



Abbeydale

Building Environment Consultants

GROUND INVESTIGATION REPORT

Oxford Road, Dewsbury, West Yorkshire

Report: 574017-GI

Date: January 2024

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Oxford Road, Dewsbury

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SUMMARY

Grid Ref: 423336(E), 422157(N) **Elevation:** 111m AOD **Site Area:** 0.77 ha

Development proposals: Residential care home with soft landscaping areas.

Past site development: Undeveloped land before tennis courts and a Pavilion.

Made Ground: Granular made ground found from 0.00-1.61m bgl.

Natural Soils: Stiff clay found to a maximum depth of 2.30m bgl.

Ground Conditions

Bedrock: Bedrock found from top depths of 0.80-2.90m bgl.

Groundwater: Not encountered during ground investigation. Monitoring visits found groundwater from 0.40m bgl - 1.72m bgl.

Shallow mining: Low risk of shallow mining affecting the site.

Environmental Assessment: Existing soils chemically suitable for retention or reuse in proposed soft landscaping areas.

Ground gases: Site categorised as CS2; gas protection measures required.

Remediation: Site categorised as CS2; gas protection measures required.

Foundations: Strip footings into stiff clay can be considered.

Drainage: Soakaways are not recommended for this site.

Geotechnical Considerations: Clay soils are low shrinkable requiring minimum founding depths of 750mm bgl.

Further Investigation: No further assessment required.

GROUND INVESTIGATION REPORT

Oxford Road, Dewsbury

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GROUND INVESTIGATION REPORT

Oxford Road, Dewsbury

1. INTRODUCTION

On the instruction of Farrell & Clark Architects, on behalf of Thomas Owen Care Ltd, a Phase 2 Ground Investigation was carried out by Abbeydale Building Environment Consultants Ltd (Abbeydale BEC) on a site off Oxford Road in Dewsbury, West Yorkshire.

The site is situated on the north-west side of Dewsbury, centred on National Grid Reference 423336, 422157, with a site area of around 0.77 ha. See Figure 1.

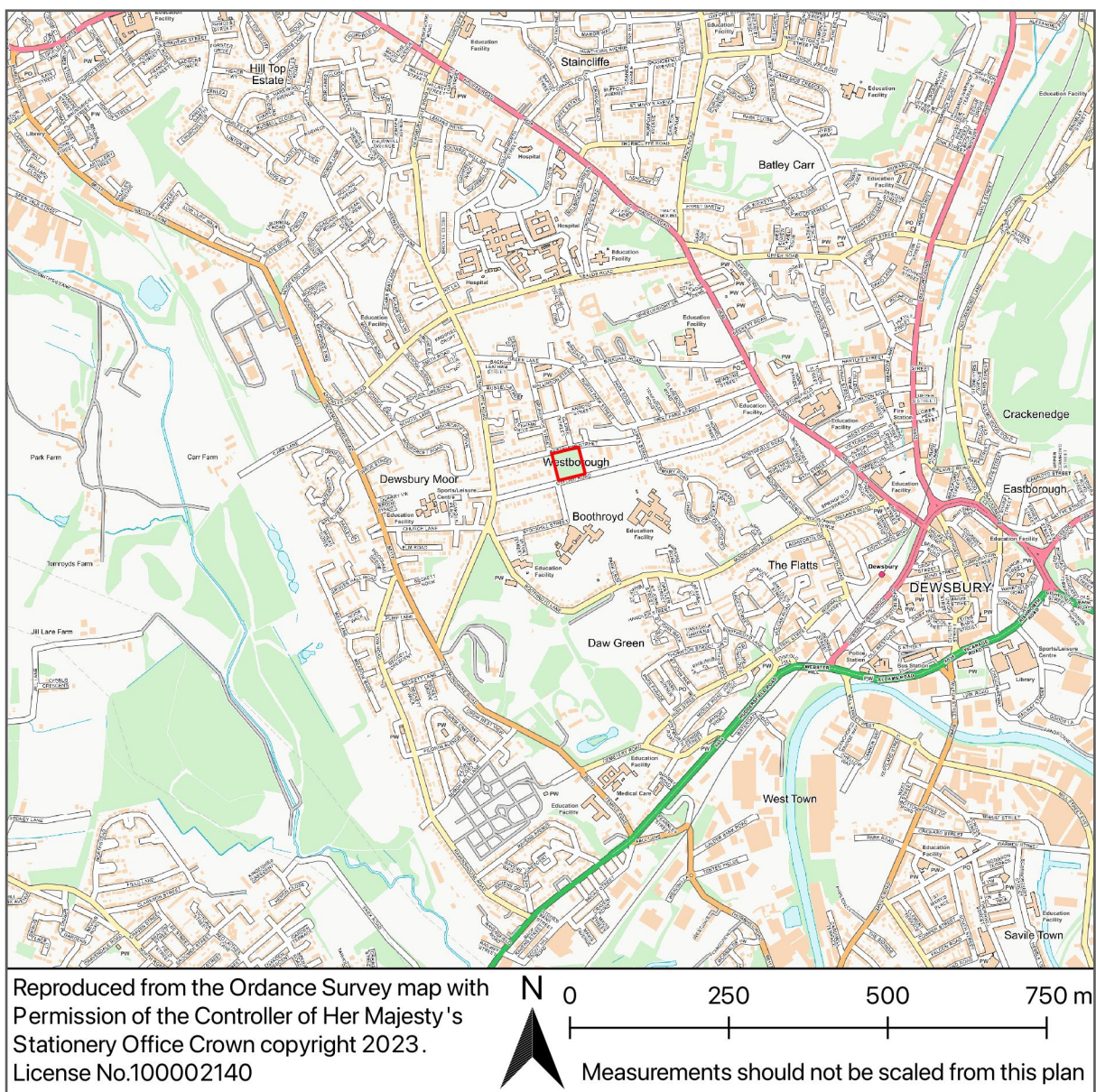


FIGURE 1 - LOCATION PLAN

This report was produced for our client, Thomas Owen Care Ltd, and their advisors and financiers; it should not be relied upon or transferred to any other parties without the express written authorisation of Abbeydale BEC and our client. If any other unauthorised third party comes into possession of this report they rely on it at their own risk and the authors owe them no duty of care or skill.

The comments and recommendations presented in this Ground Investigation report are based on the findings of a review of available information; ground conditions encountered during the intrusive investigation work and the associated laboratory testing results. There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have therefore not been taken in to account by this report. Responsibility cannot be accepted for conditions not revealed by this investigation.

When writing this report the proposed development was for a residential care home at, or close to, existing ground levels. If there are changes to these proposals then some modification to the comments and recommendations given may be required. The proposed site layout is shown on the site plan in Appendix A.

Two previous reports were provided by Farrell & Clark Architects for the site, a Coal Mining Risk Assessment undertaken by The Coal Authority dated 7th April 2021 and a preliminary summary report produced by Encia Consulting Ltd (Ref:5961/OGO) dated 15th March 2004 which includes exploratory hole logs.

In addition, a Phase 1 Desk Study Report was produced by Abbeydale BEC in September 2022, ref:574017DS, for the current development proposals.

2. OBJECTIVES

This report has been undertaken to evaluate current or former uses of the site and surrounding areas to determine the presence of any potential contaminative sources.

As part of this evaluation the potential impact on the identified receptors has been assessed to determine if a potential significant pollution linkage is present between each source and receptor. Where appropriate the report gives recommendations for further investigations and / or remediation options to mitigate any potential risks to future receptors.

The report also evaluates the current site proposals (where known) with regard to geotechnical and engineering considerations to determine what impact the anticipated ground conditions will have on the integrity of any structures or buildings included in the development proposals. As part of this evaluation the report gives foundation, floor slab, highway and drainage recommendations.

3. THE SITE

The site is a square parcel of land, located between Reservoir Street and Oxford Road, and approximately 1m higher than Reservoir Street on the northern boundary. Ground

levels then gently slope down towards the south, to Oxford Road. The current site layout is shown on Figure 2.

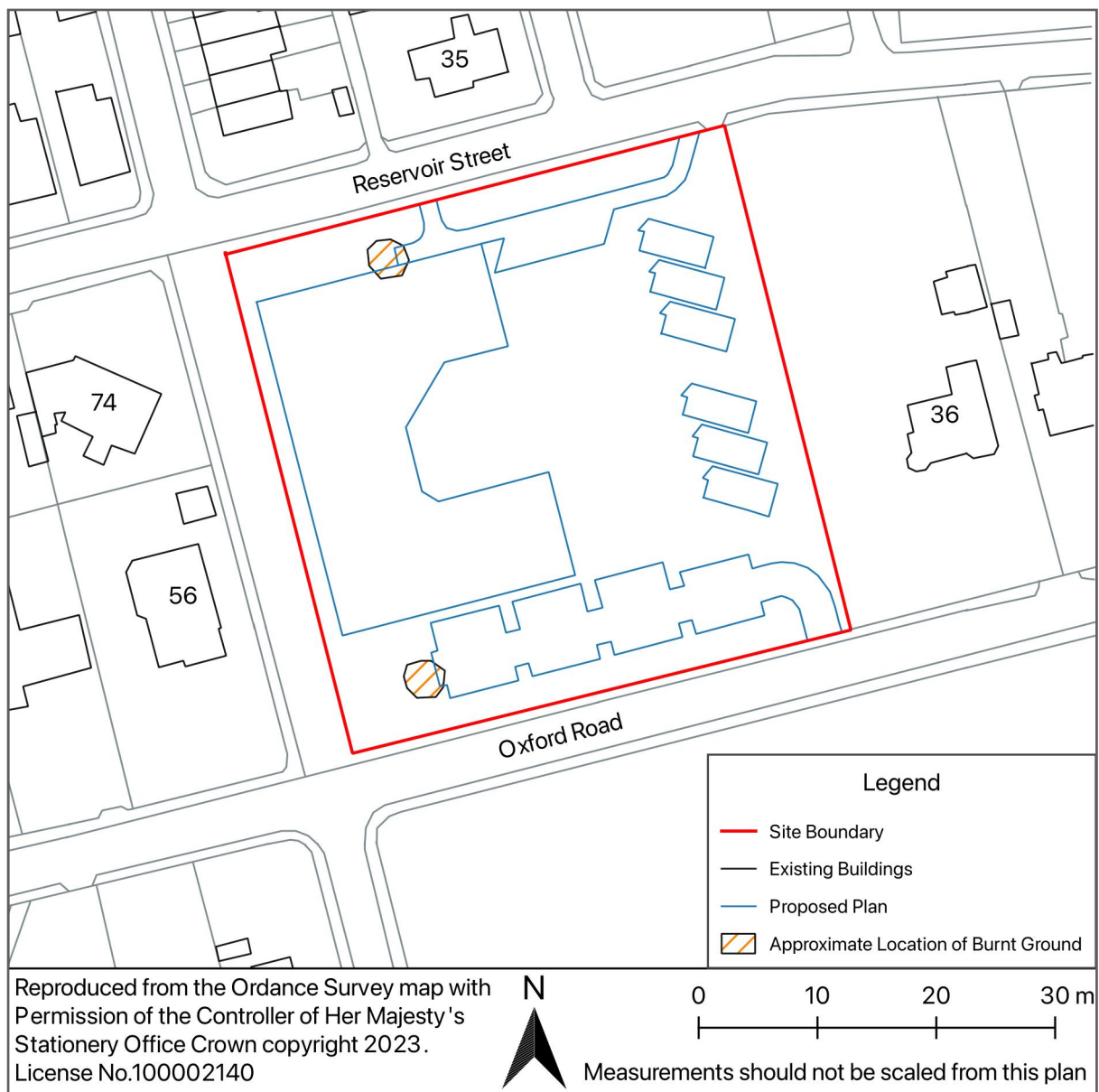


FIGURE 2 - SITE PLAN

Currently the surface of the site is mostly covered by overgrown vegetation. Trees are present along all four sides of the site, and more densely in the southern half of the site. Due to the presence of trees and shrubs, it was not possible to visually inspect the site of the former pavilion as indicated on historical maps.

Two patches of burnt ground / old fire pits were noted on site, one along the northern boundary, and one in the south-western corner. It appeared that general waste had been burnt. Other than the fire pits and some small scale general waste fly tipping, there was no visual or olfactory signs of potential contamination at the surface, distressed vegetation or any potentially contaminative sources noted on the site.

The site can be accessed via a rough narrow track in the south-western corner of the site. Vehicular access is shown to be in the northeastern corner, however a c. 2m fence, rough ground and overgrown vegetation prohibited any access from this point.

The site is bounded by the residential housing to the north, east and west, and to the south are playing fields, on the opposite side of Oxford Road.

4. HISTORY

The historic Ordnance Survey (OS) maps of the site and surrounding area were obtained from Groundsure as part of the previous Phase 1 Desk Study. For a detailed overview the Phase 1 Desk Study should be consulted, however a summary is given below for ease of reference and contextual purposes.

The site was undeveloped open land from at least 1853, with Reservoir Street and Oxford Road bounding the north and south of the site respectively by 1890.

Some development had occurred on the site by 1931, including a small building in the north-eastern corner and a tennis court in the south-eastern corner of the site. The building which is present in the north-eastern corner was labelled as a pavilion in 1955, which was later demolished by 1983 and by 2003 the tennis courts were no longer labelled.

The surrounding area was largely undeveloped land from 1853. Small sandstone quarries were noted 300m south-east which were no longer labelled by 1905.

Urbanisation had occurred in the vicinity of the site by 1890; predominantly residential housing, and further residential development intensified to the south-west of the site by the 1970s.

No discernible significant changes were noted on subsequent historical OS maps within the immediate vicinity of the site.

5. GEOLOGY

The geological survey maps of the area, 1:10,000 scale sheet SE22SW, 1:50,000 scale BGS Sheet 77 (Huddersfield) and Yorkshire County Series sheets 232 SE & 247 NE have been examined, along with the memoir of the area. The site is shown to be underlain by the Birstall Rock sandstone of the Pennine Lower Coal Measures; dipping to the east from an assessment of outcrop patterns and dip indicators on the geological maps.

A geological fault is conjectured to pass through the site from the south-west corner to the north-east corner of the site, downthrowing strata to the south-east.

No superficial drift deposits or made ground / artificial deposits are recorded to overlie the solid geology. However, made ground would be anticipated across the site associated with the past development from historical OS maps, to superficial depths in the vicinity of previous buildings.

6. HYDROGEOLOGY AND HYDROLOGY

The hydrogeological and hydrological setting of the site was detailed in our Phase 1 Desk Study report, summarised below for ease of reference. For a detailed appraisal our Phase 1 Desk Study report prepared for the site.

