

P e l l F r i s c h m a n n

Phase 2 Ratby, Reserved Matters

Drainage Statement

This report is to be regarded as confidential to our Client and is intended for their use only and may not be assigned except in accordance with the contract. Consequently, and in accordance with current practice, any liability to any third party in respect of the whole or any part of its contents is hereby expressly excluded, except to the extent that the report has been assigned in accordance with the contract. Before the report or any part of it is reproduced or referred to in any document, circular or statement and before its contents or the contents of any part of it are disclosed orally to any third party, our written approval as to the form and context of such a publication or disclosure must be obtained.

Report Ref.		100032-PEF-ZZ-XX-RP-C-0500_Phase 2 Drainage Statement				
File Path		P:\Data\10100032 - Ratby Phase 2 Reserved Matters\01 - WIP\Documents\Drainage\100032-PEF-ZZ-XX-RP-C-0500_Phase 2 Drainage Statement				
Suit	Rev	Description	Date	Originator	Checker	Approver
S2	P01	Preliminary Issue	05/04/24	L. Hulka	H. McColl	R. Holmes
S2	P02	Appendix B updated	29/04/24	L. Hulka	H. McColl	R. Holmes

Ref. reference. Rev revision. Suit suitability.

Prepared for**Lagan Homes Ltd**

Lagan Homes England
Finance House
Beaumont Road
Banbury
Oxfordshire
OX16 1RH

Prepared by**Pell Frischmann**

Suite 4.2 – 1, The Poynt
Wollaton Road
Nottingham
NG1 5FW



Pell Frischman

Contents

1 Introduction 3

1.1 Report Context 3

2 Design Parameters 4

2.1 Key Base Principles..... 4

3 Proposed Drainage Strategy 5

3.1 SuDS Hierarchy of Discharge 5

3.2 Proposed Drainage Design 5

3.3 Hydraulic Modelling Assessment 6

3.4 Outfall Design Summary..... 6

4 Monitoring and Maintenance 8

5 Summary and Conclusion 9

Tables

Table 4.1 Maintenance Schedule8

Appendices

Appendix A Phase 2 Ground Investigation Report (GIR)

Appendix B Detailed Drainage Layout

Appendix C Detailed Hydraulic Modelling Results (Surface and Foul)

Appendix D Surface Water Wetland Attenuation Calculations

Appendix E Detailed Wetland Basin Layout

1 Introduction

1.1 Report Context

- 1.1.1 Pell Frischmann has been commissioned by Lagan Homes to develop a detailed drainage strategy and statement to support, and discharge conditions associated with, the reserved matters planning application to Hinckley and Bosworth Borough Council.
- 1.1.2 This report has been prepared to collate and clarify key design principles utilised as a basis for the proposed detailed surface water drainage features in order to inform all relevant parties during design, approval, construction and maintenance.
- 1.1.3 This report has been based on the Sustainable Drainage Report (SDR) reference *106232-PEF-ZZ-XX-RP-CD-000001* and Flood Risk Assessment (FRA) reference *106232-PEF-ZZ-XX-RP-YE-000010* produced by Pell Frischmann and approved at outline planning to highlight how the detailed proposals conform to the strategy set out in these documents.
- 1.1.4 Outfall locations and catchment distribution have been designed to conform to both the strategy agreed at outline planning and existing greenfield runoff characteristics as far as reasonably practicable.
- 1.1.5 Areas of defined landscaping, such as embankments or green corridors where no development is to be undertaken, have been excluded from the design in order to avoid inflating discharge restrictions and to give an accurate depiction of runoff.
- 1.1.6 In order to reflect the existing runoff characteristics of the site, the finished levels have been designed so that they follow existing topography, so far as reasonably feasible, to a singular low point. At this low point, a wetland basin is to be constructed to attenuate the runoff from the development.
- 1.1.7 The Phase 2 Catchment will discharge, via a gravity connection, into the wetland basin (hereafter referred to as Basin 1) with the discharge rate being limited by a vortex flow control chamber. From the vortex flow control, a connection will be provided into the surface water drainage constructed as part of the adjacent Phase 1 development which eventually outfalls into an existing land drainage ditch.
- 1.1.8 Highway drainage / piped systems within the highway proposed to be adopted under a Section 38 agreement are subject to separate assessment to the LHA's requirements / DMRB specification and are not covered in this report.

2 Design Parameters

2.1 Key Base Principles

- 2.1.1 The proposed drainage strategy submitted as part of the outline planning application is detailed within the Sustainable Drainage Report (SDR) reference 106232-PEF-ZZ-XX-RP-CD-000001 undertaken by Pell Frischmann.
- 2.1.2 Within this report the following key design parameters are highlighted:
- Runoff from the development is to be restricted to the QBAR greenfield runoff rate of 9.9 l/s from developable areas based on the ICP SuDS method with an FEH rainfall profile.
 - Underlying geology does not promote the use of infiltration as a primary means of discharge.
 - The scheme should be hydraulically assessed up to the 100 year plus 40% climate change rainfall event such as not to exceed the peak runoff rate from the undeveloped site and not increase the risk of flooding off-site
 - Water quality management should be incorporated into the attenuation systems, utilising stilling basins, settlement ponds etc to provide an improvement on water quality discharge.
- 2.1.3 Proposals are to adhere to the key design parameters highlighted above to ensure conformity between detailed design and the approved drainage strategy.
- 2.1.4 In addition to the above the surface water drainage is to be designed in accordance with the following standards and best practice reports:
- Sewerage Sector Guidance (SSG) Approved Version 2.2
 - BS EN 752: 2017 “Drainage and sewer systems outside buildings”
 - BS 8582: 2013 “Code of Practice for Surface Water Management for development sites”
 - Ciria report C753 – “The SuDs Manual”
 - The Leicestershire Highway Design Guide
- 2.1.5 An impermeable area of 1.62ha, based on a 71.5% percentage of permeability, was assumed in the original strategy set out in the SDR with catchments having free discharge into the main strategic network.
- 2.1.6 Areas of known highway to be adopted by the LHA under an appropriate Section 278 or 38 agreement are assumed to be fully impermeable in order to provide a conservative design.
- 2.1.7 Landscaping beyond the extent of developable area (green strips, boundary clearance zones etc) have not been included in the overall developable areas of each catchment to avoid overcalculating discharge rates and provide a conservative strategy. It is assumed landscaped areas will drain via landscape drainage features incorporated into the on-plot drainage proposals or via existing conveyance paths such as perimeter drains.
- 2.1.8 An assessment of the site finished levels has been undertaken across the development to establish plot floor slab levels, spine road levels, private external levels, and wetland attenuation basin levels so that an in-depth assessment can be undertaken against the proposed drainage design. The site finished levels are subject to detailed design and approval by the LHA/Statutory Undertaker. Plot floor slab levels may lift or drop $\pm 450\text{mm}$ as the detailed design progresses post Reserved Matters submission.

3 Proposed Drainage Strategy

3.1 SuDS Hierarchy of Discharge

- 3.1.1 It was identified in the SDR, that was submitted for outline planning, that infiltration would be an unlikely means of primary discharge as the underlying geology was expected to have a low infiltration rate. Outline planning permission was granted subject to the following condition:

Condition 10 - No development approved by this planning permission shall take place until such time as infiltration testing has been carried out (or suitable evidence to preclude testing) to confirm or otherwise, the suitability of the site for the use of infiltration as a drainage element, has been submitted to and approved in writing by the Local Planning Authority.

- 3.1.2 A Phase 2 Ground Investigation Report (GIR) was undertaken by Travis Baker Geo-Environmental Ltd, to provide an appraisal of ground conditions and identify potential development constraints. A number of trial pits were excavated across the site to determine the underlying strata and it was revealed that these predominantly consists of fine soils grading to interbedded mudstone and sandstone.
- 3.1.3 These soils are considered to be of very low permeability and subsequently would not be suitable for soakaway drainage with the deeper interbedded mudstone and sandstone, present at a depth of 2m, also not suitable for infiltration due to the predominance of weathered mudstone. For reference, the GIR can be found in **Appendix A**.
- 3.1.4 Based on the findings on the GIR, the underlying geology does not promote the use of infiltration as the primary means of discharge. Following the requirements set out by Part H of Building Regulations, surface water discharge from the Phase 2 development shall be into a watercourse via an adoptable surface water drainage run that was constructed as part of Phase 1 residential development.

3.2 Proposed Drainage Design

- 3.2.1 A detailed drainage strategy for both the surface and foul water network has been developed, for the Phase 2 detailed masterplan, to demonstrate how the site will be effectively drained, based on the design parameters below, with pipe sizes and gradients detailed.

Surface Water

- 3.2.2 The below ground surface water drainage network has been designed to accommodate the following return periods:
- 1 in 1 year return period – No surcharging of network (except for the vortex flow control chamber)
 - 1 in 30 year return period – Surcharging of network with no flood risk (set at within 300mm of cover levels)
 - 1 in 100 year plus 40% climate change – Controlled flooding of network allowed whilst ensuring that Basin 1 achieves a freeboard of 400mm (min)

Foul Water

- 3.2.3 The below ground foul water drainage network has been designed to accommodate the peak design flow rate from the total number of dwellings. The peak foul rate is based on 4000 litres per dwellings per day (0.05 litres per second per dwelling) which equates to 3.75 l/s.
- 3.2.4 The detailed drainage layout, for both the surface and foul water network, can be found in **Appendix B**.

3.3 Hydraulic Modelling Assessment

- 3.3.1 A detailed hydraulic model for both the surface and foul water network has been prepared to demonstrate that the pipe sizes & gradients specified on the drainage layout are sufficient to convey the anticipated flows based on the design parameters set out in Section 3.2 of this report.
- 3.3.2 The assumed impermeable area from the development was originally determined to be circa 1.62ha. Based on the Phase 2 detailed masterplan, an accurate impermeable area has been calculated, at 1.672ha and this impermeable area has been used to sensitivity test the below ground surface water drainage network.
- 3.3.3 The hydraulics modelling results, tested against FEH data, for both the surface and foul water network are provided within **Appendix C**.
- 3.3.4 For robustness, Basin 1 has been tested with an added 10% increase of impermeable area to account for future urban creep which gives a final impermeable area of 1.840ha.
- 3.3.5 This impermeable area has been inputted into an updated source control model to test the system hydraulically against FEH data and results can be found in **Appendix D**. These results demonstrate that Basin 1 is sized appropriately for all future scenarios and the necessary freeboard can be achieved.

3.4 Outfall Design Summary

- 3.4.1 The Phase 2 outfall collects the entirety of the catchments from the proposed development including the proposed highway works serving the site. The outfall is to be restricted to a peak discharge rate of 9.9l/s in line with the base principles set out in the SDR.
- 3.4.2 Restriction is to be achieved by means of a suitably sized vortex flow control system installed within the chamber immediately downstream of the Basin 1. This ensures that in the event of any blockage or failure any attenuation systems will be fully utilized without compromising the upstream network whilst providing ample time and a visual indicator that immediate maintenance is required.
- 3.4.3 To mitigate potential introduced flood risk to the surrounding development and to ensure any emergency routes are clear of floodwater in exceedance events beyond the design parameters both the control system and any associated attenuation are to be lower than the development and highway. The discharge point, a local watercourse located circa 180m to the south of the site, is lower than the development and the above ground flood routing will be directed towards this in the event of a failure reducing risk to properties.
- 3.4.4 The primary means of attenuation proposed is a wetland, referred to as Basin 1, and is designed in accordance with the recommendations of CIRIA report C753 – “The SuDs Manual”, namely incorporating the following key features:
- a permanent pool with a depth between 600mm to 1000mm. The pool is proposed to act as a water quality treatment zone and to protect fine deposited sediments from resuspension. The base of this pool is to be varied throughout in an irregular pattern to encourage biodiversity and provide a visually natural form.
 - A 400mm deep aquatic bench surrounding the permanent pool, acting as a biological filter and providing ecology benefits.
 - Attenuation above the permanent pool of up to 1,770m³ covering up to the 100 year plus 40% climate change events in accordance with the design parameters stipulated in the SDR.
- 3.4.5 Suitably sized pipework links the strategic network into Basin 1 to ensure short-term storm events do not overburden the downstream wetland. The vortex flow control will restrict the discharge from Basin 1 to

ensure that the surface water runoff is attenuated without breaching a maximum water level of 400mm from the crest of the wetland in line with SSG guidance.

- 3.4.6 Based on the FEH 100 year plus 40% climate change return period simulated event the system performs successfully in accordance with the design parameters with no flooding incurred.
- 3.4.7 Basin 1 is situated along the southern boundary of the development, off the public highway with access gradients in the approaching landscape no greater than 1:20, facilitating ease of access for maintenance teams direct from the public highway or from the future developments. A 3m standoff from slopes and features is provided at the crest of both Basin 1 and the existing attenuation serving Phase 1 of the development to ensure a clear corridor for maintenance teams to traverse the perimeter of the basins safely.
- 3.4.8 A detailed wetland basin layout has been prepared for ease of reference and can be found within **Appendix E**.

4 Monitoring and Maintenance

- 4.1.1 To ensure proposals are adequately maintained by end users the following tables define the maintenance and management regimes for the drainage infrastructure and is to be used as a guide by the management company which will include Lagan Homes until such a that an appropriate management company is appointed. Soft landscaping maintenance and management proposals are to be independently verified by the Landscape Architect: -

Table 4.1 Maintenance Schedule

Type	Maintenance Work	Maintenance Frequency
Manholes / Inspection chambers not adopted by the LHA / Sewerage undertaker	Manholes / Inspection chamber openings are to be checked to ensure covers are removal and have no seized since prior inspection. Visual inspection of the internal chamber shall only be conducted is considered necessary and non-intrusive options are inapplicable, such as CCTV or dye testing. Confined space working permits are to be required before any internal inspections are undertaken	Routine inspection every two years
Gravity pipework not adopted by the LHA / Sewerage undertaker	Jet washing of the system to be carried out in order to reduce any siltation build-up / deposited debris within the surface water sewer. Where blockages are encountered an appropriate CCTV condition survey is to be undertaken to investigate the issue	Route inspection every three years
Road gully pots and channel drainage systems not adopted by the LHA / Sewerage undertaker	Pots are to be cleared of debris / siltation build up	Routine exercise every two years
Headwalls (sandbag/concrete)	Suitably qualified personnel to inspect headwall for defects and identified issues assessed and repaired as necessary	Routine inspection every two years
Headwall Trash Screens	Routine checks to be undertaken to remove any debris build-up and material disposed to licensed tip off-site Maintenance of physical trash screen to be undertaken annually, such as hinges, bolts etc to ensure functionality and corroded elements replaced as identified	Routine inspection four times a year, Routine maintenance every year
Flow Control Chambers	Internal chamber to be cleared of any debris / silt build-up in sump. In the event of blockage, the bypass plate is to be opened by utilising the bypass wire affixed to the chamber soffit for drainage of the chamber prior to access by maintenance team. Blockages / defects to be rectified and bypass plate disengaged following completion of maintenance	Routine maintenance every 6 months

- 4.1.2 For the proposed surface water drainage system to function correctly, it will need to be appropriately maintained. It is proposed that a large proportion of the site's drainage (e.g. spine sewers, laterals and attenuation basins) will be offered up for adoption by Severn Trent Water, the undertaker for the region.

