

SITE INVESTIGATION AND LAND QUALITY RISK ASSESSMENT

**Land at Westmill Trout Farm, Ware, Hertfordshire,
SG12 0ET**

Prepared for: General Phase Ltd

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SLR[®] 

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CONTENTS

1.0	INTRODUCTION	1
1.1	Appointment.....	1
1.2	Proposed Development	1
1.3	Background	1
1.4	Objectives	2
1.5	Scope of Works	2
2.0	ENVIRONMENTAL SITE SETTING	3
2.1	Site Vicinity Description	3
2.2	Physical Site Setting	4
2.3	Site History.....	4
3.0	REVISED PRELIMINARY CONCEPTUAL SITE MODEL.....	5
3.1	Approach.....	5
3.2	Qualitative Risk Assessment.....	5
3.3	Further Assessment	6
4.0	RECORD OF SITE ACTIVITIES	7
4.1	Utility Clearance.....	7
4.2	Hand Pits.....	7
4.3	Laboratory Analysis - Soils.....	7
5.0	RECORD OF GROUND CONDITIONS	8
5.1	Geology.....	8
5.2	Groundwater.....	8
5.3	Visual / Olfactory Observations.....	8
5.4	Soil Chemistry	8
6.0	HUMAN HEALTH RISK ASSESSMENT	10
6.1	Approach.....	10
6.2	Human Health Generic Risk Assessment.....	11
6.2.1	Metals.....	11
6.2.2	PAHs	11
6.2.3	TPH CWG.....	11
6.2.4	Asbestos	11
6.3	Site Specific Risk Assessment	11

7.0 CONCLUSIONS 13

DOCUMENT REFERENCES

TABLES

Table 2-1: Site Details.....	3
Table 2-2: Summary of physical site features	4
Table 3-1: Preliminary Conceptual Site Model	6
Table 6-1: Human Health Generic Risk Assessment - Soils - Lead.....	11
Table 6-2: Human Health Specific Risk Assessment – Lead	12

DRAWINGS

Drawing 01: Site Location Plan
Drawing 02: Site Layout Plan
Drawing 03: Excavation Location Plan

APPENDICES

Appendix 01: Proposed Development Layout
Appendix 02: East Herts Council Correspondence
Appendix 03: Site Walkover Photographs (July 2020)
Appendix 04: Exploratory Hole Logs
Appendix 05: Photographic Appendix
Appendix 06: Chemical Laboratory Test Certificates
Appendix 07: Human Health Risk Assessment Screening Sheets
Appendix 08: Site Specific Assessment Criteria

1.0 Introduction

1.1 Appointment

In January 2021, SLR Consulting (SLR) were appointed by General Phase Limited (the Client) to provide consultancy services to support a discharge of a Planning Conditions at Land at Westmill Trout Farm, Ware, Hertfordshire, SG12 0ET. A site location plan is provided in **Drawing 01**, while the current layout is illustrated in **Drawing 02**.

SLR has carried out a ground investigation and this report provides the factual results alongside an assessment of the land quality risks present at the site.

The report has been completed by SLR Consulting's Land Quality and Remediation team based at Treenwood House, Rowden Lane, Bradford on Avon, Wiltshire, BA15 2AU (Tel: 01225 309400).

1.2 Proposed Development

A planning application (reference 3/18/2629/ARPN) was submitted to East Herts Council for the change of use of an agricultural building into a dwelling house. The proposed development covers an area of approximately 40m² and includes no changes to the building footprint. The proposed development layout is illustrated in **Appendix 01**. The application was made under Permitted Development rights. This application was approved subject to conditions, the contaminated land condition (condition 2) is summarised below:

Prior to commencement of the development hereby approved a scheme to deal with contamination of land and/or groundwater shall be submitted to and approved by the Local Planning Authority and the development should be implemented in accordance with the approved scheme. The scheme shall include all of the following measures unless the Local Planning Authority dispenses with any such requirement specifically and in writing:

1. *A desk-top study carried out by a competent person to identify and evaluate all potential sources and impacts of land and/or ground contamination relevant to the site. The requirements of the Local Planning Authority shall be fully established before the desktop study is commenced and it shall conform to any such requirements. Copies of the desk-top study shall be submitted to the Local Planning Authority without delay upon completion.*
2. *A site investigation shall be carried out by a competent person to fully and effectively characterise the nature and extent of any land and/or groundwater contamination and its implications. The site investigation shall not be commenced until:*
 - (i). *A desk-top study has been completed satisfying the requirements of paragraph (1) above;*
 - (ii). *The requirements of the Local Planning Authority for site investigations have been fully established; and,*
 - (iii). *The extent and methodology have been agreed in writing with the Local Planning Authority.*

Copies of a report on the completed site investigation shall be submitted to the Local Planning Authority without delay on completion.

1.3 Background

SLR completed a Phase 1 report¹ to discharge Condition 2 part 1 which East Herts Council contaminated land department reviewed the report and had the following response:

¹ Preliminary Land Quality Risk Assessment - Westmill Trout Farm, Ware. July 2020.

“The details that have been submitted pursuant to condition 2 (contamination) of consent 3/18/2629/ARPN are not sufficient to enable the condition to be discharged With the nature of the proposed development being residential – a sensitive land use, we require a Phase II assessment to be completed in order to fully assess the potential for on-site contamination and the risk to end users.

A shallow site investigation in areas of soft landscaping was proposed and details were sent to East Herts Council contaminated land department for comment. The proposed scope and methodology of the site investigation were accepted by the Local Planning Authority (LPA) and this report presents the findings. Correspondence with East Herts Council is included as **Appendix 02**.

1.4 Objectives

This report presents the findings of the shallow site investigation. The information obtained has been used to further develop the conceptual site model which has been interrogated to determine potential risks to the environment or human health.

1.5 Scope of Works

The full scope of the site investigation is presented in **Section 4.0**, however the tasks undertaken by SLR comprised:

- Review of the site setting and development, summarised from the Phase 1 report.
- Health and safety planning of the site investigation.
- Clearance of all excavation locations with the use of a Cable Avoidance Tool (CAT).
- Excavation of 4No. hand pits to approximately 0.60m below ground level (bgl).
- Collection of soil samples for subsequent environmental analysis.
- Field screening tests and logging of soil arisings from all excavations to BS5930.
- Preparation of interpretive report.

2.0 Environmental Site Setting

The following information has been summarised from the Phase 1 desk-study which used information obtained from a site walkover undertaken by SLR (08/07/2020) and the following sources:

- Ordnance Survey (OS) mapping.
- Multi-Agency Geographic Information for the Countryside (MAGIC) website.
- Google Earth.
- British Geological Survey (BGS).
- Groundsure Geo + Enviro Insight Report and Historic Maps.

2.1 Site Vicinity Description

Table 2-1, below, summarises the property details.

Table 2-1: Site Details

Address	Land at Westmill Trout Farm, Ware, Hertfordshire, SG12 0ET	
Site Location	<p>The site is located approximately 3km to the northwest of Ware within a mixed agricultural and industrial setting off Westmill Road.</p> <p>The site is centred on National Grid Reference 533986, 216283. The site location is illustrated in Drawing 01.</p>	
Site Description	<p>The site is approximately 40m² (0.01 hectares) in area and roughly rectangular in shape.</p> <p>The site is occupied by former stables building with a fringe of soft landscaping (grass cover) to the north and east.</p> <p>The stables building is located on a level concrete slab at approximately 46m AOD with the surrounding land, including soft landscaped area, sloping down towards the north.</p> <p>Access to the site is via the trout farm to the north of the site or via an access gate to the east of the site boundary.</p> <p>Site photographs are included as Appendix 03.</p>	
Land Uses Surrounding the Site	North	Westmill Trout Farm with the River Rib and agricultural fields beyond
	South	Westmill Plantation is adjacent to the south of the site with a road running parallel to the site boundary approximately (c.) 10m south. A disused quarry pit is c.35m south with part of the Westmill Quarry located beyond to the southeast.
	East	Westmill Trout Farm and associated ponds continue to the east of the site.
	West	Westmill Cottages, Westmill House and Westmill Lodge are located to the west of the site with Westmill Road beyond.

2.2 Physical Site Setting

A summary of the main physical features of the site are given in **Table 2-2**, below.

Table 2-2: Summary of physical site features

Geology	<p>Made Ground – not recorded beneath the site</p> <p>Superficial Deposits – not recorded beneath the site</p> <p>Bedrock – Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) – Chalk.</p> <p>The closest BGS borehole record (TL31NW23) is situated c.140m northwest of the site and records 0.6m Topsoil above superficial deposits comprising a thin layer (c.0.40m) of clay over gravel to 5.33m bgl. Chalk was encountered beneath superficial deposits at 5.33m bgl to the base of the borehole c. 36.57m bgl.</p>
Hydrogeology	<p>The bedrock (chalk) beneath the site is designated as a principal aquifer.</p> <p>There are 5No. records for groundwater licenses associated with the Westmill Quarry located approximately 132m southeast of the site. There are no potable abstraction licenses within 1km of the site.</p> <p>The site is within a source protection zone 2 (outer catchment)</p>
Hydrology	<p>The closest surface water features are the ponds and surface drains associated with Westmill Trout Farm. The River Rib is located 16m north of the site.</p> <p>There are 15No. surface water abstractions within 200m of the site. The closest relates to the Westmill Trout Farm, approximately 135m northeast.</p>

2.3 Site History

OS mapping shows that the site was originally part of a small woodland which extended to the west, north and east of the site. During the 1900s a small building has been constructed in the western part of the site. The original building appears to have been replaced in the 1970s with a slightly larger building covering the majority of the site. There are no further changes shown on the available OS maps.

The site surrounds initially comprise agricultural fields and associated buildings with a corn mill present to the northeast of the site. Possible quarrying activities to the south of the site during the 1960's were evident with disused pits mapped in the 1970s mapping including a gravel works with associated conveyors and further disused pits 250m east of the site. A trout farm was developed in the 1990s, based on OS mapping, which include a series of ponds and drains present during a recent site walkover.

Evidence for Historic Contamination

The land has undergone minimal development since the earliest map edition, there remains potential for some Made Ground associated with the development of the site to be present which could theoretically present a source of contamination which requires further consideration.

3.0 Revised Preliminary Conceptual Site Model

3.1 Approach

The normal procedure for assessing land dictates that potential contaminants, pathways and receptors should be considered within the context of contaminant or pollutant linkages. An evaluation of the risks associated with each linkage should drive decisions regarding the status of the land as contaminated and requiring remediation, uncontaminated or requiring further investigation.

3.2 Qualitative Risk Assessment

The information summarised in **Section 2.0** has been used to identify the likely contaminant sources, receptors and pathways present at the site. The elements of the preliminary conceptual site model, in **Table 3-1** overleaf, have been used to consider the potential pollutant linkages (PPL), their significance and acceptability.

It must be remembered that:

- OS mapping indicates the site was originally part of a small woodland and during the 1900s a small building was constructed in the west of the site. The original building appears to have been replaced in the 1970s with a slightly larger building covering the majority of the site.
- The site is part of the fish farm to the north of the site which was developed in the 1990's based on OS mapping. The site walkover indicated the ponds and drains have been dug out and then infilled with site-won material over time. It is therefore likely that there is a layer of reworked material beneath the site extending northwards.
- There has been no bulk fuel storage on site and chemicals associated with the trout farm (off-site) are not stored or used within the site boundary.
- Made Ground and Superficial Deposits are not recorded beneath the site however BGS borehole records indicate granular superficial deposits beneath topsoil and a thin layer of clay are present.
- Bedrock beneath the site is recorded as the Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated).
- The bedrock (chalk) is classified as a principal aquifer
- The site is listed within a Zone 2 SPZ
- The closest surface water features are the ponds and surface drains associated with the Trout Farm. The River Rib (Inland River) is located 16m north the site.
- The development consists of a change in use of an existing stable building into a dwelling house.

Table 3-1: Preliminary Conceptual Site Model

Source / Area of Concern	Contaminant(s)	Receptors	Likelihood of PPL Forming & Comment on Consequence	Risk Classification	Next Step in Procedure
		Human Health – Future site users, including groundworkers and maintenance	PPL1: The extent of the Made Ground beneath the site is unknown. Based on the desk study and walkover information Made Ground beneath the site is likely to be a thin veneer of reworked natural material.	Moderate / Low Risk	PPL1: Further investigation and assessment
		Properties – Future on-site buildings and infrastructure	The existing buildings appear in good repair, and the development is a change of use. Unlikely that the reworked natural material would impact the existing on-site building	Negligible	-
		Surface Water – The River Rib is located approximately 16m north of the site	Despite the proximity to the River Rib (16m north) the Made Ground beneath the site is not considered a significant source of contamination an unlikely to impact the surface water.	Low Risk	-
		Groundwater – principal bedrock aquifer.	The Made Ground beneath the site is not considered to represent a significant source of contamination, rather a thin veneer of reworked natural material. Therefore, it is unlikely to impact the underlying Principal Aquifer.	Low Risk	-

Given the proposed residential end use, the most likely / significant PPL appear to be:

- **PPL1:** Potential harm to Human Health from exposure to contaminants, including metals, PAHs, TPH and asbestos, in general Made Ground. Exposure pathways include direct contact & ingestion with impacted soils, inhalation of dust (indoor and outdoor) and inhalation of vapours (indoor and outdoor).

3.3 Further Assessment

A shallow intrusive ground investigation in areas of soft landscaping where current and future site users might come into contact with general Made Ground is recommended to assess the following pollutant linkages:

- *PPL1: Potential Harm to Human Health from Exposure to Contaminants in Made Ground*

The results of the investigation should be used to inform generic and where necessary site specific human health risk assessments.

4.0 Record of Site Activities

4.1 Utility Clearance

Utility clearance was undertaken by a SLR's on site engineer using a CAT and Genny before the commencing the exploratory hole locations. The location of underground and above ground utilities, in combination with visible obstructions, shaped the final locations of SLRs exploratory hole locations.

