Land Science

ROWFOLD LODGE, CONEYHURST ROAD, BILLINGSHURST

PHASE I GEO-ENVIRONMENTAL ASSESSMENT

MR A. RUTHERFORD

30TH MAY 2024

LS7634

Site:	**ROWFOLD LODGE, CONEYHURST ROAD, BILLINGSHURST**
Title:	**PHASE I GEO-ENVIRONMENTAL ASSESSMENT**
Project:	**CONVERSION OF A REDUNDANT AGRICULTURAL BUILDING INTO A SINGLE STOREY, ONE-BEDROOM, RESIDENTIAL DWELLING**
Client:	**MR A. RUTHERFORD**
Date:	**30TH MAY 2024**
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CONTENTS

1.0 INTRODUCTION 4
2.0 WALKOVER SURVEY 6
3.0 DESK STUDY 8
4.0 CONCEPTUAL SITE MODEL (CSM) 11
5.0 PRELIMINARY RISK ASSESSMENT (PRA) 15
6.0 SUMMARY PHASE I ASSESSMENT 17
REFERENCES 18
REPORT CONDITIONS 19
GLOSSARY OF TERMS 20

FIGURES

FIGURE 1: Site Location Plan
FIGURE 2: Existing Layout
FIGURE 3: Proposed Layout

APPENDICES

APPENDIX A: Site Walkover
APPENDIX B: Photographs
APPENDIX C: Desk Study

1.0 INTRODUCTION

1.1 General

Land Science was instructed to undertake a Phase I Geo-environmental Assessment in relation to the change of use with a proposed single dwelling residential development at Rowfold Lodge, Coneyhurst Road, Billingshurst, RH14 9DD. The location is shown on Figure 1, which is centred at grid reference TQ 09894 25486.

1.2 Client

The Client for this appointment was Mr A. Rutherford. This report may only be used by this named client and their project team for the purposes set out and subject to the report conditions. It was understood that the Client already owned the property, and that this investigation was not a pre-purchase appraisal.

1.3 Area Under Investigation

The area under investigation comprised a small redundant former agricultural building situated approximately 50m to the south of Rowfold Lodge. The layout is indicated on Figure 2, and a walkover survey is presented in section 3.0. The area was approximately 1.7 hectares.

1.4 Proposed Development

The proposed development was understood to comprise the conversion of a redundant former agricultural building to a small single storey, one bedroom, residential dwelling. The proposed development was covered under planning application number DC/24/0304. Figure 3 illustrates the layout of the proposed redevelopment. The findings of this report may not be valid if the proposed development is altered.

1.5 Previous Investigations

Land Science was not aware of any previous desk studies or ground investigation(s) for this project.

1.6 Scope of Work

The work carried out is described in detail in following sections but in summary included:

- A phase I assessment desk study.
- Full site inspection to identify areas of concern or indicators of potential hazards.
- Phase I preliminary risk assessment and CSM.
- Recommendations for phase II intrusive investigation works.

The fieldwork was conducted on 23rd May2024, under the supervision of Land Science.

1.7 Geo-Environmental Objectives

A preliminary phase I assessment was carried out, to identify potential sources of contamination, to develop a preliminary Conceptual Site Model (CSM) and to form the basis of a Preliminary Risk Assessment (PRA).

The reports were required to assess risks associated with end users, the proposed redevelopment, adjacent land uses, and the wider environment, in the context of the planning regime.

1.8 Standards

Where practicable, the investigation was undertaken in accordance with the following primary standards and guidance:

- Land Contamination Risk Management (LCRM) Environment Agency 2020
- BS10175:2011+A1:2013, Investigation of Potentially Contaminated Sites.
- National Planning Policy Framework, July 2018.
- Building Regulations Approved Document C: Site preparation and resistance to contaminants and moisture, HM Government, July 2013.
- NHBC Standards Chapter 4.1: Land Quality - Managing Ground Conditions, 2019.

Other technical sources have been cited in respect of specific aspects of the investigation, as referenced throughout the text.

2.0 WALKOVER SURVEY

2.1 General

A walkover survey was carried out to order to provide an assessment of the existing site conditions and to identify potential areas of concern. The only visible concerns within the site were the presence of nesting birds and animal faeces which covered the concrete floor. A record of the inspection is shown in Appendix A, with photographs in Appendix B.

2.2 Site Description

In summary, the area under investigation comprised a small redundant former agricultural building (old apple shed) situated approximately 50m to the south of Rowfold Lodge.

2.3 Neighbouring Land

- Immediately to the north of the proposed site there is a redundant shed and stables, which once formed part of Rowfold Lodge and which are both used for storage. There is also a mixed gravel area to the north at the eastern end of the access where vehicles can park. There is a ditch with very low water levels noted on the south and south-eastern boundary of the site.
- Rowfold Lodge is situated approximately 40m further north of the site and includes a large, fenced garden and gravel driveway. Approximately 20m to the south there is a residential park home development separated by wire mesh fencing, hedgerows and a ditch with very low water levels which borders the southern and eastern boundaries. Coneyhurst Road lies approximately 30m to the west. To the east of the site there is a large open field with a mixture of wooden and wire mesh fencing separating the site from Rowfold House and Farm to the northeast and east respectively.

2.4 Geo-Environmental Conditions

The walkover survey did not identify any areas of particular concern regarding the geo-environmental condition of the site. No significant evidence of tanks, chemical storage, staining or sheens, built up ground, contaminative land uses etc. were noted.

In terms of the environmental condition of the owned land surrounding the site, the following key features were identified:

- Suspected asbestos was found in the form of corrugated cement board within the roofing of the adjacent stables. Pieces of these cement boards were also found on ground level next to the stables.
- General condition of the site was quite dilapidated and run down with evidence of damage to the barn over time.
- Possible patch of infilled land to the north of the barn adjacent to the stables.
- Two small burrows were noted leading under the wooden decking behind the site.
- Trees, hedgerows and shrubs were all noted surrounding the site. A number of mature trees were noted along the south, west and east of the owner's property. These included species of Willow, Cedar, Blackthorn, Sycamore and Elder to ~5–10m in height. Some Ash and Oak

reaching ~15 – 30m in height were noted along the south boundary of the owner's property. Bramble and nettle hedgerows were noted to border the fencing to the south and the east and were also noted to surround the barn.

- Chemicals storage – Some chemicals (weedkillers) and a small propane fuel tank were stored in the shed in Stable 1 with two fuel cans visible in Stable 2 (presented in Figure 3). Two large propane tanks are visible close to the property border in the residential park home to the south.
- Three drums were noted in the paddock area behind the barn.

3.0 DESK STUDY

3.1 General

A desk study was carried out to inform the preliminary conceptual understanding of the site and its setting, and to identify potential aspects of concern, in the context of the stated report objectives.

3.2 Historical Mapping

Various historical records were reviewed to assess potential historical land uses and activities that may impact on ground conditions at the site.

A set of historical ordnance survey maps was obtained from Envirocheck and a copy is presented in Appendix C. The following key features were noted:

- The earliest map dated 1876 showed the site and larger property within a larger open area of land, with a road (later Coneyhurst Road) trending north-south along the western border. The site remained part of an open field until 1979. A barn was developed on site by 1993 and the latest map dated 2024 showed the site to remain broadly unchanged when compared to present day.

Off-site

- The earliest map dated 1876 showed Simons House (a dwelling) was present to the west adjacent to the larger site border. Wilden's Brickyard was located >100m northwest with several kilns. The railway line trending ~east-west was located ~280m south. Great Rowfold (a collection of structures, possibly a farm) was located >250m northeast (later known as Rowfold Grange). Several ponds were present; ~150m southeast, ~150m northwest.
- By 1897 a building was present in the northwestern corner of the property – later known as Rowfold Lodge.
- By 1911 there were two additional ponds at Rowfold Grange ~200m northeast of site. A tank was also present ~250m northeast.
- By 1961-62 the site and surrounding area to the east were shown as orchards. By 1972-76 this was extended to the north and south. A further pond was located ~100m north, with two residential properties known as Bird Cottages ~25m south. A nursery was located ~150m south.
- By 1984 two structures, assumed to be the present day stables were present adjacent the site to the north, with two further structures shown by 1993 – the southernmost is assumed to be the agricultural building (site).
- By 1993 a drainage ditch is shown ~100m east around the eastern border of the fields.
- The historical map set included an aerial photograph dated 1999. The imagery showed Rowfold Lodge with the associated stables, with the agricultural building (site) in its present-day location. The nursery and an orchard are present to the south and southeast of the site respectively.

3.3 Aerial Imagery

Recent aerial photography covering the site was examined using Google Earth Pro. The imagery identified the main agricultural building (site) for redevelopment. It also identified the stables adjacent to the site, 'Park Home Bungalows' development to the south of the site and Rosier Business Park to the southwest, originally Rosier Farm.

3.4 Historic Land Use Data

A brief internet search was carried out, which identified that Thomas Keating Ltd, was located ~300m south, which manufactured insect powder until changing to precision engineering after the Second World War.

3.5 Current Industrial Land Use Data

The desk study included a search of contemporary land use records from various databases. Such land uses may impact on the condition of the site and the vicinity. The following significant land use information was identified from the property border:

- Potentially Infilled Land (Non-Water), was identified 20m west. The use is unknown (pit, quarry etc), although assumed to be linked to the historic Wilden's Brickyard. Date of mapping: 1975.
- Potentially Infilled Land (Non-Water), was identified 214m south. The use is unknown and (pit, quarry etc). Date of mapping: 1975.
- Discharge consents;
    - 10m northwest sewage discharge from Rowland Lodge to freshwater river.
    - 35m northwest sewage discharge from domestic property to freshwater river.
    - 39m west sewage discharge from domestic property to freshwater river.

