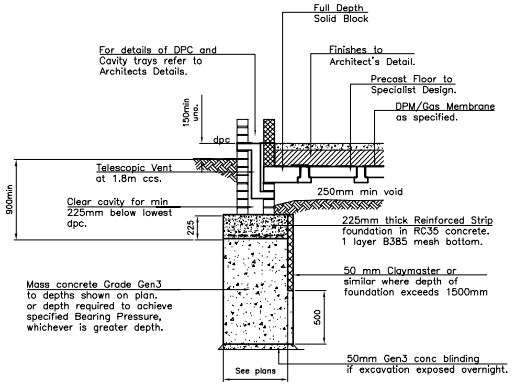
Measured below Proposed Finished Floor Level.



Typical External Section



Typical Party Wall Section



Typical External Section
Depth > 1.5m See Site Plan

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Key:
Sleeper walls

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PC units to have minimum 70mm bearing on all supports. To achieve tolerances a 140mm wall is not adequate for 2 Widesiab and bearings and PC beams for beam and block must be staggered on a 100mm wall.

Rev	Date	By	Checked	Remarks
A	Mar 16	MJG		Foundation Depths Revised.

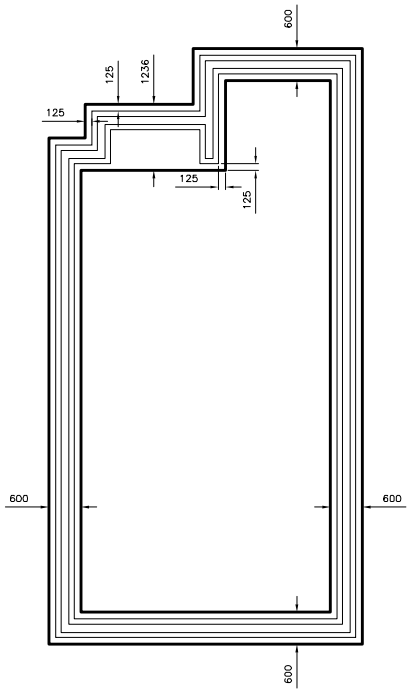
Project
Charminster Road
Crumpsall

Client
Wiggett Construction Ltd

Drawing
House Type A3/A4
Foundation and Ground Floor Layout and Details

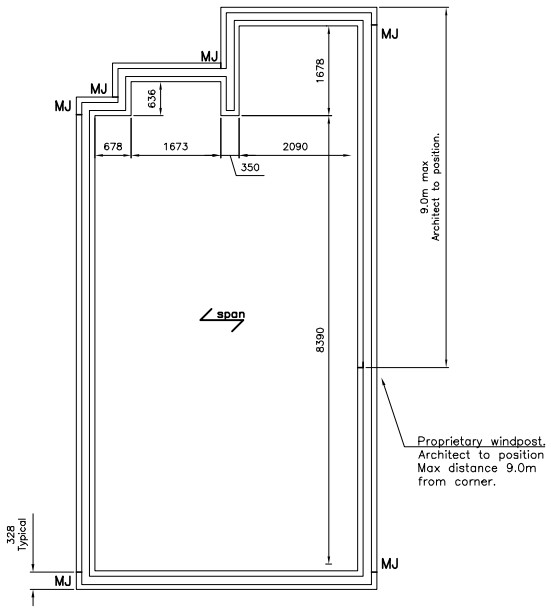
Number		Rev
1139/02		A
Scale	Drawn	Checked	Date
1:50(A1)	MJG		May 15

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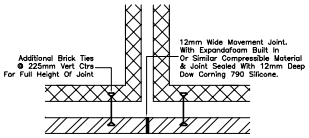


Foundation Layout

Foundation Depths
1.45 below Proposed FFL



Ground Floor Layout



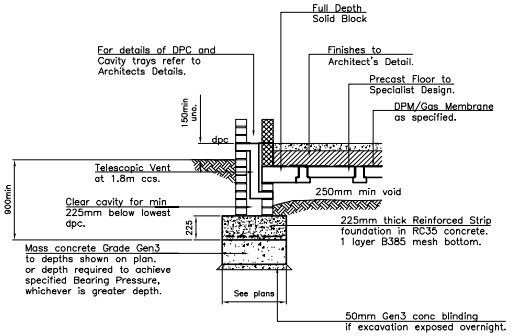
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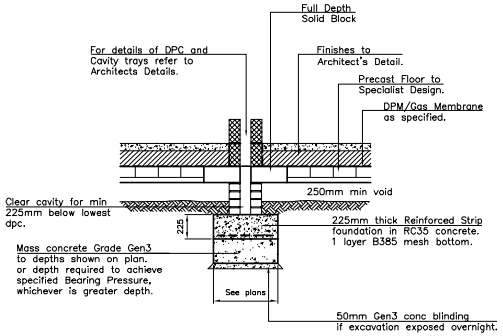
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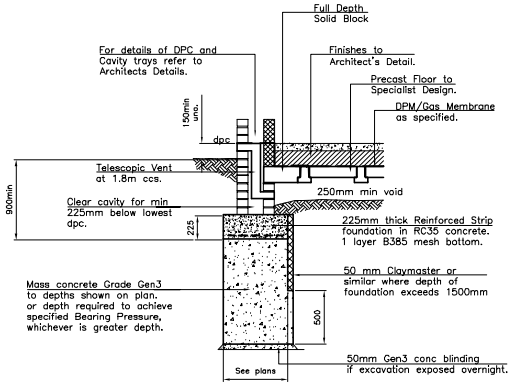
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Typical External Section



Typical Party Wall Section



Typical External Section
Depth > 1.5m See Site Plan

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Rev	Date	By	Checked	Remarks
A	Mar 16	MJG		Foundation Depth Added

