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PROJECT NAME

MELKSHAM COMMUNITY HOSPITAL

REPORT

COMBINED GEO-ENVIRONMENTAL & GEOTECHNICAL
GROUND INVESTIGATION REPORT (GIR)

CLIENT

NHS Property Services

REFERENCE NO

C13010-GIR

C13010_Melksham Community Hospital_GIR_Rev00

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1 INTRODUCTION

1.1 Commission

Red Rock Geoscience Ltd (Red Rock') was commissioned by NHS Property Services to undertake a geo-environmental and geotechnical ground investigation for the redevelopment of the existing roundabout outside Melksham Community Hospital to a car park.

A factual and interpretative report was required on the investigation.

1.2 Development Proposals

The development proposals comprise redeveloping the roundabout outside the entrance, creating more car parking spaces. This will involve replacing the center of the roundabout with parking spaces, and modifying the existing parking layout, increasing space. An outline of the proposals is shown on the exploratory hole location plan, enclosed in Appendix A.

1.3 Objectives

The geo-environmental objectives of this assessment were to identify any potential contamination on site and any associated risks, and the determination of possible remediation requirements in order to enable the safe development of the site.

The geotechnical objectives of this investigation were to determine the distribution, nature and engineering properties of the soils underlying the site to assist with the design of an extension to the existing car park.

It should be noted that this investigation is focused on the proposed developments at the site and may need to be re-assessed should the development proposals be revised.

Environmental regulators use the Source-Pathway-Receptor (SPR) pollution linkage concept when assessing the risk posed by a contaminated site. For a liability to arise, each stage of the pollution linkage must be present. A desk study has not been completed as part of this current contract and therefore we have completed a generic contaminated land assessment based on the findings of this investigation only. The historical and current site uses may mean that there are unidentified potential sources of contamination that have not been considered within this current report.

Regardless of this, this current report establishes the environmental sensitivity of the site based on the findings of this investigation allowing a preliminary conceptual site model to be developed. This will present identified potential contaminant sources, migration pathways, and possible receptors to be developed. An assessment of pollutant linkages based on the findings of the investigation works is also presented.

It should be noted that references to the word 'contamination' in this report do not relate to the statutory definition of Part IIA Contaminated Land (amended in 2012) in accordance with the Department of the Environment, Transport and the Regions¹. In the context of this report a wider term is used to cover all cases where the actual or suspected presence of substances in, on or under the land may cause risks to people, property, human activities or the environment, regardless of whether or not the land meets the current statutory definition of Part IIA.

¹ Department of the Environment, Transport & the Regions, 2012, Environmental Protection Act 1990: Part IIA.

Reference should be made to the 'General Notes and Limitations' included in Appendix I at the end of this report, which provide information on the procedures followed in the investigation and data assessment and explains the context within which this report should be read.

The geo-environmental sections of this report only address potential ground contamination issues and do not include issues pertaining to ecology, habitat, or wider environmental concerns. Appropriate professionals with expertise in these areas should be consulted.

1.4 Site Description and Site Location

The site is located at Cornflower Way, Melksham, Wiltshire, England, SN12 7SN. The site is centered on National Grid Reference 390924, 163146.

The site is a flat rectangular parcel of land roughly 40m by 50m. It is mostly tarmacked with some soft landscaped areas around the perimeter and at the center of the site lies a grassed roundabout. It is surrounded by Melksham community hospital which consists of a single storey building. It is accessed from the north.

1.5 Published Geology.

Published geological information indicates the site to be underlain by the Oxford Clay Formation. This is typically described by the British Geological Survey² (BGS) as a "Silicate-mudstone, grey, generally smooth to slightly silty, with sporadic beds of argillaceous limestone nodules".

² <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=ALBR> (date accessed 4th November 2024)

2 FIELDWORK

2.1 Methodology

The investigation comprised:

- Five (5 no.) Dynamic Window Sampler Boreholes
- Six (6 no.) Dynamic Cone Penetration (DCP) tests using the Transport Research Laboratory (TRL) method.

The ground investigation fieldwork was undertaken in general accordance with BS 5930 (2020)³. Samples collected were typically classed a Category 'C' in accordance with BS EN 1997-2 (2007)⁴, and assessment of strength and consistency were undertaken using traditional field techniques as described in BS EN ISO 14688-1 (2018)⁵. Soils have been logged, generally in accordance with BS EN ISO14688-2 (2018)⁶.

The locations of the exploratory holes are shown on the Exploratory Hole Location Plan, enclosed as Appendix A.

The fieldwork was undertaken on the 9th July 2025 and was supervised full-time by an engineering geologist.

2.2 Window Sample Boreholes

Five window sample boreholes were undertaken to depths of between 3.45m and 5.45m below existing ground level to provide information on both the geotechnical and geo-environmental conditions.

The window sample boreholes were constructed by initially driving 80mm diameter metal window sample tubes into the ground using an Archway Competitor drilling rig. The diameter of the window sample tubes was then reduced with depth as drilling progressed. In-situ Standard Penetration Tests (SPTs) were undertaken at nominal 1.0m intervals during window sampling to obtain a measure of the in-situ relative density and/or strength of the strata penetrated.

The window sample boreholes were logged on site by an experienced engineering geologist, and the window sample borehole records are enclosed in Appendix B. In addition to detailed strata descriptions, these give information on groundwater, progress, the results of in-situ tests and samples recovered.

On completion, two window sample boreholes were backfilled and reinstated at surface with arisings. Three boreholes had a 50mm groundwater monitoring well installed in a gravel filter.

2.3 In-situ TRL-DCP Testing

Six (6no.) in-situ dynamic cone penetration (DCP) tests were undertaken using the TRL apparatus to provide a continuous in-situ measurement of the estimated strength of the soils beneath areas of proposed road pavement. This apparatus conforms to that described in TRL Project Report PR/INT/277/04. The results of the DCP tests are presented in both tabular and graphical form in Appendix C.

3 British Standards Institute. (2020). BS 5930:2015+A1:2020 Code of practice for site investigations. London: BSI.

4 British Standards Institute. (2007). BS EN 1997-2: Eurocode 7 – Geotechnical design. Part 2 Ground investigation and testing. London: BSI.

5 British Standards Institute. (2018). BS EN ISO 14688-1:2018. Geotechnical investigation and testing – Identification and classification of soil – Part 1: Identification and description: London BSI

6 British Standards Institute (2018). BS EN ISO14688-2:2018. Geotechnical investigation and testing – Identification and classification of soil – Part 2: Principles for a classification. London: BSI

2.4 Percolation Testing in Monitoring Wells

Three exploratory hole locations were installed with a monitoring well to depth of 5.00m for percolation testing to assist with drainage rates for soakaway design. These were installed in WS01, WS03 and WS04.

The monitoring wells comprise a 50mm diameter HDPE slotted pipe with gravel cell from the base of the hole up to 1.0m below ground level, where a plain pipe with bentonite seal is present up to ground level. The wells were finished at surface with a gas tap and lockable flush cover.

In-situ variable head (falling head) tests were undertaken in each monitoring well to provide an in-situ permeability measurement of the soils to assess the feasibility of standard soakaway testing. The tests are considered preliminary and not in accordance with BS EN ISO 22282-1:2012 and BS EN ISO 22282-2:2012.

The results of the testing are summarized in section 5.3 and are enclosed in Appendix D.

3 LABORATORY TESTING

3.1 Geotechnical Laboratory Testing

The following geotechnical laboratory tests were undertaken on selected samples obtained during the site investigation:

Table 3.1: Geotechnical Laboratory Testing

Test	Number of Samples
Moisture Content	6
Liquid and Plastic (Atterberg) Limits	6
pH, total sulphate, soluble sulphate and total sulphur (BRE SD1 Suite) - Soils	4

Laboratory testing was undertaken, where appropriate, in accordance with BS1377 (1990)⁷ and test results are enclosed as Appendix E. All testing was undertaken in UKAS accredited laboratories.

3.2 Contamination Laboratory Testing

On the basis of observations made during intrusive investigations, the following chemical testing was undertaken on selected near surface soil samples.

Table 3.2: Geo-environmental Laboratory Testing - Soils

Test	Number of Samples
Standard Suite	2

The geo-environmental laboratory test results are enclosed as Appendix F.

⁷ British Standards Institute (1990). BS1377:1990. Methods of test for soils for Civil Engineering Purposes. London: BSI

4 GROUND CONDITIONS ENCOUNTERED

4.1 Strata Encountered

The strata sequence encountered in the exploratory holes were in general agreement with that expected based on the published information, and are summarised in the table below:

Table 4.1: Summary Table of Strata Encountered

Stratum	WS01	WS02	WS03	WS04	WS05
Topsoil	0.00 – 0.25		0.00 – 0.20	0.00 – 0.30	0.00 – 0.15
Made Ground	0.25 – 0.50	0.00 – 0.60			
Oxford Clay Formation	0.50 – 5.45	0.60 – 5.45	0.20 – 5.45	0.30 – 5.45	0.15 – 3.45

4.2 Topsoil

Material interpreted as Topsoil was encountered in all window sample boreholes to depths of between 0.15m and 0.30m. This stratum typically comprised 'Brown slightly gravelly slightly sandy CALY. Gravel is fine of angular brick and clinker'.

4.3 Made Ground

Material interpreted as Made Ground was encountered in WS01 and WS02, to depths of between 0.50m and 0.60m. These materials typically comprised 'Grey brown sandy GRAVEL> Gravel is fine to cpasre of angular brick, concrete and clinker'.

4.4 Oxford Clay Formation

Material interpreted as Oxford Clay Formation was encountered in all exploratory hole locations to a maximum depth of 5.45m. These materials typically comprised 'Firm mottled grey CLAY with rare rootlets'. At deeper depths, the soils generally comprise 'Stiff grey CLAY with rare rootlets'.

SPT 'N' values recorded within the Oxford Clay Formation range from 4 to 50 (average value 18). These values are indicative of cohesive soils with approximate undrained shear strength of between 18 kN/m² and 150 kN/m² (average 80kN/m²).

The index property test results obtained on samples of this sub-stratum gave Plasticity Index values of between 28% and 45% and classify the soils as intermediate plastic clay on the Casagrande classification system. After correcting the Plasticity Index values for the 'stone' content (material >0.425mm), the samples tested have modified plasticity index values of between 27% and 42% indicating them to have a high volume change potential in accordance with the criterion BRE Digest 240 (1993)⁸ / NHBC Chapter 4.2⁹.

4.5 Signs of Contamination

Although Made Ground was encountered in two window samples, there was no visual or olfactory evidence of contamination noted.

⁸ BRE Digest 240 (1993), Low-rise Buildings on shrinkable clay soils: Part 1. Building Research Establishment Ltd.

⁹ NHBC. (2021). Standards. Amersham: NHBC

4.6 Groundwater

Groundwater was encountered in the exploratory holes as summarised below:

Table 4.2: Summary of Groundwater Strikes in Exploratory Holes		
Exploratory Hole	Depth Water Encountered (mbgl)	Comment(s)
WS01	3.30	
WS03	1.60	

Monitoring of groundwater installations is provided in Appendix X and summarised below:

Table 4.3: Summary of Groundwater Monitoring	
Exploratory Hole	05/08/2025
WS02	0.66m bgl
WS03	0.90m bgl
WS03	1.30m bgl

Monitoring of groundwater levels shows a high level of perched water.

5 GEOTECHNICAL ASSESSMENT

5.1 Ground Conditions Summary

Near surface ground conditions generally comprise Topsoil and Made Ground, over the Oxford Clay Formation.

5.2 Road Pavement Design

The likely subgrade soils will comprise firm to stiff clay. Atterberg Limit tests on these soils indicate them to have a Modified Plasticity Index of between 28% and 45%.

Seasonal groundwater levels are likely to be more than 1.0m below the anticipated formation level, defining the subgrade soils as well-drained in terms of road pavement design.

The in-situ DCP tests undertaken on areas of proposed highway pavement produced lower bound CBR values of between 2.0% and 6.3%. Taking into consideration these test values a construction phase design CBR value of 2.0% is considered most applicable.

