PATRICKPARSONS



PHASE II SITE APPRAISAL
CHARLES RANSFORD & SONS, BISHOP'S CASTLE
for
CHARLES RANSFORD AND SONS LTD C/O DAVENPORT ARCHITECTURE LTD

February 2017

Phase II Site Appraisal

Charles Ransford & Sons, Bishop's Castle

For

Charles Ransford & Sons Ltd

c/o Davenport Architecture Ltd

B16410	Phase II Site Appraisal, Charles Ransford & Sons, Bishop's Castle

Revision	Date of issue	Comments	Prepared by	Checked by
0	28/02/2017	1st issue	AC	CRS

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Summary of Recommendations For Charles Ransford & Sons, Bishop's Castle	
Risk to End-Users	No risk, remediation not required.
Risk to Controlled Waters	No risk, remediation not required.
Ground Gases	Ground gas protection measures not required.
Concrete Specification	DS-1 / AC-1 conditions may be assumed in natural strata for concrete design. DS-2 / AC-2 conditions apply for shallow made ground.
Water Pipe Specification	Standard PE/PVC water pipes should be suitable for the site, subject to confirmation by the utility provider.
Engineering Ground Treatment	Not applicable.
Likely Foundation Types	Traditional trench fill foundations should be applicable.
Likely Foundation Depths	Minimum 750mm in cohesive clay strata.
Bearing Strata	Stiff clay.
Allowable Bearing Pressure	175kN/m^2 in the underlying natural cohesive strata.
Volume Change Potential	Low.
Tree Influence	Localised deepening for trees may be required subject to final layout plans.
Floor Slabs	Ground bearing floor slabs considered suitable if a slight reduced dig is undertaken (max 150mm).
Slope Stability Risk	Significant slopes are not present on site.
Retaining Walls	Unlikely to be required.
SUDs	The site is unsuitable for the use of soakaway drainage.
Roads	It is considered that near-surface soils will exhibit in-situ CBR values of between 2% and 4%.
Likely Waste Classification	Considered likely to be inert/non-hazardous, subject to confirmation with receiving landfill.
Other Comments	None.

The above summary should not be used in isolation and reference should be made the full report which provides a detailed assessment of the risks affecting the development.

Contents

1.0 Introduction

1.1 Commission

1.1.1 Patrick Parsons (PP) has been appointed by Davenport Architecture Ltd on behalf of Charles Ransford and Sons Ltd (client) to produce a Phase II Site Appraisal for a proposed commercial development at the site known as 'Charles Ransford and Sons, Bishop's Castle'.

1.2 Proposed Development

1.2.1 The site is being evaluated for a proposed commercial development. It is proposed to construct a large timber treatment warehouse with associated yard and hardstanding. A site location plan and proposed development plan are included in Appendix A.

1.3 Limitations

1.3.1 This report has been prepared for the client and their appointed agents only and should not be relied upon by any third party without the written permission of PP. If any unauthorised third party comes into possession of this report, they rely on it at their own risk and the authors do not owe them any Duty of Care or Skill. It is based on and limited to an assessment of the information and ground conditions identified here. PP is not responsible for ground conditions not revealed during investigations undertaken by third parties and have reviewed the information presented in good faith.

1.4 Aim of Phase II Site Appraisal

1.4.1 The client's specific requirements were to undertake a Phase II Site Appraisal. The principal objectives are as follows:

- Obtain information about the soil and groundwater conditions.
- Determine the possible ground related geotechnical and contamination hazards that may affect the proposed development.
- Provide development recommendations.
- Provide advice on further works required.

1.5 Information Sources

1.5.1 This Phase II Site Appraisal is based on the findings of the investigation, chemical analysis and geotechnical testing undertaken during the course of the assessment. The results have been used to refine the conceptual model and initial recommendations outlined in the Patrick Parsons Geo-Environmental Phase I Report:

- Phase I Site Appraisal Report, Charles Ransford and sons Ltd, Bishop's Castle (ref. B16410) dated February 2016.

2.0 Summary of Phase I Desk Study

2.1.1 The following is a summary of the findings of the Phase I Site Appraisal and should not be read in isolation. For full details reference should be made to the report outlined in section 1.5.1. In summary, the preliminary geo-environmental risk assessment highlighted the following:

- The site comprises a roughly rectangular shaped plot of land to the south of Charles Ransford and Sons timber treatment works, covering an area of approximately 0.79ha in total. The main site area is currently unoccupied with a recent demolition of the onsite buildings and the reduction of the onsite level by approximately 1.0m along the western boundary. Crushed demolition rubble has been spread across the site with a mounded area in the centre and the west of the site raising the level in this area by approximately 1.0m. Mature and semi mature trees are present to the south and western site boundaries, and a culverted river runs along the southern site boundary. The area to the west of the site is an area of unoccupied over-grown land.
- The earliest historical mapping reviewed (1883) shows the site to be unoccupied agricultural land. The site remains unchanged until the 1986 edition by which time a single large building has been constructed associated with the development of Love Lane Industrial Estate. In the west of the site a small earth works was recorded between 1986 and 1989 likely to be associated with the development of Love Lane Industrial Estate. The onsite buildings remain intact and unchanged until the latest 2014 mapping. In the wider vicinity, the site was historically recorded to be set within an area characterised by agricultural land. A railway station and line was noted approximately 80m to the northwest of the site and was present from 1883 to 1938 when the station and line were removed and replaced with a track, this track remained unchanged up until 1949. In 1949 commercial buildings associated with Love Lane Industrial Estate were built over the former railway station and subsequent track. A gas works was recorded approximately 110m to the west of the site in 1883, this gas works remained unchanged up to 1949 where the works were replaced by a depot and other small commercial buildings. A factory was also noted 80m to the northwest of the site in 1975, this remained unchanged up to the most recent 2014 mapping. An electrical substation was recorded 20m to the northwest of the site in 1975 and remained unchanged up to the most recent 2014 mapping. To the south of the site a large residential development bordering the site was constructed by 2010 and remained unchanged up to the most recent 2014 mapping.
- The site is recorded to be underlain by the Bailey Hills Formation described as interbedded sandstones and siltstone. Superficial deposits are recorded to be present on site and are recorded to be comprise glaciofluvial sheet deposits consisting of unlithified sand and gravel and hummocky glacial deposits of diamicton. No made ground is recorded on the mapping however limited thicknesses are anticipated to be present associated with the demolition of any pre-existing development. The Bailey Hill Formation recorded to underlie the site is classified as a Secondary B Aquifer and the superficial deposits on site are classified as a Secondary A Aquifer. The site does not lie within a Source Protection Zone. There are no groundwater or potable water abstraction licences within 500m of the site boundaries. There are 10no. recorded surface water features within 250m of the site boundary of which the nearest is 6m to the southwest followed by another recorded 16m to the southeast.
- There is one historic Environment Agency registered landfill site recorded within 500m of the site, located approximately 497m west of the site and is recorded to have accepted household waste.

- The site is within a Radon affected area as defined by the Health Protection Agency (HPA) as between 10% and 30% of homes are recorded to be above the action level. However, as the proposed development is a to be a well ventilated commercial premise without a basement or below ground structures, it is considered that radon protection measures are unlikely to be required. The site is not recorded to be within a coal mining affected area.

2.1.2 Phase I conceptual model:

Human Health		
Source	**Pathway**	**Receptor**
Made ground. Contaminants of concern include heavy metals, PAH's, hydrocarbons, VOC / SVOCs and asbestos.	Indoor and outdoor inhalation of soil vapours, the ingestion of contaminated soil and soil dust and direct contact with contaminated soil and soil dust should any soft landscaping be present.	End users of completed commercial development
Made ground. Contaminants of concern include heavy metals, PAH's, hydrocarbons, VOC / SVOCs and asbestos.	Indoor and outdoor inhalation of ground gas and soil vapours, the ingestion of contaminated soil and soil dust and direct contact with contaminated soil and soil dust	Construction workers.
No significant source identified.	Inhalation. (Limited pathway due to the open nature of the proposed unit).	End users of completed commercial development.
Controlled Waters		
Made Ground. Contaminants of concern include heavy metals and PAH's and hydrocarbons and VOC / SVOCs.	Groundwater transport, infiltration and leaching	Secondary A Aquifer (superficial deposits) Secondary B Aquifer (bedrock geology) River / Culvert

3.0 Phase II Ground Investigation

3.1 Fieldwork

3.1.1 The ground investigation (including fieldwork, sampling and laboratory analysis) has been designed to identify and assess potential ground related problems and to allow cost-effective solutions to be advised. It has been planned on the basis of the desk study, site inspection and the proposed development layout. All fieldwork and soil descriptions were carried out in general accordance with relevant British Standards.

3.1.2 The exploratory holes have been positioned to determine the general ground/groundwater conditions below the site, with representative samples obtained for geotechnical and environmental laboratory analysis. A general grid pattern has been adopted where accessible to provide sufficient information. The resultant exploratory hole density is considered to be commensurate with the complexity of the site conditions and detail of information required for this phase of the investigation.

3.1.3 The ground investigation was undertaken on the 13th February 2016, and comprised eight window sampling boreholes to a maximum depth of 5.00m below existing ground level (begl) (WS08). The exploratory hole location plan and exploratory hole logs are presented in Appendix B.

3.2 Ground Conditions

3.2.1 The ground conditions were generally recorded to comprise made ground comprising pale cream-brown slightly clayey sandy gravel with brick, concrete and roadstone. Made ground was recorded to extend to a maximum thickness of 0.65m (WS01).

