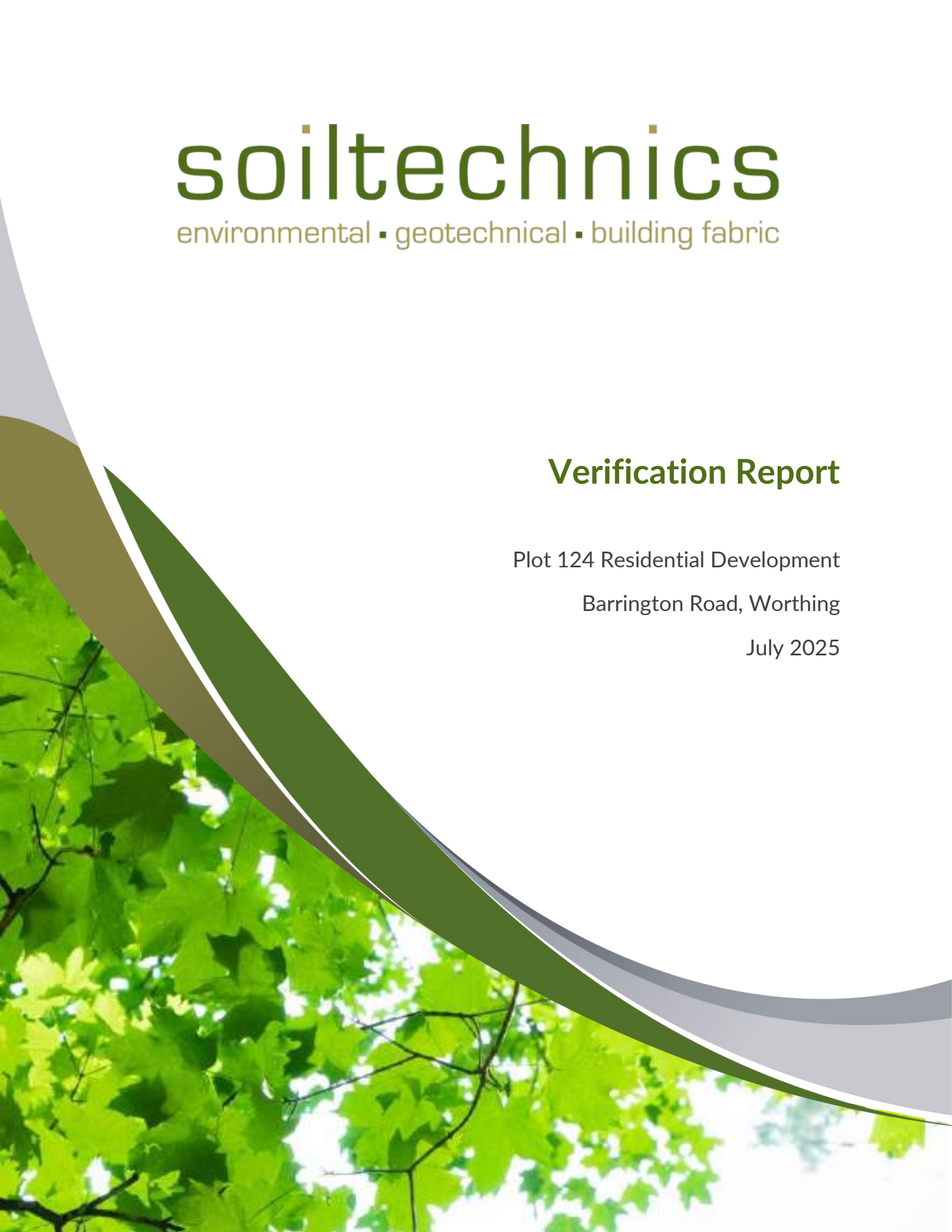




soiltechnics

environmental • geotechnical • building fabric

Verification Report

Plot 124 Residential Development

Barrington Road, Worthing

July 2025

Project Details

Site: Barrington Road, Worthing
Document Title: Verification Report
Document no.: STV5959-R20-Rev_A
Date: July 2025
Client: Bellway Homes Ltd (South London)
Issuing office: Soiltechnics Ltd
Cedar Barn, White Lodge, Walgrave, Northampton. NN6 9PY
Tel: 01604 781 877 E-mail: mail@soiltechnics.net

Document history and status

Revision	Date	Description	Author	Reviewer
A	July 2025	First issue	JB	MOH



Table of Contents

1	Introduction 1	
1.1	Scheme Outline	1
1.2	Brief	1
1.3	Investigation Standards	2
1.4	Limitations	2
2	Site Conditions and Remedial Strategy 3	
2.1	Sources of information	3
2.2	Relevant Contaminant Linkages	3
2.3	Outline of Remedial Strategy	4
3	Unexpected Contamination 5	
3.1	Remedial Requirement	5
3.2	Verification Works	5
4	Drinking Water Barrier Pipe 6	
4.1	Remedial Requirement & Verification Plan	6
4.2	Deviation	6
4.3	Verification	6
5	Clean Cover Verification 7	
5.1	Remedial and Verification Requirements	7
5.2	Material Source	7
5.3	Clean Cover Inspection	7
5.4	Contamination Observations	8
5.5	Physical Verification	8
5.6	Chemical Verification	8
5.7	Conclusion	9
6	Gas Protection Measures 10	
6.1	Remedial Requirement	10
6.2	Verification	10
7	Final Remarks, Monitoring & Maintenance 11	
7.1	Remedial Works Conclusion	11
7.2	Post Construction Monitoring	11
7.3	Long Term Maintenance	11

Appendix A	Drawings
Appendix B	Drinking Water Barrier Pipe Verification
Appendix C	3rd Party Topsoil Compliance Testing
Appendix D	Imported Subsoil Verification Record
Appendix E	Pit Inspection Records
Appendix F	GQRA
Appendix G	Gas Protection Measures Verification

List of Tables

Table 2-A:	Summary of Previous Reports	3
Table 5-A:	Summary of inspection pits	7
Table 5-B:	Summary of chemical testing	8

List of Figures

Figure 1-A:	Proposed Layout and Plots In Scope	1
-------------	------------------------------------	---

1 Introduction

1.1 Scheme Outline

- 1.1.1 The site is located at the former HM Revenues And Customs complex at Barrington Road, Worthing, BH12 4SD.
- 1.1.2 The redevelopment of the site comprises the demolition of the former HMRC buildings and construction of a residential development comprising a mixture of houses, apartments and a care home. Plans of the existing and proposed site layout are provided within Appendix A. This comprises of 139 residential plots, 4 blocks of flats, and a care home.
- 1.1.3 The development is controlled under the Worthing Borough Council planning regime, under the planning application number AWDM/0605/22.
- 1.1.4 This Verification Report is for the verification of all remedial requirements associated with Plot 124 only. A proposed development plan is included below, with the plots covered by this report highlighted in red, plots verified under previous reports are shown in pink.

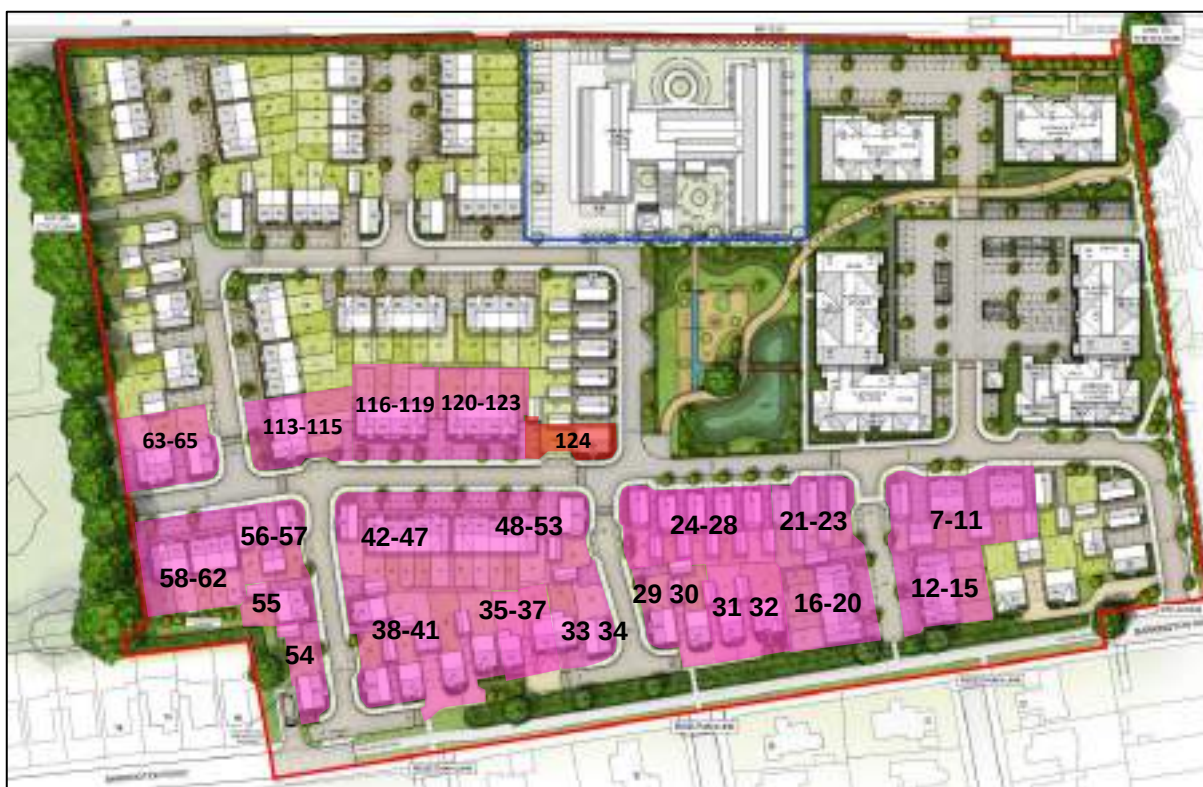


Figure 1-A: Proposed Layout and Plots In Scope

1.2 Brief

- 1.2.1 To facilitate the safe development of the project, a Remediation Strategy and Verification Plan (Report ref: STV5959-R01-Rev_C) was developed by Soiltechnics Limited, dated May 2023.
- 1.2.2 The aim of this Verification Report is to present all relevant lines of evidence obtained directly by Soiltechnics and those provided by 3rd parties, to demonstrate the required remedial actions have been completed satisfactorily, and the site is suitable and safe for use, in terms of the risks from contaminated land.

1.3 Investigation Standards

- 1.3.1 The investigation followed the principles of BS10175:2011+A2:2017 '*Investigation of potentially Contaminated Sites – Code of Practice*'. The investigation was also undertaken with reference to the Environment Agency's online publication '*Land contamination risk management (LCRM)*'.

1.4 Limitations

- 1.4.1 Soiltechnics disclaims any responsibility to our Client and others in respect of any matters outside the scope of this report. This report has been prepared with reasonable skill, care and diligence in accordance with the terms of our contract, taking account of the resources, investigations and testing devoted to it by agreement with our Client. This report is confidential to our Client and Soiltechnics accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

2 Site Conditions and Remedial Strategy

2.1 Sources of information

2.1.1 Reference has been made to the following sources of information. Full copies of all documents can be provided upon request.

