

Our ref: D41012/V1

6th October 2022

Ashwood Homes
Gateway Business Park
1 Goodison Road
Spalding
PE12 6FY

For the attention of Mr A. Jagger

Dear Adam

Re: Phase 2 Balmoral Way, Holbeach – Former Tanks Hotspot Remediation Validation Report

Following the recent completion of the validation soil sampling works at the above site, we are now pleased to report as follows.

INTRODUCTION

GeoDyne Limited has been appointed by the Client, Ashwood Homes, to prepare a validation report following the removal of hydrocarbon impacted soils associated with the former above ground tanks hotspot, as recommended within our Remediation Strategy & Verification Plan for the site.

The Site

The site comprises an irregular shaped parcel of land located to the east of Balmoral Way and Chaffinch Way between Battlefields Lane South and Foxes Low Road in the north-east of Holbeach, Lincolnshire. The site covers an area of approximately 3.2 hectares.

Project Understanding

We understand that it is proposed to develop the site with low-rise residential properties incorporating private gardens, public open space and associated infrastructure, as shown on the plan containing the proposed layout included within Appendix I. The site is proposed to comprise Phase 2 of Ashwood Homes' development site where Phase 1 of the development has recently been completed to the south-west of the study site.

This understanding has formed the basis of our report. Where our understanding is incorrect, it may be necessary to review our assessment to ensure that it continues to apply.

Previous Works

The following reports have previously been prepared for the site:

- GeoDyne Limited report '*Phase 2 Balmoral Way, Holbeach – Combined Phase I Desk Study and Phase II Exploratory Investigation*', produced for Ashwood Homes, reference D41012, dated 28th April 2021.
- GeoDyne Limited letter report '*Phase 2 Balmoral Way, Holbeach – Further Soil Sampling & Hotspot Delineation Works*', produced for Ashwood Homes, reference D41012, dated 22nd April 2022.
- GeoDyne Limited report '*Remediation Strategy & Verification Plan*', produced for Ashwood Homes, reference D41012 Revision A, dated 13th July 2022.

It is recommended that the foregoing reports are read in conjunction with this report, with the conclusions and recommendations contained therein remaining applicable for other elements of the required works.

The works detailed herein relate specifically to the verification works associated with the remediation of the hydrocarbon impacted soils previously encountered in the central southern / south-eastern portion of the site in the vicinity of trial pit TP20 and window sample borehole WS3 which were previously situated adjacent to the former above ground fuel storage tanks, as identified within the reports listed above.

REMEDIATION WORKS

Summary of the Requirements for Remediation

Taking into account the findings of the contamination assessment works undertaken for the site (as detailed within the previous reports listed above), together with the conceptual site model (as detailed within the Combined Phase I Desk Study & Phase II Exploratory Investigation report and the Remediation Strategy & Verification Plan), the following remedial measures were recommended at the site:

- a) Inspections of the ground and validation sampling following remediation of the hydrocarbon impacted soils in the vicinity of the former above ground storage tanks (in the area of TP20 and WS3). Such remedial works may involve excavation and off-site removal of contaminated soils or alternatively treatment of the hydrocarbon impacted soils / waters; and potentially the provision of a remedial capping layer (comprising subsoil and topsoil) to proposed gardens / soft landscaping in the localised affected area.
- b) Provision of a remedial capping layer (comprising subsoil and topsoil) to proposed gardens / soft landscaping in areas where Made Ground soils are present within Zones 1 and 2 at the site (see the Remediation Zoning Plan [Figure No. D41012/R3 Revision A], presented in the Remediation Strategy & Verification Plan document).

For plots situated in Zone 3 shown on the Remediation Zoning Plan [Figure No. D41012/R3 Revision A], the provision of a remedial capping layer is not considered to be necessary within gardens and soft landscaped areas. In Zone 3, provision of chemically suitable topsoil (and possibly subsoil) is proposed to be re-used (or imported if required) and placed within proposed gardens and soft landscaped areas as a growing medium.

- c) Provision of gas protection measures to Plots 1 to 3 only situated in the vicinity of the hydrocarbon impacted soils.

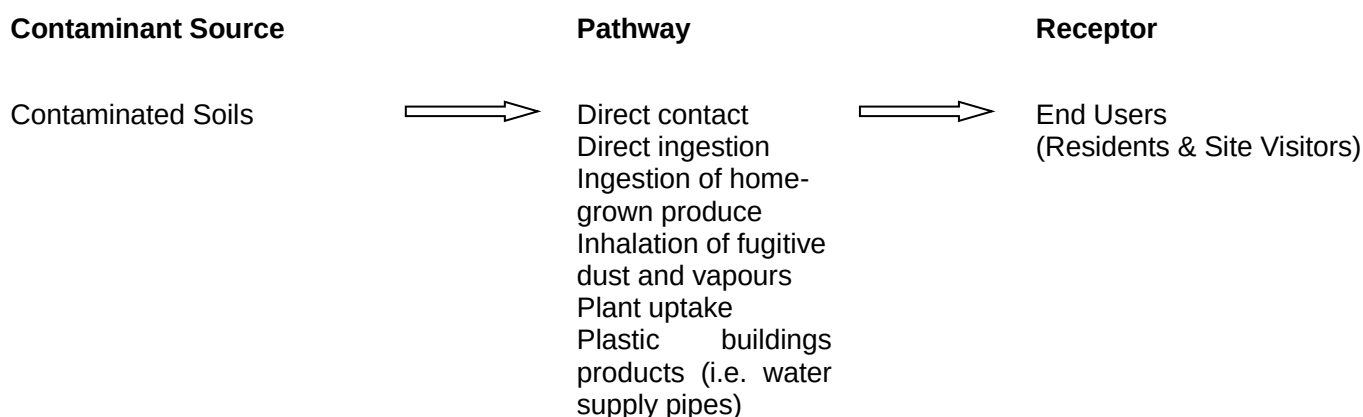
This report only relates to point a) listed above. Separate validation reports will be prepared in due course following completion of the installation of gas protection measures within Plots 1 to 3 and the placement of capping soils within gardens in Zones 1 and 2 at an appropriate stage during the development programme. Further comments in relation to a remedial capping layer in Plots 1 to 3 is provided in the Conclusions section of this letter report.

Remediation Objectives

In accordance with the Remediation Strategy, the following remediation objectives are required in order to break the identified potential significant contaminant linkages.