3.2.2 Below the made ground, the natural strata were generally recorded to comprise stiff to very stiff friable cream-brown slightly gravelly silty clay with siltstone and mudstone lithorelics. Corrected SPT-N_{60} values of 8 to 25 have been recorded in the shallow natural strata at a depth of 1.0m and were generally recorded to increase with depth.

3.3 Groundwater

3.3.1 Slight seepages of groundwater were encountered at variable depths in four exploratory locations (WS03, WS04, WS06, and WS07) from variable depths between 0.8m and 3.0m. It is considered that the inconsistent seepages recorded are representative of perched water and not of the underlying natural groundwater table. The monitoring standpipes were noted to be dry during the one visit completed to date.

3.4 Contamination Observations

3.4.1 No significant visual or olfactory evidence was observed within any of the exploratory locations during the investigation.

3.5 Ground Gas Monitoring

3.5.1 Ground gases are discussed in full in Section 4; in summary carbon dioxide of up to 2.2%v/v and oxygen levels of not less than 16.1% have been recorded; no methane or positive flow were noted above detection limits during the monitoring to date. The gas and water monitoring results are presented in Appendix C.

3.6 Chemical Analysis

3.6.1 Chemical laboratory analyses were selected to provide the parameters necessary to make an assessment of potentially contaminated soils and/or waters, for the budgetary design of the development. The choice of contamination testing was based on the Phase I assessment, identified past uses of the site and site observations. The chemical analysis results are presented in Appendix C; in summary the following testing has been completed:

- Six samples for a general suite of contaminants (metals, inorganics, PAH, speciated TPH and asbestos).
- Three samples for speciated VOC's and SVOC's.

3.7 Geotechnical Testing

3.7.1 Geotechnical soils testing has been undertaken as part of the ground investigation to provide the parameters necessary for the budgetary design of the development. The geotechnical test results are presented in Appendix C; in summary the following testing has been completed:

- Three samples of natural strata for pH and water soluble sulphate.
- Two samples of natural strata for Atterbug Limits.

4.0 Human Health Risk Assessment (Ground Gas)

4.1.1 No significant source of ground gas was identified within the Phase I or during the investigation, however, a single ground gas monitoring visit was undertaken at the time of groundwater monitoring to provide reassurance. Three gas/water monitoring standpipes have been installed across the site (WS01, WS04, WS05). The standpipes have been installed with response zones in the underlying natural strata.

4.1.2 The gas monitoring was undertaken using a GA5000 Multifunction Gas Analyser. The gas monitoring results are presented in Appendix D.

4.1.3 In summary, a maximum carbon dioxide levels of 2.2%v/v, a maximum methane level of 0.1%v/v and a minimum oxygen level of 16.1%v/v have been recorded. No flow rates above detection limits were recorded.

4.1.4 The risk from ground gases has been assessed using both 'Situation A' as outlined CIRIA C665.

4.1.5 Using a recorded borehole flow rate of 0.1 l/hr the maximum carbon dioxide concentration of 2.2%v/v equates to a GSV of 0.00022 l/hr. Using a recorded borehole flow rate of 0.1 l/hr the maximum methane concentration of 0.1%v/v equates to a GSV of 0.00001 l/hr. Therefore, the site has been assessed as 'Characteristic Situation 1' as outlined CIRIA C665.

4.1.6 Therefore, based on the results of the single monitoring round completed it is considered that gas protection measures are not required for the proposed development.

4.1.7 The desk study risk assessment determined that no radon protection measures are required.

5.0 Human Health Risk Assessment (Soil)

5.1 Introduction

5.1.1 The site is to be redeveloped for commercial/industrial end-use comprising a timber treatment works and hardstanding storage yard.

5.1.2 The desk study did not identify a significant risk of contamination; however, the fieldwork has proven that made ground deposits are present on site, accordingly testing of the near-surface soils has been undertaken to assess their suitability for re-use.

5.1.3 Representative samples of all strata and those considered to be potentially contaminated by virtue of the desk study and/or based on site observations were collected for further examination and/or potential testing.

5.1.4 The Generic Assessment Criteria (GAC) used by Patrick Parsons are presented in Appendix F; for this site the chemical analysis results are being compared against the GAC for commercial end use with plant uptake and a soil organic matter (SOM) content of 1.0%.

5.2 Risk to End-Users

5.2.1 The chemical analysis has shown that none of the determinands analysed have been recorded above their respective GACs. Asbestos fibres were not detected in any of the samples analysed. Full results of chemical analyses undertaken are presented in Appendix C.

5.2.2 It is therefore considered that the site does not pose a risk to end-users based on a proposed commercial end-use.

5.3 Risk to Construction Workers

5.3.1 Construction workers have a much shorter exposure time and as such the GAC used to assess the long term exposure risk to end users are considered unnecessarily conservative. The investigation has not revealed any specific risk to construction workers; however, suitable personal protective equipment in line with the ground workers risk assessment should be adopted.

6.0 Controlled Waters Risk Assessment

6.1 Introduction

6.1.1 No evidence of significant contamination has been recorded to be present during the ground investigation. Additionally, as the site is underlain by cohesive soils there is no plausible pathway linking the site with the identified receptors.

6.2 Summary of Risk to Controlled Waters

6.2.1 Based on the lack of an identified source of significant contamination or pathway it is considered that the site does not pose to controlled waters.

7.0 Construction Materials Risk Assessment

7.1 Water Supply Pipes

7.1.1 The chemical analysis results have been compared against UK Water Industry Research (UKWIR) Contamination Thresholds for sub-surface water pipes.

7.1.2 Based on the site history and the site chemical analysis completed it considered that the site will be suitable for standard PE/PVC water pipes. Subject to confirmation from the utility provider.

7.2 Buried Concrete

7.2.1 Based on the recorded water soluble sulphate of up to 1300mg/l and pH >6.5 in the made ground strata DS-2 and ACEC Class AC-2 conditions may be assumed in accordance with BRE Special Digest 1 (2005). The natural soils below the site recorded sulphate of less than 500mg/l and pH above 6.5 and therefore may be assumed as DS-1 and the ACEC Class as AC-1.

7.2.2 This equates to a DC-2 classification in the made ground and a DC-1 classification in the natural strata, and as such in accordance with BS 8500 FND2 concrete would be suitable for unreinforced and reinforced concrete. GEN1/RC35 concrete would be suitable for unreinforced and reinforced concrete in the natural strata.

8.0 Phase II Conceptual Model

8.1.1 The preceding information has been used to revise the conceptual model.

8.1.2 The chemical analysis has shown that no exceedances have been identified when compared against the GAC for commercial end-use. Full results of the chemical analysis are presented in Appendix C.

8.1.3 The primary receptors are end-users of the proposed commercial development and construction workers. The pathways include direct contact with contaminated soil and soil dust, ingestion of contaminated soil and dust and the indoor/outdoor inhalation of ground gas and soil vapour. As there is no source in a source-pathway-receptor scenario and that the site does not pose a risk to end-users of the proposed commercial development.

8.1.4 In terms of controlled waters, the primary receptors are the underlying Secondary Aquifers and adjacent river/culvert. The main pathway would be through leaching and groundwater transport. Given the lack of a significant source there is no source-pathway-receptor link; therefore, the risk to controlled waters is negligible.

8.1.5 The Phase II conceptual model is illustrated below.

Human Health		
Source	**Pathway**	**Receptor**
No significant source identified	Indoor and outdoor inhalation of soil vapours, the ingestion of contaminated soil and soil dust and direct contact with contaminated soil and soil dust should any soft landscaping be present	End users of completed commercial development
No significant source identified	Indoor and outdoor inhalation of ground gas and soil vapours, the ingestion of contaminated soil and soil dust and direct contact with contaminated soil and soil dust	Construction workers
No significant source identified	Inhalation. (Limited pathway due to the open nature of the proposed unit)	End users of completed commercial development
Controlled Waters		
No significant source identified	No pathway identified due to presence of cohesive strata	Secondary A Aquifer (superficial deposits) Secondary B Aquifer (bedrock geology) River / Culvert

9.0 Remediation

9.1 Protection of End-Users – Soils

9.1.1 Based on the results of the soil analysis it is considered that the site does not pose a risk to end-users, therefore, remediation to protect end-users is not required.

9.1.2 Should any topsoil be needed to be imported for use in any soft landscaped areas it should be chemically validated at the rates set out below:

Source and Validation Rate	**Chemical Analysis Suite**		
	General Soil Suite	Asbestos	Hydrocarbons (TPHCWG)
Greenfield Source 1 per 150m³	✓		
Brownfield Source 1 per 100m³	✓	✓	✓
Generated Soil 1 per 50m³	✓	✓	✓

9.1.3 The results of the chemical validation of any imported topsoil should be compared against the GAC for commercial end-use presented in Appendix F.

9.2 Protection of Construction Workers

9.2.1 Specific remediation to protect construction workers is not required.

9.3 Protection of Controlled Waters

9.3.1 The soil analysis has not identified a source of contamination; as such remediation to protect controlled waters is not considered to be required.

9.4 Protection of Construction Materials

9.4.1 Specific remediation to protect construction materials should not be required. Standard PE/PVC water pipes should be sufficient across the majority of the site, subject to approval from the utility provider. GEN1/RC35 concrete should be sufficient in the natural strata, FND2 to be used if concrete is in made ground.

