A47/A11 Thickthorn Junction

Scheme Number: TR010037

Volume 6
6.3 Environmental Statement Appendices
Appendix 9.3 – Preliminary Sources Study Report Part 1 of 2

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

March 2021

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

The A47/A11 Thickthorn Junction Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT APPENDICES
Appendix 9.3 – Preliminary Sources Study Report Part 1 of 2

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Preliminary Sources Study Report

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A47 Thickthorn Junction Improvements

Preliminary Sources Study Report

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Standard codes for suitability models and documents See BS1192:2007 Table 5 for further details					
Revision	Status	Description	Revision	Status	Description

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1. Introduction

1.1. Background

AECOM has been commissioned by Highways England to undertake a geotechnical assessment for the A47 Thickthorn Junction Improvements. This scheme is developed in conjunction with other improvements along the A47 and the A12, and aims to improve the traffic flow in the area as well as to address road safety issues.

The site is located west of the village of Cringleford, which is approximately 5 km south-west of Norwich. The Thickthorn Interchange is located where the A11 crosses the A47 Norwich Southern Bypass (Figure 1-1). The approximate National Grid reference at the centre of the existing roundabout is 618427E, 305493N. The site area is shown in Figure 1-2.

A number of options are considered for the site, namely Options 1 to 4, and these are shown on the drawings included in Appendix A: Drawings of the suggested Options.

Figure 1-1: Scheme Location

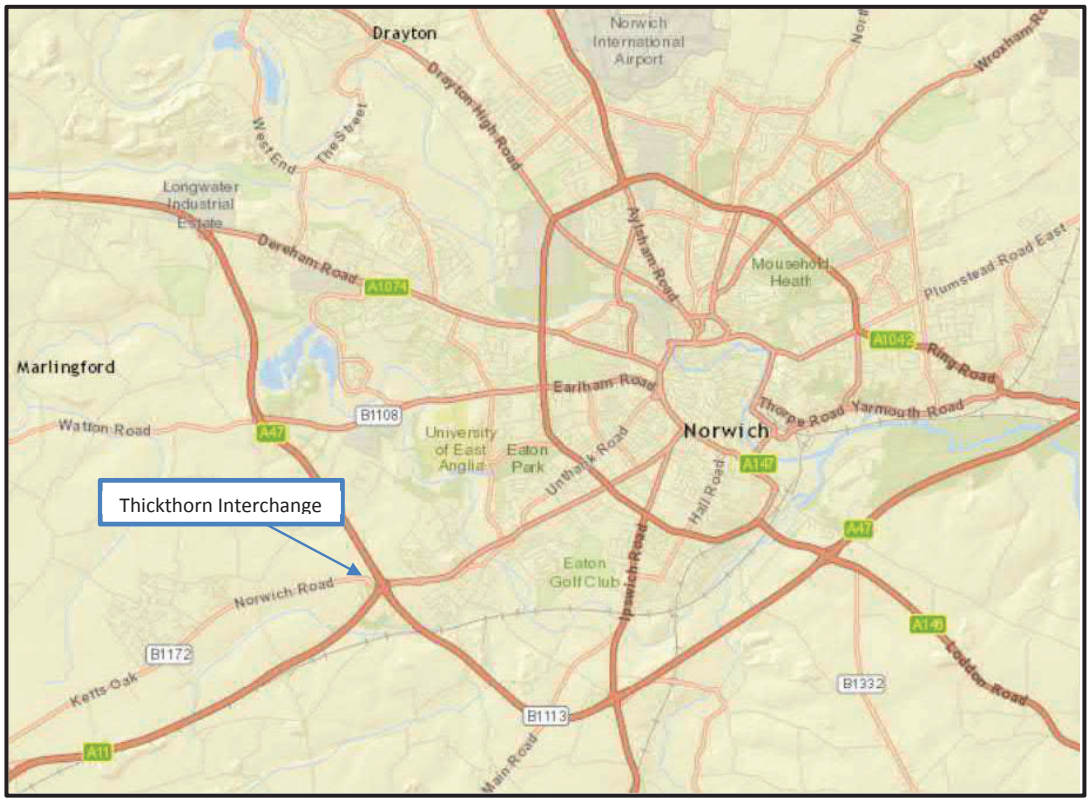
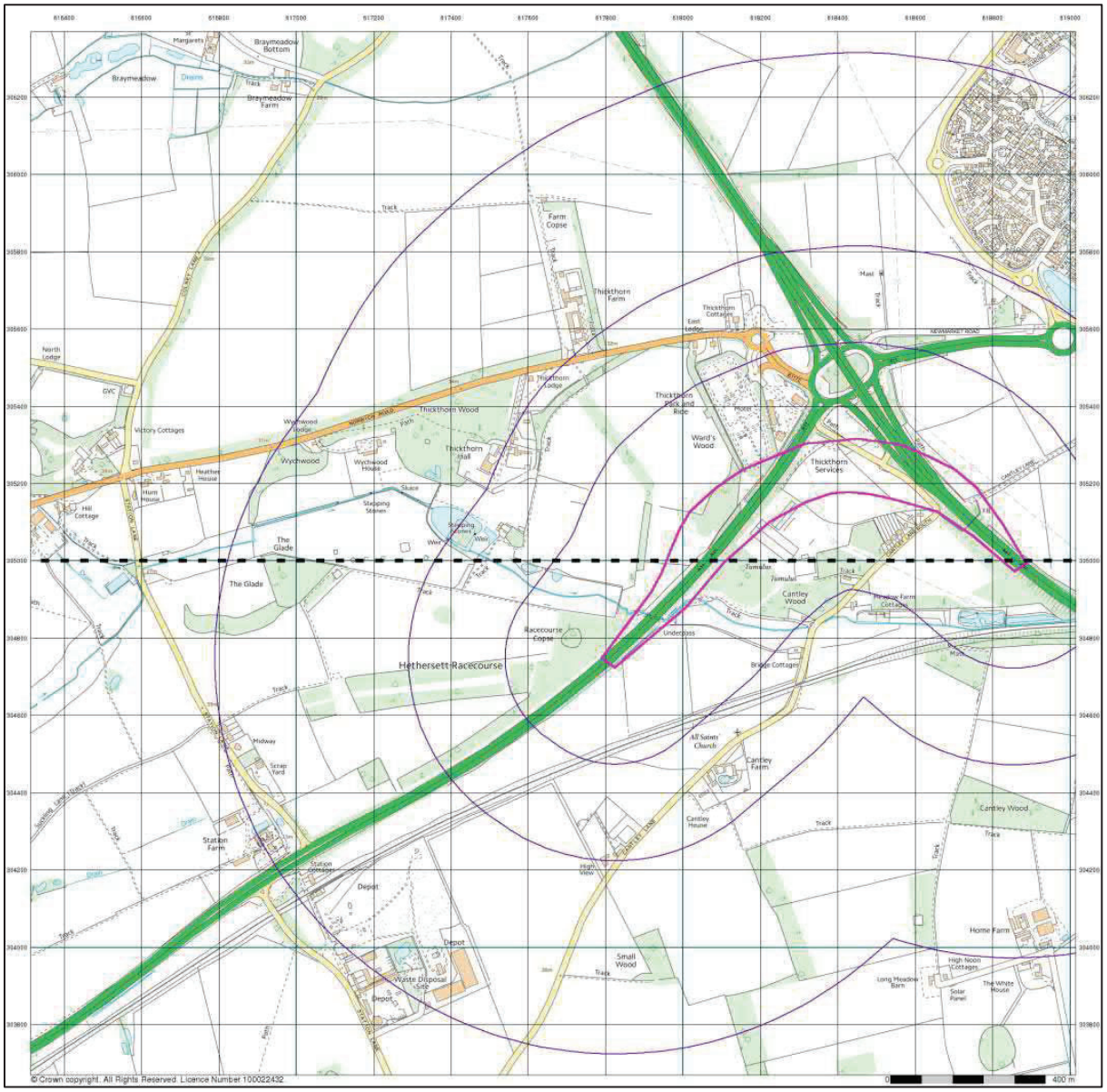


Figure 1-2: Thickthorn site area and proposed works footprint



According to HD 22/08, and considering the complexity of the proposed geotechnical works and the geotechnical risk implications to health and safety, a Geotechnical Category 2 has been established following the guidance in BS EN 1997-1:2004. The category remains consistent with the Category 2 originally assigned during Key Stage 1, included in the Statement of Intent.

Projects within Geotechnical Category 2 include conventional types of geotechnical structures, earthworks and activities, with no exceptional geotechnical risks, unusual or difficult ground conditions or loading conditions.

1.2. Purpose of Report

This PSSR has been prepared in accordance with the Highways Agency's CDF Scope Version 1.02 dated 7th November 2014, the requirements of HD22/08 "Managing Geotechnical Risk" and in general accordance with the project specific Statement of Intent

(HAGDMS Ref No 29235). Revision P01 of the PSSR examining a Single Option was issued to Highways England for comments on 16/03/17, however, following public consultation a number of different options arose. This revision of the PSSR (Rev. P02) has been produced to reflect this and at the same time address the comments received from Highways England on 23/05/17.

The purpose of this report is to collate and provide an assessment of readily available information pertinent to the ground related aspects of the scheme including historical, geological, hydrological, hydrogeological and any specific surveys.

The main site area extends to a total of 15.75 Ha. The Envirocheck report divides the area to slices that allow a more detailed search, with varying scales. The search buffer used for the study area also varies according to the specific features interest, such as 1000m for hydrological features.

This information will be used to support the design process, evaluate ground risks and identify the scope of any further investigations required to manage ground risks and facilitate detailed design.

1.3. Previous geotechnical studies in the area

A number of geotechnical studies have been conducted in the study area. These are the following:

- A11 Wymondham to Cringleford Improvement
- A47 Norwich Southern Bypass
- A11/A47 Cringleford Thickthorn Interchange

These studies are part of the HAGDMS database, a review of which was undertaken in May 2016. The most relevant reports are also presented in Chapter 2 and are listed in Table 2-1.

1.4. Limitations of Report

AECOM Infrastructure & Environment UK Limited (“AECOM”) has prepared this Report for the sole use of Highways England (“Client”) in accordance with the Agreement under which our services were performed in the Project Support Framework, Roads Investment Strategy Schemes A47/A12 Corridor, and Provisional PCF Stage 1 Scheme Review commission. No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by AECOM. This Report is confidential and may not be disclosed by the Client or relied upon by any other party without the prior and express written agreement of AECOM.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by AECOM has not been independently verified by AECOM, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by AECOM in providing its services are outlined in this Report. The work described in this Report was undertaken between January and June 2017 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

AECOM disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to AECOM's attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. AECOM specifically does not guarantee or warrant any estimate or projections contained in this Report.

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2. Sources of Information and Desk Study

2.1. General

A review of the Highway Agency Geotechnical Data Management System (HAGDMS) database was undertaken in May 2016. The most relevant reports are listed in Table 2-1. Other reports related to the construction of the A12 and adjacent roads are also available on HAGDMS but are not listed below. Pertinent historic boreholes are also presented in Appendix B: List of Historic Borehole Logs and a number of historic BGS fieldwork maps are included in Appendix C: Geological Maps & Memoirs.