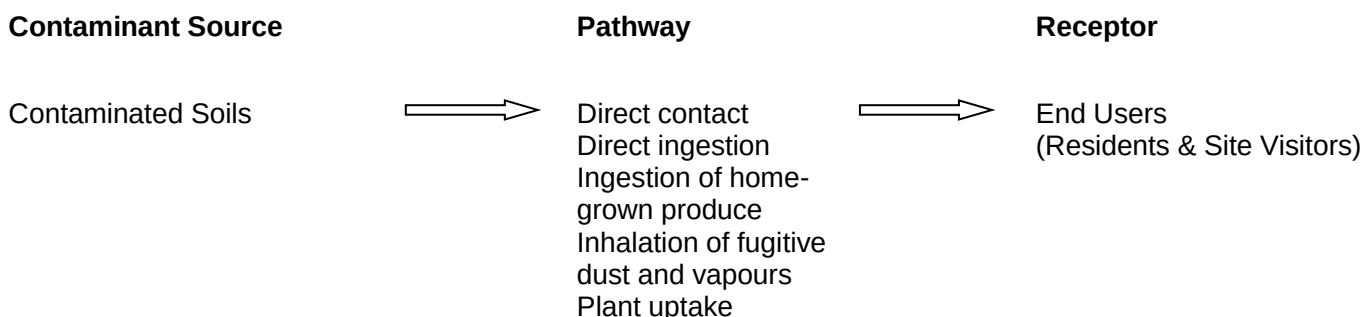
Hydrocarbon Impacted Soil

The objective of the remediation of the hydrocarbon contaminated soil from within the vicinity of the former above ground tanks (item (a)) will break the following plausible pollutant linkages:



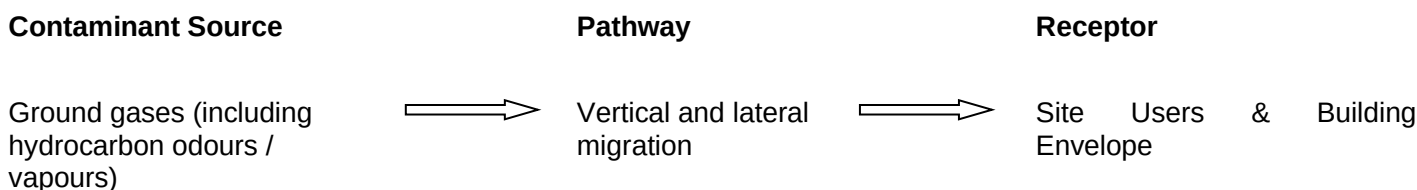
Remedial Capping Layer

The remediation objective of the proposed encapsulation of the Made Ground in gardens and soft landscaped areas in Zones 1 and 2 (item (b)) is to break the following plausible pollutant linkage:



Gas Protection Measures

The remediation objective of the proposed gas protection measures (item (c)) to be installed as a precautionary measure within Plots 1 to 3 is to break the following plausible pollutant linkage:



Verification Requirements

Remediation works were required to comprise the excavation and off-site removal of soils exhibiting significant / gross visual / olfactory TPH impaction from beneath and surrounding the location of the former tanks including around the areas of TP20 and WS3. The positions of each of the sampling points from the previous delineation works were set out to determine the location for remediation purposes.

Validation sampling and analysis were required to be undertaken in accordance with the following procedure:

- Following removal of hydrocarbon contaminated soils, a minimum of one sample will be obtained from the base and from each side of the excavation (resulting in a minimum of 5 No. additional validation samples). The results of the previous laboratory testing of 8 No. samples obtained during the delineation of the surveyed edge of the area containing hydrocarbon impacted soils (including from sample references TPH2 and TPH4 to TPH10 inclusive which contained very low TPH concentrations) are also proposed to be utilised as part of the validation exercise, in conjunction with the additional 5 No. validation samples.

- The samples will be required to be commissioned for speciated total petroleum hydrocarbon analysis (i.e. TPH by CWG method in the same manner as during the previous site investigation works).
- The individual sample concentrations will be compared to the generic assessment criteria (GAC) provided in Table 3 of the Remediation Strategy & Verification Plan.
- If the results of the validation analysis indicate that the concentrations of the determinands are less than the respective GAC (or CUGs), the lateral or vertical extent of the excavation (as appropriate) shall be deemed acceptable. However, where any exceedances of the GAC are recorded during the validation testing, then further removal of hydrocarbon impacted soils would be necessary followed by subsequent validation sampling and analysis until successful removal of the hydrocarbon impacted soils is achieved (or carry out further detailed investigation / risk assessment works including the derivation of specific CUGs, if feasible).
- Photographic records of the source removal and validation works will be obtained by GeoDyne for inclusion within the validation report.

With regard to the assessment criteria to be used to examine the results of the laboratory validation testing (as set out in Table 3 of the Remediation Strategy & Verification Plan document), it should be noted that Ashwood Homes will be installing protected potable water supply pipes (i.e. Protecta-line pipework) as part of the proposed development. In view of this, the laboratory validation results were no longer required to meet the Anglian Water threshold values contained within Table 3. The validation results were therefore only required to be examined with reference to the Tier 1 human health GAC set out within Table 3.

Remediation Undertaken

Removal of Contaminated Soils

Hydrocarbon impacted soils were excavated from the area around the former tanks, the locations of the former trial pit TP20 and WS3 and also delineation sampling points TPH1 and TPH3 where impacted soils had previously been identified. The excavation was extended in each direction until the surrounding soils exhibited a lower degree of hydrocarbon impaction. This included excavating soils up to the edge / line of the footpath associated with the new road to the south-east which was under construction at the time of the remediation works.

Photographs of the excavation during and following removal works are shown on Plate No. 1 and 2 contained within Appendix II.

Verification Undertaken

Verification works were undertaken in accordance with Section 4.3 of the Remediation Strategy & Verification Plan document. Validation samples were collected from the sides and base of the resultant excavation to assess the suitability for retention of the remaining hydrocarbon concentrations in the surrounding soils.

As part of the verification works, an additional 3 No. validation samples were collected from the sides and base of the excavation than originally set out in the Remediation Strategy & Verification Plan document (i.e. a total of 8 No. samples rather than 5 No. samples) in order to enable further assessment of the soils along the edge of the excavation with the new road.

The extent of the excavation was surveyed on site (using a Trimble GPS) and the locations of the validation samples are shown on the plans included in Appendix III (Figure No. D41012/V01 and D41012/V02) which also contains a table showing details of the depths of the validation samples, soil type and observations and PID headspace readings.

LABORATORY SOIL VALIDATION TEST RESULTS

In total, 8 No. validation soil samples were analysed for speciated TPH by CWG method, including BTEX compounds and MTBE (i.e. samples referenced 'VAL1 to VAL3, VAL5, VAL6, VAL8, VAL9 and VAL12'). Copies of the laboratory test validation certificates are included in Appendix IV.