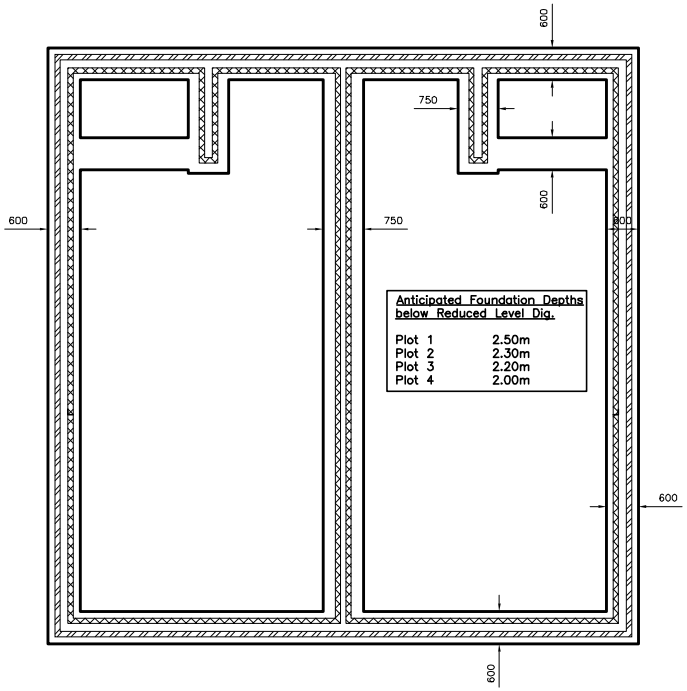
Project
Charminster Road
Crumpsall

Client
Wiggett Construction Ltd

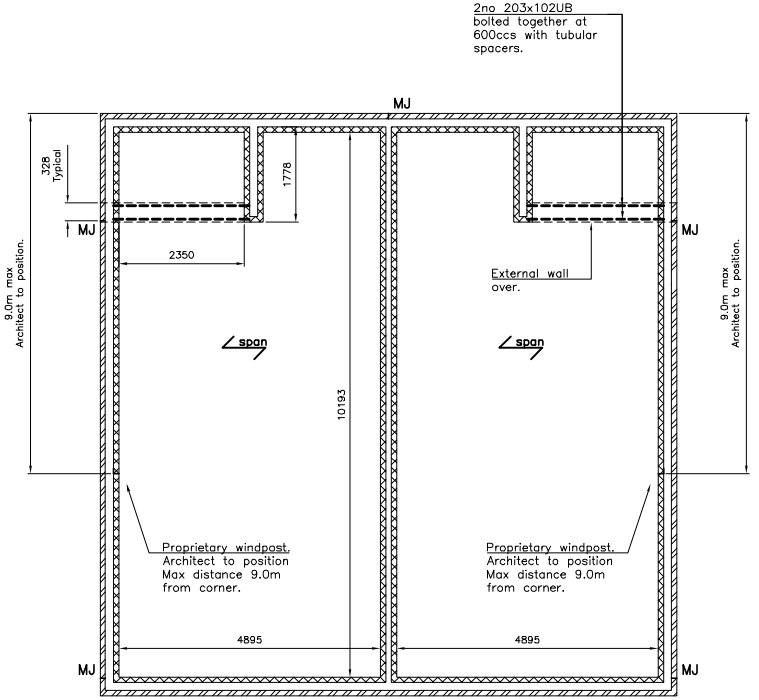
Drawing
House Type A5
Foundation and Ground Floor Layout and Details

Number		Rev
1139/03		A
Scale	Drawn	Checked	Date
1:50(A1)	MJG		May 15

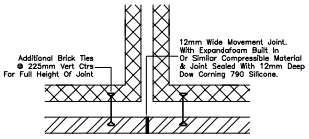
Build Vision
Consulting Engineers
Suite 1, Westleigh House, Wakefield Road,
Denby Dale, Huddersfield HD8 8QJ
Tel. 01484 868257 email: mail@bvconsulting.co.uk



Foundation Layout



Ground Floor Layout



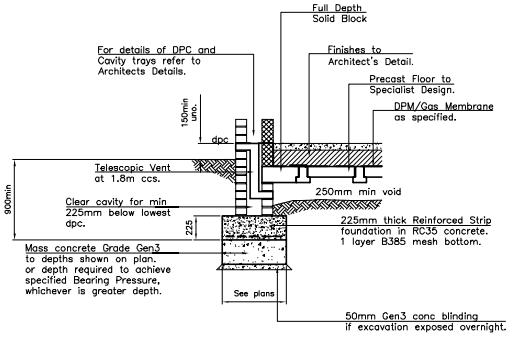
Typical movement joint in external brickwork – max spacing to be 12m measured around all corners. (Architect to show all joints on Elevations)

DPM/Gas Membrane.
Gas Protection Measures will be required.
The membrane is to be 2000g non-recycled polyethylene providing resistance to Carbon Dioxide and Radon. The membrane is to be sealed to all dpcs providing the same resistance as the membrane and the dpc and/or membrane is to cross all cavities inside the external face of the building. All joints, laps and service entries are to be sealed with an appropriate self adhesive tape and the joint shall provide the required resistance. Suitable products are available from Visqueen but equivalent products by other manufacturers may be used subject to the Engineers prior approval.

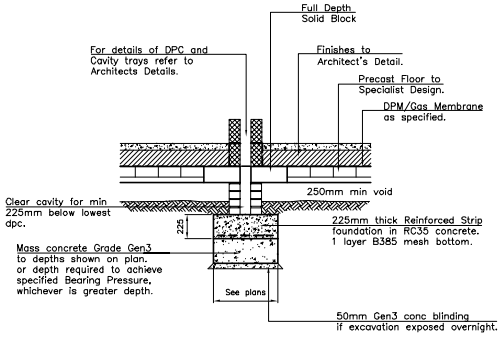
All Foundations depths indicated on plan are for minimum depths. Foundations are to go down deeper if suitable ground is not encountered at depths shown. Min Depth Of All Foundations To Be 900mm From External Level.

