Geotechnical Engineering | Geoenvironmental Consultants

GEOENVIRONMENTAL APPRAISAL

of land at

SHRIPNEY, BOGNOR REGIS

Prepared on behalf of LNT Care Developments (3) Limited

Report 7135/1

July 2021

ARUN DISTRICT COUNCIL BE/176/21/PL

GEOENVIRONMENTAL SUMMARY

Site Description	A two-storey residential property 'The Cottage' lies in the north-western corner of this site along with a garage and three outbuildings/sheds. A tarmac surfaced access road leads up a gentle slope from Shripney Road in the west to the house. The majority of the site is set to maintained residential lawned garden with areas of hedgerow and planted boarders. In the south-east are the low brick walls of a former polytunnel/greenhouse along with a polytunnel frame. Along the southern boundary lies a glasshouse with an associated concrete block shed. A dilapidated concrete block building also lies in the far south-eastern corner of the site.
History	The site was first developed with the existing house and main glasshouse around 1912 with the glasshouse in the east added around 1940. There have been no further significant alterations to the site.
Made Ground	Made ground was not encountered at the site during the investigation.
Natural Ground	Natural ground was encountered across the site and generally comprised around 200mm of topsoil overlying firm and stiff gravelly clay to depths of between 1.0m and 1.9m where structureless chalk was encountered.
Contamination & Remediation	Analysis has determined that soils at the site are 'clean' and suitable for reuse either on or off-site. Any made ground encountered outside the footprint of the new building or hardstand areas should be relocated beneath those areas. Given the proposed location of the care home and its associated car park and access road significant relocation of made ground is not expected.
Hazardous Gas	There are no sources of hazardous gas generation within influencing distance of the site and radon protection measures are not required. As such, no special precautions against hazardous gas are required.
Mining & Quarrying	This site is located beyond the CA's defined coalfields. There are no known quarries on, or within 500m of the site.
Foundations	Shallow strip or deepened trench fill footings will be the most suitable foundation solution for the proposed two-storey care home. This solution is viable where clay or the structureless chalk is the founding stratum. However, it should be noted that the founding horizon should be solely within either the clay or chalk and not span across a change in ground conditions.
Groundwater & Excavations	Shallow excavations are likely to remain stable in the short-term. Groundwater appears to lie at around 2m depth; deeper excavations may need dewatering.
Flooding & Drainage	The EA indicate that the site is not located within an indicative floodplain. Due to the low permeability soils and high groundwater level soakaways will to provide a suitable means of surface water disposal.

This brief summary should not be assumed to represent a complete account of all the potential geoenvironmental issues that may exist at the site. As such it is strongly recommended that the report be read in its entirety.

Reproduced from LNT Drawing referenced PO22-9PA-F01, dated 04/03/2021.

CALABRIAN 2021 INVESTIGATION

WINDOW SAMPLE LOCATION

APPROXIMATE SITE BOUNDARY

PROPOSED CARE HOME FOOTPRINT

rev. description

LNT Care Developments

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SHRIPNEY ROAD, BOGNOR REGIS

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GEOENVIRONMENTAL SUMMARY

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FOREWORD (Geoenvironmental Investigation Report)

This report has been prepared for the sole internal use and reliance of the LNT Care Developments (3) Limited. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Calabrian Limited (Calabrian); such authorisation not to be unreasonably withheld. If any unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill.

The report presents observations and factual data obtained during our site investigation and provides an assessment of geoenvironmental issues with respect to information provided by the Client regarding the proposed development. Further advice should be sought from Calabrian prior to significant revision of the development proposals.

The report should be read in its entirety, including all associated drawings and appendices. Calabrian cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context.

The findings and opinions conveyed in this report (including review of any third-party reports) are based on information obtained from a variety of sources as detailed within this report, and which Calabrian believes are reliable. All reasonable care and skill has been applied in examining the information obtained. Nevertheless, Calabrian cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

The report represents the findings and opinions of experienced geoenvironmental consultants. Calabrian does not provide legal advice and the advice of lawyers may also be required.

Intrusive investigation can only investigate shallow ground beneath a small proportion of the total site area. It is possible therefore that the intrusive investigation undertaken by Calabrian, whilst fully appropriate, may not have encountered all significant subsurface conditions. Consequently, no liability can be accepted for conditions not revealed by the exploratory holes. Any opinion expressed as to the possible configuration of strata between or below exploratory holes is for guidance only and no responsibility is accepted as to its accuracy

It should be borne in mind that the timescale over which the investigation was undertaken may not allow the establishment of equilibrium groundwater levels. Particularly relevant in this context is that groundwater levels are susceptible to seasonal and other variations and may be higher during wetter periods than those encountered during this commission.

Where the report refers to the potential presence of invasive weeds such as Japanese Knotweed, or the presence of asbestos containing materials, it should be noted that the observations are for information only and should be verified by a suitably qualified expert.

This report assumes that ground levels will not change significantly from those existing at present and that the care home will be of two-storey construction. If this is not to be the case, then some modification to this report may be required.

Calabrian cannot be responsible for the consequences of changing practices, revisions to waste management legislation etc that may affect the viability of proposed remediation options.

Calabrian reserve the right to amend their conclusions and recommendations in the light of further information that may become available.

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1 INTRODUCTION

1.1 The Commission and Brief

Calabrian Limited (Calabrian), were commissioned by LNT Care Developments (3) Limited (LNT) to carry out a geoenvironmental appraisal of land at Shripney, Bognor Regis.

Correspondence regarding Calabrian's appointment, including the brief for this investigation, is included in Appendix A. The agreed scope of works included:

- A site walkover and inspection;
- an assessment of the land use history;
- determination of the site's environmental setting;
- an intrusive ground investigation comprising six window sample boreholes;
- assessment of the geotechnical properties of the near surface deposits to enable provision of foundation and highway recommendations;
- a qualitative assessment of contamination risks; and,
- recommendations for the necessary site preparatory and remediation works.

1.2 Objectives

Primary aims of this investigation were to identify salient geoenvironmental issues affecting the site to enable LNT to obtain budget costs for the necessary foundation, site preparatory and remediation works, and to support the submission of a planning application to the local authority.

1.3 Development Proposals

It is understood that consideration is being given to redevelopment of the site with a two-storey residential care home with associated gardens/landscaping, access road and car park. A proposed site layout has been provided by LNT and is copied as Drawing 7135/2.

1.4 Report Format and Limitations

General notes and limitations relevant to all Calabrian investigations are described in the Foreword and should be read in conjunction with this report. The text of the report draws specific attention to any modification to these procedures and to any other special techniques employed.

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2 SITE DESCRIPTION

2.1 General

Details of the site are given below:

- Location: 3.5km north-east of Bognor Regis town centre.
- Nearest Post Code: PO22 9PA.
- National Grid Reference: SU 938 023.
- Area: 0.68 hectares.

Known Services:

- Underground water, gas, and sewer; and,
- overhead electric and telecom.

2.2 Site Features

Calabrian completed a walkover survey of the site on 16th June 2021.

The site comprises a relatively level rectangular area of land that slopes up along its eastern boundary.

A two-storey residential property 'The Cottage' lies in the north-western corner of this site along with a garage and three outbuildings/sheds. A tarmac surfaced access road leads up a gentle slope from Shripney Road in the west to the house.

The majority of the site is set to maintained residential lawned garden with areas of hedgerow and planted boarders. In the south-east are the low brick walls of a former polytunnel/greenhouse along with a polytunnel frame. Along the southern boundary lies a glasshouse with an associated concrete block shed. A dilapidated concrete block building also lies in the far south-eastern corner of the site.

The northern, western, and eastern boundaries of the site are formed by a mix of wooden fencing types with a number of mature trees. More numerous trees lie in the west of the site.

A hotel lies immediately north of the site with open fields to the east, a public footpath with residential properties to the south with Shripney Road to the west with residential properties beyond.

Existing salient features, at the time of the walkover are presented on Drawing No. 7135/3. A selection of site photographs are included on Drawing 7135/4.

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3 SITE HISTORY

In order to investigate the development history and previous land uses at the site and immediate surrounding land, site centred extracts from Ordnance Survey (OS) plans dating back to 1876 have been examined. These plans are presented in Appendix B.

Dates	On Site Features	Off Site Features
1876	The site comprises a single field within its existing boundaries.	A possible orchard lies immediately north of the site with open fields an all sides. A road runs along the western boundary of the site.
1912	The house, outbuildings and glasshouse are now shown in their existing locations.	
1940	Two further glasshouses have been constructed in the location of the existing low brick wall.	Residential properties have been constructed to the south and west.
1974		The woodland immediately north has been replaced with car parking for the Robin Hood public house.
Present	No further changes	

It is not the intention of this report to describe in detail all the changes that have occurred on or adjacent to the site. Significant former uses/operations are highlighted in bold text for ease of reference.

4 ENVIRONMENTAL SETTING

4.1 GENERAL

The responses received from the BGS and Landmark are presented in Appendix C.

Issue Data Reviewed	Remark
Geology 1:50,000 BGS map Borehole Data	Superficial – River Terrace Deposits. Solid - Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation (undifferentiated) - Chalk. Shallowest coal seam - None. Strata Dip – Not recorded. Faults – None beneath the site. The nearest archive exploratory hole to the site indicates stiff and firm clay to around 4m depth with chalk below.
Mining Coal Authority BGS maps	The site is located beyond the CA's defined coalfields.
Quarrying Landmark Report Historical OS Plans	None within 250m.
Radon BRE Report BR211 Landmark	No protective measures required. The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level).

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Issue Data Reviewed	Remark
Hydrogeology Landmark Report Groundwater Vulnerability map	Source Protection Zone? No. Aquifers: Secondary (Superficial); Principal (Bedrock). Groundwater abstractions? Nearest 908m west. Pollution incidents? None relating to the site.
Hydrology Landmark Report	Nearest watercourse(s) – 53m north, un-named surface watercourse. Water quality – E, recorded in Aldingbourne Rife, 958m south-west. Pollution incidents? None relating to the site. Abstractions? Nearest 988m north-east. Discharge consents? None relating to the site.
Landfill Sites Landmark Report	No landfills or potentially infilled land within 500m.
Flood Risk Landmark Report	The site lies in Flood Zone 1, where the risk of flooding from rivers or the sea is classified as low.

4.2 Unexploded Ordnance (UXO) Risk Assessment

Military activities including those conducted as part of both the First and Second World Wars have resulted in a legacy of unexploded ordnance (UXO) being present within the shallow soils of the UK.

UXO result from various sources including both allied (military training) and German (bombing raids) with a guide figure of approximately 10% of all munitions failing to function as designed.

The likelihood of UXO being encountered on a development site is influenced by several factors including: the proximity to strategic targets; the nature of the development works being undertaken; and evidence of local damage in the post-war periods amongst others. To determine the likelihood of UXO being present on a site, a stepwise risk assessment process is followed. This process is outlined within CIRIA C681 Unexploded Ordnance: A Guide for the Construction Industry.

Preliminary and detailed unexploded ordnance (UXO) risk assessments are advocated as good practice by industry guidance such as CIRIA C681. An initial UXO threat assessment has been undertaken using the ZeticaUXO risk map. The site is located in a low-risk area meaning that there is no greater probability of encountering UXO than anywhere else in the UK; on this basis further assessment is not advocated.

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5 GROUND INVESTIGATION DESIGN

5.1 ANTICIPATED GROUND CONDITIONS

Based on the Environmental Setting and previous land use data reviewed anticipated ground conditions are expected to comprise:

- **Made Ground**- possible veneer associated with developed areas of the site.
- **Natural Soils** - firm and stiff gravelly clay with chalk at depth.
- **Bedrock** – chalk at depths likely around 4m.
- **Mineworkings** – not in a mining area.
- **Groundwater** – possible within chalk.

5.2 POTENTIAL ISSUES

Based on the data above and that in Sections 2 (Site Description) and 3 (History), potential ground-related issues associated with this site are likely to include:

Potential on-site contamination sources:

1. Made ground – metals, PAH, and asbestos.
2. Horticulture – pesticides.

Potential off-site contamination sources:

1. None.

Potential geotechnical hazards:

1. None.

Other potential constraints:

1. None.

5.3 PRELIMINARY CONCEPTUAL SITE MODEL

The historical plans show that the site has been occupied by a residential property and small nursery which are considered to have limited potential to have caused ground contamination.

Potential pollutant linkages are shown on a preliminary conceptual site model, presented as Drawing No 7135/5. Clearly the conceptual model will be subject to modification in light of data arising from the proposed intrusive ground investigation.

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5.4 Investigation Strategy

The preliminary conceptual site model has used as a basis for design of an appropriate ground investigation, the scope of which is summarised below:

Exploratory Hole Type	Purpose
Window Sample Borehole	To determine the general nature of soils underlying the site, including the: ◦ Nature, distribution, and thickness of made ground; ◦ nature, degree, and extent of contamination; ◦ proportion of undesirable elements eg biodegradable matter, foundations etc; and, ◦ suitability of the ground for founding structures and pavements.

Proposed exploratory hole locations should be selected to provide a representative view of the strata beneath the. A nominal 30m grid spacing should be appropriate, with additional exploratory locations scheduled as necessary in light of the ground conditions actually encountered.

The number of soil samples taken should be reflective of the geological complexity actually encountered, but in general about three samples should be taken from most exploratory holes.

6 FIELDWORK

6.1 Objectives

The original investigation strategy is outlined in Section 6.4 above.

6.2 Exploratory Hole Location Constraints

No access was available beneath the existing buildings. Services, trees, and access width meant that window sampling was the only practical investigation technique at the site.

It should be noted that window sampling allows only a limited inspection of the ground (especially made ground with a significant proportion of coarse material). Furthermore, assessment of the strength of cohesive soils, via hand vane tests, is difficult due to disturbance caused by drilling.

6.3 Scope of Works

Fieldwork was supervised by Calabrian on 16th June 2021 and comprised the exploratory holes listed below.

Technique Type	Exploratory Holes	Final depth(s)	Remarks
Window Sample boreholes	WS101 to WS106	3m	

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Exploratory hole logs are presented in Appendix D. These logs include details of the:

- Samples taken; and,
- descriptions of the solid strata, and any groundwater encountered.

Exploratory hole locations are shown on Drawing No. 7135/6.

7 GROUND CONDITIONS

7.1 General

A complete record of strata encountered beneath the proposed development site is given on the exploratory hole records, presented in Appendix D.

Typical ground conditions encountered in each of these areas are described below in Sections 7.2 (made ground) and 7.3 (natural ground).

7.2 Made Ground

Made ground was not encountered at the site during the investigation.

7.3 Natural Ground

Natural ground was encountered across the site and generally comprised around 200mm of topsoil overlying firm and stiff gravelly clay (River Terrace Deposits) to depths of between 1.0m and 1.9m where structureless chalk was encountered.

7.4 Visual & Olfactory Evidence of Organic Contamination

No evidence of significant organic contamination was noted during the investigation.

7.5 Groundwater

Groundwater appears to have been encountered immediately beneath the River Terrace Deposits.

7.6 Revised Conceptual Ground Model (Ground Conditions)

The Preliminary Conceptual Site Model has been revised in light of data obtained during the ground investigation, most notably with respect to:

- The nature and distribution of made ground, including the presence of significant buried obstructions; and,
- the strength, nature, and depth of underlying natural strata.

Further refinement of the Conceptual Site Model is presented in Section 8, where the results of laboratory testing for contaminants have been considered.

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8 CONTAMINATION (ANALYSIS, RISK ASSESSMENT & REMEDIATION)

8.1 General

The historical plans show that the site has been occupied by a residential property and small nursery which are considered to have limited potential to have caused ground contamination.

In the context of risks to human health associated with residential development, the Tier 1 Soil Screening Values referenced in this report have been derived by Land Quality Management Limited as their LQM/CIEH S4ULs, but amended, where appropriate, to be more specific to redevelopment within the planning process (see Notes in Annex I).

Where available, Category 4 Screening Levels (C4SL) have also been referenced; again, see Notes in Annex II for more detail.

This site is essentially greenfield, and no evidence of significant contamination was noted. Consequently, the Tier 1 Values used in this report have been derived with reference to a CSM that assumes no clean soil cover will be placed in gardens/landscaped areas (Calabrian Scenario A). In the event that determinands exceed these Tier 1 Values, the results will be reassessed.

8.2 Testing Scheduled

Based on the above assessment, Calabrian submitted a test schedule (summarised in the table below) to a UKAS accredited laboratory.

Type of Sample	No. of Samples	Determinands
Topsoil	2	Organochlorine & Organophosphorous Insecticides
	5	Asbestos ID, TOC, pH, water soluble boron, and total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc) and speciated Poly Aromatic Hydrocarbons (PAH).
River Terrace Deposits	5	Asbestos ID, TOC, pH, water soluble boron, and total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc) and speciated Poly Aromatic Hydrocarbons (PAH).
		Water soluble sulphate, chloride, nitrate, and magnesium.
	3	BTEX and Banded Total Petroleum Hydrocarbons (TPH).

8.3 Soil Contamination Results

The soil contamination test results are summarised in the Tables in Annex I.

Laboratory test certificates as received from the laboratory are presented in Appendix E.

Inorganic Determinands

Of the ten samples of natural analysed for inorganic parameters, only one might be classified as contaminated; a single sample of topsoil from WS104 yielded an elevated concentration of lead.

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These samples are classified by comparison of concentrations with Calabrian Tier 1 Values for an end use including domestic gardens and any area where plants are to be grown (the most sensitive of the proposed end-uses).

Statistical analysis of the topsoil results has been carried out in general accordance with the methods outlined in "Guidance on Comparing Soil Contamination Data with a Critical Concentration", CIEH/CL:AIRE (2008) (see notes in Annex I).

This statistical analysis indicates that the upper 95th percentile bound values (US95) for lead in topsoil is 189mg/kg below relevant Calabrian Tier 1 Value of 200mg/kg; see calculation in Annex I.

The lead concentration within the topsoil of WS104 did not fail the outlier test.

Asbestos

No asbestos fibres were identified in any of the samples screened.

Organic Determinands

Samples have been classified by comparison with Calabrian risk-derived Tier 1 Values. These screening values assume a Soil Organic Matter (SOM) of 6% (equivalent to a TOC of 3.5%). Many organic contaminants are more mobile when the SOM is lower, and consequently lower screening values are then more appropriate for many organic contaminants.

In order to check the validity of Calabrian Tier 1 Values, the average TOC for each common fill type (beyond any areas of obvious hydrocarbon impact) have been determined.

Fill Type	Typical TOC/%	Comparison with revised Screening Value necessary?
Topsoil	<3.5	Yes, but no significant organic contamination was recorded in this soil type. All determinands well below "6%" screening value; most below limit of detection.
River Terrace Deposits	Variable	

Total Petroleum Hydrocarbons (TPH)

Calabrian have used the CLEA model to derive risk-based screening values for hydrocarbons, in accordance with the methodology detailed by the TPHCWG, and reviewed by a UK workshop of experts with respect to UK adoption of the method.

Assessment of TPH would normally be undertaken in accordance with a 3-step approach. However, given former uses and the absence of visual/olfactory evidence, only a simple banded TPH was scheduled here (compared with full speciation).

None of the fractions exceed their respective Tier 1 criteria, even if it is conservatively assumed all of each fraction is either aliphatic or aromatic.

Poly Aromatic Hydrocarbons (PAH)

Speciated PAH analysis has been undertaken in order to determine concentrations of the key "marker" compounds: benzo(a)pyrene (considered the most toxic of the PAHs); and naphthalene (the most mobile and volatile of the PAHs).

Speciated analysis has confirmed the absence of significant concentrations of naphthalene in the soils beneath this site; in fact, no samples exceeded the laboratory limit of detection (0.03mg/kg).

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No concentrations of benzo(a)pyrene were recorded above Calabrian' Tier 1 Value of 5mg/kg; in fact, no samples exceeded 0.33mg/kg.

Insecticides

All of the topsoil samples scheduled for insecticide analysis (Organochlorine & Organophosphorous Insecticides) yielded results for the various determinands below the laboratory limit of detection (0.01 mg/kg).

8.4 Discussion

The site occupied by a residential property and small nursery and there was no evidence of any made ground, burning or burials encountered during the ground investigation.

Analysis has determined that topsoil and natural soils at the site is 'clean' and suitable for reuse either on or off-site.

Waste Classification

Disposal of the made ground off site is generally not considered appropriate, economically viable, nor in line with current Government philosophy regarding sustainable development. However, some excess arisings may be generated by excavations for foundations, sewers etc. Disposal to landfill (or an appropriate soil / aggregate transfer station) may be the most practical solution if redistribution and retention on site is not feasible.

It should be noted that the classification and assessment of waste soils under the Environment Agency's Technical Guidance WM3, is a complex process (as of 1st July 2015 WM2 was archived and replaced by technical guidance WM3).

If waste soil is classed as hazardous following classification under WM3, and destined for landfill, waste acceptance criteria (WAC) leachate testing will need to be undertaken. However, non-hazardous soil waste can go to a non-hazardous landfill facility; no further testing (e.g., WAC) is required.

WAC analysis is different to the 'routine' laboratory testing (such as that included earlier in this Section) undertaken in order to determine hazardous properties. Calabrian typically only include WAC analysis if significant off-site disposal (of soil classified as hazardous waste) is anticipated.

It is critical if material is to be exported from site that this is allocated an appropriate waste code, following the steps within WM3. Waste carriers transporting, and sites accepting, this material should have a corresponding code within their permits. It is the responsibility of those generating the waste (i.e., the site), to ensure that the waste is handled and disposed of appropriately.

With respect to asbestos, waste soils will be classed hazardous if the soil mass contains more than 0.1% asbestos fibres that are free and dispersed. However, the 2013 edition of WM2 now states that where the waste contains identifiable pieces of asbestos (i.e. any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye), then the waste is hazardous if the concentration of asbestos in the pieces alone is 0.1%. If a stockpile of soil contained rare fragments of broken asbestos-cement sheeting, the whole stockpile would be classed as hazardous unless all the fragments could be picked-out (even though the concentration of asbestos in the soil mass might be an orders of magnitude less than 0.1%).

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WAC testing was undertaken on three samples; the results are presented within Appendix E. The results suggest that the soils here would be classified as inert waste. Contractors exporting waste from the site should be asked to review the site investigation data and make their own assessment.

9 HAZARDOUS GAS

9.1 SOURCES OF HAZARDOUS GAS GENERATION

The site is not believed to be affected by sources of hazardous gas generation as it is:

- Not located within 250m of a known former or current landfill site or backfilled feature (eg quarry, pond, canal etc);
- neither underlain by shallow mineworkings nor located in an area considered susceptible to mines gas emissions;
- not underlain by a significant thickness of made ground; and,
- not underlain by peat.

9.2 RADON

BRE Report BR211 (2015 Edition) indicates that radon protection measures are not required for new dwellings at the site. Information from Landmark confirms that the site is in an area where less than 1% of homes are estimated to be above the action level, and that radon protection measures are therefore not required.

9.3 CONCLUSION

As such, no special precautions against hazardous gas are required on this site.

10 GEOTECHNICAL TESTING

10.1 GENERAL

A total of five samples of natural soil were delivered to a suitably accredited laboratory with a schedule of geotechnical testing drawn up by Calabrian.

The geotechnical laboratory test results are presented in Appendix F.

10.2 ATTERBERG LIMITS

The plasticity indices of five samples of cohesive soil have been determined; results are summarised below.

Soil type	Range of Plasticity Indices * (Average)	Shrinkability
River Terrace Deposits	20 to 24 (21)	Medium

** Modified where appropriate in accordance with revised Chapter 4.2 of the NHBC Standards (April 2003).*

Note. The term Shrinkability is equivalent to the term Volume Change Potential used in Chapter 4.2.

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For the purposes of foundation design, it is recommended that all cohesive soils be regarded as being of medium shrinkability.

10.3 Soluble Sulphate and pH

In accordance with BRE Special Digest 1:2005, this site has been classified as brownfield with a mobile groundwater regime.