4.2 Hand Pits

Four hand pits (HP1 – HP4) were excavated using hand tools on the 30th June 2021 to a maximum depth of 0.70m bgl. Excavation locations were selected to target existing and proposed areas of soft landscaping on the periphery of the existing building and are shown in relation to the existing site layout on **Drawing 03**.

Soil samples were collected during the excavation for environmental testing. In-situ volatile organic compound (VOC) headspace readings were recorded for each sample and at regular intervals in all boreholes using a photo-ionisation detector (PID) calibrated to isobutylene and fitted with a 10.6eV lamp.

Ground conditions at the hand pit locations were logged to EN ISO 14688 (BS5930+A2) by SLR. The hand pit records are presented in **Appendix 04** and a Photographic Log presented in **Appendix 05**.

4.3 Laboratory Analysis - Soils

All soil samples were stored in cool boxes and transported by courier under chain of custody documentation to Element Materials Technology, and MCERTS / UKAS accredited laboratory.

A total of 8No. soil samples from the 4No. hand pits were analysed in the laboratory and scheduled for the following contaminants:

- Metals.
- Soil Organic Matter (SOM).
- pH.
- Speciated Polyaromatic Hydrocarbons (PAHs) – USEPA 16
- Total Petroleum Hydrocarbons by criteria working group (TPH CWG)
- Methyl Tertiary Butyl Ether (MTBE), Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)

In addition, a total of 6No. were screened for asbestos.

Following the initial analysis results, two samples (HP1 at 0.0 – 0.14m bgl and HP3 at 0.10 – 0.39m bgl) were re-analysed twice for lead (giving a total of three results per sample) and three samples were then tested for the bioavailability of lead.

The results are summarised in **Section 5.4** with copies of the test certificates presented in **Appendix 06**.

The results are discussed fully in **Section 6.0** and collated within a generic quantitative & site specific risk assessment in **Appendix 07 & 08** respectively.

5.0 Record of Ground Conditions

5.1 Geology

Ground conditions were proven during the site investigation as comprising Topsoil over Made Ground which was underlain by a cohesive deposit (possible superficial deposits). Competent chalk bedrock was not encountered.

Reference should be made to the excavation records, **Appendix 04**, for full details of the strata encountered by this investigation, but in summary the encountered geological horizons are described below:

Topsoil: Topsoil was encountered beneath grass at ground level in all locations to depths of between 0.08m and 0.14m bgl. Deposits generally comprised very sandy or sandy Silt with frequent rootlets.

Made Ground: Beneath topsoil Made Ground was encountered in all exploratory holes as a thin layer (0.16 – 0.35m thickness) generally comprising a sometimes slightly silty gravelly sand. Gravel was generally recorded as chert and occasional chalk. Rare fragments of metal, glass, plastics and ceramic were occasionally observed.

Superficial Geology: Beneath Made Ground superficial deposits were encountered as orangish brown sandy slightly clayey Silt sometimes with rare flint gravel.

5.2 Groundwater

Groundwater was not recorded during the shallow ground investigation.

5.3 Visual / Olfactory Observations

Made Ground was encountered in all of the exploratory holes. Anthropogenic materials encountered were rare and comprised fragments of brick, metal, plastics and ceramic.

No visible fragments of any asbestos containing materials were encountered during the site investigation.

No visual or olfactory evidence of hydrocarbon contamination was encountered. In-situ VOC headspace readings were all below the limit of detection of the instrument.

5.4 Soil Chemistry

During the site investigation, 8No. soil samples were collected in the hand pits and scheduled for contaminants detailed in **Section 4.3**. Full chemical analysis certificates are provided as **Appendix 06**, and the results are summarised in the context of a GQRA within **Appendix 07**.

The data trends are summarised below:

- The concentrations of metals exceed the limit of detection (LOD) in the majority of samples tested with the exception of selenium and mercury which were largely below the LOD. Elevated lead concentrations were recorded in two locations (HP1 at 0.0 – 0.14m bgl and HP3 at 0.10 – 0.39m bgl) in Topsoil and Made Ground samples. The analysis was repeated twice for each sample and the average results were used in the following assessment (**Section 6.0**).
- The concentrations of PAHs were encountered above the LOD in topsoil and Made Ground samples. The two samples of natural strata (HP2 at 0.34 – 0.60m bgl and HP3 at 0.39 – 0.63m bgl) did not encounter PAHs above the LOD.
- Petroleum hydrocarbons were generally not encountered above the LOD. Heavier chain aliphatics (C21 – 35) and aromatics (C16 – 35) were encountered at low levels above the LOD in Made Ground and topsoil samples, which can likely be attributed to naturally occurring humic acid.

- Concentrations of BTEX materials were not encountered above the LOD.
- Asbestos was not detected in any of the 6No. samples subject to screening.

6.0 Human Health Risk Assessment

6.1 Approach

As part of a preliminary risk assessment, Generic Assessment Criteria (GAC) have been used to assess the significance of soil contaminant concentrations.

The generic risk assessment criteria are drawn from several sources of guidance, some from non-statutory guidance and some informal. SLR uses a combination of assessment criteria that are currently available to assist in the screening of soil data prior to determining whether further action is required. The following assessment criteria (known as generic assessment criteria or GAC) have been used for the assessment of contaminant levels in soil:

- Category 4 Screening Levels (C4SLs) (DEFRA) where available. In 2014 DEFRA commissioned CL:AIRE to produce screening values that would allow an assessment land within Category 4 under Part 2A of the Environmental Protection Act (1990), under the planning regime and the DCLG's Planning Practice Guidance on Land Affected by Contamination, which includes a reference to the use of C4SLs under planning. C4SL's are available for the following contaminants; arsenic, benzene, benzo(a)pyrene (BaP), cadmium, chromium VI & lead;
- LQM/CIEH Suitable for Use Levels (S4ULs) – in 2015 Land Quality Management and the Chartered Institute of Environmental Health published S4ULs derived following CLEA technical guidance and using the Environment Agency's CLEA UK model, with updated toxicological and exposure parameters and land uses following the publication of the C4SLs. Whilst S4ULs utilise the same exposure parameters as C4SLs, the toxicological data utilised comprises the use of benchmark doses (BMDs) where the C4SLs utilise low levels of toxicological concern (LLTCs).

If the concentrations recorded on site are lower than the GAC it is generally accepted that the contaminants in question are present at acceptable concentrations which are not capable of putting human health at significant risk - as long as the humans make normal use of the site. An exceedance of these values indicates to an assessor that soil contaminant concentrations need to be considered further. Generic assessment criteria combine both authoritative science and policy judgements.

The S4ULs / C4SLs used have been derived using the CLEA model according to several typical land uses:

- Residential (with and without vegetable growth);
- Allotments;
- Commercial/Industrial;
- Public Open Space residential (POS1);
- Public Open space park (POS2).

The proposed development at the site is considered a residential land use. Given the size of the development and the limited and steeply sloping landscaped areas, it is considered highly unlikely garden areas will be used to extensively grow fruit and vegetables. The most representative screening criteria is therefore **residential without plant uptake**.

The selected GAC for the site for an initial screen are the LQM/CIEH S4ULs. These provide screening criteria derived using the most recent toxicological data, whilst still modelling "minimal risk". The selected criteria are designed to be protective of small children who are assumed to live on site and play in the garden – as such it will be overly protective for the proposed residential use of the site (the CLEA model would anticipate adult

receptors to have a far lower exposure to soil based and soil-derived contaminants). The S4ULs are therefore considered conservative. No S4UL is available for lead, therefore the C4SL has been used.

The individual sample results for each contaminant were compared to the initial screening criteria. The GAC and their sources are detailed in **Appendix 07**. The cells shaded red represent concentrations in excess of the criteria, while those in green indicate a concentration above the limit of detection (LOD) but below the GAC.

6.2 Human Health Generic Risk Assessment

6.2.1 Metals

Testing comprised the analysis of 8No. samples of Made Ground and natural soils for metals. The majority of metals were identified at concentrations below the relevant GAC in all samples.

As mentioned in **Section 5.4** two samples identified high concentrations of lead and were re-tested twice. The mean results for those samples were screened against the GAC and one sample was in excess of the adopted GAC, shown in **Table 2-1** below.

Table 6-1: Human Health Generic Risk Assessment - Soils - Lead

Contaminant	Location (depth)	Results (mg/kg)	Mean Result (mg/kg)	GAC	Pass / Fail
Lead	HP1 (0.0 – 0.14m)	370	367	310	Fail
		370			
		360			

The exceedance of lead is considered further in **Section 6.3** below.

6.2.2 PAHs

Testing comprised the analysis of 8No. samples of Made Ground and natural soils for PAHs. None of the samples tested for PAHs exceeded the GAC, therefore the risk to future site users from PAHs is considered to be low.

6.2.3 TPH CWG

Testing comprised the analysis of 6No. samples of Made Ground and 2No. samples natural soils were TPH. None of the samples tested for TPH exceeded the GAC, therefore the risk to future site users from TPH is considered to be low.

6.2.4 Asbestos

Asbestos was not identified within any of the 6No. samples tested for during the site investigation works. Therefore, asbestos shallow ground is not considered to present a risk to future groundworks falling under the Control of Asbestos Regulations (2012), nor the proposed end users of the site.

6.3 Site Specific Risk Assessment

The proposed development of the site is a change in use of an existing stable building into a dwelling house. The assumptions made to derive the GAC (**Section 6.1**) are not considered representative of the proposed use of the site. Therefore, SLR has derived a site specific assessment criteria (SSAC) for lead. Full justification and derivation of the SSAC is provided in **Appendix 08**.

Soil chemistry data from the site investigation has been re-screened against SLRs SSAC. **Table 6-2**, below, summarises the comparison.

Table 6-2: Human Health Specific Risk Assessment – Lead

Contaminant	Location (depth)	Mean Result (mg/kg)	SSAC	Pass / Fail
Lead	HP1 (0.0 – 0.14m)	367	594	Pass

The above indicates that there are no exceedances of the SSAC for lead, therefore the risk to proposed end users of the site from lead exposure is considered to be low.

7.0 Conclusions

A shallow site investigation was undertaken by SLR on the 30th June 2021 and comprised the excavation of 4No. hand pits to a maximum depth of 0.70m bgl. Ground conditions were proven during the site investigation as comprising Topsoil over Made Ground which was underlain by a cohesive deposit. Bedrock was not encountered. Groundwater was not encountered. No visual or olfactory evidence of contamination was observed.

The soil samples collected during the site investigation were subject to analysis for a suite of metals, PAHs, BTEX compounds, TPH-CWG, soil organic matter and asbestos.

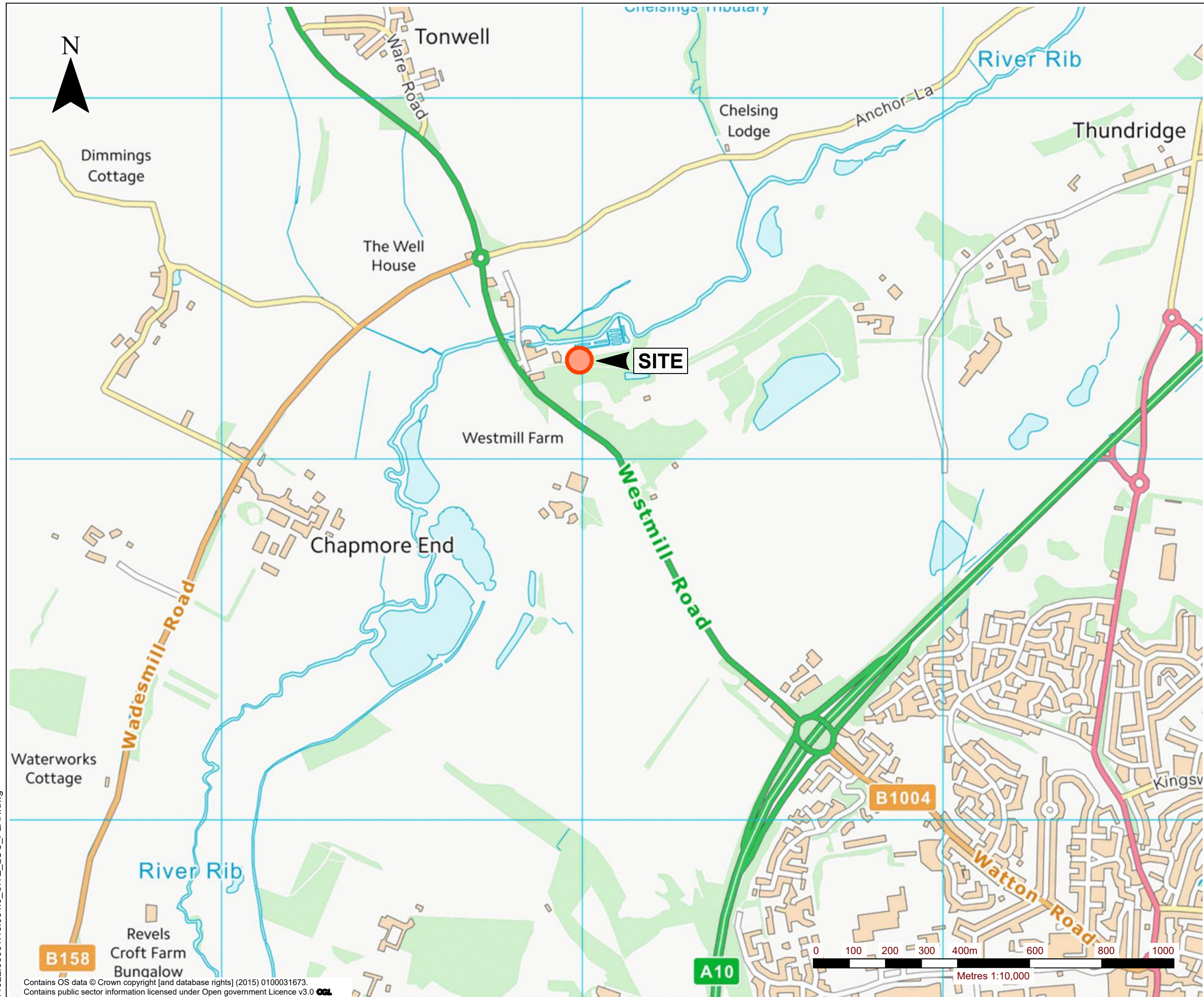
The laboratory results were initially compared to a GAC protective of residential land use (without plant uptake).