All Structural Concrete To Be Designated Mix RC28/35 Cement Content = 300kg/m³ Water/Cement ratio = 0.55 Aggregate Size = 20mm

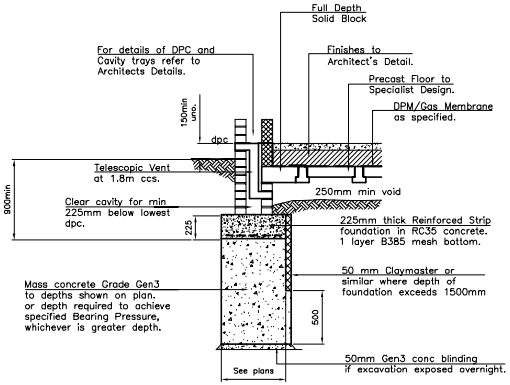
In Accordance With Building Regulations Approved Document C4. Two Opposing External Walls Should Have Ventilation Openings Placed So That The Ventilating Air Will Have A Free Path Between Opposite Sides And To All Parts. The Openings Should Be Large Enough To Give An Actual Opening Of At Least Equivalent To 1500mm For Each Metre Run Of Wall. For Position Of Air Vents Refer To Architectural Elevations.



Typical External Section



Typical Party Wall Section



Typical External Section
Depth > 1.5m See Site Plan

NOTES

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Any drawing discrepancies shown are to be reported to the Engineer prior to construction.

Pads & Strip Foundation
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Reduce level dig to remove all deleterious material under the building footprint. Ensure reduce dig is to a consistent level to all areas.

Local soft spots to be reported to Engineer.

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All structural/reinforced concrete shall be Designated Mix RC28/35
All mass fill concrete shall be grade GEN3

All concrete mixes to be in accordance with BS EN 206-1 and complementary BS 8500 parts 1 & 2.

Min. concrete cover to all reinforcement to be 40mm unless noted otherwise.

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All wall ties to be stainless steel Type 1 for cavities greater than 100mm or Type 2 otherwise, in accordance BS DD140 part 2, BS5628 parts 1,2&3.

Precast Floor Units are to be designed for the following loads:

Superimposed Load	1.50 kN/m²
Partition Load	0.50 kN/m²
Finishes inc screed	1.75 kN/m²
Point Load as specified on Plan	

Key:
Sleeper walls
Direction of pcc unit span

PC units to have minimum 70mm bearing on all supports. To achieve tolerances a 140mm wall is not adequate for 2 Widesiab end bearings and PC beams for beam and block must be staggered on a 100mm wall.

Rev	Date	By	Checked	Remarks
A	Jul 15	MJG		Foundation Depths Added

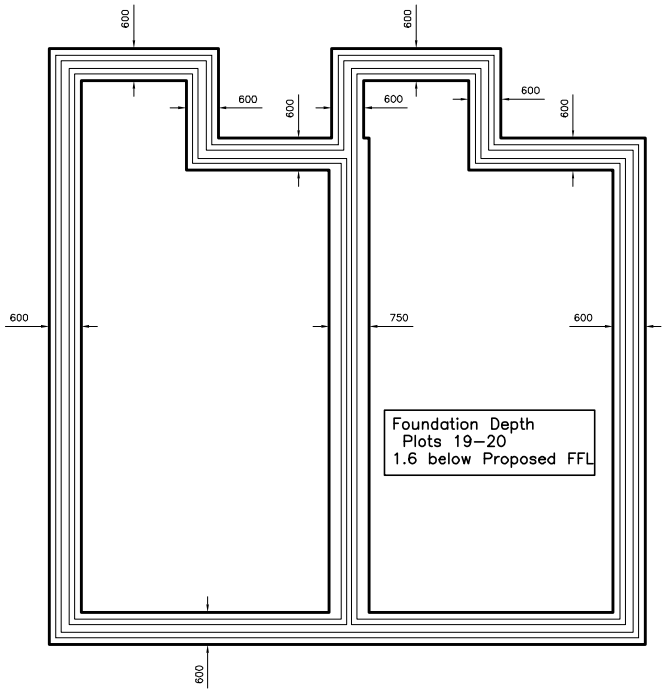
Project
Charminster Road
Crumpsall

Client
Wiggett Construction Ltd

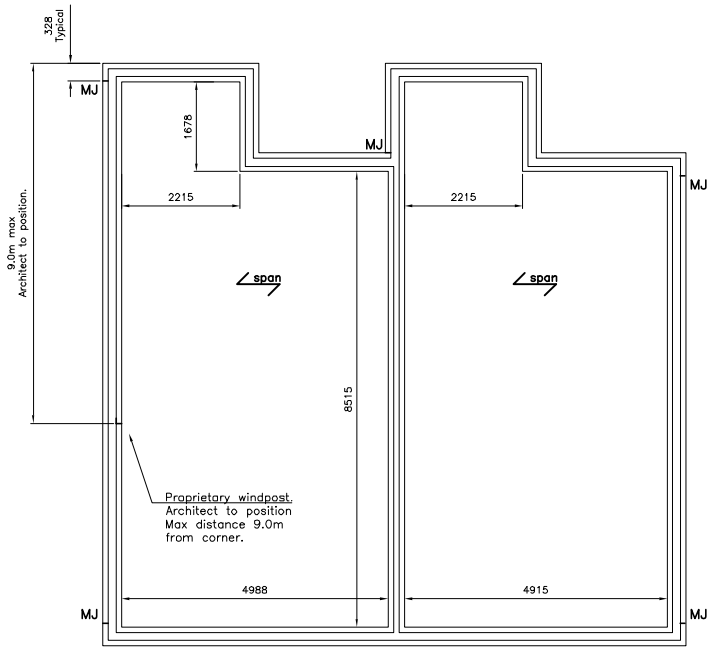
Drawing
House Type A6/A7
Foundation and Ground Floor Layout and Details