Table 2-1: Sources of Information

Scheme Title	Report Title	Year	HAGDMS Ref. No.
A11 Wymondham to Cringleford Improvement	Factual Report	1982	7792
	Site Investigation Interpretation	1983	7794
	Supplementary Site Investigation	1985	7796
A47 Norwich Southern Bypass	Site Investigation	1982	8289
	Supplementary Site Investigation for the Inner Alternative Route (Keswick)	1983	8290
	Second Supplementary Ground Investigation	1988	8296
	Soils Assessment, Contract 2 - Little Melton to Cringleford	1990	8303
	Soils Assessment Report, Contract 3 - Cringleford to Trowse	1990	8305
	Site Investigation Interpretation. Addendum to Volumes 4 & 5	1990	8302
	Geotechnical Feedback Report, Contract 2 - Little Melton to Cringleford	1994	8312
	Geotechnical Feedback Report, Contract 3 - Cringleford to Trowse	1994	8311
A11/A47 Cringleford Thickthorn Interchange	Ground Investigation	2004	18581
	Geotechnical Report	2005	19536

Other sources of information are listed below:

- British Geological Survey. 1:50,000 scale Geological Sheet 161 (Norwich). Solid and Drift Edition, dated 1975. View online at http://www.largeimages.bgs.ac.uk/iip/mapsportal.html?id=1001652.
- British Geological Survey website: Geology of Britain Viewer. View online at http://mapapps.bgs.ac.uk/geologyofbritain/home.html.
- British Geological Survey, Geology of the country around Norwich, Memoir for sheet 161,1989
- Environment Agency (EA) website (historic landfill information). View online at http://maps.environmentagency.gov.uk
- Regional Unexploded Bomb Risk map for Norfolk from Zetica
- Envirocheck Report, Landmark Information Group: A47 Thickthorn Junction, Cringleford, Norfolk. Preliminary Unexploded Ordnance (UXO) Threat Assessment

- Envirocheck Report A47, Landmark Information Group: Thickthorn Junction, Cringleford, Norfolk

A summary of the previous ground investigations used in this report is presented in Table 2-2.

Table 2-2: Summary of previous ground investigations

Source	Scheme Title	Report title (HAGMDS No.)	Date	No. of Boreholes	Max Depth (m)	No. Trial Pits	Max Depth (m)	In-situ Testing	Groundwater Observation	Laboratory Testing	Comments
BGS	A11 Wymondham to Cringleford Improvement	Factual Report (7792)	1982	12 cable percussion	25.10	29	5	SPT	Standpipes/ piezometers	Yes	18 Mackintosh Probes
		Supplementary Site Investigation (7796)	1985	5 cable percussion + 1 sunk by hand auger	30	-	-	Falling head permeability tests, CPT	Groundwater was struck and recorded during boring at each hole position	Yes	-
BGS	A47 Norwich Southern Bypass	Site Investigation (8289)	1982	224 cable percussion + 6 sunk by hand auger	40	82	5.40	SPT, 92 static CPT, 17 electrical static CPT	27 standpipe piezometers	Yes	Site investigation along protected route plus several alternative routes
		Supplementary Site Investigation for the Inner Alternative Route (Keswick) (8290)	1983	32 cable percussion	23	12	4.5	SPT	6 standpipe piezometers (Type I)	Yes	U38 & CBR samples obtained from trial pits
		Second Supplementary Ground Investigation (8296)	1988	90 cable percussion	45	25	4.5	SPT, in situ hand vane & hand penetrometer tests, 33 static CPT, geophysical testing, permeability, soakaway and pumping tests	4 standpipe piezometers (Type I) and 24 piezometers (Type II)	Yes	Undisturbed samples were recovered using CBR moulds from the trial pits

Source	Scheme Title	Report title (HAGMDS No.)	Date	No. of Boreholes	Max Depth (m)	No. Trial Pits	Max Depth (m)	In-situ Testing	Groundwater Observation	Laboratory Testing	Comments
BGS	A11/A47 Cringleford Thickthorn Interchange	Ground Investigation (18581)	2004	25 window sampler	10.45	1	1.30	SPT, 9 DCP tests	Boreholes were monitored for groundwater ingress as dynamic sampling proceeded	Yes	CBR derived from DCP results

3. Field Studies

3.1. Site Walkover

No formal walkover survey was conducted as part of this Preliminary Sources Study Report. Site Inspection was limited to the existing carriageways by means of a drive through supplemented by internet based aerial and street view photography.

3.2. Topographical Survey

No specific topographical survey was conducted as part of this report. However, the topography of the area is described in the existing sources of information (see Section 4.2).

4. Site Description

4.1. Location and Description

Thickthorn Junction is located west of the village of Cringleford, which is situated approximately 5 km south-west of Norwich. The Thickthorn Interchange is located where the A11 crosses the A47 Norwich Southern Bypass. The approximate National Grid reference at the centre of the existing roundabout is 618427E, 305493N.

The greater area surrounding Thickthorn Junction is mainly agricultural, with parts occupied by residential and commercial structures. The area around Newmarket road at the east of the site is mainly residential with agricultural land occupying the parts adjacent to the roundabout. South of the roundabout, between A11 and Cantley Lane Street, a number of cottages are present. East of the junction a large commercial complex exists.

4.2. Topography

Thickthorn Interchange is sited within a high point of the surrounding land north of a minor tributary of the River Yare (Cantley Brook) and west of the main river valley. The interchange is cut into the land at this point and sits below natural ground level. The average elevation at the site is approximately 32m OD at the interchange. The elevation drops towards the east and south, reaching the lowest value of approximately 18m OD near Cantley Brook. Elevation towards the north decreases more gradually to 25m OD at Round House Roundabout.

It is a focal point for roads in the immediate vicinity, being a junction between not only the A11and A47 Trunk Roads, but also the B1172 and a number of minor local roads.

4.3. Geology

Information regarding the geology of the study was obtained from previous ground investigations available at HAGDMS, the BGS online portal and the 1:50,000 British Geological Survey Map, Solid and Drift Edition (Sheet 161 for Norwich) with the accompanying memoir. A summary of the geological sequence of the study area is presented at Table 4-1. A geology map of the area is given below in

Figure *4-1*.

Table 4-1: Geology of the study area

Origin	Geological Deposit		Geological Period
Superficial Deposits	Alluvium		Holocene & Pleistocene
	Glacial Deposits	Glacial Sands and Gravels	
		Head Deposits	
		Glacial Till	
Bedrock		Norwich Crag	Pleistocene
		Upper Chalk*	Cretaceous

*Upper Chalk: Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation (Undifferentiated) (from http://www.bgs.ac.uk/lexicon, 2017)

Bedrock Geology

Bedrock in the area comprises Chalk of the White Sub-Group, formerly known as the Upper Chalk Formation. The BGS lexicon indicates that the sub-group includes the Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation.

The Chalk is shown to outcrop in the lower valley sides where the A47 crosses Cantley Brook, south of Thickthorn Interchange and is indicated to extend at least 30m below ordnance datum.

Superficial Geology

The superficial geology consists of Glacial Sand and Gravel (Sheringham Cliffs Formation) and Glacial Till (Lowestoft Formation).

The BGS mapping indicates the interchange and an area extending approximately 350m to the south is underlain by glacial till of the Lowestoft Formation. Further south and north of the interchange both the A11 and A47 are indicated to be underlain by the Sheringham Cliffs Formation.

The BGS 1:50,000 scale map for Norwich (sheet 161) includes a geological section which runs approximately 1km west of the Thickthorn Interchange through similar glacial deposits. The geological section indicates that the Lowestoft Formation is generally underlain by the Sheringham Cliffs Formation, however, at the boundary between the strata the deposits may be interleaved.

From the available ground investigation information the glacial till is approximately 8-10m in thickness and typically described as soft to firm, orange to brown with black mottling, slightly sandy slightly gravelly clay. The gravel is angular flint and chalk. Bands of sands and gravel are present within the glacial till.

The glacial sands and gravels are approximately 5-6m in thickness and typically described as medium dense light brown fine to medium sand, becoming orange brown with depth, and slightly clayey with some gravel. These deposits are shown to outcrop in the lower areas south of the interchange; however, glacial till was also recorded in an existing borehole near to Cantley Brook underlying a layer of glacial sands and gravels.

Alluvium comprising clay, silt, sand and gravel is present along the line of the watercourse (Cantley Brook) 700m south west of the interchange under the A11 and under the A47 to the south east. This tract of alluvium follows the course of Cantley Brook which flows alongside the railway line eastwards towards the River Yare.

Fault Geology

There are no known fault features in the vicinity.

Sensitive Geological Areas

There are no SSSIs or sites of geological interest within 2km of Thickthorn junction. However, the proposed road improvements do fall into the wider SSSI Impact Risk Zones designated around a number of SSSIs mainly relating to chalk pits or ecological systems feeding from the chalk aquifer.

Environment Agency maps show that the site is within a nitrate vulnerable zone (NVZ) for groundwater and surface water due to the extensive agricultural use of the area.

Land adjacent to the existing road network classifies as Grade 3 Agricultural Land. Some areas north of the A47 Thickthorn Interchange and east of the Norwich-Ely railway line have been mapped in more detail according to the new Agricultural Land Classification (ALC) system and have been classified as Grades 2, 3A and 3B, with Grades 1, 2 and 3A designated as Best and Most Versatile Agricultural Land.

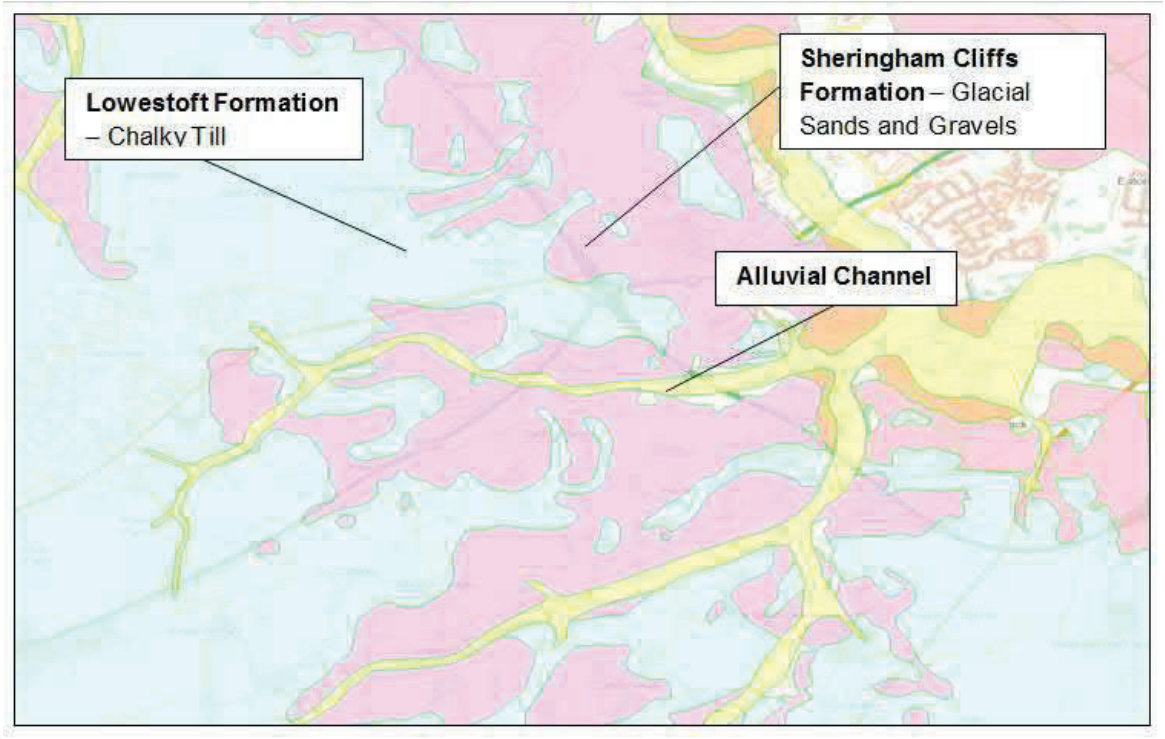
An historic landfill site is recorded on old OS plans and by the Environment Agency north of Cantley Brook close to where it is culverted below the A11 adjacent to the eastern edge of the A11. Cantley Lane landfill was operated between 1961 and 1969 receiving inert, industrial, commercial and household wastes.

