Contamination Investigation Report

at
Penventon Farm Nursery, Lanner, Cornwall TR16 6AS

for
Mr Murrell

Reference: 20885/CIR Rev1.0
May 2023

Control Document

Project
Penventon Farm Nursery, Lanner, Cornwall TR16 6AS

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This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Commission

This document comprises the Contamination Investigation Report (CIR) and incorporates the results, discussion, and conclusions to this intrusive works. General site data is recorded below:

Commission Record	
Client	Mr Murrell
Site Name	Penventon Farm Nursery, Lanner, Cornwall TR16 6AS
Grid Reference	173100, 39700
Soils Limited Quotation Ref	Q27432, dated 22nd February 2023
Clients Purchase Order	Q27432, dated 8th April 2023

The record of revision to this document is presented below:

Record Of Revisions		
Revision	Date	Reason

Note(s): The latest revised document supersedes all previous revisions of the CIR produced by Soils Limited.

Documents associated with this development that must be referred to are given below.

Record Of Associated Documents			
Reference	Type	Date	Creator
20885/PIR	Preliminary Investigation Report	May 2023	Soils Limited

Limitations and Disclaimers

The report was prepared solely for the brief described in Section 1.1 of this report.

The contents, recommendations and advice given in the report are subject to the Terms and Conditions given in Soils Limited's Quotation

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report has been prepared by Soils Limited, with all reasonable skill, care and diligence within the terms of the Contract with the Client, incorporation of our General Conditions of Contract of Business and taking into account the resources devoted to us by agreement with the Client.

The report is personal and confidential to the Client and Soils Limited accept no responsibility of whatever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report wholly at its own risk.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited.

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the Client in accordance with their brief. As such these do not necessarily address all aspects of ground behaviour at the site.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

If the term "competent person" is used in this report or any Soils Limited document, it means an engineering geologist or civil engineer with a minimum of three years post graduate experience in the understanding and application of the appropriate codes of practice.

Unless the site investigation works have been designed and specified in accordance with EC7, this report is a Geotechnical Investigation Report and is not necessarily a Ground Investigation Report as defined by EC7 (Eurocode 7 Part 1, §3.4, Part 2, §6.1) or a Geotechnical Design Report (Eurocode 7 Part 1, §2.8) as defined by Eurocode 7 and as such may not characterise the ground conditions and additional works may be required to comply with the requirements of EC7.

Within the report reference to ground level relates to the site level at the time of the investigation, unless otherwise stated.

Exploratory hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sample borehole implies the specific technique used to produce an exploratory hole.

The chemical analyses were undertaken by Derwentside Environmental Testing Services (DETS) in accordance with their UKAS and MCERTS accredited test methods or their documented in-house testing procedures. This investigation did not comprise an environmental audit of the site or its environs.

Ownership of land brings with it onerous legal liabilities in respect of harm to the environment. “Contaminated Land” is defined in Section 57 of the Environment Act 1995 (as updated 2021) as:

“Land which is in such a condition by reason of substances in, on or under the land that significant harm is being caused or that there is a significant possibility of such harm being caused or that pollution of controlled waters is being, or is likely to be caused”.

It must be noted that a detailed survey of the possible presence or absence of invasive species, such as Japanese Knotweed, is outside of the scope of investigation.

Deleterious materials may be present in any Made Ground that pose a potential risk to site workers, end users and adjacent vulnerable receptors. These could include a range of contaminants, including asbestos, especially if the material includes large fractions of demolition derived materials.

The investigation, analysis or recommendations in respect of contamination are made solely in respect of the prevention of harm to vulnerable receptors, using where possible best practice at the date of preparation of the report. The investigation and report do not address, define or make recommendations in respect of environmental liabilities. A separate environmental audit and liaison with statutory authorities is required to address these issues.

All environmental works are undertaken in the context of, and in compliance with, BS10175+A2 2017 and LCRM (EA 2021) and all other pertinent planning, standards, documentation and guidance appropriate to the site at the time of production which may include, but are not necessarily limited to, documents provided by BS/CEN/ISO, NHBC, AGS, CIEH, CIRIA, SoBRA and CLAIRE.

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Section 1 Introduction

1.1 Objective of Investigation

The Client commissioned Soils Limited to undertake an intrusive ground investigation and to prepare a Contamination Investigation Report to assess the ground conditions and potential for contamination in order to satisfy planning conditions relating to contaminated land at the site.

The investigation was to be made by means of contamination laboratory testing undertaken on soil samples taken from the exploratory holes.

Soil samples were taken for chemical laboratory testing to enable recommendations for the safe redevelopment of the site and the protection of site workers, end-users and the public from any contamination identified as dictated by the Conceptual Site Model (CSM) in the Preliminary Investigation Report undertaken for the site by Soils Limited (Report ref: 20885/PIR, May 2023) and/or the Revised Conceptual Site Model presented in Appendix C.1.

1.2 Site Description

At the time of the investigation, the site was a former plant nursery, now used for storage of various materials and merchandise relating the neighbouring garden centre. There was a main workshop and agricultural type shed in northwest of site. Walls and roof were constructed of metal sheeting. There were total of 4No. large poly tunnels in the southeast corner - now used for storage of firewood, cleaning products, merchandise.

The site was generally flat and locally steeply sloping towards to the northeast with a gradient of <5°. Evidence of terracing within the north-eastern portion of the site where it becomes increasingly steep, approximately 10m difference in height from SW to NE corners. Generally, gravel surfacing with localised areas of rough grass and ruderal growth, particularly inside borders and across the north-eastern corner. Stockpiled soils mixed with waste materials towards southwest corner. Mature trees along all site boundaries. Areas of rough grass and ruderal growth, particularly inside borders and across the north-eastern corner.

The site location plan is given in Figure 1. An aerial photograph of the site and its close environs has been included in Figure 2.

1.3 Proposed Development

The proposal comprised one warehouse with associated access, parking and soft landscaping.

In compiling this report reliance was placed on drawings 07976-TDA-DR-PL-000 A03, 07976-TDA-DR-PL-000 A03, dated 17th September 2020 prepared by Trewin Design Architects. The recommendations provided within this report are made exclusively in relation to the scheme outlined above and must not be applied to any other scheme

without further consultation with Soils Limited. Soils Limited must be notified about any change or deviation from the scheme outlined.

Development plans provided by the Client are presented in Appendix D.

1.4 Anticipated Geology

The 1:50,000 BGS Geology map showed the site to be situated on the Mylor Slate Formation bedrock, with no overlying superficial deposits. However, Alluvium was noted circa 117m north to the site and Head Deposit was noted circa 65m northeast of the site.

1.4.1 Head Deposit

Head Deposit are drifts produced by solifluxion, the downslope movement of debris outwash during the periglacial period, and characteristically comprise poorly sorted sands gravels and soils of local derivation.

1.4.2 Alluvium

Alluvium is the most recent river or estuarine deposit and generally comprises silty clays usually with an appreciable organic content. Lenses of sand and gravel are also commonly found, as are pockets of peat.

The BSI Code of Practice for Foundations, BS8004: 1986, Clause 2.2.2.3.4 Peat and organic soils, includes the caveat that 'all these soils are highly compressible, and even lightly loaded foundations will be subject to considerable settlements over a long period if placed on them. For this reason, these soils are not suitable for carrying the loads for important structures'.

1.4.3 Mylor Slate Formation

The Mylor Slate Formation comprises Hornfelsed slate and hornfelsed siltstone. Metamorphic bedrock formed between 382.7 and 358.9 million years ago during the Devonian period. The Mylor Slates are described as medium grey to dark grey slates, usually with faint colour banding and with silty laminations and thin sandstones in places.

The Mylor Slate Formation typically comprises a gradationally weathered profile, being weathered near surface and becoming competent rock with depth.

Section 2 Site Works

2.1 Proposed Project Works

The proposed intrusive investigation was designed to provide information on the ground conditions and to assist the safe development of the site. The intended investigation, as outlined within the Soils Limited quotation (Q27432, dated 22nd February 2023) was to comprise the following items:

Service clearance with a CAT and GENNY prior to excavation.

1 day trial pitting with JCB 3CX type excavator

Engineer supervision

2.1.1 Actual Project Works

The actual project works were undertaken on 9th May 2023, with subsequent sample logging, laboratory testing, and reporting. The actual works comprised:

Service clearance with a CAT and GENNY prior to excavation.

6No. trial pits (TP1 to TP6) with JCB 3CX type excavator

Engineer supervision

The exploratory holes were backfilled with arisings upon completion and left slightly proud to accommodate future settlement. All exploratory hole locations have been presented in Figure 3.

Following completion of site works, selected samples were sent to the laboratory for contamination testing.

2.2 Ground Conditions

On 9th May 2023 six trial pits were dug, using a JCB 3CX mechanical excavator, to depths ranging between 1.20m and 2.00m below ground level (bgl) at locations selected by Soils Limited using a development plan provided by the Client.

The maximum depths of exploratory holes have been included in Table 2.1.

All exploratory holes were scanned with a Cable Avoidance Tool (C.A.T.) and GENNY prior to excavation to ensure the health and safety of the operatives.

Table 2.1 Final Depth of Exploratory Holes

Exploratory Hole	Depth (m bgl)	Exploratory Hole	Depth (m bgl)
TP1	1.40	TP4	1.90
TP2	2.00	TP5	1.40
TP3	2.00	TP6	1.20

Note(s): The depths given in this table are taken from the ground level on-site at the time of investigation.

The soil conditions encountered were recorded and soil sampling commensurate with the purposes of the investigation was carried out. The depths given on the exploratory hole logs and quoted in this report were measured from ground level.

The soils encountered from immediately below ground surface have been described in the following manner. Where the soil incorporated an organic content such as either decomposing leaf litter or roots or has been identified as part of the in-situ weathering profile, it has been described as Topsoil both on the logs and within this report. Where man has clearly either placed the soil, or the composition altered, with say greater than an estimated 5% of a non-natural constituent, it has been referred to as Made Ground both on the log and within this report.

For more complete information about the soils encountered within the general area of the site reference must be made to the detailed records given within Appendix B, but for the purposes of discussion, the succession of conditions encountered in the exploratory holes in descending order can be summarised as:

Made Ground (MG)
Weathered Mylor Slate Formation (wMRSL)

The ground conditions encountered in the exploratory holes are summarised in Table 2.2.

Table 2.2 Ground Conditions

Strata	Depth Encountered (m bgl)		Typical Thickness (m)	Typical Description
	Top	Bottom		
MG	G.L.	0.35-1.80	1.00	Rough grass over grey slightly silty sandy GRAVEL. Gravel is angular to sub-angular fine to coarse granite (sub-base). Dark brown slightly gravelly SILT with fragments of brick.
wMRSL	0.35-1.80	1.20-2.00[1,2]	Not Proven	Firm orangish brown slightly sandy slightly gravelly CLAY to light orangish brown slightly sandy silty GRAVEL.

Note(s): [1] Final depth of exploratory hole. [2] Base of strata not encountered. The depths given in this table are taken from the ground level on-site at the time of investigation.

2.3 Ground Conditions Encountered in Exploratory Holes

The ground conditions encountered in exploratory holes have been described below in descending order. The engineering logs are presented in Appendix B.1.

2.3.1 Made Ground

Soils described as Made Ground were encountered in all exploratory holes from ground level to depths ranging between 0.35m (TP6) and 1.80m bgl (TP4).

The Made Ground typically comprised grey slightly silty sandy GRAVEL. Gravel is angular to sub-angular fine to coarse granite (sub-base). Dark brown slightly gravelly SILT with fragments of brick. Gravel is subangular and subrounded fine to coarse slate

and siltstone.

The established depth of Made Ground found at each exploratory hole location have been included in Table 2.3.

Table 2.3 Established Depth of Made Ground

Exploratory Hole	Depth (m bgl)	Exploratory Hole	Depth (m bgl)
TP1	0.40	TP4	1.80
TP2	1.70	TP5	0.55
TP3	1.40	TP6	0.35

Note(s): [1] Final depth of exploratory hole.

2.3.2 Weathered Mylor Slate Formation

Soils described as Weathered Mylor Slate Formation were encountered in all exploratory holes beneath Made Ground to depths ranging between 1.20m (TP6) and 2.00m bgl (TP2 and TP3).