Number		Rev
1139/04		A
Scale	Drawn	Checked	Date
1:50(A1)	MJG		May 15

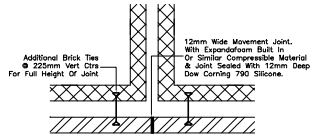
Build Vision
Consulting Engineers
Suite 1, Westleigh House, Wakefield Road, Denby Dale, Huddersfield HD8 8QJ
Tel. 01484 868257 email: mail@bvconsulting.co.uk



Foundation Layout



Ground Floor Layout



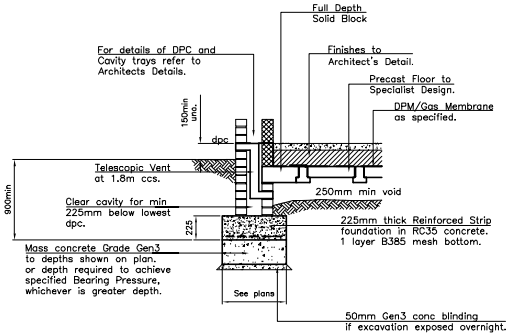
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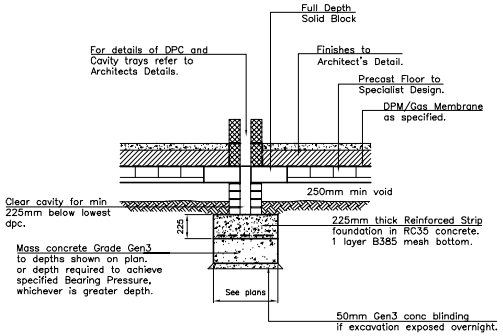
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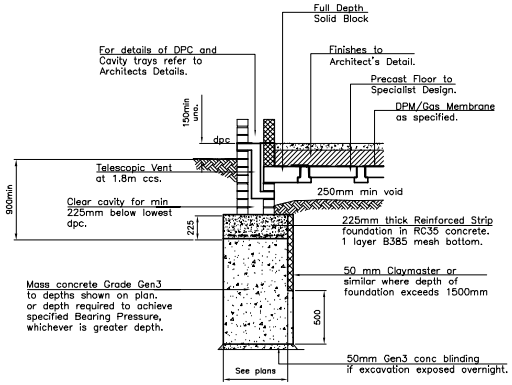
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Typical Party Wall Section



Typical External Section
Depth > 1.5m See Site Plan

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Rev	Date	By	Checked	Remarks
A	Mar 16	MJG		Foundation depth Added

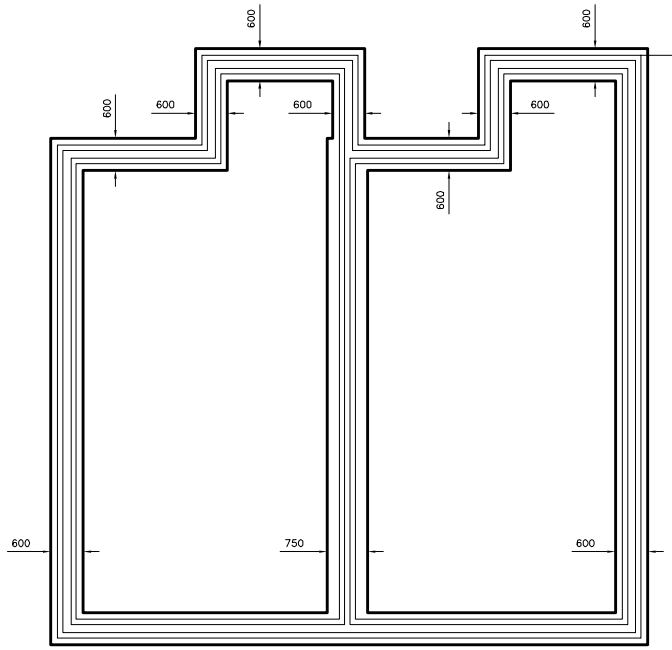
Project
Charminster Road
Crumpsall

Client
Wiggett Construction Ltd

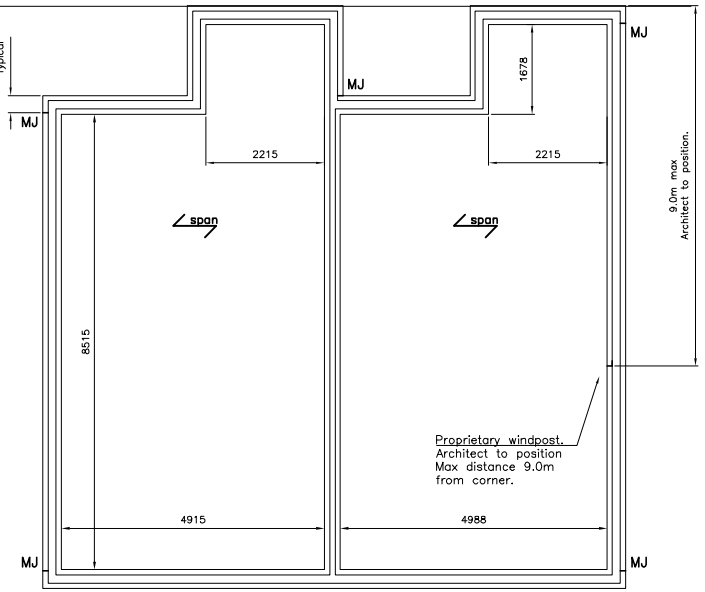
Drawing
House Type A8
Foundation and Ground Floor Layout and Details

