

APPENDIX D – Annex 4 OF R&D66: 2008

Annex 4

Qualitative risk assessment

A4.1 Context

CIFIA RP599 Contaminated Land Risk Assessment Guide, provides a guide to good practice in assessing risks from contaminated land. This distinguishes between the processes of:

- **Risk estimation** – process of estimating risk that defined receptors will suffer harm.
- **Risk evaluation** – process of evaluating need for risk management action, with regard to magnitude of risks the level of uncertainty and, if remedial action is needed the objectives and broad costs and benefits.

At Phase 1 the risk estimation will take the form of a qualitative risk assessment, which will be entirely based on the conceptual model for each potential end-use of the site. Comments on level of uncertainty will also need to be included for each source-pathway-target linkage to allow the confidence in the assessed risks to be understood. The results of the qualitative risk assessment will allow the risk evaluation to be concisely described in the following chapters.

At Phase 2 (or later stages) the risk estimation will comprise a number of sequential steps all based on the conceptual model:

1. Interpretation of site investigation data with respect to relevant generic assessment criteria (Tier 1);
2. Interpretation of site investigation data with respect to site specific assessment criteria if appropriate (Tier 2);
3. Site specific qualitative risk assessment including input from Tier 1 and Tier 2 (this procedure).

Comments on level of uncertainty will also be required for through the interpretation of site investigation data and the qualitative risk assessment. The results of the qualitative risk assessment will allow the risk evaluation to be concisely described.

A4.2 Introduction

The following classification has been developed from DOE Guide to Risk Assessment and Risk Management for Environmental Protection and the Statutory Guidance on Contaminated Land (DfEs September 2006). The methodology differs from that presented in Contaminated Land Risk Assessment, A Guide to Good Practice (CIFIA C652, 2001), particularly in terms of the definitions of classification of consequences, which include a consideration of immediacy of hazards.

The key to the classification is that the designation of risk is based upon the consideration of both:

- a) the magnitude of the potential consequence (i.e. severity).
[takes into account both the potential severity of the hazard and the sensitivity of the receptor]
- b) the magnitude of probability (i.e. likelihood).
[takes into account both the presence of the hazard and receptor and the integrity of the pathway]

Appendix 4 Qualitative risk assessment

A4.3 Classification of consequence

Classification	Definition	Examples
Severe	Highly elevated concentrations likely to result in "significant harm" to human health as defined by the EPA 1990, Part 2A, if exposure occurs. Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce. Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.	Significant harm to humans is defined in circular 01/2000 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Major fish kill in surface water from large spillage of contaminants from site. Highly elevated concentrations of List 1 and 2 substances present in groundwater close to small potable abstraction (high sensitivity). Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).
Medium	Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs. Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstraction; reduction in amenity value or significant damage to agriculture or commerce. Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.	Significant harm to humans is defined in circular 01/2000 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Damage to building rendering it unsafe to occupy e.g. foundation damage resulting in instability. Ingress of contaminants through plastic potable water pipes.
Mild	Exposure to human health unlikely to lead to "significant harm". Equivalent to EA Category 3 pollution incident including minimal or short lived effect on water quality; marginal effect on amenity value, agriculture or commerce. Minor or short lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population. Minor damage to crops, buildings or property.	Exposure could lead to slight short-term effects (e.g. mild skin rash). Surface spalling of concrete.
Minor	No measurable effect on humans. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects of damage to buildings, structures and services.	The loss of plants in a landscaping scheme. Discoloration of concrete.

* For these purposes, disease is to be taken to mean an unhealthy condition of the body or a part of it and can include, for example, cancer, liver dysfunction or extensive skin ailments. Mental dysfunction is included only insofar as it is attributable to the effects of a pollutant on the body of the person concerned.

Qualitative risk assessment

Annex 4

A4.4 Classification of probability

(only applies if there is a possibility of a pollutant linkage being present)

Category	Definition	Examples
High likelihood	There is pollutant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.	a) Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden. b) Ground/groundwater contamination could be present from chemical works, containing a number of USTs, having been in operation on the same site for over 50 years.
Likely	There is pollutant linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	a) Elevated concentrations of toxic contaminants are present in soils at depths of 0.5-1.0m in a residential garden, or the top 0.5m in public open space. b) Ground/groundwater contamination could be present from an industrial site containing a UST present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage although there are no records of integrity tests.
Low likelihood	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place, and is less likely in the shorter term.	a) Elevated concentrations of toxic contaminants are present in soils at depths >1m in a residential garden, or 0.5-1.0m in public open space. b) Ground/groundwater contamination could be present on a light industrial unit constructed in the 1950s containing a UST in operation over the last 10 years – the tank is double skinned but there is no integrity testing or evidence of leakage.
Unlikely	There is pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.	a) Elevated concentrations of toxic contaminants are present below hardstanding. b) Light industrial unit <10 yrs old containing a double-skinned UST with annual integrity testing results available.