The Weathered Mylor Slate Formation typically comprised firm orangish brown slightly sandy slightly gravelly CLAY to light orangish brown slightly sandy silty GRAVEL. Gravel is subangular and subrounded fine to coarse slate and siltstone.

The established depth of Weathered Mylor Slate Formation found at each exploratory hole location have been included in Table 2.4.

Table 2.4 Established Depth of Weathered Mylor Slate Formation

Exploratory Hole	Depth (m bgl)	Exploratory Hole	Depth (m bgl)
TP1	1.40[1]	TP4	1.90[1]
TP2	2.00[1]	TP5	1.40[1]
TP3	2.00[1]	TP6	1.20[1]

Note(s): [1] Final depth of exploratory hole.

2.4 Groundwater

No groundwater was encountered within all exploratory holes during the investigation.

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was conducted in May (2023), when groundwater levels should be falling from their annual maximum (highest) elevation, which typically occurs around March to the annual minimum (lowest) which typically occurs around September.

The approximate elevation of the site was circa 87m Above Ordnance Datum (AOD) and the site was generally flat and locally sloping towards to the northeast with a gradient of <5°, with approximately 10m difference in height from SW to NE corners.

The underlying Mylor Slate Formation was classified as a Secondary A Aquifer which are permeable layers capable of supporting water supplies at a local rather than strategic scale,

and in some cases forming an important source of base flow to rivers.

Groundwater equilibrium conditions may only be conclusively established, if a series of observations are made via groundwater monitoring wells.

Section 3 Determination of Chemical Analysis

3.1 Site Characterisation and Revised Conceptual Site Model

The Preliminary Investigation Report undertaken by Soils Limited (report ref: 20885/PIR dated May 2023) identified a very low to moderate risk of ground contamination from previous usage of the site and offsite sources.

The Contamination Investigation Report identified Made Ground to depths between 0.35m and 1.80m bgl.

Significant visual and olfactory indicators of contamination were noted in the form of potential hydrocarbon staining and odours, identified in TP3 (0.60m to 1.20m bgl) and TP5 (0.10m to 0.55m bgl).

Soils of the Weathered Mylor Slate Formation were encountered beneath Made Ground to depths ranging between 1.20m (TP6) and 2.00m bgl (TP2 and TP3). There was a diesel tank located around TP2.

3.2 Soil Sampling

Exploratory hole locations were established to provide an overview of ground conditions across the site in relation to the proposed construction, together with enabling the collection of samples to enable chemical characterisation of the underlying strata.

Representative samples for potential environmental testing were obtained from the exploratory holes at depths of between 0.10m and 1.40m to allow appropriate representation of the materials encountered, with additional samples to be obtained, if necessary, where there was visual or olfactory evidence of contamination.

Unless otherwise stated, analytical testing was based initially on a screening suite of commonly identified inorganic and organic contaminants, taking into account the prevailing site conditions and the findings of the initial conceptual site model.

3.3 Determination of Chemical Analysis

The driver for determination of the analysis suite was the information obtained from the Preliminary Investigation Report and the Contamination Investigation Report intrusive investigation.

The chemical analyses were carried out on seven samples of Made Ground. The nature of the analyses is detailed in Table 3.1.

Table 3.1 Chemical Analyses Suites - Soil

No. of Tests	Determinants	Soil Tested
		MG
7	Metal suites: Arsenic, Boron (Water Soluble), Cadmium, Chromium (total & hexavalent), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc	
7	Organic Matter	

No. of Tests	Determinants	Soil Tested MG
7	pH	
7	Polycyclic aromatic hydrocarbons (PAH) – (EPA 16)	
7	Phenols – total monohydric	
7	Extractable petroleum hydrocarbons (EPH) – Texas banding	
7	Asbestos screening	
2	Organochlorine Pesticides	

The soil testing was carried out in compliance with the MCERTS performance standard, and the results are shown in Appendix C.2, test reports 23-06108.1.

Section 4 Qualitative Risk Assessment

4.1 Assessment Criteria

The assessment criteria used to determine risks to human health are derived and explained within Appendix C.3.

4.2 Representative Contamination Criteria - Soil

In compiling this report reliance was placed on drawing number 07976-TDA-DR-PL-000 A03, 07976-TDA-DR-PL-000 A03, dated 17th September 2020 prepared by Trewin Design Architects. The recommendations provided within this report are made exclusively in relation to the scheme outlined above and must not be applied to any other scheme without further consultation with Soils Limited. Soils Limited must be notified about any change or deviation from the scheme outlined.

Based on the proposed development, the results of the chemical analysis have been compared against generic assessment criteria (GAC) for a '***Commercial*** ' end use, as presented in SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination December 2014 (C4SL), derived for the protection of human health. Where this document has not published screening values for determinants, GACs derived for the same end use have been adopted from the following published guidance; DEFRA Soil Guideline Values (SGV) and LQM/CIEH/Suitable 4 Use Level (S4UL).

To assess the potential toxicity of organic determinants (Petroleum Hydrocarbons and Polyaromatic Hydrocarbons) to human health, soils samples were analysed for Soil Organic Matter (SOM). The selected samples analysed recorded, SOM values of between 0.5% and 4.7%. For each soil sample tested, the resultant SOM allowed for the correct comparison to be made with the appropriate guideline value for each organic determinants analysed.

4.3 Risk Assessment – Made Ground

Table 4.1 outlines the sample that have exceeded their relevant assessment criteria. The full laboratory report is presented in Appendix C.2.

Table 4.1 Summary of GAC Exceedances – Made Ground

Location	Depth (m bgl)	Contaminant	Concentration	Guidance Level
None noted				

Note(s): Units mg/kg

No pollutant linkage in relation to human health was noted in the risk assessment for Made Ground.

4.4 Asbestos

The test certificate for each sample submitted for contamination analysis during this investigation includes the results of an Asbestos Screen. In each case 'Not detected' was reported.

This finding does not obviate the risk of asbestos being present on the site and the Client must seek advice from qualified and competent asbestos specialist during and prior to undertaking works to ensure compliance with appropriate legislation and guidance.

4.5 Risk to Groundwater

The site is located on a Secondary Aquifer A and is within a zone II groundwater source protection zone and there are groundwater abstractions within 1km of the site, the closest is located 382m northwest from the site and is for household water supply.

The nearest surface watercourse feature is the unnamed river, located approximately 1m to the north of the site.

It was noted that TP5 (0.20m bgl) has quite high TPH values, which would exceed residential assessment criteria. However, elevated levels are likely to relate to a localised spillage, given that there is no source in this area or nearby upstream. There is a source noted onsite, the diesel tank near TP2, but no elevated level in the vicinity. Hence, there is a very low residual risk to the groundwater exiting the site.

4.6 Risk from Ground Gas Ingression

The Preliminary Investigation Report did not identify any potential sources of ground gas, and the Made Ground noted during this investigation had a low organic content and no putrescible materials were noted.

4.6.1 Radon

The British Geological Survey, in conjunction with the Radiation Protection Division of the Health Protection Agency, indicates the site to lie within an area where there is a probability of >30% of present or future homes being above the action level of 200Bq/m^3.

As such, the site is classified as a High Probability Radon Affected Area. Therefore, the guidance recommends that full radon protective measures are required in any new structures. However, confirmation with local building control is advised.

4.7 Generic Quantitative Risk Assessment

Quantitative risk assessments are undertaken for the soil and groundwater. The CSM has been updated to take account of the assessments below and presented in Appendix C.1. The full laboratory chemical report is presented in Appendix C.2.

4.7.1 Soils

None of the sample tested showed concentrations in excess of the relevant assessment

criteria for a commercial land-use scenario.

The Tier 1 Quantitative risk assessment therefore established that there was **no risk to the human health receptors** of future end-users.

4.7.2 Groundwater

It was noted that TP5 (0.20m bgl) has quite high TPH values, which would exceed residential assessment criteria. However, elevated levels are likely to relate to a localised spillage, given that there is no source in this area or nearby upstream. There is a source noted onsite, the diesel tank near TP2, but no elevated level in the vicinity. Hence, there is a very low residual risk to the groundwater exiting the site.

There is not considered to be any significant risk to controlled waters and no further assessment deemed necessary at this time.

4.7.3 Ground Gas

No potential sources of ground gas were noted within the Preliminary Investigation Report or this investigation. As such, no risk is present, and no further work is deemed necessary.

The site **was situated** within an area where protection or risk assessment against the ingress of radon was required.

4.8 Recommendations

Based on the above findings, we recommend the removal of the hydrocarbon impacted soils or a barrier be installed in the slab around the TP5 location. All construction workers should wear appropriate PPE given the noted elevated level of hydrocarbon near TP5.

The site **was situated** within an area where protection or risk assessment against the ingress of radon was required. Radon protection measures **will be required** within the proposed new development.

4.9 Duty of Care

Groundworkers must maintain a good standard of personal hygiene including the wearing of overalls, boots, gloves and eye protectors and the use of dust masks during periods of dry weather.

4.10 Excavated Material

Excavated material as waste must be defined or classified prior to any disposal, transport, recycling or re-use at or by an appropriately licensed or exempt carrier and/or off-site disposal facility. The requirements inherent in both Duty of Care and Health and Safety must also be complied with. In order to determine what is to happen, what is suitable, appropriate and most effective in the disposal of wastes, especially those subject to CDM waste management plan requirements, several factors must be considered, and competent advice must always be sought.

4.11 HazWasteOnline

Further consideration of results using HazWasteOnlineTM can be undertaken on request to give an indication of potentially hazardous properties in the materials analysed.

4.12 Re-use of Excavated Material On-site

The re-use of on-site soils may be undertaken either under the Environmental Permitting Regulations 2007 (EPR), in which case soils other than uncontaminated soils are classed as waste, or under the CL:AIRE Voluntary Code of Practice (CoP) which was published in September 2008 and is accepted as an alternative regime to the EPR.

4.13 Imported Material

Any soil, which is to be imported onto the site, must undergo chemical analysis to permit classification prior to its importation and placement in order to ascertain its status with specific regard to contamination, i.e. to prove that it is suitable for the purpose for which it is intended.

4.14 Discovery Strategy

There may be areas of contamination not identified during the course of the investigation. Such occurrences may also be discovered during the demolition and construction phases for the redevelopment of the site.

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Figure 1 – Site Location Map

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Figure 2 – Aerial Photograph

