
Phase I Desk Study, Site Reconnaissance & Phase II Site Investigation Report

at Shrublands Nursery,
Angmering, BN16 4AT

for Sigma Homes

Report Reference: LP2386

Report Date: 22nd February 2021

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EXECUTIVE SUMMARY

The site comprises a roughly rectangular 1.37Ha plot of land the majority of which is currently in use as a horticultural nursery. A section of the eastern portion of the site is currently unused and densely vegetated. A strip of the northern section of the site is currently used for vehicle storage. The site is situated to the west of Roundstone Lane, Angmering, West Sussex and it is proposed to redevelop the site with 40 No residential dwellings comprising both houses and low-rise apartments.

The site was mapped as open fields from the earliest available historical maps until the late 1960s when the site is shown as a horticultural nursery. The site layout remains relatively unchanged since the 1970s with only small additional structures mapped in the west and south from the early 1990s onwards and the part demolition of some of the greenhouses. The desk study has identified a number of potential sources of contamination associated with the site's former and current uses. These include pesticides, and heavy metals from agricultural/horticultural activities. Heavy metals, PAH, asbestos and TPH within any made ground associated with the construction of the existing buildings and greenhouses and their ancillary systems such as heating/boilers and associated fuel tanks. The topsoil on site may also be impacted with glass fragments associated with the demolition of the previous greenhouses. The site is not affected by Radon gas.

The site is mapped as being underlain by River Terrace Deposits over Chalk. Ground conditions generally comprised topsoil over gravelly silty clay over slightly silty clayey gravel to depth. The depth to the top of the gravel was variable ranging from 1.90m to 3.80m bgl where encountered, and in some locations the depth to gravel was not proven. A thin layer (<0.5m) of made ground was encountered in the south western corner of the site only, with a soil stockpile located on the western boundary.

An allowable bearing capacity of 80kPa is recommended for the firm clays below about 1.0m. Suspended floor slabs are recommended due to the medium volume change potential of the clay soils on site. Soil sulphates fall within BRE design class DS-I and the site conditions fall within the ACEC class AC-I.

Groundwater was not encountered during the investigation although the gravels were noted to be damp. Historic BGS borehole records from the area show groundwater to be within the chalk at a depth of between 5 and 7m bgl. Ground water level monitoring consistently encountered groundwater within WS106, located at the eastern end of the site, at depths ranging from 1.92 to 2.88m bgl with all other wells remaining dry. Given the depth of the groundwater recorded off site within the BGS records it is considered that these higher groundwater levels maybe reflective of perched water within the well itself.

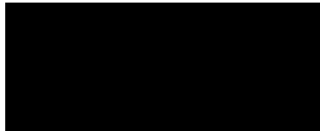
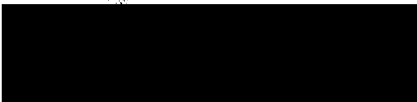
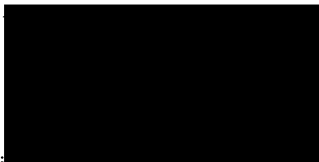
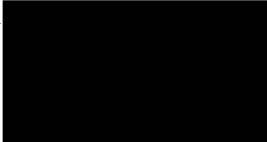
Three soakage tests were undertaken in general accordance with BRE DG365. Based on the results of testing the River Terrace Gravels are considered suitable for soakaway drainage. The site is not mapped as being within a flood risk zone by the Environment Agency.

A geo-environmental risk assessment has been carried out. Contamination testing of the soils identified lead concentrations considered to pose a risk to human health in two locations. Furthermore, sampling was limited due to the onsite structures and ongoing site activities.

As such further shallow sampling of the soils on site following cessation of onsite activities and the demolition of the structures is recommend to delineate the extent of contamination. Following which a remediation method statement outlining the remedial measures required on site should be undertaken. At this stage it is considered that remediation will comprise installation of clean cover in areas of soft landscaping.

As with any redevelopment site, there is always the risk of hitherto undetected contamination, and further investigations should be carried out prior to redevelopment.

Much of the soils on site will be expected to be classified as non-hazardous waste.

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Date:	22 February 2021
Revision:	Issue 1

A INTRODUCTION

1 Authority

Leap Environmental Ltd (hereafter referred to as LEAP) has been appointed by Sigma Homes to undertake a Phase I Desk Study, and Phase II intrusive Site Investigation of a site referred to as Shrublands Nursery, Angmering. The site location is shown in Figure 1 Appendix B. The instruction was given in an email dated 26/10/2020 and signed by Adam Light of Sigma Homes.

2 Objective

LEAP understands that the site is currently occupied by a horticultural nursery with associated outbuildings and a vehicle storage yard to the north. It is proposed to redevelop the site with 40 No. 2/3 storey residential dwellings comprising both semi-detached and detached properties and a low-rise block of flats along with the associated gardens and access roads. A portion of the southern part of the site is proposed as an area of public open green space. The proposed site layout is shown in Figure 2 Appendix B.

The proposed development is currently at a Site Purchase phase and has been assessed in accordance with BS EN 1997¹, as being a Geotechnical Category I structure.

The objectives of this report are to:

- Provide information on the geotechnical and environmental quality of the ground present on the site;
- Assess the potential health and other environmental risks posed by the site to the proposed development and to other specifically identified receptors; and
- Assess the potential for offsite contamination to adversely affect the proposed development.

3 Scope of Works

This report describes a two-stage process whereby the site is investigated and risks are assessed. The terms geotechnical and geoenvironmental are referred to throughout the report.

¹ BS EN 1997-1(2004)+A1:2013 Eurocode 7:Geotechnical Design: General Rules

Geoenvironmental refers principally to the chemical nature of the ground and the degree of soil, water and/or land gas contamination and the impact that contamination may have on current or future development and also on the wider environment.

Geotechnical refers to all other aspects of the ground conditions and the impact they may have on the physical construction of existing or future development, principally foundations, slope stability, drainage, pavement and road design and groundwater control.

The investigation comprises two phases of work.

3.1 Phase I Scope

The first part of this report presents the results of a desk study and site reconnaissance. The following publicly accessible sources of information² have also been reviewed:

- British Geological Society (BGS) 1:50,000 Series Geological Map Sheet 317/332 'Chichester and Bognor' Solid and Drift ed. 1996.
- BGS 'Geology of Britain' online viewer accessed on 04/11/2020.
- BGS Borehole log refs. TQ00SE64 and TQ00SE20 located within 100m to the north of the site boundary.
- Defra 'MAGIC' website accessed on 04/11/2020.
- Groundsure.io website accessed on 04/11/2020.
- Groundsure database report (GS-7217062)
- Unexploded WWII aerial delivered bomb (UXB) regional risk maps produced by Zetica
- Interrogations of Arun Councils online planning records 04/11/2020
- Interrogation of the World Wide Web on 04/11/2020 for general information pertaining to the site history

A site reconnaissance was carried out on 08th December 2020.

The desk study and site reconnaissance have been used to develop an initial conceptual site model, which forms the basis for the site investigation strategy. The initial site conceptual model is used to identify geotechnical and geoenvironmental hazards and the qualitative degree

² The report contains British Geological Survey materials ©UKRI 2020 and public sector information licensed under the Open Government Licence v3.0.

of risk associated with them. In terms of the geoenvironmental assessment the conceptual site model is used to identify potential sources of contamination, potential receptors and pathways by which the two may be connected. These are known as possible contaminant linkages and it is these contaminant linkages that are key to contaminated land risk assessment.

The Phase I investigation is also referred to as a Preliminary Investigation³.

3.2 Intrusive Investigation Scope

The Phase II work comprises intrusive investigation, onsite monitoring and laboratory analysis. The results of this are used to validate and/or update the initial site conceptual model. This phase of site investigation comprised the following tasks:

- 6 No. 3-4m deep windowless boreholes drilled with a tracked rig;
- 3 No. 3.0m deep monitoring well installations;
- 6 No. Winter groundwater monitoring visits;
- 3 No. 3.0m deep machine excavated trial pits;
- 3 No. BRE365 soakage tests per trial pit;
- In-situ geotechnical testing including Standard Penetrometer Tests in the boreholes and perth penetrometer tests in the trial pits;
- Geotechnical Laboratory Testing including Atterberg Limit Tests, and Sulphate Tests and Particle Size Distribution Tests; and
- Chemical Laboratory tests including 6 No. LEAP standard soil suite tests, 3 Pesticide Screens

The intrusive works were completed by contractors who have been scrutinised and are on LEAP's approved contractor list. The windowless sampling and BRE DG365 Soakage testing were carried out by Oakland Site Investigation Limited, the machine-excavated trial pits were carried out by Spillane Plant Hire and supervised by LEAP.

Selected samples of soil were scheduled for laboratory testing for a wide range of potential contaminants including metals, non-metals, polyaromatic and petroleum hydrocarbons and volatile organic compounds. The laboratory testing has been carried out by The Environmental Laboratory Ltd at its laboratories in East Sussex.

³ BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites – Code of Practice.

Selected soil samples have been classified by laboratory analysis for geotechnical design purposes. The laboratory testing has been carried out by Geolabs Ltd at its laboratories in Watford.

The final stage in the geoenvironmental assessment comprises a quantitative risk assessment and revision of the preliminary Conceptual Site Model. Preliminary recommendations for remediation have been provided, based on various development assumptions which are detailed in the following section and in the text of this report. The risk assessment has been carried out in accordance with UK industry standards and in particular in accordance with CLR11⁴ and BS10175:2011+A2:2017.

The final stage of the geotechnical assessment is the provision of preliminary soil parameters for use in geotechnical design, and broad recommendations for appropriate foundation options. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in Section 6 of Eurocode7⁵.

4 Limitations

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless

⁴ Environment Agency, 2004. Model Procedures for the management of land contamination. Contaminated Land Report 11.

⁵ BS EN 1997 Eurocode 7- Geotechnical Design- Part 1:General rules (2004) Part 2: Ground Investigation and Testing (2007)

formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk.

Full details of the limitations are provided in Appendix A.

B PHASE I – DESK STUDY

5 Environmental Setting

5.1 Site Location and Description

The site is located at Shrublands Nursery, Angmering, West Sussex, BN16 4AT, as shown in Figure 1. Shrublands Nursery is in the southern outskirts of Angmering to the west of Roundstone Lane. Access to the site is directly off Roundstone Lane approximately 234m north of the Roundstone bypass A259. The site is roughly rectangular, covering an area of approximately 1.37Ha.

The approximate National Grid Reference of the site is TQ 07378 03423. The site lies at an estimated elevation of 9m Above Ordnance Datum (mAOD) and is relatively level.

5.1.1 General Description and Boundaries

The current site layout is shown in Figure 3, Appendix B. A walkover survey was carried out on 08/12/2020 and photographs are included within Appendix E.

The majority of the site consists of a horticultural nursery with ancillary buildings, greenhouses and grassed area with a few small (2-3m high) fruit trees. A small area in the east of the site, to the north of the access drive, is currently densely vegetated unused land with a second area to the north of the nursery currently used as a vehicle storage yard.

The central northern area of the site is occupied by a greenhouse. To the west of the greenhouse was a lean-to equipment store and open sided barn; to the south of the greenhouses was a single storey ancillary unit comprising brick-built garage, small office space and welfare facilities. An area of hardcore and crushed blacktop hardstanding used for parking was located between the main greenhouse building and the southern outbuilding. Running east to west through the centre of the site, was the access track, comprising blacktop and gravel, leading from the carpark in the west to the access point off Roundstone Lane to the east.

The remaining greenhouse is still in use for a variety of crops. To the east of the greenhouses, are several rectangular walled areas (approximately 1.0m high) which from discussion with the current site users are the foundation walls of former greenhouses. The remaining areas were a mixture of sparse grass cover and hardstanding.

The south western portion of the site is occupied by large stockpiles of rubble containing various paving slabs, bricks, glass, tiles and general building waste. The north western area of the site is occupied by a soil stockpile which covered an area of around 800m² (measurement taken from the client supplied topographic survey plan prepared by Inco Surveys in December 2019 drawing ref S19149) and was generally between 1.0 and 1.8m high and appeared to consist of a mix of gravelly clay with fragments of concrete and brick on the surface.

The south east area of the site was an area of unused grass topped green space at the time of the investigation although discussion with site users indicates that this area has previously been ploughed. A number of scattered apple trees were located towards the west of this field, alongside the outbuilding wall.

The northern strip of the site is separated from the rest of the site by a Heras fence line. This northern area was occupied by more than 10 No. parked vehicles. To the east the site is bounded by a fence line and Roundstone Lane. A hedge line and overhead HV electricity cables run along the southern margin of the site. The west of the site is bound by mixed hedge and tree line with a further access track to a small commercial unit beyond thought to be used as a courier's yard.

The surrounding area consists of a mixture of residential properties, public open space and light industries including vehicle paintwork body shop to the north and Kennels and Cattery to the south.

5.2 Geology

The geology of the site has been ascertained by reference to the 1:50,000 British Geological Survey sheet 317/332 Chichester and Bognor, solid and drift edition, the BGS website (www.bgs.ac.uk) and the Groundsure report. The site is mapped as being underlain by River Terrace Gravels over the Lewes Nodular Chalk Formation.

5.2.1 River Terrace Deposits

A series of River Terrace Deposits were laid down by the River Arun and its tributaries as it moved into its present valley during the Quaternary Period. The deposits are those of a braided river system and generally comprise a sheet of variably graded sand and gravel, with local lenses of silts/clays and peats. The Terrace Gravels are usually classified by the Environment Agency as a Secondary Aquifer.

5.2.2 Lewes Nodular Chalk Formation

Chalk is a very fine grained white limestone. It consists predominantly of the disaggregated skeletal remains of tiny planktonic algae, composed of almost pure calcium carbonate. The Lewes Nodular Chalk Formation is composed of hard to very hard nodular chinks and hardgrounds with interbedded soft to medium hard chinks (some grainy) and marls. The softer chinks become more abundant towards the top. Nodular chinks are typically lumpy and iron-stained with regular seams of nodular flint, some large, commencing near the base and continuing throughout.

Chalk is particularly affected by its weathering, particularly the effects of dissolution. The top surface of the chalk is usually irregular and may include deep drift filled solution pipes for example. Chalk is also susceptible to frost action.

5.2.3 BGS Boreholes

The online BGS Geoindex (<http://www.bgs.ac.uk/geoindex/>) has been reviewed for detailed local geological and hydrogeological information.

3 No. Boreholes have been identified within 150m of the site. Borehole ref TQ00SE64, located 105m NW of the site indicates ground conditions comprise clay with flints to 4.6mbgl, green sand and ballast to 7.2mbgl, overlying chalk to 18.3mbgl which denoted the full extent of the borehole. The chalk varies in colour - yellow and white - and consistency – from putty to hard chalk. The log indicates a resting groundwater level of 6.25mbgl in the summer of 1979.

Borehole ref TQ00SE20, located 115m NW of the site indicates ground conditions comprise clay with flints to 3.9mbgl overlying green sand and ballast to 7.0mbgl over Chalk to 24m, which is the full extent of the borehole. The log indicates a resting groundwater level of 5.2mbgl in March 1965.

Borehole ref TQ00SE10, located 134m to the east of the site indicates ground conditions comprise clay and flint extending to 3.5mbgl underlain by Chalk to 76m which denotes the full extent of the borehole. The log indicates a resting groundwater level of 7.0mbgl in October 1957.

5.2.4 Solution features

Solution features generally occur where preferential weathering of the chalk occurs along discontinuities or joints. They are more common along geological boundaries, where surface water runoff from impermeable soils meets the more permeable underlying chalk. Solution features are known to be particularly prevalent in the vicinity of the chalk, Lambeth group geological boundary. As the acidic conditions within the Lambeth group soils encourage dissolution of the underlying chalk. It is noted that the boundary with the Lambeth group is mapped approximately 1km to the north of the site. Solution features are generally infilled with loose/soft soils and can be visible at ground level due to surface depressions, although this may be masked by overlying superficial deposits. They may lie dormant for many years, and are generally reactivated by the introduction of water from, for example, a leaking drain, soakaway etc.

5.3 Hydrogeology

The hydrogeology of the site has been ascertained from the Groundsure data report. The source of the data is reported to be the Environment Agency groundwater vulnerability mapping.

The superficial River Terrace deposits which are mapped beneath the site are classified as a Secondary A Aquifer whilst the underlying Chalk is classed as a Principal Aquifer.

The Groundsure report lists one active abstraction licence within 1km of the subject site. This is located 302m to the south-east of the site and is licensed for direct spray irrigation at Roundstone Nursery. The Groundsure reports no active licensed potable groundwater

abstractions within 2km of the site. The site is not located within a groundwater Source Protection Zone and none are situated within 500m of the site boundary according to the Groundsure Report.

5.4 Hydrology

There are no surface water features within the site or adjoining the site boundary.

The Groundsure report lists the nearest surface water features as an inland river 196m to the south-west and another 200m to the west. The nearest surface water feature the Environment Agency has quality data for is 'Black Ditch', located 894m to the north-west of the site. The Environment Agency recorded Black Ditch as Poor overall water quality between 2013-2019.

The Groundsure report indicates that there are two active discharge consents within 500m of the site. The first is 78m to the east regarding sewage discharge in connection to West End Nurseries. This is believed to be located within the Verbena Drive Housing redevelopment along Roundstone Lane and may therefore no longer be active. The second is 400m to the north-east: Worthing Rugby Football Club has an active discharge consent for sewage discharge- final/treated effluent onto land.

5.5 Flooding

According to the Environment Agency, the site is not located within a flood zone, either from rivers or sea. Groundsure reports a 1 in 30 years 0.1-0.3m deep risk of surface flooding, described as low risk on Environment Agency maps. Groundsure reports a moderate-high risk of groundwater flooding on site, with a high risk region mapped within 50m of the southwestern corner of the site. It notes that groundwater flooding occurs when groundwater rises above ground level or within underground structures such as basements or cellars.

5.6 Designated Environmentally Sensitive Sites

A review of designated environmentally sensitive sites presented within the Groundsure report has been carried out. The dataset makes reference to a number of sensitive sites including the following:

- Sites of Special Scientific Interest (SSSI);
- Records of National Nature Reserves (NNR);
- Areas of Special Conservation (SAC);
- Records of Special Protection Areas (SPA);
- Records of Ramsar Sites;
- Records of Local Nature Reserves;
- Ancient Woodland Records.

The site is located 821m south of the South Downs National Park and an unnamed Ancient & Semi-Natural Woodland and is located 1648m to the north of the site.

5.7 Ground Workings

The Groundsure report highlights a pond mapped 47m to the south of the site. This pond is continuously mapped until 2003 but is not shown on subsequent maps.

5.8 Mining, Extraction and Natural Cavities

The Groundsure report indicates the site is not situated within an area affected by coal mining.

The site is underlain by a geology associated with the potential for solution features (River Terrace Deposits over Chalk) although it is noted that the Groundsure report does not report any natural cavities in the vicinity of the site.

6 Site Usage

6.1 Current Land Use

The current site layout is shown in Figure 3, Appendix B.

The majority of the site is currently used as a horticultural nursery with associated machine and equipment storage, although it is believed that horticultural activities are being wound down onsite as the sale progresses. An area of hardcore and blacktop hardstanding is located between the main nursery buildings and the southern outbuilding and this is understood to be used as car parking area for site users/visitors.

There is a single active contemporary trade directory entry for the site erroneously recorded within the Groundsure report. This relates to NS marine who are Marine Engineers and are actually located on the Farrow Field Estate to the north west of site.

Historically, the Groundsure report lists the site as being a nursery from 1943. Planning records list applications relating to manufacturing paving slabs on site in 1988 and 2002. However, the historical maps show no evidence of this industry on site and during the walkover no evidence of large scale paving slab manufacturing was noted. However, there was a relatively small area of stored intact and broken concrete slabs located in the south western corner of the site. It is therefore considered that the site was probably a depot for the installation portion of this business rather than used for production purposes.

There are 9 active contemporary trade directory entries reported in the Groundsure report database search within 100m of the site, which relate mainly to automotive repairs and automotive sales. The nearest is the Marine Engineers located to the north west of the site.

6.2 Evidence of Onsite Contamination

A walkover survey was carried out on 08/12/2020.

Several potential sources of contamination were identified across the site.

The majority of site has been used for Nursery purposes; areas underlying greenhouses and the southern grassy area (assumed previously ploughed) and the small central orchard may be impacted with pesticides due to these agricultural activities. Heavy metals including arsenic and mercury were also used as pesticides historically and may be present on site. Nursery greenhouses were often heated by oil fuelled boilers and as such hydrocarbon contamination in the vicinity of the greenhouses cannot be discounted. The heating pipes associated with these boilers were often surrounded by asbestos lagging.

Stockpiles of waste/ rubble containing various paving slabs, bricks, glass, tiles and general building waste with some ash and concrete were located in the south west corner of the site. There is an approximately 1-1.8m high soil stockpile along the western boundary of the site which includes fragments of brick, concrete, plastic, glass, and metal fragments, roots and rootlets.

Fragments and sheets of potential ACM were noted in the fabric of the sheds in the north west corner of the site and asbestos may have been used in any boilers or within heating pipe lagging associated with the greenhouses. Horticultural vehicles and machinery were noted in the sheds on site and there may be a potential of associated localised hydrocarbon contamination. An historic tank and chimney were identified on the historic maps in the northern part of the site. However, no evidence of bulk fuel storage was noted during the site visits. Again this maybe a potential source of localised hydrocarbon contamination.

The topsoil on site may also be impacted with glass fragments associated with the demolition of the greenhouses although no evidence of this was observed on site.

6.3 Neighbouring Land Use

The Groundsure report indicates 34 No. contemporary trade directory entries within 500m, nine of which are within 50m of the site. These relate mainly to car repairs, marine engineering equipment manufacturers, tool repairing, coach operators and stations, vehicle dealers, salvage dealers. The closest being the Marine Engineers located to the north west of the site. The Groundsure report omits activity status but internet interrogation of the entries suggests they are active.

Groundsure reports 5 No. small historic tanks within 50m of site with the closest identified on the sites north west corner. However, no evidence of this tank was noted during the site walkover.

The Groundsure reports no fuel stations within 250m of the subject site. The Groundsure report details a historic petroleum filling station, 495m south of the subject site on North Lane, Worthing Road. It is reported as inactive and the record obsolete.

6.4 Site History

The contaminative and development history of the site has been ascertained with reference to the Ordnance Survey historical maps, and aerial imagery

In summary the site is mapped as an open field until 1957 when the first building was constructed on the northern portion of the site. By 1970 a series of greenhouses were constructed onsite and mapped as Glendevon Nurseries, the access road being mapped in 1974. The green houses mapped appear to be those that are still present or parts of which are still present on site today. The outbuildings are mapped in 1994 and the access road with car park is permanently mapped from 1994. Thereafter, the site layout remains unchanged to present day, although 3 greenhouses have been removed leaving only brick walls. A tank and chimney are mapped on site from 1970 to 1994 and a second tank is shown on the west site boundary during the same period. The surrounding area is now seen to be under mixed residential and light industrial use.

The southern boundary is lined with electricity pylons and an electrical substation is mapped 35m to the east of the site. Historic maps show around 1970 an electrical transformer on the southern boundary in association with the substation to the east.

6.4.1 Historical Map Evidence

The historical Ordnance Survey maps provided spanned the period from 1876 to present day at scales of 1:10,056, 1:10,000, 1:2,500 and 1:1,250. The maps are included in full in Appendix C.

Table 1: Summary of Historical Map Evidence

Year	On site	Surrounding area
1876 - 1878 1:10,560 1:2,500	Site is a rural field adjoining Roundstone Lane to the east.	The majority of land use around the site is agricultural. The Portsmouth train line runs from west to east around 450m to the south of site. The villages of Angmering and East Preston lie 800m to the north-west and 1km to the south respectively. Approximately 750m to the south-west is Angmering train station and the village of East Preston.
1932 1:10,560 1:2,500	No significant changes	This map shows an increase in residential housing surrounding East Preston, as well as two Nurseries 550m to the west and two 350m to the south-east.
1943 1:10,560 1:2,500	No significant changes	Two further nurseries comprising several greenhouses are mapped to 100m to the east and to the immediate south west of the site. The newly constructed A259 is mapped aligned east west ~230m to the south of the site.
1957 1:10,560	Unnamed building now mapped on the northern eastern portion of the site	The area to the immediate south of the site is now occupied by buildings. No information about the buildings use is given.
1970 – 1974 1:1,250, 1:2,500,	Unnamed building no longer mapped and instead several green houses are mapped in its place. Site is initially mapped as Glendevon Nurseries followed by Shrublands Nursery from 1974 onwards. A tank and two chimneys are mapped on the northern portion of the site.	The area to the west is mapped as a nursery and a tank is mapped adjacent to the sites western boundary. An electrical sub-station is mapped some 30m to the east of the site. The area to the south of the site is mapped as a nursery and three ponds are now mapped between 70m to 100m to the south and south east of the site.
1990 1:2,500	No significant changes	The nursery to the north east is no longer mapped and earthworks (presumed to be a bund) is mapped along the old nurseries boundary with Roundstone Lane.
1994 1:1,250	A garage/office building is now mapped in the southern portion of the site and a second structure is mapped on the western part of the site. The tank and chimneys in the north of the site are no longer mapped and this area of the site is now labelled as a works.	The nurseries to the north and south of the site are no longer mapped. Further earthworks are mapped 30m to the east of the site. The tank on the western margin of the site is no longer shown.
2003 1:1,250	No significant changes	The ponds to the south are no longer mapped.
2020 1:10,000	Several of the onsite structures are no longer mapped.	The land to the east of Roundstone Lane has been redeveloped as residential housing.

6.5 Unexploded Ordnance (UXO)

The risks from unexploded ordnance have been assessed in accordance with CIRIA guidance⁶. A non-UXO specialist preliminary screening assessment has been carried out. The risks have been assessed by considering firstly the likelihood of military activities on, or in the vicinity of the site as determined from the desk study and historical review. Secondly the risk of UXO has been assessed by reference to the unexploded WWII aerial delivered bomb (UXB) regional risk maps produced by Zetica.

The Zetica risk maps indicate a low risk. Hence the overall risk of UXO is rated as low.

6.6 Waste Planning and Landfill Records

6.6.1 Recorded Landfill Sites

The Environment Agency website and Groundsure report contains details on areas of historic and active landfilling in the vicinity of the site.

There are no areas of historic or active landfill listed within 500m of the subject site according to the Groundsure report.

6.7 Radon

According to the Groundsure report database search, the site is in an intermediate probability radon affected area as between 1 and 3% of homes are above action level. Therefore, no special protective measures in respect of radon gas are required in the construction of buildings on this site.

⁶ CIRIA C681 2009. Unexploded ordnance (UXO) - A guide for the construction industry

C PRELIMINARY CONCEPTUAL SITE MODEL

7 Environmental Risk Assessment

7.1 Conceptual Site Model (CSM)

A risk based approach is used to assess contaminated or potentially contaminated land within the UK. For a potential risk to exist, there must be a contaminant linkage in place, i.e. there must be a source of contamination, a potential receptor, and a pathway linking the two.

In order to quantify the magnitude of the risk, it is necessary to first calculate the potential exposure of the receptor as a result of all the individual active contaminant linkages affecting that receptor. Secondly it is necessary to ascertain “what is an acceptable exposure level for each of the identified receptors and contaminants?”.

The purpose of the Conceptual Site Model, in this instance, is to identify all of the potential contaminant linkages by considering, in turn, the potential sources, receptors and pathways.

7.2 Sources

7.2.1 Onsite Sources

Based on a review of the available site information the following contaminants of concern are proposed:

Table 2: Onsite sources of contamination

Source	Contaminants of Concern
Nursery	Pesticides, herbicides, polycyclic aromatic hydrocarbons (PAH), heavy metals, asbestos and glass
Potential Made ground on site	Heavy metals, PAH compounds and asbestos.
Rubble stockpile	Asbestos, PAH and heavy metals.
Earth Stockpile	Heavy metals, PAH, asbestos and pesticides.
Existing greenhouses and structures	Heavy metals, pesticides, PAH compounds, asbestos and glass.
Paving Manufacturer	Heavy metals, PAH and Sulphates
Tanks, chimneys and nursery boilers	Heavy metals, petroleum hydrocarbons (PHC) and asbestos.

Given the site’s history and ongoing use a horticultural nursery it is likely that pesticides have been utilised on site throughout its history. As such there is the potential that the shallow soils on site, as well as the soils within the earth bund may be impacted with pesticides. Metals such as mercury and arsenic were historically used as pesticides and as such there is the potential for the soils to be impacted with these metals.

A tank and chimney are mapped on the northern portion of the site between the 1970s and the 1990s, furthermore nursery greenhouses were often heated by oil burning boilers which fed hot water to the greenhouses via asbestos lagged pipes and as such hydrocarbon and asbestos contamination may be present in the general vicinity of the greenhouses.

The rubble stockpile in the southwest of the site and the soil stockpile as well as any made ground and the existing and demolished buildings on site present a potential source of asbestos. Given the age of the structures which originated in the 1950s and 1970s there is the potential that the structures incorporate asbestos containing materials (ACM). Particularly it is noted that asbestos lagging around pipes are often encountered on nursery sites. Furthermore, during the partial demolition of the greenhouses in the north east of the site there is the potential for asbestos to have impacted the shallow soils on site. The greenhouse demolition may have also dispersed glass into the shallow soils, which although not an issue chemically may impact human health physically.

Given the site has undergone several phases of development it is considered likely that made ground occurs on site. Made ground is variable by nature and often present a source for contamination including metals, asbestos and PAH compounds.

Planning records indicate that the site was licensed for the manufacture of paving however, no evidence for this is visible on site within the historical mapping or on available aerial imagery.

7.2.2 Offsite Sources

The desk study has highlighted the following potential off site sources of contamination:

Table 3: Offsite sources of contamination

Source	Distance from Site	Contaminants of Concern
Tank	Immediately west.	PHC, PAH and heavy metals.
Adjacent nurseries	Several near site.	Pesticides, herbicides, PAH compounds and heavy metals.
Marine Engineers and vehicle maintenance workshops	Beyond north west boundary	PHC, asbestos PAH, Heavy metals, VOCs
Backfilled pond	50m south of site	Ground gases

Offsite sources with the potential to impact the site include historical tank shown beyond the site's western boundary. The tank was likely used to store fuel for oil heaters and as such presents a potential localised source of hydrocarbon contamination. Although no evidence of the tank was noted during the walkover survey. Much of the land surrounding the site has at one time or another been occupied by horticultural nurseries. Therefore, they do represent a potential source of contamination however, the risk posed is no greater than that presented by the horticultural activities which have occurred on site.