The solid geology is classified as a Secondary A (formerly minor) aquifer; permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

The site is not recorded to be within a groundwater Source Protection Zone (SPZ) and no drinking water abstractions were noted within 250m of the site.

The closest surface watercourse is the River Spen around 1.1km west of the site at its closest point. No surface water abstractions are recorded within 250m of the site.

7. MINING RISK ASSESSMENT & QUARRYING

The presence of rock and mineral seams, including coal, which may have been mined or quarried in the area was assessed as part of our previously prepared Phase 1 Desk Study report for the site, summarised below for ease of reference..

Previous site investigation undertaken by Encia found a 0.70m thick coal seam at 13.80m bgl and a 0.30m thick coal seam at 15.30m bgl; no signs of potential shallow mine workings were recorded in either coal seam. Based on the depths and thicknesses from the investigation findings, bedrock could be as deep as 2.40m bgl, the coal seam could be as thick as 1.00m, and found from as shallow as 13.80m bgl. However, with 11.40m of bedrock above a 1.00m thick seam this would still be considered to have sufficient rock cover above any potential shallow mine workings, even if present.

Any possible workings in deeper coal seams would be sufficiently deep not to adversely affect the surface stability of the site.

Based on the above information the resultant risk of shallow mine workings affecting the site is considered to be **low**.

8. FIELDWORK

8.1. General

Fieldwork was undertaken on 9 November 2023 in general accordance with Eurocode 7, BS5930:2015 and BS10175:2011(+A2:2017). The Conceptual Site Model formulated as part of the Phase 1 Desk Study assessment guided the scope of investigation undertaken, to provide further information on the ground conditions present and refine the potential risks to future receptors.

Detailed descriptions of the strata encountered are recorded in the exploratory hole logs in Appendix D.

8.2. Exploratory Hole Locations

The relative ground levels and positions of the exploratory holes undertaken were assessed relative to existing features using a tape measure; the approximate locations of which are shown on Figure 3.

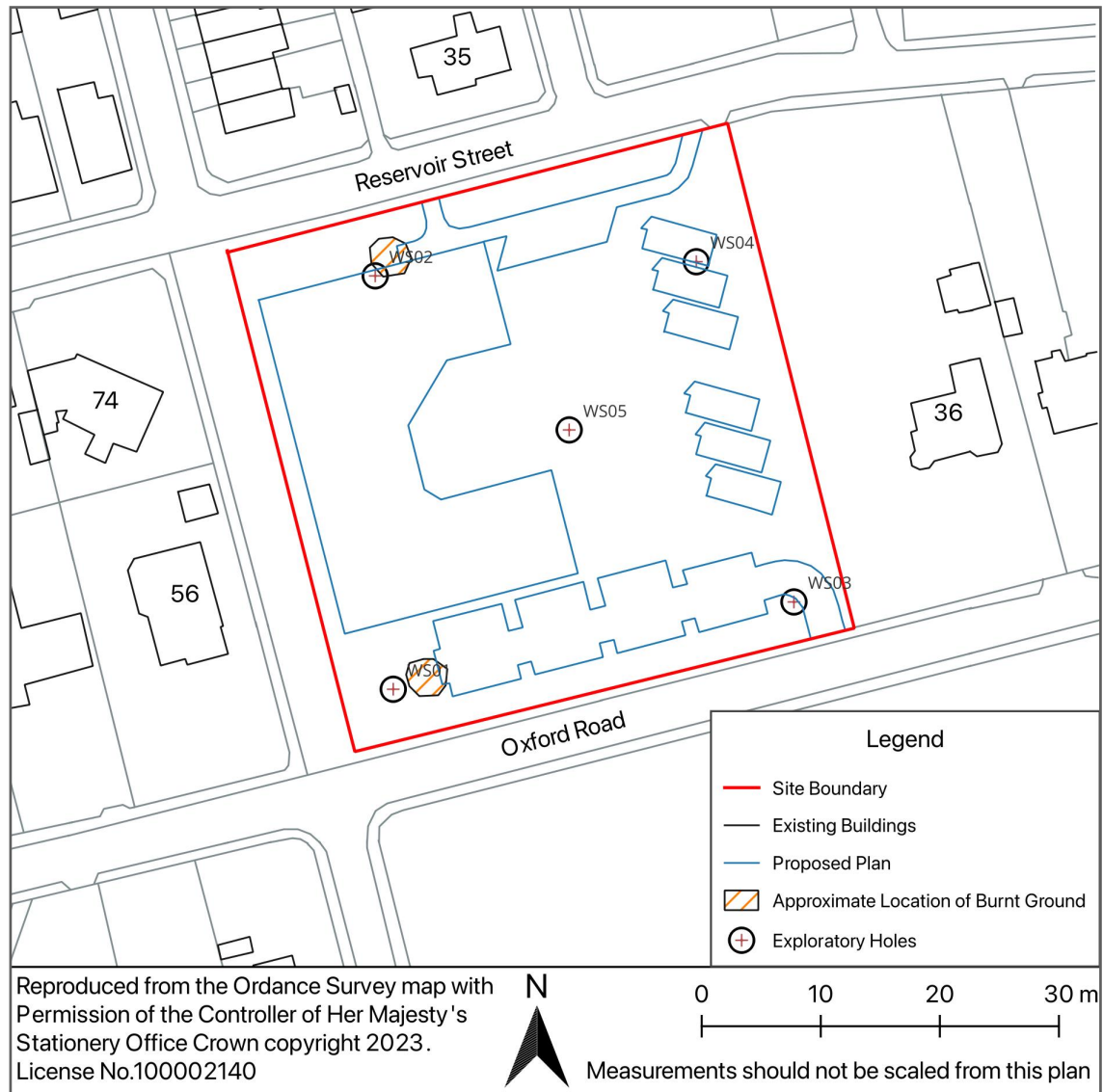


FIGURE 3 - EXPLORATORY HOLE PLAN

Based on the available information, the two areas of burnt material were highlighted as sources of potential concern that warranted targeted investigation. Generally non-targeted exploratory locations were then used elsewhere across the site to provide a spread of information across the site.

The locations of exploratory holes were restricted due to the presence of vegetation across the site.

8.3. Sampling Strategy

Representative disturbed samples of the soils and weathered rock encountered were taken throughout the course of the intrusive investigation works to facilitate subsequent geotechnical and environmental laboratory testing.

The sampling depths were taken based on professional judgement, the ground conditions encountered or at regular depths through the soil profile, or a combination of all three. Where known the sampling depths took account of proposed finished ground levels post-development, the likely source of potential contamination and the likely receptors.

Samples collected adjacent to the areas of burnt, material were tested for TPH (CWG).

On completion of fieldwork the samples were returned to Abbeydale BEC's office for scheduling of subsequent laboratory testing.

8.4. Window Sample Holes

Five window sample holes (WS1 to WS5) were carried out across the site, ranging in depth from 1.30m and 2.90m bgl, using a tracked window sample rig.

As part of the window sampling in situ Standard Penetration Tests (SPTs) or Cone Penetration Tests (CPTs) were undertaken based on the ground conditions encountered, to provide in situ relative strength information. The SPTs utilised a 50mm split spoon sampler with a 70° taper, with the CPTs using a solid cone with a 90° taper, driven using a 63.5kg hammer dropping 750mm. The blow counts are recorded for every 75mm driven, as detailed on the appended exploratory logs along with the resultant N values for each test. Where a refusal (N>50) was encountered the total number of blows over the total penetration distance is recorded.

8.5. Monitoring Installations

To facilitate post-investigation monitoring of the underlying ground gas and groundwater regimes, monitoring standpipes were installed in each of the window sample holes. The individual installation details are shown on the relevant logs for each exploratory hole.

Gas monitoring using a Gas Data GFM436 gas monitor was undertaken on six post-investigation visits, the results of which are included as Table 3 in Appendix B.

9. LABORATORY TESTING

Geotechnical laboratory testing was undertaken by Professional Soils Laboratory Ltd (PSL) in accordance with BS1377. To assess the geotechnical characteristics of the natural soils a total of five samples were sent to PSL for Plasticity Index (Atterberg Limits) testing, with natural moisture content testing undertaken on the remaining

samples of natural soils for comparison with the plasticity index results. The geotechnical testing results are summarised on Table 1 in Appendix B and also shown graphically on Figure 6.

Samples were also sent to Chemtech Environmental Ltd for chemical analysis. See Tables 2A to 2C in Appendix B.

The testing results certificates for both the chemical and geotechnical testing are presented in Appendix E.

10. GROUND CONDITIONS

The ground conditions encountered are recorded in detail in the exploratory logs appended to this report (Appendix C) and summarised on a geological section, Figure 4. Any diagram of the possible configuration of ground conditions between exploratory holes is conjectural and given for guidance purposes only. If deemed critical confirmation of intermediate ground conditions should be sought.

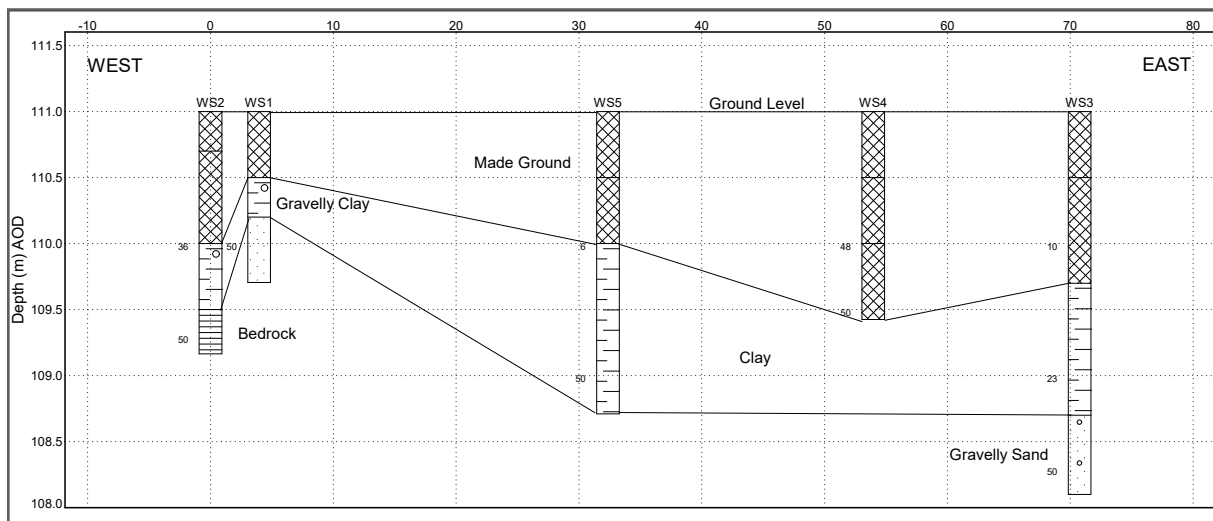


FIGURE 4 - GEOLOGICAL SECTION

Made ground was found from the surface in each window sample hole, typically consisting of gravelly clay containing brick, clinker and sandstone. The made ground was found to a maximum depth of 1.61m bgl in WS4 where the window sample borehole refused, possibly on a cobble or obstruction.

Underlying the made ground was a firm to stiff brown mottled grey gravelly clay containing fragments of sandstone. This clay was found to a maximum depth of 2.30m bgl with CPT N values in the clay ranging from N6-N36, with a mean of N22. As shown on Figure 5 a general increase in N value with depth was noted through the strata profile.

Plasticity Index testing recorded the plastic limit of the residual soils to range from 17%-19%, with the moisture content values generally around the plastic limit values as shown on Figure 6. Calculated modified plasticity index values in accordance with

NHBC Ch.4.2 “Building near trees” ranged from 15-20%, equating to a low volume change potential when factoring the fines content of the samples.

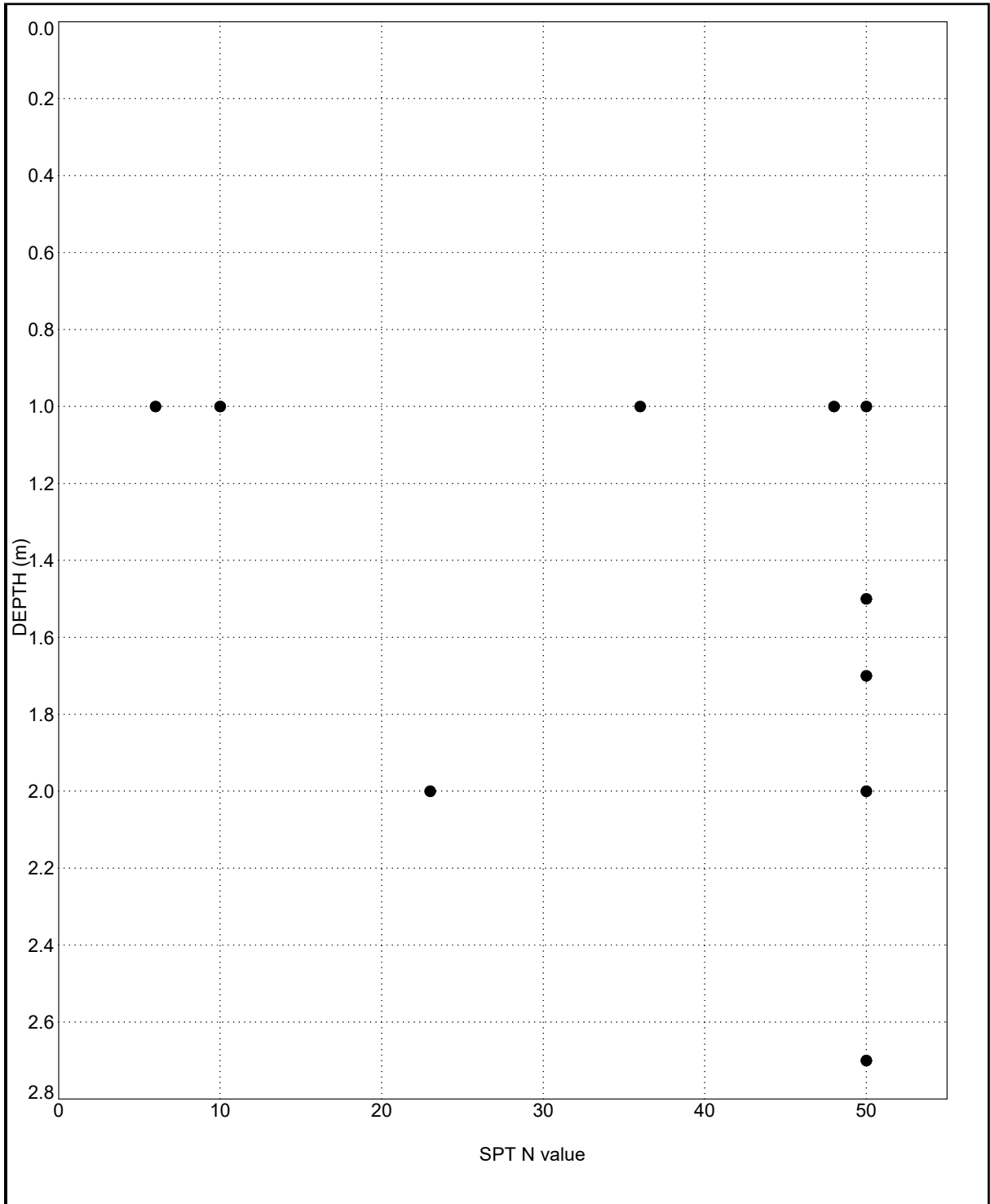


FIGURE 5 - N VALUE VS DEPTH GRAPH

Beneath the clay described above, bedrock was encountered from depths ranging between 0.80m-2.90m bgl. In WS1 and WS3, sandstone bedrock was found, while in WS2 mudstone bedrock was encountered. This is likely due to the presence of the

geological fault that is conjectured through the site. Four CPT's carried out in the bedrock all refused, with N values greater than 50.