Number		Rev
1139/05		A
Scale	Drawn	Checked	Date
1:50(A1)	MJG		May 15

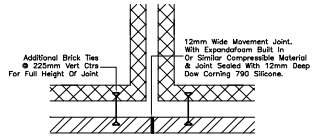
Build Vision
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Suite 1, Westleigh House, Wakefield Road,
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Tel. 01484 868257 email: mail@bvconsulting.co.uk



Foundation Layout



Ground Floor Layout



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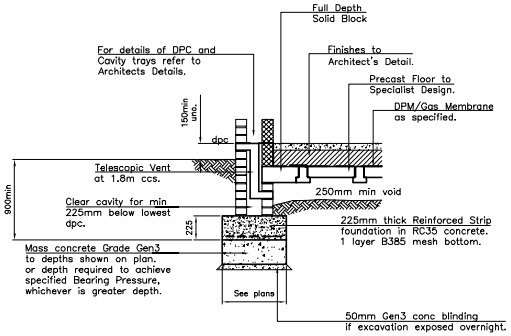
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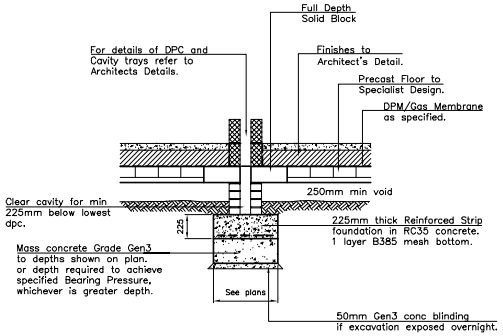
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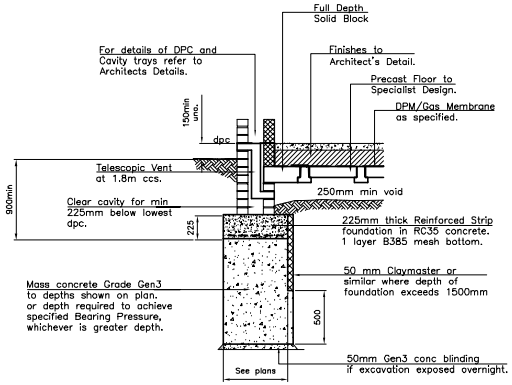
Foundation Depths
Plots 11/12 2.79m (74.26)
Measured below Proposed Finished Floor level.
(2.34 below Reduced Level Dig)



Typical External Section



Typical Party Wall Section



Typical External Section
Depth > 1.5m See Site Plan

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Rev	Date	By	Checked	Remarks
A	Mar 16	MJG		Foundation Depth added

Project
Charminster Road
Crumpsall

Client
Wiggett Construction Ltd

Drawing
House Type A9
Foundation and Ground Floor Layout and Details

Number		Rev
1139/06		A
Scale	Drawn / Checked	Date
1:50(A1)	MJG /	May 15

Build Vision
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Tel. 01484 868257 email: mail@bvconsulting.co.uk

Visqueen Gas Barrier
CE Mark to EN 13967



- **BBA approved.**
- **Low permeability to methane, radon and carbon dioxide.**
- **Approved for use in NHBC Amber 2 applications.**
- **Multi-layer reinforced LDPE membrane with aluminium core.**
- **High puncture and tear resistance.**
- **Complies with relevant codes of practice such as BRE and CIRIA.**

CE

EN 13967
Type A

13

Description

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

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

Multi-Layer Protection

Visqueen Gas Barrier utilises an advanced multi-layer lamination process to create an impenetrable and lasting protection whilst retaining flexibility for easy installation. A 0.4mm membrane comprising of five precision co-extruded film layers, it is made from high quality virgin LDPE laminating films, as thickness tolerance is critical for the heat bonding process. The Visqueen Gas Barrier provides a one piece barrier for safety, security, flexibility and durability.

The membrane should be installed blue side up

VISQUEEN BUILDING PRODUCTS

Heanor Gate, Heanor, Derbyshire DE75 7RG
T: 0845 302 4758 F: 0845 017 8663
enquiries@visqueenbuilding.co.uk
www.visqueenbuilding.co.uk

VISQUEEN BUILDING PRODUCTS IS A TRADING NAME OF BRITISH POLYTHENE LIMITED, COMPANY NUMBER: 350729, REGISTERED OFFICE: ONE LONDON WALL, LONDON, EC2Y 5AB

STRUCTURAL WATERPROOFING AND GAS PROTECTION SYSTEMS

Visqueen Gas Barrier
CE Mark to EN 13967

Application

Visqueen Gas Barrier offers a safe solution for the protection of buildings and occupiers against methane, carbon dioxide and radon ingress. Typically these are sites previously used as coalfields, landfill or are contaminated industrial sites.

SPECIFICATION SUPPORT

The following items are available to view online or to download from www.visqueenbuilding.co.uk

- Technical Datasheets
- Typical installation CAD details
- Health and Safety data

Register online for access to NBS Clauses and for information about our CPD Seminars

TECHNICAL SUPPORT

For advice on detailing or installation call Visqueen Building Products Technical Help Line 0845 302 4758. Pricing & Availability may be obtained from our UK Network of merchant stockists. For details of these call our Sales Office on 0845 302 4758.

Installation Guidelines
Visqueen Gas Barrier and ancillary components must be installed in accordance with the recommendations of Building Research Establishment BRE 414 "Protective measures for housing on gas contaminated land" and CIRIA C665 "Assessing risks posed by hazardous ground gases to buildings", NHB C guidelines, and the Chartered Institute of Environmental Health Ground Gas Handbook. The product is not intended for use where there is a risk of hydrostatic pressure. **The membrane should be installed blue side up**. The membrane should be installed on a compacted sand blinding layer or smooth concrete float finish. In areas where high levels of unsupported membrane occur it is recommended that Visqueen Pre Applied Membrane is used. To avoid slip or shear planes and high compressive loadings it is not recommended to take the membrane through the wall. In order to provide a continuous barrier across the cavity Visqueen Gas Resistant DPC should be taken through the blockwork and incorporated below the damp proof course cavity tray in the outer leaf.