The adjacent vehicle maintenance and marine engineers activities appear to be very small scale and are therefore considered unlikely to impact the site.

An ornamental pond is shown on the historic maps around 50m south of the site until around 2003 when the area was redeveloped. Given the size of the pond and the underlying clay soils it is unlikely that gas migration will have occurred onto the site.

7.3 Receptors

Potential receptors are those which may be impacted by any of the contaminants of concern identified above, and include the following:-

- Future residents
- Construction workers
- Groundwater – River Terrace, Secondary A Aquifer & Chalk, Principal Aquifer
- Material construction of buildings and infrastructure
- Neighbouring properties

7.4 Pathways and Potential Contaminant Linkages

The development will include private gardens and public open space. All potential contaminant linkages involving resident humans and soil contaminants will be active i.e. direct ingestion of soil, ingestion of soil attached to plants as well as via plant uptake, inhalation of indoor and outdoor vapour and of dust tracked back into the house and finally ingestion of water carried by plastic water pipes through contaminated ground.

Ground workers are at risk as a result from all of the above, except for those involving edible plants.

The site is underlain by a Secondary A Aquifer (River Terrace Deposits) and at depth by a Principal Aquifer (Newhaven Nodular Chalk). Hence there is a potential pathway for leachate from soil contaminants and for mobile liquid contaminants to enter the groundwater. Historical borehole logs indicate that the water table is likely to be between 5 and 7m bgl.

7.5 Qualitative Risk Assessment of Contaminant Linkages

Risk levels within the preliminary CSM are determined on a qualitative basis following review of the available desk-based information. The significance of particular contaminant linkages is dependant both upon the severity and likelihood of the risk. These two factors are summarised in the following tables.

The potential contaminant linkages are summarised in the table appended in Appendix D and given a qualitative risk classification in accordance with current guidance. The details of the risk assessment methodology are presented in Appendix D.

7.6 Conclusions

Evidence for asbestos containing materials was noted on site during the walkover, furthermore, given the age of the existing structures there is the potential that asbestos was utilised in their construction. As such it is considered the soils on site may be impacted with asbestos contamination which would pose a risk to future residents where present in areas of soft landscaping such as gardens. The risk to future residents is classified as moderate.

Given the site's long term use as a nursery it is likely that pesticides and/or herbicides have been utilised on site throughout its history. Therefore, it is considered that the shallow soils on site may be impacted with pesticides at concentrations considered to pose a risk to human health. The risk to future site users is classified as moderate.

Given that part of the site was occupied by greenhouses which have since been partially demolished there is the potential for made ground to occur on site. This may represent a source of metal and PAH contamination although significant thicknesses are not anticipated. Heavy metal and PAH contamination may also be present within the onsite stockpiles. One historical tank is mapped on site between the 1970s and the 1990s. A second is mapped on the western boundary. These tanks represent a potential source of hydrocarbon contamination. However, due to the limited size of the tanks any contamination associated with them is likely to be relatively localised and so the risk from metal and hydrocarbon contamination is considered to be moderate.

The risk to construction workers from metal and hydrocarbon contamination is classified as moderate. The risk from pesticides and asbestos is classified as moderate and high respectively, however assuming the appropriate site hygiene is maintained, and the correct PPE is utilised on site these risks would be considered low.

The nearest surface water feature is over 190m from the site boundary and therefore the site is not considered to pose a risk to surface water. Groundwater is anticipated to occur in excess of 6m bgl, given the minimal contamination anticipated on site the risk to groundwater is considered low to moderate.

8 Geotechnical Risk Assessment

8.1 Geotechnical Risk Register

The preliminary geotechnical risk register for the proposed development is summarised in the table in Appendix D. Details of the risk assessment methodology are presented in Appendix D.

The site is underlain by River Terrace Deposits over Newhaven Nodular Chalk. Chalk is susceptible to dissolution whilst the overlaying soils can bridge the feature reducing its expression at surface. It is noted that solution features are generally prevalent in the vicinity of the Lambeth Group / Chalk geological boundary which is located ~1km to the north of the site. However, given that historic borehole records show that the depth to groundwater coincides with the top of the chalk at a depth of around 5-7m bgl it is considered that solution features on site are unlikely to be activated by further discharges to groundwater.

The site is underlain by River Terrace Deposits, these soils are highly variable comprising gravels, sands, silts and clays. The site perimeter is marked by mature trees whilst fruit trees occur on the southern portion of the site. Should cohesive soils occur on site heave may occur where trees are to be removed and some deepening of foundations may be required.

On the basis of the initial review and preliminary risk assessment, the site is given a Geotechnical Classification of **Geotechnical Category I** in accordance with EN1997-1 §2.1(14)-(21).

D PHASE II - INTRUSIVE INVESTIGATION

9 Investigation Rationale

A total of 9 trial holes were excavated across the site. These included 3 No. machine excavated trial pits to a depth of around 3.0m and 6 No. windowless sampler boreholes to depths of between 3.0m and 4.0m.

The trial holes were located to give general coverage, taking into consideration the proposed development and the potential geoenvironmental and geotechnical risks/hazards highlighted by the CSM in accordance with BS10175.

The trial hole spacing was consistent with the recommended density of 25 to 50m for an exploratory investigation after BS10175 Section 7.7.

Groundwater level monitoring wells have been installed in trial holes WSI01, WSI04 and WSI06 and a program of six monitoring visits have been scheduled during the wetter winter months.

Access was restricted within the footprints of the existing and historical greenhouses and the adjacent former greenhouses due to the ongoing horticultural activities. Access was also restricted in the eastern portion of the site, to the north of the access road, due to dense vegetation. No investigation was undertaken on the northern most part of the site as this is currently occupied, however WSI04 was located as close as reasonably practicable to the boundary of this area.

The investigation rationale for the trial hole locations is summarised below and shown on Figure 4 Appendix B:

Table 4 Rationale for Investigation Locations

Trial Hole Location	Rationale	Proposed Depth (m bGl.)	Notes
TP101 – TP103	Provide information on the ground conditions and a location for soakage testing and geotechnical and chemical sampling	3.0	TP102 was terminated at 2.5m bgl due to very slow progress through dense gravel.
WSI01 – WSI06	Provide information on the ground conditions and a location for groundwater monitoring wells and provide samples for geotechnical and chemical testing	4.0	-
TS1	Provide a shallow soil sample from amongst the apple trees for chemical testing	0.05	-

10 Site Work

10.1 Date and Weather Conditions

The intrusive investigations were undertaken in two phases, the first on the 8th of December 2020, and the second on the 12th of January 2021. At the time of the 2020 investigation, the weather was overcast with light showers in the morning clearing in the afternoon. The weather during the January works was overcast with light rain which became heavier throughout the day.

The weather over the preceding three months was relatively wet with both October and December experiencing significantly above average rainfall for the time of year although November was somewhat drier than average.

10.2 Site Work Methods

10.2.1 Windowless Sampler

The Windowless sampling rig consists of a tracked barrow with a sampling unit mounted on the top. When in the required position, the mast was raised to a height allowing a mechanised drop weight to fall repeatedly onto an anvil and drive attached sample tubes or probe rods into the ground to produce reasonably intact continuous samples which were then extracted using the integrated hydraulic ram.

To reduce any tendency of the tubes to stick in the ground, a succession of smaller diameters may be used to obtain full depth. Excavated soils were placed aside for inspection and sampling.

On completion the trial hole was backfilled with excavated material, placed in reverse order, and the surface reinstated unless otherwise specified.

10.2.2 Trial Pitting

Trial pits were dug by a backhoe excavator. The trial pits had a target depth of 4mbgl and were typically 2.4m wide by 0.6m long. Trial pit dimensions are shown on the trial pit logs, included as Appendix F. Spoil was replaced in reverse order. Trial pits were left mounded to allow for future settlement.

10.2.3 Soil Logging and Sampling

Soil samples were recovered from the boreholes and trial pits for field screening, logging and sampling.

Boreholes were logged in general accordance with the requirements of BS 5930:⁷ and BS EN ISO 14688⁸. Borehole logs are presented in Appendix F.

Visual and olfactory evidence of contamination was noted if encountered. These observations were used to aid scheduling of samples for chemical laboratory analyses and are included on the borehole logs in Appendix F and summarised in Section 11.

Samples were collected by hand (using dedicated nitrile gloves for each sampling location). Samples were placed into laboratory supplied sampling containers, specific to the type of analyses required.

All sample containers were sealed and labelled with a unique location identity, depth and date of sampling.

10.2.4 Monitoring Well Installation

Three monitoring wells were installed during this investigation within the windowless sample boreholes. The monitoring wells were constructed of 50mm diameter HDPE pipe. The response zone was typically targeted to intercept the groundwater surface and was surrounded by washed filter gravel. The plain zone was surrounded with bentonite to provide a seal. The monitoring wells were finished with bungs with gas taps and flush mounted steel covers. Monitoring well installations are shown on the borehole logs and summarised in the following table.

Table 5: Borehole installation details

Borehole	Type W-water	Plain Well Screen (mbgl)	Slotted Well Screen (mbgl)	Bentonite Seal (mbgl)
WS101	W	0.0 – 1.0	1.0 – 3.0	0.0 – 1.0
WS104	W	0.0 – 1.0	1.0 – 3.0	0.0 – 1.0
WS106	W	0.0 – 1.0	1.0 – 3.0	0.0 – 1.0

10.3 Field Tests

10.3.1 Standard Penetration Tests

Standard penetration tests were undertaken in the boreholes at 1.0m centres. Uncorrected blow counts, 'N values', are recorded on the borehole logs in Appendix F.

⁷ BS5930:2015+A1:2020 Code of Practice for Ground Investigation

⁸ BS EN ISO 14688 Parts 1-2 (2018) Geotechnical Investigation and Testing. Identification and classification of soil

10.3.2 Perth Penetration Tests

Perth penetration tests were undertaken in the trial pits at ~1.0m bgl. Uncorrected blow counts, 'N values', are recorded on the trial pit logs in Appendix F.

10.3.3 BRE365 Soakage Tests

3 No. soakage tests have been carried out in the trial pits in general accordance with BRE Digest 365⁹.

10.3.4 Groundwater Level Monitoring

Five rounds of groundwater level monitoring have been undertaken as part of this investigation with a final visit scheduled for March 2021. The visits completed to date have been carried out between the 11/12/21 and the 12/2/21. Groundwater levels were recorded within the monitoring wells using an electronic dipmeter.

10.4 Laboratory Analysis

10.4.1 Chemical Soil Analysis

Selected samples of soil have been subjected to laboratory testing. Sampling techniques and storage have been undertaken as per BS 10175:2011+A1:2013 Code of Practice for Investigation of Potentially Contaminated Sites. The laboratory testing has been carried out by The Environmental Laboratory Ltd at its laboratories in East Sussex. Where available, the tests procedures are UKAS and MCERTS accredited.

The following analyses were completed on selected samples:-

- LEAP standard Soil suite (metals, speciated PAHs, asbestos)
- Pesticide Screens

The full laboratory test results are presented in Appendix I.

10.4.2 Geotechnical Laboratory Testing

Selected samples of the soils have been classified by laboratory analysis for geotechnical design purposes. The laboratory testing has been carried out by Geolabs Ltd at its laboratories in Watford, in accordance with BS1377¹⁰ and BS EN ISO17892¹¹. The sampling technique, type,

⁹ Building Research Establishment DG365 Digest Soakaway Design (2016)

¹⁰ BS1377 Parts 1-9:1990 Methods of test for Soils for Civil Engineering Purposes

¹¹ BS EN ISO 17892 Parts 1-12 Geotechnical Investigation and Testing. Laboratory testing of soil

storage and transport and the number of laboratory tests have been undertaken where possible in accordance with BS EN 1997-2:2007 and BS EN ISO 22475¹².

The following laboratory tests have been undertaken:-

Table 6 Geotechnical Laboratory Testing

Test	Number of tests	
	River Terrace (Clay)	River Terrace (Gravel)
Moisture Content	5	-
Atterberg Limit Test	5	-
Particle Size Distribution Test	-	2
Sulphate Determination	3	-
pH	3	-

11 Ground Conditions

The ground conditions are described in detail in the logs attached in Appendix F. In summary the soil conditions were as follows:

Table 7: Summary of soils encountered

Depth From (m)	Depth To (m)	Soil Type	Description
0.0	0.20 / 0.30	TOPSOIL	Brown silty sandy TOPSOIL with occasional fine to coarse flint gravels. Occasional ash noted in WS103 and brick and concrete noted in TP101.
0.0	0.40 / 0.50	MADE GROUND	MADE GROUND comprising sandy fine to coarse, occasional cobble sized gravel of concrete, brick, paving slabs, tile and flint. (Encountered in WS101 and TP102 only)
0.20 / 0.50	1.90 / 3.80	CLAY	Soft to firm orange, brown silty CLAY with occasional fine to medium sub-angular to rounded flint gravel.
1.90 / 3.80	4.20*	GRAVEL	Medium dense to dense orange, brown clayey GRAVEL. Gravel is fine to cobble sized subrounded to rounded flint. (Not encountered in WS101, WS103 or WS105)

*full depth of investigation

¹² BS EN ISO 22475 Parts 1-3 Geotechnical Investigation and Testing. Sampling methods and groundwater measurements

Ground conditions encountered onsite generally comprised topsoil over firm silty gravelly clays over medium dense to dense gravels at depth. WSI01 and TPI02 situated in the south western corner of the site encountered up to 0.50m of made ground comprising sandy concrete, brick and flint rubble. Within WSI01 underlying the made ground the clays were noted to be reworked to a depth of ~1.0m bgl. The depth to the top of the gravels was noted to be variable ranging from 1.90m in TPI01 to 3.80m in WSI04 and appeared to show a general deepening of the clay / gravel interface towards the east of the site.

WSI01 encountered a band of very soft clay below a depth of 3.0m with medium dense silty sand from 3.60m to 4.0m bgl. No sand was encountered within any of the other excavations.

SPT 'N' values recorded on site were highly variable and were noted to be poor in several locations. With 'N' values indicative of loose / soft soils being recorded within the shallow clay soils at all of the windowless boreholes. Notably WSI01 recorded an SPT at 3.0m where the SPT test rig sank under its own weight. This coincides with softening noted within the clays and maybe due to further reworking noted in the shallower soils in this borehole.

Underlying the clays the deeper sands and gravel deposits, where encountered, found SPTs were notably improved with values generally recorded between 24 and 30, which equate to medium dense.

11.1.1 Groundwater

Groundwater strikes were recorded in the following trial holes:-

Table 8: Groundwater Strikes

Trial Hole	Depth to Groundwater strike (mbGL)	Comments
TPI01	1.9	Gravel damp to the touch
TPI02	2.2	Gravel damp to the touch
TPI03	2.6	Gravel damp to the touch

Groundwater monitoring results are summarised as follows:-

Table 9: Groundwater Monitoring Results

Monitoring well	Depth to groundwater (m bgl)				
	11/12/20	23/12/20	06/01/21	29/01/21	12/2/21
WSI01	Dry	Dry	Dry	Dry	Dry
WSI04	Dry	Dry	Dry	2.5	Dry
WSI06	Dry	1.92	2.58	2.88	Dry

On several occasions during the monitoring, surface water was noted to have ponded around the well covers and drained into the well when the bung was removed. The water levels recorded within both WSI04 and WSI06 are therefore considered to either represent small amounts of perched water present within the clays or flooding of the well from the surface during monitoring.

A review of the historic BGS borehole logs nearby all show that groundwater is lying within the top of the chalk at a depth of around 5.0-7.0m bgl. The logs are generally dated between 1957 and 1979 and so groundwater levels may have risen slightly since then following the decline of the market gardens in this area and a reduction in associated water abstraction and pumping but deeper wells would be required to confirm this.

11.1.2 Visual and Olfactory Evidence of Contamination

Visual and olfactory evidence of contamination noted during the investigation works is summarised in the following table.

Table 10: Summary of Visual and Olfactory Evidence

Hole ID	Depth (m)	Olfactory Evidence	Visual Evidence
WSI01	0.50	-	Made Ground including brick and concrete
TP102	0.40	-	Made Ground including brick, concrete and tile

Only limited visual and olfactory evidence of contamination was identified during the investigation. These were limited to shallow made ground encountered in the south west corner of the site.

E GEOTECHNICAL INFORMATION

12 Strata Encountered

12.1 Made Ground

Made ground was encountered within WSI01 and TPI02 only extending to 0.5m bgl, and comprised sandy gravel including brick, concrete, tile and flint.

Made ground or fill is by nature highly variable in both composition and bearing capacity and can be subject to large differential settlements when loaded. It is therefore generally unsuitable for use as a bearing stratum. In addition, made ground may contain contaminated and/or putrescible material. It can therefore be potential source of contamination and landfill gas.

12.2 Clay – River Terrace

The topsoil and made ground were underlain by soft to firm clays to depths of between 1.90m and 3.80m bgl. The results of the geotechnical laboratory testing are summarised in Table 11 below.

Table 11: Summary of Geotechnical Test Results for Clay

Test	Range
SPT 'N value'	0 - 19
Moisture Content (%)	23.2 – 28.3
Liquid Limit (%)	40 – 43
Plastic Limit (%)	20 – 23
Plasticity Index (%)	19 - 22
Sulphate Content (g/l)	<0.010
Total Acid Soluble Sulphate (%)	0.016 – 0.024
Total Sulphur (%)	<0.010
pH	8.3 – 8.4

SPT N values within the clays ranged between 0 to 19 but were generally between 3 and 7. N values indicative of soft clays were noted in all windowless sampler boreholes. In addition, hand penetrometer testing undertaken on the clay soils again returned values indicative of soft to firm clays. A notable “soft” spot was identified within WSI01 at a depth of 3.0m bgl where the SPT test rods and hammer sank under their own weight before testing could be completed. This was overlain by gravelly clays where an ‘N’ value of 19 had been recorded. This higher result is likely due to a more gravelly band within the clays.

The results of Atterberg limit testing indicate that the cohesive soils are intermediate plasticity clays. An A line plot summarising the plasticity testing results is available in Figure 5 Appendix B.

12.3 Gravel and Sand– River Terrace

Underlying the clays clayey gravels and gravelly sand deposits were encountered to the full depth of investigation. The results of the geotechnical laboratory testing are summarised in **Error! Reference source not found.** and **Error! Reference source not found.** below.

Table 12: Summary of Particle Size Distribution (PSD) tests for Gravel

Excavation No.	Clay & Silt (%)	Sand (%)	Gravel (%)	Cobbles (%)
TPI02 @ 2.40m	21.2	9.5	69.3	0
TPI03 @ 2.8m	35.2	10.5	54.3	0

Table 13: Summary of Geotechnical Test Results for Sand/Gravel

Test	Range
SPT 'N value'	12 - 28

SPT N values within the gravels ranged from 12 to 28, indicative of medium dense gravels. The results of PSD testing indicate that the granular soils comprise slightly sandy slightly silty slightly clayey gravel.

F GEOTECHNICAL APPRAISAL

The foregoing geotechnical appraisal does not constitute a Geotechnical Design Report in accordance with BSEN1997. The following recommendations are for preliminary design purposes only.

For the detailed design, the short-term and long-term design situations must be considered. Where relevant, the following limit states should be considered:-

- Loss of equilibrium of the structure or the ground, considered as a rigid body, in which the strengths of structural material and the ground are significant in providing resistance (EQU)
- Internal failure or excessive deformation of the structure or structural elements in which the strength of structural materials is significant in providing resistance (STR)
- Failure or excessive deformation of the ground, in which the strength of soil or rock is significant in providing resistance (GEO)
- Loss of equilibrium of the structure or the ground due to uplift by water pressure or other vertical actions (UPL)
- Hydraulic heave, internal erosion and piping in the ground caused by hydraulic gradients (HYD)

The following factors should also be considered.

- Overall stability and ground movements
- Nature and size of the proposed construction including the design life
- Conditions with regards to the surroundings (e.g. neighbouring structures, traffic, utilities, vegetation, contamination etc.)
- Ground and groundwater conditions
- Influence of the environment.

13 Swelling and Shrinkage

Based on the laboratory test results, an overall classification of NHBC **MEDIUM** Volume Change Potential (VCP) is recommended for the clay soils.

Foundations will therefore require deepening in accordance with NHBC Chapter 4.2 where clay soils are encountered near trees. Foundation depths should be calculated based on the mature height of the tree, however, the existing height is relevant for trees which are to be removed. Deepening can be terminated where medium dense to dense sands or gravels are encountered.

14 Sulphates

The potential for high levels of sulphates within the natural soils on site has been identified due to the underlying geology. In particular, construction activities that may substantially disturb previously unweathered strata and expose sulphur minerals such as pyrite to air, water and bacteria can result in the relatively rapid oxidation of such minerals producing high levels of sulphates. In accordance with the BRE¹³ methodology, 3 No. samples of the river terrace clays were tested for water and acid soluble sulphate, total potential sulphate (TPS) and pH.

Based on the results of the testing, oxidisable sulphides (OS) are generally <0.3%, indicating significant volumes of pyrite are not present. The soils are therefore classified as Design Sulphate Class DS-I and assuming mobile groundwater, the ACEC class is AC-I.

15 Groundwater

Groundwater was not encountered during the intrusive investigation, but some shallow potentially perched groundwater was identified within boreholes WSI04 and WSI06 during the monitoring phase of works. Should excavations be required to extend below the groundwater within the deeper gravel deposits then collapses should be anticipated and protection measures such as trench supports adopted.

It is anticipated that any shallow water ingress should be adequately dealt with by pumping from sumps.

¹³ Building Research Establishment Special Digest I: 2005. Concrete in aggressive ground. Part I: Assessing the aggressive chemical environment.

16 Soakage Potential

16.1 Test Results

3 No. soakage tests were undertaken on site in accordance with BRE365¹⁴. The results are attached in Appendix G and are summarised below:

Table 14: Summary of soakage tests

Test Location	Soakage Rate		Comments
	(m/s)	l/m ² /min	
TPI01	8.63E-05	5.18	Pit was empty at the end of the test.
	8.23E-05	4.95	Pit was empty at the end of the test.
	5.08E-05	3.05	Pit was empty at the end of the test.
TPI02	1.06E-05	0.63	Pit was nearly empty at the end of the test.
	8.80E-06	0.53	Pit was nearly empty at the end of the test.
	8.11E-06	0.49	Pit was nearly empty at the end of the test.
TPI03	1.24E-05	0.74	Pit was empty at the end of the test.
	1.25E-05	0.75	Water level fell to between 25% and 50% of the maximum water level. Results not compliant with BRE DG365 requirements.
	1.32E-05	0.79	Pit was empty at the end of the test.

Soakage testing in accordance with BRE DG365 recorded reasonable soakage rates ranging from 8.63E-05 m/s (5.18 l/m²/min) to 8.11E-06 m/s (0.49 l/m²/min). The highest soakage rates were recorded within TPI01 in the north west of the site where the depth to the gravels is noted to have been relatively shallow.

16.2 Recommendations

Based on the above results, the site may be suitable for conventional soakaways including ring, trench or linked would be appropriate for this site assuming that they are deepened to extend through the low permeability clays to the gravels at depth. The base of the clay/ top of the gravel has been encountered at variable depths across the site of between 1.9 and 3.8m bgl. The sand and gravel deposits were not encountered within WSI03 and WSI05 which were both completed to 3.0m.

¹⁴ Building Research Establishment DG365: 2016. Digest Soakaway Design

At this stage we have calculated an average soakage rate for linked systems of 3.0E-05 m/s within the gravels. But due to the special variation in test results, location specific testing will be required at the proposed soakaway locations to provide accurate design parameters.

All such testing will however be contingent on sufficient depth to groundwater to allow for discharge of water to the ground with an appropriate unsaturated zone above the aquifer.

17 Bearing Capacity and Foundations

17.1 Shallow Foundations

During the investigation the density and stiffness of the soils on site was noted to be relatively variable with loose / soft soils noted to as much as 3.0m bgl in some locations. All foundation loads should be transferred below these loose / soft soils as any topsoil, made ground, low strength, desiccated or disturbed soils and transferred onto the firm clays at depth. For low rise housing, based on local experience and BS8103¹⁵ Table 8, an allowable bearing capacity of 80kPa is recommended for shallow foundations, on the firm clays below about 1.0m. With further plot specific testing it may be possible to increase this. However, foundations will require deepening in the clay soils near trees to NHBC MEDIUM VCP.

Where foundations are stepped or span different soil types, allowance should be made for nominal reinforcement.

18 Floor Slabs

With reference to NHBC Standard 5.2, suspended floor slabs are recommended:-

- Where the depth of fill exceeds 600mm
- Where foundations are deepened below 1.5m in accordance with NHBC Standards Chapter 4.2
- Where desiccated soils are encountered
- Where vibratory ground improvement techniques have been used
- Where foundations have been piled.

Given the medium VCP of the soils suspended floor slabs are recommended on site.

BS8103-1:2011 Structural design of low-rise buildings. Code of practice for stability, site investigations, foundations, precast concrete floors and ground floor slabs for housing



19 Roads

CBR testing was beyond the scope of works. However, based on the results of plasticity testing, IAN 73 06¹⁶, Road Note 29 and LRI 132¹⁷ indicate an estimated CBR value of 2.5 – 6% for clays with plasticity indices ranging from 20% to 30%.

The shallow soils are assessed as marginally frost susceptible, based on the results of the plasticity testing. Unless frost testing indicates otherwise frost protection measures are recommended on site.

19.1.1 Recommendations

A preliminary CBR value of 3% is recommended for a silty clay subgrade.

Confirmatory testing may be required if the proposed roads are to be adopted.

20 Excavations

Excavations in the silty clays should be stable in the short term. However, groundwater seepages should be anticipated along the more granular horizons and at depth. Minor localised perched water should be anticipated within more granular soils and as such allowance should be made for light pumping in shallow excavations. Excavations are likely to be unstable in the long term and in deeper soils and should be backfilled as soon as possible.

Appropriate Health and Safety precautions must be adhered to where man entry into excavations is required. Even stiff clay soils at shallow depth can collapse, particularly following wet weather. Alternative foundation methods may need to be adopted where trench footings cannot be safely or satisfactorily constructed.

21 Filling

The preliminary recommendations contained within this report assume that ground levels are to remain at a similar level across the site for the proposed development, and that no significant changes in level are proposed. In the event that ground levels are to be raised, this may induce significant settlement, particularly across the areas of soft clays, which could adversely affect foundation design, drainage etc. Where significant changes in ground levels are

¹⁶ Interim Advice Note 73/06 Rev 1 Design guidance for road pavement foundations (Draft HD25) (2009)

¹⁷ TRRL Laboratory Report 1132 The structural design of bituminous roads. Powell, Potter Mayhew and Nunn (1984)

proposed then further investigation will be required to assess the impact of such earthworks on the above recommendations.

22 Settlement

Based on the allowable bearing capacity settlements should be within typical tolerable limits for the low-rise development proposed.

If soft clays are encountered at formation level or below, significant settlement should be anticipated and serviceable limit state analyses will be required.

At this stage it is assumed that ground levels will remain at the current level for the proposed development. If significant level raises are proposed, this may induce significant settlement in the natural soils and detailed settlement analyses will be required.

Where foundations are stepped or span different soil types, differential settlement should be anticipated and allowance should be made for nominal reinforcement.

23 Heave and Uplift

In accordance with NHBC Standards Chapter 4.2, precautions against heave should be used where foundations are within the influence of trees and the resulting foundation depth is greater than 1.5m. Compressible material must be provided against the inside faces of all external wall foundations greater than 1.5m in depth. For pier and beam foundations, additional voids are required below ring beams.

24 Revised Conceptual Site Model

The preliminary conceptual site model has identified a number of potential contaminant linkages.

On-site sources of contamination with the potential to impact the site include:

- Asbestos within made ground and stockpiles associated with the demolition of the former greenhouses.
- Pesticide and herbicides in the shallow soils associated with the historical horticultural activities on site.
- Heavy metals in any made ground and the stockpiles.
- Petroleum hydrocarbons from historical tanks and vehicle fuel leakages.

These sources are considered to pose a low to moderate risk to future residents and a low risk to controlled waters.

Off-site sources of potential contamination identified comprise a historical tank situated on the western site boundary. The risk to human receptors from these off-site sources is considered to be low.

WSI04 was in close proximity to the previously mapped on site tank location. Whilst TP 101 and WSI02 were located in close proximity to the tank location on the western boundary. No visual or olfactory evidence of hydrocarbon contamination was encountered during the investigation and as such petroleum hydrocarbons have not been tested for.

25 Testing Strategy

25.1 Soil Sampling

Trial hole locations were spread evenly across the site to provide even, non-targeted coverage. The trial hole spacing was generally consistent with the recommended density of 25 to 50m for an exploratory investigation after BS10175 Section 7.7.

Samples have been tested for the presence of the identified contaminants of concern (heavy metals, PAH compounds, pesticides and asbestos).

Due to ongoing site activities within the greenhouses sampling was not possible in this portion of the site.

26 Assessment Criteria

26.1 Human Health Assessment Criteria

The generic quantitative risk assessment (GQRA) for human health compares the analytical results from the current investigation to Generic Assessment Criteria (GAC). These were selected using the following rationale and assumptions.

Defra and the EA have published a limited number of Soil Guideline Values (SGVs)¹⁸ that represent minimal chronic risk to human health. CL:AIRE has published a limited number of Category Four Screening Levels (C4SLs)¹⁹ which represent a low but still strongly precautionary level of chronic risk to human health. Both the SGVs and C4SLs have both been derived for a Soil Organic Matter (SOM) content of 6%, which is not always representative of the low SOM that are encountered within Made Ground on brownfield sites.

LQM responded to the demand for a more comprehensive set of screening values for a wider range of SOM and produced Suitable for Use Levels (S4ULs)²⁰ which are a hybrid of SGVs and C4SLs. The S4ULs have been endorsed by the Chartered Institute of Environmental Health (CIEH).

LEAP uses C4SLs where they are available as generic assessment criteria to quantitatively assess the potential chronic risks to human health. Where C4SLs are not available, the S4ULs are used. It is noted that S4ULs are not equivalent to C4SLs in all their exposure assumptions but are generally more conservative in their assumptions. For benzene and benzo(a)pyrene, LEAP has calculated equivalent C4SLs for 1% and 2.5% SOM. This does not affect the inorganic contaminants.