Project
Penventon Farm Nursery, Lanner, Cornwall TR16 6AS

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Mr Murrell

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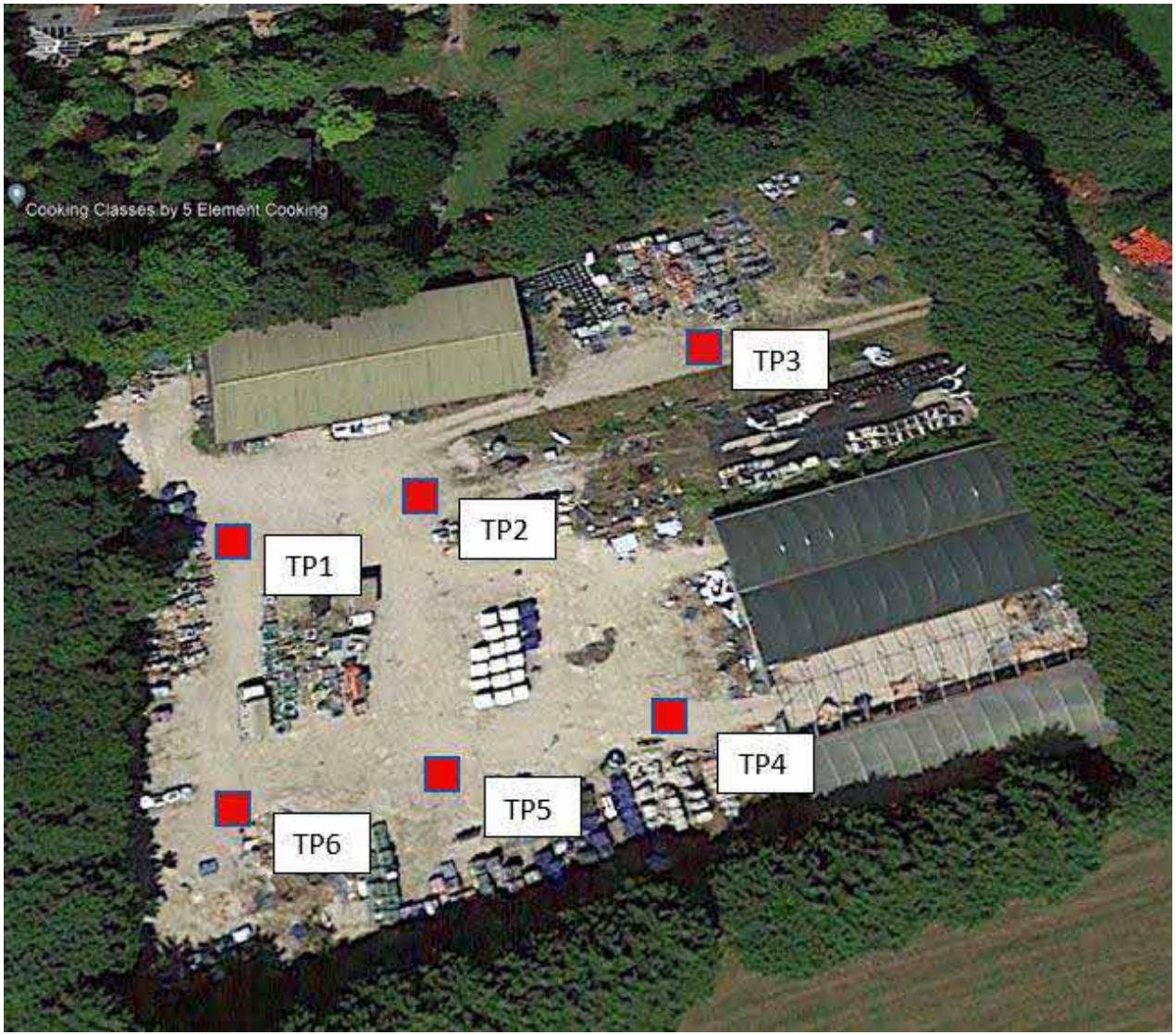
Job Number
20885

Figure 3 – Exploratory Hole Plan



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Appendix A Standards and Resources

The site works, soil descriptions and geotechnical testing was undertaken in accordance with the following standards were applicable:

BS EN ISO 14688-1:2018 - Geotechnical investigation and testing - Identification and description

BS EN ISO 14688-2:2018 - Geotechnical investigation and testing - Principles for a classification

BS 10175:2011+A2:2017 - Investigation of potentially contaminated sites

LCRM 2021 Environment Agency

SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination December 2014

Soil Guideline Value (SGV) (Environment Agency, 2009)

Suitable 4 Use Level (S4UL) (Nathanail et al, 2015)

Google Earth Accessed in May 2023

British Geological Survey Website & iGeology App Accessed in May 2023

Appendix B Field Work

Appendix B.1 Engineers Logs

Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend
	Depth	Type	Results			
				0.25		
				0.40		
				1.40		

Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend
	Depth	Type	Results			
				0.40		
				1.30		
				1.70		
				2.00		

Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend
	Depth	Type	Results			
				0.60		
				1.20		
				1.30		
				1.40		
				2.00		

Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend
	Depth	Type	Results			
				1.60		
				1.80		
				1.90		

Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend
	Depth	Type	Results			
				0.10		
				0.55		
				1.40		

Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend
	Depth	Type	Results			
				0.35		
				0.75		
				1.20		

Appendix C Chemical Laboratory Analyses

Appendix C.1 Conceptual Site Model

Table C.1.1 CSM Revised Pre-Chemical Analyses

Source	Potential Contaminant	Exposure Pathway	Receptor	Initial Assessment from Preliminary Investigation Report Information			Comments	Further Works
				Severity	Probability	Risk		
Radon (Underlying Geology)	Radon	Inhalation of Vapour/gases (including Radon)	Site Workers/Site Maintenance	Medium	Likely	Moderate	The site is within an area where >30% of homes are at or above the action level.	The guidance recommends that full radon protective measures are required in any new structures. However, confirmation with local building control is advised.
			End Users	Medium	Likely	Moderate		
			Off-site Users	Minor	Unlikely	Very Low		
			Off-site Users	Minor	Unlikely	Very low		
			Building and Confined Spaces					
Farm/Nursery/Diesel tank/storage of cleaning products/old, damaged machinery and vehicles/stockpiled soils and waste On-site historic and current site usage.	Metals, Semi-metals and non-metals, PAHs, TPH, pH, pesticides and asbestos	Inhalation of dust	Site Workers/Site Maintenance	Mild	Low	Low	Site located on superficial deposits of Alluvium and bedrock of the Mylor Formation Bedrock, both of which was classified as Secondary Aquifer - A which would support both shallow and deep groundwater.	Chemical testing prior to undertaking a generic quantitative risk assessment.
			End Users	Mild	Low	Low		
			Off-site Users	Minor	Unlikely	Very low		
	Metals, Semi-metals and non-metals, PAHs, TPH, pH, pesticides	Ingestion and absorption via direct contact	Site Workers/Site Maintenance	Mild	Low	Low		
			End Users	Minor	Unlikely	Very low		
	Metals, Semi-metals and non-metals, PAHs, TPH, pH, pesticides	Migration via surface runoff	Surface Water	Mild	Low	Low		
		Migration in solution via groundwater	Surface Water	Mild	Low	Low		
			Shallow Aquifer	Mild	Low	Low		
			Deep Aquifer	Mild	Low	Low		
		Direct contact with construction material	Buried Structures	Minor	Unlikely	Very low		
			Buried Services					
	PAHs and TPH	Migration of gases via permeable soils	Site Workers/Site Maintenance	Medium	Unlikely	Low		
			End Users					
			Off-site Users	Minor	Unlikely	Very low		
			Building and Confined Spaces					
			End Users					
Old quarry (disused) Off-site sources from which potential contamination would have migrated onto the site.	Metals, Semi-metals and non-metals, PAHs, TPHs, pH	Inhalation of dust	Site Workers/Site Maintenance	Medium	Unlikely	Low	Site located on superficial deposits of Alluvium and bedrock of the Mylor Formation Bedrock, both of which was classified as Secondary Aquifer - A which would support both shallow and deep groundwater.	Chemical testing prior to undertaking a generic quantitative risk assessment.
			End Users	Medium	Unlikely	Low		
			Off-site Users	Minor	Unlikely	Very low		
	Metals, Semi-metals and non-metals, PAHs, TPHs, pH	Ingestion and absorption via direct contact	Site Workers/Site Maintenance	Medium	Unlikely	Low		
			End Users	Medium	Unlikely	Low		
	Metals, Semi-metals and non-metals, PAHs, TPHs, pH	Migration via surface runoff	Surface Water	Medium	Unlikely	Low		
		Migration in solution via groundwater	Surface Water	Medium	Unlikely	Low		
			Shallow Aquifer	Medium	Unlikely	Low		
			Deep Aquifer	Medium	Unlikely	Low		
		Direct contact with construction material	Buried Structures	Mild	Low	Low		
			Buried Services					
	PAHs	Migration of gases via permeable soils	Site Workers/Site Maintenance	Medium	Unlikely	Low		
			End Users					
			Off-site Users	Minor	Unlikely	Very low		
			Building and Confined Spaces					

Table C.1.2 CSM Revised Post-Chemical Analyses

Source	Potential Contaminant	Exposure Pathway	Receptor	Initial Assessment from Preliminary Investigation Report Information			Comments	Proposed Investigation
				Severity	Probability	Risk		
Radon (Underlying Geology)	Radon	Inhalation of Vapour/gases (including Radon)	Site Workers/Site Maintenance	Medium	Likely	Moderate	The site is within an area where >30% of homes are at or above the action level.	The guidance recommends that full radon protective measures are required in any new structures. However, confirmation with local building control is advised.
			End Users	Medium	Likely	Moderate		
			Off-site Users	Minor	Unlikely	Very Low		
			Off-site Users	Minor	Unlikely	Very low		
			Building and Confined Spaces					

Appendix C.2 Chemical Laboratory Results

Margaret Lo
Soils Ltd
St Day Road
Redruth
TR16 5HY

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 23-06108

Site Reference:	Penventon Farm Nursery, Lanner, Cornwall, TR16 6AS
Project / Job Ref:	None Supplied
Order No:	None Supplied
Sample Receipt Date:	11/05/2023
Sample Scheduled Date:	11/05/2023
Report Issue Number:	1
Reporting Date:	22/05/2023

Authorised by:

[redacted]

Kevin Old
Operations Director

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 23-06108	Date Sampled	09/05/23	09/05/23	09/05/23	09/05/23	09/05/23
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penventon Farm Nursery, Lanner, Cornwall, TR16 6AS	TP / BH No	TP1	TP2	TP2	TP3	TP4
Project / Job Ref: None Supplied	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.30	0.20	1.40	0.70	0.30
Reporting Date: 22/05/2023	DETS Sample No	651003	651004	651005	651006	651007

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	5.8	6.2	7.3	6.6	8.2
Organic Matter (SOM)	%	< 0.1	MCERTS	2	0.5	4.7	3.5	1.7
Arsenic (As)	mg/kg	< 2	MCERTS	111	61	152	133	55
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	0.5	0.3	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	32	8	39	39	12
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	59	17	137	107	36
Lead (Pb)	mg/kg	< 3	MCERTS	85	66	92	71	337
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	18	3	23	25	10
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	40	11	54	51	15
Zinc (Zn)	mg/kg	< 3	MCERTS	129	93	204	191	124
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)
(n) 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

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Soil Analysis Certificate						
DETS Report No: 23-06108	Date Sampled	09/05/23	09/05/23			
Soils Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Penventon Farm Nursery, Lanner, Cornwall, TR16 6AS	TP / BH No	TP5	TP6			
Project / Job Ref: None Supplied	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	0.20	0.10			
Reporting Date: 22/05/2023	DETS Sample No	651008	651009			

Determinand	Unit	RL	Accreditation	(n)				
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected			
pH	pH Units	N/a	MCERTS	7.4	8.1			
Organic Matter (SOM)	%	< 0.1	MCERTS	1.9	0.5			
Arsenic (As)	mg/kg	< 2	MCERTS	23	30			
W/S Boron	mg/kg	< 1	NONE	< 1	< 1			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2			
Chromium (Cr)	mg/kg	< 2	MCERTS	9	9			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	< 4	< 4			
Lead (Pb)	mg/kg	< 3	MCERTS	13	11			
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	4	4			
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2			
Vanadium (V)	mg/kg	< 1	MCERTS	12	11			
Zinc (Zn)	mg/kg	< 3	MCERTS	63	48			
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-06108	Date Sampled	09/05/23	09/05/23	09/05/23	09/05/23	09/05/23
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penventon Farm Nursery, Lanner, Cornwall, TR16 6AS	TP / BH No	TP1	TP2	TP2	TP3	TP4
Project / Job Ref: None Supplied	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.30	0.20	1.40	0.70	0.30
Reporting Date: 22/05/2023	DETS Sample No	651003	651004	651005	651006	651007

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.11
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

(n) 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

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Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 23-06108	Date Sampled	09/05/23	09/05/23			
Soils Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Penventon Farm Nursery, Lanner, Cornwall, TR16 6AS	TP / BH No	TP5	TP6			
Project / Job Ref: None Supplied	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	0.20	0.10			
Reporting Date: 22/05/2023	DETS Sample No	651008	651009			

Determinand	Unit	RL	Accreditation	(n)				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Pyrene	mg/kg	< 0.1	MCERTS	0.24	< 0.1			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6			

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Soil Analysis Certificate - EPH Texas Banded							
DETS Report No: 23-06108	Date Sampled	09/05/23	09/05/23	09/05/23	09/05/23	09/05/23
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penventon Farm Nursery, Lanner, Cornwall, TR16 6AS	TP / BH No	TP1	TP2	TP2	TP3	TP4
Project / Job Ref: None Supplied	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.30	0.20	1.40	0.70	0.30
Reporting Date: 22/05/2023	DETS Sample No	651003	651004	651005	651006	651007

Determinand	Unit	RL	Accreditation					
EPH Texas (C6 - C8) : HS_1D_MS_Total	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH Texas (>C8 - C10) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	2	< 1
EPH Texas (>C10 - C12) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH Texas (>C12 - C16) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH Texas (>C16 - C21) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH Texas (>C21 - C40) : EH_1D_Total	mg/kg	< 6	MCERTS	< 6	< 6	< 6	< 6	< 6
EPH Texas (C6 - C40) : HS_1D_MS+EH_1D_Total	mg/kg	< 6	NONE	< 6	< 6	< 6	< 6	< 6