Whilst other records were identified, these were unlikely to be significant in terms of this project due to a combination of their size, distance from the site, and the intervening geology and hydrogeology.

3.6 Ground Conditions

A preliminary ground model was derived for the site by based on a combination of various sources including published maps, borehole records, previous investigations, and the site history. In summary, the following potential ground model was identified:

Strata	Approximate Depth (mbgl)	Summary Description
Made Ground	1.00	The site has been subject to previous development and there is a potential for construction and demolition wastes, imported fill materials, and zones of disturbed ground, etc.
Bedrock – Weald Clay Formation – Mudstone	To depth	Dark grey, thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine to medium grained sandstones, shelly limestones and clay ironstones.

In addition, it was anticipated, as follows;

- Perched water – in granular soils upon cohesive soil or buried structures or in old trenches.
- Due to the site being located on an unproductive aquifer with low vulnerability, the potential for groundwater flooding to occur was low.

3.7 Geological Hazards

The desk study included searches of geological hazards. None of the hazards were rated as moderate or above, considered the screening threshold for further investigation.

A search of various databases for coal mining, mining, brine compensation, and natural cavities was carried-out. No relevant features were identified.

3.8 Environmental Setting

- Superficial aquifer: No superficial strata were classified.
- Bedrock aquifer: The Weald Clay Formation – Mudstone strata was classified as a Unproductive Strata - Low permeability strata that have negligible significance for water supply or river base flow.
- Source protection zone: None - no groundwater Source Protection Zones were identified on site or in the vicinity.
- Flooding from Rivers and Sea: Zone 1 Low Probability - Land having a less than 1 in 1,000 annual probability of river or sea flooding.
- Surface water flooding on site: Low risk – Each year this area has a chance of flooding of between 0.1% and 1%.
- Groundwater flooding on site: Unlikely.
  Surface water features: Several ponds; ~100m north, ~150m southeast, ~150m northwest and ~200m northeast of site. Drainage ditch ~100m east. River Adur trending ~ north-south ~500m east.
- Nitrate vulnerable zone – for surface water.

3.9 Radon Gas

The requirement for Radon Protection Measures (RPM) has been assessed in accordance with BRE 211:2015. Public Health England and the BGS estimate the potential for radon and the requirement for Radon Protection Measures on site as follows:

- Radon probability: Not at risk - less than 1% of homes are estimated by PHE to exceed the threshold for Radon gas in residential dwellings.
- Radon Protection Measures (RPM): No Radon protection is required for new dwellings or extensions constructed at this location.

3.10 UXO Risk Assessment

Free online maps suggest the risk from UXO might be Low. As such, no further assessment is considered necessary at this stage.

4.0 CONCEPTUAL SITE MODEL (CSM)

4.1 Source-Pathway-Receptor (SPR) Model

The assessment of potential contamination risks follows a Source-Pathway-Receptor (SPR) approach, following established guidance and best practice. The principle of primary and secondary sources has been adopted:

- A **primary source** for instance a leaking tank or drainage, industrial activity, buried fill materials, etc, identified as part of the desk study and site walkover.

- A **secondary source** is the environmental media (or phases) in which any resulting contamination may occur, being soils, ground gases, volatile vapours, and groundwater:

Secondary source	Summary
Soil	Soils (Made Ground) contaminated with materials such as ash, clinker, bitumen, refuse, wastes, asbestos, etc [Endogenic] or soils contaminated by discharges, spillage, drainage, run-off, migration etc of contaminants from diffuse or point sources [Anthropogenic].
Ground water	Mobile contaminants entering groundwater, being either perched water (impermeable horizons such as clays or buried structures) or as a water table (more persistent water bodies within productive strata).
Volatile vapours	Volatile or semi-volatile compounds generating vapours which exist in a gas phase and may be generated from soils, groundwater or directly from storage such as underground tanks.
Ground gases	Ground gases occurring from a variety of natural and man-made sources, principally from the decomposition of waste materials, organic matter, organic contaminants. Examples include landfill sites, alluvium, and mine workings etc.

4.2 Qualitative Risk Assessment Framework

A qualitative estimate of risk associated with the identified source-pathway-receptor linkages has been made. Each source, pathway and receptor in each linkage is given a rating from 0-5, and the overall rating for the linkage is expressed as a multiple of the three numbers. The overall risk ratings are concluded in the next chapter (Preliminary Risk Assessment).

Rating	Source	Pathway	Receptor	SPR Linkage
Unlikely	0	0	0	0
Very Low	1	1	1	1-3
Low	2	2	2	4-17
Moderate	3	3	3	18-48
High	4	4	4	49-100
Very high	5	5	5	100+

The scoring is based on professional judgement and qualitative assessment of various factors:

Source - Whether it is on-site or off-site, the distance from the site, the age and time period, the history and evolution, whether it has been redeveloped and when, the overall magnitude or extent, any existing data or observations. Sources are identified from the conceptual site model.

Pathway - Proximity and relationship to the associated receptor, frequency, the ground conditions, flow directions, migration pathways. Pathways may vary between each source and each receptor.

Receptor - Direct or indirect effects, human health or non-human receptor, age classes, exposure duration and frequency, types of activity, materials, existing evidence of harm, quality of the receptor and significance of any harm. This will depend on any existing or proposed site uses.

Potential sources and Receptors are identified first, before identifying whether any active realistic pathways exist between them.

4.3 Primary Sources

Potential sources of contamination were identified and rated as follows:

Primary sources	Soils	Ground Water	Vapours	Ground Gases
Made Ground <1m - widespread	High	Low	Unlikely	Unlikely
Agricultural land (farmyards) Onsite	High	Unlikely	Low	Unlikely
Agricultural land (Offsite fields)	Low	Unlikely	Unlikely	Unlikely
Infilled land	Unlikely	Unlikely	Unlikely	Unlikely
OVERALL RATING	High	Low	Low	Unlikely

Made Ground <1m - widespread
The site may be situated on a subbase or compacted ground underneath the concrete hardstanding within the barn. These materials may contain a wide range of potential contaminants including metals, non-metals, organic contaminants and potential asbestos and therefore the likelihood of soil contamination is high. Although groundwater was not expected there is still a chance that contaminants may collect in perched water from the Made Ground and this was rated as low. The depth of Made Ground was not anticipated to be greater than 1.00m and therefore was unlikely to be a significant source of ground gases. The potential for significant generation of organic vapours from Made Ground was also considered as unlikely.

Agricultural Land (Farmyards) Onsite
The proposed dwelling is situated within agricultural land with a farmyard where animals had previously been kept. Over time this may have been used for contaminative activities such as animal wastes, the storage and use of fuels and vehicles and the use of persistent pesticides. The presence of corrugated asbestos sheet roofing on the stables adjacent was also noted and as such the potential for soil contamination was rated as high. As groundwater is not expected on site groundwater contamination has been rated unlikely. The nature of farm yards' use on-site meant that the potential for significant generation of organic vapours was low. There is potential for animal burials contributing to the potential of ground gases, but this rating is unlikely.

Agricultural Land (Offsite fields)
The land surrounding the site comprises of open fields which may have been subject to contaminative activities such as the use of pesticides and the application of animal wastes and as such the likelihood of soil contamination is low. Groundwater was not expected on site and as such the risk of contamination was noted to be unlikely. The composition of the surrounding exposed soils and land usage showed that the potential for the significant generation of both organic vapours and ground gases was unlikely.

Infilled Land
Two sites of potentially infilled land (Non-water) post 1970 were identified 20m and 214m from the property border. It is unclear what their respective uses were except for the known Wilden's Brickyard but the possibility of soil and groundwater contaminants from those locations affecting the site is unlikely. Both the age and distance of the infilled land including the Weald Clay geology was such that the ongoing potential for gas and vapour generation and their migration onto the site was unlikely.

4.4 Potential Receptors

The following potential receptors associated with the site and the proposed redevelopment have been considered in this report:

Receptor	Rating	Justification
End Users	Moderate	Occupants of the proposed redevelopment. The proposed development comprised the conversion of a redundant former agricultural building to a small single storey, 1no. bedroom, residential dwelling without gardens/soft standing.
Adjacent Land	Low	The site was surrounded by several residential areas; including the home park approximately 20m to the south. residential dwellings 50m+ to the north and the east, with residential properties Beyond Coneyhurst Road to the west.
Soft Landscaping	Unlikely	No soft landscaping was proposed, with the site covered with concrete hardstanding on site. No evidence of existing plant phytotoxicity was observed, and was unlikely to be a significant issue.
Structural Concrete	Moderate	New foundations etc. cast in contact with the ground. The development was anticipated to include shallow foundations.
Water Supply Pipework	Moderate	Water supplies may be damaged or tainted when mains are laid in contaminated ground. New potable water mains are to be laid.
Groundwater	Unlikely	The site overlies strata classified as Unproductive Strata and is negligibly permeable therefore unlikely to be used for potable or commercial abstractions. No groundwater Source Protection Zones were identified on site or in the vicinity.
Surface Water	Low	The site is surrounded by multiple ponds. The closest is located ~100m north. There is also a shallow ditch ~100m east along the eastern boundary to the property.

4.5 Receptors Excluded

The following potential receptors were excluded from the assessment as they are covered by other legislative controls and are outside the remit of this report.

- Ecological receptors such as statutory protected species or wildlife areas. An assessment of such risks was outside the scope of this report.
- Site workers such as those involved in construction work or future maintenance. Any risks posed to site workers would be controlled through Health & Safety legislation, including the CDM and COSHH regulations etc.

