

REF: 1755/GGR/Rep/pbg

Nathan Cunningham
Urban Developments
Pinfold Works
Rossett Road
Wrexham LL12 0DQ

30th October 2015

Dear Nathan,

RE: GOLDEN GROVES, ROSSETT

1.0 Introduction

Urban Developments (UD) are proposing to construct two detached houses on the site of the former Golden Groves Public House in Rossett, near Wrexham.

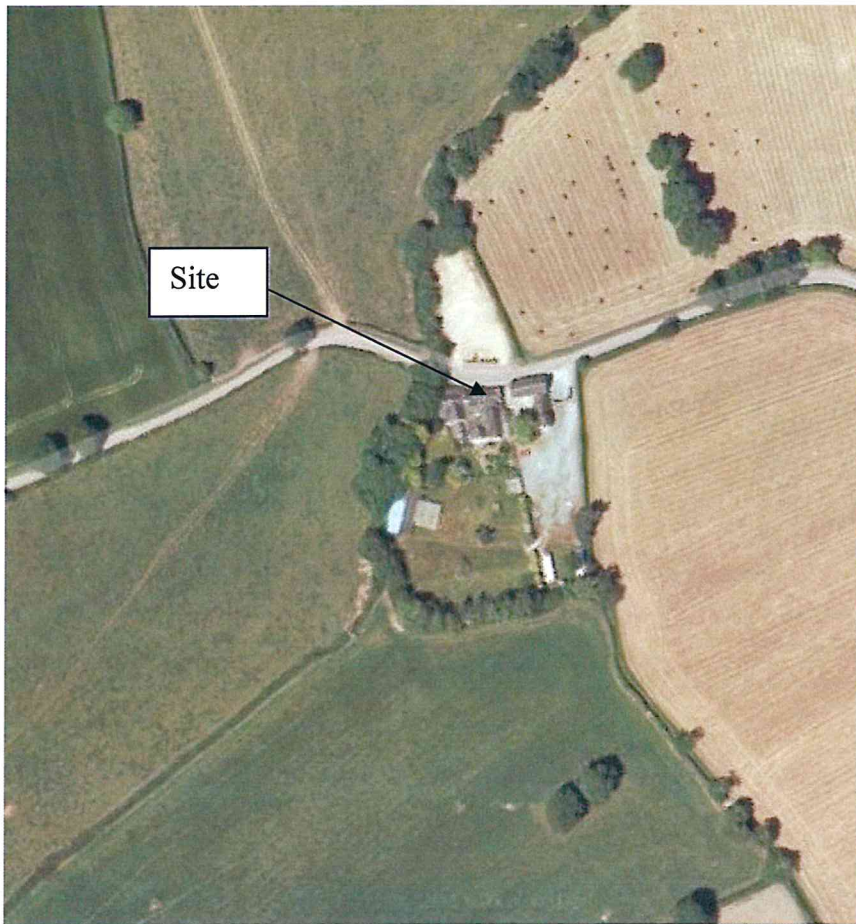
GroundSolve Ltd (GSL) have been appointed by UD, to carry out a geotechnical investigation and letter report for the proposed development.

This report presents the findings of the site investigation undertaken and presents geotechnical recommendations for the development. No desk study has been requested as part of this commission, although limited desk study research has been carried out.

2.0 Site Location and Description

The site lies within the grounds of the former Golden Groves Public House, to the east of the village of Burton Green and 2km to the north west of the village of Rossett, the site lies just off Llyndir Road at NGR SJ 354 587.

The proposed housing will be built in the former location of the Public House. An aerial photograph taken from the internet prior to the demolition of the Public House showing the general site layout is presented below.



The northern site boundary is defined by Lyndir Road, with hedgerows defining the eastern, southern and western boundaries, with agricultural land beyond.

The south western section of the site is predominantly covered in grass, whilst the northern half of the site was formerly occupied by the Golden Groves Public House, which has recently been demolished. The eastern half of the site was previously covered in tarmac and used as a car park, with this surface being stripped as part of the site preparation. The site is generally fairly level. A topographical survey provided by the client recorded site elevations between 12.50 and 13.0mASD (Site Datum). A small stream flows past the western and southern site boundaries.

GSL were informed that there were no services on site, except for an attenuation tank present on the western boundary of the site. This had been disconnected and is in the process of being removed, a telegraph pole was also present in the south east corner of the site.

Photographs of the site are presented in Appendix A.

3.0 Geology and Hydrogeology

The geology of the site has been studied on the 1:50,000 scale geology plan, Sheet 108. This shows the area to be underlain with superficial deposits, comprising sand and gravel of undifferentiated glaciofluvial deposits formed during the last ice age. The underlying bedrock comprises fine grained red sandstones of the Kinnerton Sandstone Formation, formed during the Permo-Triassic period.

The BGS website was also studied, which showed a borehole to have been drilled on the site in 1960. The strata is generalised in the table below, and presented in full in Appendix B.

Borehole No.	Black Soil (m)	Red Sand (m)	Brown Clay m)
SJ35NE14	0.00-0.30	0.30-2.13 45.42-48.77	2.13-45.42

The upper sand is considered to represent glacial outwash deposits, formed by glacial meltwaters during retreat of the ice sheet, with the lower sand being the weathered bedrock. The brown clay is a glacial till deposited beneath advancing ice sheets during the last ice age.

It is understood from discussions with the client that the well was artesian, and that water was issuing at surface. This water flow is from the underlying sandstone bedrock, with the above thickness of clay acting as an aquiclude, as it is of low permeability. The artesian water from the well is now being discharged to the adjacent stream. Any water encountered in the upper sands will be perched water in the more permeable sands, which rest on the lower permeability clays at shallow depth.

4.0 Proposed Development

The proposed development is to comprise two detached properties, with associated garages and hardstanding for car parking, the larger of the two properties will also have a basement and swimming pool, see Figure 1.

Detailed foundation loads are not known at this stage, however, experience of similar developments suggests that foundation loads will not exceed 50 kN/m run, with floor slab loadings not exceeding 5kN/m². The construction drawings are presented in Appendix C.

Floor levels have been set at 12.62mASD, and it appears that for Plot 2 the basement level is 10.76mASD, giving an excavation depth of around 1.30m.

The recommendations given in this report are based upon these assumptions and should be reviewed and if necessary revised during the detailed design phase.

5.0 Site Investigation

The site investigation was undertaken on the 6th October 2015 and comprised four machine dug trial pits TP01-TP04 to a maximum depth of 2.60m, along with soakaway tests undertaken in TP01 and TP02.

The trial pits were carried out using a machine supplied by UD under the full time supervision of an engineer from GSL, who logged the trial pits in general accordance with BS 5930, 1999, Code of Practice for Site Investigation. In addition, soakaway tests were carried out in two of the trial pits, which comprise excavating pits and filling them as quickly as possible using a 2,000 gallon water bowser. The water level was then monitored and the test repeated if time allowed. The tests were carried out in accordance with BRE Digest 365, Soakaway Design, 2003.

The location of the trial pits is presented on Figure 1 and the logs presented in Appendix D, along with the soakaway test results.

Soil samples were taken from the trial pits in the appropriate containers, placed in a cool box and taken immediately to the laboratories of Alcontrol in Hawarden for the following chemical testing.

CLEA Contaminants – Arsenic (As), Cadmium (Cd), Mercury (Hg), Nickel (Ni), Lead (Pb), Selenium (Se), Phenol, Benzene, MTBE, Toluene, Ethylbenzene, m,p-Xylene, o-Xylene.

GAC Contaminants – Boron (B), Copper (Cu), Zinc (Zn), Chromium total (Cr), PAH (Speciation), TPHCWG.

Other Contaminants

Sulphide, Sulphate (2:1 water extract), Cyanide total, pH, Sulphur elemental, Total Organic Matter, Asbestos screening.

The results are summarised in Section 7.0 and the results presented in full in Appendix E.

6.0 Ground Conditions

The findings from the trial pits are summarised in the table below.

TP No.	Made Ground (m)	Sand & Gravel (m)	Groundwater (m)
TP01		0.00-2.60	2.0
TP02	0.00-0.05	0.05-1.75	1.75
TP03	0.00-0.05	0.05-2.30	2.30
TP04	0.00-0.95	0.95-2.00	1.70

Made Ground

A thin veneer of made ground was encountered in TP02, 03 and 04, which was described as medium dense, dark brown, slightly gravelly, silty, fine, sand. The gravel was angular to sub angular, fine to coarse, brick.

In TP04 between 0.05-0.95m the made ground comprised mainly reworked natural ground, described as loose to medium dense, dark brown and brown, locally mottled light grey, slightly gravelly, silty, fine to medium sand. The gravel was sub rounded, fine to medium. This was described as made ground as a plastic water pipe was encountered at 0.95m.

Glacial Sand & Gravel

These deposits were encountered in all of the pits and comprised loose, becoming medium dense with depth, brown, fine to medium, sand, with depth becoming a medium dense, brown, locally mottled light grey, fine to medium sand, with local cobble and rare boulder sized pockets of silty clay.

pH values were between 6.31 and 7.82, with sulphate contents when measured as 2:1 water extract between <0.004 and 0.0211g/l.

Groundwater

Slight groundwater seepages were encountered between 1.75 and 2.30m in all of the pits. As discussed above, they are considered to represent a perched water table above the underlying glacial till.

7.0 Results of Chemical Testing

The soil samples were taken from the topsoil and subsoil. The sample depths are presented in the table below.

TP No	Depth (m)	Material
TP01	0.00-0.50	River Terrace Deposits
TP03	0.00-0.50	Made Ground/ River Terrace Deposits

The results of the soil analyses are presented below where they compared to human health critical values (CVs) for initial screening purposes. The CVs adopted are for residential land use. They are taken primarily from CLEA Soil Guideline Values (SGVs) published by the Environment Agency (2009), and LQM/CIEH Generic Assessment Criteria (GACs-2nd edition 2009). These criteria are derived using the CLEA model under a standard default residential land use scenario, assuming that the potentially contaminated soil is present in gardens and beneath houses, and assuming worst case soil organic matter levels where these affect the critical value.

The lead values were withdrawn in 2009 and have recently been replaced by new C4SL values, which are presented in the table below. Where published human health critical values are unavailable or inappropriate, then other widely-used screening values are used, as noted below.

CLEA SGV Contaminants

Determinant	No of Tests	Range (mg/kg)	CLEA SGV Guidelines A*		% exceeding CLEA SGV
Arsenic	2	3.62-3.81	1	32	0
Cadmium	2	0.19-0.301	1	10	0
Lead	2	11-15.9	1	200	0
Mercury	2	<0.14	1	1	0
Nickel	2	7.19-9.93	1	130	0
Selenium	2	<1	1	350	0
Phenol	2	<0.01	1	420	0
MTBE	2	<0.005	1	0.33	0
Benzene	2	<0.01	1	NA	NA
Toluene	2	<0.002	1	610	0
Ethylbenzene	2	<0.003	1	350	0
M, p-Xylene	2	<0.006	1	230-240	0
o-xylene	2	<0.003	1	250	0
Notes					
A* 1 SGV for residential use.					