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

Jointing and Sealing
Visqueen Gas Barrier should be overlapped by at least 150mm and bonded with Visqueen Double Sided Tape. The joint should be secured with Visqueen Foil Backed Girth Jointing Tape. Ensure that the membrane is clean and dry at the time of jointing

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

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

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

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

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

It is recommended that the barrier is covered with Visqueen Protection

Boards or screed before positioning the reinforcement. When underfloor heating is

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VISQUEEN BUILDING PRODUCTS

Visqueen Gas Barrier
CE Mark to EN 13967

being installed, it is recommended that the barrier is positioned between the blinded hardcore and insulation. This will protect the insulation from moisture and avoid any risk of overheating the membrane.

Storage and Handling

Visqueen Gas Barrier is classified as non-hazardous when used in accordance with the relevant Code of Practice (CP 1021973). The product is chemically inert and is not affected by acids and alkalis that may be present in the sub-soils. The material is not recommended for uses where it will be exposed to long periods of outdoor weathering as exposure to ultraviolet light will embrittle the product. Weathering will not occur when the membrane is installed in accordance with CP102 1973. Care should be taken to avoid accidental damage when handling the membrane on site. When the weather is cold, Visqueen Double Sided Jointing Tape and Visqueen Foil Backed Girth Jointing Tape should be kept in a warm, dry place until needed. Installation is not recommended below 5°C.

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VISQUEEN BUILDING PRODUCTS

Visqueen Gas Barrier
CE Mark to EN 13967

Technical Data and CE Mark

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

CE

EN 13967
Type A

13

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

Product Data

Characteristic	Test method	Units	Compliance criteria	Value or Statement
Visible defects	EN 1850 -2	-	Pass/Fail	Pass
Length	EN 1848-2	m	-0%/+10%	25 or 50
Width	EN 1848-2	m	-0%/+10%	2
Thickness	EN 1849-2	mm	-10%/+10%	0.52
Mass	EN 1849-2	g/m2	-10%/+10%	370
Tensile Strength - MD	EN EN12311	N	>MLV	350
Tensile Strength - CD	EN EN12311	N/mm2	>MLV	350
Tensile Elongation - MD	EN EN12311	%	>MLV	17
Tensile Elongation - CD	EN EN12311	%	>MLV	15
Joint Strength	EN12317-2	N	>MLV	332
Watertightness 2kPa	EN 1928	-	Pass/Fail	Pass
Resistance to impact	EN 12691	mm	>MLV	200
Dart Impact	BS 2782	g	MDV	731
Puncture CBR	BS EN ISO 12236	N	MDV	1114
Low temperature flexibility	EN 495-5	oC	-40	Pass
Durability against ageing	EN 1296 and EN 1928	-	Pass/Fail	Pass
Durability Chemical Resistance	EN 1847	-	Pass/Fail	Pass
Resistance to tearing (nail shank) CD	EN 12310-1	N	MDV	358
Resistance to tearing (nail shank) MD	EN 12310-1	N	MDV	368
Resistance to static loading	EN 12730	Kg	>MLV	Pass 20

Visqueen Gas Barrier
CE Mark to EN 13967

Water vapour transmission - resistance	EN 1931	MNs/g	MDV	7000
Water vapour transmission - permeability	EN 1931	g/m2/d	MDV	0.03
Methane Permeability	IS0 2782	mls/m2/d	MDV	<0.001
Reaction to Fire	EN 13501-1	Class	MDV	F

The information given in this datasheet is based on data and knowledge correct at the time of printing. Statements made are of a general nature and are not intended to apply to any use or application outside any referred to in the datasheet. As conditions of usage and installation are beyond our control we do not warrant performance obtained but strongly recommend that our installation guidelines and the relevant British Standard Codes of Practice are adhered to. Please contact us if you are in any doubt as to the suitability of application.

CSS (North West) Ltd

Construction Site Solutions

Louisa Street Walkden
Manchester M28 3GA

Tel: 0161 713 1200 Fax: 0161 703 8081

Delivery Note No. 144883

DELIVERY TO:
JD Kelly
COLLECTED EX YARD

INVOICE TO:
JD Kelly
Ropers Barn
Valletts Lane
Bolton
BL1 6DY

Customer Order No.

Invoice / Del Date 03/06/2016

QUANTITY	DESCRIPTION
3.00	PER ROLL;VISQUEEN METHANE BARRIER 2.0X25MTR

SIGNA [redacted]
PRINT
DATE:
1111

CSS (North West) Ltd

Construction Site Solutions

Louisa Street Walkden
Manchester M28 3GA

Tel: 0161 713 1200 Fax: 0161 703 8081

Delivery Note No. 143168

DELIVERY TO:

JD Kelly
COLLECTED EX YARD

INVOICE TO:

JD Kelly
Ropers Barn
Valletts Lane
Bolton
BL1 6DY

Customer Order No. JOE

Invoice / Del Date 03/05/2016

QUANTITY	DESCRIPTION
1.00	PER ROLL;VISQUEEN METHANE BARRIER 2.0X25MTR

SIGNATURE: .....

PRINT NAME: .....

DATE:

1111

CSS (North West) Ltd

Construction Site Solutions

Louisa Street Walkden
Manchester M28 3GA

Tel: 0161 713 1200 Fax: 0161 703 8081

Delivery Note No. 142412

DELIVERY TO:

JD Kelly
COLLECTED EX YARD

INVOICE TO:

JD Kelly
Ropers Barn
Valletts Lane
Bolton
BL1 6DY

Customer Order No. WIGGETT Invoice / Del Date 15/04/2016

QUANTITY	DESCRIPTION
4.00	PER ROLL;VISQUEEN METHANE BARRIER 2.0X25MTR

SIGNATURE: .....