5.0 PRELIMINARY RISK ASSESSMENT (PRA)

5.1 SPR Linkages and Risk Ratings

The source-pathway-receptor linkages identified are summarised below:

Soils	Pathways	Rating	Receptor	Rating	Overall Rating
High	Dermal contact with soil and soil-borne dust	Unlikely	End Users	Moderate	**Unlikely**
High	Ingestion of soil and soil-borne dust	Unlikely	End Users	Moderate	**Unlikely**
High	Inhalation of soil-borne dust	Unlikely	End Users	Moderate	**Unlikely**
High	Consumption of homegrown produce	Unlikely	End Users	Moderate	**Unlikely**
High	Inhalation of soil-borne dust	Unlikely	Adjacent Land	Low	**Unlikely**
High	Plant uptake, phytotoxic effects	Unlikely	Planting	Unlikely	**Unlikely**
High	Chemical attack	Moderate	Concrete	Moderate	**Moderate**
High	Chemical attack	Moderate	Pipework	Moderate	**Moderate**
High	Leaching-out, migration to water table	Unlikely	Groundwater	Unlikely	**Unlikely**
High	Leaching-out, migration to water bodies	Unlikely	Surface Water	Low	**Unlikely**

Ground water	Pathways	Rating	Receptor	Rating	Overall Rating
Low	Direct contact	Unlikely	End Users	Moderate	**Unlikely**
Low	Direct contact	Unlikely	Adjacent Land	Low	**Unlikely**
Low	Plant uptake, phytotoxic effects	Unlikely	Planting	Unlikely	**Unlikely**
Low	Chemical attack	Low	Concrete	Moderate	**Low**
Low	Chemical attack	Low	Pipework	Moderate	**Low**
Low	Migration to Controlled Water receptor	Unlikely	Groundwater	Unlikely	**Unlikely**
Low	Lateral migration to water bodies	Unlikely	Surface Water	Low	**Unlikely**

Vapours	Pathways	Rating	Receptor	Rating	Overall Rating
Low	Inhalation, ignition	Low	End Users	Moderate	**Low**
Low	Inhalation, ignition	Low	Adjacent Land	Low	**Low**
Unlikely	Root asphyxiation, phytotoxic effects	Unlikely	Planting	Unlikely	**Unlikely**
Unlikely	Not a significant hazard	Unlikely	Concrete	Moderate	**Unlikely**
Unlikely	Chemical attack	Unlikely	Pipework	Moderate	**Unlikely**
Unlikely	Not a significant hazard	-	Groundwater	Unlikely	**Unlikely**
Unlikely	Not a significant hazard	-	Surface Water	Low	**Unlikely**

Ground Gasses	Pathways	Rating	Receptor	Rating	Overall Rating

Unlikely	Inhalation, ignition	Unlikely	End Users	Moderate	**Unlikely**
Unlikely	Inhalation, ignition	Unlikely	Adjacent Land	Low	**Unlikely**
Unlikely	Root asphyxiation, phytotoxic effects	Unlikely	Planting	Unlikely	**Unlikely**
Unlikely	Not a significant hazard	-	Concrete	Moderate	**Unlikely**
Unlikely	Not a significant hazard	-	Pipework	Moderate	**Unlikely**
Unlikely	Not a significant hazard	-	Groundwater	Unlikely	**Unlikely**
Unlikely	Not a significant hazard	-	Surface Water	Low	**Unlikely**

5.2 Other Factors

The following other areas of possible concern were identified, but were outside the geo-environmental risk assessment:

- Site workers such as those involved in construction work or future maintenance. Any risks posed to site workers would be controlled through Health & Safety legislation, including the CDM and COSHH regulations etc.

- Ecological receptors such as statutory protected species or wildlife areas. An assessment of such risks was outside the scope of this report.

6.0 SUMMARY PHASE I ASSESSMENT

6.1 Qualitative Ratings

Overall, the level of risk ranged between Unlikely and Moderate. Consequently, a **Moderate** level of risk has been assigned to the site in respect of the proposed development. This is primarily due to the suspected asbestos cement tiles and potential Made Ground below the barn and the proposed residential end use.

6.2 Recommendations

It would be necessary to undertake basic ground investigation works, which may include;

- Shallow boreholes, or trial pits, to assess the composition and depth of any Made Ground and any field evidence of contamination into the underlying soils.
- Selected samples (including materials bearing field evidence of contamination) should be sent for laboratory analysis. The main analytical suite is identified below.
- Soil samples should be screened for vapours using a Photoionisation Detector (PID).
- Positions should be located in areas of concern; i.e. targeted to specific points of potential contamination such as where the suspected asbestos sheeting was noted below the footprint dwellings, in the location of buried services, etc.
- Positions should be located adjacent to the site boundaries, to evaluate the potential for contamination to have migrated laterally off site and impact on adjacent land users.
- Positions should be targeted to potential source areas including the potential Made Ground underlying the hardcover concrete of the barn.
- Samples of any perched water should be collected for laboratory testing.

The analytical suite, based on the known site history and walkover survey, should include:

- General parameters: Acidity (pH), fraction of organic carbon.
- A selection of shallow samples should be screened for pesticides and herbicides.
- Metals; Arsenic, Cadmium, Chromium (total), Lead, Mercury, Selenium, Boron, Copper, Nickel and Zinc.
- Non metals: water soluble Sulphate, Sulphide, total Cyanide.
- Targeted organic parameters; TPH, BTEX, Speciated PAHs, VOCs and SVOCs, scheduled based on PID screening and field evidence etc.
- Visual asbestos screening of all Made Ground samples. Where possible asbestos fibres or ACMs are identified, these should be examined under a microscope to determine type.

Further positions may be required, additional samples analysed or additional determinands added to the analysis, as appropriate, based on any field evidence of possible contamination encountered.

In addition, the requirement for Waste Acceptance Criteria (WAC) testing should be considered to categorise soils in terms of disposal.

It would be prudent to confirm the scope of ground investigation works with the Local Authority and other stakeholders before carrying out these works.

REFERENCES

A number of technical references have been referred to in the preparation of this document, including:

- Smith, I. (2014) Smith's Elements of Sil Mechanics. Chichester. Wiley Blackwell. 9th Edition.
- Highways England 2009. Interim Advice Note 73/06 revision 1: Design Guidance for Road Pavement foundations (draft HD25)
- BRE Design Guide 365. Soakaway design ("DG365")
- Radon: Guidance on protective measures for new buildings, BRE Report BR 211, 2015 2ND edition
- Groundwater protection: Principles and practice (GP3) August 2013 Version 1.1
- Revised EU Waste Framework Directive 2008 2008/98/EC [transposed into English law under The Waste (England and Wales) Regulations 2011]
- European Community (EC) Directive 1999/31/EC [transposed into English law under the Landfill (England and Wales) Regulations 2002]
- Defining Waste Recovery - Permanent Deposit of Waste on Land, EPR13 v1.0, EA 2010
- The definition of waste: Development Industry Code of Practice, v2, CL:AIRE 2011
- Guidance on the classification and assessment of waste Technical Guidance WM3 ("WM3") EA publication (1st edition 2015)

REPORT CONDITIONS

The Client

This report may also be used only by the client named in section 1 and their appointed project team for the purpose of design, obtaining planning, building regulations approval, and in connection with finance. This report must not be used by any other persons or for other purposes without express written agreement of Land Science.

General

Land Science takes all reasonable professional care in preparation of this report, using current standards and industry practice. However, the evaluation of ground conditions depends on an interpretation and extrapolation of the conditions revealed by a limited data set. The level of risk is related to the extent of investigation and no site is ever free of risk. The client should understand their risks and liabilities. We accept no liability whatsoever in respect of:

- The scope, extent or design of an investigation.
- Any conditions not directly revealed by the investigation.
- Published standards or methodologies used or adopted in this report.
- The opinion of any other party including any regulator, authority or stakeholder.
- Any dispute, claim or consequential loss arising from any findings of this report.
- Third party information and data.

This report relates solely to ground-related matters as set out in the objectives and makes no representation on other matters such as ecology, arboriculture, invasive plant species, the condition of buildings and structures, hazardous building materials such as insulation or asbestos, the locations of boundaries, unexploded ordnance, and or planning constraints etc. Further reports should be commissioned in this respect as appropriate.

Regulators and Approvals

This (and any other) report should be submitted to relevant authorities for their own assessments and to provide their approval or comments accordingly. This should be in good time before commencing on site in case additional work is to be carried out.

Standards, technical guidance and regulatory positions change over time and which may therefore affect the findings and recommendations made in this report; this should be verified by the client prior to any critical project milestones. Where this information is used in design, the designer should verify that the information is appropriate and has been used correctly.

Variations with time

The report relates to conditions revealed at the time of the investigation and any monitoring visits. Some parameters may vary over time or seasonally; groundwater levels, ground gas compositions, or concentrations of contaminants are particularly variable in this respect. Further monitoring or verification should be considered as appropriate.