Section 4.3 of the Remediation Strategy & Verification Plan document provides details of the Tier 1 human health GAC against which the laboratory soil validation samples are to be compared.

The assessment of the laboratory results against the Tier 1 GAC is provided in Table 1 below.

TABLE 1 GAC ASSESSMENT OF CONTAMINATED SOIL REMOVAL WORKS – FORMER ABOVE GROUND FUEL STORAGE TANKS HOTSPOT EXCAVATION			
Determinand	Soil Assessment (Total Concentrations)		
	Sample Concentration Range (mg/kg)	Tier 1 GAC (mg/kg)	Tier 1 GAC Exceeded (Yes/No) & No. of Exceedances (n/12)
Aliphatic C5 – C6	<0.01 or <0.03 (All samples)	42 S4UL	No
Aliphatic C6 – C8	<0.01 (All samples)	100 S4UL	No
Aliphatic C8 – C10	<1 – 10	27 S4UL	No
Aliphatic C10 – C12	<1 – 47	130 S4UL	No
Aliphatic C12 – C16	<1 – 148	1100 S4UL	No
Aliphatic C16 – C35	<2 – 172	65000 S4UL	No
Aromatic C5 – C7	<0.01 (All samples)	70 S4UL	No
Aromatic C7 – C8	<0.01 (All samples)	130 S4UL	No
Aromatic C8 – C10	<1 – 8	34 S4UL	No
Aromatic C10 – C12	<1 – 15	74 S4UL	No
Aromatic C12 – C16	<1 – 53	140 S4UL	No
Aromatic C16 – C21	<1 – 19	260 S4UL	No
Aromatic C21 – C35	<1 – 5	1100 S4UL	No
Benzene	<0.01 (All samples)	0.087 S4UL	No
Toluene	<0.01 (All samples)	130 S4UL	No
Ethyl Benzene	<0.01 – 0.03	47 S4UL	No
m/p Xylene	<0.01 – 0.04	59 / 56 S4UL	No
o Xylene	<0.01 – 0.04	60 S4UL	No
KEY S4UL – CIEH/LQM Sutable 4 Use Levels (2015)) for a residential with consumption of homegrown produce / with plant uptake end use scenario. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3026. All rights reserved. Assessment criteria values derived from S4UL values assume 1% SOM in the first instance (where appropriate, S4UL values for 2.5% or 6% SOM may be considered for the assessment of soils).			

As indicated in Table 1, all of the validation samples analysed following completion of the excavation works contained TPH carbon fractions and BTEX compounds that were below their respective Tier 1 human GAC for the proposed residential with plant uptake end use at the site.

The remedial works in the area of the hydrocarbon hotspot associated with the former above ground fuel tanks (around former TP20 and WS3) are therefore considered to have been successfully completed.

As Protecta-line water supply pipe work is to be installed (including beneath the road) as part of the proposed development, it was considered not necessary to remove any further soils which exhibited only slight to faint hydrocarbon odours from beneath the road, as these soils (represented by validation points VAL1, VAL2, VAL3 and VAL9) containing concentrations which were below the Tier 1 human health GAC.

Following removal of the tanks and the hydrocarbon impacted soils, the resulting void was to be filled with site won soils generated during the site preparation works carried out on the wider development site.

WASTE DISPOSAL

We have been informed that the hydrocarbon impacted soils removed from site during the remediation works were disposed at the following waste management facility:

- Mepal Bioremediation Facility, Witcham Meadlands Landfill, Block Fen Drove, Mepal, Chatteris, CB6 2AY

CONCLUSIONS & RECOMMENDATIONS

Based on the verification inspections and validation testing, it is concluded that the soil remediation works associated with the hydrocarbon impacted soils in the area of the former above ground fuel tanks hotspot at the site have been successfully completed in accordance with the Remediation Strategy & Verification Plan document for the site.

The remediation works have been carried out to facilitate the proposed development of the site with residential properties. As required within the Remediation Strategy & Verification Plan, the remaining remediation works to be carried out at the site include the installation of gas protection measures within Plots 1 to 3. It is considered that the proposed incorporation of gas protection measures should adequately mitigate against the potential ingress of any residual nuisance odours from the retained validated soils beneath / surrounding the remediated area into properties constructed in the vicinity of these soils (where present).

As part of the development works, it is proposed to raise site levels to varying degrees across the site for flood risk and drainage purposes (as discussed within the Remediation Strategy & Verification Plan document). It should be noted that the site levels in the area of Plots 1 to 3 (i.e. the plots within the area where hydrocarbon impacted soils have been removed) are proposed to be raised by approximately 0.50m to 0.90m above existing ground levels. In view of this, together with the removal of hydrocarbon impacted soils as part of the remediation works, it is considered that provision of a formal remedial capping layer will not be required within gardens and soft landscaped areas of Plots 1 to 3, only provision of a suitable thickness of chemically suitable topsoil as a growing medium.

Statutory Consultation

In accordance with normal planning requirements, we would recommend that a copy of our report is issued by the Client to the Local Authority (including the Environmental Protection Officer (Sue Armour) and the NHBC or other Warranty Provider (if necessary) for review and comment and approval prior to irrevocable actions within the proposed development area of the site.

COMMENTS

The conclusions and recommendations made in this report are limited to those that can be made based on the findings of the investigation. Where comments are made based on information obtained from third parties, GeoDyne Limited assumes that all third party information is true and correct. No independent action has been undertaken to validate the findings of third parties, unless specifically stated. This report has been prepared in accordance with our understanding of current good practice. However, changes to good practice, guidance or legislation may necessitate revision of this report after the date of issue.

We would note that the scope of laboratory testing and our assessment of the chemical soil test results have been primarily focussed on potential risks to human health and Controlled Waters.

GeoDyne Limited has prepared this report for the sole use and reliance of the Client, Ashwood Homes, in accordance with our Standard Conditions and Limitations (included in Appendix V). This report may not be used or relied upon by any unauthorised third party without the explicit written agreement of GeoDyne Limited. Reliance may not be placed on our report until all invoices associated with the project have been paid.

We trust the foregoing is suitable for your current requirements, however, please contact us should you have any comments or queries.

Yours sincerely
For and on behalf of GeoDyne Limited

A handwritten signature in blue ink, appearing to read 'D Brunt'.