Groundwater was not encountered during the ground investigation, however on subsequent monitoring visits groundwater was found from 0.20m - 1.61m bgl, interpreted to be perched water towards the base of the made ground, above the residual clay soils.

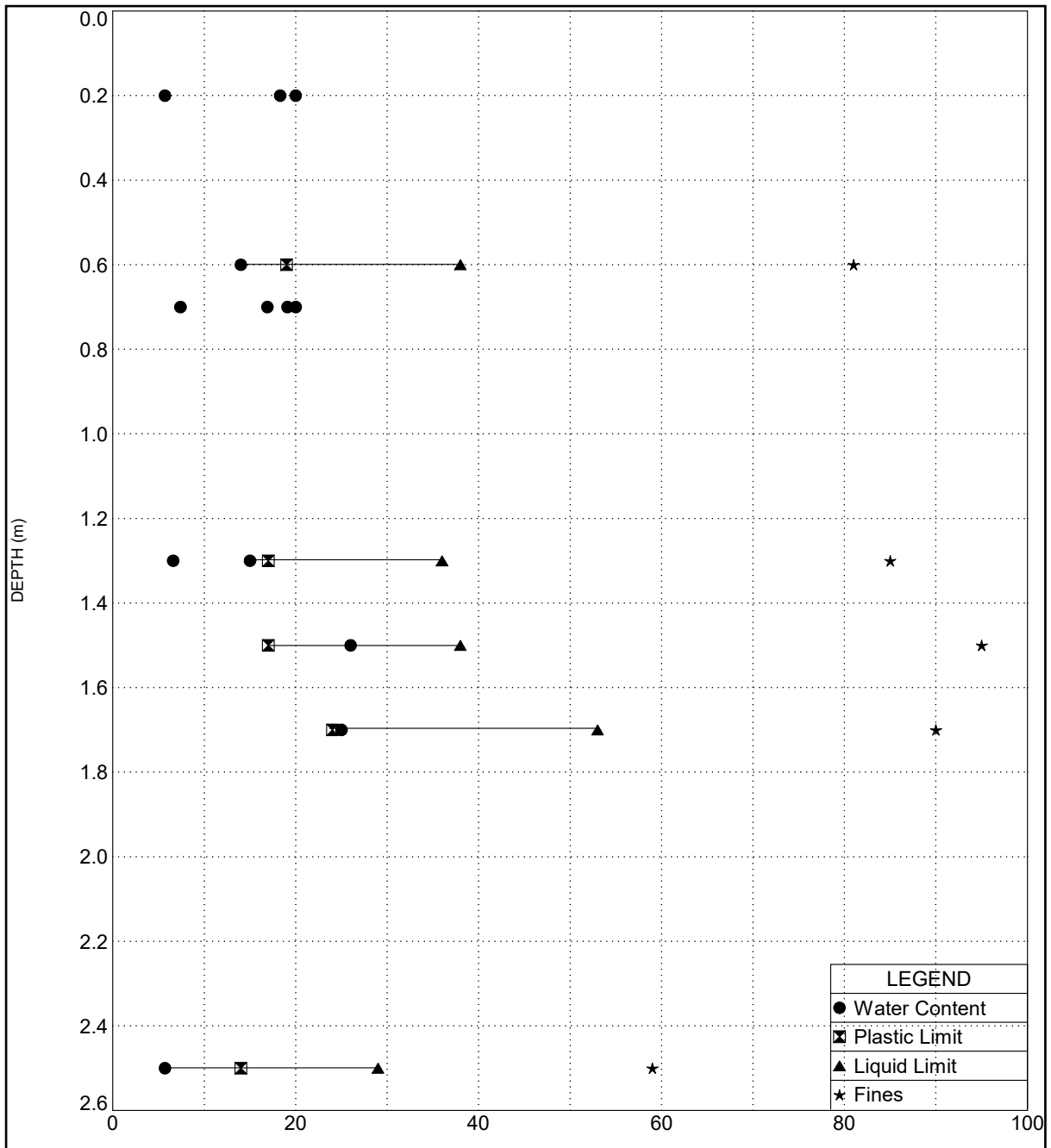


FIGURE 6 - INDEX PROPERTIES VS DEPTH GRAPH

11. GEOTECHNICAL CONSIDERATIONS

11.1. General

An outline plan was available when completing this report. We understand that a residential care home is to be constructed at, or close to, existing ground levels. The proposed ground loadings were not known but for the purposes of this report are assumed to be less than 100 kN/m. If there are changes to these proposals, then some modification to the comments and recommendations given may be required.

11.2. Mining Precautions

The risk of mine workings affecting the site is deemed to be **low** based on the available information assessed as part of our previous Phase 1 Desk Study report.

11.3. Foundations

Lightly reinforced strip footings founding at least 250mm into the stiff clay encountered across the site should provide a net allowable bearing pressure of at least 100 kPa, assuming a nominal acceptable settlement of 25mm is tolerable.

Plasticity index testing carried out on samples of the stiff clay found the soils to be low volume change potential in accordance with NHBC Ch.4.2, with an applicable minimum founding depth of 750mm bgl.

Foundations may need to be locally deepened if any disturbed ground from previous buildings is present or where within the zone of influence from any existing or proposed trees. Further assessment should be undertaken in accordance with NHBC Ch.4.2. "Building near trees" once the final landscaping design has been established.

Consideration should also be given to the increased potential for ground movements in the vicinity of the conjectured geological fault, and whether any associated ground disturbance may be present in the locality of the fault.

Additionally the potential effects of differential settlement would need to be considered if foundations were partly underlain by residual soils and partly underlain by weathered bedrock. If foundations need to be stepped to account for differing levels of a suitable foundation strata, they should be done so in accordance with Building Standards requirements.

11.4. Floor Slabs

Where bearing directly onto non-shrinkable stratum, ground bearing floor slabs can be considered. In areas with more than 600mm of made ground, or where cohesive soils that are susceptible to volume changes are present beneath the floor footprint, suspended are recommended.

If ground bearing floors were being considered they would need to be designed by a structural engineer to account of the volume change potential of the soils and replacement of the made ground with a suitable compacted granular fill.

11.5. Highways & Hardstanding

Highways and hardstanding will need to be constructed on reengineered material. For design purposes a CBR of 2.5% may be assumed provided that the formation is proof rolled and any soft spots are removed.

If any disturbed ground is encountered in the vicinity of the conjectured geological fault then consideration may need to be given to the requirement for an increased thickness of unbound material beneath the new access road or hardstanding areas, and/or the use of geogrid to provide mechanical stabilisation at formation level.

11.6. Drainage & Excavatability

Some difficulties in excavation of trenches for sewers and foundations in the made ground and bedrock should be anticipated. Consideration should be given to providing safe temporary support of excavations within made ground or where greater than 1.20m depth.

Although sandstone bedrock has been recorded across parts of the site, mudstone bedrock is present across parts of the site and a geological fault is conjectured through the site, trending beneath the proposed new residential building. Consequently it would not be recommended to utilise soakaway drainage for this site. Attenuation and off-site controlled discharge of surface waters is therefore likely to be required.

11.7. Chemical Precautions

To assess the potential for chemical attack of any buried concrete substructures by the existing soils, sulphate and pH testing was undertaken on eight samples of the made ground and topsoil as part of the chemical analysis suite indicate that Class DS-2 (ACEC Class AC-1s) can be used on this site in accordance with BRE Special Digest 1:2005. Where in made ground, water supply pipes should be leachate resistant.

11.8. Ground Source Heating

Providing space heating and hot water using ground source heating could be considered for this site. If this method of heating is being proposed then a further assessment of the site and its underlying geology would be required to determine the most efficient ground loop configuration for the required heat load of the proposed building(s).

12. ENVIRONMENTAL RISK ASSESSMENT

Contaminated Land is defined under Part 2A of the Environmental Protection Act 1990, implemented through Section 57 of the Environment Act 1995. This supports a

‘suitable for use’ based approach to the risk assessment of contaminated land. The evaluation is based on an assessment of plausible pollutant linkages, referred to as the **source - pathway - receptor** model, based on the current or proposed use of the site.

A **pollutant linkage** is the relationship between a contaminant, a pathway and a receptor. Unless all three elements are present there is not considered to be a potential pollutant linkage.

However, where a potential pollutant linkage is deemed to be present, the resultant risk is based on the consequence should the event occur, and the probability that the event will occur, as outlined in CIRIA C552. A tabulated summary of the resultant risk matrix is provided below for contextual purposes.

| | | Consequence (C) | | | |
|-----------------|-----------------|---------------------|---------------------|---------------------|---------------------|
| | | Severe | Medium | Mild | Minor |
| Probability (P) | High Likelihood | Very high risk | High risk | Moderate risk | Moderate / low risk |
| | Likely | High risk | Moderate risk | Moderate / low risk | Low risk |
| | Low likelihood | Moderate risk | Moderate / low risk | Low risk | Very low risk |
| | Unlikely | Moderate / low risk | Low risk | Very low risk | Very low risk |

RISK MATRIX FOR ENVIRONMENTAL RISK ASSESSMENT (BASED ON CIRIA C552)

Part 2A states that for land to be defined as Contaminated Land by the Local Authority it needs to be in such a condition that:

- Significant harm is being caused, or there is significant possibility of such harm being caused.
- Pollution of controlled waters is being caused, or likely to be caused.

12.1. Proposed Site Use

We understand that a residential care home is to be constructed at, or close to, existing ground levels. A proposed layout plan is included in Appendix A.

Proposals include general soft landscaping areas where receptors could come into contact with underlying soils, however we understand that no designated gardens areas are proposed. Based on the proposed end use, this would be representative of a residential end use **without** the potential for homegrown produce, and measured chemical concentrations in the soils could be compared

against this land use scenario for Generic Quantitative Risk Assessment (GQRA) purposes.

There is also a lesser potential for any construction workers to come into contact with existing soils, and standard precautionary measures should be employed to reduce the potential for dermal contact and/or inhalation of dust or vapours. Good hygiene practises and facilities should also be provided as a standard precautionary measure.

12.2. Potential Pathways

- Dermal contact (indoor and outdoor).
- Ingestion of soil and indoor dust.
- Indirect ingestion (indoor and outdoor).
- Inhalation of dust (indoor and outdoor).
- Inhalation of vapours (indoor and outdoor).
- Leaching to groundwater
- Surface water run-off.
- Director contact with concrete substructures.
- Migration through the ground (vertical and horizontal).

12.3. On Site Contamination

The historic OS maps show the site to have been previously unoccupied, with a subsequent **low** risk of potential contamination resulting from this usage.

No obvious visual or olfactory signs of potential contamination were identified during the intrusive investigation undertaken.

However, two areas of localised surface burning and associated potential contamination were noted during the intrusive Ground Investigation works, and the made ground was highlighted as the most likely source of any contamination. Chemical testing therefore focused on these soils, to determine the chemically suitability of the made ground and topsoil for reuse close to the surface in any proposed soft landscaping areas.

Soils chemical testing, summarised on Tables 2A to 2C, indicate that all levels of metals, polycyclic aromatic hydrocarbons and total petroleum hydrocarbons in the existing made ground are below current GQRA threshold values even for a residential setting with potential for homegrown produce, and therefore deemed to be suitable for retention or reuse in proposed soft landscaping areas as part of the redevelopment of the site.

12.4. Off Site Contamination

With all chemical levels found to be below current GQRA threshold values. The risk of potential contamination from off-site sources is deemed to be **low** at this stage.

12.5. Ground Gases

According to the Enviro Insight report the site is not within a radon affected area as defined by the Health Protection Agency (HPA) and radon protection measures are not required to be installed in any new buildings in accordance with Building Research Establishment (BRE) document BR211.

Post-investigation ground gas monitoring was undertaken on six visits following installation of the monitoring standpipes, as summarised in Table 3 in Appendix B. No methane (CH₄) was recorded throughout any of the monitoring visits undertaken, with a maximum carbon dioxide (CO₂) concentration of 5.6% in WS3 during the monitoring visit, with a CO₂ of 5.0% also recorded in the third monitoring visit in WS4.

No flow was recorded during any of the monitoring visits; for risk assessment purposes a nominal flow rate of 0.1 l/h has therefore been assumed, which is the limit of detection of the gas monitor used.

In accordance with BS8485:2015 a Gas Screening Value of 0.0056 l/h has been calculated for the site using the highest recorded peak CO₂ concentration from across the site and the assumed nominal flow rate.

Although the calculated GSV value of 0.0056 l/h gives rise to a classification of Characteristic Situation (CS) 1, with an associated very low hazard potential, due to two CO₂ concentrations of 5.0% and 5.6% recorded throughout the monitoring regime it is recommended that the risk classification be increased to CS2, with an associated **low** risk potential from ground gases.

In accordance with BS8485:2015 gas protection measures will need to be incorporated into the design of the proposed new residential building to meet a minimum gas protection score of 3.5 points, and should consist of at least 2 different elements, likely underfloor ventilation and a suitable gas resistant membrane to meet the requirements of BS8485:2015.

12.6. Invasive Species

The vegetation in and around the site has been examined. No obvious signs of potential invasive plant species were noted during the site walkover undertaken. However, because weedkiller could have been applied prior to carrying out our walkover survey, not seeing any signs of invasive plants during our brief time on site cannot be a guarantee that they are not present on or around the site.