PRINT NAME: .....

DATE:

1111

CSS (North West) Ltd

Construction Site Solutions

Louisa Street Walkden
Manchester M28 3GA

Tel: 0161 713 1200 Fax: 0161 703 8081

Delivery Note No. 143132

DELIVERY TO:

JD Kelly
c/o WIGGETTS (Former March Hare Pub)
CROWHILL ROAD
ASHTON U LYNE OL7 9HB

S/C JOE 07976 150154

INVOICE TO:

JD Kelly
Ropers Barn
Valletts Lane
Bolton
BL1 6DY

Customer Order No. WIGGETT/ASHTON Invoice / Del Date 03/05/2016

QUANTITY	DESCRIPTION
6.00	ROLL;VISQUEEN METHANE BARRIER 2.0X25MTR (BLUE / SILVER)

SIGNATURE: .....

PRINT NAME: .....

DATE:

1111

CSS (North West) Ltd

Construction Site Solutions

Louisa Street Walkden
Manchester M28 3GA

Tel: 0161 713 1200 Fax: 0161 703 8081

Delivery Note No. 145004

DELIVERY TO:
JD Kelly
COLLECTED EX YARD

INVOICE TO:
JD Kelly
Ropers Barn
Valletts Lane
Bolton
BL1 6DY

Customer Order No. WIGGET

Invoice / Del Date 06/06/2016

QUANTITY	DESCRIPTION
2.00	ROLL VISQUEEN GR DETAILING STRIPS 300MM X 10MTR

SIGNATURE [redacted]
PRINT NAME
DATE:
1111

CSS (North West) Ltd

Construction Site Solutions

Louisa Street Walkden
Manchester M28 3GA

Tel: 0161 713 1200 Fax: 0161 703 8081

Delivery Note No. 142556

DELIVERY TO:

JD Kelly
COLLECTED EX YARD

INVOICE TO:

JD Kelly
Ropers Barn
Valletts Lane
Bolton
BL1 6DY

Customer Order No. [redacted]

Invoice / Del Date 19/04/2016

QUANTITY	DESCRIPTION
16.00	PER ROLL; VISQUEEN FOIL TAPE 75MMX50MTR
24.00	PER ROLL;VISQUEEN D/SIDED BUTYL TAPE 50MMX10MTR
1.00	EACH STANLEY 99E KNIFE

SIGNATURE: .....

PRINT NAME: .....

DATE:

1111

RECEIVED
19 MAY 2016

Builders' Merchants
Tel: 0161 713 1200
Fax: 0161 703 8081

Page 1

Invoice

Wiggett Construction Limited
Viking House
449 Middleton Road
Chadderton
OL9 9LB

DELIVERY TO:
Wiggett Construction Limited
CHARMINSTER DRIVE
CRUMPSALL
MANCHESTER M8 5QA

S/C ANDREW 07843 026695

CUSTOMER ORDER NO. 025719/C533 | DELIVERY NO. ANDY C | INVOICE NO. 143360
OUR REFERENCE NO. 1111 | ACCOUNT 00000122 | INV/DEL DATE 06/05/2016

QUANTITY	DESCRIPTION	UNIT PRICE	NET AMOUNT	VAT AMOUNT
4.00	PER ROLL;800MMX20 L/MTR ZEDEX COMME	40.80	163.20	32.64
40.00	PFU113 PRE FORMED REV. CORNERSx 215m	19.50	780.00	156.00
14.00	PER ROLL;VISQUEEN D/SIDED BUTYL TAPE	5.55	77.70	15.54
3.00	PER ROLL; VISQUEEN FOIL TAPE 75MMX50	9.85	29.55	5.91

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to first page

EZDL035783

JOB
COST
NOMINAL
PRICE
CALC
SALES

PLEASE MAKE BACS PAYMENTS TO

NATWEST
SORT CODE 60-08-46
ACCOUNT NO 67728707

Net Amount	1,050.45
VAT Amount	210.09
Invoice Total	£ 1,260.54

VAT REG. NO. 719 6230 30

TERMS: 30 DAYS END OF MONTH

RECEIVED
[illegible]

Builders' Merchants
Tel: 0161 713 1200
Fax: 0161 703 8081

Invoice

Wiggett Construction Limited
Viking House
449 Middleton Road
Chadderton
OL9 9LB

DELIVERY TO:
Wiggett Construction Limited
CHARMINSTER DRIVE
CRUMPSALL
MANCHESTER M8 5QA

S/C ANDREW 07843 026695

CUSTOMER ORDER NO. 24145/C533 | DELIVERY NO. raymond C | INVOICE NO. 140745
OUR REFERENCE NO. 1111 | ACCOUNT 00000122 | INV/DEL DATE 11/03/2016

QUANTITY	DESCRIPTION	UNIT PRICE	NET AMOUNT	VAT AMOUNT
4.00	PER ROLL;800MMX20 L/MTR ZEDEX COMME	40.80	163.20	32.64
3.00	PER ROLL; VISQUEEN FOIL JOINTING TAPE	9.85	29.55	5.91
14.00	PER ROLL;VISQUEEN D/SIDED BUTYL TAPE	5.55	77.70	15.54
40.00	each;PFU113 PRE FORMED REV. CORNERSx 2	19.50	780.00	156.00

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to first page

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JOB
COST
NOMINAL
PRICE
CALC
SALES