None of the above values exceeded the SGV values for residential land use.

GAC Contaminants

Determinant	No of Tests	Range (mg/kg)	GAC Value (mg/kg)	% exceeding GAC
Zinc	2	17-41.6	3750	0
Boron	2	1.62-1.78	291	0
Chromium	2	7.43-11.80	NA	0
Chromium(Hex)	2	<0.60	4.3	0
Chromium (Triv)	2	7.43-11.8	3000	0
Copper	2	5.37-9.07	2330	0

None of the above values exceed the relevant guidelines.

PAH Speciation

Determinant (GAC Speciated PAH)	No of Tests	Range (mg/kg)	GAC Value (mg/kg)	% exceeding GAC
Anthracene	2	<0.016	4900	0
Acenaphthylene	2	<0.012	400	0
Acenaphthene	2	<0.008	480	0
Benz(a)anthracene	2	<0.014	4.7	0
Benzo(a)pyrene	2	<0.015	0.94	0
Benzo(b)fluoranthene	2	<0.015	6.5	0
Benzo(ghi)perylene	2	<0.024	46	0
Benzo(k)fluoranthene	2	<0.014	9.6	0
Chrysene	2	<0.01	8	0
Dibenzo(ah)anthracene	2	<0.023	0.86	0
Fluoranthene	2	<0.017	460	0
Fluorene	2	<0.01	380	0
Indeno(123cd)pyrene	2	<0.018	3.9	0
Naphthalene	2	<0.009	3.7	0
Phenanthrene	2	<0.015	200	0
Pyrene	2	<0.015	1000	0

Note: The above guidance values are based on a SOM of 2.5%.

None of the above values exceed the relevant guidelines for residential land use.

Other Contaminants

Determinant	No of Tests	Range (Mean) (mg/kg unless otherwise stated)	Published Guidelines
Sulphide	2	<15	1000 (ICRCL)
Sulphur	2	<10	0.5% (UU)
Sulphate (wat sol)	2	<0.004-0.0211	N/A
Total Cyanide	2	<1	NA
pH	4	6.31-7.82	<5 (UU)
Soil Organic Matter	2	<0.35-0.798	6% (EA)
Notes. UU United Utilities EA Environment Agency			

The test results have not revealed any concentrations above the indicated guidance levels for residential land use.

Hydrocarbons

LQM 1% Organic Content	No of Tests	Range (mg/kg)	Published Guidelines (mg/kg)
Aliphatic EC 5-6	2	<0.01	55
Aliphatic EC >6-8	2	<0.01	160
Aliphatic EC >8-10	2	<0.01-0.023	46
Aliphatic EC >10-12	2	<0.01-0.092	230
Aliphatic EC >12-16	2	<0.10	1700
Aliphatic EC >16-35	2	<0.10	64000
Aliphatic EC >35-44	2	<0.10	64000
Aromatic EC 5-7(benzene)	2	<0.01	130
Aromatic EC >7-8(toluene)	2	<0.01	270
Aromatic EC >8-10	2	<0.01-0.018	65
Aromatic EC >10-12	2	<0.01-0.062	160
Aromatic EC >12-16	2	<0.10	310
Aromatic EC >16-21	2	<0.10	480
Aromatic EC >21-35	2	<0.10	1100
Aromatic EC >35-44	2	<0.10	1100

Note: Based on 2.5% SOM.

None of the above values exceeded the relevant guidance and the asbestos screening failed to reveal the presence of any asbestos.

8.0 Geotechnical Recommendations

8.1 Excavations and Site Preparation

While the previous building on site has been demolished, old foundations may remain in the ground, which may need to be broken out using pneumatic/hydraulic breakers.

Any further excavations will be in glacial sands and gravels and possibly glacial till, which will be possible using conventional earthmoving equipment.

Excavations deeper than 1.20m that are to be entered should be battered back or shored for safety reasons.

Groundwater seepages are not anticipated in shallow excavations, but may be encountered in deeper excavations for the basement/swimming pool of the larger property, if encountered they should be easily catered for by pumping from sumps cut within the excavations.

However, the trial pits were excavated following a prolonged dry period and due to the shallowness of the underlying glacial till, it is possible that water levels could rise quickly following prolonged wet weather. In which case, excavations below the water table could encounter running sands. In which case, conventional dewatering techniques may be required, such as well pointing.

Consequently, it should be assumed that excavations for the swimming pool and basement are likely to encounter groundwater. In which case, the excavation will either need to be battered back, if space allows. If this is not possible, then the basement excavation should be constructed within a sheet pile cofferdam with the sheet piles extended into the underlying clay to form a seal.

8.2 Foundations and Floor Slabs

Conventional strip foundations are recommended in the underlying sands of loose to medium dense consistency, where an allowable bearing pressure of 100kN/m² can be used to proportion the foundations. Foundations should be founded at depths of at least 750mm below final external ground levels.

It is recommended that the below ground sections of the structure are tanked to protect against water ingress. It is also recommended that a flotation check be carried out on the below ground sections of the development in the temporary case.

Floor slabs can be designed as ground bearing assuming a “Good Formation” as defined by Cement & Concrete Association, Concrete Ground floors: Their design, construction and finish, Deacon, R, Publication 48.034, 1986.

8.3 Protection of Buried Concrete

Testing of the underlying sands and gravel has revealed that chemical attack of buried concrete is not an issue. Buried concrete can therefore be designed for the following classes, in accordance with BRE Special Digest 1, 2005, Concrete in Aggressive Ground.

- DS-1,
- AC-1s

8.4 Drainage

The soakaway tests revealed the following results.

TP No	Depth (m)	Test No	Permeability (m/sec)
TP 1	2.60	1	2.78×10^{-6}
	1.90	2	2.87×10^{-6}
TP 2	1.75	1	2.032×10^{-6}

It must be stressed that difficulty was encountered in undertaking the soakaway tests due to the instability of the pit sides. It has therefore been necessary to extrapolate the test results to obtain a permeability. While this normally produces optimistic results, the values above are considered realistic for fine sand. It is therefore recommended that a permeability of 1×10^{-6} m/sec be used for the soakaway design.

However, it is recommended that rather than construct deep soakaways, whose function would be impeded when the groundwater levels rise, that shallow trench soakaways are constructed. If necessary an overflow could be constructed from the soakaway into the adjacent stream, although this may need a discharge consent.

8.5 Environmental Comments

The only past site use has been as a Public House and the only made ground encountered has been from previous hardstandings and the demolition of the previous buildings on site.

The trial pits failed to reveal any visual or olfactory evidence of contamination and no contaminants of concern were recorded in the chemical tests.

The site is therefore considered to be uncontaminated and suitable for its intended use as housing.

Examination of plans contained in, Radon: Guidance on protective measures for new buildings, 2007, shows that no radon protection measures are necessary. However, it is recommended that a radon report be obtained from the BGS.

We trust this is satisfactory, should you have any queries please call Mike Scott on 01244 661361.

Yours Sincerely

A handwritten signature in black ink, appearing to read 'M.J. Scott', with a long horizontal flourish extending to the right.

M.J.Scott

FIGURES

APPENDIX A

Site Photographs



Photograph 1 looking south at the site from Lyndir Road



Photograph 2 looking at the north east corner of the site from Lyndir Road



Photograph 3 looking across the site from the west of the site from TP 1



Photograph 4 looking east across the southern half of the site



Photograph 5 looking towards the southern boundary of the site from TP 1



Photograph 6 looking east across to the south east corner of the site from TP 1



Photograph 7 looking north from TP 3



Photograph 8 looking south from TP 3

APPENDIX B

Previous Borehole

13/10/2015



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 154043 : BGS Reference: SJ35NE14
British National Grid (27700) : 335350,358670

[Report an issue with this borehole](#)

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KINNERTON BOREHOLES
No. 12. Golden Grove.

Analysis	13.10.66.	5.12.66.
Appearance	colourless, very slight deposit.	clear and colourless
Odour	nil	nil
Reaction, pH	7.3	7.4
Total solids	316	322
Nitrogen as free and saline ammonia	0.065	0.04
Nitrogen as albuminoid ammonia	0.005	less than 0.01
Nitrogen as nitrites	nil	nil
Nitrogen as nitrates	0.25	0.00
Chlorides, as Cl	23	16
Oxygen absorbed from permanganate in 4 hours at 27°C	0.3	0.2
Total hardness	260	260
Temporary hardness	260	260
Permanent hardness	0	0
Alkalinity	263	260
Free Chlorine	-	0.05
Potassium, as K	-	2.4
Anionic synthetic detergents	-	-
Manganese, as Mn	0.15	0.24
Cyanides and thiocyanates	nil	-
Poisonous Metals	nil	nil
Iron, as Fe	1.1	0.27
Free carbon dioxide	-	26
Suspended solids, total	nil	-
mineral	nil	-
Sodium carbonate	-	0.0