12.7. Conceptual Site Model

Using the information presented above and the **source - pathway - receptor** model, a Conceptual Site Model (CSM) has been formulated to determine

whether a potentially significant pollutant linkage is perceivable and what potential risks are posed to the identified future receptor from each potential contaminant source.

The CSM is tabulated and shown graphically in Appendix F. Where required the CSM should be updated as further investigation and/or development works progress to reflect the potential risks to future receptors, especially if any previously unidentified ground conditions are encountered.

12.8. Remediation Requirements

Based on the findings of the ground investigation undertaken gas protection measures will need to be incorporated into the design of the proposed new care home building, to meet a Characteristic Situation 2 (CS2) risk classification.

The proposals for gas protection measures will need to be outlined in a Remediation Method Statement, to meet the guidance outlined in BS8485:2015 and CIRIA report C735:2014.

12.9. Imported Soils

If any imported soils are required to be brought to site to facilitate the proposed development, they will need to be validated to confirm their chemical suitability, and that they do not pose a risk to future receptors. The soils should be validated in accordance with Yorkshire And Lincolnshire Pollution Advisory Group (YALPAG) guidance “*Verification Requirements for Cover Systems*” version 4.1, dated June 2021.

The scope and frequency of analysis required to validate any imported soils will be dependent on the source and/or historical setting of the source site and the volume of soils imported to site.

13. WASTE DISPOSAL

Any waste arising from development of the site, such as excess soil or material deemed unsuitable for retention on site, should be disposed of in accordance with the Duty of Care Regulations. If any soils are being disposed directly to a landfill site Waste Acceptance Criteria (WAC) analysis may be required in addition to basic environmental screen testing to determine the most appropriate disposal facility for the waste, in accordance with the requirements of the current Landfill Directive.

14. REGULATORY APPROVAL

The conclusions and recommendations in this report are based on a review of available information and observations made during the site walkover survey undertaken. The conclusions cannot be guaranteed to gain regulatory approval if this report is required as part of a planning application. If it is required as such it should be passed to the relevant regulatory bodies for their comment and approval.

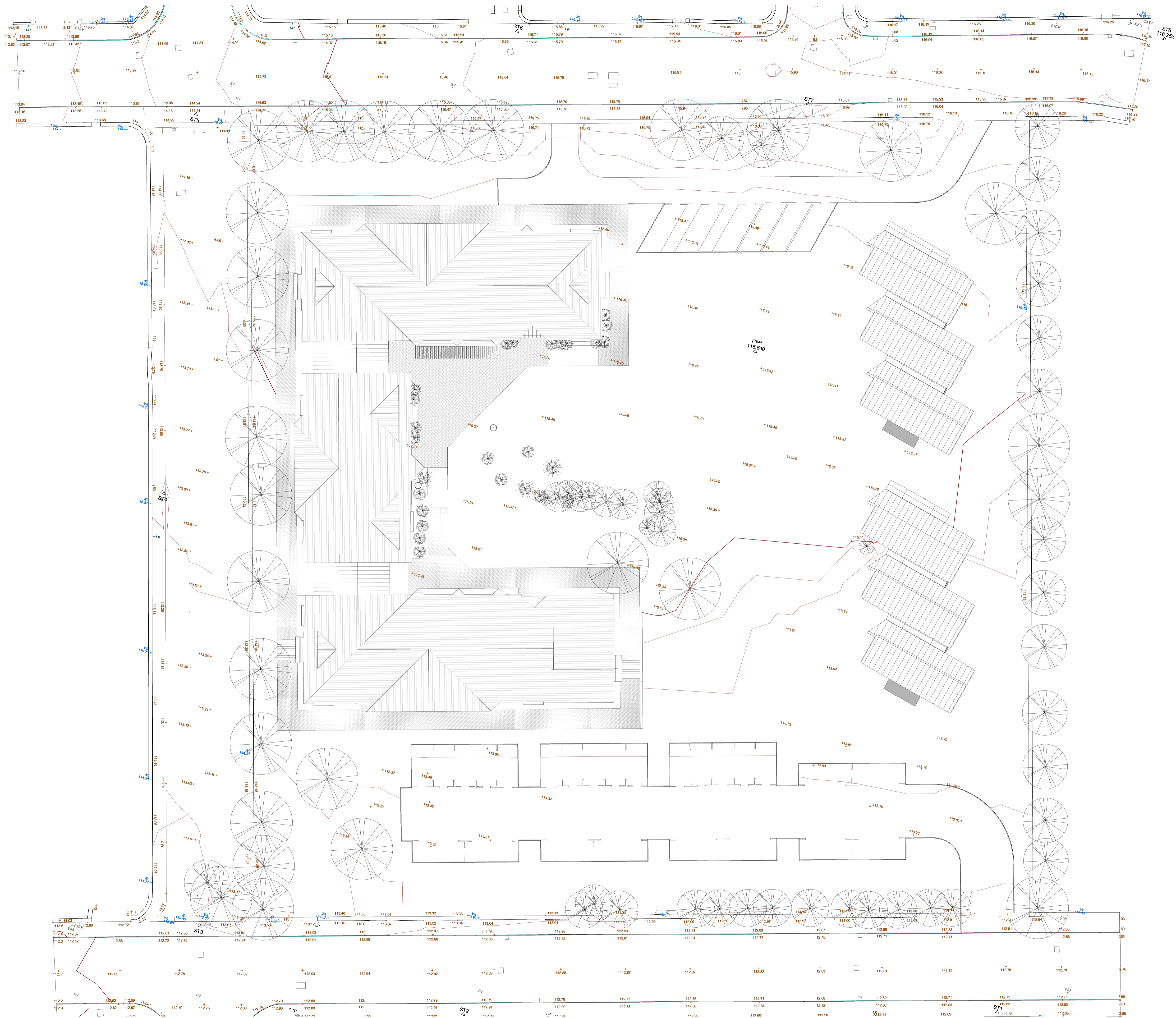
15. FURTHER INVESTIGATION

A Remediation Method Statement for the proposed scope of gas protection measures will need to be prepared and submitted to the Local Authority for their comment and approval before any protection measures are installed.

If any unexpected ground conditions or signs of potential unidentified contamination are encountered during earthworks then further geo-environmental advice should be sought and any additional risk assessment undertaken as required to assess the potential risks to future receptors.

Report 574017-GI | January 2024

APPENDIX A - PROPOSED LAYOUT DRAWINGS



Farrell & Clark
 Architects

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| | | |
|-------------------|--|--------------------|
| Status: | INFORMATION | SO |
| Client: | Thomas Owen Care | |
| Project: | Fredrick Finlay Oxford Road, Dewsbury | |
| Title: | Proposed Site Plan | |
| Drawn: | AMN | Date: Sept 22 |
| Check: | NC | Scale: 1 : 200 @A1 |
| Information Name: | 410_004-FCA-01-XX-DR-A- | Rev: 0110 |

SITE PLAN
 1 : 200

APPENDIX B - TESTING SUMMARY TABLES

| Exploratory Hole | Depth (m bgl) | Water Content (%) | Liquid Limit - LL (%) | Plastic Limit - PL (%) | Plasticity Index - IP (%) | Passing 0.425mm (%) | Modified Plasticity - IP* (%) | PSD D ₆₀ | PSD D ₁₀ | Dry Density (Mg/m ³) | Bulk Density (Mg/m ³) |
|------------------|---------------|-------------------|-----------------------|------------------------|---------------------------|---------------------|-------------------------------|---------------------|---------------------|----------------------------------|-----------------------------------|
| WS1 | 0.20 | 18.3 | | | | | | | | | |
| WS1 | 0.60 | 14 | 38 | 19 | 19 | 81 | 15.39 | | | | |
| WS2 | 0.20 | 5.7 | | | | | | | | | |
| WS2 | 0.70 | 7.4 | | | | | | | | | |
| WS2 | 1.30 | 15 | 36 | 17 | 19 | 85 | 16.15 | | | | |
| WS3 | 0.70 | 16.9 | | | | | | | | | |
| WS3 | 1.70 | 25 | 53 | 24 | 29 | 90 | 26.1 | | | | |
| WS3 | 2.50 | 5.7 | 29 | 14 | 15 | 59 | 8.85 | | | | |
| WS4 | 0.70 | 20 | | | | | | | | | |
| WS4 | 1.30 | 6.6 | | | | | | | | | |
| WS5 | 0.20 | 20 | | | | | | | | | |
| WS5 | 0.70 | 19.1 | | | | | | | | | |
| WS5 | 1.50 | 26 | 38 | 17 | 21 | 95 | 19.95 | | | | |

2016 - ENGINEERING TESTING - 574017.GPJ - ABEC TEMPLATE.GDT - 2/1/24



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GEOTECHNICAL RESULTS SUMMARY

Client: Thomas Owen Care Ltd

Project: Oxford Road, Dewsbury

Number: 574017

TABLE 1

Residential With Homegrown Produce (RwHP)

| Exploratory Hole | Depth (m) | Date | Toxic | | | | | | | | | | Phytotoxic | | | Organics | | Other | | | |
|------------------|-----------|------------|------------|--------------|------------|-------------------|------------------|---------|------------|-------------|-----------|------------|------------|---------|---------|----------|---------|--------------------|----------|--------------|------------|
| | | | Arsenic As | Beryllium Be | Cadmium Cd | Chromium (III) Cr | Chromium (VI) Cr | Lead Pb | Mercury Hg | Selenium Se | Nickel Ni | Vanadium V | Copper Cu | Boron B | Zinc Zn | SOM | Phenols | Cyanide (total) Cn | Asbestos | Sulphate g/l | pH (units) |
| WS1 | 0.20 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | 5.1 | - | - | N.D | 0.54 | 5.4 |
| WS2 | 0.20 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | 8.8 | - | - | N.D | - | 6.1 |
| WS2 | 0.70 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | 2.5 | - | - | N.D | - | 7.0 |
| WS3 | 0.70 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | - | - | N.D | - | 8.0 |
| WS4 | 0.70 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1.3 | - | - | N.D | - | 6.9 |
| WS4 | 1.30 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1.6 | - | - | N.D | - | 6.6 |
| WS5 | 0.20 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | 9.6 | - | - | N.D | - | 7.2 |
| WS5 | 0.70 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | 5.2 | - | - | N.D | - | 9.1 |



| | | | | | | | | | | | | | | | | | | | |
|-----------------------|------------|------|------------|-----|------------|-------------|------|------|-------|-------|-------|------|-------|------|------|-------|--|------------|--------|
| Number | 8 | 8 | 8 | | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 7 | 8 | 8 | 8 | | 8 | 8 |
| Average | 17.44 | 1.14 | 2.00 | | 0.04 | 45.33 | 2.00 | 3.00 | 25.10 | 58.01 | 41.89 | 0.49 | 81.70 | 4.64 | 0.50 | 1.00 | | 0.11 | 7.04 |
| Minimum | 4.7 | 0.8 | 2 | | 0.04 | 14.8 | 2 | 3 | 20.2 | 29.1 | 18.1 | 0.05 | 67.7 | 1.3 | 0.5 | 1 | | 0.02 | 5.4 |
| Maximum | 28.4 | 1.4 | 2 | | 0.04 | 68.6 | 2 | 3 | 32.2 | 74.8 | 85.4 | 0.9 | 92.3 | 9.6 | 0.5 | 1 | | 0.544 | 9.1 |
| Standard Dev | 8.33 | 0.20 | 0.00 | | 0.00 | 20.76 | 0.00 | 0.00 | 4.07 | 15.46 | 21.45 | 0.23 | 9.47 | 3.16 | 0.00 | 0.00 | | 0.18 | 1.13 |
| US95 | 23.0 | | 2.0 | | | 59.2 | 2.0 | 3.0 | 27.8 | | 56.3 | 0.6 | 88.7 | | 0.5 | 1.0 | | 0.2 | 7.8 |
| Source: LQM S4UL 2015 | 37 | 1.7 | 11 | 910 | 6.0 | 200 | 40 | 250 | 180 | 410 | 2400 | 290 | 3700 | % | 280 | 50 | | 0.5 | 5 to 9 |
| | 37 CS4L | | 26 CS4L | | 26 CS4L | 210 CS4L | | | | | | | | | | DUTCH | | 0.5 BRE | |

Notes:

- Levels expressed as mg/kg (ppm) unless stated.
- Soil guideline values are for RwHP.
- Tested levels below S4UL are shown as -
For actual result see certificate sheet.