9.5 Waste Disposal Classification

9.5.1 Based on the results currently available it is considered that should any material require removal from site it may be suitable for disposal as inert, or as worst-case non-hazardous. However, this needs to be confirmed with the receiving landfill.

10.0 Geotechnical Appraisal

10.1 Introduction

10.1.1 It is proposed that the site is to be redeveloped for a commercial/industrial end-use comprising a timber treatment works.

10.2 Excavation Conditions

10.2.1 Excavation of the soils encountered during the ground investigation should be easily achieved using conventional hydraulic equipment.

10.2.2 The made ground encountered was noted to be generally granular in nature therefore, it should be assumed that collapse will occur in all excavations at the site and allowance should be made for the use of trench support. Full support should be provided to any excavation to which man entry is required.

10.2.3 Based on the site observations, it is considered that dewatering of excavations is unlikely to be required. However, sump pumping should be sufficient to control ingress in shallow excavations if encountered.

10.3 Foundations

10.3.1 Based on current proposals it is considered that a traditional trenchfill foundation solution will be suitable for the proposed development. A nett allowable bearing pressure of 175kN/m^2 should be readily achievable in the underlying natural cohesive strata with total settlements not exceeding 25mm. A minimum founding depth of 750mm should be adopted. Localised deepening for trees and heave precautions may be required.

10.3.2 Floor Slabs

10.3.3 Based on the current thicknesses of made ground recorded (up to 0.65m) it is considered that ground bearing floor slabs will be unsuitable for the development. However, should site levels be reduced slightly so that made ground thicknesses are less than 0.5m across the proposed footprint it is considered that ground bearing floor slabs would be suitable.

10.4 Slope Stability and Retaining Structures

10.4.1 The site is generally level and therefore slope stability issues are not expected. Depending on final site levels small retaining features are considered unlikely but may be required.

10.5 New Access Roads

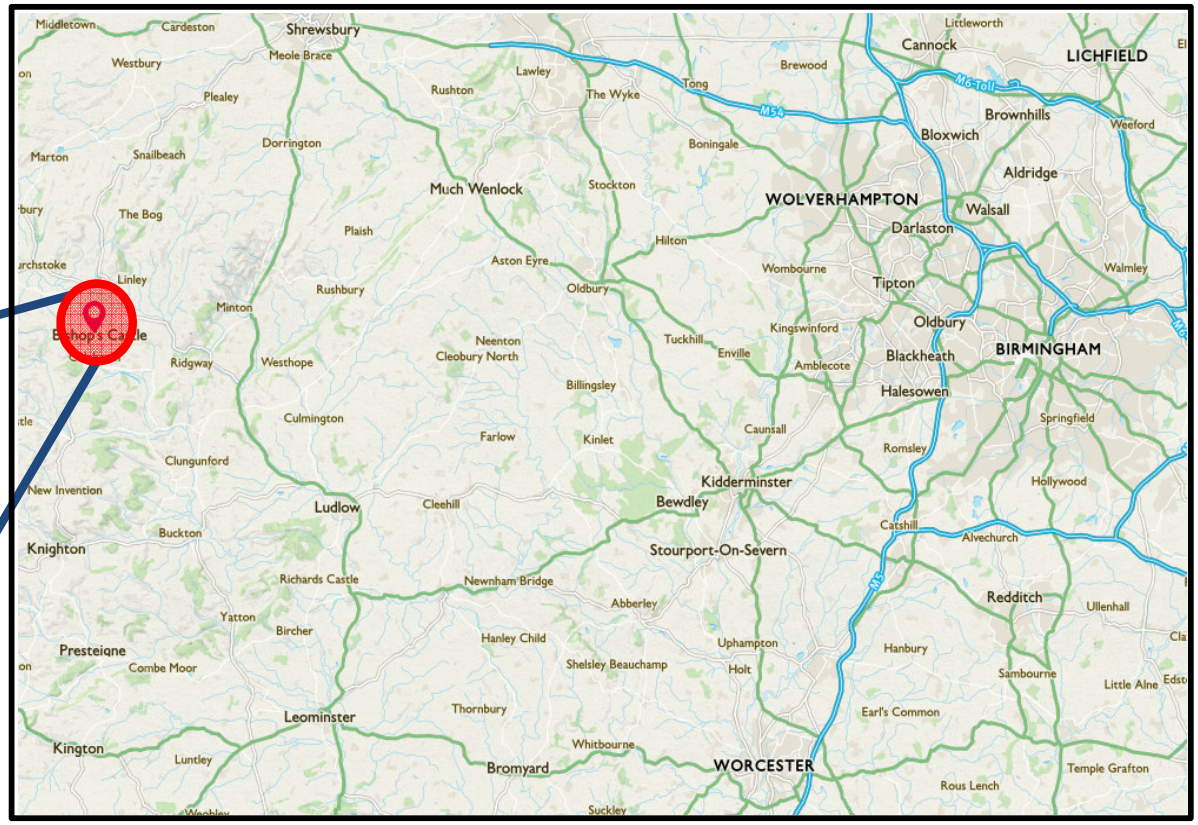
10.5.1 The proposed development includes driveways and access roads. The near-surface natural soils are considered likely to provide CBR values of between 2% and 4%.

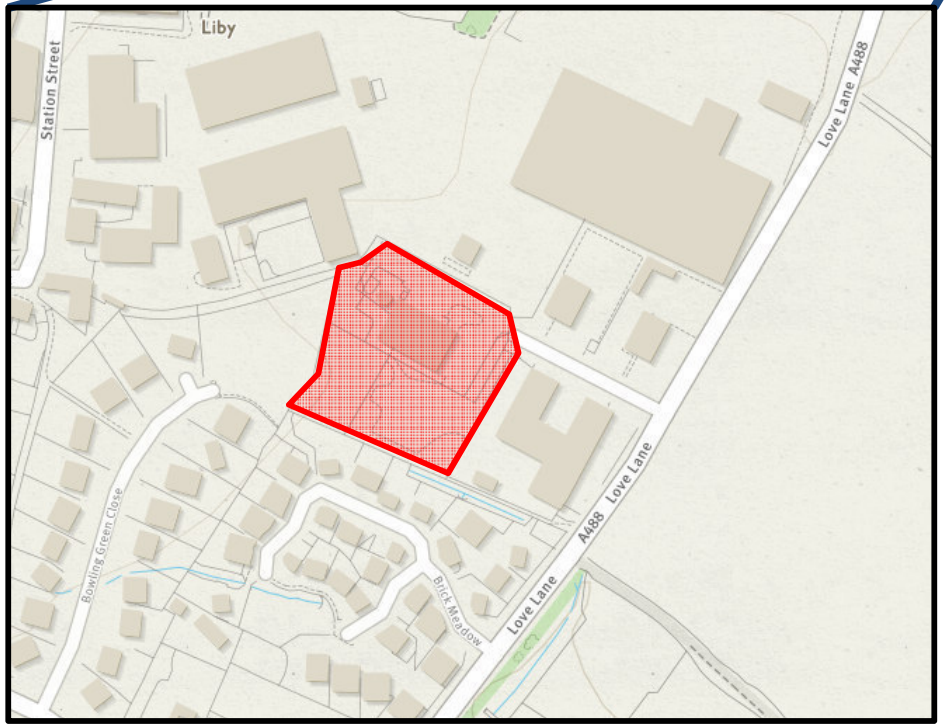
11.0 Further Investigation

11.1 At this stage, it is considered that no further investigation works are deemed necessary.

11.2 Following review of this report a copy of it should be submitted to the Local Authority planning department prior to any development works as this is often a condition of planning.