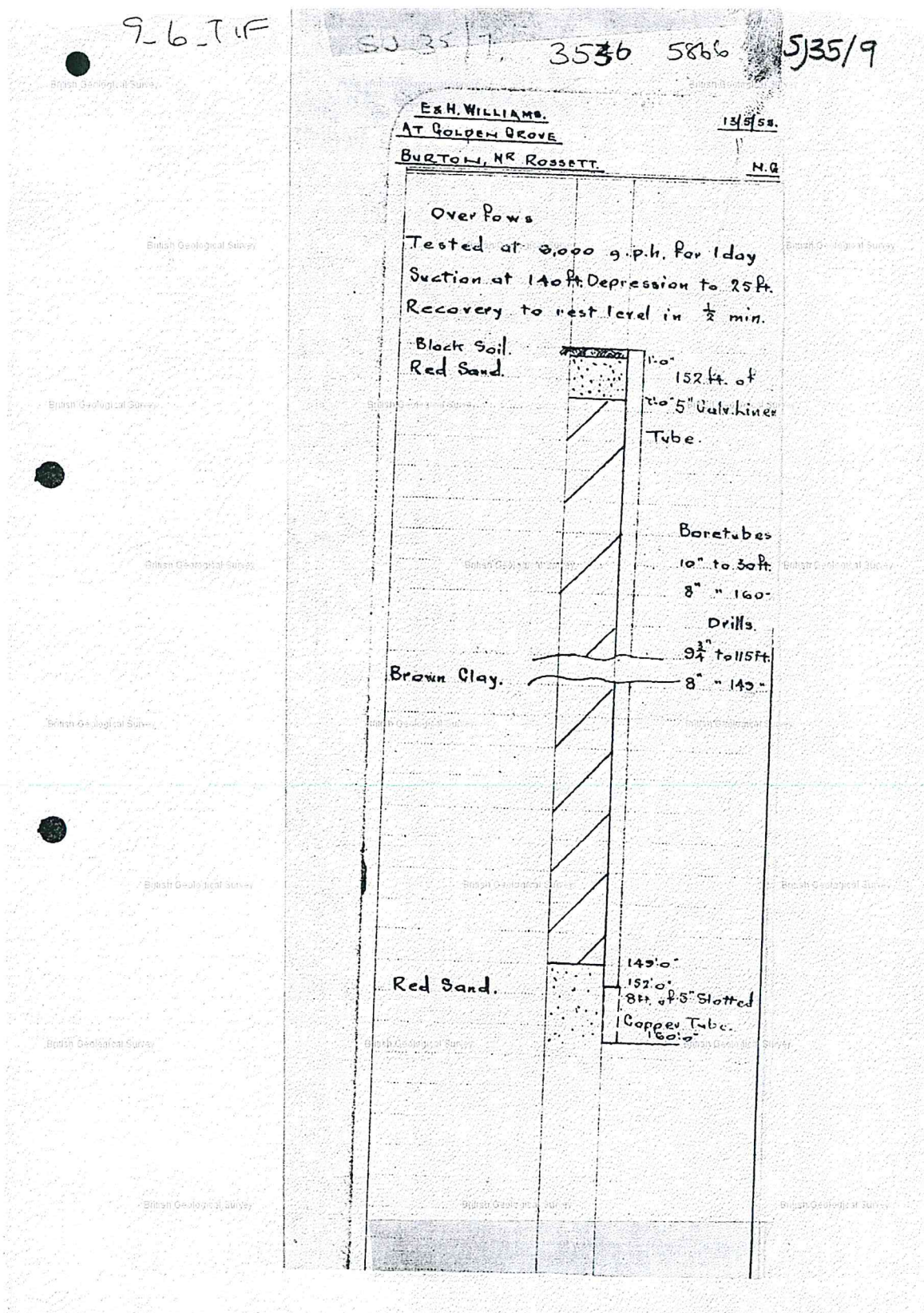


**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

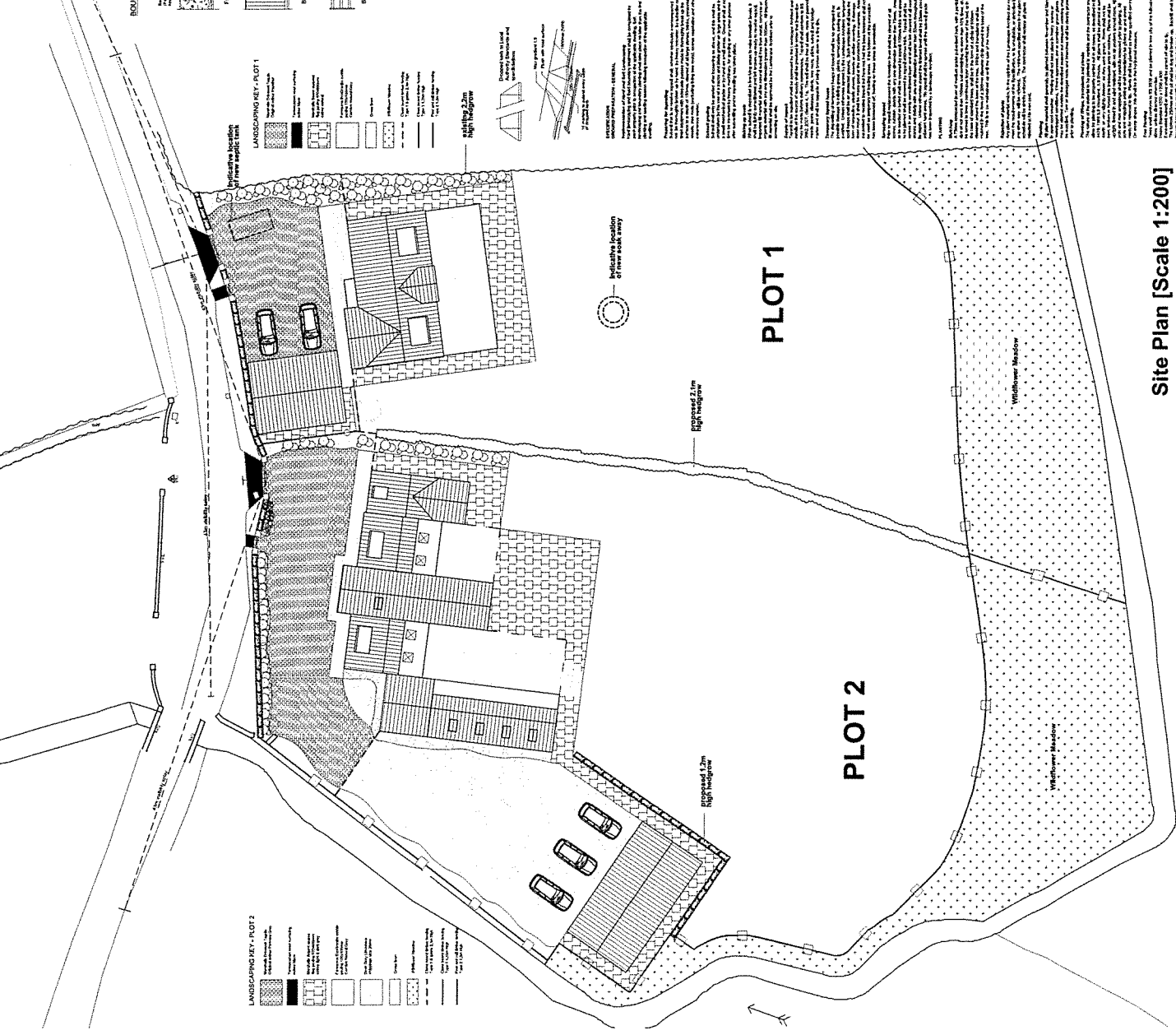
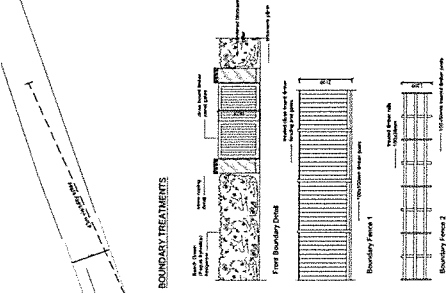
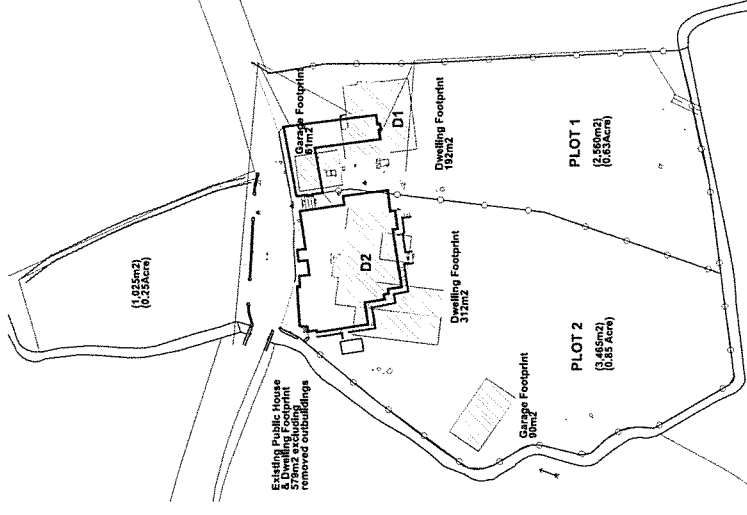
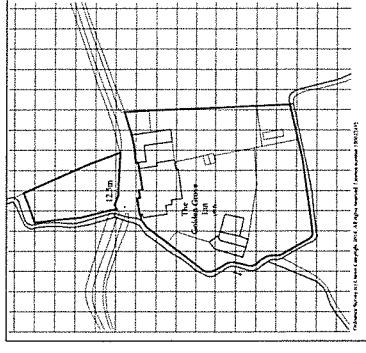
BGS ID: 154043 : BGS Reference: SJ35NE14
British National Grid (27700) : 335350,358670
[Report an issue with this borehole](#)