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Soil Analysis Certificate - EPH Texas Banded						
DETS Report No: 23-06108	Date Sampled	09/05/23	09/05/23			
Soils Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Penventon Farm Nursery, Lanner, Cornwall, TR16 6AS	TP / BH No	TP5	TP6			
Project / Job Ref: None Supplied	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	0.20	0.10			
Reporting Date: 22/05/2023	DETS Sample No	651008	651009			

Determinand	Unit	RL	Accreditation	(n)				
EPH Texas (C6 - C8) : HS_1D_MS_Total	mg/kg	< 0.05	NONE	< 0.05	< 0.05			
EPH Texas (>C8 - C10) : EH_1D_Total	mg/kg	< 1	MCERTS	189	< 1			
EPH Texas (>C10 - C12) : EH_1D_Total	mg/kg	< 1	MCERTS	890	< 1			
EPH Texas (>C12 - C16) : EH_1D_Total	mg/kg	< 1	MCERTS	2944	1			
EPH Texas (>C16 - C21) : EH_1D_Total	mg/kg	< 1	MCERTS	2616	3			
EPH Texas (>C21 - C40) : EH_1D_Total	mg/kg	< 6	MCERTS	724	< 6			
EPH Texas (C6 - C40) : HS_1D_MS+EH_1D_Total	mg/kg	< 6	NONE	7364	< 6			

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Tel : 01622 850410

Soil Analysis Certificate - Organochlorine Pesticides						
DETS Report No: 23-06108	Date Sampled	09/05/23	09/05/23			
Soils Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Penventon Farm Nursery, Lanner, Cornwall, TR16 6AS	TP / BH No	TP4	TP6			
Project / Job Ref: None Supplied	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	0.30	0.10			
Reporting Date: 22/05/2023	DETS Sample No	651007	651009			

Determinand	Unit	RL	Accreditation	(n)				
Aldrin	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
alpha-HCH	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
beta-HCH	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
cis-chlordane	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
delta-HCH	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
Dieldrin	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
Endosulfan A	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
Endosulfan B	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
Endrin	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
gamma-HCH (Lindane)	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
Heptachlor	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
Heptachlor epoxide	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
Hexachlorobenzene (HCB)	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
Isodrin	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
Methoxychlor	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
o,p' - DDD	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
o,p' - DDE	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
o,p' - DDT	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
p,p' - DDD	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
p,p' - DDE	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
p,p' - DDT	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
trans-chlordane	mg/kg	< 0.02	NONE	< 0.02	< 0.02			
Trifluralin	mg/kg	< 0.02	NONE	< 0.02	< 0.02			

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Rose Lane
Lenham Heath
Maidstone
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Soil Analysis Certificate - Sample Descriptions
DETS Report No: 23-06108
Soils Ltd
Site Reference: Penventon Farm Nursery, Lanner, Cornwall, TR16 6AS
Project / Job Ref: None Supplied
Order No: None Supplied
Reporting Date: 22/05/2023

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
651003	TP1	None Supplied	0.30	12.5	Brown sandy clay with stones
651004	TP2	None Supplied	0.20	6.5	Brown sandy clay with stones
651005	TP2	None Supplied	1.40	24.3	Brown sandy clay with stones
651006	TP3	None Supplied	0.70	19.5	Brown sandy clay with stones
651007	TP4	None Supplied	0.30	7.8	Brown sandy clay with stones
651008	TP5	None Supplied	0.20	7.2	Brown sandy clay with stones
651009	TP6	None Supplied	0.10	4.8	Brown sandy gravel with stones and concrete

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-06108
Soils Ltd
Site Reference: Penventon Farm Nursery, Lanner, Cornwall, TR16 6AS
Project / Job Ref: None Supplied
Order No: None Supplied
Reporting Date: 22/05/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

List of HWOL Acronyms and Operators
DETS Report No: 23-06108
Soils Ltd
Site Reference: Penventon Farm Nursery, Lanner, Cornwall, TR16 6AS
Project / Job Ref: None Supplied
Order No: None Supplied
Reporting Date: 22/05/2023

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
EPH Texas (C10 - C12) - EH_1D_Total
EPH Texas (C12 - C16) - EH_1D_Total
EPH Texas (C16 - C21) - EH_1D_Total
EPH Texas (C21 - C40) - EH_1D_Total
EPH Texas (C6 - C40) - HS_1D_MS+EH_1D_Total
EPH Texas (C6 - C8) - HS_1D_MS_Total
EPH Texas (C8 - C10) - EH_1D_Total

Appendix C.3 General Assessment Criteria

HUMAN HEALTH RISK ASSESSMENT

Introduction

The statutory definition of contaminated land is defined in the Environmental Protection Act 1990, ref. 1.1, which was introduced by the Environment Act 1995, ref. 1.2;

'Land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that –

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) pollution of controlled waters is being, or is likely to be, caused.'

The UK guidance on the assessment of contaminated has developed as a direct result of the introduction of these two Acts. The technical guidance supporting the new legislation has been summarised in a number of key documents collectively known as the Contaminated Land Reports (CLRs), a proposed series of twelve documents. Seven were originally published in March 1994, four more were published in April 2002, while the last remaining guidance document, CLR 11, ref 1.3 was published in 2004. In 2008 CLR reports 7 to 10 were withdrawn by DEFRA and the Environment Agency and updated version of CLR 9 and 10 were produced in the form of Science Reports SR2, ref. 1.4 and SR3, ref. 1.5.

In establishing whether a site fulfils the statutory definition of 'contaminated land' it is necessary to identify, whether a pollutant linkage exists in respect of the land in question and whether the pollutant linkage:

- is resulting in significant harm being caused to the receptor in the pollutant linkage,
- presents a significant possibility of significant harm being caused to that receptor,
- is resulting in the pollution of the controlled waters which constitute the receptor, or
- is likely to result in such pollution.

A 'pollutant linkage' may be defined as the link between a contaminant 'source' and a 'receptor' by means of a 'pathway'.

Assessment Methodology

The guidance proposes a four-stage assessment process for identifying potential pollutant linkages on a site. These stages are set out in the table below:

No.	Process	Description
1	Hazard Identification	Establishing contaminant sources, pathways and receptors (the conceptual model).
2	Hazard Assessment	Analysing the potential for unacceptable risks (what linkages could be present, what could be the effects).
3	Risk Estimation	Trying to establish the magnitude and probability of the possible consequences (what degree of harm might result and to what receptors, and how likely is it).
4	Risk Evaluation	Deciding whether the risk is unacceptable.

Stages 1 and 2 develop a *'conceptual model'* based upon information collated from desk based studies, and frequently a walkover of the site. The walkover survey should be conducted in general accordance with CLR 2, ref. 1.6. The formation of a conceptual model is an iterative process and as such, it should be updated and refined throughout each stage of the project to reflect any additional information obtained.

The extent of the desk studies and enquiries to be conducted should be in general accordance with CLR 3, ref. 1.7. The information from these enquiries is presented in a desk study report with recommendations, if necessary, for further work based upon the conceptual model. Specific DoE 'Industry Profiles' provide guidance on the nature of contaminants relating to specific industrial processes.

If potential pollutant linkages are identified within the conceptual model, a Phase 2 site investigation and report will be recommended. The investigation should be planned in general accordance with CLR 4, ref 1.8. The number of exploratory holes and samples collected for analysis should be consistent with the size of the site and the level of risk envisaged. This will enable a contamination risk assessment to be conducted, at which point the conceptual model can be updated and relevant pollutant linkages can be identified.

A two-stage investigation may be more appropriate where time constraints are less of an issue. The first stage investigation being conducted as an initial assessment for the presence of potential sources, a second being a more refined investigation to delineate wherever possible the extent of the identified contamination.

All site works should be in general accordance with the British Standards BS 10175:2011, ref. 1.9. and BS 5930:2015, ref. 1.10.

The generic contamination risk assessment screens the results of the chemical analysis against generic guidance values which are dependent on the proposed end-use of the development.

The end-use may be defined as one of the following ref. 1.15;

- Residential with homegrown produce –domestic low rise and low density housing with gardens where vegetables may be grown for home consumption
- Residential without homegrown produce –domestic low density and low density housing where no gardens are present.
- Allotments –specific areas where vegetables are grown for home consumption.
- Public open space in close proximity to residential housing –includes the predominantly grassed area adjacent to high density housing and the central green area around which houses are developed. This land-use includes the smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soil with planting.
- Public open space in use as general parkland –provided for recreational use and may be used for family visits and picnics, children's play area, sports grounds and dig walking.
- Commercial –industrial premises where there is limited exposure to soil.

Standard Land-use Scenarios

The standard land-use scenarios used to develop conceptual exposure models are presented in the following sections:

Residential with homegrown produce

Generic scenario assumes a typical two-storey house built on a ground bearing slab with a private garden having a lawn, flowerbeds and a small fruit and vegetable patch.

• Critical receptor is a young female child (zero to six years old)
• Exposure duration is six years.
• Exposure pathways include direct soil and indoor dust ingestion, consumption of home-grown produce and any adhering soil, skin contact with soils and indoor dust and inhalation of indoor and outdoor dust and vapours.
• Building type is a two-storey small terraced house.

A sub-set of the Residential land-use is **Residential without Homegrown produce**. The generic scenario assumes low density housing with communal landscaped gardens where the consumption of home grown vegetables will not occur.

Allotments

Provision of open space (about 250sq.m) commonly made available to tenants by the local authority to grow fruit and vegetable for their own consumption. Typically, there are a number of plots to a site which may have a total area of up to 1 hectare. The tenants are assumed to be adults and that young children make occasional accompanied visits.

Although some allotment holders may choose to keep animals including rabbits, hens, and ducks, potential exposure to contaminated meat and eggs is not considered.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and inhalation of outdoor dust and vapours.
- There is no building.

Commercial

The generic scenario assumes a typical commercial or light industrial property comprising a three-storey building at which employees spend most time indoors and are involved in office-based or relatively light physical work.

- Critical receptor is a working female adult (aged 16 to 65 years old).
- Exposure duration is a working lifetime of 49 years.
- Exposure pathways include direct soil and indoor dust ingestion, skin contact with soils and dusts and inhalation of dust and vapours.
- Building type is a three-storey office (pre 1970).

Public Open Space within Residential Area

The generic scenario refers to any grassed area 0.05 ha and that is close to Housing.

- Grassed area of up to 0.05 ha and a considerable proportion of this (up to 50%) may be bare soil
- Predominantly used by children for playing and may be used for activities such as a football kick about
- Sufficiently close proximity to home for tracking back of soil to occur, thus indoor exposure pathways apply
- older children as the critical receptor on basis that they will use site most frequently (Age class 4-9)
- ingestion rate 75 $mg.day^{-1}$

Public Open Space Park

This generic scenario refers to any public park that is more than 0.5ha in area:

- Public park (>0.5 ha), predominantly grassed and may also contain children's play equipment and border areas of soil containing flowers or shrubs (75% cover)
- Female child age classes 1-6
- Soil ingestion rate of 50 $mg.day^{-1}$
- Occupancy period outdoors = 2 $hours.day^{-1}$
- Exposure frequency of 170 days.year-1 for age classes 2-18 and 85
- $days.year^{-1}$ for age class 1
- Outdoor exposure pathways only (no tracking back).

Human Health Generic Quantitative Risk Assessment (GQRA) involves the comparison of contaminant concentrations measured in soil at the site with Generic Assessment Criteria (GAC).

GAC are conservative values adopted to ensure that they are applicable to the majority of possible contaminated site. These values may be published Contaminated Land Exposure Assessment Model (CLEA) derived GAC derived by a third party or the Environment Agency/ DEFRA. It is imperative to the risk assessor to understand the uncertainties and limitations associated with these GAC to ensure that they are used appropriately. Where the adoption of a GAC is not appropriate, for instance when the intended land-use is at variance the CLEA standard land-uses, then a Detailed Quantitative Risk Assessment (DQRA) may be undertaken to develop site specific values for relevant soil contaminants based on the site specific conditions.