5 Summary and Conclusion

5.1.1 In summary, the design proposals adequately demonstrate the following: -

- The site retains and restricts runoff up to and including the 100 Year plus 40% rainfall event utilizing the local monitored FEH rainfall data.
- Flooding in exceedance events is demonstrably controlled by ensuring basins and controls are below surrounding development and promote runoff into the local watercourse.
- Accessibility and maintenance by end-users has been considered in the interests of best practice and minimizing any unnecessary residual risks.
- Unrestricted discharge is accommodated into the proposed basin based on the impermeable catchment including for urban creep. Any increase in impermeability or redistribution will need to be compensated via further attenuation measures.

5.1.2 No attenuation upstream of the basin is required. Any pipework should be sized as necessary to convey flows towards the downstream wetland.

5.1.3 Any increase in impermeable area within developable areas beyond what has been assumed will need to be independently assessed and any additional upstream attenuation / restriction implemented accordingly to ensure no adverse impact on this overall strategy.

Appendix A Phase 2 Ground Investigation Report (GIR)



LAGAN HOMES

BURROUGHS ROAD, RATBY

**GROUND INVESTIGATION
REPORT**

**Travis Baker
Geo-Environmental Ltd**
Trinity Point
New Road
Halesowen
West Midlands
B63 3HY

Tel: 0121 550 8037
Fax: 0121 550 8047

**info@travisbaker.co.uk
www.travisbaker.co.uk**

DOCUMENT CONTROL



Project title: **Burroughs Road, Ratby**

Document type: **Ground Investigation Report**

Job number: **22069**

Date	Revision	Comments		
25 September 2023	GI01	Final		
		Prepared by	Checked by	Approved by
	Name	D Potts	L Geddes	D James
Date	Revision	Comments		
		Prepared by	Checked by	Approved by
Date	Revision	Comments		
		Prepared by	Checked by	Approved by
Date	Revision	Comments		
		Prepared by	Checked by	Approved by

This document has been prepared by Travis Baker Geo-Environmental Limited for the exclusive use by the commissioning party in accordance with the terms and conditions of the contract between Travis Baker Geo-Environmental Limited and the commissioning party. No other party may use, make use or rely on the contents of this report without the prior written consent of Travis Baker Geo-Environmental Limited. No liability is accepted by Travis Baker Geo-Environmental Limited for any use of this report other than for the purpose for which it was originally prepared. This document may contain and rely on information provided by Third Parties; no verification of such information has been undertaken and Travis Baker Geo-Environmental Limited accept no responsibility for any inaccuracies within such information. No part of this report may be copied or reproduced by any means without written permission from Travis Baker Geo-Environmental Limited.

The consultant's liability to the client arising out of or in connection with this document whether under the law of contract in tort (including negligence), in equity, or under statute or otherwise shall be limited to the fee paid for the preparation of this document. The consultant shall not be liable to the client in respect of any consequential or indirect loss or damage. The consultant shall be deemed to have been discharged from all liability in respect of this document whether under contract, in tort (including negligence), under statute or otherwise, on the expiration of 1 year from the completion of this document.

CONTENTS

1.0	INTRODUCTION	1
2.0	SITE SETTING AND HISTORY	2
3.0	PREVIOUS REPORTS	3 - 6
4.0	DETAILS OF GROUND INVESTIGATION	7
6.0	GROUND CONDITIONS	8 - 9
7.0	GROUND CONTAMINATION ASSESSMENT	10 - 12
8.0	GEOTECHNICAL ASSESSMENT	13 - 14
9.0	CONCLUSIONS AND RECOMMENDATIONS	15 - 17

APPENDICES

Appendix 1 – Sources of Information

Appendix 2 – Selection of Site Photographs

Appendix 3 – Trial Pit Logs and Photographs

Appendix 4 – Laboratory Geochemical Results

Appendix 5 – Geotechnical Results

Appendix 6 – Dynamic Cone Penetrometer Test Results

Appendix 7 – Adopted Generic Assessment Criteria for Long-term Human Health Laboratory

DRAWINGS

Drawing No.	Drawing Title	Scale
22069-GE01A	Phase 2 Site Location Plan	NTS
22069-GE02B	Phase 2 Site Features Plan	1:1000 @ A0
22069-GE03	Exploratory Hole Location Plan	1:1000 @ A0

1. INTRODUCTION

1.1 Introduction

- 1.1.1 This report has been compiled in accordance with instructions received from Mr Stuart Pearson on behalf of Lagan Homes Limited and in accordance with proposals prepared by Travis Baker Geo-Environmental Ltd (TBGE) and issued by email on 14 July 2023.
- 1.1.2 This report has been prepared to provide an appraisal of ground conditions and identify potential development constraints in respect of a proposed development at Burroughs Road in Ratby. The Burroughs Road site forms Phase 2 of the West Ratby Expansion development. Drawing 22069-GE01A identifies the subject area for the this report (hereafter referred to as the 'site') in the context of the wider West Ratby Expansion, which is referred to hereafter as the 'wider site area'.
- 1.1.3 The appraisal of the site, documented in this report has been undertaken in accordance with the risk assessment framework presented in 'Land Contamination Risk Management (LCRM)' (Environment Agency, 2020). LCRM requires that a phased approach be followed to assess the risk of ground contamination. This phased approach involves the production of a 'preliminary risk assessment' (PRA), followed by an intrusive investigation and quantitative risk assessment, followed in turn by the design, implementation and verification of remedial works should any contaminants be found in unacceptable concentrations.
- 1.1.4 A Phase 1 Desk Study Report has been prepared for the site by TBGE (Phase 1 Geo-Environmental Assessment), dated 16 May 2022 (hereafter referred to as the Desk Study Report). The Desk Study Report includes a desk study and site reconnaissance, and is therefore compliant with a PRA.
- 1.1.6 The ground investigation works detailed in this report have been designed based on the Conceptual Site Model (CSM) included in the Desk Study Report.
- 1.1.7 The information contained within this report includes a site specific summary of the relevant historical, geological and environmental setting of the site and immediate area. A list of the information sources used in the preparation of this report are included in Appendix 1. TBGE have exercised reasonable care in examining and interpreting this information but cannot guarantee its authenticity.
- 1.1.8 The findings of this report are based on the ground conditions identified at the individual exploratory holes and the associated laboratory testing. TBGE have used reasonable skill and diligence in interpreting the conditions between the exploratory hole locations, however we do not accept any liability for conditions that are not revealed by the exploratory holes or test data. Our recommendations on the ground conditions between or beneath exploratory hole locations are therefore for general guidance only and should be confirmed at or prior to construction.
- 1.1.9 This report has been prepared for the sole internal use and reliance of Lagan Homes. This report shall not be relied upon or transferred to other parties without the written authorisation of TBGE.

2. SITE DETAILS

2.1 Site Location and Description

Site Location and Description

2.1.1 The site comprises an irregular shaped parcel of land located to the north west of the wider proposed development area in the west of Ratby, Leicestershire. The site lies to the south of Markfield Road and west of the Phase 1 development area, which is currently under construction. The site comprises approximately 4.7 hectares of undeveloped agricultural land approximately centred at national grid reference 450525, 306405. The site location is shown on Drawing No. 22069-GE01A.

2.1.2 A Travis Baker Engineer initially conducted a site walkover on 27 April 2022 as part of the preliminary risk assessment of the wider site area. As part of the ground investigation works carried out on 1 August 2023, a walkover of the site has been undertaken to reflect the current status of the site. The main site features observed are outlined in the following paragraphs and are illustrated on Drawing No. 22069-GE02B. A selection of photographs taken during the ground investigation are included as Appendix 3.

Site Walkover - April 2022

2.1.3 At the time of the site visit the site comprised two undeveloped agricultural fields designated Fields 5 and 8 on drawing 20040-GE02B that were planted with an unknown crop. The eastern boundary of Field 8 comprises a track and Heras fencing associated with car parking for the Phase 1 development of the site (situated to the north east). A public footpath (R50) intersects the north east of Field 5. In the western corner of Field 5, an electricity pylon is located with overhead cables trending north west off-site.

Site Walkover – August 2023

2.1.4 At the time of the second site visit in August 2023, the site comprised undeveloped grassland with areas of disturbed ground that are assumed to be associated with relatively recent archaeological trenches. The field boundary between fields 5 and 8 are defined by hedgerows together with infrequent trees. Access to the site is off Markfield Road from the north leading to a private road with gravel hardstanding that grades to a dirt track. The gravel hardstanding extends from the access road into an adjacent field to the north east. The area formerly in use as a parking area for the Phase 1 works (observed April 2022) is no longer present.

2.1.5 The site is bound by hedgerows to the north east, south east and south west together with an area of woodland to the north west and Markfield Road to the north.

2.1.6 The topography varies across the site from a high point of 111.3m AOD in the approximate centre of the site that gently slopes to the east, south and west to a low point of 100.1m AOD in the eastern corner of the site. We have included a copy of the topographic survey on Drawing No. 22069-GE02B.

2.1.7 No signs of potentially significant contamination were noted during the site walkover.

2.1.8 No invasive species (i.e. Japanese knotweed, Himalayan balsam or giant hogweed) were observed during the site walkover however; it should be noted that we are not ecological specialists and consultation with suitably qualified consultants will be required to confirm their absence.

2.1.9 The main features observed on the site and in the surrounding area are shown on Drawing No. 22069-GE02B; a selection of site photographs taken from the initial walkover (April 2022) and site works (August 2023) is included in Appendix 2.

3. PREVIOUS DESK STUDY REPORT

3.1 Overview

- 3.1.1 The following subsections present a brief summary of the main findings and conclusions of the Travis Baker Phase 1 Geo-Environmental Assessment dated 16 May 2022. This report should be read in conjunction with the Desk Study Report for supporting background information. Please note, the Desk Study Report was prepared for the wider site area therefore not all of the information is relevant to the proposed development area.
- 3.1.2 This section aims to summarise the pertinent findings of the Desk Study Report relevant to the site and supplement the summary with further updated background research from online sources. Subsequently, an updated site-specific Conceptual Site Model (CSM) has been prepared that is suitable for the site.

3.2 Site History

Site Area

- 3.2.1 Based on historic mapping, the site has generally comprised undeveloped agricultural land from the 1880's until the present day with the exception of the north of the site (Field 8) where allotment gardens were mapped between the 1920's to the 1990's.

Surrounding Area

- 3.2.2 From the 1880's the surrounding area comprised undeveloped agricultural land and mixed woodland to the north. Residential development began in the 1900's to the south west with successive construction mapped until the present day. Aerial photography from publicly available online sources suggest mixed woodland to the north west was seeded in the late 1990's.

3.3 Geology

- 3.3.1 The site is reported to be overlain by superficial materials comprising diamicton of the Thrussington Member. These deposits are variable in nature but typically comprise brown to reddish brown gravelly clay with sand and silt. The superficial deposits are recorded to be underlain by the Edwalton Member with the material comprising red brown and greenish grey mudstone and siltstone with beds of dolomitic siltstone and fine grained sandstone.

3.4 Hydrology and Hydrogeology

- 3.4.1 There is a stream recorded to the south west of the site. The stream flows to the south east and joins another stream to the south of the site. These streams are recorded to join Rothley Brook further to the south east of the site.
- 3.4.2 The Thrussington Member is classified as a Secondary A aquifer defined as '*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. These are generally aquifers formerly classified as minor aquifers.*'
- 3.4.3 The underlying Edwalton Member is classified as a Secondary B aquifer defined as '*Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.*'
- 3.4.4 The site does not lie within a designated Groundwater Source Protection Zone (SPZ).

- 3.4.5 The Government's online Flood Map for Planning and the Groundsure report indicate that the site lies within 'Flood Zone 1' which means there is a low probability of flooding from rivers across the site.

3.5 Mining

- 3.5.1 The site lies outside of a Coal Mining Reporting Area therefore a Coal Mining report is not required for the site. Based on the underlying geology, the site is not considered to be at risk as a result of past underground coal mining.

3.6 Radon

- 3.6.1 It should be noted that the 'UKHSA-BGS Indicative Atlas of Radon in the United Kingdom' was updated on 1 December 2022 prior to the production of the Desk Study Report. The updated guidance indicates that radon potential has changed and is now categorised between 1% to 3% in this area. However, the recommendations have not changed and new properties constructed on the site will not require radon protective measures.

3.7 Landfill / Waste Sites

- 3.7.1 There are no active or historic landfill sites, waste treatment, transfer or disposal sites within 500m of the site (or wider site) boundary.

3.8 Services

- 3.8.1 Service information has been provided to us by Lagan Homes in April 2022. In addition, we have undertaken web-based service searches of utility providers for the site and surrounding area in July 2023 prior to the intrusive works. Aside from the electricity pylon in the west corner of the site (for which the connecting cables trend offsite), there are no water, gas or drainage services recorded on site.
- 3.8.2 The approximate locations of the known services are shown on Drawing No. 22069-GE02B.

3.9 Unexploded Ordnance

- 3.9.1 An Unexploded Ordnance (UXO) risk map produced by Zetica indicates that the risk of encountering UXO associated with World War II bombing raids beneath the site is 'low'. It should be noted that the risk map is drawn based on the bombing density of an area and does not take into account the specific historical use of the site during WWII therefore the possibility of encountering UXO cannot be completely discounted. However, based on the general absence of development on the site and lack of specific targets in the general area, the bomb risk is not considered to be elevated when compared with similar development projects.