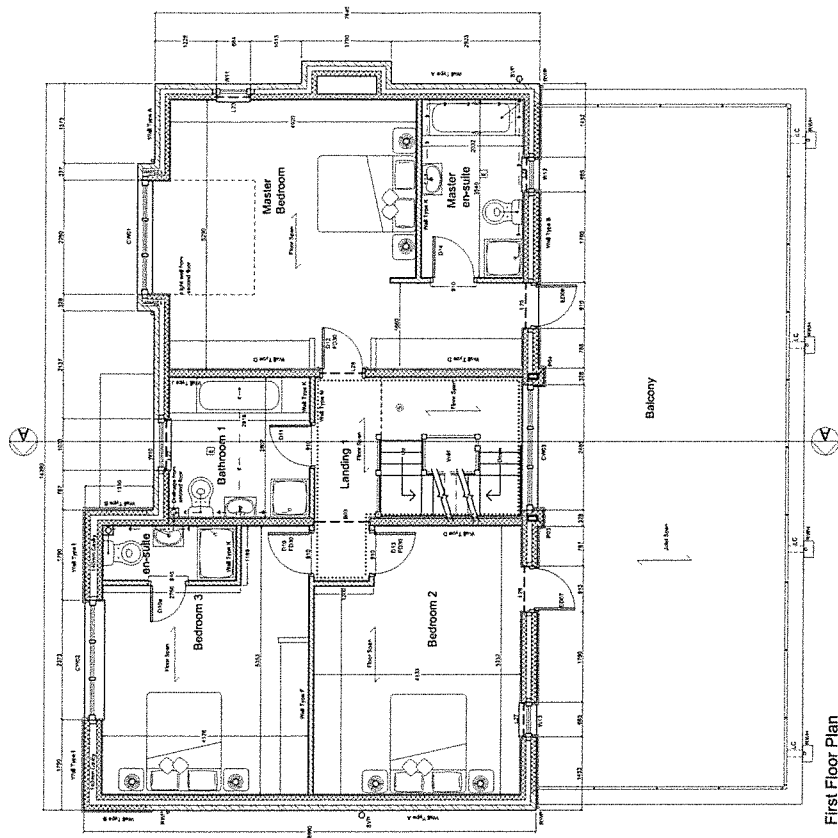
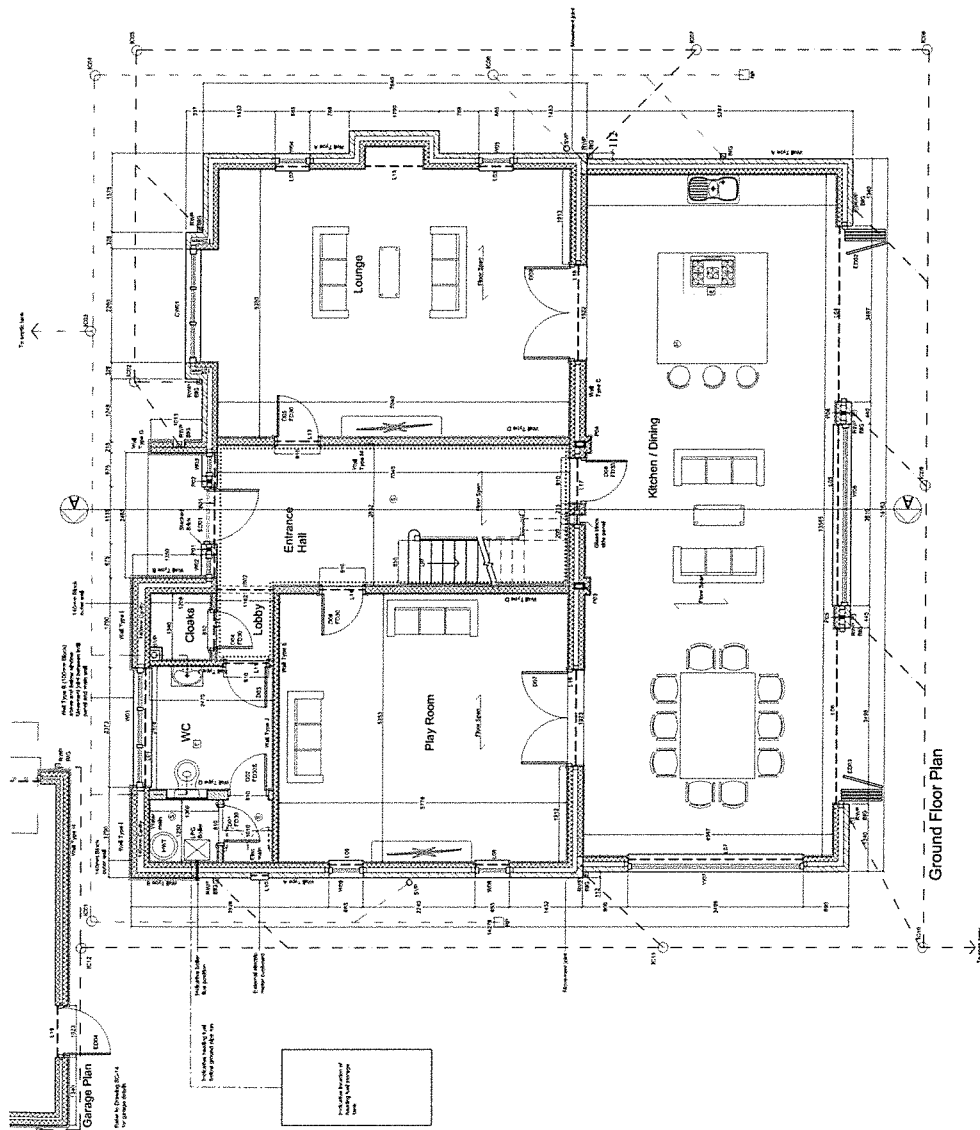
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APPENDIX C

Construction Drawings

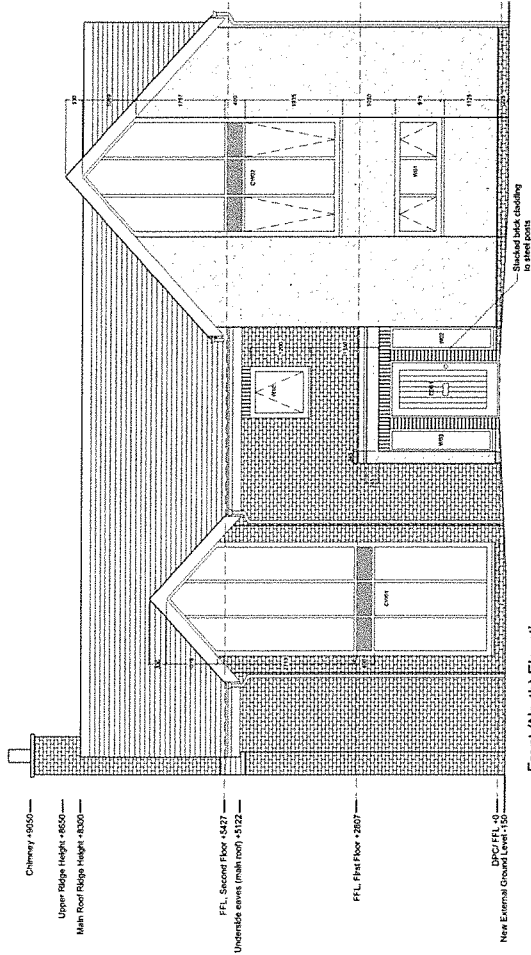
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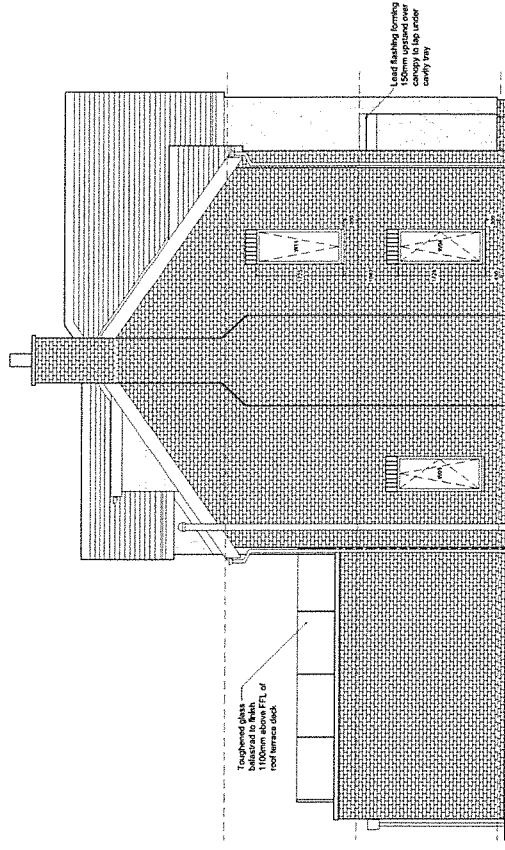
Drawing Notes

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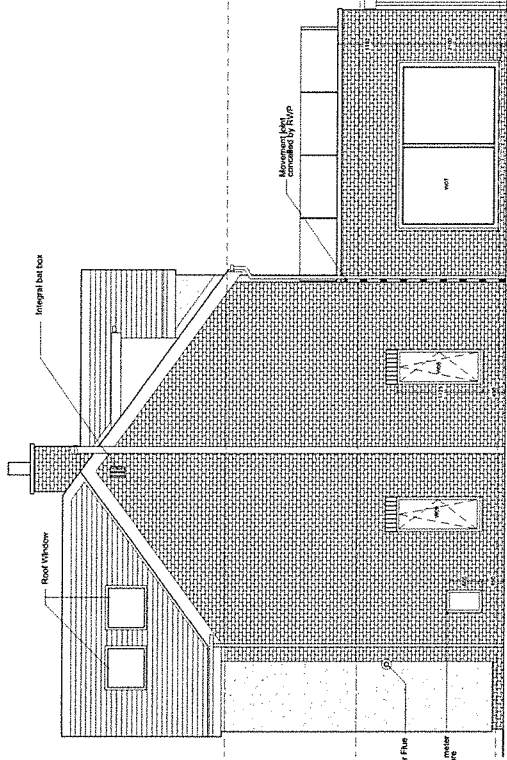
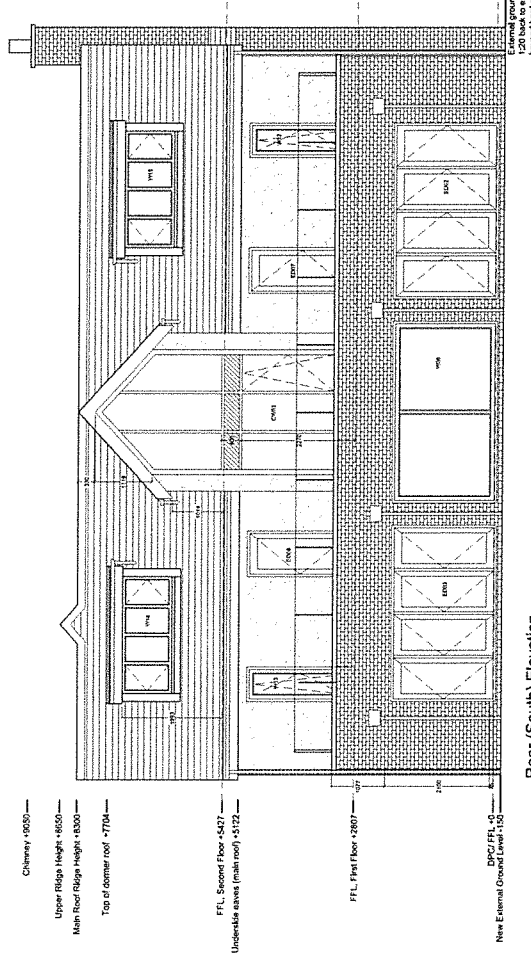
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Front (North) Elevation