It is envisaged foundations will extend to depths of about 1m into natural strata and samples taken from this depth range have been submitted for pH and water-soluble sulphate (2:1 soil/water extract).

The concentrations of sulphate in the aqueous natural soil extracts of five samples were determined as part of the contamination suite. The pH value of each sample has also been determined.

The highest water-soluble sulphate concentration and the lowest pH value for each soil type analysed are shown in the Table below.

Soil type	Lowest pH values	Highest Soluble Sulphate Concentration (mg/l)
River Terrace Deposits	6.4	21

pH values were all above 5.5, therefore concentrations of chloride and nitrate are considered insignificant.

In accordance with Tables C1 and C2 of SD1, sub-surface concrete should be Design Sulphate Class DS-1, with the site allocated an ACEC Classification of AC-1.

11 GEOTECHNICAL ISSUES

11.1 Conceptual Site Model

Made ground was not encountered at the site during the investigation.

Natural ground was encountered across the site and generally comprised around 200mm of topsoil overlying firm and stiff gravelly clay to depths of between 1.0m and 1.9m where structureless chalk was encountered.

11.2 Mining & Quarrying

This site is located beyond the CA's defined coalfields.

There are no known quarries on, or within 500m of the site.

ARUN DISTRICT COUNCIL BE/176/21/PL

11.3 Foundation Recommendations

General

Foundation recommendations assume that development will be two-storey construction and that line loads will not exceed 110kN/m run. If this is not the case significant alteration to these recommendations will be required.

We have assumed that final development levels will not differ significantly from ground levels existing at the time of investigation. Any digital terrain modelling undertaken or commissioned by Client should consider implications for the foundation recommendations outlined below.

Sub-surface concrete in contact with the natural ground should be Design Sulphate Class DS-1, with the site allocated an ACEC Classification of AC-1.

Strip/Trench Fill Footings

It is considered that shallow strip or deepened trench fill footings will be the most suitable foundation solution for the proposed two-storey care home. This solution is viable where clay or the structureless chalk is the founding stratum. However, it should be noted that the founding horizon should be solely within either the clay or chalk and not span across a change in ground conditions.

Clay/Cohesive Soils

The care home has an assumed maximum foundation line load of 110kN/m run, a foundation geometry of length = 50m, breadth = 0.6m, thickness = 225mm, founding at between approximately 1m and 2m depth and assuming an undrained shear strength of 75kPa for the stiff clay then theoretical safe bearing capacities as detailed below can be calculated:

- Meyerhof (Factor of Safety) Approach = >150kPa (FoS=2.5)
- Lumped Factor of Safety = >150kPa (FoS=2.5)

A Eurocode 7 approach provides the following ultimate bearing capacities including the use of depth factors. Applying 75mm of eccentricity to the line load has negligible effect in either case:

- DA1 Combination 1 = >150kPa (ultimate)
- DA2 Combination 2 = >150kPa

However, consideration should also be given to the effect of settlement on the above safe bearing capacities in order to assess meaningful allowable bearing capacities. Assuming the foundation geometry detailed above minimal settlements would be anticipated.

Clay classification tests suggest that natural cohesive soils at the site should be regarded as being of medium shrinkability. A minimum founding depth of 900mm is therefore recommended for all soils on the site where strip footings are proposed.

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Chalk

For foundations founded within the structureless chalk an allowable bearing pressure of 150kPa may be used for design purposes in accordance with CIRIA[1] guidance. Chalk is considered non-shrinkable and therefore not effected by trees.

Minimum founding depths for building foundations within chalk will need to be 450mm below finished ground level as a precaution against frost action in accordance with the current building regulations.

General

Reinforcement, as a precaution against differential settlement, is recommended only where foundation excavations encounter significant lateral and vertical variations in strata. One layer of B385 mesh placed 75mm above the base of the footing is likely to provide suitable reinforcement, but further advice should be sought from the Structural Engineer.

Founding depths are from original or finished ground level, whichever is the lower, to the underside of the footing.

Foundations should be deepened near trees in accordance with NHBC Standards Chapter 4.2; preliminary assessment suggests that foundations will be affected by the numerous mature trees and require deepening into the chalk across the site.

Overdeepened foundations should be stepped in accordance with NHBC Standards, Chapter 4.4.

LNT or their groundworker should seek further advice from Calabrian if unexpected ground conditions are encountered in foundation or sewer excavations.

11.4 Designated Concrete Mixes

The following designated mixes in accordance with BRE Special Digest SD1 and BS 8500: Part 1: 2006 will be suitable for use on this site.

Application	DS-1 conditions (natural ground) ACEC Class AC-1
Unreinforced strip/trench fill footings	GEN1
Reinforced strip/ trench fill footings (mesh reinforcement)	RC28/35

11.5 Excavations

Based on the results of the investigation it is possible that groundwater flows will be encountered in shallow excavations.

Excavations should remain stable in the short term but if left open for any significant period of time may require shoring.

[1] CIRIA C574: Engineering in chalk.

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11.6 Drainage

Based on observations made during the investigation soakaways will not provide a suitable drainage solution for surface water run-off at the site. Consequently, it will be necessary to consider alternative sustainable drainage systems (SUDS), and there may be a need for surface water balancing.

Any damage to the existing land drainage system caused by foundation or sewer excavations should be made good; this may require diversion and re-connection.

It is recommended that the developer contact the local water services company with respect to capacity in existing foul and surface water sewers in the vicinity of the development area.

11.7 Pavements

Based on visual inspection of the natural materials at the site, published tables (Interim Advice Note 73/06 Revision 1 (2009), Chapter 5. Characterisation of Materials Design Guidance for Road Pavement Foundations - Draft HD25) PDF p25 indicate that the chalk deposits will have a CBR value of at least 3%. These values should be verified prior to or during construction.

11.8 External Works

Any digital terrain modelling undertaken or commissioned by Client should be made available to their Engineering Designer prior to issue of an External Works Drawing.

12 REDEVELOPMENT ISSUES

12.1 General

This report has presented options with respect to foundation solutions and contamination assessment that are considered technically feasible and in line with current good practice. Consequently, we would expect to obtain regulatory approval for whichever option is adopted, although this cannot be guaranteed. Copies of this report should be forwarded to the relevant regulatory authorities (Warranty Provider and Local Authority) for their comment/approval.

12.2 Preparation Works

Given the absence of any significant contamination, a remediation strategy is not considered necessary. Nonetheless, some preparatory works will be required, most notably:

- Controlled demolition of existing house and other structures;
- general site clearance of surface materials, unprotected trees, and vegetation;
- topsoil strip & stockpile;
- break-up of hardstand; and,
- relocation of made ground beneath hardstand or building.

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It should be ensured that the groundworker understands the need for good materials management. Most notably the importance of not mixing different materials within a given stockpile; i.e. there should be separate stockpiles of topsoil and made ground.

No areas of gross contamination were encountered during the site investigation. However, if any buried drums, "oily", odorous, brightly coloured etc. materials are encountered, further advice should be sought from Calabrian. Further advice should also be sought if deep foundations etc associated with the former building (highly unlikely) are encountered during the preparatory works; such obstructions might necessitate revised foundation design.

12.3 Health & Safety Issues - Construction Workers

Access into excavations etc. must be controlled and only undertaken in accordance with the Confined Spaces Regulations 1997. The atmosphere in shored trenches in excess of 1.2m should be monitored for oxygen and hazardous gas (methane & carbon dioxide), prior to personnel entering such excavations. Monitoring should continue whilst personnel are working in deep excavations.

Before site operations are started, the necessary COSHH statements and Health & Safety Plan should be drafted in accordance with the CDM regulations.

12.4 New Utilities

It is strongly recommended that all statutory service bodies are consulted at an early stage with respect to the ground conditions within which they will lay services in order to enable them to assess at an early stage any potential abnormal costs.

This site is essentially greenfield, and no previous or current usage of the site or its immediate surroundings is likely to have resulted in ground contamination. Furthermore, no significant made ground was encountered in any of the exploratory holes during the ground investigation.

Consequently, the use of 'standard' polyethylene water supply pipes should be acceptable, although Client should consult the local water company at the earliest opportunity to confirm this.

13 CONCLUSIONS & RECOMMENDATIONS

13.1 General

Consideration is being given to redevelopment of the site with a two-storey residential care home with associated gardens/landscaping, access road and car park.

The site was first developed with the existing house and main glasshouse around 1912 with the glasshouse in the east added around 1940. There have been no further significant alterations to the site.

ARUN DISTRICT COUNCIL BE/176/21/PL

Made ground was not encountered at the site during the investigation. Natural ground was encountered across the site and generally comprised around 200mm of topsoil overlying firm and stiff gravelly clay to depths of between 1.0m and 1.9m where structureless chalk was encountered.

13.2 Hazardous Gas

There are no known or suspected areas of landfilling within 250m, and the site is not in area considered susceptible to mines gas, nor is it underlain by shallow mineworkings.

The site is in an area where less than 1% of homes are estimated to be above the radon action level.

As such, no special precautions against hazardous gas are required.

13.3 Mining & Quarrying

This site is located beyond the CA's defined coalfields.

There are no known quarries on, or within 500m of the site.

13.4 Contamination & Remediation

The site has only ever been developed with the existing house and outbuildings and there was no evidence of any made ground, burning or burials encountered during the ground investigation.

Analysis has determined that soils at the site are 'clean' and suitable for reuse either on or off-site.

Any made ground encountered outside the footprint of the new building or hardstand areas should be relocated beneath those areas. Given the proposed location of the care home and its associated car park and access road significant relocation of made ground is not expected.

13.5 Foundations

Conventional strip or trenchfill foundations will be suitable for the two-storey care home. Due to the proximity of mature trees overdeepening will be required in accordance with the NHBC Standards into chalk across the site.

13.6 Flooding

The EA indicate that the site is not located within an indicative floodplain.

13.7 Drainage

Soakaways would not provide a suitable drainage solution for surface water run-off at the site. Consequently, it will be necessary to consider alternative sustainable drainage systems (SUDS), and there may be a need for surface water balancing.

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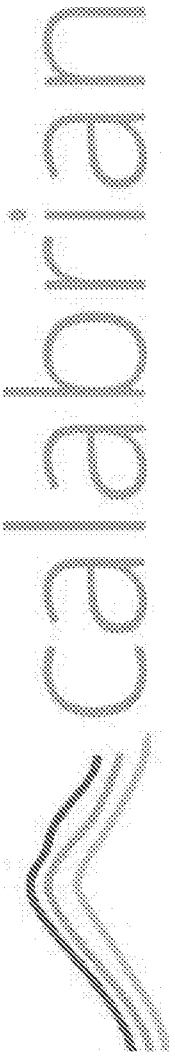
13.8 Pavements

The natural clay deposits will have a CBR value of at least 3%. These values should be verified prior to or during construction.

ARUN DISTRICT COUNCIL BE/176/21/PL

DRAWINGS	
7135/1	Site Location Plan
7135/2	Proposed Site Layout
7135/3	Existing Site Features
7135/4	Site Photographs
7135/5	Preliminary Conceptual Site Model
7135/6	Exploratory Hole Location Plan
7135/7	Geoenvironmental Summary



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LNT Care Developments

client

SHRIPNEY ROAD, BOGNOR REGIS

project

SITE LOCATION

drawing title

drawing number 7135/1

revision

drawing status Final

scale 1:25,000 @ A4

date 24/06/2021

drawn by RJH

checked by

calabrian

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info@calabrian.co.uk

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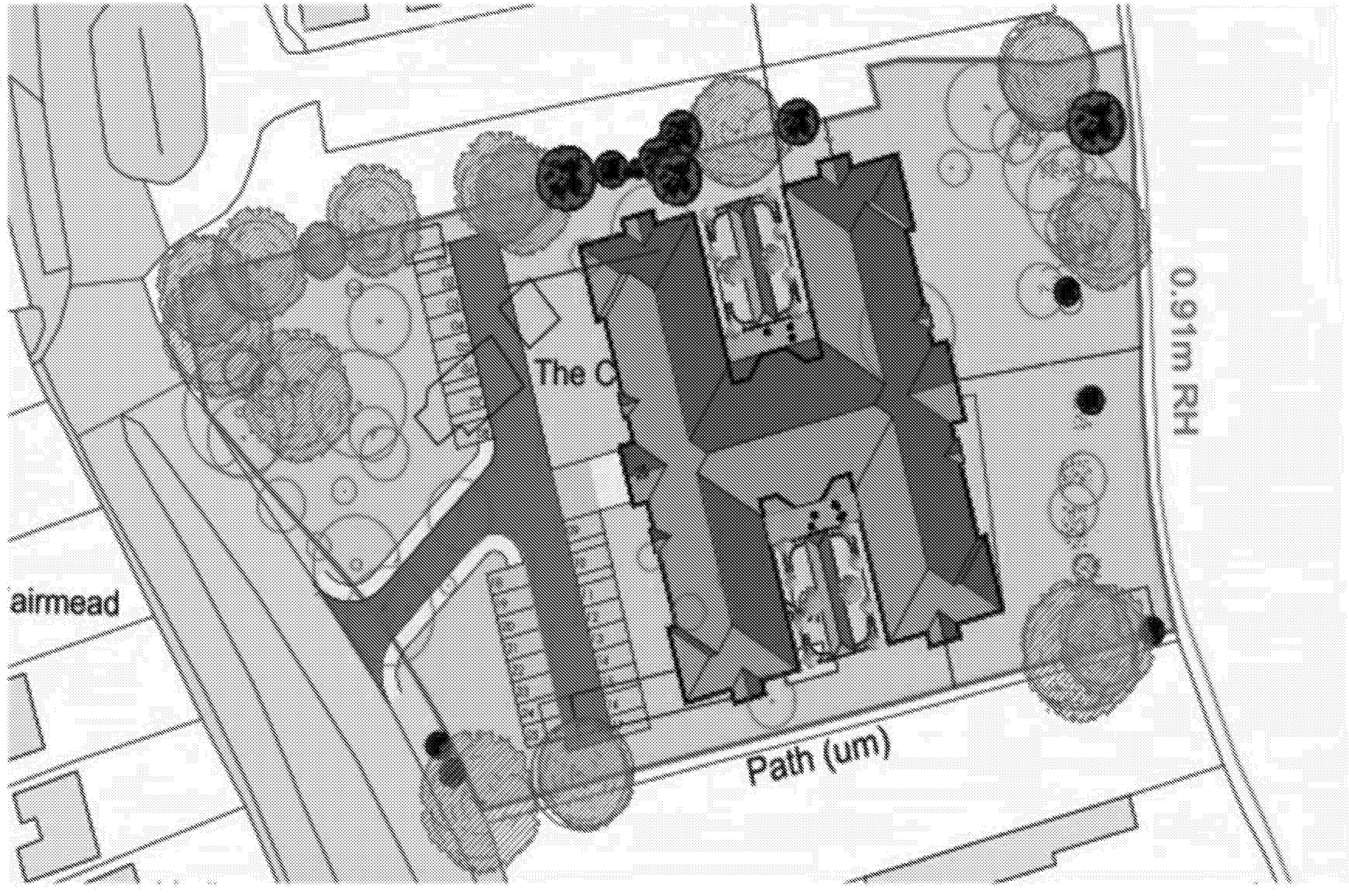
Reproduced from LNT Drawing referenced PO22-SPA-F01, dated 04/03/2021.



LNT Care Developments

SHIPLEY ROAD, BOGNOR REGIS

PROPOSED LAYOUT

73952

Final

1:500 @A3

24/06/2021

BDK

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Notes

1.

- GRASS & OVERGROWN AREAS
- BUILDING
- GRAVEL OR HARDCORE SURFACING
- TARMAC HARDSTAND

APPROXIMATE SITE BOUNDARY

rev. description

Gate Developments

client :

SHRIPNEY ROAD, BOGNOR REGIS

project :

SITE FEATURES

drawing title :

drawing number : 7X36/3

revision : --

drawing status : Final

scale : 1:500 @A3

date : 24/06/2021

drawn by : RHH

checked by : --

calabrian

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info@calabrian.co.uk

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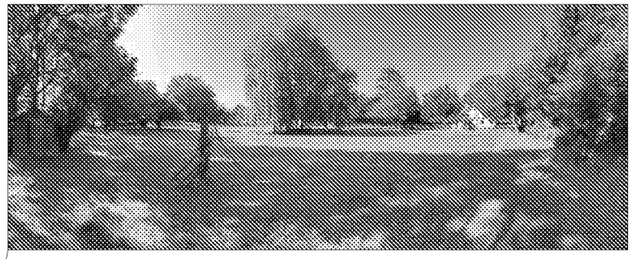

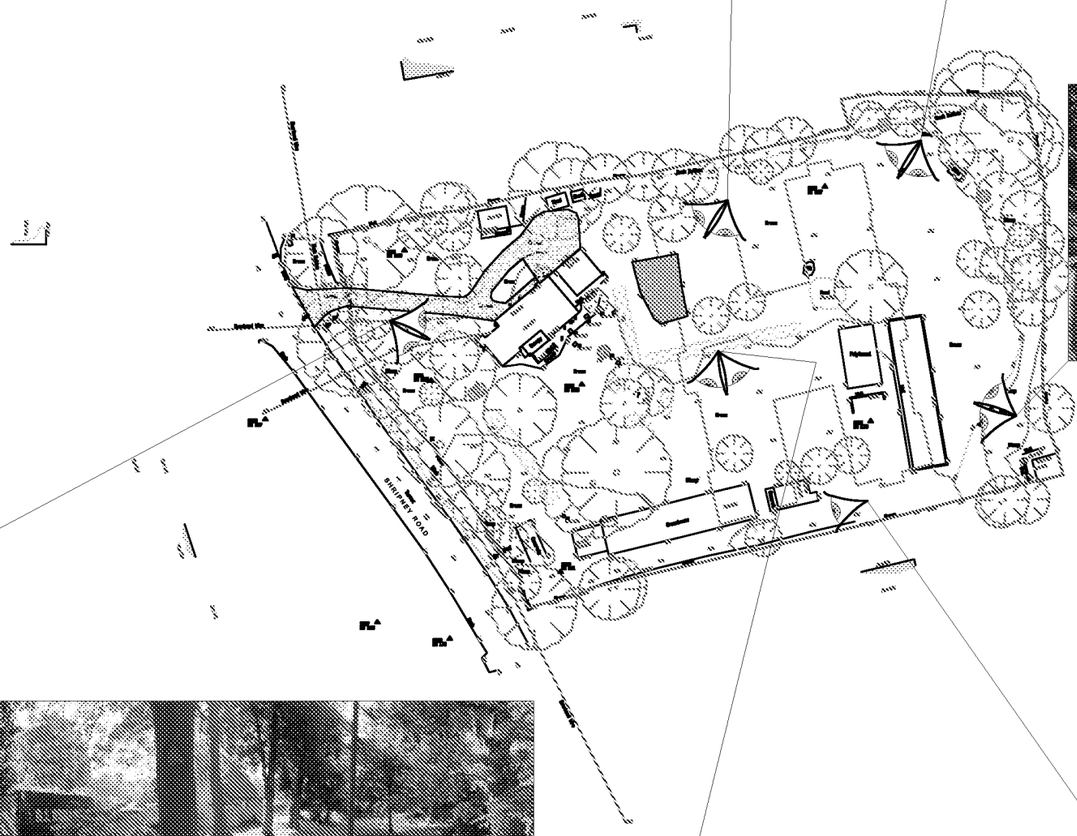

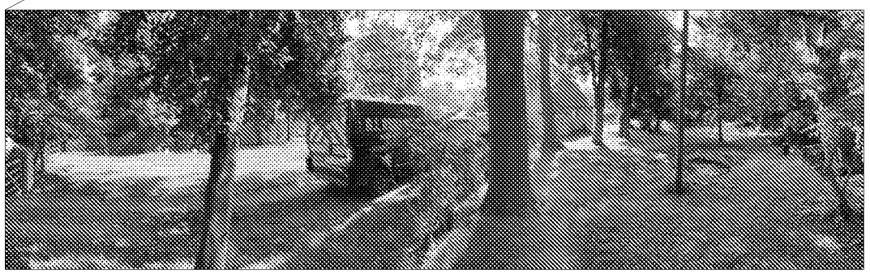

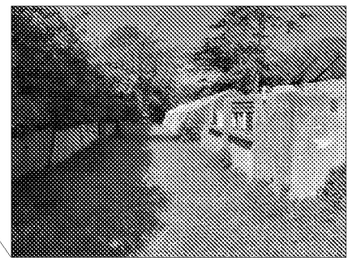

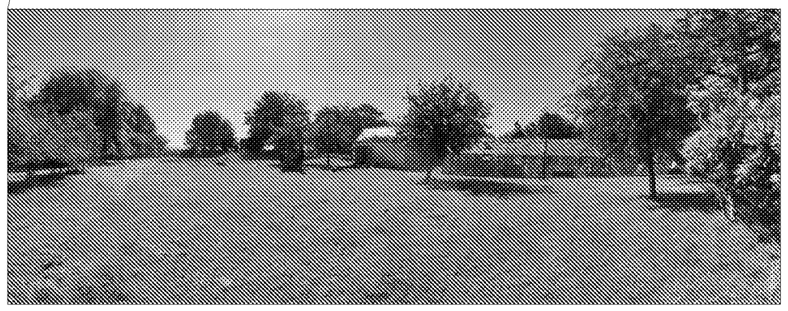

Note :

APPROXIMATE SITE BOUNDARY

LOCATION & ORIENTATION OF PHOTOGRAPH

N

W E

S

rev. description

LNT Care Developments

client :

SHRIPNEY ROAD, BOGNOR REGIS

project :

PHOTOGRAPHS

drawing title :

drawing number : 7235/A

revision : --

drawing status : Final

scale : 1:1000 @A3

date : 24/06/2021

drawn by : BJH

checked by : --

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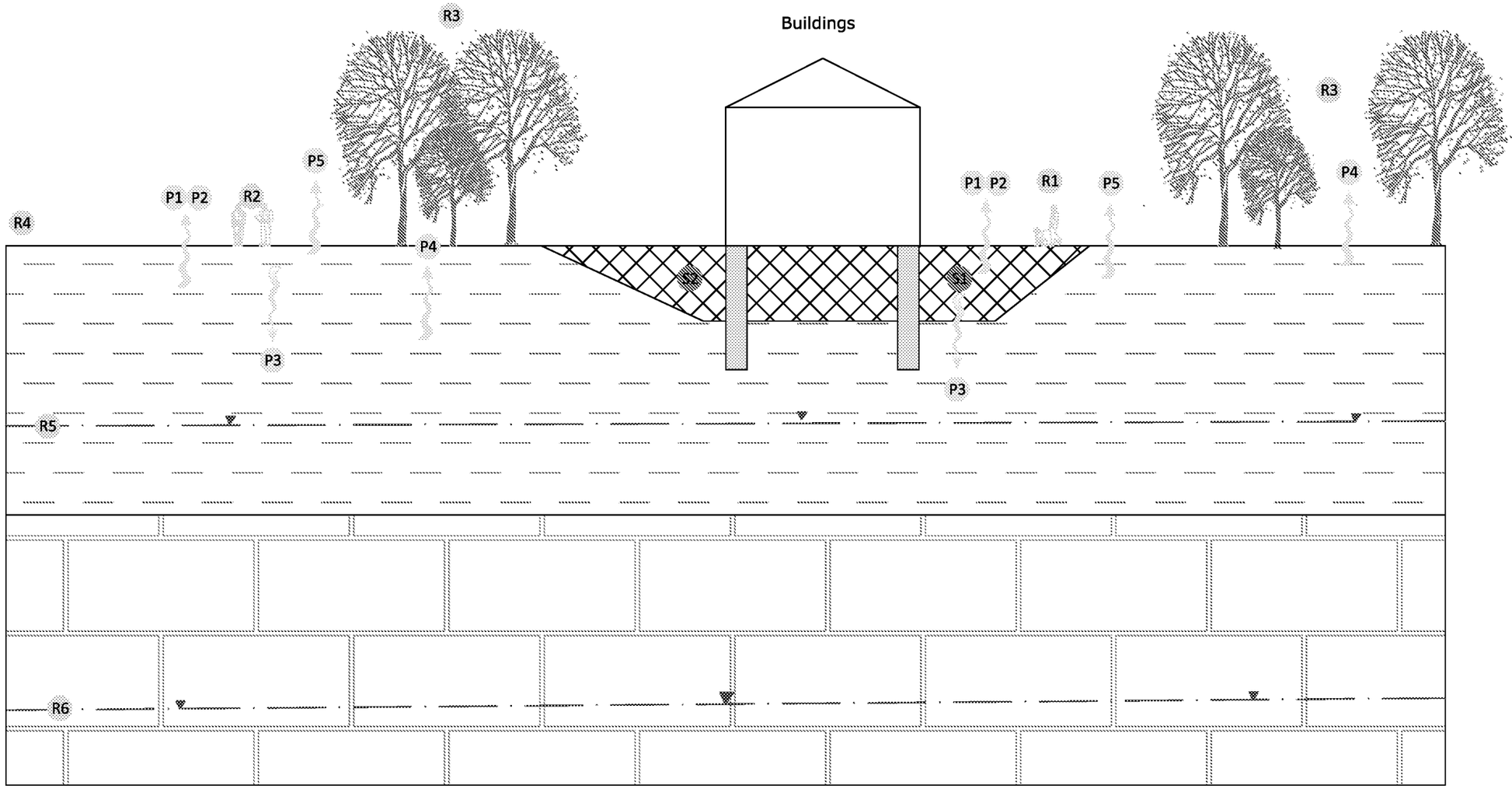