A gravel pit is shown on the historical OS maps east of Cantley Lane South and the current footbridge, immediately south of the A47. The pit is first identified on the 1993 1:2,500 map edition and although its footprint is shown on the 2000 1:10,000 map it cannot be identified on the 1999 or current aerial photography, suggesting that the pit is now infilled. As the time of operation of the gravel pit roughly coincides with the construction of the A47 it is thought that it may have been used as a borrow pit for the scheme. The source and depth of the fill material is unknown but given the time of backfill it is likely the fill has been placed in an engineered manner. However, potential differential settlement of the proposed road embankment over the pit may occur and ground investigation is recommended to assess the risk.

The elevation of the Chalk rockhead varies from around 18mAOD at Thickthorn Interchange to 1mAOD immediately south-west of the A47 railway bridge. The existing boreholes around the A47 railway bridge indicate a difference in Chalk rockhead elevation north and south of the railway; to the north of the railway rockhead, is around 8.7mAOD whereas to the south, it varies from 1m to 5mAOD. There is therefore potential for variation in rockhead elevation over short distances. There is also the potential for solution features in the Chalk and associated zones of loose material within the overlying glacial deposits associated with them.

Perched water may be present in granular lenses or layers within the Lowestoft Formation which may be encountered within excavations. Perched water may also soften underlying cohesive glacial till.

Figure 4-1: A47 Thickthorn Superficial Geology (from BGS Geoindex 1:50,000 map)



4.4. Geomorphology

The geological landscape within the study area is relatively stable but has been highly modified by human interference.

4.5. Hydrology

The south east flowing River Yare is located approximately 1.5km north east from the study area. The Yare valley divides Norwich and Cringleford. An east flowing tributary of the River Yare is found approximately 0.6km south of the site (Cantley Brook). This tributary includes a number of secondary and tertiary rivers, most notably to the east of the site, near Meadow farm drive and Cringleford Hall.

According to HA DDMS drainage infrastructure records (http://www.haddms.com), a number of structures exist along the A47, A11 and Thickthorn junction. The Routine Maintenance Management System (RMMS) database includes manholes, gullies, channels, ditches and filter drains as drainage infrastructure. Highway drainage is discussed in the Technical Appraisal Report for the scheme.

4.6. Hydrogeology

The Environment Agency Superficial and Bedrock Aquifer Designation maps indicate the following:

- The study area is underlain by a Principal Aquifer (Chalk), formerly known as a Major Aquifer, which is highly permeable.
- This formation is overlain by low permeability drift deposits (glacial silt and clay) in the vicinity of Thickthorn Interchange and high permeability deposits (glacial sand and gravel) further to the north, east and south.
- The superficial deposits are designated a ‘Secondary A Aquifer (Sheringham Cliffs Formation) and ‘Secondary (Undifferentiated)’ Aquifer (Lowestoft Formation).

The Environment Agency classifies the Chalk bedrock as a Principal Aquifer i.e. a major aquifer that may support water supply on a strategic scale. The superficial deposits are classified as Secondary Undifferentiated and Secondary A aquifers i.e. minor aquifers where permeable layers may support local water supply or base flow to rivers. The area north-west of the A11 at Thickthorn Interchange is denoted as an Outer (Zone 2) Source Protection Zone whereas land south east of the A11 is outside the Source Protection Zone. The groundwater vulnerability maps show the area to be underlain by a Major Aquifer (Chalk) of intermediate vulnerability. The available borehole information indicates the groundwater table lies within the Chalk at approximately 15mAOD (16mbgl) at the Thickthorn interchange reducing to approximately 10mAOD (2mbgl) within the superficial deposits overlying the Chalk at the A47 railway crossing.

4.7. Discharge Consents and Groundwater Abstractions

The Envirocheck report shows a total of 3 discharge consent sites on the greater site area, with the closest ones approx. 250m east the site, where Intwood Rd crosses Cantley Brook and the railway lines. The location of the discharge consent sites are shown in Appendix E: Landmark Envirocheck Report (see Site Sensitivity Map - Slice A and Site Sensitivity Map - Slice B).

The Envirocheck also reports 20 water abstraction sites and 6 pollution incidents due to controlled waters.

The location and details of the discharge consent, water abstraction and pollution incidents sites are shown in Appendix E (Envirocheck report).

According to the Environment Agency Groundwater Source Protection Zones map (http://maps.environment-agency.gov.uk), the area of study within Options 1, 2 and 3 does not include any groundwater source protection zone.

It is noted that Thickthorn Interchange itself and part of the northwestern layout of Option 4 towards B1172 Norwich Road are within the Outer Zone (Zone 2) of a source protection zone.

4.8. Flood Records

Reference to Environment Agency website indicates the floodplain along the Cantley Brook belongs to Flood Zone 3 (assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year) (Figure 4-2). Higher ground along Cantley Brook Flood Zone 3 is designated as Flood Zone 2, i.e. area susceptible to extreme flooding (assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding, or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding).

According to the BGS Groundwater Flooding Susceptibility map there is potential for groundwater flooding along the course of Cantley Brook and potential for groundwater flooding of property situated below ground level either side of the surface groundwater flooding zone.

The Envirocheck Report further includes a map showing areas at risk of flooding from surface water. In addition to the floodplain associated with Cantley Brook, the map indicates that a part of the A47 Thickthorn Interchange Junction is also at risk of flooding from surface water, as is the A11, particularly the northbound carriageway towards the Junction, and the A47, especially the southbound carriageway east of Cantley Lane. Areas of Cantley Lane South are also shown to be at risk of flooding from surface water. Hence, it is recommended that this map is taken into consideration during the design phase of the works and particularly during drainage design.

The HA DDMS available reports confirm the aforementioned presence of the floodplain and probability of flooding. News reports available online suggest that Thickthorn roundabout is prone to flooding, with a recent incident taking place during January 2016 (http://www.edp24.co.uk, 2016).

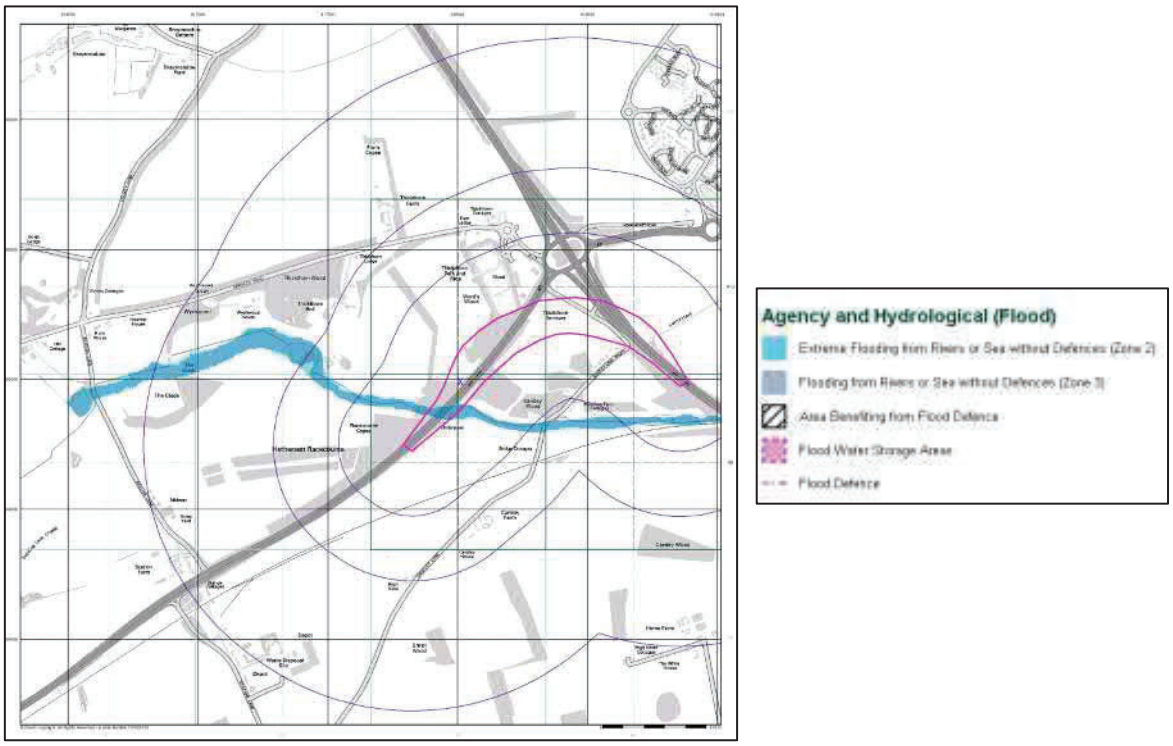
HA DDMS website includes a number of flood incidents that are presented in *Table 4-2*.

Table 4-2: Flood events at Thickthorn Junction (from HA DDMS, 2017)

System Flood ID	Date/time reported	High impact flood	Flood Severity Index	Status	OS Easting	OS Northing
16698	14 Jan 2016 20:58	No	5.04	Closed	618332.00	305687.00
16423	03 Jan 2016 19:19	No	3.92	Closed	618363.00	305513.00
19336	17 May 2017 22:00	No	3.46	Closed	618388.00	305533.00
19307	19 May 2017 07:30	No	1.01	Closed	618411.00	305547.00
16858	11 Jan 2016 14:42	No	1.18	Closed	618488.00	305540.00
16591	07 Jan 2016 11:33	No	4.61	Closed	618420.00	305488.00
12022	03 May 2012 13:45	No	0.67	Closed	618359.00	305408.00
11947	16 Jul 2011 16:03	No	2.65	Closed	618502.00	305476.00
13214	07 Jan 2014 11:02	No	2.65	Closed	618502.00	305452.00
12224	11 May 2013 17:22	No	2.65	Closed	618524.00	305394.00
8599	06 Feb 2009 11:15	No	3.58	Historic	619189.80	304768.20

According to the Landmark Envirocheck report (Appendix E: Landmark Envirocheck Report) no areas are benefiting from flood defences near the site.

Figure 4-2: Flood Map (from Envirocheck report)



4.9. Historic Land Use

Prior to the Construction of the A11 Wymondham to Cringleford improvement in the 1980's the area of Thickthorn Interchange was mixed farmland, traversed by the A11 Norwich Road. The improvement established the A11 on its current alignment as a dual carriage road, and also saw the construction of the Thickthorn Interchange allowing traffic to access local routes into Hethersett and to Cantley Road from the new dual carriageway.