Rear (South) Elevation



Side (West) Elevation

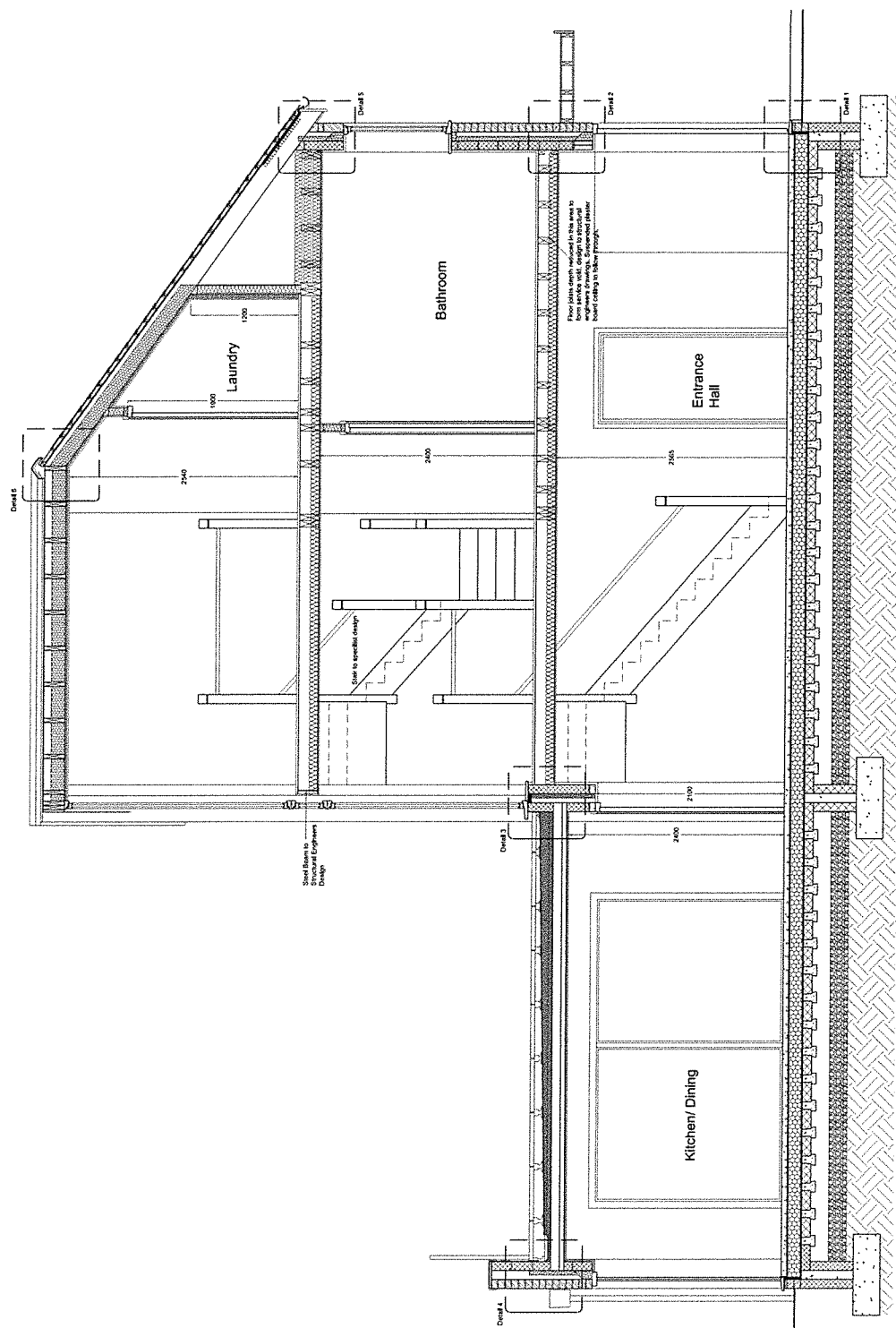
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HB3A

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Project: New Housing Development
Client: Former Golden Grove Inn, Lyndri Lane, Rossett, Wrexham LL12 0AS
Drawing: Proposed Elevations (Ref 1)
Scale: 1:50 @ A1
Date: 20.08.15
Ref: HB3A/170/BC-16

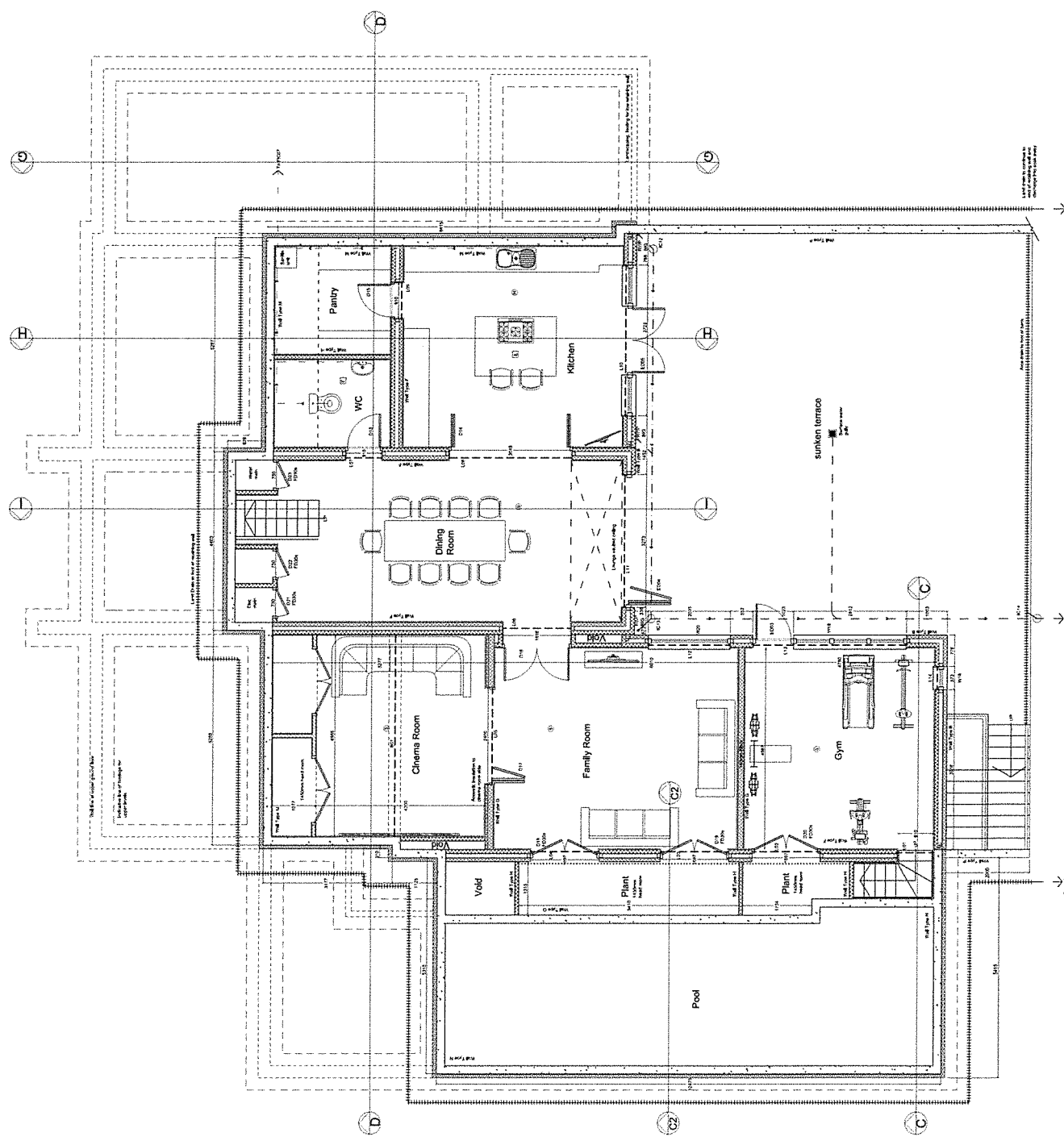


Section AA

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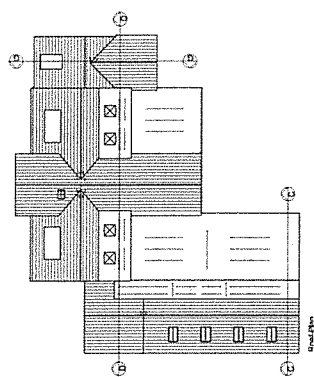
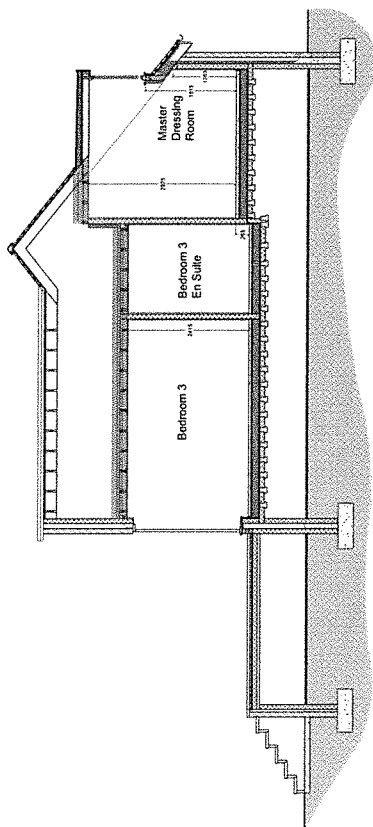
Drawing Notes

Wall type	Notes
1. External walls	1. External walls to be constructed in accordance with the relevant building regulations.
2. Internal walls	2. Internal walls to be constructed in accordance with the relevant building regulations.
3. Party walls	3. Party walls to be constructed in accordance with the relevant building regulations.
4. Partition walls	4. Partition walls to be constructed in accordance with the relevant building regulations.
5. Glazed walls	5. Glazed walls to be constructed in accordance with the relevant building regulations.
6. Solid walls	6. Solid walls to be constructed in accordance with the relevant building regulations.
7. Hollow walls	7. Hollow walls to be constructed in accordance with the relevant building regulations.
8. Concrete walls	8. Concrete walls to be constructed in accordance with the relevant building regulations.
9. Brick walls	9. Brick walls to be constructed in accordance with the relevant building regulations.
10. Block walls	10. Block walls to be constructed in accordance with the relevant building regulations.
11. Timber walls	11. Timber walls to be constructed in accordance with the relevant building regulations.
12. Steel walls	12. Steel walls to be constructed in accordance with the relevant building regulations.
13. Aluminium walls	13. Aluminium walls to be constructed in accordance with the relevant building regulations.
14. Glass walls	14. Glass walls to be constructed in accordance with the relevant building regulations.
15. Other walls	15. Other walls to be constructed in accordance with the relevant building regulations.