GEOLOGY

- MADE GROUND
- RIVER TERRACE DEPOSITS (Gravelly Clay)
- CHALK

SOURCES

- S1 MADE GROUND (Inorganics, Asbestos, PAH)
- S2 HORTICULTURE (Inorganics, Asbestos, PAH, Pesticides)

POTENTIAL PATHWAYS

- P1 DERMAL CONTACT
- P2 INGESTION\INHALATION
- P3 LEACHING OF CONTAMINANTS
- P4 UPTAKE BY PLANTS
- P5 VOLATILISATION

SIGNIFICANT RECEPTORS

- R1 END USERS (RESIDENTS)
- R2 SITE WORKERS
- R3 VEGETATION
- R4 SURFACE WATERS
- R5 SECONDARY AQUIFER - SUPERFICIAL
- R6 PRINCIPAL AQUIFER - SOLID

client	Gere Developments
project	SHRIPNEY ROAD, BOGNOR REGIS
drawing title	PRELIMINARY CONCEPTUAL SITE MODEL
drawing number	7235/5
revision	--
drawing status	Final
scale	Not to Scale
date	24/06/2021
drawn by	BJH
checked by	--

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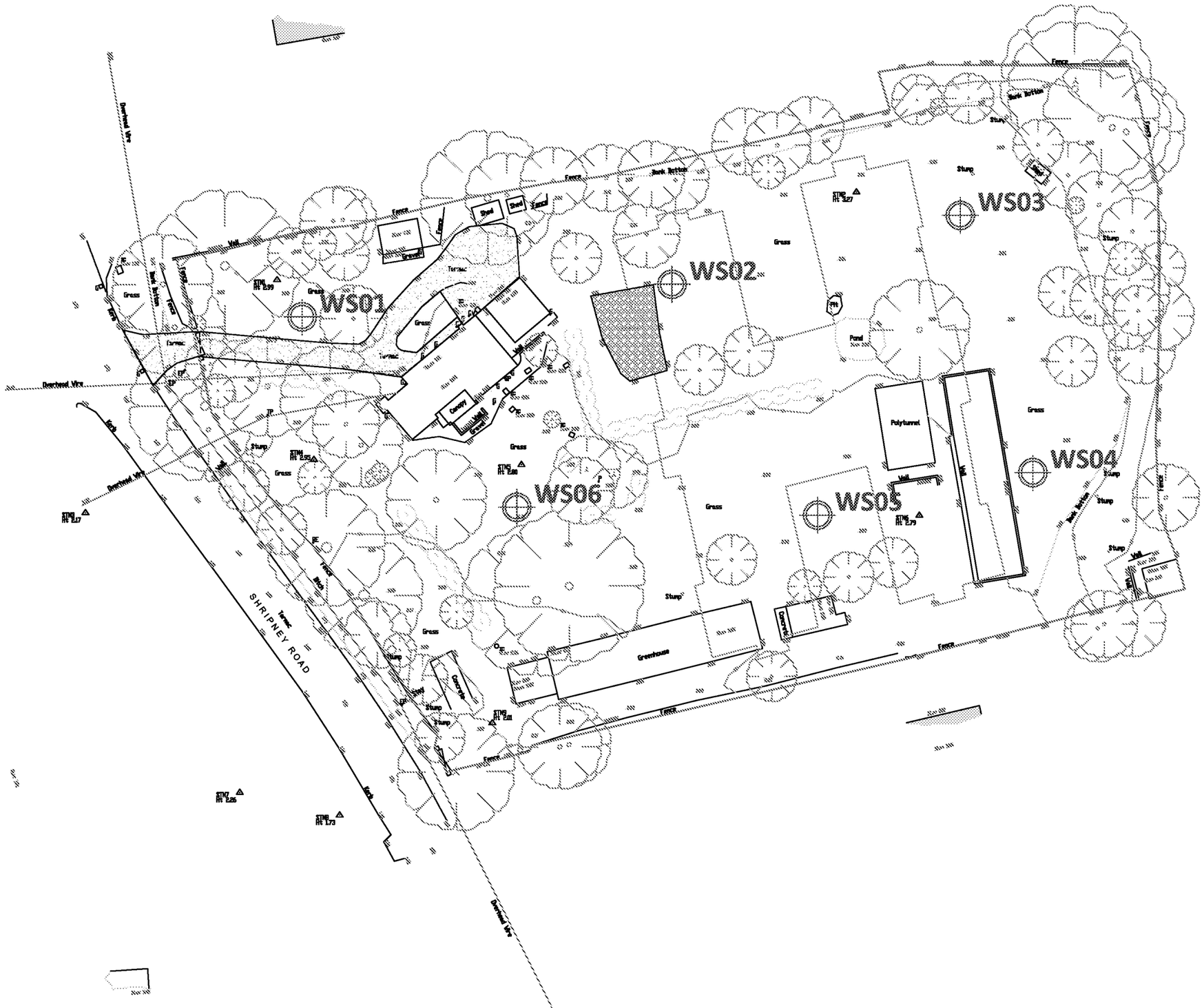

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CALABRIAN 2021 INVESTIGATION

WINDOW SAMPLE LOCATION

APPROXIMATE SITE BOUNDARY

PROPOSED CARE HOME FOOTPRINT

rev	description

client	
project	SHRIPNEY ROAD, BOGNOR REGIS
drawing title	EXPLORATORY HOLE LOCATION PLAN
drawing number	7385/6
revision	--
drawing status	FINAL
scale	1:500 @A3
date	24/06/2021
drawn by	RJH
checked by	--

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ANNEX I	SUMMARY CONTAMINATION DATA (SOILS)
Table A	Summary of Contamination Results (Inorganics)
Table B	Summary of Contamination Results (Organics)
Table C	Statistical Analysis (Lead)

ARUN DISTRICT COUNCIL BE/176/21/PL

Summary of Degree of Ground Contamination (Inorganics)

Exp Hole	Depth (m)	Material	Concentrations in mg/kg unless otherwise stated. Results are quoted to 1 decimal place if <10, and whole numbers if >10. Trigger Level Concentrations are shown in **BLACK** and assume a **residential with homegrown produce end-use.**											
			pH	As	B	Cd	Cr(III)	Cu	Pb	Phenol	Ni	Se	Zn	Asbestos
				37	290	11	910	2400	200	40	130	250	3700	Identification / Quantity (% mass)
WS101	0.1	Topsoil	6.3	10	0.8	0.5	22	22	64		0.07	12	< 0.5	110	Not identified
WS101	0.5	River Terrace Deposits	8.1	6.7	0.5	0.3	21	14	13		< 0.05	16	< 0.5	45	Not identified
WS102	0.1	River Terrace Deposits	6.4	8.4	0.8	0.5	18	36	63		0.07	12	< 0.5	150	Not identified
WS102	0.8	River Terrace Deposits	7.7	7.5	0.5	0.3	21	14	12		< 0.05	16	< 0.5	45	Not identified
WS103	0.1	Topsoil	6.3	9.9	0.6	0.4	17	23	110		0.09	13	< 0.5	94	Not identified
WS104	0.1	Topsoil	6.8	7.3	0.7	0.4	13	25	**250**		0.06	14	< 0.5	160	Not identified
WS104	0.5	River Terrace Deposits	7.5	6.1	0.5	0.3	16	12	11		< 0.05	12	< 0.5	34	Not identified
WS105	0.1	Topsoil	6.8	11	0.8	0.7	22	35	130		0.12	16	< 0.5	330	Not identified
WS105	0.9	River Terrace Deposits	8.2	7	0.3	0.4	21	14	9.3		< 0.05	17	< 0.5	40	Not identified
WS106	0.1	Topsoil	5.9	8.6	0.4	0.2	21	17	45		0.06	15	< 0.5	85	Not identified

KEY

36	Parameter tested for and found to be in excess of Tier 1 concentration
179	Parameter tested for and found to be > 5 x Tier 1 concentration
12	Parameter tested for but not found to be in excess of Tier 1 concentration

Summary of Degree of Ground Contamination (Organics)

Expl Hole	Depth (m)	Material	Concentrations in mg/kg. Results are quoted to 1 decimal place if >10, and whole numbers if >100. Trigger level concentrations are shown in **BLACK** and assume a **residential with homegrown produce end use**									
								PAH		TPH - CO - 8 CWG		
			% TOC	Benzene	Toluene	Ethyl Benzene	Xylenes	Naph	Naphth-alene	GRO C5-6 Ali	GRO C6-10 Ali	GRO C6-10 Aro
				0.87	497	240	127	5	13	15	151	1000
WS101	0.1	Topsoil	3.5					0.15	< 0.03			
WS101	0.5	River Terrace Deposits	0.7	< 0.01	< 0.01	< 0.01	< 0.01	< 0.03	< 0.03	< 0.1	< 10	< 10
WS102	0.1	River Terrace Deposits	4.4					0.11	< 0.03			
WS102	0.8	River Terrace Deposits	0.3	< 0.01	< 0.01	< 0.01	< 0.01	< 0.03	< 0.03	< 0.1	< 10	< 10
WS103	0.1	Topsoil	2.1					0.07	< 0.03			
WS104	0.1	Topsoil	3.2					0.33	< 0.03			
WS104	0.5	River Terrace Deposits	0.6					< 0.03	< 0.03			
WS105	0.1	Topsoil	2.3					0.12	< 0.03			
WS105	0.9	River Terrace Deposits	0.4	< 0.01	< 0.01	< 0.01	< 0.01	< 0.03	< 0.03	< 0.1	< 10	< 10
WS106	0.1	Topsoil	2.5					< 0.03	< 0.03			

KEY

36	Parameter tested for and found to be in excess of Tier 1 concentration
179	Parameter tested for and found to be > 5 x Tier 1 concentration
12	Parameter tested for but not found to be in excess of Tier 1 concentration

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LEAD

Project No.	**7135**
Project Name	**Shripney**
Calculated By	**RJH**
Site Area	**All**
Ground Type	**Topsoil**

Analytical Data	
Data (mg/kg)	log Data
64.00	1.8062
110.00	2.0414
250.00	2.3979
130.00	2.1139
45.00	1.6532

Mean Value Test		
n	t	t value
2	6.3138	
3	2.9200	
4	2.3534	
5	2.1318	2.132
6	2.0150	
7	1.9432	
8	1.8946	
9	1.8595	
10	1.8331	
11	1.8125	
12	1.7959	
13	1.7823	
14	1.7709	
15	1.7613	
16	1.7531	
17	1.7459	
18	1.7396	
19	1.7341	
20	1.7291	
21	1.7247	
22	1.7207	
23	1.7171	
24	1.7139	
25	1.7109	
26	1.7081	
27	1.7056	
28	1.7033	
29	1.7011	
30	1.6991	

Outlier Test	
T_{crit} 10%	T_{crit} V
1.425	
1.602	1.602
1.729	
1.828	
1.909	
1.977	
2.036	
2.088	
2.134	
2.176	
2.213	
2.248	
2.279	
2.309	
2.336	
2.361	
2.385	
2.408	
2.429	
2.449	
2.468	
2.486	
2.503	
2.520	
2.536	
2.551	
2.565	

No. of samples:	**5**
Tier 1 Value:	450
Log Tier 1 Value:	2.65

t value:	**2.13**
mean log data(x):	**2.00**
st.dev (s):	**0.29**
95% ile log data:	2.28
95% ile:	189.12

Is the Mean Value Test Higher or Lower than the SGV?	
Higher or Lower	LOWER

Y max:	**2.40**
Y mean:	**2.00**
Y st.dev.:	**0.29**
T value	**1.37**
Comparator	**1.60**

Maximum Value Test Result:	
Outlier Test?	**Maximum is within a Normal Distribution**

Outlier Values	Sample Number

Soil Screening Values used by Calabrian

In March 2002 DEFRA and the Environment Agency published a series of technical papers (R&D Publications CLR 7, 8, 9 and 10) outlining the UK approach to the assessment of risk to human health from land contamination. In 2008 CLR 7, 9 and 10 and all corresponding SGV and Tox reports were withdrawn and superseded by new guidance including:

- Guidance on Comparing Soil Contamination Data with a Critical Concentration - CL:AIRE and CIEH, May 2008
- Evaluation of models for predicting plant uptake of chemicals from soil - Science Report – SC050021/SR
- Human health toxicological assessment of contaminants in soil - Science Report: SC050021/SR2
- Updated technical background to the CLEA model - Science Report: SC050021/SR3
- CLEA Software (Version 1.05) Handbook Science report: SC050021/SR4
- Compilation of data for priority organic pollutants for derivation of Soil Guideline Values - Science Report: SC050021/SR7

The approach set out in these documents represents current scientific knowledge and thinking; and includes the Contaminated Land Exposure Model (CLEAv1.06). The Environment Agency are in the process of using this updated approach to regenerate a selection of Soil Guideline Values (SGVs).

CLEA SGVs were derived for standard land use scenarios predominantly in the context of Part IIA, using a conceptual site model (CSM) defined in SR3. Calabrian have incorporated amendments to the CSM used to derive SGVs that more accurately reflect redevelopment within the planning regime; consequently, Calabrian have not necessarily adopted any published SGV as a screening value.

The CLEA conceptual site model assumes a source located in a sandy loam, with 6% soil organic matter (SOM) - equivalent to 3.5% total organic carbon (TOC). Calabrian consider it reasonable to adopt the CLEA default TOC for made ground. However, where the average TOC value for a particular soil type is significantly lower than the 3.5%, Calabrian adopt refined Screening Values.

In March 2014 DEFRA published Category 4 Screening Levels (C4SLs) for six substances (arsenic, cadmium, chromium IV, lead, benzene & benzo(a)pyrene) for four generic land-uses comprising residential, commercial, allotments and public open space.

The methodology for deriving both the previous Soil Guideline Values and the new Category 4 Screening Levels is based on the Environment Agency's Contaminated Land Exposure Assessment (CLEA) methodology. Development of Category 4 Screening Levels has been achieved by modifying the toxicological and\or exposure parameters used within CLEA (while maintaining current exposure parameters).

The Part 2A Statutory Guidance was developed on the basis that Category 4 Screening Levels could be used under the planning regime. However, policy responsibility for the National Planning Policy Framework falls to the Department for Communities and Local Government. Defra anticipate that, where they exist, C4SLs will be used as generic screening criteria, and Calabrian consider C4SLs to be suitable for use as Tier 1 Screening Values. Calabrian have discussed this matter with both NHBC and YAHPAC (collection of Yorkshire & Humberside local authorities) and received confirmation that they are satisfied with this approach.

In general Calabrian have adopted the use of the LQM/CIEH Suitable 4 Use Levels (S4ULs) as Tier 1 Screening Criteria. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3373. All rights reversed.

Calabrian have adopted Tier 1 Screening Criteria for four different CSMs (Scenarios); these are:

- A - Residential with homegrown produce, but no cover (or only up to 300mm)
- B - Residential with homegrown produce and 600mm 'clean' cover
- C – Residential apartments with landscaping (i.e. no home grown produce)
- D - Commercial/industrial with landscaping.

The **exposure** pathways considered for each scenario are detailed in the Table below.

Scenario	Land use	Pathways	Justification
A	Residential with homegrown produce, but no cover (or only up to 300mm)	• Direct ingestion of soil • Dermal contact • Consumption of vegetables and soil attached to vegetables • Inhalation of indoor vapours and dust • Inhalation of outdoor vapours and dust	Minimal cover – insufficient to break any pathways therefore all exposure pathways are relevant
B	Residential with homegrown produce minimum 600mm cover	• Inhalation of indoor vapours • Inhalation of outdoor vapours	The 600mm cover removes the risk from all pathways other than inhalation.
C	Residential apartments with landscaped areas and minimum 300mm cover	• Direct ingestion of soil • Dermal contact • Inhalation of indoor vapours and dust • Inhalation of outdoor vapours and dust	All pathways applicable due to possible exposure from landscaped areas. However consumption of home grown produce not included as unlikely to be grown in landscaped areas. Where vegetables are to be grown site specific QRA may be required.
D	Commercial/ industrial with landscaped areas no cover	• Direct ingestion of soil • Dermal contact • Inhalation of indoor vapours and dust • Inhalation of outdoor vapours and dust	All pathways applicable due to possible exposure from landscaped areas. Assumed the commercial development consists of offices to provide a conservative assessment.
E	Grassed area or play park in close proximity to housing. Assumes minimum 300mm cover (growing medium).	• Direct ingestion of soil • Dermal contact • Inhalation of outdoor vapours and dust	All pathways applicable due to possible exposure from landscaped areas. Assumes an area where some children play regularly and others less.
F	Dedicated sports grounds. Assumes minimum 300mm cover (growing medium).	• Direct ingestion of soil • Dermal contact • Inhalation of outdoor vapours and dust	All pathways applicable due to possible exposure from landscaped areas. Assumes an where exposure only occurs to players and grounds staff

The Soil Screening Values referred to in this document are **not** intended to be used when considering potential risks associated with:

- existing land uses in the context of Part IIA of the Environment Protection Act 1990;
- end uses such as allotments, sports fields, children's playgrounds, care homes, hospitals etc; and
- controlled waters.

With respect to **inorganic** determinands, Calabrian derived Tier 1 values for the four Scenarios A to D are presented below:

Inorganic Contaminant	Source	Tier 1 Assessment Criteria (mg/kg) for Scenarios A to D										Comments/Notes
		SGV*	C4SL*	LQM/ CIEH S4UL	A	B	C	D	E	F		
As	CLEA	32	37	37	37	Use (A) in SI Report for initial "screen". If >5 x A, then consider increase of cover to 1,000mm	40	640	79	170		C4SLs adopted
Cd	CLEA	10	26	11	11		85	190	120	532		LQM/CIEH S4UL adopted
Cr	CLEA				910		910	8600	1,500	33,000		Assumes Cr is CrIII.
Pb	CLEA	(450)	200		200		310	2,330	630	1,300		C4SLs adopted
Ni	CLEA	130		130	130		180	980	230	3,400		LQM/CIEH S4UL. Assessment of health risk only
Se	CLEA	350		250	250		430	12,000	1,100	1,800		LQM/CIEH S4UL adopted
Hg	CLEA	170		40	40		56	11,000	120	240		LQM/CIEH S4UL. Assumes in an inorganic compound.
B	Drinking			290	290		11,000	240,000	21,000	46,000		LQM/CIEH S4UL adopted
Cu	EPA			2,400	2,400		7100	68,00	12,000	44,000		LQM/CIEH S4UL adopted
Zn	DoE	200		3,700	3,700		40,000	73,000	81,000	170,000		LQM/CIEH S4UL adopted
Cyanide	CLEA				527		530	14,000				

* *For a residential end use*

Calabrian

With respect to **organic** determinands, Calabrian derived Tier 1 values (assuming 6% SOM) for the four Scenarios A to D are presented below:

Organic Contaminant (all sourced via GAC)	Tier 1 Assessment Criteria (mg/kg) for Scenarios A to D									Comments/Notes
	SGV*	C4SL*	LQM/ CIEH S4UL*	A	B	C	D	E	F	
Benzene	0.33	0.87	0.37	0.87	0.87	3.3	98	140	230	C4SLs adopted
Toluene	610		660	497	1,440	1,690	4,360	56,000#	100,000#	
Ethyl Benzene	350		260	240	416	498	2,840	25,000#	27,000#	
Xylenes	240		310	127	146	183	2,620	43,000#	31,000#	
Phenol	420			412	2,360	557	38,700			
PCBs				1.7	1.8	1.8	1.8			Based on toxicity of EC7.
Benzo(a)pyrene		5	3	5	25	5.3	77	10	21	C4SLs adopted. Where source **not** a coal tar.
Naphthalene			13	13	13	13	432	4,900#	3,000#	
Gasoline Range Organics				15	16	21	1,000	21	21	See **3-step** assessment of TPH below.
Diesel Range Organics				151	153	232	5,000	232	232	
Lubricating Range Org				1,000	5,000	1,000	5,000	1,000	1,000	

* *For a residential end use*

\# *LQM/CIEH S4UL adopted, 6% SOM*

Note: **PAH** cannot be assessed as a single "total" value, as each individual PAH compound has different toxicity and mobility in the environment. Speciated analysis is required to determine the concentrations of the various compounds, most notably the key PAHs: Benzo(a)Pyrene (considered the most toxic of the PAHs); and Naphthalene (the most mobile and volatile of the PAHs).

Similarly, **TPH** cannot be assessed as a single "total" value, and reference has been made to the Environment Agency's document P5-080/TR3, "*The UK approach for evaluating human health risks from petroleum hydrocarbons in soils*". This document supports the assumptions and recommendations made by the US Total Petroleum Hydrocarbons Criteria Working Group (TPHCWG). The TPHCWG have broken down "TPH" into thirteen representative constituent fractions or "EC Bandings". The TPHCWG have derived a series of physiochemical and toxicological parameters for each of the thirteen bandings. The significance of speciated TPH results can be assessed by following the 3 steps outlined in the below.

Step	Result	Action
1. Consider indicator compounds: Are BTEX, Naphthalene, Benzo(a)pyrene above their respective Tier 1 values?	Yes	Remediation or DQRA required
	No	Proceed to Step 2
2. Consider individual TPH fractions: are they above respective screening values?	Yes	Remediation or DQRA required
	No	Proceed to Step 3
3. Assess Cumulative effects: Is the calculated Hazard Index for each source >1	Yes	Remediation or DQRA required
	No	TPH compounds pose no significant risk

Step 1 *- Assessing indicator compounds*

TPH fraction indicator compound	Risk Based Soilsafe screening value (mg/kg)			
	A: Residential no veg	B: Residential with allotments	C: Commercial no veg	D: Commercial with allotments
Benzene	0.87	0.87	3.3	98
Toluene	497	1,440	1,690	4,360
Ethyl Benzene	240	416	498	2,840
Xylenes	127	146	183	2,620
Naphthalene	13	13	13	432

Step 2 *- Assessing individual TPH fractions*

TPH fraction		End use specific screening value (mg/kg)					
		A: Residential no cover	B: Residential with produce cover	C: Residential with no produce	D: Commercial/ industrial	E: POS (Residential) S4UL	F: POS (Park) S4UL
Aliphatic 5-6	GRO	41	41	63	5,000^	160	160
Aliphatic 6-8	GRO	123	123	191		530	530
Aliphatic 8-10	GRO	30	31	48		150	150
Aliphatic 10-12	DRO	151	153	232		760	770
Aliphatic 12-16	DRO	500^	500^	500^		4,300	4,400
Aliphatic 16-21	DRO	1,000^	5,000#	1,000^		11,000	11,000
Aliphatic 21-35	LRO	1,000^	5,000#	1,000^			
Aromatic 5-7	GRO	52	56	72		300	1,400
Aromatic 7-8	GRO	15	16	21	1,000^	660	3,900
Aromatic 8-10	GRO	47	50	77	5,000^	190	270
Aromatic 10-12	DRO	212	282	390		380	1,200
Aromatic 12-16	DRO	683	1,000*	1,000*		660	2,500
Aromatic 16-21	DRO	1,000^	5,000#	1,000^		930	1,900
Aromatic 21-35	LRO	1,000^	5,000#	1,000^		1,700	1,900

* Calculated Screening Value exceeded soil saturation limit and could indicate free product, therefore calculated soil saturation limit adopted as a target

^ Calculated Screening Value close to soil saturation limit, screening value selected by Calabrian considering visual and olfactory impacts.