Note: A pollution linkage must first be established before probability is classified. If there is no pollution linkage then there is no potential risk. If there is no pollution linkage then there is no need to apply tests for probability and consequence.

For example if there is surface contamination and a major aquifer is present at depth, but this major aquifer is overlain by an aquiclude of significant thickness then there is no pollution linkage and the risks to the major aquifer are not assessed. The report should identify both the source and the receptor but state that because there is no linkage there are no potential risks.

A4.5 The classification of risk

Probability (likelihood)	Consequence			
	Severe	Medium	Mild	Minor
High likelihood	Very high risk	High risk	Moderate risk	Low risk
Likely	High risk	Moderate risk	Moderate/low risk	Low risk
Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

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A4.5.1 Description of the classified risks

Very high risk

There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to the site owner/occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.

High risk

Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.

Moderate risk

It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.

Low risk

It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.

Very low risk

It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.

No potential risk

There is no potential risk if no pollution linkage has been established.

Definitions	
Hazard	A property or situation which in certain circumstances could lead to harm. [The properties of different hazards must be assessed in relation to their potential to affect the various different receptors].
Risk	A combination of the probability or frequency of the occurrence of a defined hazard AND the magnitude of the consequences of that occurrence.
Probability	The mathematical expression of the chance of a particular event in a given period of time [e.g. probability of 0.2 is equivalent to 20% or a 1 in 5 chance].
Likelihood	Probability; the state or fact of being likely.
Consequences	The adverse effects (or harm) arising from a defined hazard which impairs the quality of the environment or human health in the short or longer term.
Pollution linkage	An identified pathway is capable of exposing a receptor to a contaminant and that contaminant is capable of harming the receptor.

APPENDIX E – Correspondence with Arun District Council

From: Paul Cann <Paul.Cann@arun.gov.uk> **On Behalf Of** Land Drainage
Sent: 20 November 2019 11:49
To: [REDACTED]
Cc: Sarah Burrow <Sarah.Burrow@arun.gov.uk>
Subject: RE: West Walbarton Lane - Soakaway Design Information

Hi Richard

I think the locations are ok, but have an additional one where the LAP is to be located. They need to be installed as a matter of urgency or there is a fear you will not capture sufficient information for the winter period. Please contact us again in January, so we can discuss the results so far and agree any infiltration testing locations/depths.

Regards

Paul Cann
Senior Engineer (Drainage & Coastal)

Paul Cann | Senior Engineer (Drainage & Coastal), Engineering Services, Arun District Council | Location: First Floor,
Arun Civic Centre, Maltravers Road, Littlehampton, BN17 5LF
Internal: 37819 | External: +44 (0) 1903 737819 | Fax: +44 (0) 1903 716019 | E-mail: Paul.Cann@arun.gov.uk
Arun is Working in Partnership with Chichester District Council
Visit Arun's web site at <http://www.arun.gov.uk/> and www.chichester.gov.uk



Save the environment - think before you print.

From: [REDACTED]
Sent: 19 November 2019 15:28
To: Land Drainage <Land.Drainage@arun.gov.uk>
Subject: West Walbarton Lane - Soakaway Design Information

Dear Paul,

Thank you for talking to me this morning and as discussed my client, the developer, is looking to put around 21 residential houses on the site on the southern side of West Walbarton Lane, as shown on the attached Housing Mix Plan.

Unfortunately, they did not realise it would be necessary to undertake groundwater level monitoring between October and March for a development of this size. So as we discussed we could install the monitoring points now and undertaking the monitoring for the remaining 5 months, which hopefully will be acceptable.

As promised I have attached a plan showing the locations around the site boundary where we would propose to install 5N^o window sampler probe holes to 5-6m, which I hope would be acceptable but please let me know if you would prefer different locations.

I hope our proposals will be acceptable and as discussed following the monitoring in November, December and January I will contact you again to agree the locations and depths for the soakaway tests.

Many thanks for your assistance.

Richard
Richard Blaney

FORGE ENVIRONMENTAL MANAGEMENT Ltd



From: Kevin Macknay <[REDACTED].uk> **On Behalf Of** Flood Risk Management
Sent: 15 November 2019 14:30
To: [REDACTED]
Cc: Paul Cann <Paul.Cann@arun.gov.uk>
Subject: RE: Soakaway Design Information

Richard,

Further to your recent email.