GLOSSARY OF TERMS

ACM	Asbestos Containing Material
BGS	British Geological Survey
BRE	Building Research Establishment
BS	British Standard
C4SL	Category 4 Screening Level
CBR	California Bearing Ratio
CDM	Construction Design and Management regulations
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CLEA	Contaminated Land Exposure Assessment model
CSM	Conceptual Site Model
EA	Environment Agency
EQS	Environmental Quality Standards
FOC	Fraction of Organic Carbon
GAC	Generic Assessment Criterion
GQRA	Generic Quantitative Risk Assessment
mbgl	Meters Below Ground Level
NHBC	National House Building Council
mOD	Metres above Ordnance Datum
PAH's	Polycyclic Aromatic Hydrocarbons
PHE	Public Health England
PID	Photo-Ionisation Detector
PQRA	Preliminary Quantitative Risk Assessment
PSD	Particle Size Distribution Test
RMS	Remediation Method Statement
S4UL	Suitable for Use Level
SOM	Soil Organic Matter
SPZ	Source Protection Zone
SPT	Standard Penetration Test
SSSI	Sites of Special Scientific Interest
ST-WEL	Short Term Workplace Exposure Limit
SVOC's	Semi-Volatile Organic Compounds
TPH	Total Petroleum Hydrocarbons
TRRL / TRL	Transport Road Research Laboratory
TWA-WEL	Time Weighted Average Workplace Exposure Limit
UK HBF	United Kingdom House Building Federation
VOC's	Volatile Organic Compounds
WAC	Waste Acceptance Criteria

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Land Science	Title: Site Location		Reference: LS7634
	Project: Rowfold Lodge, Billingshurst, RH14 9DD		Figure: 1
	Client: Mr Rutherford		Date: 16/05/2024
	Prepared by: AL	Checked by: JM	Version: 0.1	Sheet: 1 of 1

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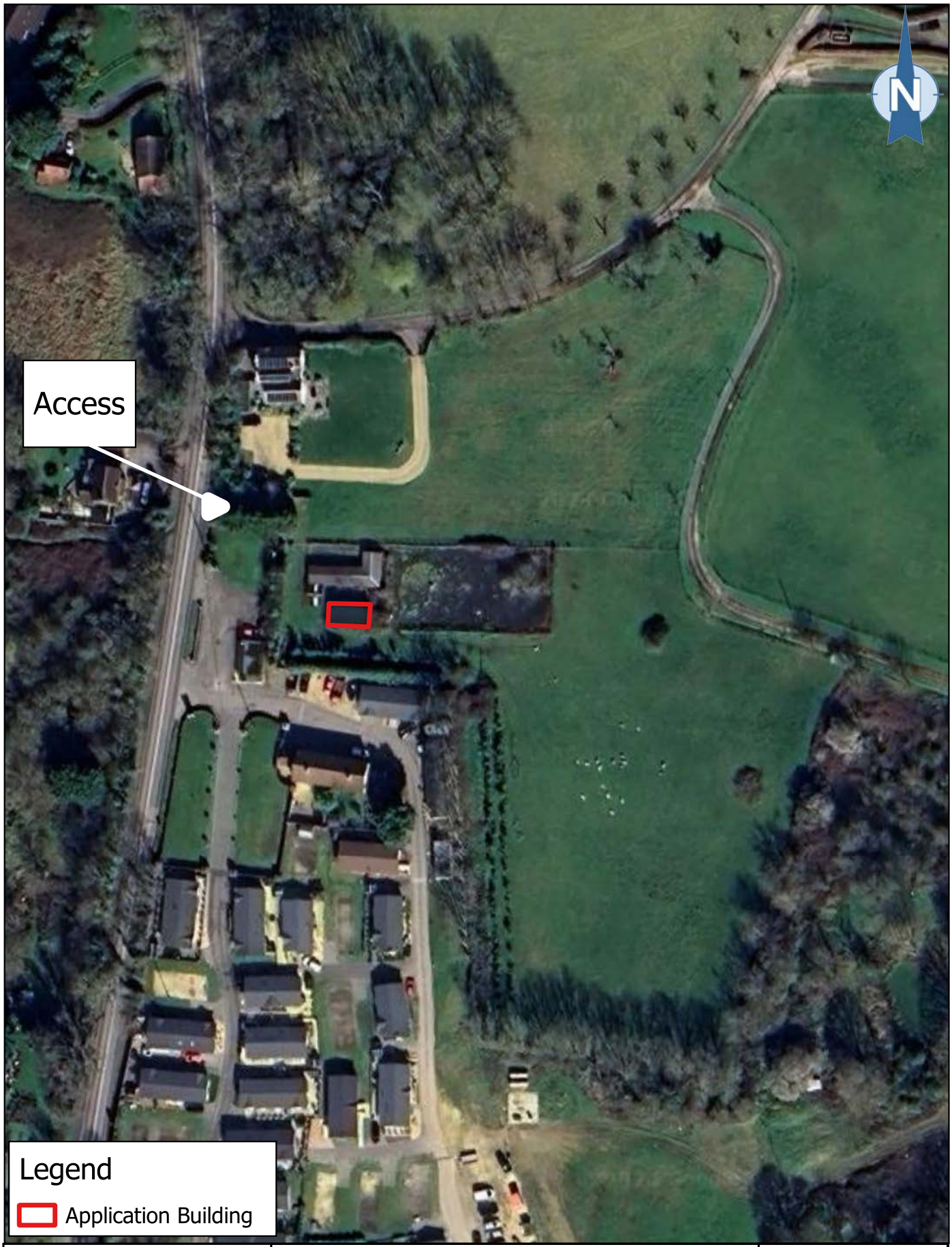

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Land Science	Title: Investigation Layout		Reference: LS7634
	Project: Rowfold Lodge, Billingshurst, RH14 9DD		Figure: 2
	Client: Mr Rutherford		Date: 16/05/2024
	Prepared by: AL	Checked by: JM	Version: 0.1	Sheet: 1 of 1

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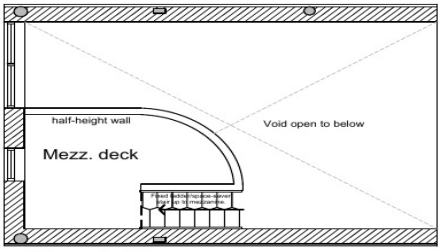
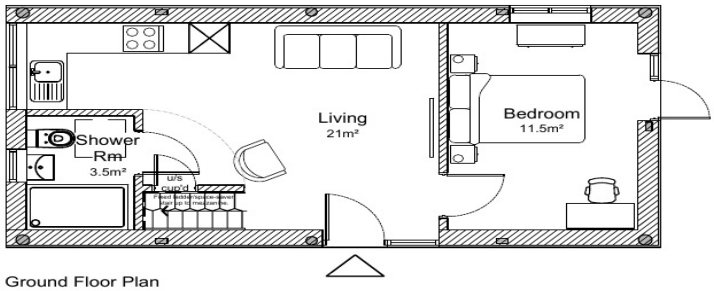


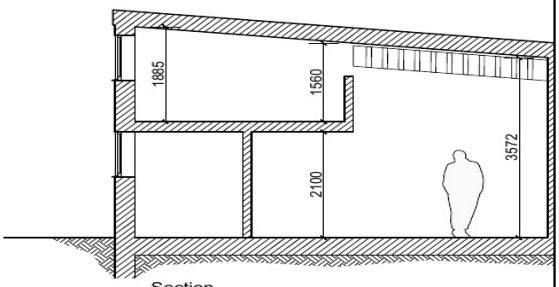
Mezzanine Storage area
(5.3m²)
(all head room above 1.5m)



Ground Floor Plan
(37.2m²)

Total GIA 42.5m²
1bed 1 person

75% of ceilings 2.3m or above.



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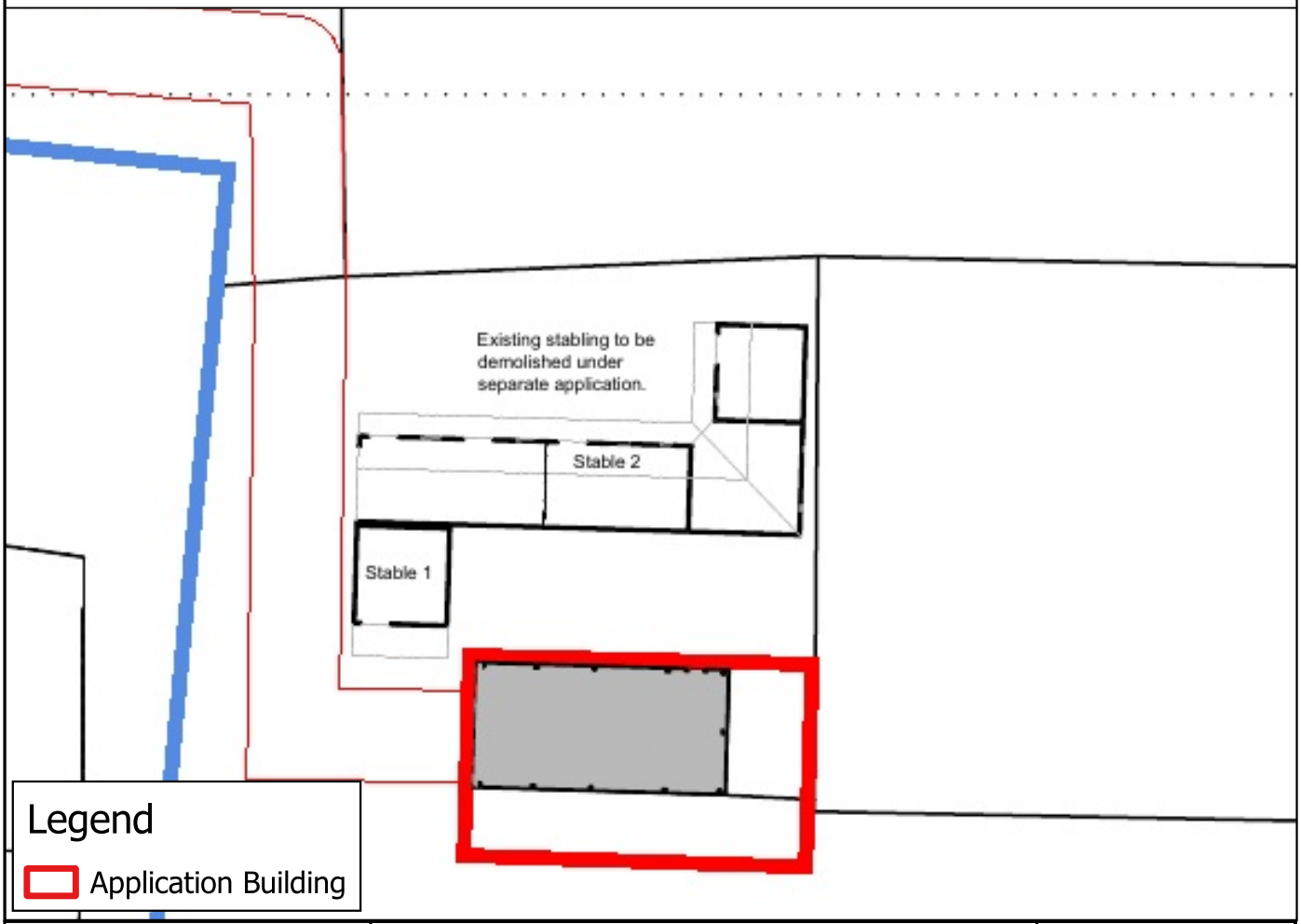