CHEMICAL RESULTS ASSESSMENT

Client: Thomas Owen Care Ltd

Project: Oxford Road, Dewsbury

Number: 574017

TABLE 2A



2016 - SOIL METALS - RWHP - 574017.GPJ - ABEC TEMPLATE.GDT - 1/12/23

Residential With Homegrown Produce (RwHP)

Sheet 1 of 1

| Exploratory Hole | Depth (m) | Soil Organic Matter (%) | Probable carcinogens ⁽²⁾ | | | Possible carcinogens ⁽²⁾ | | | Fluorene | Phenanthrene | Pyrene | Acenaphthylene | Benzo (g,h,i) Perylene | Acenaphthene | Anthracene | Naphthalene | Fluoranthene | Carcinogenic PAH Total | PAH 16 Total |
|------------------|-----------|-------------------------|-------------------------------------|--------------------------|------------------|-------------------------------------|--------------------------|--------------------------|----------|--------------|--------|----------------|------------------------|--------------|------------|-------------|--------------|------------------------|--------------|
| | | | Benzo (a) Anthracene | Dibenzo (a,h) Anthracene | Benzo (a) Pyrene | Chrysene | Benzo (b&k) Fluoranthene | Indeno (1,2,3-cd) Pyrene | | | | | | | | | | | |
| WS1 | 0.20 | 5.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6.60 | 14.5 |
| WS2 | 0.20 | 8.8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1.51 | 3.14 |
| WS2 | 0.70 | 2.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.17 | 0.34 |
| WS3 | 0.70 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.26 | 0.47 |
| WS4 | 0.70 | 1.3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1.38 | 2.58 |
| WS4 | 1.30 | 1.6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.29 | 0.60 |
| WS5 | 0.20 | 9.6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1.60 | 3.75 |
| WS5 | 0.70 | 5.2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.24 | 0.42 |

| | | | | | | | | | | | | | | | | | | | |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|
| Number | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Average | | 0.05 | 0.25 | 0.32 | 0.44 | 0.18 | 0.04 | 0.30 | 0.50 | 0.02 | 0.17 | 0.04 | 0.09 | 0.05 | 0.57 | | | 3.23 | |
| Minimum | 0.02 | 0.02 | 0.02 | 0.03 | 0.05 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.34 | |
| Maximum | 1.18 | 0.16 | 1.17 | 1.39 | 1.97 | 0.73 | 0.11 | 1.44 | 2.30 | 0.03 | 0.76 | 0.17 | 0.35 | 0.21 | 2.53 | | | 3.75 | |
| Standard Dev | 0.39 | 0.05 | 0.38 | 0.46 | 0.64 | 0.24 | 0.03 | 0.48 | 0.76 | 0.00 | 0.25 | 0.05 | 0.11 | 0.07 | 0.83 | | | 4.76 | |
| US95 | | 0.1 | 0.5 | 0.6 | 0.9 | 0.3 | 0.1 | 0.6 | 1.0 | 0.0 | 0.3 | 0.1 | 0.2 | 0.1 | 1.1 | | | 6.4 | |
| Source: LQM S4UL 2015 | 7.2 | 0.24 | 2.2 | 15 | 2.6 | 27 | 170 | 95 | 620 | 170 | 320 | 210 | 2400 | 2.3 | 280 | | | | |

Notes:

1. Levels expressed as mg/kg (ppm) unless stated.
2. International Agency for Research on Cancer (IARC) classifications
3. Soil guideline values are for RwHP.
4. Tested levels below S4UL are shown as -
For actual result see certificate sheet.
5. Levels presented for SOM 1% -
Higher concentrations may be permissible

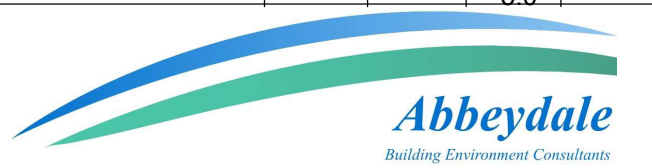
PAH RESULTS ASSESSMENT

Client: Thomas Owen Care Ltd

Project: Oxford Road, Dewsbury

Number: 574017

TABLE 2B



2016 - SOIL PAH - RWHP - 574017.GPJ - ABC TEMPLATE.GDT - 19/1/24

Residential With Homegrown Produce (RWHP)

Sheet 1 of 1

| Hole Ref. | Depth (m) | Date | Aliphatic | | | | | | | Aromatic | | | | | | |
|-----------|-----------|------------|-----------------------|-----------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|----------------------|----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|
| | | | Aliphatic C5-C6 mg/kg | Aliphatic C6-C8 mg/kg | Aliphatic C8-C10 mg/kg | Aliphatic C10-C12 mg/kg | Aliphatic C12-C16 mg/kg | Aliphatic C16-C21 mg/kg | Aliphatic C21-C35 mg/kg | Aromatic C6-C7 mg/kg | Aromatic C7-C8 mg/kg | Aromatic C8-C10 mg/kg | Aromatic C10-C12 mg/kg | Aromatic C12-C16 mg/kg | Aromatic C16-C21 mg/kg | Aromatic C21-C35 mg/kg |
| WS1 | 0.20 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| WS2 | 0.20 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| WS2 | 0.70 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| WS3 | 0.70 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| WS4 | 0.70 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| WS4 | 1.30 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| WS5 | 0.20 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| WS5 | 0.70 | 09/11/2023 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

| | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

| | | | | | | | | | | | | | | | | |
|--|-----------------------|------|------|------|-------|------|--------|--------|------|------|------|------|------|------|-------|---|
| | Number | | | | | | | | | | | | | | | |
| | Average | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | Minimum | 0.05 | 0.10 | 0.05 | 0.51 | 1.06 | 10.13 | 10.11 | 0.05 | 0.05 | 0.05 | 2.00 | 4.75 | 7.88 | 40.81 | |
| | Maximum | 0.05 | 0.1 | 0.05 | 0.05 | 0.5 | 23 | 23 | 0.05 | 0.05 | 0.05 | 0.5 | 1 | 16 | 1.5 | |
| | Standard Dev | 0.05 | 0.1 | 0.05 | 1 | 2 | 4.5 | 4.5 | 0.05 | 0.05 | 0.05 | 4 | 6 | 98 | | |
| | US95 | 0.00 | 0.00 | 0.00 | 0.36 | 0.42 | 10.63 | 10.64 | 0.00 | 0.00 | 0.00 | 1.49 | 3.69 | 7.20 | 48.37 | |
| | Source: LQM S4UL 2015 | 42 | 100 | 27 | 130 | 1100 | 65000* | 65000* | 70 | 130 | 34 | 74 | 140 | 260 | 1100 | |
| | | | | | (48)v | (24) | (8.48) | (8.48) | | | | | | | | |



Notes:

1. Levels expressed as mg/kg (ppm) unless stated.
2. Soil guideline values are for RWHP.
3. Tested levels below S4UL are shown as -
For actual result see certificate sheet.
4. Levels presented for SOM 1% -
Higher concentrations may be permissible
5. * Combined analysis for C16 to C35 < 65000 mg/kg

| |
|--------------------------------|
| TPH RESULTS ASSESSMENT |
| Client: Thomas Owen Care Ltd |
| Project: Oxford Road, Dewsbury |
| Number: 574017 |
| TABLE 2C |

2017 - SOIL HYDROCARBON - RWHP - 574017.GPJ - ABEC TEMPLATE.GDT - 1/12/23

| Exploratory Hole | Date/Time | Flow Rate l/h | Methane Peak CH ₄ % | Carbon Monoxide CO (ppm) | Hydrogen Sulphide H ₂ S (%) | Carbon Dioxide CO ₂ (%) | Oxygen O ₂ (%) | VOCs ppm | Water Level / mBGL | Pressure (mbars) | Pressure Rise/Fall /Steady | Remarks |
|------------------|------------|---------------|--------------------------------|--------------------------|--|------------------------------------|---------------------------|----------|--------------------|------------------|----------------------------|---------|
| WS1 | 14/11/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 19.6 | 1.0 | 0.42 | 987 | S | Cloudy |
| WS1 | 21/11/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 18.6 | 1.0 | 0.30 | 1016 | S | Suuny |
| WS1 | 27/11/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 17.8 | 1.0 | 0.25 | 991 | S | Rainy |
| WS1 | 04/12/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 18.5 | 1.0 | 0.28 | 987 | S | Cloudy |
| WS1 | 12/12/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 18.4 | 1.0 | 0.35 | 991 | S | Cloudy |
| WS1 | 19/12/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 13.5 | 1.0 | 0.20 | 1007 | S | Cloudy |
| WS2 | 04/11/2023 | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | Flooded |
| WS2 | 14/11/2023 | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | Flooded |
| WS2 | 21/11/2023 | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | Flooded |
| WS2 | 27/11/2023 | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | Flooded |
| WS2 | 12/12/2023 | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | Flooded |
| WS2 | 19/12/2023 | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | Flooded |
| WS3 | 14/11/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 5.6 | 7.6 | 1.0 | 0.73 | 987 | S | Cloudy |
| WS3 | 21/11/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 19.6 | 1.0 | 0.72 | 1016 | S | Sunny |
| WS3 | 27/11/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 18.8 | 1.0 | 0.55 | 991 | S | Rainy |
| WS3 | 04/12/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 18.5 | 1.0 | 0.59 | 987 | S | Cloudy |
| WS3 | 12/12/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 18.6 | 1.0 | 0.62 | 991 | S | Cloudy |
| WS3 | 19/12/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 17.6 | 1.0 | 0.88 | 1007 | S | Cloudy |
| WS4 | 14/11/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 19.4 | 1.0 | 1.59 | 987 | S | Cloudy |
| WS4 | 21/11/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 19.5 | 1.0 | 1.56 | 1016 | S | Sunny |
| WS4 | 27/11/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 5.0 | 8.5 | 1.0 | 1.61 | 991 | S | Rainy |
| WS4 | 04/12/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 4.5 | 12.5 | 1.0 | 1.61 | 987 | S | Cloudy |

2016 - LANDSCAPE GAS MONITORING - 574017.GPJ - ABEC TEMPLATE.GDT - 19/1/24



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NR = Not recorded

GAS MONITORING RESULTS

Client: Thomas Owen Care Ltd
 Project: Oxford Road, Dewsbury
 Number: 574017

TABLE 3

| Exploratory Hole | Date/Time | Flow Rate l/h | Methane Peak CH ₄ % | Carbon Monoxide CO (ppm) | Hydrogen Sulphide H ₂ S (%) | Carbon Dioxide CO ₂ (%) | Oxygen O ₂ (%) | VOCs ppm | Water Level / mBGL | Pressure (mbars) | Pressure Rise/Fall /Steady | Remarks |
|------------------|------------|---------------|--------------------------------|--------------------------|--|------------------------------------|---------------------------|----------|--------------------|------------------|----------------------------|---------|
| WS4 | 12/12/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 17.0 | 1.0 | 1.57 | 991 | S | Cloudy |
| WS4 | 19/12/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 16.6 | 1.0 | 1.61 | 1007 | S | Cloudy |
| WS5 | 14/11/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 | 17.6 | 1.0 | 0.40 | 987 | S | Cloudy |
| WS5 | 21/11/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 2.4 | 17.8 | 1.0 | 0.46 | 1016 | S | Sunny |
| WS5 | 27/11/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 16.3 | 1.0 | 0.55 | 991 | S | Rainy |
| WS5 | 04/12/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 17.5 | 1.0 | 0.53 | 987 | S | Cloudy |
| WS5 | 12/12/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 | 17.4 | 1.0 | 0.45 | 991 | S | Cloudy |
| WS5 | 19/12/2023 | 0.0 | 0.0 | 0.0 | 0.0 | 2.3 | 17.5 | 1.0 | 0.57 | 1007 | S | Cloudy |

2016 - LANDSCAPE GAS MONITORING 574017.GPJ - ABEC TEMPLATE.GDT 19/1/24



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NR = Not recorded

GAS MONITORING RESULTS

Client: Thomas Owen Care Ltd

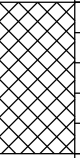



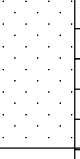

Project: Oxford Road, Dewsbury

Number: 574017

TABLE 3

APPENDIX C - EXPLORATORY HOLE LOGS

| | | | | | |
|--|------------------|--------------------------------|---|-----------------------|-----------------|
| Project Oxford Road, Dewsbury, West Yorkshire | | | | HOLE No WS1 | |
| Job No 574017 | Date 09-11-23 | Ground level (m AOD) 111.00 | Co-Ordinates (NGR) E 423,314.0 N 422,111.0 | | |
| Method/Plant Used Archway competitor tracked window sample rig | | | | | Sheet 1 of 1 |






| SAMPLES & TESTS | | | Water | STRATA | | | Geology | Instrument/ Backfill |
|-------------------|----------|--|--------|---|----------------|---|---------|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thickness) | | |
| 0.20 | J | | |  | (0.50) | MADE GROUND. Firm to stiff dark brown very gravelly clay. Gravel is medium to coarse, angular to sub-angular of brick, clinker and sandstone. Rootlets present. | |  |
| 0.60 | D | | 110.50 |  | (0.30) | Firm to stiff light brown mottled grey gravelly CLAY. Gravel is coarse, sub-angular of sandstone. | |  |
| 1.00 1.00-1.30 | D SPT | N50 <small>6.1/26,24 for 70mm</small> | 110.20 |  | 0.80 (0.50) | SANDSTONE. Recovered as light brown gravelly clay. Gravel is coarse, angular to sub-angular. | |  |
| | | | 109.71 | | 1.30 | Window sample borehole refused at 1.295m bgl. | | |

| Boring Progress and Water Observations | | | | | | GENERAL REMARKS |
|--|------|-------|-------------------|---------|------------|---|
| Date | Time | Depth | Core/casing Depth | Dia. mm | Water Dpth | |
| | | | | | | CAT Used to check for severs. No groundwater encountered. Monitoring standpipe installed to 1.00m bgl. Stable |

| | | | |
|--|--------------------------------|---------------------------|-----------------|
| All dimensions in metres Scale 1:25 | Client Thomas Owen Care Ltd | Contractor RP Drilling | Logged By NA |
|--|--------------------------------|---------------------------|-----------------|

ABEC WINDOW SAMPLE 574017.GPJ ABEC TEMPLATE.GDT 10/1/24

| | | | | | |
|--|------------------|--------------------------------|---|-----------------------|-----------------|
| Project Oxford Road, Dewsbury, West Yorkshire | | | | HOLE No WS2 | |
| Job No 574017 | Date 09-11-23 | Ground level (m AOD) 111.00 | Co-Ordinates (NGR) E 423,311.0 N 422,180.0 | | |
| Method/Plant Used Archway competitor tracked window sample rig | | | | | Sheet 1 of 1 |

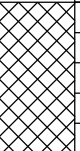

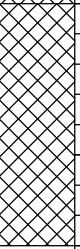
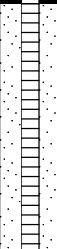
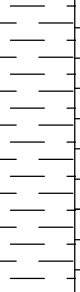
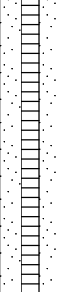
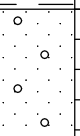
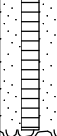




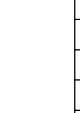

| SAMPLES & TESTS | | | Water | STRATA | | | Geology | Instrument/ Backfill |
|---|----------|--------------------------------|--------|--|----------------|---|---------|-------------------------|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thickness) | | |
| 0.20 | J | | 110.70 |  | (0.30) 0.30 | MADE GROUND. Very dark brown slightly sandy very gravelly clay. Gravel is medium to coarse, angular to sub-angular of brick, clinker and sandstone. | | |
| 0.70 | J | | 110.00 |  | (0.70) 1.00 | MADE GROUND. Light brown very gravelly slightly clayey sand. Gravel is coarse, sub-angular of sandstone, clinker. Low ash content. | | |
| 1.00-1.45 | SPT | N36 7,7/8,7,8,13 | |  | (0.50) 1.50 | Firm brown mottled grey very gravelly CLAY. Gravel is fine to medium, angular to sub-angular of sandstone. | | |
| 1.30 | D | | 109.50 |  | 1.50 | | | |
| 1.60 1.70-1.84 | D SPT | N50 25 for 70mm/50 for 65mm | 109.17 |  | (0.34) 1.84 | Very weak dark brown and grey MUDSTONE. Recovered as coarse, angular tabular gravel. | | |
| Window sample borehole refused at 1.835m bgl. | | | | | | | | |