Within West Sussex it is our Borough and District councils who take the lead on the review of any technical submission for surface water drainage. In the case of Arun this would be Paul Cann, who I have copied into this email.

With our Borough and District partners we have developed a surface water policy, which you may find useful:

https://www.westsussex.gov.uk/media/12230/ws_ifa_policy_for_management_of_surface_water.pdf

Regards,

Kevin Macknay
Flood Risk Management - Team Leader
Highways, Transport and Planning
Place Services
West Sussex County Council

Follow us at  @WSHighways

From: [REDACTED]
Sent: 13 November 2019 17:06

To: Flood Risk Management
Subject: Soakaway Design Information

Dear Sir/Madam,

Further to a conversation I had with one of your colleagues in the highway team he suggested that I would be best e-mailing you regarding a query about undertaking groundwater level monitoring ahead of a proposed development.

The site in question is off West Walberton Lane, Walberton which is under the control of Arun Council whose guidance document "Supplementary Requirements for Surface Water Drainage Design Proposals" states that the groundwater levels for developments over 15 units needs to be undertaken between October and March. Unfortunately we have missed October so would it be acceptable for us to undertake 5 visits (i.e. Nov-March)?

Many thanks in advance for your assistance.

Regards

Richard
Richard Blaney

FORGE ENVIRONMENTAL MANAGEMENT Ltd
The Forge, Lower Vagg, Chilthorne Damer, Yeovil, Somerset. BA21 3PY



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<http://www.arun.gov.uk>

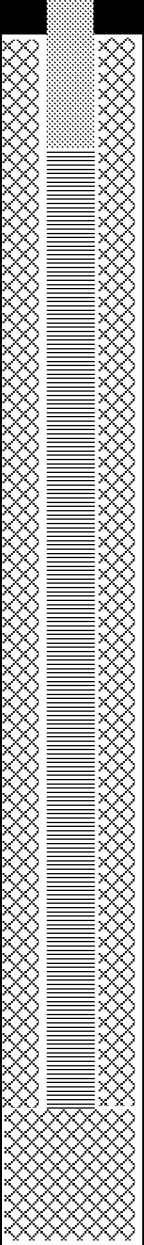
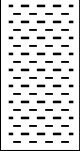
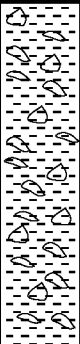
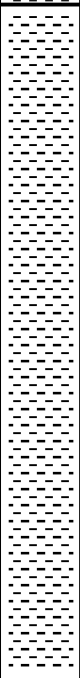
DX 57406 Littlehampton

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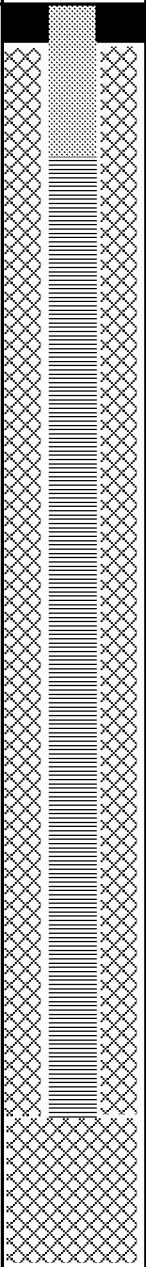
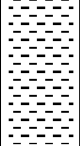
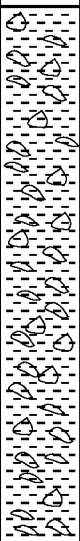
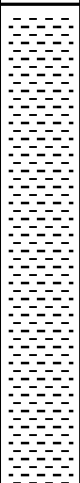
APPENDIX F – Probe Hole Logs

Issue No	A	Drilled by Jackson Drilling	Logged by RB	Approved by RB
 Forge Environmental Management Ltd The Forge, Lower Vagg, Chilthorne Damer, Yeovil, Somerset. BA21 3PY Tel : 01935 840346				Borehole No. WS1
Project West Walbarton Lane, Walbarton				
Job No	WAL168	Date Started	28/11/2019	Ground Level
		Date Completed	28/11/2019	Co-Ordinates
Client	Macra Ltd			Method/Plant
				Archway
				Sheet 1 of 1

STRATA					SAMPLES & TESTS			Backfill
Water	Level (mOD)	Legend	Depth (thickness)	Strat Description	Depth	Type No	Test Result	
▼			(0.20) 0.2	Brown silty clay with roots	0.1	disturbed		
				TOPSOIL				
			(0.60) 0.8	Light brown/yellow soft silty CLAY	0.5	disturbed		
				NATURAL SOILS				
			(1.30) 2.1	Soft to firm yellow/light brown sandy very gravelly CLAY. Gravel is sub angular to angular flint	2-2.45	5,5,5,6,5,6	N=-22	
				NATURAL SOILS				
			(2.90) 5.00	Firm tending to firm to stiff with depth yellow/light brown very sandy CLAY	4-4.45	6,10,11,14,12,9	N=46	
				NATURAL SOILS				