Five times the screening value for Scenario A.

S4UL LQM/CIEH S4UL adopted, 6% SOM

Step 3 *- Assessing Cumulative Effects*

$$HI = \sum_{F_i=1}^{16} HQ\ F_i = \frac{Measured\ concentration\ F_i\ (mg\,kg^{-1})}{SGV\ F_i\ (mg\,kg^{-1})}$$

where HI = Hazard Index
HQ = Hazard Quotient
F_i = Fraction $_i$
SGV = Soil Guideline Value

With respect to the interpretation of the **calorific values**, at present there are no accepted methods to assess whether a sample is combustible and under what circumstances it might smoulder. Some guidance is given in ICRCL Note 61/84 "Notes on the fire hazards of contaminated land" which states that:

"In general … it seems likely that materials whose CV's exceed 10MJ/kg are almost certainly combustible, while those with values below 2MJ/kg are unlikely to burn".

Tier 1 **groundwater** risk assessments are undertaken by comparing leachate or groundwater concentrations with the appropriate water quality standard. Tier 1 Screening Values have been discussed with the Environment Agency, and typically those in **bold** below are adopted.

Analyte	Source of Tier 1 Screening Value (µg/l)			
	Surface Water (Abstraction for Drinking) 1980	Water Supply Regulations 2000	Water Framework Directive	Environment Agency Advice
Arsenic	50	10	**50**	
Selenium	10	**10**		
Cadmium	5	5	**1.5**	
Chromium	50	50	**32**	
Copper	50	2,000	**28**	
Lead	50	10	**7.2**	
Nickel		20	**20**	
Zinc	3,000		**125**	
Boron		**1,000**		
Mercury	1	1	**0.05**	
Polyromantic Hydrocarbons		0.01~	**0.002#**	
Petroleum Hydrocarbons				10
1,1,1-Trichloroethane			100	
1,1 Dichloroethane				100
1,2-Dichloroethane		3	10	
1,1-Dichloroethene				100
Benzene		1	10	
Ethylbenzene				10
Tetrachloroethene		10	10	
Toluene			50	
Trichloroethene		10	10	
Vinyl Chloride		0.5		
Trichloromethane			2.5	
Xylenes			30	
Chloroethane				**100**

~ sum of benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene

sum of Benzo(b)fluoranthene + Benzo(k)fluoranthene + Benzo(g,h,i)perylene + Indeno(1,2,3-cd)pyrene

Possible Action in event of Tier 1 exceedance

Should any of the Tier 1 criteria detailed above be exceeded, then three potential courses of action are available. (The first is only applicable in terms of human health, but the second and third could also be applied to groundwater or landfill gas).

1. Undertake further statistical analysis following the approach set out in "*Guidance on Comparing Soil Contamination Data with a Critical Concentration - CL:AIRE and CIEH, May 2008*" in order to determine whether contaminant concentrations of inorganic contaminants within soil\fill actually present a risk (only applicable to assessing the risk to human health).
2. Carry out a more detailed quantitative risk assessment in order to determine whether contamination risks actually exist.
3. Based on a qualitative risk assessment, advocate an appropriate level of remediation to "break" the pollutant linkage - for example the removal of the contaminated materials or the provision of a clean cover.

Prior to undertaking any statistical analysis the issue of the **averaging area** requires further consideration. The CL:AIRE\CIEH document still refers to CLR 7, which suggests averaging area should reflect receptor behaviour and therefore might be a single garden, or an open area used by the local community as a play area. This approach to averaging areas is considered applicable within the context of Part IIA of the Environmental Protection Act (EPA) 1990, in terms of an existing residential development.

However, Calabrian consider the concept of a single garden as an averaging area to be inappropriate with respect to brownfield redevelopment, which is regulated by the planning regime. In this context, contamination across the entire site needs to be characterised by reference to the Conceptual Site Model. Consequently, Calabrian gather and analyse sample results by fill type, and\or by former use in a given sub-area of the site, before undertaking statistical analysis; ie the averaging area is associated with the extent of a particular fill type, or an area affected by spillage\leakage.

In terms of brownfield redevelopment, this is considered a more appropriate methodology which provides a more representative sample population for statistical analysis. As such the entire site is considered in terms of the proposed end use, be this residential with, or without gardens.

Analysis by soil\fill type is appropriate for essentially immobile contaminants associated with a particular fill type, for example arsenic in colliery spoil, metals in ash & clinker, sulphate in plaster-rich demolition rubble etc.

Analysis by former use is appropriate where more mobile contaminants have entered the ground, for example diesel associated with leakage from a former fuel tank, downward migration of leachable metals through granular materials, various soluble contaminants present in a wastewater leaking into the ground via a fractured sewer etc. In these circumstances, it may be appropriate to undertake statistical analysis of sample results from a variety of different soil\fill types. However, consideration would have to be given to factors such as porosity which might influence impregnation of a mobile contaminant into the soil mass; ie contamination would normally be more pervasive and significant in granular soils than cohesive soils.

Cabrian

APPENDIX A COMMISSION

7135/002/RJH/rjh

26th May 2021

S Rose
LNT Care Developments
Helios 47
Leeds
West Yorkshire
LS25 2DY

Dear Sam

Shipney, Bognor Regis, PO22 9PA

Please find enclosed our fee proposal for undertaking a site investigation on the above.

Your drawing suggests that the site consists of a single parcel of land with a plan area of approximately 0.7 hectares. The site currently comprises a residential property and its gardens. There are relatively dense mature trees in the west and around the perimeter of the site.

Your proposed layout referenced PO22-9PA-F01 and dated 4th March 2021 indicates a two-storey residential care home development with associated gardens/landscaping, access road and car park.

A brief review of our archives and publically available data suggests the site:

- Appears to have remained undeveloped until the existing residential dwelling was constructed at the beginning of the 20th Century;
- is not within 250m of an area of current or known historical landfilling;
- is located beyond the Coal Authority's defined coalfields; and,
- is not within a source protection zone.

The geological map for the area suggests the site is underlain by River Terrace Deposits (sand, silt, and clay) with Chalk at depth. The nearest archive exploratory hole to the site indicates stiff and firm clat to around 4m depth with chalk below.

Ground investigation is generally best undertaken once site operations have ceased and preferably post-demolition; access constraints associated with existing buildings, operations, and underground service runs, can prevent thorough inspection of the ground via extensive trial pitting/trenching. Consequently, some uncertainties may remain, and a supplementary, post-demolition ground investigation may be required by the relevant regulatory authorities. Nonetheless, useful data can be obtained at this time and we will certainly aim to resolve as much uncertainty relating to ground as possible, in order to enable you to make an unconditional offer for the site.

[redacted]

ARUN DISTRICT COUNCIL BE/176/21/PL

Our site investigation proposal allows for the following works:

Phase 1 Desk Study

Environmental search data and historical maps (obtained from Landmark) will be reviewed in order to determine whether any past land uses have had any effect on the proposed development. In addition, published geological plans of the area will be examined. We will also visit site to undertake a walkover survey.

Preliminary and detailed unexploded ordnance (UXO) risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'. An initial UXO threat assessment has been undertaken using the ZeticaUXO risk map. The site is located in a low-risk area meaning that there is no greater probability of encountering UXO than anywhere else in the UK; on this basis further assessment is not advocated.

Fieldwork

Given the access constraints around the existing residential property we have allowed for one day's window sampling (around six boreholes) using a mini percussion drilling rig, equipped with a concrete corer. All boreholes will be supervised and logged by an experienced geoenvironmental engineer.

Representative soil samples of natural and man-made ground, including any contaminated samples, will be taken during the works. In-situ shear strengths of any cohesive soils encountered will be determined by the use of a hand-held shear vane.

This site is greenfield and therefore highly unlikely to be underlain by made ground. Furthermore, we are not aware of any other sources of hazardous gas (shallow mine workings, landfill sites etc) within influencing distance of the site. Consequently, at this stage, we have not allowed for undertaking a hazardous gas risk assessment, but we will review the need for this in light of desk study data and the ground conditions actually encountered.

This proposal has been put together without a visit to the site and it has been assumed that access is available for a mini-track mounted drilling rig.

Soils Testing: This will comprise routine geotechnical soils analysis, typical of that normally required for greenfield sites. Although no allowance has been made for in-situ or laboratory CBR testing, CBR values will be estimated from the strata descriptions and classification test results, where appropriate (ie. if no significant regrading or reworking of made ground is proposed).

Appropriate chemical analyses, based on our knowledge of the site's history, have been allowed for; this will comprise ten samples for a suite including asbestos, heavy metals, TPH and PAH. In the event that ground contamination is more significant or different to that anticipated, it might be necessary to carry out additional chemical testing.

'Full Two Stage' Waste Acceptance Criteria (WAC) analysis will be undertaken on three samples of soils that are likely to require removal from site to landfill.

Reporting & Timescales

In order to provide you with sufficient information to enable assessment of abnormal costs at the earliest opportunity we will issue a concise overview report within five days of fieldwork completion.

[redacted]

ARUN DISTRICT COUNCIL BE/176/21/PL

On completion of the desk study, fieldwork and laboratory testing a comprehensive, factual, and interpretative report will be issued. This will contain detailed engineering records, laboratory test results, copies of all relevant correspondence and drawings of the site. The report will include qualitative risk assessment with respect to both controlled waters and human health.

The report will also provide technically feasible options for redevelopment of the site with a care home, including consideration of foundation types and treatment\removal of contamination.

Fieldwork could be commenced within three weeks of receipt of your written instruction to proceed. Our comprehensive geoenvironmental appraisal report will be issued within four weeks of fieldwork completion.

A copy of the final report will be issued to the relevant regulatory authorities on receipt of written instruction from yourselves.

Invoicing: The attached proposal provides a breakdown of the costs associated with this project. This breakdown is for information only and the proposal can be regarded as a lump sum price of £*,*** plus VAT. Variation will only occur in the event that a given item is not undertaken or that substantial additional works are recommended, in which case we will inform you immediately, provide costs for the required works, and seek your prior consent.

Our proposal allows for submission of the report to the Local Authority and for submission of a single piece of subsequent correspondence with each regulator to address any queries they may have. Any further meetings, correspondence etc, would be chargeable.

The investigation should be considered to comprise two elements. Each will be invoiced on completion of the relevant report as defined below:

1. Items A to C within five days of fieldwork completion, with exploratory hole logs and an interim letter report outlining our initial findings and Preliminary Recommendations Report; and,
2. Items D to G on issue of the comprehensive geoenvironmental appraisal report.

Health, Safety & Welfare

The works outlined above will be carried out in accordance with Calabrian task- and site- specific Risk Assessments and Method Statements.

Details of welfare will be included within the Method Statements; however, this investigation is expected to be completed within one working day and therefore it is not considered reasonably practicable to provide formal welfare facilities, and our proposal makes no allowance for so doing.

Utility plans are required in order to protect operatives from the hazards associated with striking buried services and avoid potentially substantial disruption\repair costs. We will make every effort not to damage any services (including review of utility plans and use of a CAT detector).

Calabrian will obtain copies of the necessary utility plans in a Landmark Utility Report; however, if you already hold these it would be appreciated if you could forward these prior to the proposed fieldworks.

It is highly likely that the site is underlain by many "private" services and drains etc which will not be shown on statutory utility plans. Consequently, it would be appreciated if copies of plans showing these services could be made available to our field engineer, and\or someone with site knowledge could advise us with respect to safe locations for our exploratory holes.

ARUN DISTRICT COUNCIL BE/176/21/PL

Terms & Conditions

This work will be undertaken in accordance with our Standard Terms and Conditions, a copy of which are enclosed.

Should you require any further information, please contact the undersigned.

Yours sincerely

[redacted]

Richard Hey - Managing Director
for and on behalf of
CALABRIAN LIMITED

enc

Calabrian Limited
East View Farm | Redmire | Leyburn | DL8 4EP | Tel: 01969 623803
[redacted]

ARUN DISTRICT COUNCIL BE/176/21/PL

Terms and Conditions for the Appointment of Calabrian Limited

1 DEFINITIONS AND INTERPRETATION

1.1 In this Agreement, unless the context otherwise requires, the following words and expressions have the following meanings:

"Agreement" shall mean these Terms (entitled "Terms and Conditions for the Appointment of Calabrian Limited"), the Proposal, any document recording the Client's unequivocal acceptance of the Proposal and any other documents or parts of other documents expressly referred to in any of the foregoing:

"Client" shall mean the party for whom the Services are being provided by Calabrian;

"Documents" shall mean all documents of any kind and includes plans, drawings, reports, programmes, specifications, Bills of Quantities, calculations, letters, e-mails, faxes, memoranda, films, and photographs (including negatives), or any other form of record prepared or provided or received by, or on behalf of Calabrian, and whether in paper form or stored electronically or on disk, or otherwise;

"Calabrian" shall mean Calabrian Limited whose registered office is at Spring Royd, Clapham Road, Austwick, Lancaster, LA2 8BE.

"Intellectual Property" includes all rights to, and any interests in, any patents, designs, trademarks,

right, know-how, trade secrets and any other proprietary rights or forms of intellectual property (protectable by registration or not) in respect of any technology, concept, idea, data, programme, or other software (including source and object codes), specification, plan, drawing, schedule, minutes, correspondence, scheme, programme, design, system, process logo, mark, style, or other matter or thing, existing or conceived, used, developed, or produced by any person;

"Parties" shall mean the Client and Calabrian

"Project" shall mean the project described in the Proposal and any enquiry from the Client on which Calabrian has based its Proposal;

"Proposal" means the offer document prepared by Calabrian in response to an enquiry or otherwise, in connection with the proposed provision of the Services;

"Services" means the work and services relating to the Project to be provided by Calabrian pursuant to the Agreement and as set out in the Proposal and shall include any additions or amendments thereto made in accordance with these Terms;

"Terms" means these terms entitled "Calabrian Terms of Appointment";

1.2 Words importing the singular only shall also include the plural and vice versa, where the context requires.

1.3 Words importing persons or parties shall include firms, corporations and any organisation having legal capacity and vice versa, where the context requires; and words importing a particular gender include all genders.

1.4 The sub-headings to the clauses of these Terms are for convenience only and shall not affect the construction of the Agreement.

1.5 A reference to legislation includes that legislation as from time to time amended, re-enacted or substituted and any Orders in Council, orders, rules, regulations, schemes, warrants, by-laws, directives or codes of practice issued under any such legislation.

1.6 In the event of conflict between the documents forming part of the Agreement, the Proposal shall prevail, followed by the Terms.

2 APPOINTMENT

2.1 The Client agrees to engage Calabrian and Calabrian agrees to provide the Services in accordance with the provisions of the Agreement.

3 OBLIGATIONS OF CALABRIAN

3.1 Calabrian shall perform the Services using the reasonable standard of skill and care normally exercised by similar professional Environmental firms in performing similar services under similar conditions.

3.2 Calabrian shall perform the Services in accordance with all relevant environmental and safety legislation at the time of undertaking the project.

4 OBLIGATIONS OF THE CLIENT

4.1 Throughout the period of this Agreement the Client shall afford to Calabrian or procure the affording to Calabrian of access to any site where access is required for the performance of the Services.

4.2 The Client accepts responsibility for ensuring that Calabrian is notified in writing of all special site and/or plant conditions, including without prejudice to the generality of the foregoing, the existence and precise location of all underground services, cables, pipes, drains or underground buildings, constructions or any hazards known or suspected by the Client, which the Client shall clearly mark on the ground or identify on accurate location plans supplied to Calabrian prior to the commencement of the Services. The Client shall also inform Calabrian in writing of any relevant operating procedures including any site safe operating procedures and any other regulations relevant to the carrying out of the Services. The Client shall indemnify Calabrian against all costs, claims, demands and expenses arising as a result of any non-disclosure in this respect, including but not limited to indemnification against any action brought by the owner of the land or otherwise.

4.3 If the Client discovers any conflict, defect or other fault in the information or designs provided by Calabrian pursuant to the Agreement, he will advise Calabrian in writing of such defect, conflict or other fault and Calabrian shall have the right to rectify the same or where necessary, to design the solution for rectification of any works carried out by others pursuant the conflicting, defective or in any other way faulty information or designs. Calabrian shall indemnify the client against all costs claims demands and expenses arising as a result of any conflict, defect, or other fault in this respect.

5 INTELLECTUAL PROPERTY

5.1 The copyright in all Intellectual Property prepared by or on behalf of Calabrian in connection with the Project for delivery to the Client shall remain vested in Calabrian.

5.2 The Client shall have a non-exclusive licence to copy and use such Intellectual Property for purposes directly related to the Project. Such licence shall enable the Client to copy and use the Intellectual Property but solely for its own purposes in connection with the Project and such use shall not include any licence to reproduce any conceptual designs or professional opinions contained therein nor shall it include any license to amend any drawing, design or other Intellectual Property produced by Calabrian.

5.3 Should the Client wish to use such Intellectual Property in connection with any other works or for any other purpose not directly related to the Project or wish to pass any Intellectual Property to any third party, it must obtain the prior written consent of Calabrian. The giving of such consent shall be at the discretion of Calabrian and shall be upon such terms as may be required by Calabrian. Calabrian shall not be liable for the use by any person of such Intellectual Property for any purpose other than that for which the same were prepared by or on behalf of Calabrian.

5.4 Ownership of any proposals submitted to the Client that are not subsequently confirmed as part of the Services to be provided for the Client remain with Calabrian and such proposals must not be used as the basis for any future work undertaken by the Client or a third party and no liability can be accepted howsoever arising from such proposals.

5.5 In the event of the Client being in default of payment of any fees or other amounts due, Calabrian may suspend further use of the licence on that Project on giving 2 days' notice of the intention to do so. Use of the licence may be resumed on receipt of the outstanding amounts.

6 TITLE

6.1 Calabrian shall transfer only such title or rights in respect of the Documents as it has, and if any part is purchased from a third-party Calabrian shall transfer only such title or rights as that party had and has transferred to Calabrian.

6.2 Title in the Documents shall remain with and shall not pass to the Client until the amount due under the invoice(s) (including interest and costs) has been paid in full.

6.3 Until title passes, the Client shall hold the Documents as bailee for Calabrian and shall store or mark them so that they can at all times be identified as the property of Calabrian.

6.4 At any time before title passes (save and except where payment is not due), but only after prior consultation with the Client, Calabrian may without any liability to the Client repossess and use or sell all or any of part of the Documents and by doing so terminate the right of the Client to use, sell or otherwise deal in the Documents.

6.5 Calabrian may maintain an action for the price of the Documents notwithstanding that title in them has not passed to the Client.

7 CONFIDENTIALITY

7.1 Calabrian undertakes not to divulge or disclose to any third party without the written consent of the Client information which is designated confidential by the Client or which can reasonably be considered to be confidential and arises during the performance of the Services unless required to do so by law or necessary in the proper performance of its duties in relation to the Project, or in order to make full frank and proper disclosure to its insurers or intended insurers, or to obtain legal or accounting advice.

7.2 Subject to the above and to the advance prior written consent of the Client, Calabrian shall be permitted to use information related to the Services it provides in connection with the Project for the purposes of marketing its services and in proposals for work of a similar type.

8 THIRD PARTIES

8.1 The Agreement or any part thereof or any benefit or interest thereunder may not be assigned by the Client without the prior written consent of Calabrian. The giving of such consent shall be at the discretion of Calabrian and Calabrian will only agree to an assignment on its terms and in return for payment of a fee by the Client to Calabrian to cover Calabrian's legal and other costs associated with any assignment.

8.2 The Agreement shall not confer and shall not purport to confer on any third party any benefit or any right to enforce any term of this Agreement for the purposes of the Contracts (Rights of Third Parties) Act 1999 or otherwise.

8.3 Calabrian will consent to any reasonable request from the Client for Calabrian to enter a collateral warranty or provide a letter of reliance with/to a tenant, funder, or purchaser with regard to the Services provided under the Agreement. Calabrian will only enter a collateral warranty or provide a letter of reliance on its terms and in return for payment of a fee by the Client to Calabrian to cover Calabrian's legal and other costs associated with any collateral warranty or letter of reliance.

9 INSURANCE

9.1 Calabrian warrants to the Client that there is in force a policy of Professional Indemnity insurance covering its liabilities for negligence under this Agreement, with a limit of indemnity of £5,000,000 (FIVE MILLION POUNDS) any one Single Claim, Defence Costs in addition. This policy is annually renewable and whilst renewal is not automatic, Calabrian agrees to use reasonable endeavours to maintain such insurance at all times until six years from the date of the completion (or termination) of the Services under the Agreement, provided such insurance is available at commercially reasonable rates having regard, inter alia, to premiums required and policy terms obtainable.

9.2 If for any period such insurance is not available at commercially reasonable rates, Calabrian shall forthwith inform the Client and shall obtain in respect of such period such reduced level of Professional Indemnity insurance as is available and as would be fair and reasonable in the circumstances for Calabrian to obtain.

10 LIMITATIONS ON LIABILITY

10.1 Calabrian's liability under or in connection with the Agreement whether in contract, tort, negligence, breach of statutory duty or otherwise (other than in respect of personal injury or death) shall not exceed five million pounds in the aggregate.

10.2 No action or proceedings under or in respect of the Agreement whether in contract, tort, negligence, under statute or otherwise shall be commenced against Calabrian after the expiry of a period of six years from the date of the completion (or termination) of the Services under the Agreement.

10.3 Whilst Calabrian will scan all potential exploratory locations with a Cable Avoidance Tool, Calabrian shall not be liable for any damage to underground services, cables, pipes, drains or underground buildings, constructions and the like which were either not marked on site or for which accurate plans were not provided.

10.4 Calabrian shall not be liable for the cost of rectifying any defect, conflict or other fault in the information or designs provided by Calabrian or for the cost of designing a solution for and rectifying any subsequent works carried out by others pursuant to the conflicting, defective or in any other way faulty information or designs, unless Calabrian has been advised in writing of the same by the Client and has been given the opportunity to rectify the same or where necessary, to design the solution for rectification of any subsequent works carried out by others pursuant to the same. Calabrian shall indemnify the client against all costs claims demands and expenses arising as a result of any conflict, defect, or other fault in this respect.

11 PAYMENT

11.1 Invoices for services rendered will be submitted for payment in accordance with the Proposal.

11.2 The due date for payment is the date of the invoice and the final date for payment is 28 days from the date of the invoice.

11.3 If the Client disputes the amount included for payment in an invoice a written notice must be served on Calabrian by the Client not later than 14 days before the final date for payment. If no notice is given the amount due shall be the amount stated in the invoice.

11.4 In the event of failure on the part of the Client to pay any monies in accordance with the foregoing payment provisions, Calabrian will be entitled to charge interest on any monies owed to it by the Client, such interest to be at a rate of 8% above the base rate of a clearing bank from time to time calculated from the final date for payment to the date of actual payment on a compound basis.

12 DELAY

12.1 Calabrian will comply with any timescale agreed for completion of the Services unless delayed or prevented by circumstances beyond its reasonable control and in the event of any such circumstances arising Calabrian undertakes to complete the Services within a reasonable period but will not be liable to the Client for any delay as a result.