Author	Document Title	Date & Document Reference	Report Context
Ashdown Ground Investigation Limited	Combined Geotechnical and Ground Contamination Risk Assessment	December 2018 R18-13236	Preliminary geoenvironmental risk assessment, an assessment of ground conditions and a geotechnical appraisal
Soiltechnics	Ground Investigation Report	April 2021 STS5226-G01-Rev_A	Supplementary works to address outstanding geotechnical and contamination concerns at the site.
Soiltechnics	Piling Risk Assessment	February 2023 STV5959-R02-Rev-A	A piling risk assessment in order to satisfy planning condition 29 of the planning application.
Soiltechnics	Supplementary Ground Investigation Report	May 2023 STV5959-R03-Rev_A	The previous ground investigation works identified some data gaps which required further investigation once access into previously unexplored areas of the site was facilitated.
Soiltechnics	Remediation Strategy	May 2023 STV5959-R01-Rev_C	A remedial and verification strategy for the site to address identified contaminant linkages.
Soiltechnics	Subsoil Verification Testing	August 2023 L-STV5959M-001	Stockpile sampling and characterisation work on imported subsoils. Included as Appendix D.
Soiltechnics	Stockpile Characterisation	October 2024 STV5959-R12-Rev_A	Characterisation of suitability of topsoil stockpile
Soiltechnics	[multiple reports] Verification Reports: Plots 7-65, 113-123	Aug 2024 to Dec 2024 STV5959-R09-Rev_A, STV5959-R11-Rev_B, STV5959-R13-Rev_A STV5959-R15-Rev_B STV5959-R16-Rev_A STV5959-R17-Rev_A STV5959-R18-Rev_A STV5959-R19-Rev_A	Remedial verification report for plots: Plots 7–23 (R09) Plots 24–28, 31, 32, 35, and 36 (R11) Plots 29, 30, 33, 34, and 37–53 (R13) Plots 55–56 (R15) Plots 54, 57–62 (R16) Plots 120-123 (R17) Plots 63-65, 116-119 (R18) Plots 113-115 (R19)

Table 2-A: Summary of Previous Reports

2.2 Relevant Contaminant Linkages

- 2.2.1 Both the Ashdown and Soiltechnics reports noted sporadic elevated levels of PAHs and metals within the Made Ground deposits following soil testing. In addition, asbestos fibres were identified in Made Ground local to the former maintenance compound although given the variability of the Made Ground, its presence elsewhere could not be discounted.
- 2.2.2 The risk assessment concluded that while sporadic, due to the sensitivity of a residential development, contaminant levels could pose an unacceptable level of risk to proposed end users, and therefore the site required remediation.
- 2.2.3 Relevant contamination linkages identified relate solely to human health receptors and can be summarised as follows:
- i) Inhalation of asbestos fibres present within Made Ground soils.
 - ii) Contact, inhalation and ingestion of soils and dusts arising from Made Ground soils.
 - iii) Accumulation and inhalation of radon.

2.2.4 Given the previous uses of the site, it was also acknowledged that there was a potential for unexpected and previously unknown contamination to be present, such as localised gross hydrocarbon contamination. If present, this had potential to impact both human health and sensitive water receptors.

2.3 Outline of Remedial Strategy

2.3.1 To mitigate the risks posed by the identified relevant contaminant linkages, the Remediation Strategy detailed four key remedial actions which required evidencing through verification works, specifically:

- i) Prepare a discovery strategy and provide a watching brief in the event of encountering unexpected or previously unencountered contamination.
- ii) Installation of barrier pipe for underground drinking water infrastructure to prevent permeation of organic contaminants into drinking water.
- iii) Install a cover system in proposed soft landscaped areas to prevent end user exposure to identified contamination.
- iv) Install basic Radon Protection measures to prevent ingress into buildings.

2.3.2 The following report sections address each remedial action in turn.

3 Unexpected Contamination

3.1 Remedial Requirement

- 3.1.1 As with the development of any site, there was the potential to encounter unexpected contamination, in particular within the areas of former oil storage and drainage interceptors.
- 3.1.2 A contamination discovery protocol was established, and a copy provided to the developer to communicate and distribute through their workforce.

3.2 Verification Works

- 3.2.1 Soiltechnics have been in regular contact with the developer throughout the enabling works and build programme, and have not been informed of any contamination discovery event. The contractors on site were aware of their reporting obligations.
- 3.2.2 No unexpected contamination is believed to have been encountered, and this remedial action is considered to have been satisfactorily addressed.

4 Drinking Water Barrier Pipe

4.1 Remedial Requirement & Verification Plan

- 4.1.1 To address risk from residual hydrocarbon contamination permeating into below ground drinking water infrastructure, barrier pipe was required to be installed for all new below-ground water supply pipes.
- 4.1.2 The verification of the installation was to be evidenced by the provision of delivery tickets showing protective barrier pipe has been delivered to site, and by providing photographs showing the subsequent installation.

4.2 Deviation

- 4.2.1 The contractor deviated from the agreed remedial strategy without consultation with Soiltechnics.
- 4.2.2 A Water Main Design drawing, dated June 2023, see Appendix B, shows that standard PE pipe is planned to be installed in all areas of the site with the exception of two hotspot areas. One in the area of a known drainage interceptor tank, the other in the area of known former heating oil storage near the centre of the site.
- 4.2.3 Whilst this is a significant deviation from the Remediation Strategy, the change can be retrospectively justified as chemical testing results from all three phases of intrusive work show low levels of organic contaminants outside of the highlighted hotspot areas. However, agreement should have been sought from both the consultant and the regulator.
- 4.2.4 The updated strategy for the site requires protective water pipe to be installed in drinking water infrastructure in the vicinity of the following plots.
- Plots 40, 41, 54 and 55 (in the vicinity of a former interceptor)
 - Plots 103 → 106, 126 → 134, and the care home (in the vicinity of former heating oil storage)

4.3 Verification

- 4.3.1 For this Verification Report, protective barrier pipe was not required for Plot 124 which are permitted to have standard PE pipe. This is shown on Water Main Design drawing included within Appendix B.
- 4.3.2 The contractor has provided a series of photographs showing the installation of both the standard PE pipe and protective barrier pipe on site, with a selection of these photographs presented within Appendix B, and a full copy can be provided upon request.
- 4.3.3 The photographs do not show any evidence of significant hydrocarbon contamination in areas of PE pipework, and protective barrier pipe can be identified by a thick brown line along blue pipework in the relevant plots. It should be noted that an oily sheen can be seen on perched water in one of the trenches exposing the protective barrier pipe, supporting the use of the pipe in this area.
- 4.3.4 Soiltechnics are satisfied that the remedial requirements have been met.

5 Clean Cover Verification

5.1 Remedial and Verification Requirements

- 5.1.1 In areas of hard landscaping, no remedial works are considered necessary.
- 5.1.2 In all private gardens and planted areas of public open space, the cover requirement should be a minimum of 600mm thick. This reduces to 300mm in grassed public open space lawn areas.
- 5.1.3 All materials utilised in the cover system should be chemically suitable and laboratory testing was required to confirm suitability of the material, at a minimum testing frequency of 1 sample per 100m³ per soil type, subject to a minimum of 3 samples.
- 5.1.4 On site inspections were required to confirm the minimum thickness and adequate installation of the cover system. Based upon the overall development proposals, inspection pits were required at a frequency of one in every five plots.

5.2 Material Source

- 5.2.1 The topsoil was sourced through Eurogreen Environmental Ltd, and a pre-delivery compliance testing certificate was provided to give assurance of suitability. This is included within Appendix C.
- 5.2.2 Delivery certificates were not made available to confirm the overall volume of topsoil material imported.
- 5.2.3 Subsoil was imported from two sites, called Billingshurst and Newick. A site visit was undertaken to inspect the stockpiled materials and sample them to determine suitability prior to use. This is reported within Appendix D, and the assessment confirmed that material was suitable for use. Delivery notes of the subsoil imports have been provided, and a full copy can be provided upon request.

5.3 Clean Cover Inspection

- 5.3.1 Previous site visits have been undertaken by Soiltechnics to inspect the overall thickness of the cover soils, and undertake sampling and analysis on the in-situ topsoil and subsoil materials for the plots included in reports ref: STV5959-R09-Rev_A, STV5959-R11-Rev_B, STV5959-R13-Rev_A, STV5959-R15-Rev_B, STV5959-R16-Rev_A, STV5959-R17-Rev_A, STV5959-R18-Rev_A.
- 5.3.2 Verification pit for plot 124 was completed by the contractor with provision of photographs to Soiltechnics on 7th June 2025 to inspect the overall thickness and appearance of the cover soils in plot 124.
- 5.3.3 The below table outlines inspection pits completed to date showing that the required frequency of 1 in 5 plots has been met.

Plots covered	Pits completed this round	Total pits completed	Total plots completed	Required frequency	Frequency achieved
7-65, 113-124	1	29	71	1 per 5 plots	≈ 1 per 2.5 plots

Table 5-A: Summary of inspection pits

5.3.4 Verification inspection pits undertaken by the consultant (Soiltechnics) are preferred to ensure independence and quality assurance. However, as the overall plot inspection frequency is higher than required and all inspections to date show a consistent quality of work, it was permitted to allow contractor records for plot 124.

5.3.5 Clean cover inspection noted the cover system in each plot to be of sufficient depth in all cases (>600mm) comprising of topsoil (>150mm) and subsoil. Pit inspection records are included in Appendix E.

5.4 Contamination Observations

5.4.1 No visual or olfactory evidence of contamination was noted within the clean cover soils, and no suspected ACMs were identified by the contractor.

5.5 Physical Verification

5.5.1 No undesirable or injurious artefacts were observed within the topsoil, such as over-sized materials, sharps, or plastics.

5.5.2 The material underlying the topsoil comprised of a compact clay subsoil, which contain occasional brick and other similar anthropogenic materials, such as concrete. Whilst undesirable, this does not present a risk of harm to the end users.

5.6 Chemical Verification

5.6.1 The volume of topsoil and subsoil used across all plots verified to date, including those within this report (7-65 and 113-124) has been estimated at 1,420m³ subsoil and 710m³ topsoil based on 3,550m² of landscaping (50m² per plot), 200mm thickness topsoil and 400mm thickness subsoil.

5.6.2 The subsoil has previously been verified as part of the Subsoil Verification Testing Letter Report included in Appendix D. Topsoil and subsoil has previously been tested as part of garden verification visits. The below table details testing undertaken to date and resulting frequency.

Material	Source	Tests this round	Total tests	Est. volume used to date	Required frequency	Frequency achieved
Topsoil	Eurogreen	0	13	710	1 per 100m ³	≈ 1 per 55m ³
Subsoil	Billinghurst/Newick	0	29	1,420		≈ 1 per 50m ³

Table 5-B: Summary of chemical testing

5.6.3 Topsoil and subsoil from the same source that has been tested has been placed in plot 124.

5.6.4 Samples obtained from site were sent to an independent accredited laboratory for chemical analysis, and the samples were handled in accordance with BS ISO 18400-105:2017 'Soil quality — Sampling Part 105: Packaging, transport, storage and preservation of samples'.

5.6.5 The chemical laboratory test results completed to date are included in the GQRA assessment in Appendix F.

5.6.6 The results have been screened using the C4SL and S4UL generic assessment criteria, under a residential with plant uptake scenario at 1% SOM.

- 5.6.7 Soiltechnics acknowledge that no chemical testing of the topsoil and subsoil has been undertaken in plot 124, however, based on site observations, the level of work observed and previous chemical testing showing it suitable for use, and satisfying the sampling frequency to date, the topsoil and subsoil in plot 124 is considered chemically suitable for use.

5.7 Conclusion

- 5.7.1 Overall, the soils are considered to be suitable for use, in terms of the risks from land contamination, and placed at a sufficient thickness to protect against contamination in the underlying Made Ground at depth.

6 Gas Protection Measures

6.1 Remedial Requirement

- 6.1.1 To address risk from radon ingress, basic radon gas protection measures were required to be installed in all properties.

6.2 Verification

- 6.2.1 Membrane Testing Solutions were commissioned as the independent verifier for the scheme. They have inspected the plots under the scope of this report, and a copy of their certification of approval is provided within Appendix G.

7 Final Remarks, Monitoring & Maintenance

7.1 Remedial Works Conclusion

- 7.1.1 Remedial works carried out on the scheme comprised the installation of a clean cover system, protective barrier pipe and basic radon protection measures. Verification works were undertaken through a combination of site inspections, a review of contractor supplied records, and the sampling and analysis of materials. There is sufficient lines of evidence to demonstrate the satisfactory completion of these elements.
- 7.1.2 Overall, the development is considered safe and suitable for use in relation to the risk of harm from land contamination.

7.2 Post Construction Monitoring

- 7.2.1 No post construction monitoring is required.

7.3 Long Term Maintenance

- 7.3.1 Post completion and following occupation of the buildings, landscaping and maintenance works may disturb or damage the clean cover system. Based upon the levels of contamination encountered and the site setting, it is considered unlikely that the cover system would be damaged in a way sufficient to compromise the protection of human health. As such, there is no formal monitoring or maintenance necessary for upkeep of the cover system.
- 7.3.2 All buildings on site have a radon gas membrane and passive ventilation. Both aspects will be adequately protected by the building slab throughout the lifespan of the property and therefore do not require regular upkeep. However, the membrane would be put at risk of damage during any significant structural; renovation works. No works must be permitted which could compromise the integrity of the installation without full consideration. Therefore, the owner of the buildings must be made aware of the location and purpose of the radon protection measures within the buildings' construction.