In 2014, the publication of Category 4 Screening Levels (C4SL) ref 1.15, 1.16, as part of the Defra-funded research project SP1010, included modifications to certain exposure assumptions documented within EA Science Report SC050221/SR3 (herein after referred to as SR3) ref 1.5 used in the generation of SGVs. C4SL were published for six substances (cadmium, arsenic, benzene, benzo(a)pyrene, chromium VI and lead) for a sandy loam soil type with 6% soil organic matter, based on a low level of toxicological concern (LLTC; see Section 2.3 of research project report SP1010 ref 1.16. Where a C4SL has been published, Soils Limited has adopted them as GAC for these six substances.

For all other substances the soils will be compared to Suitable 4 Use Levels (S4ULs) published by LQM ref. 1.12, which were developed for around 85 substances and are intended to enable a screening assessment of the risks posed by soil quality on development sites. The updated LQM/CIEH GAC publication was developed to accommodate recent developments in the understanding of chemical, toxicological and routine exposure to soil-based contaminants.

Where no S4UL or C4SL is available, the assessment criteria (AC) may be generated using the Contaminated Land Exposure Assessment (CLEA) Software Version 1.07, ref. 1.13. Toxicological and physico-chemical/fate and transport data used to generate the AC has been derived from a hierarchy of data sources as follows:

1. Environment Agency or Department of Environment Food and Rural Affairs (DEFRA) documents;
2. Other documents produced by UK Government or state organisations;
3. European institution documents;
4. International organisation documents;
5. Foreign government institutions.

In the case of the majority of contaminants considered, the toxicological data has been drawn from the relevant CLR 9 TOX report, or updated toxicological data published by the Environment Agency (2009), ref. 1.6, where available. Where no TOX report is available reference has been made to the health criteria values, derived for use in Land Quality Press (2006), ref. 1.17, as this is considered to represent a peer reviewed data source. Similarly, fate and transport data has been derived in the first instance from Environment Agency (2003), ref. 1.18 and for contaminants not considered in this document the fate and transport data used in previous versions of the CLEA model has been used.

Chemical laboratory test results are processed as follows. A statistical analysis of the results is conducted, as detailed in CIEH and CL:AIRE ‘Guidance on Comparing Soil Contamination Data with a Critical Concentration’, ref. 1.14. Individual concentrations are compared to the selected guideline values to identify concentrations of contaminants that are above the selected screening criteria.

Where the risk estimation identifies significant concentrations of one or more contaminants, a further risk evaluation needs to be undertaken.

References

1.1 The Environmental Protection Act, Part IIA, Section 78, DoE 1990.

1.2 Environment Act 1995, Section 57, DoE 1995.

1.3 CLR 11, '*Model Procedures for the Management of Contaminated Land*', DEFRA and Environment Agency, 2004.

1.4 Environment Agency Science Report SC050021/SR2 'Human health toxicological assessment of contaminants in soil'.

1.5 Science Report SC050021/SR3 '*Updated technical background to the CLEA model*', Environment Agency, 2008

1.6 CLR 2, '*Guidance on preliminary site inspection of contaminated land*', Report by Applied Environmental, DoE 1994.

1.7 CLR 3 '*Documentary Research on Industrial Sites*', Report by RPS Consultants Ltd., DOE, 1994

1.8 CLR 4, '*Sampling strategies for contaminated land*', Report by The Centre for Research into the Built Environment, the Nottingham Trent University, DoE, 1994

1.9 BS 10175: 2011 '*Investigation of potentially contaminated sites. Code of practice*', British Standards Institute, 2011

1.10 BS 5930: 2015 '*Code of practice for ground investigations*', British Standards Institute, 2015

1.11 Science Report SC050021 '*Contaminants in Soil: Updated Collation of Toxicological Data and Intake Values for Humans*', Environment Agency, 2009

1.12 The LQM/S4ULs for Human Health Risk Assessment, Nathanail P, McCaffery C, Gillett A, Ogden R, and Nathanail J, Land Quality Press, Nottingham, published 2015.

1.13 CLEA '*Software Version 1.071*' (downloaded from the Environment Agency website, http://www.environment-agency.gov.uk)

1.14 CIEH '*Guidance on Comparing Soil Contamination Data with a Critical Concentration*', Chartered Institute of Environmental Health (CIEH) and Contaminated Land: Applications in Real Environments (CL:AIRE), May 2008.

1.15 DEFRA SP1010: Development of Category 4 Screening Levels for the Assessment of Land Affected by Contamination, published March 2014.

1.16 Contaminated Land: Applications in Real Environment (CL:AIRE) (2014). 'Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination', Revision 2, DEFRA research project SP1010.

1.17 Generic Assessment Criteria for Human Health Risk Assessment, Nathanial CP, McCaffery C, Ashmore M, Cheng Y, Gillett A, Hooker P and Ogden RC

1.18 CLR 2, '*Guidance on preliminary site inspection of contaminated land*', Report by Applied Environmental, DoE 1994.

				Residential with home-grown produce			Residential without home-grown produce			Allotments			Commercial			Public Open Space - Resi			Public Open Space -Park					
			SOM	1.0	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6			
Type	Contaminants	Species	Year																					
	Antimony		2010				550						7500									EIC/AGS/	CL:AIRE	2010
	Arsenic		2014		37			40			49			640			79			168		C4SL	DEFRA	2014
			2015		37			40			40			640			79			170		S4UL	LQM/CIEH	2015
	Beryllium		2015		1.7			1.7			35			12			2.2			63		S4UL	LQM/CIEH	2015
	Boror		2015		290			11000			45			240000			21000			46000		S4UL	LQM/CIEH	2015
	Cadmium		2015		11			85			1.9			190			120			532		S4UL	LQM/CIEH	2015
			2014		26			149			4.9			410			220			880		C4SL	DEFRA	2014
	Chromium	III	2015		910			910			18000			8600			1500			33000		S4UL	LQM/CIEH	2015
		VI	2014		21			21			170			49			23			250		C4SL	DEFRA	2014
		VI	2015		6			6			1.8			33			7.7			220		S4UL	LQM/CIEH	2015
	Copper		2015		2400			7100			520			68000			12000			44000		S4UL	LQM/CIEH	2015
	Lead		2014		200			310			80			2330			630			1300		C4SL	DEFRA	2014
Metals	Mercury	Elemental	2015		1.2			1.2			21			*58*			16			*30*		S4UL	LQM/CIEH	2015
		Inorganic	2015		40			56			19			1100			120			240		S4UL	LQM/CIEH	2015
		Methyl	2015		11			15			6			320			40			68		S4UL	LQM/CIEH	2015
	Nickel		2015		130			180			53			980			230			800		S4UL	LQM/CIEH	2015
	Selenium		2015		250			430			88			12000			1100			1800		S4UL	LQM/CIEH	2015
	Vanadium		2015		410			1200			91			9000			2000			5000		S4UL	LQM/CIEH	2015
	Zinc		2015		3700			40000			620			730000			81000			170000		S4UL	LQM/CIEH	2015
	Benzene		2014		0.87			3.3			0.18			98			140			230		C4SL	DEFRA	2014
			2015	0.087	0.17	0.37	0.38	0.7	1.4	0.017	0.034	0.075	27	47	90	72	72	73	90	100	110	S4UL	LQM/CIEH	2015
	Toluene		2015	130	290	660	*880*	1900	3900	22	51	120	*65000*	*110000*	*180000*	56000	56000	56000	*87000*	*95000*	*100000*	S4UL	LQM/CIEH	2015
	Ethylbenzene		2015	47	110	260	83	190	440	16	39	91	*4700*	*13000*	*27000*	24000	24000	25000	*17000*	*22000*	*27000*	S4UL	LQM/CIEH	2015
	Xylenes	o-xylene	2015	60	140	330	88	210	480	28	67	160	*6600*	*15000*	*33000*	41000	42000	43000	*17000*	*24000*	*33000*	S4UL	LQM/CIEH	2015
		m-xylene	2015	59	140	320	82	190	450	31	74	170	*6200*	*14000*	*31000*	41000	42000	43000	*17000*	*24000*	*32000*	S4UL	LQM/CIEH	2015
		p-xylene	2015	56	130	310	79	180	310	29	69	160	*5900*	*14000*	*30000*	41000	42000	43000	*17000*	*23000*	*31000*	S4UL	LQM/CIEH	2015
Petroleum Hydrocarbons Fractions	Aliphatic >C5 - C6		2015	42	78	160	42	78	160	730	1700	3900	*3200*	*5900*	*12000*	*570000*	590000	600000	*95000*	*130000*	*180000*	S4UL	LQM/CIEH	2015
	Aliphatic >C6 - C8		2015	100	230	530	100	230	530	2300	5600	13000	*7800*	*17000*	*40000*	600000	610000	620000	*150000*	*220000*	*320000*	S4UL	LQM/CIEH	2015
	Aliphatic >C8 - C10		2015	27	65	150	27	65	150	320	770	1700	*2000*	*4800*	*11000*	13000	13000	13000	*14000*	*18000*	*21000*	S4UL	LQM/CIEH	2015
	Aliphatic >C10 - C12		2015	*130*	*330*	*760*	*130*	*330*	*770*	2200	4400	7300	*9700*	*23000*	*47000*	13000	13000	13000	*21000*	*23000*	*24000*	S4UL	LQM/CIEH	2015
	Aliphatic >C12 - C16		2015	*1100*	*2400*	*4300*	*1100*	*2400*	*4400*	11000	13000	13000	*59000*	*82000*	*90000*	13000	13000	13000	*25000*	*25000*	*26000*	S4UL	LQM/CIEH	2015
	Aliphatic >C16 - C35		2015	*65000*	*92000*	*110000*	*65000*	*92000*	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000	450000	480000	490000	S4UL	LQM/CIEH	2015
	Aliphatic >C35 - C44		2015	*65000*	*92000*	*140000*	*65000*	*92000*	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000	450000	480000	490000	S4UL	LQM/CIEH	2015
	Aromatic >C5 - C7		2015	70	140	300	370	690	1400	13	27	57	*26000*	*46000*	*86000*	56000	56000	56000	*76000*	*84000*	*92000*	S4UL	LQM/CIEH	2015
	Aromatic >C7 - C8		2015	130	290	660	860	1800	3900	22	51	120	*56000*	*110000*	*180000*	56000	56000	56000	*87000*	*95000*	*100000*	S4UL	LQM/CIEH	2015
	Aromatic >C8 - C10		2015	34	83	190	47	110	270	8.6	21	51	*3500*	*8100*	*17000*	5000	5000	5000	*7200*	*8500*	*9300*	S4UL	LQM/CIEH	2015
	Aromatic >C10 - C12		2015	74	180	380	250	590	1200	13	31	74	*16000*	*28000*	*34000*	5000	5000	5000	*9200*	*9700*	*10000*	S4UL	LQM/CIEH	2015
	Aromatic >C12 - C16		2015	140	330	660	1800	2300	2500	23	57	130	*36000*	*37000*	*38000*	5100	5100	5000	10000	10000	10000	S4UL	LQM/CIEH	2015
	Aromatic >C16 - C21		2015	260	540	930	1900	1900	1900	46	110	260	28000	28000	28000	3800	3800	3800	7600	7700	7800	S4UL	LQM/CIEH	2015
	Aromatic >C21 - C35		2015	1100	1500	1700	1900	1900	1900	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900	S4UL	LQM/CIEH	2015
	Aromatic >C34 - C44		2015	1100	1500	1700	1900	1900	1900	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900	S4UL	LQM/CIEH	2015
	Aliphatic + Aromatic >C44 - C70		2015	1600	1800	1900	1900	1900	1900	1200	2100	3000	28000	28000	28000	3800	3800	3800	7800	7800	7900	S4UL	LQM/CIEH	2015
Polycyclic Aromatic Hydrocarbons (PAH's) (mg/kg)	Acenaphthene		2015	210	510	1100	*3000*	*4700*	*6000*	34	85	200	*84000*	*97000*	100000	15000	15000	15000	29000	30000	30000	S4UL	LQM/CIEH	2015
	Acenaphthylene		2015	170	420	920	*2900*	*4600*	*6000*	28	69	160	*83000*	*97000*	100000	15000	15000	15000	29000	30000	30000	S4UL	LQM/CIEH	2015
	Anthracene		2015	2400	5400	11000	*31000*	*35000*	*37000*	380	950	2200	520000	54000	540000	74000	74000	74000	150000	150000	150000	S4UL	LQM/CIEH	2015
	Benzo(a)anthracene		2015	7.2	11	13	11	14	15	2.9	6.5	13	170	170	180	29	29	29	49	56	62	S4UL	LQM/CIEH	2015
	Benzo(a)pyrene		2014			5			5.3			5.7			76			10			21	C4SL	DEFRA	2014
			2015	2.2	2.7	3	3.2	3.2	3.2	0.97	2	3.5	35	35	36	5.7	5.7	5.7	11	12	13	S4UL	LQM/CIEH	2015
	Benzo(b)fluoranthene		2015	2.6	3.3	3.7	3.9	4.0	4.0	0.99	2.1	3.9	44	44	45	7.1	7.2	7.2	13	15	16	S4UL	LQM/CIEH	2015
	Benzo(ghi)perylene		2015	320	340	350	360	360	360	290	470	640	3900	4000	4000	640	640	640	1400	1500	1600	S4UL	LQM/CIEH	2015
	Benzo(k)fluoranthene		2015	77	93	100	110	110	110	37	75	130	1200	1200	1200	190	190	190	370	410	440	S4UL	LQM/CIEH	2015
	Chrysene		2015	15	22	27	30	31	32	4.1	9.4	19	350	350	350	57	57	57	93	110	120	S4UL	LQM/CIEH	2015
	Dibenz(a,h)anthracene		2015	0.24	0.28	0.3	0.31	0.32	0.32	0.14	0.27	0.43	3.5	3.6	3.6	0.57	0.57	0.58	1.1	1.3	1.4	S4UL	LQM/CIEH	2015