13 TERMINATION

13.1 The Agreement may be determined by either party in the event of the other making a composition or arrangement with its creditors, becoming bankrupt, or being a company, making a proposal for a voluntary arrangement for a composition of debts, or has a provisional liquidator appointed, or has a winding-up order made, or passes a resolution for voluntary winding-up (except for the purposes of a bona fide scheme of amalgamation or reconstruction), or has an administrator or an administrative receiver appointed to the whole or any part of its assets. Notice of determination must be given to the party which is insolvent by the other party.

13.2 If for any reason the performance of the Services by Calabrian is suspended for a period in excess of three calendar months then Calabrian shall be entitled to determine its appointment in respect of the Services by seven days written notice to the Client.

13.3 If the Client shall fail to pay in full any sum due under the terms of the Agreement by the final date for payment for that sum and no effective notice of intention to withhold payment has been issued, Calabrian may serve written notice on the Client demanding payment within 14 days of such notice. If the Client shall fail to comply with such notice, Calabrian shall be entitled to terminate its employment under the Agreement forthwith.

13.4 Any determination of the appointment of Calabrian howsoever caused shall be without prejudice to the right of Calabrian to require payment for all services performed up to the date of such determination including but not limited to payment of a fair and reasonable proportion of any figure identified in the Proposal or otherwise for fees in respect of a particular service which Calabrian has started, but not completed.

14 NOTICES

14.1 Any notice provided for in the Agreement shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post to the address of the relevant party as may have been notified by each party to the other or, in the absence of notification, to the address of Calabrian set out above or to the registered address of the Client.

14.2 Such notice shall be deemed to have been received on the day of delivery if delivered by hand or on the second working day after the day of posting if sent by first class post.

15 ENTIRE AGREEMENT

15.1 The Agreement constitutes the complete and entire agreement between the Client and Calabrian with respect to the Services and supersedes any prior oral and/or written warranties, terms, conditions, communications, and representations, whether express or implied and any claim against Calabrian in respect of the Services can only be made in contract under the provisions of the Agreement and not otherwise under the law or tort or otherwise.

15.2 No amendments, modifications or variation of the Agreement shall be valid unless made in writing and agreed to by both the Client and Calabrian; such agreement must be recorded in writing by at least one of the Parties.

15.3 Calabrian will not be bound by any standard or printed terms or conditions furnished by the Client in any of its documents unless Calabrian specifically states in writing separately from such documents that it intends such terms and conditions to apply.

16 DISPUTES AND GOVERNING LAW

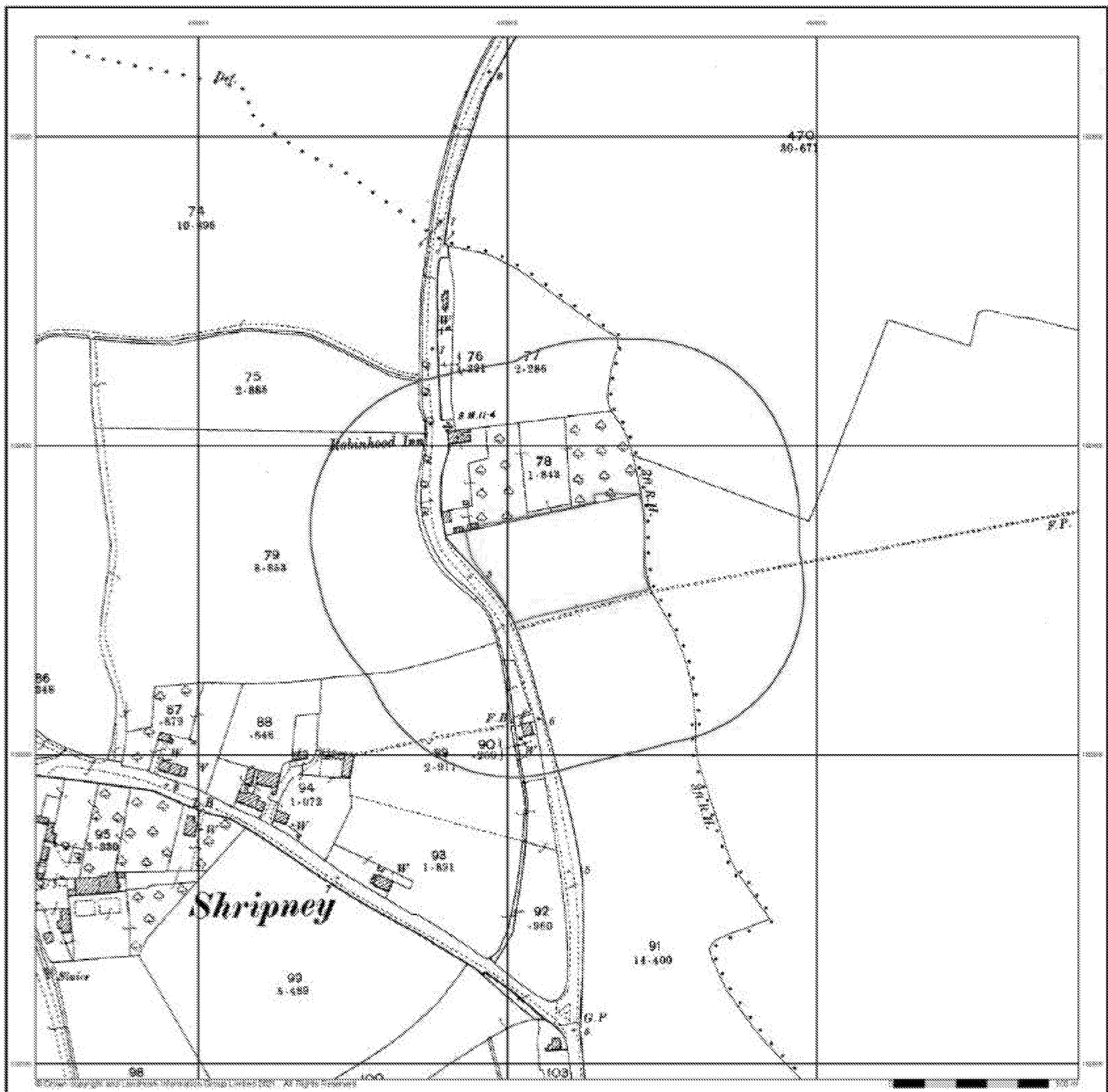
16.1 The Agreement shall be governed by and construed in accordance with English law and the Parties irrevocably and unconditionally submit to the jurisdiction of the English Courts.

16.2 Where the Housing Grants, Construction and Regeneration Act 1996 applies, any dispute between the Parties may be referred to adjudication in accordance with The Scheme for Construction Contracts Regulations 1998 or any amendment or modification thereof being in force at the time of the dispute, as applicable to England, Wales, Scotland, and Northern Ireland.

APPENDIX B HISTORICAL OS PLANS

ARUN DISTRICT COUNCIL BE/176/21/PL

ARUN DISTRICT COUNCIL BE/176/21/PL

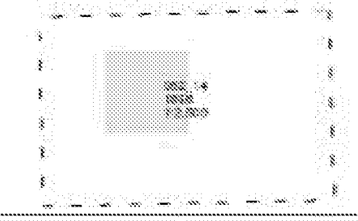


calabrian

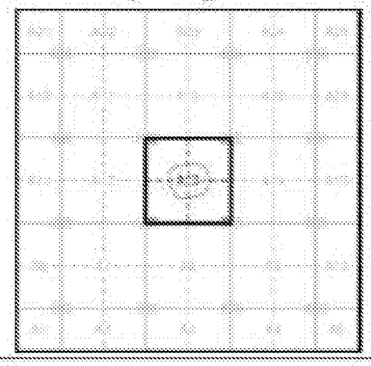
Sussex
Published 1898
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's, in 1856 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1855, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



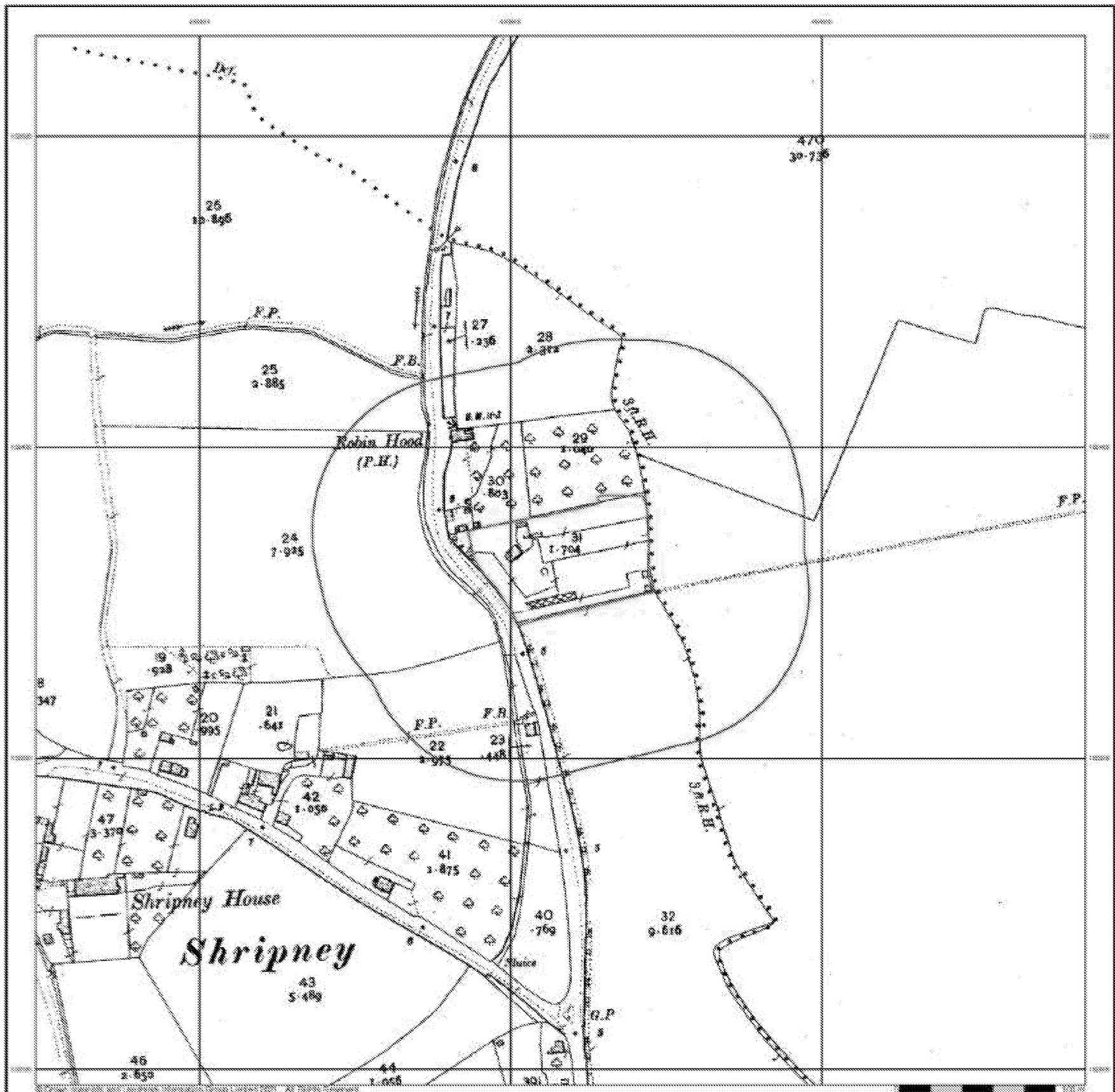
Order Details

Order Number:	280316733_1_1
Customer Ref:	7135
National Grid Reference:	493840, 102330
Slice:	A
Site Area (Ha):	0.08
Search Buffer (m):	100

Site Details

Site at 493832,102327

ARUN DISTRICT COUNCIL BE/176/21/PL

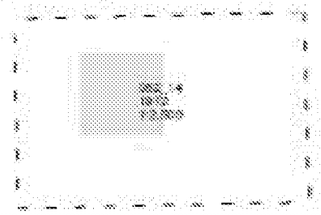


calabrian

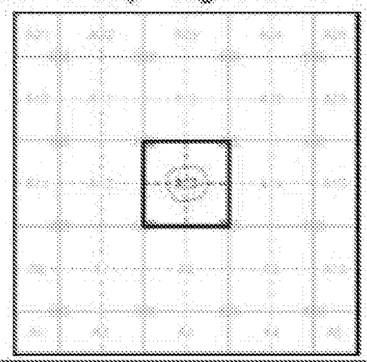
Sussex
Published 1912
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's, in 1856 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1888, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in adjoining areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



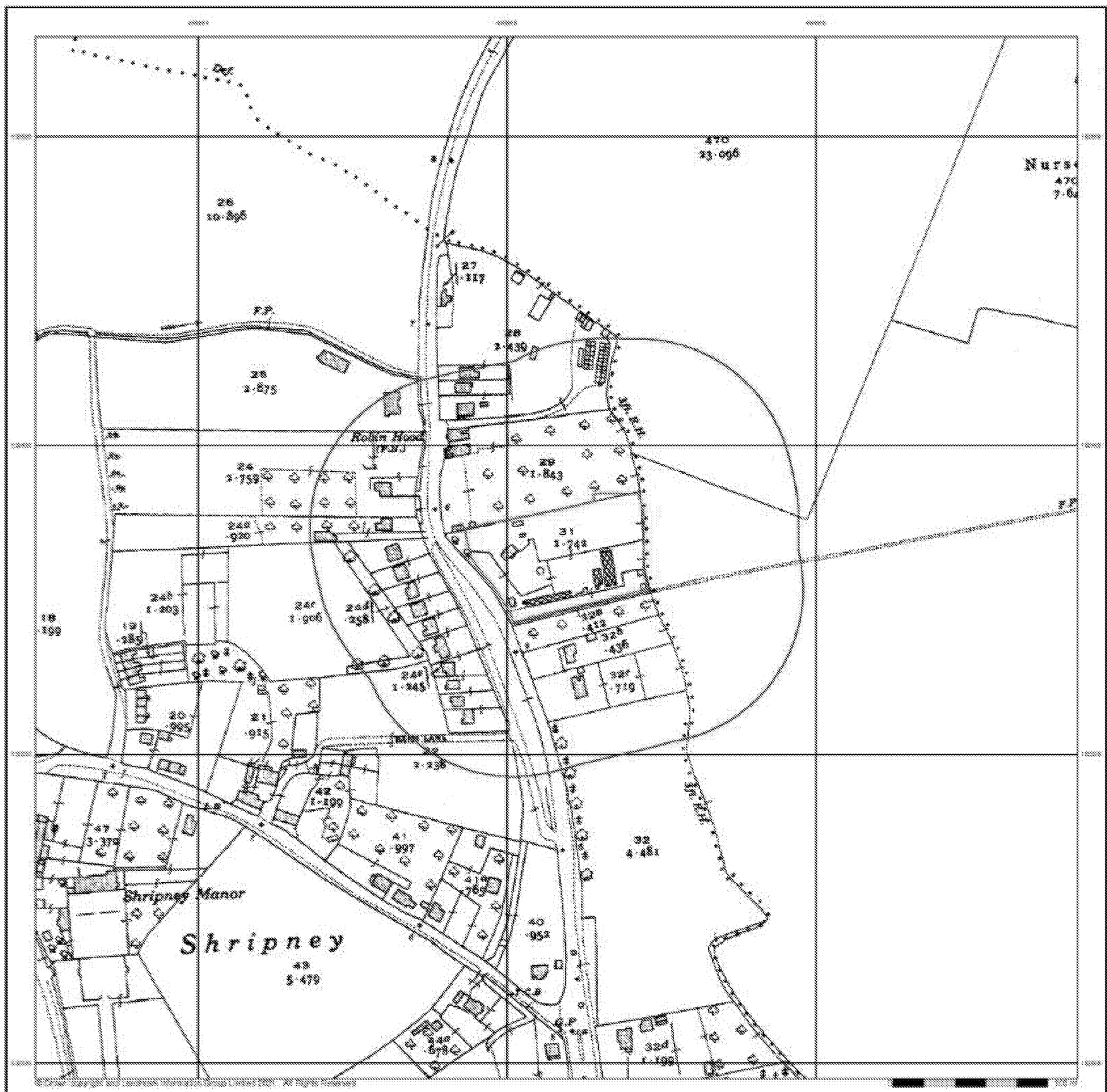
Order Details

Order Number:	280316733_1_1
Customer Ref:	7135
National Grid Reference:	493840, 102330
Slice:	A
Site Area (Ha):	0.68
Search Buffer (m):	100

Site Details

Site at 493832,102327

ARUN DISTRICT COUNCIL BE/176/21/PL



calabrian

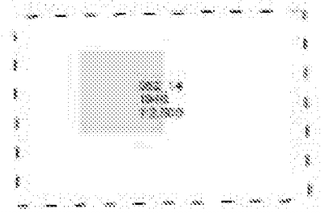
Sussex

Published 1940

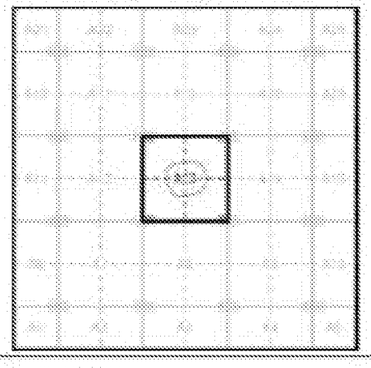
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's, in 1856 the 1:2,500 scale was adopted for mapping urban areas and by 1890 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1888, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	280316733_1_1
Customer Ref:	7135
National Grid Reference:	493840, 102330
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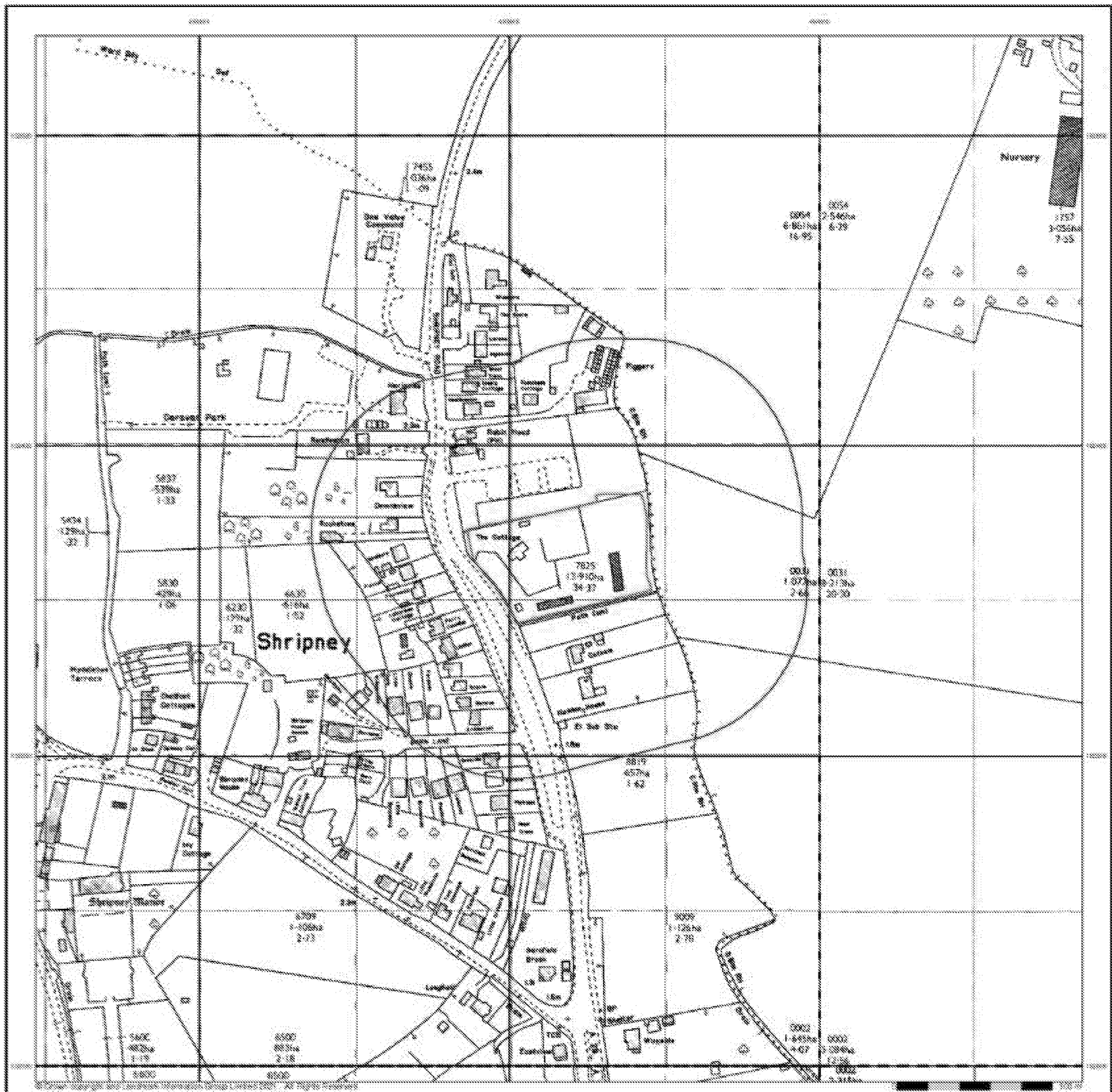
Site Area (Ha):	0.68
Search Buffer (m):	100

Site Details

Site at 493832,102327

ARUN DISTRICT COUNCIL BE/176/21/PL

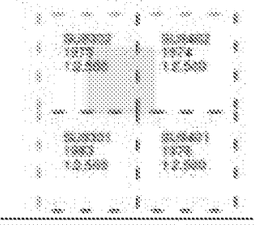


calabrian

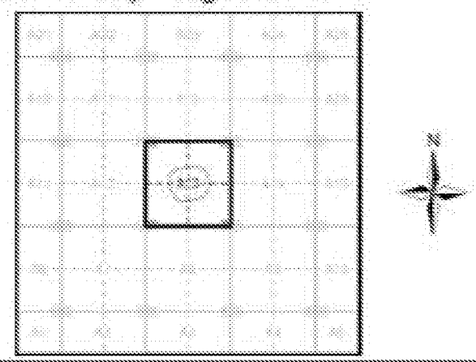
Ordnance Survey Plan
Published 1974 - 1983
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's, in 1856 the 1:2,500 scale was adopted for mapping urban areas and by 1890 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1855, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