Appendix A Drawings

287

Appendix B Drinking Water Barrier Pipe Verification



- Notes
1. This drawing has been prepared in accordance with the scope of SNR ENG Ltd's appointment by its Client and is subject to the terms and conditions of said appointment. Unless agreed in writing by SNR ENG Ltd no other party may use or rely upon the contents of this drawing.
 2. No liability is accepted by SNR ENG Ltd for any use of this drawing other than for the purpose for which it was originally prepared.
 3. This drawing should be read in conjunction with all other relevant drawings and specifications.
 4. Do not scale from this drawing; only written dimensions should be used. If in doubt contact SNR ENG Ltd. If received electronically it is the responsibility of the recipient to print this drawing to the correct scale.
 5. All dimensions are in metres unless noted otherwise.
 6. The contractor shall prior to construction check and verify that the details shown on this drawing are fully compatible with any constructed dimensions or levels. Any discrepancies should be immediately reported in writing to SNR ENG Ltd.
 7. This drawing may include data provided by third parties. No liability is accepted by SNR ENG Ltd as to the accuracy of this data.
 8. This drawing shall not be reproduced without the written permission of SNR ENG Ltd.

Disclaimer

This plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any works (including but not limited to excavations) in the vicinity of SOUTHERN WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.

CONSULT ALL UTILITY PLANS
BEFORE ANY EXCAVATION

AS-LAID Disclaimer

As-laid data capture should be recorded in accordance with Section 3.7.5 of the Code of Practice for the Self-Laying of Water Mains and Services (England and Wales). The Water Company's asset data is recorded on a geographic information (digital mapping) or CAD system. Therefore, it is important that accurate location information is supplied to the Water Company.

AS-LAID Drawing

If an As-laid drawing is required by the Water Company in AutoCAD format, please contact info@snr-eng.co.uk for further information.

KEY:

EXISTING:

WATER MAIN

FIRE HYDRANT (FH)

PROPOSED:

WATER MAIN

SERVICE CONNECTION

TEMPORARY WASHOUT (TW)

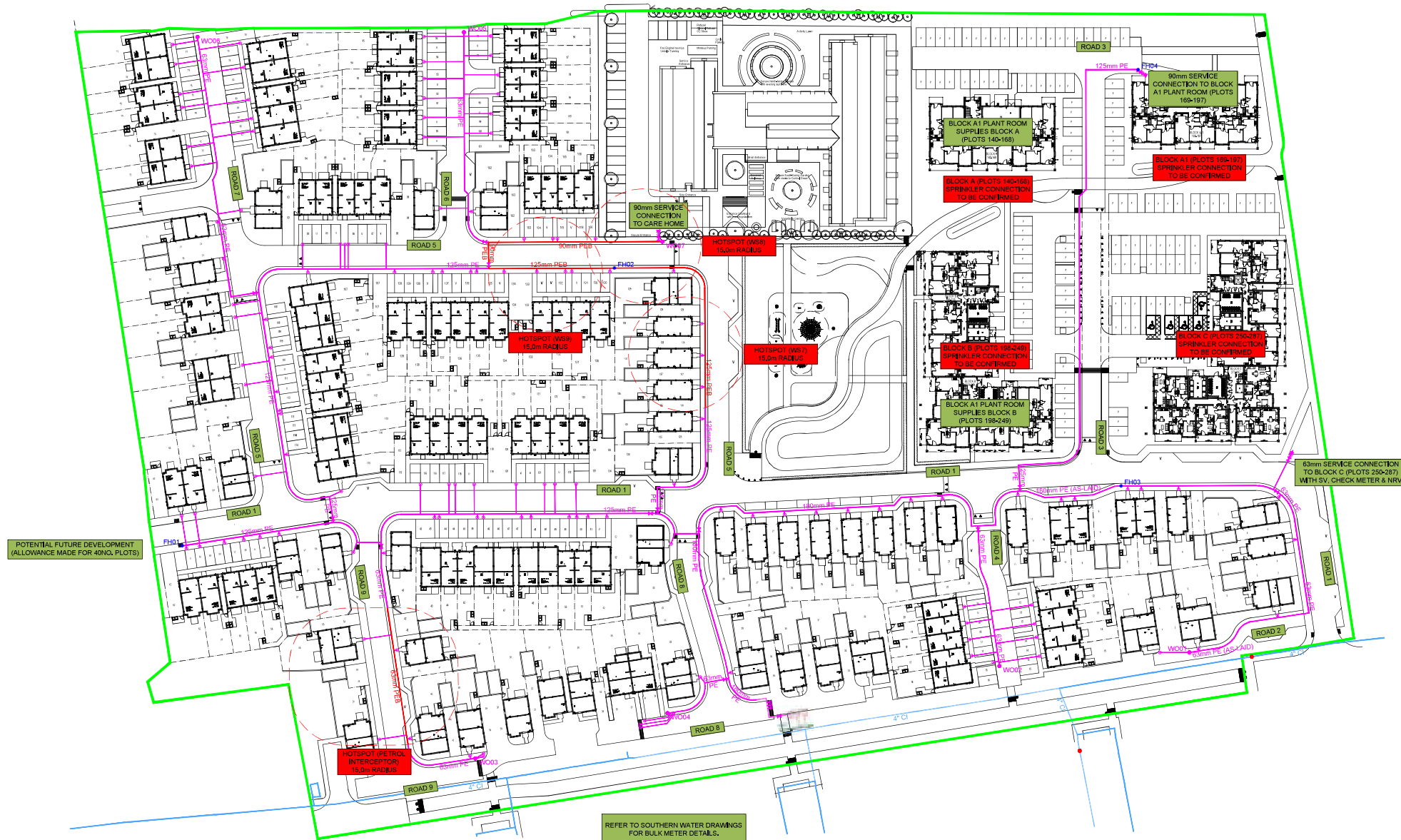
SLUCE VALVE
(ANTI-CLOCKWISE CLOSING
UNLESS STATED OTHERWISE)

WASHOUT (WO)

CHECK VALVE

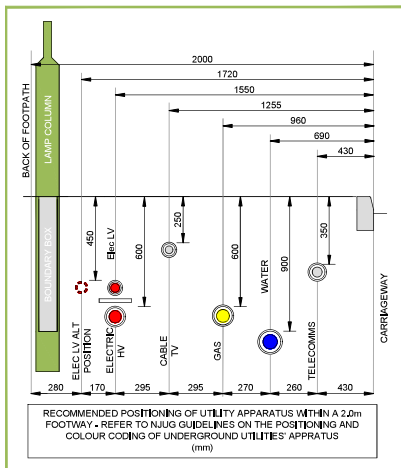
NOTE:

- SERVICE CONNECTIONS <30m TO BE 25mm.
- SERVICE CONNECTIONS >30m TO BE 32mm.
- SERVICE CONNECTIONS TO PEB MAINS SHALL ALSO BE IN BARRIER PIPE.
- SERVICE CONNECTION TO CARE HOME & APARTMENT BLOCKS TO BE FITTED WITH EXTERNAL CHECK METER ARRANGEMENT (CONSISTING OF A SV, METER & CHECK VALVE).



POTENTIAL FUTURE DEVELOPMENT
(ALLOWANCE MADE FOR 40NO. PLOTS)

REFER TO SOUTHERN WATER DRAWINGS
FOR BULK METER DETAILS.



H	BLOCK C CONNECTION AMENDED & DRAWING STATUS UPDATED FOLLOWING NAV APPROVAL	23.05.24	RAK	RAK
O	UPDATED TO SUIT CLIENT & NAV COMMENTS	28.03.24	RAK	RAK
F	UPDATED TO SUIT CLIENT & NAV COMMENTS	30.01.24	RAK	RAK
E	UPDATED TO SUIT NAV COMMENTS	17.01.24	RAK	RAK
D	UPDATED TO SUIT NEW POC & AS-LAID INFO	15.01.24	RAK	RAK
C	UPDATED TO SUIT NAV COMMENTS	15.03.23	RAK	RAK
B	UPDATED TO SUIT 1NO. POC	26.08.23	RAK	RAK
A	UPDATED TO SUIT 2NO. POCs	11.07.23	RAK	RAK

REV DESCRIPTION DATE BY AUTH

SNR ENG Ltd
Senior, Engineering.

Registered Office:
The Coach House
Church Road
Orley
Warrington
WV10 6AB

info@snr-eng.co.uk
www.snr-eng.co.uk

Civil Engineering Design | Utilities Design Consultancy

Bellway

PROJECT
**BARRINGTON ROAD,
DURRINGTON ON SEA BN12 4SE**

TITLE
WATER MAIN DESIGN

DRAWN
RAK

APPROVED
RAK

SCALE
1:500 @ A0

DATE
JUN '23

PROJECT NO.
2305020

DRAWING NO.
100

REV
H

APPROVED

TABLE 1: SCHEDULE										
STREET NAME	USIN	HAUC CLASS	PIPE SIZE (mm)	MATERIAL	PRESSURE RATING	LENGTH (m)	FITTINGS			
							SV	WO	LPT	TEE
ROAD 1	-	-	180	PE	SDR17	185.5	0	0	0	4
ROAD 1	-	-	125	PE	SDR17	132.5	1	1	0	2
ROAD 1	-	-	63	PE	SDR11	36.2	1	0	0	0
ROAD 2	-	-	63	PE	SDR11	34.5	1	1	0	0
ROAD 3	-	-	125	PE	SDR17	138.2	1	1	0	0
ROAD 4	-	-	63	PE	SDR11	37.7	1	1	0	0
ROAD 5	-	-	125	PE	SDR17	172.9	2	0	0	2
ROAD 6	-	-	125	PEB	SDR17	91.2	0	1	0	0
ROAD 6	-	-	90	PEB	SDR17	52.5	1	1	0	1
ROAD 6	-	-	63	PE	SDR11	58.6	1	1	0	0
ROAD 7	-	-	63	PE	SDR11	76.5	1	1	0	0
ROAD 8	-	-	180	PE	SDR17	62.8	1	0	0	1
ROAD 8	-	-	63	PE	SDR11	21.0	1	2	0	1
ROAD 9	-	-	63	PE	SDR11	38.1	1	1	0	0
ROAD 9	-	-	63	PEB	SDR11	36.4	0	0	0	0
TOTALS:						1,174.8	13	11	0	11

TABLE 2: HYDRANT SCHEDULE FIRE SERVICE REFERENCE			
REF	ADOPT (Y/N)	MARKER (Y/N)	COMMENTS
WO01			THROUGHBORE
WO02			
WO03			
WO04	N	N	
WO05			
WO06			HYDRANTS TO BE ADOPTED BY WEST SUSSEX FIRE & RESCUE SERVICE REFERENCE COM985 (THROUGHBORE)
WO07			
FH01			
FH02	Y	N	
FH03			
FH04			











PLOT 40





PLOT 41



Appendix C 3rd Party Topsoil Compliance Testing



TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Mr Jonathan Cowley
Eurogreen Environmental Ltd
North Barn Farm
Titnore Lane
Worthing
West Sussex, BN12 6NZ

14th June 2024
Our Ref: TOHA/24/1399/SS
Your Ref: as below

Dear Sirs

Topsoil Analysis Report: 10mm Topsoil – Batch No. 9

We have completed the analysis of the soil sample recently submitted, referenced *Batch No. 9*, and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the sample for general landscape purposes (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

This report presents the results of analysis for the sample submitted to our office, and it should be considered 'indicative' of the topsoil source. The report and results should therefore not be used by third parties as a means of verification or validation testing or waste designation purposes, especially after the topsoil has left the Eurogreen Environmental Ltd site.

SAMPLE EXAMINATION

The sample was described as a very dark brown (Munsell Colour 10YR 2/2), slightly moist, friable, moderately calcareous LOAMY SAND with a weakly developed, fine to medium granular structure*. The sample was virtually stone-free, and contained a moderate proportion of organic fines and occasional woody fragments. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

*This appraisal of soil structure was made from examination of a disturbed sample. Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

Tim O'Hare Associates LLP
Howbery Park Wallingford Oxfordshire OX10 8BA
T:01491 822653 E:info@toha.co.uk
www.toha.co.uk

Registered in England No. OC324049 Registered Office: The Innovation Centre, Howbery Park, Wallingford, Oxfordshire OX10 8BA

ANALYTICAL SCHEDULE

The sample was submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- particle size analysis (sand, silt, clay);
- stone content (2-20mm, 20-50mm, >50mm);
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- heavy metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn);
- total cyanide and total (mono) phenols;
- speciated PAHs (US EPA16 suite);
- aromatic and aliphatic TPH (C5-C35 banding);
- benzene, toluene, ethylbenzene, xylene (BTEX).

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

RESULTS OF ANALYSIS

Particle Size Analysis and Stone Content

The sample fell into the *loamy sand* texture class, which is usually considered suitable for general landscape applications provided the soil's physical condition is satisfactory.