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Land Science	Title: Proposed Development		Reference: LS7634
	Project: Rowfold Lodge, Billingshurst, RH14 9DD		Figure: 3
	Client: Mr Rutherford		Date: 16/05/2024
	Prepared by: AL	Checked by: JM	Version: 0.1	Sheet: 1 of 1

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APPENDIX A

SITE WALKOVER RECORD

The walkover is restricted only to aspects related to the Land Science report and the stated objectives therein. The walkover does not replace other surveys such as asbestos, arboriculture, ecology, utilities etc which the client should consider. The client should review the walkover and provide any further relevant information where available.

SITE DETAILS			
Project	*Rowfold Lodge, Coneyhurst Road, Billingshurst, RH14 9DD*		
Reference	*LS7634*	**Date of walkover**	23/05/24
Engineer	*Alex Lintern*		
CURRENT USE			
Existing land uses	*Old apple shed barn on agricultural land. Barn occasionally used for keeping animals. Stables adjacent to barn used for storage.*		
Status	*The barn itself is derelict. There is also a small derelict shed to the south of the barn which is inaccessible due to overgrowth.*		
Suspected asbestos	*Corrugated cement board roofing on stables. Some in a small pile next to stables.*		
Below ground structures	*None visible but possible patch of infilled land to the north of the barn next to the stables.*		
Hardstandings	*Asphalt and concrete surrounding barn and stables. Concrete floor in barn. Wooden decking on top of concrete behind barn. Gravel entrance with large mixed gravels of brick and flint.*		
Soft landscaping	*Overgrown brambles and nettles surrounding the barn and stables. Paddock area – sand with rubber chippings. Compost area in the corner to the south of the barn. Bare ground into gravel (possible infill land) to the north of the barn. Large bonfire of mixed vegetation in the middle of the open field to the east of the barn.*		
General condition	*Dilapidated, run down with some damage to the barn.*		
Boundaries	*A mixture of wooden and wire mesh fencing border the site. 2no. metal gates are used to access the area with the barn and stables.*		
Adjacent land uses	*Home Park (bungalows) to the south. Coneyhurst Road to the west. Open fields and paddock to the east. Open fields and Rowfold House to the north.*		
TOPOGRAPHY			

General lie of the land	*Located on relatively flat land with a gradual incline to the north with a sloping north-south gradient.*
General lie of the site	*Relatively flat*
Abrupt changes in slope	*None*
Excavations and Depressions	*None*
Raised ground	*No raised ground*
GROUND STABILITY	
Signs of landslip	*None*
Cracking in buildings and walls etc	*None*
Subsidence on ground surface	*None*
GROUND CONDITIONS	
Possible filled-in ground	*Possible infilled ground to the north of the barn between the barn and stables.*
Possible built-up ground	*None*
Exposed soils	*Silty, sandy soil.*
Desiccation	*None*
Disturbance	*None*
WATER CONDITIONS	
Wet boggy ground	*None*
Wells and ditches	*Ditch with very low water level noted on the south and south-eastern boundary of the larger site.*

Ponds or ponding	*None*
Streams / Rivers	*None*
ECOLOGY	
Burrows	*Nesting birds in barn.* *Small burrows behind barn leading under wooden decking.*
VEGETATION	
Reeds or water loving plants	*None*
Sparse growth or die back	*Patches of bare ground amongst nettles/brambles to the North of the barn (possible infill) and South of the barn.*
Invasive species	*None*
TREES	
Relevant trees height/species	*Mixture of 5–10m trees along the south, west and east of the site. Tree species ranging from Willow, Cedar, Blackthorn, Sycamore and Elder.*
Off-site	*Varying mixture of trees, some Ash and Oak ranging in 15–30m*
Hedgerows	*Bramble hedgerows border fencing to the south and east. Bramble and nettle hedgerows surround the barn.*
Recent felling and older stumps	*Several felled trees and some older stumps along the field border to the South.*
CONTAMINATION	
Tipped materials	*None*
Areas of possible fill	*Possible infill area to the north of the barn.*
Discolouration/sheens of waterbodies	*None*
Surface staining	*None*

Chemicals storage	*Some chemicals (weedkillers) and fuel tank stored in Stable 1.*
Drums and tanks	*3no. drums in the paddock area.*
Petrol interceptor	*Petrol jerry cans visible in Stable 2.* *2no. large propane tanks visible close to the border in the Home Park to the south.*
Soakaways	*None*
LOCAL INFORMATION	
Place/road names	*Coneyhurst Road lies to the west.*
3rd party information	
OTHER INFORMATION	

APPENDIX B










Land Science	**TITLE:**	Site Photographs	**REF:** LS7634	**PREPARED:**	AL
	PROJECT:	Rowfold Lodge, Coneyhurst Road, Billingshurst, RH14 9DD	**SHEET:** 1 of 4	**CHECKED:**	JM
	CLIENT:	Mr Rutherford	**DATE:** 29/05/2024	**VERSION**	v1

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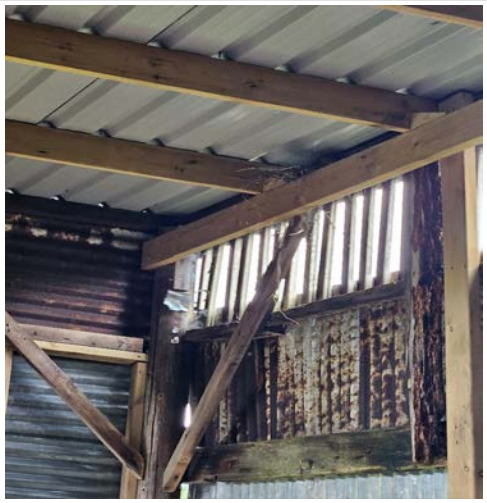
0345 604 6494
UNIT 10, 19 ALBERT DRIVE BURGESS HILL, **WEST SUSSEX**, RH15 9TN







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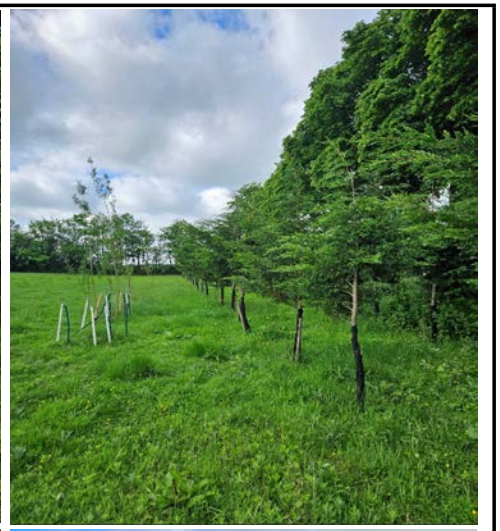
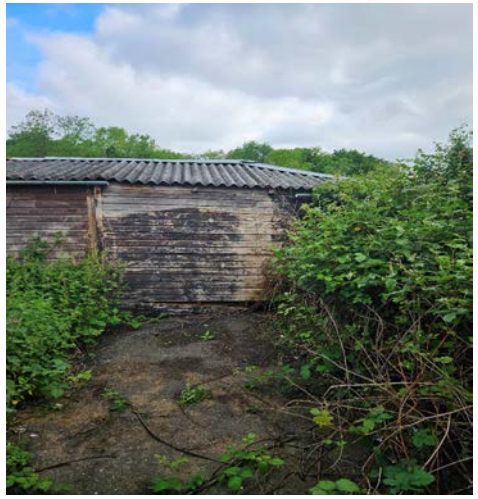
	PROJECT:	Rowfold Lodge, Coneyhurst Road, Billingshurst, RH14 9DD	**SHEET:** 2 of 4	**CHECKED:**	JM
	CLIENT:	Mr Rutherford	**DATE:** 29/05/2024	**VERSION**	v1







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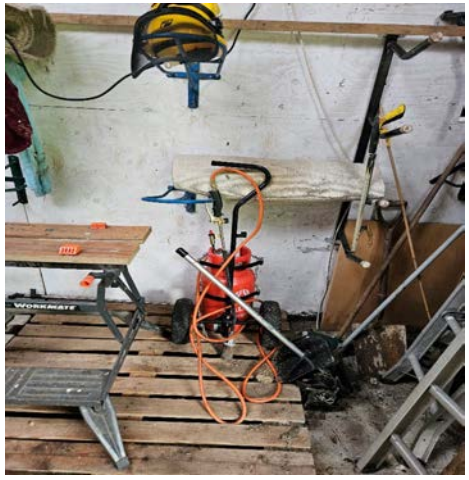
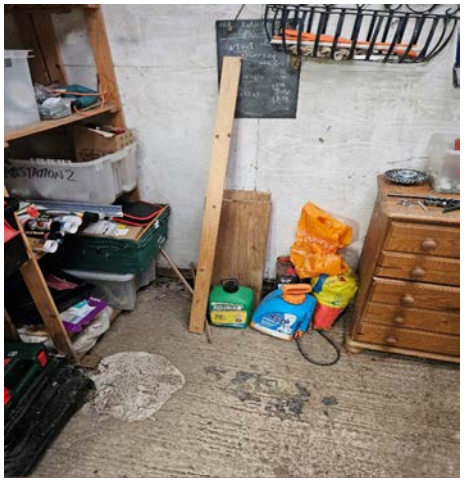
	PROJECT:	Rowfold Lodge, Coneyhurst Road, Billingshurst, RH14 9DD	**SHEET:** 3 of 4	**CHECKED:**	JM
	CLIENT:	Mr Rutherford	**DATE:** 29/05/2024	**VERSION**	v1