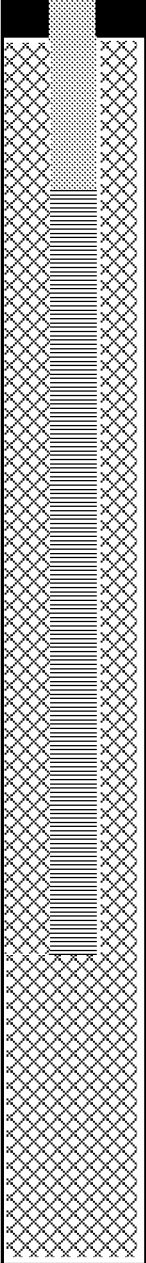
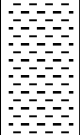
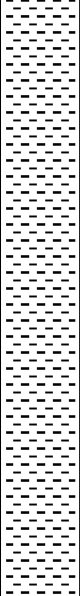
GENERAL REMARKS 1 Water strike at 2.2m 2 Standpipe installed to 4.5m due to collapse - plain 0.5m over 4.0m slotted
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Issue No	A	Drilled by	Jackson Drilling	Logged by	RB	Approved by	RB
 Forge Environmental Management Ltd The Forge, Lower Vagg, Chilthorne Damer, Yeovil, Somerset. BA21 3PY Tel : 01935 840346						Borehole No. WS2	
Project West Walbarton Lane, Walbarton							
Job No	WAL168	Date Started	28/11/2019	Ground Level		Co-Ordinates	
		Date Completed	28/11/2019				Depth 5m
Client						Method/Plant	Sheet
Macra Ltd						Archway	1 of 1

STRATA					SAMPLES & TESTS			Backfill
Water	Level (mOD)	Legend	Depth (thickness)	Strat Description	Depth	Type No	Test Result	
▼			(0.20) 0.2	Brown silty clay with roots TOPSOIL	0.1	disturbed		
			(0.60) 0.8	Light brown soft to firm silty CLAY NATURAL SOILS	0.5	disturbed		
			(2.20) 3.0	Soft to firm yellow/light brown sandy very gravelly CLAY. Gravel sub angular to angular flint NATURAL SOILS	1-1.45 3-3.45	4,3,4,4,4,5 1,2,1,2,2,1	N=17 N=6	
			(2.00) 5.00	Soft yellow/light brown very sandy CLAY NATURAL SOILS	5-5.45	1,0,1,1,1,0	N=3	

GENERAL REMARKS 1 Water Strike at 1.1m 2 Standpipe installed to 4.5m due to collapse - plain 0.5m over 4.0m slotted
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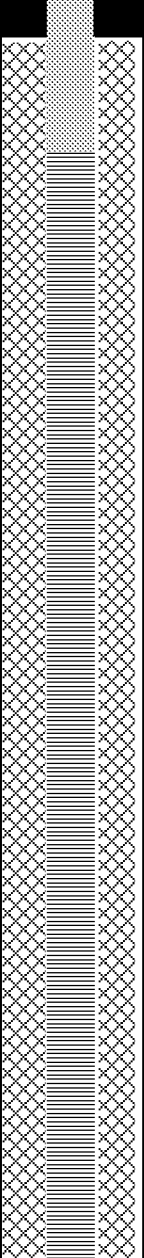
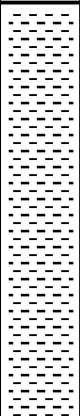
Issue No	A	Drilled by Jackson Drilling	Logged by RB	Approved by RB
 Forge Environmental Management Ltd The Forge, Lower Vagg, Chilthorne Damer, Yeovil, Somerset. BA21 3PY Tel : 01935 840346				Borehole No. WS3
Project West Walbarton Lane, Walbarton				
Job No	WAL168	Date Started	28/11/2019	Ground Level
		Date Completed	28/11/2019	Co-Ordinates
Client	Macra Ltd			Method/Plant
				Archway
				Depth
				5.00
				Sheet
				1 of 1