As with any road pavement construction, the formation should be carefully inspected and (if necessary) tested to identify any localised weaker areas with a CBR value lower than the design value, with any such areas excavated out and replaced with suitable capping material or Class C10 concrete.

The subgrade soils are likely to be frost susceptible. However, based on the CBR design value the construction thickness required for structural reasons is likely to provide sufficient cover to prevent problems of frost heave provided all capping/ sub-base layers comprise non-frost susceptible materials.

Because the subgrade soils comprise high-plasticity clay material, it is recommended that an appropriate separation geotextile be placed on the formation to prevent potential subsequent deterioration of the basal capping / sub-base layers via impregnation of 'fines' during initial pavement construction layers and/or fluctuations in groundwater level.

5.3 Soakaway Drainage Potential

Three in-situ percolation tests were attempted, however due to high levels of perched water in two of the monitoring well, only 1 test was able to be completed. Testing in WS04 showed a drainage rate of $7.06e^{-8}$. In view of the relatively slow rate of percolation, soakaways are unlikely to form an effective method for surface water drainage for this site. The results are shown in Appendix D.

It should be noted that the infiltration characteristics of soils can be variable both spatially across the site and with depth below ground level. Similarly, the depth to groundwater (and presence of perched groundwater) can also vary both spatially across the site and in response to seasonal fluctuations. Provided the locations of the tests undertaken coincide with the anticipated locations and levels of proposed soakaways, and worst-case seasonal groundwater levels do not vary significantly from those encountered in this investigation.

5.4 Excavation Considerations

The boreholes indicate that on site excavations are likely to be generally stable in the short to medium term. However, all excavations should be monitored and, if necessary, supported in accordance with appropriate guidance such as CIRIA Report 97 (1992)¹⁰.

10 Irvine, D.J. and Smith, R.J.H., (1992) Trenching Practice. R97. London: CIRIA.

6 GEO-ENVIRONMENTAL ASSESSMENT

6.1 Assessment of Geo-environmental Results

Generic Assessment Criteria for Human Health

The Contaminated Land Exposure Assessment (CLEA) model enables the derivation of site-specific assessment criteria for contaminants present on a site. The most recent model (CLEA v1.071) was released in September 2015 together with guidance documents including toxicological reports for selected contaminants and standard land use scenarios. In addition, Land Quality Management (LQM) in association with Chartered Institute of Environmental Health (CIEH) published in 2009 Generic Assessment Criteria (GAC) values for a number of other contaminants not included in the EA publication. The 2009 generic assessment criteria values have been revised in 2015 and published as 'Suitable for Use Levels' (S4ULs) which have been utilised in this report for assessment of contaminant levels. In addition, guideline values for use in Part IIA determinations ('Category 4 screening Levels' – C4SLs) were also published in 2014 by DEFRA which included lead. In the absence of a lead S4UL, the C4SL for lead was utilised.

In view of the development proposals, the site is being considered under a Commercial & Industrial Land Use scenario and the human health generic assessment criteria guideline values used in this assessment are enclosed in Appendix G.

Laboratory contamination results are included as Appendix F. The assessment of the results is summarised, and where appropriate, discussed in further detail below.

Assessment of Soil Test Results

The following table summarises the assessment of the soil test results and provides comments and remedial recommendations.

Table 6.1: Assessment of Geo-environmental Soil Results				
Determinants	No of Samples Tested (Made Ground)	No of Samples Tested (Natural Ground)	Comments	Recommendations
Metals & Metalloids	1	1	Metal and metalloids were recorded in concentrations below their respective commercial / industrial land use guidelines. Statistical analyses not required.	No remedial measures required
Polycyclic Aromatic Hydrocarbons (PAHs)	1	1	Low PAH concentrations detected.	No remedial measures required
Total Petroleum Hydrocarbons (TPHs)	1	1	Not detected in the samples tested.	No remedial measures required
BTEX + MTBE	1	1	Not detected in the samples tested.	No remedial measures required
PCBs	1	1	Not detected in the samples tested.	No remedial measures required

Table 6.1: Assessment of Geo-environmental Soil Results

Determinants	No of Samples Tested (Made Ground)	No of Samples Tested (Natural Ground)	Comments	Recommendations
Asbestos	1	1	Asbestos not detected in any of the samples screened	No remedial measures required

6.2 Assessment of Pollutant Linkages

A number of exposure pathways link the contamination to the receptor and potential risks are dependent on active pathways. The qualitative assessment of potential pollutant linkages based on the findings of the investigations involves the matching of the identified sources of contamination to the receptors through the possible migration pathways. These links must be completed for there to be any risk associated with the site and its development.

This assessment is presented in terms of the Source (S), Pathway (P) and Receptor (R) concept and applying a qualitative value judgement to this appraisal. The assessment assigns a level of risk to each SPR link based on the probability and potential consequence of the risk being realised. The risk phrases and matrices are enclosed in Appendix H and a summary is presented in table 6.2.

6.3 Suitability for Water Mains Pipework

A full assessment of soils for water mains suitability was not in the remit of the current report and testing to UKWIR guidance was not undertaken.

Test results recorded generally low levels of PAHs below the standard PE thresholds.

6.4 Geo-Environmental Recommendations

Geo-environmental test results recorded metal, metalloid, and PAH contamination below their respective commercial / industrial guidelines. Asbestos, PCBs, TPHs and VOCs were not detected.

The report findings indicate that the likelihood of extensive contamination on the site is low and unlikely to pose a risk to human health in view of the expected ground conditions and the development proposals. The site is generally considered low risk and remedial measures are not required with respect to risks to soils.

6.5 Unidentified Contamination

The following are general recommendations in line with good practice:

- Adequate precautions and appropriate personal hygiene and safety protocols should be employed by all construction workers on site at all times.
- Regular inspections should be carried out by ground workers during any excavation work, and advice should be sought in the event that unexpected ground conditions are encountered. Should any visual or olfactory signs of contamination be found during construction works, soils should be tested and assessed.
- Should further testing and assessment occur, where unacceptable risks are identified, appropriate remedial measures would need to be implemented. A detailed remediation strategy should be prepared, any remedial works and associated clean-up levels would need to be discussed with and approved by the Regulatory Authorities. Additionally, a Validation Statement would need to be prepared upon completion of any remedial works, detailing the works undertaken and the results of the associated validation testing.

Table 6.2: Geo-Environmental Risk Assessment

Receptors	Contaminant Sources	Probability of Pollutant Linkage Being Present	Severity of Consequence if Contaminant and Pollutant Linkage Present	Risk Assessment	Recommendations
Human Health	Metals and PAHs identified in soils at site.	2 - UNLIKELY (Pollutant linkage may be present, but the circumstances are such that an event is improbable, even in the long term)	3 - MILD (Mild human health effects)	VERY LOW RISK (Probability x Severity = 6 to 9)	The risk has been classified as NEGLIGIBLE or VERY LOW. Contamination unlikely and further assessment not required. Personal protective equipment during all site works recommended as good practice.
	Asbestos: Asbestos not identified the samples screened.	1 - NO RISK IDENTIFIED (No contaminative sources or contaminants identified above guideline values likely to pose a risk to human health)	5 - SEVERE (Acute or fatal human health effects)	NEGLIGIBLE RISK (Probability x Severity = 1 to 5)	Potential asbestos sources not identified. Further assessment not required.
	Water Mains: Elevated levels of PAHs above the PE threshold recorded.	4 - LIKELY (Pollutant linkage may be present, and it is probable that there will be a long term risk and possibly a short term risk)	4 - MEDIUM (Chronic human health effects)	MODERATE (Probability x Severity = 15 to 16)	Barrier pipe recommended for the development.

Table 6.2: Geo-Environmental Risk Assessment

Receptors	Contaminant Sources	Probability of Pollutant Linkage Being Present	Severity of Consequence if Contaminant and Pollutant Linkage Present	Risk Assessment	Recommendations
Human Health - Ground Gas	Radon: The site is within an area likely to be affected by radon gas.	1 - NO RISK IDENTIFIED (No contaminative sources or contaminants identified above guideline values likely to pose a risk to human health)	5 - SEVERE (Acute or fatal human health effects)	NEGLIGIBLE RISK (Probability x Severity = 1 to 5)	In view of the proposed development, no radon protection measures are required.
	Additional Ground Gas Sources	1 - NO RISK IDENTIFIED (No contaminative sources or contaminants identified above guideline values likely to pose a risk to human health)	5 - SEVERE (Acute or fatal human health effects)	NEGLIGIBLE RISK (Probability x Severity = 1 to 5)	In view of the proposed development, no ground gas assessment required.
Flora and Fauna	Metals and PAHs identified in soils at site. No visual signs of vegetation distress or any indication that soils may be toxic to Fauna or Flora. Any impact to vegetation would be localised in nature.	2 - UNLIKELY (Pollutant linkage may be present, but the circumstances are such that an event is improbable, even in the long term)	3 - MILD (Damage to non-sensitive ecosystems or species)	VERY LOW RISK (Probability x Severity = 6 to 9)	The risk has been classified as NEGLIGIBLE or VERY LOW. Contamination unlikely and further assessment not required in view of the expected ground conditions and proposals.

Table 6.2: Geo-Environmental Risk Assessment

Receptors	Contaminant Sources	Probability of Pollutant Linkage Being Present	Severity of Consequence if Contaminant and Pollutant Linkage Present	Risk Assessment	Recommendations
Water Resources	Metals and PAHs identified in soils onsite.	2 - UNLIKELY (Pollutant linkage may be present, but the circumstances are such that an event is improbable, even in the long term)	3 - MILD (Damage to non-sensitive controlled waters)	VERY LOW RISK (Probability x Severity = 6 to 9)	The risk has been classified as NEGLIGIBLE or VERY LOW. Contamination unlikely and further assessment not required in view of the expected ground conditions and proposals.
Future Built Environment	No significant organic contamination recorded likely to affect the integrity of the future built environment.	2 - UNLIKELY (Pollutant linkage may be present, but the circumstances are such that an event is improbable, even in the long term)	2 - MINOR (Possible, localised damage to buildings or structures)	NEGLIGIBLE RISK (Probability x Severity = 1 to 5)	The risk has been classified as NEGLIGIBLE or VERY LOW. Contamination unlikely and further assessment not required.

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Appendix A. EXPLORATORY HOLE LOCATION PLAN



-  Window sample Borehole
-  TRL-DCP CBR Test
-  Monitoring Well Installation

DRAWING TITLE PROPOSED EXPLORATORY HOLE LOCATION PLAN Proposed overlayed Existing		PROJECT Melksham Community Hospital
DRAWING NO. 13010-D01-R00	SCALE NOT TO SCALE	CLIENT NHS Property Services

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-  Window sample Borehole
-  TRL-DCP CBR Test
-  Monitoring Well Installation

DRAWING TITLE PROPOSED EXPLORATORY HOLE LOCATION PLAN Existing Plan		PROJECT Melksham Community Hospital	
DRAWING NO. 13010-D01-R00	SCALE NOT TO SCALE	CLIENT NHS Property Services	



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 Tel: 01392 460800



-  Window sample Borehole
-  TRL-DCP CBR Test
-  Monitoring Well Installation

DRAWING TITLE PROPOSED EXPLORATORY HOLE LOCATION PLAN Proposed Plan		PROJECT Melksham Community Hospital	 East Wing, Station House, Broadclyst Station, EX5 3AS www.redrockgeo.co.uk Email: office@redrockgeo.co.uk Tel: 01392 460800
DRAWING NO. 13010-D01-R00	SCALE NOT TO SCALE	CLIENT NHS Property Services	

Appendix B. BOREHOLE RECORDS



Borehole Log

Borehole No.