In accordance with current Public Health England (PHE) guidance²¹, the assessment of PAHs has been carried out using a surrogate marker approach, whereby the assessment of risk from benzo(a)pyrene also captures potential risks from other carcinogenic PAHs that may be present. The alternative S4ULs for PAHs using the Toxic Equivalent Factor (TEF) approach have not been used because this approach is likely to under predict the true carcinogenicity

¹⁸ Environment Agency Science Report SC050021 series.

¹⁹ CL:AIRE Final Project Report. SPI010 – Development of Category 4 Screening Levels for assessment of land affected by contamination. CL:AIRE, December 2013

²⁰ The LQM/CIEH S4ULs for Human Health Risk Assessment, Nathaniel P et al, 2015. Copyright Land Quality Management Ltd, reproduced with permission: Publication Number S4UL3509

²¹ HPA Contaminated Land Information Sheet. Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs). Public Health England, 2017.

of PAHs and is not advocated by PHE. The threshold PAHs have been assessed similarly, by using naphthalene as a marker compound due to its high volatility relative to other PAHs.

Total phenols have been assessed against the S4UL for phenol and total chromium has been assessed against the S4UL for trivalent chromium.

Theoretical soil saturations have not been considered in the evaluation of organic compounds and as such, some of the S4ULs for the less sensitive exposure scenarios are lower than their more sensitive equivalents.

Sets of GACs have been generated for SOMs of 1%, 2.5% and 6%. In this case, TOC in the shallow soil samples that were analysed ranged from 0.30 to 3.7%. Using the conversion of $SOM = TOC \times 1.72$, this equates to a SOM range of 0.52 to 5.42%. 1% SOM was considered to be appropriate to maintain conservatism.

For some contaminants of concern, direct contact will be the dominant pathway for exposure. In order to support with development options, human exposure to all unsaturated soils, irrespective of depth, was assumed possible for the purpose of this assessment. This will maximise the information available to the design team on the suitability of all unsaturated material and can support with their materials management options.

27 Analytical Test Results – Soils

27.1 Metals and Non Metals

The metal concentrations encountered within the shallow soils on site are summarised below:

Table 15: Summary of soil contamination test results within shallow soils (6 samples)

Determinant	Concentration range (mg/kg)	Number of samples	Tier 1 GAC Residential with private gardens (mg/kg)	Samples which exceed GAC
Arsenic	8.8 – 13.1	6	37	None
Cadmium	<0.5	6	22	None
Hexavalent Chromium	<0.3	6	21	None
Copper	19.9 – 50.2	6	2,400	None
Lead	51.8 – 465	6	200	WS101 @ 0.30m (465 mg/kg) WS105 @ 0.15 (216 mg/kg)
Mercury ¹	<0.5	6	40 ¹	None
Nickel	14.6 – 24.4	6	130	None
Zinc	81.1 – 339	6	3,700	None.

Notes to table - Assessment criterion based on inorganic mercury

The chemical testing results indicate that the shallow soils on site are not impacted with metal concentrations (with the exception of lead) above the GAC values. As such it is considered that the metal concentrations recorded, other than lead, would not pose a risk to future site residents. Two samples, taken from the made ground encountered in WSI01 and topsoil in WSI05 recorded lead concentration in excess of the GAC.

Sampling was not possible within the footprint of the existing buildings and greenhouses. Further shallow (<1m bgl) sampling in these areas and around the location of the former tank is recommended following demolition to confirm no contamination is present within these portions of the site.

27.2 Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are widespread within made ground and the urban environment generally. They are one of the most common contaminants in made ground and the one that most commonly drives remediation. Benzo(a)Pyrene is a particular problem, being very commonly found in association with tarmac, clinker and any burnt products and also being highly toxic to human health. The assessment criterion for BaP is close to levels that are found naturally in many topsoils.

The mean Soil Organic Matter of the population has been used to determine an appropriate Tier I GAC for each population. The results are summarised as follows:

Table 16: Summary of BaP and Naphthalene in shallow soils (6 samples)- mean SOM 1%

Determinant	Concentration range (mg/kg)	Tier I GAC ¹ (mg/kg) Residential with plant uptake 1% SOM	Samples that exceed GAC
Benzo(a)pyrene ¹	<0.1 – 0.5	5.0	None.
Naphthalene ²	<0.1	2.3	None.

Notes to table

1. As a surrogate marker for genotoxic PAH
2. As a marker compound for threshold PAH

Neither Benzo(a)pyrene or Naphthalene were recorded at concentrations above the GAC values. Based on the chemical testing results it is considered that the shallow soils on site are not impacted with PAH compounds at concentrations considered to pose a risk to human health. Further shallow sampling within the footprints of the onsite buildings is recommended following their demolition.

27.3 Pesticides

Two samples of the topsoil were tested for the presence of organochlorine and organophosphorus pesticides and triazine herbicides. Only p,p-DDE and p,p-DDT were recorded above the laboratory limit of detection and were encountered in WS105 at 0.15m and TS1 at 0.05m. p,p-DDE was recorded at concentrations of 54 – 62 ug/kg, p,p-DDT ranged from 14 – 24 ug/kg. DDT was a widely used manufactured pesticide whilst DDE is a product of the breakdown of DDT in the environment.

The UK has no assessment criteria values for DDT or DDE however as a preliminary assessment the recorded concentrations have been recorded against internationally published assessment criteria as follows:

Table 17: Comparison of the recorded contaminant concentrations and the GAC values for DDT and DDT related compounds from various international sources.

and DDT Related compounds from various international sources.

DDT Generic Assessment Criteria			
Organisation/Country	Compound	Residential (mg/kg)	
MFE New Zealand (Soil Guideline Values 2010)	Total DDT	High density Residential	Residential 10% produce
		270	90
Western Australia (Health Investigation levels 2010)	Total DDT	200	
Netherlands (Intervention Levels 2009)	DDT	1.7	
	DDE	2.3	
	DDD	34	
Canada (Soil Quality Guidelines 1999)	Total DDT	0.7	
Concentrations recorded on site			
Excavation / depth	Compound	Concentration recorded (mg/kg)	
WS105 / 0.15	DDE	0.062	
	DDT	0.024	
TS1 / 0.05	DDE	0.054	
	DDT	0.014	

As outlined above the pesticide concentrations recorded on site are significantly below the international assessment criteria. As such the pesticide concentrations recorded are unlikely to pose a significant risk to future site users. However, further testing in the former planting areas, where concentrations may be expected to be higher, is recommended once improved access is available.

27.4 Asbestos

All of the soil samples tested were screened for the presence of asbestos containing materials and/or loose asbestos fibres. No ACM or free fibres were recorded within any of the samples tested.

28 Risk Assessment

28.1 Human Health

The works carried out to date have indicated that the shallow soils beneath the site are locally impacted with lead concentrations above the GAC values.

The lead contamination identified poses a risk to human health, where present in critical areas such as gardens or areas of soft landscaping. Contamination may impact human health through the direct ingestion, inhalation, skin contact and/or plant uptake pathways that would be present in a residential setting. The contaminated ground is considered to pose an unacceptable risk if it is to be retained in the near surface of garden/outdoor soft covered areas where direct human contact is feasible.

Whilst the assessment has not found any other significant contamination, sampling was not possible within the footprint of the existing buildings and was limited in other areas due to ongoing horticultural activities. Therefore, there remains the possibility that as yet unidentified contamination may be present beneath the existing structures.

Given the elevated lead concentrations recorded on site further shallow sampling is recommended to assess the extent of lead contamination. Further sampling is also recommended within the footprints of the existing structures following their demolition to assess whether any contamination is present in these areas as well as from the material currently stockpiled along the site's western boundary.

Some remediation to mitigate the risk to human health from lead impacted soils is likely to be required and it is recommended that a remediation strategy for the site is prepared following further investigations. At this stage allowance for installation of a 600mm clean cover in proposed gardens should be made. This requirement may be reduced to cover only specific portions of the site based on the findings of any additional sampling.

28.2 Controlled Waters

28.2.1 Groundwater

The site is located above a secondary aquifer, the River Terrace Deposits and a Principal Aquifer, the Chalk. The site is not situated within a Source Protection Zone, and the nearest groundwater abstraction borehole is situated 302m from the site and it licensed for spray irrigation.

Specific laboratory testing has not been carried out as part of this investigation to enable a detailed quantitative risk assessment in respect of groundwater. The measured levels of potential contaminants within the soils are generally low, with only lead contamination recorded at levels considered to pose a risk to human health. The concentrations recorded are unlikely to pose a significant risk to groundwater. Additionally, groundwater was not encountered within any of the excavations and is expected to be at a depth in excess of 5.0m – 6.0m. although groundwater monitoring did indicate the presence of localised perched water within the River Terrace Deposits at shallower depths. On this basis, the recorded contamination is not considered to pose a significant risk to groundwater. This assessment should be reconsidered if significant contamination is identified at a later stage.

28.2.2 Surface Water

There are no surface water features on site. The closest surface water feature is over 190m from the site. Based on this information and the recorded concentrations of contaminants the site is not considered to pose a risk to surface water receptors.

29 Waste Disposal

It is anticipated that the proposed development will generate waste soils and materials will need to be removed from site as part of the construction process.

Where soils are to be disposed off-site, it is the duty of the waste producer, in this case Sigma Homes, to ensure that all waste is disposed of appropriately and that any that is sent to landfill is sent to an appropriately licensed one. All waste sent to landfill must be classified and must be pre-treated. There are various forms of pre-treatment that are acceptable. In this case it could include “reduction in volume”, which could be achieved by segregating the Made Ground and re-using part of it on site.

Where made ground soil is to be re-used on site then it is recommended that this is carried out under the CL:AIRE Definition of Waste Industry Code of Practice (DoWCoP) for re-use of soils²².

²² The Definition of Waste: Development Industry Code of Practice. Version 2 2011. CL:AIRE

All samples tested were screened for waste classification purposes. It is considered that the soils would be classified as non-hazardous for waste disposal purposes.

Further testing and inspection of soils will be required to confirm waste classification of material leaving the site.

It is strongly advised that detailed discussions be held with remediation/groundworks contractors and that receiving landfill sites are identified in advance of commencing any waste removal.

30 Recommendations for Remediation

Sampling in some areas of the site was restricted due to buildings and ongoing site activities. It is recommended that once the structures have been demolished and hard standing removed, shallow sampling is undertaken to confirm no contamination is present beneath the existing structures. Furthermore, shallow sampling may enable delineation of the lead contamination encountered and in turn reduce the remedial measures required. Sampling of the stockpile on the site's western boundary is also recommended to confirm its potential for retention and reuse onsite or waste classification for disposal.

Following the additional sampling a remediation strategy to mitigate risks to the proposed development from identified contamination should be prepared. At this stage remediation is considered to comprise installation of 600mm clean cover in gardens and other areas of soft landscaping.

31 Validation of Remediation

A final remediation method statement will be required to be prepared once the final site designs are complete. This method statement should be submitted to the appropriate regulatory authorities. It is advised that the local authority is advised of the intended build programme in order that they can phase the sign off of planning conditions as required.

The remediation strategy is likely to require the importation of clean topsoil, and possibly subsoil. Imported soils should be tested at source by the supplier. The validation engineers should then make spot checks as and when necessary once material has been imported.

Provision should also be made for dealing with further localised hotspots of contamination which may come to light during construction. Any such soils should be inspected by the validation engineers and appropriate remedial action taken as necessary.

APPENDIX A – Limitations

Limitations

LIMITATIONS

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk. Unless explicitly agreed otherwise in writing, this report has been prepared under LEAP's standard terms and conditions, as included in the quotation for this works.

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed. LEAP cannot be held responsible for any disclosures or changes in regulation that are provided post production of this report, and will not automatically update the report.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted, and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

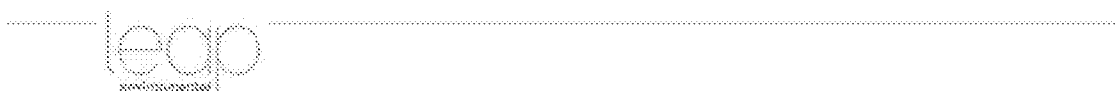
The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development and site usage, timescales or clients specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an overall assessment of ground conditions on site. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode7²³, although this is subject to the restrictions imposed on the investigation as listed above. For geotechnical design,

²³ BS EN 1997 Eurocode 7- Geotechnical Design - Part 1: General Rules (2004) and Part 2: Ground Investigation and Testing (2007)

Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this report will not meet the requirements of a Geotechnical Design Report (GDR), and should therefore be used for preliminary guidance only.

The presence of asbestos may be noted during the site walkover survey, intrusive investigations and/or from the results of contamination testing. However, this report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.



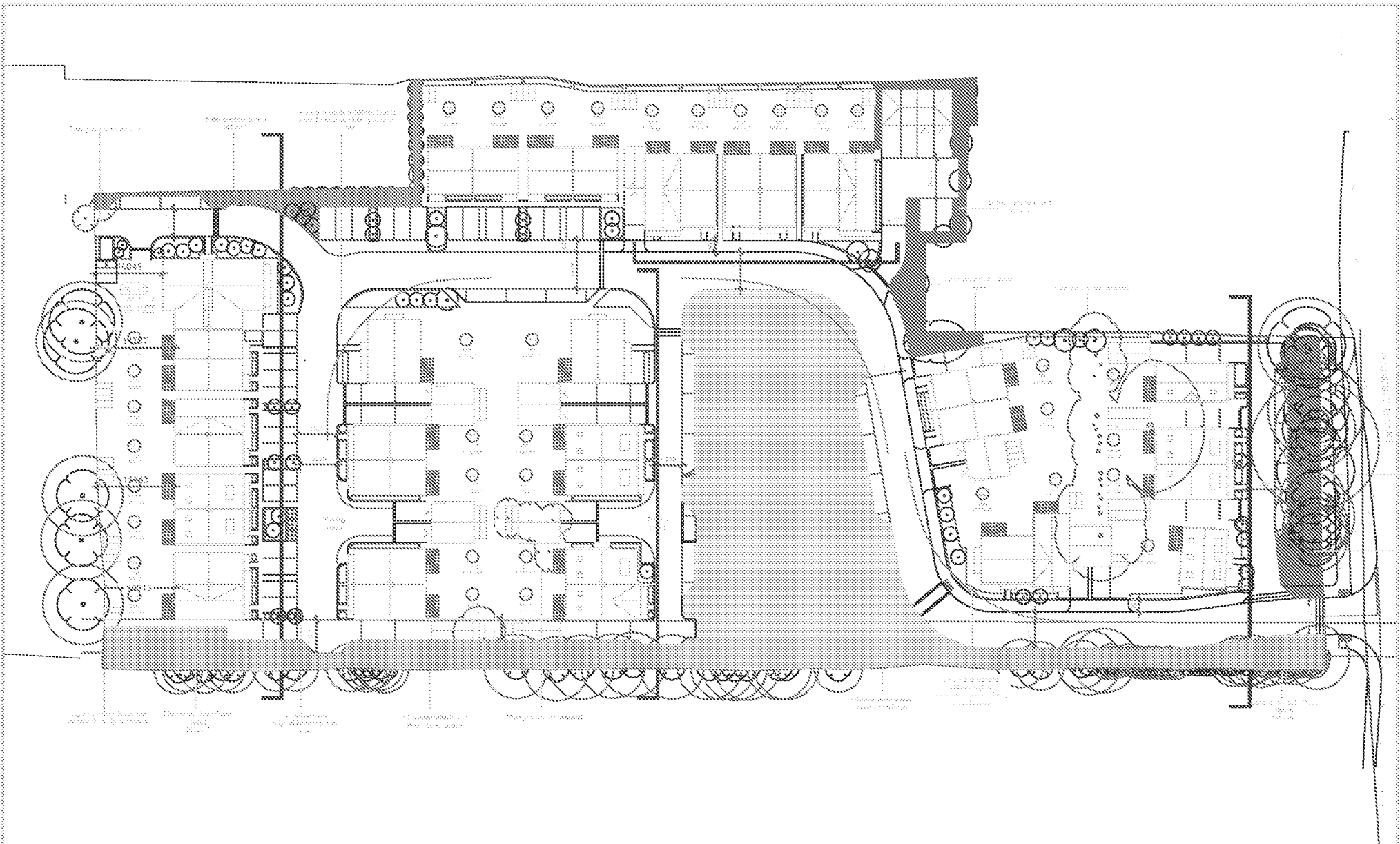
Figures



Basemap: ©sourced from Groundsure report

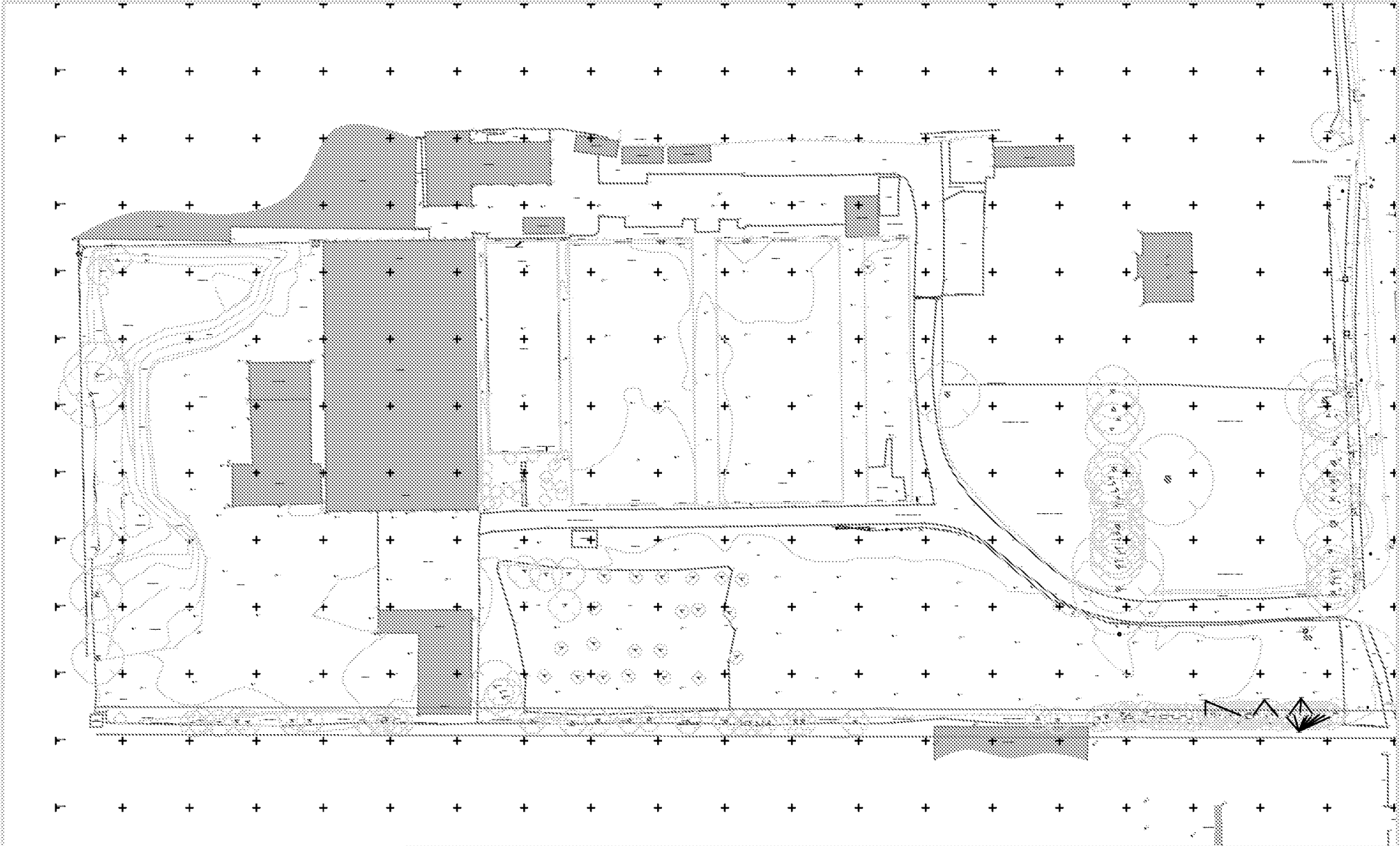


Client:	Sigma Homes	Date:	01/02/21	Project ID:	LP2386
Project:	Shrublands, Angmering	Title:	Site location	Fig. No.	I



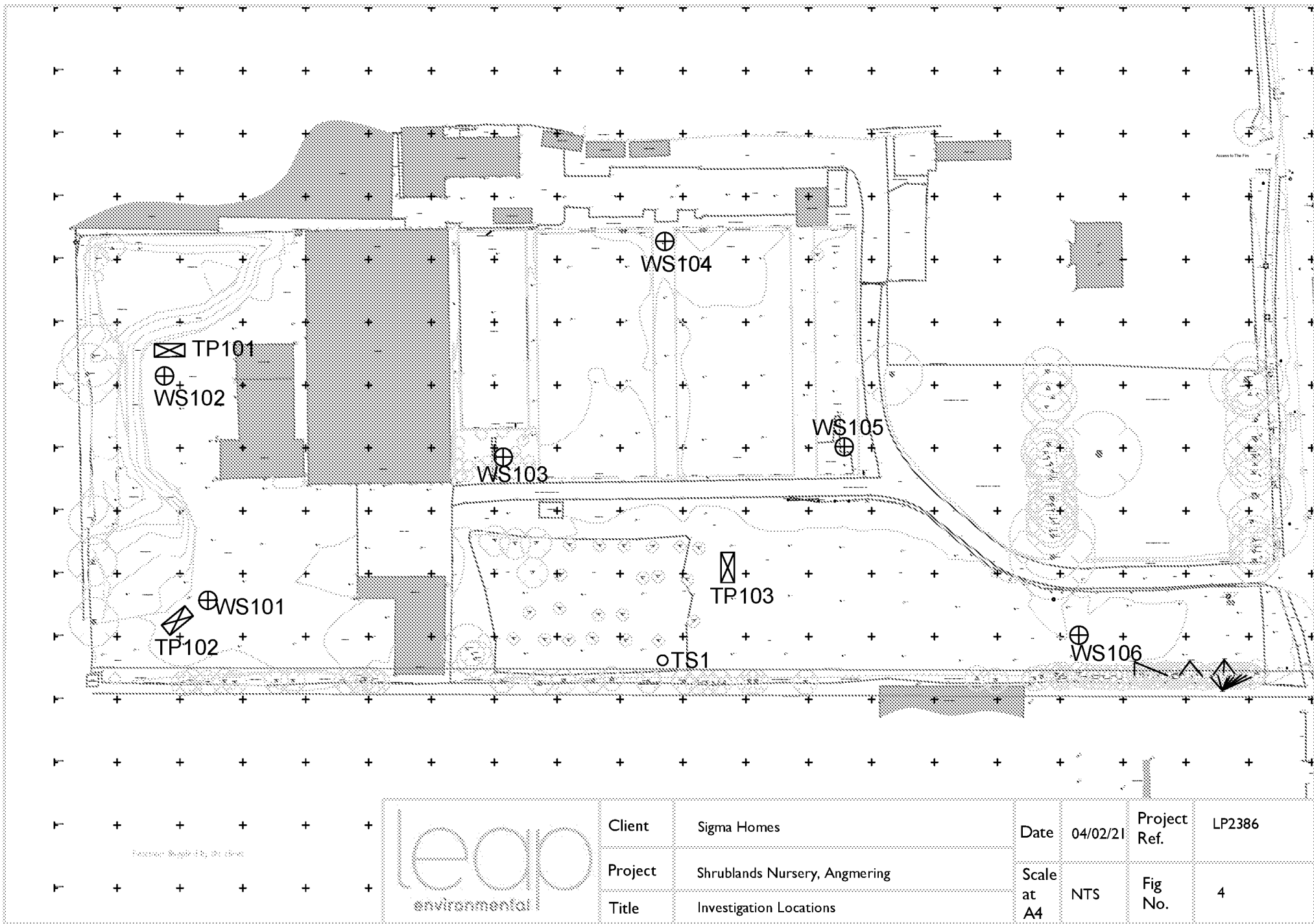
Prepared by the client

	Client	Sigma Homes	Date	04/02/21	Project Ref.	LP2386
	Project	Shrublands Nursery, Angmering	Scale at A4	Text	Fig No.	2
	Title	Proposed site layout				



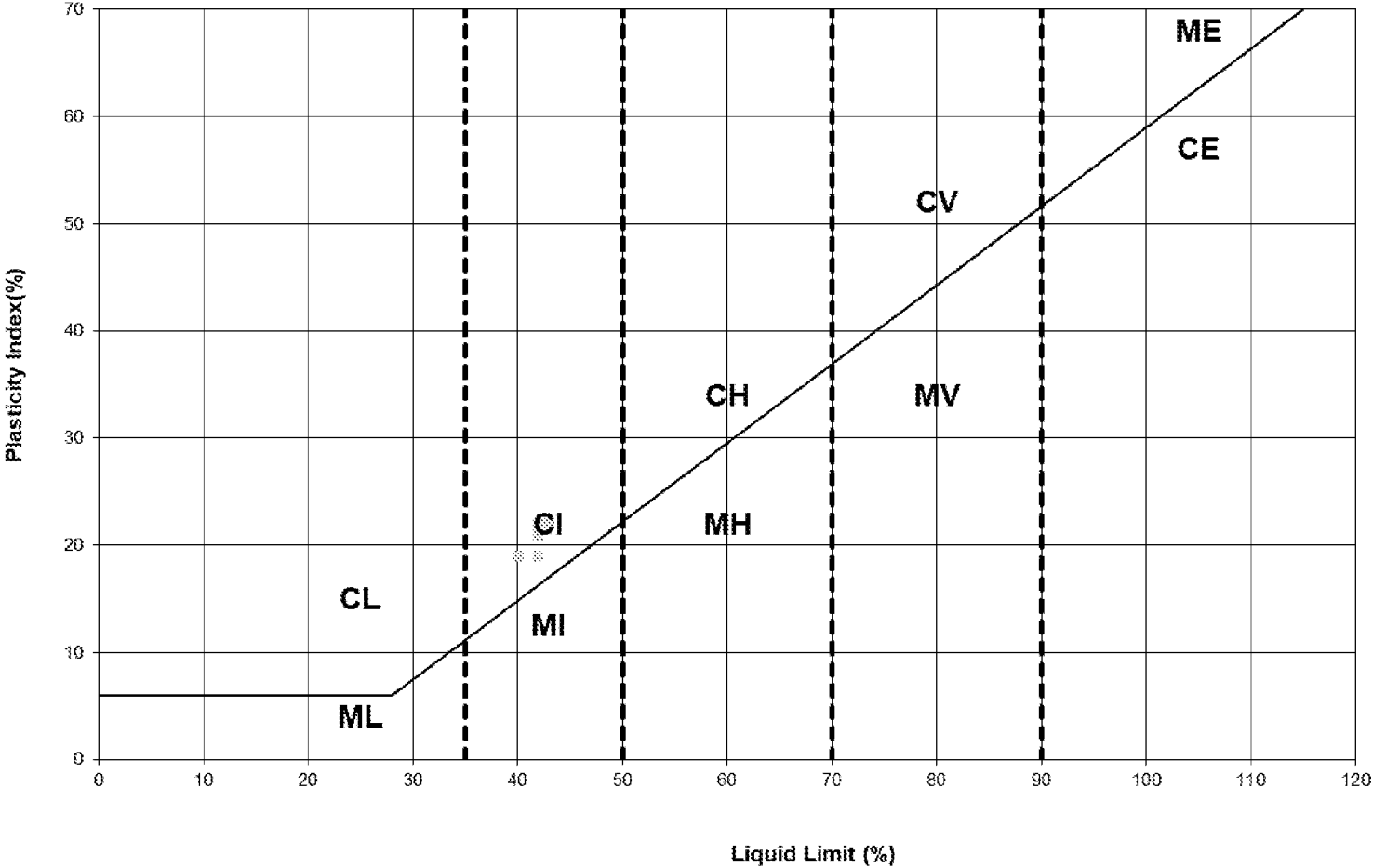
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	Client	Sigma Homes	Date	04/02/21	Project Ref.	LP2386
	Project	Shrublands Nursery, Angmering	Scale at A4	Text	Fig No.	3
	Title	Current Site Layout				



	Client	Sigma Homes	Date	04/02/21	Project Ref.	LP2386
	Project	Shrublands Nursery, Angmering	Scale at A4	NTS	Fig No.	4
	Title	Investigation Locations				

Chart 2 Atterberg Limits A-Line Plot



	Client:	Sigma Homes	Date:	01/02/21	Project ID:	LP2386
	Project:	Shrublands, Angmering	Title:	A Line Plot	Fig. No.	5