Appendix A
Figures





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Approximate site boundary

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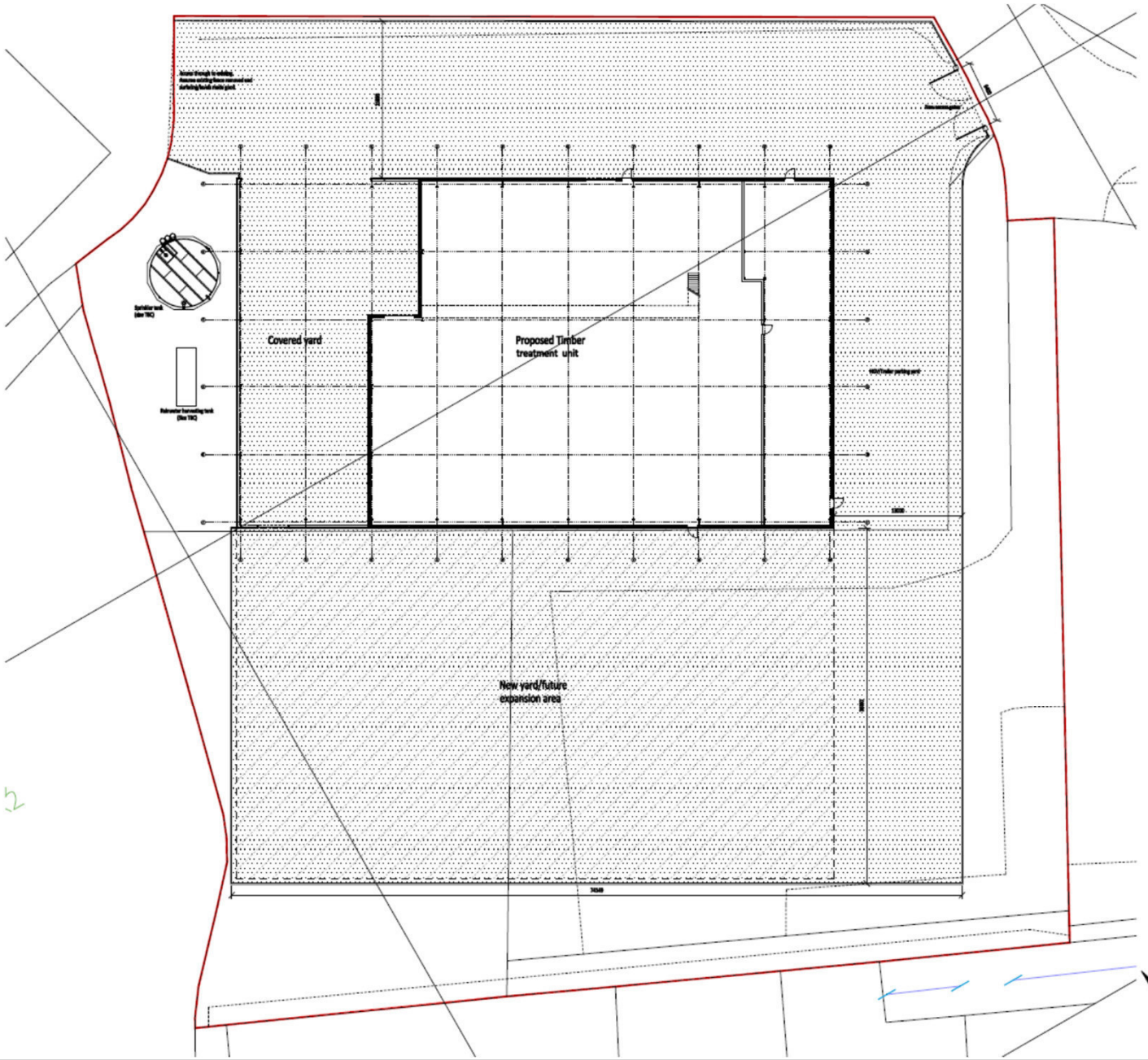
Client: Charles Ransford & Sons Ltd		Project No.: B16410	Scales: Not to scale	Issue: 0
Project: Bishop's Castle		Title: Site Location Plan	Design/drawn: HA	Checked: AJC
			Drawing no: B16410-701	Rev. 0



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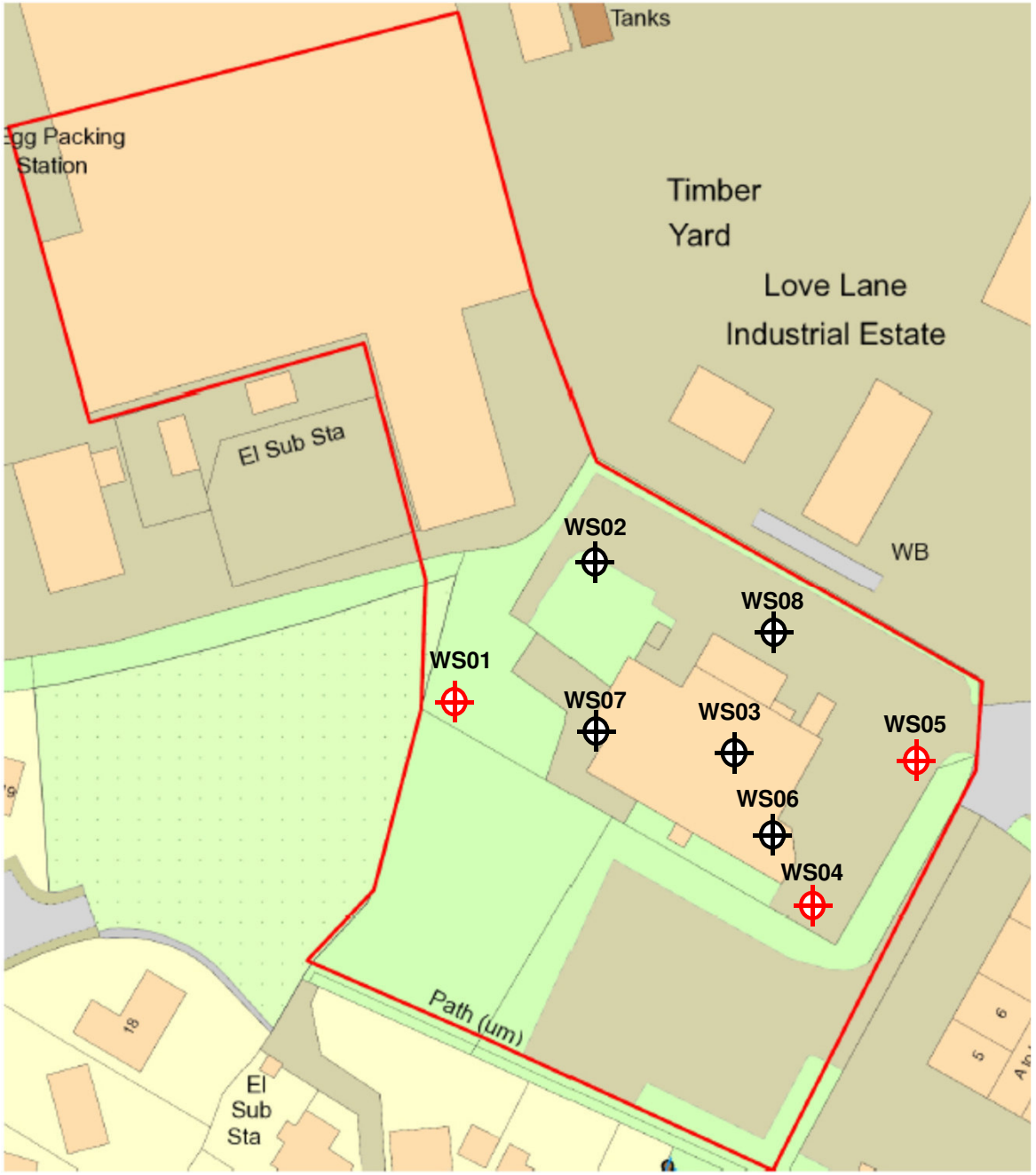
Client: Charles Ransford & Sons Ltd	Project No.: B16410	Scales: Not to scale	Issue: 0
Project: Bishop's Castle	Title: Proposed Development Plan	Design/drawn: AJC	Checked: AJC
		Drawing no: B16410-702	Rev. 0



Key

- Window sample borehole.
- Groundwater monitoring installation

N

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Client: Charles Ransford & Sons Ltd	Project No.: B16410	Scales: Not to scale	Issue: 0
Project: Bishop's Castle	Title: Exploratory Hole Location Plan	Design/drawn: HA	Checked: AJC
		Drawing no: B16410-703	Rev. 0

Appendix B
Exploratory Hole Logs

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Borehole Log

Borehole No. **WS01**

Sheet 1 of 1

Project Name: Charles Ransford & Sons	Project No. B16410	Co-ords:	Hole Type WS
Location: Charles Ransford & Sons, Bishop's Castle		Level:	Scale 1:25
Client: Davenport Architecture Ltd		Dates: 13/02/2017	Logged By HA

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.40	ES		0.65			MADE GROUND: Pale creamy brown slightly clayey sandy gravel. Gravel is fine to coarse sub angular red brick, flint, concrete and road stone.
G		1.00	SPT	N=18 (4,5/5,5,4,4)				Stiff very friable creamy brown slightly gravelly silty CLAY with gravel sized siltstone and mudstone lithorelics. Gravel is fine to coarse subrounded quartzite.
		1.30	D					
		2.00	SPT	N=22 (4,4/6,5,5,6)				
		3.00	SPT	N=24 (4,4/6,5,5,8)	3.00			End of Borehole at 3.00m

Remarks

1. No groundwater encountered. 2. 50mm ID HDPE gas and groundwater monitoring standpipe to 3.00m. Slotted standpipe from 3.00m to 1.00m with gravel filter. Plain standpipe from 1.00m to 0.20m with bentonite seal. Concrete from 0.20m to 0.00m with lockable cover at surface.

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Borehole Log

Borehole No.
WS02
Sheet 1 of 1

Project Name: Charles Ransford & Sons	Project No. B16410	Co-ords:	Hole Type WS
Location: Charles Ransford & Sons, Bishop's Castle		Level:	Scale 1:25
Client: Davenport Architecture Ltd		Dates: 13/02/2017	Logged By HA

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Pale creamy brown slightly clayey sandy gravel. Gravel is fine to coarse sub angular red brick, flint, concrete and road stone.
					0.45			
		0.70	ES					Stiff pale brown slightly silty CLAY with abundant orangish brown former rootlets.
					0.90			
		1.00	SPT	N=17 (2,3/4,4,4,5)				Stiff very friable creamy brown slightly gravelly silty CLAY with gravel sized siltstone and mudstone lithorelics. Gravel is fine to coarse subrounded quartzite.
		2.00	SPT	N=23 (3,4/5,6,5,7)				
		3.00	SPT	50 (6,5/50 for 200mm)	3.00			End of Borehole at 3.00m

1
2
3
4
5

Remarks
1. No groundwater encountered.