Land Science	**TITLE:**	Site Photographs	**REF:** LS7634	**PREPARED:**	AL
	PROJECT:	Rowfold Lodge, Coneyhurst Road, Billingshurst, RH14 9DD	**SHEET:** 4 of 4	**CHECKED:**	JM
	CLIENT:	Mr Rutherford	**DATE:** 29/05/2024	**VERSION**	v1

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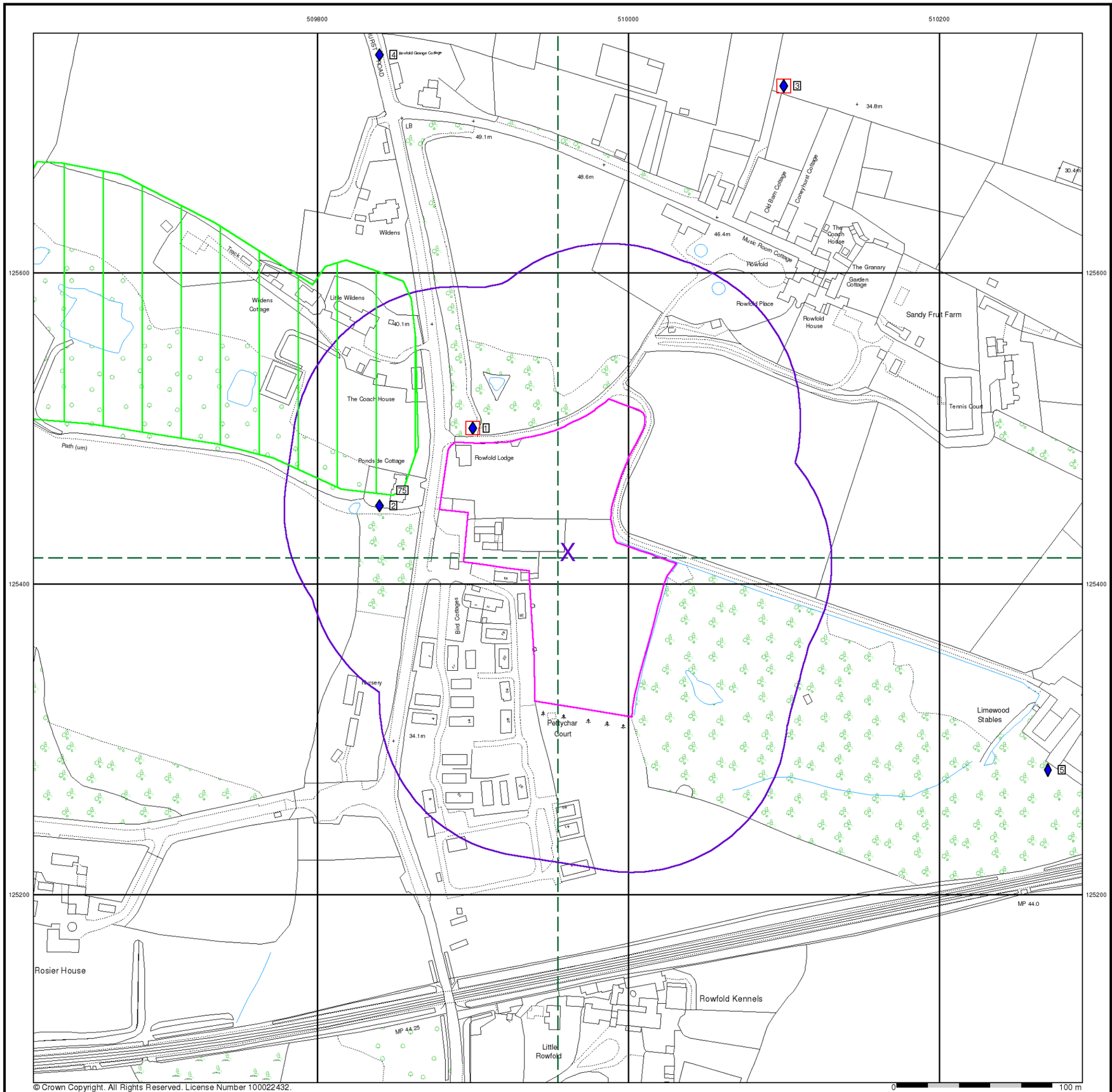
APPENDIX C



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Land Science

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location
- Pylon
- Overhead Transmission Line

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- 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 Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated 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

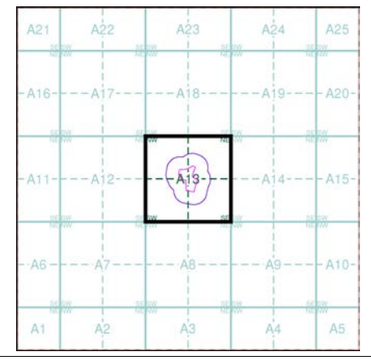
Geological

- BGS Recorded Mineral Site

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- 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 (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Segment A13



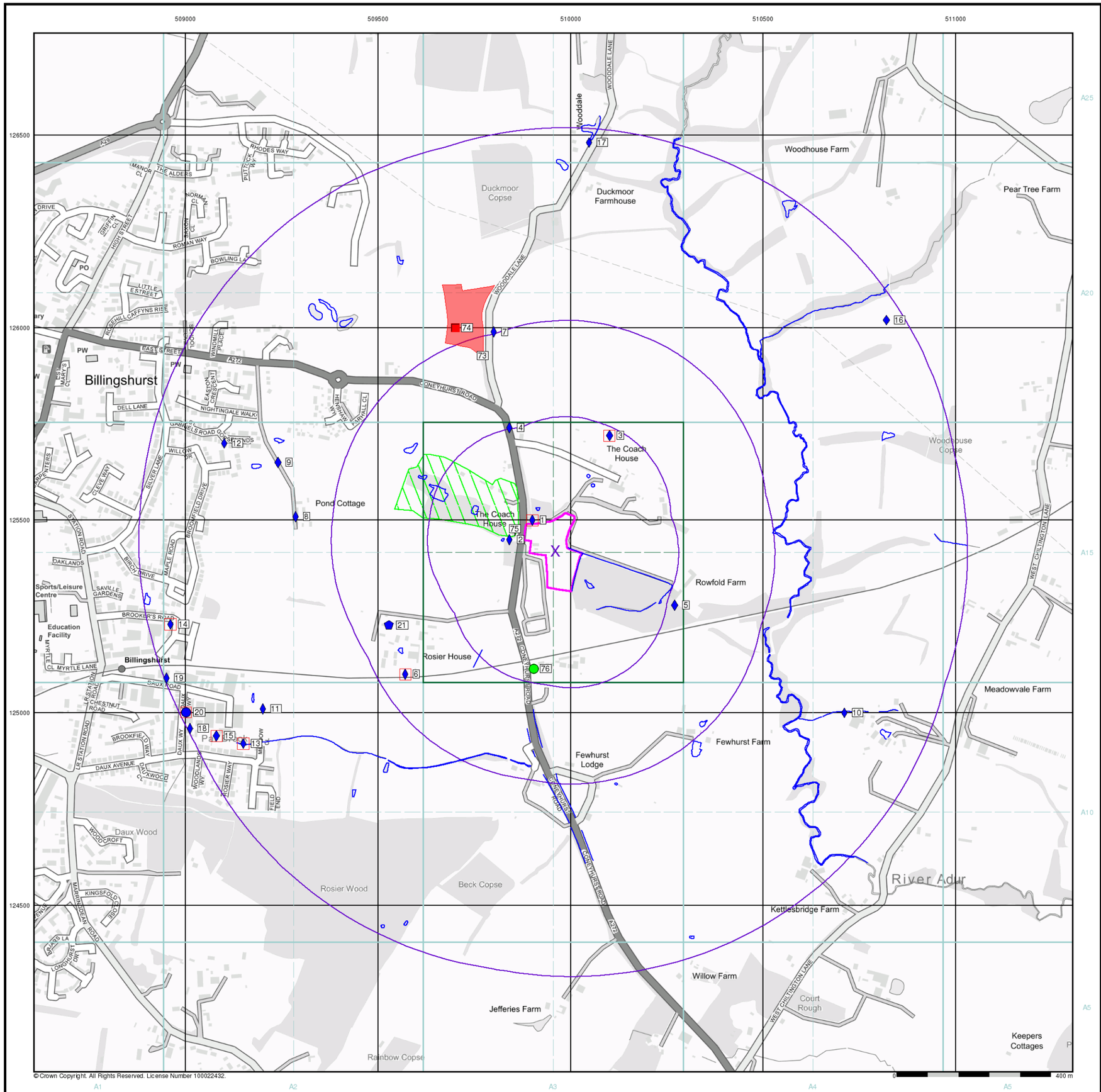
Order Details

Order Number:	346770745_1_1
Customer Ref:	LS7634
National Grid Reference:	509960, 125420
Slice:	A
Site Area (Ha):	1.69
Plot Buffer (m):	100