APPENDIX C – Historic Maps and Environmental Database Searches

Historic Maps and
Environmental
Database Searches



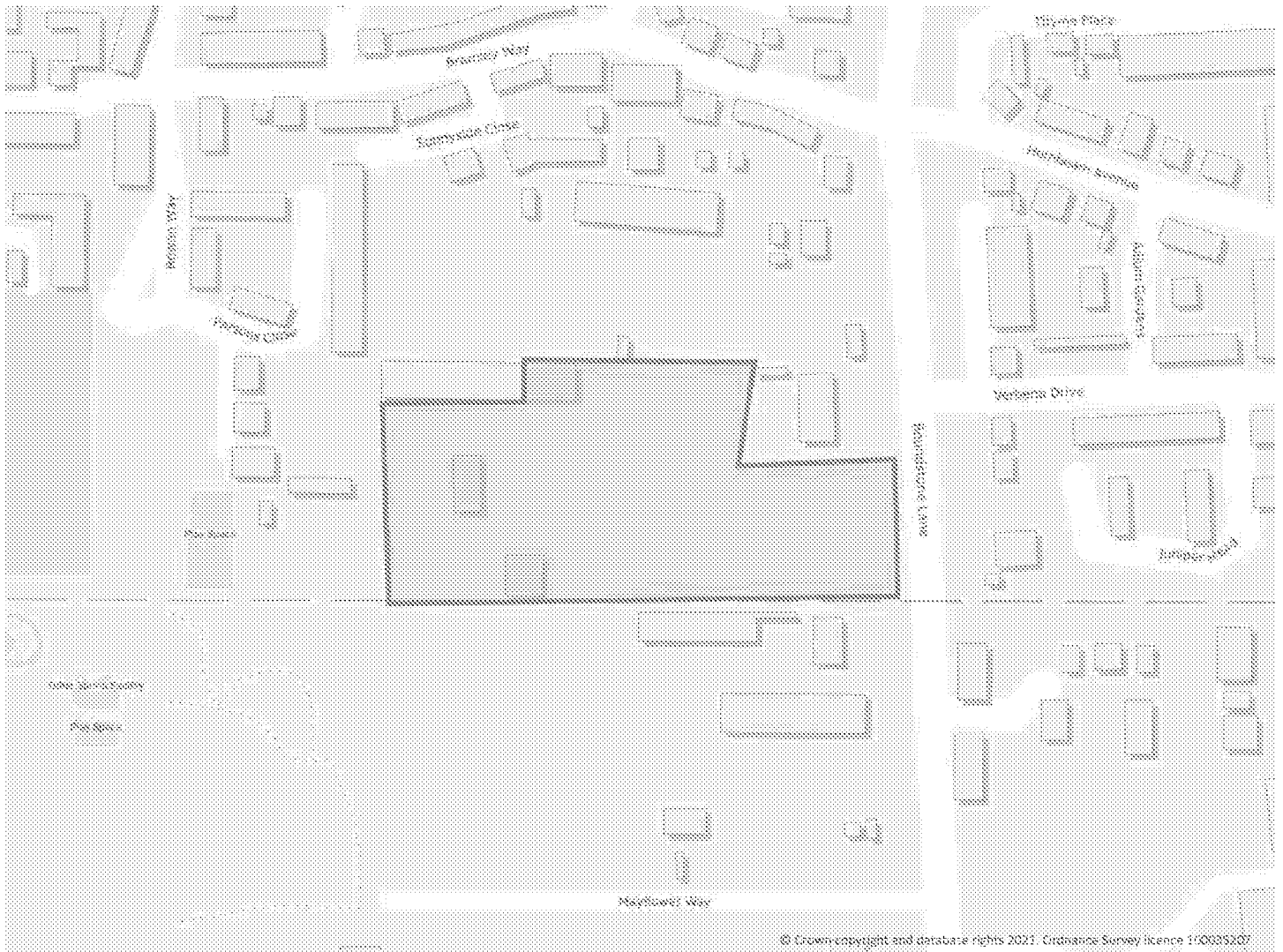
SHRUBLANDS, ROUNDSTONE LANE, ANGMERING, BN16 4AT

Order Details

Date: 18/02/2021
Your ref: LP2386_Angmering_-_LPO
Our Ref: GS-7588455
Client: Leap Environmental Ltd

Site Details

Location: 507301 103472
Area: 1.37 ha
Authority: Arun District Council



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Summary of findings

p. 2

Aerial image

p. 8

OS MasterMap site plan

p.13

Contact us with any questions at:

info@groundsure.com

08444 159 000

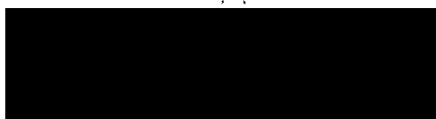
Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	Historical industrial land uses	3	4	8	8	-
15	1.2	Historical tanks	3	3	17	13	-
17	1.3	Historical energy features	0	1	2	13	-
18	1.4	Historical petrol stations	0	0	0	0	-
18	1.5	Historical garages	0	0	0	3	-
19	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
20	2.1	Historical industrial land uses	4	4	14	16	-
22	2.2	Historical tanks	4	5	23	19	-
24	2.3	Historical energy features	0	5	4	29	-
26	2.4	Historical petrol stations	0	0	0	0	-
26	2.5	Historical garages	0	0	0	9	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
27	3.1	Active or recent landfill	0	0	0	0	-
27	3.2	Historical landfill (BGS records)	0	0	0	0	-
28	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
28	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
28	3.5	Historical waste sites	0	0	0	0	-
28	3.6	Licensed waste sites	0	0	0	0	-
28	3.7	Waste exemptions	0	0	4	1	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
30	4.1	Recent industrial land uses	2	7	25	-	-
32	4.2	Current or recent petrol stations	0	0	0	1	-
33	4.3	Electricity cables	0	0	0	0	-
33	4.4	Gas pipelines	0	0	0	0	-
33	4.5	Sites determined as Contaminated Land	0	0	0	0	-

<u>33</u>	<u>4.6</u>	<u>Control of Major Accident Hazards (COMAH)</u>	0	0	1	0	-
33	4.7	Regulated explosive sites	0	0	0	0	-
<u>34</u>	<u>4.8</u>	<u>Hazardous substance storage/usage</u>	0	0	1	0	-
34	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
34	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
<u>34</u>	<u>4.11</u>	<u>Licensed pollutant release (Part A(2)/B)</u>	1	0	0	1	-
35	4.12	Radioactive Substance Authorisations	0	0	0	0	-
<u>35</u>	<u>4.13</u>	<u>Licensed Discharges to controlled waters</u>	0	0	4	3	-
36	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
37	4.15	Pollutant release to public sewer	0	0	0	0	-
37	4.16	List 1 Dangerous Substances	0	0	0	0	-
37	4.17	List 2 Dangerous Substances	0	0	0	0	-
<u>37</u>	<u>4.18</u>	<u>Pollution Incidents (EA/NRW)</u>	0	0	3	3	-
38	4.19	Pollution inventory substances	0	0	0	0	-
38	4.20	Pollution inventory waste transfers	0	0	0	0	-
39	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
<u>40</u>	<u>5.1</u>	<u>Superficial aquifer</u>	Identified (within 500m)				
<u>41</u>	<u>5.2</u>	<u>Bedrock aquifer</u>	Identified (within 500m)				
<u>42</u>	<u>5.3</u>	<u>Groundwater vulnerability</u>	Identified (within 50m)				
<u>43</u>	<u>5.4</u>	<u>Groundwater vulnerability- soluble rock risk</u>	Identified (within 0m)				
43	5.5	Groundwater vulnerability- local information	None (within 0m)				
<u>44</u>	<u>5.6</u>	<u>Groundwater abstractions</u>	0	0	1	2	5
<u>46</u>	<u>5.7</u>	<u>Surface water abstractions</u>	0	0	0	0	2
<u>47</u>	<u>5.8</u>	<u>Potable abstractions</u>	0	0	0	0	1
48	5.9	Source Protection Zones	0	0	0	0	-
48	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
<u>49</u>	<u>6.1</u>	<u>Water Network (OS MasterMap)</u>	0	0	2	-	-



<u>50</u>	<u>6.2</u>	<u>Surface water features</u>	0	0	2	-	-
<u>50</u>	<u>6.3</u>	<u>WFD Surface water body catchments</u>	2	-	-	-	-
<u>51</u>	<u>6.4</u>	<u>WFD Surface water bodies</u>	0	0	0	-	-
<u>51</u>	<u>6.5</u>	<u>WFD Groundwater bodies</u>	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
52	7.1	Risk of Flooding from Rivers and Sea (RoFRaS)	None (within 50m)				
52	7.2	Historical Flood Events	0	0	0	-	-
52	7.3	Flood Defences	0	0	0	-	-
52	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
53	7.5	Flood Storage Areas	0	0	0	-	-
54	7.6	Flood Zone 2	None (within 50m)				
54	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
<u>55</u>	<u>8.1</u>	<u>Surface water flooding</u>	1 in 30 year, 0.1m - 0.3m (within 50m)				
Page	Section	Groundwater flooding					
<u>57</u>	<u>9.1</u>	<u>Groundwater flooding</u>	High (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
58	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
59	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
59	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
59	10.4	Special Protection Areas (SPA)	0	0	0	0	0
59	10.5	National Nature Reserves (NNR)	0	0	0	0	0
60	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
<u>60</u>	<u>10.7</u>	<u>Designated Ancient Woodland</u>	0	0	0	0	1
60	10.8	Biosphere Reserves	0	0	0	0	0
60	10.9	Forest Parks	0	0	0	0	0
61	10.10	Marine Conservation Zones	0	0	0	0	0
61	10.11	Green Belt	0	0	0	0	0
61	10.12	Proposed Ramsar sites	0	0	0	0	0



61	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
61	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
62	10.15	Nitrate Sensitive Areas	0	0	0	0	0
62	10.16	<u>Nitrate Vulnerable Zones</u>	0	0	1	0	0
63	10.17	<u>SSSI Impact Risk Zones</u>	2	-	-	-	-
64	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
65	11.1	World Heritage Sites	0	0	0	-	-
65	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
65	11.3	National Parks	0	0	0	-	-
65	11.4	Listed Buildings	0	0	0	-	-
66	11.5	Conservation Areas	0	0	0	-	-
66	11.6	Scheduled Ancient Monuments	0	0	0	-	-
66	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
67	12.1	<u>Agricultural Land Classification</u>	Grade 1 (within 250m)				
68	12.2	Open Access Land	0	0	0	-	-
68	12.3	Tree Felling Licences	0	0	0	-	-
68	12.4	Environmental Stewardship Schemes	0	0	0	-	-
68	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
69	13.1	<u>Priority Habitat Inventory</u>	0	1	5	-	-
70	13.2	Habitat Networks	0	0	0	-	-
70	13.3	Open Mosaic Habitat	0	0	0	-	-
70	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
71	14.1	<u>10k Availability</u>	Identified (within 500m)				
72	14.2	Artificial and made ground (10k)	0	0	0	0	-
73	14.3	<u>Superficial geology (10k)</u>	1	0	0	0	-

74	14.4	Landslip (10k)	0	0	0	0	-
75	14.5	<u>Bedrock geology (10k)</u>	1	1	0	0	-
76	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
77	15.1	<u>50k Availability</u>	Identified (within 500m)				
78	15.2	Artificial and made ground (50k)	0	0	0	0	-
78	15.3	Artificial ground permeability (50k)	0	0	-	-	-
79	15.4	<u>Superficial geology (50k)</u>	1	0	1	0	-
80	15.5	<u>Superficial permeability (50k)</u>	Identified (within 50m)				
80	15.6	Landslip (50k)	0	0	0	0	-
80	15.7	Landslip permeability (50k)	None (within 50m)				
81	15.8	<u>Bedrock geology (50k)</u>	1	1	1	0	-
82	15.9	<u>Bedrock permeability (50k)</u>	Identified (within 50m)				
82	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
83	16.1	<u>BGS Boreholes</u>	0	0	3	-	-
Page	Section	Natural ground subsidence					
85	17.1	<u>Shrink swell clays</u>	Low (within 50m)				
86	17.2	<u>Running sands</u>	Low (within 50m)				
87	17.3	<u>Compressible deposits</u>	Negligible (within 50m)				
88	17.4	<u>Collapsible deposits</u>	Low (within 50m)				
89	17.5	<u>Landslides</u>	Very low (within 50m)				
90	17.6	<u>Ground dissolution of soluble rocks</u>	Very low (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
92	18.1	Natural cavities	0	0	0	0	-
93	18.2	BritPits	0	0	0	0	-
93	18.3	<u>Surface ground workings</u>	0	1	0	-	-
93	18.4	Underground workings	0	0	0	0	0
93	18.5	Historical Mineral Planning Areas	0	0	0	0	-



94	18.6	<u>Non-coal mining</u>	1	0	0	0	0
94	18.7	Mining cavities	0	0	0	0	0
94	18.8	IPB mining areas	None (within 0m)				
94	18.9	Coal mining	None (within 0m)				
95	18.10	Brine areas	None (within 0m)				
95	18.11	Gypsum areas	None (within 0m)				
95	18.12	Tin mining	None (within 0m)				
95	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
96	19.1	<u>Radon</u>	Between 1% and 3% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
97	20.1	<u>BGS Estimated Background Soil Chemistry</u>	2	1	-	-	-
97	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
97	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
98	21.1	Underground railways (London)	0	0	0	-	-
98	21.2	Underground railways (Non-London)	0	0	0	-	-
98	21.3	Railway tunnels	0	0	0	-	-
98	21.4	Historical railway and tunnel features	0	0	0	-	-
98	21.5	Royal Mail tunnels	0	0	0	-	-
99	21.6	Historical railways	0	0	0	-	-
99	21.7	Railways	0	0	0	-	-
99	21.8	Crossrail 1	0	0	0	0	-
99	21.9	Crossrail 2	0	0	0	0	-
99	21.10	HS2	0	0	0	0	-

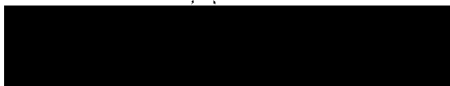
Recent aerial photograph



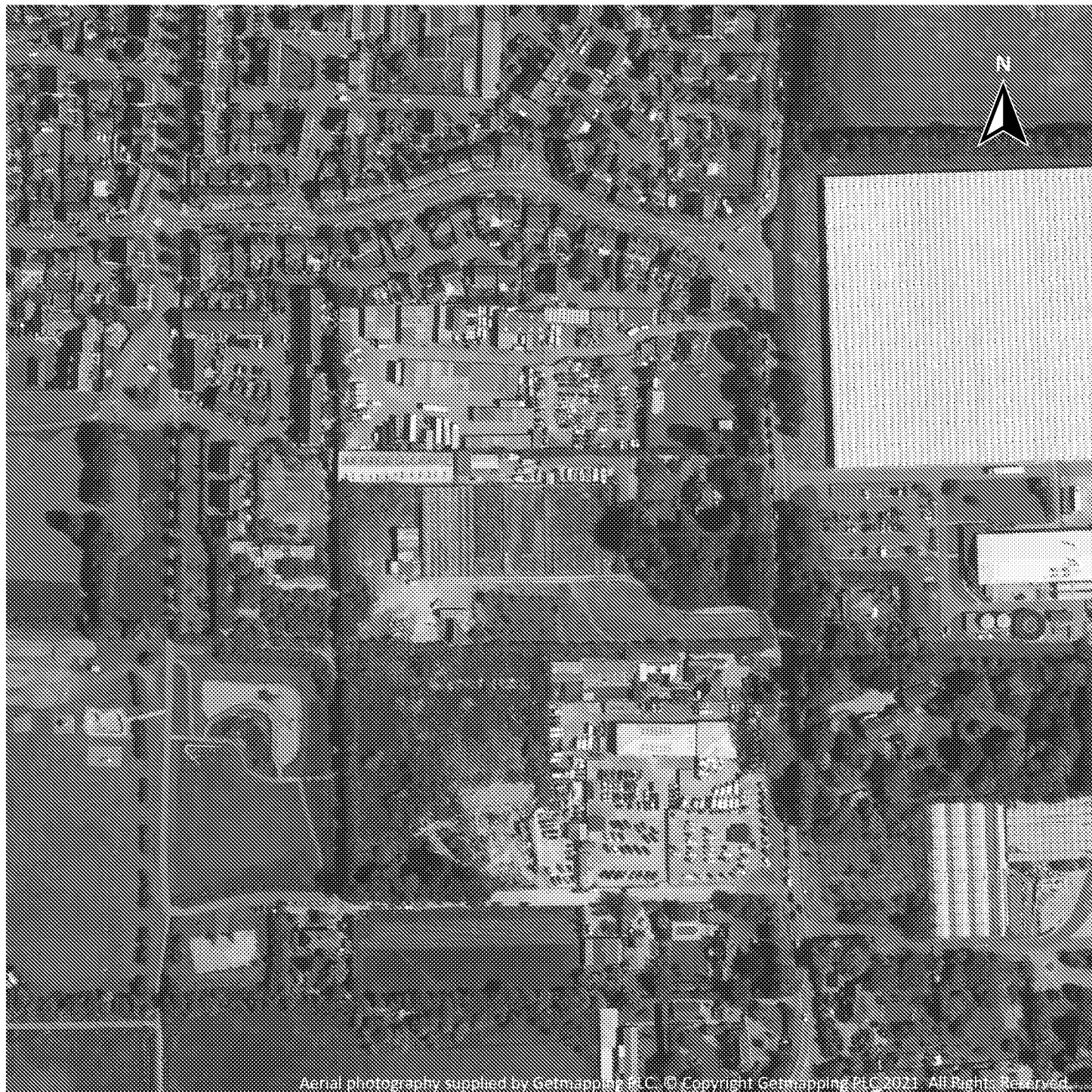
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Capture Date: 28/06/2018

Site Area: 1.37ha



Recent site history - 2015 aerial photograph



Capture Date: 07/06/2015

Site Area: 1.37ha

Recent site history - 2012 aerial photograph



Capture Date: 13/09/2012

Site Area: 1.37ha

Recent site history - 2010 aerial photograph



Capture Date: 24/04/2010

Site Area: 1.37ha



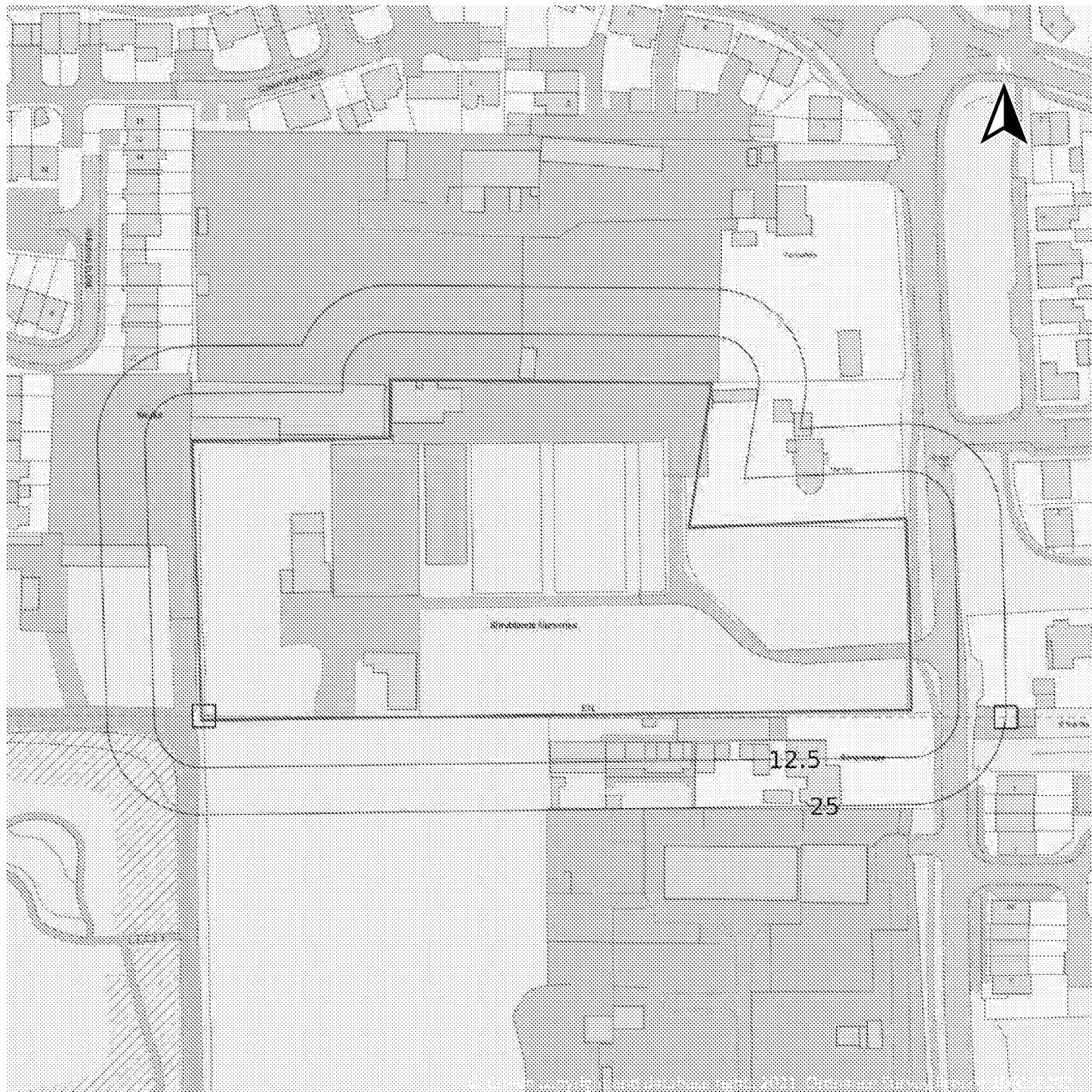
Recent site history - 1999 aerial photograph



Capture Date: 29/08/1999

Site Area: 1.37ha

OS MasterMap site plan



Site Area: 1.37ha

1 Past land use



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

1.1 Historical industrial land uses

Records within 500m

23

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on [page 14](#)

ID	Location	Land use	Dates present	Group ID
A	On site	Nursery	1974	2192288

ID	Location	Land use	Dates present	Group ID
A	On site	Nurseries	1943 - 1957	2274806
C	On site	Nursery	1974	2219036
D	7m E	Nursery	1957	2260925
D	11m E	Nursery	1943	2226021
E	16m E	Nursery	1974	2287517
F	21m E	Nursery	1974	2177995
2	113m NW	Nursery	1974	2256767
4	153m S	Nursery	1957	2292323
5	160m N	Nursery	1974	2249855
6	168m W	Nursery	1932 - 1943	2206528
F	190m SE	Nursery	1943	2209606
F	190m SE	Nursery	1932	2216878
7	204m W	Nursery	1932 - 1974	2219034
9	230m S	Nursery	1943 - 1957	2250991
J	250m S	Nursery	1957	2211714
10	263m NW	Nursery	1943	2280450
11	265m SE	Nursery	1943	2189730
L	367m NW	Nursery	1943 - 1957	2173631
18	422m NW	Nursery	1943 - 1974	2219035
21	473m S	Nursery	1957	2160960
N	476m SW	Railway Building	1943	2147867
23	499m NW	Nursery	1943 - 1957	2248203

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	36
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Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or



succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
B	On site	Unspecified Tank	1985 - 1990	394298
B	On site	Unspecified Tank	1970	395837
B	On site	Unspecified Tank	1970	405879
C	1m W	Unspecified Tank	1985 - 1990	390835
C	2m W	Unspecified Tank	1970	391388
C	4m W	Unspecified Tank	1990	402915
C	63m N	Unspecified Tank	1985 - 1990	383917
D	67m E	Unspecified Tank	1990	359171
G	73m SW	Unspecified Tank	1970 - 1990	409827
G	75m SW	Unspecified Tank	1970	391778
G	94m SW	Unspecified Tank	1942	359172
D	98m E	Tanks	1990	374884
I	105m W	Unspecified Tank	1990	359173
D	107m E	Unspecified Tank	1990	359170
D	114m E	Unspecified Tank	1990	359169
B	127m S	Tanks	1990	374888
D	128m E	Unspecified Tank	1990	359166
D	132m E	Unspecified Tank	1990	359165
D	133m E	Unspecified Tank	1990	359167
H	146m E	Unspecified Tank	1970 - 1985	406736
H	148m E	Unspecified Tank	1985	359164
I	165m E	Unspecified Tank	1978	359168
I	182m SE	Unspecified Tank	1985 - 1990	404782
F	260m SE	Sewage Tanks	1985	374702
E	263m E	Unspecified Tank	1985	359146
F	272m SE	Unspecified Tank	1970 - 1990	408987

ID	Location	Land use	Dates present	Group ID
E	277m E	Unspecified Tank	1985	359145
13	281m S	Unspecified Tank	1943	359122
K	290m E	Tanks	1985 - 1990	399705
K	323m E	Unspecified Tank	1990	359149
K	326m E	Unspecified Tank	1990	359147
15	355m N	Tanks	1985 - 1990	333312
17	415m E	Unspecified Tank	1990	359148
19	437m W	Unspecified Tank	1970	359177
20	448m SE	Unspecified Tank	1943	359144
22	474m W	Unspecified Tank	1942	359176

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	16
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Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
D	27m E	Electricity Substation	1970 - 1990	273190
D	69m E	Gas Governor	1990	249951
8	223m E	Electricity Substation	1978 - 1990	282949
12	276m W	Electricity Substation	1989 - 1994	259736
14	346m SW	Electricity Substation	1969 - 1994	259945
J	386m SE	Electricity Substation	1970 - 1990	260056
16	404m S	Electricity Substation	1970 - 1990	288530
N	476m SW	Electricity Substation	1997	279878

ID	Location	Land use	Dates present	Group ID
L	477m NW	Electricity Substation	1989 - 1994	264588
N	478m SW	Electricity Substation	1970	255233
N	478m SW	Electricity Substation	1982	252816
N	478m SW	Electricity Substation	1969	256396
N	478m SW	Electricity Substation	1994	256422
N	478m SW	Electricity Substation	1974	256746
N	481m SW	Electricity Substation	1984	256562
N	481m SW	Electricity Substation	-	240670

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0
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Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	3
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Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
M	435m S	Garage	1959 - 1994	84564
M	435m S	Garage	1976 - 1979	84727
M	439m S	Garage	1959 - 1969	83424

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m

0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

2.1 Historical industrial land uses

Records within 500m

38

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20**

ID	Location	Land Use	Date	Group ID
A	On site	Nurseries	1957	2274806
A	On site	Nurseries	1943	2274806
A	On site	Nursery	1974	2192288

ID	Location	Land Use	Date	Group ID
C	On site	Nursery	1974	2219036
D	7m E	Nursery	1957	2260925
D	11m E	Nursery	1943	2226021
E	16m E	Nursery	1974	2287517
F	21m E	Nursery	1974	2177995
1	63m N	Nursery	1974	2219036
3	113m NW	Nursery	1974	2256767
5	153m S	Nursery	1957	2292323
6	160m N	Nursery	1974	2249855
K	168m W	Nursery	1932	2206528
F	190m SE	Nursery	1943	2209606
F	190m SE	Nursery	1932	2216878
K	194m W	Nursery	1943	2206528
K	204m W	Nursery	1974	2219034
K	204m W	Nursery	1957	2219034
L	220m NW	Nursery	1943	2219034
L	231m NW	Nursery	1957	2219034
N	238m S	Nursery	1943	2250991
N	239m S	Nursery	1957	2250991
O	250m S	Nursery	1957	2211714
P	261m NW	Nursery	1932	2219034
P	263m NW	Nursery	1943	2280450
7	265m SE	Nursery	1943	2189730
P	265m NW	Nursery	1974	2219034
P	265m NW	Nursery	1957	2219034
U	367m NW	Nursery	1943	2173631
U	369m NW	Nursery	1957	2173631
10	415m N	Nursery	1974	2249855



ID	Location	Land Use	Date	Group ID
W	422m NW	Nursery	1943	2219035
W	424m NW	Nursery	1974	2219035
W	424m NW	Nursery	1957	2219035
11	427m N	Nursery	1974	2219035
14	473m S	Nursery	1957	2160960
Y	476m SW	Railway Building	1943	2147867
16	499m NW	Nursery	1957	2248203

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	51
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Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20**

ID	Location	Land Use	Date	Group ID
B	On site	Unspecified Tank	1970	395837
B	On site	Unspecified Tank	1970	405879
B	On site	Unspecified Tank	1985	394298
B	On site	Unspecified Tank	1990	394298
C	1m W	Unspecified Tank	1985	390835
C	1m W	Unspecified Tank	1990	390835
C	2m W	Unspecified Tank	1970	391388
C	3m W	Unspecified Tank	1970	391388
C	4m W	Unspecified Tank	1990	402915
G	63m N	Unspecified Tank	1985	383917
G	63m N	Unspecified Tank	1990	383917
O	67m E	Unspecified Tank	1990	359171
H	73m SW	Unspecified Tank	1985	409827

ID	Location	Land Use	Date	Group ID
H	73m SW	Unspecified Tank	1990	409827
H	74m SW	Unspecified Tank	1970	409827
H	75m SW	Unspecified Tank	1970	391778
H	75m SW	Unspecified Tank	1990	409827
H	94m SW	Unspecified Tank	1942	359172
D	98m E	Tanks	1990	374884
Z	105m W	Unspecified Tank	1990	359173
D	107m E	Unspecified Tank	1990	359170
D	114m E	Unspecified Tank	1990	359169
A	127m S	Tanks	1990	374888
D	128m E	Unspecified Tank	1990	359166
D	132m E	Unspecified Tank	1990	359165
D	133m E	Unspecified Tank	1990	359167
I	146m E	Unspecified Tank	1970	406736
I	147m E	Unspecified Tank	1985	406736
I	148m E	Unspecified Tank	1985	359164
J	165m E	Unspecified Tank	1978	359168
J	182m SE	Unspecified Tank	1985	404782
J	182m SE	Unspecified Tank	1990	404782
F	260m SE	Sewage Tanks	1985	374702
E	263m E	Unspecified Tank	1985	359146
F	272m SE	Unspecified Tank	1970	408987
F	273m SE	Unspecified Tank	1978	408987
F	273m SE	Unspecified Tank	1970	408987
F	273m SE	Unspecified Tank	1985	408987
F	273m SE	Unspecified Tank	1990	408987
E	277m E	Unspecified Tank	1985	359145
B	281m S	Unspecified Tank	1943	359122



ID	Location	Land Use	Date	Group ID
R	290m E	Tanks	1985	359705
R	290m E	Tanks	1990	359705
R	323m E	Unspecified Tank	1990	359149
R	326m E	Unspecified Tank	1990	359147
T	355m N	Tanks	1985	383312
T	355m N	Tanks	1990	383312
9	415m E	Unspecified Tank	1990	359148
12	437m W	Unspecified Tank	1970	359177
13	448m SE	Unspecified Tank	1943	359144
15	474m W	Unspecified Tank	1942	359176

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	38
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Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20**

ID	Location	Land Use	Date	Group ID
D	27m E	Electricity Substation	1990	273190
D	28m E	Electricity Substation	1970	273190
D	28m E	Electricity Substation	1970	273190
D	30m E	Electricity Substation	1985	273190
D	30m E	Electricity Substation	1990	273190
D	69m E	Gas Governor	1990	249951
M	223m E	Electricity Substation	1985	282949
M	223m E	Electricity Substation	1990	282949
M	223m E	Electricity Substation	1978	282949
Q	276m W	Electricity Substation	1989	259736

ID	Location	Land Use	Date	Group ID
Q	277m W	Electricity Substation	1994	259736
S	346m SW	Electricity Substation	1982	259945
S	347m SW	Electricity Substation	1970	259945
S	347m SW	Electricity Substation	1974	259945
S	347m SW	Electricity Substation	1994	259945
S	347m SW	Electricity Substation	1969	259945
O	386m SE	Electricity Substation	1985	260056
O	386m SE	Electricity Substation	1990	260056
O	387m SE	Electricity Substation	1970	260056
O	387m SE	Electricity Substation	1985	260056
O	387m SE	Electricity Substation	1990	260056
O	387m SE	Electricity Substation	1978	260056
O	387m SE	Electricity Substation	1970	260056
V	404m S	Electricity Substation	1985	288530
V	404m S	Electricity Substation	1990	288530
V	404m S	Electricity Substation	1970	288530
V	404m S	Electricity Substation	1990	288530
V	405m S	Electricity Substation	1970	288530
Y	476m SW	Electricity Substation	1997	279878
U	477m NW	Electricity Substation	1989	264588
U	478m NW	Electricity Substation	1994	264588
Y	478m SW	Electricity Substation	1970	255233
Y	478m SW	Electricity Substation	1982	252816
Y	478m SW	Electricity Substation	1969	256396
Y	478m SW	Electricity Substation	1974	256746
Y	478m SW	Electricity Substation	1994	256422
Y	481m SW	Electricity Substation	1984	256562
Y	481m SW	Electricity Substation	-	240670

This data is sourced from Ordnance Survey / Groundsure.