WS01

Sheet 1 of 1

Project Name: Melksham Community Hospital

Project No.
C13010

Co-ords:

Hole Type
WS

Location: Spa Rd, Melksham SN12 7NZ

Level:

Scale
1:30

Client: Kendall Kingscott Ltd

Dates: 09/07/2025

Logged By
BS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	D		0.25			Grass over brown slightly gravley slightly sandy CLAY. Gravel is fine of angular brick and clinker. (TOPSOIL)	
		0.40	D		0.50			Grey brown sandy GRAVEL. Gravel is fine to coarse, of angular brick, concrete, clinker. (MADE GROUND)	
		0.70	D					Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		0.70	HSV	Peak=90kPa					
		1.00	SPT (S)	N=8 (2,2/2,2,2,2)					1
		1.20	D						
		1.25	HSV	Peak=90kPa					
		1.75	HSV	Peak=90kPa					
		2.00	SPT (S)	N=25 (4,5/8,5,6,6)					2
		2.25	HSV	Peak=120kPa	2.30			Stiff grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		2.70	D						
		3.00	SPT (S)	N=16 (3,3/3,4,4,5)					3
		3.50	HSV	Peak=120kPa					
		3.75	HSV	Peak=120kPa					
		3.90	D						
		4.00	SPT (S)	N=25 (4,4/5,5,7,8)					4
		4.50	D						
		4.50	HSV	Peak=120kPa					
		5.00	SPT (S)	N=30 (5,5/6,7,9,8)					5
					5.45			End of Borehole at 5.45m	
									6

Remarks

CAT scanned prior to drilling. Groundwater encountered at 3.30m. Borehole installed with groundwater monitoring well.





Borehole Log

Borehole No.

WS02

Sheet 1 of 1

Project Name: Melksham Community Hospital

Project No.
C13010

Co-ords:

Hole Type
WS

Location: Spa Rd, Melksham SN12 7NZ

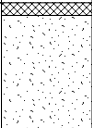
Level:

Scale
1:30

Client: Kendall Kingscott Ltd

Dates: 09/07/2025

Logged By
BS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.05			ASPHALT CONCRETE	
		0.50	D		0.50				
		0.50	HSV	Peak=4kPa	0.60			Very soft black SILT.	
		0.75	HSV	Peak=20kPa				Soft brownish grey CLAY.	
		0.90	D		0.90				
		1.00	SPT (S)	N=4 (1,1/1,1,1,1)				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	1
		1.10	HSV	Peak=50kPa					
		1.50	D						
		1.50	HSV	Peak=80kPa					
		2.00	SPT (S)	N=12 (1,2/2,3,3,4)					2
		2.20	HSV	Peak=100kPa	2.20				
		2.50	D						
		2.70	HSV	Peak=100kPa					
		3.00	SPT (S)	N=24 (3,4/5,5,6,8)					3
		3.20	HSV	Peak=100kPa					
		3.50	D						
		3.80	HSV	Peak=100kPa					
		4.00	SPT (S)	N=28 (4,5/8,6,6,8)					4
		4.20	HSV	Peak=120kPa					
		4.50	D						
		4.80	HSV	Peak=120kPa					
		5.00	SPT (S)	N=24 (4,4/5,6,6,7)					5
					5.45			End of Borehole at 5.45m	6

Remarks

CAT scanned prior to drilling. No groundwater encountered. Borehole backfilled with arisings.





Borehole Log

Borehole No.

WS03

Sheet 1 of 1

Project Name: Melksham Community Hospital

Project No.
C13010

Co-ords:

Hole Type
WS

Location: Spa Rd, Melksham SN12 7NZ

Level:

Scale
1:30

Client: Kendall Kingscott Ltd

Dates: 09/07/2025

Logged By
BS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	D		0.20			Grass over brown slightly gravley slightly sandy CLAY. Gravel is fine of angular brick and clinker. (TOPSOIL)	
		0.40	D					Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		0.50	HSV	Peak=84kPa	0.60			Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		0.70	D					Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		0.80	HSV	Peak=84kPa				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		1.00	SPT (S)	N=5 (1,1/1,1,1,2)				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	1
		1.20	HSV	Peak=84kPa				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		1.50	D					Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		1.80	HSV	Peak=120kPa				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		2.00	SPT (S)	N=12 (1,2/2,3,3,4)				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	2
		2.50	D					Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		2.50	HSV	Peak=120kPa				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		3.00	HSV	Peak=120kPa				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		3.00	SPT (S)	N=24 (3,4/5,5,6,8)	3.40			Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	3
		3.75	HSV	Peak=120kPa				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		4.00	SPT (S)	N=25 (4,5/5,6,6,8)				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	4
		4.60	D					Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		4.75	HSV	Peak=120kPa				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		5.00	SPT (S)	N=29 (5,5/6,7,8,8)				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	5
					5.45			End of Borehole at 5.45m	

Remarks

CAT scanned prior to drilling. Groundwater encountered at 1.60m. Borehole installed with groundwater monitoring well.





Borehole Log

Borehole No.

WS04

Sheet 1 of 1

Project Name: Melksham Community Hospital

Project No.
C13010

Co-ords:

Hole Type
WS

Location: Spa Rd, Melksham SN12 7NZ

Level:

Scale
1:30

Client: Kendall Kingscott Ltd

Dates: 09/07/2025

Logged By
BS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
		Depth (m)	Type	Results								
		0.15	D		0.30			Grass over brown slightly gravley slightly sandy CLAY. Gravel is fine of angular brick and clinker. (TOPSOIL)	1			
		0.50 0.50	D HSV	Peak=80kPa				Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)				
		0.75	HSV	Peak=92kPa								
		1.00	SPT (S)	N=15 (1,1/2,3,4,6)								
		1.20 1.20	D HSV	Peak=92kPa								
		1.70	D									
		2.00	SPT (S)	N=11 (1,2/2,3,3,3)								
		2.20 2.25	D HSV	Peak=120kPa								
		2.75	HSV	Peak=120kPa								
		3.00	SPT (S)	N=12 (2,2/2,3,4,3)				3.00			Stiff grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	3
		3.20	D									
		3.50	HSV	Peak=120kPa								
		4.00	SPT (S)	N=12 (2,2/2,3,3,4)								
		4.50	HSV	Peak=120kPa								
		5.00	SPT (S)	N=20 (2,3/5,5,5,5)	5.45				End of Borehole at 5.45m	5		
												6

Remarks

CAT scanned prior to drilling. No groundwater encountered. Borehole installed with groundwater monitoring well.





Borehole Log

Borehole No.

WS05

Sheet 1 of 1

Project Name: Melksham Community Hospital

Project No.
C13010

Co-ords:

Hole Type
WS

Location: Spa Rd, Melksham SN12 7NZ

Level:

Scale
1:30

Client: Kendall Kingscott Ltd

Dates: 09/07/2025

Logged By
BS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	D		0.15			Grass over brown slightly gravley slightly sandy CLAY. Gravel is fine of angular brick and clinker. (TOPSOIL)	1
		0.40	D		0.50			Firm brown, mottled grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		0.40	HSV	Peak=80kPa					
		0.60	D					Firm brown CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		0.75	HSV	Peak=90kPa					
		1.00	SPT (S)	N=8 (1,1/1,2,2,3)	1.00			Firm grey mottled brown, CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		1.10	D		1.90				
		1.50	HSV	Peak=92kPa					
		2.00	SPT (S)	N=8 (2,2/2,2,2,2)				Stiff grey CLAY with rare rootlets. (OXFORD CLAY FORMATION)	
		2.25	HSV	Peak=120kPa					
		2.75	HSV	Peak=120kPa					
		3.00	SPT (S)	N=53 (8,11/12,14,14,13)	3.30 3.45			Extremely weak grey, thinly laminated MUDSTONE. Recovered as Dense grey sandy GRAVEL of angular mudstone. (OXFORD CLAY FORMATION)	3
		3.40	D					End of Borehole at 3.45m	
									4
									5
									6

Remarks

CAT scanned prior to drilling. No groundwater encountered. Borehole backfilled with arisings.



Appendix C. DYNAMIC CONE PENETRATION (DCP) TEST RESULTS

DYNAMIC CONE PENETRATION (DCP) TEST RESULTS

Project: **Melksham Community Hospital**
Project No: **C13010**

DCP No: **DCP01** Date: **09-Jul-25**

Start Depth (m): **0.00** Test Surface: **grass**

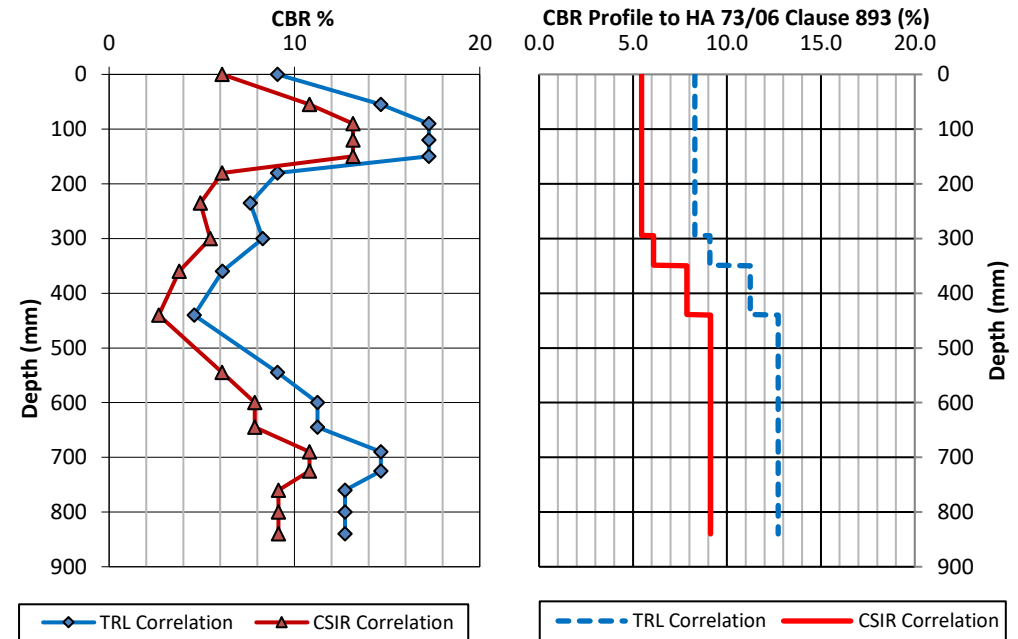
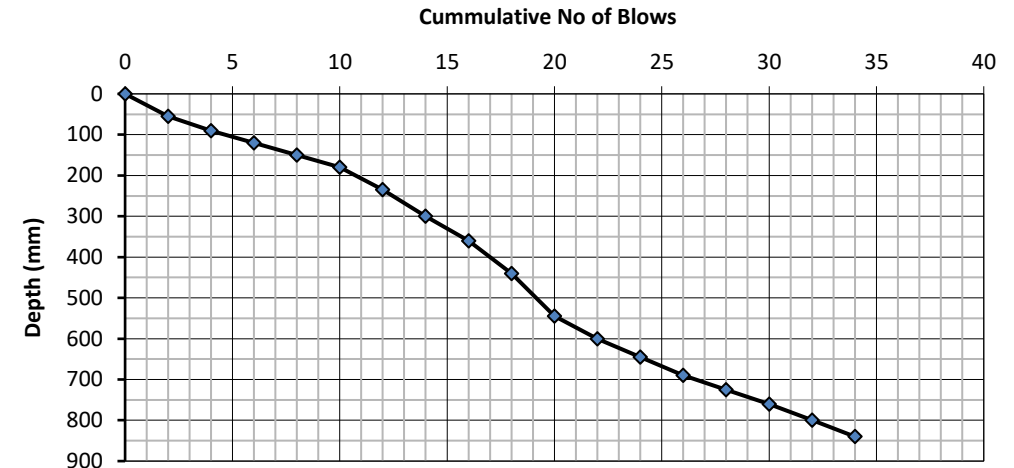
INPUT DATA							
Incremental DCP Blows	End of Increment ...		Cumulative Blows	Increment Penetration Rate (mm/blow)	Approximate Equivalent CBR (%)		
	DCP Depth (mm)	Test Depth (mm)			TRL ^(Note 1)	CSIR ^(Note 2)	Av'ge
0	100	0	0				
2	155	55	2	27.5	9.1	6.1	7.6
2	190	90	4	17.5	14.7	10.8	12.7
2	220	120	6	15.0	17.3	13.2	15.2
2	250	150	8	15.0	17.3	13.2	15.2
2	280	180	10	15.0	17.3	13.2	15.2
2	335	235	12	27.5	9.1	6.1	7.6
2	400	300	14	32.5	7.6	4.9	6.3
2	460	360	16	30.0	8.3	5.5	6.9
2	540	440	18	40.0	6.1	3.8	5.0
2	645	545	20	52.5	4.6	2.7	3.6
2	700	600	22	27.5	9.1	6.1	7.6
2	745	645	24	22.5	11.2	7.9	9.6
2	790	690	26	22.5	11.2	7.9	9.6
2	825	725	28	17.5	14.7	10.8	12.7
2	860	760	30	17.5	14.7	10.8	12.7
2	900	800	32	20.0	12.7	9.1	10.9
2	940	840	34	20.0	12.7	9.1	10.9