The sample was virtually stone-free, and as such, stones should not restrict the use of the soil for general landscape purposes.

pH and Electrical Conductivity Values

The sample was strongly alkaline in reaction (pH 8.3). This pH value would be considered suitable for general landscape purposes provided species with a wide pH tolerance or those known to prefer alkaline soils are selected for planting, turfing and seeding.

The electrical conductivity (salinity) value (water extract) was moderate, which indicates that soluble salts should not be present at levels that would be harmful to plants.

The electrical conductivity value by CaSO_4 extract was equal to the maximum specified value (3300 $\mu\text{S}/\text{cm}$) given in BS3882:2015 – Table 1.

Organic Matter and Fertility Status

The sample was well supplied with organic matter and all major plant nutrients.

The C:N ratio of the sample was acceptable for general landscape purposes.

Potential Contaminants

With reference to BS3882:2015 - Table 1: Notes 3 and 4, there is a requirement to confirm levels of potential contaminants in relation to the topsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations that affect human health have been compared with the *residential with homegrown produce* land use in the Suitable For Use Levels (S4ULs) presented in *The LQM/CIEH S4ULs for Human Health Risk Assessment* (2015) and the DEFRA SP1010: *Development of Category 4 Screening Levels (C4SLs) for Assessment of Land Affected by Contamination – Policy Companion Document* (2014).

Of the potential contaminants determined, none was found at levels that exceeded their guideline values.

Phytotoxic Contaminants

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in BS3882:2015 – Table 1.

CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil sample for general landscape purposes. The analysis has also been undertaken to determine the sample's compliance with the requirements of the British Standard for Topsoil (BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil).

From the soil examination and subsequent laboratory analysis, the sample was described as a strongly alkaline, non-saline, moderately calcareous, virtually stone-free *loamy sand* with an adequate structure. The sample contained sufficient reserves of organic matter and all major plant nutrients. Of the potential contaminants determined, none exceeded their respective guideline values.

To conclude, based on our findings, the topsoil represented by this sample would be considered suitable for general landscape purposes (trees, shrubs and amenity grass), provided the physical condition of the soil is satisfactory and species with a wide pH tolerance or those known to prefer alkaline soils are selected.

The topsoil was also fully compliant with the requirements of the British Standard for Topsoil (BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil).

Soil Handling Recommendations

It is important to maintain the physical condition of the soil and avoid structural damage during all phases of soil handling (e.g. stockpiling, resspreading, cultivating, planting, seeding or turfing). As a consequence, soil handling operations should be carried out when soil is reasonably dry and non-plastic (friable) in consistency.

It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking by site machinery, and soil handling should be stopped during and after heavy rainfall and not continued until the soil is friable in consistency. If the soil is structurally damaged and compacted at any stage during the course of soiling or landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

Further details on soil handling are provided in Annex A of BS3882:2015.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully



Ebony Gheorghe
BSc MSc
Soil Scientist



Tim White
BSc MSc MSoilSci CSci
Senior Associate

For & on behalf of Tim O'Hare Associates LLP



Sample Reference		Accession
Clase (v0.002mm)	%	UKAS
SW (0.002 to 0.05mm)	%	UKAS
Carer (0.003 to 0.0mm)	%	UKAS
Tireless Usage (i.e. Classification)		
Tireless (v0.0001%)	% DNP	GLP
Glucose (v0.000mm)	% DNP	GLP
Glucose (v0.00mm)	% DNP	GLP

Statistik Nr. 9

5
11
24
10
3
0
0

5.3
890
2787
5.5
8.8
0.32
1.8
81
0308
1.87

7
$\times 0.2$
18
$\times 1.8$
43
35
$\times 0.3$
5
$\times 1.0$
45
13
$\times 1.0$
$\times 1.0$

	= 0.05
	0.06
	= 0.05
	= 0.05
	0.08
	= 0.05
	1.00
	0.67
	0.43
	0.48
	0.61
	0.19
	0.40
	0.27
	= 0.05
	0.28
	0

0.020
0.030
0.050
1.0
2.0
6.0
32
32
0.010
0.010
0.050
1.0
2.0
10
39
39

12

Elvyn George
BSc MSc
Sed Scientist

Results of analysis should be read in conjunction with the report they were issued with

The contents of this certificate shall not be reproduced without the express written permission of Tim O'Hare Associates LLP

Appendix D Imported Subsoil Verification Record



Unit 9, Clarence Avenue
Westpoint Enterprise Park
Trafford Park
Manchester
M17 1QS

t: 0161 9470270
e: mail@soiltechnics.net
w: www.soiltechnics.net

Clive Hilton
Bellway Homes Limited, South London

Date: 2nd August 2023
Your Ref: Barrington Road,
Worthing
Our Ref: L-STV59595M-001

RE: Subsoil Verification Testing at Barrington Road, Goring-by-Sea, Worthing, BN12 4EA

Introduction

Further to our email correspondence of 28th June 2023, we are pleased to enclose our subsoil verification assessment.

We confirm our brief was to undertake sampling of subsoil stockpiles originating from the Bellway site at Billingshurst and a HGH site at Newick, both of which have been imported for use within the residential development at Barrington Road, Goring-by-Sea. The scope of the assessment is to determine the suitability of the soils for reuse on site, in terms of the risks to human health.

Site location and description

The residential development site is located on land south of the Durrington-on-Sea train station and North of Barrington Road, Goring-by-Sea, which provides access to the site.

The development is for the construction of approximately 139 residential plots, 4 blocks of flats and a care home with associated access, open space, parking, landscaping, infrastructure and other associated works. The development is controlled under the Worthing Borough Council planning regime, under the planning application number AWDM/0605/22.

Summary of findings

Aspect	Comments
Material tested	Billingshurst Material, Newick Material
Current placement	3x Billingshurst stockpiles (total of 2,600m ³), 1x Newick stockpile (total of 550m ³)
Approximate volume	~3,150m ³
Testing frequency	10x Billingshurst, 3x Newick. Equivalent to 1 sample per 250m ³ .
Physical suitability	No injurious, or over-sized artefacts identified.
Chemical suitability	Contaminants are within acceptable levels.
Overall comments	Chemically and physical suitable for use. No further testing required.
Recommendations	Organic matter content appears low, consider applying an organic based soil improver, or testing to BS:3882 standards to ensure suitability as a growing medium

Material origin

The subsoil materials are understood to be imported from two separate developments, a Bellway site at Billingshurst and a HGH site at Newick. On review of desk study and investigation reports provided, it was concluded that there is no evidence to indicate the site has been subject to activities which could produce a significant source of chemical contamination, and the materials are considered to be clean and naturally occurring.

Chemical testing has been carried out for reassurance purposes and to ensure no unexpected contamination is present or cross-contamination has occurred.

Fieldwork

The fieldwork was undertaken on 4th July 2023 and comprised the collection of soil samples from the recently formed stockpiles.

The dimensions of the stockpile have not been surveyed and the volume estimates provided below are based on visual observations at the time of the site visit.

Stockpile Origin	Stockpile Reference	Approximate Volume	Approximate Dimensions	Samples Obtained
Billingshurst	SL01	50m ³	4m x 6m x 2.5m	2
	SL02	800m ³	8m x 25m x 5m	4
	SL03	1,600m ³	10m x 40m x 5m	4
Newick	SL04 / SL05	500m ³	7m x 25m x 3.5m	3

The Billingshurst subsoil typically comprised of brown, slightly gravelly clay. With gravels of fine, subrounded flint. The material included infrequent inclusions of brick and concrete.

The Newick subsoil comprised of firm brown slightly sandy slightly gravelly clay. With gravels of fine to coarse, subrounded to subangular flint, brick and concrete.

Sampling was evenly distributed across the extent of the stockpiles. Generally sampling was undertaken following the principles of ISO 18400-104:2018 *Soil quality – Sampling - Part 104: Strategies*. Laboratory testing was undertaken on all samples collected for a general suite of organic and inorganic contaminants, as well as asbestos. Laboratory test results are presented within Appendix B. The stockpile location plan is shown below.



Fig 1 A Stockpile Location

The following photographs presented below shows one of the Billingshurst stockpiles and a stockpile of Newick soil.



Figure 1: Billingshurst soil stockpile SL01

soiltechnics



Figure 2: Billingshurst soil stockpile SL02



Figure 3: Billingshurst soil stockpile SL03

soiltechnics



Figure 4: Billingshurst soil stockpile SL04/05

Assessment for reuse

The soils were screened against published, widely accepted generic criteria for a residential end-use (with plant uptake).

No exceedances were detected within Billingshurst soil samples.

Exceedances from the Newick soil materials showed exceedances of Dibenz(a,h)anthracene, with a maximum concentration of 0.31 mg/kg, against the guideline value of 0.24mg/kg. As the exceedance is marginal, and all other PAH compounds fall below the guideline values, it is not considered to represent a significant risk to future residents, and can be discounted. Details of laboratory testing screening is presented within Appendix C.

Observations from the fieldworks, and screening of the laboratory analysis indicate that the imported soil materials are not impacted by contamination and are considered chemically suitable for re-use on site.

No injurious, undesirable, or over-sized materials were identified within the soil stockpile and is therefore considered broadly physically suitable for use.

Conclusions

Based on evidence obtained during our investigations, we are of the opinion that the subsoil deposits at the site are not affected by chemical contamination and can be reused within a residential development.

Should any of the soils be suspected to contain contamination or non-inert materials (by virtue of visual or olfactory evidence) upon excavation, then such soils should be stockpiled separately, and additional testing carried out as considered necessary.

Yours sincerely,

Prepared by
Richard Farrell BSc.
Geoenvironmental Consultant, Soiltechnics Limited

Supervised/reviewed by
Mark Hamill BSc, MSc, CEnv, MIEEnvSc.
Technical Director, Soiltechnics Limited

Encs.

Appendices	Principal coverage
A	Definitions of geo-environmental terms used in this report
B	Chemical laboratory test results
C	GQRA chemical screening assessments

Appendix A

soiltechnics

Definition of geo-environmental terms used in this report

Conceptual model

Textual and/or schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the basis of the information obtained from the investigatory process.

Contamination

Presence of a substance which is in, on or under land, and which has the potential to cause harm or to cause pollution of controlled water.

Controlled water

Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three mile limit of territorial waters.

Harm

Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case of humans, including property.

Pathway

Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.

Receptor

Persons, living organisms, ecological systems, controlled waters, atmosphere, structures and utilities that could be adversely affected by the contaminant(s).

Risk

Probability of the occurrence of, and magnitude of the consequences of, an unwanted adverse effect on a receptor.

Risk assessment

Process of establishing, to the extent possible, the existence, nature and significance of risk.

Definition of environmental risk/hazard terms used in this report

Based on CIRIA report C552 '*Contaminated land risk assessment – A guide to good practice*'.

Potential hazard severity definition

Category	Definition
Severe	Acute risks to human health, catastrophic damage to buildings/property, major pollution of controlled waters
Medium	Chronic risk to human health, pollution of sensitive controlled waters, significant effects on sensitive ecosystems or species, significant damage to buildings or structures
Mild	Pollution of non-sensitive waters, minor damage to buildings or structures
Minor	Requirement for protective equipment during site works to mitigate health effects, damage to non-sensitive ecosystems or species

Probability of risk definition

Category	Definition
High likelihood	Pollutant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term
Low likelihood	Pollutant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so
Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable

Level of risk for potential hazard definition

Probability of risk	Potential severity			
	Severe	Medium	Mild	Minor
High likelihood	Very high	High	Moderate	Low/Moderate
Likely	High	Moderate	Low/Moderate	Low
Low likelihood	Moderate	Low/Moderate	Low	Very low
Unlikely	Low/Moderate	Low	Very low	Very low

See below for definitions of 'very high' to 'very low'

Definition of environmental risk/hazard terms used in this report

Based on CIRIA report C552 '*Contaminated land risk assessment – A guide to good practice*'.

Risk classifications and likely action required:

Very high risk

High probability that severe harm could arise to a designated receptor from an identified hazard OR there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised is likely to result in substantial liability. Urgent investigation and remediation are likely to be required.

High risk

Harm is likely to arise to a designated receptor from an identified hazard. This risk, if realised, is likely to result in substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term.

Moderate risk

It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is likely that the harm would be relatively mild. Investigation is normally required to clarify risks and to determine potential liability. Some remedial works may be required in the long term.

Low risk

It is possible that harm could arise to a designated receptor from an identified hazard but it is likely that this harm, if realised, would at worst normally be mild.

Very low risk

It is a low possibility that harm could arise to a designated receptor. On the event of such harm being realised it is not likely to be severe.