Daniel Brunt
Associate

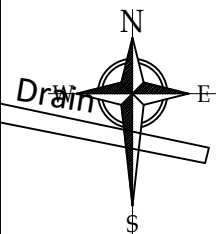
Appendices

Appendix I	Proposed Site Layout Plan
Appendix II	Plates
Appendix III	Plans Showing Tanks Hotspot Excavation and Validation Sampling Point Locations
Appendix IV	Laboratory Soil Test Results
Appendix V	Conditions & Limitations

cc Mr G Baxter – Ashwood Homes

APPENDIX I

Proposed Site Layout Plan



House Type Schedule - Rented				
House Type	Sqft	Storeys	Beds	No of
* A538	538	2	1b 2p	2
* A732	732	2	2b 4p	3
* A902	902	2	3b 6p	1
Total				6

House Type Schedule - Shared Ownership				
House Type	Sqft	Storeys	Beds	No of
* A732	732	2	2b 4p	2
* A902	902	2	3b 6p	1
Total				3

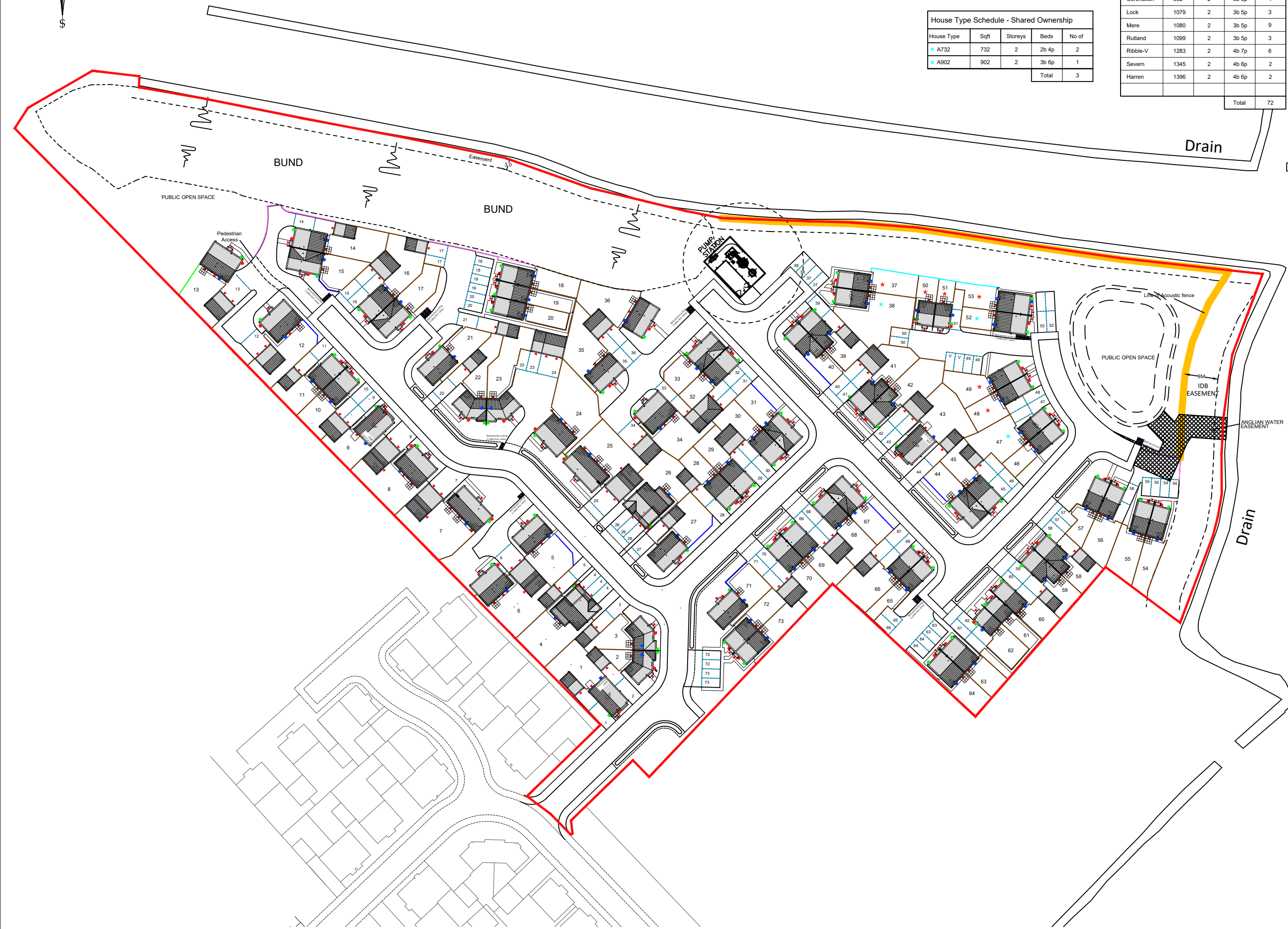
House Type Schedule - Open Market				
House Type	Sqft	Storeys	Beds	No of
A538	538	2	1b 2p	2
Dee	732	2	2b 4p	13
Aire	902	2	3b 5p	14
Avon	910	2	3b 5p	6
Coronation	932	2	3b 5p	4
Lock	1079	2	3b 5p	3
Mere	1080	2	3b 5p	9
Rutland	1099	2	3b 5p	3
Ribble-V	1283	2	4b 7p	6
Severn	1345	2	4b 6p	2
Harren	1396	2	4b 6p	2
Total				72

Plot Schedule	
Plot No	House Type
1	RUTLAND
2	CORONATION
3	CORONATION
4	SEVERN
5	LOCK
6	RIBBLE-V
7	HARREN
8	RIBBLE-V
9	RUTLAND
10	AIRE
11	AIRE
12	RIBBLE-V
13	RIBBLE-V
14	AIRE
15	MERE
16	AIRE
17	MERE
18	DEE
19	DEE
20	DEE
21	MERE
22	CORONATION
23	CORONATION
24	RIBBLE-V
25	HARREN
26	SEVERN
27	MERE
28	AIRE
29	AIRE
30	AIRE
31	MERE
32	AIRE
33	MERE
34	RIBBLE-V
35	LOCK
36	LOCK
37	* A732

Plot Schedule	
Plot No	House Type
38	* A732(DEE)
39	AVON
40	AVON
41	AVON
42	AVON
43	RUTLAND
44	MERE
45	AIRE
46	DEE
47	* A732(DEE)
48	* A732
49	* A732
50	* A538
51	* A538
52	* A902(AIRE)
53	* A902
54	DEE
55	DEE
56	DEE
57	DEE
58	AVON
59	AVON
60	DEE
61	A538
62	A538
63	AIRE
64	AIRE
65	DEE
66	DEE
67	MERE
68	AIRE
69	AIRE
70	AIRE
71	MERE
72	DEE
73	DEE