Only one exceedance of lead was identified in HP1 and a site-specific assessment criteria (SSAC) was developed to take into consideration the proposed end use of the site.

The results were re-screened and there were no exceedances to the SSAC. The risk from general Made Ground beneath the site is considered low.

Referencing the above, SLR considers contaminants are not present within shallow soils which might pose a potential risk to the proposed end users of the site. As such no further investigation, assessment or remediation is necessary at this time.

DRAWINGS



NOTES

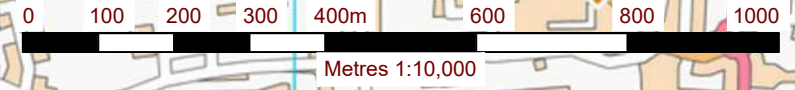
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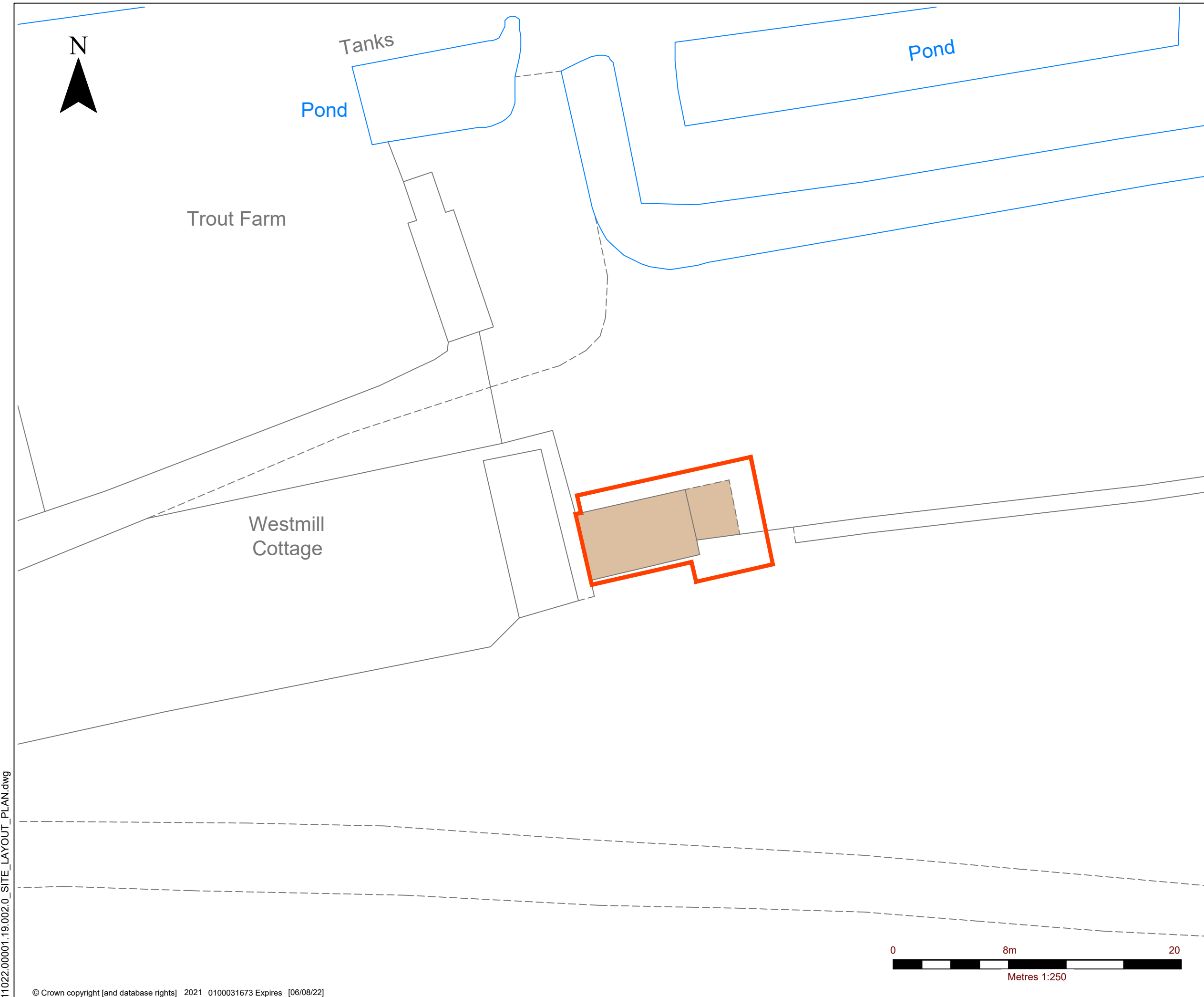
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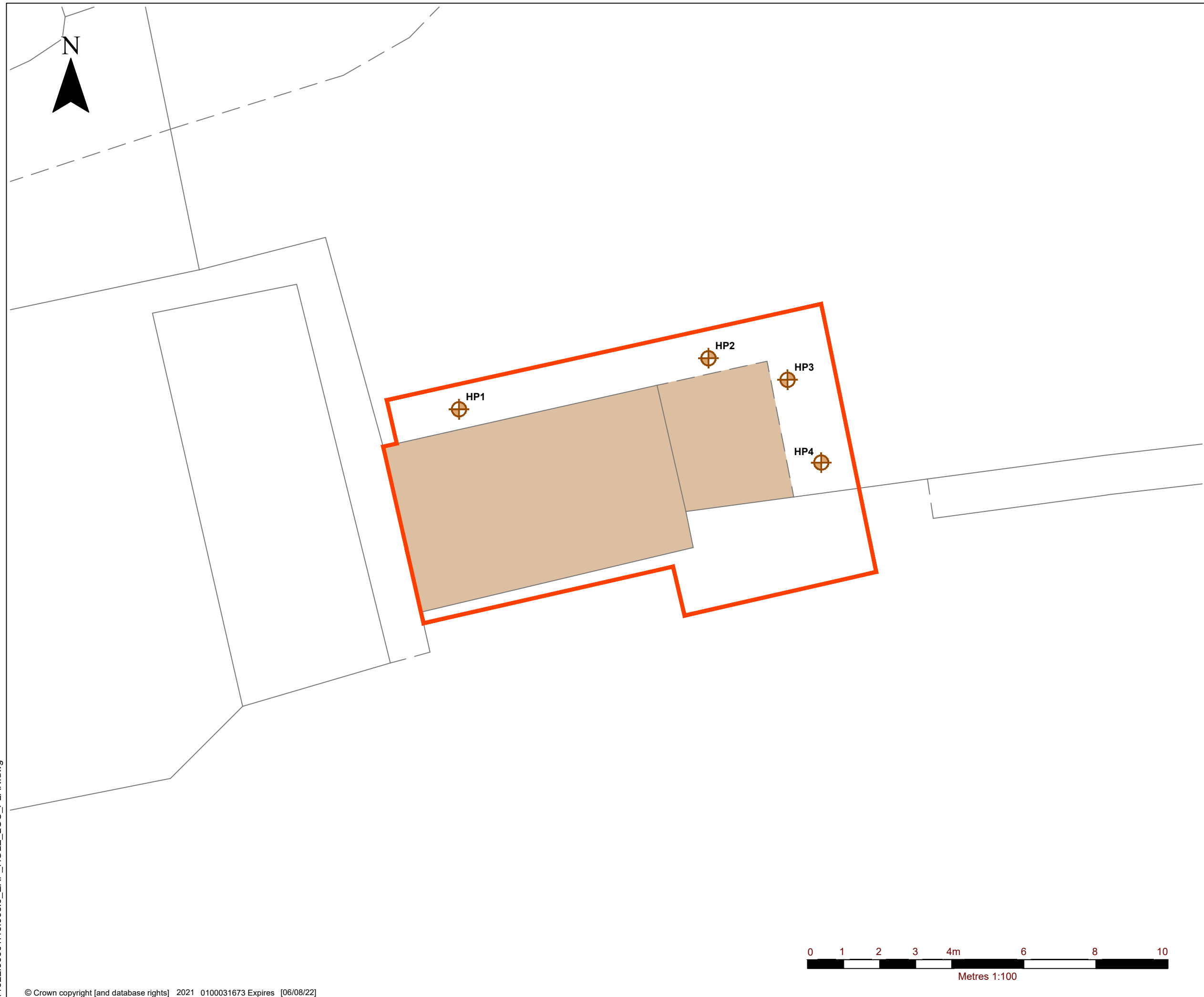
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DWG No. 3

Scale 1:100 @ A3 Date AUGUST 2021

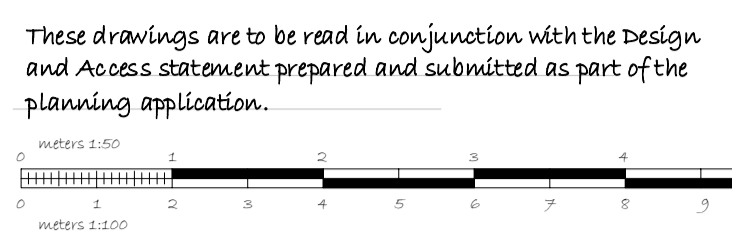
APPENDIX 01

Proposed Development Layout

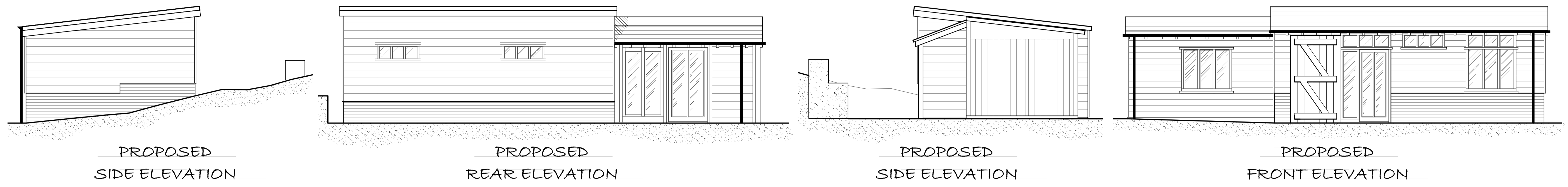
General
 This drawing is for the purposes of obtaining Planning Permission under the Town and Country Planning Act 1990 only. The user should only use written dimensions which are to be checked by the Contractor on site and any discrepancies reported to NWA immediately.

All site/survey based on ordinance survey information provided by Landmark Information Group Ltd. (www.Promap.co.uk), who can not guarantee that all past or current uses or feature will be identified in their product.

The product does not give details about the actual state or condition of the site, nor should it be used or taken to indicate or exclude actual suitability or unsuitability of the site for any other particular purpose, or relied upon for determining suitability or value, or used as a substitute for any physical investigation or inspection.



USE WRITTEN DIMENSIONS ONLY - IF IN DOUBT ASK!