			Residential with home-grown produce			Residential without home-grown produce			Allotments			Commercial			Public Open Space - Resi			Public Open Space -Park					
		SOM	1.0	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6			
Type	Contaminants Species	Year																					
	Fluoranthene	2015	280	560	890	1500	1600	1600	52	130	290	23000	23000	23000	3100	3100	3100	6300	6300	6400	S4UL	LQM/CIEH	2015
	Fluorene	2015	170	400	860	*2800*	*3800*	*4500*	27	67	160	63000	68000	71000	9900	9900	9900	20000	20000	20000	S4UL	LQM/CIEH	2015
	Indeno(1,2,3-cd)pyrene	2015	27	36	41	45	46	46	9.5	21	39	500	510	510	82	82	82	150	170	180	S4UL	LQM/CIEH	2015
	Naphthalene	2015	2.3	5.6	13	2.3	5.6	13	4.1	10	24	*190*	*460*	*1100*	4900	4900	4900	*1200*	*1900*	*3000*	S4UL	LQM/CIEH	2015
	Phenanthrene	2015	95	220	440	*1300*	*1500*	*1500*	15	38	90	22000	22000	23000	3100	3100	3100	6200	6200	6300	S4UL	LQM/CIEH	2015
	Pyrene	2015	620	1200	2000	3700	3800	3800	110	270	620	54000	54000	54000	7400	7400	7400	15000	15000	15000	S4UL	LQM/CIEH	2015
	Coal Tar(Bap as surrogate matter	2015	0.79	0.98	1.1	1.2	1.2	1.2	0.32	0.67	1.2	15	15	15	2.2	2.2	2.2	4.4	4.7	4.8	S4UL	LQM/CIEH	2015
Chloroalkanes & alkenes	1,2 Dichloroethane	2015	0.0071	0.011	0.019	0.0092	0.013	0.023	0.0046	0.0083	0.016	0.67	0.97	1.7	29	29	29	21	24	28	S4UL	LQM/CIEH	2015
	1,1,1 Trichloroethane	2015	8.8	18	39	9	18	40	48	110	240	660	1300	3000	140000	140000	*140000*	*57000*	*76000*	*100000*	S4UL	LQM/CIEH	2015
	1,1,2,2 Tetrachloroethane	2015	1.6	3.4	7.5	3.9	8	17	0.41	0.89	2	270	550	1100	1400	1400	1400	1800	2100	2300	S4UL	LQM/CIEH	2015
	1,1,1,2 Tetrachloroethane	2015	1.2	2.8	6.4	1.5	3.5	8.2	0.79	1.9	4.4	110	250	560	1400	1400	1400	1500	1800	2100	S4UL	LQM/CIEH	2015
	Tetrachloroethene	2015	0.18	0.39	0.9	0.18	0.4	0.92	0.65	1.5	3.6	19	42	95	1400	1400	1400	*810*	*1100*	1500	S4UL	LQM/CIEH	2015
	Tetrachloromethane (Carbon Tetrachloride)	2015	0.026	0.056	0.13	0.026	0.056	0.13	0.45	1	2.4	2.9	6.3	14	890	920	950	190	270	400	S4UL	LQM/CIEH	2015
	Trichloroethene	2015	0.016	0.034	0.075	0.017	0.036	0.08	0.041	0.091	0.21	1.2	2.6	5.7	120	120	120	70	91	120	S4UL	LQM/CIEH	2015
	Trichloromethan	2015	0.91	1.7	3.4	1.2	2.1	4.2	0.42	0.83	1.7	99	170	350	2500	2500	2500	2600	2800	3100	S4UL	LQM/CIEH	2015
	Vinyl Chloride (cloroethene	2015	0.00064	0.00087	0.0014	0.00077	0.001	0.0015	0.00055	0.001	0.0018	0.059	0.077	0.12	3.5	3.5	3.5	4.8	5	5.4	S4UL	LQM/CIEH	2015
Explosives	2,4,6 Trinitrotoluene	2015	1.6	3.7	8.1	65	66	66	0.24	0.58	1.4	1000	1000	1000	130	130	130	260	270	270	S4UL	LQM/CIEH	2015
	RDX (Hexogen/Cyclonite/1,3,5-trinitro-1,3,5-triazacyclohexane)	2015	120	250	540	13000	13000	13000	17	38	85	210000	210000	210000	26000	26000	27000	49000	51000	53000	S4UL	LQM/CIEH	2015
	HMX (Octogen/1,3,5,7-tetrenitro-1,3,5,7-tetrazacyclo-octane)	2015	5.7	13	26	6700	6700	6700	0.86	1.9	3.9	110000	110000	110000	13000	13000	13000	*23000*	*23000*	*24000*	S4UL	LQM/CIEH	2015
Pesticides	Aldrin	2015	5.7	6.6	7.1	7.3	7.4	7.5	3.2	6.1	9.6	170	170	170	18	18	18	30	31	31	S4UL	LQM/CIEH	2015
	Dieldrir	2015	0.97	2	3.5	7	7.3	7.4	0.17	0.41	0.96	170	170	170	18	18	18	30	30	31	S4UL	LQM/CIEH	2015
	Atrazine	2015	3.3	7.6	17.4	610	620	620	0.5	1.2	2.7	9300	9400	9400	1200	1200	1200	2300	2400	2400	S4UL	LQM/CIEH	2015
	Dichlorvos	2015	0.032	0.066	0.14	6.4	6.5	6.6	0.0049	0.01	0.022	140	140	140	16	16	16	26	26	27	S4UL	LQM/CIEH	2015
	Alpha - Endosulfan	2015	7.4	18	41	*160*	*280*	*410*	1.2	2.9	6.8	*5600*	*7400*	*8400*	1200	1200	1200	2400	2400	2500	S4UL	LQM/CIEH	2015
	Beta - Endosulfan	2015	7	17	39	*190*	*320*	*440*	1.1	2.7	6.4	*6300*	*7800*	*8700*	1200	1200	1200	2400	2400	2500	S4UL	LQM/CIEH	2015
	Alpha -Hexachlorocyclohexanes	2015	0.23	0.55	1.2	6.9	9.2	11	0.035	0.087	0.21	170	180	180	24	24	24	47	48	48	S4UL	LQM/CIEH	2015
	Beta -Hexachlorocyclohexanes	2015	0.085	0.2	0.46	3.7	3.8	3.8	0.013	0.032	0.077	65	65	65	8.1	8.1	8.1	15	15	16	S4UL	LQM/CIEH	2015
	Gamma -Hexachlorocyclohexanes	2015	0.06	0.14	0.33	2.9	3.3	3.5	0.0092	0.023	0.054	67	69	70	8.2	8.2	8.2	14	15	15	S4UL	LQM/CIEH	2015
Chlorobenzenes	Chlorobenzene	2015	0.46	1	2.4	0.46	1	2.4	5.9	14	32	56	130	290	11000	13000	14000	*1300*	*2000*	*2900*	S4UL	LQM/CIEH	2015
	1,2-Dichlorobenzene	2015	23	55	130	24	57	130	94	230	540	*2000*	*4800*	*11000*	90000	95000	98000	*24000*	*36000*	*51000*	S4UL	LQM/CIEH	2015
	1,3-Dichlorobenzene	2015	0.4	1	2.3	0.44	1.1	2.5	0.25	0.6	1.5	30	73	170	300	300	300	390	440	470	S4UL	LQM/CIEH	2015
	1,4-Dichlorobenzene	2015	61	150	350	61	150	350	15	37	88	*4400*	*10000*	*25000*	17000	17000	1700	*36000*	*36000*	*36000*	S4UL	LQM/CIEH	2015
	1,2,3,-Trichlorobenzene	2015	1.5	3.6	8.6	1.5	3.7	8.8	4.7	12	28	102	250	590	1800	1800	1800	*770*	*1100*	*1600*	S4UL	LQM/CIEH	2015
	1,2,4,-Trichlorobenzene	2015	2.6	6.4	15	2.6	6.4	15	55	140	320	220	530	1300	15000	17000	19000	*1700*	*2600*	*4000*	S4UL	LQM/CIEH	2015
	1,3,5,-Trichlorobenzene	2015	**0.33**	**0.81**	**1.9**	**0.33**	**0.81**	**1.9**	**4.7**	**12**	**28**	**23**	**55**	**130**	**1700**	**1700**	**1800**	***380***	***580***	***860***	S4UL	LQM/CIEH	2015
	1,2,3,4,-Tetrachlorobenzene	2015	**15**	**36**	**78**	**24**	**56**	**120**	**4.4**	**11**	**26**	**1700**	**3080**	**4400**	**830**	**830**	**830**	***1500***	***1600***	***1600***	S4UL	LQM/CIEH	2015
	1,2,3,5,- Tetrachlobenzene	2015	**0.66**	**1.6**	**3.7**	**0.75**	**1.9**	**4.3**	**0.38**	**0.9**	**2.2**	***49***	***120***	***240***	**78**	**79**	**79**	***110***	***120***	***130***	S4UL	LQM/CIEH	2015
	1,2,4, 5,- Tetrachlobenzene	2015	**0.33**	**0.77**	**1.6**	**0.73**	**1.7**	**3.5**	**0.06**	**0.16**	**0.37**	***42***	***72***	***96***	**13**	**13**	**13**	**25**	**26**	**26**	S4UL	LQM/CIEH	2015
	Pentachlrobenzene	2015	**5.8**	**12**	**22**	**19**	**30**	**38**	**1.2**	**3.1**	**7**	***640***	***770***	***830***	**100**	**100**	**100**	**190**	**190**	**190**	S4UL	LQM/CIEH	2015
	Hexachlorobenzene	2015	***1.8***	***3.3***	**4.9**	***4.1***	***5.7***	***6.7***	**0.47**	**1.1**	**2.5**	***110***	**120**	**120**	**16**	**16**	**16**	**30**	**30**	**30**	S4UL	LQM/CIEH	2015
Phenols & Chlorophenols																							
	Phenols	2015	120	200	380	440	690	1200	23	42	83	*440*	*690*	*1300*	*440*	*690*	*1300*	*440*	*690*	*1300*	S4UL	LQM/CIEH	2015
	Chlorophenols (4 Congeners)	2015	**0.87**	**2**	**4.5**	**94**	**150**	**210**	**0.13**	**0.3**	**0.7**	**3500**	**4000**	**4300**	**620**	**620**	**620**	**1100**	**1100**	**1100**	S4UL	LQM/CIEH	2015
	Pentachlorophenols	2015	**0.22**	**0.52**	**1.2**	***27***	**29**	**31**	**0.03**	**0.08**	**0.19**	**400**	**400**	**400**	**60**	**60**	**60**	**110**	**120**	**120**	S4UL	LQM/CIEH	2015
Others																							
	Carbon Disulphide	2015	**0.14**	**0.29**	**0.62**	**0.14**	**0.29**	**0.62**	**4.8**	**10**	**23**	**11**	**22**	**47**	**11000**	**11000**	**12000**	**1300**	**1900**	**2700**	S4UL	LQM/CIEH	2015
	Hexachloro-1,3-Butadiene	2015	**0.29**	**0.7**	**1.6**	**0.32**	**0.78**	**1.8**	**0.25**	**0.61**	**1.4**	**31**	**66**	**120**	**25**	**25**	**25**	**48**	**50**	**51**	S4UL	LQM/CIEH	2015
	Sum of PCDDs, PCDFs and dioxin-like PCB's.	2012			**8**			**8**			**8**			**240**							SGV	DEFRA	2012