List of documents used in assessment of chemical contamination

No.	Title	Publication reference / publisher
1	Human health toxicological assessment of contaminants in soil	EA Science Report – SC050021/SR2
2	Updated technical background to the CLEA model	EA Science Report – SC050021/SR3
3	CLEA Software (Version 1.03 beta) Handbook	EA Science Report - SC050021/SR4
4	Guidance on comparing Soil Contamination Data with a Critical Concentration	CIEH
5	The LQM/CIEH S4ULs for Human Health Risk Assessment (2015)	LQM/CIEH
6	Assessment of Risks to Human Health from Land Contamination: An overview of the development of soil guideline values and related research	R&D Publication, Contaminated Land Report CLR 7
7	Contaminants of Soil: Collation of Toxicological Data and Intake Values for Humans	R&D Publication, Contaminated Land Report CLR 9
8	The Contaminated Land Exposure Assessment Model (CLEA): Technical Basis and Algorithms	R&D Publication, Contaminated Land Report CLR 10
9	Model Procedures for the Management of Land Contamination	R&D Publication, Contaminated Land Report CLR 11
10	Contaminants in Soil: Collection of Toxicological Data and Intake Values for Human Values	R&D Publications, Tox. 6
11	Soil Guideline Values for Contamination (2002)	R&D Publications, SGV 10
12	Soil Guideline Values (2009)	EA Science Reports – SC050021
13	Atkins ATRISK ^{SOIL} (2011)	http://www.atrisksoil.co.uk
14	Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination (September 2014)	CL:AIRE

CIEH	Chartered institute of Environmental Health
LQM	Land Quality Management
EA	Environment Agency
CL:AIRE	Contaminated Land: Applications in Real Environments

Testing suite summary

Table summarising testing suites		
Suite	Parameters	Medium
Suite 1	Arsenic, beryllium, boron, cadmium, chromium (total and VI), copper, lead, mercury, nickel, selenium, vanadium zinc, cyanide (free, total and complex), organic matter content, PAH (16 speciated), pH, phenol (total), TOC	Soil
Suite 2	Arsenic, boron (water soluble), beryllium, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, vanadium, zinc, cyanide (free, total and complex, PAH (16 speciated), pH, phenol (total), sulfate (water soluble), sulfide, nitrate	Leachate
Suite 3	Arsenic, boron (water soluble), beryllium, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, vanadium, zinc, cyanide (free, total and complex, PAH (16 speciated), pH, phenol (total), sulfate (water soluble), sulfide, nitrate	Water
Suite 4	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, MTBE, PAH (16 speciated), organic matter	Soil
Suite 5	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, MTBE, PAH (16 speciated)	Leachate
Suite 6	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, MTBE, PAH (16 speciated)	Water
Suite 7	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, TOC, organic matter	Soil
Suite 8	Sulphur (total), sulphate (water and acid soluble), pH	Soil
Suite 9	Sulphate, ammoniacal nitrogen, dissolved magnesium, pH	Water
Suite 10	VOC, SVOC, TOC, organic matter	Soil
Suite 11	VOC, SVOC	Leachate
Suite 12	VOC, SVOC	Water
Suite 13	Organotins dibutyltin/ tributyl-tin/tetrabutyltin/triphenyl-tin, tetraethyl-lead/tetramethyl-lead	Soil
Suite 14	Organotin	Leachate
Suite 15	Organotin	Water
Suite 16	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, VOC, SVOC	Soil, water, leachate
Suite 17	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, SVOC, VOC, arsenic, boron (water soluble), beryllium, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, vanadium, zinc, cyanide (free, total and complex, pH, phenol (total), sulfate (water soluble), sulfide, nitrate	Soil, water, leachate
Concrete BRE suite	pH, sulphate (water and acid soluble), magnesium (water soluble), ammonia (water soluble), chloride, nitrate	Soil

Appendix B

soiltechnics



Final Report

Report No.: 23-23395-1

Initial Date of Issue: 19-Jul-2023

Re-Issue Details:

Client Soiltechnics Limited

Client Address: 1st Floor Unit 9 Westpoint Enterprise
Park
Clarence Avenue
Trafford Park
Manchester
M17 1QS

Contact(s): Admin

Project STV5959 Barrington Road, Worthing

Quotation No.: **Date Received:** 11-Jul-2023

Order No.: POR015875 **Date Instructed:** 11-Jul-2023

No. of Samples: 13

Turnaround (Wkdays): 7 **Results Due:** 19-Jul-2023

Date Approved: 18-Jul-2023

Approved By:

Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: STV5959 Barrington Road, Worthing

Client: Soiltechnics Limited	Chemtest Job No.:				23-23395	23-23395	23-23395	23-23395	23-23395	23-23395	23-23395	23-23395	23-23395
Quotation No.:	Chemtest Sample ID.:				1672171	1672172	1672173	1672174	1672175	1672176	1672177	1672178	1672179
Order No.: POR015875	Client Sample Ref.:				1	2	2	3	4	1	1	2	3
	Client Sample ID.:				SL010.201	SL011.502	SL020.102	SL020.203	SL020.304	SL020.601	SL030.101	SL030.202	SL030.303
	Sample Location:				SL01	SL01	SL02	SL02	SL02	SL02	SL03	SL03	SL03
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.20	1.50	0.10	0.20	0.30	0.60	0.10	0.20	0.30
	Date Sampled:				04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	NEW-ASB	NEW-ASB
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	21	19	15	14	13	16	5.4	12	11
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	50% Stones	45% Stones	Stones	Stones	50% Stones	Stones	Stones
Soil Texture	N	2040		N/A	Clay	Clay	Sand	Sand	Clay	Sand	Gravel	Sand	Sand
pH	M	2010		4.0	7.6	7.8	7.8	7.5	7.1	7.6	7.7	7.4	8.0
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	3.1	3.5	1.9	1.2	0.49	1.8	6.6	1.5	1.0
Cyanide (Complex)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	M	2455	mg/kg	0.5	11	9.2	9.2	8.4	8.4	6.5	14	8.4	8.6
Beryllium	U	2455	mg/kg	0.5	0.8	0.7	0.6	0.7	0.7	< 0.5	0.9	0.6	0.7
Cadmium	M	2455	mg/kg	0.10	< 0.10	< 0.10	0.21	< 0.10	0.20	< 0.10	< 0.10	< 0.10	< 0.10
Chromium	M	2455	mg/kg	0.5	26	24	26	23	18	16	31	20	24
Copper	M	2455	mg/kg	0.50	52	21	20	18	15	25	31	16	23
Mercury	M	2455	mg/kg	0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Nickel	M	2455	mg/kg	0.50	16	18	15	15	11	11	13	13	17
Lead	M	2455	mg/kg	0.50	23	24	27	24	14	26	20	24	33
Selenium	M	2455	mg/kg	0.25	0.53	0.62	0.56	0.56	0.37	0.38	0.43	0.50	0.68
Vanadium	U	2455	mg/kg	0.5	34	32	29	30	22	23	38	28	33
Zinc	M	2455	mg/kg	0.50	65	57	59	50	36	46	46	49	64
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
LOI	M	2610	%	0.10	5.5	4.5	5.1	4.5	4.6	5.9	6.2	5.0	4.3
Organic Matter	M	2625	%	0.40	1.9	2.1	3.1	1.8	4.2	1.4	0.95	2.4	1.5
TPH >C5-C6	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C6-C7	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C7-C8	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C8-C10	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C10-C12	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C12-C16	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C16-C21	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C21-C35	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	2.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total TPH >C5-C35	N	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Naphthalene	M	2800	mg/kg	0.10	0.62	0.64	1.2	0.55	1.1	0.65	0.74	0.83	0.90
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: STV5959 Barrington Road, Worthing

Client: Soiltechnics Limited	Chemtest Job No.:				23-23395	23-23395	23-23395	23-23395	23-23395	23-23395	23-23395	23-23395	23-23395
Quotation No.:	Chemtest Sample ID.:				1672171	1672172	1672173	1672174	1672175	1672176	1672177	1672178	1672179
Order No.: POR015875	Client Sample Ref.:				1	2	2	3	4	1	1	2	3
	Client Sample ID.:				SL010.201	SL011.502	SL020.102	SL020.203	SL020.304	SL020.601	SL030.101	SL030.202	SL030.303
	Sample Location:				SL01	SL01	SL02	SL02	SL02	SL02	SL03	SL03	SL03
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.20	1.50	0.10	0.20	0.30	0.60	0.10	0.20	0.30
	Date Sampled:				04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	NEW-ASB	NEW-ASB
Determinand	Accred.	SOP	Units	LOD									
Acenaphthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	0.14	0.18	0.14	< 0.10	< 0.10	0.33	< 0.10	< 0.10	< 0.10
Anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10	< 0.10	0.14	0.47	< 0.10	< 0.10	0.42	< 0.10	< 0.10	< 0.10
Pyrene	M	2800	mg/kg	0.10	< 0.10	0.12	0.52	< 0.10	< 0.10	0.26	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	2.3	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: STV5959 Barrington Road, Worthing

Client: Soiltechnics Limited	Chemtest Job No.:				23-23395	23-23395	23-23395	23-23395
Quotation No.:	Chemtest Sample ID.:				1672180	1672181	1672182	1672183
Order No.: POR015875	Client Sample Ref.:				4	1	1	2
	Client Sample ID.:				SL030.604	SL040.601	SL050.201	SL050.602
	Sample Location:				SL03	SL04	SL05	SL05
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.60	0.60	0.20	0.60
	Date Sampled:				04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023
	Asbestos Lab:				NEW-ASB	DURHAM	DURHAM	NEW-ASB
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	16	12	7.5	7.4
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand
pH	M	2010		4.0	7.6	6.6	9.7	9.9
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.50	0.48	1.4	1.3
Cyanide (Complex)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	M	2455	mg/kg	0.5	9.9	10	10	6.8
Beryllium	U	2455	mg/kg	0.5	0.7	< 0.5	0.6	0.5
Cadmium	M	2455	mg/kg	0.10	0.12	< 0.10	0.31	0.21
Chromium	M	2455	mg/kg	0.5	23	17	19	14
Copper	M	2455	mg/kg	0.50	18	19	22	16
Mercury	M	2455	mg/kg	0.05	0.06	0.06	0.09	0.08
Nickel	M	2455	mg/kg	0.50	15	10	17	11
Lead	M	2455	mg/kg	0.50	41	30	77	74
Selenium	M	2455	mg/kg	0.25	0.59	0.56	0.54	0.36
Vanadium	U	2455	mg/kg	0.5	35	23	31	25
Zinc	M	2455	mg/kg	0.50	61	58	110	84
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
LOI	M	2610	%	0.10	4.5	3.0	4.1	4.0
Organic Matter	M	2625	%	0.40	2.4	1.3	1.6	1.4
TPH >C5-C6	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C6-C7	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C7-C8	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C8-C10	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C10-C12	N	2670	mg/kg	1.0	< 1.0	< 1.0	12	< 1.0
TPH >C12-C16	N	2670	mg/kg	1.0	< 1.0	< 1.0	14	3.4
TPH >C16-C21	N	2670	mg/kg	1.0	< 1.0	< 1.0	18	23
TPH >C21-C35	N	2670	mg/kg	1.0	< 1.0	< 1.0	57	170
Total TPH >C5-C35	N	2670	mg/kg	10	< 10	< 10	100	190
Naphthalene	M	2800	mg/kg	0.10	1.2	0.64	0.70	0.57
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	0.11	0.14

Results - Soil

Project: STV5959 Barrington Road, Worthing

Client: Soiltechnics Limited	Chemtest Job No.:				23-23395	23-23395	23-23395	23-23395
Quotation No.:	Chemtest Sample ID.:				1672180	1672181	1672182	1672183
Order No.: POR015875	Client Sample Ref.:				4	1	1	2
	Client Sample ID.:				SL030.604	SL040.601	SL050.201	SL050.602
	Sample Location:				SL03	SL04	SL05	SL05
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.60	0.60	0.20	0.60
	Date Sampled:				04-Jul-2023	04-Jul-2023	04-Jul-2023	04-Jul-2023
	Asbestos Lab:				NEW-ASB	DURHAM	DURHAM	NEW-ASB
Determinand	Accred.	SOP	Units	LOD				
Acenaphthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	0.35	0.23
Fluorene	M	2800	mg/kg	0.10	< 0.10	< 0.10	0.22	0.19
Phenanthrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	2.5	2.1
Anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	0.61	0.58
Fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	4.2	4.3
Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	3.4	3.6
Benzo[a]anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	1.7	2.0
Chrysene	M	2800	mg/kg	0.10	< 0.10	< 0.10	1.9	2.3
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	2.5	2.5
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	0.95	1.0
Benzo[a]pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	1.8	2.1
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	1.4	1.4
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	0.28	0.31
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10	< 0.10	1.4	1.5
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	24	25
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Appendix C

soiltechnics

QRA Screening

Assessments	Status	Date	Created by	Reviewed By
Acute human health risk - Soils	Not undertaken			
Chronic human health risk - Soils	Complete	26.08.23	RF	MOH
Chronic human health risk - Groundwater vapour	Not undertaken			
Controlled waters risk - Surface water	Not undertaken			
Controlled waters risk - Drinking water	Not undertaken			
Controlled waters - Free phase indicator	Not undertaken			
Phytotoxicity	Not undertaken			
Ecotoxicity	Not undertaken			