Summary	TRL ^(Note 1)	CSIR ^(Note 2)	Av'ge
CBR (Weighted Average %)	10.2	7.1	8.7
CBR (Minimum %)	4.6	2.7	3.6
CBR (Maximum %)	17.3	13.2	15.2

Notes:

1) TRRL, Road Transport Note 8: Largely applicable to granular soils ($\log \text{CBR} = 2.48 - 1.057 \log (\text{Penetration Rate})$)

2) CSIR (2009): More applicable to cohesive soils ($\text{CBR} = 410 \times (\text{Penetration Rate})^{-1.27}$)



DYNAMIC CONE PENETRATION (DCP) TEST RESULTS

Project: **Melksham Community Hospital**

Project No: **C13010**

DCP No: **DCP02**

Date: **09-Jul-25**

Start Depth (m): **0.00**

Test Surface: **grass**

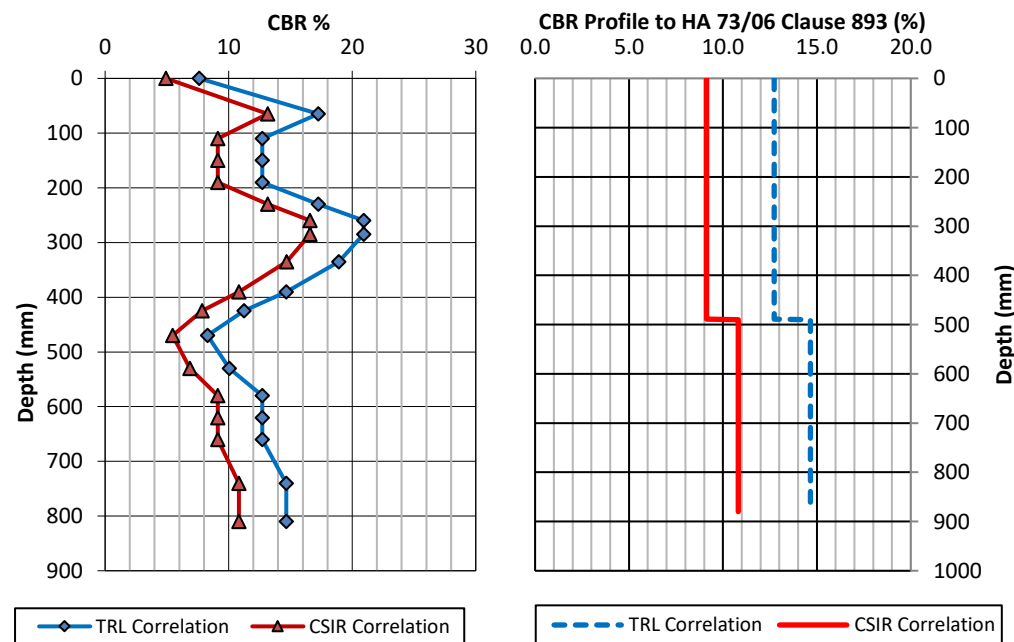
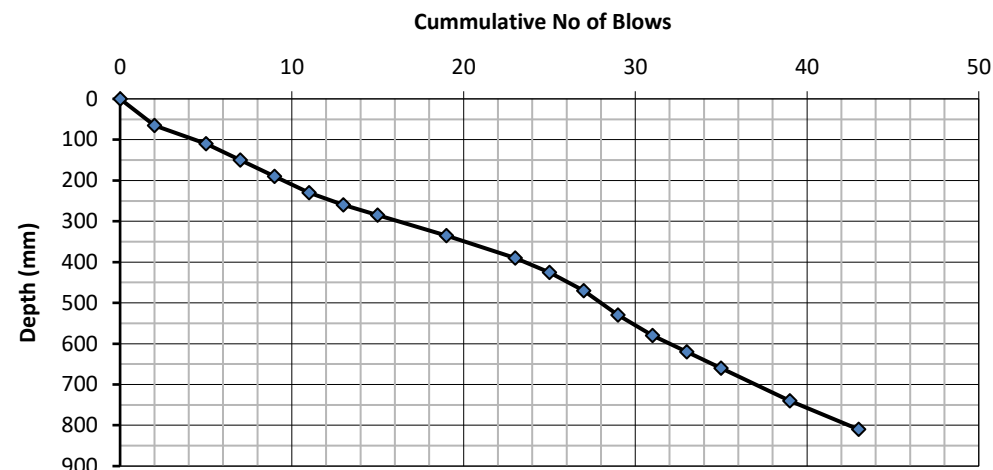
INPUT DATA							
Incremental DCP Blows	End of Increment ...		Cumulative Blows	Increment Penetration Rate (mm/blow)	Approximate Equivalent CBR (%)		
	DCP Depth (mm)	Test Depth (mm)			TRL ^(Note 1)	CSIR ^(Note 2)	Av'ge
0	100	0	0				
2	165	65	2	32.5	7.6	4.9	6.3
3	210	110	5	15.0	17.3	13.2	15.2
2	250	150	7	20.0	12.7	9.1	10.9
2	290	190	9	20.0	12.7	9.1	10.9
2	330	230	11	20.0	12.7	9.1	10.9
2	360	260	13	15.0	17.3	13.2	15.2
2	385	285	15	12.5	20.9	16.6	18.8
4	435	335	19	12.5	20.9	16.6	18.8
4	490	390	23	13.8	18.9	14.7	16.8
2	525	425	25	17.5	14.7	10.8	12.7
2	570	470	27	22.5	11.2	7.9	9.6
2	630	530	29	30.0	8.3	5.5	6.9
2	680	580	31	25.0	10.1	6.9	8.5
2	720	620	33	20.0	12.7	9.1	10.9
2	760	660	35	20.0	12.7	9.1	10.9
4	840	740	39	20.0	12.7	9.1	10.9
4	910	810	43	17.5	14.7	10.8	12.7
4	980	880	47	17.5	14.7	10.8	12.7

Summary	TRL ^(Note 1)	CSIR ^(Note 2)	Av'ge
CBR (Weighted Average %)	13.7	10.0	11.9
CBR (Minimum %)	7.6	4.9	6.3
CBR (Maximum %)	20.9	16.6	18.8

Notes:

1) TRRL, Road Transport Note 8: Largely applicable to granular soils ($\log \text{CBR} = 2.48 - 1.057 \log (\text{Penetration Rate})$)

2) CSIR (2009): More applicable to cohesive soils ($\text{CBR} = 410 \times (\text{Penetration Rate})^{-1.27}$)



DYNAMIC CONE PENETRATION (DCP) TEST RESULTS

Project: **Melksham Community Hospital**
Project No: **C13010**

DCP No: **DCP03** Date: **09-Jul-25**

Start Depth (m): **0.00** Test Surface: **grass**

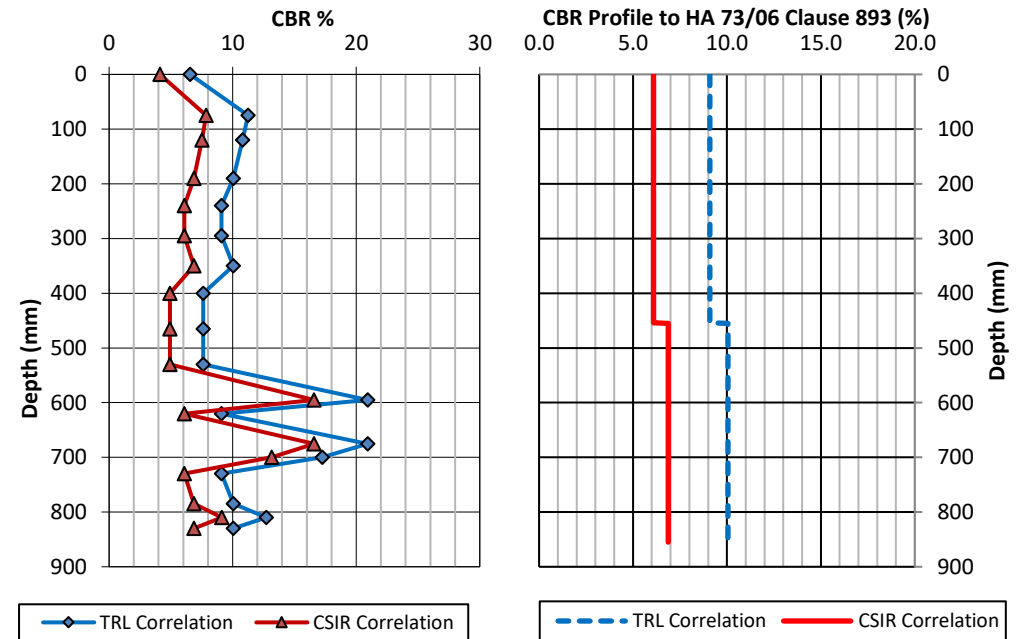
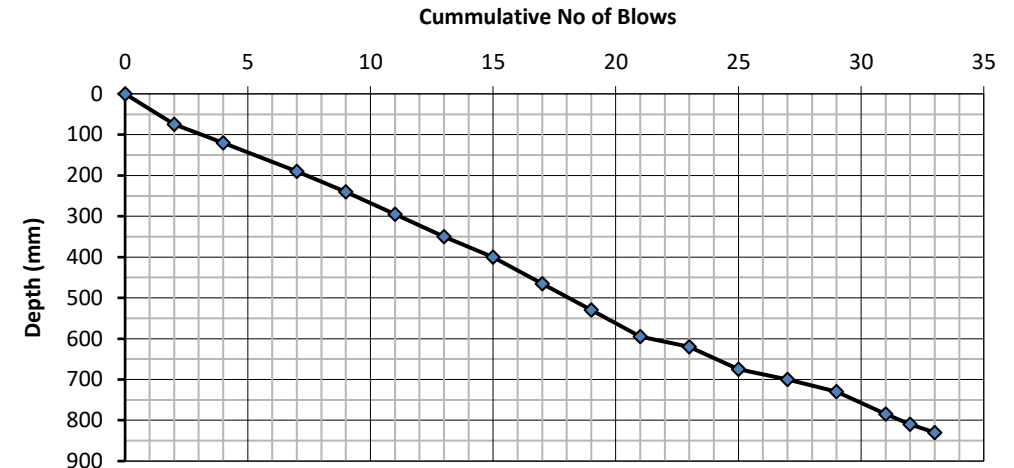
INPUT DATA							
Incremental DCP Blows	End of Increment ...		Cumulative Blows	Increment Penetration Rate (mm/blow)	Approximate Equivalent CBR (%)		
	DCP Depth (mm)	Test Depth (mm)			TRL ^(Note 1)	CSIR ^(Note 2)	Av'ge
0	110	0	0				
2	185	75	2	37.5	6.6	4.1	5.3
2	230	120	4	22.5	11.2	7.9	9.6
3	300	190	7	23.3	10.8	7.5	9.2
2	350	240	9	25.0	10.1	6.9	8.5
2	405	295	11	27.5	9.1	6.1	7.6
2	460	350	13	27.5	9.1	6.1	7.6
2	510	400	15	25.0	10.1	6.9	8.5
2	575	465	17	32.5	7.6	4.9	6.3
2	640	530	19	32.5	7.6	4.9	6.3
2	705	595	21	32.5	7.6	4.9	6.3
2	730	620	23	12.5	20.9	16.6	18.8
2	785	675	25	27.5	9.1	6.1	7.6
2	810	700	27	12.5	20.9	16.6	18.8
2	840	730	29	15.0	17.3	13.2	15.2
2	895	785	31	27.5	9.1	6.1	7.6
1	920	810	32	25.0	10.1	6.9	8.5
1	940	830	33	20.0	12.7	9.1	10.9
1	965	855	34	25.0	10.1	6.9	8.5