STRATA					SAMPLES & TESTS			Backfill
Wat	Level (mOD)	Legend	Depth (thickness)	Strat Description	Depth	Type No	Test Result	
▼			(0.20)	Brown silty clay with roots	0.1	disturbed		
			0.2	TOPSOIL				
			(0.60)	Light brown/yellow soft silty CLAY	0.5	disturbed		
			0.8	NATURAL SOILS				
			(1.60)	Soft to firm light grey/light brown sandy very gravelly CLAY. Gravel sub angular to angular	1-1.45	3,4,3,4,3,3	N=13	
			2.4	NATURAL SOILS				
			(2.6)	Soft yellow/light brown very sandy CLAY	3-3.45	2,2,2,1,2,1	N=6	
			5.00	NATURAL SOILS	5-5.45	1,0,0,1,0,1	N=2	

GENERAL REMARKS

- 1 Water strike at 0.8m
- 2 Standpipe installed to 3.8m due to collapse - plain 0.8m over 3.0m slotted

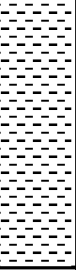
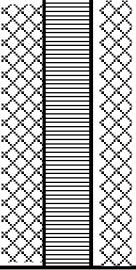
Issue No	A	Drilled by Jackson Drilling	Logged by RB	Approved by RB
 Forge Environmental Management Ltd The Forge, Lower Vagg, Chilthorne Damer, Yeovil, Somerset. BA21 3PY Tel : 01935 840346				Borehole No. WS4
Project West Walbarton Lane, Walbarton				
Job No	WAL168	Date Started	27/11/2019	Ground Level
		Date Completed	27/11/2019	Co-Ordinates
Client	Macra Ltd			Method/Plant
				Archway
				Depth
				6.00
				Sheet
				1 of 2

STRATA					SAMPLES & TESTS			Backfill
Water	Level (mOD)	Legend	Depth (thickness)	Strat Description	Depth	Type No	Test Result	
▼			(0.15) 0.15	Brown silty clay with roots TOPSOIL	0.1	disturbed		
			(0.45) 0.60	Light brown/light grey firm silty CLAY NATURAL SOILS	0.5	disturbed		
			(1.30) 2.0	Firm yellow/light brown sandy very gravelly CLAY. Gravel sub angular to angular flint NATURAL SOILS	1-1.45	5,6,6,6,5,6	N=23	
			(4.00)	Soft yellow/light brown very sandy CLAY	3-3.45	1,2,2,2,3,4	N=11	
					5-5.45	1,,2,1,1,0,2	N=4	

GENERAL REMARKS

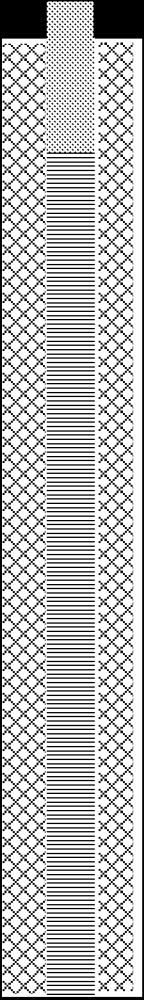
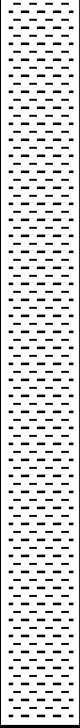
- 1 Water standing at surface
- 2 Standpipe installed to 6m - plain 1.0m over 5.0m slotted

Issue No	A	Drilled by	Jackson Drilling	Logged by	RB	Approved by	RB
 Forge Environmental Management Ltd The Forge, Lower Vagg, Chilthorne Damer, Yeovil, Somerset. BA21 3PY Tel : 01935 840346						Borehole No. WS4	
Project West Walbarton Lane, Walbarton							
Job No		WAL168		Date Started	27/11/2019	Ground Level	
				Date Completed	27/11/2019	Co-Ordinates	
Client						Method/Plant	Sheet
Macra Ltd						Archway	2 of 2

STRATA					SAMPLES & TESTS			Backfill
Wat	Level (mOD)	Legend	Depth (thickness)	Strat Description	Depth	Type No	Test Result	
				Soft yellow/light brown very sandy CLAY				
				NATURAL SOIL				
				End of probe hole				

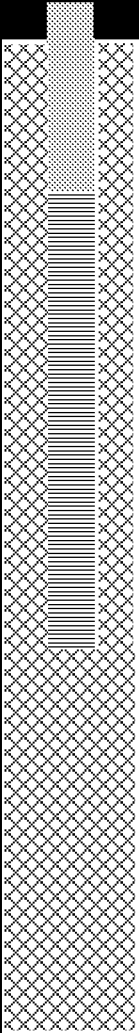
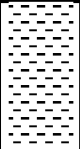
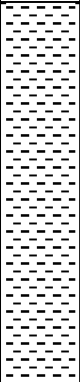
GENERAL REMARKS 1 Water standing at surface 2 Standpipe installed to 6m - plain 1.0m over 5.0m slotted