NOTE

Priority	Guideline (mg kg^{-1})

				Residential with home-grown produce			Residential without home-grown produce			Allotments			Commercial			Public Open Space - Resi			Public Open Space -Park		
			SOM	1.0	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6
Type	Contaminants	Species	Year																		
	1	Site Specific Assessment Criteria (SSAC) (Soils Limite																			
	2	2014: Category 4 Screening Level (C4SL) (Contaminated Land: Application in Real Environment (CL:ARE), 201																			
	3	2012: Soil Guideline Value (SGV) (Environment Agency, 2009																			
	4	2015: Suitable 4 Use Level (S4UL) (Nathanail *et al*, 2015)																			
		For Generic Risk Assessment, the values in Bold have priorit																			
	Table reviewed February 2020																				

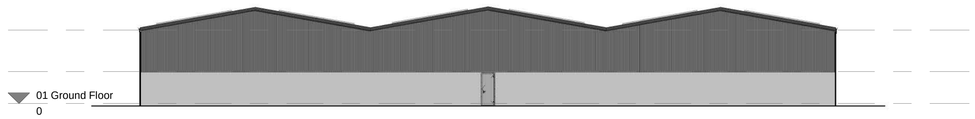
Appendix A Information Provided by the Client

North Elevation

1 : 200 0 5m

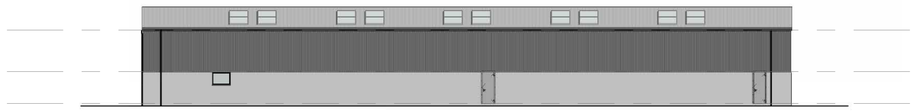
East Elevation

1 : 200



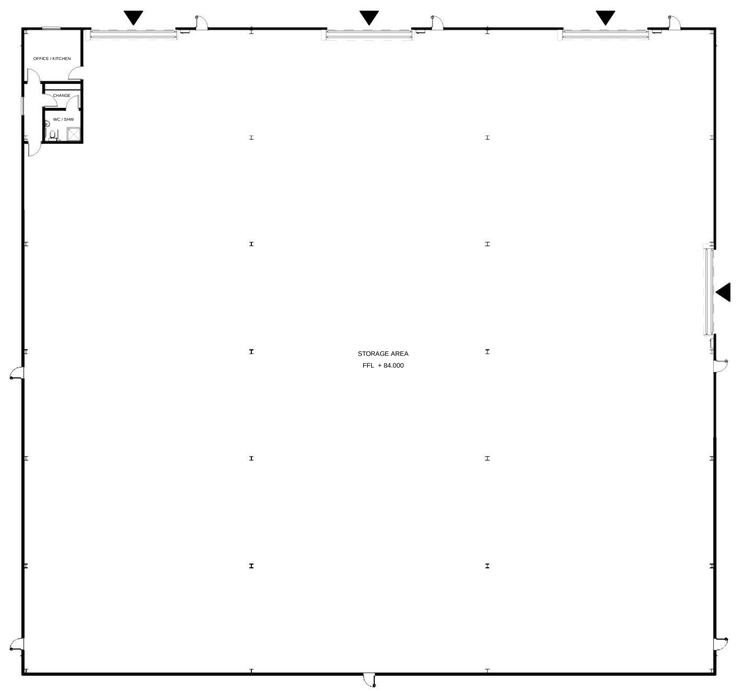
South Elevation

1 : 200



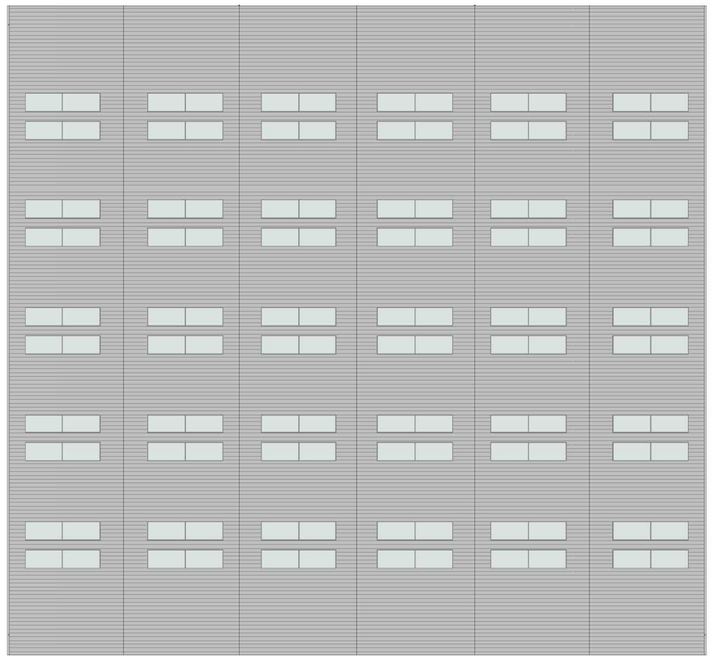
West Elevation

1 : 200



Ground Floor Plan

1 : 200 0 5m



Roof Plan

1 : 200

TREWIN DESIGN ARCHITECTS

1 Stanhope Square Holsworthy Devon EX22 6DR - 01409253013
www.trewin-design.co.uk - create@trewin-design.co.uk

MATERIALS

Roof: Trapezoidal insulated roof panels -Grey

Walls:Fair faced concrete plinth / Trapezoidal insulated panels -Grey

Rainwater Goods: Aluminium -Grey

Metal Roller shutter doors -Blue -RAL colour tbc

Metal personnel Doors -Grey -RAL colour tbc

Drawing title

As Proposed

Job title

New Warehouse
Penventon Farm Nursery
Lanner

Client

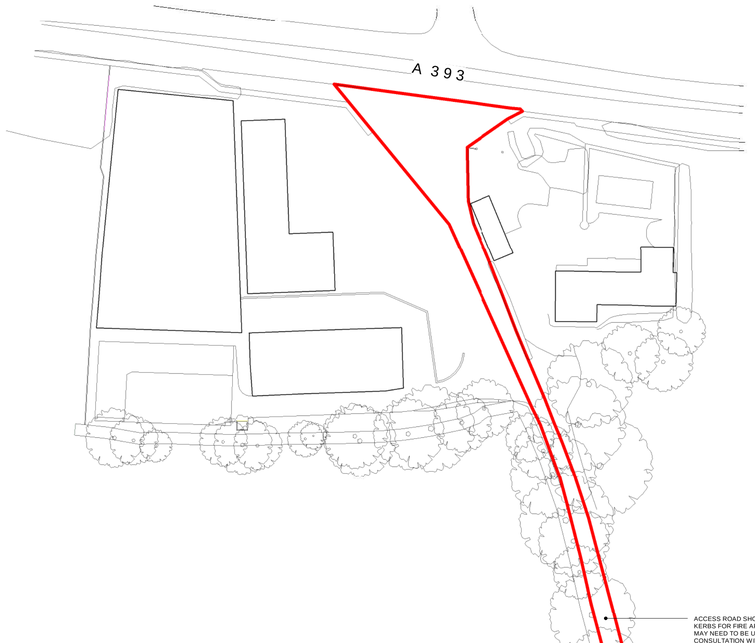
Warrior Warehouses Ltd

Stage	PL -Detailed Design	**Issued for**	Client/Stage Approved
Scale @ A1	1 : 200	**Date**	15/09/2020
Drawn by	SD	**Checked by**	SD

Drawing number 07976-TDA-DR-PL-0005

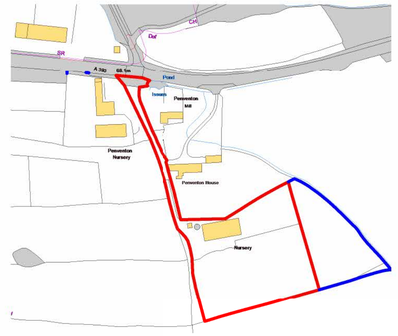
Revision A03

Revision	Description	Date	Initials
02	Planning Application	17.09.20	SMD



Site Location Plan

1 : 2500 0 50m



Key: To be read in conjunction with Arboricultural and Net Gain report

- Site boundary
- Tree protection fencing
- Category B trees
- Category C trees
- Grassland -other natural grassland (species-rich wildflower grassland on bank)
- Newly planted species rich hedge associated with bank or ditch
- Heathland and scrub -mixed scrub

Bat box information

Bat boxes to be mounted onto the existing building or large trees on the cormish hedgebank at the southwest perimeter.

Bird box information

Pre-fabricated bird boxes to be mounted onto the large tress at the site perimeters or incorporating them into the existing building.

Block Plan

1 : 500 0 10m

TREWIN DESIGN ARCHITECTS

1 Stanhope Square Holsworthy Devon EX22 6DR - 01409253013
www.trewin-design.co.uk - create@trewin-design.co.uk

Drawing title

Block Plan and Site Location Plan

Job title

New Warehouse
Penventon Farm Nursery
Lanner

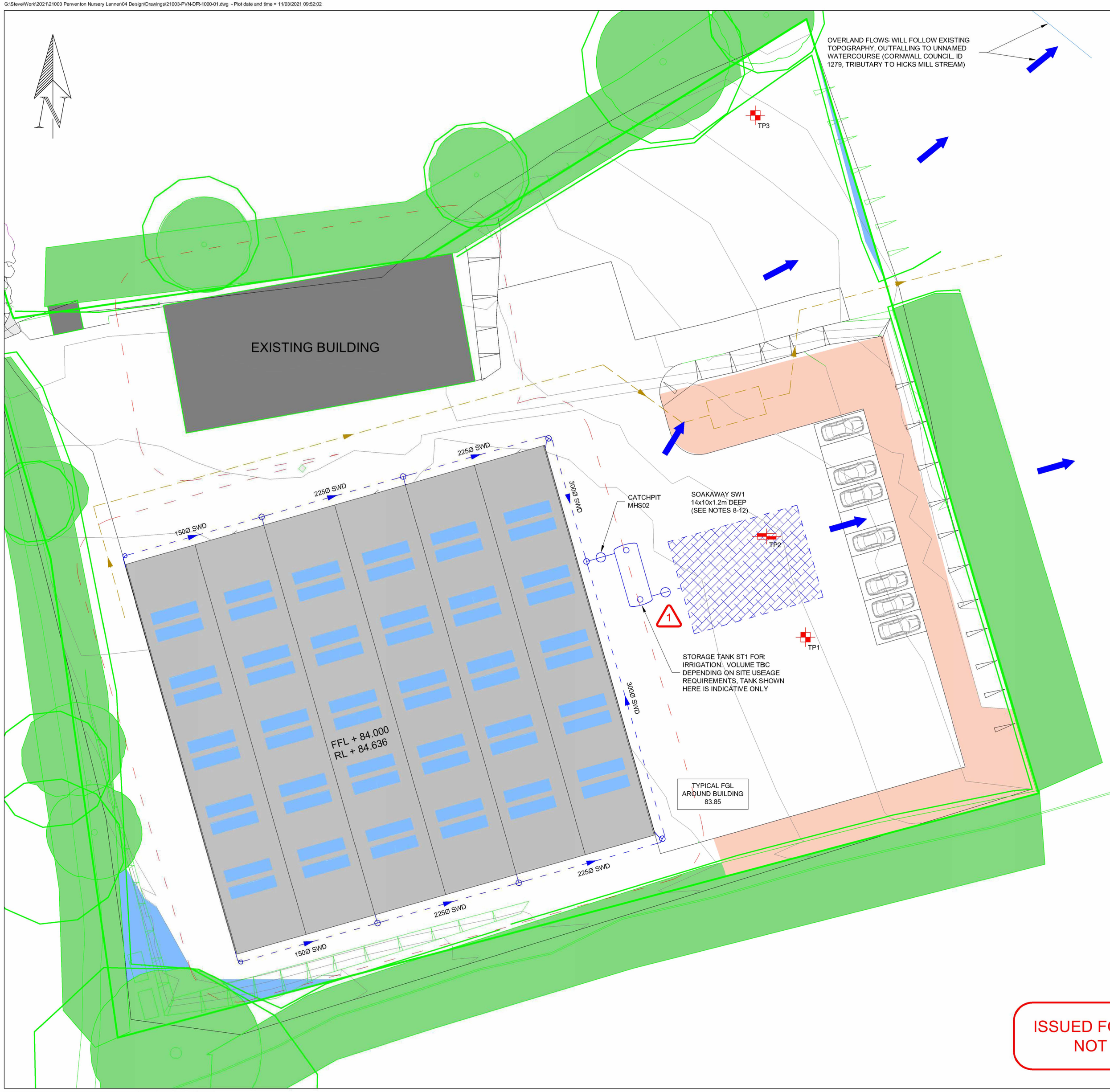
Client

Warrior Warehouses Ltd

Stage	PL -Detailed Design	**Issued for**	Client/Stage Approved
Scale @ A1	As indicated	**Date**	15/09/2020
Drawn by	SD	**Checked by**	JT