Lower Ground Floor

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Project Information Project Name: New Housing Development Client: Urban Developments Address: 1234 Main Street, London, UK Contact: 01234 567890	
Drawing Information Drawing Title: Lower Ground Floor Plan Drawing No: 1.50 @ A1 Date: 21.05.15 Scale: 1:100	
Architect Information Architect: H3A Address: 1234 Main Street, London, UK Contact: 01234 567890	

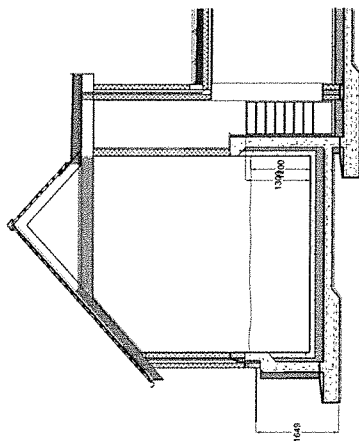


URBAN DESIGN

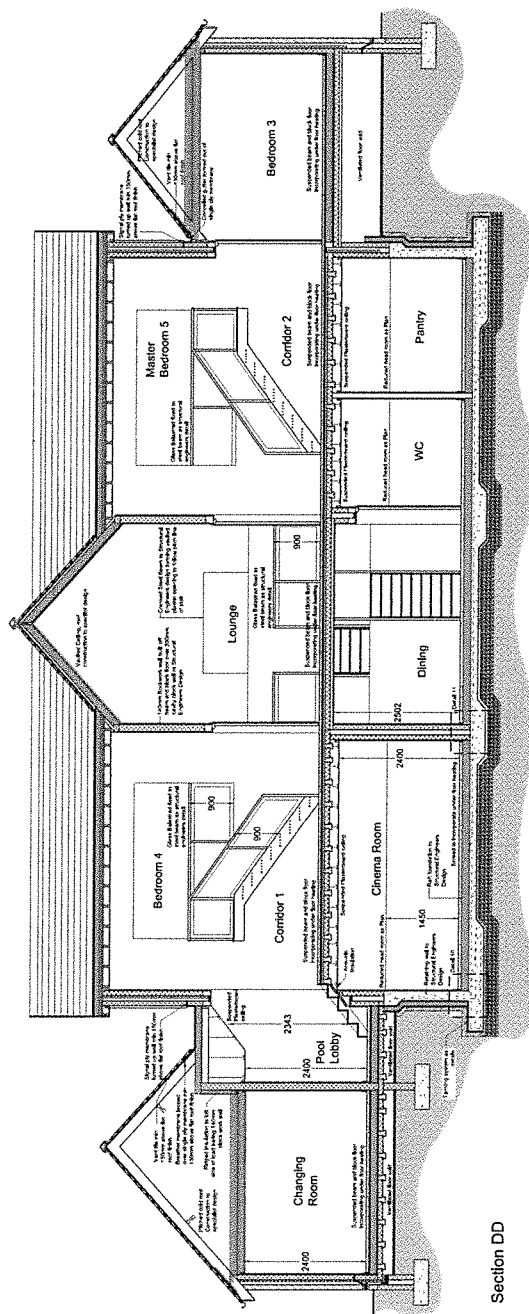
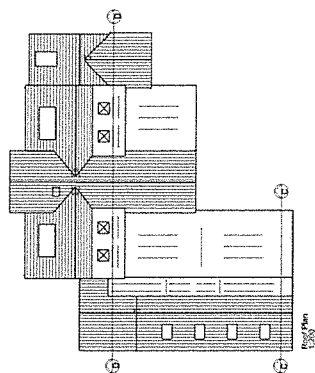
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- Music Industry Development
- Theater & Performing Arts Subsidies
- Visual Arts Grants
- Literary Awards & Fellowships
- Journalism & Media Literacy Programs
- Documentary Filmmaking Support
- Podcast Production Grants
- Video Game Development Funding
- Virtual Reality Experiences Creation
- Augmented Reality Applications Development
- Artificial Intelligence Ethics Guidelines
- Robotics Education Programs
- Space Exploration Inspiration Campaigns
- Mars Colonization Feasibility Studies
- Lunar Base Establishment Plans
- Asteroid Mining Ventures
- Deep Sea Exploration Missions
- Antarctic Research Stations
- Arctic Region Development
- High Altitude Expedition Support
- Polar Regions Conservation
- Oceanographic Research Vessels
- Marine Protected Areas Designation
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- Great Barrier Reef Management
- Amazon Rainforest Conservation
- Borneo Rainforest Preservation
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- 黔西南州兴义市万峰林景区周边村庄环境整治工程竣工验收
- 安顺市平坝县天龙镇美丽乡村示范片创建推进会召开
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- 黔东南

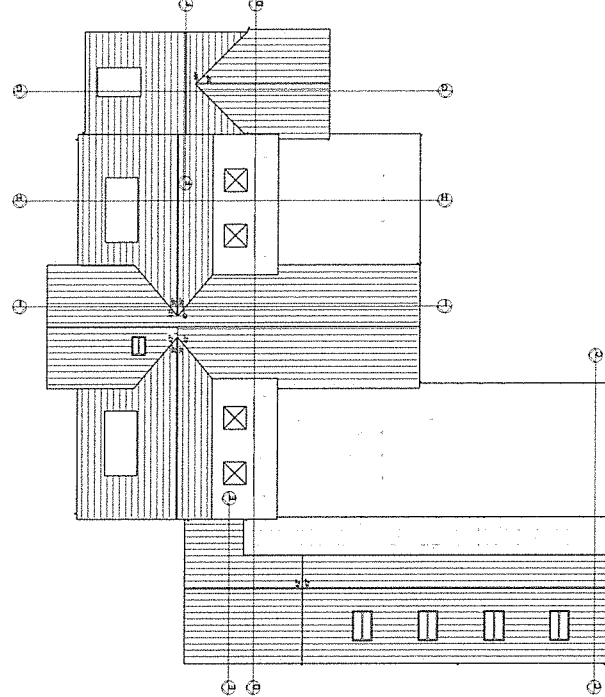
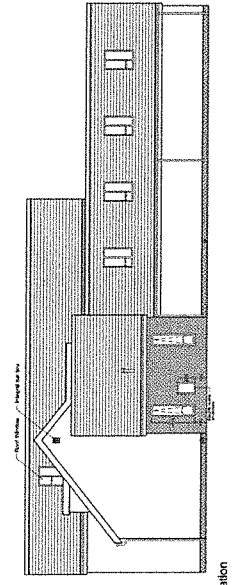
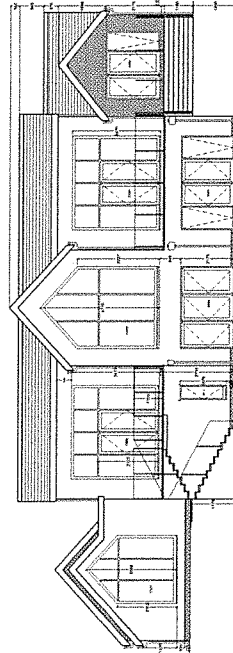
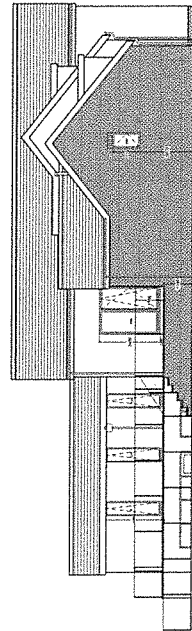
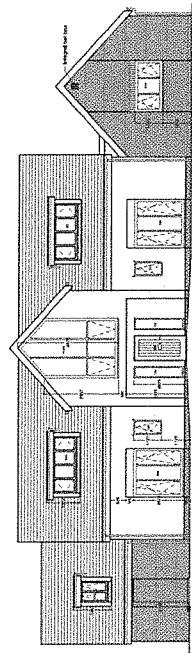


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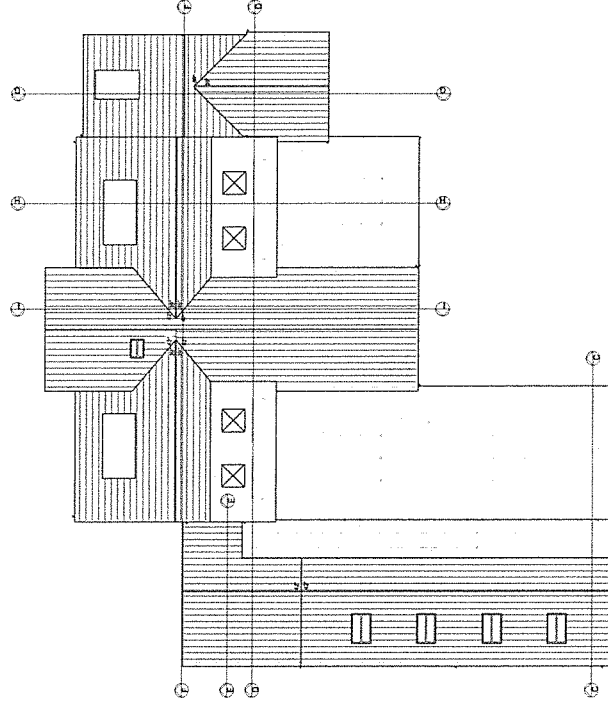
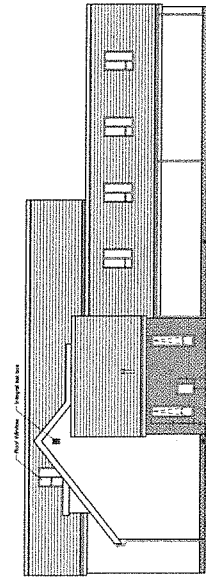
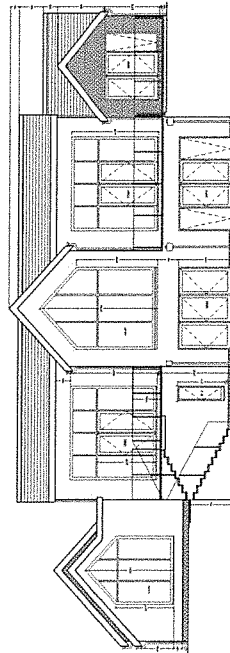
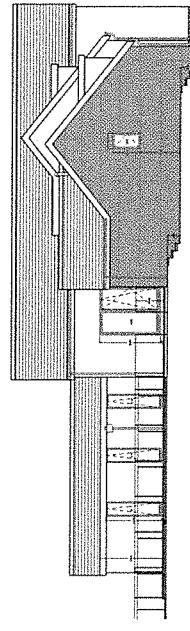
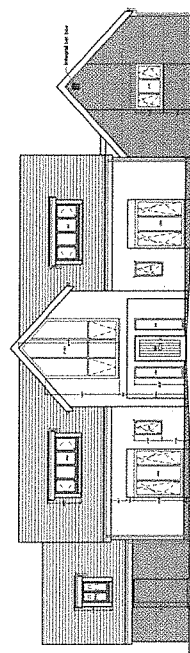
Section DD