Issue No	A	Drilled by Jackson Drilling	Logged by RB	Approved by RB
 Forge Environmental Management Ltd The Forge, Lower Vagg, Chilthorne Damer, Yeovil, Somerset. BA21 3PY Tel : 01935 840346				Borehole No. WS5
Project West Walbarton Lane, Walbarton				
Job No	WAL168	Date Started 27/11/2019	Ground Level	Co-Ordinates
		Date Completed 27/11/2019		Depth 4.00
Client			Method/Plant	Sheet
Macra Ltd			Archway	1 of 1

STRATA					SAMPLES & TESTS			Backfill
Water	Level (mOD)	Legend	Depth (thickness)	Strat Description	Depth	Type No	Test Result	
▼			(0.15)	Brown silty clay with roots	0.05	disturbed		
			0.15	TOPSOIL				
			(0.45)	Firm light brown/yellow gravelly silty CLAY	0.5	disturbed		
			0.60					
			0.95	NATURAL SOILS				
				Soft to firm yellow/light brown very sandy CLAY	2-2.45	3,3,3,3,4,5	N=15	
			4.0	NATURAL SOILS	4-4.55	1,1,2,1,2,2	N=7	
				BASE OF PROBE HOLE				

GENERAL REMARKS 1 Water standing at surface 2 Standpipe installed to 4m - plain 1.0m over 3.0m slotted

Issue No	A	Drilled by Jackson Drilling	Logged by RB	Approved by RB
 Forge Environmental Management Ltd The Forge, Lower Vagg, Chilthorne Damer, Yeovil, Somerset. BA21 3PY Tel : 01935 840346				Borehole No. WS6
Project West Walbarton Lane, Walbarton				
Job No	WAL168	Date Started	28/11/2019	Ground Level
		Date Completed	28/11/2019	Co-Ordinates
Client	Macra Ltd			Method/Plant
				Archway
				Depth
				4.00
				Sheet
				1 of 1

STRATA					SAMPLES & TESTS			Backfill
Water	Level (mOD)	Legend	Depth (thickness)	Strat Description	Depth	Type No	Test Result	
▼			(0.20) 0.2	Brown silty clay with roots TOPSOIL	0.1	disturbed		
			(0.60) 0.8	Light brown/yellow soft silty CLAY NATURAL SOILS	0.5	disturbed		
			(1.80) 2.6	Light grey/light brown sandy very gravelly CLAY. Gravel sub rounded to sub angular NATURAL SOILS	2-2.45	2,2,3,2,3,2	N=10	
			(1.40) 4.0	Soft yellow/light brown very sandy CLAY NATURAL SOILS	4-4.45	1,2,1,1,2,1	N=5	
				BASE OF PROBE HOLE				

GENERAL REMARKS 1 Located with the area of the proposed LAP 2 Water strike at 1.0m 3 Standpipe installed to 2.6m due to collapse - plain 0.6m over 2.0m slotted

APPENDIX G – Site Photographs



PLATE 1 – Cores from Window Sample borehole WS1



PLATE 2 – Cores from Window Sample borehole WS2



PLATE 3 – Cores from Window Sample borehole WS3



PLATE 4 – Cores from Window Sample borehole WS4



PLATE 5 – Cores from Window Sample borehole WS5



PLATE 6 – Cores from Window Sample borehole WS6 (LAP)

APPENDIX H – Chemical Analysis Results Report



2683



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 19-26031

Issue: 1

Date of Issue: 06/12/2019

Contact: Richard Blaney

Customer Details: Forge Environmental Management Ltd
The Forge
Lower Vagg
Yeovil
Somerset BA21 3PY

Quotation No: Q19-01649

Order No: WAL163.D/184

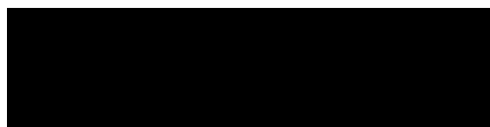
Customer Reference: WAL163.D/184

Date Received: 03/12/2019

Date Approved: 06/12/2019

Details: Walbarton Lane, Walbarton

Approved by:



Mike Varley, Technical Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

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Sample Summary

Report No.: 19-26031, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
191106	WS1 0.10	29/11/2019	03/12/2019	Silty loam	
191107	WS1 0.50	29/11/2019	03/12/2019		
191108	WS2 0.10	29/11/2019	03/12/2019		
191109	WS2 0.50	29/11/2019	03/12/2019	Silty loam	
191110	WS3 0.10	29/11/2019	03/12/2019	Silty loam	
191111	WS3 0.50	29/11/2019	03/12/2019		
191112	WS4 0.10	28/11/2019	03/12/2019		
191113	WS4 0.50	28/11/2019	03/12/2019	Silty clayey loam	
191114	WS5 0.05	28/11/2019	03/12/2019	Silty loam	
191115	WS5 0.60	28/11/2019	03/12/2019		
191116	WS6 0.10	29/11/2019	03/12/2019		
191117	WS6 0.50	29/11/2019	03/12/2019	Silty loam	