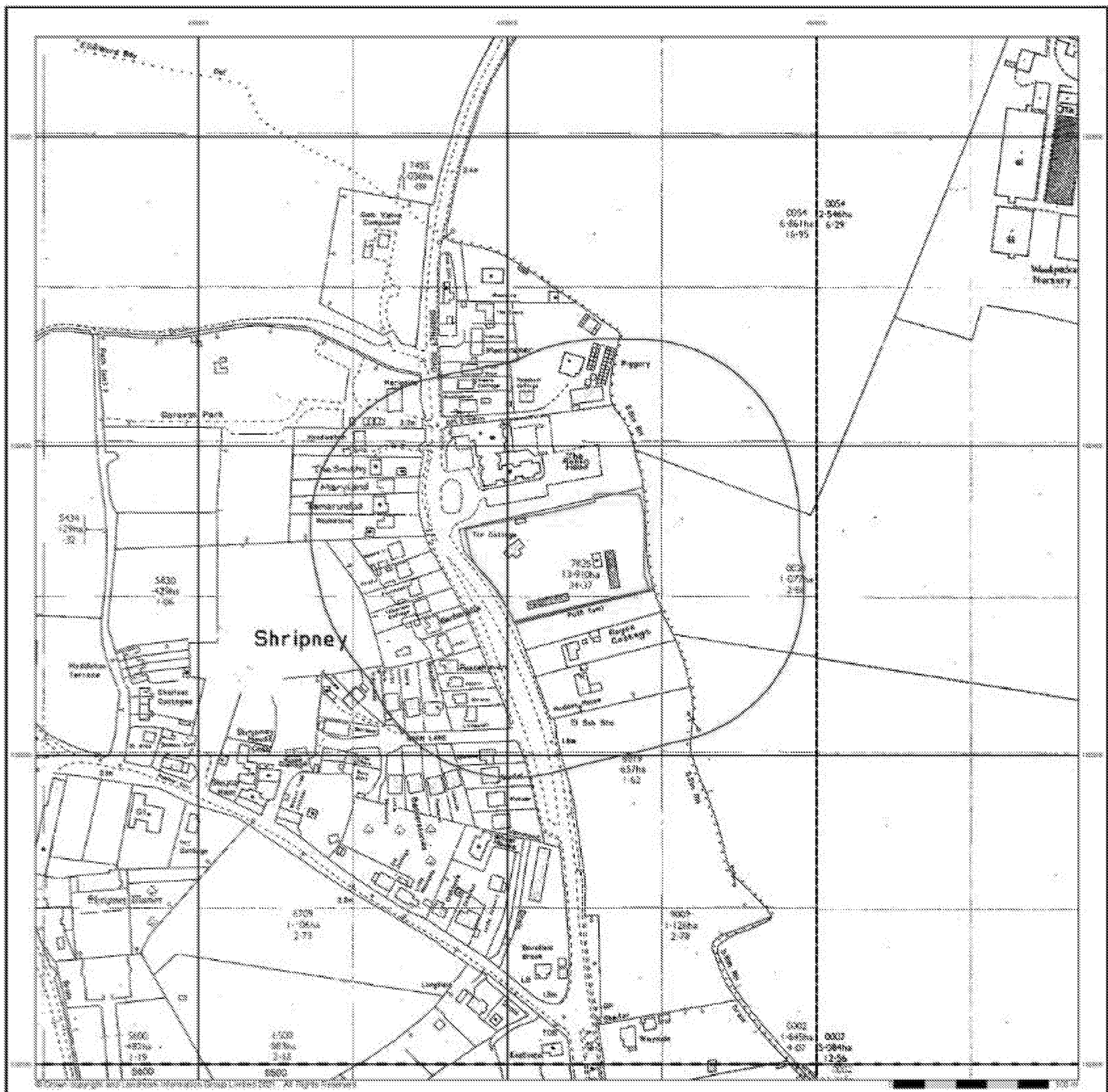
Order Details

Order Number:	280316733_1_1
Customer Ref:	7135
National Grid Reference:	493840, 102300
Slice:	A
Site Area (Ha):	0.68
Search Buffer (m):	100

Site Details

Site at 493832,102327

ARUN DISTRICT COUNCIL BE/176/21/PL

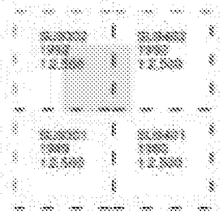


calabrian

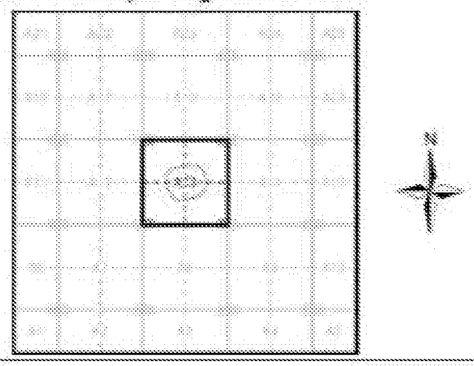
Additional SIMs
Published 1980 - 1992
Source map scale - 1:2,500

The SIM were Ordnance Survey's 'Survey of Information on Monuments' and further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1967 to 1994, and contain detailed information on buildings, roads and land use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	280316733_1_1
Customer Ref:	7135
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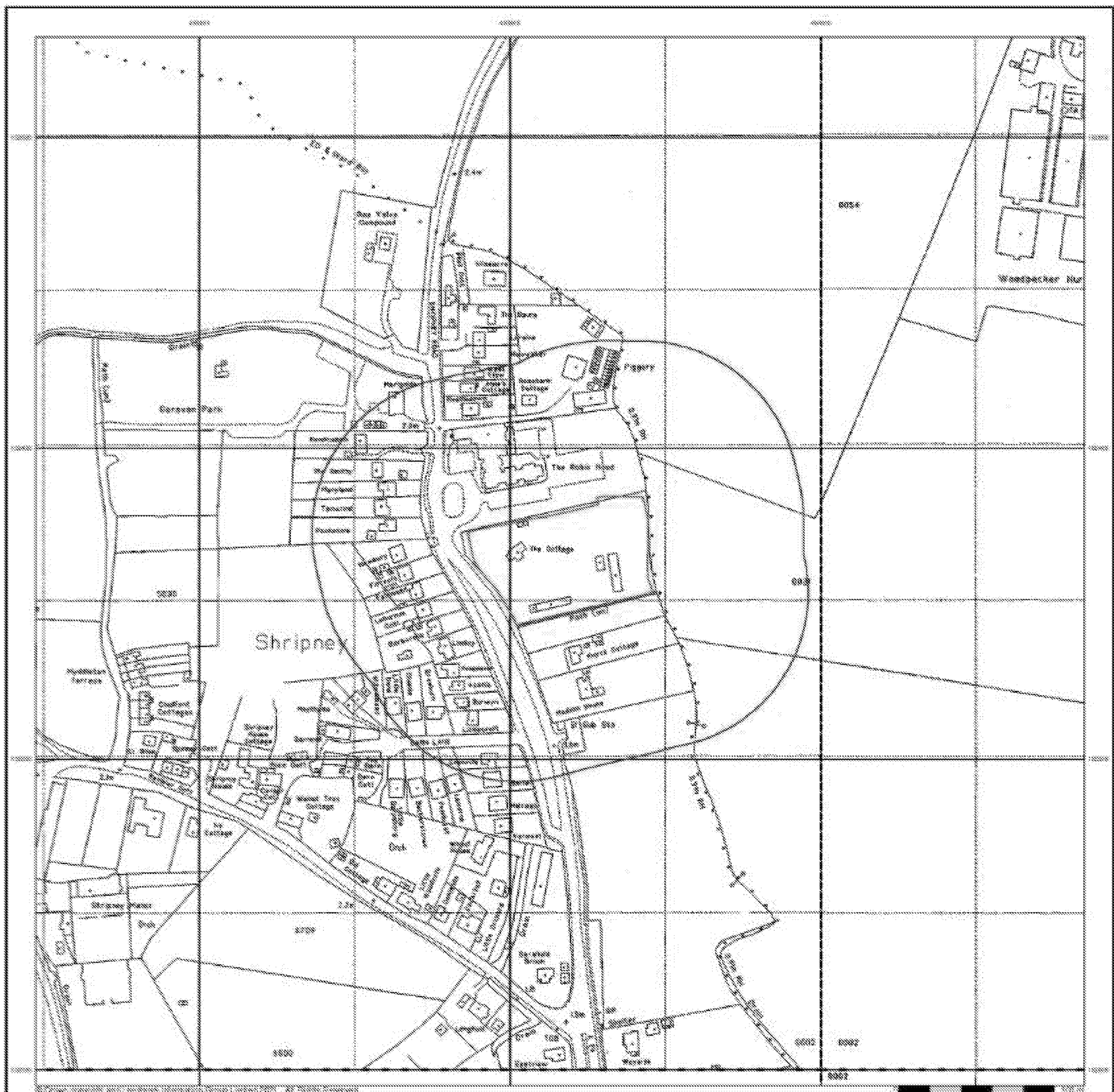
Slice:	A
Site Area (Ha):	0.68
Search Buffer (m):	100

Site Details

Site at 493832,102327

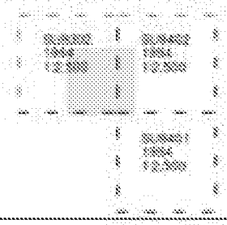


calabrian

Large-Scale National Grid Data
Published 1994
Source map scale - 1:2,500

Large Scale National Grid Data supersedes 1:2500 County Survey's. Survey of information on Microfiche in 1992, and continued to be produced until 1995. These maps were the first runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



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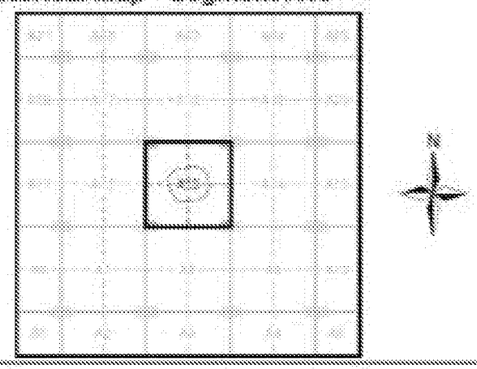


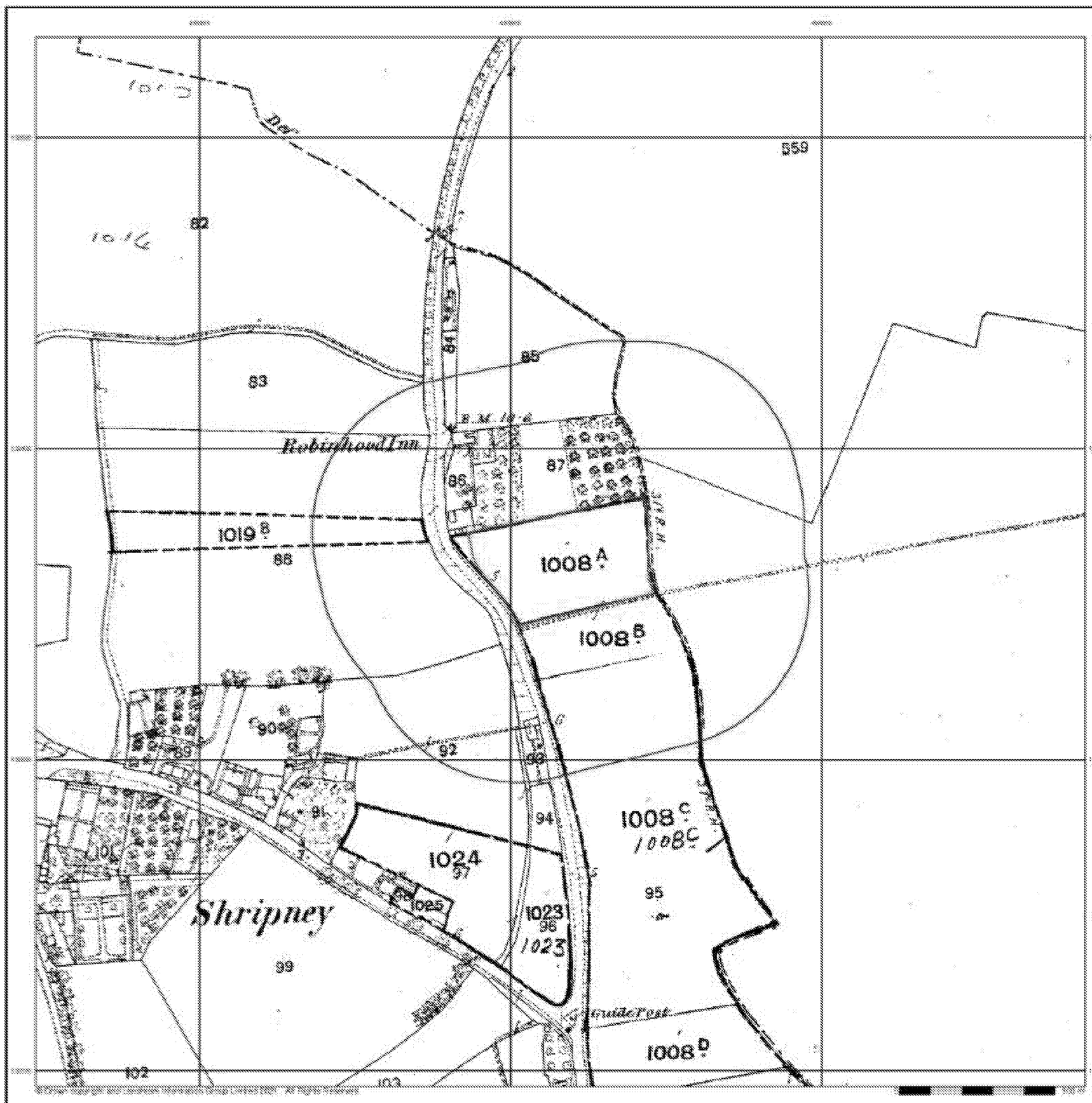
Order Details

Order Number:	280316733_1_1
Customer Ref:	7135
National Grid Reference:	493840, 102330
Slice:	A
Site Area (Ha):	0.68
Search Buffer (m):	100

Site Details

Site at 493832,102327

ARUN DISTRICT COUNCIL BE/176/21/PL



calabrian

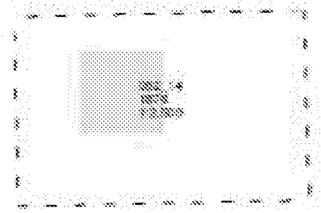
Sussex

Published 1876

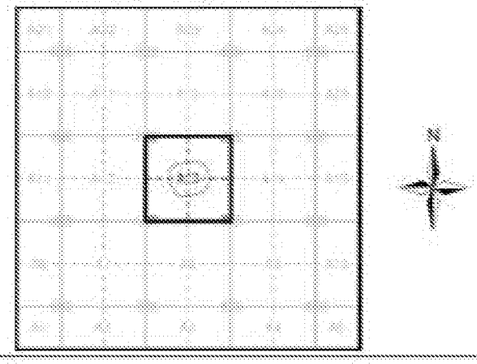
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's, in 1858 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1888, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	280316733_1_1
Customer Ref.	7135
National Grid Reference:	493840, 102330
Slice:	A
Site Area (Ha):	0.68
Search Buffer (m):	100

Site Details

Site at 493832,102327

APPENDIX C	SEARCHES
Landmark	Envirocheck Report
BGS	Archive Borehole Record
ZeticaUXO	UXO Risk Map

ARUN DISTRICT COUNCIL BE/176/21/PL

calabrian

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
280316733_1_1

Customer Reference:
7135

National Grid Reference:
493840, 102330

Slice:
A

Site Area (Ha):
0.68

Search Buffer (m):
1000

Site Details:

Site at 493832,102327

Client Details:

Mr R Hey
Calabrian Limited
East View Farm
Redmire
Leyburn
DL8 4ED

Prepared For:

LNT Care Developments

Landmark

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 1			2	15
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 5			1	
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 5		Yes		
Pollution Incidents to Controlled Waters	pg 5			1	
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality	pg 5				1
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions	pg 6				4 (*37)
Water Industry Act Referrals					
Groundwater Vulnerability Map	pg 16	Yes	n/a	n/a	n/a
Groundwater Vulnerability - Soluble Rock Risk	pg 16	1	n/a	n/a	n/a
Groundwater Vulnerability - Local Information			n/a	n/a	n/a
Bedrock Aquifer Designations	pg 16	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 16	Yes	n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences	pg 16		Yes	n/a	n/a
Flooding from Rivers or Sea without Defences	pg 16		Yes	n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
OS Water Network Lines	pg 17		7	30	111

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites	pg 34				2
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Landfill Coverage	pg 34	2	n/a	n/a	n/a
Local Authority Recorded Landfill Sites					
Potentially Infilled Land (Non-Water)					
Potentially Infilled Land (Water)	pg 34				2
Registered Landfill Sites	pg 34				1
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Geological					
BGS 1:625,000 Solid Geology	pg 35	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 35	Yes			Yes
BGS Recorded Mineral Sites	pg 35				1
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability			n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 35	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards				n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 35	Yes		n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 35	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 35	Yes		n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 35	Yes		n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 37		1	3	3
Fuel Station Entries					
Points of Interest - Commercial Services					
Points of Interest - Education and Health					
Points of Interest - Manufacturing and Production	pg 37			1	5
Points of Interest - Public Infrastructure					
Points of Interest - Recreational and Environmental	pg 38				1
Gas Pipelines					
Underground Electrical Cables					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Ancient Woodland					
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves	pg 39				1
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones	pg 39	1			
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

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General

Selected Site | Specified Radius | Bearing Reference Point | Site ID

Boundary of Type of Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Current)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substances
- River Quality Sampling Point
- Substantial Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Hazardous Substances

- COMAH Site | Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

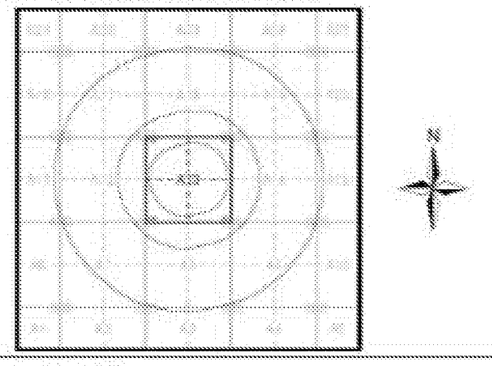
Geological

- BGS Recorded Mineral Site

Waste

- BGS Recorded Landfill Site (Current)
- BGS Recorded Landfill Site
- EA Historic Landfill (Current Site)
- EA Historic Landfill (Closed)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Landfill Site Boundary)
- Local Authority Recorded Landfill Site (Current)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Boundary)
- Registered Landfill Site (Part Enforcement Notice)
- Registered Landfill Site (Part Enforcement Notice)
- Registered Waste Transfer Site (Boundary)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Boundary)
- Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Slice A



Order Details

Order Number:	280316733_1_1
Customer Ref:	7135
National Grid Reference:	493840, 102330
Slice:	A
Site Area (Ha):	0.08
Search Buffer (m):	1000

Site Details

Site at 493832, 102327

Landmark INFORMATION GROUP

ARUN DISTRICT COUNCIL BE/176/21/PL

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Industrial Land Use Map

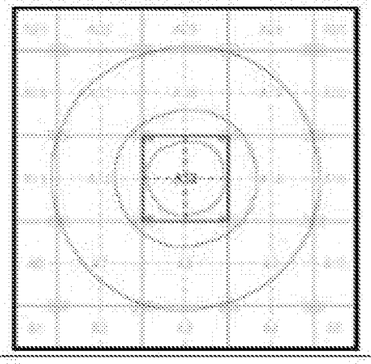
General

Specified Site | Specified Buffers | Bearing Reference Point
Sites | Map ID

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- Site Pipeline
- Points of Interest - Commercial Services
- Points of Interest - Education and Health
- Points of Interest - Manufacturing and Production
- Points of Interest - Public Administration
- Points of Interest - Recreational and Environmental
- Underground Electrical Cables

Industrial Land Use Map - Slice A



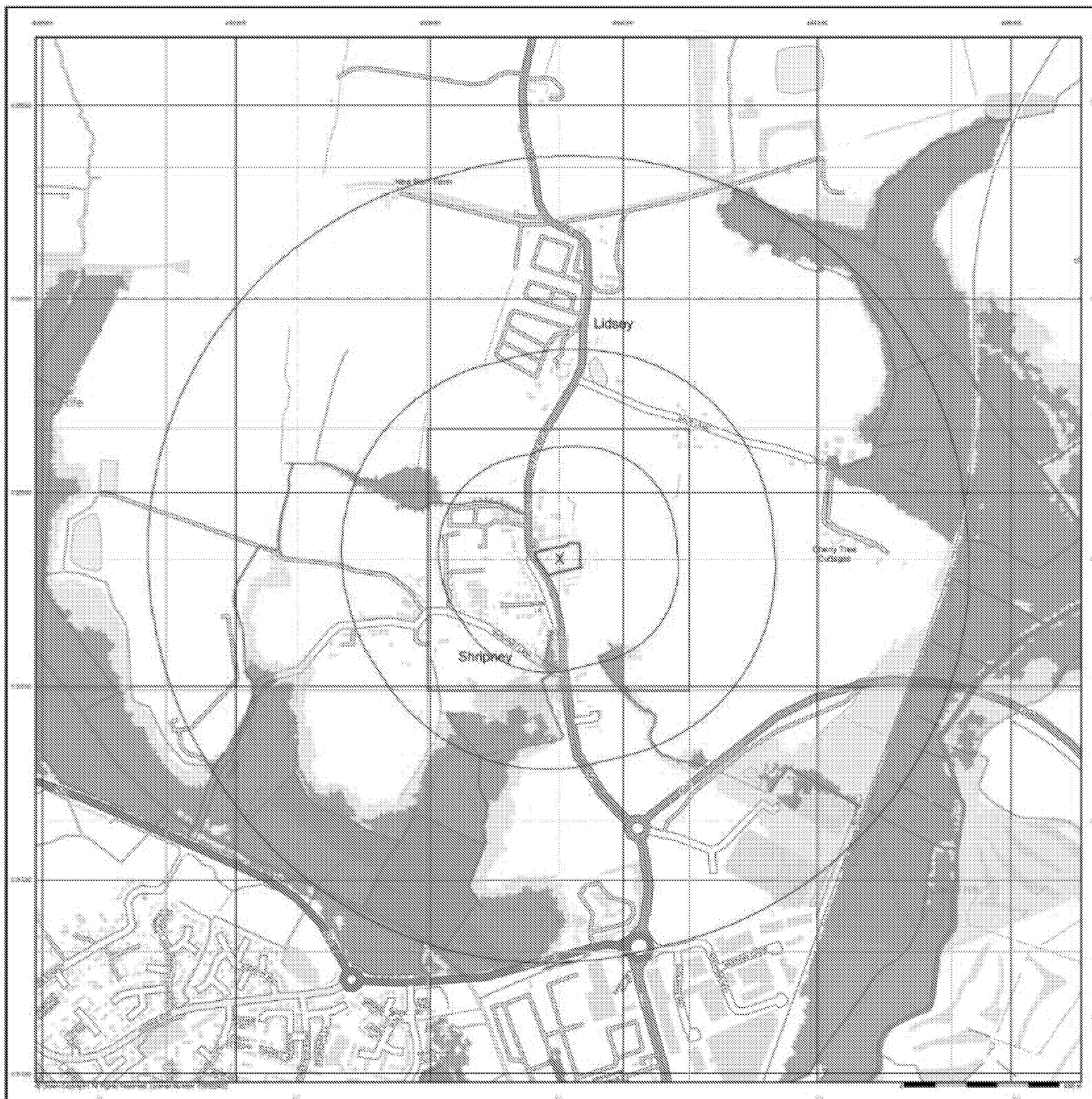
Order Details

Order Number:	280316733_1_1
Customer Ref:	7135
National Grid Reference:	493840, 102330
Slice:	A
Site Area (Ha):	0.68
Search Buffer (m):	1000

Site Details

Site at 493832, 102327

ARUN DISTRICT COUNCIL BE/176/21/PL



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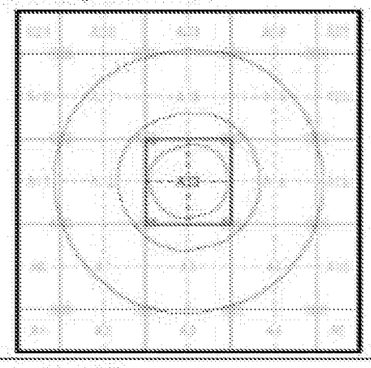
General

- Grid Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 3)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



Order Details

Order Number:	280316733_1_1
Customer Ref:	7135
National Grid Reference:	493840, 102330
Slice:	A
Site Area (Ha):	0.08
Search Buffer (m):	1000

Site Details

Site at 493832, 102327

ARUN DISTRICT COUNCIL BE/176/21/PL

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General

- Boreholes Site
- Boreholes Boundary(s)
- Ordering Reference Point
- Map ID
- General Type of Location

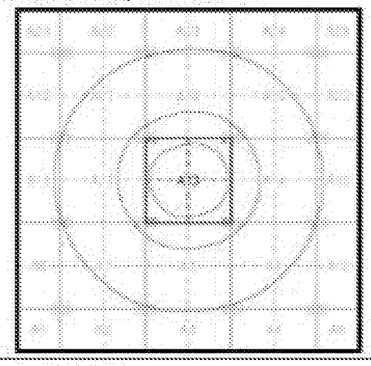
Agency and Hydrological (Boreholes)