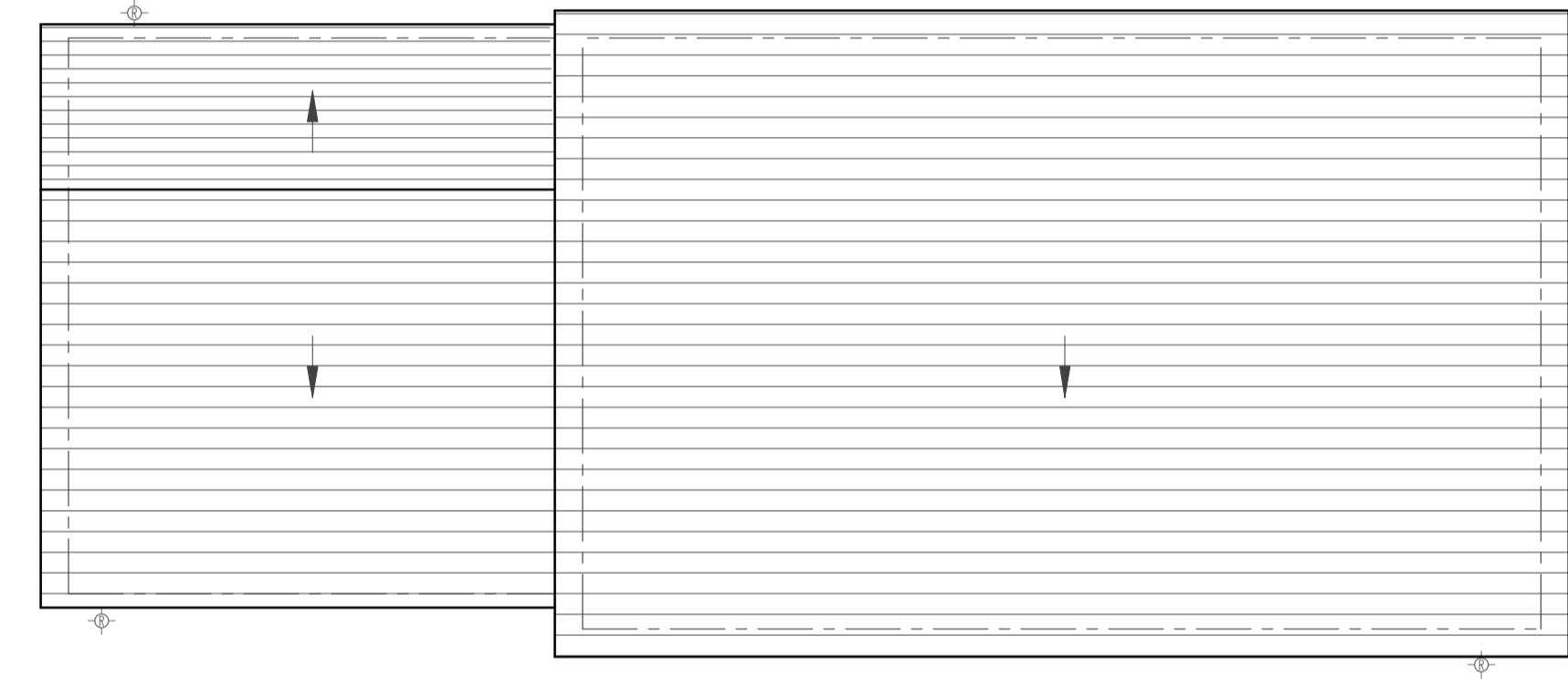


PROPOSED
SIDE ELEVATION

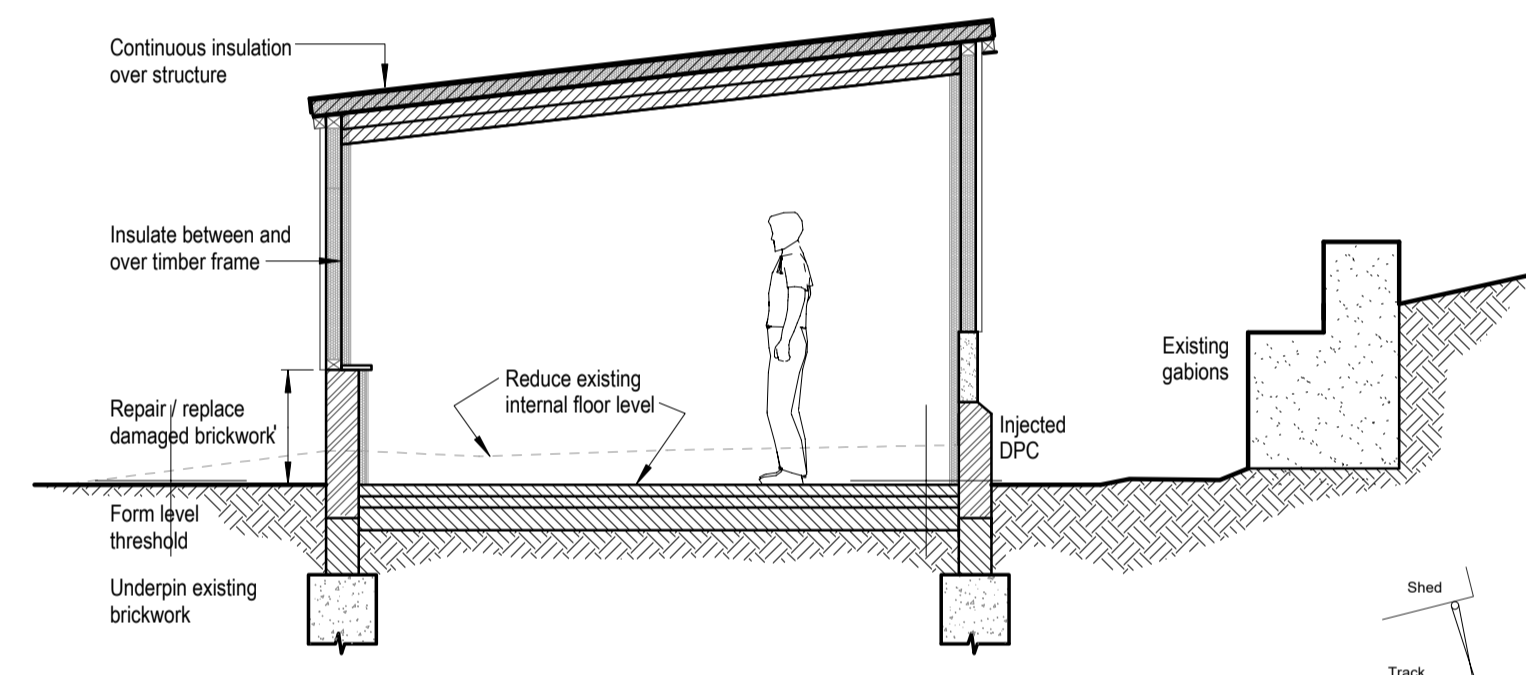
PROPOSED
REAR ELEVATION

PROPOSED
SIDE ELEVATION

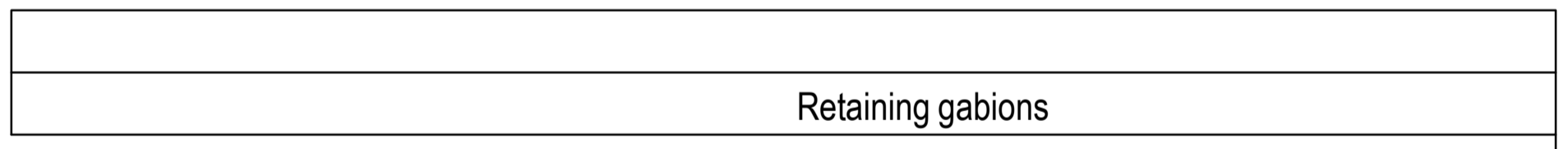
PROPOSED
FRONT ELEVATION



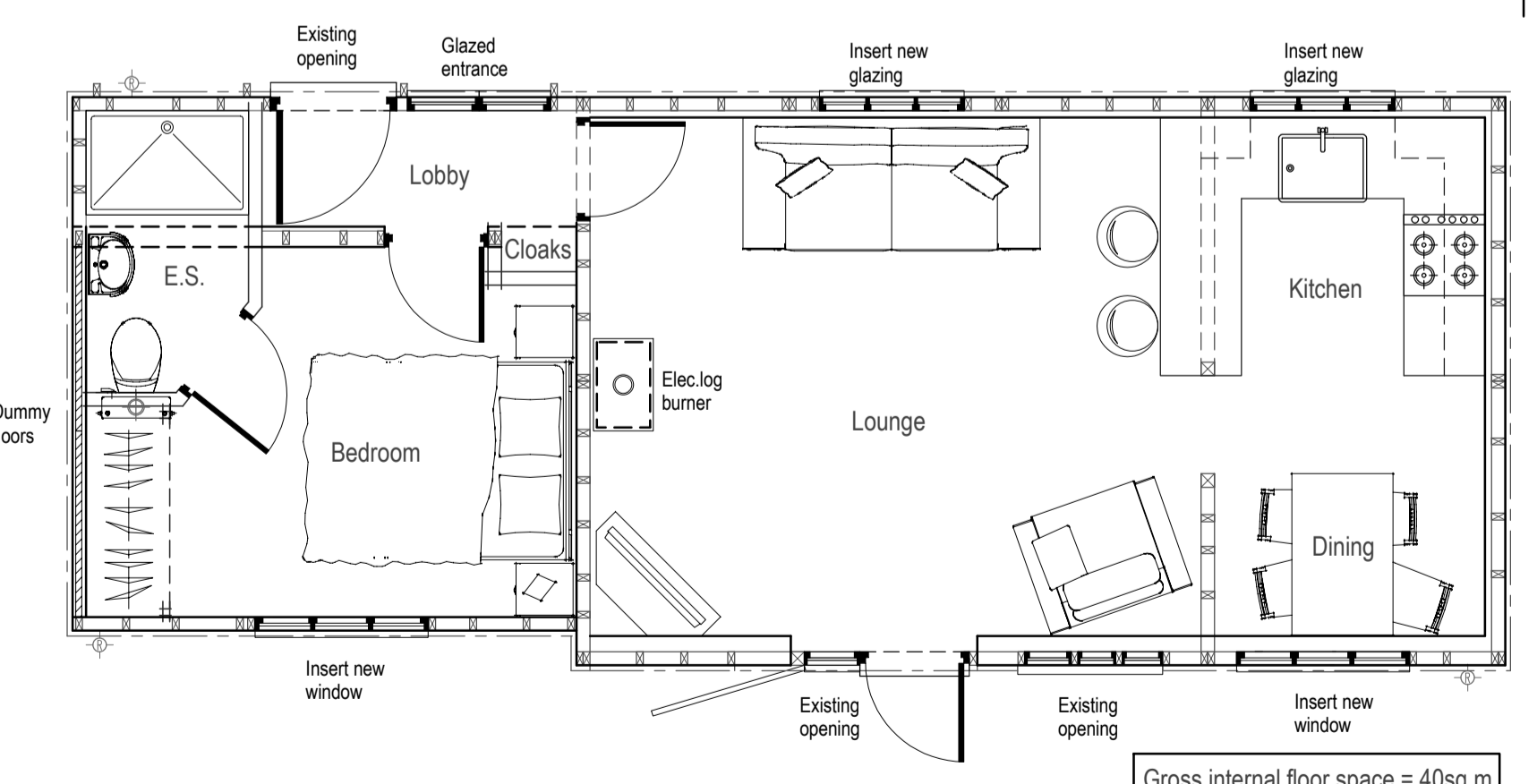
PROPOSED
ROOF PLAN



PRELIMINARY
SECTION 1:50

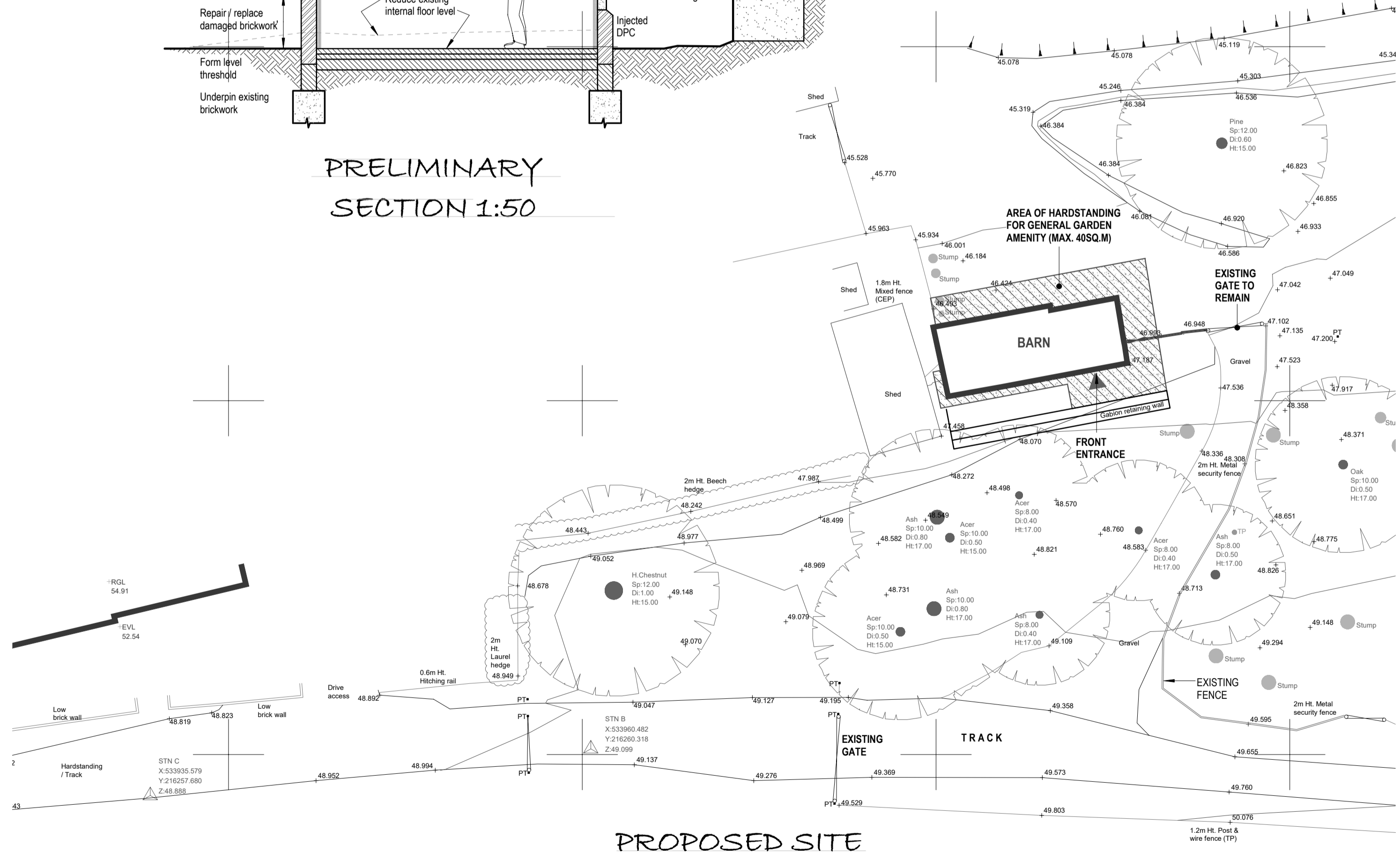


Retaining gabions



PROPOSED GROUND
FLOOR PLAN

Gross internal floor space = 40sq.m



PROPOSED SITE
PLAN 1:200

A	Minor Amendment	22-11-2018
DRAWING REVISIONS		

New World Architectural
 Ecological Building Solutions
 Sucklings Yard, Church Street, Ware, Hertfordshire, SG12 9EN
 • Tel: 01920 319376 • Email: Info@newworldarchitectural.com •

PROJECT:
**WESTMILL TROUT FARM,
 WARE, HERTS,
 SG12 0ET**

TITLE
**PROPOSED
 BARN CONVERSION**

SCALE @ A1 1:100 (UNLESS STATED)	DATE: 24-01-2018	BY: N.COOK
DRAWING REF: NWA-18-002-2	REV:	A

APPENDIX 02

East Herts Council Correspondence

Development Management

01279 655261
www.eastherts.gov.uk
East Herts Council, Wallfields, Pegs Lane, Hertford, SG13 8EQ

EastHertsDC
EastHerts
easthertscouncil



Application Ref: X/20/0490/CND

Christopher Collis
George Baker (Insurance Brokers) Limited

TOWN AND COUNTRY PLANNING ACT 1990 PLANNING (LISTED BUILDINGS AND CONTROL) ACT 1990

PROPOSAL: Discharge condition 2 (contamination) attached to 3/18/2629/ARPN

LOCATION: Westmill Trout Farm Westmill Road

I write with reference to your application to discharge the above condition(s) received on 30th October 2020.