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Borehole Log

Borehole No. **WS03**

Sheet 1 of 1

Project Name: Charles Ransford & Sons	Project No. B16410	Co-ords:	Hole Type WS
Location: Charles Ransford & Sons, Bishop's Castle		Level:	Scale 1:25
Client: Davenport Architecture Ltd		Dates: 13/02/2017	Logged By HA

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES					MADE GROUND: Pale creamy brown slightly clayey sandy gravel. Gravel is fine to coarse sub angular red brick, flint, concrete and road stone.	
					0.55			Stiff pale brown slightly silty CLAY with abundant orangish brown former rootlets.	
		0.90	D						
		1.00	SPT	N=16 (2,2/2,4,5,5)					1
					1.10			Stiff very friable creamy brown slightly gravelly silty CLAY with gravel sized siltstone and mudstone lithorelics. Gravel is fine to coarse subrounded quartzite.	
	▼								
		2.00	SPT	N=33 (5,7/10,8,8,7)					2
		3.00	SPT	N=37 (10,10/10,8,9,10)					3
		4.00	SPT	N=46 (7,7/10,11,12,13)	4.00			End of Borehole at 4.00m	4
									5

Remarks

1. Groundwater encountered at 1.50m begl.

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Borehole Log

Borehole No. **WS04**

Sheet 1 of 1

Project Name: Charles Ransford & Sons	Project No. B16410	Co-ords:	Hole Type WS
Location: Charles Ransford & Sons, Bishop's Castle		Level:	Scale 1:25
Client: Davenport Architecture Ltd		Dates: 13/02/2017	Logged By HA

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.10			MADE GROUND: Dark grey sandy gravel. Gravel is fine to coarse subangular road stone and concrete.
		0.50	ES					Stiff very friable creamy brown slightly gravelly silty CLAY with gravel sized siltstone and mudstone lithorelics. Gravel is fine to coarse subrounded quartzite.
G		1.00	SPT	N=12 (3,4/3,3,3,3)				
		1.50	D					
		2.00	SPT	N=21 (4,5/6,6,5,4)				
	▼							*between 2.80m and 3.00m becomes slightly silty clay.*
		3.00	SPT	N=50 (6,5/50 for 235mm)	3.00			End of Borehole at 3.00m

1 2 3 4 5

Remarks

1. Groundwater encountered at 2.50m begl. 2. 50mm ID HDPE gas and groundwater monitoring standpipe to 3.00m. Slotted standpipe from 3.00m to 1.00m with gravel filter. Plain standpipe from 1.00m to 0.20m with bentonite seal. Concrete from 0.20m to 0.00m with lockable cover at surface.

AGS

PATRICKPARSONS

Borehole Log

Borehole No. **WS05**

Sheet 1 of 1

Project Name: Charles Ransford & Sons	Project No. B16410	Co-ords:	Hole Type WS
Location: Charles Ransford & Sons, Bishop's Castle		Level:	Scale 1:25
Client: Davenport Architecture Ltd		Dates: 13/02/2017	Logged By HA

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.15			MADE GROUND: Asphalt.
		0.40	ES		0.45			MADE GROUND: Grey slightly clayey slightly sandy gravel. Gravel is fine to coarse angular road stone, mudstone and concrete.
G		1.00	SPT	N=18 (4,4/3,5,5,5)				Stiff very friable creamy brown slightly gravelly silty CLAY with gravel sized siltstone and mudstone lithorelics. Gravel is fine to coarse subrounded quartzite.
		1.30	D					
		2.00	SPT	N=25 (4,7/7,6,6,6)				*between 2.00m and 3.00m with subangular flint.*
		3.00	SPT	N=50 (5,11/50 for 295mm)	3.00			End of Borehole at 3.00m

Remarks

1. No groundwater encountered. 2. 50mm ID HDPE gas and groundwater monitoring standpipe to 3.00m. Slotted standpipe from 3.00m to 1.00m with gravel filter. Plain standpipe from 1.00m to 0.20m with bentonite seal. Concrete from 0.20m to 0.00m with lockable cover at surface.

AGS

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Borehole Log

Borehole No.
WS06
Sheet 1 of 1

Project Name: Charles Ransford & Sons	Project No. B16410	Co-ords:	Hole Type WS
Location: Charles Ransford & Sons, Bishop's Castle		Level:	Scale 1:25
Client: Davenport Architecture Ltd		Dates: 13/02/2017	Logged By HA

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.50	ES		0.60			MADE GROUND: Pale creamy brown slightly clayey sandy gravel. Gravel is fine to coarse sub angular red brick, flint, concrete and road stone.
		1.00	SPT	N=7 (2,2/2,2,1,2)				Stiff very friable creamy brown slightly silty CLAY with gravel sized siltstone and mudstone lithorelics. Gravel is fine to coarse subrounded quartzite. *between 0.60m and 2.00m becomes less friable.*
		2.00	SPT	N=25 (5,6/8,6,5,6)				
	▼	3.00	SPT	N=22 (4,3/5,5,6,6)				
		4.00	SPT	N=24 (7,7/6,5,6,7)	4.00			End of Borehole at 4.00m

Remarks
1. Groundwater encountered at 3.00m begl.

AGS

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Borehole Log

Borehole No. **WS07**

Sheet 1 of 1

Project Name: Charles Ransford & Sons	Project No. B16410	Co-ords:	Hole Type WS
Location: Charles Ransford & Sons, Bishop's Castle		Level:	Scale 1:25
Client: Davenport Architecture Ltd		Dates: 13/02/2017	Logged By HA

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								MADE GROUND: Pale creamy brown slightly clayey sandy gravel. Gravel is fine to coarse sub angular red brick, flint, concrete and road stone.	
					0.30			Stiff pale brown slightly silty CLAY with abundant orangish brown former rootlets.	
	▼	0.80	ES						
		1.00	SPT	N=20 (4,4/5,5,5,5)	1.00			Stiff very friable creamy brown slightly gravelly silty CLAY with gravel sized siltstone and mudstone lithorelics. Gravel is fine to coarse subrounded quartzite.	1
		2.00	SPT	N=28 (5,5/7,7,6,8)					2
		3.00	SPT	N=29 (6,6/7,6,8,8)					3
		4.00	SPT	N=40 (9,9/10,10,10,10)	4.00			End of Borehole at 4.00m	4
									5

Remarks

1. Groundwater encountered at 0.80m begl.

AGS

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Borehole Log

Borehole No.
WS08
Sheet 1 of 1

Project Name: Charles Ransford & Sons	Project No. B16410	Co-ords:	Hole Type WS
Location: Charles Ransford & Sons, Bishop's Castle		Level:	Scale 1:25
Client: Davenport Architecture Ltd		Dates: 13/02/2017	Logged By HA

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								MADE GROUND: Pale creamy brown slightly clayey sandy gravel. Gravel is fine to coarse sub angular red brick, flint, concrete and road stone.	
					0.50			Stiff friable pale brown slightly silty CLAY with abundant orangish brown former rootlets.	
		1.00	SPT	N=16 (4,4/4,4,4,4)	1.00			Stiff very friable creamy brown slightly gravelly silty CLAY with gravel sized siltstone and mudstone lithorelics. Gravel is fine to coarse subrounded quartzite.	1
		1.50	ES						
		2.00	SPT	N=14 (4,3/3,4,4,3)					2
		3.00	SPT	N=19 (5,6/5,3,3,8)					3
								between 3.20m and 3.90m becomes less friable.	
		4.00	SPT	N=34 (8,8/10,9,7,8)					4
		5.00	SPT	N=31 (8,7/8,6,7,10)	5.00			End of Borehole at 5.00m	5

Remarks
1. No groundwater encountered.

AGS

Appendix C
Laboratory Analysis Results

Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

Patrick Parsons (Birmingham)
9 Frederick Road
Edgbaston
Birmingham
B15 1JD

Analytical Test Report: L17/0354/PPB/001

Your Project Reference:	**Charles Ransford & Sons**	Samples Received on:	14.02.2017
Your Order Number:	B16410	Testing Instruction Received:	14.02.2017
Report Issue Number:	1	Sample Tested:	14 to 24.02.2017
Samples Analysed:	9 Soils	Report issued:	24.02.2017

Signed

James Gane
Commercial Manager
Nicholls Colton Group

Notes:

General

Please refer to Methodologies tab for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report with the exception of the asbestos test portion which is held for 6 months unless otherwise requested.

Moisture Content was determined in accordance with NC method statement MS - CL - Sample Prep, oven dried at <30˚C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Stone Content was determined in accordance with NC method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.

With the exception of Sulphate,which is crushed over the 2mm test sieve, concentrations are reported as a percentage mass of the dry soil passing the 10mm BS test sieve. As received samples have been corrected for moisture content but not stone content.