Summary	TRL ^(Note 1)	CSIR ^(Note 2)	Av'ge
CBR (Weighted Average %)	10.0	6.9	8.5
CBR (Minimum %)	6.6	4.1	5.3
CBR (Maximum %)	20.9	16.6	18.8

Notes:

1) TRRL, Road Transport Note 8: Largely applicable to granular soils ($\log \text{CBR} = 2.48 - 1.057 \log (\text{Penetration Rate})$)

2) CSIR (2009): More applicable to cohesive soils ($\text{CBR} = 410 \times (\text{Penetration Rate})^{-1.27}$)



DYNAMIC CONE PENETRATION (DCP) TEST RESULTS

Project: **Melksham Community Hospital**
Project No: **C13010**

DCP No: **DCP04** Date: **09-Jul-25**

Start Depth (m): **0.00** Test Surface: **grass**

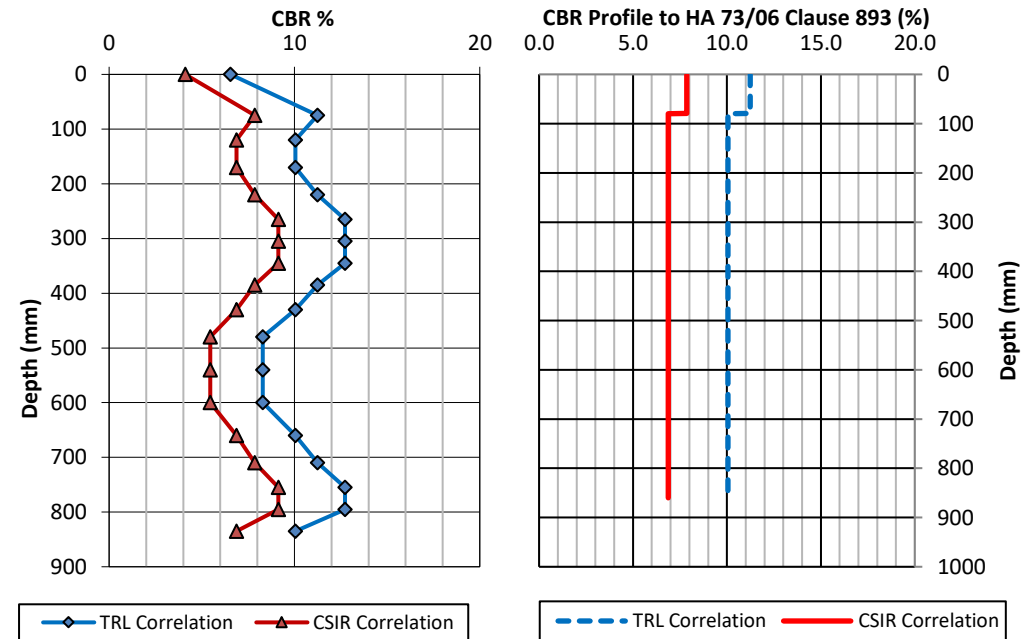
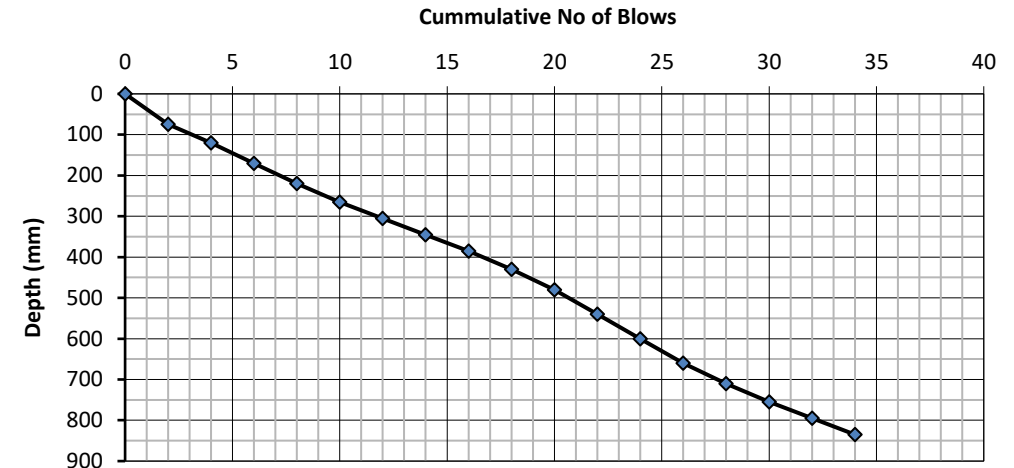
INPUT DATA							
Incremental DCP Blows	End of Increment ...		Cumulative Blows	Increment Penetration Rate (mm/blow)	Approximate Equivalent CBR (%)		
	DCP Depth (mm)	Test Depth (mm)			TRL ^(Note 1)	CSIR ^(Note 2)	Av'ge
0	100	0	0				
2	175	75	2	37.5	6.6	4.1	5.3
2	220	120	4	22.5	11.2	7.9	9.6
2	270	170	6	25.0	10.1	6.9	8.5
2	320	220	8	25.0	10.1	6.9	8.5
2	365	265	10	22.5	11.2	7.9	9.6
2	405	305	12	20.0	12.7	9.1	10.9
2	445	345	14	20.0	12.7	9.1	10.9
2	485	385	16	20.0	12.7	9.1	10.9
2	530	430	18	22.5	11.2	7.9	9.6
2	580	480	20	25.0	10.1	6.9	8.5
2	640	540	22	30.0	8.3	5.5	6.9
2	700	600	24	30.0	8.3	5.5	6.9
2	760	660	26	30.0	8.3	5.5	6.9
2	810	710	28	25.0	10.1	6.9	8.5
2	855	755	30	22.5	11.2	7.9	9.6
2	895	795	32	20.0	12.7	9.1	10.9
2	935	835	34	20.0	12.7	9.1	10.9
1	960	860	35	25.0	10.1	6.9	8.5

Summary	TRL ^(Note 1)	CSIR ^(Note 2)	Av'ge
CBR (Weighted Average %)	10.3	7.1	8.7
CBR (Minimum %)	6.6	4.1	5.3
CBR (Maximum %)	12.7	9.1	10.9

Notes:

1) TRRL, Road Transport Note 8: Largely applicable to granular soils ($\log CBR = 2.48 - 1.057 \log (\text{Penetration Rate})$)

2) CSIR (2009): More applicable to cohesive soils ($CBR = 410 \times (\text{Penetration Rate})^{-1.27}$)



DYNAMIC CONE PENETRATION (DCP) TEST RESULTS

Project: **Melksham Community Hospital**
Project No: **C13010**

DCP No: **DCP05** Date: **09-Jul-25**

Start Depth (m): **0.00** Test Surface: **grass**

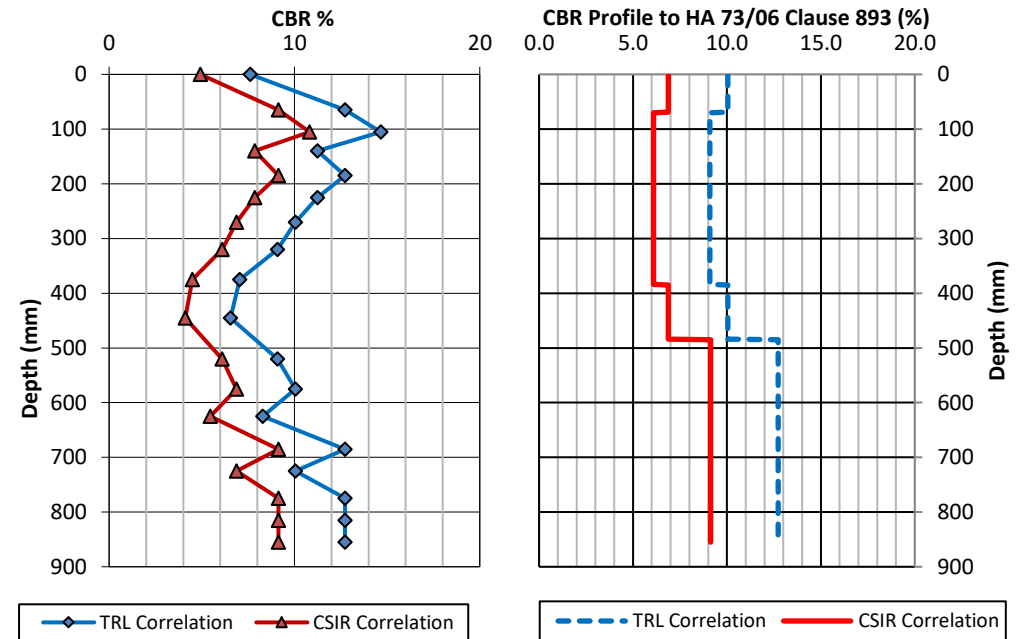
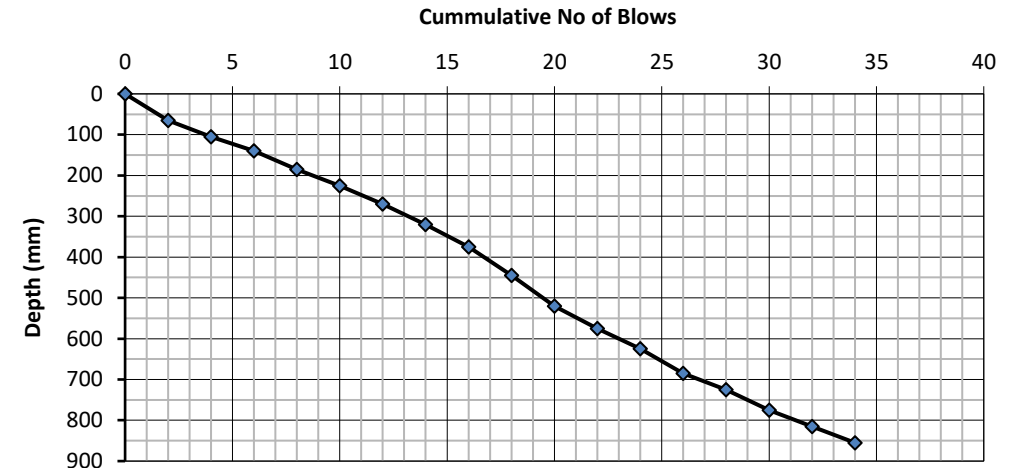
INPUT DATA							
Incremental DCP Blows	End of Increment ...		Cumulative Blows	Increment Penetration Rate (mm/blow)	Approximate Equivalent CBR (%)		
	DCP Depth (mm)	Test Depth (mm)			TRL ^(Note 1)	CSIR ^(Note 2)	Av'ge
0	105	0	0				
2	170	65	2	32.5	7.6	4.9	6.3
2	210	105	4	20.0	12.7	9.1	10.9
2	245	140	6	17.5	14.7	10.8	12.7
2	290	185	8	22.5	11.2	7.9	9.6
2	330	225	10	20.0	12.7	9.1	10.9
2	375	270	12	22.5	11.2	7.9	9.6
2	425	320	14	25.0	10.1	6.9	8.5
2	480	375	16	27.5	9.1	6.1	7.6
2	550	445	18	35.0	7.0	4.5	5.8
2	625	520	20	37.5	6.6	4.1	5.3
2	680	575	22	27.5	9.1	6.1	7.6
2	730	625	24	25.0	10.1	6.9	8.5
2	790	685	26	30.0	8.3	5.5	6.9
2	830	725	28	20.0	12.7	9.1	10.9
2	880	775	30	25.0	10.1	6.9	8.5
2	920	815	32	20.0	12.7	9.1	10.9
2	960	855	34	20.0	12.7	9.1	10.9