3.10 Initial Conceptual Site Model

- 3.10.1 An initial Conceptual Site Model (CSM) is reported in the Desk Study Report, the relevant site specific points have been reproduced and it has been updated as necessary below. It incorporates the accepted 'Source-Pathway-Receptor' linkage ('contaminant linkage') approach outlined in Part 2A of the Environmental Protection Act 1990. In order for a contaminant linkage to exist, a source, pathway and receptor must all be present. Land Contamination Risk Management (LCRM) (Environment Agency, 2020) defines these elements as follows:

- **Source** – a contaminant or pollutant that is in, on or under the land and has the potential to cause harm or pollution

- **Pathway** – a route by which a receptor is, or could be affected by a contaminant
- **Receptor** – Something that could be adversely affected by a contaminant. Examples include humans, controlled waters, ecosystems and Part 2A receptors such as buildings, crops or animals.

3.10.2 LCRM expressly states that “without a contaminant linkage, there is not a risk – even if a contaminant is present”.

3.10.3 The aim of the CSM is therefore to provide a qualitative assessment of the risk posed to both human health and environmental receptors from potential on-site and off-site sources of ground contamination. Sections 3.11 to 3.13 below summarises the potential sources, pathways and receptors identified.

3.11 Potential Sources

3.11.1 Table 1, below, lists the remaining potential sources of ground contamination identified at the site and in the surrounding area, together with the contaminants that have the potential to have been generated. Contaminants arising from both current and historical land uses have been considered, and have been separated according to whether they are likely to have originated from within the development area or from other on-site or off-site source activity.

3.11.2 Table 1 below shows a visual representation of the CSM, an illustration of the relevant site features in respect to the site are shown on Drawing 22069-GE02B.

Table 1 – Initial Conceptual Site Model

	Source	Potential Contaminant
<i>On-Site</i>		
1	Possible infilling of natural hollows etc associated with farming activities	Asbestos, heavy metals, metalloids, polyaromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH)
2	Former allotment gardens in the north east	Organophosphorus pesticides, organochlorine pesticides, lead-/arsenic-based pesticides including lead arsenate
3	Historical use as farmland	Organophosphorus pesticides, organochlorine pesticides, total petroleum hydrocarbons (TPH), lead-/arsenic-based pesticides including lead arsenate)
4	Possible localised near-surface made ground associated with use as former compound / parking area (associated with Phase 1)	Polyaromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH)
<i>Off-Site</i>		
5	Historical use as farmland	Organophosphorus pesticides, organochlorine pesticides, total petroleum hydrocarbons (TPH), lead-/arsenic-based pesticides including lead arsenate)

3.12 Potential Pathways

3.12.1 The list below summarises possible pathways, which could allow potential receptors to be exposed to any contamination present at the site:

- Dermal contact, ingestion or inhalation of soil contaminants by site users;
- Ingestion of contaminated soil and soil-derived dust;
- Inhalation of contaminated dust;
- Migration of contaminants via service routes and foundations;
- Direct contact between contaminated soils and building substructures;
- Leachate migration into pore water from soil contamination, followed by dilution and dispersion through soils into groundwater.

3.13 Potential Receptors

3.13.1 Potential receptors to any contamination identified at the site include:

- Humans –construction workers and subsequent site users;
- Proposed development – buildings, substructures, flora and fauna;
- Controlled waters – ‘Secondary A’ classification of superficial soils beneath the site, ‘Secondary B’ aquifer classification of Edwalton Member bedrock geology;

3.13.2 There are no major ecological receptors recorded within a 1km radius of the site.

3.14 Preliminary Geotechnical Assessment

3.14.1 The superficial geology indicated by the BGS ‘Geoindex’ data (Thrussington Member) could potentially provide suitable bearing strata for conventional shallow foundations supporting lightly-loaded structures. However, foundation choice has the potential to be affected by the volume change potential of clay soils (particularly if present in the vicinity of existing or former trees). The ground investigation works need to provide geotechnical data for the proposed development, including an assessment of suitable foundation options for the proposed dwellings.

3.15 UXO

3.15.1 The online risk map maintained by Zetica UXO has been reviewed to determine the risk of unexploded ordnance at the site in relation to WWII. The map indicates the site to have a low bomb risk of 1% across the site and surrounding area although it indicates there was industry nearby to the west.

3.15.2 Although the site does not appear to pose an increased risk of UXO encounters when compared with similar sites, it is recommended that prior to any development a preliminary UXO risk assessment should be obtained, in line with current best practice.

4. DETAILS OF GROUND INVESTIGATION

4.1 Ground Investigation Strategy

4.1.1 The TBGE ground investigation was undertaken on 1 August 2023 and comprised the following works:

- 8 mechanically excavated trial pits (TP01 to TP08);
- 5 mechanically excavated shallow trial pits (HP01 to HP05);
- 6 dynamic cone penetrometer tests (DCP1 to DCP6);
- Geochemical and geotechnical laboratory analysis of soil samples.

4.1.2 The ground investigation was designed to provide a series of non-targeted sampling points to obtain a general spread of information across the proposed development area. All exploratory holes are to investigate any potential ground contamination and geotechnical risks identified in the initial CSM. Table 2 presents a summary of the ground investigation strategy:

Table 2 - Ground Investigation Strategy

Ref.	Objective
All exploratory holes	To investigate the nature and depth of any topsoil/made ground, any near surface superficial deposits and underlying strata.
Machine excavated trial pits (TP01 to TP08)	To investigate the stability of the near surface materials, the characteristics of the groundwater and obtain samples of the recovered material. Undertake hand shear vane tests within the undisturbed cohesive strata to 1.0m and suitable arisings below 1.0m to determine the consistency of the cohesive materials.
Hand excavated trial pits (HP01 to HP05)	To investigate the nature and depth of the topsoil and any near surface superficial deposits and allow collection of samples for laboratory chemical testing.
Dynamic Cone Penetration (DCP) tests (DCP1 – DCP6)	To obtain data for CBR equivalency values for road design.
Laboratory testing (contamination)	Analysis of soil samples to enable a quantitative assessment of the potential risks identified in the CSM.
Laboratory testing (geotechnical)	Analysis of soil samples to assist with foundation design.

4.1.3 The number and spacing of non-targeted sampling points across the site was generally compliant with that recommended by BS10175:2011+A2,2017 '*Investigation of potentially contaminated sites – Code of practice*' for a 'main investigation'.

4.1.4 The following subsections describe the investigation in additional detail. The locations of the exploratory holes are shown in Drawing No. 22069-GE03.

4.2 Investigation Methodology

4.2.1 All of the ground investigation fieldwork was undertaken under the direction of a TBGE engineer.

Underground Services Avoidance

- 4.2.2 Prior to the commencement of each trial pit and DCP each location was checked against the available service records. Further checks were made by the TBGE Engineer using a Cable Avoidance Tool (CAT) at each location.
- 4.2.3 Trial Pits TP01 to TP08 were dug using a mechanical excavator supplied by Colden Plant Hire, to depths of between 2.2m and 3.5m. After detailed examination, measurement and sampling the pits were backfilled with arisings and nominally compacted with the machine bucket to minimise (as far as possible) the risk of post-reinstatement settlement. HDP01 to HDP05 were excavated by hand to depths of between 0.4m and 0.5m to record the thickness of topsoil, nature of the underlying soils and allow collection of samples for laboratory testing.

Soil Sampling

- 4.2.4 Samples of the soil arisings recovered from the trial pits were collected by a TBGE Engineer. The guidance in BS10175:2011+A2,2017 '*Investigation of potentially contaminated sites – Code of practice*' was followed during the recovery of samples for chemical analysis. All samples were collected using a stainless-steel trowel, which was cleaned prior to the collection of each sample. The samples were stored in new clean containers (plastic tubs or amber jars, as appropriate to the laboratory analysis) and transported to the laboratory in insulated, refrigerated cool boxes under complete chain of custody documentation.

Records of Fieldwork

- 4.2.5 Detailed records of the trial pits have been produced in accordance with BS5930:2015+A1,2020 '*Code of practice for ground investigations*' and are included in Appendix 3. Photographs of the trial pits are included in Appendix 3.

4.3 Laboratory Testing

Chemical Testing

- 4.3.1 Selected soil samples were subjected to laboratory tests for a range of contaminants, as identified by the CSM in the Sections 3.11 to 3.13 above and also taking account of observations made during the fieldwork. Table 3 summarises the laboratory tests performed.

Table 3 - Contamination Laboratory Tests Performed on Soil Samples

Test	Topsoil	Edwalton Member
Travis Baker Greenfield Suite (◇)	12	12
USEPA16 Polyaromatic Hydrocarbons (PAHs) (#)	10	-
Total Organic Carbon	-	5
Asbestos screen	4	-
Pesticides	3	-
pH and water soluble sulphate	-	21

Notes on Table 3:

(◇): Travis Baker Greenfield suite includes: - arsenic, boron, cadmium, total chromium, copper, lead, mercury, nickel, selenium, zinc, phenol, sulphate (soluble), pH (Brownfield suite includes cyanide, beryllium, chromium VI and vanadium).

(#): USEPA16 PAH includes:- naphthalene, acenaphthylene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(123-cd)pyrene, benzo(ghi)perylene and dibenzo(a,h)anthracene.

5. GROUND CONDITIONS

5.1 Succession of Strata

- 5.1.1 The general succession of the underlying substrata comprises a surface covering of topsoil, typically overlying naturally occurring clay grading to interbedded clays further grading to interbedded mudstone and sandstone of the Edwalton Member.

5.2 Topsoil

- 5.2.1 Ploughed topsoil is encountered across the majority of the site (Field 5) comprising dark brown slightly sandy to sandy clay with rare rootlets. Localised constituents of gravel of chert and sandstone are recorded in TP06.
- 5.2.2 Topsoil is recorded in HP03 and HP04 in field 8 comprising black and dark brown sandy clay.

5.3 Natural Soils

Superficial Deposits

- 5.3.1 No materials considered representative of the recorded Thrusington Member were recovered across the site.

Edwalton Member

- 5.3.2 Beneath the topsoil, materials comprising orangish / reddish brown, light brown and light grey slightly sandy to sandy clay is found interbedded with silty very sandy clay and slightly sandy gravelly to very gravelly clay with variable proportions of mudstone, siltstone and sandstone lithorelicts, typically increasing with depth. Locally rare bands of cemented silty sand and sandstone are present. These materials are considered representative of weathered strata of the Edwalton Member.
- 5.3.3 Typically, the majority of trial pits TP01 and TP03 to TP08 were terminated at depths of between 1.9m to 3.4m on mudstone and sandstone attributed to the Edwalton Member.
- 5.3.4 At this stage, based on the ground conditions encountered, it is considered that there may be several thin bands of 'hard strata' encountered which may not be representative of bedrock and further bands of weathered materials (clays and sands) may potentially be present at greater depth.

5.4 Groundwater

- 5.4.1 During the fieldwork, groundwater was encountered in a single trial pit, TP01 at 3.0m, within sandstone of the Edwalton Member; all of the remaining trial pits remained dry.
- 5.4.2 Groundwater levels have the potential to fluctuate throughout the year and between years due to the dynamic balance between groundwater recharge, storage and discharge.

5.5 Stability

- 5.5.1 All of the exploratory holes remained stable for a short period following excavation. It is considered that excavations for conventional strip or trench fill foundations are unlikely to require support in the short term however, trench support should be provided for excavations requiring person entry or any excavation greater than 1.0m.

6. GROUND CONTAMINATION ASSESSMENT

6.1 Assessment Methodology

- 6.1.1 The ground contamination has been undertaken using a risk-based approach and incorporating the accepted 'contaminant linkage' approach.
- 6.1.2 The detailed assessment of ground contamination at the site has followed the tiered approach adopted in LCRM and presented below:
- **Preliminary risk assessment** – Development of a CSM, presenting the identified contaminant linkages at the site
 - **Generic quantitative risk assessment** – Selection of appropriate Generic Assessment Criteria (GAC) and comparison to the measured contaminant concentrations
 - **Detailed quantitative risk assessment** – Derivation of Site-specific Assessment Criteria (SSAC), if the measured contaminant concentrations exceed the respective GAC.

6.2 Preliminary Risk Assessment

- 6.2.1 An initial CSM is presented in Sections 3.10 to 3.13 of this report.
- 6.2.2 The ground conditions generally comprise topsoil overlying clays of the Edwalton Member grading to interbedded mudstone and sandstone. Groundwater was encountered at 3.0m at one location during the ground investigation; all other trial pits are recorded dry.
- 6.2.3 No visual or olfactory evidence of potentially significant contamination was recorded during the ground investigation.

6.3 Generic Quantitative Risk Assessment: Long-term Human Health (Future Site Users) and Proposed Development End Use

- 6.3.1 The risk to long-term human health has been assessed using a combination of published GAC for a residential development end use with homegrown produce. This is considered appropriate for the proposed development of residential housing with an associated garden area.
- 6.3.2 The contamination laboratory test results (included in Appendix 4) have been compared directly to GAC obtained from the following sources (listed in order of preference):
- Category 4 Screening Levels (C4SL). LCRM specifies that these should be used in preference to other published GAC where available
 - Suitable for Use Levels (S4UL) published by the Chartered Institute of Environmental Health (CIEH) and Land Quality Management (LQM)¹

The GAC adopted for this assessment are tabulated in Appendix 7.

¹ S4ULs have been used in accordance with the following: "Copyright Land Quality Management Ltd reproduced with permission; Publication number S4UL3689. All rights reserved".

- 6.3.3 Where appropriate, a soil organic matter (SOM) content of 1% has been conservatively assumed.
- 6.3.4 A summary table, which includes comparisons of the concentrations of each determinant measured by the laboratory tests to the respective GAC is included in Appendix 4. This indicates that the maximum detected concentrations of all of the tested determinants were below the respective GAC.

- 6.3.6 No fragments or fibres of asbestos were detected in any of the soil samples tested.
- 6.3.7 Three samples of topsoil were sent for organochlorine (OCP) and organophosphate (OPP) pesticide suites, all determinands are below the laboratory limit of detection.
- 6.3.8 On the basis of the foregoing, it is considered that the levels of contamination across the site are within acceptable limits for retention without presenting an unacceptable risk of harm to the long-term health of future site users; remedial works with respect to contamination issues will therefore not be required.
- 6.3.9 The site won top soil and sub soil materials will therefore be suitable for re-use within the proposed garden and landscape areas.