Key

Assessment	Abbr.	QRA Source (in order of preference)	Last Update
All	NGA	No guideline value available	-
Chronic human health risk - Soils	C4SL	Category 4 Screening Levels (DEFRA)	May 2021
	S4UL	Suitable 4 Use Levels (LQM)	August 2015
	ATK	Atrisk Soil Screening Values (Atkins)	June 2017
	CL:AIRE	Generic Assessment Criteria (CL:AIRE)	Jan 2010

Chronic human health risk (soils)

Scenario																				
End user				Proposed site user																
Receptor				Residential with homegrown produce																
SOM				1.00%																
GAC Preference				C4SLs over S4ULs																
Unspecified TPH GAC				Worst-case aliphatic/aromatic																
Contaminant	Guideline source	Guideline value (mg/kg)	Max value (mg/kg)	Location		SL01	SL01	SL02	SL02	SL02	SL02	SL03	SL03	SL03	SL03	SL04	SL05	SL05		
				Depth (m)		0.20	1.50	0.10	0.20	0.30	0.60	0.10	0.20	0.30	0.60	0.60	0.20	0.60		
				Date		04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	
Inorganics - Metals																				
Arsenic	C4SL	37	14			11	9.2	9.2	8.4	8.4	6.5	14	8.4	8.6	9.9	10	10	6.8		
Beryllium	S4UL	1.7	0.9			0.8	0.7	0.6	0.7	0.7	< 0.5	0.9	0.6	0.7	0.7	< 0.5	0.6	0.5		
Boron	S4UL	290	6.6			3.1	3.5	1.9	1.2	0.49	1.8	6.6	1.5	1	0.5	0.48	1.4	1.3		
Cadmium	C4SL	22	0.31			< 0.10	< 0.10	0.21	< 0.10	0.2	< 0.10	< 0.10	< 0.10	< 0.10	0.12	< 0.10	0.31	0.21		
Chromium (III)	S4UL	910	31			26	24	26	23	18	16	31	20	24	23	17	19	14		
Chromium (VI)	C4SL	21	<LoD			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Copper	S4UL	2400	52			52	21	20	18	15	25	31	16	23	18	19	22	16		
Cyanide - Free	ATK	34	<LoD			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Lead	C4SL	200	77			23	24	27	24	14	26	20	24	33	41	30	77	74		
Mercury	S4UL	40	0.09			< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	0.06	0.06	0.09	0.08		
Nickel	S4UL	130	18			16	18	15	15	11	11	13	13	17	15	10	17	11		
Selenium	S4UL	250	0.68			0.53	0.62	0.56	0.56	0.37	0.38	0.43	0.5	0.68	0.59	0.56	0.54	0.36		
Vanadium	S4UL	410	38			34	32	29	30	22	23	38	28	33	35	23	31	25		
Zinc	S4UL	3700	110			65	57	59	50	36	46	46	49	64	61	58	110	84		
Inorganics - Asbestos																				
Asbestos Type		N/A				-	-	-	-	-	-	-	-	-	-	-	-	-		
Asbestos Screen		N/A				NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
Inorganics - Soil Parameters																				
Organic matter		N/A				1.9	2.1	3.1	1.8	4.2	1.4	0.95	2.4	1.5	2.4	1.3	1.6	1.4		
Organics - PAH & Phenol						< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.35	0.23		
Acenaphthene	S4UL	210	0.35			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.11	0.14		
Acenaphthylene	S4UL	170	0.14			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.61	0.58		
Anthracene	S4UL	2400	0.61			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.7	2		
Benzo(a)anthracene	S4UL	7.2	2			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.8	2.1		
Benzo(a)pyrene	C4SL	5	2.1			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.5	2.5		
Benzo(b)fluoranthene	S4UL	2.6	2.5			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.4	1.5		
Benzo(ghi)perylene	S4UL	320	1.5			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.95	1		
Benzo(k)fluoranthene	S4UL	77	1			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.9	2.3		
Chrysene	S4UL	15	2.3			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.28	0.31		
Dibenz(a,h)anthracene	S4UL	0.24	0.31			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	4.2	4.3		
Fluoranthene	S4UL	280	4.3			< 0.10	0.14	0.47	< 0.10	< 0.10	0.42	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.22	0.19		
Fluorene	S4UL	170	0.22			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.4	1.4		
Indeno(1,2,3-cd)pyrene	S4UL	27	1.4			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.62	0.57		
Naphthalene	S4UL	2.3	1.2			0.62	0.64	1.2	0.55	1.1	0.65	0.74	0.83	0.9	1.2	0.64	0.7	0.57		
Phenanthrene	S4UL	95	2.5			0.14	0.18	0.14	< 0.10	< 0.10	0.33	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.5	2.1		
Phenol	S4UL	120	<LoD			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Pyrene	S4UL	620	3.6			< 0.10	0.12	0.52	< 0.10	< 0.10	0.26	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	3.4	3.6		
Organics - Banded TPH (unspecified)																				
EC >5-EC6 (unspecified)	S4UL	42	<LoD			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
EC >6-EC7 (unspecified)	S4UL	70	<LoD			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
EC >7-EC8 (unspecified)	S4UL	13	<LoD			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
EC >08-EC10 (unspecified)	S4UL	27	<LoD			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
EC >10-EC12 (unspecified)	S4UL	74	12			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	12	< 1.0		
EC >12-EC16 (unspecified)	S4UL	140	14			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	14	3.4		
EC >16-EC21 (unspecified)	S4UL	260	23			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	18	23		
EC >21-EC35 (unspecified)	S4UL	1100	170			< 1.0	< 1.0	< 1.0	2.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	57	170		

Chronic human health risk (soils)

Scenario	
End user	Proposed site user
Receptor	Residential with homegrown produce
SOM	1.00%
GAC Preference	C4SLs over S4ULs
Unspeciated TPH GAC	Worst-case aliphatic/aromatic

Contaminant	Guideline source	Guideline value	Max value	Location	SL01	SL01	SL02	SL02	SL02	SL02	SL03	SL03	SL03	SL03	SL04	SL05	SL05
				Depth (m)	0.20	1.50	0.10	0.20	0.30	0.60	0.10	0.20	0.30	0.60	0.60	0.20	0.60

Chronic human health risk (soils)

Scenario	
End user	Proposed site user
Receptor	Residential with homegrown produce
SOM	1.00%
GAC Preference	C4SLs over S4ULs
Unspeciated TPH GAC	Worst-case aliphatic/aromatic

Contaminant	Guideline source	Guideline value	Max value	Location	SL01	SL01	SL02	SL02	SL02	SL02	SL03	SL03	SL03	SL03	SL04	SL05	SL05
				Depth (m)	0.20	1.50	0.10	0.20	0.30	0.60	0.10	0.20	0.30	0.60	0.60	0.20	0.60

Appendix E Pit Inspection Records

General Site Details

Site Name	Barrington Road, Worthing	Development Use	Residential with gardens
Date	07/07/2025	Groundwork Contractor	
Engineer	Contractor	Developer	Bellway

Verification Action Undertaken

Plot No. / Area	Plot 124	Exploratory Hole ID	VTP124
General Comment	Excavated an inspection pit to inspect depth and physical suitability of clean cover system, and collect chemical samples to assess chemical suitability of cover system soils.		
Samples Taken	N/A		
No-Dig / Demarcation Layers	N/A		
Physical Suitability	No undesirable or injurious objects were observed within any of the materials inspected, such as sharps, metals, plastics or over-sized materials, except for a few cobble-sized fragments of brick and concrete within the subsoil.		

Remediation Requirement		Observed Conditions (if applicable)	
Minimum Total Thickness:	≥ 600mm	Minimum Thickness:	Pit dug to 0.62m
Topsoil:	150mm – 300mm	Topsoil:	200mm
Subsoil:	≥300mm	Subsoil:	420mm
Geotextile Marker:	N/A	Geotextile Marker:	N/A
No-Dig Layer:	N/A	No-Dig Layer:	N/A

Photographs Overleaf

Verification Outcome

Conclusion	The aspects considered under this inspection record have passed verification.
Exclusions	Where chemical analysis has been undertaken, please refer to the Verification Report for a discussion on the results and confirmation of compliance and chemical suitability.

General Site Details

Site Name	Barrington Road, Worthing	Development Use	Residential with gardens
Date	07/07/2025	Groundwork Contractor	
Engineer	Contractor	Developer	Bellway

Photograph (in-situ soils):	Photograph (depth)
	

Photograph (spatial)


Appendix F GQRA

QRA Screening

Assessments	Status	Date	Created by	Reviewed By
Acute human health risk - Soils	Not undertaken			
Chronic human health risk - Soils	Completed	08.07.25	JB	MOH
Chronic human health risk - Groundwater vapour	Not undertaken			
Controlled waters risk - Surface water	Not undertaken			
Controlled waters risk - Drinking water	Not undertaken			
Controlled waters - Free phase indicator	Not undertaken			
Phytotoxicity	Not undertaken			
Ecotoxicity	Not undertaken			

Key

Assessment	Abbr.	QRA Source (in order of preference)	Last Update
All	NGA	No guideline value available	-
Chronic human health risk - Soils	C4SL	Category 4 Screening Levels (DEFRA)	May 2021
	S4UL	Suitable 4 Use Levels (LQM)	August 2015
	ATK	Atrisk Soil Screening Values (Atkins)	June 2017
	CL:AIRE	Generic Assessment Criteria (CL:AIRE)	Jan 2010

Chronic human health risk (soils)

Scenario																			
End user		Proposed site user																	
Receptor		Residential with homegrown produce																	
SOM		1.00%																	
GAC Preference		C4SLs over S4ULs																	
Unspecified TPH GAC		Worst-case aliphatic/aromatic																	
Contaminant	Guideline source	Guideline value (mg/kg)	Max value (mg/kg)	Location		SP101a	SP101b	SP101c	SP101d	SP101e	SL010.201	SL011.502	SL020.102	SL020.203	SL020.304				
				Depth (m)		0.00	0.00	0.00	0.00	0.00	0.20	1.50	0.10	0.20	0.30				
				Date		09/10/24	09/10/24	09/10/24	09/10/24	09/10/24	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23				
Inorganics - Metals																			
Arsenic	C4SL	37	22			14	13	13	12	22	11	9.2	9.2	8.4	8.4				
Beryllium	S4UL	1.7	1.3			0.8	1.1	0.8	0.6	1.2	0.8	0.7	0.6	0.7	0.7				
Boron	S4UL	290	6.6			0.86	0.95	1.2	< 0.40	0.41	3.1	3.5	1.9	1.2	0.49				
Cadmium	C4SL	22	0.59			0.26	0.49	0.19	< 0.10	0.24	< 0.10	< 0.10	0.21	< 0.10	0.2				
Chromium (III)	S4UL	910	47			24	23	25	20	36	26	24	26	23	18				
Chromium (VI)	C4SL	21	<LoD			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50				
Copper	S4UL	2400	160			27	160	30	27	45	52	21	20	18	15				
Cyanide - Free	ATK	34	<LoD			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50				
Lead	C4SL	200	300			79	68	49	41	69	23	24	27	24	14				
Mercury	S4UL	40	0.54			0.13	0.08	0.07	0.08	0.13	< 0.05	< 0.05	0.05	< 0.05	< 0.05				
Nickel	S4UL	130	35			19	20	16	12	23	16	18	15	15	11				
Selenium	S4UL	250	1.4			0.44	1.4	0.48	0.38	0.95	0.53	0.62	0.56	0.56	0.37				
Vanadium	S4UL	410	73			34	36	73	25	46	34	32	29	30	22				
Zinc	S4UL	3700	440			100	110	90	71	130	65	57	59	50	36				
Inorganics - Asbestos																			
Asbestos Type	N/A					-													
Asbestos Screen	N/A					No Asbestos Detected													
Inorganics - Soil Parameters						No Asbestos Detected													
Organic matter	N/A			3.3															
Organics - PAH & Phenol				3.6															
Acenaphthene	S4UL	210	0.14	4.1															
Acenaphthylene	S4UL	170	0.35	1.7															
Anthracene	S4UL	2400	0.61	1.3															
Benzo(a)anthracene	S4UL	7.2	2.9	1.9															
Benzo(a)pyrene	C4SL	5	2.8	2.1															
Benzo(b)fluoranthene	S4UL	2.6	3	3.1															
Benzo(ghi)perylene	S4UL	320	2.7	3.1															
Benzo(k)fluoranthene	S4UL	77	2.6	1.8															
Chrysene	S4UL	15	3.1	4.2															
Dibenz(a,h)anthracene	S4UL	0.24	2.4	< 0.10															
Fluoranthene	S4UL	280	4.3	< 0.10															
Fluorene	S4UL	170	0.22	< 0.10															
Indeno(1,2,3-cd)pyrene	S4UL	27	2.5	< 0.10															
Naphthalene	C4SL	15	1.2	< 0.10															
Phenanthrene	S4UL	95	2.5	< 0.10															
Phenol	S4UL	120	<LoD	< 0.10															
Pyrene	S4UL	620	3.6	< 0.10															
Organics - Banded TPH (unspecified)																			
EC >5-EC6 (unspecified)	S4UL	42	<LoD	< 1.0															
EC >6-EC7 (unspecified)	S4UL	70	<LoD	< 1.0															
EC >7-EC8 (unspecified)	S4UL	100	<LoD	< 1.0															
EC >08-EC10 (unspecified)	S4UL	27	<LoD	< 1.0															
EC >10-EC12 (unspecified)	S4UL	74	12	< 1.0															
EC >12-EC16 (unspecified)	S4UL	140	14	< 1.0															
EC >16-EC21 (unspecified)	S4UL	260	420	< 1.0															
EC >21-EC35 (unspecified)	S4UL	1100	4200	< 1.0															