Summary	TRL ^(Note 1)	CSIR ^(Note 2)	Av'ge
CBR (Weighted Average %)	10.0	6.9	8.4
CBR (Minimum %)	6.6	4.1	5.3
CBR (Maximum %)	14.7	10.8	12.7

Notes:

1) TRRL, Road Transport Note 8: Largely applicable to granular soils ($\log \text{CBR} = 2.48 - 1.057 \log (\text{Penetration Rate})$)

2) CSIR (2009): More applicable to cohesive soils ($\text{CBR} = 410 \times (\text{Penetration Rate})^{-1.27}$)



DYNAMIC CONE PENETRATION (DCP) TEST RESULTS

Project: **Melksham Community Hospital**
Project No: **C13010**

DCP No: **DCP06** Date: **09-Jul-25**

Start Depth (m): **0.00** Test Surface: **grass**

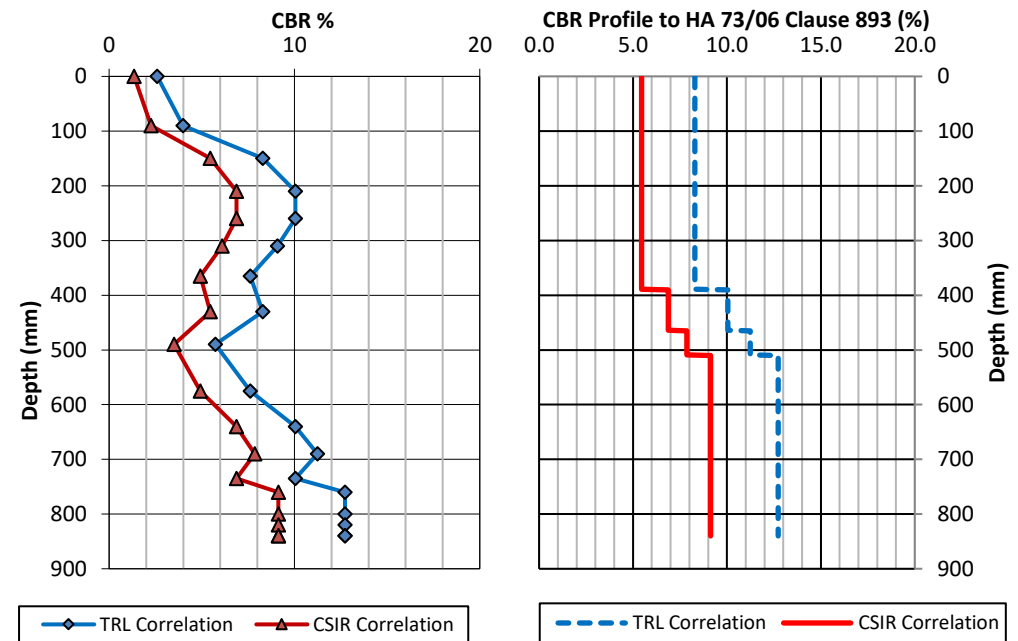
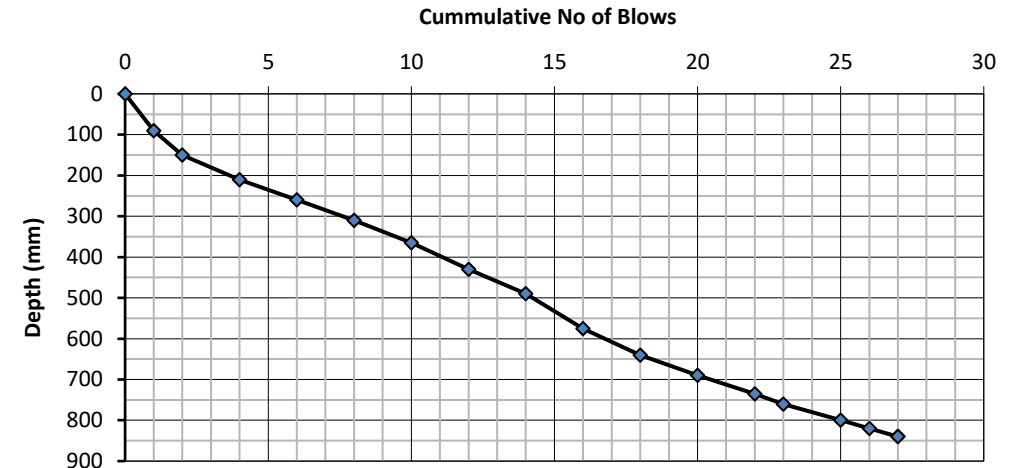
INPUT DATA							
Incremental DCP Blows	End of Increment ...		Cumulative Blows	Increment Penetration Rate (mm/blow)	Approximate Equivalent CBR (%)		
	DCP Depth (mm)	Test Depth (mm)			TRL ^(Note 1)	CSIR ^(Note 2)	Av'ge
0	110	0	0				
1	200	90	1	90.0	2.6	1.4	2.0
1	260	150	2	60.0	4.0	2.3	3.1
2	320	210	4	30.0	8.3	5.5	6.9
2	370	260	6	25.0	10.1	6.9	8.5
2	420	310	8	25.0	10.1	6.9	8.5
2	475	365	10	27.5	9.1	6.1	7.6
2	540	430	12	32.5	7.6	4.9	6.3
2	600	490	14	30.0	8.3	5.5	6.9
2	685	575	16	42.5	5.7	3.5	4.6
2	750	640	18	32.5	7.6	4.9	6.3
2	800	690	20	25.0	10.1	6.9	8.5
2	845	735	22	22.5	11.2	7.9	9.6
1	870	760	23	25.0	10.1	6.9	8.5
2	910	800	25	20.0	12.7	9.1	10.9
1	930	820	26	20.0	12.7	9.1	10.9
1	950	840	27	20.0	12.7	9.1	10.9

Summary	TRL ^(Note 1)	CSIR ^(Note 2)	Av'ge
CBR (Weighted Average %)	8.0	5.3	6.7
CBR (Minimum %)	2.6	1.4	2.0
CBR (Maximum %)	12.7	9.1	10.9

Notes:

1) TRRL, Road Transport Note 8: Largely applicable to granular soils ($\log \text{CBR} = 2.48 - 1.057 \log (\text{Penetration Rate})$)

2) CSIR (2009): More applicable to cohesive soils ($\text{CBR} = 410 \times (\text{Penetration Rate})^{-1.27}$)



Appendix D. PERCOLATION TEST RESULTS

Appendix E. GEOTECHNICAL LABORATORY TEST RESULTS



Laboratory Report



Contract Number: 79804

Client Ref: **C13010**

Client PO: **C13010**

Date Received: **14-07-2025**

Date Completed: **25-07-2025**

Report Date: **25-07-2025**

Client: **Red Rock Geoscience Ltd**

This report has been checked and approved by:

Contract Title: **Melksham Community Hospital**

For the attention of: **Benjamin sagar**



Shaun Jones
Laboratory manager

Description	Qty
Determination of water content BS EN ISO 17892-1:2014 - @ Non Accredited Test	6
4 Point Liquid & Plastic Limit.. BS EN ISO 17892-12 - * UKAS	6

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This test report/certificate shall not be reproduced except in full, without the approval of GEO Site & Testing Services Ltd. Any opinions or interpretations stated - within this report/certificate are excluded from the laboratories UKAS accreditation.

Approved Signatories:

Brendan Evans (Senior Office Administrator) - Brendan Evans (Business Support Co-ordinator) - Darren Bourne (Quality Senior Technician)

Paul Evans (Director) - Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager)

Shaun Thomas (Site Manager) - Wayne Honey (HR & HSE Manager)

GEO Site & Testing Services Ltd

Unit 3-4 Heol Aur, Dafen Ind Est, Llanelli, Carmarthenshire SA14 8QN

Tel: 01554 784 040 Fax: 01554 784 040 info@gstl.co.uk https://gstl.co.uk



Contract Number	79804	
Project Name	Melksham Community Hospital	
Date Tested	24/07/2025	
	DESCRIPTIONS	

[illegible]

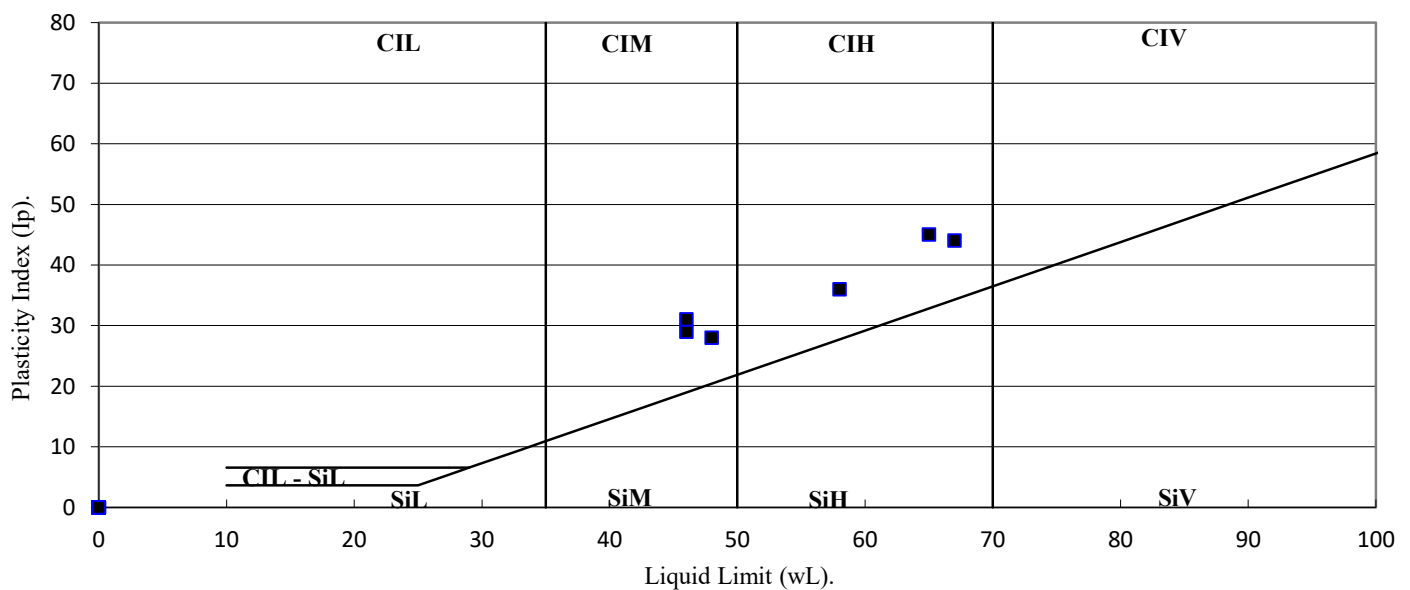
Operator
Aaron. H

Contract Number	79804	
Project Name	Melksham Community Hospital	
Date Tested	24/07/2025	
Test Comments	80g/30° Fall cone used with increasing water content	

[illegible]

SYMBOLS : NP = Non Plastic NB: All liquid limits are 4 point and wet sieved

PLASTICITY CHART



***For sample descriptions please see sample descriptions sheet**

Operator
Aaron. H

Appendix F. GEO-ENVIRONMENTAL LABORATORY TEST RESULTS

Red Rock Geoscience Ltd
East Wing
Station House
Broadclyst
Exeter
Devon
EX5 3AS

t: 01392 460800

e: Benjamin.Sagar@Redrock.global
office@redrock.global

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

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e: reception@i2analytical.com

Analytical Report Number : 25-037223

Project / Site name:	Melksham Community Hospital	Samples received on:	15/07/2025
Your job number:	C13010	Samples instructed on/ Analysis started on:	15/07/2025
Your order number:	C13010	Analysis completed by:	22/07/2025
Report Issue Number:	1	Report issued on:	22/07/2025
Samples Analysed:	5 soil samples		