6.4 Generic Quantitative Risk Assessment: Short-term Human Health (Construction Workers)

- 6.4.1 The contamination test results do not indicate any element or compound of specific concern with respect to the short-term health of construction workers. Therefore, the use of normal site PPE consisting of overalls, gloves and protective footwear is generally considered appropriate to mitigate any potential short-term risk of exposure by construction workers to soil contamination at the site.
- 6.4.2 A Health and Safety Hazard Assessment for the detailed undertakings should be undertaken as stipulated under the Construction Design and Management (CDM) Regulations 2015, with due regard to the laboratory test results presented in Appendix 4 and also identifying procedures for dealing with any unforeseen hazardous conditions. A Working Health and Safety Plan should be prepared, which mitigates the potential risks to site workers from the specific undertakings as identified in the Hazard Assessment.

6.5 Generic Quantitative Risk Assessment: Controlled Waters

- 6.5.1 Groundwater was encountered at 3.0m at one location during the ground investigation. No risk to groundwater was identified in the CSM. The ground investigation revealed the site is generally underlain by relatively impermeable clays and no determinands tested within the soils are recorded above the relevant GAC. On the basis of the foregoing it is considered the risk to groundwater is very low therefore no further action is required in this regard.

6.6 Ground Gas

- 6.6.1 The initial CSM did not identify any potential sources of ground gas that were considered to represent a risk to construction workers or the end users of the site. The subsequent ground investigation confirmed the site comprises natural clays grading to interbedded mudstone and sandstone associated with the Edwalton Member. There was no evidence of any made ground, organic rich soils or potential vapour sources. Total organic carbon tests undertaken on the Edwalton Member recorded concentrations of between <0.1% to 0.2%. On this basis the natural clays are not considered to be a significant source of ground gas.
- 6.6.2 Based on the CL:AIRE Research Bulletin RB17 '*A Pragmatic Approach to Ground Gas Risk Assessment*' the site can be classified with the framework presented in CIRIA Report C665 (2007) as a characteristic situation 1 (CS1). On this basis ground gas protection measures are not considered necessary. This should be confirmed with the local authority / NHBC prior to construction.
- 6.6.3 The site is not located within an area that requires radon protection measures.

7. GEOTECHNICAL ASSESSMENT

7.1 In-Situ Testing

Hand Shear Vane Tests

- 7.1.1 Hand Shear Vane Tests (HSV's) were undertaken within the fine ground soils identified within trial pits. The individual HSV values are provided on the trial pit logs and are summarised in Table 4, below.

Table 4 – Summary of Hand Shear Vane Tests

Location	Depth (m)	Hand Shear Vane Results (kPa)				Consistency
		HSV 1	HSV 2	HSV 3	Average HSV	
TP01	0.9	124	94	106	108	Stiff
TP02	0.8	119	96	82	99	Stiff
	1.6	46	60	50	52	Firm
	1.8	42	59	40	47	Firm
TP03	0.7	81	91	83	85	Stiff
	2.1	82	70	76	76	Firm / Stiff
TP04	0.9	108	99	96	101	Stiff
	1.9	103	100	101	101	Stiff
TP05	0.8	94	79	128	95	Stiff
TP06	0.8	94	91	73	86	Stiff
TP07	0.8	81	94	100	92	Stiff
TP08	0.8	82	90	90	87	Stiff

- 7.1.2 The HSV results for the weathered Edwalton Member clays indicate an average shear strength of between 47kPa to 108kPa (firm to stiff).

7.2 Laboratory Geotechnical Testing

Natural Water Content and Plasticity Index

- 7.2.1 Measurements of the natural moisture content and Atterberg Limits have been carried out on five samples of clay soils taken from trial pits. The results are included as Appendix 5 and summarised in Table 5, below.

Table 5 – Summary of Laboratory Plasticity Index Test Results

Location	Depth (m bgl)	Plasticity Index % (Ip)	Modified Plasticity Index % (I'p)	Volume Change Potential
TP01	1.7	12	12	Low
TP03	2.2	15	13	Low
TP04	1.0	16	15.4	Low
TP05	1.3	29	21.2	Medium
TP08	1.5	19	18.6	Low

- 7.2.2 The results of the laboratory testing indicate that the test soil have a modified plasticity index of 12% to 21% (i.e. low to medium volume change potential).

Particle Size Distribution Tests

- 7.2.3 Measurements of the particle sizes of selected samples have been carried out on three samples of natural material. The results are included as Appendix 5.
- 7.2.4 The results indicate that the natural strata comprises a grading of 28% to 44% clay, 16% to 51% silt and 9% to 56% sand. The particle size distribution tests indicated a higher portion of silt sized particles than identified during the field tests suggesting the natural strata behaves as a clay. Further analysis of the silt portions indicates the natural materials comprise a higher portion of medium to coarse grained silt than fine to medium grained silt. Therefore, the observed friability and lower shear strength in disturbed strata may be attributed to this faction.

7.3 Buried Concrete Classification

- 7.3.1 Measurements of the water-soluble sulphate content and pH-values have been made for twenty three samples of natural soils and eleven of topsoil recovered from across the site. The water soluble sulphate contents ranged between 5mg/l and 199mg/l. In accordance with the recommendations of BRE Special Digest 1 (3rd Edition, 2005) the soil can be designated a Design Sulphate Class of DS-1.
- 7.3.2 The measured pH values ranged between 6.8 and 8.6 that indicates an Aggressive Chemical Environment for Concrete (ACEC) Class of AC-1.

7.4 Hard Strata

- 7.4.1 Bands of extremely weak sandstone are present at depths between 0.7m and 2.0m and were fully penetrated using a JCB 3CX. Hard strata comprising interbedded mudstone and sandstone are encountered between 1.8m and 3.3m at the base of the trial pits. However, the trial pits designated TP06 to TP08 were terminated between 1.9m and 2.5m on very weak sandstone.
- 7.4.2 Based on the results of the trial pit investigation, it is considered the uppermost 2.0m of soils beneath the site should generally be achievable with similar plant to a JCB 3CX or larger. Should there be a requirement to excavate deeper than 2m then specialist plant may be required to achieve the target depth.

7.5 Founding Horizon

- 7.5.1 The topsoil is not considered an appropriate horizon for direct founding.
- 7.5.2 The near surface ground conditions encountered generally comprise firm to stiff clay of the weathered Edwalton Member. It is considered that these soils will generally be suitable for standard strip and trench fill foundations for the proposed 2 and 2½ storey residential housing. Consideration will need to be given to the depth of founding in the presence of trees.
- 7.5.3 Foundation options are discussed in further detail in Section 8 of this report.

7.6 Soakaway Drainage Potential

- 7.6.1 The ground investigation revealed predominantly fine-grained soils grading to interbedded mudstone and sandstone. The fine soils are generally considered to be of very low permeability and unlikely to be suitable for soakaway drainage. The interbedded mudstone and sandstone present at a depth of 2.0m is also considered unlikely to be sufficiently permeable for soakaway drainage due to the ratio of weathered mudstone. Groundwater was encountered at 3.0m at one

location within the sandstone. Based on the foregoing these materials are unlikely to be suitable for soakaway drainage.

7.7 Highways

7.7.1 Six dynamic cone penetration tests (DCPs) were undertaken across the proposed development area at depths of up to 0.9m to provide a CBR equivalency value for future road design.

7.7.2 The results are provided in Appendix 6 and summarised in Table 6, below.

Table 6 – Summary of Estimated CBR Values from DCPs

Location (depth below surface)	Estimated CBR Value (%)
DCP1 (0.05 to 0.31)	6.6
DCP1 (0.31 to 0.59)	32
DCP1 (0.59 to 0.87)	13
DCP2 (0.03 to 0.32)	3.3
DCP2 (0.32 to 0.87)	7.7
DCP3 (0.03 to 0.16)	3.5
DCP3 (0.16 to 0.85)	7.2
DCP4 (0.03 to 0.87)	11
DCP5 (0.27 to 0.59)	9.4
DCP5 (0.59 to 0.86)	12
DCP6 (0.14 to 0.87)	9.3

7.7.3 The results of the DCP testing provide estimated CBR values of between 3.3% and 32% between existing ground level and 0.9m below.

7.7.4 In-situ CBR testing will need to be carried out at the formation level to confirm the CBR values of the near surface soils and confirm the highway construction.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Potential Development Constraints

8.1.1 Based on the findings of the ground investigation works documented in this report, it is considered that the following issues relating to ground contamination, geotechnical considerations and other potential development constraints will need to be addressed prior to redevelopment of the Burroughs Road, Ratby site:

- The presence of fine soils of medium volume change potential within the weathered Edwalton Member beneath the site;
- Presence of sandstone bands at various depths within clay soils in the weathered Edwalton Member;
- Variable CBR tests;
- Near surface soils unlikely to be suitable for soakaway drainage.

8.1.2 Each of these issues is discussed in further detail below.

8.2 Foundations

8.2.1 Underlying the topsoil materials the ground conditions generally comprise firm to stiff clays attributed to the weathered Edwalton Member with bands of sand and sandstone. Groundwater was encountered at 3.0m in one trial pit during the ground investigation and all other trial pits remained dry.

8.2.2 It is recommended that an allowable bearing pressure of 150kN/m² is used for initial design purposes for shallow strip / trench fill foundations founding on the weathered Edwalton Member to limit total settlements to less than 25mm. All strip / trench fill foundations should extend a minimum of 0.9m below ground level (both existing and proposed ground level - whichever is deeper) based on the presence of medium volume change potential clays. All foundations should extend a minimum of 0.2m into undisturbed competent material. In areas of potential tree influence, foundations should be extended in accordance with Chapter 4.2 of the NHBC Standards. Localised heave protection measures are also likely to be required.

8.2.3 It is considered unlikely that shallow groundwater will be an issue during excavation of foundations up to 2.5m. If localised seepages are encountered, these should be able to be managed by sump pumping.

8.2.4 Due to the variable nature of the weathered Edwalton Member overlying the site, there is the potential for a combination of clay, sand and sandstone based materials to be present within the base of future foundation excavations. To accommodate any minor settlement between the clay and sand fractions the groundworker could either:

- i. Extend the foundation deeper in parts to ensure the whole foundations lies on a consistent soil type, or;
- ii. Provide a layer of mesh reinforcement (say B385) across the join of the two material types (to be confirmed by a structural engineer).

8.2.5 Alternatively if there are frequent changes in the nature of the soils at founding level the foundation designs could include light mesh reinforcement (say, B385) across the whole foundation to accommodate any potential minor differential settlement between cohesive and granular fractions.

- 8.2.6 If any made ground, loose sands or soft clays are encountered at the proposed founding level, the excavation should be extended into underlying competent materials. Alternatively, any materials deemed unsuitable for founding should be removed and replaced lean mix concrete.
- 8.2.7 We have not been provided with a tree survey. Alternative founding options such as piled foundations may potentially need to be considered in areas of clay based soils where foundations need to extend beyond 2.5m due to tree influence. In such circumstances, it is recommended that allowances are made for steel tube or CFA piles. Additional site investigations (combined dynamic sampling / rotary cored boreholes) will be required to provide the geotechnical data for pile design. In areas where sandstone strata underlies the clay based soils it may be preferable to extend the trench fill foundation though to the sandstone.
- 8.2.8 Buried concrete should conform to Design Sulphate Class DS-1 and ACEC Class AC-1 of Special Digest 1 (3rd Edition, BRE, 2005).

8.3 Floor Slabs

- 8.3.1 Suspended / beam and block floor slabs will be required in localised areas due to tree influence, where plots are being raised or in areas of made ground (if encountered). Ground bearing floor slabs are likely to be appropriate elsewhere at the site.

8.4 Ground Contamination

- 8.4.1 The risk assessment included in Section 6 of this report identified that the levels of ground contamination in all of the soil samples tested are within acceptable limits for the proposed residential development. The topsoil (and subsoil) is considered suitable for re-use as part of the proposed development.
- 8.4.2 In the unlikely event that contamination is suspected during site enabling / construction works, procedures should be identified for dealing with unforeseen contamination. Specifically, works in the affected area(s) should cease and arrangements made for the suspected contamination to be inspected by a suitably qualified environmental specialist, followed by sampling and testing as appropriate. If these works identify the requirement for remediation, proposals should be communicated to the Local Planning Authority prior to implementation.

8.5 Ground Gas

- 8.5.1 There is a general absence of potential ground gas sources (i.e. made ground, recorded landfill sites, organic materials etc). On this basis, gas protection measures are not generally considered necessary for the site.
- 8.5.2 As discussed in Section 3.6, radon gas protection measures are not required.
- 8.5.3 It is recommended that the report is provided to the Local Authority at the earliest opportunity to confirm their requirements.

8.6 Groundwater / Stability

- 8.6.1 Groundwater was encountered in a single trial at 3.0m within sandstone of the Edwalton Member during the ground investigation; all other trial pits were recorded to be dry. It is considered localised seepages should be controllable by sump pumping.
- 8.6.2 The trial pits generally remain stable. Shallow excavations are unlikely to require support in the short term.

8.8 Soakaway Potential

- 8.8.1 The ground investigation revealed predominantly fine soils grading to interbedded mudstone and sandstone. The fine soils are generally considered to be of very low permeability and not suitable for soakaway drainage. The interbedded mudstone and sandstone present at a depth of 2.0m, is considered unlikely to be sufficiently permeable for soakaway drainage due to the preponderance of weathered mudstone. Groundwater was encountered at 3.0m at one location within the sandstone (although could be higher during / after periods of wet weather). Based on the foregoing these materials are not considered suitable for soakaway drainage.

8.9 Hard Strata

- 8.9.1 Bands of extremely weak sandstone are present at depths between 0.7m and 2.0m and were fully penetrated using a JCB 3CX. Hard strata comprising interbedded mudstone and sandstone are encountered between 1.8m and 3.3m at the base of the trial pits. Trial pits designated TP06 to TP08 were terminated between 1.9m and 2.5m on very weak sandstone. The JCB 3CX typically progressed through the thin bands of mudstone and sandstone with only two trial pits (TP01 and TP07) terminated due to limited progression (bucket scraping on the base).
- 8.9.2 It is considered the uppermost 2.0m of soils beneath the site should generally be achievable with similar plant to a JCB 3CX or larger. Should there be a requirement to excavate deeper than 2m then specialist plant may be required to achieve the target depth.

8.10 Recommendations for Further Investigation

- 8.10.1 Based on the information provided in this report the following outstanding issues have been identified which would benefit from further works:
- Foundation zoning plan and accompanying tree survey to determine if any plots will be affected by tree influence;
 - Possible requirement for deeper boreholes should a piled foundation solution be required.