The construction of the Norwich Southern Bypass (A47) in the early 1990's saw the remodelling and enlargement of the interchange to accommodate the A47 embankment, overbridges and slip roads.

A service area has been established for some time between the A11 N/B and B1172, immediately behind the cut slopes of the interchange circulatory.

A Park and Ride facility is constructed adjacent to the service area which will result in some remodelling of the B1172 approach to the interchange.

In the areas along the layout of Options 1 to 4 the land use is mainly agricultural. The countryside remains predominantly rural and little development has occurred except close to the major areas of population and the "park and ride" facilities next to the site.

According to the Envirocheck Report and the EA, there are a number of historic landfill sites at the greater area of Cringleford. A smaller historic landfill site is located along the route of A11, south of Thickthorn junction, just East of A11 at Cantley lane. The site name is Cantley Lane. The types of wastes buried are (from maps.environment-agency.gov.uk, 2017):

- **Inert**: Waste which remains largely unaltered once buried such as glass, concrete, bricks, tiles, soil and stones.
- **Industrial:** Waste from a factory or industrial process. It excludes waste from mines, quarries and agricultural wastes

- **Commercial:** Waste from premises used wholly or mainly for trade, business, sport, recreation or entertainment (excluding household and industrial waste).
- **Household:** Waste from dwellings of various types including houses, caravans, houseboats, campsites, prisons and wastes from schools, colleges and universities.

The Cantley Lane landfill was operational from 31st of December 1961 until 31st of December 1969.

The landfill sites detailed in Table 4-3 are located within approximately 4km of the junction.

Table 4-3: Details of landfill site operators in proximity to Thickthorn Junction (*from maps.environment-agency.gov.uk*, 2017)

Site Name	Grid Reference	Site Address	Operator	Operational Period	Type of Waste
Cantley Lane	618,161.75E; 304,971.25N	Cringleford, Norwich, Norfolk	Forehoe and Henstead Rural District Council	31/12/1961 - 31/12/1969	Inert, Industrial, Commercial, Household
Central Depot	617,505.58E; 303,669.5N	Heathersett, Norwich, Norfolk	Forehoe and Henstead Rural District Council	31/12/1971 - 31/12/1973	Industrial, Commercial
Morbays Tip	617,050.5E; 303,087.42N	E Carleston Road, Norwich, Norfolk	Forehoe and Henstead Rural District Council	31/12/1964 - 31/07/1984	Inert, Industrial, Commercial, Liquids/sludge
Keswick Lime Pit	621,252.08E; 304,844.25N	The Lime Works, Keswick	Howes Lime Company Limited	30/11/1989 - 30/11/1995	Inert
Harford Bridges	622,437.42E; 304,971.25N	Ipswich Road, Norwich, Norfolk	Norwhich C.B.C.	31/12/1927 - 31/12/1974	Inert, Commercial, Household

4.10. Archaeological Investigation

No archaeological investigation has been carried out as part of this preliminary sources study. However, it is noted that much of the site was comprehensively excavated at the time of original construction. According to pastscape.org.uk, there are 14 archaeology related results within 1km of the main site area. These mainly comprise historical buildings and ancient artefacts discovered some decades ago.

It is further noted that the historical OS maps included within the Envirocheck Report show two tumuli in Cantley Wood, located between the A11 and Cantley Lane South. According to MAgiC Interactive Map (http://magic.defra.gov.uk/), these tumuli are designated as Scheduled Monuments.

It is, therefore, advised that consultation with the archaeology department is carried out before any works are carried out.

4.11. Mining and Quarrying

According to the Envirocheck report, A47 Thickthorn junction, Cringleford, Norfolk, five mineral sites have been recorded in the area of study (BGS). The status for all the mineral sites is given as 'ceased'. It is considered that the workings exploited the glacial, Sheringham Cliffs Formation.

In addition, as mentioned in Section 4.3 above, a gravel pit has been mapped in the 1990s east of Cantley Lane South and the existing footbridge, immediately south of A47. The pit is currently infilled.

4.12. Potential Ground Instability

According to the Envirocheck report, the channel of alluvial deposits along the Cantley Brook has moderate potential for compressible ground stability hazards. From the existing ground investigation information near the railway bridge the alluvium includes highly compressible amorphous peat between 1.0m and 2.25m in thickness.

The potential for stability hazards from collapsible ground within the study area is indicated to be very low.

The potential for landslide stability hazards within the study area is indicated to be very low, locally low adjacent to the western railway embankment south of the A47.

The variability in the composition of the Glacial Till may lead to perched groundwater, softening of cohesive deposits and wetting up of slopes potentially causing instability.

The Envirocheck report indicates that the potential for ground dissolution stability hazards within the study area is generally very low, being low where the Chalk is shown to outcrop near Cantley Brook. Chalk has a risk of dissolution features (castellation, sinkholes, dissolution pipes) and there is increased potential for these to be present above the groundwater table, such as in the higher ground areas at the location of Thickthorn Interchange.

The potential for running sand ground stability hazards is indicated to be very low in the majority of the study area, with the exception of the alluvial deposits where the potential is indicated as low.

The potential for shrinking or swelling clay ground stability hazards is shown as very low along the alluvial deposits and low in areas of glacial till.

The Envirocheck report classifications used above to describe the potential of instability are compared to the BGS GeoSure categories as follows:

Table 4-4: Comparison of Envirocheck and BGS GeoSure ground stability rating classifications

Envirocheck Classification	BGS GeoSure Category
No Hazard	A
Very Low	B
Low	C
Moderate	D
High	E

The BGS GeoSure rating legends are explained in Appendix F: BGS GeoSure Ground Stability Rating.

4.13. Other Environmental Records

A review of all environmental records will be included in the environmental appraisal for the scheme.

4.14. Statutory Undertakers

A search of Statutory Undertakers records is required to determine the type and location of any buried or overhead services affecting the site.

Notwithstanding the requirement to carry out a search of Statutory Undertakers records, historical and aerial mapping in the Envirocheck report indicate that overhead power lines cross the A11 south of Thickthorn Interchange.

Enquiries to Statutory Undertakers were made during consideration of the Single Option discussed in Rev.P01 of the PSSR, issued in March 2017. The results are shown on Drawing HE551492-ACM-VUT-TJ-DR-HE-01060 included herein as Appendix G: Statutory Undertakers. It is noted that, as the drawing depicts the Single Option which is now superseded by Options 1 to 4, the drawing is included herein for information only and that further enquiries may be required once the final option is selected for development.

4.15. Unexploded Ordnance Survey

According to the Regional Unexploded Bomb Risk map for Norfolk (Zetica), Cringleford is located in an area where the probability of encountering unexploded bombs is low.

During WWII the Study Site was situated within Forehoe & Henstead Rural District, which recorded two High Explosive (HE) bomb strikes per 100 hectares; a low level of bombing.

Luftwaffe aerial reconnaissance photography associated with the Site did not identify a primary bombing target on-site or within 1,000m. Nevertheless, railway lines and a railway station located in the vicinity may have been considered secondary bombing targets.

Neither Air Raid Precaution (ARP) records nor official bomb damage mapping could be located. Nevertheless, an analysis of pre and post-WWII mapping and further research of historical records did not indicate any evidence of bomb damage within close proximity to the Site.

As there was no bombing or bomb damage recorded in the Site's vicinity during WWII, there is no evidence to suggest that further investigation into UXO is warranted.

The UXO risk assessment is included in Appendix H: Preliminary UXO Risk Assessment.

4.16. Records of Seismic Activity

The UK is a region of low seismicity, however small earthquakes occur every year and a damaging earthquake occurs approximately every 10 years.

The UK National Forewords to Parts 1, 2, 4, 5 and 6 of Eurocode 8 states there is generally no requirement in the UK to consider seismic loading, and the whole of the UK may be considered an area of low seismicity by international standards, in which the

provisions of EN 1998 need not apply. However, certain types of structures by reason of their function, location or form, may warrant an explicit consideration of seismic actions.

In recognition that further guidance was required, an up to date and authoritative UK seismic zoning map was produced (Musson and Sargeant, 2007) and guidance was provided in the form of "ICE-02 Establishing the Need for Seismic Design in the UK" (Booth et al 2008).

Following this guidance, an initial screening process has identified that there is no significant regional seismic hazard, unfavourable ground conditions or unfavourable structural features to seismicity. It is therefore considered that the structural design will not need to consider seismic design.

4.17. Contaminated Land

Contaminated land is defined as land where substances are present in sufficient quantities or concentrations to cause or are likely to be causing harm, directly or indirectly, to human health or to the environment, in particular to controlled waters (surface water and groundwater).

A qualitative approach was used in the assessment based on the significance of the attribute and through professional judgement. The significance of a predicted impact is based on a combination of the sensitivity or importance of the attribute and the predicted magnitude of any effect. The assessment considers both predicted effects on the geological conditions and the groundwater environment and residual effects, which would remain after the implementation of any mitigation measures.

In order for a potential impact or contaminant linkage to be realised, three factors must be present. There must be a source or a potential effect (contaminated land/ground gases); a receptor which can be adversely affected; and, a pathway or connection which allows the source to impact the receptor. Only when all three factors are present can a potential impact be realised.

The preliminary conceptual site model (CSM) has been developed based on the site setting described in Section 5. The CSM is presented below in terms of potential contaminant sources, potential sensitive receptors and associated exposure and migration pathways.

Sources

On-site

The historical land use on and in the immediate vicinity of the scheme predominantly comprises agricultural land. Based on a review of the historical maps and environmental datasheets provided in the Envirocheck report, a potential source of contamination (landfill) has been identified on-site.

A historical landfill site is recorded by the Environment Agency north of Cantley Brook and immediately east of the existing A11. Cantley Lane landfill site was operated between 1961 and 1969 receiving inert, industrial, commercial and household waste. The site is a former sand and gravel quarry, which it is assumed worked the Sheringham Cliffs Formation.

In addition to any potential geo-environmental hazards, landfills typically comprise low strength, highly compressible materials which are unsuitable for incorporating into earthworks without some form of treatment or improvement.

Off-site

A fuel filling station and Thickthorn Park and Ride facility are located immediately to the west of Thickthorn Interchange between the A11 and B1172.

The land-use immediately surrounding the study area is mainly agricultural with a limited number of properties located on Cantley Lane South, west of the existing A47.

Potential on-site and off-site sources of contamination based on current and historical land-use are summarised as follows:

- Historical landfill site, north of Cantley Brook and east of the existing A11 (see Sections 4.3 and 4.9); and
- One active fuel filling station (west of Thickthorn Interchange between the A11 and B1172).

The potential for contamination associated with the two identified sources to have migrated on-site is dependent on the presence, extent and flow direction of groundwater beneath the Site.

Contaminants of Concern

According to the Envirocheck Report the estimated soil chemistry in the area of study is as presented in Table 4-5 below.

Table 4-5: Estimated Soil Chemistry

Chemical	Range of Concentrations (mg/kg)
Arsenic	15-25
Cadmium	<1.8
Chromium	20-60
Lead	<100
Nickel	15-30

It should be noted that the estimated soil chemistry presented in Table 4-5 is associated with the broad soil types indicated to be present within the study area and not specific identified sources of contamination such as the historical landfill.