Signed:



Joanna Wawrzeczko
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 25-037223

Project / Site name: Melksham Community Hospital

Your Order No: C13010

Lab Sample Number	614008	614009	614010	614011	614012
Sample Reference	WS05	WS01	WS03	WS04	WS01
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix	N/A	N/A	N/A	N/A	N/A
Depth (m)	0.40	1.20	0.70	1.20	0.10
Date Sampled	Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	14	17	17	8.7
Total mass of sample received	kg	0.1	NONE	1	1	1	0.6	1

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	-	-	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	OGR	-	-	-	OGR
Analysis completed	N/A	N/A	N/A	18/07/2025	-	-	-	18/07/2025

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8.2	9	8.3	8.2	8.1
Total Sulphate as SO ₄	%	0.005	MCERTS	0.095	0.129	0.108	0.083	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	42	120	81	130	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	20.8	60.2	40.3	65.4	-
Total Sulphur	mg/kg	50	MCERTS	400	410	500	260	-
Total Sulphur	%	0.005	MCERTS	0.04	0.041	0.05	0.026	-
Organic Matter (automated)	%	0.1	MCERTS	2.8	-	-	-	3.3

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	0.16
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.09	-	-	-	0.77
Pyrene	mg/kg	0.05	MCERTS	0.08	-	-	-	0.77
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	0.35
Chrysene	mg/kg	0.05	MCERTS	0.07	-	-	-	0.46
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.08	-	-	-	0.47
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	-	-	-	0.29
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.07	-	-	-	0.47
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	0.23
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	0.31

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	-	-	-	4.29
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Analytical Report Number: 25-037223

Project / Site name: Melksham Community Hospital

Your Order No: C13010

Lab Sample Number				614008	614009	614010	614011	614012
Sample Reference				WS05	WS01	WS03	WS04	WS01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.40	1.20	0.70	1.20	0.10
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection	Test Accreditation Status		

Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	3	-	-	-	5
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18	-	-	-	15
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	-	-	-	2.1
Boron (water soluble)	mg/kg	0.2	MCERTS	3.1	-	-	-	2.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	-	-	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	-	-	-	< 1.8
Chromium (III)	mg/kg	1	NONE	39	-	-	-	33
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	39	-	-	-	33
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	-	-	-	32
Lead (aqua regia extractable)	mg/kg	1	MCERTS	31	-	-	-	85
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	-	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	26	-	-	-	31
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.1	-	-	-	1.3
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	95	-	-	-	91

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	-	-	-	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	-	-	-	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	-	-	-	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	-	-	-	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	-	-	-	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	-	-	-	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	-	-	-	< 8.0
TPHCWG - Aliphatic >EC35 - EC44 EH_CU_1D_AL	mg/kg	8.4	NONE	< 8.4	-	-	-	< 8.4
TPHCWG - Aliphatic >EC5 - EC35 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	-	-	-	< 10
TPHCWG - Aliphatic >EC5 - EC44 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	-	-	-	< 10

TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	-	-	-	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	-	-	-	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.02	MCERTS	< 0.020	-	-	-	< 0.020
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	-	-	-	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	-	-	-	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	-	-	-	< 10
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	-	-	-	< 10
TPHCWG - Aromatic >EC35 - EC44 EH_CU_1D_AR	mg/kg	8.4	NONE	< 8.4	-	-	-	< 8.4
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	-	-	-	< 10
TPHCWG - Aromatic >EC5 - EC44 EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	-	-	-	< 10

VOCs

MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	-	-	-	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	-	-	-	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	-	-	-	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	-	-	-	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	-	-	-	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 25-037223

Project / Site name: Melksham Community Hospital

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
614008	WS05	None Supplied	0.4	Brown loam with gravel and vegetation
614009	WS01	None Supplied	1.2	Brown clay and loam with gravel
614010	WS03	None Supplied	0.7	Brown clay with gravel and vegetation
614011	WS04	None Supplied	1.2	Brown clay with gravel
614012	WS01	None Supplied	0.1	Brown loam with gravel and vegetation

Analytical Report Number : 25-037223

Project / Site name: Melksham Community Hospital

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID in soil	Determination of total petroleum hydrocarbons in soil by GC-FID with carbon banding aliphatic and aromatic	In-house method	L076B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil (Summed Bands)	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic (Summed Bands).	Calculation	L076B/L088-PL	D/W	NONE
Chromium III in soil	In-house method by calculation from total Cr and Cr VI	In-house method by calculation	L080-PL/L130B	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-PL	W	MCERTS
Total petroleum hydrocarbons with carbon banding by HS-GC/MS in soil	Determination of total petroleum hydrocarbons in soil by HS-GC/MS with carbon banding aliphatic and aromatic	In-house method	L088-PL	W	MCERTS

Analytical Report Number : 25-037223

Project / Site name: Melksham Community Hospital

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

Analytical Report Number : 25-037223

Project / Site name: Melksham Community Hospital

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container/Insufficient material provided c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS01	N/A	S	614009	a	Moisture Content	L019B	a
WS01	N/A	S	614009	a	Sample preparation	L019B	a
WS01	N/A	S	614009	a	Soil Descriptions	L019B	a
WS01	N/A	S	614009	a	Stones content of soil	L019B	a
WS01	N/A	S	614009	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS01	N/A	S	614009	a	Total Sulphur in soil	L038B	a
WS01	N/A	S	614009	a	Total sulphate (as SO ₄ in soil)	L038B	a
WS01	N/A	S	614009	a	pH in soil (automated)	L099-PL	a
WS01	N/A	S	614012	ab	Asbestos identification in Soil	A001B	ab
WS01	N/A	S	614012	ab	Asbestos types if id positive	N/A	a
WS01	N/A	S	614012	ab	BTEX and/or Volatile organic compounds in soil	L073B	ab
WS01	N/A	S	614012	ab	Boron, water soluble, in soil	L038B	a
WS01	N/A	S	614012	ab	Chromium III in soil	L080-PL/L130B	a
WS01	N/A	S	614012	ab	Hexavalent chromium in soil	L080-PL	a
WS01	N/A	S	614012	ab	Metals in soil by ICP-OES	L038B	a
WS01	N/A	S	614012	ab	Moisture Content	L019B	a
WS01	N/A	S	614012	ab	Organic matter (Automated) in soil	L009B	a
WS01	N/A	S	614012	ab	Sample preparation	L019B	a
WS01	N/A	S	614012	ab	Soil Descriptions	L019B	a
WS01	N/A	S	614012	ab	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	ab
WS01	N/A	S	614012	ab	Stones content of soil	L019B	a
WS01	N/A	S	614012	ab	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil (Summed Bands)	L076B/L088-PL	a
WS01	N/A	S	614012	ab	pH in soil (automated)	L099-PL	a
WS03	N/A	S	614010	a	Moisture Content	L019B	a
WS03	N/A	S	614010	a	Sample preparation	L019B	a
WS03	N/A	S	614010	a	Soil Descriptions	L019B	a
WS03	N/A	S	614010	a	Stones content of soil	L019B	a
WS03	N/A	S	614010	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS03	N/A	S	614010	a	Total Sulphur in soil	L038B	a
WS03	N/A	S	614010	a	Total sulphate (as SO ₄ in soil)	L038B	a
WS03	N/A	S	614010	a	pH in soil (automated)	L099-PL	a
WS04	N/A	S	614011	a	Moisture Content	L019B	a
WS04	N/A	S	614011	a	Sample preparation	L019B	a
WS04	N/A	S	614011	a	Soil Descriptions	L019B	a
WS04	N/A	S	614011	a	Stones content of soil	L019B	a
WS04	N/A	S	614011	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS04	N/A	S	614011	a	Total Sulphur in soil	L038B	a
WS04	N/A	S	614011	a	Total sulphate (as SO ₄ in soil)	L038B	a
WS04	N/A	S	614011	a	pH in soil (automated)	L099-PL	a
WS05	N/A	S	614008	ab	Asbestos identification in Soil	A001B	ab
WS05	N/A	S	614008	ab	Asbestos types if id positive	N/A	a
WS05	N/A	S	614008	ab	BTEX and/or Volatile organic compounds in soil	L073B	ab
WS05	N/A	S	614008	ab	Boron, water soluble, in soil	L038B	a
WS05	N/A	S	614008	ab	Chromium III in soil	L080-PL/L130B	a
WS05	N/A	S	614008	ab	Hexavalent chromium in soil	L080-PL	a
WS05	N/A	S	614008	ab	Metals in soil by ICP-OES	L038B	a
WS05	N/A	S	614008	ab	Moisture Content	L019B	a
WS05	N/A	S	614008	ab	Organic matter (Automated) in soil	L009B	a
WS05	N/A	S	614008	ab	Sample preparation	L019B	a
WS05	N/A	S	614008	ab	Soil Descriptions	L019B	a
WS05	N/A	S	614008	ab	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	ab
WS05	N/A	S	614008	ab	Stones content of soil	L019B	a
WS05	N/A	S	614008	ab	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS05	N/A	S	614008	ab	Total Sulphur in soil	L038B	a
WS05	N/A	S	614008	ab	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil (Summed Bands)	L076B/L088-PL	a

Analytical Report Number : 25-037223

Project / Site name: Melksham Community Hospital

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container/Insufficient material provided c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS05	N/A	S	614008	ab	Total sulphate (as SO ₄ in soil)	L038B	a
WS05	N/A	S	614008	ab	pH in soil (automated)	L099-PL	a

Appendix G. GENERIC ASSESSMENT CRITERIA VALUES

Commercial / Industrial		Assessment Criteria	Statutory SGVs (1)	Non-Statutory S4ULs (2)	Plymouth (3)	West Devon (4)	Atkins (5)	Statutory Part 2A C4SLs (6)
Metals and Metalloids	Antimony	7,500.00						
	Arsenic	640.00	640.00	640.00				640.00
	Cadmium	230.00	230.00	190.00 (7)				410.00
	Chromium III	8,600.00		8,600.00				
	Chromium VI	33.00		33.00				49.00
	Copper	68,000.00		68,000.00				
	Mercury inorganic	1,100.00	Withdrawn	1,100.00				
	Nickel	980.00		980.00				
	Lead	6,000.00			6,000.00 (6)			6,000.00
	Selenium	12,000.00	13,000.00	12,000.00				
Cyanide (mg/Kg)	Zinc	730,000.00		730,000.00				
	Beryllium	12.00		12.00				
	Boron	240,000.00		240,000.00				
	Mercury Elemental	25.80	Withdrawn	25.80 (8)				
	Mercury Methyl	320.00	Withdrawn	320.00				
	Vanadium	9,000.00		9,000.00				
	Cyanide	34.00					34.00	

Commercial / Industrial		Assessment Criteria S4ULs (2)			Statutory Part 2A C4SLs (6)
		1%	2.5%	6%	
PAH Congeners (mg/Kg)	Naphthalene	76.40 (7)	183.00 (7)	432.00 (7)	
	Acenaphthylene	83,000.00	97,000.00	100,000.00	
	Acenaphthene	84,000.00	97,000.00	100,000.00	
	Fluorene	63,000.00	68,000.00	71,000.00	
	Phenanthrene	22,000.00	22,000.00	23,000.00	
	Anthracene	520,000.00	540,000.00	540,000.00	
	Fluoranthene	23,000.00	23,000.00	23,000.00	
	Pyrene	54,000.00	54,000.00	54,000.00	
	Benzo(a)anthracene	170.00	170.00	180.00	
	Chrysene	350.00	350.00	350.00	
	Benzo(b)fluoranthene	44.00	44.00	45.00	
	Benzo(k)fluoranthene	1,200.00	1,200.00	1,200.00	
	Benzo(a)pyrene	35.00	35.00	36.00	76.00
	Indeno(1,2,3-cd)pyrene	500.00	510.00	510.00	
	Dibenzo(ah)Anthracene	3.50	3.60	3.60	
	Benzo(g,h,i)perylene	3,900.00	4,000.00	4,000.00	
	Coal Tar (3)	15.00	15.00	15.00	