PLEASE MAKE BACS PAYMENTS TO

NATWEST
SORT CODE 60-08-46
ACCOUNT NO 67728707

Net Amount	1,050.45
VAT Amount	210.09
Invoice Total	£ 1,260.54

VAT REG. NO. 719 6230 30

TERMS: 30 DAYS END OF MONTH

RECEIVED
25 JAN 2016

AXFORD GROUP

Construction Site Solutions
Tel: 0161 713 1200
Fax: 0161 703 8081

Page 1

Invoice

Wiggett Construction Limited
Viking House
449 Middleton Road
Chadderton
OL9 9LB

DELIVERY TO:
Wiggett Construction Limited
CHARMINSTER DRIVE
CRUMPSALL
MANCHESTER M8 5QA

S/C ANDREW 07843 026695

CUSTOMER ORDER NO. 023889/C533 DELIVERY NO. ANDY C INVOICE NO. 137658

OUR REFERENCE NO. 1111 ACCOUNT 00000122 INV/DEL DATE 11/01/2016

QUANTITY	DESCRIPTION	UNIT PRICE	NET AMOUNT	VAT AMOUNT
14.00	ROLL;800MMX20 L/MTR ZEDEX COMMERCI	40.80	571.20	114.24
72.00	each;PFU113 PRE FORMED REV. CORNERSx 2	19.50	1,404.00	280.80
10.00	ROLL;VISQUEEN D/SIDED BUTYL TAPE 50M	5.55	55.50	11.10
10.00	ROLL; VISQUEEN FOIL JOINTING TAPE 75M	9.85	98.50	19.70

JOB
COST
NOMINAL
PRICE
CALC
SALES

Affix label
to first page

EZDL033083

PLEASE MAKE BACS PAYMENTS TO

NATWEST
SORT CODE 60-08-46
ACCOUNT NO 67728707

VAT REG. NO. 719 6230 30

Net Amount	2,129.20
VAT Amount	425.84
Invoice Total	£ 2,555.04

TERMS: 30 DAYS END OF MONTH

BV

GAS PROTECTION PHOTOGRAPHS

PLOTS 1 & 2







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GAS PROTECTION PHOTOGRAPHS

PLOTS 1 & 2







GAS PROTECTION PHOTOGRAPHS

PLOTS 1 & 2





GAS PROTECTION PHOTOGRAPHS

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GAS PROTECTION PHOTOGRAPHS

PLOTS 3 & 4







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GAS PROTECTION PHOTOGRAPHS

PLOT 11







GAS PROTECTION PHOTOGRAPHS



PLOT 12

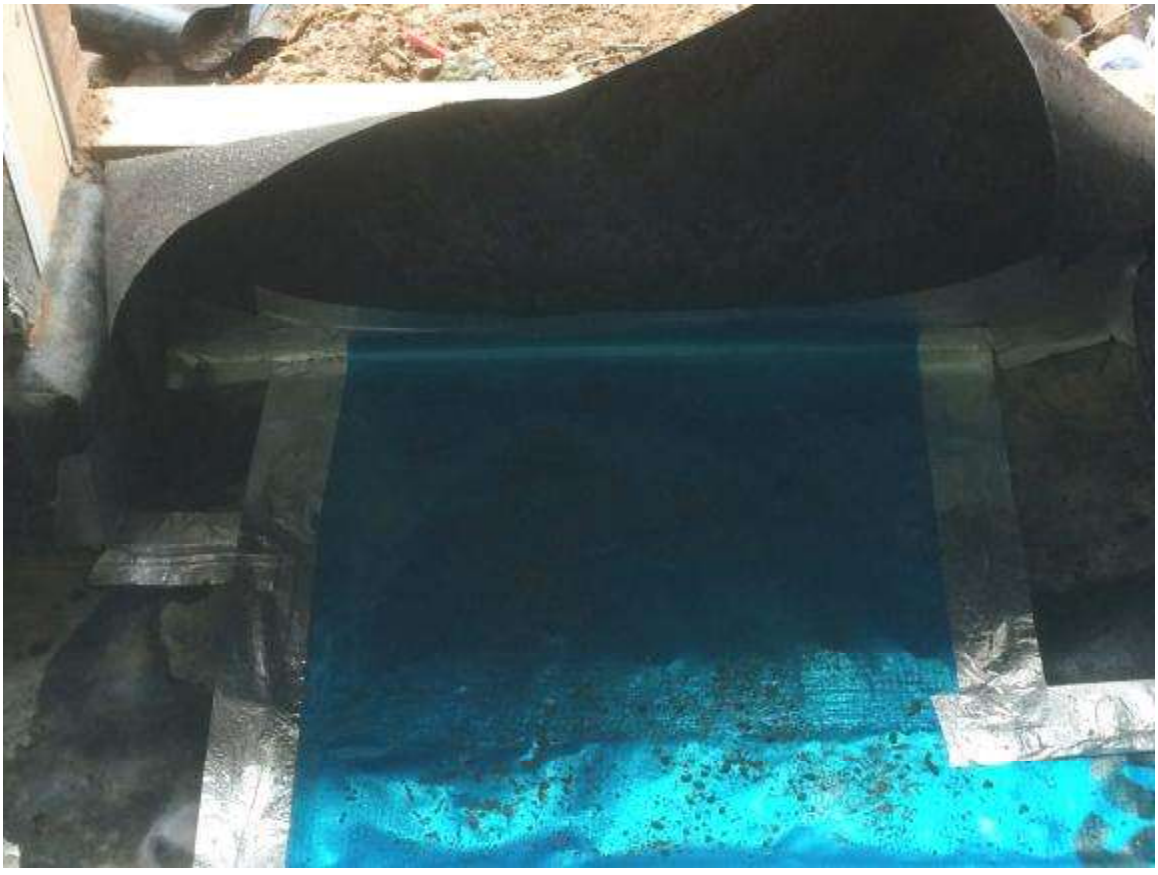




GAS PROTECTION PHOTOGRAPHS

PLOT 13





GAS PROTECTION PHOTOGRAPHS

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GAS PROTECTION PHOTOGRAPHS

PLOT 14





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