Results Summary

2683

Report No.: 19-26031, issue number 1

ELAB Reference	191106	191109	191110	191113
Customer Reference				
Sample ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sample Location	WS1	WS2	WS3	WS4
Sample Depth (m)	0.10	0.50	0.10	0.50
Sampling Date	29/11/2019	29/11/2019	29/11/2019	28/11/2019

Determinand	Codes	Units	LOD				
Soil sample preparation parameters							
Material removed	N	%	0.1	28.0	< 0.1	< 0.1	26.7
Description of Inert material removed	N		0	Stones	None	None	Stones
Metals							
Arsenic	M	mg/kg	1	5.7	10.8	10.2	13.1
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	0.6	0.6
Chromium	M	mg/kg	5	24.3	36.9	36.4	37.5
Copper	M	mg/kg	5	12.9	16.8	40.0	14.9
Lead	M	mg/kg	5	38.0	16.6	81.5	22.5
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	14.3	23.2	19.2	36.1
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	72.6	61.6	580	91.0
Anions							
Water Soluble Sulphate	M	g/l	0.02	0.89	0.06	0.06	0.11
Inorganics							
Elemental Sulphur	M	mg/kg	20	< 20	< 20	< 20	36
Free Cyanide	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8
Total Sulphide	N	mg/kg	2	< 2	< 2	< 2	< 2
Total Cyanide	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Boron	N	mg/kg	0.5	1.0	0.6	1.4	< 0.5
Miscellaneous							
pH	M	pH units	0.1	6.2	5.4	6.2	7.0
Soil Organic Matter	U	%	0.1	4.5	0.6	4.6	0.2
Phenols							
Phenol	M	mg/kg	1	< 1	< 1	< 1	< 1
3,4-Dimethylphenol	N	mg/kg	1	< 1	< 1	< 1	< 1
2,3-Dimethylphenol	M	mg/kg	1	< 1	< 1	< 1	< 1
2,3,5-trimethylphenol	M	mg/kg	1	< 1	< 1	< 1	< 1
Total Monohydric Phenols	N	mg/kg	5	< 5	< 5	< 5	< 5
Polyaromatic hydrocarbons							
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1	0.3	< 0.1
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	0.2	< 0.1	0.8	< 0.1
Pyrene	M	mg/kg	0.1	0.2	< 0.1	0.8	< 0.1
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	0.6	< 0.1
Chrysene	M	mg/kg	0.1	< 0.1	< 0.1	0.6	< 0.1
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	0.4	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	0.7	< 0.1
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	0.4	< 0.1
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	0.3	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	M	mg/kg	0.1	< 0.1	< 0.1	0.3	< 0.1
Total PAH(16)	M	mg/kg	0.4	1.0	< 0.4	5.3	< 0.4



Results Summary

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Report No.: 19-26031, issue number 1

ELAB Reference			191106	191109	191110	191113
Customer Reference						
Sample ID						
Sample Type			SOIL	SOIL	SOIL	SOIL
Sample Location			WS1	WS2	WS3	WS4
Sample Depth (m)			0.10	0.50	0.10	0.50
Sampling Date			29/11/2019	29/11/2019	29/11/2019	28/11/2019
s	Units	LOD				
	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0



Results Summary

2683

Report No.: 19-26031, issue number 1

ELAB Reference	191114	191117
Customer Reference		
Sample ID		
Sample Type	SOIL	SOIL
Sample Location	WS5	WS6
Sample Depth (m)	0.05	0.50
Sampling Date	28/11/2019	29/11/2019