Receptors and Pathways

Table 4-6: Potential Source-Pathway-Receptor Linkages

Source	Receptor	Pathways
Residual contaminants on site from former landfill	Site end-users and construction workers.	Dermal contact, inhalation and ingestion following direct contact with excavated contaminated soils and waste

Source	Receptor	Pathways
Inorganic and organic soil contamination from the adjacent historical landfill and fuel filling station	Site Neighbours (limited number of residential and commercial properties adjacent to proposed scheme)	Inhalation of contaminated soil dusts (including asbestos) during excavation and construction works
	Groundwater: - Secondary Aquifers (superficial deposits) - Principal Aquifer (Chalk)	Exposure of waste materials and leaching of soluble contaminants to underlying groundwater
	Surface Water: Cantley Brook	Leaching of soluble contaminants through surface water run-off. Exposure of waste materials and leaching of soluble contaminants into groundwater in hydraulic connectivity with Cantley Brook
	Foundations and sub-surface utilities	Corrosion of construction materials and permeation of water pipes
Ground gases (methane and carbon dioxide) from degradation of natural organic soils, landfill materials or bacterial digestion of hydrocarbons	Site end-users and construction workers.	Accumulation of gases in confined spaces and excavations

5. Ground Conditions

5.1. Ground Model

A general ground model has been produced and is presented in Table 5-1 and Figure 5-1 below, including the following geological sequence:

- Alluvium
- Glacial Till
- Glacial Sand & Gravel
- Chalk Formation

Table 5-1: General Preliminary Ground Model

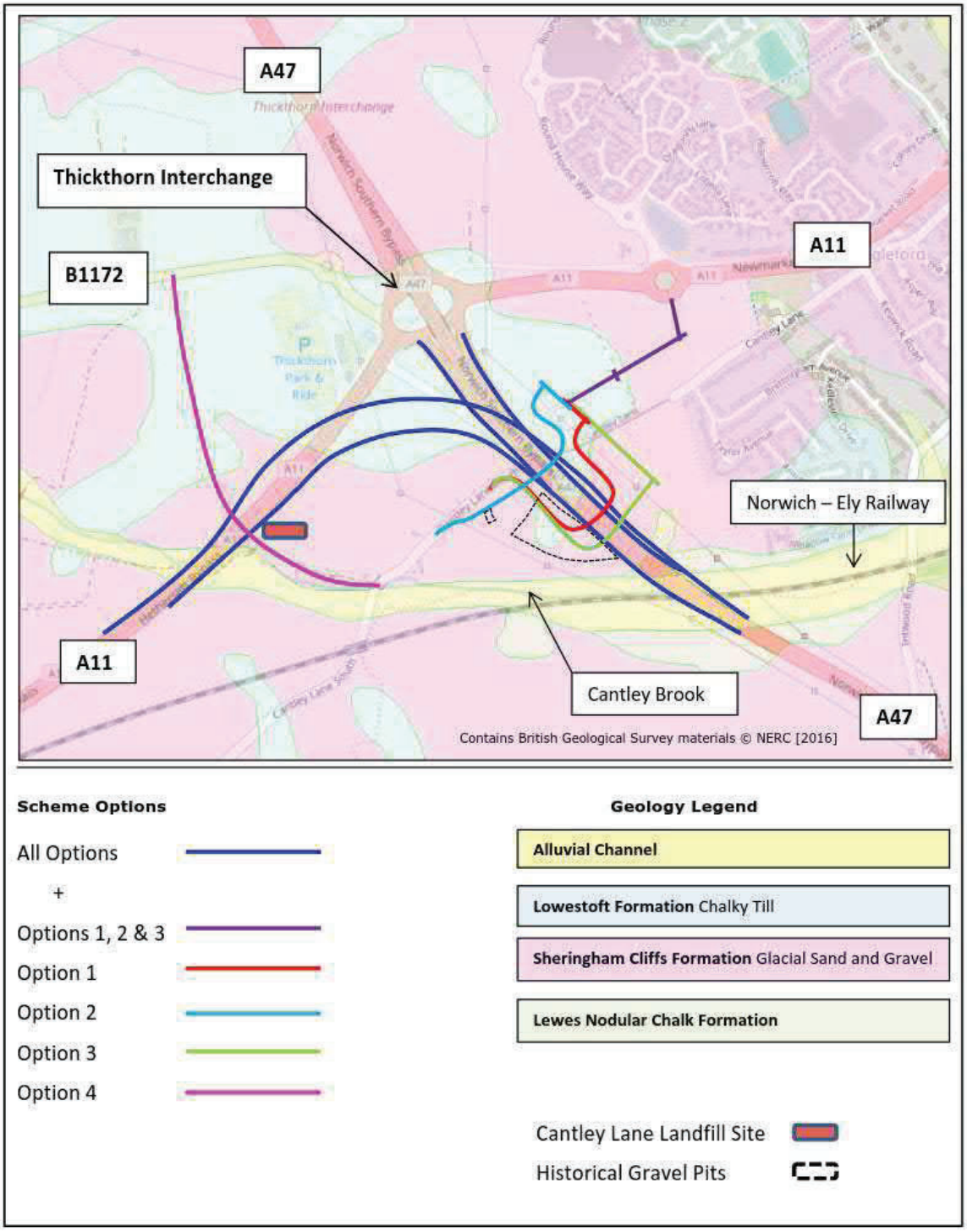
Stratum	General Description	Typical Depth (m bgl)	Likely Thickness (m)	Comments
Alluvium	Highly compressible peat, clay, silt, sand and gravel.	GL-1.70	1.5	Encountered as a channel following the course of the Cantley Brook
Lowestoft Formation (Glacial Till)	Soft to firm, orange to brown with black mottling slightly sandy slightly gravelly clay. The gravel is angular flint and chalk. Bands of sands and gravel are present.	GL-1.00	3.0-10.0	Encountered from ground level on higher ground near interchange. Thickness reduces with distance from interchange
Sheringham Cliffs Formation (Glacial sand & gravel)	Medium dense light brown fine to medium sand, becoming orange brown with depth, and slightly clayey with some gravel, outcropping in the lower areas around the interchange.	GL-10.00	4.0-6.0	Thin layers of Glacial Till encountered within the stratum in the lower areas around the interchange
Lewes Nodular Chalk Formation (Undifferentiated)	Generally recovered as sand, gravel and cobbles of comminuted Chalk and flint gravel. Indicated to outcrop where the A47 crosses Cantley Brook, depth to Chalk increases towards interchange.	1.30–15.00	>20.0	Ground investigations by percussive techniques undertaken to date do not permit a full engineering description of the Chalk

In addition to the strata listed in the General Preliminary Ground Model possible Norwich Crag was recorded overlying the Chalk in two boreholes carried out immediately south of

the railway line where it is crossed by the A47. The Norwich Crag is described as medium dense orange brown gravelly sand, the gravel comprising flint and chalk. It was not recorded in the boreholes located immediately north of the railway line, which also recorded the Chalk rockhead at a higher level.

Infilled ground associated with the former mineral extraction sites (sand and gravel pits) adjacent to Cantley Lane South, Cantley Wood and the A47 should also be anticipated. Cantley Lane landfill site is identified immediately east of the A11.

Figure 5-1: General Preliminary Ground Model



Geological cross sections are shown in Appendix D: Cross Sections & Typical Borehole Logs.

A summary of the engineering properties of the glacial strata and Norwich Crag based on laboratory and in situ testing as given in the A11/A47 Thickthorn Interchange Geotechnical Report (HAGDMS 19536) is presented in Table 5-2 below.

The report relates to the proposed widening of the interchange and the relevant ground conditions at that location. Due to the depth of the Chalk at the interchange this was not relevant to the proposed widening nor included in the summary table.

The report also notes that the Norwich Crag Formation is not indicated to be present south of the River Yare and would therefore not be anticipated at Thickthorn Interchange. The material identified as Norwich Crag may therefore be a glacial sand layer.

Table 5-2: Summary of Engineering Properties (from HAGDMS 19536)

Geological Unit	Bulk Density (Mg/m^3)	Undrained Shear Strength (kN/m^2)	Effective Shear Strength	Consolidation Parameters	ACEC Class	Design CBR
Glacial Sand and Gravel	2.1	N/A	$\phi' = 31^\circ$ $c' = 0$ kN/m^2	N/A	AC-1s	8 %
Glacial Till	2.1	GL-5m: 40 5m+: $40+(^{25}/_{3})(z-5)$	$\phi' = 31^\circ$ $c' = 1.5$ kN/m^2	$m_v = 0.15$ m^2/MN $c_v = 8.0$ $m^2/year$	AC-1s	3 %
Norwich Crag	2.1	N/A	$\phi' = 33^\circ$ $c' = 0$ kN/m^2	N/A	AC-1s	N/A

HAGDMS Report No 19536 (A11/A47 Cringleford Thickthorn Interchange Geotechnical Report) provides a summary of laboratory and in situ testing results carried out for the A47 Norwich Southern Bypass site investigation. The geotechnical properties are presented at the Table 5-3 below.

Table 5-3: Summary of Geotechnical Properties: A47 Norwich Southern Bypass (HAGDMS 19536)

Parameter	Fluvial Deposits		Head deposits		Glacial Sand & Gravel		Glacial Till		Upper Chalk	
	No of results	Range (Ave)	No of results	Range (Ave)	No of results	Range (Ave)	No of results	Range (Ave)	No of results	Range (Ave)
Moisture content (%)	4	6-71 (28.8)	-	-	10	10-18 (13.7)	67	7.1-38 (17)	15	23-31 (27.3)
LL (%)	2	50-58 (54)	-	-	1	16	34	15-53 (27.6)	-	-
PL (%)	2	36-43 (39.5)	-	-	-	-	34	9-18 (13.7)	-	-
PI (%)	2	14-15 (14.5)	-	-	-	-	34	4-35 (13.9)	-	-
Bulk density (Mg/m^3)	1	1.49	-	-	-	-	17	1.75-2.5 (2.15)	5	1.93 – 2.1 (2.03)
SPT (N value)	5	2-28 (16.8)	4	26-62 (40.3)	85	7-100 (34.9)	43	5-100 (23.7)	105	1-79 (12.3)
Cu (KPa)	1	15	-	-	-	-	51	5-132 (53.1)	-	-

5.2. Groundwater

According to the A11/A47 Thickthorn Interchange Geotechnical Report (HAGDMS 19536) groundwater was not encountered during the ground investigation in the area of study, however, localised perched water tables may occur within the glacial till.

The A11/A47 Thickthorn Interchange ground investigation comprised exploratory holes to a maximum depth of 10.45mbgl. Given the interchange sits at a local high point in the surrounding topography, the absence of groundwater is not unexpected.

Other existing ground investigations available on HAGDMS which include deeper boreholes and exploratory holes in lower ground areas generally record groundwater within the Glacial Sand and Gravel overlying the Chalk.

5.3. Summary of Chemical Testing Results

According to the A11/A47 Thickthorn Interchange Geotechnical Report (HAGDMS 19536), the design sulphate class for all strata considered is DS1 and the ACEC Class is AC-1s.

The A11/A47 Thickthorn Interchange Geotechnical Report (HAGDMS 19536) does not consider all strata underlying the study area. In a summary of existing chemical test results, the Chalk is noted to be Class 1 (the lowest class in accordance with BRE Digest 363, which was superseded by BRE Special Digest 1 in 2001).

Neither alluvium nor groundwater were encountered or considered in the A11/A47 Thickthorn Interchange Geotechnical Report, however, both of are likely to require consideration for buried concrete within the study area.

6. Preliminary Engineering Assessment

6.1. Introduction

This preliminary engineering assessment is based on available information including historical borehole data, the factual findings of previous ground investigation reports described in Section 2 of this PSSR and project specific constraints such as the requirement to maintain traffic flows during construction. Proposed project specific detailed ground investigations are yet to be carried out along the proposed route but will be available to inform the detailed design and construction phase.

The following discussions will cover the proposed embankments, cuttings, subgrade, retaining walls, structural foundations, drainage and chemical considerations associated with the reference design.

6.2. Cuttings

According to the Transport and Road Research Laboratory (TRL), Department of Transport, Research Report 199 'A survey of slope condition on motorway earthworks in England and Wales' by J Perry, a preliminary slope gradient for the cuttings is recommended to be 1:3.0 (v:h).

The LiDAR survey from other aerial surveys for the study area indicates that the existing cutting slopes on the A11 and A47 near Thickthorn Interchange are at gradients of 1:3.0 (v:h) and 1:2.4 (v:h) respectively and both up to 4m high.

The existing cutting slopes on the A11 are likely to be within Glacial Till. The deeper sections of cutting on the A47 are indicated to be in an area underlain by glacial sand and gravel. Cuttings within the glacial sand and gravel could be formed at a steeper gradient, with TRL Research Report 199 indicating a gradient of 1:2.0 (v:h) for cuttings in glacial gravel over 5m high.

For cuttings formed through both the glacial till and glacial sand and gravel slope optimisation in the different materials could reduce the extent of the earthwork. However, where interbedded layers of granular and cohesive glacial materials are present, the cutting slope gradient adopted will need to reflect these variable ground conditions.

The regional water table is generally too deep to affect the cuttings of the proposed scheme. However, perched groundwater within the glacial till might cause stability issues in the cuttings.

6.3. Embankments

The undrained shear strength c_u= 40kN/m^2 (Table 5-2) for the upper 5m of the Glacial Till indicates a firm medium strength soil. Particle size distribution tests on the glacial sand and gravel indicate it is generally well graded.

According to TRL Research Report 199, a preliminary slope gradient for the embankments is recommended to be 1:2.5 (v:h) for embankments up to 5m high and 1:3.0 (v:h) for embankments over 5m high.

The LiDAR survey from other aerial surveys for the study area indicates that the existing embankment slopes to the A11 south of Cantley Brook are at a gradient of 1:2.0 (v:h) and up to 2.5m high. This is consistent with TRL Research Report 199 for glacial materials and embankments up to this height.

The LiDAR survey also indicates that the existing embankment slopes to the A47 north of Cantley Brook and the railway line are at a gradient of 1:3.0 (v:h) and up to 10m high.

The fill materials used to construct the embankments of the A11 and A47 are unknown but are likely to comprise locally won glacial deposits. Embankment design will need to consider the variability of these soils both in situ and when used as fill material. The underlying soils and local groundwater conditions may also influence the embankment design and selection of side slope gradients.

6.4. Structures

Options 1 to 4 drawings (HE551492-ACM-HML-TJ-DR-HE-01062 to 01065) show a link road from the northbound carriageway of the A11 merging into the southbound carriageway of the A47. The link road diverges from the A11 south of Cantley Brook, passing beneath the A11 and the A47 carriageways and merging onto the A47 north of the railway overbridge.

The A11 – A47 link road would require an overbridge over Cantley Brook and skewed underbridges beneath both the A11 and A47. The A47 railway overbridge would also require widening.

Options 1 to 4 drawings (HE551492-ACM-HML-TJ-DR-HE-01062 to 01065) also show a link road from the northbound carriageway of the A47 merging into the southbound carriageway of the A11. The link road begins to diverge from the A47 south of the railway overbridge and fully merges onto the A11 south of Cantley Brook.

The A47 – A11 link road would require widening of the existing railway overbridge and the western side of the existing A11 overbridge over Cantley Brook.

The existing footbridge over the AA47 would be removed.

Wingwalls are shown retaining the existing carriageways on all sides of the proposed A11 and A47 underbridges. The south-east wingwall to the A47 underbridge, however, extends for approximately 90m parallel to the A47 southbound carriageway due to the depth and proximity of the link road at this location.

Option 1

Option 1 drawing (HE551492-ACM-HML-TJ-DR-HE-01062) additionally shows a link road from the northern end of Cantley Lane South crossing over the A47 and merging into the Round House Roundabout, north of Thickthorn Interchange. An overbridge would be required over the full width of the A47 and the new A11-A47 and A47-A11 link roads described above.

Option 2

Option 2 differs from Option 1 in the layout of the proposed link road between Cantley Lane South and Round House Roundabout (see Drawing HE551492-ACM-HML-TJ-DR-HE-01063). An overbridge over the full width of the A47 and new link roads would still be required and would have a greater span than the one required in Option 1.

Option 3

Option 3 differs from Options 1 and 2 in that an underbridge instead of an overbridge would be required for the proposed link road between Cantley Lane South and Round House Roundabout (see Drawing HE551492-ACM-HML-TJ-DR-HE-01064). The bridge would be formed below the A47 and new A11-A47 and A47-A11 link roads.

Option 4

In Option 4 there would be no link road between Cantley Lane South and Round House Roundabout (see Drawing HE551492-ACM-HML-TJ-DR-HE-01065). The existing footbridge would be replaced by a new one crossing over the A47 and proposed A11-A47 and A47-A11 link roads.

A link road would diverge from Cantley Lane South near the intersection of Cantley Brook with an existing track, travel westwards over the A11 and continue north where it would merge onto the B1172 Norwich Road. Two overbridges would be required to carry the road over the A11 and proposed A11-A47 and A47-A11 link roads.

Structural adequacy of the structure carrying the existing track over Cantley Brook at Cantley Lane South would need to be examined and a new structure for the link road could be required.

It is noted that the method of construction of the existing track and the materials used are not known and would need to be investigated.

6.5. Drainage

Positive drainage will be constructed for the new sections of road to intercept surface water flow from the carriageway.

The regional water table is generally too deep to affect the cuttings of the proposed scheme. However, perched groundwater within the glacial till may require slope drainage in cuttings.

In areas of higher ground near Thickthorn Interchange the groundwater level is indicated to be below the top of the chalk which can result in an increased potential for dissolution features in these areas. Construction of the cuttings associated with the A11 – A47 link road would remove the glacial till which overlies these higher ground areas potentially increasing the amount of infiltration into the chalk and reducing the length of drainage pathways. Infiltration of acidic rainfall into the chalk could increase the risk of dissolution features developing above the groundwater table.

There is potential for groundwater flooding to occur at the surface and to below ground structures in the floodplain and wider area around Cantley Brook. This will need to be considered in relation to the A11 – A47 link road which grades into cutting soon after diverging from the A11 to the north of Cantley Brook.

The A11 – A47 link road passes over Cantley Brook floodplain on embankment and the A47 – A11 link will require the western side of the existing A11 embankment to be widened either side of Cantley Brook overbridge. Re-alignment of the existing watercourse is also proposed in this area. Impinging on the floodplain with the new and widened earthworks could alter the extent of the areas currently liable from flooding.

Consideration of the Cantley Brook floodplain is also required in relation to the Cantley Lane South – B1172 link road proposed as part of Option 4. It is noted that re-alignment of the existing watercourse in the vicinity of Cantley Lane South is proposed for this Option.

6.6. Subgrade

The A11/A47 Thickthorn Interchange Geotechnical Report (HAGDMS 19536) recommends CBR values for the underlying geology for an unimproved foundation taking into consideration current and previous investigations using the relationships contained within HD25/94 and from DCP correlations. The recommended values are shown in *Table 6-1* below.

Table 6-1: Design CBR values

Geology	Recommended Design CBR value (%)
Glacial Sand and Gravel	8 %
Glacial Till	3 %
Norwich Crag	N/A

The A11/A47 Thickthorn Interchange Geotechnical Report (HAGDMS 19536) notes that CBR values recorded in the Glacial Sand and Gravel were highly variable influenced by both the method of testing (DCP) and the composition of the soil itself.

It would be anticipated that similar CBR values could be achieved for engineered fill comprised of the same soils. Glacial Till can also be sensitive to changes in moisture content. Increases in moisture content could result in a loss of strength and lower CBR value.

6.7. Chemically Aggressive Ground

According to the A11/A47 Thickthorn Interchange Geotechnical Report (HAGDMS 19536) the Design Sulphate Class for all strata considered is DS1 and the ACEC Class is AC-1s. It was therefore recommended that any concrete used on the scheme should be designed for a minimum of Class AC-1s.

The characteristic values of sulphate, Design Sulphate Class and ACEC Class were obtained by following the procedures set out in the Building Research Establishment (BRE) Special Digest 1 'Concrete in Aggressive Ground'. These values were recommended for the Glacial Sand and Gravel, Glacial Till and Norwich Crag.

The A11/A47 Cringleford/Thickthorn Interchange ground investigation (HAGDMS 18581) did not encounter Alluvium, Chalk or groundwater, however, these are likely to require consideration for buried concrete within the study area and a higher ACEC class may be required.

Table 6-2: Design Suplhate Class (from HAGDMS 19536)

Stratum	Characteristic Value (g/l) (SO_4)	pH	Design Sulphate Class	ACEC Class
Glacial Sand and Gravel	0.054	7.2 – 8.1 (>5.5)	DS-1	AC-1s
Glacial Till	0.065	7.3 – 8.6 (>5.5)	DS-1	AC-1s
Norwich Crag	0.016	7.8 (>5.5)	DS-1	AC-1s

6.8. Reusability

Taking into consideration the engineering properties mentioned above, the existing glacial materials should provide a suitable source of general fill for embankments. Preliminary design parameters are as provided in Table 5-2.

Glacial Till, as noted above, can be sensitive to changes in moisture content. Glacial Till can be used as engineered fill for earthworks subject to the appropriate control of

moisture content to permit compaction to the required density, air voids content and minimum strength requirements.

Due to the variable nature of the glacial deposits together with the potential for mixing of soils during placement and compaction, suitable control of filling operations will be required to ensure that the required level of compaction is achieved and verified by appropriate testing.

6.9. Groundwater

Groundwater was encountered in the ground investigations at shallow depth within the Glacial Sand and Gravel overlying the Chalk in the lower ground areas (around Cantley Brook) in the south of the study area. The Glacial Sand and Gravel is anticipated to be in hydraulic continuity with the underlying Chalk.

Groundwater was encountered at depth within the Chalk in the higher ground areas towards Thickthorn Interchange in the north of the study area. Localised perched water tables may also be present within the Glacial Till which is present in the higher ground areas around Thickthorn Interchange.

6.10. Ground Gas

The available data does not provide evidence of ground gas in the study area, however, potential sources of ground gas include the historical landfill immediately east of the existing A11 and the Alluvium which is present along the course of Cantley Brook.

6.11. Contaminated Land

Section 4.17 has identified a number of potential onsite and off-site sources and receptors. A further assessment should be carried out taking into consideration the results of the Ground Investigation and determine if there are any linkages and any mitigation measures required.

7. Comparison of Project Options and Risks

According to HD 22/08, and considering the complexity of the proposed geotechnical works and the geotechnical risk implications to health and safety, a Geotechnical Category 2 has been established following the guidance in BS EN 1997-1:2004.