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Roof Plan

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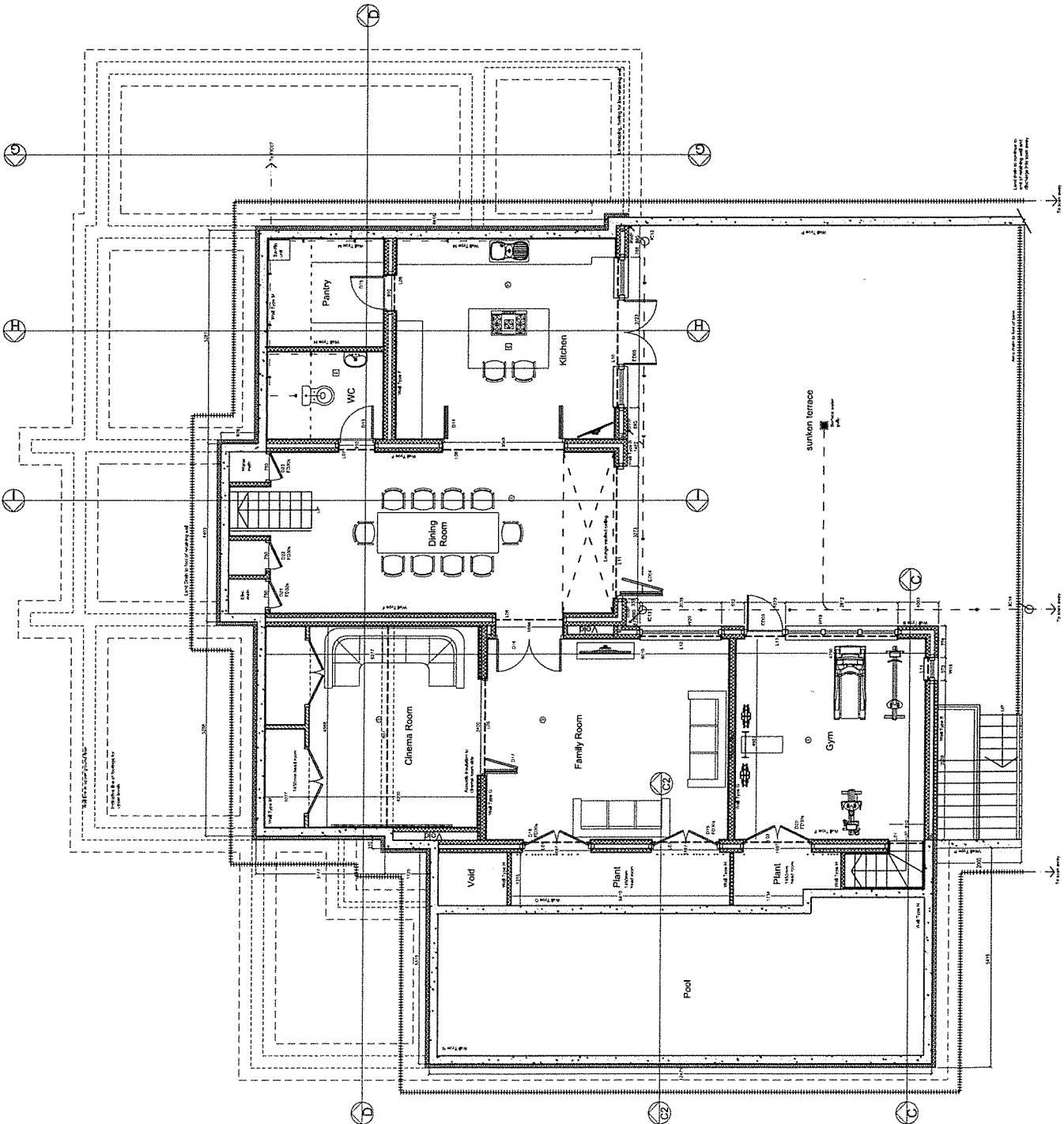
Roof Plan

[illegible]

Wall type

Wall type

Project Name	Project Number	Project Description	Project Status
Project A	001	Design and development of a new software application for the company's internal use.	In Progress
Project B	002	Implementation of a new marketing campaign to increase brand awareness.	Completed
Project C	003	Upgrade of the company's IT infrastructure to improve system performance.	On Hold
Project D	004	Research and development of a new product line for the company's next fiscal year.	Planned
Project E	005	Expansion of the company's operations into new international markets.	Under Review
Project F	006	Optimization of the company's supply chain management process.	Completed
Project G	007	Implementation of a new human resources management system.	In Progress
Project H	008	Development of a new mobile application for the company's customers.	On Hold
Project I	009	Upgrade of the company's financial reporting system.	Planned
Project J	010	Implementation of a new data analytics platform for the company's management.	Under Review

[illegible]

Lower Ground Floor

[illegible]

APPENDIX D

Trial Pit Logs

TRIAL PIT 01

Depth (m)	Strata
0.00-0.70	Loose brown locally mottled yellowish brown slightly gravelly silty fine SAND. Gravel was sub angular to sub rounded medium (GLACIAL SAND & GRAVEL)
0.70-1.70	Loose becoming medium dense with depth brown fine to medium SAND (GLACIAL SAND & GRAVEL)
1.70-2.60	Medium dense locally loose brown locally mottled light grey fine to medium SAND with local cobble and rare boulder sized pockets of silty clay (GLACIAL SAND & GRAVEL)

Notes

1. Pit dimensions 1.00m x 3.90m x 2.60m,
2. Pit sides were unstable from 0.70-2.00m,
3. A slight seepage of groundwater was encountered at 2.00m in the eastern pit wall,
4. Jar samples were taken at 0.00-0.50m, tub samples were taken at 1.00-1.50m.



Trial Pit 01



Trial Pit 01

Trial Pit 01 Soakaway results

Test 1			Test 2			Test 3		
Time (Mins)	Depth (m)	Head (m)	Time (Mins)	Depth (m)	Head (m)	Time (Mins)	Depth (m)	Head (m)
0	1.09	1.51	0	1.06	0.84	0	1.10	0.60
1	1.02	1.58	1	1.06	0.84	1	1.10	0.60
2	1.01	1.59	2	1.06	0.84	2	1.10	0.60
3	0.99	1.61	3	1.06	0.84	3	1.10	0.60
4	1.00	1.60	4	1.06	0.84	4	1.10	0.60
5	0.99	1.61	5	1.06	0.84	5	1.10	0.60
6	0.98	1.62	6	1.05	0.85	6	1.10	0.60
7	0.97	1.63	7	1.04	0.86	7	1.10	0.60
8	0.97	1.63	8	1.04	0.86	8	1.10	0.60
9	0.96	1.64	9	1.04	0.86	9	1.10	0.60
10	0.96	1.64	10	1.02	0.88	10	1.10	0.60
15	0.97	1.63	15	0.96	0.94	20	1.10	0.60
20	0.97	1.63	27	0.97	0.93	28	1.10	0.60
25	0.97	1.63	33	0.97	0.93	65	1.10	0.60
30	0.97	1.63	54	0.97	0.93			
47	0.97	1.63	74	0.97	0.93			
68	0.98	1.62	105	0.98	0.92			
103	0.98	1.62	178	1.00	0.90			

TRIAL PIT 02

Depth (m)	Strata
0.00-0.05	Medium dense dark brown slightly gravelly silty fine SAND. Gravel is angular to sub angular fine to coarse brick (MADE GROUND)
0.05-0.80	Loose brown locally mottled yellowish brown slightly gravelly silty fine SAND. Gravel was sub angular to sub rounded medium (GLACIAL SAND & GRAVEL)
0.80-1.75	Loose becoming medium dense with depth brown fine to medium SAND with local cobble sized pockets of silt (GLACIAL SAND & GRAVEL)

Notes

1. Pit dimensions 0.70m x 3.40m x 1.75m,
2. Pit sides were unstable from 0.80-1.75m,
3. A slight seepage of groundwater was encountered at 1.75m in the eastern pit wall.



Trial Pit 02



Trial Pit 02

Trial Pit 02 Soakaway results

Test 1			Test 2			Test 3		
Time (Mins)	Depth (m)	Head (m)	Time (Mins)	Depth (m)	Head (m)	Time (Mins)	Depth (m)	Head (m)
0	0.81	0.94	0	0.72	1.38	0	0.97	0.53
1	0.80	0.95	1	0.69	1.41	1	0.97	0.53
2	0.80	0.95	2	0.69	1.41	2	0.97	0.53
3	0.80	0.95	3	0.69	1.41	3	0.97	0.53
4	0.80	0.95	4	0.69	1.41	4	0.97	0.53
5	0.80	0.95	5	0.69	1.41	5	0.91	0.59
6	0.80	0.95	6	0.65	1.45	6	0.91	0.59
7	0.80	0.95	7	0.65	1.45	7	0.91	0.59
8	0.81	0.94	8	0.65	1.45	8	0.86	0.64
9	0.81	0.94	9	0.65	1.45	9	0.87	0.63
10	0.81	0.94	10	0.65	1.45	10	0.87	0.63
20	0.81	0.94	47	0.66	1.44	40	0.78	0.72
30	0.81	0.94	56	0.67	1.43	49	0.78	0.72
63	0.83	0.92	63	0.67	1.43	75	0.78	0.72
90	0.83	0.92	71	0.67	1.43			
95	0.83	0.92	82	0.63	1.47			
			86	0.60	1.50			
			90	0.60	1.50			
			100	0.60	1.50			

TRIAL PIT 03

Depth (m)	Strata
0.00-0.05	Loose dark brown slightly gravelly silty fine SAND. Gravel is angular to sub angular fine to coarse brick (MADE GROUND)
0.05-1.50	Loose to medium dense dark brown and brown locally mottled light grey slightly gravelly silty fine to medium SAND. Gravel is sub rounded fine to medium (GLACIAL SAND & GRAVEL)
1.50-2.30	Loose to medium dense light brown locally mottled light grey slightly gravelly silty becoming clayey with depth fine to medium SAND with some cobble sized pockets of clay. Gravel is sub rounded fine to medium (GLACIAL SAND & GRAVEL)

Notes

1. Pit dimensions 0.70m x 3.20m x 2.30m,
2. Pit sides were unstable from 0.00-2.30m,
3. A slight seepage of groundwater was encountered at 2.30m in the eastern pit wall,
4. Jar samples were taken at 0.00-0.50m, tub samples were taken at 1.00-1.50m.



Trial Pit 03



Trial Pit 03

TRIAL PIT 04

Depth (m)	Strata
0.00-0.05	Medium dense dark brown slightly gravelly silty fine SAND. Gravel is angular to sub angular fine to coarse brick (MADE GROUND)
0.05-0.95	Loose to medium dense dark brown and brown locally mottled light grey slightly gravelly silty fine to medium SAND. Gravel is sub rounded fine to medium (REWORKED GLACIAL SAND & GRAVEL)
0.95-2.00	Medium dense orangish brown medium SAND with some cobble and boulder sized pockets of clay (GLACIAL SAND & GRAVEL)

Notes

1. Pit dimensions 0.70m x 3.40m x 2.00m,
2. Pit sides were unstable from 0.00-2.00m,
3. A slight seepage of groundwater was encountered at 1.70m,
4. Jar samples were taken at 0.00-0.50m, tub samples were taken at 1.00-1.50m,
5. Plastic water pipe approximate diameter of 25mm, running north to south, approximately 0.5m from the eastern pit wall.