* RENTED
* SHARED OWNERSHIP

* RENTED
* SHARED OWNERSHIP



REV	DATE	DESCRIPTION
N	14.02.2022	LOTS 74-81 REMOVED, RED LINE REDUCED, WENE RENAMED AS RUTLAND
M	22.11.2021	LOTS 48 TO 53 REPLANNED, BIN COLLECTION POINT SIZES INCREASED
L	08.09.2021	LOTS 37 & 38 CHANGED TO 2 BEDS, LINK ROAD REMOVED
K	31.08.2021	AFFORDABLE MIX UPDATED
J	13.08.2021	BIN COLLECTION POINTS REVISED PLOT 5 & 22-23, FUTURE ACCESS TO ADJACENT DEVELOPMENT INDICATED
H	19.07.2021	UPDATED FOLLOWING PLANNING COMMENTS
G	24.06.2021	SCHEDULE UPDATED
F	22.06.2021	AFFORDABLE MIX UPDATED
E	18.06.2021	1 BED AFFORDABLE HOUSE SIZE INCREASED
D	04.06.2021	PLOT 81 CHANGED TO RICHMOND
C	01.06.2021	PLOT NUMBERS REDUCED TO 81
B	25.05.2021	ADDITIONAL 9 PLOTS ADDED
A	18.05.2021	PLOT 1 GARAGE AMENDED

1 Goodison Road, Lincs Gateway Business Park,
Spalding, Lincs, PE12 6FY T: 01406 490590

PROJECT:
PROPOSED RESIDENTIAL DEVELOPMENT AT
LAND EAST OF CHAFFINCH WAY
HOLBEACH

DRAWING TITLE:
SITE PLAN

SCALE: 1:500 @ A1 DATE: 20.04.2022

DRAWN: AR O

DRAWING No:
75 - SL - 01

APPENDIX II

Plates



Project No.	D41012	Drawn	GH	
Client	Ashwood Homes	Checked	DB	
		Approved	PK	
Project	Phase 2 Balmoral Way Holbeach	Scale	NTS	
		Date Drawn	06/10/2022	
		Rev.		
Title	Excavation during removal of hydrocarbon contaminated soils	Plate No.	1	



Project No.	D41012	Drawn	GH
Client	Ashwood Homes	Checked	DB
		Approved	PK
Project	Phase 2 Balmoral Way Holbeach	Scale	NTS
		Date Drawn	06/10/2022
Title	Excavation following removal of hydrocarbon contaminated soils	Rev.	
		Plate No.	2

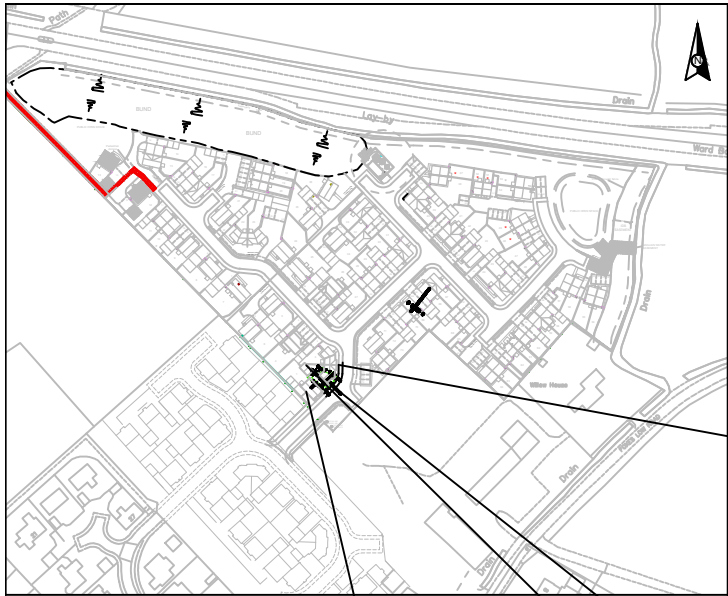


APPENDIX III

**Plan Showing Tanks Hotspot Excavation and Validation Sampling Point Locations
(Figure No. D41012/V01)**

&

**Plan Showing Tanks Hotspot Excavation and Validation Sampling Point Locations with
Proposed Site Layout
(Figure No. D41012/V02)**



Sample Ref.	Depth	Sample Type	PID Reading
VAL1	2.00m - 2.10m	Natural sandy SILT with a grey colouration and a faint / slight hydrocarbon odour	44.6ppm
VAL2	2.10m - 2.20m	Natural sandy SILT with a grey colouration and a faint / slight hydrocarbon odour	21.0ppm
VAL3	2.00m - 2.10m	Natural sandy SILT with a grey colouration and a faint / slight hydrocarbon odour	62.9ppm
VAL4	2.00m - 2.10m	Natural sandy SILT with a faint hydrocarbon odour	34.9ppm
VAL5	2.00m - 2.10m	Natural sandy SILT (No hydrocarbon odours or staining)	3.7ppm
VAL6	2.00m - 2.10m	Natural sandy SILT (No hydrocarbon odours or staining)	0ppm
VAL7	2.00m - 2.10m	Natural sandy SILT (No hydrocarbon odours or staining)	0ppm
VAL8	1.40m - 1.50m	Natural sandy SILT (No hydrocarbon odours or staining)	0ppm
VAL8	2.00m - 2.10m	Natural sandy SILT (No hydrocarbon odours or staining)	0ppm
VAL9	2.20m - 2.30m	Natural sandy SILT with a grey colouration and a faint / slight hydrocarbon odour	16.4ppm
VAL10	2.20m - 2.30m	Natural sandy SILT (No hydrocarbon odours or staining)	0ppm
VAL11	2.10m - 2.20m	Natural sandy SILT (No hydrocarbon odours or staining)	0ppm
VAL12	1.90m - 2.00m	Natural sandy SILT (No hydrocarbon odours or staining)	0ppm

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- Drawing based on Remediation Plan by Ashwood Homes Drawing No. 75 - RMS - 01 dated 19/07/2022. Used, edited and reproduced with permission of the Client.