2.4 Historical petrol stations

Records within 500m	0
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Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	9
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Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20**

ID	Location	Land Use	Date	Group ID
X	435m S	Garage	1959	84564
X	435m S	Garage	1979	84727
X	435m S	Garage	1969	84564
X	439m S	Garage	1959	83424
X	439m S	Garage	1969	83424
X	445m S	Garage	1994	84564
X	448m S	Garage	1959	84564
X	448m S	Garage	1966	84564
X	452m S	Garage	1976	84727

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



- Site Outline
- Search buffers in metres (m)
- Waste exemptions

3.1 Active or recent landfill

Records within 500m

0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m

0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0
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Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	0
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Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0
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Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0
---------------------	---

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	5
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Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 27**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	100m E	West End Nursery Roundstone Lane LITTLEHAMPTON West Sussex BN16 4AX	EPR/EF0534BK /A001	Disposing of waste exemption	Both agricultural and non- agricultural waste	Burning waste in the open
A	100m E	West End Nursery Roundstone Lane LITTLEHAMPTON West Sussex BN16 4AX	EPR/EF0534BK /A001	Treating waste exemption	Both agricultural and non- agricultural waste	Cleaning, washing, spraying or coating relevant waste
A	100m E	West End Nursery Roundstone Lane LITTLEHAMPTON West Sussex BN16 4AX	EPR/EF0534BK /A001	Treating waste exemption	Both agricultural and non- agricultural waste	Preparatory treatments (baling, sorting, shredding etc)
A	100m E	West End Nursery Roundstone Lane LITTLEHAMPTON West Sussex BN16 4AX	EPR/EF0534BK /A001	Treating waste exemption	Both agricultural and non- agricultural waste	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
1	446m E	-	WEX204828	Using waste exemption	Not on a farm	Use of waste in construction

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Recent industrial land uses
- Current or recent petrol stations
- Control of Major Accident Hazards
- Hazardous substance storage/usage
- Licensed pollutant release (Part A(2)/B)
- Licensed Discharges to controlled waters
- Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m

34

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on [page 30](#)

ID	Location	Company	Address	Activity	Category
1	On site	Pylon	West Sussex, BN16	Electrical Features	Infrastructure and Facilities
A	On site	N S Marine	Unit 5, Roundstone Lane, Angmering, Littlehampton, West Sussex, BN16 4AT	Marine Engineers and Services	Engineering Services

ID	Location	Company	Address	Activity	Category
2	11m N	Overland Travel (Sussex) Ltd	Roundstone Lane, Angmering, Littlehampton, West Sussex, BN16 4AT	Bus and Coach Stations, Depots and Companies	Public Transport, Stations and Infrastructure
3	16m W	Works	West Sussex, BN16	Unspecified Works Or Factories	Industrial Features
B	25m E	Pylon	West Sussex, BN16	Electrical Features	Infrastructure and Facilities
B	34m E	Electricity Sub Station	West Sussex, BN16	Electrical Features	Infrastructure and Facilities
C	42m S	D & A Motors	Mayflower Way, Angmering, Littlehampton, West Sussex, BN16 4AY	Vehicle Repair, Testing and Servicing	Repair and Servicing
C	43m S	Van Sales & Servicing	Roundstone Van Centre, Roundstone Lane, Angmering, Littlehampton, West Sussex, BN16 4AT	New Vehicles	Motoring
C	47m S	Hillsons Ltd	Roundstone Lane, Angmering, Littlehampton, West Sussex, BN16 4AT	Vehicle Repair, Testing and Servicing	Repair and Servicing
4	54m N	Smart Tech	Farrowfield Farm, Roundstone Lane, Angmering, Littlehampton, West Sussex, BN16 4AT	Vehicle Repair, Testing and Servicing	Repair and Servicing
5	58m N	Farrowfield Estates	Farrowfields, Roundstone Lane, Angmering, Littlehampton, West Sussex, BN16 4AT	Container and Storage	Transport, Storage and Delivery
6	63m N	Tank	West Sussex, BN16	Tanks (Generic)	Industrial Features
7	73m SW	Tank	West Sussex, BN16	Tanks (Generic)	Industrial Features
B	75m E	Gas Governor	West Sussex, BN16	Gas Features	Infrastructure and Facilities
C	85m S	P H N Motors	Mayflower Way, Angmering, Littlehampton, West Sussex, BN16 4AY	Vehicle Repair, Testing and Servicing	Repair and Servicing
C	86m S	Love Cars Sussex Ltd	Mayflower Way, Angmering, Littlehampton, West Sussex, BN16 4AY	Secondhand Vehicles	Motoring
D	99m W	Tank	West Sussex, BN16	Tanks (Generic)	Industrial Features
B	101m E	Tank	West Sussex, BN16	Tanks (Generic)	Industrial Features
D	116m NW	Electricity Sub Station	West Sussex, BN16	Electrical Features	Infrastructure and Facilities
B	120m E	Tank	West Sussex, BN16	Tanks (Generic)	Industrial Features
D	122m NW	Pumping Station	West Sussex, BN16	Water Pumping Stations	Industrial Features

ID	Location	Company	Address	Activity	Category
B	135m E	Tank	West Sussex, BN16	Tanks (Generic)	Industrial Features
B	140m E	Tank	West Sussex, BN16	Tanks (Generic)	Industrial Features
E	148m SE	Electricity Sub Station	West Sussex, BN16	Electrical Features	Infrastructure and Facilities
E	181m SE	Tank	West Sussex, BN16	Tanks (Generic)	Industrial Features
9	182m S	Wood Design	Roundstone by-Pass, Angmering, Littlehampton, West Sussex, BN16 4BD	Furniture	Consumer Products
11	193m W	Pylon	West Sussex, BN16	Electrical Features	Infrastructure and Facilities
12	216m NW	J C L Computing	9, The Walkway, Angmering, Littlehampton, West Sussex, BN16 4BF	Electrical Equipment Repair and Servicing	Repair and Servicing
13	217m SW	Mast	West Sussex, BN16	Telecommunications Features	Infrastructure and Facilities
F	217m E	Hopper	West Sussex, BN16	Hoppers and Silos	Farming
E	218m SE	Cafflyns Audi Worthing	Roundstone by-Pass, Angmering, Littlehampton, West Sussex, BN16 4BD	New Vehicles	Motoring
F	219m E	Pylon	West Sussex, BN16	Electrical Features	Infrastructure and Facilities
E	226m SE	Worthing Audi	Roundstone Bypass Road, Angmering, Littlehampton, West Sussex, BN16 4BD	New Vehicles	Motoring
F	229m E	Electricity Sub Station	West Sussex, BN16	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	1
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Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Company	Address	LPG	Status
18	456m S	OBSOLETE	North Lane, Worthing Road, East Preston, Littlehampton, West Sussex, BN16 1BN	Not Applicable	Obsolete

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0
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High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0
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High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0
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Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	1
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Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Company	Address	Operational status	Tier
15	247m SE	Roundstone Nurseries	Roundstone Nurseries, Roundstone Lane, Angmering	Historical NIHHS Site	-

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0
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Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m

1

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Details	
B	56m E	Application reference number: A/148/92/HS Application status: Historical Consent Application date: 01/01/1992 Address: Roundstone Nurseries, Roundstone Lane, Angmering, BN16 4AT	Details: Application under the Hazardous Substances Act 1992 for the storage of liquified petroleum gas. Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m

0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m

0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m

2

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Address	Details	
A	On site	Town & Country Paving Ltd, Shrublands Nurseries, Roundstone Lane, BN16 4AT	Process: Other Mineral Processes Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
17	398m S	East Preston Laudrette, 132 Downs Way, East Preston, BN16 1AF	Process: Dry Cleaning Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0
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Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	7
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Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Address	Details	
B	77m E	A SEWAGE TREATMENT PLANT SERVING, "WEST END NURSERY" HUNTER VHB LT, ROUNDSTONE LANE, ANGMERING, WEST SUSSEX	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: P09757 Permit Version: 1 Receiving Water: INTO LAND	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 10/08/2001 Effective Date: 10/08/2001 Revocation Date: 20/12/2012
B	77m E	A SEWAGE TREATMENT PLANT SERVING, "WEST END NURSERY" HUNTER VHB LT, ROUNDSTONE LANE, ANGMERING, WEST SUSSEX	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: P09757 Permit Version: 2 Receiving Water: INTO LAND	Status: VARIED UNDER EPR 2010 Issue date: 21/12/2012 Effective Date: 21/12/2012 Revocation Date: -

ID	Location	Address	Details	
B	126m NW	GREEN PASTURES NURSERY, OFF ROUNDSTONE LANE, EAST PRESTON, LITTLEHAMPTON WEST SUSSEX	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: P00873 Permit Version: 1 Receiving Water: INTO LAND	Status: LAPSED UNDER SCHEDULE 23 ENVIRONMENT ACT 1995 Issue date: 17/03/1987 Effective Date: 17/03/1987 Revocation Date: 31/03/1997
E	178m SE	ROUNDSTONE NURSERY, ROUNDSTONE LANE	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: P02730 Permit Version: 1 Receiving Water: INTO LAND	Status: REVOKED UNDER EPR 2010 Issue date: 25/01/1990 Effective Date: 25/01/1990 Revocation Date: 08/10/2013
16	288m SE	ROUNDSTONE GARDEN CENTRE, ANGMERING, LITTLEHAMPTON, WEST SUSSEX	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: N01461 Permit Version: 1 Receiving Water: FRESHWATER STREAM OR RIVER	Status: SURRENDERED UNDER EPR 2010 Issue date: 11/04/1983 Effective Date: 11/04/1983 Revocation Date: 26/07/2012
H	375m NE	CLUB HEADQUARTERS, WORTHING RUGBY FOOTBALL CLUB, ROUNDSTONE LANE, ANGMERING	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: N02979 Permit Version: 1 Receiving Water: INTO LAND	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 08/05/1979 Effective Date: 08/05/1979 Revocation Date: 20/12/2012
H	375m NE	CLUB HEADQUARTERS, WORTHING RUGBY FOOTBALL CLUB, ROUNDSTONE LANE, ANGMERING	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: N02979 Permit Version: 2 Receiving Water: INTO LAND	Status: VARIED UNDER EPR 2010 Issue date: 21/12/2012 Effective Date: 21/12/2012 Revocation Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0
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Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.



4.15 Pollutant release to public sewer

Records within 500m

0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m

6

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Details	
0	103m W	Incident Date: 17/10/2003 Incident Identification: 196731 Pollutant: Contaminated Water Pollutant Description: Urban Run-Off	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
10	189m S	Incident Date: 09/02/2002 Incident Identification: 57414 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)

ID	Location	Details	
14	229m N	Incident Date: 11/05/2002 Incident Identification: 78070 Pollutant: Contaminated Water Pollutant Description: Firefighting Run-Off	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
G	314m S	Incident Date: 18/03/2003 Incident Identification: 143932 Pollutant: Inert Materials and Wastes/Other Pollutant Pollutant Description: Construction and Demolition Materials and Wastes/Other	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
G	314m S	Incident Date: 18/03/2003 Incident Identification: 143932 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
G	314m S	Incident Date: 18/03/2003 Incident Identification: 143932 Pollutant: Other Pollutant Pollutant Description: Other	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0
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The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency

4.20 Pollution inventory waste transfers

Records within 500m	0
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The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.21 Pollution inventory radioactive waste

Records within 500m

0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency



5 Hydrogeology - Superficial aquifer



- Site Outline
- Search buffers in metres (m)
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive
 - Unknown

5.1 Superficial aquifer

Records within 500m

1

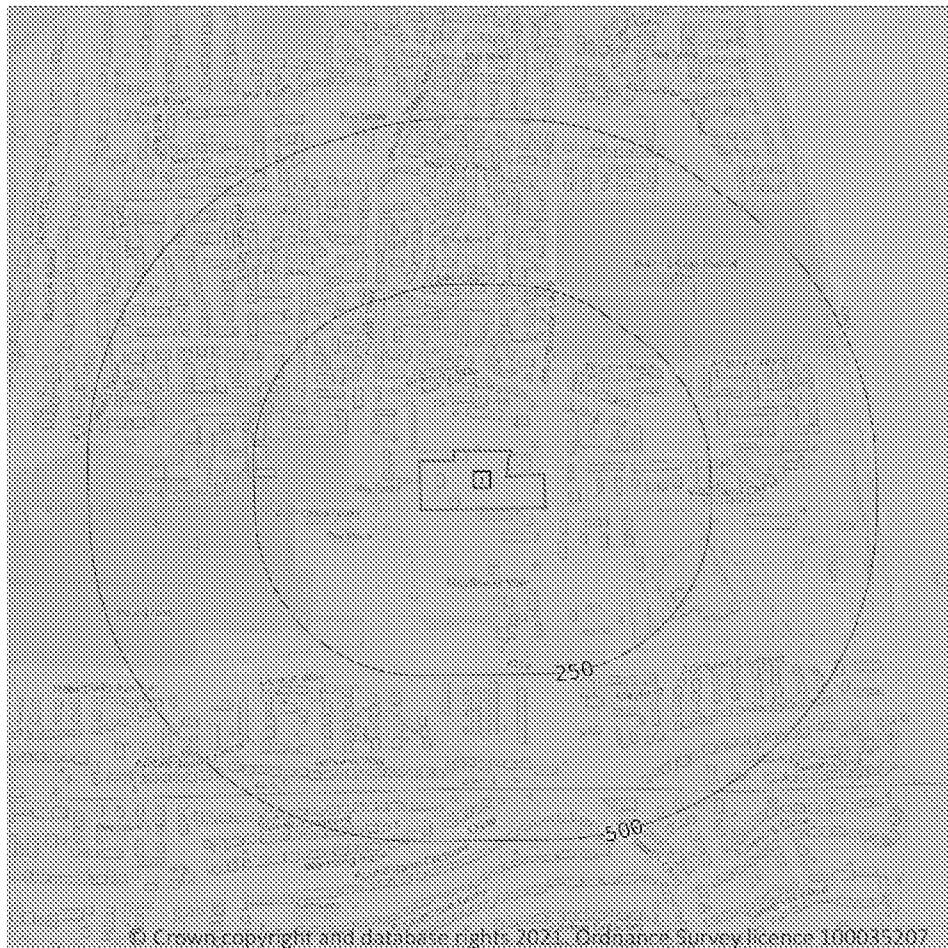
Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on [page 40](#)

ID	Location	Designation	Description
1	On site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



- Site Outline
- Search buffers in metres (m)
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive

5.2 Bedrock aquifer

Records within 500m

1

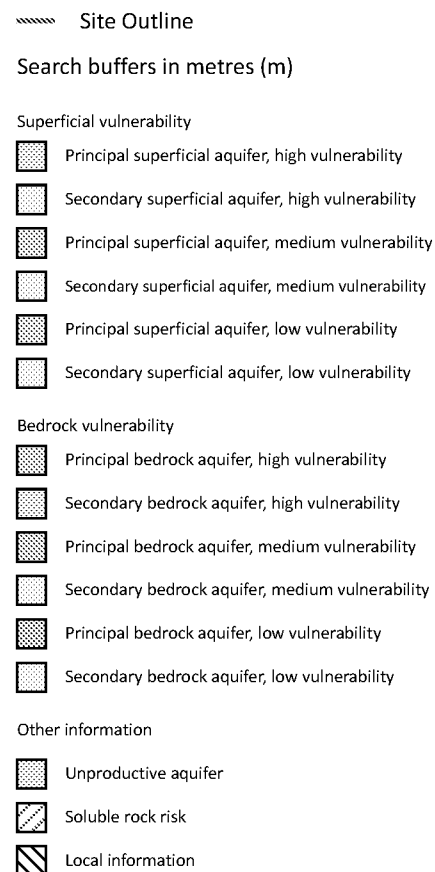
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on [page 41](#)

ID	Location	Designation	Description
1	On site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

1

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 42**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
A	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: >70% Dilution value: 300- 550mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: High	Vulnerability: Low Aquifer type: Principal Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	1
------------------------	----------

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

ID	Maximum soluble risk category	Percentage of grid square covered by maximum risk
A	Significant soluble rocks are likely to be present. Low possibility of localised subsidence or dissolution-related degradation of bedrock occurring naturally, but may be possible in adverse conditions such as high surface or subsurface water flow.	11.0%

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

Records on site	0
------------------------	----------

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.



Abstractions and Source Protection Zones



- Site Outline
- Search buffers in metres (m)
- Source Protection Zone 1
Inner catchment
- Source Protection Zone 2
Outer catchment
- Source Protection Zone 3
Total catchment
- Source Protection Zone 4
Zone of Special Interest
- Source Protection Zone 1c
Inner catchment - confined aquifer
- Source Protection Zone 2c
Outer catchment - confined aquifer
- Source Protection Zone 3c
Total catchment - confined aquifer
- Drinking water abstraction licences
Polygon features
- Drinking water abstraction licences
Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m

8

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on [page 44](#)



ID	Location	Details	
1	162m NE	Status: Historical Licence No: 10/41/414002 Details: Horticultural Watering Direct Source: Southern Region Groundwater Point: WEST END NURSERIES Data Type: Point Name: Van Heyningen Bros. Ltd Easting: 507540 Northing: 103530	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 11/01/1966 Version End Date: -
2	302m SE	Status: Active Licence No: 10/41/310106 Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: ROUNDSTONE NURSERY Data Type: Point Name: Roundstone Garden Centre Ltd Easting: 507640 Northing: 103240	Annual Volume (m³): 18,200 Max Daily Volume (m³): 191 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 08/05/2015 Version End Date: -
3	338m N	Status: Historical Licence No: 10/41/414018 Details: Horticultural Watering Direct Source: Southern Region Groundwater Point: FRESH ACRES NURSERIES Data Type: Point Name: Fresh Acres Nurseries Ltd Easting: 507140 Northing: 103820	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 19/07/1967 Version End Date: -
-	1357m NE	Status: Active Licence No: 10/41/310112 Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: ROUNDSTONE FARM FERRING Data Type: Point Name: Langmead Easting: 508580 Northing: 104120	Annual Volume (m³): 77,270 Max Daily Volume (m³): 1,820 Original Application No: - Original Start Date: 03/11/1987 Expiry Date: - Issue No: 100 Version Start Date: 08/06/2009 Version End Date: -
-	1392m W	Status: Active Licence No: 10/41/414009 Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: BLACK DITCH AT HAM MANOR GOLF CLUB Data Type: Point Name: Ham Manor Golf Club Ltd Easting: 505870 Northing: 103890	Annual Volume (m³): 11,783 Max Daily Volume (m³): 109.10 Original Application No: - Original Start Date: 07/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/2016 Version End Date: -



ID	Location	Details	
-	1512m E	Status: Historical Licence No: 10/41/310103 Details: General Farming & Domestic Direct Source: Southern Region Groundwater Point: REYNARDS NURSERY Data Type: Point Name: Fox Esq Easting: 508900 Northing: 103570	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 01/01/1971 Version End Date: -
-	1845m SW	Status: Historical Licence No: 10/41/310009 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: AQUADOM STATION ROAD RUSTINGTON BOREHOLE 1 Data Type: Point Name: Southern Water Services Ltd Easting: 505630 Northing: 102450	Annual Volume (m³): 150018 Max Daily Volume (m³): 636.4 Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 08/06/2009 Version End Date: -
-	1845m SW	Status: Historical Licence No: 10/41/310009 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Southern Region Groundwater Point: AQUADOM STATION ROAD RUSTINGTON BOREHOLE 2 Data Type: Point Name: Southern Water Services Ltd Easting: 505630 Northing: 102450	Annual Volume (m³): 150018 Max Daily Volume (m³): 636.4 Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 08/06/2009 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	2
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Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 44**

ID	Location	Details	
-	1569m W	Status: Active Licence No: 10/41/414021 Details: Spray Irrigation - Direct Direct Source: Southern Region Surface Waters Point: BLACK DITCH AT HAM MANOR FARM RUSTINGTON Data Type: Line Name: Rustington Golf Centre Ltd Easting: 505620 Northing: 104190	Annual Volume (m ³): 31,822 Max Daily Volume (m ³): 1,500 Original Application No: - Original Start Date: 08/03/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/04/2016 Version End Date: -
-	1569m W	Status: Active Licence No: 10/41/414021 Details: Spray Irrigation - Storage Direct Source: Southern Region Surface Waters Point: BLACK DITCH AT HAM MANOR FARM RUSTINGTON Data Type: Line Name: Rustington Golf Centre Ltd Easting: 505620 Northing: 104190	Annual Volume (m ³): 31,822 Max Daily Volume (m ³): 1,500 Original Application No: - Original Start Date: 08/03/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/04/2016 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

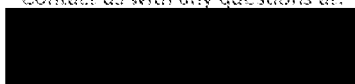
Records within 2000m	1
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Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 44**

ID	Location	Details	
-	1845m SW	Status: Historical Licence No: 10/41/310009 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: AQUADOM STATION ROAD RUSTINGTON BOREHOLE 1 Data Type: Point Name: Southern Water Services Ltd Easting: 505630 Northing: 102450	Annual Volume (m ³): 150018 Max Daily Volume (m ³): 636.4 Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 08/06/2009 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.



5.9 Source Protection Zones

Records within 500m**0**

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

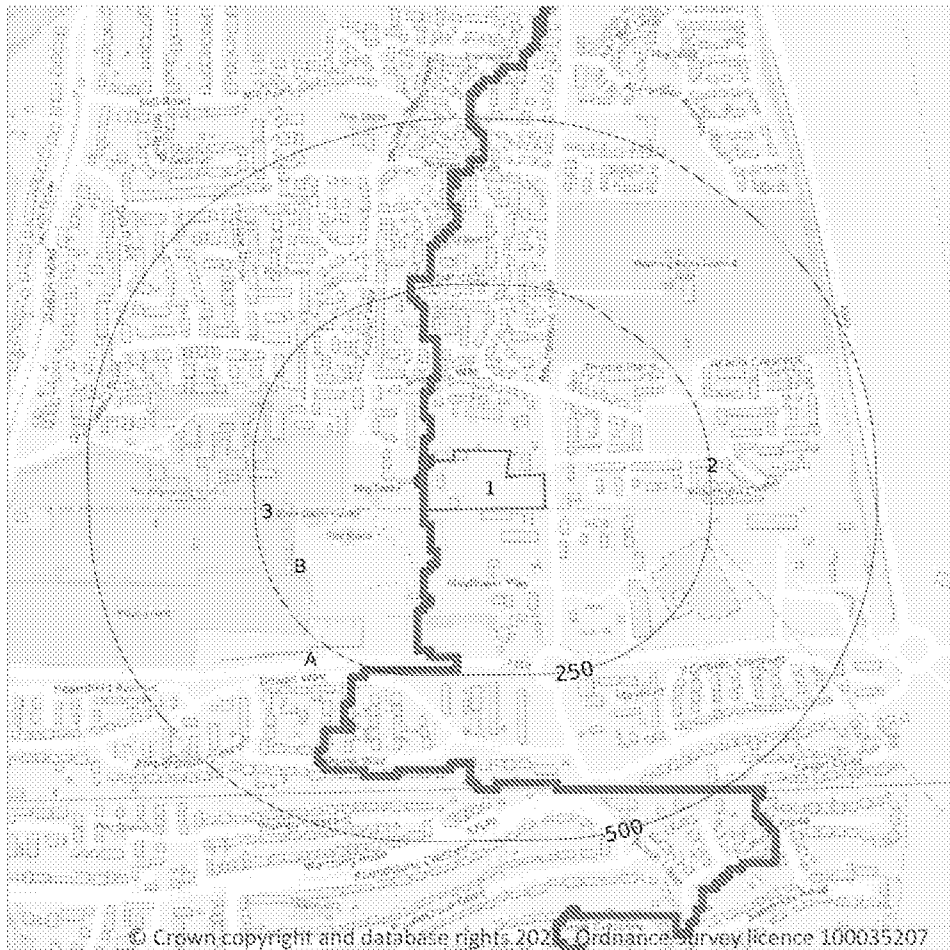
5.10 Source Protection Zones (confined aquifer)

Records within 500m**0**

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



- Site Outline
- Search buffers in metres (m)
- Water Network (OS MasterMap)
- Surface water features (wider than 5m)
- Surface water features (narrower than 5m)
- WFD River, canal and surface water transfer water bodies
- WFD Lake water bodies
- WFD Transitional and coastal water bodies
- WFD Surface water body catchments boundaries
- WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m

2

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on [page 49](#)

ID	Location	Type of water feature	Ground level	Permanence	Name
A	194m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
8	198m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	2
----------------------------	----------

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 49**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	2
------------------------	----------

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 49**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
2	On site	River WB catchment	Ferring Rife	GB107041073300	Lower Arun	Arun and Western Streams
3	On site	River WB catchment	Black Ditch (W Sussex)	GB107041012890	Lower Arun	Arun and Western Streams

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	2
---------------------------	----------

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 49**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	892m NW	River	Black Ditch (W Sussex)	GB107041012890	Poor	Good	Poor	2016
-	1665m SE	River	Ferring Rife	GB107041073300	Good	Good	Good	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1
------------------------	----------

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 49**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	On site	Littlehampton Anticline East	GB40701G503400	Good	Good	Good	2015

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

7.1 Risk of Flooding from Rivers and Sea (RoFRaS)

Records within 50m

0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m

0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m

0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m

0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.



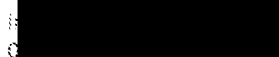
7.5 Flood Storage Areas

Records within 250m

0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.



River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0
--------------------	---

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

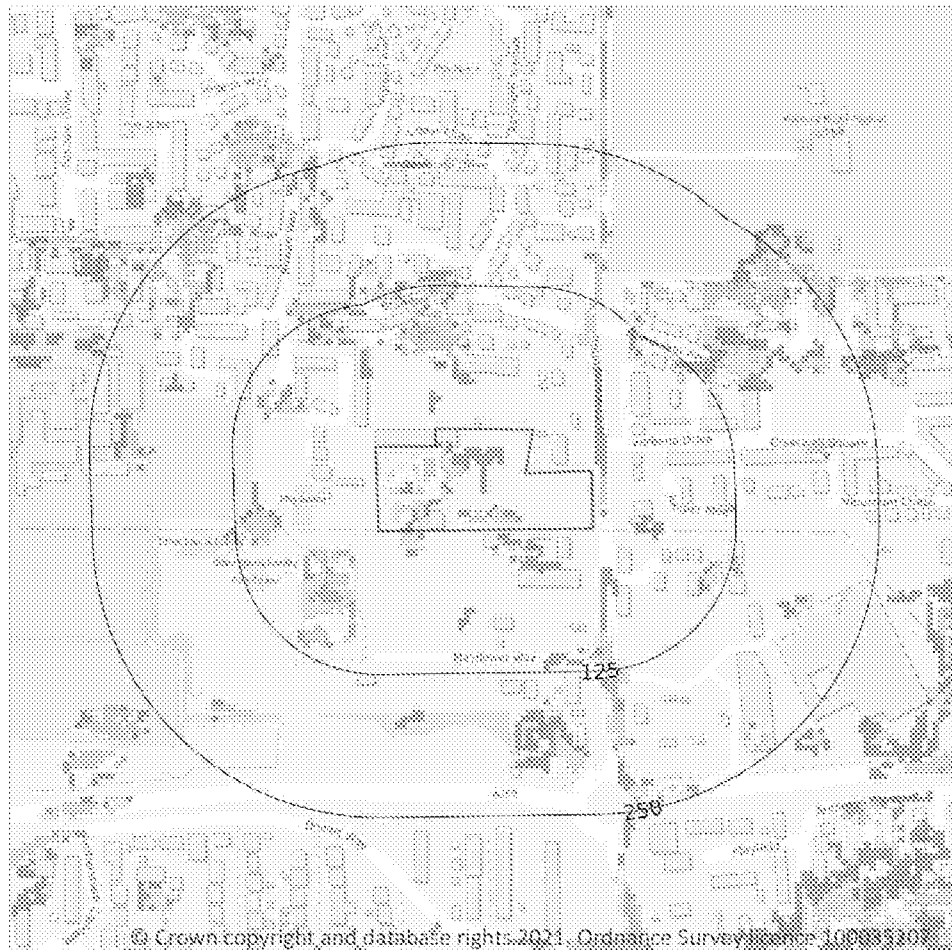
7.7 Flood Zone 3

Records within 50m	0
--------------------	---

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



Site Outline

Search buffers in metres (m)

1 in 1000 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site

1 in 30 year, 0.1m - 0.3m

Highest risk within 50m

1 in 30 year, 0.1m - 0.3m

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on [page 55](#)

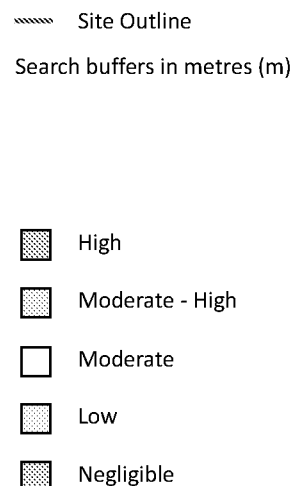
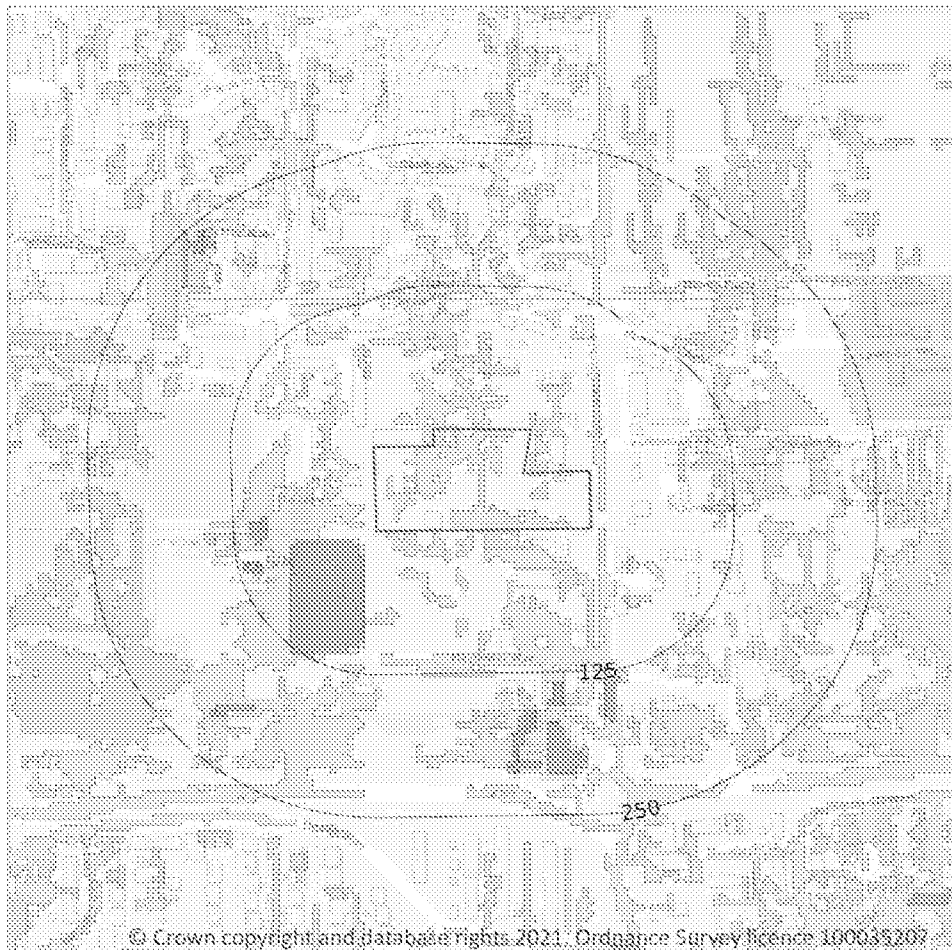
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.3m and 1.0m
1 in 250 year	Between 0.3m and 1.0m
1 in 100 year	Between 0.3m and 1.0m
1 in 30 year	Between 0.1m and 0.3m

This data is sourced from Ambienta! Risk Analytics.