Determinand	Codes	Units	LOD		
Soil sample preparation parameters					
Material removed	N	%	0.1	13.9	< 0.1
Description of Inert material removed	N		0	Stones, Twigs	None
Metals					
Arsenic	M	mg/kg	1	4.0	6.4
Cadmium	M	mg/kg	0.5	0.6	< 0.5
Chromium	M	mg/kg	5	20.3	25.6
Copper	M	mg/kg	5	17.3	15.2
Lead	M	mg/kg	5	33.5	14.9
Mercury	M	mg/kg	0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	14.5	15.0
Selenium	M	mg/kg	1	< 1.0	< 1.0
Zinc	M	mg/kg	5	63.8	52.6
Anions					
Water Soluble Sulphate	M	g/l	0.02	0.08	< 0.02
Inorganics					
Elemental Sulphur	M	mg/kg	20	< 20	< 20
Free Cyanide	N	mg/kg	1	< 1.0	< 1.0
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8
Total Sulphide	N	mg/kg	2	< 2	< 2
Total Cyanide	M	mg/kg	1	1.3	< 1.0
Water Soluble Boron	N	mg/kg	0.5	1.8	0.5
Miscellaneous					
pH	M	pH units	0.1	5.5	5.6
Soil Organic Matter	U	%	0.1	12	2.6
Phenols					
Phenol	M	mg/kg	1	< 1	< 1
3,4-Dimethylphenol	N	mg/kg	1	< 1	< 1
2,3-Dimethylphenol	M	mg/kg	1	< 1	< 1
2,3,5-trimethylphenol	M	mg/kg	1	< 1	< 1
Total Monohydric Phenols	N	mg/kg	5	< 5	< 5
Polyaromatic hydrocarbons					
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	0.1	< 0.1
Pyrene	M	mg/kg	0.1	0.1	< 0.1
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	< 0.1
Chrysene	M	mg/kg	0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	M	mg/kg	0.1	< 0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4	< 0.4	< 0.4



Results Summary

2683

Report No.: 19-26031, issue number 1

ELAB Reference	191114	191117
Customer Reference		
Sample ID		
Sample Type	SOIL	SOIL
Sample Location	WS5	WS6
Sample Depth (m)	0.05	0.50
Sampling Date	28/11/2019	29/11/2019

Determinand	Codes	Units	LOD		
BTEX					
Benzene	N	ug/kg	10	< 10.0	< 10.0
Toluene	N	ug/kg	10	< 10.0	< 10.0
Ethylbenzene	N	ug/kg	10	< 10.0	< 10.0
Xylenes	N	ug/kg	10	< 10.0	< 10.0
MTBE	N	ug/kg	10	< 10.0	< 10.0
TPH CWG					
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0	< 1.0
>C10-C12 Aliphatic	M	mg/kg	1	< 1.0	< 1.0
>C12-C16 Aliphatic	M	mg/kg	1	< 1.0	< 1.0
>C16-C21 Aliphatic	M	mg/kg	1	< 1.0	< 1.0
>C21-C35 Aliphatic	M	mg/kg	1	< 1.0	< 1.0
>C35-C40 Aliphatic	M	mg/kg	1	< 1.0	< 1.0
Total aliphatic hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	< 1.0
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01
>C8-C10 Aromatic	N	mg/kg	1	< 1.0	< 1.0
>C10-C12 Aromatic	M	mg/kg	1	< 1.0	< 1.0
>C12-C16 Aromatic	M	mg/kg	1	< 1.0	< 1.0
>C16-C21 Aromatic	M	mg/kg	1	< 1.0	< 1.0
>C21-C35 Aromatic	M	mg/kg	1	< 1.0	< 1.0
>C35-C40 Aromatic	M	mg/kg	1	< 1.0	< 1.0
Total aromatic hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	< 1.0
Total petroleum hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	< 1.0

Method Summary

Report No.: 19-26031, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Free cyanide	N	As submitted sample	04/12/2019	107	Colorimetry
Sulphide	N	As submitted sample	04/12/2019	109	Colorimetry
Hexavalent chromium	N	As submitted sample	04/12/2019	110	Colorimetry
pH	M	Air dried sample	04/12/2019	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	04/12/2019	118	ICPMS
Phenols in solids	M	As submitted sample	04/12/2019	121	HPLC
Elemental Sulphur	M	Air dried sample	04/12/2019	122	HPLC
PAH (GC-FID)	M	As submitted sample	04/12/2019	133	GC-FID
Water soluble anions	M	Air dried sample	04/12/2019	172	Ion Chromatography
Low range Aliphatic hydrocarbons soil	N	As submitted sample	04/12/2019	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	04/12/2019	181	GC-MS
BTEX in solids	N	As submitted sample	04/12/2019	181A	GC-MS
Water soluble boron	N	Air dried sample	04/12/2019	202	Colorimetry
Total cyanide	M	As submitted sample	04/12/2019	204	Colorimetry
TPH CWG soil by gc-gc	M	As submitted sample	04/12/2019	214	
Soil organic matter	U	Air dried sample	04/12/2019	BS1377:P3	Titrimetry

Tests marked N are not UKAS accredited



Report Information

Report No.: 19-26031, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.

ELAB are unable to provide an interpretation or opinion on the content of this report.

The results relate only to the sample received.

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage