Intrusive Site Investigation Report (Phase1 & 2 Report)

Asharry Commercial Limited

wiser environment

Helping clients prosper through compliance

SITE DETAILS

187 Crosshall Rd,

St Neots

Cambridgeshire,

United Kingdom,

PE19 7GE

OPERATOR DETAILS

Ascension House,

Phoenix Business Park,

St Neots,

Cambridgeshire,

United Kingdom,

PE19 8EP

DOCUMENT REFERENCE

K566.1~14~001

ISSUE DATE

21/05/2026

Wiser Environment Ltd, Suite 11 Manor Mews, Bridge Street, St Ives, PE27 5UW
94 Xuan Thuy, Thao Dien Ward, District 2, Ho Chi Minh City, 713385
+44 1480 462 232 | www.wiserenvironment.co.uk | info@wisergroup.co.uk

DOCUMENT CONTROL

DOCUMENT TITLE:	Phase 1 Preliminary Risk Assessment
REFERENCE:	K566.1~14~001
CLIENT:	Asharry Commercial Limited
REPORTED BY:	Wiser Environment Limited
STATUS:	Final
ISSUE:	F1
ISSUE DATE:	21/05/2026
AUTHOR:	Wiser Environment Limited
APPROVED BY:	

REVISION HISTORY

REFERENCE	DATE	ISSUE:	REVISION SUMMARY
K558.1~11~001	21/05/2026	D1	For client review.
	Enter date.		
	Enter date		

QUALITY CONTROL

ACTION	DATE	NAME
Prepared	28/04/2026	[redacted]
Checked	18/05/2026	
Approved	20/05/2026	

CONTENTS

1. EXECUTIVE SUMMARY 7

2. INTRODUCTION 10

2.1. Context 10

2.2. Objective 10

2.3. Methodology 10

2.4. Limitations and Exceptions 11

3. SITE DETAILS, HISTORY AND LAND USE 12

3.1. Site Location 12

3.2. Historic Land Use 12

3.3. Recent Land Use 13

3.4. Surrounding Land 14

3.5. Environmental Permits, Incidents and Registers 14

3.6. Part A (1) & Integrated Pollution Prevention Control (IPPC) Authorised Activities 14

3.7. Landfill and Other Waste Sites 14

3.8. Other Waste Sites 14

3.9. Current Land Uses 15

4. ENVIRONMENTAL SETTING 16

4.1. Geology 16

4.2. Radon 16

4.3. Mining & Ground Workings 16

4.4. Boreholes 16

4.5. Estimated Background Soil Chemistry 16

4.6. Railway and Tunnels 17

4.7. Hydrogeology 17

4.8. Hydrology 17

4.9. Surface Water Features 17

4.10. Flood risk 17

4.11. Designated Environmentally Sensitive Sites 18

5. SITE RECONNAISSANCE 19

5.1. Description 19

5.2. Access 19

5.3. Topography 19

5.4. Structures 19
5.5. Surface 19
5.6. Vegetation 19
5.7. Storage Tanks 19
5.8. Material Storage and Use 19
5.9. Wastes 19
5.10. Emissions 19
5.11. Drainage 20
5.12. Asbestos Containing Materials 20
5.13. Spills and Discharges 20
5.14. Neighbours 20
5.15. Previous Investigations and Reports 20
6. SITE INVESTIGATION METHODOLOGY 21
6.1. Introduction 21
6.2. Sample Locations & Pattern 21
6.3. Site Constraints 21
6.4. Soil Sampling 21
6.5. Soil Laboratory Analysis Methodology 22
7. GROUND CONDITIONS 24
7.1. Topsoil 24
7.2. Made Ground 24
7.3. Superficial Deposits 24
7.4. Observations 24
8. SITE INVESTIGATION RESULTS 25
8.1. Soil Laboratory Analysis Results 25
8.1. Laboratory Analysis Data Interpretation Methodology 26
8.2. Soil Data Summary & Interpretation 26
9. INITIAL CONCEPTUAL SITE MODEL 28
9.1. Introduction 28
9.2. Initial Conceptual Site Model and Preliminary Risk Assessment 29
10. CONCLUSION AND RECOMMENDATIONS 33

TABLES

TABLE	TITLE
Table 1	Historic Land Use
Table 2	Soil Sample Locations and Descriptions
Table 3	Soil Sample Laboratory Analysis Results
Table 4	Probability of Exposure
Table 5	Consequences of Exposure
Table 6	Assessing Overall Risk
Table 7	Initial Conceptual Site Model
Table 8	Preliminary Risk Assessment

APPENDICES

APPENDIX	TITLE	DATE
Appendix A	Enviro+Geo Insight Report (GS-7QJ-VLC-1GC-X7K)	08/04/2026
Appendix B (1&2)	GS-D7B-DIO-QMA-RTM__largeScale & GS-D7B-DIO-QMA-RTM_smallScale	02/02/2026
Appendix C	Site Visits Photograph Logs: 27th April 2026	27/04/2026
Appendix D	Laboratory analysis results	29/04/2026

DRAWINGS

DRAWING	REFERENCE	TITLE	DATE
Drawing 1	K566.1~20~003	Trial Pit Location Plan	19/05/2026

1. EXECUTIVE SUMMARY

This executive summary forms part of the Initial Site Investigation Report (Phase 1 & 2) (K566.1~14~001) and must be read in conjunction with the information contained therein.

The landowner, Asharry Limited, is preparing to discharge Planning Condition 6A of Planning Permission 26/00036/FUL for the erection of replacement dwelling and associated works at 187 Crosshall Road Eaton Ford St Neots PE19 7GE. This report has been commissioned to accompany the approved planning application, and to satisfy any concerns held by Huntingdonshire District Council regarding any contamination on the site, whether it originates from the site or previous site use to assess the potential risks to human health, property and the environment. The planning permission was granted on 11th March 2026.

Planning Condition 6A of the Planning Permission states that:

No development (except demolition of above ground structures) shall take place until an assessment of the nature and extent of contamination has been submitted to and approved in writing by the local planning authority.

This assessment must be undertaken by a competent person and shall assess any contamination on the site, whether or not it originates from the site. Moreover, it must include;

(i) details of previous land uses;
(ii) a site investigation survey of the extent, scale and nature of contamination;
(iii) an assessment of the potential risks to;
a. human health,
b. property,*
c. adjoining land,
d. groundwaters and surface waters,
e. ecological systems and
f. archaeological sites and ancient monuments.

** Property (existing or proposed) includes buildings, crops, livestock, pets, woodland and service lines and pipes*

To ensure that any potential contaminants are captured, this report is a product of a site reconnaissance visit, environmental data and intrusive site investigation and soil sampling results, including soil laboratory analysis. This report shall include details of previous land use, a site investigation survey of the extent, scale and nature of contamination and an assessment of the potential risks to:

- Human health

- Property
- Adjoining land
- Groundwaters and surface waters
- Ecological systems and
- Archaeological sites and ancient monuments

A bungalow is currently present on site, with a garage to the west and an extension to the rear. The property includes a front garden and a rear garden comprising a patio, raised beds and a lawn area. Overhead cables run diagonally across the front of the house and garden area. A foul drainage system is located at the front garden of the house, on the sidewalk and some underground telecommunications cables run beneath the front garden. No visual evidence of contamination or odours was noted in the vicinity of the site.

A review of available historical information and site plans indicates that the site is located within a historic gravel pit. The plans show that the gravel pit underlies most of the site, except for a small area to the rear, within the back garden.

Three trial pits were excavated across the site, and soil samples were collected. The trial pits were advanced to a maximum depth of 0.4m below ground level. Groundwater was not encountered and no visual or olfactory evidence of contamination was recorded in any of the trial pits.

The Conceptual Site Model and Preliminary Risk Assessment (Table 7 and 8 respectively in Section 9) reviewed the potential sources, considered the risk management measures proposed and concluded that there is a Low residual risk, regarding impact on controlled waters, local ecology, property and workers on the proposed development and end users.

Following the completion of the site investigation, Wiser Environment recommend the following;

- Care should be taken during any construction works to avoid below ground services.
- Site workers should observe for any olfactory or visual evidence of contamination during works. Any evidence of visual contamination should be reported and further investigations such as further intrusive Site Investigation works, and soil sampling be undertaken if required.
- Although visual observations of the existing structure showed no evidence of subsidence on the site, it is noteworthy that the presence of the gravel pit below the structure should be considered during the design of the foundation of the replacement dwelling.

Wiser Environment recommends that this report is submitted to Huntingdonshire District Council to discharge Planning Condition 6A.

2. INTRODUCTION

2.1. Context

The landowner, Asharry Commercial Limited, is preparing to discharge Planning Condition 6A in relation to Planning Permission 26/00036/FUL for Huntingdonshire District Council. This report has been commissioned to accompany the approved planning application, and to satisfy any concerns held by Huntingdonshire District Council regarding potential contaminants which may have arisen across the use the of the site.

2.2. Objective

The objective of this report is to review the current and historic land use of the site, the ground conditions and sensitive receptors near the site as well as conduct an intrusive site investigation within the site. This report will include a Conceptual Site Model reviewing the potential sources, the considered risk of impact to these sources and management measures proposed to either reduce or further assess the risks.

2.3. Methodology

This Phase 2 site investigation and Phase 1 report have been compiled in accordance with the guidance provided by the Environment Agency regarding *Land Contamination Risk Management (LCRM)*[1], which replaced the former Contaminated Land Report 11 (CLR11), *Model Procedures for the Management of Land Contamination* when it was published 8th October 2020.

The Phase 2 Intrusive Site Investigation was undertaken in accordance with the guidance given in the:

- Land Contamination Risk Management[2]
- BS10175:2026 Investigation of potentially contaminated sites – Code of practice;
- BS5930:2015+ A1:2020 Code of practice for ground investigations;
- BS8576:2013 Guidance on investigations for ground gas and has been designed following review of available documents.

This report has been produced based on a desktop review of available documents, and a site walkover and site investigation conducted by Hannah Davies and Okelani Aworabhi on 20th April 2026.

[1] Land contamination risk management (LCRM) - GOV.UK 8th October 2020 (updated 19th April 2021)
[2] https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

This is supplemented by information provided by the *Enviro+Geo Insight Report* (Appendix A) in respect of; geology, mining & ground stability, historic maps, sensitive land uses, industrial land uses, hydrology, hydrogeology, pollution incidents, waste facilities, COMAH sites, consents, permits and flooding. Based on this information and a site walkover, an initial conceptual site model was developed for the site (see Table 8 in Section 9).

2.4. Limitations and Exceptions

This report has been prepared on behalf of the client in accordance with the instruction and information provided by Asharry Commercial Limited. If any third party wishes to rely on the information contained within this report, then written approval must be sought from Wiser Environment Limited.

The information and opinions contained within this report are constrained by the limited data upon which it is based and the timescales within which it was produced. The information reviewed should not be considered as exhaustive and any information provided has been taken in good faith. Where information is not available at the time, which may influence or alter the opinions contained within the report, becomes available later, we reserve the right to review and incorporate such information as an addendum to the original report. The findings and opinions conveyed via this assessment are based on information obtained from a variety of sources as detailed within this report, and which Wiser Environment believes are reliable. Nevertheless, Wiser Environment cannot, and does not, guarantee the authenticity or reliability of the information it has relied upon. Where potential or indefinable risks are referred to within the report, further investigation may be required to confirm such risk.

The report represents the findings and opinions of experienced environmental consultants. Wiser Environment does not provide legal advice, and the counsel of lawyers may also be required. Lastly, it should be noted that the following were not included as part of the agreed scope of works with the client: - geotechnical assessment, controlled waters assessment, detailed ecological surveys, or liaison with the Local Authority Contaminated Land Officer.

Though drafted according to current guidance, where it is intended to use this information as a basis for discharging contaminated land conditions on any future planning permission, this report and its findings will require review following consultation with the Local Authority Contaminated Land Officer. Any additional information provided at that stage, changes to guidance, legislation or information may alter the findings of this report.

3. SITE DETAILS, HISTORY AND LAND USE

3.1. Site Location

The site covers approximately 0.09 hectares and contains a bungalow with an attached garage positioned to the west and an attached conservatory to the south. It features both a front and rear garden, with the rear garden accessed via a 95cm side entrance to the east making it impossible for a drilling rig to access this area without damage to the walls and neighbour's fence. The rear garden lawn is raised by 0.40cm compared to the surrounding ground level, and the rest of the area was flat. There were no trees in the rear garden just a lawn area and there are a few trees and vegetation located in the front garden area.

A gravel driveway is situated at the front (north) of the property, providing access to the site from Crosshall Road. The site is surrounded by residential properties on all sides.

There was no visual evidence of contamination at the site. A foul drainage system is present at the front of the house, indicated by a manhole. There are also suspected underground mains electricity cables in the front garden, along with visible overhead telecommunication cables.

3.2. Historic Land Use

Historic Ordnance Survey maps were provided within the Enviro+Geo Insight report (Appendix A & B) and reviewed to identify historic land uses. These maps include larger scale (1:2,500) and smaller scale (1:10,560). Table 1 below shows the historic onsite and offsite features within 500m of the site.

Table 1 Historic Land Use

YEAR	ON SITE	SURROUNDING LAND
1882 - 1887	-	Old Gravel pits up to 278m NW of the site
1882 - 1958	-	Boat house located up to 376m E of the site
1900 - 1924	Gravel pits on site	Cuttings can be found 251m NW of the site
1950 -1958	Residential bungalow built over gravel pits	Boat house located up to 376m E of the site
1960 -1975	Residential bungalow built over gravel pits	Gas governor located 456m SE. From 1974 onwards, OS maps (GS-D7B-DIO-QMA-RTM) shows residential buildings in the site proximity.

YEAR	ON SITE	SURROUNDING LAND
1960 - 1988	Residential bungalow built over gravel pits	Electricity substation 462m SE, 464 m SE. From 1974 onwards, OS maps (GS-D7B-DIO-QMA-RTM) shows residential buildings in the site proximity.
1971 -1988	Residential bungalow built over gravel pits	Electricity substation located 115m NW, 193 m S, 411M SW. From 1974 onwards, OS maps (GS-D7B-DIO-QMA-RTM) shows residential buildings in the site proximity.
1974 - 1981	Residential bungalow built over gravel pits	Unspecified factory located 480m SW of the site. From 1974 onwards, OS maps (GS-D7B-DIO-QMA-RTM) shows residential buildings in the site proximity.
1974 - 1991	Residential bungalow built over gravel pits	Electrical substation located 116 m NW of the site; unspecified warehouse located 163 m NW of the site with cuttings up to 256m NW of the site. Some unspecified heaps located 378m N of the site. From 1974 onwards, OS maps (GS-D7B-DIO-QMA-RTM) shows residential buildings in the site proximity.
1975 - 1981	Residential bungalow built over gravel pits	Electricity substation 462 m SE of the site. From 1974 onwards, OS maps (GS-D7B-DIO-QMA-RTM) shows residential buildings in the site proximity.
1981 - 1988	Residential bungalow built over gravel pits	Gas governor located 456m SE, 457m SE, and 458m SE. From 1974 onwards, OS maps (GS-D7B-DIO-QMA-RTM) shows residential buildings in the site proximity.

3.3. Recent Land Use

The site consists of a bungalow with a gravel access track from Crosshall road to the site entrance. The site is surrounded by other residential buildings making the land use within the area residential. Historical records from Ordnance Survey Maps (GS-D7B-DIO-QMA-RTM) show that the residential building on site and the surrounding areas may have been built in the 1950s.

3.4. Surrounding Land

The surrounding land uses consists of residential buildings. Infrastructure and facilities such as an Electrical substation located 117m NW and 197 m S also surround the site. 194m SE of the site there are consumer productions of Medals, Trophies, Ceremonial and Religious Goods.

3.5. Environmental Permits, Incidents and Registers

3.5.1. Historic Integrated Pollution Control (IPC) Authorisations

There are no Integrated Pollution Control (IPC) records within 500m of the site.

3.6. Part A (1) & Integrated Pollution Prevention Control (IPPC) Authorised Activities

There are no Part A (1) regulated installations within 500m of the site.

3.6.1. Dangerous Substances Inventory Sites

There are no pollution inventory substances within 500m of the site.

No radioactive substances are present within 500m of the site.

3.6.2. Licensed Discharge Consents

There is no licensed discharge consent to controlled water within 500m of the site.

3.6.3. Water Industry Referrals

There are no water Industry Referrals within 500m of the site.

3.6.4. Planning Hazardous Substance Consents and Enforcements

There are no planning hazardous substances consents and enforcements within 500m of the site.

3.6.5. Dangerous or Hazardous Sites

There are no dangerous or hazardous sites within 500m of the site.

3.6.6. Contaminated Land under Part 2A EPA 1990

There is no contaminated land under Part 2A sites within 500m of the site.

3.7. Landfill and Other Waste Sites

There are no landfills or wastes sites within 500m of the site.

3.8. Other Waste Sites

Two waste exemptions for activities involving the storage, treatment, use or disposal of waste are recorded 177m NW of the site and 201m W of the site.

3.9. Current Land Uses

3.9.1. Recent Industrial Uses

The recent industrial land uses consist of electrical substations located 117m northwest and 197m south of the site. A commercial business (Endersby Awards) is located 194m Southeast of the site.

3.9.2. Petrol and Fuel Sites

There are no current or recent petrol stations within 500m of the site.

3.9.3. Historic and Current Planning Permissions

There are no historic or current planning permissions for this area of land. However, there are records of historic planning permissions for the land surrounding the site. These may be considered to have 'Active', 'Dormant' or 'Expired' planning permissions by the Mineral Planning Authority.

4. ENVIRONMENTAL SETTING

4.1. Geology

4.1.1. Artificial and Made Ground

No artificial or Made Ground records were identified within 500m of the site.

4.1.2. Superficial and Drift Geology

The site is underlain by River Terrace Deposits 3 (Sand & Gravel) with LEX CODE RTD3-XSV.

4.1.3. Bedrock Geology

The River Terrace Deposits are underlain by Oxford Clay Formation-Mudstone of Callovian age with LEX CODE OXC-MDST.

4.2. Radon

The site has a Radon potential estimated to affect less than 1 % of properties.

4.3. Mining & Ground Workings

There are four records of mining and ground workings within 500m of the site. There is historical evidence of surface mineral working 12m NW, 290m NW, 298 m NW and 344m NW of the site. This is associated with the identified historic gravel pits in this location.

4.4. Boreholes

The closest BGS borehole to the site is Swedish Bungalow Eaton Socon which is located approximately 196m south-west of the site.

4.5. Estimated Background Soil Chemistry

There are two records established on site of estimated background soil chemistry. The values are primarily estimated from rural topsoil data collected at a sample density of approx. 1 per 2 km^2. Within areas where rural soils are not available then estimation is conducted on stream sediment data. The data recorded on site is as follows:

- Arsenic 15 – 25 mg/kg
- Lead 100 mg/kg
- Cadmium 1.8 mg/kg
- Chromium 40 – 60 mg/kg
- Nickel 15 – 30 mg/kg

4.6. Railway and Tunnels

No current or historic railways or tunnels were identified within 250m of the site.

4.7. Hydrogeology

4.7.1. Superficial Aquifer

The superficial geology onsite is designated as a Secondary A superficial aquifer.

4.7.2. Bedrock Aquifer

The bedrock geology onsite is designated as unproductive.

4.7.3. Source Protection Zones

The site is not located within a Source Protection Zone (SPZ).

4.7.4. Water Abstractions

There are no groundwater, surface water or portable water abstractions identified within 500m of the site.

4.7.5. Groundwater vulnerability

The superficial aquifer is considered a medium vulnerability aquifer within an approximate thickness of >10m and a high recharge level. The bedrock aquifer is considered unproductive.

4.8. Hydrology

4.9. Surface Water Features

A surface water body catchment (Ouse (Roxton to Earith) is located on site, with water body ID GB105033047921.

4.10. Flood risk

The site has a very low risk of flooding from surface water and rivers and sea according to the Government Guidance on long term flood risk[3].

4.10.1. Historical flood events

There are no records of historic flood events within 250m of the site.

4.10.2. Flood Defences

There is no flood defence located within 250m of the site.

[3] https://www.gov.uk/check-long-term-flood-risk

4.10.3. Surface water flooding

The highest onsite risk of surface water flooding is a 1 in 30 years flood event with a flood depth of 0.10m to 0.30m.

4.10.4. Groundwater flooding

The site is at a moderate risk of groundwater flooding.

4.11. Designated Environmentally Sensitive Sites

There are no records of Sites of Special Scientific Interest (SSSI, conserved wetland Sites (Ramsar sites), Proposed Ramsar Sites, Special Areas of Conservation (SAC), Special Protection Areas (SPA), National Nature Reserves (NNR), Local Nature Reserves (LNR), biosphere reserves, forest parks, Possible Special Areas of Conservation (pSAC), Potential Special Protection Areas (pSPA), Nitrate Sensitive Areas, Nitrate Vulnerable Zones, World Heritage Sites, Area of Outstanding Natural Beauty, National Parks, Listed Buildings, Conservation Areas, Scheduled Ancient Monuments, registered Parks and Gardens, Habitat Networks, Open Mosaic Habitats, Designated Ancient Woodland, Marine Conservation Zones or Limestone Pavement Orders within 250 m of the site boundary.

5. SITE RECONNAISSANCE

A site walkover and intrusive site investigation was undertaken by [redacted] Senior Consultant and [redacted] Consultant on 27th April 2026. Photographs were taken during the site walkover and are presented within Appendix C. Soil samples were also collected to be chemically analysed.

5.1. Description

The site is approximately 0.09ha and is situated off Crosshall Road.

5.2. Access

The site is accessed via Crosshall Road.

5.3. Topography

The site topography is flat.

5.4. Structures

The site features a detached bungalow made of brick with pitch tiled roof, with an attached garage positioned to the west and an attached conservatory to the south. There is a concrete driveway with geotextile membrane beneath the driveway up to the garage. The site features both a front and rear garden. of concrete and wood. There are surface water drainage and below ground electricity supplies in the vicinity.

5.5. Surface

The ground cover is predominantly grass with a gravel track leading to the garage.

5.6. Vegetation

There is no large vegetation onsite, only a few trees in the front garden. The rest of the site is covered in grass.

5.7. Storage Tanks

There are no storage tanks onsite.

5.8. Material Storage and Use

There is no onsite storage of material.

5.9. Wastes

No waste deposit found on site or in the vicinity.

5.10. Emissions

There are no air or water emission points on site.

5.11. Drainage

Below ground surface water drainage and mains foul drainage was noted in front garden and on the sidewalk adjacent to Crosshall road. No olfactory or visual evidence of contamination was noted to this service.

5.12. Asbestos Containing Materials

Site walkover and results of the chemical analysis showed that there was no evidence of asbestos on the site although the house was built in the 1950s.

5.13. Spills and Discharges

No visual or olfactory evidence of spills or discharges to ground or the onsite services were noted during the site walkover on 27th April 2026.

5.14. Neighbours

The site is surrounded by residential properties.

5.15. Previous Investigations and Reports

No evidence of previous site investigations or reports have been provided by the landowner.

6. SITE INVESTIGATION METHODOLOGY

6.1. Introduction

The site walkover and intrusive investigation was conducted on 27th April 2026 and consisted of 3 trial pits excavated by hand using a shovel and a trowel. The trial pit locations are shown on site plan K566.1~20~003.

6.2. Sample Locations & Pattern

The site is approximately 0.09 ha in size therefore due to the size of the site it was initially agreed that 4 trial pits would be advanced across the site. 3 trial pits were advanced in a triangular pattern due to the presence of underground services encountered onsite during the intrusive site investigation, which prevented the fourth trial pit being advanced. The sample locations were chosen to target the area covered by the historical gravel pit where potential contaminant sources could be identified and to avoid any underground services on site.

In choosing the trial pit locations, underground services were detected using a cable avoidance tool (CAT) which utilises radio waves and detection techniques to identify metallic utilities and electric cables.

6.3. Site Constraints

Some site constraints encountered include, presence of paving and concrete, presence of tree-roots, electrical cables, drainage pipes and geotextile membrane beneath the driveway up to the garage. Below ground utilities were detected onsite using the CAT including telecommunications and electric cables in the front and rear gardens. Visual inspection of the site showed the presence of drainage systems and pipes in the garden areas.

All trial pit locations were chosen to avoid these below ground services to prevent any damage to underground services. Therefore, the presence of services restricted the trial pit locations onsite.

6.4. Soil Sampling

Soil samples were collected from each trial pit and submitted for laboratory analysis. The soil samples were taken from the subsoils (Topsoil) and where gravels and sand were encountered.

The samples were labelled and accompanied by a Chain of Custody form and transported by courier under temperature-controlled conditions directly to Socotec Laboratory.

Sampling locations and depths are outlined in table 2 below and a trial pit location plan in drawing K566.1~20~003.

Table 2: Soil Sample Locations and Descriptions

LOCATION	DEPTH (m)	DESCRIPTION
TP1	GL - 0.10m bgl (Topsoil) 0.10 - 0.25m bgl (Subsoils)	The trial pit was advanced close to the driveway in the front garden. The soil surface was covered in lawn grass which was carefully removed and kept aside. The topsoil consisted of dark brown silty material with a few tree roots present. Concrete fragments, cobbles and gravel was encountered between 0.10 and 0.25m bgl, indicating the presence of Made Ground. This area was particularly hard with course materials encountered, thereby restricting further manual excavation.
TP2	GL - 0.18m bgl (Topsoil) 0.18 - 0.35m bgl (Subsoils)	The trial pit was advanced in the northeast corner of the front garden towards the flower beds. The topsoil comprises of a dark brown silty gravelly sand overlying made ground and/or superficial River Terrace Deposits. The topsoil contained plant roots, while the made ground includes sand and gravel, medium to subrounded and subangular concrete fragments, cobbles and gravel. Beneath this, the natural deposits comprise soft brown to dark brown slightly gravelly, slightly sandy silty clay, with subangular to subrounded flint and gravel. No visual evidence of contamination was noted.
TP3	GL – 0.3m bgl (Topsoil) 0.3 – 0.40 m bgl (Subsoils)	The trial pit was advanced in the back garden. The topsoil consisted of dark brown fine to coarse sandy gravel with some grave flints and vegetation roots. The topsoil was underlain by river terrace deposits of sand and gravel. The subsoils were light brown in colour consisting of subrounded to subangular gravelly fine to coarse sand.

6.5. Soil Laboratory Analysis Methodology

The soil samples collected from the trial pits were submitted for the following analysis:

- Metals.

- Total Organic Carbon (TOC).
- Total Petroleum Hydrocarbon (TPH).
- Polycyclic Aromatic Hydrocarbons (PAHs).
- Phenols.
- Asbestos.
- Volatile Organic Compounds (VOCs) & Semi-Volatile Organic Compounds (SVOCs).
- Sulphate.
- Cyanide.
- Ammoniacal Nitrogen.
- PCBs.

7. GROUND CONDITIONS

This section summarises the encountered ground conditions within the three trial pits.

7.1. Topsoil

Topsoil was encountered in all trial pits. The maximum depth of topsoil 0.3m bgl was encountered in TP3. Topsoil consisted of dark brown silty gravel with some organic matter.

7.2. Made Ground

Made Ground was encountered in all trial pits. Made Ground consisted of yellowish brown to dark brown slightly sandy gravelly material mixed with concrete, cobbles and stone. The sand particles were fine to coarse, and the gravel and stones were subrounded to subangular.

7.3. Superficial Deposits

Superficial deposits were encountered in all three trial pits. These are River Terrace deposits, which are present beneath the site according to the historical ground sure data.

7.4. Observations

No groundwater was noted in the three trial pits which were advanced to a maximum depth of 0.40m bgl. There was no visual or olfactory evidence of contamination.

During the site visit, there was no evidence of subsidence within the property.

8. SITE INVESTIGATION RESULTS

8.1. Soil Laboratory Analysis Results

The results of the laboratory analysis are presented in Appendix D and Table 3 below.

Table 3: Soil Laboratory Analysis Results

Parameters Tested	Unit	Results		
		TP1	TP2	TP3
Total Moisture at 35°C	%	5.7	6.2	4.6
Asbestos Identification	-	Non detected	Non detected	Non detected
Total Organic Carbon	% m/m	1.46	0.93	0.46
Total Cyanide	mg/kg	<0.5	<0.5	<0.5
Phenol Index	mg/kg	<0.5	<0.5	<0.5
Acid Soluble Sulphate as SO4	mg/kg	568	299	332
Arsenic as As	mg/kg	32.1	42	28.9
Cadmium as Cd	mg/kg	0.5	0.4	0.3
Total Chromium as Cr	mg/kg	24.2	22.8	13.2
Copper as Cu	mg/kg	34.9	17.5	11.7
Lead as Pb	mg/kg	109.8	32.1	23.6
Mercury as Hg	mg/kg	<0.5	<0.5	<0.5
Nickel as Ni	mg/kg	31.5	34	22.2
Selenium as Se	mg/kg	0.5	0.7	<0.5
Zinc as Zn	mg/kg	131.8	89.4	51.5
Boron as B	mg/kg	0.9	0.8	<0.5
MTBE	µg/kg	<11	<11	<11
Benzene	µg/kg	<11	<11	<11
Toluene	µg/kg	<5	<5	<5
Ethylbenzene	µg/kg	<5	<5	<5
m/p-Xylene	µg/kg	<11	<11	<11

Parameters Tested	Unit	Results		
		TP1	TP2	TP3
o-Xylene	µg/kg	<5	<5	<5
Total TPH >C8-C40 (Aliphatic)	mg/kg	<21.2	<21.3	<21.0
Total TPH >C8-C40 (Aromatic)	mg/kg	56.7	27.7	87.3
Total PAH 16	mg/kg	6.18	1.92	9.32

8.1. Laboratory Analysis Data Interpretation Methodology

Results of the chemical analysis were compared to the MCERTS performance standard[4], the generic assessment criteria (GAC) for soils, Soil Guideline Values (SGVs) provided by CL:AIRE[5], LQM/CIEH S4UIs for Human Health Risk Assessment and Defra Category 4 Screening Levels (C4SLs) where relevant. A residential land use scenario with homegrown produce or plant uptake was used based on the most conservative values (Soil Organic Matter of 1%).

8.2. Soil Data Summary & Interpretation

There was no asbestos detected in all soil samples (TP1, TP2 & TP3).

Phenol index in all 3 samples (<0.5 mg/kg) was below the limits for residential homegrown produce (280 mg/kg). Mercury was also <0.5 mg/kg in all 3 samples which is below the residential homegrown produce value of 11 mg/kg.

Low concentrations of sulphate were recorded in all three samples with the maximum values of Acid soluble sulphates recorded in TP1 as 568 mg/kg. This value is below the residential with homegrown produce value (2000mg/kg). This value is also below the Generic Assessment Criteria for residential areas (2400 mg/kg).

The recorded concentrations for arsenic in TP1 and TP3 were below the GAC value for residential land use with plant uptake (37 mg/kg), without plant uptake (40 mg/kg) and the Soil Guideline Vale for residential land use (32 mg/kg). Arsenic concentration in TP2 was reported to be 42mg/kg which exceeds both the SGV and GAC but taking an average of all three samples, (TP1 (32.1mg/kg), TP2 (42mg/kg) and TP3 (28.9mg/kg)) the average arsenic

[4] MCERTS standard for laboratories undertaking chemical testing of soil
[5] https://claire.co.uk/information-centre/water-and-land-library-wall.html?view=article&id=180:soil-guideline-value-reports&catid=41

concentration for the site is 34 mg/kg which is below the GAC value for residential land use with and without plant uptake.

The SGV for Cadmium is listed as 10 mg/kg for residential land use scenarios. The values recorded at TP1, TP2 and TP3 are below the SGV for cadmium.

The concentration of Lead from all 3 sampling points were below the C4SL for Lead for a residential land use scenario with homegrown produce (200 mg/kg). Maximum values for Lead were recorded in TP1 (109.8mg/kg).

Nickel and Zinc respectively have 180mg/kg and 3700 mg/kg concentrations for LQM/CIEH Suitable for Use Levels for a Residential location with homegrown produce. All 3 samples were below the critical levels for both parameters.

The recorded Copper and Selenium concentrations are also below the S4UL levels for residential land use and homegrown produce.

The concentrations of Benzene, Toluene, Ethyl Benzene, m/p-Xylene and o-Xylene were all below the S4UL levels for residential land use and homegrown produce.

The concentration of aliphatic and aromatic hydrocarbons as well as PAHS and TPH were all beneath the S4UL levels for residential land use and homegrown produce.

9. INITIAL CONCEPTUAL SITE MODEL

9.1. Introduction

In developing a Conceptual Site Model for the site, possible pollutant linkages are determined by identifying potential sources of contamination, potential receptors, and likely pathways between them. For a pollutant linkage to be present all three, i.e. source, pathway and receptor, need to be present. A preliminary risk assessment has been undertaken using the methodology described to establish the degree of risk and which potential pollutant linkages require further consideration.

A source of pollution may be a potentially polluting activity or store of the contaminating substance – for example fuel storage, leaks of liquids to the ground or emission from waste processes. Potential sources of pollution may be present in, on or under the ground or in the vicinity of the site. Pathways are routes by which a potential source of pollution can or is reaching a receptor – these can be natural pathways through permeable soils or the air, or manmade pathways such as underground pipework.

Receptors are those adversely affected by the contamination. These include but are not limited to; humans (e.g. occupants of nearby industrial or residential properties); groundwater (and aquifers) and surface water that could be contaminated, potentially affecting drinking water and the ecology; and buildings.

Assessment of risk is based on the probability of receptor exposure to the identified source and the consequences of such exposure.

Risk management, which can include site surfacing, formal management systems, legal requirements; is then considered to provide an overall residual risk. A matrix is used to determine overall risk and uses the following definitions:

Table 4 Probability of Exposure

PROBABILITY OF EXPOSURE	
High	Exposure is probable: direct exposure likely with no / few barriers between hazard, source and receptor.
Moderate	Exposure is probable: feasible exposure possible, barriers to exposure less controllable.
Low	Exposure is unlikely: several barriers exist between hazardous source and receptors to mitigate against exposure.
Very Low	Exposure is very unlikely: effective, multiple barriers in place to mitigate against exposure.

Table 5 Consequences of Exposure

CONSEQUENCES OF EXPOSURE	
High	The consequences are severe: sufficient evidence that short or long-term exposure may result in serious damage.
Moderate	Consequences are significant: sufficient evidence that exposure to hazard may result in damage that is not severe in nature and reversible once exposure ceases (e.g. irritant)
Low	Consequences are minor: damage not apparent though reversible adverse changes may occur
Very Low	Consequences are negligible: no evidence of adverse changes following exposure

Comparison between probability and consequence provides the overall risk which is reached as follows:

Table 6 Assessing Overall Risk

		CONSEQUENCES			
		Very Low	**Low**	**Moderate**	**High**
LIKELIHOOD	**High**	Low	Moderate	High	High
	Moderate	Low	Moderate	Moderate	High
	Low	Low	Low	Moderate	Moderate
	Very Low	Very Low	Low	Low	Low

9.2. Initial Conceptual Site Model and Preliminary Risk Assessment

Potential sources of pollution, pathways, and receptors, identified primarily through historical records are listed in Table 5 below with potential environmental risk identified.

Table 7 Initial Conceptual Site Model

RECEPTORS	PATHWAYS	SOURCES
• Groundwater – Secondary A Aquifer • Surface Water – Ouse (Roxton to Earith onsite). • Drainage systems on site • Site Workers during the development • Current and future residents and neighbouring residential areas	• Vertical and lateral migration. • Direct exposure: inhalation, dermal contact, accidental ingestion. • Migration through drainage systems and below ground water pipes found on site. • Plant uptake	• Presence of historical Gravel pits, surface works on site • Underground services on site

Table 8 Preliminary Risk Assessment

Source		Pathway	Receptors				Risk Management & Mitigation Measures
Potential Contamination Source	Potential Contaminants			Likelihood	Consequences	Risk	
Historical Gravel pits, brit pits, surface works on site	Hydrocarbons, inorganic (e.g. Ammoniacal Nitrogen & sulphate), heavy metals	Dermal contact, ingestion & indirect inhalation	Site workers and residents	Very Low	Moderate	Low	No asbestos was identified in all three soil samples and there was no visual or olfactory evidence of contamination recorded on the site. Results of the chemical analysis indicated that all parameters were beneath the required Generic Assessment Criteria (GAC) and SGVs for residential areas, except for one sample (TP2) with marginal exceedance in Arsenic concentration. The average Arsenic value for all three samples was below the GAC for residential land use with and without plant uptake. Since the site has a proposed residential use, it is expected that, future development at the site will include impermeable surfaces and gardens. The presence of the impermeable surface will reduce the risk to human health and the environment. According to the site plans for the proposed residential development, the sample from TP2 will be beneath the garage. Visual observations of the existing structure built over the gravel pits in the 1950s showed no evidence of subsidence, hence Wiser consider the gravel pits do not pose a substantial risk to the proposed residential development. The site therefore poses a Low risk to human health and the environment and to property. Appropriate safety measured should be adhered to when working on the site. The right PPE should be worn by site workers during works. If any visual evidence of additional contamination is noted to soils and/or groundwater, this should be reported and an appropriate remedial method statement produced.

Source		Pathway	Receptors	Likelihood	Consequences	Risk	Risk Management & Mitigation Measures
Potential Contamination Source	Potential Contaminants						
	Hydrocarbons, Heavy metals, inorganic (e.g. Ammoniacal Nitrogen & sulphate)	Vertical and lateral migration through soils and/or groundwater	Underlying groundwater and surface waters catchment (Ouse (Roxton to Earith onsite)).	Low	Low	Low	There is a surface water catchment body - Ouse Roxton to Earith located onsite and a secondary A aquifer and an unproductive bedrock aquifer on site. The results of the soil analysis showed low levels of contaminants apart from one sample of Arsenic which returned slightly elevated results which when averaged with the other returned concentrations were below the critical limit. This therefore results in a low likelihood of contamination. Hence a Low risk is considered to groundwater and other surface water features.
			Below ground services.	Low	Low	Low	During the advancement of the trial pits, no groundwater was encountered to the maximum depth of 0.40m bgl. All parameters tested returned low or non-detected concentrations except for one Arsenic sample with average values of all three returned Arsenic concentrations being beneath the GAC for residential land use with or without plant uptake. This indicates a low risk to underground services. A CAT and Genny were used to detect underground services during the site works. The equipment detected several underground services in the rear and front gardens including telecommunications and electric cables. Visual inspection showed the presence of drainage pipes and systems on site. Care should be taken to prevent damage to underground services during construction and demolition works. Appropriate safety measured should be adhered to when working on the site. Correct PPE should be worn by site workers during works.

10. CONCLUSION AND RECOMMENDATIONS

The Conceptual Site Model identified plausible contaminative linkages at site such as historical industrial land use for gravel pits, brit pits, surface works on site.

The Preliminary Risk Assessment and Phase 2 Intrusive Site Investigation concludes that there is a **Low risk** of contamination across the conceptual model.

Wiser Environment recommends the following mitigation and further works to be considered during the construction process;

- Care should be taken during any construction works to avoid below ground services.
- Site workers should observe for any olfactory or visual evidence of contamination during works. Any contaminants should be reported and further investigations such as further intrusive Site Investigation works, and soil sampling will be undertaken if required.
- Although visual observations of the existing structure showed no evidence of subsidence on the site, it is noteworthy that the presence of the gravel pit below the structure should be considered during the design of the foundation of the replacement dwelling.

Wiser Environment recommends that this report should be submitted to Huntingdonshire District Council to fulfil Planning Condition 6A.

wiser
environment

Helping clients prosper through compliance

Suite 11 Manor Mews, Bridge Street, St Ives, PE27 5UW
01480 462 232 | www.wiserenvironment.co.uk | info@wisergroup.co.uk