APPENDICES

APPENDIX 1
Sources of Information

BURROUGHS ROAD, RATBY

Appendix 1 – List of Information Sources

The following principal sources of information have been consulted in the preparation of this report:

- Environment Agency (2020). Contaminated Land Risk Management (LCRM). Accessed at www.gov.uk/government/publications;
- British Standards Institution. BS10175:2011 + A2:2017 'Investigation of Potentially Contaminated Sites – Code of Practice';
- Groundsure 'Enviro + Geo-Insight' Report No. GS-8666019, dated 11 April 2022;
- British Geological Survey 'Onshore GeoIndex', including digitised geological map information and borehole records. Accessed at <https://mapapps2.bgs.ac.uk/geoindex>;
- British Geological Survey map reference '*Coalville. England and Wales Sheet 155. Bedrock and Drift Geology. 2010.*'
- UK Health Security Agency UK Radon Website
- Environment Agency (2008). R&D Publication 66 : 2008 Guidance for the Safe Development of Housing on Land Affected by Contamination Volume 1 and 2
- British Standards Institution. BS5930:2015+A1,2020 'Code of Practice for Ground Investigations';
- British Standards Institution. BS1377-2:1990 'Methods of test for soils for civil engineering purposes';
- British Standards Institution. BS EN ISO 14688-2:2018 'Geotechnical Investigation and Testing. Principles for Classification';
- Chartered Institute of Environmental Health (CIEH) and Land Quality Management (LQM) S4ULs for Human Health Risk Assessment (2015) – Publication Number S4UL3689;
- Department for Environment, Food and Rural Affairs (2014) Report SP1010 'Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Final Project Report (Revision 2)';
- Health and Safety Executive. 'EH40/2005 Workplace Exposure Limits' (4th Edition, 2020);
- CIRIA (2007) Report C665 'Assessing Risks Posed by Hazardous Ground Gases to Buildings';
- British Standards Institution. BS8485:2015+A1,2019 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings;
- BRE. 'Concrete in Aggressive Ground'. 3rd Edition, 2005;
- Statutory Instrument 2004 No. 1375. 'The Landfill (England and Wales) (Amendment) Regulations 2004.

APPENDIX 2
Selection of Site Photographs

April 2022 Site Walkover

**Appendix 2 – Selection of Photographs
Burroughs Road, Ratby**



View across Field 5, facing west



View across Field 5, facing southwest

**Appendix 2 – Selection of Photographs
Burroughs Road, Ratby**



View of Field 8, facing north west

August 2023 Site Walkover



Looking south at the private access road off Markfield Road in the north of the site



Looking south further down the private access road



Looking north east across Field 8 from the private access road



Looking south at an accumulation of surface water near the private access road



Looking north east across Field 5 at the Phase 1 area



Looking south west across Field 5



Looking north west from the south west of Field 5



Looking west from the south of Field 5

APPENDIX 3
Trial Pit Logs and Photos



Site

Burroughs Road, Ratby

Trial Pit Number

HP01

Machine : JCB 3CX

Method : Trial Pit

Dimensions

Ground Level (mOD)

107.40

Client

Lagan Homes Limited

Job

Number
22069

Location

450481 E 306310 N

Dates

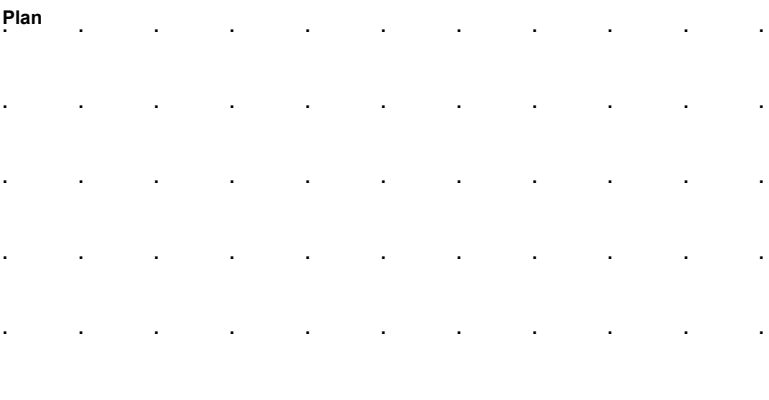
01/08/2023

Engineer

Travis Baker Geo-Environmental

Sheet

1/1

Plan 	Remarks Shallow trial pit for chemical testing. Backfilled with arisings upon completion.		
Scale (approx) 1:25	Logged By DP	Figure No. 22069.HP01	



Burroughs Road, Ratby

**Trial Pit
Number
HP02**

Method : Trial Pit

Dimensions

Ground Level (mOD)

104.00

Client	
---------------	--

Lagan Homes Limited

Job	Rate	Time	Cost
1	10	10	100
2	20	20	400
3	30	30	900
4	40	40	1600
5	50	50	2500
6	60	60	3600
7	70	70	4900
8	80	80	6400
9	90	90	8100
10	100	100	10000

Number
22069

Location

450416 E 306393 N

Dates

01/08/2023

Engineer

Travis Baker Geo-Environmental

Sheet

1/1

[illegible]

Plan

Remarks

Shallow trial pit for chemical testing.
Backfilled with arisings upon completion.

Scale (approx)

1:25

Logged By

DP

Figure No.

22069.HP02



Burroughs Road, Ratby

**Trial Pit
Number**
TP01

Method : Trial Pit

Dimensions

Ground Level (mOD)

108.50

Client	
---------------	--

Lagan Homes Limited

Job

Number
22069

Location

450663 F 306423 N

Dates

01/08/2023

Engineer

Travis Baker Geo-Environmental

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
0.10	D		124, 94, 106/Av. 108.00		(0.30)	Dark brown slightly sandy CLAY with rare rootlets. - (PLOUGHED TOPSOIL)	
0.40	D			108.20	0.30 (0.40)	Stiff reddish brown mottled light grey CLAY. - (EDWALTON MEMBER)	
				107.80	0.70 (0.10)	Extremely weak completely weathered light grey SANDSTONE with clay partings. - (EDWALTON MEMBER)	
				107.70	0.80		
0.90	HSV 108kPa					Stiff reddish brown and light grey interbedded slightly sandy CLAY and silty very sandy CLAY. Light grey bands include rare sandstone lithorelicts. - (EDWALTON MEMBER)	
1.20	D				(0.70)		
				107.00	1.50	*Firm (damp and friable) reddish brown mottled light grey silty sandy CLAY with frequent mudstone and sandstone lithorelicts. - (EDWALTON MEMBER)	
1.70	B				(1.30)		
2.50	D						
				105.70	2.80 (0.20)	Very weak highly weathered light grey SANDSTONE. - (EDWALTON MEMBER)	
				105.50	3.00	Excavator scraping at the base.	
						Complete at 3.00m	

Plan

Remarks

Groundwater encountered at 3.0m during excavation.
Pit sides stable during excavation and for a short period afterwards.
Backfilled with arisings upon completion.
Hand shear vane at 0.9m tested in-situ; below 1.0m recovery is too friable to test.
*Recovered arisings generally comprise softened strata. However, it is considered that due to the damp and friable nature of this material, excavation has reduced the consistency, therefore firm is considered appropriate.

Scale (approx)

1:25

Logged By

DP

Figure No.

22069.TP01



Travis Baker Geo-Environmental Ltd

Site
Burroughs Road, Ratby

Trial Pit Number
TP02

Machine : JCB 3CX Method : Trial Pit		Dimensions		Ground Level (mOD) 110.00		Client Lagan Homes Limited		Job Number 22069	
		Location 450617 E 306442 N		Dates 01/08/2023		Engineer Travis Baker Geo-Environmental		Sheet 1/1	

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D				(0.30)	Dark brown sandy CLAY with rare rootlets. - (PLOUGHED TOPSOIL)		
0.50	D			109.70	0.30	Stiff reddish brown mottled light grey slightly sandy silty CLAY. Rare light grey pockets comprise sandy clay with rare sandstone lithorelicts. - (EDWALTON MEMBER)		
0.80	HSV 99kPa		119, 96, 82/Av. 99.00		(1.20)			
1.40	B			108.50	1.50	Firm reddish brown and light grey slightly sandy CLAY with occasional sandstone lithorelicts. - (EDWALTON MEMBER)		
1.60	HSV 52kPa		46, 60, 50/Av. 52.00		(0.40)			
1.80	HSV 47kPa		42, 59, 40/Av. 47.00	108.10	1.90	Extremely weak completely weathered light grey SANDSTONE. - (EDWALTON MEMBER)		
2.00	D			108.00	(0.10)	Firm reddish brown mottled light grey CLAY. - (EDWALTON MEMBER)		
				107.90	(0.10)			
				107.80	(0.10)	Extremely weak completely weathered light grey SANDSTONE. - (EDWALTON MEMBER)		
					(1.10)	Stiff slightly sandy CLAY with frequent mudstone and sandstone lithorelicts. - (EDWALTON MEMBER)		
						Excavator lightly scraping through strata from 3.0m.		
				106.70	3.30	Very stiff reddish brown CLAY with occasional mudstone lithorelicts. - (EDWALTON MEMBER)		
3.50	D			106.50	3.50	Complete at 3.50m		

Plan					Remarks			
.	.	.	.	.	Hand shear vane at 0.8m tested in-situ; below 1.0m tested on boulder sized disturbed samples. Groundwater not encountered at during excavation. Pit sides stable during excavation and for a short period afterwards. Backfilled with arisings upon completion.			
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
					Scale (approx)		Logged By	Figure No.
					1:25		DP	22069.TP02



Travis Baker Geo-Environmental Ltd

Site
Burroughs Road, Ratby

Trial Pit Number
TP03

Machine : JCB 3CX Method : Trial Pit		Dimensions		Ground Level (mOD) 109.90		Client Lagan Homes Limited		Job Number 22069	
		Location 450604 E 306393 N		Dates 01/08/2023		Engineer Travis Baker Geo-Environmental		Sheet 1/1	

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D		81, 91, 83/Av. 85.00	109.60	(0.30)	Dark brown sandy CLAY with rare rootlets. - (PLOUGHED TOPSOIL)		
0.40	D				0.30	Stiff reddish brown mottled light grey slightly sandy CLAY. - (EDWALTON MEMBER)		
0.70	HSV 85kPa				(1.10)			
1.00	D				1.40	Stiff reddish brown and light grey interbedded slightly sandy CLAY and sandy slightly gravelly CLAY. Gravel is fine to coarse angular sandstone lithorelicts. - (EDWALTON MEMBER)		
				108.50	(0.30)			
				108.20	1.70	Extremely weak completely weathered light grey SANDSTONE. - (EDWALTON MEMBER)		
				108.10	(0.10)			
					1.80	Stiff reddish brown and light grey interbedded slightly sandy CLAY and slightly sandy very gravelly CLAY. Gravel is fine to coarse angular sandstone lithorelicts. - (EDWALTON MEMBER)		
2.10	HSV 76kPa		82, 70, 76/Av. 76.00		(1.00)			
2.20	B							
2.40	B							
2.70	D				2.80	Extremely weak completely weathered light grey mottled reddish brown interbedded MUDSTONE and SANDSTONE. - (EDWALTON MEMBER)		
				107.10	(0.60)			
				106.50	3.40	Complete at 3.40m		

Plan					Remarks			
.	.	.	.	.	Backfilled with arisings upon completion. Pit sides stable during excavation and for a short period afterwards. Groundwater not encountered at during excavation. Hand shear vane at 0.7m tested in-situ; below 1.0m tested on boulder sized disturbed samples.			
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
					Scale (approx)	Logged By	Figure No.	
					1:25	DP	22069.TP03	



Travis Baker Geo-Environmental Ltd

Site
Burroughs Road, Ratby

Trial Pit Number
TP04

Machine : JCB 3CX Method : Trial Pit		Dimensions		Ground Level (mOD) 110.70		Client Lagan Homes Limited		Job Number 22069	
		Location 450568 E 306375 N		Dates 01/08/2023		Engineer Travis Baker Geo-Environmental		Sheet 1/1	

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D				(0.40)	Dark brown sandy CLAY. - (PLOUGHED TOPSOIL)		
0.60	D			110.30	0.40 (0.50)	Stiff slightly sandy gravelly CLAY. Gravel is fine to coarse angular sandstone. - (MADE GROUND - REWORKED EDWALTON MEMBER - ARCHAEOLOGICAL TRENCH)		
0.90	HSV 101kPa		108, 99, 96/Av. 101.00	109.80	0.90	Firm reddish brown locally mottled light grey sandy CLAY. - (EDWALTON MEMBER)		
1.00	B				(0.50)			
				109.30	1.40 (0.20)	Light grey silty SAND with rare sandstone lithorelicts. - (EDWALTON MEMBER)		
				109.10	1.60 (0.40)	Stiff reddish brown locally mottled light grey slightly sandy CLAY with occasional pockets of light grey slightly gravelly very sandy clay. Gravel is fine to medium angular sandstone lithorelicts. - (EDWALTON MEMBER)		
1.90	HSV 101.33kPa		103, 100, 101/Av. 101.33	108.70	2.00	Stiff light grey and reddish brown interbedded slightly sandy CLAY and slightly sandy gravelly CLAY. Gravel is fine to medium subangular sandstone lithorelicts. - (EDWALTON MEMBER)		
2.20	D				(0.80)			
				107.90	2.80 (0.40)	Extremely weak completely weathered light grey and reddish brown interbedded MUDSTONE and SANDSTONE with occasional clay partings. - (EDWALTON MEMBER)		
3.00	D			107.50	3.20	Complete at 3.20m		

Plan					Remarks			
.	.	.	.	.	Excavated within an area of an archaeological trench. Hand shear vane at 0.9m tested in-situ; below 1.0m tested on boulder sized disturbed samples. Groundwater not encountered during excavation. Pit sides stable during excavation and for a short period afterwards. Backfilled with arisings upon completion.			
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
					Scale (approx)	Logged By	Figure No.	
					1:25	DP	22069.TP04	



Travis Baker Geo-Environmental Ltd

Site
Burroughs Road, Ratby

Trial Pit Number
TP05

Machine : JCB 3CX Method : Trial Pit		Dimensions		Ground Level (mOD) 111.00		Client Lagan Homes Limited		Job Number 22069	
		Location 450553 E 306415 N		Dates 01/08/2023		Engineer Travis Baker Geo-Environmental		Sheet 1/1	