Samples were supplied by customer, results are representative of the material provided

Asbestos

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

Deviating Samples

Samples were received in suitable containers	**Yes**
A date and time of sampling was provided	**Yes**
Sample holding times were exceeded prior to analysis of determinants	**No**

Where samples do not meet one or more of the above criteria they will be classed as deviating, this means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

Date of Issue 24.01.2017
Owned by Emily Blissett - Customer Services Supervisor
Authorised by James Gane - Commercial Manager
G:\LE1 Production\Commercial\Current Reports\2017\L17\PPB - Patrick Parsons\L17-0354-PPB\[L17-0354-PPB 001.xlsx]PPB Suite

Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

L17/0354/PPB/001

Project Reference - Charles Ransford & Sons

Analytical Test Results - PPL Suite 1

NC Reference			17-4358	17-4360	17-4361	17-4362	17-4363	17-4365
Client Sample Reference			WS01	WS02	WS03	WS03	WS04	WS05
Client Sample Location			WS01	WS02	WS03	WS03	WS04	WS05
Depth (m)			0.40	0.70	0.30	0.90	0.50	0.40
Date of Sampling			26.01.2017	27.01.2017	27.01.2017	27.01.2017	27.01.2017	27.01.2017
Time of Sampling			Not provided	Not provided	Not provided	Not provided	Not provided	Not provided
Sample Matrix			Sand	Clay	Sand	Clay	Clay	Sand
Determinant	**Units**	**Accreditation**						
Arsenic	(mg/kg)	MCERTS	< 10	< 10	< 10	-	< 10	< 10
Cadmium	(mg/kg)	MCERTS	0.7	0.8	0.7	-	0.9	1.0
Chromium (Total)	(mg/kg)	UKAS	12.7	20.5	14.2	-	21.8	52.2
Copper	(mg/kg)	MCERTS	19.9	18.2	20.3	-	24.0	34.1
Lead	(mg/kg)	MCERTS	18.3	37.4	17.9	-	18.4	7.7
Mercury	(mg/kg)	u	< 1	< 1	< 1	-	< 1	< 1
Nickel	(mg/kg)	MCERTS	16.6	29.6	18.5	-	40.9	45.8
Selenium	(mg/kg)	u	< 8	< 8	< 8	-	< 8	< 8
Zinc	(mg/kg)	MCERTS	84.3	90.4	85.8	-	70.5	67.6
Chromium (Hexavalent)	(mg/kg)	u	< 1	< 1	< 1	-	< 1	< 1
SOM	(%)	UKAS	<1.7	<1.7	<1.7		<1.7	<1.7
pH	pH Units	MCERTS	11.1	7.3	10.8	7.1	7.8	8.1
Sulphate (2:1 Water extract)	(mg/l)	u	1300	100	1300	81	24	31
Acid Soluble Sulphate	(%)	u	0.61	0.05	0.62	-	0.02	0.02
Acenaphthene	(mg/kg)	MCERTS	<0.02	<0.02	<0.2	-	<0.02	<0.02
Acenaphthylene	(mg/kg)	UKAS	<0.02	<0.02	<0.2	-	<0.02	<0.02
Anthracene	(mg/kg)	UKAS	<0.02	<0.02	<0.2	-	<0.02	0.06
Benzo (a) anthracene	(mg/kg)	MCERTS	0.02	<0.02	<0.2	-	<0.02	0.04
Benzo (a) pyrene	(mg/kg)	MCERTS	<0.02	<0.02	<0.2	-	<0.02	0.04
Benzo (b) fluoranthene	(mg/kg)	MCERTS	<0.02	<0.02	<0.2	-	<0.02	0.06
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	<0.02	<0.02	<0.2	-	<0.02	0.03
Benzo (k) fluoranthene	(mg/kg)	MCERTS	<0.02	<0.02	<0.2	-	<0.02	<0.02
Chrysene	(mg/kg)	MCERTS	0.03	<0.02	<0.2	-	<0.02	0.06
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	<0.02	<0.02	<0.2	-	<0.02	<0.02
Fluoranthene	(mg/kg)	MCERTS	0.17	<0.02	0.70	-	<0.02	0.09
Fluorene	(mg/kg)	MCERTS	<0.02	<0.02	<0.2	-	<0.02	<0.02
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	<0.02	<0.02	<0.2	-	<0.02	0.03
Naphthalene	(mg/kg)	MCERTS	<0.02	<0.02	<0.2	-	<0.02	<0.02
Phenanthrene	(mg/kg)	MCERTS	<0.02	<0.02	<0.2	-	<0.02	0.09
Pyrene	(mg/kg)	MCERTS	0.19	<0.02	0.63	-	<0.02	0.10
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	0.67	<0.32	4.42	-	<0.32	0.71
Asbestos	-	UKAS	No asbestos detected	No asbestos detected	No asbestos detected	-	No asbestos detected	No asbestos detected

Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

L17/0354/PPB/001

Project Reference - Charles Ransford & Sons

Analytical Test Results - PPL Suite 1

NC Reference			17-4366	17-4368	17-4369
Client Sample Reference			WS05	WS07	WS08
Client Sample Location			WS05	WS07	WS08
Depth (m)			1.30	0.80	1.50
Date of Sampling			27.01.2017	27.01.2017	27.01.2017
Time of Sampling			Not provided	Not provided	Not provided
Sample Matrix			Clay	Clay	Clay
Determinant	**Units**	**Accreditation**			
Arsenic	(mg/kg)	MCERTS	-	-	< 10
Cadmium	(mg/kg)	MCERTS	-	-	1.1
Chromium (Total)	(mg/kg)	UKAS	-	-	21.5
Copper	(mg/kg)	MCERTS	-	-	27.9
Lead	(mg/kg)	MCERTS	-	-	16.7
Mercury	(mg/kg)	u	-	-	< 1
Nickel	(mg/kg)	MCERTS	-	-	48.4
Selenium	(mg/kg)	u	-	-	< 8
Zinc	(mg/kg)	MCERTS	-	-	82.1
Chromium (Hexavalent)	(mg/kg)	u	-	-	< 1
SOM	(%)	UKAS			<1.7
pH	pH Units	MCERTS	7.3	7.4	7.4
Sulphate (2:1 Water extract)	(mg/l)	u	<10	64	39
Acid Soluble Sulphate	(%)	u	-	-	0.02
Acenaphthene	(mg/kg)	MCERTS	-	-	<0.02
Acenaphthylene	(mg/kg)	UKAS	-	-	<0.02
Anthracene	(mg/kg)	UKAS	-	-	<0.02
Benzo (a) anthracene	(mg/kg)	MCERTS	-	-	<0.02
Benzo (a) pyrene	(mg/kg)	MCERTS	-	-	<0.02
Benzo (b) fluoranthene	(mg/kg)	MCERTS	-	-	<0.02
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	-	-	<0.02
Benzo (k) fluoranthene	(mg/kg)	MCERTS	-	-	<0.02
Chrysene	(mg/kg)	MCERTS	-	-	<0.02
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	-	-	<0.02
Fluoranthene	(mg/kg)	MCERTS	-	-	<0.02
Fluorene	(mg/kg)	MCERTS	-	-	<0.02
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	-	-	<0.02
Naphthalene	(mg/kg)	MCERTS	-	-	<0.02
Phenanthrene	(mg/kg)	MCERTS	-	-	<0.02
Pyrene	(mg/kg)	MCERTS	-	-	<0.02
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	-	-	<0.32
Asbestos	-	UKAS	-	-	No asbestos detected

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XXX/XXX/XXX

Project Reference - xxxxxxxxxx

Analytical Test Results - TPH CWG

NC Reference			17-4358	17-4360	17-4361	17-4363	17-4365	17-4369
Client Sample Reference			WS01	WS02	WS03	WS04	WS05	WS08
Client Sample Location			WS01	WS02	WS03	WS04	WS05	WS08
Depth (m)			0.40	0.70	0.30	0.50	0.40	1.50
Date of Sampling			26.01.2017	27.01.2017	27.01.2017	27.01.2017	27.01.2017	27.01.2017
Time of Sampling			Not provided	Not provided	Not provided	Not provided	Not provided	Not provided
Sample Matrix			Sand	Clay	Sand	Clay	Sand	Clay
Determinant	**Units**	**Accreditation**						
Aliphatics								
$>C_5$ to C_6	(mg/kg)	u	<0.03	<0.03	<0.03	<0.04	<0.03	<0.04
$>C_6$ to C_8	(mg/kg)	u	0.33	<0.03	0.26	<0.04	<0.03	0.14
$>C_8$ to C_{10}	(mg/kg)	u	<0.03	<0.03	<0.03	<0.04	<0.03	<0.04
$>C_{10}$ to C_{12}	(mg/kg)	u	<11	<12	<11	<12	<11	<12
$>C_{12}$ to C_{16}	(mg/kg)	u	<11	<12	<11	<12	<11	<12
$>C_{16}$ to C_{21}	(mg/kg)	u	<11	<12	<11	<12	<11	<12
$>C_{21}$ to C_{35}	(mg/kg)	u	18	<12	22	<12	16	<12
Aromatics								
$>C_5$ to C_7	(mg/kg)	u	<0.03	<0.03	<0.03	<0.04	<0.03	<0.04
$>C_7$ to C_8	(mg/kg)	u	<0.03	<0.03	<0.03	<0.04	<0.03	<0.04
$>C_8$ to C_{10}	(mg/kg)	u	<0.03	<0.03	<0.03	<0.04	<0.03	<0.04
$>C_{10}$ to C_{12}	(mg/kg)	u	<11	<12	<11	<12	<11	<12
$>C_{12}$ to C_{16}	(mg/kg)	u	<11	<12	<11	<12	<11	<12
$>C_{16}$ to C_{21}	(mg/kg)	u	<11	<12	<11	<12	<11	<12
$>C_{21}$ to C_{35}	(mg/kg)	u	11	<12	15	<12	14	<12