Project No.	D41012
Client	Ashwood Homes
Project	Phase 2 Balmoral Way Holbeach
Title	Plan Showing Tanks Hotspot Excavation and Validation Sampling Point Locations
Drawn By	SJ
Checked By	DB
Approved By	PK
Scale	NTS
Date Drawn	05/10/2022
Revision	
Figure No.	D41012/V01

KEY

Window Sample Borehole (Advanced February 2021)

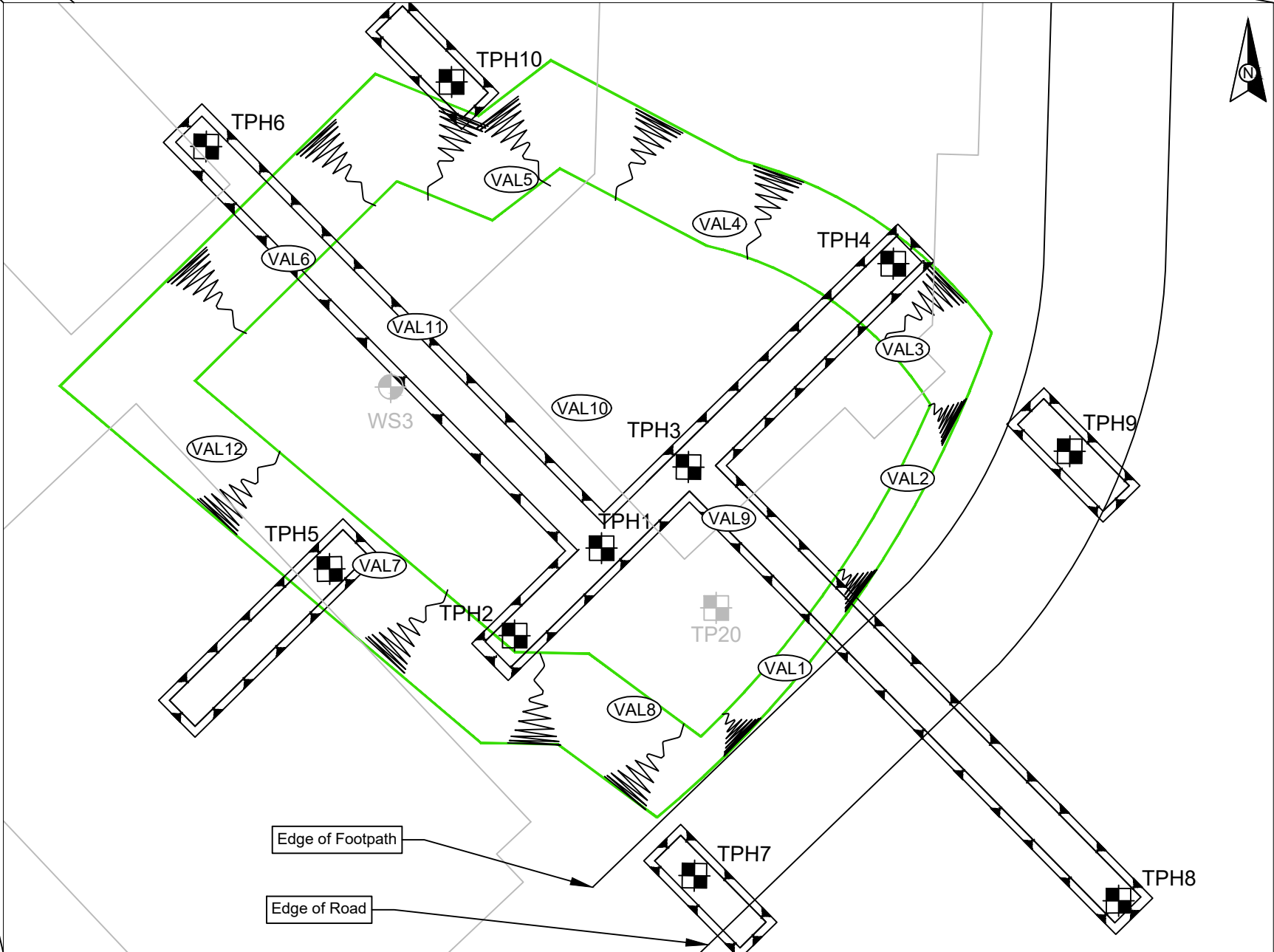
Trial Pit (Advanced February 2021)

Sample Location

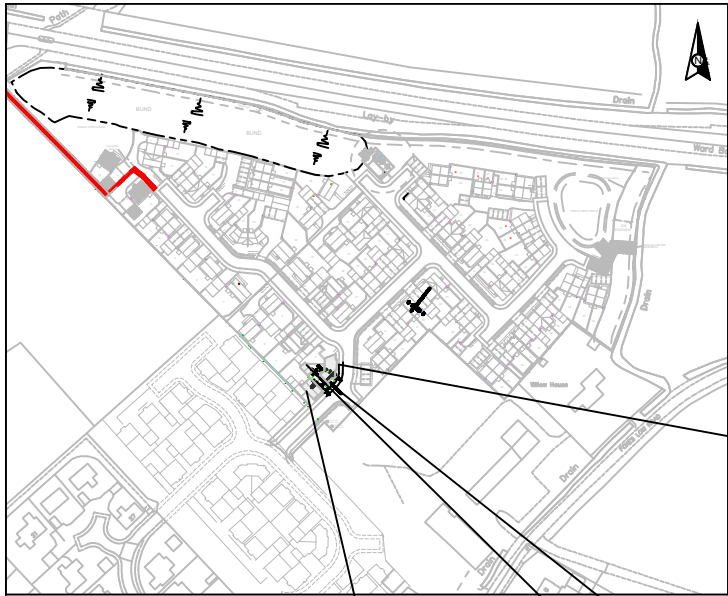
Approximate Extent of Trial Pits and Trenches