Commercial / Industrial		Assessment Criteria S4ULs (2)			Statutory Part 2A C4SLs (6)
		1%	2.5%	6%	
TPH Speciation (mg/Kg)	TPH Aliphatic EC5-6	304.00 (8)	558.00 (8)	1,150.00 (8)	
	TPH Aliphatic EC6-8	144.00 (8)	322.00 (8)	736.00 (8)	
	TPH Aliphatic EC8-10	78.00 (8)	190.00 (8)	451.00 (8)	
	TPH Aliphatic EC10-12	48.00 (8)	118.00 (8)	283.00 (8)	
	TPH Aliphatic EC12-16	24.00 (8)	59.00 (8)	142.00 (8)	
	TPH Aliphatic EC16-35	1,600,000.00	170,000.00	1,800,000.00	
	TPH Aliphatic EC35-44	1,600,000.00	170,000.00	1,800,000.00	
	TPH Aromatic EC5-7	1,220.00 (8)	2,260.00 (8)	4,710.00 (8)	
	TPH Aromatic EC7-8	869.00 (8)	1,920.00 (8)	4,360.00 (8)	
	TPH Aromatic EC8-10	613.00 (8)	1,500.00 (8)	3,580.00 (8)	
	TPH Aromatic EC10-12	364.00 (8)	899.00 (8)	2,150.00 (8)	
	TPH Aromatic EC12-16	36,000.00	37,000.00	38,000.00	
	TPH Aromatic EC16-21		28,000.00		
	TPH Aromatic EC21-35		28,000.00		
	TPH Aromatic EC35-44		28,000.00		
	TPH Ali / Aro EC44-70		28,000.00		
	TPH 3-Band C6-10	78.00 (8)	190.00 (8)	451.00 (8)	
	TPH 3-Band C10-21	24.00 (8)	59.00 (8)	142.00 (8)	
	TPH 3-Band C21-40		28,000.00		

Commercial / Industrial		Assessment Criteria S4ULs / GAC		
		1%	2.5%	6%
Misc. Organics (mg/Kg)	BTEX Benzene (1)	27.00	47.00	90.00
	BTEX Toluene (1)	869.00 (8)	1,920.00 (8)	4,360.00 (8)
	BTEX Ethylbenzene (1)	518.00 (8)	1,220.00 (8)	2,840.00 (8)
	BTEX m Xylene (1)	478.00 (8)	1,120.00 (8)	2,620.00 (8)
	BTEX p Xylene (1)	625.00 (8)	1,470.00 (8)	3,460.00 (8)
	BTEX o Xylene (1)	576.00 (8)	1,350.00 (8)	3,170.00 (8)
	Phenol (1)	440.00	690.00	1,300.00
	Chlorophenols (1)	3,500.00	4,000.00	4,300.00
	Pentachlorophenol (1)		400.00	
	Methyl Tributyl Ether (MTBE) (2)	7,900.00	13,000.00	2,400.00
	Tributyl Tin oxide (TBTO) (2)	130.00	180.00	200.00
	1,2,4-trimethylbenzene (2)	42.00	99.00	220.00
	Isopropylbenzene (2)	1,400.00	3,300.00	7,700.00
	Propylbenzene (2)	4,100.00	9,700.00	21,000.00
	Cresols (total) (2)	160,000.00	180,000.00	
	Styrene (2)	3,300.00	6,500.00	11,000.00

Notes:

- (1) Environment Agency SGV, 2009
- (2) LQM / CIEH S4UL, 2015 and where unavailable CL:AIRE 2009 or In-House derived using CLEA UK V1.07 with C4SL setting
- (3) Arsenic criteria based on Clark, L.M., 2012, A critical review of the policy for arsenic risk assessments in Plymouth, Master of Science Dissertation
- (4) West Devon Borough Council, Arsenic Advice Note for Environmental Health Officers
- (5) No guideline value has been published for cyanide for the UK setting. A generic value derived by ATKINS is used
- (6) DEFRA, 2014, Category 4 Screening Levels (C4SLs)
- (7) LQM / CIEH GAC, 2015, based on a lifetime exposure via the oral, inhalation and dermal pathways
- (8) Value set at the vapour saturation limit. The CLEA UK model does not take into consideration oral or dermal exposure via direct contact with free phase product, nor does it consider inhalation exposure from vapours derived from free phase product (i.e. LNAPLs and DNAPLs). As a result, the model can under-estimate the risk at higher soil concentrations. This may happen when the calculated S4UL or SGV exceeds the soil saturation limit. On this basis the SGV/S4UL should be set at, or equal to, the aqueous or vapour soil saturation limits (whichever the lowest). However, where the vapour inhalation pathway is not considered to be a critical pathway (i.e. <10% of exposure total) this rule can be over-ridden. This has been the approach of the EA and LQM/CIEH and EIC/AGS/CL:AIRE in the generation of their respective generic assessment criteria values.

It is generally the approach of Red Rock Geoscience Ltd to set the GACs at the vapour saturation limit unless the vapour inhalation pathway is less than 10% of the total exposure.

Notes on the Derivation of Generic Assessment Criteria (SGVs / S4ULs):

- * Calculation of SGVs and S4ULs reflect a minimal risk approach
- * The typical soil scenario considered appropriate for the derivation of the generic value was SANDY LOAM
- * All chemical parameters as per CLEA UK default values. Default pH=7. Default Soil Organic Matter (SOM)=1%, 2.5 or 3%, and 6%
- * Metals and Metalloids not sensitive to soil organic matter variations
- * Vapour inhalation rates updated as per USEPA 2011
- * Exposure values changed as per S4UL publication, 2015. All other soil, land use, and exposure parameters were taken as per EA Publication EA SC050021/SR3 "Updated Technical Background to the CLEA Model", 2009

Notes on Lead:

The calculation of a generic assessment criteria for lead differs from the calculation of guideline values for other contaminants in that it uses the blood level concentrations as opposed to ingestion and inhalation intake concentrations. The approach taken by DEFRA for the calculation of the C4SL for lead utilised the IEUBK and Carlisle & Wade models to estimate intake values on the basis of blood level concentrations that could then be used in the CLEA UK model. As a result the CLEA UK Model can now be used to calculate a GAC for lead. However, in the absence of data for calculation of a lead GAC reflecting the minimal risk approach, the C4SL approach reflecting a low level of toxicological concern is used instead.

Appendix H. RISK PHRASES & MATRICES

RISK PHRASES AND MATRICES

Classification of Probability of Risk	
Classification	Definition
High Likelihood	There may be a pollutant linkage present and an event appears very likely in the short term or almost inevitable in the long term; or there is already evidence of harm to receptor.
Likely	Pollutant linkage may be present, and it is probable that there will be a long term risk and possibly a short term risk.
Low Likelihood	Pollutant linkage may be present, and it is possible that there will be a long term risk, though not certain
Unlikely	Pollutant linkage may be present, but the circumstances are such that an event is improbable, even in the long term.
No Risk Identified	No contaminants identified above guideline values likely to pose a risk to human health, fauna, flora, the water resources or the future built environment.

Risk Matrix of Probability and Consequence		Consequences				
		Severe	Medium	Mild	Minor	None
Probability of Risk	High Likelihood	Very High	High	Moderate	Low	Very Low
	Likely	High	Moderate	Low	Very Low	Negligible
	Low Likelihood	Moderate	Low	Very Low	Negligible	Negligible
	Unlikely	Low	Very Low	Negligible	Negligible	Negligible
	No Risk identified	Very Low	Negligible	Negligible	Negligible	Negligible

Classification of Severity of Consequence	
Classification	Definition
Severe	Acute risks to human health Catastrophic damage to buildings and property Major pollution of controlled waters
Medium	Chronic risk to human health Pollution of sensitive controlled waters Significant effects on sensitive ecosystems or species Significant damage to buildings or structures
Mild	Pollution of non-sensitive waters Minor damage to buildings or structures
Minor	Requirement for protective equipment during site works to mitigate health effects Damage to non-sensitive ecosystems or species
None Identified	Damage to human health, and the wider environment not expected. Requirement for basic protective equipment during site works still required as good practice.

NOTES:

Contaminated Land Risk Assessment involves the matching of the identified potential sources of contamination to the receptors through the possible migration pathways. These links must be completed for there to be any risk associated with the site.

This assessment of pollutant linkages is presented in terms of the Source (S), Pathway (P) and Receptor (R) concept and applying a qualitative value judgement to this appraisal. The assessment assigns a level of risk to each SPR link based on the probability and potential consequence of the risk being realised. The scale of risk is based on matrices as presented in the tables.

Appendix I. GENERAL NOTES AND LIMITATIONS

General Notes

The report has been prepared for the exclusive use of the Client named in the document and copyright remains with Red Rock Geoscience Ltd (RRG). Prior written permission must be obtained to reproduce all or part of the report. It has been prepared on the understanding that you will only disclose its contents to parties directly involved in the current investigation, preparation, and development of the site. Further copies may be obtained with the Client's written permission, from RRG who retains the master copy of the report.

Reports are prepared for the specific purpose stated in the document and in relation to the nature and extent of proposals made available to RRG. The recommendations should not be used for other schemes on or adjacent to the site. The assessment of the factual data, where called for, is provided to assist the Client and his Engineer and/or Advisers in the preparation of the designs.

All assessments and recommendations should be forwarded to the relevant planning authorities for comment and approval prior to implementation.

Phase I Assessments

Phase I desk study reports are largely based on data supplied by third parties and is therefore interpreted in accordance with the guidance notes and limitations provided by the data supplier.

Site walkover comments are based on simple observation by the Engineer and do not include extensive environmental, geotechnical, or structural surveys.

Phase II Assessments

Phase II site investigation reports are based on the ground and groundwater conditions encountered in the exploratory holes, together with the results of field and laboratory testing in the context of the proposed development. There may be special conditions appertaining to the site, which have not been revealed by the investigation and which may not have been taken into account in the report. RRG cannot be responsible for any changes in ground conditions following completion of fieldwork (e.g. subsequent spillages, leakages, excavations, etc. on or adjacent to the site).

Positioning of exploratory holes depends on the existence of utility services, existing structures, and / or access restrictions.

Methods of design and/or construction other than those proposed or referred to in the report may require consideration during the evolution of the proposals and if this is the case further assessment of the geotechnical data appropriate to these methods would be required.

The accuracy of results reported depends upon the technique of measurement, investigation, and test used and these values should not be regarded necessarily as characteristics of the strata as a whole.

The evaluation and conclusions do not preclude the variation in ground conditions between the test holes. Hence this report should be used in this context and not be construed necessarily as a comprehensive characterisation of the entire site conditions.

The samples selected for environmental and geotechnical laboratory testing are prepared and tested by an UKAS accredited and when possible or necessary MCERTS accredited external laboratory.

Any unavoidable variations from specified procedures are identified in the report.

Whilst reports may have expressed an opinion on possible configurations of strata between or beyond exploratory holes, or on the possible presence of features based on visual, verbal, written, cartographical, photographic, or published evidence, this is for guidance only and no liability can be accepted for its accuracy.

Ground conditions should be monitored during the construction of the works by ground-workers and the recommendations of the report re-evaluated as necessary.

Any comments on groundwater conditions have been based on observations made at the time of the investigation, unless specifically stated otherwise. It should be noted, however, that the observations are subject to the method and speed of boring, drilling, or excavation and that groundwater levels will vary due to seasonal effects and rainfall.

Where the investigation has taken account of possible effects of gases from fill or natural sources within, below, or outside the site, assessment has been based on current guidance provided by the CIRIA 665 Publication.

Unless specifically stated, the investigation has not taken account of any environmental soil or water guideline values other than the current and approved guideline values for the United Kingdom. Where these are not available, others such as the Canadian Environmental Guidelines, the US EPA guidelines and/or European Union Drinking Water Standards may be used as indicative only.

Site-specific assessment criteria values have been calculated using the current CLEA UK model V1.07, published by the Environment Agency in 2015.