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L17/0354/PPB/001

Project Reference - Charles Ransford & Sons

Analytical Test Results - VOC

NC Reference			17-4358	17-4360	17-4363
Client Sample Reference			WS01	WS02	WS04
Client Sample Location			WS01	WS02	WS04
Depth (m)			0.40	0.70	0.50
Date of Sampling			26.01.2017	27.01.2017	27.01.2017
Time of Sampling			Not provided	Not provided	Not provided
Sample Matrix			Sand	Clay	Clay
Determinant	**Units**	**Accreditation**			
Benzene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Toluene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Ethylbenzene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
m&p Xylene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
o-Xylene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Dichlorodifluoromethane	(mg/kg)	UKAS	<0.04	<0.06	<0.05
Chloromethane	(mg/kg)	UKAS	<0.04	<0.06	<0.05
Vinyl Chloride	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Bromomethane	(mg/kg)	u	<0.04	<0.06	<0.05
Chloroethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Trichlorofluoromethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,1-Dichloroethylene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Dichloromethane	(mg/kg)	u	<0.04	<0.06	<0.05
MTBE	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
trans-1,2,-dichloroethylene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,1-Dichloroethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
2,2-Dichloropropane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
cis--1,2,-dichloroethylene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Bromochloromethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Chloroform	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,1,1-Trichloroethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,1-Dichloropropene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Carbon Tetrachloride	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,2-dichloroethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Trichloroethylene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,2-Dichloropropane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Dibromomethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Bromodichloromethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
cis-1,2-dichloropropylene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
trans-1,3-dichloropropylene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,1,2-Trichloroethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,3-Dichloropropane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Tetrachloroethylene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Chlorodibromomethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,2-Dibromoethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Chlorobenzene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,1,1,2-tetrachloroethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Styrene	(mg/kg)	UKAS	<0.04	<0.06	<0.05
Isopropylbenzene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Bromoform	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,1,2,2-Tetrachloroethane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,2,3-Trichloropropane	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
n-Propylbenzene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
Bromobenzene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,3,5-Trimethylbenzene	(mg/kg)	UKAS	<0.04	<0.06	<0.05
2-chlorotoluene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
4-chlorotoluene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
tert-butylbenzene	(mg/kg)	UKAS	<0.04	<0.06	<0.05
1,2,4-trimethylbenzene	(mg/kg)	UKAS	<0.04	<0.06	<0.05
sec-Butylbenzene	(mg/kg)	UKAS	<0.04	<0.06	<0.05
4-Isopropyltoluene (P-Cymene)	(mg/kg)	UKAS	<0.04	<0.06	<0.05
1,3-Dichlorobenzene	(mg/kg)	u	<0.04	<0.06	<0.05
1,4-Dichlorobenzene	(mg/kg)	u	<0.04	<0.06	<0.05
n-Butylbenzene	(mg/kg)	UKAS	<0.04	<0.06	<0.05
1,2-Dichlorobenzene	(mg/kg)	MCERTS	<0.04	<0.06	<0.05
1,2-Dibromo-3-chloropropane	(mg/kg)	u	<0.04	<0.06	<0.05
1,2,4-Trichlorobenzene	(mg/kg)	u	<0.04	<0.06	<0.05
Hexachlorobutadiene	(mg/kg)	u	<0.04	<0.06	<0.05
Naphthalene	(mg/kg)	u	<0.04	<0.06	<0.05
1,2,3-Trichlorobenzene	(mg/kg)	u	<0.04	<0.06	<0.05

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Project Reference - Charles Ransford & Sons

Analytical Test Results - SVOC

NC Reference			17-4358	17-4360	17-4363
Client Sample Reference			WS01	WS02	WS04
Client Sample Location			WS01	WS02	WS04
Depth (m)			0.40	0.70	0.50
Date of Sampling			26.01.2017	27.01.2017	27.01.2017
Time of Sampling			Not provided	Not provided	Not provided
Sample Matrix			Sand	Clay	Clay
Determinant	**Units**	**Accreditation**			
1,2,4-trichlorobenzene,	(mg/kg)	u	<0.5	<0.6	<0.6
1,3-dichlorobenzene,	(mg/kg)	u	<0.5	<0.6	<0.6
1,4-dichlorobenzene,	(mg/kg)	u	<0.5	<0.6	<0.6
1-chloronaphthalene,	(mg/kg)	u	<0.5	<0.6	<0.6
2,3,4,6-tetrachlorophenol	(mg/kg)	u	<0.5	<0.6	<0.6
2,4,5-trichlorophenol	(mg/kg)	u	<0.5	<0.6	<0.6
2,4,6-trichlorophenol	(mg/kg)	u	<0.5	<0.6	<0.6
2,4-Dichorophenol	(mg/kg)	u	<0.5	<0.6	<0.6
2,4-dimethyphenol	(mg/kg)	u	<0.5	<0.6	<0.6
2,4-Dinitrophenol,	(mg/kg)	u	<0.5	<0.6	<0.6
2,6-Dichorophenol	(mg/kg)	u	<0.5	<0.6	<0.6
2,6-Dinitrotoluene	(mg/kg)	u	<0.5	<0.6	<0.6
2-chlorophenol,	(mg/kg)	u	<0.5	<0.6	<0.6
2-Methylnaphthalene	(mg/kg)	u	<0.5	<0.6	<0.6
2-methylphenol,	(mg/kg)	u	<0.5	<0.6	<0.6
2-Nitroaniline	(mg/kg)	u	<0.5	<0.6	<0.6
2-Nitrophenol	(mg/kg)	u	<0.5	<0.6	<0.6
3,3-Dichlorobenzidine	(mg/kg)	u	<0.5	<0.6	<0.6
3/4-methylphenol,	(mg/kg)	u	<0.5	<0.6	<0.6
3-Nitroaniline	(mg/kg)	u	<0.5	<0.6	<0.6
4 Chlorophenyl phenyl ether	(mg/kg)	u	<0.5	<0.6	<0.6
4,6-Dinitro-2-methylphenol	(mg/kg)	u	<0.5	<0.6	<0.6
4-bromophenyl phenyl ether	(mg/kg)	u	<0.5	<0.6	<0.6
4-chloro-3-methylphenol,	(mg/kg)	u	<0.5	<0.6	<0.6
4-Chloroaniline	(mg/kg)	u	<0.5	<0.6	<0.6
4-Nitroaniline	(mg/kg)	u	<0.5	<0.6	<0.6
4-nitrophenol,	(mg/kg)	u	<0.5	<0.6	<0.6
Acenaphthene	(mg/kg)	u	<0.5	<0.6	<0.6
Acenaphthylene	(mg/kg)	u	<0.5	<0.6	<0.6
Aniline	(mg/kg)	u	<0.5	<0.6	<0.6
Anthracene	(mg/kg)	u	<0.5	<0.6	<0.6
Azobenzene	(mg/kg)	u	<0.5	<0.6	<0.6
Benz[a]anthracene	(mg/kg)	u	<0.5	<0.6	<0.6
Benzene, 1,2-dichloro-	(mg/kg)	u	<0.5	<0.6	<0.6
Benzidine	(mg/kg)	u	<0.5	<0.6	<0.6
Benzo(ghi)perylene	(mg/kg)	u	<0.5	<0.6	<0.6
Benzo[a]pyrene	(mg/kg)	u	<0.5	<0.6	<0.6
Benzo[bfluoranthene	(mg/kg)	u	<0.5	<0.6	<0.6
Benzo[k]fluoranthene	(mg/kg)	u	<0.5	<0.6	<0.6
Benzoic Acid	(mg/kg)	u	<0.5	<0.6	<0.6
Benzyl Alcohol	(mg/kg)	u	<0.5	<0.6	<0.6
Benzyl butyl phthalate	(mg/kg)	u	<0.5	<0.6	<0.6
Bis(2-chloroethoxy)methane	(mg/kg)	u	<0.5	<0.6	<0.6
Bis(2-chloroethyl)ether	(mg/kg)	u	<0.5	<0.6	<0.6
Bis(2-chloroisopropyl)ether	(mg/kg)	u	<0.5	<0.6	<0.6
Bis(2-ethylhexyl) phthalate	(mg/kg)	u	<0.5	<0.6	<0.6
Chrysene	(mg/kg)	u	<0.5	<0.6	<0.6
Dibenzo(a,h)anthracene	(mg/kg)	u	<0.5	<0.6	<0.6
Dibenzofuran	(mg/kg)	u	<0.5	<0.6	<0.6
Dibutyl phthalate	(mg/kg)	u	<0.5	<0.6	<0.6
Diethyl Phthalate	(mg/kg)	u	<0.5	<0.6	<0.6
Dimethyl phthalate	(mg/kg)	u	<0.5	<0.6	<0.6
Di-n-octyl phthalate	(mg/kg)	u	<0.5	<0.6	<0.6
Diphenylamine	(mg/kg)	u	<0.5	<0.6	<0.6
Fluoranthene	(mg/kg)	u	<0.5	<0.6	<0.6
Fluorene	(mg/kg)	u	<0.5	<0.6	<0.6
Hexachlorobenzene	(mg/kg)	u	<0.5	<0.6	<0.6
Hexachlorobutadiene	(mg/kg)	u	<0.5	<0.6	<0.6
Hexachlorocyclopentadiene	(mg/kg)	u	<0.5	<0.6	<0.6
Hexachloroethane,	(mg/kg)	u	<0.5	<0.6	<0.6
Indeno[1,2,3-cd]pyrene	(mg/kg)	u	<0.5	<0.6	<0.6
Isophorone	(mg/kg)	u	<0.5	<0.6	<0.6
Methyl Methanesulfonate	(mg/kg)	u	<0.5	<0.6	<0.6
Naphthalene	(mg/kg)	u	<0.5	<0.6	<0.6
NitroBenzene	(mg/kg)	u	<0.5	<0.6	<0.6
N-Nitrosodimethylamine	(mg/kg)	u	<0.5	<0.6	<0.6
Pentachlorophenol	(mg/kg)	u	<0.5	<0.6	<0.6
Phenanthrene	(mg/kg)	u	<0.5	<0.6	<0.6
Phenol	(mg/kg)	u	<0.5	<0.6	<0.6
Pyrene	(mg/kg)	u	<0.5	<0.6	<0.6