Trial Pit 04



Trial Pit 04

APPENDIX E

Chemical Laboratory Results



Ground Solve
Unit 1
Well House Barns
Chester Road
Bretton
Cheshire
CH4 0DH

Attention: Mike Scott

CERTIFICATE OF ANALYSIS

Date: 20 October 2015
Customer: H_GRSOLVE_BRE
Sample Delivery Group (SDG): 151010-10
Your Reference: 1755/pbg
Location: The Golden Grove, Burton Green
Report No: 334284

We received 4 samples on Friday October 09, 2015 and 4 of these samples were scheduled for analysis which was completed on Tuesday October 20, 2015. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 151010-10
Job: H_GRSOLVE_BRE-157
Client Reference: 1755/pbg

Location: The Golden Grove, Burton Green
Customer: Ground Solve
Attention: Mike Scott

Order Number: 1755/pbg
Report Number: 334284
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
12214908	TP01		0.00 - 0.50	06/10/2015
12214911	TP03		0.00 - 0.50	06/10/2015
12214909	TP03		1.00 - 1.50	06/10/2015
12214912	TP04		1.00 - 1.50	06/10/2015

Only received samples which have had analysis scheduled will be shown on the following pages.



SDG: 151010-10
 Job: H_GRSOLVE_BRE-157
 Client Reference: 1755/pbg

Location: The Golden Grove, Burton Green
 Customer: Ground Solve
 Attention: Mike Scott

Order Number: 1755/pbg
 Report Number: 334284
 Superseded Report:

SOLID Results Legend ☒ Test ☒ No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	12214912		TP04				1.00 - 1.50		1kg TUB	
	12214909		TP03				1.00 - 1.50		1kg TUB	
	12214911		TP03				0.00 - 0.50		250g Amber Jar (ALE21)	
	12214908		TP01				0.00 - 0.50		250g Amber Jar (ALE21)	
Anions by Kone (soil)	All	NDPs: 0 Tests: 4	X	X	X	X				
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 2	X	X						
Chromium III	All	NDPs: 0 Tests: 2	X	X						
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 2	X	X						
Easily Liberated Sulphide	All	NDPs: 0 Tests: 2	X	X						
Elemental Sulphur	All	NDPs: 0 Tests: 2	X	X						
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 2	X	X						
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 2	X	X						
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2	X	X						
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 2	X	X						
Metals in solid samples by OES	All	NDPs: 0 Tests: 2	X	X						
PAH by GCMS	All	NDPs: 0 Tests: 2	X	X						
pH	All	NDPs: 0 Tests: 4	X	X	X	X				
Phenols by HPLC (S)	All	NDPs: 0 Tests: 2	X	X						
Sample description	All	NDPs: 0 Tests: 4	X	X	X	X				



CERTIFICATE OF ANALYSIS

Validated

SDG: 151010-10
Job: H_GRSOLVE_BRE-157
Client Reference: 1755/pbg

Location: The Golden Grove, Burton Green
Customer: Ground Solve
Attention: Mike Scott

Order Number: 1755/pbg
Report Number: 334284
Superseded Report:

SOLID Results Legend ☒ Test ☐ No Determination Possible	Lab Sample No(s)		12214912		
	Customer Sample Reference		TP04		
	AGS Reference				
	Depth (m)		1.00 - 1.50		
	Container		1kg TUB		
Total Organic Carbon	All	NDPs: 0 Tests: 2	X	X	
TPH CWG GC (S)	All	NDPs: 0 Tests: 2	X	X	



SDG: 151010-10
Job: H_GRSOLVE_BRE-157
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Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
Lab Sample No(s)	Customer Sample Ref.		Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2	
12214908	TP01		0.00 - 0.50	Dark Brown	Sand	0.1 - 2 mm	Stones	None	
12214909	TP03		1.00 - 1.50	Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None	
12214911	TP03		0.00 - 0.50	Dark Brown	Sand	0.1 - 2 mm	Stones	None	
12214912	TP04		1.00 - 1.50	Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None	

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



Validated

Order Number: 1755/pbg
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SDG: 151010-10
Job: H_GRSOLVE_BRE-157
Client Reference: 1755/pbg

Location: The Golden Grove, Burton Green
Customer: Ground Solve
Attention: Mike Scott

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Superseded Report:

PAH by GCMS

[illegible]

CERTIFICATE OF ANALYSIS

Validated

SDG: 151010-10
Job: H_GRSOLVE_BRE-157
Client Reference: 1755/pbg

Location: The Golden Grove, Burton Green
Customer: Ground Solve
Attention: Mike Scott

Order Number: 1755/pbg
Report Number: 334284
Superseded Report:

TPH CWG (S)

Results Legend		Customer Sample Ref.	TP01	TP03			
#	ISO17025 accredited.						
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
dis.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed						
1-5A+5B	Sample deviation (see appendix)						
Component	LOD/Units	Method					
GRO Surrogate % recovery**	%	TM089	122	183			
			2	2			
GRO TOT (Moisture Corrected)	<44 µg/kg	TM089	<44	209			
			2 M	2 M			
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<5	<5			
			2 M	2 M			
Benzene	<10 µg/kg	TM089	<10	<10			
			2 M	2 M			
Toluene	<2 µg/kg	TM089	<2	<2			
			2 M	2 M			
Ethylbenzene	<3 µg/kg	TM089	<3	<3			
			2 M	2 M			
m,p-Xylene	<6 µg/kg	TM089	<6	<6			
			2 M	2 M			
o-Xylene	<3 µg/kg	TM089	<3	<3			
			2 M	2 M			
sum of detected mpo xylene by GC	<9 µg/kg	TM089	<9	<9			
			2	2			
sum of detected BTEX by GC	<24 µg/kg	TM089	<24	<24			
			2	2			
Aliphatics >C5-C6	<10 µg/kg	TM089	<10	<10			
			2	2			
Aliphatics >C6-C8	<10 µg/kg	TM089	<10	10.2			
			2	2			
Aliphatics >C8-C10	<10 µg/kg	TM089	<10	23.7			
			2	2			
Aliphatics >C10-C12	<10 µg/kg	TM089	<10	92.7			
			2	2			
Aliphatics >C12-C16	<100 µg/kg	TM173	<100	<100			
Aliphatics >C16-C21	<100 µg/kg	TM173	<100	<100			
Aliphatics >C21-C35	<100 µg/kg	TM173	<100	<100			
Aliphatics >C35-C44	<100 µg/kg	TM173	<100	<100			
Total Aliphatics >C12-C44	<100 µg/kg	TM173	<100	<100			
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10	<10			
			2	2			
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10	<10			
			2	2			
Aromatics >EC8-EC10	<10 µg/kg	TM089	<10	18.1			
			2	2			
Aromatics >EC10-EC12	<10 µg/kg	TM089	<10	62.2			
			2	2			
Aromatics >EC12-EC16	<100 µg/kg	TM173	<100	<100			
Aromatics >EC16-EC21	<100 µg/kg	TM173	<100	<100			
Aromatics >EC21-EC35	<100 µg/kg	TM173	<100	<100			
Aromatics >EC35-EC44	<100 µg/kg	TM173	<100	<100			
Aromatics >EC40-EC44	<100 µg/kg	TM173	<100	<100			
Total Aromatics >EC12-EC44	<100 µg/kg	TM173	<100	<100			
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173	<100	129			

SDG: 151010-10
Job: H_GRSOLVE_BRE-157
Client Reference: 1755/pbg

Location: The Golden Grove, Burton Green
Customer: Ground Solve
Attention: Mike Scott

Order Number: 1755/pbg
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Superseded Report:

Asbestos Identification - Solid Samples

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP01 0.00 - 0.50 SOLID 06/10/2015 00:00:00 15/10/2015 07:19:30 151010-10 12214908 TM048	20/10/15	Lauren Sargeant	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP03 0.00 - 0.50 SOLID 06/10/2015 00:00:00 15/10/2015 07:08:13 151010-10 12214911 TM048	20/10/15	Lauren Sargeant	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

SDG: 151010-10	Location: The Golden Grove, Burton Green	Order Number: 1755/pbg
Job: H_GRSOLVE_BRE-157	Customer: Ground Solve	Report Number: 334284
Client Reference: 1755/pbg	Attention: Mike Scott	Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
ASB_PREP				
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material		
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM136	Method 17.10, Second Site property, March 2003	Determination of Sulphur by HPLC		
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser		
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		
TM221	Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd	Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer		
TM243		Mixed Anions In Soils By Kone		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

SDG: 151010-10	Location: The Golden Grove, Burton Green	Order Number: 1755/pbg
Job: H_GRSOLVE_BRE-157	Customer: Ground Solve	Report Number: 334284
Client Reference: 1755/pbg	Attention: Mike Scott	Superseded Report:

Test Completion Dates

Lab Sample No(s)	12214908	12214909	12214911	12214912
Customer Sample Ref.	TP01	TP03	TP03	TP04
AGS Ref.				
Depth	0.00 - 0.50	1.00 - 1.50	0.00 - 0.50	1.00 - 1.50
Type	SOLID	SOLID	SOLID	SOLID
Anions by Kone (soil)	19-Oct-2015	20-Oct-2015	19-Oct-2015	20-Oct-2015
Asbestos ID in Solid Samples	20-Oct-2015		20-Oct-2015	
Chromium III	20-Oct-2015		20-Oct-2015	
Cyanide Comp/Free/Total/Thiocyanate	19-Oct-2015		19-Oct-2015	
Easily Liberated Sulphide	16-Oct-2015		16-Oct-2015	
Elemental Sulphur	19-Oct-2015		19-Oct-2015	
EPH CWG (Aliphatic) GC (S)	16-Oct-2015		16-Oct-2015	
EPH CWG (Aromatic) GC (S)	16-Oct-2015		16-Oct-2015	
GRO by GC-FID (S)	19-Oct-2015		20-Oct-2015	
Hexavalent Chromium (s)	19-Oct-2015		19-Oct-2015	
Metals in solid samples by OES	20-Oct-2015		20-Oct-2015	
PAH by GCMS	19-Oct-2015		19-Oct-2015	
pH	16-Oct-2015	15-Oct-2015	16-Oct-2015	15-Oct-2015
Phenols by HPLC (S)	17-Oct-2015		17-Oct-2015	
Sample description	15-Oct-2015	15-Oct-2015	15-Oct-2015	15-Oct-2015
Total Organic Carbon	20-Oct-2015		20-Oct-2015	
TPH CWG GC (S)	19-Oct-2015		20-Oct-2015	

SDG: 151010-10
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Appendix General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
5	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anorthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.