Validation Sample Location

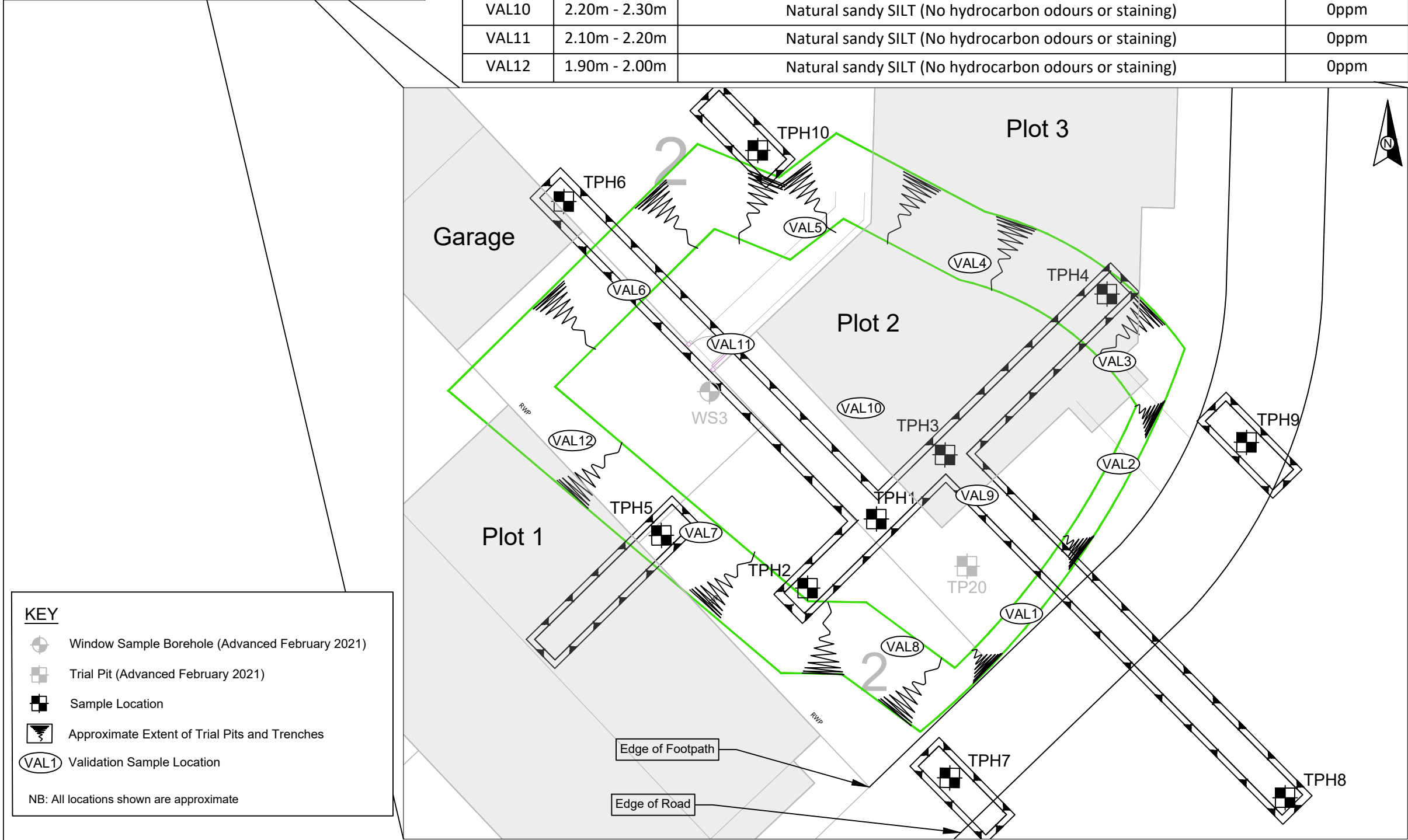
NB: All locations shown are approximate



Nottingham 0115 962 0001
Derby 01332 290 798
info@geodyne.co.uk
www.geodyne.co.uk



Sample Ref.	Depth	Sample Type	PID Reading
VAL1	2.00m - 2.10m	Natural sandy SILT with a grey colouration and a faint / slight hydrocarbon odour	44.6ppm
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VAL7	2.00m - 2.10m	Natural sandy SILT (No hydrocarbon odours or staining)	0ppm
VAL8	1.40m - 1.50m	Natural sandy SILT (No hydrocarbon odours or staining)	0ppm
VAL8	2.00m - 2.10m	Natural sandy SILT (No hydrocarbon odours or staining)	0ppm
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VAL12	1.90m - 2.00m	Natural sandy SILT (No hydrocarbon odours or staining)	0ppm



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Project No.	D41012
Client	Ashwood Homes
Project	Phase 2 Balmoral Way Holbeach
Title	Plan Showing Tanks Hotspot Excavation and Validation Sampling Point Locations with Proposed Site Layout
Drawn By	SJ
Checked By	DB
Approved By	PK
Scale	NTS
Date Drawn	05/10/2022
Revision	
Figure No.	D41012/V02



Nottingham 0115 962 0001
Derby 01332 290 798
info@geodyne.co.uk
www.geodyne.co.uk

APPENDIX IV

Laboratory Soil Test Results

FINAL ANALYTICAL TEST REPORT

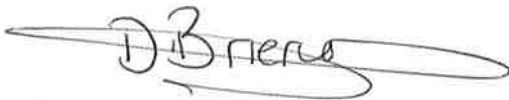
Envirolab Job Number: 22/09491
Issue Number: 1

Date: 05 October, 2022

Client: GeoDyne (Derby)
9 Brunel Parkway
Pride Park
Derby
Derbyshire
UK
DE24 8HR

Project Manager: Gavin Hallam
Project Name: Phase 2 Balmoral Way, Holbeach
Project Ref: D41012
Order No: D41012/GH
Date Samples Received: 29/09/22
Date Instructions Received: 29/09/22
Date Analysis Completed: 05/10/22

Approved by:



Danielle Brierley
Deputy Client Services Supervisor

Envirolab Job Number: 22/09491

Client Project Name: Phase 2 Balmoral Way, Holbeach

Client Project Ref: D41012

Lab Sample ID	22/09491/1	22/09491/2	22/09491/3	22/09491/5	22/09491/6	22/09491/9	22/09491/10	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	VAL1	VAL2	VAL3	VAL5	VAL6	VAL8	VAL9			
Depth to Top	2.00	2.10	2.00	2.00	2.00	2.00	2.20			
Depth To Bottom	2.10	2.20	2.10	2.10	2.10	2.10	2.30			
Date Sampled	26-Sep-22	26-Sep-22	26-Sep-22	26-Sep-22	26-Sep-22	26-Sep-22	26-Sep-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4	4	4	4	4	4	4			
% Stones >10mm _A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	% w/w	0.1	A-T-044

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Lab Sample ID	22/09491/1	22/09491/2	22/09491/3	22/09491/5	22/09491/6	22/09491/9	22/09491/10	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	VAL1	VAL2	VAL3	VAL5	VAL6	VAL8	VAL9			
Depth to Top	2.00	2.10	2.00	2.00	2.00	2.00	2.20			
Depth To Bottom	2.10	2.20	2.10	2.10	2.10	2.10	2.30			
Date Sampled	26-Sep-22	26-Sep-22	26-Sep-22	26-Sep-22	26-Sep-22	26-Sep-22	26-Sep-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4	4	4	4	4	4	4			
TPH CWG with Clean Up										
Ali >C5-C6 _A [#]	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	10	5	<1	<1	<1	<1	3	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	47	15	1	<1	<1	<1	1	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	148	38	5	<1	1	<1	1	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	24	6	1	<1	<1	<1	1	mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	5	1	2	<1	1	<1	3	mg/kg	1	A-T-055s
Total Aliphatics _A	235	65	10	<1	2	<1	9	mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	3	3	<1	<1	<1	<1	8	mg/kg	1	A-T-055s
Aro >C10-C12 _A	11	8	1	<1	<1	<1	15	mg/kg	1	A-T-055s
Aro >C12-C16 _A	53	28	6	<1	<1	<1	26	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	19	9	5	<1	<1	<1	3	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	5	1	2	<1	2	<1	1	mg/kg	1	A-T-055s
Total Aromatics _A	91	48	15	<1	2	<1	52	mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	326	113	25	<1	5	<1	61	mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s