I am able to confirm that the details submitted pursuant to the relevant conditions are refused.

The details that have been submitted pursuant to condition 2 (contamination) of consent ref: 3/18/2629/ARPN are not sufficient to enable the condition to be discharged for the following reason:-

The Local Planning Authority do not agree with the conclusions of the 'Preliminary Land Quality Risk Assessment' dated July 2020 prepared by 'SLR', which concludes that no further investigation of the site is required. With the nature of the proposed development being residential - a sensitive land use, we require a Phase II assessment to be completed, in order to fully assess the potential for on site contamination and the risk to end users.

Notes:

1. You are hereby advised that the approved development shall be implemented in strict accordance with the approved plans, conditions and details agreed by condition. Failure to adhere to this may result in enforcement action being taken.
2. East Herts District Council would like to know what you think about our Planning Service process. We would be very grateful if you could complete the survey, by using this link <https://www.surveymonkey.co.uk/r/FQMRJR9>. There are only four questions to answer, so it will take no time at all. We want to improve our customer experience, so please take the time to let us know what you think.

On Behalf Of Development Management

Signed:

A handwritten signature in black ink, appearing to be a stylized 'S' or similar character.

Dated:

16/12/20.

Development Management

- 01279 655261
- www.eastherts.gov.uk
- East Herts Council, Wallfields, Pegs Lane, Hertford, SG13 8EQ

- EastHertsDC
- EastHerts
- easthertscouncil



Appeals to the Secretary of State

- If you are aggrieved by the decision of your Local Planning Authority to refuse permission for the proposed development or to grant it subject to conditions, then you can appeal to the First Secretary of State under Section 78 of the Town and Country Planning Act 1990, or Section 20 of the Planning (Listed Buildings and Conservation Areas) Act 1990.
- If this is a decision to refuse to planning permission for a Householder application and you wish to appeal against your Local Planning Authority's decision then you must do so within 12 weeks of the date of this notice.
- If you want to appeal against your Local Planning Authority's decision for any other type of application then you must do so within six months of the date of this notice.
- Appeals must be made using a form which you can get from the Planning Inspectorate at The Planning Inspectorate, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6PN (Tel. 0303 444 5000) or online at www.gov.uk/planning-inspectorate.
- The Secretary of State can allow a longer period of giving notice of an appeal, but he will not be prepared to use this power unless there are special circumstances which excuse the delay in giving notice of appeal.
- The Secretary of State need not consider an appeal if it seems to him that the Local Planning Authority could not have granted permission for the proposed development or could not have granted it without the conditions they imposed, having regard to the statutory requirements, to any provisions of any development order and to any directions given under a development order.
- In practice, the Secretary of State does not refuse to consider appeals solely because the Local Planning Authority based their decision on a direction given by him.

Appeals under the Control of Advertisement Regulations

The same provision relating to rights of appeal against the Local Planning Authority's decision applies to advertisements with the following differences:

- Notice of appeal must be given in writing to the Secretary of State within 8 weeks from the date of this notice.
- The notice of appeal must be accompanied by a copy of the following documents:
 - The application forms
 - All relevant plans and particulars
 - This notice of decision
 - All other relevant correspondence with the Authority

The Secretary of State may require a statement of additional matters from either the applicant or the Local Planning Authority, and may with the agreement of both the applicant and the authority determine the appeal without affording an opportunity to appear before an Inspector.

Purchase Notices

- If either the Local Planning Authority or the First Secretary of State refuses permission to develop land or grants it subject to conditions, the owner may claim that he can neither put the land to a reasonably beneficial use in its existing state nor render the land capable of a reasonably beneficial use by the carrying out of any development which has been or would be permitted.
- In these circumstances, the owner may serve a purchase notice on the Council in whose area the land is situated. This notice will require the Council to purchase his interest in the land in accordance with the provisions of Part VI of the Town and Country Planning Act 1990.

Compensation

- In certain circumstances compensation may be claimed from the Local Planning Authority if permission is refused or granted subject to conditions by the Secretary of State on appeal or on reference of the application to him.
- These circumstances are set out in Section 169 and related provisions of the Town and Country Planning Act 1971.

From: Eliane Foteu-Madio <Foteu-Madio.Elaine@eastherts.gov.uk>
Sent: 15 June 2021 09:31
To: Charlotte Main <cmain@slrconsulting.com>
Cc: Eliane Foteu-Madio <Foteu-Madio.Elaine@eastherts.gov.uk>
Subject: RE: Discharging Planning Conditions - 3/18/2629/ARPN - Contaminated Land_21/01049/CM12.

Hi Charlotte,

Sorry for the late response to your email.

Because the nature and source of reworked material beneath the site is unknown, provided there is no risk to controlled waters I would suggest the analysis the soils for the full range of contaminants including TPHs., I would also suggest not only testing the made ground but the underlying natural ground to assess any hydrocarbon risk to building services.

I am looking forward to receiving the full report.

Kind Regards



Eliane Foteu-Madio
Senior Environmental Health
officer (Environment) –
Environmental Health
East Herts District Council
Mobile: **07874 872834**

Current Work Days: Mond-Wed

Sign up to our weekly
newsletter - [Network](#)



From: Charlotte Main [<mailto:cmain@slrconsulting.com>]
Sent: 18 May 2021 10:54
To: Eliane Foteu-Madio
Cc: Paul Thomas-Jones
Subject: [External] RE: Discharging Planning Conditions - 3/18/2629/ARPN - Contaminated Land

Good Morning Elaine,

Thank you for sending on the comments on the Phase 1 that SLR previously submitted.

As part of the planning conditions (detailed below) the extent and methodology of the site investigation were to be agreed with the council prior to commencing:

Prior to commencement of the development hereby approved a scheme to deal with contamination of land and/or groundwater shall be submitted to and approved by the Local Planning Authority and the development should be implemented in accordance with the approved scheme. The scheme shall include all of the following measures unless the Local Planning Authority dispenses with any such requirement specifically and in writing:

- 1. A desk-top study carried out by a competent person to identify and evaluate all potential sources and impacts of land and/or ground contamination relevant to the site. The requirements of the Local Planning Authority shall be fully established before the desktop study is commenced and it shall conform to any such requirements. Copies of the desk-top study shall be submitted to the Local Planning Authority without delay upon completion.*

- 2. A site investigation shall be carried out by a competent person to fully and effectively characterise the nature and extent of any land and/or groundwater contamination and its implications. The site investigation shall not be commenced until:*
 - i. A desk-top study has been completed satisfying the requirements of paragraph (1) above;*
 - ii. The requirements of the Local Planning Authority for site investigations have been fully established; and,*
 - iii. The extent and methodology have been agreed in writing with the Local Planning Authority.*

Copies of a report on the completed site investigation shall be submitted to the Local Planning Authority without delay on completion.

Therefore please find attached SLRs proposed methodology of the phase 2 site investigation, for your review and comment.

If you are in agreement with the scope and methodology we will commence the Phase 2 intrusive works and send on the report following completion for comment.

I look forward to hearing from you,

Many Thanks,




Charlotte

SLR's response to Coronavirus COVID-19 - In response to the ongoing global pandemic, we are actively following the advice provided by our national and state governments. As a flexible, full-service organisation we are open for business and will continue to operate and deliver a range of services to our clients wherever possible and in line with government guidance.



Charlotte Main

Project Consultant - Land Quality & Remediation

 +44 1225 309400
 +44 7719 940477
 cmain@slrconsulting.com

SLR Consulting Limited
Treenwood House, Rowden Lane, Bradford on Avon, BA15 2AU



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Notice

and

Limitation

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08 February 2021

Development Management
East Herts Council
Wallfields
Pegs Lane
Hertford
SG13 8EQ

Application Ref: X/20/0490/CND

Dear Sirs,

RE: WESTMILL TROUT FARM, WARE – PLANNING APPLICATION 3/18/2629/ARPN - CONDITION 2

BACKGROUND

SLR were commissioned to assist in discharging planning condition 2 for application 3/18/2629/ARPN for the site at Westmill Trout Farm, Ware, SG12 0ES which relates to contamination and states:

Prior to commencement of the development hereby approved a scheme to deal with contamination of land and/or groundwater shall be submitted to and approved by the Local Planning Authority and the development should be implemented in accordance with the approved scheme. The scheme shall include all of the following measures unless the Local Planning Authority dispenses with any such requirement specifically and in writing:

1. *A desk-top study carried out by a competent person to identify and evaluate all potential sources and impacts of land and/or ground contamination relevant to the site. The requirements of the Local Planning Authority shall be fully established before the desktop study is commenced and it shall conform to any such requirements. Copies of the desk-top study shall be submitted to the Local Planning Authority without delay upon completion.*
2. *A site investigation shall be carried out by a competent person to fully and effectively characterise the nature and extent of any land and/or groundwater contamination and its implications. The site investigation shall not be commenced until:*
 - i. *A desk-top study has been completed satisfying the requirements of paragraph (1) above;*
 - ii. *The requirements of the Local Planning Authority for site investigations have been fully established; and,*
 - iii. *The extent and methodology have been agreed in writing with the Local Planning Authority.*

Copies of a report on the completed site investigation shall be submitted to the Local Planning Authority without delay on completion.

SLR completed a preliminary land quality risk assessment (PLQRA) in July 2020 to address planning condition 2, clause 1. The report was submitted to East Herts Council and the following response was received:

“The details that have been submitted pursuant to Condition 2 (contamination) of consent 3/18/2629/ARP are not sufficient to enable the condition to be discharged...With the nature of the proposed development being residential – a sensitive land use, we will require a Phase II assessment to be completed in order to fully assess the potential for on-site contamination and the risk to end users.”

GROUND INVESTIGATION STRATEGY

The PLQRA noted that there was possibly a layer of reworked material beneath the site extending northwards beyond the planning application boundary. Given the historic development and use of the site and surrounding area, it was thought unlikely that there was significant contamination present, however given the sensitive end users of the site (residential) further assessment was required by the LPA.

SLR considers a shallow ground investigation to be sufficient, on the assumption that no significant contamination is expected. The ground investigation scope is as follows:

- Hand excavation of approximately 4No. inspection pits to a maximum depth of 0.60m bgl to profile the thickness of the Made Ground and to enable soil samples to be obtained for chemical analysis.
- Hand pit locations will be targeted in areas of proposed soft landscaping within the planning boundary. The rationale for this is these are the only areas of the site that proposed end users might come into contact with any impacted soils.
- Given the absence of a significant source on-site, SLR do not consider there to be a significant risk to controlled waters that requires further investigation or assessment.
- Having reviewed the site history and historical use, general Made Ground is the only potential source identified. As such approximately 2No. samples will be collected from each inspection pit and subject to the following analysis:
 - pH;
 - Metals (As, Cd, Cr (total & Cr^{VI}), Cu, Hg, Ni, Pb, Se, V, Zn);
 - PAH USEPA 16; and
 - Asbestos Screen.
- Samples for chemical analysis will be collected in vessels appropriate to the intended analysis and immediately placed into insulated boxes to minimise changes in temperature. Samples will be collected at the end the working day and taken by overnight courier to the laboratory for chilling and further preservation. Chain of custody documentation will accompany the shipment.
- Chemical analysis will be undertaken by a UKAS accredited laboratory, also holding MCERTS accreditation for the range of determinands proposed. Asbestos screening will be undertaken by a laboratory accredited to UKAS 17025. At this stage it is proposed to use Element Materials Technology for this work.

- The results of the analyses would initially be compared to generic criteria suitable for a residential development, derived using the CLEA model. Where potential risks are identified, which would not be mitigated by the development proposals, a quantitative risk assessment would be used to derive site specific target values.
- The results of the Phase Two investigation will show if remediation work is required for the development. If this is the case, a remediation strategy will be prepared for agreement with the planning authority prior to works progressing.

CLOSURE

We trust that our scope of investigation is acceptable; however, should you wish to discuss matters further please do not hesitate to contact us.

Yours sincerely
SLR Consulting Limited

Charlotte Main
Project Consultant – Land Quality and Remediation

APPENDIX 03

Site Walkover Photographs (July 2020)



Photograph 1: View north of the site building



Photograph 2: View west of the site building



Photograph 3: View northeast off-site from the building of the drain and infilled ponds in the background associated with the fish farm.



Photograph 4: View west of the off-site infilled ponds.