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D				(0.30)	Dark brown sandy CLAY. - (PLOUGHED TOPSOIL)		
0.40	D			110.70	0.30	Stiff reddish brown slightly sandy gravelly CLAY with frequent sandstone lithorelicts. Gravel is well rounded quartzite. - (EDWALTON MEMBER)		
0.80	HSV 95.6kPa		94, 76, 128, 93, 87/Av. 95.60		(0.90)			
1.30	B			109.80	1.20	Firm reddish brown mottled light grey slightly sandy CLAY with pockets of light grey sand. - (EDWALTON MEMBER)		
1.80	D			109.10	1.90	Firm reddish brown and light grey interbedded slightly sandy CLAY and slightly gravelly sandy CLAY. Gravel is fine to medium angular sandstone lithorelicts. - (EDWALTON MEMBER)		
2.50	D			108.40	2.60	Extremely weak completely weathered light grey SANDSTONE with frequent bands of reddish brown clay. - (EDWALTON MEMBER)		
				108.00	3.00	Very weak highly weathered light grey SANDSTONE. - (EDWALTON MEMBER)		
				107.80	3.20	Complete at 3.20m		

Plan					Remarks			
.	.	.	.	.	Backfilled with arisings upon completion. Pit sides stable during excavation and for a short period afterwards. Groundwater not encountered during excavation. Hand shear vane at 0.8m tested in-situ; below 1.0m recovery is too friable to test.			
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
					Scale (approx)	Logged By	Figure No.	
					1:25	DP	22069.TP05	



Travis Baker Geo-Environmental Ltd

Site
Burroughs Road, Ratby

Trial Pit Number
TP06

Machine : JCB 3CX Method : Trial Pit		Dimensions		Ground Level (mOD) 111.00		Client Lagan Homes Limited		Job Number 22069	
		Location 450553 E 306415 N		Dates 01/08/2023		Engineer Travis Baker Geo-Environmental		Sheet 1/1	

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D		94, 91, 73/Av. 86.00	110.70	(0.30)	Dark brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium well rounded chert and angular sandstone. - (PLOUGHED TOPSOIL)		
					0.30	Stiff reddish brown slightly sandy CLAY with rare mudstone lithorelicts. - (EDWALTON MEMBER)		
0.60	D				(0.80)			
0.80	HSV 86kPa							
1.20	B			109.90	1.10	Stiff reddish brown and light grey interbedded sandy CLAY with subordinate clayey locally cemented slightly gravelly SAND. Gravel is fine to coarse angular sandstone lithorelicts. - (EDWALTON MEMBER)		
					(0.60)			
				109.30	1.70	Stiff light grey locally reddish brown sandy CLAY with occasional becoming frequent sandstone lithorelicts and occasional pockets of clay.		
1.90	D			109.00	2.00	Extremely weak becoming very weak light grey locally reddish brown SANDSTONE. - (EDWALTON MEMBER)		
					(0.20)			
2.20	D			108.80	2.20	Complete at 2.20m		

Plan					Remarks			
.	.	.	.	.	Backfilled with arisings upon completion. Pit sides stable during excavation and for a short period afterwards. Groundwater not encountered during excavation. Hand shear vane at 0.8m tested in-situ; below 1.0m recovery is too friable to test.			
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
					Scale (approx)		Logged By	Figure No.
					1:25		DP	22069.TP06



Travis Baker Geo-Environmental Ltd

Site Burroughs Road, Ratby	Trial Pit Number TP07
--------------------------------------	--

Machine : JCB 3CX Method : Trial Pit	Dimensions	Ground Level (mOD) 110.50	Client Lagan Homes Limited	Job Number 22069
	Location 450596 E 306376 N	Dates 01/08/2023	Engineer Travis Baker Geo-Environmental	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D				(0.30)	Dark brown sandy CLAY with rare rootlets. - (PLOUGHED TOPSOIL)		
0.40	D			110.20	0.30	Stiff reddish brown with light grey bands increasing with depth slightly sandy CLAY with occasional mudstone and sandstone lithorelicts. Occasional pockets of light grey sandy clay. - (EDWALTON MEMBER)		
0.80	HSV 91.67kPa		81, 94, 100/Av. 91.67		(1.20)			
1.00	D							
1.60	B			109.00	1.50	Stiff reddish brown and light grey slightly sandy silty CLAY with rare becoming occasional sandstone lithorelicts. Occasional bands of silty sandy clay. - (EDWALTON MEMBER)		
2.10	D			108.30	2.20	Extremely weak becoming very weak completely weathered becoming highly weathered light grey SANDSTONE. - (EDWALTON MEMBER)		
				108.00	2.50	Excavator scraping at base of trial pit. Complete at 2.50m		

Plan	Remarks
	Backfilled with arisings upon completion. Pit sides stable during excavation and for a short period afterwards. Groundwater not encountered during excavation. Hand shear vane at 0.8m tested in-situ; below 1.0m recovery is too friable to test.
	Scale (approx) 1:25
	Logged By DP
	Figure No. 22069.TP07



Travis Baker Geo-Environmental Ltd

Site
Burroughs Road, Ratby

Trial Pit Number
TP08

Machine : JCB 3CX Method : Trial Pit		Dimensions		Ground Level (mOD) 109.00		Client Lagan Homes Limited		Job Number 22069	
		Location 450470 E 306445 N		Dates 01/08/2023		Engineer Travis Baker Geo-Environmental		Sheet 1/1	

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D				(0.30)	Dark brown sandy CLAY with rare rootlets. - (PLOUGHED TOPSOIL)		
0.50	D			108.70	0.30	Stiff light grey and reddish brown interbedded sandy slightly gravelly CLAY and slightly sandy CLAY. Gravel is fine to medium subangular sandstone lithorelicts. - (EDWALTON MEMBER)		
0.80	HSV 87.33kPa		82, 90, 90/Av. 87.33		(0.90)			
1.50	B			107.80	1.20	Firm (damp and friable) reddish brown mottled light grey slightly sandy silty CLAY. - (EDWALTON MEMBER)		
1.50	D				(0.50)			
				107.30	1.70	Firm light grey slightly sandy CLAY with frequent sandstone lithorelicts. - (EDWALTON MEMBER)		
				107.20	(0.10)			
1.90	D			107.10	(0.10)	Very weak highly weathered light grey SANDSTONE. - (EDWALTON MEMBER)		
					1.90	Complete at 1.90m		

Plan					Remarks			
.	.	.	.	.	Backfilled with arisings upon completion. Pit sides stable during excavation and for a short period afterwards. Groundwater not encountered during excavation. Hand shear vane at 0.8m tested in-situ; below 1.0m recovery is too friable to test.			
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
.	.	.	.	.				
					Scale (approx)		Logged By	Figure No.
					1:25		DP	22069.TP08

Trial Pit Photographs

**Appendix 3 – Selection of Photographs
Burroughs Road, Ratby**



TP01 Trial Pit



TP01 Arisings

Appendix 3 – Selection of Photographs
Burroughs Road, Ratby



TP02 Trial Pit



TP02 Arisings

Appendix 3 – Selection of Photographs
Burroughs Road, Ratby



TP03 Trial Pit



TP03 Arisings

Appendix 3 – Selection of Photographs
Burroughs Road, Ratby



TP04 Trial Pit



TP04 Arisings

**Appendix 3 – Selection of Photographs
Burroughs Road, Ratby**



TP05 Trial Pit



TP05 Arisings

Appendix 3 – Selection of Photographs
Burroughs Road, Ratby



TP06 Trial Pit



TP06 Arisings

Appendix 3 – Selection of Photographs
Burroughs Road, Ratby



TP07 Trial Pit



TP07 Arisings

Appendix 3 – Selection of Photographs
Burroughs Road, Ratby



TP08 Trial Pit



TP08 Arisings

APPENDIX 4
Laboratory Geochemical Results

Daniel Potts
Travis Baker Geo-Environmental Limited
Trinity Point
New Road
Halesowen
West Midlands
B63 3HY

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

e: daniel.potts@travisbaker.co.uk

Analytical Report Number : 23-48769

Project / Site name:	Burroughs Road, Ratby	Samples received on:	02/08/2023
Your job number:	22069	Samples instructed on/ Analysis started on:	02/08/2023
Your order number:	3588G	Analysis completed by:	09/08/2023
Report Issue Number:	1	Report issued on:	10/08/2023
Samples Analysed:	38 soil samples		



Signed:

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769342	2769343	2769344	2769345	2769346
Sample Reference				TP01	TP01	TP01	TP01	TP02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.40	1.20	2.50	0.10
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	17	16	19	17	14
Total mass of sample received	kg	0.001	NONE	0.9	0.2	0.2	0.3	0.8

Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	N/A	N/A	N/A	N/A	MWI

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.4	7.4	-	8.3	7.2
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	17	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0057	0.0197	-	0.0083	0.0086
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	8.3	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	< 0.1	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	-	-	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	-	-	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	-	-	-	< 0.80
-----------------------------	-------	-----	-----------	--------	---	---	---	--------

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.7	3	-	-	4.3
Boron (water soluble)	mg/kg	0.2	MCERTS	0.9	0.8	-	-	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.2	< 0.2	-	-	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	45	-	-	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	24	62	-	-	20
Lead (aqua regia extractable)	mg/kg	1	MCERTS	18	3.3	-	-	17
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	38	-	-	11
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	62	56	-	-	43

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769342	2769343	2769344	2769345	2769346
Sample Reference				TP01	TP01	TP01	TP01	TP02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.40	1.20	2.50	0.10
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Pesticides

Alachlor	µg/kg	10	NONE	< 10	-	-	-	-
Aldrin	µg/kg	10	NONE	< 10	-	-	-	-
BHC-alpha (benzene hexachloride)	µg/kg	10	NONE	< 10	-	-	-	-
BHC-beta	µg/kg	10	NONE	< 10	-	-	-	-
BHC-delta	µg/kg	10	NONE	< 10	-	-	-	-
BHC-gamma (Lindane, gamma HCH)	µg/kg	10	NONE	< 10	-	-	-	-
Chlordane-cis	µg/kg	10	NONE	< 10	-	-	-	-
Chlordane-trans	µg/kg	10	NONE	< 10	-	-	-	-
Chlorothalonil	µg/kg	20	NONE	< 20	-	-	-	-
DDD-o,p'	µg/kg	10	NONE	< 10	-	-	-	-
DDD-p,p'	µg/kg	10	NONE	< 10	-	-	-	-
DDE-o,p'	µg/kg	10	NONE	< 10	-	-	-	-
DDE-p,p'	µg/kg	10	NONE	< 10	-	-	-	-
DDT-o,p'	µg/kg	10	NONE	< 10	-	-	-	-
DDT-p,p'	µg/kg	10	NONE	< 10	-	-	-	-
Dichlorobenzonitrile, 2,6-	µg/kg	10	NONE	< 10	-	-	-	-
Dieldrin	µg/kg	10	NONE	< 10	-	-	-	-
Endosulfan I (alpha isomer)	µg/kg	10	NONE	< 10	-	-	-	-
Endosulfan II (beta isomer)	µg/kg	10	NONE	< 10	-	-	-	-
Endosulfan sulfate	µg/kg	10	NONE	< 10	-	-	-	-
Endrin	µg/kg	20	NONE	< 20	-	-	-	-
Heptachlor	µg/kg	10	NONE	< 10	-	-	-	-
Heptachlor exo-epoxide	µg/kg	10	NONE	< 10	-	-	-	-
Hexachlorobenzene	µg/kg	10	NONE	< 10	-	-	-	-
Hexachlorobutadiene	µg/kg	10	NONE	< 10	-	-	-	-
Isodrin	µg/kg	20	NONE	< 20	-	-	-	-
Methoxychlor, p,p'-	µg/kg	20	NONE	< 20	-	-	-	-
Pendimethalin	µg/kg	10	NONE	< 10	-	-	-	-
Pentachlorobenzene	µg/kg	10	NONE	< 10	-	-	-	-
Propyzamide	µg/kg	10	NONE	< 10	-	-	-	-
Tecnazene	µg/kg	10	NONE	< 10	-	-	-	-
Tetrachlorobenzene, 1,2,4,5-	µg/kg	10	NONE	< 10	-	-	-	-
Triadimefon	µg/kg	10	NONE	< 10	-	-	-	-
Trichlorobenzene, 1,2,3-	µg/kg	10	NONE	< 10	-	-	-	-
Trichlorobenzene, 1,3,5-	µg/kg	10	NONE	< 10	-	-	-	-
Trifluralin	µg/kg	10	NONE	< 10	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769347	2769348	2769349	2769350	2769351
Sample Reference				TP02	TP02	TP03	TP03	TP03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	2.00	0.10	0.40	1.00
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	15	19	14	14	19
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.8	0.3	0.3

Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.4	6.9	7.7	7.3	7.9
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	10	-	-	36
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0073	0.005	0.0061	0.016	0.0182
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	5	-	-	18.2
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	-	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	-	-	-	-
-----------------------------	-------	-----	-----------	---	---	---	---	---

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3	-	3.9	3.2	-
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	-	0.4	0.7	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	< 0.2	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	29	-	16	24	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	32	-	22	32	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	3.4	-	13	4	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	22	-	11	22	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	44	-	39	38	-