Site Details

Rowfold Lodge, Coneyhurst Road, BILLINGSHURST, RH14 9DD

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Land Science

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- 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 Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
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- Local Authority Recorded Landfill Site
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- 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 (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

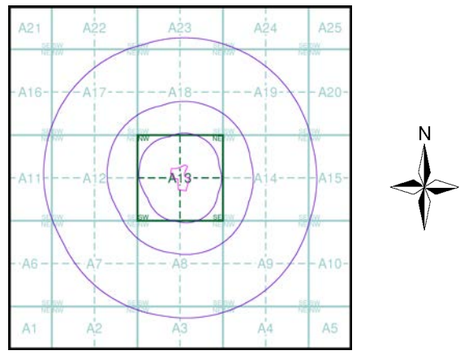
Hazardous Substances

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

Geological

- BGS Recorded Mineral Site

Site Sensitivity Map - Slice A



Order Details

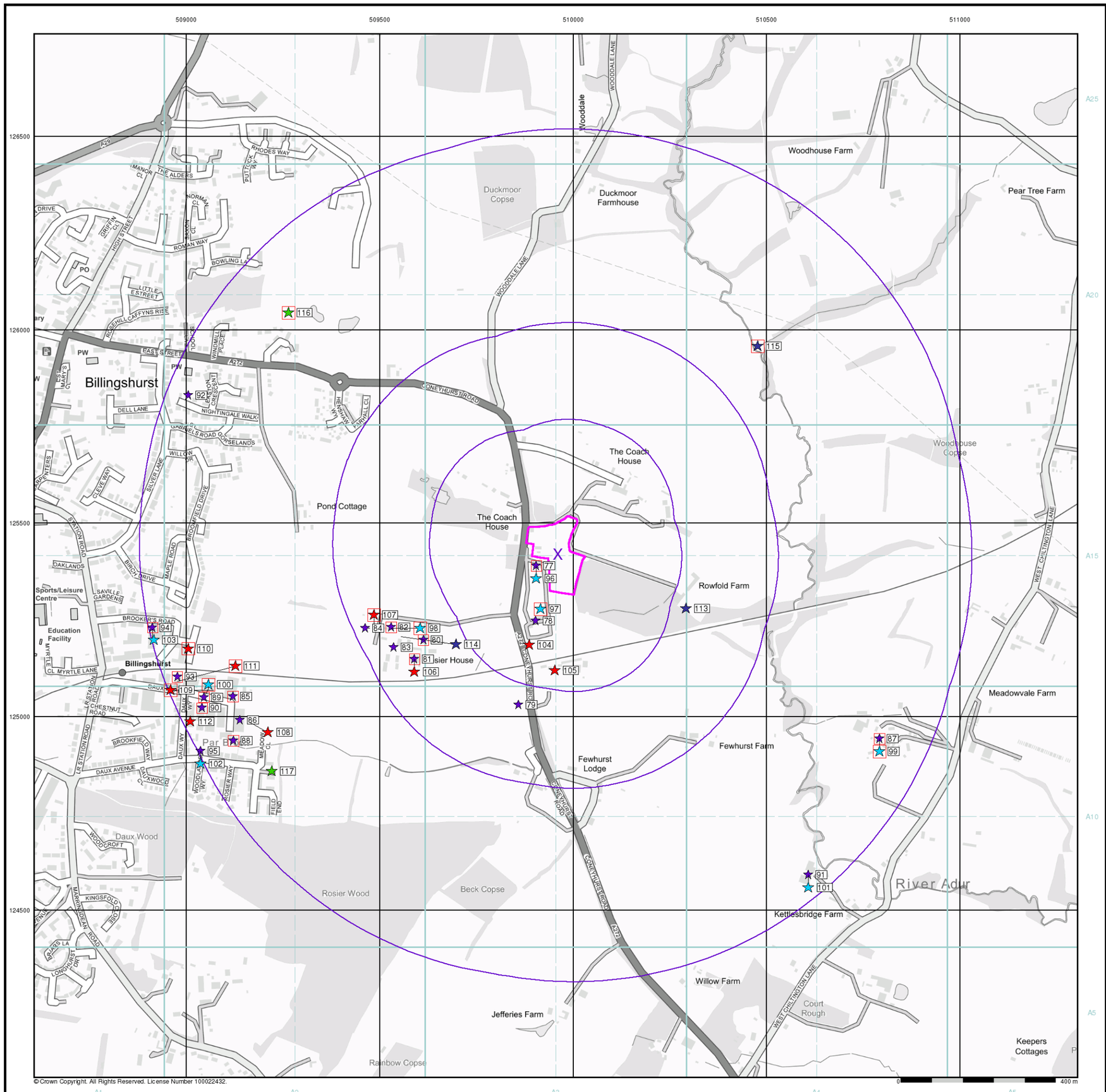
Order Number:	346770745_1_1
Customer Ref:	LS7634
National Grid Reference:	509960, 125420
Slice:	A
Site Area (Ha):	1.69
Search Buffer (m):	1000

Site Details

Rowfold Lodge, Coneyhurst Road, BILLINGSHURST, RH14 9DD

Landmark INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk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A2
A3
A4
A5
Billingshurst
Pond Cottage
The Coach House
The Coach House
Duckmoor Copse
Duckmoor Farmhouse
Woodhouse Farm
Pear Tree Farm
Woodhouse Copse
Rowfold Farm
Meadowvale Farm
Fewhurst Lodge
Fewhurst Farm
Kettlesbridge Farm
River Adur
Willow Farm
Court Rough
Keepers Cottages
Jefferies Farm
Rainbow Copse
Rosier Wood
Beck Copse
Daux Wood
Sports/Leisure Centre
Education Facility
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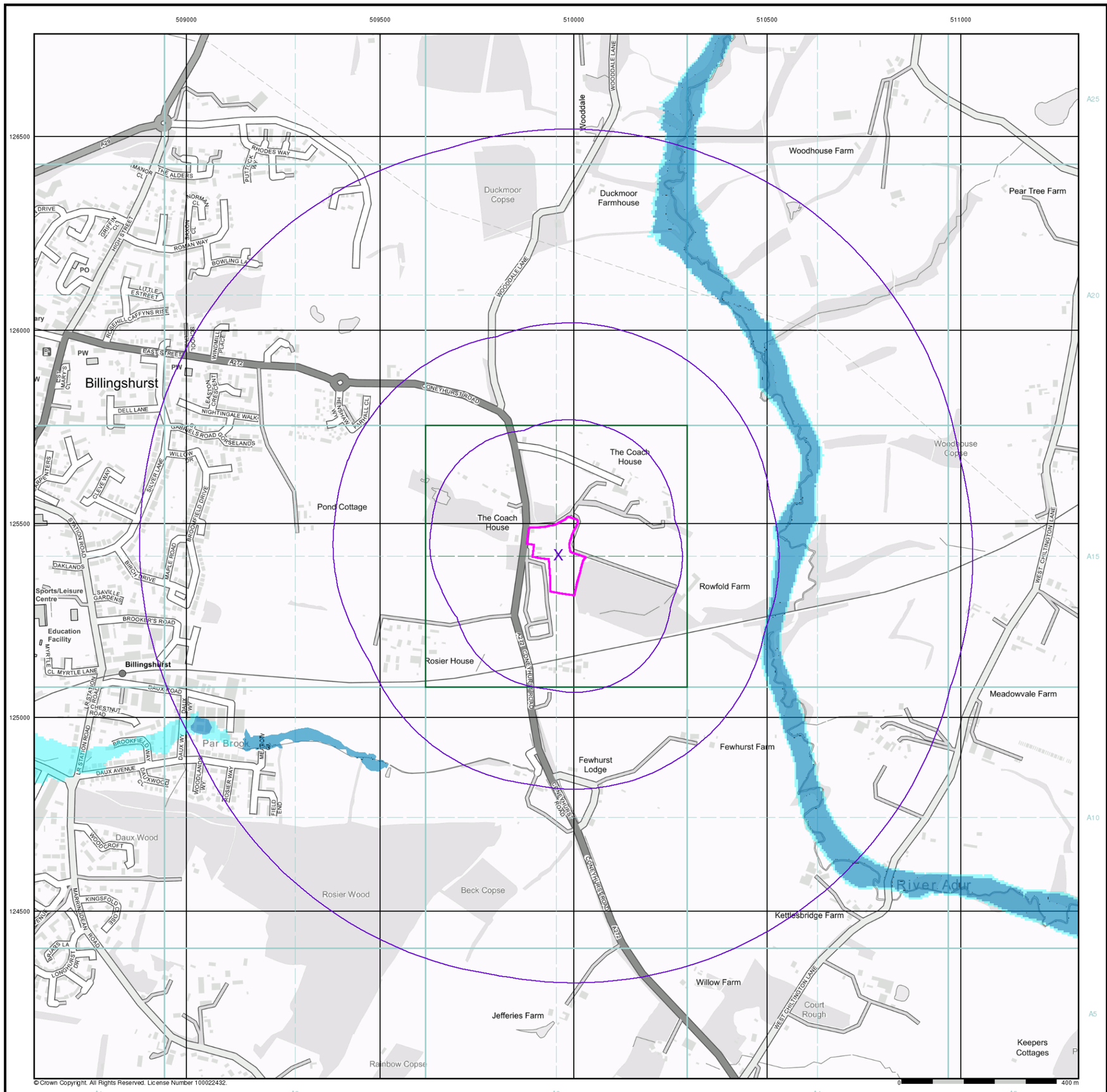