9 Groundwater flooding



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9.1 Groundwater flooding

Highest risk on site

Moderate-High

Highest risk within 50m

High

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on [page 57](#)

This data is sourced from Ambient Risk Analytics.

10 Environmental designations



- Site Outline
- Search buffers in metres (m)
- Designated Ancient Woodland

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m

0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m

0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m

0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m

0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m

0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m

1

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on [page 58](#)

ID	Location	Name	Woodland Type
-	1630m N	Unknown	Ancient & Semi-Natural Woodland

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m

0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m

0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m

0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m

0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m

0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m

0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m

0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0
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Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m	1
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Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
160m NW	Sussex Chalk	Groundwater	G56	Changed

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



- Site Outline
- Search buffers in metres (m)
- SSSI Impact Risk Zones
- SSSI Units
 - Not recorded
 - Favourable
 - Unfavourable - Recovering
 - Unfavourable - No change
 - Unfavourable - Declining
 - Partially destroyed
 - Destroyed

10.17 SSSI Impact Risk Zones

Records on site

2

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on [page 63](#)

ID	Location	Type of developments requiring consultation
1	On site	Infrastructure - Airports, helipads and other aviation proposals.
2	On site	Infrastructure - Airports, helipads and other aviation proposals. Air pollution - Livestock & poultry units with floorspace > 500m ² , slurry lagoons > 750m ² & manure stores > 3500t.

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m

0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.



11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m

0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m

0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m

0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m

0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m

0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m

0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.7 Registered Parks and Gardens

Records within 250m

0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

12 Agricultural designations



- Site Outline
- Search buffers in metres (m)
- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

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12.1 Agricultural Land Classification

Records within 250m

1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on [page 67](#)

ID	Location	Classification	Description
1	On site	Grade 1	Excellent quality agricultural land. Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m**0**

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m**0**

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m**0**

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment.

This data is sourced from Natural England

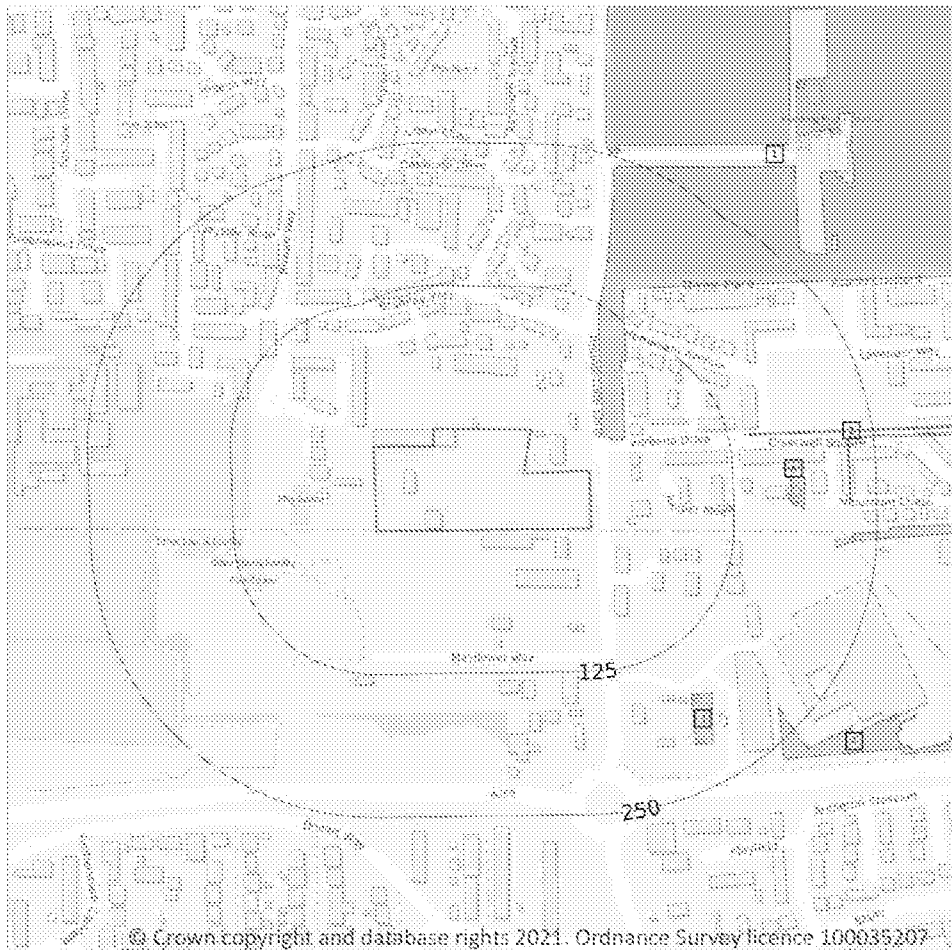
12.5 Countryside Stewardship Schemes

Records within 250m**0**

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



- Site Outline
- Search buffers in metres (m)
- Priority Habitat Inventory
- Open Mosaic Habitat
- Limestone Pavement Orders
- Habitat Networks
- Primary Habitat
- Restorable Habitat
- Associated Habitats
- Habitat Restoration-Creation
- Network Enhancement Zone 1
- Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m

6

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on [page 69](#)

ID	Location	Main Habitat	Other habitats
1	33m NE	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%)
2	140m E	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%)
A	170m E	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%)
3	170m SE	Traditional orchard	Main habitat: TORCH (INV > 50%)

ID	Location	Main Habitat	Other habitats
A	172m E	Good quality semi-improved grassland	Main habitat: GOSIG (INV > 50%)
4	226m SE	Good quality semi-improved grassland	Main habitat: GOSIG (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0
----------------------------	----------

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0
----------------------------	----------

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m	0
----------------------------	----------

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



- Site Outline
- Search buffers in metres (m)
- Full coverage
 - Partial coverage
 - No coverage

14.1 10k Availability

Records within 500m

1

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on [page 71](#)

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	No coverage	TQ00SE

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

14.2 Artificial and made ground (10k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



- Site Outline
- Search buffers in metres (m)
- ☒ Landslip (10k)
- Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m

1

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on [page 73](#)

ID	Location	LEX Code	Description	Rock description
1	On site	BRK-Z	Brickearth - Silt	Silt

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

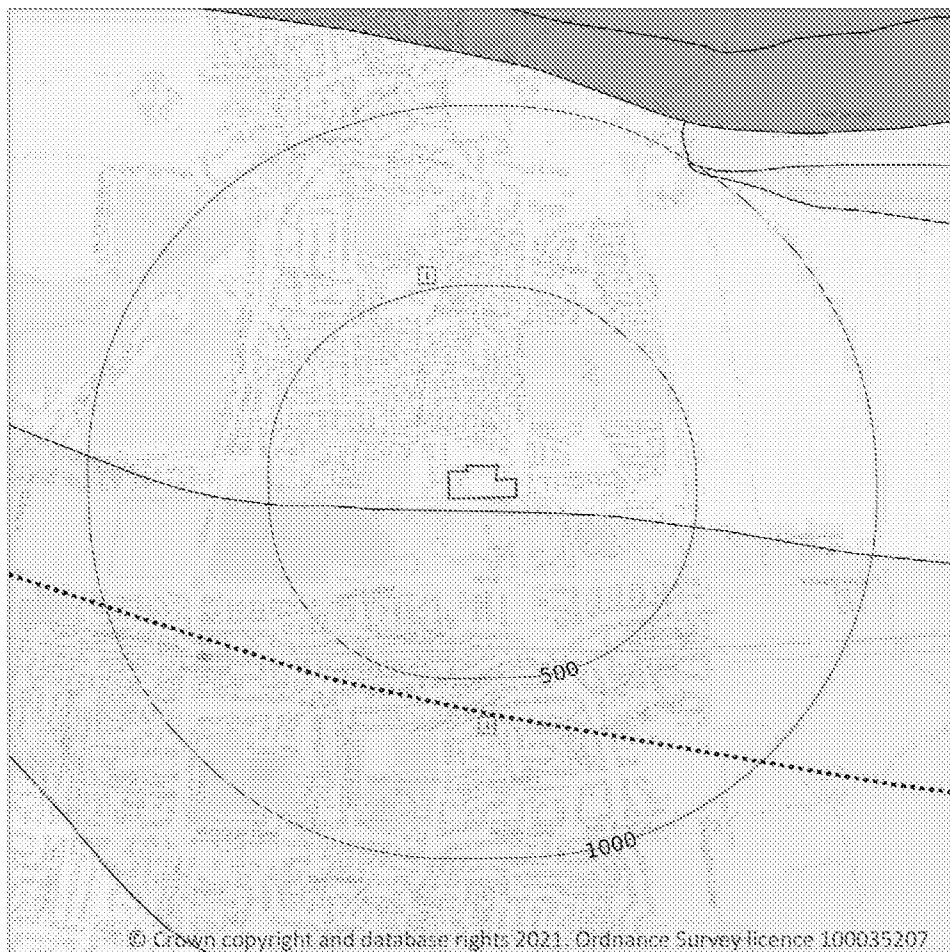
Records within 500m

0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



----- Site Outline
Search buffers in metres (m)
----- Bedrock faults and other linear features (10k)
Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m

2

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on [page 75](#)

ID	Location	LEX Code	Description	Rock age
1	On site	LPCK-CHLK	Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation And Portsdown Chalk Formation (undifferentiated) - Chalk	Campanian Age - Turonian Age
2	35m S	NPCH-CHLK	New PR Chalk Formation - Chalk	Turonian Age

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m

0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



- Site Outline
- Search buffers in metres (m)
- Geological map tile

15.1 50k Availability

Records within 500m

2

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on [page 77](#)

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	Full	EW317_332_chichester_and_bognor_v4
2	220m S	Full	Full	Full	Full	EW317_332_chichester_and_

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

Records within 50m

0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



- Site Outline
- Search buffers in metres (m)
- Landslip (50k)
- Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m

2

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on [page 79](#)

ID	Location	LEX Code	Description	Rock description
1	On site	RTDU-XSZC	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND, SILT AND CLAY
2	220m S	RTDU-XSZC	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND, SILT AND CLAY

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	1
---------------------------	----------

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Intergranular	High	Low

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0
----------------------------	----------

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

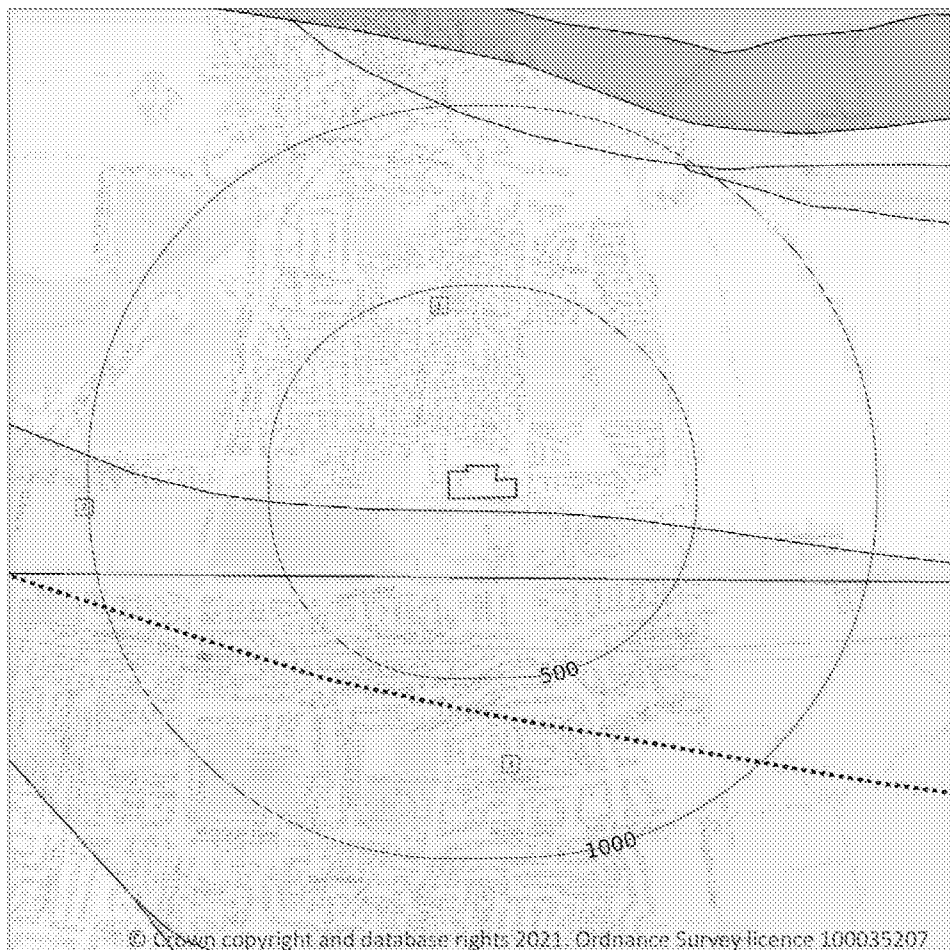
15.7 Landslip permeability (50k)

Records within 50m	0
---------------------------	----------

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



- Site Outline
- Search buffers in metres (m)
- Bedrock faults and other linear features (50k)
- Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m

3

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 81**

ID	Location	LEX Code	Description	Rock age
1	On site	LPCK-CHLK	LEWES NODULAR CHALK FORMATION, SEAFORD CHALK FORMATION, NEWHAVEN CHALK FORMATION, CULVER CHALK FORMATION AND PORTSDOWN CHALK FORMATION (UNDIFFERENTIATED) - CHALK	TURONIAN
2	35m S	NPCH-CHLK	NEW PIT CHALK FORMATION - CHALK	TURONIAN

ID	Location	LEX Code	Description	Rock age
3	220m S	NPCH-CHLK	NEW PIT CHALK FORMATION - CHALK	TURONIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	2
---------------------------	----------

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Fracture	Very High	Very High
35m SE	Fracture	Very High	Very High

This data is sourced from the British Geological Survey.

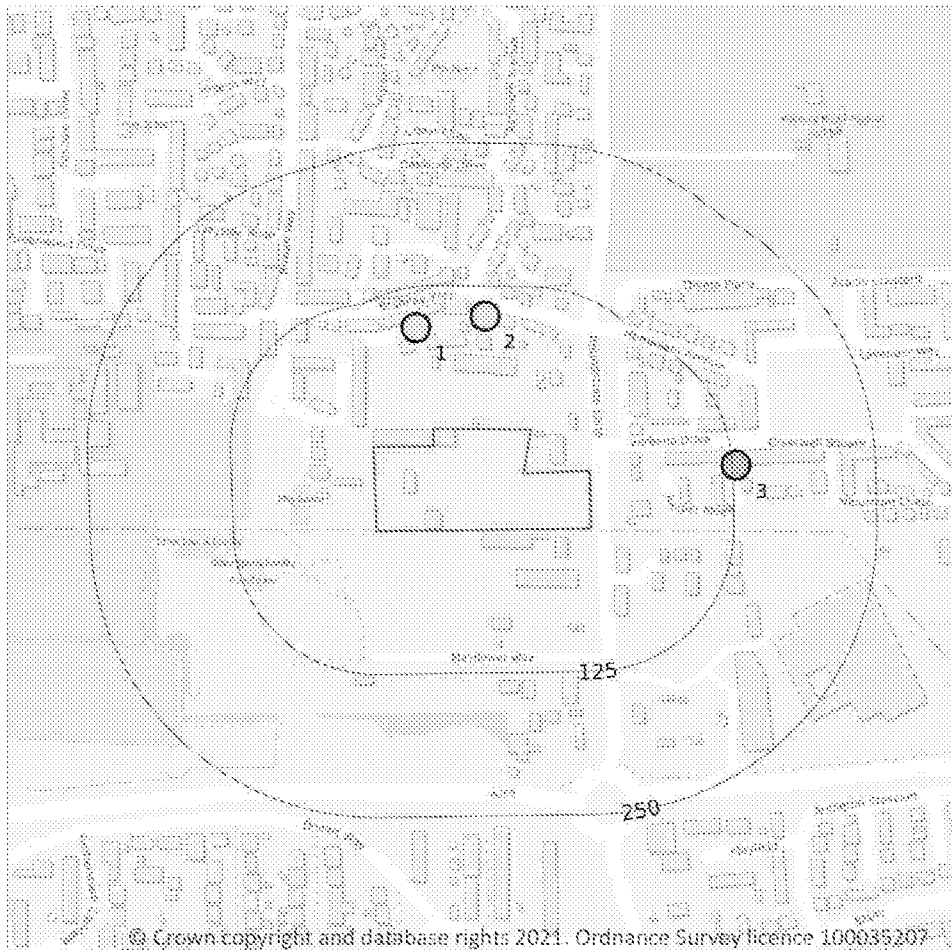
15.10 Bedrock faults and other linear features (50k)

Records within 500m	0
----------------------------	----------

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



Site Outline
Search buffers in metres (m)

- Confidential
- 0 - 10m
- 10 - 30m
- 30m+
- Unknown

16.1 BGS Boreholes

Records within 250m

3

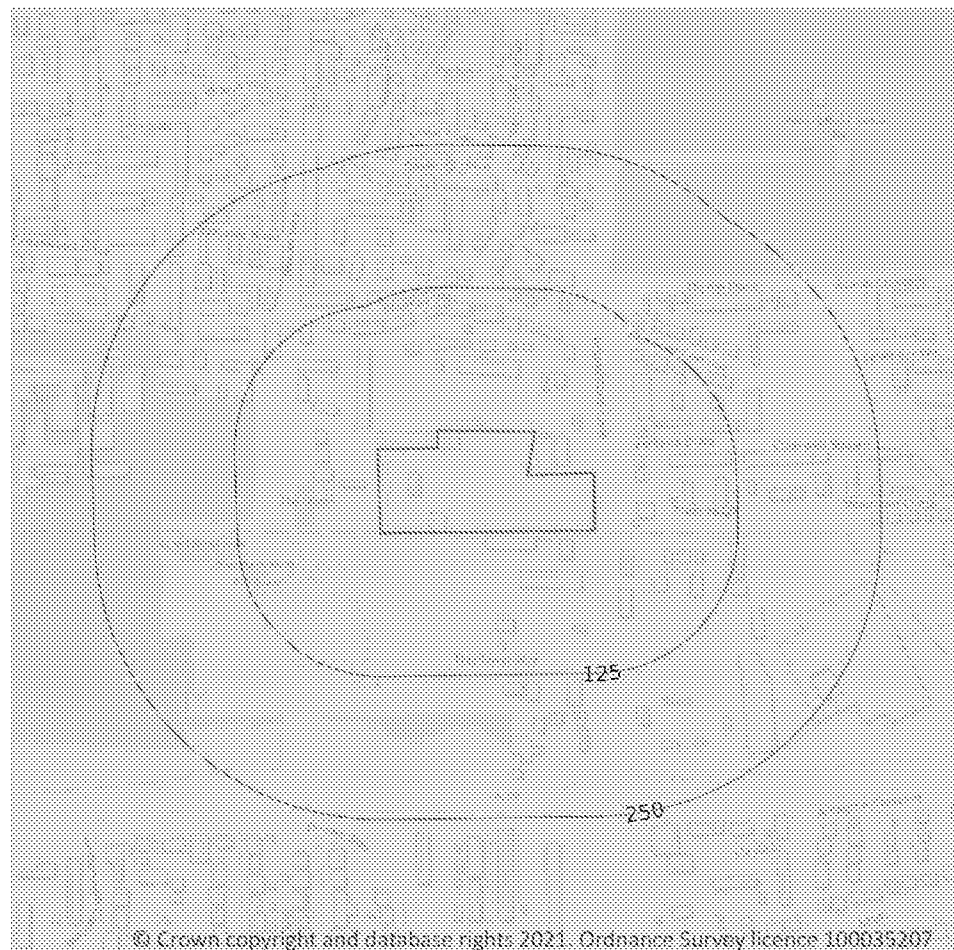
The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

Features are displayed on the Boreholes map on **page 83**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	90m N	507240 103590	ROUNDSTONE LANE, ANGMERING	18.3	N	570016
2	99m N	507300 103600	ROUNDSTONE LANE EAST PRESTON	24.38	N	569971
3	129m E	507520 103470	SPARKES NURSERY ANGMERING	76.2	N	569961

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

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17.1 Shrink swell clays

Records within 50m

1

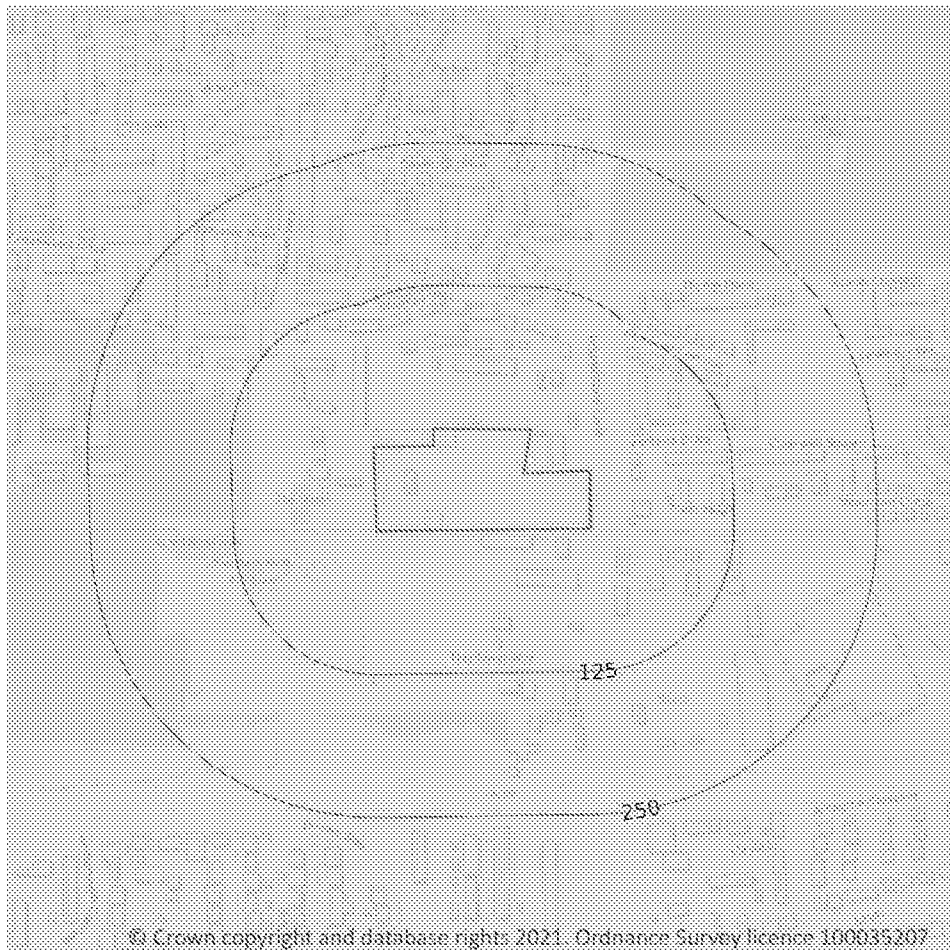
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on [page 85](#)

Location	Hazard rating	Details
On site	Low	Ground conditions predominantly medium plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.2 Running sands

Records within 50m

1

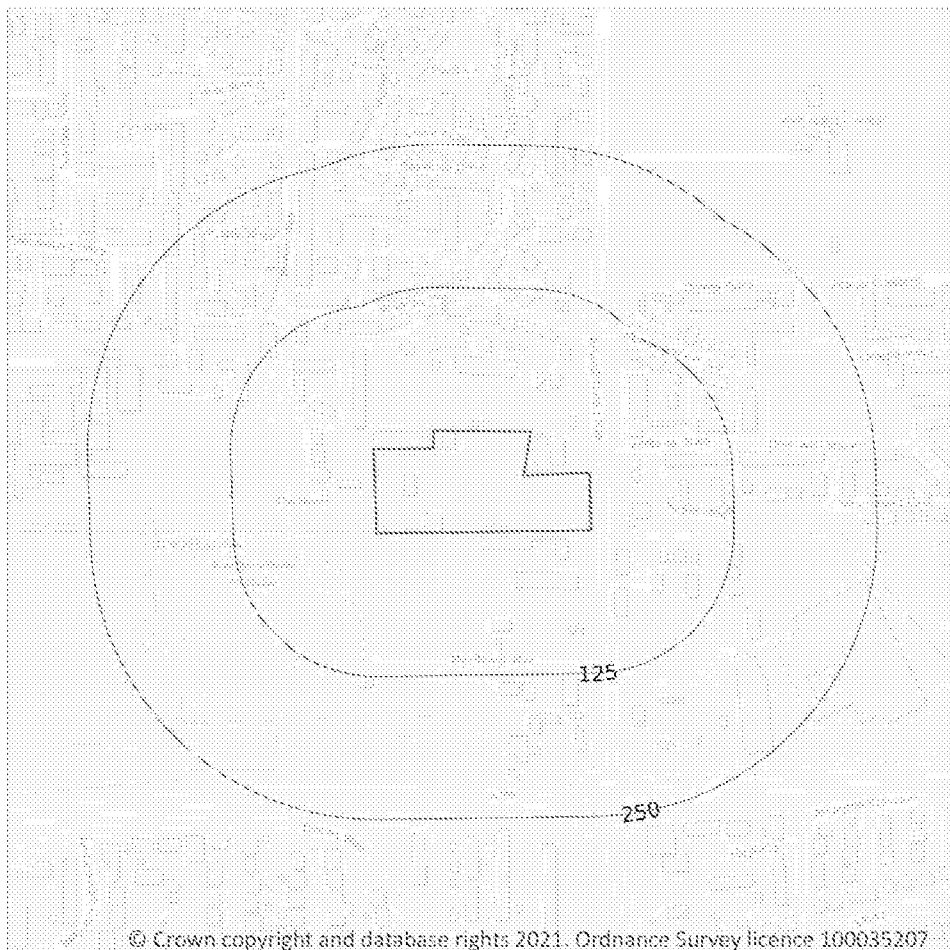
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on [page 86](#)

Location	Hazard rating	Details
On site	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

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17.3 Compressible deposits

Records within 50m

1

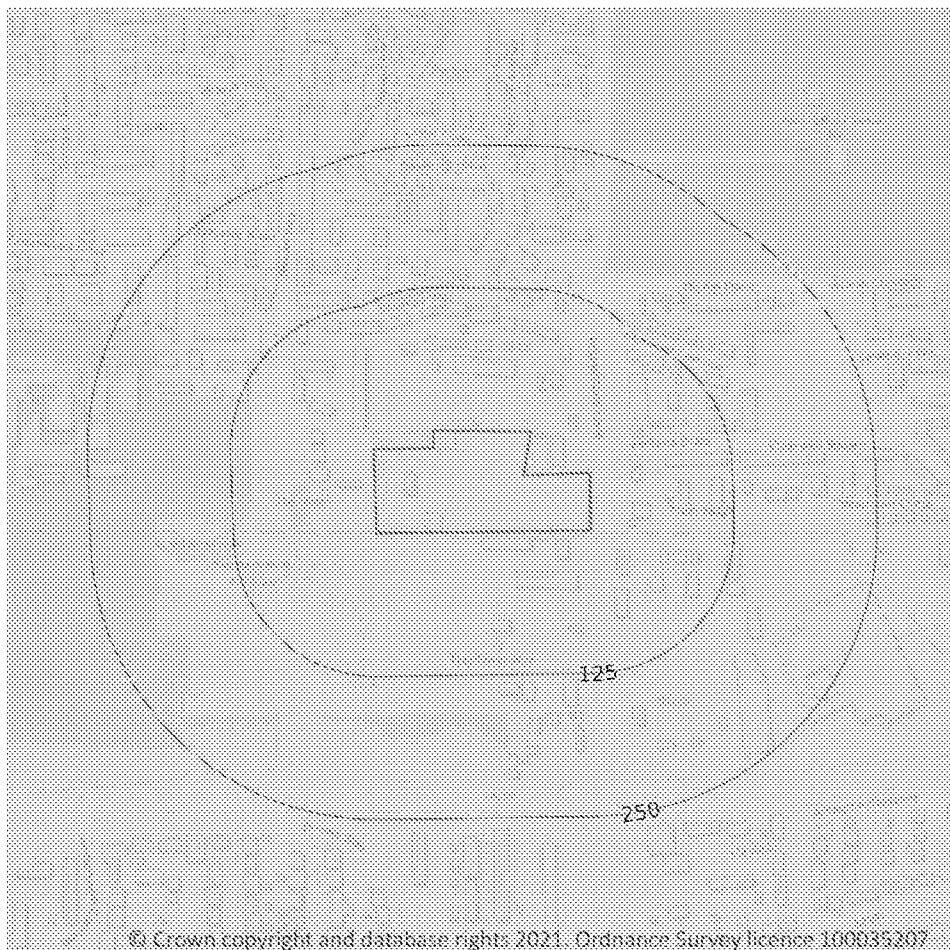
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on [page 87](#)