Photograph 5: Off-site pond in the far east of the clients land ownership

Notes:




Rev. 402.09311.00001



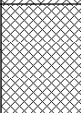

Site:	WESTMILL TROUT FARM, WARE, HERTS, SG12 0ET
Project:	PRELIMINARY LAND QUALITY RISK ASSESSMENT
Date:	JULY 2020

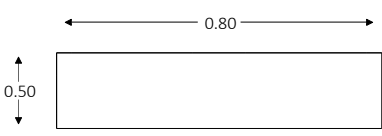
OBSERVATION PHOTOGRAPHS 1 OF 1

APPENDIX 04


Exploratory Hole Logs

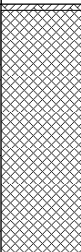

HAND PIT LOG				HAND PIT No HP1	
Client: General Phase Ltd.					
Project: Westmill Trout Farm					
Project No: 402.11022.00001	Date: 30/06/2021	Ground Level:	Co-ordinates:	Sheet 1 of 1	

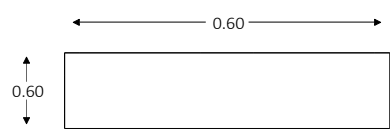
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.00 - 0.14	ES	HS	0ppm			(0.14)	MADE GROUND: Very soft dark brown slightly gravelly very sandy SILT with frequent rootlets. Sand is fine to coarse. Gravel is rounded fine to coarse chert (Topsoil).		
0.14 - 0.30	ES	HS	0ppm			(0.16)	MADE GROUND: Dark brown mottled yellowish brown, slightly silty very gravelly SAND with occasional rootlets and rare fragments of glass and ceramics. Sand is fine to coarse. Gravel is sub-angular to sub-rounded medium to coarse chert.		
0.30 - 0.64	ES	HS	0ppm			(0.34)	Cohesive orangeish brown mottled brown slightly clayey sandy SILT with rare fine sub-angular chert gravel. Sand is fine to coarse.		
							Hand Dug Pit Complete at 0.64m		
0.8									
1.0									
1.2									
1.4									

GENERAL REMARKS: 1. Groundwater not encountered 2. Upon completion hand pit backfilled with arisings		Hand Pit Dimensions:  Shoring/Support: None Stability: Stable
KEY V = Hand Vane Shear Strength PP = Pocket Penetrometer Shear Strength J = Jar Sample D = Disturbed Sample B = Large Bulk Sample HS = Head Space Measurement		


All dimensions in metres Scale 1:10	Contractor: Plant: Hand Tools	Method: Inspection pit	Logged By: HA	Approved By: CM
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

HAND PIT LOG				HAND PIT No HP2	
Client: General Phase Ltd.					
Project: Westmill Trout Farm					
Project No: 402.11022.00001	Date: 30/06/2021	Ground Level:	Co-ordinates:	Sheet 1 of 1	

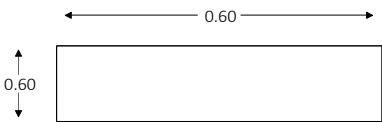
SAMPLES & TESTS				Water	STRATA			Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thickness)	
0.00 - 0.01	ES	HS	0ppm			0.08	MADE GROUND: Very soft, dark brown, sandy SILT with very frequent rootlers. Sand is fine to coarse.	
0.01 - 0.34	ES	HS	0ppm			(0.33)	MADE GROUND: Brown, yellowish brown, orangish red mottled, slightly gravelly SAND with rare boulders. Sand is fine to coarse (building sand). Gravels is sub-angular to sub-rounded fine to coarse of chert, redbrick, charcoal and chalk. Rare angular boulders of red brick and yellow brick.	
0.2		HS	0ppm					
0.34 - 0.60	ES	HS	0ppm			0.34	Cohesive, orangeish brown, mottled dark brown, sandy Silt. Rare fine gravelled chert and chalk.	
0.4		HS	0ppm			(0.26)		
0.6						0.60	Hand Dug Pit Complete at 0.60m	
0.8								
1.0								
1.2								
1.4								

GENERAL REMARKS: 1. Groundwater not encountered 2. Upon completion hand pit backfilled with arisings	Hand Pit Dimensions:  Shoring/Support: Stability:
KEY V = Hand Vane Shear Strength PP = Pocket Penetrometer Shear Strength J = Jar Sample D = Disturbed Sample B = Large Bulk Sample HS = Head Space Measurement	


All dimensions in metres Scale 1:10	Contractor: Plant: 0	Method: Inspection pit	Logged By: HA	Approved By: CM
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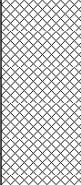

HAND PIT LOG				HAND PIT No HP3	
Client: General Phase Ltd.					
Project: Westmill Trout Farm					
Project No: 402.11022.00001	Date: 30/06/2021	Ground Level:	Co-ordinates:	Sheet 1 of 1	

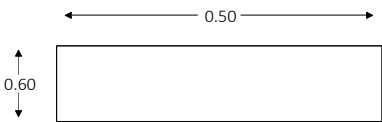
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.00 - 0.10	ES	HS	0ppm			(0.10) 0.10	MADE GROUND: Dark brown, very soft, sandy Silt with very frequent rootlets. Sand is fine to coarse.		
0.10 - 0.39	ES						MADE GROUND: Dark brown, orangish red, cream mottled, slightly silty gravelly Sand with frequent cobbles and rare boulders. Sand is fine to medium. Gravel is angular to sub-angular fine to coarse of chert, redbrick, yellow brick and chalk. Cobbles and boulders of red and yellow brick.		
0.2		HS	0ppm			(0.29)			
0.39 - 0.63	ES					(0.24) 0.63	Firm, orangeish brown, mottled dark brown, sandy SILT with rare gravels. Sand is fine to coarse. Gravels are sub angular and fine of chert and chalk.		
0.4		HS	0ppm						
0.6									
0.8									
1.0									
1.2									
1.4									
							Hand Dug Pit Complete at 0.63m		

GENERAL REMARKS: 1. Groundwater not encountered 2. Upon completion hand pit backfilled with arisings		Hand Pit Dimensions:  Shoring/Support: Stability:
KEY V = Hand Vane Shear Strength PP = Pocket Penetrometer Shear Strength J = Jar Sample D = Disturbed Sample B = Large Bulk Sample HS = Head Space Measurement		

All dimensions in metres Scale 1:10	Contractor: Plant: 0	Method: Inspection pit	Logged By: HA	Approved By: CM
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HAND PIT LOG				HAND PIT No HP4	
Client: General Phase Ltd.					
Project: Westmill Trout Farm					
Project No: 402.11022.00001	Date: 30/06/2021	Ground Level:	Co-ordinates:	Sheet 1 of 1	

SAMPLES & TESTS				Water	STRATA			Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thickness)	
0.00 - 0.10	ES	HS	Oppm			(0.10)	MADE GROUND: Very soft, dark brown, very sandy SILT with frequent rootlets and rare gravels. Sand is fine to coarse. Gravel is sub angular fine of chert.	
0.10 - 0.15	ES	HS	Oppm			0.15	MADE GROUND: Unconsolidated, granular yellowish brown, mottled dark brown. Slightly gravelly Sand. Sand is medium to coarse silica grains. Gravels fine to coarse, sub-angular to sub-rounded chert.	
0.15 - 0.45	ES	HS	Oppm			(0.30)	MADE GROUND: Unconsolidated, granular brown, yellowish brown, orangish red mottled, slightly gravelly SAND with rare cobbles and rare fragements of steel, plastic and ceramics. Sand is fine to coarse. Gravels are sub-angular to sub-rounded fine to coarse of chert, redbrick, charcoal and chalk. Cobbles are sub angular of chert.	
0.45 - 0.70	ES	HS	Oppm			(0.25)	Firm, orangeish brown, mottled dark brown, very sandy SILT with rare gravel. Sand is fine to coarse. Gravels are sub-rounded and fine of chert and chalk.	
						0.70	Hand Dug Pit Complete at 0.70m	
0.8								
1.0								
1.2								
1.4								

GENERAL REMARKS: 1. Groundwater not encountered 2. Upon completion hand pit backfilled with arisings		Hand Pit Dimensions:  Shoring/Support: Stability:
KEY V = Hand Vane Shear Strength PP = Pocket Penetrometer Shear Strength J = Jar Sample D = Disturbed Sample B = Large Bulk Sample HS = Head Space Measurement		

All dimensions in metres Scale 1:10	Contractor: Plant: 0	Method: Inspection pit	Logged By: HA	Approved By: CM
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APPENDIX 05

Photographic Appendix



Photograph 1 – HP1 0.0 – 0.14m (MADE GROUND)



Photograph 2 – HP1 0.14 – 0.30m (MADE GROUND)



Photograph 3 – HP1 0.30 – 0.64m (NATURAL GROUND)



Photograph 4 – HP1 Post Condition



Photograph 5 – HP2 0.0 – 0.08m (MADE GROUND)



Photograph 6 – HP2 0.08 – 0.34m (MADE GROUND)



Site:	WESTMILL	
Project:	402.11022.00001	
Date:	JUNE 2021	
Drawing:	HAND PIT PHOTOGRAPHS	Appendix 05



Photograph 7 – HP2 0.34 – 0.60m (NATURAL GROUND)



Photograph 8 – HP2 Post Condition



Photograph 9 – HP3 0.0 – 0.10m (MADE GROUND)



Photograph 10 – HP2 0.63m base. Made ground – natural ground boundary at 0.39m.



Photograph 11 – HP3 Arisings



Photograph 12 – HP3 Post Condition



Site:	WESTMILL	
Project:	402.11022.00001	
Date:	JUNE 2021	
Drawing:	HAND PIT PHOTOGRAPHS	Appendix 05



Photograph 13 – HP4 0.0 – 0.10m (MADE GROUND)



Photograph 14 – HP4 0.45m base of made ground. Made ground strata boundaries.



Photograph 15 – HP4 0.15 – 0.45m (MADE GROUND)



Photograph 16 – HP4 0.45 – 70m (NATURAL GROUND)



Photograph 17 – HP4 Post Condition



Site:	WESTMILL	
Project:	402.11022.00001	
Date:	JUNE 2021	
Drawing:	HAND PIT PHOTOGRAPHS	Appendix 05

APPENDIX 06

Chemical Laboratory Test Certificates

SLR Consulting Ltd
Treenwood House
Rowden Lane
Bradford on Avon
BA15 2UA



Attention : Charlotte Main
Date : 14th July, 2021
Your reference : 402.11022.00001
Our reference : Test Report 21/10069 Batch 1
Location : Westmill
Date samples received : 2nd July, 2021
Status : Final report
Issue : 1

Thirteen samples were received for analysis on 2nd July, 2021 of which eight were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: SLR Consulting Ltd
Reference: 402.11022.00001
Location: Westmill
Contact: Charlotte Main
EMT Job No: 21/10069

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-4	5-8	16-18	19-21	26-29	30-32	33-36	41-44			Please see attached notes for all abbreviations and acronyms		
	Sample ID	HP1	HP1	HP2	HP2	HP3	HP3	HP4	HP4				
Depth	0.00-0.14	0.14-0.30	0.08-0.26	0.34-0.60	0.10-0.39	0.39-0.63	0.00-0.10	0.15-0.45					
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021					
Sample Type	Clay	Clay	Clayey Sand	Clay	Clay	Clay	Clay	Clay					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	02/07/2021	02/07/2021	02/07/2021	02/07/2021	02/07/2021	02/07/2021	02/07/2021	02/07/2021					
											LOD/LOR	Units	Method No.
Arsenic ^{#M}	32	9.6	26	11	15	10	14	14			<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	1.0	0.3	0.2	<0.1	0.3	<0.1	0.2	0.3			<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	110	150	110	67	110	60	120	120			<0.5	mg/kg	TM30/PM15
Copper ^{#M}	40	19	13	10	33	10	25	17			<1	mg/kg	TM30/PM15
Lead ^{#M}	370	71	40	19	690	150	55	73			<5	mg/kg	TM30/PM15
Mercury ^{#M}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	37	14	25	21	21	20	24	19			<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	1	<1	<1	1	<1	<1	<1	<1			<1	mg/kg	TM30/PM15
Zinc ^{#M}	410	110	92	69	210	61	150	150			<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.05	0.05	0.04	<0.03	0.07	<0.03	0.12	0.06			<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.30	0.27	0.19	<0.03	0.26	<0.03	0.55	0.44			<0.03	mg/kg	TM4/PM8
Anthracene [#]	0.15	0.12	0.11	<0.04	0.08	<0.04	0.23	0.12			<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.64	0.54	0.56	<0.03	0.75	<0.03	1.9	1.2			<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.50	0.46	0.47	<0.03	0.64	<0.03	1.8	1.1			<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.27	0.26	0.27	<0.06	0.40	<0.06	1.1	0.68			<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.32	0.27	0.27	<0.02	0.42	<0.02	0.89	0.68			<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	0.61	0.55	0.59	<0.07	0.83	<0.07	2.3	1.2			<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.35	0.27	0.35	<0.04	0.43	<0.04	1.3	0.67			<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	0.23	0.19	0.28	<0.04	0.33	<0.04	0.97	0.43			<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	0.05	0.06	0.05	<0.04	0.08	<0.04	0.19	0.11			<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	0.22	0.20	0.32	<0.04	0.32	<0.04	1.1	0.46			<0.04	mg/kg	TM4/PM8
PAH 16 Total	3.7	3.3	3.5	<0.6	4.6	<0.6	12.5	7.2			<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.44	0.40	0.42	<0.05	0.60	<0.05	1.7	0.86			<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.17	0.15	0.17	<0.02	0.23	<0.02	0.64	0.34			<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	100	100	100	93	95	88	94	94			<0	%	TM4/PM8
MTBE [#]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM36/PM12
Benzene [#]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM36/PM12
Toluene [#]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM36/PM12
Ethylbenzene [#]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM36/PM12
m/p-Xylene [#]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM36/PM12
o-Xylene [#]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM36/PM12
Xylenes (sum of isomers) [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			<0.01	mg/kg	TM36/PM12

Element Materials Technology

Client Name: SLR Consulting Ltd
Reference: 402.11022.00001
Location: Westmill
Contact: Charlotte Main
EMT Job No: 21/10069