Drawing number	**Revision**
07976-TDA-DR-PL-0006	A03

Revision	Description	Date	Initials
02	Planning Application	17.09.20	SMD



KEY:

- NEW SURFACE WATER DRAIN
- NEW SURFACE WATER INSPECTION CHAMBER / MANHOLE
- NEW SURFACE WATER SOAKAWAY
- 5 METRE SOAKAWAY "EXCLUSION ZONE" FROM BUILDINGS OR PUBLIC HIGHWAY
- INDICATIVE OVERLAND FLOW DIRECTION
- NEW FOUL DRAINAGE BY OTHERS
- NEW PACKAGE SEWAGE TREATMENT PLANT (PTP) BY OTHERS
- TP99 — PERCOLATION TEST PIT

NOTE:

THE SURFACE WATER DRAINAGE SYSTEM HAS BEEN DESIGNED ON THE BASIS THAT 110% OF NEW ROOF AREAS DRAIN TO THE SYSTEM (TO ALLOW FOR FUTURE "URBAN CREEP"). EXTERNAL HARD LANDSCAPING, VEHICLE ACCESS & PARKING AREAS WILL BE PERMEABLE PAVING AND SO ARE EXCLUDED FROM THE IMPERMEABLE AREAS USED IN THE DRAINAGE DESIGN.

STORAGE TANK ST1 IS PROPOSED TO PROVIDE ADDITIONAL WATER SUPPLIES FOR IRRIGATION PURPOSES. AS THE USEAGE PROFILE OF THIS WILL BE SEASONAL, THE TANK CANNOT BE RELIED UPON TO HAVE SUFFICIENT SPARE CAPACITY TO STORE RAINFALL AND SO THE VOLUME OF THIS IS EXCLUDED FROM THE DRAINAGE DESIGN.

THE SYSTEM IS DESIGNED NOT TO FLOOD ON A 100 YEAR RETURN PERIOD STORM EVENT + 40% CLIMATE CHANGE ALLOWANCE.

SAFETY, HEALTH & ENVIRONMENTAL (SHE) INFORMATION - KEY RESIDUAL DESIGN RISKS

1 EXISTING SERVICES UNKNOWN - TBC BEFORE CONSTRUCTION COMMENCES.

The above are the Key residual risks that have been identified by the designer at the outline design stage. This is not expected to be exhaustive at this stage and should be confirmed by undertaking a risk assessment exercise.

NOTES

1 THIS DRAWING TO BE READ IN CONJUNCTION WITH ANY RELEVANT ARCHITECT'S DRAWIINGS.

2 ALL LEVELS ARE IN METRES UNLESS STATED OTHERWISE, TO ORDNANCE DATUM, RELATIVE TO TOPOGRAPHICAL SURVEY & DESIGN INFORMATION PROVIDED BY THE ARCHITECT.

3 ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.

4 ALL PIPEWORK & INSPECTION CHAMBERS / MANHOLES SHALL BE IN ACCORDANCE WITH BUILDING REGULATIONS PART H1 SECTION 2, UNLESS OTHER DETAILS ARE SPECIFICALLY DETAILED ON THESE DRAWINGS.

5 ALL PIPEWORK IS ASSUMED TO HAVE MINIMUM 600 COVER UNLESS STATED OTHERWISE, INCLUDING AT GULLY OUTLETS. PIPE PROTECTION MAY BE REQUIRED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, ESPECIALLY IN TRAFFICKED AREAS.

6 WHERE ESVC OR uPVC PIPES ARE USED, 600 LONG ROCKER PIPES SHALL BE PROVIDED OUTSIDE CHAMBERS & STRUCTURES. WHERE PE PIPES ARE USED, ROCKER PIPES ARE NOT REQUIRED.

7 BUILDING DRAINAGE, i.e. ROOF GUTTERS & INTERNAL SANITARY PIPEWORK, IS TO BE DESIGNED BY OTHERS. ANY DETAILS SHOWN HERE ARE INDICATIVE ONLY.

8 SOAKAWAYS MUST BE LOCATED MINIMUM 5m FROM BUILDINGS & MINIMUM 5m FROM OTHER SOAKAWAYS / DRAINAGE FIELDS.

9 SOAKAWAY UNITS SHALL COMPRISE MODULAR GEOCELLULAR BOX STRUCTURES DESIGNED SPECIFICALLY FOR THE PURPOSE OF SUBTERRANEAN CATCHMENT & SOAKAWAY OF WATER AND SHALL HAVE MINIMUM 95% VOIDS. UNITS MUST BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

10 TRIAL PITS ARE REQUIRED TO BE DUG AT EACH SOAKAWAY LOCATION TO CONFIRM THAT THE WATER TABLE IS AT LEAST 1m BELOW THE BASE OF THE SOAKAWAY.

11 NO CHANGES TO DRAINAGE SIZING, CONFIGURATION OR LAYOUT SHOULD BE MADE WITHOUT FIRST CONSULTING THE DESIGNER.

12 COVER LEVELS SHOWN ARE INDICATIVE ONLY AND ARE DEPENDENT UPON SITE LANDSCAPING & FINISHED GROUND LEVELS.

Rev.	Drawn	Chkd.	Apprvd.	Date	Description
01	SDP	SDP	SDP	11/03/21	ISSUED FOR APPROVAL

Client

WARRIOR WAREHOUSES LTD.

Project

PENVENTON NURSERY, LANNER
TR16 6AS
CONSTRUCTION OF NEW WAREHOUSE

Drawing Title

CONCEPTUAL SURFACE WATER DRAINAGE LAYOUT

SP CIVIL DESIGN LTD.
07879 821 968
www.spcivildesign.co.uk
Email: steve@spcivildesign.co.uk

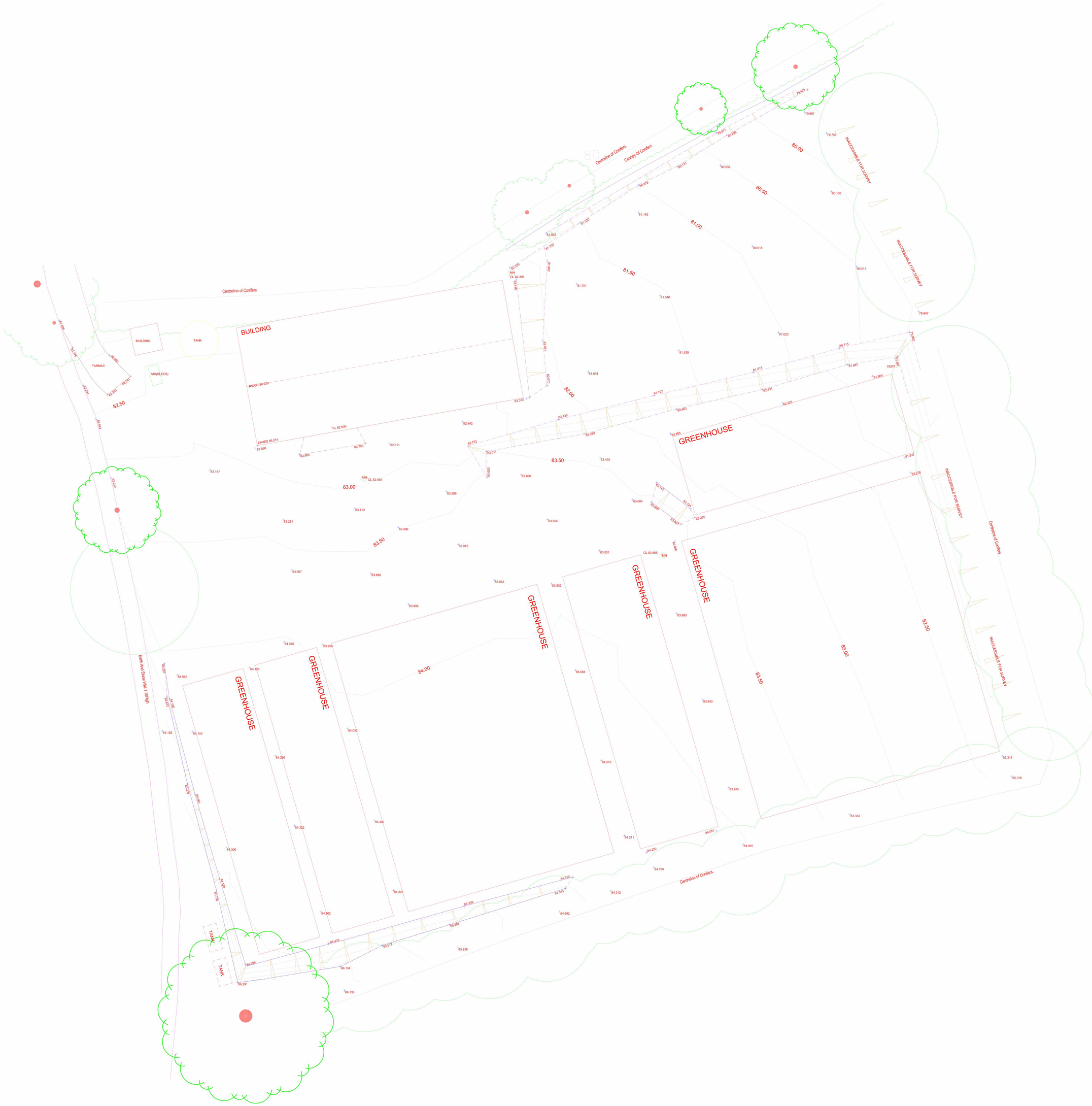
Scale (at A1)	Date	Drawn
1:200	11/03/2021	SDP

Drg. no.	Rev.
21003-PVN-DR-1000	01

ISSUED FOR PLANNING APPROVAL - NOT FOR CONSTRUCTION

10 0 10 20 50 100mm NATURAL SCALE

ORIGINAL DRAWING SIZE 841 x 594



National GPS network Value 0SGM 02. Survey relates to Ordnance Survey Grid & Datum carried out with Network RTK.

On site benchmark datum 82.995 cover level of manhole south of main building. Off site benchmark datum 68.110 BT cover in main road at entrance to nursary

It is sole responsibility of all Contractors and Consultants to check all dimensions on site. Only figured dimensions are to be used. Any discrepancies to be reported prior to the commencement of any works. This drawing shall be used only for the purpose intended.

Do not scale from this drawing

Hedges, banks / fences do not represent any actual agreed physical boundaries unless stated.

No.	Revision/Issue	Date

MARK TREWIN
SURVEYING ENGINEER

No 1 Puffin Close
Shorelands
Bude
Cornwall
EX23 8BQ

mark@datumline.co.uk
07786 194781

Datumline surveys

Client: Mr & Mrs Grubb

Address: Penventon Farm Nursary

Project: Level survey of top yard for general planning

Scales: 1/250 @ A1

Drawn: mjt

Date: 9th February 2016

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