Chronic human health risk (soils)

Scenario																	
End user				Proposed site user													
Receptor				Residential with homegrown produce													
SOM				1.00%													
GAC Preference				C4SLs over S4ULs													
Unspecified TPH GAC				Worst-case aliphatic/aromatic													
Contaminant	Guideline source	Guideline value (mg/kg)	Max value (mg/kg)	Location		SL020.601	SL030.101	SL030.202	SL030.303	SL030.604	SL040.601	SL050.201	SL050.602	VTP101	VTP101		
				Depth (m)		0.60	0.10	0.20	0.30	0.60	0.60	0.20	0.60	0.15	0.50		
				Date		04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	04/07/23	02/07/24	02/07/24		
Inorganics - Metals																	
Arsenic	C4SL	37	22			6.5	14	8.4	8.6	9.9	10	10	6.8	19	16		
Beryllium	S4UL	1.7	1.3			< 0.5	0.9	0.6	0.7	0.7	< 0.5	0.6	0.5				
Boron	S4UL	290	6.6			1.8	6.6	1.5	1	0.5	0.48	1.4	1.3	0.49	1.9		
Cadmium	C4SL	22	0.59			< 0.10	< 0.10	< 0.10	< 0.10	0.12	< 0.10	0.31	0.21	0.5	0.37		
Chromium (III)	S4UL	910	47			16	31	20	24	23	17	19	14	5	8.7		
Chromium (VI)	C4SL	21	<LoD			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Copper	S4UL	2400	160			25	31	16	23	18	19	22	16	81	72		
Cyanide - Free	ATK	34	<LoD			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Lead	C4SL	200	300			26	20	24	33	41	30	77	74	140	130		
Mercury	S4UL	40	0.54			< 0.05	< 0.05	< 0.05	0.05	0.06	0.06	0.09	0.08	0.54	0.33		
Nickel	S4UL	130	35			11	13	13	17	15	10	17	11	33	25		
Selenium	S4UL	250	1.4			0.38	0.43	0.5	0.68	0.59	0.56	0.54	0.36	1.3	0.87		
Vanadium	S4UL	410	73			23	38	28	33	35	23	31	25	32	32		
Zinc	S4UL	3700	440			46	46	49	64	61	58	110	84	440	310		
Inorganics - Asbestos																	
Asbestos Type	N/A					-	-	-	-	-	-	-	-	-	-		
Asbestos Screen	N/A					No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		
Inorganics - Soil Parameters																	
Organic matter	N/A					1.4	0.95	2.4	1.5	2.4	1.3	1.6	1.4	1.7	1.3		
Organics - PAH & Phenol																	
Acenaphthene	S4UL	210	0.14			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.11	0.14	< 0.10	< 0.10	
Acenaphthylene	S4UL	170	0.35			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.35	0.23	< 0.10	< 0.10	
Anthracene	S4UL	2400	0.61			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.61	0.58	< 0.10	< 0.10	
Benzo(a)anthracene	S4UL	7.2	2.9			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.7	2	< 0.10	< 0.10	
Benzo(a)pyrene	C4SL	5	2.8			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.8	2.1	< 0.10	< 0.10	
Benzo(b)fluoranthene	S4UL	2.6	3			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.5	2.5	< 0.10	< 0.10	
Benzo(ghi)perylene	S4UL	320	2.7			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.4	1.5	< 0.10	< 0.10	
Benzo(k)fluoranthene	S4UL	77	2.6			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.95	1	< 0.10	< 0.10	
Chrysene	S4UL	15	3.1			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.9	2.3	< 0.10	< 0.10	
Dibenz(a,h)anthracene	S4UL	0.24	2.4			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.28	0.31	< 0.10	< 0.10	
Fluoranthene	S4UL	280	4.3			0.42	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	4.2	4.3	0.18	0.41	
Fluorene	S4UL	170	0.22			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.22	0.19	< 0.10	< 0.10	
Indeno(1,2,3-cd)pyrene	S4UL	27	2.5			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.4	1.4	< 0.10	< 0.10	
Naphthalene	C4SL	15	1.2			0.65	0.74	0.83	0.9	1.2	0.64	0.7	0.57	< 0.10	< 0.10		
Phenanthrene	S4UL	95	2.5			0.33	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.5	2.1	< 0.10	0.2	
Phenol	S4UL	120	<LoD			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Pyrene	S4UL	620	3.6			0.26	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	3.4	3.6	0.17	0.36	
Organics - Banded TPH (unspecified)																	
EC >5-EC6 (unspecified)	S4UL	42	<LoD			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
EC >6-EC7 (unspecified)	S4UL	70	<LoD			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
EC >7-EC8 (unspecified)	S4UL	100	<LoD			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
EC >8-EC10 (unspecified)	S4UL	27	<LoD			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
EC >10-EC12 (unspecified)	S4UL	74	12			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	12	< 1.0	< 1.0	< 1.0	< 1.0
EC >12-EC16 (unspecified)	S4UL	140	14			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	14	3.4	< 1.0	< 1.0	< 1.0
EC >16-EC21 (unspecified)	S4UL	260	420			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	18	23	< 1.0	< 1.0	< 1.0
EC >21-EC35 (unspecified)	S4UL	1100	4200			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	57	170	< 1.0	< 1.0	< 1.0

Chronic human health risk (soils)

Scenario																	
End user		Proposed site user															
Receptor		Residential with homegrown produce															
SOM		1.00%															
GAC Preference		C4SLs over S4ULs															
Unspecified TPH GAC		Worst-case aliphatic/aromatic															
Contaminant	Guideline source	Guideline value (mg/kg)	Max value (mg/kg)	Location		VTP102	VTP102	VTP103	VTP103	VTP104	VTP104	VTP105	VTP105	VTP116	VTP24		
				Depth (m)		0.10	0.50	0.10	0.50	0.10	0.40	0.10	0.50	0.20	0.10		
				Date		02/07/24	02/07/24	02/07/24	02/07/24	02/07/24	02/07/24	02/07/24	02/07/24	30/04/25	09/10/24		
Inorganics - Metals																	
Arsenic	C4SL	37	22			15	16	15	12	14	10	12	16	10	21		
Beryllium	S4UL	1.7	1.3											0.6	1.2		
Boron	S4UL	290	6.6			1.9	2	2.2	2.1	0.65	1.4	0.64	1.9	<1	0.52		
Cadmium	C4SL	22	0.59			0.38	0.17	0.18	0.13	0.13	<0.10	0.11	0.19	0.3	0.24		
Chromium (III)	S4UL	910	47			6.8	32	27	30	27	28	23	47		40		
Chromium (VI)	C4SL	21	<LoD			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2	<0.50		
Copper	S4UL	2400	160			99	34	37	30	32	22	28	32	34	43		
Cyanide - Free	ATK	34	<LoD			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1	<0.50		
Lead	C4SL	200	300			300	54	61	38	46	34	38	32	46	70		
Mercury	S4UL	40	0.54			0.4	0.09	0.14	0.07	0.1	0.07	0.09	0.06	<1	0.13		
Nickel	S4UL	130	35			23	20	17	18	16	16	14	35	13	22		
Selenium	S4UL	250	1.4			0.71	1.1	1.1	0.87	0.93	0.91	0.82	1.3	<2	0.89		
Vanadium	S4UL	410	73			30	41	37	37	31	36	27	59	26	43		
Zinc	S4UL	3700	440			260	90	98	83	88	60	80	82	71	130		
Inorganics - Asbestos																	
Asbestos Type		N/A															
Asbestos Screen		N/A															
Inorganics - Soil Parameters																	
Organic matter		N/A															
Organics - PAH & Phenol																	
Acenaphthene	S4UL	210	0.14			1.8	1.7	1.5	1.2	1.6	1.1	1.2	0.48	3.8	1.9		
Acenaphthylene	S4UL	170	0.35			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.10		
Anthracene	S4UL	2400	0.61			<0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.1	0.18		
Benzo(a)anthracene	S4UL	7.2	2.9			<0.10	0.22	<0.10	0.26	<0.10	<0.10	<0.10	0.15	0.3	0.99		
Benzo(a)pyrene	C4SL	5	2.8			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	0.36	0.95		
Benzo(b)fluoranthene	S4UL	2.6	3			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.1	0.44	1.2		
Benzo(ghi)perylene	S4UL	320	2.7			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.28	0.82		
Benzo(k)fluoranthene	S4UL	77	2.6			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.14	0.88		
Chrysene	S4UL	15	3.1			<0.10	0.21	<0.10	0.24	<0.10	<0.10	<0.10	0.14	0.35	1		
Dibenz(a,h)anthracene	S4UL	0.24	2.4			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	0.55		
Fluoranthene	S4UL	280	4.3			<0.10	0.45	0.29	0.6	<0.10	0.22	<0.10	0.44	0.57	1.4		
Fluorene	S4UL	170	0.22			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.10		
Indeno(1,2,3-cd)pyrene	S4UL	27	2.5			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.25	0.89		
Naphthalene	C4SL	15	1.2			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.10		
Phenanthrene	S4UL	95	2.5			<0.10	0.15	0.1	0.34	<0.10	0.12	<0.10	0.46	0.26	0.4		
Phenol	S4UL	120	<LoD			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<2	<0.10		
Pyrene	S4UL	620	3.6			<0.10	0.4	0.27	0.48	<0.10	0.19	<0.10	0.32	0.53	1.3		
Organics - Banded TPH (unspecified)																	
EC >5-EC6 (unspecified)	S4UL	42	<LoD			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0		
EC >6-EC7 (unspecified)	S4UL	70	<LoD			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0		
EC >7-EC8 (unspecified)	S4UL	100	<LoD			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0		
EC >08-EC10 (unspecified)	S4UL	27	<LoD			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0		
EC >10-EC12 (unspecified)	S4UL	74	12			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0		
EC >12-EC16 (unspecified)	S4UL	140	14			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0		
EC >16-EC21 (unspecified)	S4UL	260	420			<1.0	<1.0	<1.0	<1.0	<1.0	420	<1.0	<1.0	5	<1.0		
EC >21-EC35 (unspecified)	S4UL	1100	4200			<1.0	<1.0	<1.0	<1.0	<1.0	4200	<1.0	<1.0	27	<1.0		

Chronic human health risk (soils)