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-4	5-8	16-18	19-21	26-29	30-32	33-36	41-44					
Sample ID	HP1	HP1	HP2	HP2	HP3	HP3	HP4	HP4					
Depth	0.00-0.14	0.14-0.30	0.08-0.26	0.34-0.60	0.10-0.39	0.39-0.63	0.00-0.10	0.15-0.45					
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021					
Sample Type	Clay	Clay	Clayey Sand	Clay	Clay	Clay	Clay	Clay					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	02/07/2021	02/07/2021	02/07/2021	02/07/2021	02/07/2021	02/07/2021	02/07/2021	02/07/2021					
										LOD/LOR	Units	Method No.	
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12	
>C6-C8 ^{#M}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12	
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12	
>C10-C12 ^{#M}	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16	
>C12-C16 ^{#M}	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16	
>C16-C21 ^{#M}	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16	
>C21-C35 ^{#M}	36	20	25	<7	14	<7	73	37	<7	<7	mg/kg	TM5/PM8/PM16	
Total aliphatics C5-35	36	20	25	<19	<19	<19	73	37	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM11	
Aromatics													
>C5-EC7 [#]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12	
>EC7-EC8 [#]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12	
>EC8-EC10 ^{#M}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12	
>EC10-EC12 [#]	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16	
>EC12-EC16 [#]	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16	
>EC16-EC21 [#]	18	8	18	<7	19	<7	32	20	<7	<7	mg/kg	TM5/PM8/PM16	
>EC21-EC35 [#]	89	77	97	<7	89	<7	270	170	<7	<7	mg/kg	TM5/PM8/PM16	
Total aromatics C5-35 [#]	107	85	115	<19	108	<19	302	190	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM11	
Total aliphatics and aromatics(C5-35)	143	105	140	<38	108	<38	375	227	<38	<38	mg/kg	TM5/PM8/PM16/PM12/PM11	
Natural Moisture Content	28.8	17.8	7.5	16.8	19.1	17.3	28.7	18.8	<0.1	<0.1	%	PM4/PM0	
Hexavalent Chromium [#]	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20	
Sample Type	Clay	Clay	Clayey Sand	Clay	Clay	Clay	Clay	Clay			None	PM13/PM0	
Sample Colour	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown			None	PM13/PM0	
Other Items	stones, vegetation	stones, vegetation	stones, vegetation	stones	stones, vegetation, chalk	stones	stones, vegetation	stones			None	PM13/PM0	
Organic Matter	5.9	15	1.1	0.7	3.3	0.6	3.6	2.2	<0.2	<0.2	%	TM21/PM24	
pH ^{#M}	7.6	7.9	8.6	7.8	8.3	8.2	7.7	8.0	<0.01	<0.01	pH units	TM73/PM11	

Please see attached notes for all abbreviations and acronyms

Client Name: SLR Consulting Ltd
Reference: 402.11022.00001
Location: Westmill
Contact: Charlotte Main

Note:
 Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/10069	1	HP1	0.00-0.14	4	12/07/2021	General Description (Bulk Analysis)	Soil
					12/07/2021	Asbestos Fibres	NAD
					12/07/2021	Asbestos ACM	NAD
					12/07/2021	Asbestos Type	NAD
					12/07/2021	Asbestos Level Screen	NAD
21/10069	1	HP1	0.14-0.30	8	12/07/2021	General Description (Bulk Analysis)	Soil
					12/07/2021	Asbestos Fibres	NAD
					12/07/2021	Asbestos ACM	NAD
					12/07/2021	Asbestos Type	NAD
					12/07/2021	Asbestos Level Screen	NAD
21/10069	1	HP2	0.08-0.26	18	12/07/2021	General Description (Bulk Analysis)	Soil
					12/07/2021	Asbestos Fibres	NAD
					12/07/2021	Asbestos ACM	NAD
					12/07/2021	Asbestos Type	NAD
					12/07/2021	Asbestos Level Screen	NAD
21/10069	1	HP3	0.10-0.39	29	12/07/2021	General Description (Bulk Analysis)	soil
					12/07/2021	Asbestos Fibres	NAD
					12/07/2021	Asbestos ACM	NAD
					12/07/2021	Asbestos Type	NAD
					12/07/2021	Asbestos Level Screen	NAD
21/10069	1	HP4	0.00-0.10	36	12/07/2021	General Description (Bulk Analysis)	soil
					12/07/2021	Asbestos Fibres	NAD
					12/07/2021	Asbestos ACM	NAD
					12/07/2021	Asbestos Type	NAD
					12/07/2021	Asbestos Level Screen	NAD
21/10069	1	HP4	0.15-0.45	44	12/07/2021	General Description (Bulk Analysis)	Soil
					12/07/2021	Asbestos Fibres	NAD
					12/07/2021	Asbestos ACM	NAD
					12/07/2021	Asbestos Type	NAD
					12/07/2021	Asbestos Level Screen	NAD

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/10069

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/10069

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes

EMT Job No: 21/10069

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013!	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No

SLR Consulting Ltd
Treenwood House
Rowden Lane
Bradford on Avon
BA15 2UA



Attention : Charlotte Main
Date : 20th July, 2021
Your reference : 402.11022.00001
Our reference : Test Report 21/10069 Batch 1 Schedule B
Location : Westmill
Date samples received : 2nd July, 2021
Status : Final report
Issue : 1

Thirteen samples were received for analysis on 2nd July, 2021 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/10069

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/10069

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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SLR Consulting Ltd
Treenwood House
Rowden Lane
Bradford on Avon
BA15 2UA

Attention : Charlotte Main
Date : 12th August, 2021
Your reference : 402.11022.00001
Our reference : Test Report 21/10069 Batch 1 Schedule C
Location : Westmill
Date samples received : 2nd July, 2021
Status : Final report
Issue : 1

Thirteen samples were received for analysis on 2nd July, 2021 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

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Authorised By:



Simon Gomery BSc

Project Manager

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/10069

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REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

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NDP	No Determination Possible
SS	Calibrated against a single substance
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+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
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AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/10069

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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TM171	Operation and analysis of metals by Thermo Fisher iCAPQc ICP-MS	PM124	UBM Unified BARGE bioaccessibility extraction of soil, in vitro method for simulating human digestive procedure using synthetic digestive fluids, carried out on the <250um fraction of the sample.				Yes

APPENDIX 07

Human Health Risk Assessment Screening Sheets

Generic Risk Assessment - Soils
Lab Data Screening

SLR

	Exceeds GAC
	Exceeds LOD

Client Name	General Phase Limited
Site Name	Westmill SI
Job Number	402.11022.00001
Date	12/08/2021
Description of Data Assessment / Zoning	
Selected Screening Value and Land Use	S4UL - Residential without plant uptake

Sample ID	HP1	HP1	HP2	HP2	HP3	HP3	HP4	HP4
Depth	0.00-0.14	0.14-0.30	0.08-0.26	0.34-0.60	0.10-0.39	0.39-0.63	0.00-0.10	0.15-0.45
Sample Type	Clay	Clay	Clayey Sand	Clay	Clay	Clay	Clay	Clay
Sampled Date	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021
Sample Received Date	02 July 2021	02 July 2021	02 July 2021	02 July 2021	02 July 2021	02 July 2021	02 July 2021	02 July 2021
EMT Sample No	1-4	5-8	16-18	19-21	26-29	30-32	33-36	41-44
Batch Number	1	1	1	1	1	1	1	1
Strata / Zone	-	-	-	-	-	-	-	-

Test	Units	LOD	Selected GAC	No. Above GAC								
					-	-	-	-	-	-	-	-
Arsenic	mg/kg	<0.5	40	0	32	9.6	26	11	15	10	14	14
Cadmium	mg/kg	<0.1	85	0	1	0.3	0.2	<0.1	0.3	<0.1	0.2	0.3
Chromium	mg/kg	<0.5	910	0	110	150	110	67	110	60	120	120
Copper	mg/kg	<1	7100	0	40	19	13	10	33	10	25	17
Lead	mg/kg	<5	310	1	367	71	40	19	290	150	55	73
Mercury	mg/kg	<0.1	56	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<0.7	180	0	37	14	25	21	21	20	24	19
Selenium	mg/kg	<1	430	0	1	<1	<1	1	<1	<1	<1	<1
Zinc	mg/kg	<5	40000	0	410	110	92	69	210	61	150	150
					-	-	-	-	-	-	-	-
PAH MS												
Naphthalene	mg/kg	<0.04	2.3	0	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Acenaphthylene	mg/kg	<0.03	2900	0	0.05	0.05	0.04	<0.03	0.07	<0.03	0.12	0.06
Acenaphthene	mg/kg	<0.05	3000	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg	<0.04	2800	0	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Phenanthrene	mg/kg	<0.03	1300	0	0.3	0.27	0.19	<0.03	0.26	<0.03	0.55	0.44
Anthracene	mg/kg	<0.04	31000	0	0.15	0.12	0.11	<0.04	0.08	<0.04	0.23	0.12
Fluoranthene	mg/kg	<0.03	1500	0	0.64	0.54	0.56	<0.03	0.75	<0.03	1.9	1.2
Pyrene	mg/kg	<0.03	3700	0	0.5	0.46	0.47	<0.03	0.64	<0.03	1.8	1.1
Benzo(a)anthracene	mg/kg	<0.06	11	0	0.27	0.26	0.27	<0.06	0.4	<0.06	1.1	0.68
Chrysene	mg/kg	<0.02	30	0	0.32	0.27	0.27	<0.02	0.42	<0.02	0.89	0.68
Benzo(b)fluoranthene	mg/kg	<0.07			0.61	0.55	0.59	<0.07	0.83	<0.07	2.3	1.2
Benzo(a)pyrene	mg/kg	<0.04	3.2	0	0.35	0.27	0.35	<0.04	0.43	<0.04	1.3	0.67
Indeno(123cd)pyrene	mg/kg	<0.04	45	0	0.23	0.19	0.28	<0.04	0.33	<0.04	0.97	0.43
Dibenzo(ah)anthracene	mg/kg	<0.04	0.31	0	0.05	0.06	0.05	<0.04	0.08	<0.04	0.19	0.11
Benzo(ghi)perylene	mg/kg	<0.04	360	0	0.22	0.2	0.32	<0.04	0.32	<0.04	1.1	0.46
PAH 16 Total	mg/kg	<0.6			3.7	3.3	3.5	<0.6	4.6	<0.6	12.5	7.2
Benzo(b)fluoranthene	mg/kg	<0.05	3.9	0	0.44	0.4	0.42	<0.05	0.6	<0.05	1.7	0.86
Benzo(k)fluoranthene	mg/kg	<0.02	110	0	0.17	0.15	0.17	<0.02	0.23	<0.02	0.64	0.34
PAH Surrogate % Recovery	%	<0			100	100	100	93	95	88	94	94
					-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	mg/kg	<0.005	ND	0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzene	mg/kg	<0.005	0.38	0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg	<0.005	880	0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	mg/kg	<0.005	83	0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
m & p Xylene	mg/kg	<0.005	79	0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
o-Xylene	mg/kg	<0.005	88	0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Xylenes	mg/kg	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
					-	-	-	-	-	-	-	-



Generic Risk Assessment - Soils
Lab Data Screening

SLR

Exceeds GAC
 Exceeds LOD

Client Name	General Phase Limited
Site Name	Westmill SI
Job Number	402.11022.00001
Date	12/08/2021
Description of Data Assessment / Zoning	
Selected Screening Value and Land Use	S4UL - Residential without plant uptake

Sample ID	HP1	HP1	HP2	HP2	HP3	HP3	HP4	HP4
Depth	0.00-0.14	0.14-0.30	0.08-0.26	0.34-0.60	0.10-0.39	0.39-0.63	0.00-0.10	0.15-0.45
Sample Type	Clay	Clay	Clayey Sand	Clay	Clay	Clay	Clay	Clay
Sampled Date	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021
Sample Received Date	02 July 2021	02 July 2021	02 July 2021	02 July 2021	02 July 2021	02 July 2021	02 July 2021	02 July 2021
EMT Sample No	1-4	5-8	16-18	19-21	26-29	30-32	33-36	41-44
Batch Number	1	1	1	1	1	1	1	1
Strata / Zone	-	-	-	-	-	-	-	-

TPH CWG													
Aliphatics													
aliphatics >C5-C6	mg/kg	<0.1	42	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
aliphatics >C6-C8	mg/kg	<0.1	100	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
aliphatics >C8-C10	mg/kg	<0.1	27	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
aliphatics >C10-C12	mg/kg	<0.2	130	0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
aliphatics >C12-C16	mg/kg	<4	1100	0	<4	<4	<4	<4	<4	<4	<4	<4	<4
aliphatics >C16-C21	mg/kg	<7	-	0	<7	<7	<7	<7	<7	<7	<7	<7	<7
aliphatics >C21-C35	mg/kg	<7	-	0	36	20	25	<7	14	<7	73	37	37
Total aliphatics C5-35	mg/kg	<19	-	-	36	20	25	<19	<19	<19	73	37	37
Aromatics													
aromatics >EC5-EC7	mg/kg	<0.1	370	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
aromatics >EC7-EC8	mg/kg	<0.1	860	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
aromatics >EC8-EC10	mg/kg	<0.1	47	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
aromatics >EC10-EC12	mg/kg	<0.2	250	0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
aromatics >EC12-EC16	mg/kg	<4	1800	0	<4	<4	<4	<4	<4	<4	<4	<4	<4
aromatics >EC16-EC21	mg/kg	<7	1900	0	18	8	18	<7	19	<7	32	20	20
aromatics >EC21-EC35	mg/kg	<7	1900	0	89	77	97	<7	89	<7	270	170	170
Total aromatics C5-35	mg/kg	<19	-	-	107	85	115	<19	108	<19	302	190	190
Total aliphatics and aromatics(C5-35)	mg/kg	<38	-	-	143	105	140	<38	108	<38	375	227	227
Natural Moisture Content	%	<0.1	-	-	28.8	17.8	7.5	16.8	19.1	17.3	28.7	18.8	18.8
Hexavalent Chromium	mg/kg	<0.3	6	0	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Sample Type	None				Clay	Clay	Clayey Sand	Clay	Clay	Clay	Clay	Clay	Clay
Sample Colour	None				Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown
Other Items	None				stones, vegetation	stones, vegetation	stones, vegetation	stones	stones, vegetation, chalk	stones	stones, vegetation	stones, vegetation	stones
Organic Matter	%	<0.2	-	-	5.9	15	1.1	0.7	3.3	0.6	3.6	2.2	2.2
pH	pH units	<0.01	-	-	7.6	7.9	8.6	7.8	8.3	8.2	7.7	8	8
Asbestos Screen & Identification													
General Description (Bulk Analysis)*	None				Soil	Soil	Soil	-	soil	-	soil	Soil	Soil
Asbestos Fibres*	None				NAD	NAD	NAD	-	NAD	-	NAD	NAD	NAD
Asbestos ACM*	None				NAD	NAD	NAD	-	NAD	-	NAD	NAD	NAD
Asbestos Type*	None				NAD	NAD	NAD	-	NAD	-	NAD	NAD	NAD
Asbestos Level Screen*	None				NAD	NAD	NAD	-	NAD	-	NAD	NAD	NAD
Bioaccessible Lead (Stomach)	mg/kg	<5	-	-	230	-	-	-	-	86	-	130	130
Bioaccessible Lead (Stomach And Intestine)	mg/kg	<5	-	-	120	-	-	-	-	34	-	38	38
Total Lead	mg/kg	<5	-	-	320	-	-	-	-	110	-	180	180
Bioaccessible Fraction (BAF) - Lead	%	<0	-	-	72	-	-	-	-	78	-	72	72

APPENDIX 08

Site Specific Assessment Criteria

WESTMILL TROUT FARM

SITE SPECIFIC ASSESSMENT CRITERIA – HUMAN HEALTH

1.0 Approach

Commercially available generic assessment criteria (GAC) protective of residential development are derived in accordance with generic land use scenarios as prescribed in UK legislation and best practice (EA, 2009ⁱ & CL:AIRE 2014aⁱⁱ). For residential land use, the conceptual site model (CSM) used to assess exposure assumes:

- A female child aged 0-6;
- Exposure duration for 6 years; and
- Building type comprising a two storey terraced house.