Projects within Geotechnical Category 2 include conventional types of geotechnical structures, earthworks and activities, with no exceptional geotechnical risks, unusual or difficult ground conditions or loading conditions.

The following geotechnical risks are anticipated:

- Unforeseen ground conditions might lead to construction delays and redesign;
- Variability of made ground and presence of voids or obstructions.
- Change of design during construction, leading to cost increase and project delay.
- Residential areas might be affected by temporary works.
- Increased traffic loads and construction activities may lead to additional loading and movement of existing structures.
- Encountering unexploded ordnance might cause delays or endanger life;
- Variability of Glacial Till – perched water which might lead to soft pockets of ground and slope instability. Obstructions due to the presence of boulders within the till;
- Dissolution of Chalk leading to foundation and earthworks instability;
- Localised weak/ compressible soils might lead to differential settlement and increased maintenance liability;
- High groundwater levels leading to poor drainage and construction problems;
- Contaminated ground might cause health and safety issues and have cost and programme implications; presence of leachate from the former landfill may impact on the cutting design;
- Ground gases from organic deposits (alluvium and landfilled wastes) or potential sources of contamination;
- Settlement of existing railway and highway infrastructure due to new embankments;
- Option 4 requires the construction of a new footbridge over a new cutting. Abutment foundations will need to be significantly deep to transfer loads safely below cutting level. In this case, lateral loads could be an issue;
- Excavations causing slope instability leading to traffic and construction programme disruption;
- Excavations causing ground movements leading to undermining services, the former landfill or the foundations of the neighbouring structures;
- Failure of existing embankments during construction might cause road closure/diversions;
- Chemical attack on buried concrete which may result in maintenance problems; and
- Risk of poor drainage characteristics of superficial deposits at soakage pond locations.

More details regarding geotechnical risks can be found in the initial Geotechnical Risk Register in Table 7-1 below. The table includes an assessment of risk based on the perceived likelihood of the hazard and the potential consequence both before and after the proposed design control measures using the following scales.

Likelihood (L)	Consequence (C)
5 – Frequent	5 – Catastrophic
4 – Probable	4 – Critical
3 – Occasional	3 – Major
2 – Remote	2 – Moderate
1 – Improbable	1 – Minor

Risk Rating R = L x C	
1 to 4 = Low	
5 to 9 = Medium	
10 to 25 = High	

A more detailed explanation of the Risk Rating R meaning is given below:

Low: The risk is tolerable and can be managed by experienced designers, contractors and clients.

Medium: The risk is significant and cannot be ignored. Risk should be further addressed during the design and/or construction.

High: The risk is unacceptable and needs to be further mitigated during design.

Table 7-1: Geotechnical Risk Register

ID	Hazard	Consequence	Before Mitigation			Design Control Measures	After Mitigation		
			L	C	R		L	C	R
GEO1	Unforeseen Ground Conditions	Construction delays and redesign	4	5	20	Undertake comprehensive desk study and project specific intrusive ground investigation to develop a robust ground model	2	2	4
GEO2	Encountering Unexploded Ordnance	Delays caused by clearance works or initiation endangering life	3	5	15	Undertake UXO risk assessment and adopt appropriate mitigation measures.	1	5	5
GEO3	Variability of Glacial Till	Presence of soft or wet ground, or obstructions	4	3	12	Undertake comprehensive ground investigation with groundwater monitoring	2	2	4
GEO4	Excavations causing Slope Instability/ Ground Movement	Slope failure during construction leading to delays in construction and traffic disruption	4	4	16	Assess stability of earthworks during construction and provide appropriate temporary works.	2	2	4
GEO5	Dissolution of Chalk	Instability of earthworks and structural foundations	3	3	9	Identify areas of high risk along the scheme and undertake assessments.	2	2	4
GEO6	Localised Weak/Compressible Soils, e.g. Alluvial Deposits	Instability, differential settlement and increased maintenance, for example of existing railway structures	3	2	6	Appropriate ground investigation, design, excavation and replacement where required	2	1	2

ID	Hazard	Consequence	Before Mitigation			Design Control Measures	After Mitigation		
			L	C	R		L	C	R
GEO7	Drainage Excavations causing Slope Instability	Slope failure. Possible impact on site safety. Increased cost and delay	3	3	9	Fully supported trenches, limited open length to that which can be completed in one shift.	2	2	4
GEO8	Contaminated Ground and Groundwater	Health and safety of construction workers or site users or groundwater/surface water resources. Cost/ programme implications if additional protection measures are required or there are special requirements for disposal of site won material	3	3	9	Assess risk of contamination and implement appropriate mitigation and remedial measures	2	2	4
GEO9	Chemical Attack on Buried Concrete	Reduced durability of concrete	3	4	12	Determine ground chemistry and use appropriate concrete class	1	1	1

ID	Hazard	Consequence	Before Mitigation			Design Control Measures	After Mitigation		
			L	C	R		L	C	R
GEO10	Change of Design During Construction	Cost increase and project delay	4	4	16	Assess all available options for the scheme prior to construction	2	2	4
GEO11	Failure of New or Widened Existing Embankments during Construction	Slope failure during construction leading to delays in construction and traffic disruption	4	4	16	Assess stability of earthworks during construction and provide appropriate temporary works.	2	2	4
GEO12	High Groundwater Levels	Poor drainage and construction difficulties	3	3	9	Assess groundwater conditions prior to construction and design appropriate groundwater control and temporary support to excavations.	2	2	4

ID	Hazard	Consequence	Before Mitigation			Design Control Measures	After Mitigation		
			L	C	R		L	C	R
GEO13	Poor Drainage	Construction difficulties leading to redesign, cost increase and project delay	4	3	12	Assess drainage conditions prior to construction and design appropriate drainage measures.	2	2	4
GEO14	Ground Gases	Migration of gases into confined spaces may lead to accumulations of dangerous concentrations of gases capable of asphyxiation and potentially explosion in the case of methane	3	3	9	Assess risk of ground gas and implement appropriate mitigation measures	2	2	4
GEO15	Influence on New Works to Existing Structures (e.g. Settlement of Existing Railway/ Highway Infrastructure)	The new works might interfere with existing structures and movement of these (new structures) might damage/ make existing infrastructure non-operational. The availability and maintenance of existing structures might be influenced.	4	4	16	Design to account for differential movement between new and existing structure. Accurate surveys to establish extend of existing structures. Monitoring of the existing infrastructure	2	3	6
GEO16	Encountering Services	Cost and programme delays	4	5	20	Undertake thorough services	2	2	4

ID	Hazard	Consequence	Before Mitigation			Design Control Measures	After Mitigation		
			L	C	R		L	C	R
		for reinstatement/ diversion of existing services, Loss of life if gas/ electrical mains are hit				searches. All excavations/ intrusive works to be checked for services prior to works			
GEO17	Buried Obstructions associated with Previous Structures.	Difficulty during construction, increased cost, time delays.	4	3	12	Study historical site information and vigilance during site surveys. Contractors to manage risk of buried obstructions during construction.	2	2	4
GEO18	Stakeholders Objections	Delays	4	4	16	Early and effective engagement with Stakeholders.	2	2	4
GEO19	Interface between Construction Activities and Residential Areas	Restricted access to the site, possibility for poor public relations	5	3	15	Assess existing situation in the area of study prior to construction, apply appropriate mitigation measures	2	2	4

References

1) AECOM (2016). A47 Thickthorn Junction Improvements. Statement of Intent. Report No. HE551492-ACM-HGT-TJ-RP-GE-00001, HAGDMS No. 29235.

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8) Envirocheck Report, Landmark Information Group, A47 Thickthorn Junction, Cringleford, Norfolk.

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11) Highways England Geotechnical Data Management System (HAGDMS) www.hagdms.co.uk.

12) Highways Agency Drainage Data Management System (HAGDMS) http://www.haddms.com.

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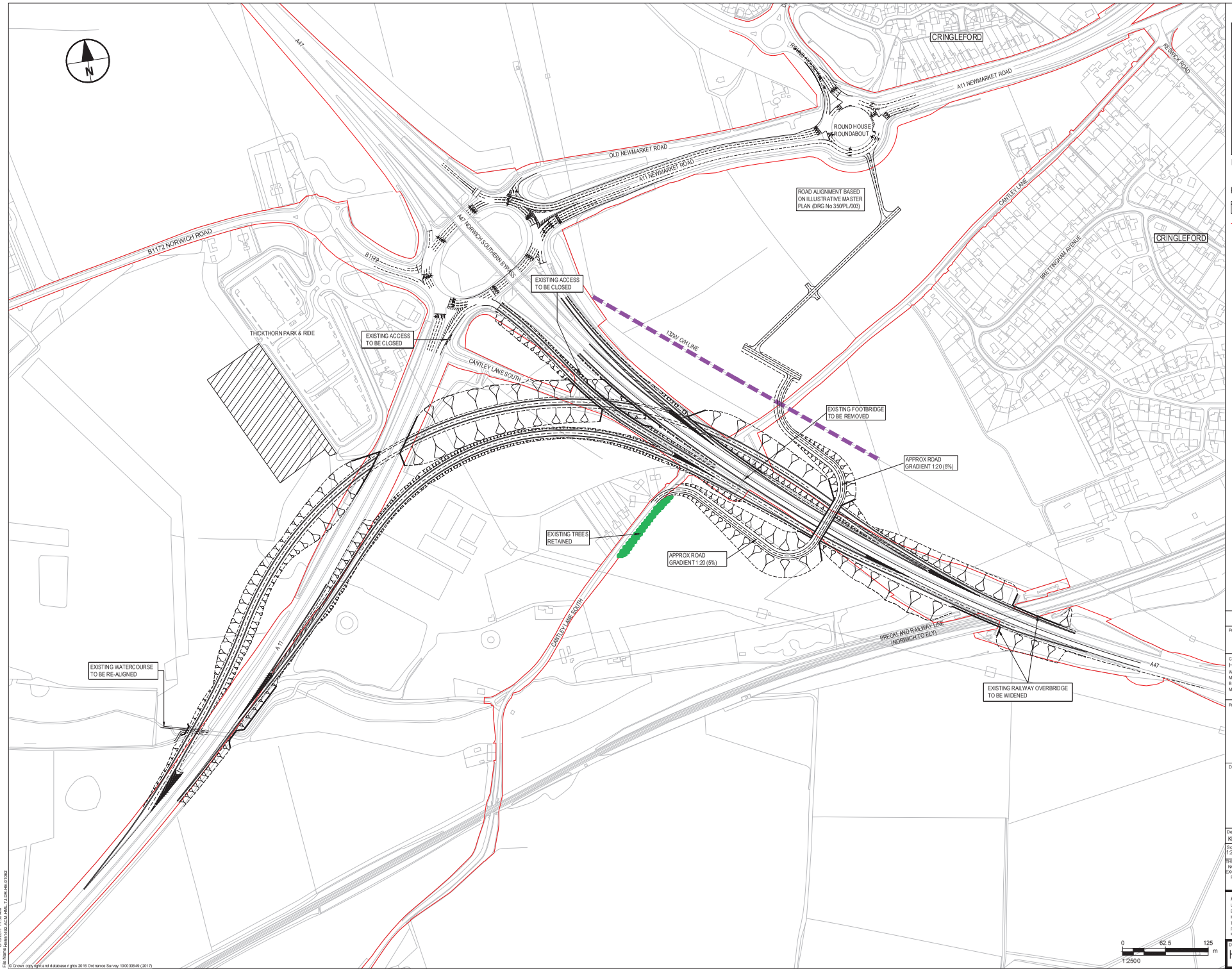
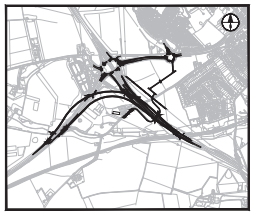
14) PastScape: Information on archaeological, architectural and maritime sites. https://www.pastscape.org.uk/default , 2017