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.4 Collapsible deposits

Records within 50m

1

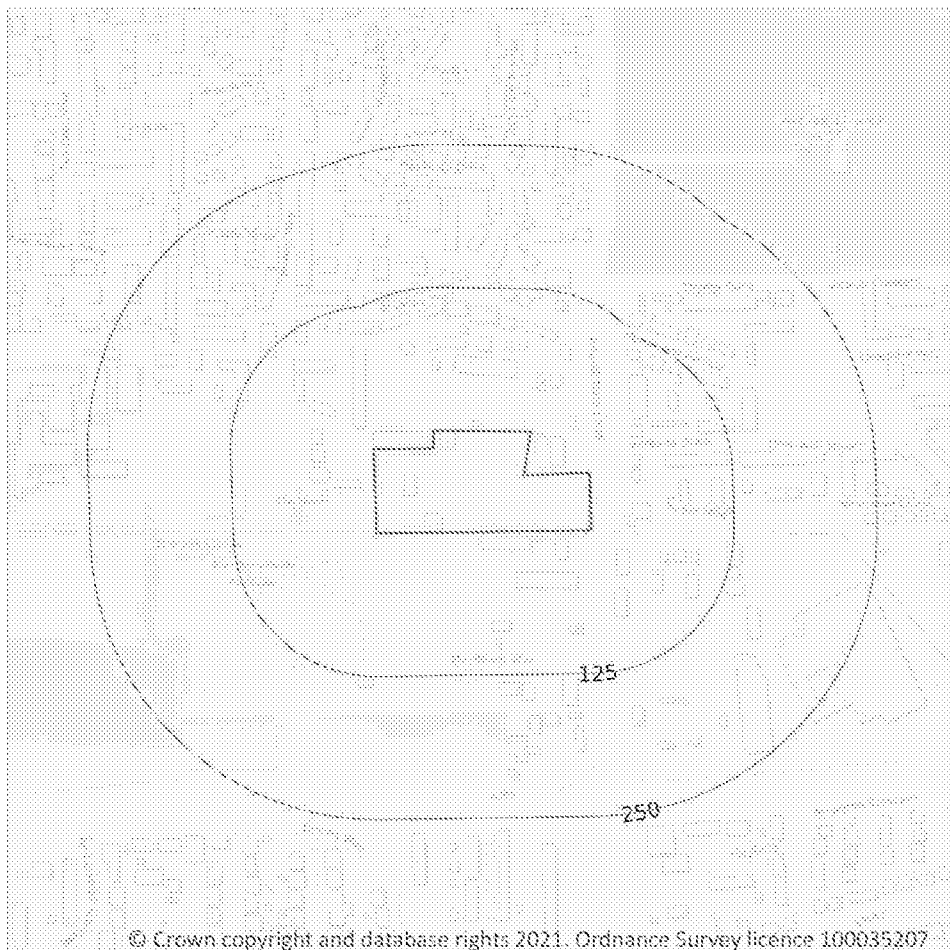
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on [page 88](#)

Location	Hazard rating	Details
On site	Low	Deposits with potential to collapse when loaded and saturated are possibly present in places.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

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17.5 Landslides

Records within 50m

1

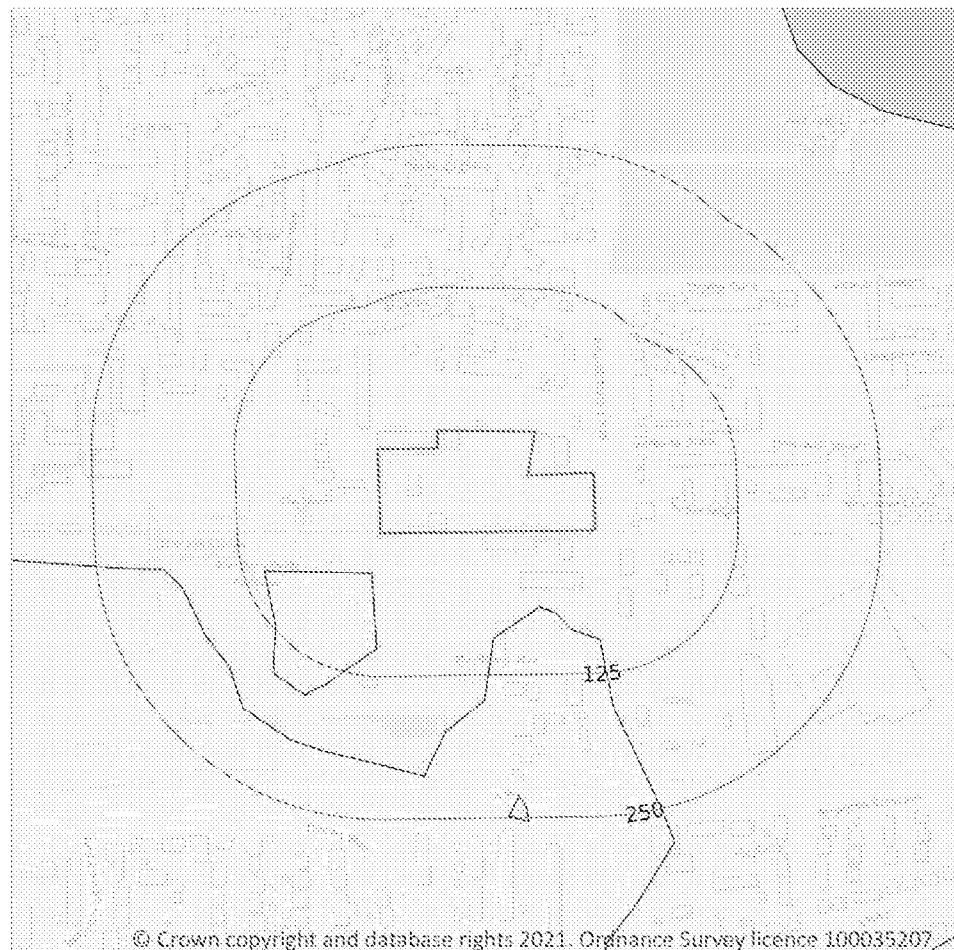
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on [page 89](#)

Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



17.6 Ground dissolution of soluble rocks

Records within 50m

2

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on page 90

Location	Hazard rating	Details
On site	Very low	Soluble rocks are present within the ground. Few dissolution features are likely to be present. Potential for difficult ground conditions or localised subsidence are at a level where they need not be considered.

Location	Hazard rating	Details
35m S	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



- Site Outline
- Search buffers in metres (m)
- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities
- Non Coal Mining
 - Sporadic underground mining of restricted extent possible
 - Localised small scale underground mining possible
 - Small scale mining possible
 - Underground mining known or likely within or in close proximity
 - Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m

0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Peter Brett Associates (PBA).

18.2 BritPits

Records within 500m

0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m

1

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on [page 92](#)

ID	Location	Land Use	Year of mapping	Mapping scale
2	47m 5	Pond	1974	1:10000

This data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m

0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m

0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m

1

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

Features are displayed on the Mining, ground workings and natural cavities map on [page 92](#)

ID	Location	Name	Commodity	Class	Likelihood
1	On site	Not available	Chalk	A	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m

0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Peter Brett Associates (PBA).

18.8 JPB mining areas

Records on site

0

Areas which could be affected by former coal mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site

0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site**0**

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site**0**

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site**0**

Generalised areas that may be affected by historical tin mining.

This data is sourced from Mining Searches UK.

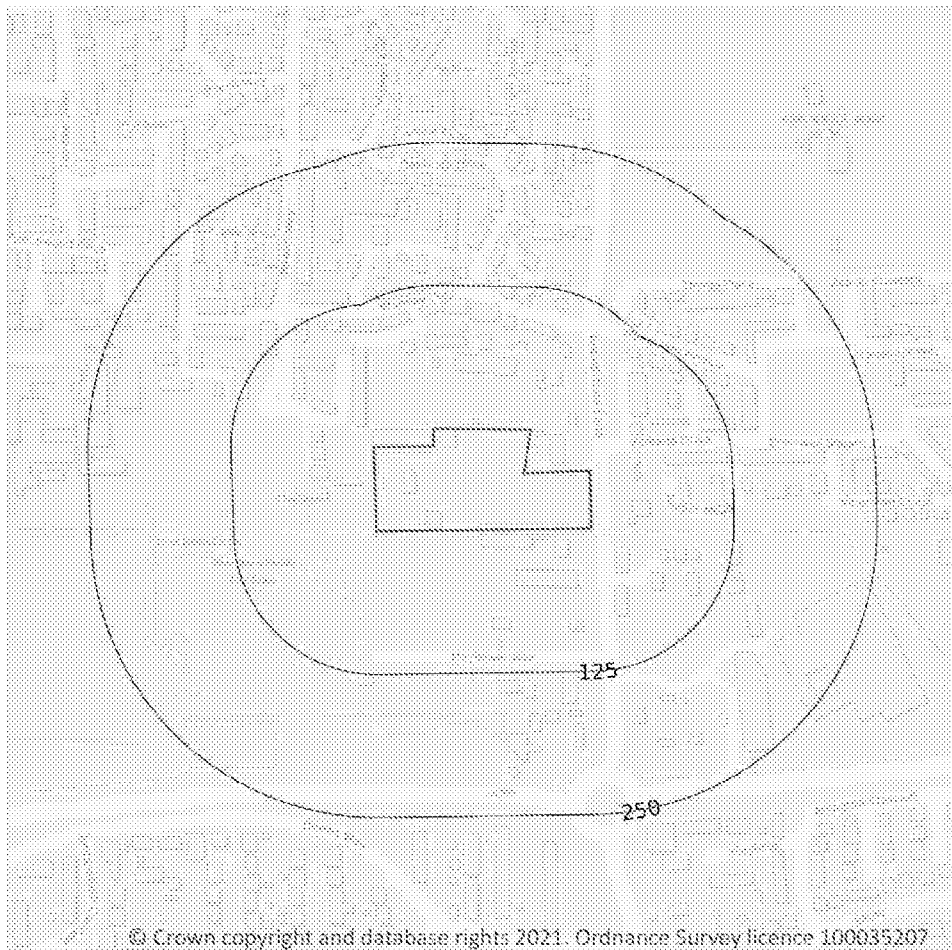
18.13 Clay mining

Records on site**0**

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



- Site Outline
- Search buffers in metres (m)
- Greater than 30%
 - Between 10% and 30%
 - Between 5% and 10%
 - Between 3% and 5%
 - Between 1% and 3%
 - Less than 1%

19.1 Radon

Records on site

1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on [page 96](#)

Location	Estimated properties affected	Radon Protection Measures required
On site	Between 1% and 3%	None

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m

3

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km²; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
35m S	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m

0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km²).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m

0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km².

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m**0**

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m**0**

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m**0**

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m**0**

Railways and tunnels digitised from historical Ordnance Survey mapping at scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m**0**

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m

0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m

0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m

0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m

0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m

0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 Ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see [REDACTED]

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link [REDACTED]



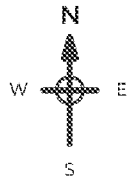
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LANE, ANGMERING, BN16 4AT

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Report Ref: GS-7588454
Grid Ref: 507298, 103457

Map Name: County Series
Map date: 1876
Scale: 1:10,560
Printed at: 1:10,560

Surveyed 1876
Revised 1876
Edition N/A
Copyright N/A
Levelled N/A



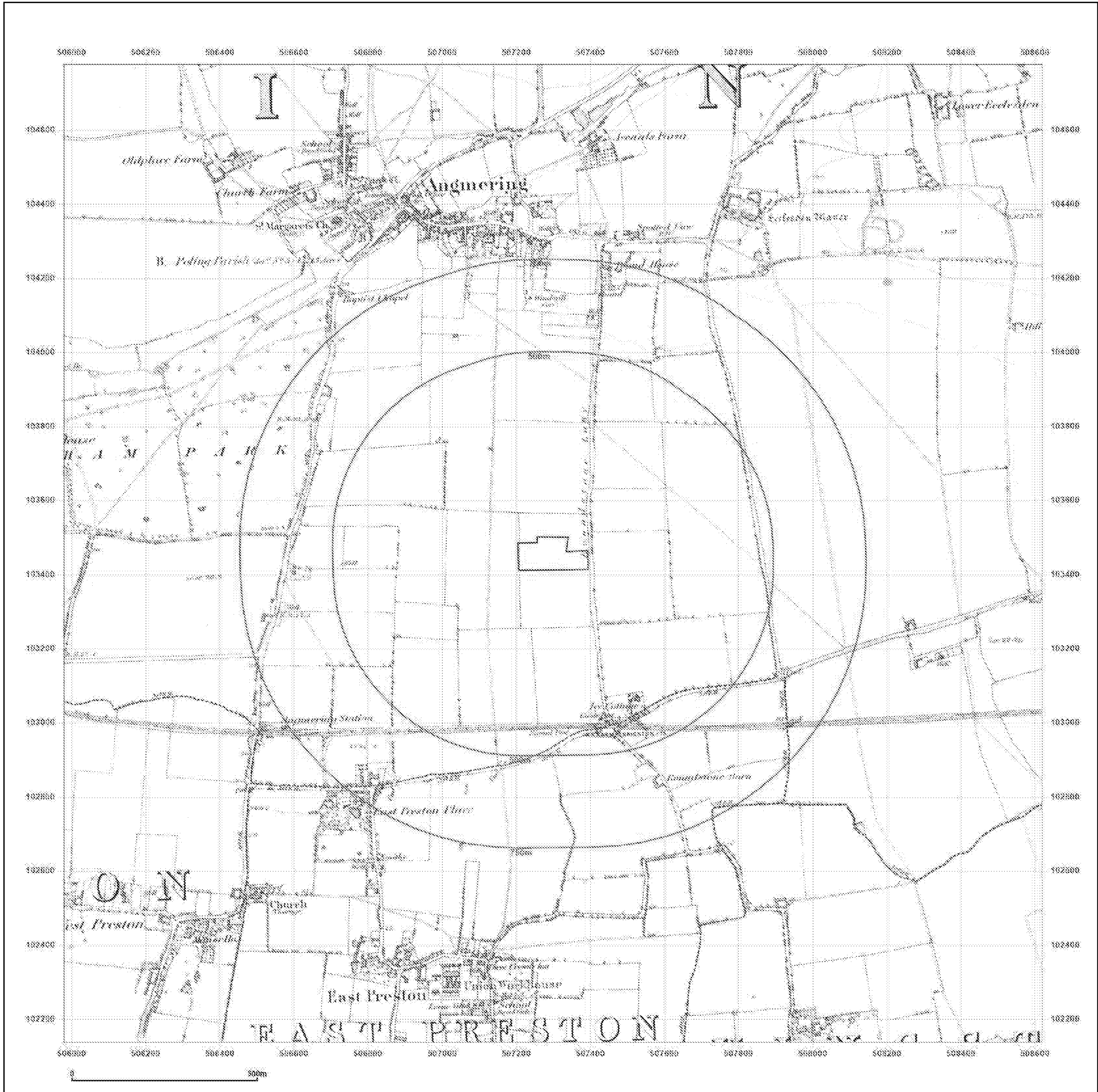
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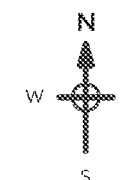
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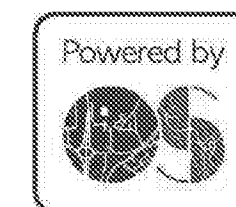
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Printed at: 1:10,560



Surveyed 1876
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A

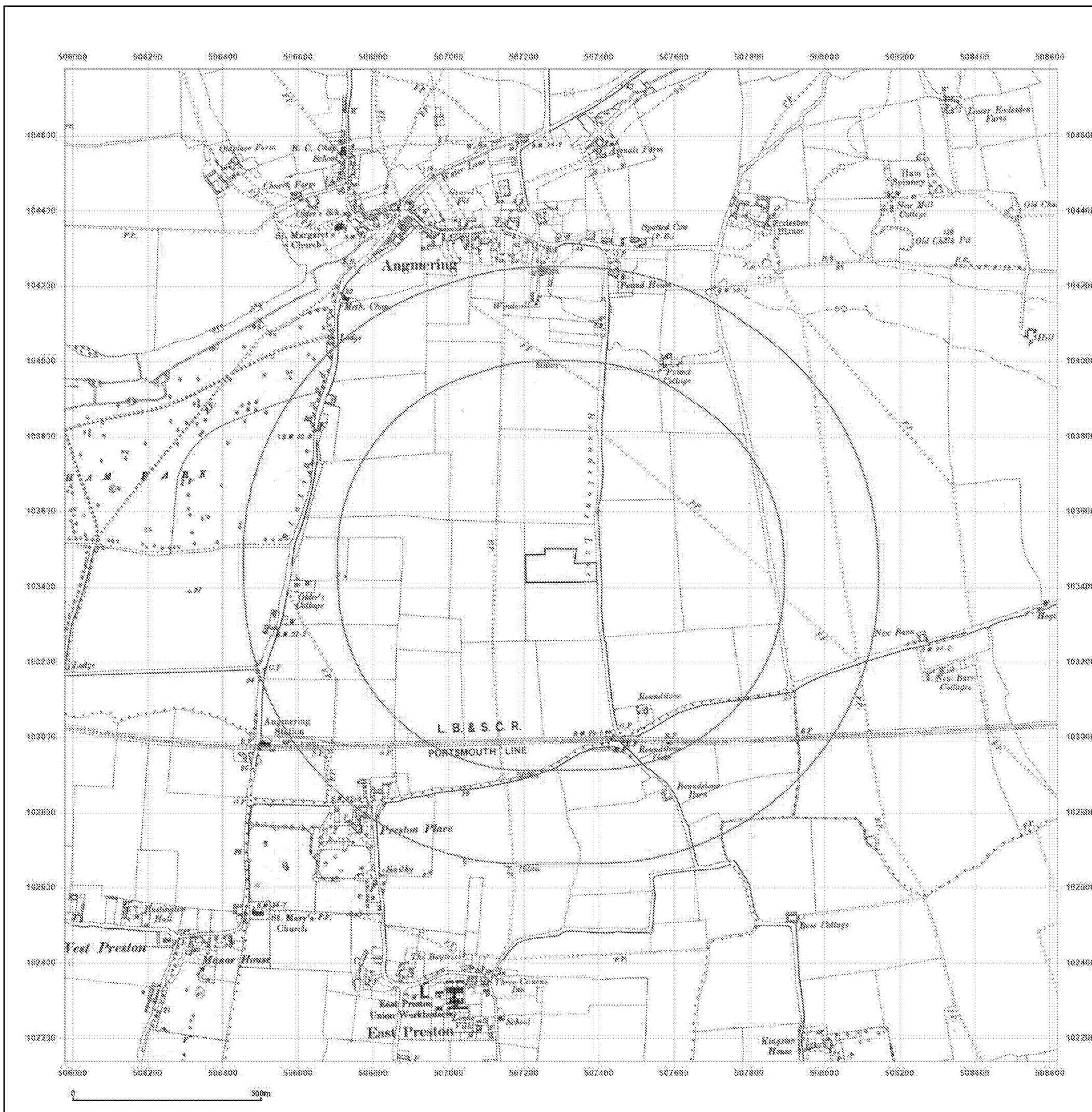


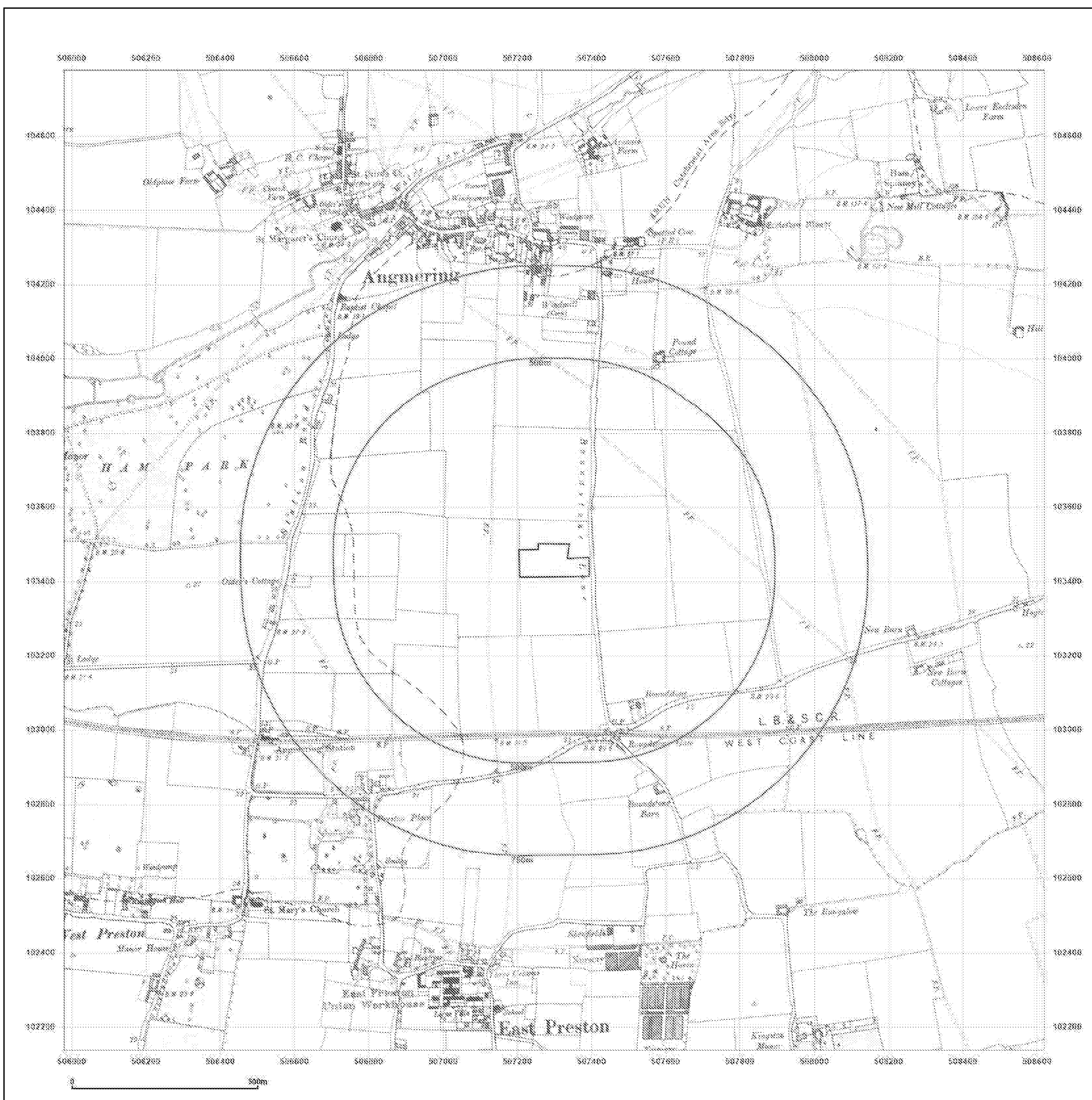
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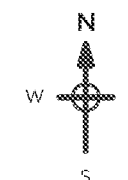
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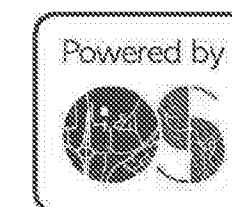
Map date: 1910

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1875
Revised 1910
Edition N/A
Copyright N/A
Levelled N/A

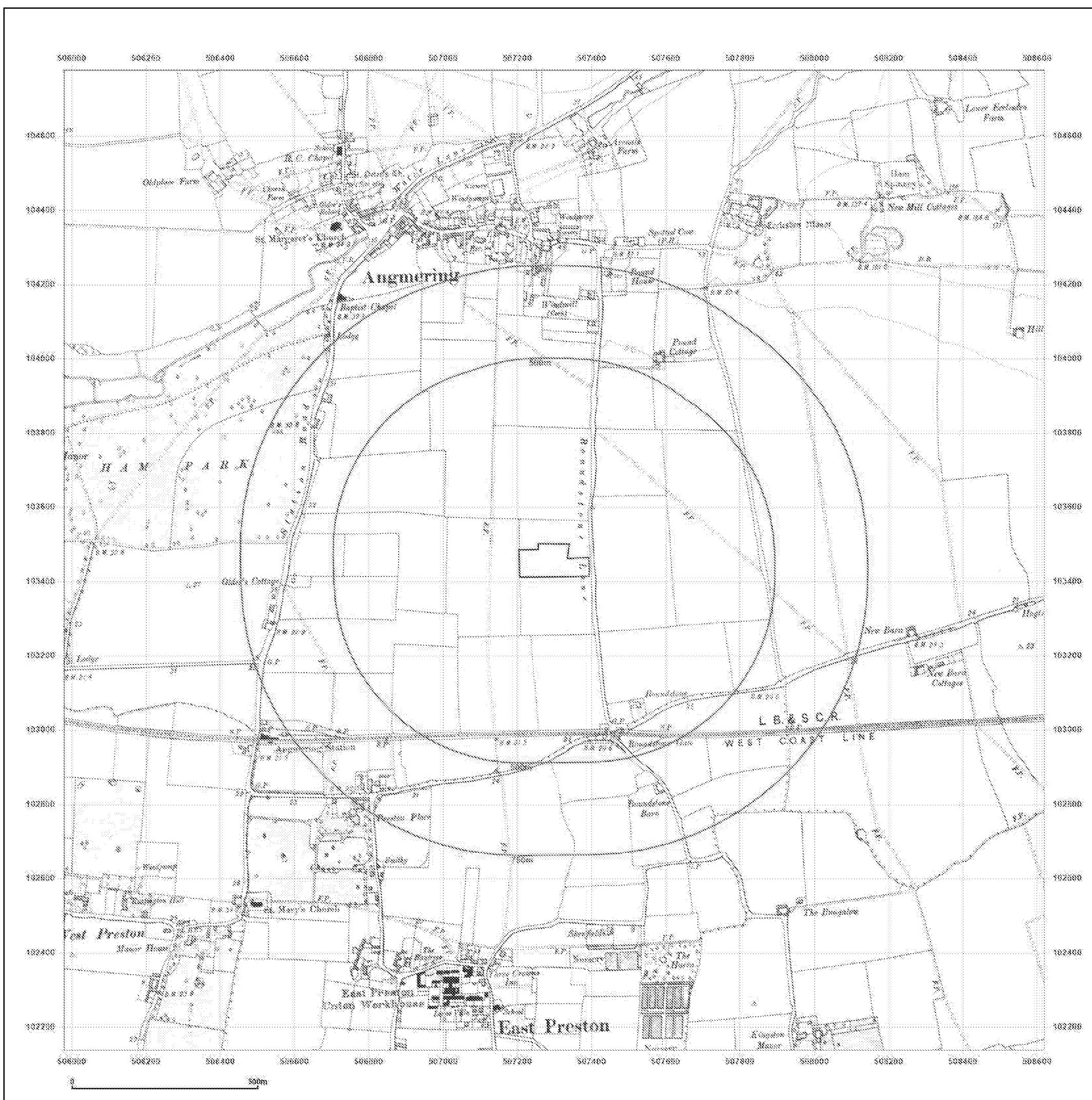


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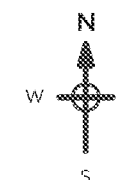
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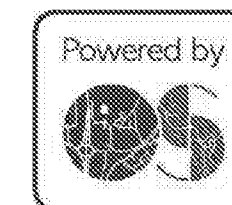
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Surveyed 1875
Revised 1910
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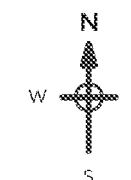
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Grid Ref: 507298, 103457

Map Name: County Series

Map date: 1932

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1875
Revised 1932
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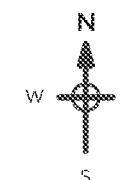
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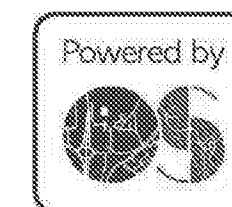
Map date: 1943

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1875
Revised 1943
Edition N/A
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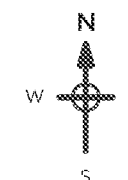
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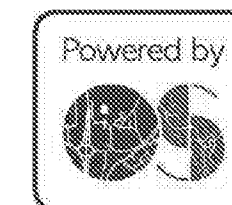
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Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1957
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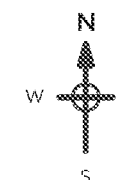
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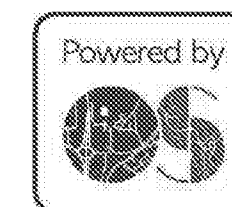
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Surveyed 1873
Revised 1974
Edition N/A
Copyright N/A
Landed N/A