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769347	2769348	2769349	2769350	2769351
Sample Reference				TP02	TP02	TP03	TP03	TP03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	2.00	0.10	0.40	1.00
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Pesticides								
Alachlor	µg/kg	10	NONE	-	-	-	-	-
Aldrin	µg/kg	10	NONE	-	-	-	-	-
BHC-alpha (benzene hexachloride)	µg/kg	10	NONE	-	-	-	-	-
BHC-beta	µg/kg	10	NONE	-	-	-	-	-
BHC-delta	µg/kg	10	NONE	-	-	-	-	-
BHC-gamma (Lindane, gamma HCH)	µg/kg	10	NONE	-	-	-	-	-
Chlordane-cis	µg/kg	10	NONE	-	-	-	-	-
Chlordane-trans	µg/kg	10	NONE	-	-	-	-	-
Chlorothalonil	µg/kg	20	NONE	-	-	-	-	-
DDD-o,p'	µg/kg	10	NONE	-	-	-	-	-
DDD-p,p'	µg/kg	10	NONE	-	-	-	-	-
DDE-o,p'	µg/kg	10	NONE	-	-	-	-	-
DDE-p,p'	µg/kg	10	NONE	-	-	-	-	-
DDT-o,p'	µg/kg	10	NONE	-	-	-	-	-
DDT-p,p'	µg/kg	10	NONE	-	-	-	-	-
Dichlorobenzonitrile, 2,6-	µg/kg	10	NONE	-	-	-	-	-
Dieldrin	µg/kg	10	NONE	-	-	-	-	-
Endosulfan I (alpha isomer)	µg/kg	10	NONE	-	-	-	-	-
Endosulfan II (beta isomer)	µg/kg	10	NONE	-	-	-	-	-
Endosulfan sulfate	µg/kg	10	NONE	-	-	-	-	-
Endrin	µg/kg	20	NONE	-	-	-	-	-
Heptachlor	µg/kg	10	NONE	-	-	-	-	-
Heptachlor exo-epoxide	µg/kg	10	NONE	-	-	-	-	-
Hexachlorobenzene	µg/kg	10	NONE	-	-	-	-	-
Hexachlorobutadiene	µg/kg	10	NONE	-	-	-	-	-
Isodrin	µg/kg	20	NONE	-	-	-	-	-
Methoxychlor, p,p'-	µg/kg	20	NONE	-	-	-	-	-
Pendimethalin	µg/kg	10	NONE	-	-	-	-	-
Pentachlorobenzene	µg/kg	10	NONE	-	-	-	-	-
Propyzamide	µg/kg	10	NONE	-	-	-	-	-
Tecnazene	µg/kg	10	NONE	-	-	-	-	-
Tetrachlorobenzene, 1,2,4,5-	µg/kg	10	NONE	-	-	-	-	-
Triadimefon	µg/kg	10	NONE	-	-	-	-	-
Trichlorobenzene, 1,2,3-	µg/kg	10	NONE	-	-	-	-	-
Trichlorobenzene, 1,3,5-	µg/kg	10	NONE	-	-	-	-	-
Trifluralin	µg/kg	10	NONE	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769352	2769353	2769354	2769355	2769356
Sample Reference				TP03	TP04	TP04	TP04	TP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.70	0.10	0.60	2.20	0.10
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	16	15	17	16
Total mass of sample received	kg	0.001	NONE	0.3	0.8	0.3	0.2	0.8

Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	N/A	MWI	N/A	N/A	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.6	7.3	6.8	7.3	7.1
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	21	-	-	18	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0104	0.0114	0.0131	0.0091	0.0094
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	10.4	-	-	9.1	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	-	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	< 0.05	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	< 0.05	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Dibenzo(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	< 0.80	-	-	-
-----------------------------	-------	-----	-----------	---	--------	---	---	---

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	4.9	7	-	5.8
Boron (water soluble)	mg/kg	0.2	MCERTS	-	0.5	0.8	-	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	19	39	-	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	20	35	-	25
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	18	6.2	-	20
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	12	29	-	14
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	47	68	-	61

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769352	2769353	2769354	2769355	2769356
Sample Reference				TP03	TP04	TP04	TP04	TP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.70	0.10	0.60	2.20	0.10
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Pesticides								
Alachlor	µg/kg	10	NONE	-	-	-	-	-
Aldrin	µg/kg	10	NONE	-	-	-	-	-
BHC-alpha (benzene hexachloride)	µg/kg	10	NONE	-	-	-	-	-
BHC-beta	µg/kg	10	NONE	-	-	-	-	-
BHC-delta	µg/kg	10	NONE	-	-	-	-	-
BHC-gamma (Lindane, gamma HCH)	µg/kg	10	NONE	-	-	-	-	-
Chlordane-cis	µg/kg	10	NONE	-	-	-	-	-
Chlordane-trans	µg/kg	10	NONE	-	-	-	-	-
Chlorothalonil	µg/kg	20	NONE	-	-	-	-	-
DDD-o,p'	µg/kg	10	NONE	-	-	-	-	-
DDD-p,p'	µg/kg	10	NONE	-	-	-	-	-
DDE-o,p'	µg/kg	10	NONE	-	-	-	-	-
DDE-p,p'	µg/kg	10	NONE	-	-	-	-	-
DDT-o,p'	µg/kg	10	NONE	-	-	-	-	-
DDT-p,p'	µg/kg	10	NONE	-	-	-	-	-
Dichlorobenzonitrile, 2,6-	µg/kg	10	NONE	-	-	-	-	-
Dieldrin	µg/kg	10	NONE	-	-	-	-	-
Endosulfan I (alpha isomer)	µg/kg	10	NONE	-	-	-	-	-
Endosulfan II (beta isomer)	µg/kg	10	NONE	-	-	-	-	-
Endosulfan sulfate	µg/kg	10	NONE	-	-	-	-	-
Endrin	µg/kg	20	NONE	-	-	-	-	-
Heptachlor	µg/kg	10	NONE	-	-	-	-	-
Heptachlor exo-epoxide	µg/kg	10	NONE	-	-	-	-	-
Hexachlorobenzene	µg/kg	10	NONE	-	-	-	-	-
Hexachlorobutadiene	µg/kg	10	NONE	-	-	-	-	-
Isodrin	µg/kg	20	NONE	-	-	-	-	-
Methoxychlor, p,p'-	µg/kg	20	NONE	-	-	-	-	-
Pendimethalin	µg/kg	10	NONE	-	-	-	-	-
Pentachlorobenzene	µg/kg	10	NONE	-	-	-	-	-
Propyzamide	µg/kg	10	NONE	-	-	-	-	-
Tecnazene	µg/kg	10	NONE	-	-	-	-	-
Tetrachlorobenzene, 1,2,4,5-	µg/kg	10	NONE	-	-	-	-	-
Triadimefon	µg/kg	10	NONE	-	-	-	-	-
Trichlorobenzene, 1,2,3-	µg/kg	10	NONE	-	-	-	-	-
Trichlorobenzene, 1,3,5-	µg/kg	10	NONE	-	-	-	-	-
Trifluralin	µg/kg	10	NONE	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769357	2769358	2769359	2769360	2769361
Sample Reference				TP05	TP05	TP06	TP06	TP06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	1.80	0.10	0.60	1.90
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	17	20	15	13	17
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.8	0.3	0.7

Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.3	7.1	6.9	7.1	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	49	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.017	0.0243	0.0139	0.0222	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	24.3	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	0.2	-	-	0.1

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-	< 0.05	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-	< 0.05	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	-	< 0.80	-	-
-----------------------------	-------	-----	-----------	---	---	--------	---	---

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.4	-	4.3	2.2	-
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	-	0.5	0.6	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	< 0.2	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	37	-	17	23	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	55	-	19	30	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	5.4	-	17	2.2	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	36	-	11	17	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	56	-	47	51	-

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769357	2769358	2769359	2769360	2769361
Sample Reference				TP05	TP05	TP06	TP06	TP06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	1.80	0.10	0.60	1.90
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Pesticides								
Alachlor	µg/kg	10	NONE	-	-	< 10	-	-
Aldrin	µg/kg	10	NONE	-	-	< 10	-	-
BHC-alpha (benzene hexachloride)	µg/kg	10	NONE	-	-	< 10	-	-
BHC-beta	µg/kg	10	NONE	-	-	< 10	-	-
BHC-delta	µg/kg	10	NONE	-	-	< 10	-	-
BHC-gamma (Lindane, gamma HCH)	µg/kg	10	NONE	-	-	< 10	-	-
Chlordane-cis	µg/kg	10	NONE	-	-	< 10	-	-
Chlordane-trans	µg/kg	10	NONE	-	-	< 10	-	-
Chlorothalonil	µg/kg	20	NONE	-	-	< 20	-	-
DDD-o,p'	µg/kg	10	NONE	-	-	< 10	-	-
DDD-p,p'	µg/kg	10	NONE	-	-	< 10	-	-
DDE-o,p'	µg/kg	10	NONE	-	-	< 10	-	-
DDE-p,p'	µg/kg	10	NONE	-	-	< 10	-	-
DDT-o,p'	µg/kg	10	NONE	-	-	< 10	-	-
DDT-p,p'	µg/kg	10	NONE	-	-	< 10	-	-
Dichlorobenzonitrile, 2,6-	µg/kg	10	NONE	-	-	< 10	-	-
Dieldrin	µg/kg	10	NONE	-	-	< 10	-	-
Endosulfan I (alpha isomer)	µg/kg	10	NONE	-	-	< 10	-	-
Endosulfan II (beta isomer)	µg/kg	10	NONE	-	-	< 10	-	-
Endosulfan sulfate	µg/kg	10	NONE	-	-	< 10	-	-
Endrin	µg/kg	20	NONE	-	-	< 20	-	-
Heptachlor	µg/kg	10	NONE	-	-	< 10	-	-
Heptachlor exo-epoxide	µg/kg	10	NONE	-	-	< 10	-	-
Hexachlorobenzene	µg/kg	10	NONE	-	-	< 10	-	-
Hexachlorobutadiene	µg/kg	10	NONE	-	-	< 10	-	-
Isodrin	µg/kg	20	NONE	-	-	< 20	-	-
Methoxychlor, p,p'-	µg/kg	20	NONE	-	-	< 20	-	-
Pendimethalin	µg/kg	10	NONE	-	-	< 10	-	-
Pentachlorobenzene	µg/kg	10	NONE	-	-	< 10	-	-
Propyzamide	µg/kg	10	NONE	-	-	< 10	-	-
Tecnazene	µg/kg	10	NONE	-	-	< 10	-	-
Tetrachlorobenzene, 1,2,4,5-	µg/kg	10	NONE	-	-	< 10	-	-
Triadimefon	µg/kg	10	NONE	-	-	< 10	-	-
Trichlorobenzene, 1,2,3-	µg/kg	10	NONE	-	-	< 10	-	-
Trichlorobenzene, 1,3,5-	µg/kg	10	NONE	-	-	< 10	-	-
Trifluralin	µg/kg	10	NONE	-	-	< 10	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769362	2769363	2769364	2769365	2769366
Sample Reference				TP06	TP07	TP07	TP07	TP07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.20	0.10	0.40	1.00	2.10
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	17	16	15	18
Total mass of sample received	kg	0.001	NONE	0.3	0.9	0.2	0.2	0.3

Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.1	7.5	7.5	7.8	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	16	-	-	59	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0082	0.0076	0.011	0.0293	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	8.2	-	-	29.3	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	-	-	< 0.1

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	< 0.05	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	< 0.05	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	< 0.80	-	-	-
-----------------------------	-------	-----	-----------	---	--------	---	---	---

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	5.6	7.6	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	0.5	0.7	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	22	35	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	19	30	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	15	6.4	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	13	21	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	43	49	-	-

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769362	2769363	2769364	2769365	2769366
Sample Reference				TP06	TP07	TP07	TP07	TP07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.20	0.10	0.40	1.00	2.10
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Pesticides								
Alachlor	µg/kg	10	NONE	-	-	-	-	-
Aldrin	µg/kg	10	NONE	-	-	-	-	-
BHC-alpha (benzene hexachloride)	µg/kg	10	NONE	-	-	-	-	-
BHC-beta	µg/kg	10	NONE	-	-	-	-	-
BHC-delta	µg/kg	10	NONE	-	-	-	-	-
BHC-gamma (Lindane, gamma HCH)	µg/kg	10	NONE	-	-	-	-	-
Chlordane-cis	µg/kg	10	NONE	-	-	-	-	-
Chlordane-trans	µg/kg	10	NONE	-	-	-	-	-
Chlorothalonil	µg/kg	20	NONE	-	-	-	-	-
DDD-o,p'	µg/kg	10	NONE	-	-	-	-	-
DDD-p,p'	µg/kg	10	NONE	-	-	-	-	-
DDE-o,p'	µg/kg	10	NONE	-	-	-	-	-
DDE-p,p'	µg/kg	10	NONE	-	-	-	-	-
DDT-o,p'	µg/kg	10	NONE	-	-	-	-	-
DDT-p,p'	µg/kg	10	NONE	-	-	-	-	-
Dichlorobenzonitrile, 2,6-	µg/kg	10	NONE	-	-	-	-	-
Dieldrin	µg/kg	10	NONE	-	-	-	-	-
Endosulfan I (alpha isomer)	µg/kg	10	NONE	-	-	-	-	-
Endosulfan II (beta isomer)	µg/kg	10	NONE	-	-	-	-	-
Endosulfan sulfate	µg/kg	10	NONE	-	-	-	-	-
Endrin	µg/kg	20	NONE	-	-	-	-	-
Heptachlor	µg/kg	10	NONE	-	-	-	-	-
Heptachlor exo-epoxide	µg/kg	10	NONE	-	-	-	-	-
Hexachlorobenzene	µg/kg	10	NONE	-	-	-	-	-
Hexachlorobutadiene	µg/kg	10	NONE	-	-	-	-	-
Isodrin	µg/kg	20	NONE	-	-	-	-	-
Methoxychlor, p,p'-	µg/kg	20	NONE	-	-	-	-	-
Pendimethalin	µg/kg	10	NONE	-	-	-	-	-
Pentachlorobenzene	µg/kg	10	NONE	-	-	-	-	-
Propyzamide	µg/kg	10	NONE	-	-	-	-	-
Tecnazene	µg/kg	10	NONE	-	-	-	-	-
Tetrachlorobenzene, 1,2,4,5-	µg/kg	10	NONE	-	-	-	-	-
Triadimefon	µg/kg	10	NONE	-	-	-	-	-
Trichlorobenzene, 1,2,3-	µg/kg	10	NONE	-	-	-	-	-
Trichlorobenzene, 1,3,5-	µg/kg	10	NONE	-	-	-	-	-
Trifluralin	µg/kg	10	NONE	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769367	2769368	2769369	2769370	2769371
Sample Reference				TP08	TP08	TP08	TP08	HP01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	1.50	1.90	0.10
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	19	24	21	12
Total mass of sample received	kg	0.001	NONE	0.8	0.3	0.2	0.3	0.9

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	MWI	N/A	N/A	N/A	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.5	7.6	8	-	7.7
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	58	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0084	0.0219	0.0292	-	0.0098
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	29.2	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	-	< 0.1	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.05	-	-	-	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.11	-	-	-	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.1	-	-	-	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.06	-	-	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	-	-	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.05	-	-	-	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	-	-	-	< 0.80
-----------------------------	-------	-----	-----------	--------	---	---	---	--------

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.9	2.6	-	-	4.1
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.6	-	-	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	-	-	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	24	46	-	-	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22	43	-	-	17
Lead (aqua regia extractable)	mg/kg	1	MCERTS	16	2.7	-	-	17
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	38	-	-	11
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	54	53	-	-	40

Analytical Report Number: 23-48769
 Project / Site name: Burroughs Road, Ratby
 Your Order No: 3588G