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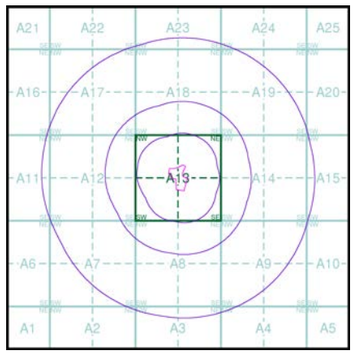
General

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

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- 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:	346770745_1_1
Customer Ref:	LS7634
National Grid Reference:	509960, 125420
Slice:	A
Site Area (Ha):	1.69
Search Buffer (m):	1000

Site Details

Rowfold Lodge, Coneyhurst Road, BILLINGSHURST, RH14 9DD

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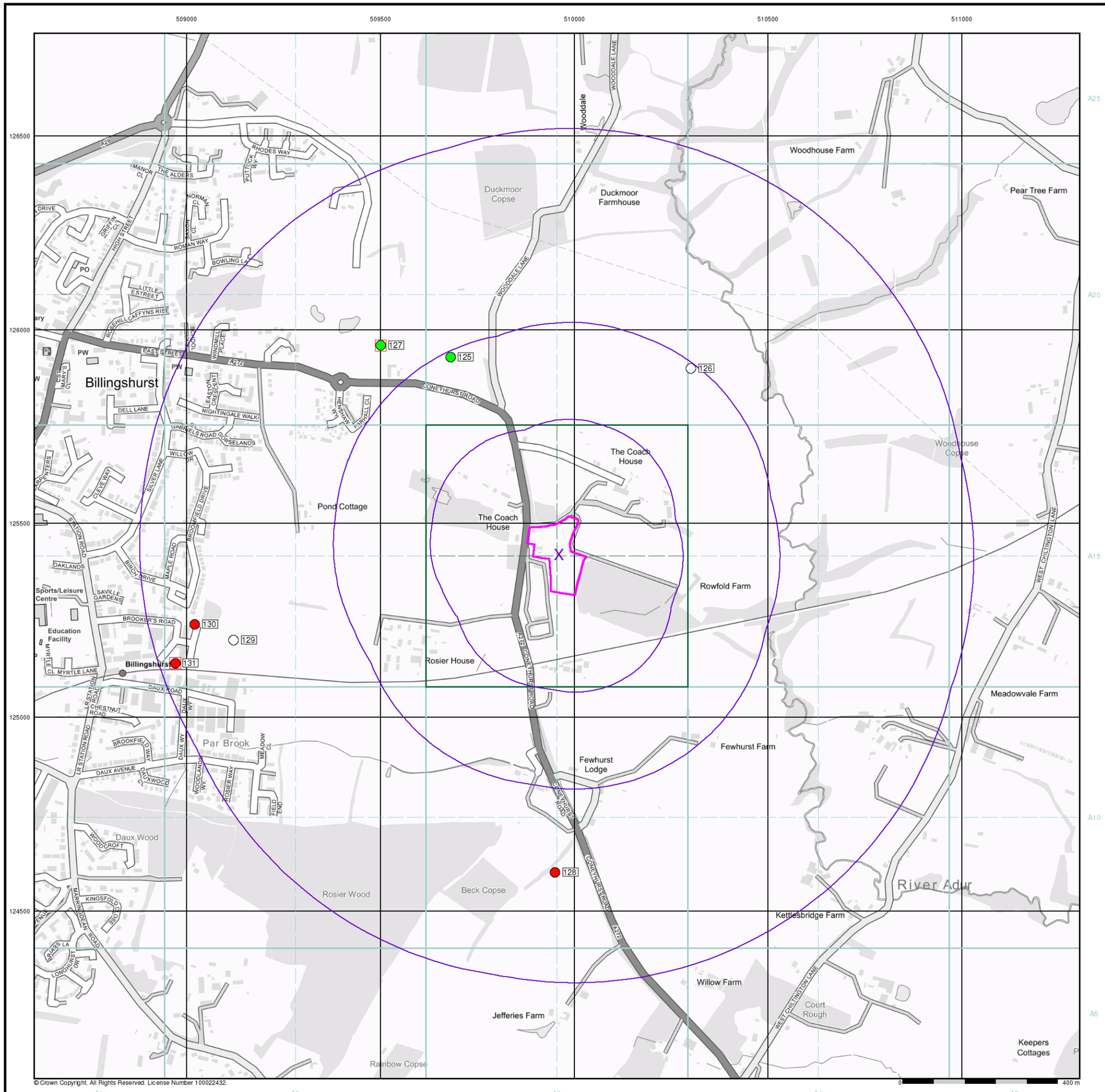
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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Land Science

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

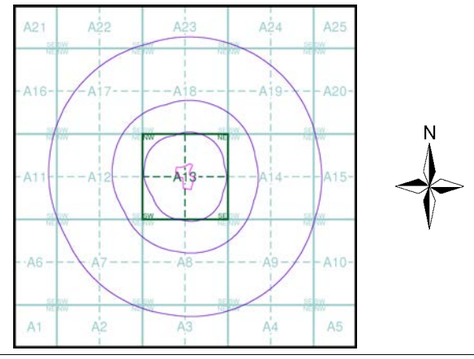
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied 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



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Customer Ref:	LS7634
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Slice:	A
Site Area (Ha):	1.69
Search Buffer (m):	1000

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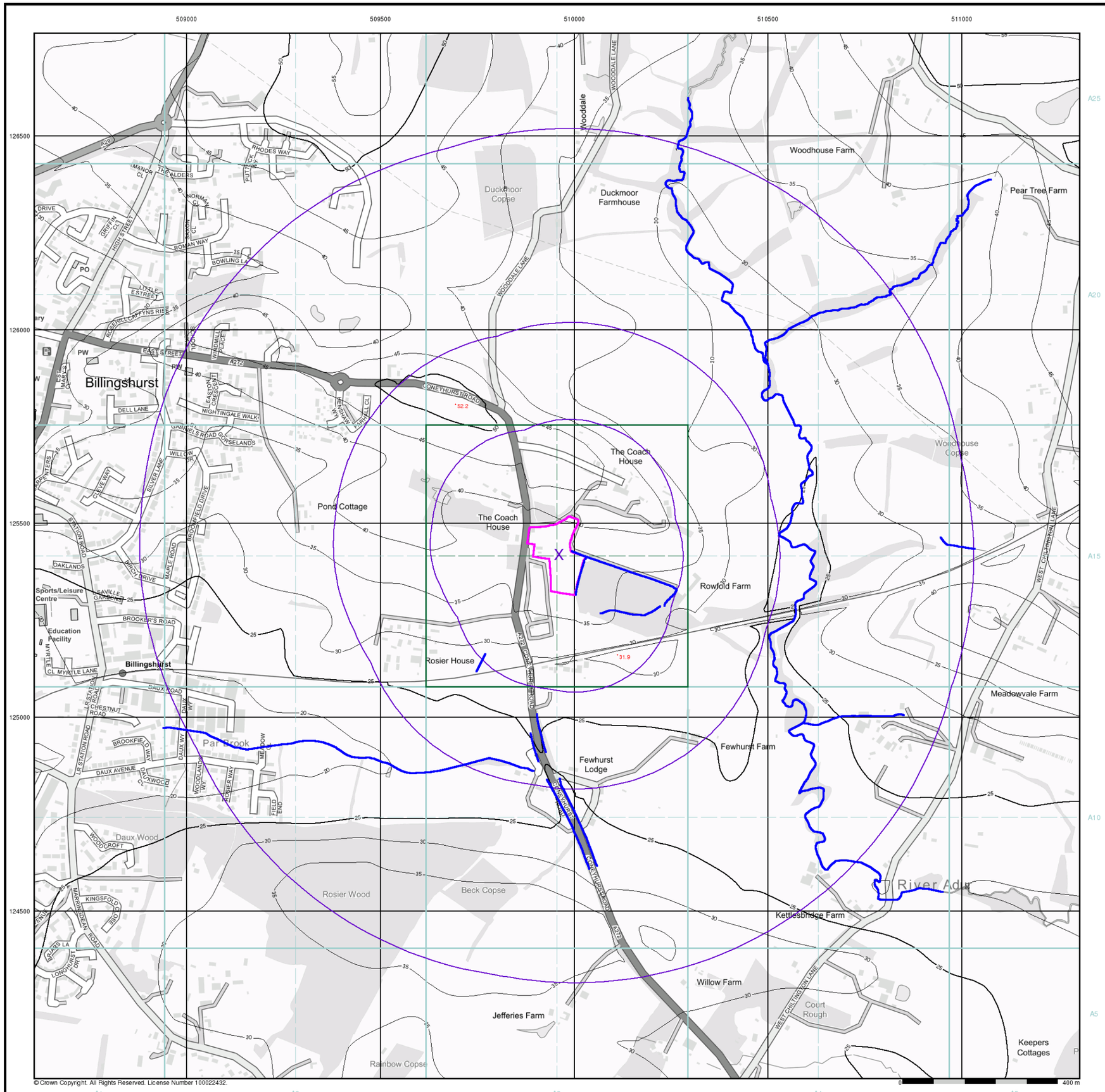
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Billingshurst
Woodhouse Farm
Duckmoor Farmhouse
Duckmoor Copse
Pear Tree Farm
Woodhouse Copse
The Coach House
Pond Cottage
Rowfold Farm
Rosier House
Meadowvale Farm
Fewhurst Farm
Fewhurst Lodge
Par Brook
Daux Wood
Rosier Wood
Beck Copse
River Adur
Kettlesbridge Farm
Willow Farm
Court Rough
Jefferies Farm
Keepers Cottages
Rainbow Copse
Sports/Leisure Centre
Education Facility
Billingshurst
A29
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A272
A272