Scenario																	
End user				Proposed site user													
Receptor				Residential with homegrown produce													
SOM				1.00%													
GAC Preference				C4SLs over S4ULs													
Unspecified TPH GAC				Worst-case aliphatic/aromatic													
Contaminant	Guideline source	Guideline value (mg/kg)	Max value (mg/kg)	Location		VTP24	VTP26	VTP28	VTP28	VTP29	VTP31	VTP34	VTP36	VTP50	VTP53		
				Depth (m)		0.50	0.10	0.10	0.50	0.30	0.50	0.30	0.30	0.30	0.30	0.30	
				Date		09/10/24	09/10/24	09/10/24	09/10/24	05/12/24	09/10/24	05/12/24	05/12/24	05/12/24	05/12/24	05/12/24	
Inorganics - Metals																	
Arsenic	C4SL	37	22			7.9	17	16	9.3	6.9	10	8.6	5.7	6.7	7.2		
Beryllium	S4UL	1.7	1.3			0.6	0.9	1.2	1.1	< 0.5	0.8	0.6	< 0.5	< 0.5	0.5		
Boron	S4UL	290	6.6			0.56	< 0.40	0.41	0.5	1	0.79	1	1	0.91	0.95		
Cadmium	C4SL	22	0.59			< 0.10	0.15	0.49	0.19	0.59	0.2	0.24	0.18	0.17	0.23		
Chromium (III)	S4UL	910	47			23	26	27	29	20	25	18	13	15	17		
Chromium (VI)	C4SL	21	<LoD			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Copper	S4UL	2400	160			19	34	32	18	79	25	19	14	15	17		
Cyanide - Free	ATK	34	<LoD			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Lead	C4SL	200	300			66	56	53	23	46	34	45	34	35	52		
Mercury	S4UL	40	0.54			< 0.05	0.11	0.12	0.05	0.06	0.06	0.07	0.05	0.06	0.07		
Nickel	S4UL	130	35			13	18	17	25	20	18	14	10	11	14		
Selenium	S4UL	250	1.4			0.39	0.6	1	0.95	0.36	0.78	0.43	< 0.25	0.25	0.33		
Vanadium	S4UL	410	73			27	35	32	41	23	30	27	18	21	23		
Zinc	S4UL	3700	440			45	96	91	59	140	67	64	59	53	61		
Inorganics - Asbestos																	
Asbestos Type		N/A				-	-	-	-	-	-	-	-	-	-		
Asbestos Screen		N/A				No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		
Inorganics - Soil Parameters																	
Organic matter		N/A				0.57	1.2	1.3	< 0.40	1.3	0.76	2.9	2.6	2.8	2.4		
Organics - PAH & Phenol																	
Acenaphthene	S4UL	210	0.14			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Acenaphthylene	S4UL	170	0.35			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Anthracene	S4UL	2400	0.61			< 0.10	< 0.10	< 0.10	< 0.10	0.33	0.37	< 0.10	< 0.10	0.31	0.46		
Benzo(a)anthracene	S4UL	7.2	2.9			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.9	< 0.10	< 0.10	1.4	2.9	
Benzo(a)pyrene	C4SL	5	2.8			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.7	< 0.10	< 0.10	2	2.8	
Benzo(b)fluoranthene	S4UL	2.6	3			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2	< 0.10	< 0.10	1.5	3	
Benzo(ghi)perylene	S4UL	320	2.7			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.6	< 0.10	< 0.10	0.7	2.7	
Benzo(k)fluoranthene	S4UL	77	2.6			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.6	< 0.10	< 0.10	0.55	2.6	
Chrysene	S4UL	15	3.1			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.9	< 0.10	< 0.10	0.96	3.1	
Dibenz(a,h)anthracene	S4UL	0.24	2.4			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.3	< 0.10	< 0.10	< 0.10	2.4	
Fluoranthene	S4UL	280	4.3			< 0.10	0.24	0.28	0.2	0.72	2	0.45	0.41	1.2	2.3		
Fluorene	S4UL	170	0.22			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Indeno(1,2,3-cd)pyrene	S4UL	27	2.5			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.6	< 0.10	< 0.10	0.52	2.5	
Naphthalene	C4SL	15	1.2			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Phenanthrene	S4UL	95	2.5			< 0.10	< 0.10	0.12	< 0.10	< 0.10	< 0.10	0.46	< 0.10	< 0.10	0.7	0.58	
Phenol	S4UL	120	<LoD			< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Pyrene	S4UL	620	3.6			< 0.10	0.25	0.27	0.21	0.67	2	0.36	0.44	1.3	2.2		
Organics - Banded TPH (unspecified)																	
EC >5-EC6 (unspecified)	S4UL	42	<LoD			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
EC >6-EC7 (unspecified)	S4UL	70	<LoD			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
EC >7-EC8 (unspecified)	S4UL	100	<LoD			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
EC >08-EC10 (unspecified)	S4UL	27	<LoD			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
EC >10-EC12 (unspecified)	S4UL	74	12			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
EC >12-EC16 (unspecified)	S4UL	140	14			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.7	
EC >16-EC21 (unspecified)	S4UL	260	420			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.8	3.1	< 1.0	7.2		
EC >21-EC35 (unspecified)	S4UL	1100	4200			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3	2.7	< 1.0	21		

Chronic human health risk (soils)

Scenario															
End user		Proposed site user													
Receptor		Residential with homegrown produce													
SOM		1.00%													
GAC Preference		C4SLs over S4ULs													
Unspecified TPH GAC		Worst-case aliphatic/aromatic													
Contaminant	Guideline source	Guideline value (mg/kg)	Max value (mg/kg)	Location		VTP53	VTP54	VTP58	VTP62	VTP63	VTP65				
				Depth (m)		0.50	0.10	0.30	0.15	0.15	0.10				
				Date		05/12/24	04/02/25	04/02/25	04/02/25	30/04/25	30/04/25				
Inorganics - Metals															
Arsenic	C4SL	37	22			5.3	11	9.3	11	15	10				
Beryllium	S4UL	1.7	1.3			< 0.5	0.8	0.8	1.3	0.7	0.6				
Boron	S4UL	290	6.6			1.4	0.76	0.74	0.73	< 1	< 1				
Cadmium	C4SL	22	0.59			0.14	0.13	0.19	0.14	0.4	0.3				
Chromium (III)	S4UL	910	47			11	23	26	34						
Chromium (VI)	C4SL	21	<LoD			< 0.50	< 0.50	< 0.50	< 0.50	< 2	< 2				
Copper	S4UL	2400	160			43	22	20	19	33	34				
Cyanide - Free	ATK	34	<LoD			< 0.50	< 0.50	< 0.50	< 0.50	< 1	< 1				
Lead	C4SL	200	300			32	48	39	27	53	50				
Mercury	S4UL	40	0.54			< 0.05	0.19	0.06	0.05	< 1	< 1				
Nickel	S4UL	130	35			8.6	17	19	24	14	13				
Selenium	S4UL	250	1.4			< 0.25	0.45	0.54	0.72	< 2	< 2				
Vanadium	S4UL	410	73			16	29	35	47	29	26				
Zinc	S4UL	3700	440			60	68	70	76	86	72				
Inorganics - Asbestos															
Asbestos Type		N/A													
Asbestos Screen		N/A													
Inorganics - Soil Parameters						No Asbestos Detected		No Asbestos Detected		No Asbestos Detected					
Organic matter		N/A													
Organics - PAH & Phenol						2.9	1.4	0.84	1.1	4.2	4.9				
Acenaphthene	S4UL	210	0.14	< 0.10	< 0.10	< 0.10	< 0.10	< 0.1	< 0.1						
Acenaphthylene	S4UL	170	0.35	< 0.10	< 0.10	< 0.10	< 0.10	< 0.1	< 0.1						
Anthracene	S4UL	2400	0.61	< 0.10	< 0.10	< 0.10	< 0.10	0.13	< 0.1						
Benzo(a)anthracene	S4UL	7.2	2.9	< 0.10	< 0.10	< 0.10	< 0.10	0.6	0.31						
Benzo(a)pyrene	C4SL	5	2.8	< 0.10	< 0.10	< 0.10	< 0.10	0.64	0.4						
Benzo(b)fluoranthene	S4UL	2.6	3	< 0.10	< 0.10	< 0.10	< 0.10	0.75	0.4						
Benzo(ghi)perylene	S4UL	320	2.7	< 0.10	< 0.10	< 0.10	< 0.10	0.39	0.25						
Benzo(k)fluoranthene	S4UL	77	2.6	< 0.10	< 0.10	< 0.10	< 0.10	0.29	0.18						
Chrysene	S4UL	15	3.1	< 0.10	< 0.10	< 0.10	< 0.10	0.61	0.37						
Dibenz(a,h)anthracene	S4UL	0.24	2.4	< 0.10	< 0.10	< 0.10	< 0.10	< 0.1	< 0.1						
Fluoranthene	S4UL	280	4.3	0.51	0.23	0.49	0.19	1.34	0.66						
Fluorene	S4UL	170	0.22	< 0.10	< 0.10	< 0.10	< 0.10	< 0.1	< 0.1						
Indeno(1,2,3-cd)pyrene	S4UL	27	2.5	< 0.10	< 0.10	< 0.10	< 0.10	0.44	0.25						
Naphthalene	C4SL	15	1.2	< 0.10	< 0.10	< 0.10	< 0.10	< 0.1	< 0.1						
Phenanthrene	S4UL	95	2.5	< 0.10	< 0.10	0.24	< 0.10	0.45	0.27						
Phenol	S4UL	120	<LoD	< 0.10	< 0.10	< 0.10	< 0.10	< 2	< 2						
Pyrene	S4UL	620	3.6	0.43	0.21	0.41	0.17	1.32	0.59						
Organics - Banded TPH (unspecified)															
EC >5-EC6 (unspecified)	S4UL	42	<LoD	< 1.0	< 1.0	< 1.0	< 1.0								
EC >6-EC7 (unspecified)	S4UL	70	<LoD	< 1.0	< 1.0	< 1.0	< 1.0								
EC >7-EC8 (unspecified)	S4UL	100	<LoD	< 1.0	< 1.0	< 1.0	< 1.0								
EC >08-EC10 (unspecified)	S4UL	27	<LoD	< 1.0	< 1.0	< 1.0	< 1.0	< 1	< 1						
EC >10-EC12 (unspecified)	S4UL	74	12	< 1.0	< 1.0	< 1.0	< 1.0	< 1	< 1						
EC >12-EC16 (unspecified)	S4UL	140	14	< 1.0	< 1.0	< 1.0	< 1.0	4	< 1						
EC >16-EC21 (unspecified)	S4UL	260	420	2.8	< 1.0	8.2	< 1.0	14	3						
EC >21-EC35 (unspecified)	S4UL	1100	4200	3.3	< 1.0	13	< 1.0	46	18						

Appendix G Gas Protection Measures Verification

INDEPENDENT INSPECTION, TESTING & VALIDATION, CERTIFICATE OF CONFORMANCE

DATE: 15th November 2024

PROJECT NAME: Barrington Road, Durrington

CONTRACT NO: C908 - Plot No.124, Visqueen Radon Membrane - Full Line Out

INSPECTION, VALIDATION & INTEGRITY TESTING DETAILS:

MTS Ltd attended site under instruction to inspect, test and validate the installed Visqueen R400 membrane which had been installed on a full line out basis. We confirm all main membrane panel seams had been welded using the hand held hot air welding method and corners, door reveals, service pipe and ducts and internal wall ends had all be sealed using the Visqueen Pro Detail Strip. Our verifier performed seam pick probe testing to the welded and taped seams in line with the ASTM D4437-2018 test method included within the CIRIA C735 best practice document. We are pleased to advise there were no defects to report therefore the gas membrane was marked up as a pass in full and photographs were taken for final report inclusion. Whilst we were on site we checked the other plots at an earlier stage of construction and took measurements of the under floor void depth which proved to be a minimum of 300mm deep and we also noted cross ventilation holes in internal obstructive walls which proved acceptable and in accordance with the requirements of the BS 8485:2015+A1:2019 best practice document. Our surveyor also performed a detailed survey of the installed periscopic air brick vent sets and marked them on a layout plan.

MembraneTestingSolutions Ltd hereby confirm that the elements of the project detailed above have been inspected and validated by a suitably qualified independent consultant in accordance with industry requirements, with the test result noted below:

CONCLUSION (PASS/FAIL)

PASS IN FULL

Where the conclusion above indicates a Pass, the construction activities may proceed subject to suitable protection measures of the membrane being applied in accordance with the manufacturers recommendations.

Signed for on behalf of MembraneTestingSolutions Ltd



Name:

BARRIE ACKROYD

Dated:

15.11.2024

Signed for on behalf of The Client:

Name:

MARTIN STEFANOV

Dated:

15.11.2024

Membrane Testing Solutions Limited • The Studio, Parsonage House, Parsonage Street, Halstead, Essex CO9 2JR

Telephone: 0844 557 3786 • email: sales@mtsltd.net • www.mtsltd.net

Registered Office: 1, Second Avenue, Halstead, Essex, CO9 2SU • Company Registration Number: 8871015