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Sample Descriptions

NC Reference	Client Sample Reference	Sample Depth (m)	Description	Moisture Content (%)	Stone Content (%)
17-4358	WS01	0.40	Brown/grey sandy gravel with crushed rock.	7.5	56
17-4360	WS02	0.70	Grey silty sandy clay.	25	0
17-4361	WS03	0.30	Grey gravel with brick fragments and crushed rock. (Fill)	10	49
17-4363	WS04	0.50	Brown/grey silty sandy clay.	15	32
17-4365	WS05	0.40	Grey crushed rock.	7.8	54
17-4369	WS08	1.50	Brown/grey silty sandy clay.	17	16

NC Reference	Client Sample Reference	Sample Location	Description	% Passing 2mm BS test sieve
17-4362	WS03	0.90	Brown sandy silty clay.	74
17-4366	WS05	1.30	Brown sandy gravelly clay.	55
17-4368	WS07	0.80	Grey silty sandy clay.	69

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Analysis Methodologies

Matrix	Determinant	Sample condition for analysis	Test Method used
Soil	Metals	Air Dried	In house method statement - MS - CL - ICP metals
Soil	PAH	As Received	In house method statement - MS - CL - PAH (As received)
Soil	Chromium (hexavalent)	As Received	In house method statement - MS - CL - Hexavalent Chromium by Skalar
Soil	pH	As Received	In house method statement - MS - CL - pH in soils (using a 1:3 soil to water extraction)
Soil	SOM	Air Dried	In house method statement - MS - CL - TOC Eltra
Soil	Sulphate (w/s)	Oven Dried	In house method statement - MS - CL - Anions by Aquakem
Soil	Acid Sulphate	Oven Dried	In house method statement - MS - CL - BRE Analysis
Soil	CWG	As Received	In house method statements - MS - CL - EPH in soil and MS - CL - VPH
Soil	Asbestos	-	Fibre identification is in accordance with in house documented methods which are based on the procedure documented in the HSE Document HSG 248 "Asbestos: The analysts guide for sampling, analysis and clearance procedures"
Soil	SVOC	As Received	In house method statement - MS - CL - Semi VOC
Soil	VOC	As Received	In house method statement - MS - CL - VOC and MBTEX

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UKAS TESTING 0320

TEST REPORT

BS 1377 PLASTICITY INDEX AND MOISTURE CONTENT

Charles Ransford & Sons

Report no. L17/0354/PPB/002			
Order reference: B16410	Date of receipt: 14/02/2017	Date of testing: 02 to 06/03/2017	Date of issue: 06/03/2017

NC Sample reference	Client sample reference	Sample type	Depth (m)	Sample description	Fines passing 425µm (%)	**Liquid limit (%)**	**Plastic limit (%)**	**Plasticity index (%)**	**Moisture content (%)**
17-4362	WS03	Disturbed	0.9	Light brown slightly gravelly slightly silty clay.	71	**52**	**31**	**21**	**27**
17-4364	WS04	Disturbed	1.5	Brown silty clay.	68	**26**	**17**	**9**	**14**

NOTES:
1. Sample preparation was in accordance with BS 1377 : Part 1 : 2016.
2. Plasticity index testing was in accordance with BS 1377 : Part 2 : 1990 Clauses 3, 4.4 (one-point) & 5.
3. Moisture content testing was in accordance with BS 1377 : Part 2 : 1990 Clause 3.2.3.2 .
4. The material was prepared from its natural state.
5. Some information required by BS 1377 is not included in the report. The information will be provided if requested.

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James Gane
Commercial Manager
Nicholls Colton Group

Patrick Parsons (Birmingham)
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Appendix D
Gas and Groundwater Monitoring Results

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Charles Ransford & Sons
Site: Bishop's Castle
Date: 21/02/2017
Job No: B16410
Visit No: 1 **of** 6
Operator: SAB
Project Manager: CRS

Monitoring Point	GAS CONCENTRATIONS												VOCs		GAS FLOWS				WELL AND GROUNDWATER DATA					Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
WS01	0.1	0.1	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	19.9	19.9			0.0	0.0			DRY	2.90				
WS04	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	20.3	20.3			0.0	0.0			DRY	2.97				
WS05	0.0	0.0	0.0	0.0	2.2	2.2	0.0	0.0	0.0	0.0	16.1	16.1			0.1	0.0			DRY	2.96				
Max	**0.1**	**0.1**	**0**	**0**	**2.2**	**2.2**	**0**	**0**	**0**	**0**	**20.3**	**20.3**	**0**	**0**	**0.1**	**0**	**0**	**0**	**0**	**2.97**	**0**	**0.00**		
Min	**0**	**0**	**0**	**0**	**0.5**	**0.5**	**0**	**0**	**0**	**0**	**16.1**	**16.1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2.9**	**0**	**0.00**		
GSV (l/hr)	**0.0001**				**0**																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:	X	Dry		Moist		Wet		Snow		Frozen
Wind:	X	Calm		Light		Moderate		Strong		
Cloud cover:		None		Slight	X	Cloudy		Overcast		
Preciptation:	X	None		Slight		Moderate		Heavy		
Barometric pressure (mbar):			993	Before			993	After		
Pressure trend:				Falling	X	Steady		Rising		
Air Temperature (Deg. C):			10	Before			10	After		

Appendix E
PPL Generic Assessment Criteria (GAC)

	* Non SOM dependent	Commercial			Source
	SOM %	**1**	**2.5**	**6**	
Metals and Inorganics	Antimony				
	Arsenic		640		**7**
	Barium				
	Beryllium		12		**7**
	Boron		240000		**7**
	Cadmium		190		**7, 9**
	Chromium (III)		8600		**7**
	Chromium (VI) (Hexavalent)		33		**7**
	Copper		68000		**7**
	Cyanide (Free)				
	Elemental Mercury		58		**7**
	Inorganic Mercury		1100		**7**
	Methylmercury		320		**7**
	Lead		2300		**8**
	Molybdenum				
	Nickel		980		**11**
	Selenium		12000		**7**
	Tin				
	Vanadium		9000		**7**
	Zinc		730000		**7**
	Tributlytinoxide				
Polyaromatic Hydrocarbons	Acenaphthene	84000	97000	100000	**7**
	Acenaphthylene	83000	97000	100000	**7**
	Anthracene	520000	540000	540000	**7**
	Benzo[a]anthracene	170	170	180	**7**
	Benzo[a]pyrene	35	35	36	**7**
	Benzo[b]fluoranthene	44	44	45	**7**
	Benzo[ghi]perylene	3900	4000	4000	**7**
	Benzo[k]fluoranthene	1200	1200	1200	**7**
	Chrysene	350	350	350	**7**
	Dibenz[ah]anthracene	3.5	3.6	3.6	**7**
	Fluoranthene	23000	23000	23000	**7**
	Fluorene	63000	68000	71000	**7**
	Indeno[123-cd]pyrene	500	510	510	**7**
	Naphthalene	190	460	1100	**7**
	Phenanthrene	22000	22000	23000	**7**
	Pyrene	54000	54000	54000	**7**
	Coal Tar (B[a]P as surrogate marker)	15	15	15	**7**

Petroleum Hydrocarbons	Benzene	27	47	90	**7**
	Toluene	56000	110000	180000	**7**
	Ethylbenzene	5700	13000	27000	**7**
	m-Xylene	6200	14000	31000	**7**
	o-Xylene	6600	15000	33000	**7**
	p-Xylene	5900	14000	30000	**7**
	Methyl tert-butyl ether (MTBE)				
	1,2,4-Trimethylbenzene				
	iso-Propylbenzene				
	Propylbenzene				
	Styrene				
	Aliphatic EC 5-6	3200	5900	12000	**7**
	Aliphatic EC >6-8	7800	17000	40000	**7**
	Aliphatic EC >8-10	2000	4800	11000	**7**
	Aliphatic EC >10-12	9700	23000	47000	**7**
	Aliphatic EC >12-16	59000	82000	90000	**7**
	Aliphatic EC >16-35	1600000	1700000	1800000	**7**
	Aliphatic EC >35-44	1600000	1700000	1800000	**7**
	Aromatic EC 5-7 (benzene)	26000	46000	86000	**7**
	Aromatic EC >7-8 (toluene)	56000	110000	180000	**7**
	Aromatic EC >8-10	3500	8100	17000	**7**
	Aromatic EC >10-12	16000	28000	34000	**7**
	Aromatic EC >12-16	36000	37000	38000	**7**
	Aromatic EC >16-21	28000	28000	28000	**7**
	Aromatic EC >21-35	28000	28000	28000	**7**
	Aromatic EC >35-44	28000	28000	28000	**7**
	Petroleum Hydrocarbons EC >44-70	28000	28000	28000	**7**

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