Lab Sample Number				2769367	2769368	2769369	2769370	2769371
Sample Reference				TP08	TP08	TP08	TP08	HP01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	1.50	1.90	0.10
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Pesticides								
Alachlor	µg/kg	10	NONE	-	-	-	-	-
Aldrin	µg/kg	10	NONE	-	-	-	-	-
BHC-alpha (benzene hexachloride)	µg/kg	10	NONE	-	-	-	-	-
BHC-beta	µg/kg	10	NONE	-	-	-	-	-
BHC-delta	µg/kg	10	NONE	-	-	-	-	-
BHC-gamma (Lindane, gamma HCH)	µg/kg	10	NONE	-	-	-	-	-
Chlordane-cis	µg/kg	10	NONE	-	-	-	-	-
Chlordane-trans	µg/kg	10	NONE	-	-	-	-	-
Chlorothalonil	µg/kg	20	NONE	-	-	-	-	-
DDD-o,p'	µg/kg	10	NONE	-	-	-	-	-
DDD-p,p'	µg/kg	10	NONE	-	-	-	-	-
DDE-o,p'	µg/kg	10	NONE	-	-	-	-	-
DDE-p,p'	µg/kg	10	NONE	-	-	-	-	-
DDT-o,p'	µg/kg	10	NONE	-	-	-	-	-
DDT-p,p'	µg/kg	10	NONE	-	-	-	-	-
Dichlorobenzonitrile, 2,6-	µg/kg	10	NONE	-	-	-	-	-
Dieldrin	µg/kg	10	NONE	-	-	-	-	-
Endosulfan I (alpha isomer)	µg/kg	10	NONE	-	-	-	-	-
Endosulfan II (beta isomer)	µg/kg	10	NONE	-	-	-	-	-
Endosulfan sulfate	µg/kg	10	NONE	-	-	-	-	-
Endrin	µg/kg	20	NONE	-	-	-	-	-
Heptachlor	µg/kg	10	NONE	-	-	-	-	-
Heptachlor exo-epoxide	µg/kg	10	NONE	-	-	-	-	-
Hexachlorobenzene	µg/kg	10	NONE	-	-	-	-	-
Hexachlorobutadiene	µg/kg	10	NONE	-	-	-	-	-
Isodrin	µg/kg	20	NONE	-	-	-	-	-
Methoxychlor, p,p'-	µg/kg	20	NONE	-	-	-	-	-
Pendimethalin	µg/kg	10	NONE	-	-	-	-	-
Pentachlorobenzene	µg/kg	10	NONE	-	-	-	-	-
Propyzamide	µg/kg	10	NONE	-	-	-	-	-
Tecnazene	µg/kg	10	NONE	-	-	-	-	-
Tetrachlorobenzene, 1,2,4,5-	µg/kg	10	NONE	-	-	-	-	-
Triadimefon	µg/kg	10	NONE	-	-	-	-	-
Trichlorobenzene, 1,2,3-	µg/kg	10	NONE	-	-	-	-	-
Trichlorobenzene, 1,3,5-	µg/kg	10	NONE	-	-	-	-	-
Trifluralin	µg/kg	10	NONE	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769372	2769373	2769374	2769375	2769376
Sample Reference				HP01	HP02	HP03	HP03	HP04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.10	0.10	0.50	0.10
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	17	18	14	14
Total mass of sample received	kg	0.001	NONE	0.2	0.8	0.8	0.3	0.8

Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	N/A	MWI	N/A	N/A	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.4	7.9	7.5	7.2	7.2
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0071	0.0085	0.0073	0.0076	0.0285
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	-	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.15
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.34
Pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.31
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.2
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.22
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	< 0.05	-	-	0.27
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	< 0.05	-	-	0.13
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.22
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.15
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.18

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	< 0.80	-	-	2.17
-----------------------------	-------	-----	-----------	---	--------	---	---	------

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.2	3.7	4.8	3.6	8.1
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	0.9	0.7	0.6	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	0.4
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	14	27	23	27	19
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	28	29	19	37
Lead (aqua regia extractable)	mg/kg	1	MCERTS	7.7	12	31	6.1	54
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	11	21	18	21	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	29	49	60	50	110

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769372	2769373	2769374	2769375	2769376
Sample Reference				HP01	HP02	HP03	HP03	HP04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.10	0.10	0.50	0.10
Date Sampled				01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Pesticides								
Alachlor	µg/kg	10	NONE	-	-	< 10	-	-
Aldrin	µg/kg	10	NONE	-	-	< 10	-	-
BHC-alpha (benzene hexachloride)	µg/kg	10	NONE	-	-	< 10	-	-
BHC-beta	µg/kg	10	NONE	-	-	< 10	-	-
BHC-delta	µg/kg	10	NONE	-	-	< 10	-	-
BHC-gamma (Lindane, gamma HCH)	µg/kg	10	NONE	-	-	< 10	-	-
Chlordane-cis	µg/kg	10	NONE	-	-	< 10	-	-
Chlordane-trans	µg/kg	10	NONE	-	-	< 10	-	-
Chlorothalonil	µg/kg	20	NONE	-	-	< 20	-	-
DDD-o,p'	µg/kg	10	NONE	-	-	< 10	-	-
DDD-p,p'	µg/kg	10	NONE	-	-	< 10	-	-
DDE-o,p'	µg/kg	10	NONE	-	-	< 10	-	-
DDE-p,p'	µg/kg	10	NONE	-	-	< 10	-	-
DDT-o,p'	µg/kg	10	NONE	-	-	< 10	-	-
DDT-p,p'	µg/kg	10	NONE	-	-	< 10	-	-
Dichlorobenzonitrile, 2,6-	µg/kg	10	NONE	-	-	< 10	-	-
Dieldrin	µg/kg	10	NONE	-	-	< 10	-	-
Endosulfan I (alpha isomer)	µg/kg	10	NONE	-	-	< 10	-	-
Endosulfan II (beta isomer)	µg/kg	10	NONE	-	-	< 10	-	-
Endosulfan sulfate	µg/kg	10	NONE	-	-	< 10	-	-
Endrin	µg/kg	20	NONE	-	-	< 20	-	-
Heptachlor	µg/kg	10	NONE	-	-	< 10	-	-
Heptachlor exo-epoxide	µg/kg	10	NONE	-	-	< 10	-	-
Hexachlorobenzene	µg/kg	10	NONE	-	-	< 10	-	-
Hexachlorobutadiene	µg/kg	10	NONE	-	-	< 10	-	-
Isodrin	µg/kg	20	NONE	-	-	< 20	-	-
Methoxychlor, p,p'-	µg/kg	20	NONE	-	-	< 20	-	-
Pendimethalin	µg/kg	10	NONE	-	-	< 10	-	-
Pentachlorobenzene	µg/kg	10	NONE	-	-	< 10	-	-
Propyzamide	µg/kg	10	NONE	-	-	< 10	-	-
Tecnazene	µg/kg	10	NONE	-	-	< 10	-	-
Tetrachlorobenzene, 1,2,4,5-	µg/kg	10	NONE	-	-	< 10	-	-
Triadimefon	µg/kg	10	NONE	-	-	< 10	-	-
Trichlorobenzene, 1,2,3-	µg/kg	10	NONE	-	-	< 10	-	-
Trichlorobenzene, 1,3,5-	µg/kg	10	NONE	-	-	< 10	-	-
Trifluralin	µg/kg	10	NONE	-	-	< 10	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769377	2769378	2769379
Sample Reference				HP04	HP05	HP05
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.10	0.40
Date Sampled				01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	17	15	18
Total mass of sample received	kg	0.001	NONE	0.3	0.8	0.3

Asbestos in Soil	Type	N/A	ISO 17025	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	N/A	N/A	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3	7.6	7.9
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.199	0.0094	0.0103
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-
Phenanthrene	mg/kg	0.05	MCERTS	-	0.19	-
Anthracene	mg/kg	0.05	MCERTS	-	0.07	-
Fluoranthene	mg/kg	0.05	MCERTS	-	0.43	-
Pyrene	mg/kg	0.05	MCERTS	-	0.4	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	0.27	-
Chrysene	mg/kg	0.05	MCERTS	-	0.26	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	0.37	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	0.15	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	0.28	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	0.17	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	0.24	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	2.88	-
-----------------------------	-------	-----	-----------	---	------	---

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.4	8.8	4.7
Boron (water soluble)	mg/kg	0.2	MCERTS	1.2	1.6	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.4	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	39	23	30
Copper (aqua regia extractable)	mg/kg	1	MCERTS	23	44	33
Lead (aqua regia extractable)	mg/kg	1	MCERTS	8.4	73	15
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	31	24	24
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	74	120	60

Analytical Report Number: 23-48769
Project / Site name: Burroughs Road, Ratby
Your Order No: 3588G

Lab Sample Number				2769377	2769378	2769379
Sample Reference				HP04	HP05	HP05
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.10	0.40
Date Sampled				01/08/2023	01/08/2023	01/08/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Pesticides						
Alachlor	µg/kg	10	NONE	-	-	-
Aldrin	µg/kg	10	NONE	-	-	-
BHC-alpha (benzene hexachloride)	µg/kg	10	NONE	-	-	-
BHC-beta	µg/kg	10	NONE	-	-	-
BHC-delta	µg/kg	10	NONE	-	-	-
BHC-gamma (Lindane, gamma HCH)	µg/kg	10	NONE	-	-	-
Chlordane-cis	µg/kg	10	NONE	-	-	-
Chlordane-trans	µg/kg	10	NONE	-	-	-
Chlorothalonil	µg/kg	20	NONE	-	-	-
DDD-o,p'	µg/kg	10	NONE	-	-	-
DDD-p,p'	µg/kg	10	NONE	-	-	-
DDE-o,p'	µg/kg	10	NONE	-	-	-
DDE-p,p'	µg/kg	10	NONE	-	-	-
DDT-o,p'	µg/kg	10	NONE	-	-	-
DDT-p,p'	µg/kg	10	NONE	-	-	-
Dichlorobenzonitrile, 2,6-	µg/kg	10	NONE	-	-	-
Dieldrin	µg/kg	10	NONE	-	-	-
Endosulfan I (alpha isomer)	µg/kg	10	NONE	-	-	-
Endosulfan II (beta isomer)	µg/kg	10	NONE	-	-	-
Endosulfan sulfate	µg/kg	10	NONE	-	-	-
Endrin	µg/kg	20	NONE	-	-	-
Heptachlor	µg/kg	10	NONE	-	-	-
Heptachlor exo-epoxide	µg/kg	10	NONE	-	-	-
Hexachlorobenzene	µg/kg	10	NONE	-	-	-
Hexachlorobutadiene	µg/kg	10	NONE	-	-	-
Isodrin	µg/kg	20	NONE	-	-	-
Methoxychlor, p,p'-	µg/kg	20	NONE	-	-	-
Pendimethalin	µg/kg	10	NONE	-	-	-
Pentachlorobenzene	µg/kg	10	NONE	-	-	-
Propyzamide	µg/kg	10	NONE	-	-	-
Tecnazene	µg/kg	10	NONE	-	-	-
Tetrachlorobenzene, 1,2,4,5-	µg/kg	10	NONE	-	-	-
Triadimefon	µg/kg	10	NONE	-	-	-
Trichlorobenzene, 1,2,3-	µg/kg	10	NONE	-	-	-
Trichlorobenzene, 1,3,5-	µg/kg	10	NONE	-	-	-
Trifluralin	µg/kg	10	NONE	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-48769

Project / Site name: Burroughs Road, Ratby

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2769342	TP01	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
2769343	TP01	None Supplied	0.4	Brown clay and sand.
2769344	TP01	None Supplied	1.2	Brown clay and sand.
2769345	TP01	None Supplied	2.5	Brown clay and sand with gravel.
2769346	TP02	None Supplied	0.1	Brown loam and sand with gravel and vegetation.
2769347	TP02	None Supplied	0.5	Brown clay and sand.
2769348	TP02	None Supplied	2	Brown clay and sand with gravel.
2769349	TP03	None Supplied	0.1	Brown clay and sand with gravel.
2769350	TP03	None Supplied	0.4	Brown clay and sand with gravel.
2769351	TP03	None Supplied	1	Brown clay and sand.
2769352	TP03	None Supplied	2.7	Brown clay and sand with gravel.
2769353	TP04	None Supplied	0.1	Brown clay and sand with gravel.
2769354	TP04	None Supplied	0.6	Brown clay and sand with gravel.
2769355	TP04	None Supplied	2.2	Brown clay and sand with gravel.
2769356	TP05	None Supplied	0.1	Brown clay and loam with vegetation.
2769357	TP05	None Supplied	0.4	Brown clay and sand with gravel.
2769358	TP05	None Supplied	1.8	Brown clay and sand.
2769359	TP06	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
2769360	TP06	None Supplied	0.6	Brown clay and sand with gravel.
2769361	TP06	None Supplied	1.9	Grey clay and sand with gravel.
2769362	TP06	None Supplied	2.2	Grey clay and sand with gravel.
2769363	TP07	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
2769364	TP07	None Supplied	0.4	Brown clay and sand with gravel and vegetation.
2769365	TP07	None Supplied	1	Brown clay and sand with gravel.
2769366	TP07	None Supplied	2.1	Grey clay and sand with gravel.
2769367	TP08	None Supplied	0.1	Brown loam and sand with gravel and vegetation.
2769368	TP08	None Supplied	0.5	Brown clay and sand with gravel.
2769369	TP08	None Supplied	1.5	Brown clay and sand with gravel.
2769370	TP08	None Supplied	1.9	Grey clay and sand with gravel.
2769371	HP01	None Supplied	0.1	Brown loam and sand with gravel and vegetation.
2769372	HP01	None Supplied	0.4	Brown clay and sand with gravel and vegetation.
2769373	HP02	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
2769374	HP03	None Supplied	0.1	Brown clay and sand with gravel.
2769375	HP03	None Supplied	0.5	Brown clay and sand with gravel.
2769376	HP04	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
2769377	HP04	None Supplied	0.4	Brown clay and sand with gravel and vegetation.
2769378	HP05	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
2769379	HP05	None Supplied	0.4	Brown clay and sand with gravel and vegetation.

Analytical Report Number : 23-48769

Project / Site name: Burroughs Road, Ratby

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Pesticides by GC-MS/MS	Determination of Pesticides in soil by GC MS/MS	In-house method	L055B-PL	W	NONE
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Appendix 5
Laboratory Geotechnical Results