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Client Project Name: Phase 2 Balmoral Way, Holbeach

Client Project Ref: D41012

Lab Sample ID	22/09491/13							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	VAL12									
Depth to Top	1.90									
Depth To Bottom	2.00									
Date Sampled	26-Sep-22									
Sample Type	Soil - ES									
Sample Matrix Code	4									
% Stones >10mm _A	<0.1							% w/w	0.1	A-T-044

Envirolab Job Number: 22/09491

Client Project Name: Phase 2 Balmoral Way, Holbeach

Client Project Ref: D41012

Lab Sample ID	22/09491/13									
Client Sample No										
Client Sample ID	VAL12									
Depth to Top	1.90									
Depth To Bottom	2.00									
Date Sampled	26-Sep-22									
Sample Type	Soil - ES									
Sample Matrix Code	4									
TPH CWG with Clean Up										
Ali >C5-C6 _A [#]	<0.03							mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1							mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	1							mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	2							mg/kg	1	A-T-055s
Total Aliphatics _A	3							mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<1							mg/kg	1	A-T-055s
Aro >C10-C12 _A	<1							mg/kg	1	A-T-055s
Aro >C12-C16 _A	2							mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	1							mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	3							mg/kg	1	A-T-055s
Total Aromatics _A	7							mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	10							mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01							mg/kg	0.01	A-T-022s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Subscript ""^" indicates analysis has dependant options against results. Testing dependant on results appear in the comments area of your sample receipt.

EPH CWG results have humics mathematically subtracted through instrument calculation

TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these

humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

Envirolab Analysis Dates

Lab Sample ID	22/09491/1	22/09491/2	22/09491/3	22/09491/5	22/09491/6	22/09491/9	22/09491/10	22/09491/13
Client Sample No								
Client Sample ID/Depth	VAL1 2.00-2.10m	VAL2 2.10-2.20m	VAL3 2.00-2.10m	VAL5 2.00-2.10m	VAL6 2.00-2.10m	VAL8 2.00-2.10m	VAL9 2.20-2.30m	VAL12 1.90-2.00m
Date Sampled	26/09/22	26/09/22	26/09/22	26/09/22	26/09/22	26/09/22	26/09/22	26/09/22
A-T-022s	03/10/2022	03/10/2022	03/10/2022	03/10/2022	03/10/2022	05/10/2022	03/10/2022	03/10/2022
A-T-044	03/10/2022	03/10/2022	03/10/2022	03/10/2022	03/10/2022	03/10/2022	03/10/2022	03/10/2022
A-T-055s	03/10/2022	03/10/2022	03/10/2022	03/10/2022	03/10/2022	03/10/2022	03/10/2022	03/10/2022
Calc-As Recd	03/10/2022	03/10/2022	03/10/2022	03/10/2022	03/10/2022	05/10/2022	03/10/2022	03/10/2022

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

APPENDIX V

Conditions & Limitations

Conditions & Limitations

Phase I Desk Studies

1. Works undertaken to provide the basis of the Phase I Desk Study report comprise a review of information available from a number of sources/parties (potentially also including the Client) together with a walk over of the site (where applicable and included within the quotation). The opinions given in the Phase I Desk Study are based on the information available from third parties/sources that has been obtained within the available timeframe. GeoDyne Limited assumes all third party information to be true and correct and therefore cannot accept liability for the accuracy of such information supplied.
2. Should additional information become available that may affect the comments and opinions made within the Phase I Desk Study, GeoDyne Limited reserves the right to review such information and make modifications to comments/opinions as appropriate.
3. It should be borne in mind that a Phase I Desk Study collates available information to generate a conceptual model of the site. The actual geotechnical and environmental considerations can only be fully quantified by intrusive investigation works to confirm the accuracy of the conceptual site model.

Phase II Intrusive Investigations

1. Our quotation assumes that access to the site will be arranged by others at no cost to ourselves.
2. We have assumed that free access is available throughout to the entire site and that works can be undertaken during a single mobilisation. Where restricted access is encountered, or where additional unscheduled mobilisations are required, additional costs may be incurred to the client.
3. We have assumed that all available information relating to buried services will be supplied by the Client at no cost to ourselves. No responsibility will be accepted for damage to underground services that have not been brought to our prior attention by the Client.
4. All excavations/boreholes will be backfilled with compacted arisings upon completion, with any excess arisings left proud of ground levels. Excess arisings will not be removed from the site unless specifically requested by the Client. Where we are requested to remove excess arisings, all associated costs will be passed to the Client.
5. We will attempt to leave the site in a clean and tidy state, however, it must be understood that some disturbance of the site is unavoidable during intrusive works.
6. Exploratory holes are positioned approximately on site by GeoDyne Limited. Should the client require precise locations of all exploratory points, additional fees will be incurred. It must be borne in mind that backfilled trial pits can create 'soft spots', therefore, should the Client wish to designate 'no dig' zones, for example under the footprint of proposed structures, these must be brought to our attention prior to commencement of works.
7. Groundwater observations relate to conditions encountered at the time of investigation. It must be understood that groundwater levels may vary as a result of recent climatic conditions or seasonal variation.
8. Trial pits and boreholes examine only a small proportion of the total site area. No liability can be accepted for conditions not revealed in exploratory holes, particularly between positions. All extrapolations of available data are given in good faith.

Payment

1. Payment terms are strictly 28 days from the invoice date.
2. Prior to commencement of works, we require receipt of formal written instruction from the party accepting full financial responsibility for the work. In the absence of such an instruction, we would expect the instructing Consulting Engineers/Architects to accept full financial responsibility for the works.
3. Receipt of instruction to commence work shall be taken as acceptance and compliance of the foregoing conditions.

Liability

1. GeoDyne Limited offer £5,000,000.00 Professional Indemnity Insurance (in aggregate over the year). This shall be the limit of our liability for works undertaken. No individual liability shall be implied to, or accepted by, any employee for works undertaken for and on the behalf of GeoDyne Limited.