ABEC WINDOW SAMPLE 574017.GPJ ABEC TEMPLATE.GDT 10/1/24

| Boring Progress and Water Observations | | | | | | GENERAL REMARKS |
|--|------|-------|----------------------|---------|---------------|--|
| Date | Time | Depth | Core/casing Depth | Dia. mm | Water Dpth | |
| | | | | | | CAT Used to check for services. No groundwater encountered. Monitoring standpipe installed to 1.70m bgl. Stable |

| | | | |
|--|--------------------------------|---------------------------|-----------------|
| All dimensions in metres Scale 1:25 | Client Thomas Owen Care Ltd | Contractor RP Drilling | Logged By NA |
|--|--------------------------------|---------------------------|-----------------|

| | | | | | |
|--|------------------|--------------------------------|---|-----------------------|-----------------|
| Project Oxford Road, Dewsbury, West Yorkshire | | | | HOLE No WS3 | |
| Job No 574017 | Date 09-11-23 | Ground level (m AOD) 111.00 | Co-Ordinates (NGR) E 423,381.0 N 422,125.0 | | |
| Method/Plant Used Archway competitor tracked window sample rig | | | | | Sheet 1 of 1 |

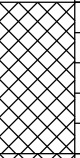

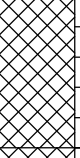
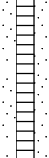
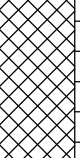
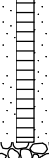
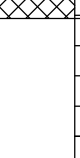

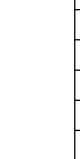

| SAMPLES & TESTS | | | Water | STRATA | | | | Geology | Instrument/ Backfill |
|-----------------|---------|------------------------------------|--------|---|--------|---|-------------|---|-------------------------|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thickness) | DESCRIPTION | | |
| 0.20 | J | | 110.50 |  | (0.50) | MADE GROUND. Very dark brown very gravelly slightly sandy clay. Gravel is fine to medium, angular to sub-angular of brick, clinker and sandstone. | |  | |
| 0.70 | J | | |  | (0.80) | MADE GROUND. Brown mottled grey slightly sandy very gravelly clay. Gravel is fine to medium, sub-angular of brick, clinker and sandstone. | |  | |
| 1.00-1.45 | SPT | N10 2,2/2,3,2,3 | 109.70 |  | 1.30 | Stiff brown mottled grey CLAY. | |  | |
| 1.70 | D | | |  | (1.00) | | |  | |
| 2.00-2.45 | SPT | N23 3,5/4,3,5,11 | 108.70 |  | 2.30 | | |  | |
| 2.50 | D | | |  | (0.60) | Dense brown and grey slightly clayey very gravelly SAND. Gravel is medium to coarse, angular to sub-angular of sandstone. | |  | |
| 2.70-2.90 | SPT | N50 16,9 for 40mm/41,9 for 10mm | 108.10 |  | 2.90 | | |  | |
| | | | | | | Window sample borehole refused at 2.90m bgl. | | | |

ABEC WINDOW SAMPLE 574017.GPJ ABEC TEMPLATE.GDT 10/1/24

| Boring Progress and Water Observations | | | | | | GENERAL REMARKS |
|--|------|-------|-------------------|---------|------------|---|
| Date | Time | Depth | Core/casing Depth | Dia. mm | Water Dpth | |
| | | | | | | CAT Used to check for services. No groundwater encountered. Monitoring standpipe installed to 2.70m bgl. Stable |

| | | | |
|--|--------------------------------|---------------------------|-----------------|
| All dimensions in metres Scale 1:25 | Client Thomas Owen Care Ltd | Contractor RP Drilling | Logged By NA |
|--|--------------------------------|---------------------------|-----------------|

| | | | | | |
|--|------------------|--------------------------------|---|-----------------------|-----------------|
| Project Oxford Road, Dewsbury, West Yorkshire | | | | HOLE No WS4 | |
| Job No 574017 | Date 09-11-23 | Ground level (m AOD) 111.00 | Co-Ordinates (NGR) E 423,365.0 N 422,183.0 | | |
| Method/Plant Used Archway competitor tracked window sample rig | | | | | Sheet 1 of 1 |

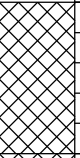

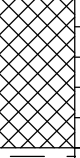
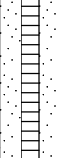
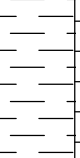
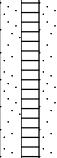
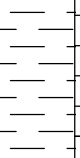
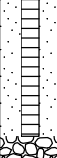
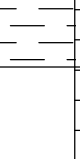

| SAMPLES & TESTS | | | Water | STRATA | | | Geology | Instrument/ Backfill |
|-----------------|---------|---------------------------------|--------|---|--------|---|---------|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thickness) | | |
| 0.20 | J | | 110.50 |  | (0.50) | MADE GROUND. Brown and grey very gravelly sand. Gravel is medium to coarse, angular to sub-angular of brick and sandstone. | |  |
| 0.70 | J | | 110.00 |  | (0.50) | MADE GROUND. Brown mottled grey slightly sandy very gravelly clay. Gravel is medium to coarse, angular to sub-angular of brick and sandstone. | |  |
| 1.00-1.45 | SPT | N48 3,7,22,10,6,10 | |  | 1.00 | MADE GROUND. Brown and grey very gravelly sand. Gravel is medium to coarse, angular to sub-angular of brick and sandstone. | |  |
| 1.30 | J | | |  | (0.61) | | |  |
| 1.50-1.58 | SPT | N50 25 for 40mm/ 50 for 70mm | 109.39 |  | 1.61 | | |  |
| | | | | | | Window sample borehole refused at 1.61 m bgl | | |

ABEC WINDOW SAMPLE 574017.GPJ ABEC TEMPLATE.GDT 10/1/24

| Boring Progress and Water Observations | | | | | | GENERAL REMARKS |
|--|------|-------|----------------------|---------|---------------|--|
| Date | Time | Depth | Core/casing Depth | Dia. mm | Water Dpth | |
| | | | | | | CAT Used to check for severs. No groundwater encountered. Monitoring standpipe installed to 1.50m bgl. Stable |

| | | | |
|--|--------------------------------|---------------------------|-----------------|
| All dimensions in metres Scale 1:25 | Client Thomas Owen Care Ltd | Contractor RP Drilling | Logged By NA |
|--|--------------------------------|---------------------------|-----------------|

| | | | | | |
|--|------------------|--------------------------------|---|-----------------------|-----------------|
| Project Oxford Road, Dewsbury, West Yorkshire | | | | HOLE No WS5 | |
| Job No 574017 | Date 09-11-23 | Ground level (m AOD) 111.00 | Co-Ordinates (NGR) E 423,343.0 N 422,154.0 | | |
| Method/Plant Used Archway competitor tracked window sample rig | | | | | Sheet 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | Geology | Instrument/ Backfill |
|-----------------|---------|---|--------|---|--------|--|---------|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thickness) | | |
| 0.20 | J | | 110.50 |  | (0.50) | MADE GROUND. Dark brown gravelly clay. Gravel is medium to coarse, angular to sub-angular of brick, clinker and sandstone. | |  |
| 0.70 | J | | 110.00 |  | (0.50) | MADE GROUND. Brown mottled grey gravelly clay. Gravel is medium to coarse, angular to sub-angular of brick, clinker and sandstone. | |  |
| 1.00-1.45 | SPT | N6 1,2/1,1,2,2 | |  | 1.00 | Stiff brown CLAY. | |  |
| 1.50 | D | | |  | (1.29) | | |  |
| 2.00-2.29 | SPT | N50 15,10 for 80mm/15,20,15 for 35mm | 108.71 |  | 2.29 | | |  |
| | | | | | | Window sample borehole refused at 2.29m bgl. | | |

ABEC WINDOW SAMPLE 574017.GPJ ABEC TEMPLATE.GDT 10/1/24

| Boring Progress and Water Observations | | | | | | GENERAL REMARKS |
|--|------|-------|-------------------|---------|------------|---|
| Date | Time | Depth | Core/casing Depth | Dia. mm | Water Dpth | |
| | | | | | | CAT Used to check for services. No groundwater encountered. Monitoring standpipe installed to 2.00m bgl. Stable |

| | | | |
|--|--------------------------------|---------------------------|-----------------|
| All dimensions in metres Scale 1:25 | Client Thomas Owen Care Ltd | Contractor RP Drilling | Logged By NA |
|--|--------------------------------|---------------------------|-----------------|

APPENDIX D - LABORATORY TESTING RESULTS



ANALYTICAL TEST REPORT

Contract no: 128290

Contract name: Oxford Road, Dewsbury

Client reference: 574017

Clients name: Abbeydale BEC

Clients address: 4 Neville Street
Wakefield
WF1 5EF

Samples received: 13 November 2023

Analysis started: 13 November 2023

Analysis completed: 23 November 2023

Report issued: 23 November 2023

Key

U UKAS accredited test

M MCERTS & UKAS accredited test

\$ Test carried out by an approved subcontractor

I/S Insufficient sample to carry out test

N/S Sample not suitable for testing

NAD No Asbestos Detected

Approved by:

Samantha Rogerson
Reporting Manager

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

| Lab ref | Sample id | Depth (m) | Sample description | Material removed | % Removed | % Moisture |
|----------|-----------|-----------|---------------------------------------|------------------|-----------|------------|
| 128290-1 | WS01 | 0.20 | Sandy Loamy Clay with Gravel & Roots | - | - | 18.3 |
| 128290-2 | WS02 | 0.20 | Clayey Loam with Gravel & Roots | - | - | 5.7 |
| 128290-3 | WS02 | 0.70 | Sand with Gravel & Roots | - | - | 7.4 |
| 128290-4 | WS03 | 0.70 | Sandy Loamy Clay with Gravel & Roots | - | - | 16.9 |
| 128290-5 | WS04 | 0.70 | Sandy Clay with Gravel & Roots | - | - | 20.0 |
| 128290-6 | WS04 | 1.30 | Sandy Clay with Gravel | - | - | 6.6 |
| 128290-7 | WS05 | 0.20 | Sandy Clayey Loam with Gravel & Roots | - | - | 20.0 |
| 128290-8 | WS05 | 0.70 | Sandy Clayey Loam with Gravel & Roots | - | - | 19.1 |

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SOILS

| Lab number | | | 128290-1 | 128290-2 | 128290-3 | 128290-4 | 128290-5 | 128290-6 |
|---------------------------------------|--------------------|----------------------|------------|------------|------------|------------|------------|------------|
| Sample id | | | WS01 | WS02 | WS02 | WS03 | WS04 | WS04 |
| Depth (m) | | | 0.20 | 0.20 | 0.70 | 0.70 | 0.70 | 1.30 |
| Date sampled | | | 09/11/2023 | 09/11/2023 | 09/11/2023 | 09/11/2023 | 09/11/2023 | 09/11/2023 |
| Test | Method | Units | | | | | | |
| Arsenic (total) | CE264 ^M | mg/kg As | 22.7 | 27.7 | 14.3 | 16.9 | 10.2 | 4.7 |
| Beryllium (total) | CE264 ^M | mg/kg Be | 1.2 | 1.3 | 1.1 | 1.3 | 1.0 | 0.8 |
| Boron (water soluble) | CE063 ^U | mg/kg B | 0.9 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Cadmium (total) | CE264 ^M | mg/kg Cd | <2 | <2 | <2 | <2 | <2 | <2 |
| Chromium (total) | CE264 ^U | mg/kg Cr | 33.0 | 31.4 | 26.6 | 30.4 | 33.9 | 24.3 |
| Chromium (III) | CE208 | mg/kg CrIII | 33.0 | 31.4 | 26.6 | 30.4 | 33.9 | 24.3 |
| Chromium (VI) | CE263 | mg/kg CrVI | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| Copper (total) | CE264 ^M | mg/kg Cu | 85.4 | 46.4 | 24.5 | 41.7 | 23.9 | 18.1 |
| Lead (total) | CE264 ^U | mg/kg Pb | 68.6 | 60.6 | 33.1 | 36.4 | 23.9 | 14.8 |
| Mercury (total) | CE264 ^U | mg/kg Hg | <2 | <2 | <2 | <2 | <2 | <2 |
| Nickel (total) | CE264 ^M | mg/kg Ni | 29.5 | 24.7 | 24.2 | 32.2 | 22.5 | 21.4 |
| Selenium (total) | CE264 | mg/kg Se | <3 | <3 | <3 | <3 | <3 | <3 |
| Vanadium (total) | CE264 ^U | mg/kg V | 74.8 | 52.2 | 29.1 | 48.6 | 52.5 | 71.8 |
| Zinc (total) | CE264 ^M | mg/kg Zn | 107.2 | 92.3 | 70.2 | 83.1 | 67.7 | 83.8 |
| pH | CE004 ^M | units | 5.4 | 6.1 | 7.0 | 8.0 | 6.9 | 6.6 |
| Sulphate (2:1 water soluble) | CE061 ^U | mg/l SO ₄ | 544 | 155 | 43 | 74 | 21 | 24 |
| Cyanide (free) | CE077 | mg/kg CN | <1 | <1 | <1 | <1 | <1 | <1 |
| Cyanide (total) | CE077 | mg/kg CN | <1 | <1 | <1 | <1 | <1 | <1 |
| Phenols (total) | CE078 | mg/kg PhOH | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Organic Carbon (TOC) | CE197 | % w/w C | 3.0 | 5.1 | 2.5 | 1.8 | 0.8 | 0.9 |
| Estimate of OMC (calculated from TOC) | CE197 | % w/w | 5.1 | 8.8 | 4.4 | 3.0 | 1.3 | 1.6 |
| PAH | | | | | | | | |
| Naphthalene | CE087 ^M | mg/kg | 0.21 | <0.02 | <0.02 | <0.02 | <0.02 | 0.06 |
| Acenaphthylene | CE087 ^M | mg/kg | <0.02 | <0.02 | <0.02 | <0.02 | 0.03 | <0.02 |
| Acenaphthene | CE087 ^M | mg/kg | 0.17 | 0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Fluorene | CE087 ^U | mg/kg | 0.11 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Phenanthrene | CE087 ^M | mg/kg | 1.44 | 0.26 | <0.02 | 0.05 | 0.10 | 0.06 |
| Anthracene | CE087 ^U | mg/kg | 0.35 | 0.08 | <0.02 | <0.02 | 0.04 | 0.02 |
| Fluoranthene | CE087 ^M | mg/kg | 2.53 | 0.59 | <0.02 | 0.08 | 0.47 | 0.09 |
| Pyrene | CE087 ^M | mg/kg | 2.30 | 0.52 | <0.02 | 0.07 | 0.40 | 0.09 |
| Benzo(a)anthracene | CE087 ^U | mg/kg | 1.18 | 0.28 | <0.02 | 0.04 | 0.26 | 0.05 |
| Chrysene | CE087 ^M | mg/kg | 1.39 | 0.31 | <0.03 | 0.05 | 0.27 | 0.05 |
| Benzo(b)fluoranthene | CE087 ^M | mg/kg | 1.41 | 0.27 | <0.02 | 0.04 | 0.29 | 0.06 |
| Benzo(k)fluoranthene | CE087 ^M | mg/kg | 0.56 | 0.12 | <0.03 | <0.03 | 0.13 | <0.03 |
| Benzo(a)pyrene | CE087 ^U | mg/kg | 1.17 | 0.25 | <0.02 | 0.04 | 0.22 | 0.04 |
| Indeno(123cd)pyrene | CE087 ^M | mg/kg | 0.73 | 0.20 | <0.02 | 0.04 | 0.17 | 0.04 |
| Dibenz(ah)anthracene | CE087 ^M | mg/kg | 0.16 | 0.08 | 0.03 | 0.02 | 0.04 | <0.02 |
| Benzo(ghi)perylene | CE087 ^M | mg/kg | 0.76 | 0.17 | <0.02 | 0.03 | 0.16 | 0.04 |
| PAH (total of USEPA 16) | CE087 | mg/kg | 14.5 | 3.14 | <0.34 | 0.47 | 2.58 | 0.60 |
| TPH | | | | | | | | |
| VPH Aromatic (>EC5-EC7) | \$ | mg/kg | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |

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SOILS

| Lab number | | | 128290-1 | 128290-2 | 128290-3 | 128290-4 | 128290-5 | 128290-6 |
|---------------------------|--------|-------|------------|------------|------------|------------|------------|------------|
| Sample id | | | WS01 | WS02 | WS02 | WS03 | WS04 | WS04 |
| Depth (m) | | | 0.20 | 0.20 | 0.70 | 0.70 | 0.70 | 1.30 |
| Date sampled | | | 09/11/2023 | 09/11/2023 | 09/11/2023 | 09/11/2023 | 09/11/2023 | 09/11/2023 |
| Test | Method | Units | | | | | | |
| VPH Aromatic (>EC7-EC8) | \$ | mg/kg | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| VPH Aromatic (>EC8-EC10) | \$ | mg/kg | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| EPH Aromatic (>EC10-EC12) | CE250 | mg/kg | 4 | 1 | 1 | <0.5 | <0.5 | 3 |
| EPH Aromatic (>EC12-EC16) | CE250 | mg/kg | 11 | 4 | <1 | <1 | 1 | 6 |
| EPH Aromatic (>EC16-EC21) | CE250 | mg/kg | 22 | 5 | <2 | <2 | <2 | 6 |
| EPH Aromatic (>EC21-EC35) | CE250 | mg/kg | 98 | 14 | <5 | <5 | <5 | 131 |
| EPH Aromatic (>EC35-EC44) | CE250 | mg/kg | 87 | 6 | <1.5 | <1.5 | <1.5 | 167 |
| VPH Aliphatic (>C5-C6) | \$ | mg/kg | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| VPH Aliphatic (>C6-C8) | \$ | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| VPH Aliphatic (>C8-C10) | \$ | mg/kg | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| EPH Aliphatic (>C10-C12) | CE250 | mg/kg | 1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EPH Aliphatic (>C12-C16) | CE250 | mg/kg | 1 | 1 | 1 | 1 | <0.5 | 1 |
| EPH Aliphatic (>C16-C35) | CE250 | mg/kg | 23 | <4.5 | <4.5 | <4.5 | <4.5 | 31 |
| EPH Aliphatic (>C35-C44) | CE250 | mg/kg | 3 | <1 | <1 | <1 | <1 | 23 |
| Subcontracted Analysis | | | | | | | | |
| Asbestos (qualitative) | \$ | - | NAD | NAD | NAD | NAD | NAD | NAD |

Chemtech Environmental Limited

SOILS

| Lab number | | | 128290-7 | 128290-8 |
|---------------------------------------|--------------------|----------------------|------------|------------|
| Sample id | | | WS05 | WS05 |
| Depth (m) | | | 0.20 | 0.70 |
| Date sampled | | | 09/11/2023 | 09/11/2023 |
| Test | Method | Units | | |
| Arsenic (total) | CE264 ^M | mg/kg As | 28.4 | 14.6 |
| Beryllium (total) | CE264 ^M | mg/kg Be | 1.4 | 1.0 |
| Boron (water soluble) | CE063 ^U | mg/kg B | <0.5 | <0.5 |
| Cadmium (total) | CE264 ^M | mg/kg Cd | <2 | <2 |
| Chromium (total) | CE264 ^U | mg/kg Cr | 30.3 | 25.7 |
| Chromium (III) | CE208 | mg/kg CrIII | 30.3 | 25.7 |
| Chromium (VI) | CE263 | mg/kg CrVI | <0.04 | <0.04 |
| Copper (total) | CE264 ^M | mg/kg Cu | 42.5 | 52.6 |
| Lead (total) | CE264 ^U | mg/kg Pb | 66.2 | 59.0 |
| Mercury (total) | CE264 ^U | mg/kg Hg | <2 | <2 |
| Nickel (total) | CE264 ^M | mg/kg Ni | 26.1 | 20.2 |
| Selenium (total) | CE264 | mg/kg Se | <3 | <3 |
| Vanadium (total) | CE264 ^U | mg/kg V | 63.7 | 71.4 |
| Zinc (total) | CE264 ^M | mg/kg Zn | 83.8 | 91.0 |
| pH | CE004 ^M | units | 7.2 | 9.1 |
| Sulphate (2:1 water soluble) | CE061 ^U | mg/l SO ₄ | 22 | 20 |
| Cyanide (free) | CE077 | mg/kg CN | <1 | <1 |
| Cyanide (total) | CE077 | mg/kg CN | <1 | <1 |
| Phenols (total) | CE078 | mg/kg PhOH | <0.5 | <0.5 |
| Total Organic Carbon (TOC) | CE197 | % w/w C | 5.6 | 3.0 |
| Estimate of OMC (calculated from TOC) | CE197 | % w/w | 9.6 | 5.2 |
| PAH | | | | |
| Naphthalene | CE087 ^M | mg/kg | 0.03 | <0.02 |
| Acenaphthylene | CE087 ^M | mg/kg | <0.02 | <0.02 |
| Acenaphthene | CE087 ^M | mg/kg | 0.06 | <0.02 |
| Fluorene | CE087 ^U | mg/kg | 0.04 | <0.02 |
| Phenanthrene | CE087 ^M | mg/kg | 0.44 | 0.06 |
| Anthracene | CE087 ^U | mg/kg | 0.13 | <0.02 |
| Fluoranthene | CE087 ^M | mg/kg | 0.67 | 0.08 |
| Pyrene | CE087 ^M | mg/kg | 0.59 | 0.07 |
| Benzo(a)anthracene | CE087 ^U | mg/kg | 0.33 | 0.04 |
| Chrysene | CE087 ^M | mg/kg | 0.38 | 0.05 |
| Benzo(b)fluoranthene | CE087 ^M | mg/kg | 0.30 | 0.04 |
| Benzo(k)fluoranthene | CE087 ^M | mg/kg | 0.13 | <0.03 |
| Benzo(a)pyrene | CE087 ^U | mg/kg | 0.23 | 0.03 |
| Indeno(123cd)pyrene | CE087 ^M | mg/kg | 0.18 | 0.03 |
| Dibenz(ah)anthracene | CE087 ^M | mg/kg | 0.05 | <0.02 |
| Benzo(ghi)perylene | CE087 ^M | mg/kg | 0.16 | 0.02 |
| PAH (total of USEPA 16) | CE087 | mg/kg | 3.75 | 0.42 |
| TPH | | | | |
| VPH Aromatic (>EC5-EC7) | \$ | mg/kg | <0.05 | <0.05 |

Chemtech Environmental Limited

SOILS

| Lab number | | | 128290-7 | 128290-8 |
|---------------------------|--------|-------|------------|------------|
| Sample id | | | WS05 | WS05 |
| Depth (m) | | | 0.20 | 0.70 |
| Date sampled | | | 09/11/2023 | 09/11/2023 |
| Test | Method | Units | | |
| VPH Aromatic (>EC7-EC8) | \$ | mg/kg | <0.05 | <0.05 |
| VPH Aromatic (>EC8-EC10) | \$ | mg/kg | <0.05 | <0.05 |
| EPH Aromatic (>EC10-EC12) | CE250 | mg/kg | 2 | 4 |
| EPH Aromatic (>EC12-EC16) | CE250 | mg/kg | 4 | 9 |
| EPH Aromatic (>EC16-EC21) | CE250 | mg/kg | 5 | 16 |
| EPH Aromatic (>EC21-EC35) | CE250 | mg/kg | 43 | 29 |
| EPH Aromatic (>EC35-EC44) | CE250 | mg/kg | 19 | 7 |
| VPH Aliphatic (>C5-C6) | \$ | mg/kg | <0.05 | <0.05 |
| VPH Aliphatic (>C6-C8) | \$ | mg/kg | <0.1 | <0.1 |
| VPH Aliphatic (>C8-C10) | \$ | mg/kg | <0.05 | <0.05 |
| EPH Aliphatic (>C10-C12) | CE250 | mg/kg | <0.5 | 1 |
| EPH Aliphatic (>C12-C16) | CE250 | mg/kg | 1 | 2 |
| EPH Aliphatic (>C16-C35) | CE250 | mg/kg | <4.5 | <4.5 |
| EPH Aliphatic (>C35-C44) | CE250 | mg/kg | 2 | <1 |
| Subcontracted Analysis | | | | |
| Asbestos (qualitative) | \$ | - | NAD | NAD |

Chemtech Environmental Limited

METHOD DETAILS

| METHOD | SOILS | METHOD SUMMARY | SAMPLE | STATUS | LOD | UNITS |
|--------|---------------------------------------|---|-------------|--------|------|----------------------|
| CE264 | Arsenic (total) | Aqua Regia Extraction, ICPOES | Dry | M | 3 | mg/kg As |
| CE264 | Beryllium (total) | Aqua Regia Extraction, ICPOES | Dry | M | 0.2 | mg/kg Be |
| CE063 | Boron (water soluble) | Hot water extract, ICP-OES | Dry | U | 1 | mg/kg B |
| CE264 | Cadmium (total) | Aqua Regia Extraction, ICPOES | Dry | M | 2 | mg/kg Cd |
| CE264 | Chromium (total) | Aqua Regia Extraction, ICPOES | Dry | U | 2 | mg/kg Cr |
| CE208 | Chromium (III) | Calculation: Cr (total) - Cr (VI) | Dry | | 1 | mg/kg CrIII |
| CE263 | Chromium (VI) | Discrete Analyser | Dry | | | mg/kg CrVI |
| CE264 | Copper (total) | Aqua Regia Extraction, ICPOES | Dry | M | 2 | mg/kg Cu |
| CE264 | Lead (total) | Aqua Regia Extraction, ICPOES | Dry | U | 3 | mg/kg Pb |
| CE264 | Mercury (total) | Aqua Regia Extraction, ICPOES | Dry | U | 2 | mg/kg Hg |
| CE264 | Nickel (total) | Aqua Regia Extraction, ICPOES | Dry | M | 3 | mg/kg Ni |
| CE264 | Selenium (total) | Aqua Regia Extraction, ICPOES | Dry | U | 3 | mg/kg Se |
| CE264 | Vanadium (total) | Aqua Regia Extraction, ICPOES | Dry | U | 4 | mg/kg V |
| CE264 | Zinc (total) | Aqua Regia Extraction, ICPOES | Dry | M | 4 | mg/kg Zn |
| CE004 | pH | Based on BS 1377, pH Meter | As received | M | - | units |
| CE061 | Sulphate (2:1 water soluble) | Aqueous extraction, ICP-OES | Dry | U | 10 | mg/l SO ₄ |
| CE077 | Cyanide (free) | Extraction, Continuous Flow Colorimetry | As received | | 1 | mg/kg CN |
| CE077 | Cyanide (total) | Extraction, Continuous Flow Colorimetry | As received | | 1 | mg/kg CN |
| CE078 | Phenols (total) | Extraction, Continuous Flow Colorimetry | As received | | 0.5 | mg/kg PhOH |
| CE197 | Total Organic Carbon (TOC) | Carbon Analyser | Dry | | 0.1 | % w/w C |
| CE197 | Estimate of OMC (calculated from TOC) | Calculation from Total Organic Carbon | Dry | | 0.1 | % w/w |
| CE087 | Naphthalene | Solvent extraction, GC-MS | As received | M | 0.02 | mg/kg |
| CE087 | Acenaphthylene | Solvent extraction, GC-MS | As received | M | 0.02 | mg/kg |
| CE087 | Acenaphthene | Solvent extraction, GC-MS | As received | M | 0.02 | mg/kg |
| CE087 | Fluorene | Solvent extraction, GC-MS | As received | U | 0.02 | mg/kg |
| CE087 | Phenanthrene | Solvent extraction, GC-MS | As received | M | 0.02 | mg/kg |
| CE087 | Anthracene | Solvent extraction, GC-MS | As received | U | 0.02 | mg/kg |
| CE087 | Fluoranthene | Solvent extraction, GC-MS | As received | M | 0.02 | mg/kg |
| CE087 | Pyrene | Solvent extraction, GC-MS | As received | M | 0.02 | mg/kg |
| CE087 | Benzo(a)anthracene | Solvent extraction, GC-MS | As received | U | 0.02 | mg/kg |
| CE087 | Chrysene | Solvent extraction, GC-MS | As received | M | 0.03 | mg/kg |
| CE087 | Benzo(b)fluoranthene | Solvent extraction, GC-MS | As received | M | 0.02 | mg/kg |
| CE087 | Benzo(k)fluoranthene | Solvent extraction, GC-MS | As received | M | 0.03 | mg/kg |
| CE087 | Benzo(a)pyrene | Solvent extraction, GC-MS | As received | U | 0.02 | mg/kg |
| CE087 | Indeno(123cd)pyrene | Solvent extraction, GC-MS | As received | M | 0.02 | mg/kg |
| CE087 | Dibenz(ah)anthracene | Solvent extraction, GC-MS | As received | M | 0.02 | mg/kg |
| CE087 | Benzo(ghi)perylene | Solvent extraction, GC-MS | As received | M | 0.02 | mg/kg |
| CE087 | PAH (total of USEPA 16) | Solvent extraction, GC-MS | As received | | 0.34 | mg/kg |
| \$ | VPH Aromatic (>EC5-EC7) | Headspace GC-FID | As received | | 0.05 | mg/kg |
| \$ | VPH Aromatic (>EC7-EC8) | Headspace GC-FID | As received | | 0.05 | mg/kg |
| \$ | VPH Aromatic (>EC8-EC10) | Headspace GC-FID | As received | | 0.05 | mg/kg |
| CE250 | EPH Aromatic (>EC10-EC12) | Solvent extraction, GCxGC-FID | As received | | 1 | mg/kg |
| CE250 | EPH Aromatic (>EC12-EC16) | Solvent extraction, GCxGC-FID | As received | | 1 | mg/kg |
| CE250 | EPH Aromatic (>EC16-EC21) | Solvent extraction, GCxGC-FID | As received | | 1 | mg/kg |