- BGS Boreholes Depth 0 - 10m
- BGS Boreholes Depth 10 - 30m
- BGS Boreholes Depth 30m +
- Coordinates
- Other

For Borehole information please refer to the Borehole Log file which accompanies this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



Order Details

Order Number:	280316733_1_1
Customer Ref:	7135
National Grid Reference:	493840, 102330
Slice:	A
Site Area (Ha):	0.08
Search Buffer (m):	1000

Site Details

Site at 493832, 102327

Landmark Information Group

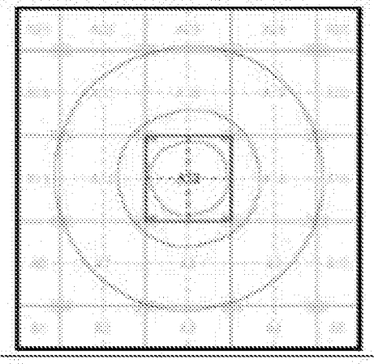
calabrian

General
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

OS Water Network Data
- Canal
- Reservoir
- Foreshore
- Marsh
- Tidal River
- Inland River
- Stone
- Other
- Lake
- Foreshore
- Lock Or Flight Of Locks
- Sea

Contours (height in meters)
- Standard Contour
- Index Contour
- Spot Height
- Mean Low Water
- Mean High Water

OS Water Network Map - Slice A



Order Details

Order Number:	280316733_1_1
Customer Ref:	7135
National Grid Reference:	493840, 102330
Slice:	A
Site Area (Ha):	0.08
Search Buffer (m):	1000

Site Details

Site at 493832, 102327

ARUN DISTRICT COUNCIL BE/176/21/PL

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General

- Search Site
- Search Buffer(s)
- Existing Reference Point

Risk of Flooding from Surface Water

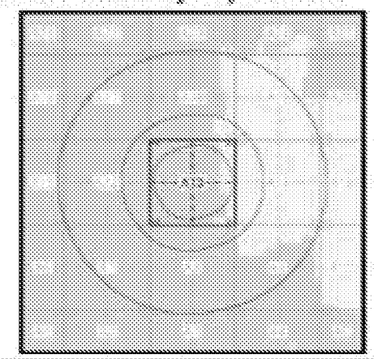
- High - 30 Year Return
- Medium - 100 Year Return
- Low - 1000 Year Return

Suitability

See the suitability map below

- Suitable for Housing
- Unlikely to be Suitable for Housing
- Potentially Suitable
- Need to discuss with LPA
- Property

EA/NRW Suitability Map - Slice A



Order Details

Order Number:	280316733_1_1
Customer Ref:	7135
National Grid Reference:	493840, 102330
Slice:	A
Site Area (Ha):	0.68
Search Buffer (m):	1000

Site Details

Site at 493832, 102327

Landmark INFORMATION GROUP

ARUN DISTRICT COUNCIL BE/76/21/PL

PAGE: 2

DATE: 17.10.90

LOCATION

SHRIPNEY - NR BOGNOR

BOREHOLE 1

DESCRIPTION	REDUCED LEVEL m	DEPTH m	LEGEND	SAMPLE TYPE	SAMPLE DEPTH	THICKNESS m	SPT	REMARKS
TOPSOIL		0.00				0.25		
Stiff grey brown sandy CLAY with ..... occasional gravel		0.25		U100	0.90			--1095/1 / 0.9U
						1.75		
				D	1.40			--1095/1 / 1.4D
				U100	1.90			--1095/1 / 1.9U
Firm to stiff grey brown sandy CLAY		2.00						Roots found down to 2.0m.
				D	2.40	0.80		--1095/1 / 2.4D
Firm chalky flinty CLAY		2.80		U100	2.90			--1095/1 / 2.9U
						1.00		
Firm CHALK - Grade V (wet from 5.1m).....		3.80		CPT D	4.00 4.00		12	--1095/1 / 4.0D
						2.20		
		5.10W						Water seepage
				CPT	5.50		17	
		6.00						

TERRAMECH INVESTIGATIONS LIMITED
183 LONG LANE TILEHURST READING

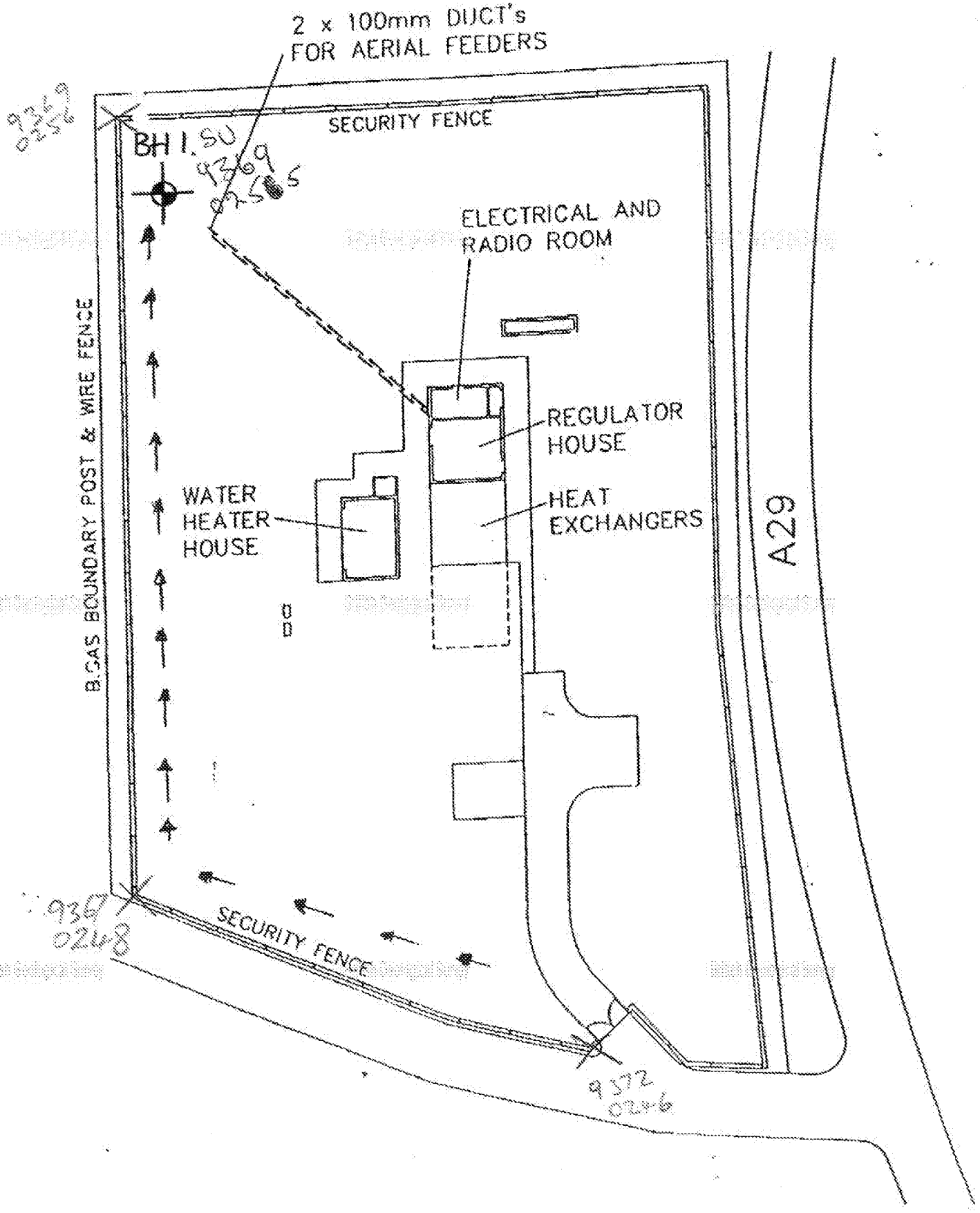
REMARKS:

U100=100mm dia. UNDISTURBED SAMPLE U38=38mm dia. UNDISTURBED SAMPLE D=SMALL DISTURBED SAMPLE
B=BULK SAMPLE W=WATER SAMPLE SPT=STANDARD PENETRATION TEST CPT=CONE PENETRATION TEST

PAGE: 1	LOCATION	BOREHOLE LAYOUT
DATE: 17.10.90	SHRIPNEY – NR BOGNOR	

SU90SW
935
025

BOREHOLE LAYOUT

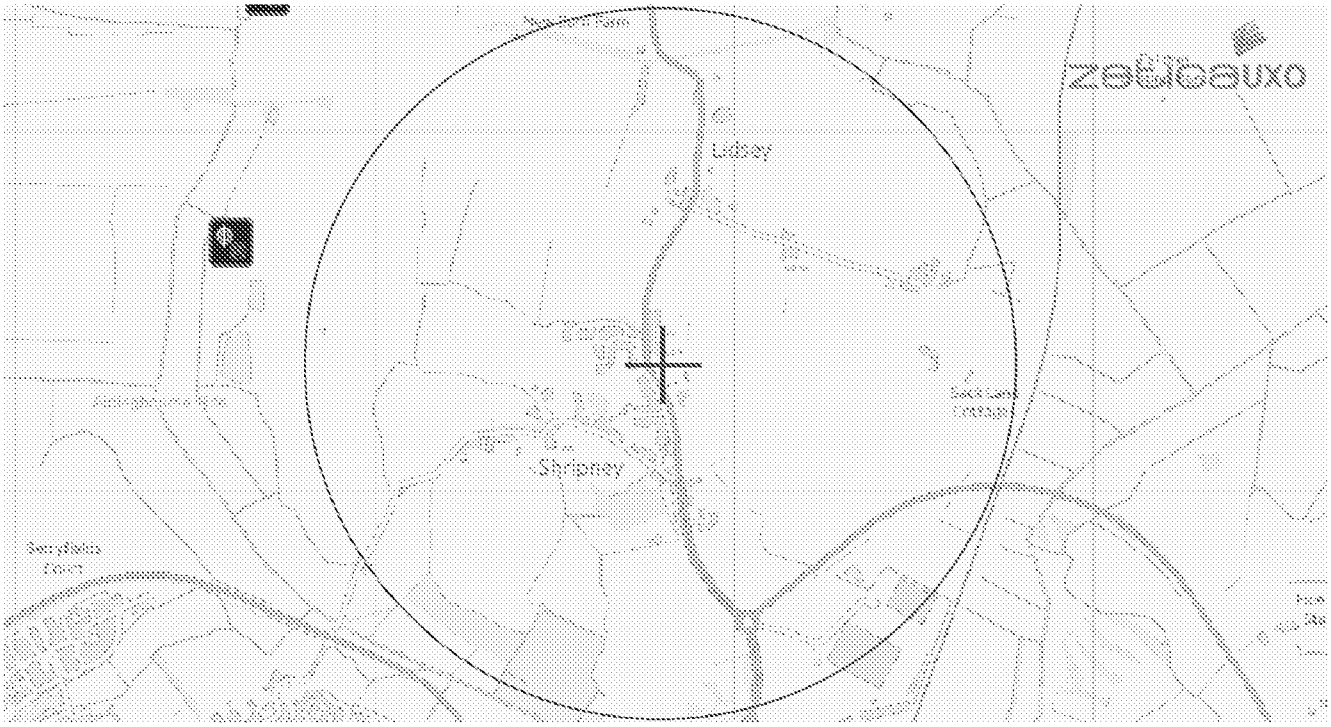


UNEXPLODED BOMB RISK MAP

zeticauxo

SITE LOCATION

Map Centre: 493807,102356



LEGEND

- **High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- **Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- **Low:** Areas indicated as having 15 bombs per 1000acre or less.

- **miltary**
- **industry**
- **UXO find**
- **transport**
- **dock**
- **Luftwaffe targets**
- **utilities**
- **Bombing decoy**
- **other**

How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment* is necessary.

What do I do if my site is in a moderate or high risk area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites in a moderate or high UXB risk area.

Similarly, if your site is near to a designated Luftwaffe target or bombing decoy then additional detailed research is recommended.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.

If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

If I have any questions, who do I contact?

tel: **+44 (0) 1993 886682**

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: **(https://zeticauxo.com/downloads-and-resources/risk-maps/)**

Zetica cannot guarantee the accuracy or completeness of the information or data used and cannot accept any liability for any use of the maps. These maps can be used as part of a technical report or similar publication, subject to acknowledgment. The copyright remains with Zetica Ltd.

It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.

*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.

APPENDIX D	EXPLORATORY HOLE RECORDS
Window Sample Boreholes	WS101 to WS106

ARUN DISTRICT COUNCIL BE/176/21/PL

calabrian

Borehole Log

Borehole No. **WS101**

Sheet 1 of 1

Project Name: Shripney	Project No. 7135	Co-ords: 493787.19 - 102339.33	Hole Type WS
Location: Bognor Regis		Level: 2.95	Scale 1:20
Client: LNT Care Developments (3) Limited		Dates: 16/06/2021 - 16/06/2021	Logged By RJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	J,K&T		0.15	2.80		TOPSOIL: Friable brown slightly sandy organic clay with occasional fine rootlets . TOPSOIL
		0.50	J,K&T					Stiff brown and orange brown CLAY with a little angular and subangular fine to coarse flint and chalk gravel. RIVER TERRACE DEPOSITS
		1.20	D		1.30	1.65		Structureless CHALK composed of cream and orange brown, slightly gravelly sandy silt. Gravel is very weak, low density, white and subrounded. (Grade VI, Dm) CHALK
								Below 1.9m, chalk gravel is angular with occasional angular/ nodular flint gravel.
					3.00	-0.05		End of borehole at 3.00 m

1 2 3 4

Remarks

1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out. 2. Possible groundwater at 2.1m.

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Borehole Log

Borehole No.
WS102
Sheet 1 of 1

Project Name: Shripney	Project No. 7135	Co-ords: 493830.99 - 102343.18	Hole Type WS
Location: Bognor Regis		Level: 3.05	Scale 1:20
Client: LNT Care Developments (3) Limited		Dates: 16/06/2021 - 16/06/2021	Logged By RJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.15	2.90		TOPSOIL: Friable brown slightly sandy organic clay with occasional fine rootlets . TOPSOIL
		0.70	J,K&T					Stiff brown and orange brown CLAY with a little angular and subangular fine to coarse flint and chalk gravel. RIVER TERRACE DEPOSITS
		0.80	J,K&T					
		1.00	D					
					1.15	1.90		Structureless CHALK composed of cream and orange brown, slightly gravelly sandy silt. Gravel is very weak, low density, white and subrounded. Rare angular/nodular flint gravel. (Grade VI, Dm) CHALK
					2.10	0.95		Structureless CHALK composed of cream and orange brown, gravelly sandy silt. Gravel is very weak, low density, white and rounded and subrounded. Rare angular/nodular flint gravel. (Grade VI, Dm) CHALK
					3.00	0.05		End of borehole at 3.00 m

1
2
3
4

Remarks
1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during drilling.

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Borehole Log

Borehole No. **WS103**

Sheet 1 of 1

Project Name: Shripney	Project No. 7135	Co-ords: 493865.12 - 102351.34	Hole Type WS
Location: Bognor Regis		Level: 3.30	Scale 1:20
Client: LNT Care Developments (3) Limited		Dates: 16/06/2021 - 16/06/2021	Logged By RJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	J,K&T		0.15	3.15		TOPSOIL: Friable brown slightly sandy organic clay with occasional fine rootlets . TOPSOIL
								Firm orange brown slightly speckled black CLAY with rare subangular fine chalk gravel. RIVER TERRACE DEPOSITS
					1.90	1.40		Structureless CHALK composed of cream and orange brown, slightly gravelly sandy silt. Gravel is very weak, low density, white and subrounded. Rare angular/nodular flint gravel. (Grade VI, Dm) CHALK
					2.10	1.20		Structureless CHALK composed of cream and orange brown, gravelly sandy silt. Gravel is very weak, low density, white and rounded and subrounded. Rare angular/nodular flint gravel. (Grade VI, Dm) CHALK
					3.00	0.30		End of borehole at 3.00 m

1 2 3 4

Remarks

1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out. 2. Possible groundwater at 2.0m.

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Borehole Log

Borehole No.
WS104
Sheet 1 of 1

Project Name: Shripney	Project No. 7135	Co-ords: 493873.71 - 102320.89	Hole Type WS
Location: Bognor Regis		Level: 3.15	Scale 1:20
Client: LNT Care Developments (3) Limited		Dates: 16/06/2021 - 16/06/2021	Logged By RJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	J,K&T					TOPSOIL: Friable brown slightly sandy organic clay with occasional fine rootlets . TOPSOIL
					0.20	2.95		Stiff brown and orange brown CLAY with a little angular and subangular fine to coarse flint and chalk gravel. RIVER TERRACE DEPOSITS
		0.50	J,K&T					
		0.90	D					
					1.10	2.05		Structureless CHALK composed of cream and orange brown, slightly gravelly sandy silt. Gravel is very weak, low density, white and subrounded. Rare angular/nodular flint gravel. (Grade VI, Dm) CHALK
					1.90	1.25		Structureless CHALK composed of cream and orange brown, gravelly sandy silt. Gravel is very weak, low density, white and rounded and subrounded. Rare angular/nodular flint gravel. (Grade VI, Dm) CHALK
					3.00	0.15		End of borehole at 3.00 m

1 2 3 4

Remarks
1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out. 2. Possible groundwater at 1.9m.

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Borehole Log

Borehole No. **WS105**

Sheet 1 of 1

Project Name:	Shripney	Project No. 7135	Co-ords:	493848.23 - 102315.85	Hole Type WS
Location:	Bognor Regis		Level:	2.75	Scale 1:20
Client:	LNT Care Developments (3) Limited		Dates:	16/06/2021 - 16/06/2021	Logged By RJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	J,K&T					TOPSOIL: Friable brown slightly sandy organic clay with occasional fine rootlets . TOPSOIL
					0.20	2.55		Stiff brown and orange brown CLAY with a little angular and subangular fine to coarse flint and chalk gravel. RIVER TERRACE DEPOSITS
		0.90	J,K&T					
					1.00	1.75		Structureless CHALK composed of cream and orange brown, slightly gravelly sandy silt. Gravel is very weak, low density, white and subrounded. Rare angular/nodular flint gravel. (Grade VI, Dm) CHALK
		1.50	D					
					2.30	0.45		Structureless CHALK composed of cream and orange brown, gravelly sandy silt. Gravel is very weak, low density, white and rounded and subrounded. Rare angular/nodular flint gravel. (Grade VI, Dm) CHALK
					3.00	-0.25		End of borehole at 3.00 m

1 2 3 4

Remarks

1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out. 2. Possible groundwater at 2.0m.

AGS

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Borehole Log

Borehole No.
WS106
Sheet 1 of 1

Project Name: Shripney	Project No. 7135	Co-ords: 493812.60 - 102316.78	Hole Type WS
Location: Bognor Regis		Level: 2.70	Scale 1:20
Client: LNT Care Developments (3) Limited		Dates: 16/06/2021 - 16/06/2021	Logged By RJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	J,K&T		0.15	2.55		TOPSOIL: Friable brown slightly sandy organic clay with occasional fine rootlets . TOPSOIL
		0.90	D					Stiff brown and orange brown CLAY with a little angular and subangular fine to coarse flint and chalk gravel. RIVER TERRACE DEPOSITS
					1.10	1.60		Structureless CHALK composed of cream and orange brown, slightly gravelly sandy silt. Gravel is very weak, low density, white and subrounded. Rare angular/nodular flint gravel. (Grade VI, Dm) CHALK
					2.10	0.60		Structureless CHALK composed of cream and orange brown, gravelly sandy silt. Gravel is very weak, low density, white and rounded and subrounded. Rare angular/nodular flint gravel. (Grade VI, Dm) CHALK
					3.00	-0.30		End of borehole at 3.00 m

1
2
3
4

Remarks
1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out. 2. Possible groundwater at 1.7m.

AGS

APPENDIX E CHEMICAL TEST RESULTS

ARUN DISTRICT COUNCIL BE/176/21/PL

Certificate of Analysis

Certificate Number 21-13345 *Issued:* 02-Jul-21

Client Calabrian
East View Farm
Redmire
Leyburn
DL8 4ED

Our Reference 21-13345

Client Reference 7135

Order No PO-2694/7135

Contract Title Shripney, Bognor Regis

Description 10 Soil samples, 6 Leachate samples.

Date Received 24-Jun-21

Date Started 24-Jun-21

Date Completed 02-Jul-21

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

[redacted]

ARUN DISTRICT COUNCIL BE

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13345
Client Ref 7135
Contract Title Shripney, Bognor Regis

			Lab No	1866734	1866735	1866736	1866737	1866738	1866739
			.Sample ID	WS101	WS101	WS102	WS102	WS103	WS104
			Depth	0.10	0.50	0.10	0.80	0.10	0.10
			Other ID	1	2	1	2	1	1
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/05/2021	16/05/2021	16/05/2021	16/05/2021	16/05/2021	16/05/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	10	6.7	8.4	7.5	9.9	7.1
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.8	0.5	0.8	0.5	0.6	0.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.3	0.5	0.2	0.4	0.4
Chromium	DETSC 2301#	0.15	mg/kg	22	21	18	21	17	13
Chromium III	DETSC 2301*	0.15	mg/kg	22	21	18	21	17	13
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	22	14	36	14	21	23
Lead	DETSC 2301#	0.3	mg/kg	64	11	68	12	110	250
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l		< 10	< 10	< 10		
Mercury	DETSC 2325#	0.05	mg/kg	0.07	< 0.05	0.07	< 0.05	0.09	0.06
Nickel	DETSC 2301#	1	mg/kg	18	16	18	18	13	14
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	110	45	150	45	94	160
Inorganics									
pH	DETSC 2008#		pH	6.3	8.1	6.4	7.7	6.3	6.8
Total Organic Carbon	DETSC 2002	0.1	%	3.5	0.7	4.4	0.3	2.1	3.2
Chloride Aqueous Extract	DETSC 2055	1	mg/l		9.0	3.7	2.8		
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l		3.2	1.5	4.4		
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l		21	17	11		
Petroleum Hydrocarbons									
EPH (C6-C10)	DETSC 3321*	0.1	mg/kg		< 0.1		< 0.1		
EPH (C10-C12)	DETSC 3311	10	mg/kg		< 10		< 10		
EPH (C12-C16)	DETSC 3311	10	mg/kg		< 10		< 10		
EPH (C16-C21)	DETSC 3311	10	mg/kg		< 10		< 10		
EPH (C21-C35)	DETSC 3311	10	mg/kg		< 10		< 10		
EPH (C35-C40)	DETSC 3311	10	mg/kg		< 10		< 10		
Benzene	DETSC 3321#	0.01	mg/kg		< 0.01		< 0.01		
Ethylbenzene	DETSC 3321#	0.01	mg/kg		< 0.01		< 0.01		
Toluene	DETSC 3321#	0.01	mg/kg		< 0.01		< 0.01		
Xylene	DETSC 3321#	0.01	mg/kg		< 0.01		< 0.01		
MTBE	DETSC 3321	0.01	mg/kg		< 0.01		< 0.01		
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	0.16	< 0.03	0.10	0.41
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.41	< 0.03	0.38	< 0.03	0.25	0.98
Pyrene	DETSC 3303#	0.03	mg/kg	0.39	< 0.03	0.36	< 0.03	0.24	0.96
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.16	< 0.03	0.12	< 0.03	0.09	0.36

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

ARUN DISTRICT COUNCIL BE/176/21/PL

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13345
Client Ref 7135
Contract Title Shripney, Bognor Regis