The proposed change of land use at Westmill Trout Farm comprises converting an old stable into a dwelling house. The proposed site layout indicates the externals are to be retained, and the internal area is to be redeveloped to comprise:

- A double bedroom with en-suite bathroom;
- A lobby;
- A lounge/living room; and
- A combined kitchen dining area.

The overall area totals 40m². Referencing the above it is considered generic assumptions made to derive commercially available screening criteria are not representative of the proposed land use and their use is highly conservative. Given that the size of the proposed dwelling house is small (40m²) and the redevelopment has only one bedroom it is highly unlikely children will inhabit the house.

Where contaminants have been found to exceed the adopted screening criteria for generic residential land use SLR has derived site specific assessment criteria.

2.0 Contaminants of Concern

Site specific assessment criteria have been derived for lead only as all other contaminants of concern pass Tier 1 generic screening values.

3.0 Conceptual Site Model

3.1 Exposure Parameters

In the UK various models are used to model and assess the risk to human health including (but not limited to):

- The CLEA model (contaminated land exposure assessment);
- The RBCA model (risk-based corrective action); and
- BP-RISC (risk integrated software for clean-ups).

In accordance with UK best practice, and to provide consistency with the derivation of the Category 4 Screening Levels (C4SL), SLR has used the CLEA v1.071 model to derive the SSAC.

We have used the majority of generic exposure parameters utilised for residential developments detailed in SR3, with the following modifications shown in Table A.

Given the small garden spaces included within the application boundary, it is considered highly unlikely fruit and vegetables will be grown, therefore the exposure pathways adopted include direct contact and ingestion with soil and dust, dermal contact indoor and outdoor and inhalation of dust/vapour indoor and outdoor (i.e. no consumption of homegrown produce or soil attached to homegrown produce).

Table A
Exposure Parameter Input

Input Parameter	Value adopted	Source/Rationale
Age Class	17 (16-65)	Figure 2.2 SR3. Highly unlikely a child will inhabit the house.
Occupancy Period (indoor)	23 hours	Table 3.1 SR3 – assumes residents will be at home for 24 hours per day.
Occupancy Period (outdoor)	1 hour	Table 3.1 SR3 – assumes residents spend on average 1 hour per day in the garden.
Skin to soil adherence factor (indoor)	0.06	Table 8.1 SR3.
Skin to soil adherence factor (outdoor)	0.3	Table 8.1 SR3.
Soil and dust ingestion rate	0.05	Table 6.2 SR3.
Building type	Bungalow	Building parameters most similar to a bungalow.
Bioaccessibility	74%	Generic value adopted to derive C4SL's 60%, however SLR has carried out site specific bioaccessibility testing, so site specific values have been used, which result in more precautionary assessment criteria.

3.2 Toxicity Data

Toxicity data has been sourced from CL:AIRE 2014bⁱⁱⁱ, assuming blood lead concentration of 3.5 ug dL⁻¹, converted to ug kg bw⁻¹ day⁻¹ using the USEPA Adult Lead Methodology (ALM). This is consistent with the approach used to derived the C4SLs.

4.0 Model Output

The calculated site-specific assessment criteria for lead is **594 mg/kg**.

ⁱ Environment Agency (2009). Updated Technical Background to the CLEA Model. Science Report SC050021/SR3

ⁱⁱ CL:AIRE (2014a) Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. SP1010

ⁱⁱⁱ CL:AIRE (2014b) Appendix H. Provisional C4SL for Lead Appendix H.

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Report title West Mill Trout Farm



Created by Ben Jones at SLR

BASIC SETTINGS

Land Use Residential without produce (C4SL)

Building Bungalow

Receptor Female (res C4SL)

Start age class 17

End age class 17

Exposure Duration 49 years

Soil Sandy loam

Exposure Pathways

Direct soil and dust ingestion

Consumption of homegrown produce

Soil attached to homegrown produce

Dermal contact with indoor dust

Dermal contact with soil

Inhalation of indoor dust

Inhalation of soil dust

Inhalation of indoor vapour

Inhalation of outdoor vapour



Land Use Residential without produce (C4SL)

Receptor Female (res C4SL)

Age Class	Exposure Frequencies (days yr ⁻¹)						Occupation Periods (hr day ⁻¹)		Soil to skin adherence factors (mg cm ²)		Direct soil ingestion rate (g day ⁻¹)	Receptor			Max exposed skin factor		
	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with indoor dust	Dermal contact with soil	Inhalation of dust and vapour, indoor	Inhalation of dust and vapour, outdoor	Indoors	Outdoors	Indoor	Outdoor		Body weight (kg)	Body height (m)	Inhalation rate (m ³ day ⁻¹)	Indoor (m ² m ⁻²)	Outdoor (m ² m ⁻²)	Total skin area (m ²)
1	180	0	180	170	365	365	23.0	1.0	0.06	0.10	0.10	5.60	0.7	5.4	0.32	0.26	3.43E-01
2	365	0	365	170	365	365	23.0	1.0	0.06	0.10	0.10	9.80	0.8	8.0	0.33	0.26	4.84E-01
3	365	0	365	170	365	365	23.0	1.0	0.06	0.10	0.10	12.70	0.9	8.9	0.32	0.25	5.82E-01
4	365	0	365	170	365	365	23.0	1.0	0.06	0.10	0.10	15.10	0.9	10.1	0.35	0.28	6.36E-01
5	365	0	365	170	365	365	19.0	1.0	0.06	0.10	0.10	16.90	1.0	10.1	0.35	0.28	7.04E-01
6	365	0	365	170	365	365	19.0	1.0	0.06	0.10	0.10	19.70	1.1	10.1	0.33	0.26	7.94E-01
7	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	22.10	1.2	12.0	0.22	0.15	8.73E-01
8	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	25.30	1.2	12.0	0.22	0.15	9.36E-01
9	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	27.50	1.3	12.0	0.22	0.15	1.01E+00
10	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	31.40	1.3	12.0	0.22	0.15	1.08E+00
11	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	35.70	1.4	12.0	0.22	0.14	1.19E+00
12	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	41.30	1.4	15.2	0.22	0.14	1.29E+00
13	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	47.20	1.5	15.2	0.22	0.14	1.42E+00
14	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	51.20	1.6	15.2	0.22	0.14	1.52E+00
15	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	56.70	1.6	15.2	0.21	0.14	1.60E+00
16	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	59.00	1.6	15.2	0.21	0.14	1.63E+00
17	365	0	365	170	365	365	23.0	1.0	0.06	0.30	0.10	70.00	1.6	15.7	0.33	0.27	1.78E+00
18	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	70.90	1.6	13.6	0.33	0.27	1.80E+00



Consumption Rates

Consumption rates (α FW kg^{-1} bodyweight day^{-1}) by Produce Group

Age Class	MEAN RATES						90TH PERCENTILE RATES					
	Green veg	Root veg	Tuber veg	Herb. Fruit	Shrub fruit	Tree fruit	Green veg	Root veg	Tuber veg	Herb. Fruit	Shrub fruit	Tree fruit
1	3.47E+00	5.22E+00	9.22E+00	8.90E-01	1.07E+00	1.87E+00	7.12E+00	1.07E+01	1.60E+01	1.83E+00	2.23E+00	3.82E+00
2	3.34E+00	1.61E+00	3.14E+00	1.93E+00	2.60E-01	5.84E+00	5.87E+00	2.83E+00	6.60E+00	3.39E+00	4.60E-01	1.03E+01
3	3.34E+00	1.61E+00	3.14E+00	1.93E+00	2.60E-01	5.84E+00	5.87E+00	2.83E+00	6.60E+00	3.39E+00	4.60E-01	1.03E+01
4	3.34E+00	1.61E+00	3.14E+00	1.93E+00	2.60E-01	5.84E+00	5.87E+00	2.83E+00	6.60E+00	3.39E+00	4.60E-01	1.03E+01
5	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
6	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
7	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
8	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
9	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
10	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
11	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
12	1.03E+00	4.90E-01	1.60E+00	5.10E-01	4.00E-02	1.18E+00	1.87E+00	8.90E-01	3.05E+00	9.30E-01	8.00E-02	2.13E+00
13	1.03E+00	4.90E-01	1.60E+00	5.10E-01	4.00E-02	1.18E+00	1.87E+00	8.90E-01	3.05E+00	9.30E-01	8.00E-02	2.13E+00
14	1.03E+00	4.90E-01	1.60E+00	5.10E-01	4.00E-02	1.18E+00	1.87E+00	8.90E-01	3.05E+00	9.30E-01	8.00E-02	2.13E+00
15	1.03E+00	4.90E-01	1.60E+00	5.10E-01	4.00E-02	1.18E+00	1.87E+00	8.90E-01	3.05E+00	9.30E-01	8.00E-02	2.13E+00
16	1.03E+00	4.90E-01	1.60E+00	5.10E-01	4.00E-02	1.18E+00	1.87E+00	8.90E-01	3.05E+00	9.30E-01	8.00E-02	2.13E+00
17	1.26E+00	6.00E-01	1.18E+00	6.90E-01	9.00E-02	1.27E+00	2.36E+00	1.12E+00	2.35E+00	1.29E+00	1.80E-01	2.38E+00
18	1.35E+00	6.40E-01	1.25E+00	7.40E-01	1.00E-01	1.36E+00	2.34E+00	1.12E+00	2.36E+00	1.28E+00	1.80E-01	2.37E+00

Top 2 applied? Yes

Where top 2 method is applied, two produce categories use 90th percentile rates, while the remainder use the mean. Produce categories vary on a chemical-by-chemical basis. Where top 2 method is not used, all produce categories for all chemicals assume 90th percentile rates.

Building Bungalow**Soil** Sandy loam

Building footprint (m ²)	7.80E+01	Porosity, Total (cm ³ cm ⁻³)	5.30E-01
Living space air exchange rate (hr ⁻¹)	5.00E-01	Porosity, Air-Filled (cm ³ cm ⁻³)	2.00E-01
Living space height (above ground, m)	2.40E+00	Porosity, Water-Filled (cm ³ cm ⁻³)	3.30E-01
Living space height (below ground, m)	0.00E+00	Residual soil water content (cm ³ cm ⁻³)	1.20E-01
Pressure difference (soil to enclosed space, Pa)	2.60E+00	Saturated hydraulic conductivity (cm s ⁻¹)	3.56E-03
Foundation thickness (m)	1.50E-01	van Genuchten shape parameter <i>m</i> (dimensionless)	3.20E-01
Floor crack area (cm ²)	7.07E+02	Bulk density (g cm ⁻³)	1.21E+00
Dust loading factor (µg m ⁻³)	5.00E+01	Threshold value of wind speed at 10m (m s ⁻¹)	7.20E+00
		Empirical function (F _x) for dust model (dimensionless)	1.22E+00
		Ambient soil temperature (K)	2.83E+02
		Soil pH	7.00E+00
		Soil Organic Matter content (%)	6.00E+00
		Fraction of organic carbon (g g ⁻¹)	3.48E-02
		Effective total fluid saturation (unitless)	5.12E-01
		Intrinsic soil permeability (cm ²)	4.75E-08
		Relative soil air permeability (unitless)	6.42E-01
		Effective air permeability (cm ²)	3.05E-08

Soil - Vapour Model

Depth to top of source (no building) (cm)	0
Depth to top of source (beneath building) (cm)	65
Default soil gas ingress rate?	Yes
Soil gas ingress rate (cm ³ s ⁻¹)	2.50E+01
Building ventilation rate (cm ³ s ⁻¹)	2.60E+04
Averaging time surface emissions (yr)	49
Finite vapour source model?	No
Thickness of contaminated layer (cm)	200

Air Dispersion Model

Mean annual windspeed at 10m (m s ⁻¹)	5.00
Air dispersion factor at height of 0.8m *	2400.00
Air dispersion factor at height of 1.6m *	0.00
Fraction of site cover (m ² m ⁻²)	0.75

* Air dispersion factor in g m⁻² s⁻¹ per kg m⁻³**Soil - Plant Model**

	Dry weight conversion factor	Homegrown fraction		Soil loading factor	Preparation correction factor
	g DW g ⁻¹ FW	Average	High		
		dimensionless		g g ⁻¹ DW	dimensionless
Green vegetables	0.096	0.05	0.33	1.00E-03	2.00E-01
Root vegetables	0.103	0.06	0.40	1.00E-03	1.00E+00
Tuber vegetables	0.210	0.02	0.13	1.00E-03	1.00E+00
Herbaceous fruit	0.058	0.06	0.40	1.00E-03	6.00E-01
Shrub fruit	0.166	0.09	0.60	1.00E-03	6.00E-01
Tree fruit	0.157	0.04	0.27	1.00E-03	6.00E-01

Gardener type None

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RESULTS



	Average Daily Exposure (mg kg ⁻¹ bw day ⁻¹)							Distribution by Pathway (%)							
	Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour	Background (oral)	Background (inhalation)	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour (indoor)	Inhalation of vapour (outdoor)	Background (oral)	Background (inhalation)
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															

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