Chemtech Environmental Limited

METHOD DETAILS

| METHOD | SOILS | METHOD SUMMARY | SAMPLE | STATUS | LOD | UNITS |
|--------|---------------------------|-------------------------------|-------------|--------|------|-------|
| CE250 | EPH Aromatic (>EC21-EC35) | Solvent extraction, GCxGC-FID | As received | | 1 | mg/kg |
| CE250 | EPH Aromatic (>EC35-EC44) | Solvent extraction, GCxGC-FID | As received | | 1 | mg/kg |
| \$ | VPH Aliphatic (>C5-C6) | Headspace GC-FID | As received | | 0.05 | mg/kg |
| \$ | VPH Aliphatic (>C6-C8) | Headspace GC-FID | As received | | 0.1 | mg/kg |
| \$ | VPH Aliphatic (>C8-C10) | Headspace GC-FID | As received | | 0.05 | mg/kg |
| CE250 | EPH Aliphatic (>C10-C12) | Solvent extraction, GCxGC-FID | As received | | 6 | mg/kg |
| CE250 | EPH Aliphatic (>C12-C16) | Solvent extraction, GCxGC-FID | As received | | 6 | mg/kg |
| CE250 | EPH Aliphatic (>C16-C35) | Solvent extraction, GCxGC-FID | As received | | 15 | mg/kg |
| CE250 | EPH Aliphatic (>C35-C44) | Solvent extraction, GCxGC-FID | As received | | 10 | mg/kg |
| \$ | Asbestos (qualitative) | HSG 248, Microscopy | Dry | U | - | - |

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

| | |
|-----|---|
| N | No (not deviating sample) |
| Y | Yes (deviating sample) |
| NSD | Sampling date not provided |
| NST | Sampling time not provided (waters only) |
| EHT | Sample exceeded holding time(s) |
| IC | Sample not received in appropriate containers |
| HP | Headspace present in sample container |
| NCF | Sample not chemically fixed (where appropriate) |
| OR | Other (specify) |

| Lab ref | Sample id | Depth (m) | Deviating | Tests (Reason for deviation) |
|----------|-----------|-----------|-----------|------------------------------|
| 128290-1 | WS01 | 0.20 | N | |
| 128290-2 | WS02 | 0.20 | N | |
| 128290-3 | WS02 | 0.70 | N | |
| 128290-4 | WS03 | 0.70 | N | |
| 128290-5 | WS04 | 0.70 | N | |
| 128290-6 | WS04 | 1.30 | N | |
| 128290-7 | WS05 | 0.20 | N | |
| 128290-8 | WS05 | 0.70 | N | |

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

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

Soil/Solid samples will be disposed of 4 weeks from initial receipt unless otherwise agreed.

Waters and leachate samples will be disposed of 2 weeks from report issue unless otherwise agreed.

DEFRA Licence for the introduction and movement within England of prohibited soil for chemical and physical analysis Licence No: 132693/469907-0

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

For soils and solids, analytical results are inclusive of stones, where applicable.

Moisture Content Calculated on a Wet Weight basis



4043
9462

LABORATORY REPORT



Contract Number: PSL23/9653

Report Date: 28 November 2023

Client's Reference:

Client Name: Abbeydale BEC

4 Neville Street
Wakefield
WF1 5EF

For the attention of: Norman Abbas

Project Name: Oxford Road, Dewsbury

Date Received: 15/11/2023

Date Commenced: 15/11/2023

Date Completed: 27/11/2023

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)

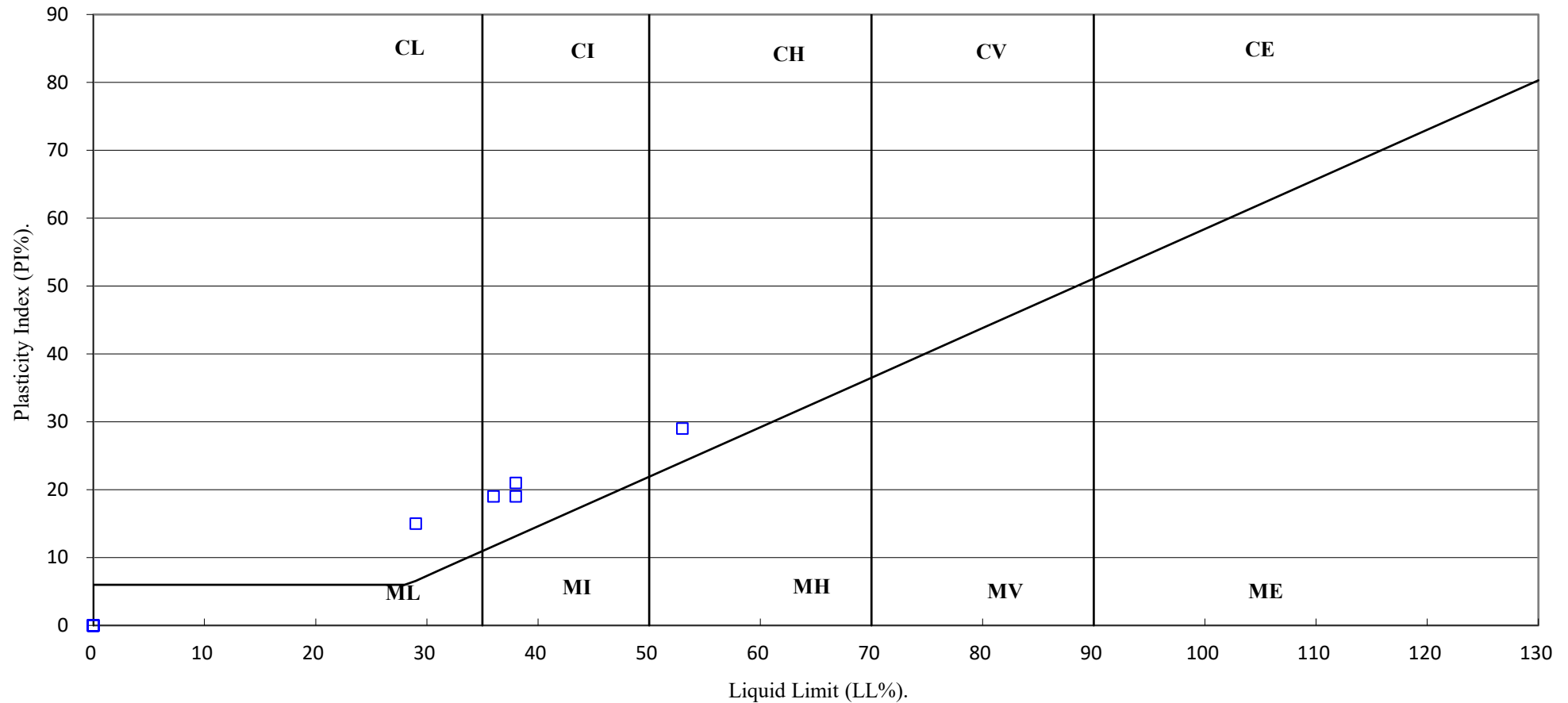
S Eyre
(Senior Technician)


M Fennell
(Senior Technician)

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Page 1 of

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



Oxford Road, Dewsbury

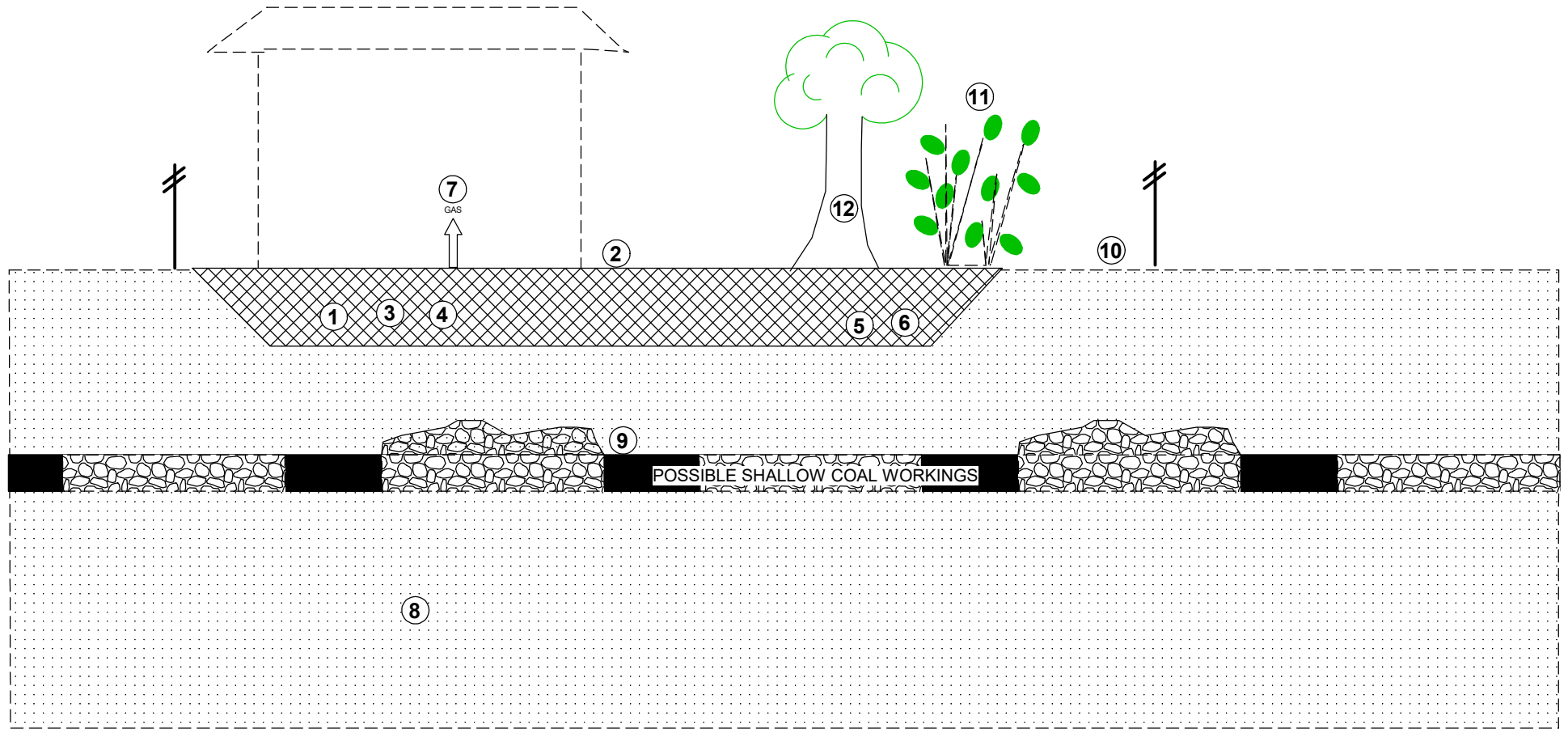
Contract No:

PSL23/9653

Client Ref:

5740

APPENDIX E - CONCEPTUAL SITE MODEL



Notes:

1. Diagram not to scale. This model is schematic only and does not reflect the specific ground conditions identified on or off the site.
2. See Conceptual Model Table for further details.
3. Sloping ground not depicted. Topography is considered in report text.

CONCEPTUAL SITE MODEL

Client: Thomas Own Care Ltd

Project: Oxford Road, Dewsbury

Number: 574017



| Ref. | Hazard | Source | Pathway | Receptor | Pollutant Linkage ? | Current anticipated risk (1) * | Comment | Action | Residual Risk *^ |
|------|--------------------------|-------------------------|-------------------------------------|-------------------|---------------------|--------------------------------|--|--|------------------|
| 1 | Metals & PAH | Made Ground | Ingestion of soil & indoor dust | Residents | ✓ | Low / 100% | No risks at levels present | No further action deemed necessary | Low |
| 2 | Carcinogenic PAHs | Fires / surface burning | Ingestion of soil & indoor dust | Residents | ✓ | High / 25% | No risks at levels present | No further action deemed necessary | Low |
| 3 | Asbestos fibres in soils | Made Ground | Inhalation of dust | Residents | ✓ | Low / 100% | No risks at levels present | No further action deemed necessary | Low |
| 4 | TPH | Made Ground | Inhalation of vapour | Residents | ✓ | Low / 100% | No risks at levels present | No further action deemed necessary | Low |
| 5 | Leachable metals | Made Ground | Leaching to groundwater | Groundwater | ✓ | Low / 100% | No groundwater encountered | No further action deemed necessary | Low |
| 6 | Leachable PAH | Made Ground | Leaching to groundwater | Groundwater | ✓ | Low / 100% | No groundwater encountered | No further action deemed necessary | Low |
| 7 | Ground gases | Infilled features | Vertical migration through | Residents | ✓ | Moderate / 100% | Ground gas protection measures required for new buildings | Ground gas protection measures required | Moderate |
| 8 | Radon | Bedrock | Vertical migration through | Residents | ✓ | Low / 100% | No risks at levels present | No further action deemed necessary | Low |
| 9 | Mine gases | Unknown | Vertical migration through | Residents | ✓ | Low / 100% | No shallow mine workings recorded or identified during previous GI | No further action deemed necessary | Low |
| 10 | Flooding | N/A | Over land flow | Residents | ✗ | Very low / 100% | Site not within designated flood risk zone | No further action deemed necessary | Very Low |
| 11 | Invasive plant species | Invasive plant species | Contact with concrete substructures | On site buildings | ✓ | Low / 100% | None identified during site walkover survey undertaken | Maintain vigilance during construction | Low |
| 12 | Trees | On site trees | Changes to soil moisture regime | On site buildings | ✓ | Low / 100% | Further investigation / assessment required | Dependent on final development proposals | Low |

NOTES:

- (1) Anticipated risk over percentage site area.
- * Refer to Risk Matrix Table within report text.
- ^ Anticipated risk after carrying out action

CONCEPTUAL MODEL TABLE

Client : Thomas Owen Care Ltd
Project : Oxford Road, Dewsbury
Job No : 574017