			Lab No	1866734	1866735	1866736	1866737	1866738	1866739
			.Sample ID	WS101	WS101	WS102	WS102	WS103	WS104
			Depth	0.10	0.50	0.10	0.80	0.10	0.10
			Other ID	1	2	1	2	1	1
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/05/2021	16/05/2021	16/05/2021	16/05/2021	16/05/2021	16/05/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Chrysene	DETSC 3303	0.03	mg/kg	0.23	< 0.03	0.19	< 0.03	0.15	0.51
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.25	< 0.03	0.20	< 0.03	0.14	0.52
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.09	< 0.03	0.08	< 0.03	0.06	0.19
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.15	< 0.03	0.11	< 0.03	0.07	0.33
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	0.10	< 0.03	0.07	0.23
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	0.10	< 0.03	0.07	0.25
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	2.1	< 0.10	1.8	< 0.10	1.2	4.8
OCPs									
alpha-BHC	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
gamma-BHC (Lindane)	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
beta-BHC	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
delta-BHC	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
Heptachlor	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
Aldrin	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
Heptachlor epoxide	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
gamma-Chlordane	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
Endosulphan I & Alpha-chlorodane	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
4,4-DDE	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
Dieldrin	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
Endrin	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
Endosulphan II & 4,4-DDD	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
Endrin aldehyde	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
4,4-DDT	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
Endosulphan sulphate	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
Methoxychlor	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
Endrin ketone	DETSC 3441*	0.1	mg/kg					< 0.1	< 0.1
OPPs									
Dichlorvos	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Mevinphos	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Demeton-O	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Ethoprop	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Naled	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Phorate	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Demeton-S	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Diazinon	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Disulfoton	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Methylparathion	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Ronnel	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Fenthion	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Chlopyrifos	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Trichlorinate	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1

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ARUN DISTRICT COUNCIL BE/176/21/PL

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13345
Client Ref 7135
Contract Title Shripney, Bognor Regis

			Lab No	1866734	1866735	1866736	1866737	1866738	1866739
			.Sample ID	WS101	WS101	WS102	WS102	WS103	WS104
			Depth	0.10	0.50	0.10	0.80	0.10	0.10
			Other ID	1	2	1	2	1	1
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/05/2021	16/05/2021	16/05/2021	16/05/2021	16/05/2021	16/05/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Merphos	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Stirofos	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Tokuthion	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Fensulfothion	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Bolstar	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Azinphos methyl	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1
Coumaphos	DETSC 3443*	0.1	mg/kg					< 0.1	< 0.1

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13345
Client Ref 7135
Contract Title Shripney, Bognor Regis

			Lab No	1866740	1866741	1866742	1866743
			.Sample ID	WS104	WS105	WS105	WS106
			Depth	0.50	0.10	0.90	0.10
			Other ID	2	1	2	1
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/05/2021	16/05/2021	16/05/2021	16/05/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	6.1	11	7.0	8.6
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.5	0.8	0.3	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	0.7	0.4	0.3
Chromium	DETSC 2301#	0.15	mg/kg	16	22	21	21
Chromium III	DETSC 2301*	0.15	mg/kg	16	22	21	21
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	12	35	14	17
Lead	DETSC 2301#	0.3	mg/kg	11	130	9.3	45
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10		< 10	
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.12	< 0.05	0.06
Nickel	DETSC 2301#	1	mg/kg	12	18	17	15
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	34	300	40	65
Inorganics							
pH	DETSC 2008#		pH	7.5	6.8	8.2	5.9
Total Organic Carbon	DETSC 2002	0.1	%	0.6	2.3	0.4	2.5
Chloride Aqueous Extract	DETSC 2055	1	mg/l	1.8		1.9	
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	1.4		< 1.0	
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	12		< 10	
Petroleum Hydrocarbons							
EPH (C6-C10)	DETSC 3321*	0.1	mg/kg			< 0.1	
EPH (C10-C12)	DETSC 3311	10	mg/kg			< 10	
EPH (C12-C16)	DETSC 3311	10	mg/kg			< 10	
EPH (C16-C21)	DETSC 3311	10	mg/kg			< 10	
EPH (C21-C35)	DETSC 3311	10	mg/kg			< 10	
EPH (C35-C40)	DETSC 3311	10	mg/kg			< 10	
Benzene	DETSC 3321#	0.01	mg/kg			< 0.01	
Ethylbenzene	DETSC 3321#	0.01	mg/kg			< 0.01	
Toluene	DETSC 3321#	0.01	mg/kg			< 0.01	
Xylene	DETSC 3321#	0.01	mg/kg			< 0.01	
MTBE	DETSC 3321	0.01	mg/kg			< 0.01	
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.10	< 0.03	0.04
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.32	< 0.03	0.08
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.32	< 0.03	0.06
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.14	< 0.03	< 0.03

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ARUN DISTRICT COUNCIL BE/176/21/PL

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13345
Client Ref 7135
Contract Title Shripney, Bognor Regis

			Lab No	1866740	1866741	1866742	1866743
			.Sample ID	WS104	WS105	WS105	WS106
			Depth	0.50	0.10	0.90	0.10
			Other ID	2	1	2	1
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/05/2021	16/05/2021	16/05/2021	16/05/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.21	< 0.03	0.04
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.24	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.09	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.12	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.12	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.12	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	1.8	< 0.10	0.26
OCPs							
alpha-BHC	DETSC 3441*	0.1	mg/kg		< 0.1		
gamma-BHC (Lindane)	DETSC 3441*	0.1	mg/kg		< 0.1		
beta-BHC	DETSC 3441*	0.1	mg/kg		< 0.1		
delta-BHC	DETSC 3441*	0.1	mg/kg		< 0.1		
Heptachlor	DETSC 3441*	0.1	mg/kg		< 0.1		
Aldrin	DETSC 3441*	0.1	mg/kg		< 0.1		
Heptachlor epoxide	DETSC 3441*	0.1	mg/kg		< 0.1		
gamma-Chlordane	DETSC 3441*	0.1	mg/kg		< 0.1		
Endosulphan I & Alpha-chlorodane	DETSC 3441*	0.1	mg/kg		< 0.1		
4,4-DDE	DETSC 3441*	0.1	mg/kg		< 0.1		
Dieldrin	DETSC 3441*	0.1	mg/kg		< 0.1		
Endrin	DETSC 3441*	0.1	mg/kg		< 0.1		
Endosulphan II & 4,4-DDD	DETSC 3441*	0.1	mg/kg		< 0.1		
Endrin aldehyde	DETSC 3441*	0.1	mg/kg		< 0.1		
4,4-DDT	DETSC 3441*	0.1	mg/kg		< 0.1		
Endosulphan sulphate	DETSC 3441*	0.1	mg/kg		< 0.1		
Methoxychlor	DETSC 3441*	0.1	mg/kg		< 0.1		
Endrin ketone	DETSC 3441*	0.1	mg/kg		< 0.1		
OPPs							
Dichlorvos	DETSC 3443*	0.1	mg/kg		< 0.1		
Mevinphos	DETSC 3443*	0.1	mg/kg		< 0.1		
Demeton-O	DETSC 3443*	0.1	mg/kg		< 0.1		
Ethoprop	DETSC 3443*	0.1	mg/kg		< 0.1		
Naled	DETSC 3443*	0.1	mg/kg		< 0.1		
Phorate	DETSC 3443*	0.1	mg/kg		< 0.1		
Demeton-S	DETSC 3443*	0.1	mg/kg		< 0.1		
Diazinon	DETSC 3443*	0.1	mg/kg		< 0.1		
Disulfoton	DETSC 3443*	0.1	mg/kg		< 0.1		
Methylparathion	DETSC 3443*	0.1	mg/kg		< 0.1		
Ronnel	DETSC 3443*	0.1	mg/kg		< 0.1		
Fenthion	DETSC 3443*	0.1	mg/kg		< 0.1		
Chlopyrifos	DETSC 3443*	0.1	mg/kg		< 0.1		
Trichlorinate	DETSC 3443*	0.1	mg/kg		< 0.1		

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13345
Client Ref 7135
Contract Title Shripney, Bognor Regis

			Lab No	1866740	1866741	1866742	1866743
			.Sample ID	WS104	WS105	WS105	WS106
			Depth	0.50	0.10	0.90	0.10
			Other ID	2	1	2	1
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/05/2021	16/05/2021	16/05/2021	16/05/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Merphos	DETSC 3443*	0.1	mg/kg		< 0.1		
Stirofos	DETSC 3443*	0.1	mg/kg		< 0.1		
Tokuthion	DETSC 3443*	0.1	mg/kg		< 0.1		
Fensulfothion	DETSC 3443*	0.1	mg/kg		< 0.1		
Bolstar	DETSC 3443*	0.1	mg/kg		< 0.1		
Azinphos methyl	DETSC 3443*	0.1	mg/kg		< 0.1		
Coumaphos	DETSC 3443*	0.1	mg/kg		< 0.1		

Summary of Asbestos Analysis
Soil Samples

Our Ref 21-13345
Client Ref 7135
Contract Title Shripney, Bognor Regis

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1866734	WS101 1 0.10	SOIL	NAD	none	Darryl Fletcher
1866735	WS101 2 0.50	SOIL	NAD	none	Darryl Fletcher
1866736	WS102 1 0.10	SOIL	NAD	none	Darryl Fletcher
1866737	WS102 2 0.80	SOIL	NAD	none	Darryl Fletcher
1866738	WS103 1 0.10	SOIL	NAD	none	Darryl Fletcher
1866739	WS104 1 0.10	SOIL	NAD	none	Darryl Fletcher
1866740	WS104 2 0.50	SOIL	NAD	none	Darryl Fletcher
1866741	WS105 1 0.10	SOIL	NAD	none	Darryl Fletcher
1866742	WS105 2 0.90	SOIL	NAD	none	Darryl Fletcher
1866743	WS106 1 0.10	SOIL	NAD	none	Darryl Fletcher

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 21-13345
Client Ref 7135
Contract Title Shripney, Bognor Regis
Sample Id WS101 2 0.50

Sample Numbers 1866735 1866744 1866745
Date Analysed 01/07/2021

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084* Total Organic Carbon	%	0.7	3	5	6
DETSC 2003# Loss On Ignition	%	3.6	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# TPH (C10 - C40)	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.1	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l		Amount Leached* mg/kg		WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
	2:1	8:1	LS2	LS10			
DETSC 2306 Arsenic as As	0.33	0.25	< 0.002	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	2.7	2.4	< 0.02	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.030	< 0.004	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	2.3	1.7	< 0.02	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.98	0.54	< 0.004	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.010	< 0.0004	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 1.1	< 0.02	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	1	1	< 0.02	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.16	0.13	< 0.01	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.17	< 0.01	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.25	< 0.006	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	4.4	3.1	0.009	0.033	4	50	200
DETSC 2055 Chloride as Cl	2000	970	< 20	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	180	< 100	0.36	0.3	10	150	500
DETSC 2055 Sulphate as SO4	2200	1500	< 20	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	38000	22000	76	246.6	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 100	< 0.2	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	3800	< 2000	< 10	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.6	5.8
DETSC 2009 Conductivity uS/cm	53.8	31.9
* Temperature*	20.0	19.0

Mass of Sample Kg*	0.140
Mass of dry Sample Kg*	0.120

Stage 1

Volume of Leachant L2*	0.221
Volume of Eluate VE1*	0.2

Stage 2

Volume of Leachant L8*	0.964
Volume of Eluate VE2*	0.93

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 21-13345
Client Ref 7135
Contract Title Shripney, Bognor Regis
Sample Id WS102 2 0.80

Sample Numbers 1866737 1866746 1866747
Date Analysed 01/07/2021

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084* Total Organic Carbon	%	0.3	3	5	6
DETSC 2003# Loss On Ignition	%	3.3	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# TPH (C10 - C40)	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.7	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l		Amount Leached* mg/kg		WAC Limit Values Limit values for LS10 Leachate Inert Waste	SNRHW	Hazardous Waste
	2:1	8:1	LS2	LS10			
DETSC 2306 Arsenic as As	0.7	0.33	< 0.002	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	4.9	2.7	< 0.02	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.052	< 0.030	< 0.004	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	1.1	0.5	< 0.02	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.4	0.5	< 0.004	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	0.02	< 0.010	< 0.0004	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	2.1	< 1.1	< 0.02	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	0.71	< 0.50	< 0.02	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.49	0.13	< 0.01	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.23	< 0.17	< 0.01	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	1.2	0.38	< 0.006	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	1.8	< 1.3	0.004	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1200	730	< 20	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	< 100	< 100	< 0.02	< 0.1	10	150	500
DETSC 2055 Sulphate as SO4	1400	1100	< 20	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	38000	11000	76	155.4	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 100	< 0.2	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	< 2000	< 2000	< 10	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.7	5.9
DETSC 2009 Conductivity uS/cm	54.2	15.5
* Temperature*	20.0	19.0

Mass of Sample Kg*	0.140
Mass of dry Sample Kg*	0.119

Stage 1

Volume of Leachant L2*	0.217
Volume of Eluate VE1*	0.2

Stage 2

Volume of Leachant L8*	0.951
Volume of Eluate VE2*	0.91

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WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 21-13345
Client Ref 7135
Contract Title Shripney, Bognor Regis
Sample Id WS105 2 0.90

Sample Numbers 1866742 1866748 1866749
Date Analysed 01/07/2021

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084* Total Organic Carbon	%	0.4	3	5	6
DETSC 2003# Loss On Ignition	%	2.3	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# TPH (C10 - C40)	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.2	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	5.4	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l		Amount Leached* mg/kg		WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
	2:1	8:1	LS2	LS10			
DETSC 2306 Arsenic as As	0.34	0.21	< 0.002	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	6.6	4	< 0.02	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.030	< 0.004	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.25	< 0.02	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.2	1.1	< 0.004	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.010	< 0.0004	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 1.1	< 0.02	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.50	< 0.02	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.090	< 0.01	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.17	< 0.01	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.29	< 0.25	< 0.006	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	2.4	< 1.3	0.005	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	940	590	< 20	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	< 100	< 100	< 0.02	< 0.1	10	150	500
DETSC 2055 Sulphate as SO4	1100	950	< 20	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	46000	34000	92	360.3	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 100	< 0.2	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	< 2000	< 2000	< 10	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.8	6.0
DETSC 2009 Conductivity uS/cm	65.6	49.0
* Temperature*	20.0	20.0

Mass of Sample Kg*	0.140
Mass of dry Sample Kg*	0.118

Stage 1

Volume of Leachant L2*	0.215
Volume of Eluate VE1*	0.2

Stage 2

Volume of Leachant L8*	0.947
Volume of Eluate VE2*	0.91

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Information in Support of the Analytical Results

Our Ref 21-13345
Client Ref 7135
Contract Shripney, Bognor Regis

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1866734	WS101 0.10 SOIL	16/05/21	PT 1L	Mercury (28 days), Kone Cr6 (30 days), Naphthalene (14 days), Organic Matter (Manual) (28 days), PAH MS (14 days), pH + Conductivity (7 days)	Naphthalene, PAH MS
1866735	WS101 0.50 SOIL	16/05/21	PT 1L	Anions 2:1 (30 days), BTEX (14 days), Mercury (28 days), Kone Cr6 (30 days), Naphthalene (14 days), Organic Matter (Manual) (28 days), PAH FID (14 days), PAH MS (14 days), PCB (30 days), pH + Conductivity (7 days), EPH/TPH (14 days)	BTEX, Naphthalene, PAH FID, PAH MS, PCB, EPH/TPH
1866736	WS102 0.10 SOIL	16/05/21	PT 1L	Anions 2:1 (30 days), Mercury (28 days), Kone Cr6 (30 days), Naphthalene (14 days), Organic Matter (Manual) (28 days), PAH MS (14 days), pH + Conductivity (7 days)	Naphthalene, PAH MS
1866737	WS102 0.80 SOIL	16/05/21	PT 1L	Anions 2:1 (30 days), BTEX (14 days), Mercury (28 days), Kone Cr6 (30 days), Naphthalene (14 days), Organic Matter (Manual) (28 days), PAH FID (14 days), PAH MS (14 days), PCB (30 days), pH + Conductivity (7 days), EPH/TPH (14 days)	BTEX, Naphthalene, PAH FID, PAH MS, PCB, EPH/TPH
1866738	WS103 0.10 SOIL	16/05/21	PT 1L	Mercury (28 days), Kone Cr6 (30 days), Naphthalene (14 days), OC Pesticides (30 days), Organic Matter (Manual) (28 days), OP Pesticides (14 days), PAH MS (14 days), pH + Conductivity (7 days)	Naphthalene, OC Pesticides, OP Pesticides, PAH MS
1866739	WS104 0.10 SOIL	16/05/21	PT 1L	Mercury (28 days), Kone Cr6 (30 days), Naphthalene (14 days), OC Pesticides (30 days), Organic Matter (Manual) (28 days), OP Pesticides (14 days), PAH MS (14 days), pH + Conductivity (7 days)	Naphthalene, OC Pesticides, OP Pesticides, PAH MS
1866740	WS104 0.50 SOIL	16/05/21	PT 1L	Anions 2:1 (30 days), Mercury (28 days), Kone Cr6 (30 days), Naphthalene (14 days), Organic Matter (Manual) (28 days), PAH MS (14 days), pH + Conductivity (7 days)	Naphthalene, PAH MS

Information in Support of the Analytical Results

Our Ref 21-13345
Client Ref 7135
Contract Shripney, Bognor Regis

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1866741	WS105 0.10 SOIL	16/05/21	PT 1L	Mercury (28 days), Kone Cr6 (30 days), Naphthalene (14 days), OC Pesticides (30 days), Organic Matter (Manual) (28 days), OP Pesticides (14 days), PAH MS (14 days), pH + Conductivity (7 days)	Naphthalene, OC Pesticides, OP Pesticides, PAH MS
1866742	WS105 0.90 SOIL	16/05/21	PT 1L	Anions 2:1 (30 days), BTEX (14 days), Mercury (28 days), Kone Cr6 (30 days), Naphthalene (14 days), Organic Matter (Manual) (28 days), PAH FID (14 days), PAH MS (14 days), PCB (30 days), pH + Conductivity (7 days), EPH/TPH (14 days)	BTEX, Naphthalene, PAH FID, PAH MS, PCB, EPH/TPH
1866743	WS106 0.10 SOIL	16/05/21	PT 1L	Mercury (28 days), Kone Cr6 (30 days), Naphthalene (14 days), Organic Matter (Manual) (28 days), PAH MS (14 days), pH + Conductivity (7 days)	Naphthalene, PAH MS
1866744	WS101 0.50 LEACHATE	16/05/21	PT 1L		
1866745	WS101 0.50 LEACHATE	16/05/21	PT 1L		
1866746	WS102 0.80 LEACHATE	16/05/21	PT 1L		
1866747	WS102 0.80 LEACHATE	16/05/21	PT 1L		
1866748	WS105 0.90 LEACHATE	16/05/21	PT 1L		
1866749	WS105 0.90 LEACHATE	16/05/21	PT 1L		

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

APPENDIX F GEOTECHNICAL TEST RESULTS

ARUN DISTRICT COUNCIL BE/176/21/PL

LABORATORY REPORT

4043

Contract Number: PSL21/5174

Report Date: 21 July 2021

Client's Reference: 7135

Client Name: Calabrian
Market Chambers
14 Market Place
Bedale
DL8 1EQ

For the attention of: Richard Hey

Contract Title: Shripney, Bognor Regis

Date Received: 24/6/2021
Date Commenced: 24/6/2021
Date Completed: 20/7/2021

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

A Watkins (Director)
R Berriman (Quality Manager)
S Royle (Laboratory Manager)

[redacted]

L Knight (Assistant Laboratory Manager)
S Eyre (Senior Technician)
M Fennell (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR

[redacted]

ARUN DISTRICT CO

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS101	3	D	1.20		Brown slightly gravelly sandy CLAY.
WS102	3	D	1.00		Brown slightly gravelly sandy CLAY.
WS104	3	D	0.90		Brown slightly gravelly sandy CLAY.
WS105	3	D	1.50		Brown slightly gravelly sandy CLAY.
WS106	2	D	0.90		Brown slightly gravelly sandy CLAY.

UKAS TESTING
4043

PSL
Professional Soils Laboratory

Shripney, Bognor Regis

Contract No:
PSL21/5174
Client Ref:
7135

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
WS101	3	D	1.20		20			39	18	21	95	Intermediate Plasticity CI
WS102	3	D	1.00		17			40	19	21	96	Intermediate Plasticity CI
WS104	3	D	0.90		22			48	23	25	97	Intermediate Plasticity CI
WS105	3	D	1.50		20			40	20	20	98	Intermediate Plasticity CI
WS106	2	D	0.90		22			43	21	22	97	Intermediate Plasticity CI

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

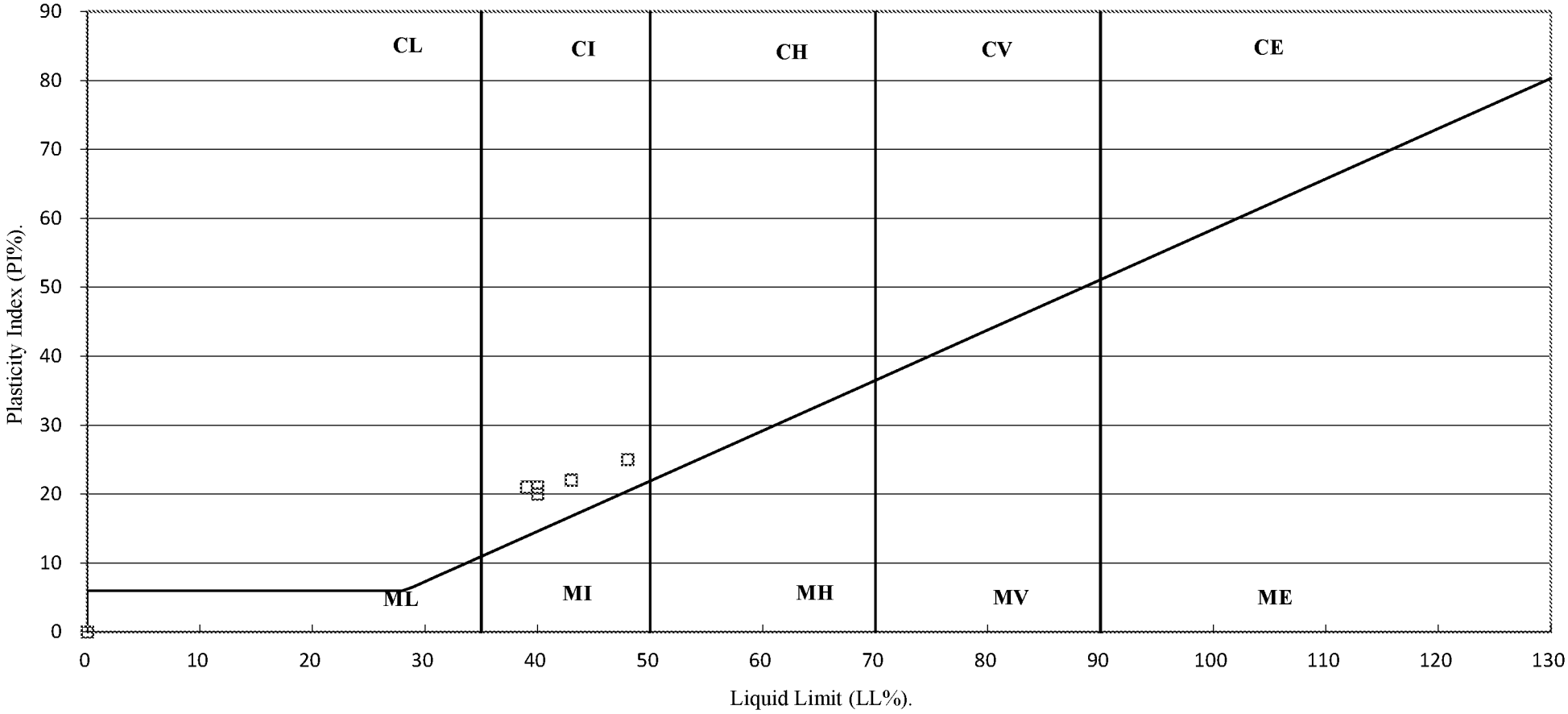
UKAS TESTING 4043

PSL Professional Soils Laboratory

Shripney, Bognor Regis

Contract No:
PSL21/5174
Client Ref:
7135

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043 — PSL Professional Soils Laboratory	Shripney, Bognor Regis	Contract No: PSL21/5174 Client Ref: 7135