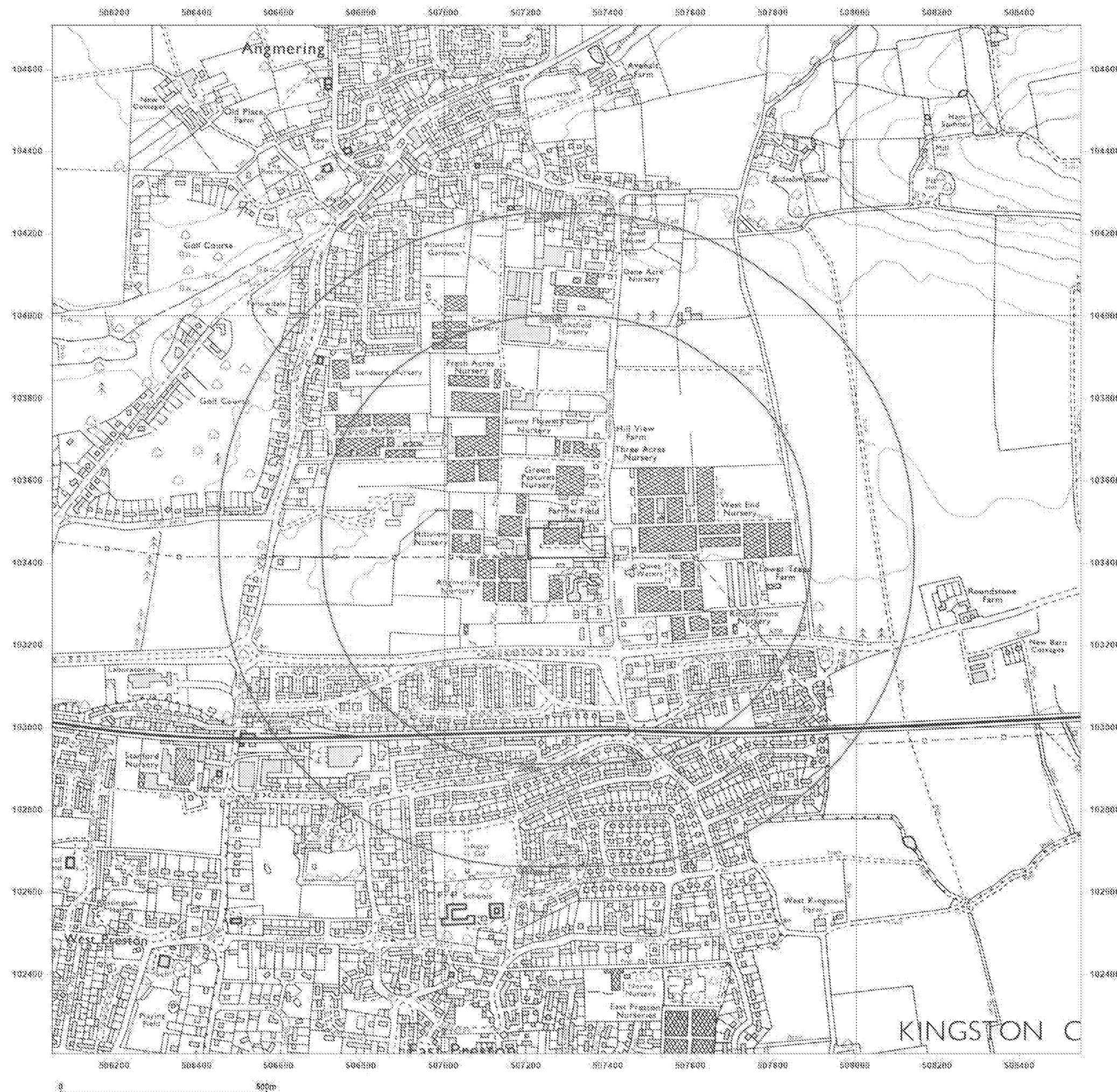


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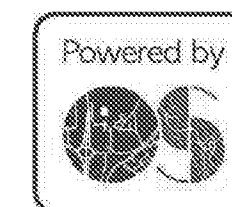
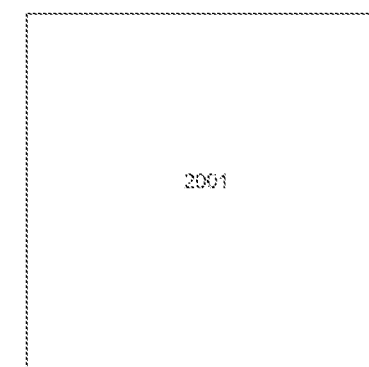
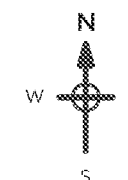
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Map Name: National Grid

Map date: 2001

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Printed at: 1:10,000

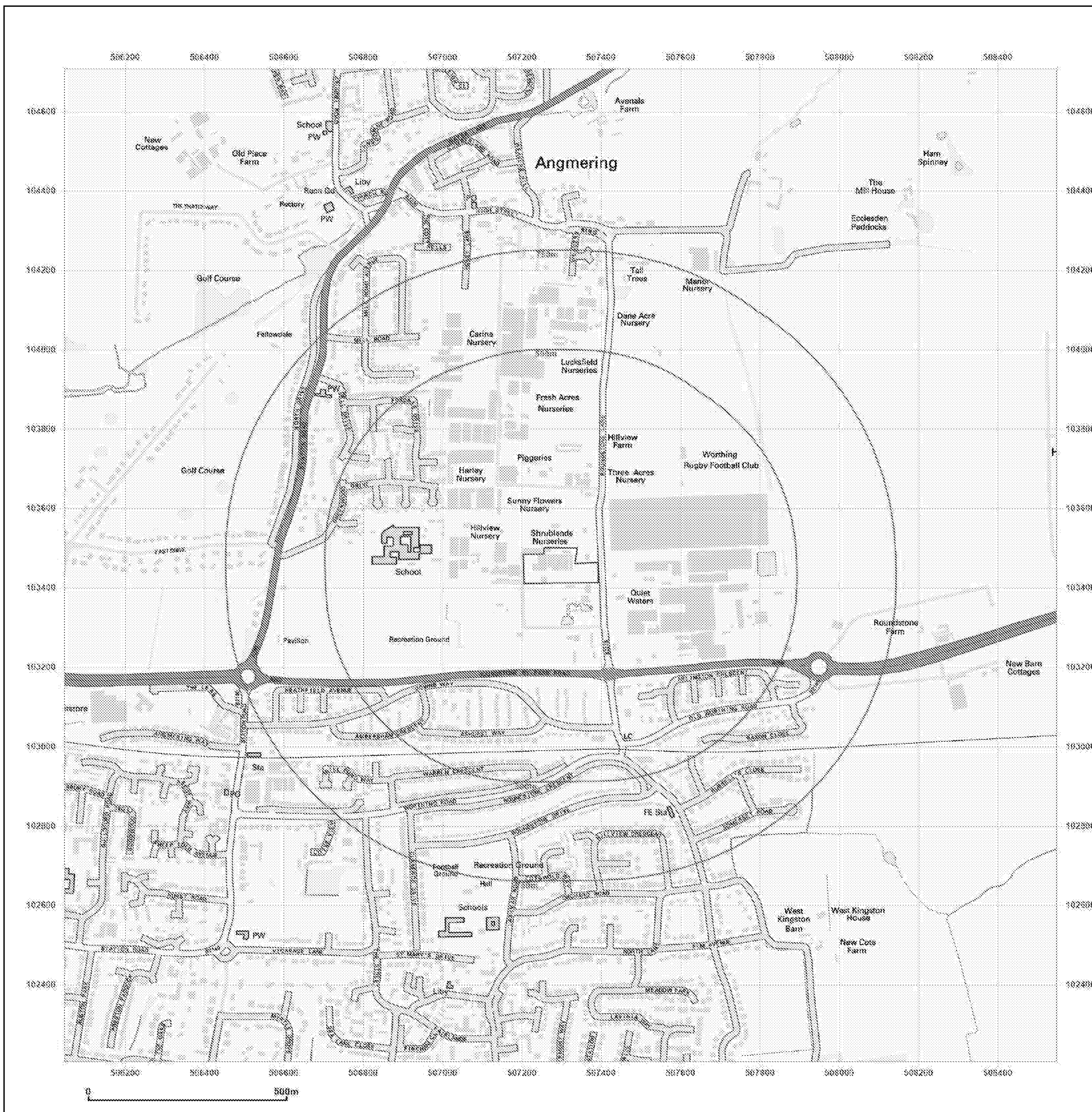


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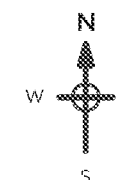
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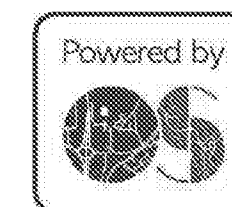
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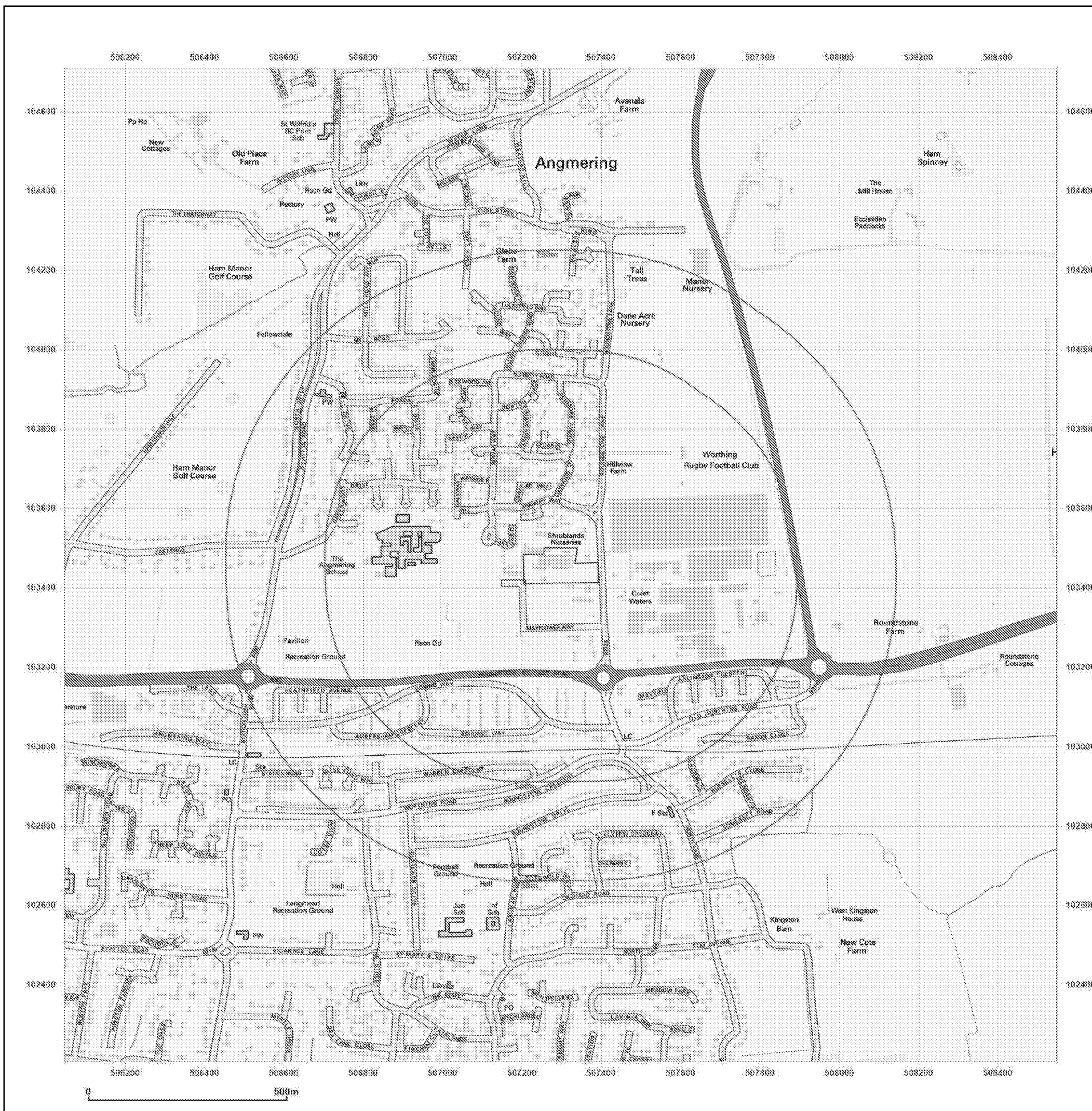


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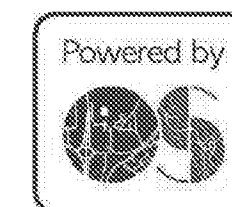
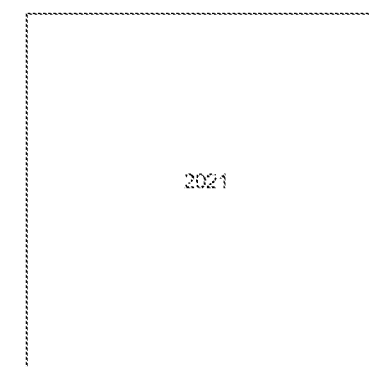
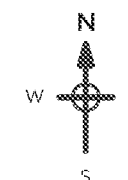
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Map Name: National Grid

Map date: 2021

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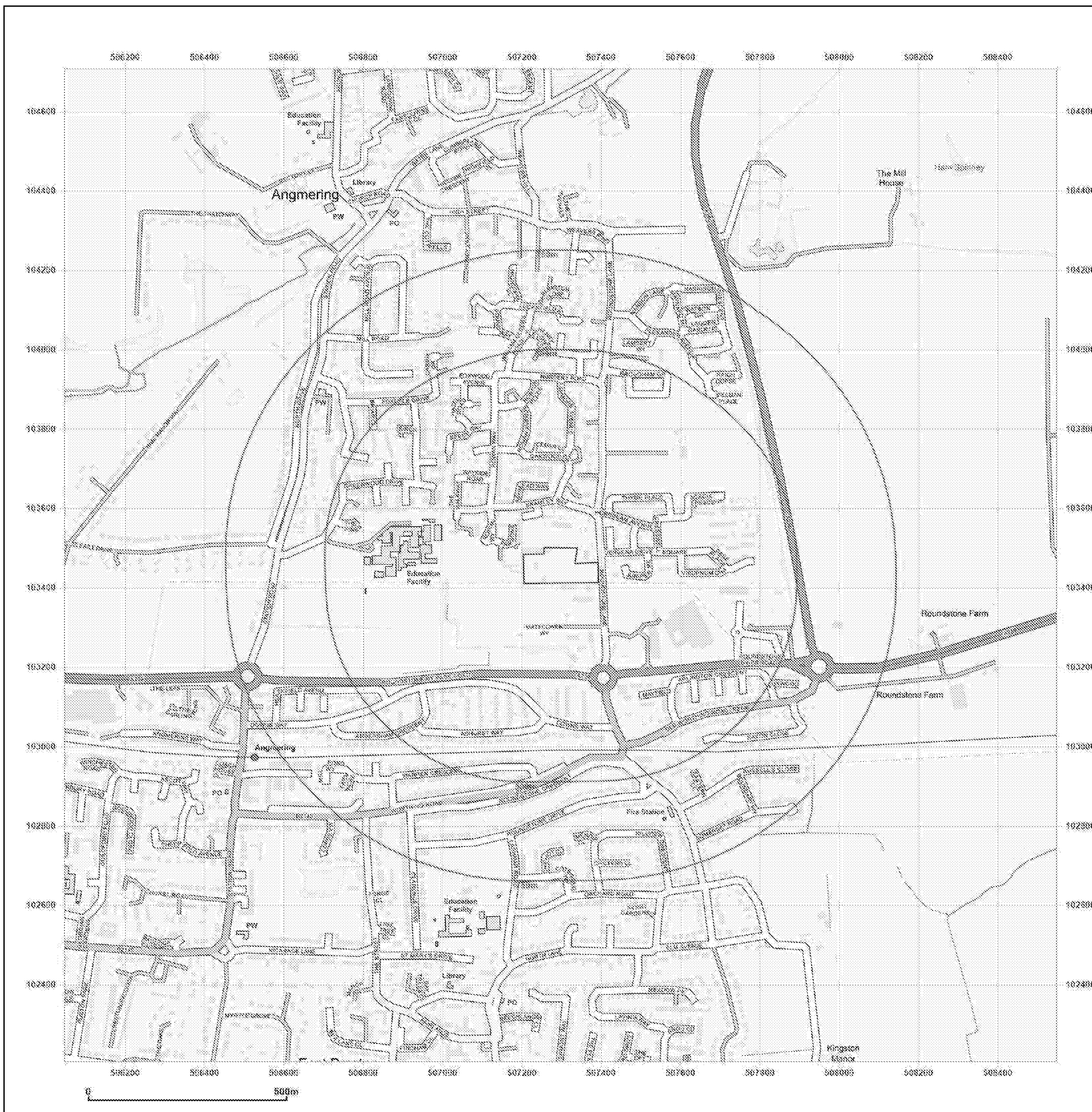


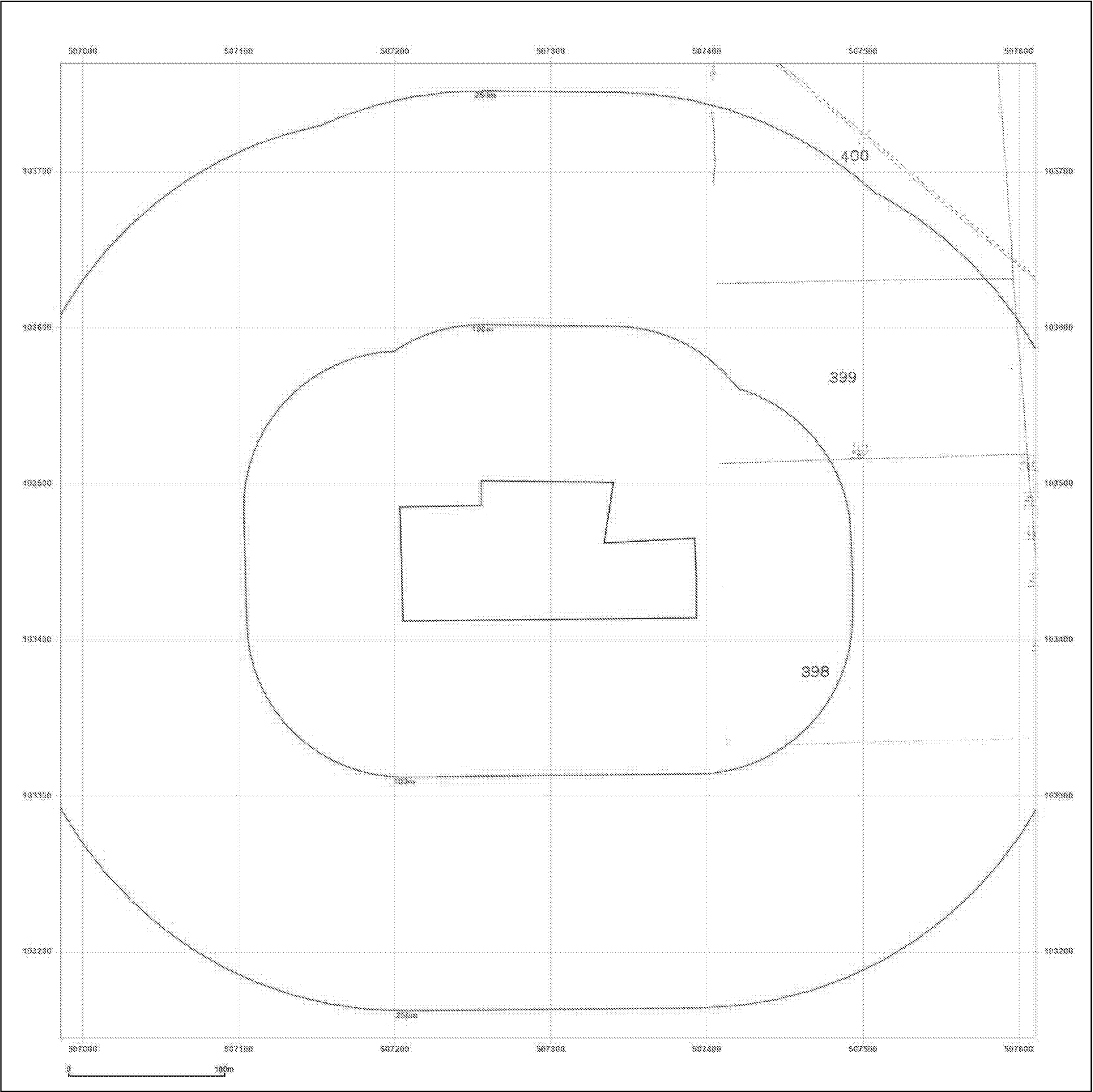
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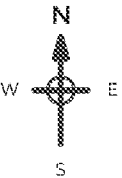
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Map Name: County Series

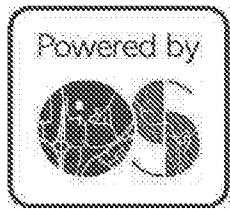
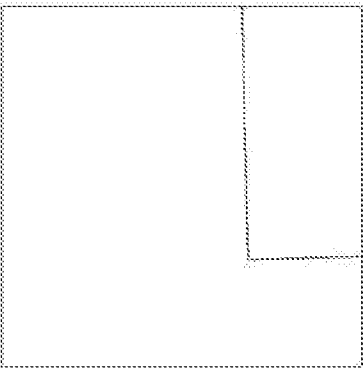
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Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1877
Revised 1877
Edition N/A
Copyright N/A
Levelled N/A

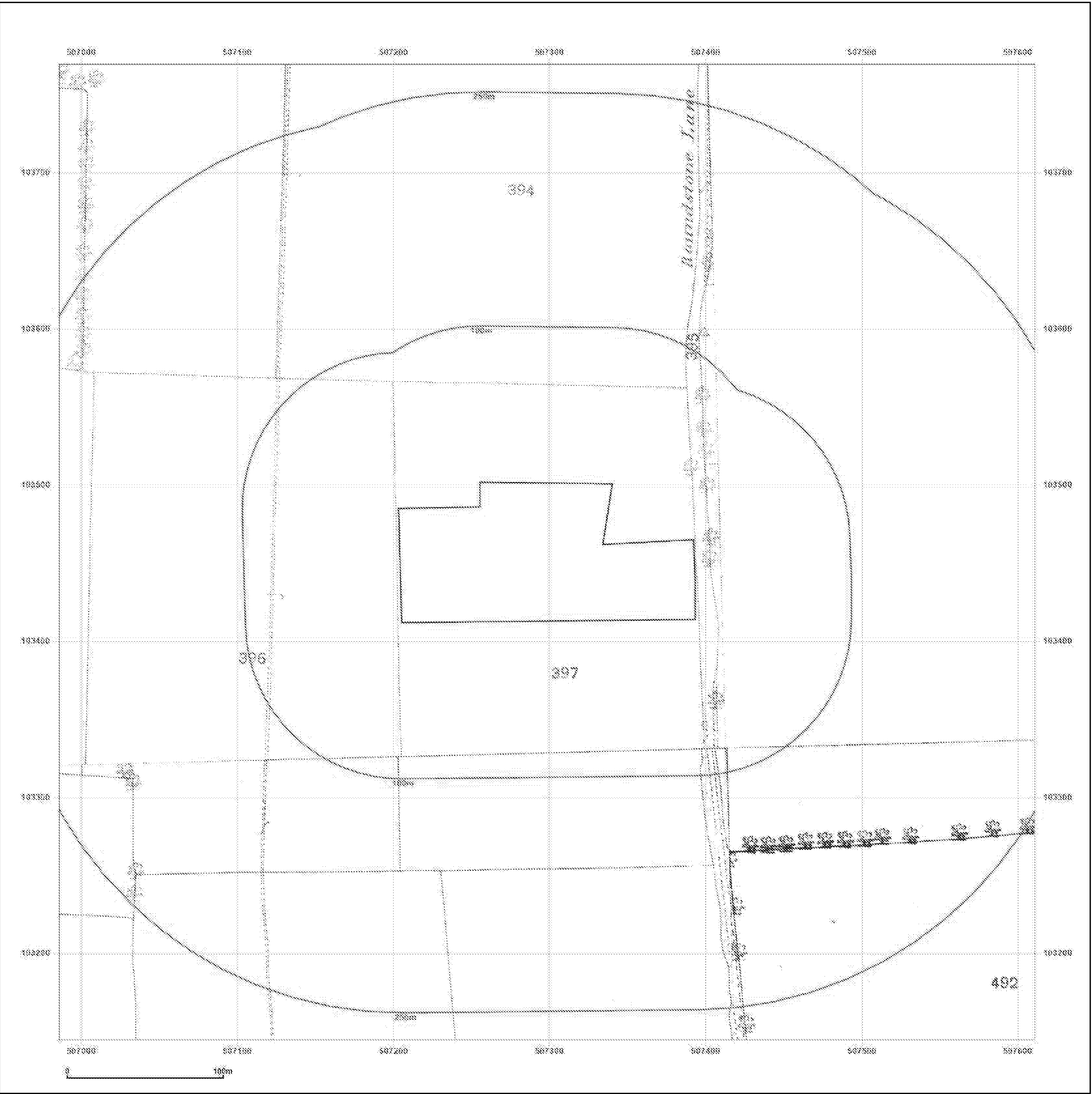


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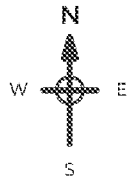
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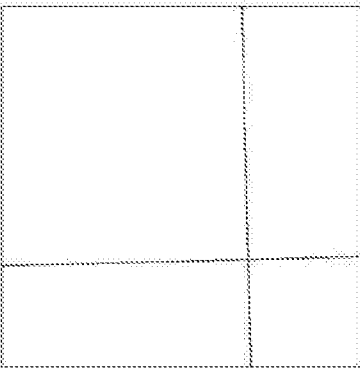
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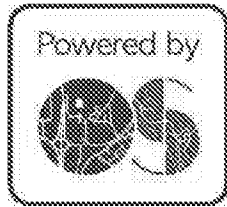


Surveyed 1876
Revised 1876
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1876
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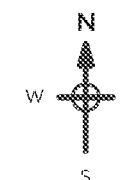
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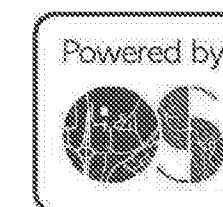


Surveyed 1897
Revised 1897
Edition N/A
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Levelled N/A

Surveyed 1897
Revised 1897
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Copyright N/A
Levelled N/A

Surveyed 1893
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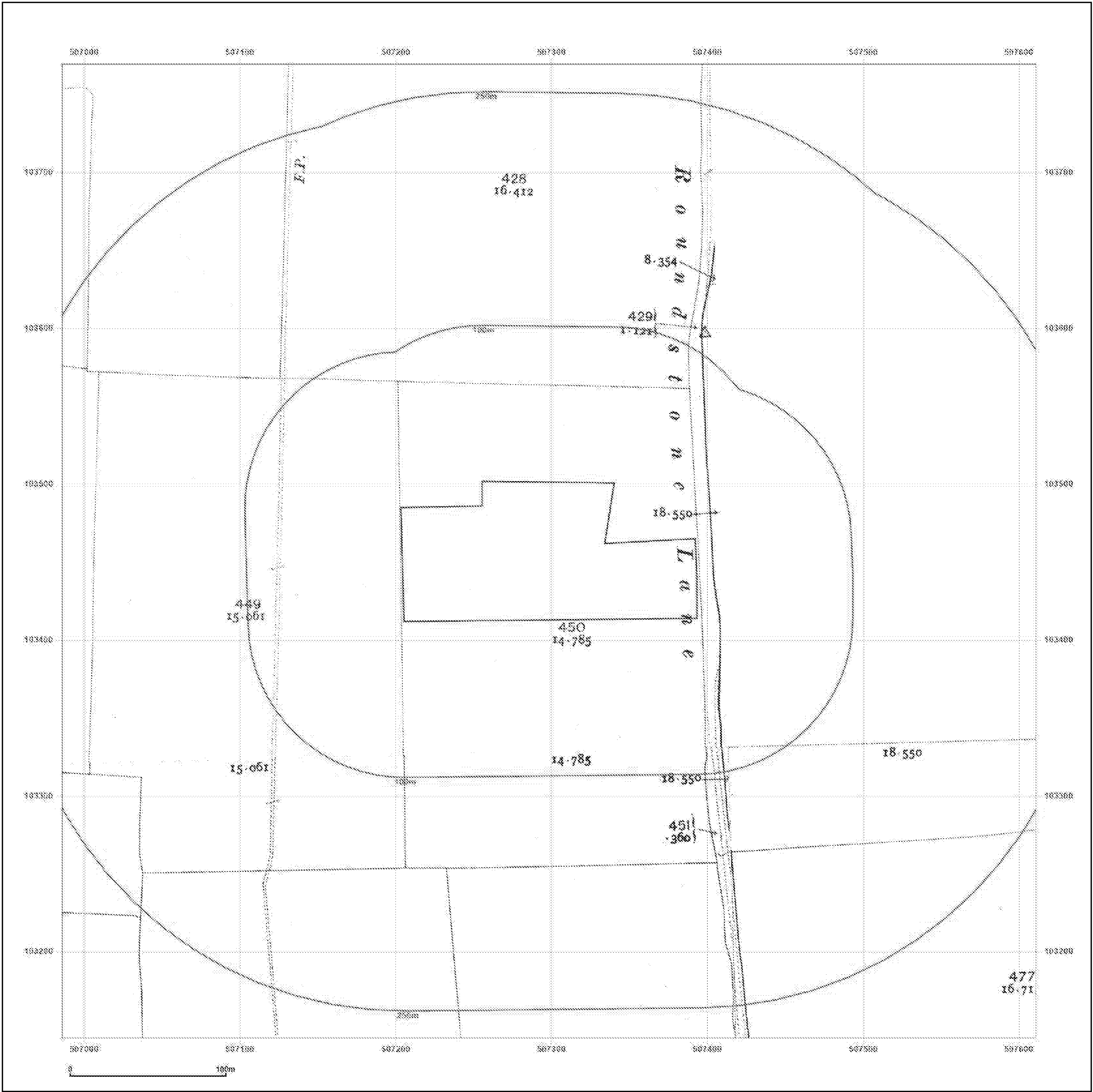


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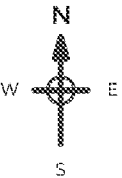
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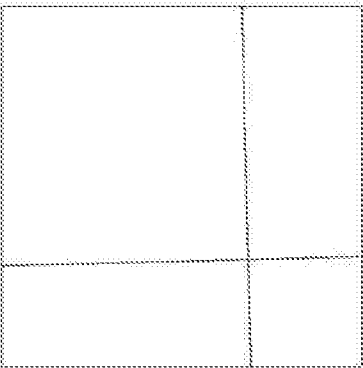
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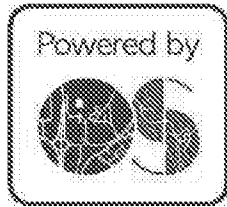


Surveyed 1911
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Edition N/A
Copyright N/A
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Edition N/A
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