15) MAgiC Interactive Map: http://magic.defra.gov.uk/ (accessed June 2017)

Appendix A: Drawings of the suggested Options

Drawing Number	Title
HE551492-ACM-HML-TJ-DR-HE-01062	A47/A11 Thickthorn Interchange Improvements Cantley Lane – Option 1
HE551492-ACM-HML-TJ-DR-HE-01063	A47/A11 Thickthorn Interchange Improvements Cantley Lane – Option 2
HE551492-ACM-HML-TJ-DR-HE-01064	A47/A11 Thickthorn Interchange Improvements Cantley Lane – Option 3
HE551492-ACM-HML-TJ-DR-HE-01065	A47/A11 Thickthorn Interchange Improvements Cantley Lane – Option 4





KEY LOCATION PLAN
SCALE 1:25000

KEY

POTENTIAL FUTURE PARK & RIDE EXPANSION

EXISTING HIGHWAY BOUNDARY

Revision Details	By / Check	Date	Suffix

Purpose of issue

INFORMATION

Client
Highways England
Woodlands
Manton Lane
Bedford
MK41 7LW

Working on behalf of Highways England

Project Title

A47/A11 THICKTHORN INTERCHANGE IMPROVEMENTS PCF STAGE 2

Drawing Title

CANTLEY LANE OPTION 1

Designed	Drawn	Checked	Approved	Date
KN	MCJ	PRB	JN	Jun 2017

Scale @ A1
1:2500

Suitability

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AECOM

Drawing Number
HE551492-ACM-HML-TJ-DR-HE-01062

Rev

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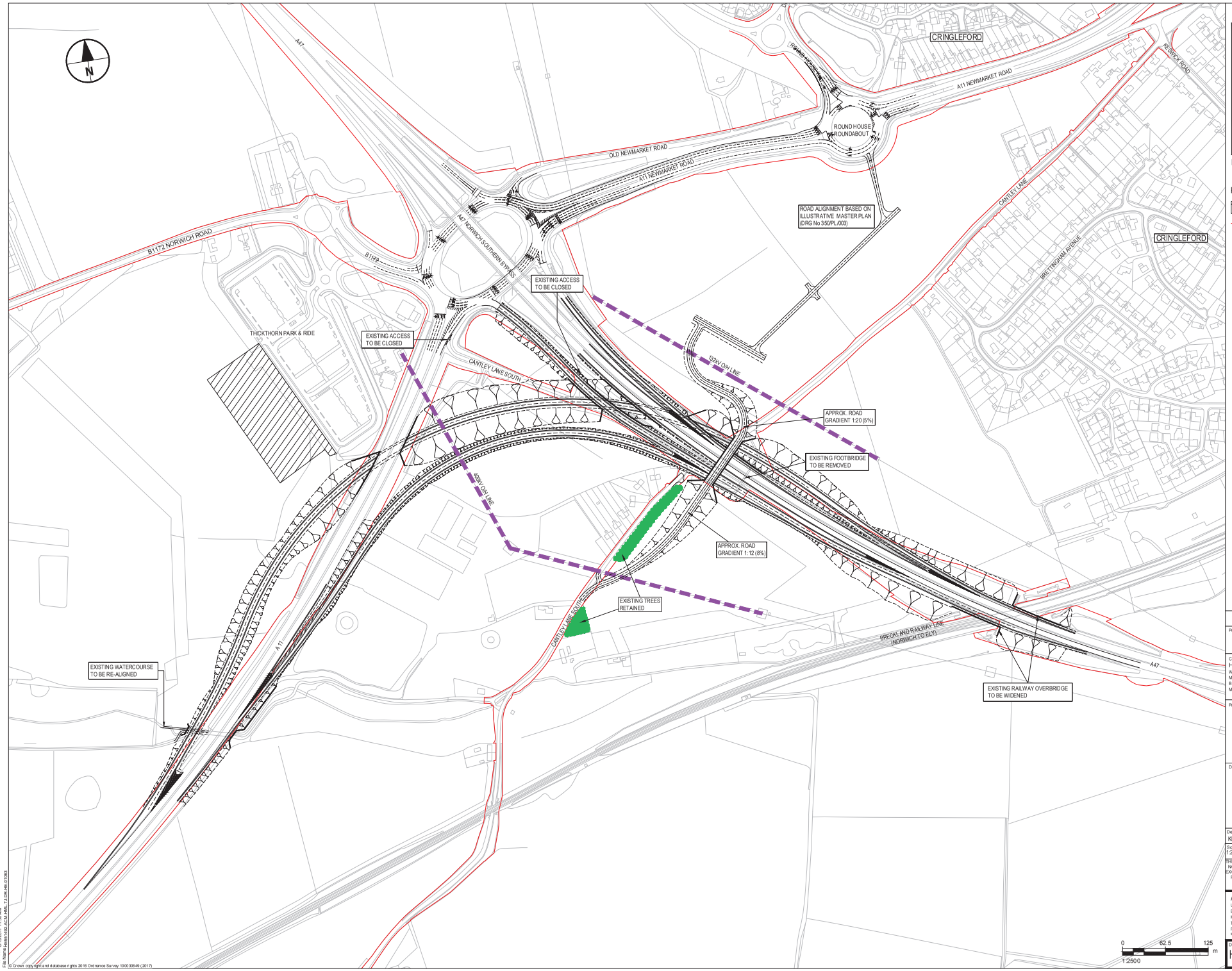

KEY LOCATION PLAN
SCALE 1:25000

KEY

POTENTIAL FUTURE PARK & RIDE EXPANSION

EXISTING HIGHWAY BOUNDARY

Revision Details	By / Check	Date	Suffix

Purpose of issue

INFORMATION

Client
Highways England
Woodlands
Manton Lane
Bedford
MK41 7LW

Working on behalf of Highways England

Project Title

A47/A11 THICKTHORN INTERCHANGE IMPROVEMENTS PCF STAGE 2

Drawing Title

CANTLEY LANE OPTION 2

Designed	Drawn	Checked	Approved	Date
KN	MCJ	PRB	JN	Jun 2017

Scale @ A1
1:2500

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Drawing Number
HE551492-ACM-HML-TJ-DR-HE-01063

Rev

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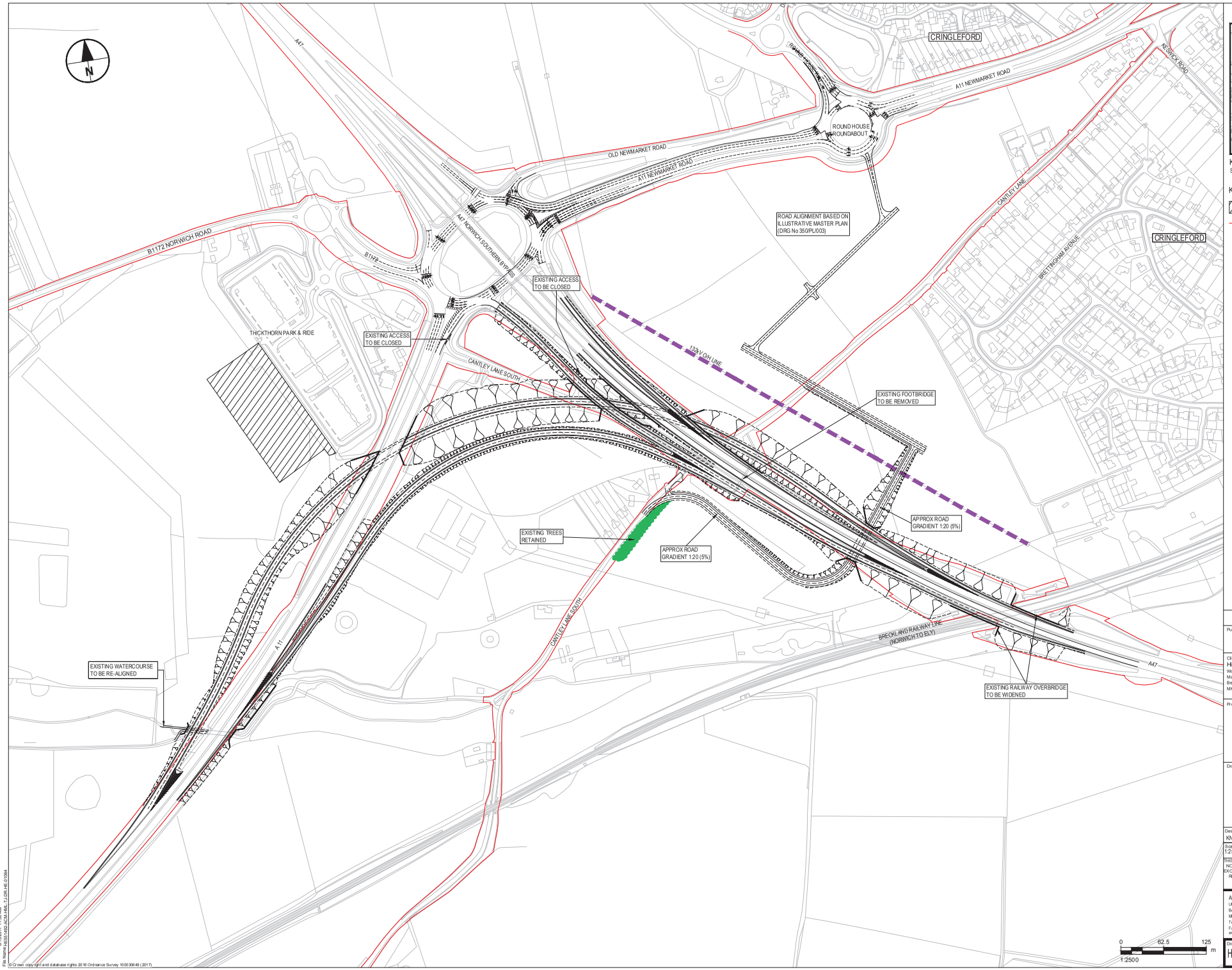

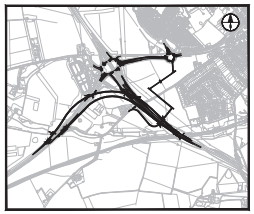

KEY LOCATION PLAN
SCALE 1:25000

KEY

POTENTIAL FUTURE PARK & RIDE EXPANSION

EXISTING HIGHWAY BOUNDARY

Revision Details	By / Check	Date	Suffix

Purpose of issue

INFORMATION

Client
Highways England
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Working on behalf of Highways England

Project Title

A47/A11 THICKTHORN INTERCHANGE IMPROVEMENTS PCF STAGE 2

Drawing Title

CANTLEY LANE OPTION 3

Designed	Drawn	Checked	Approved	Date
KN	MCJ	PRB	JN	Jun 2017

Scale @ A1	Suitability
1:2500	

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Drawing Number
HE551492-ACM-HML-TJ-DR-HE-01064

Rev

Plot Date: 01/12/2017 11:55 AM
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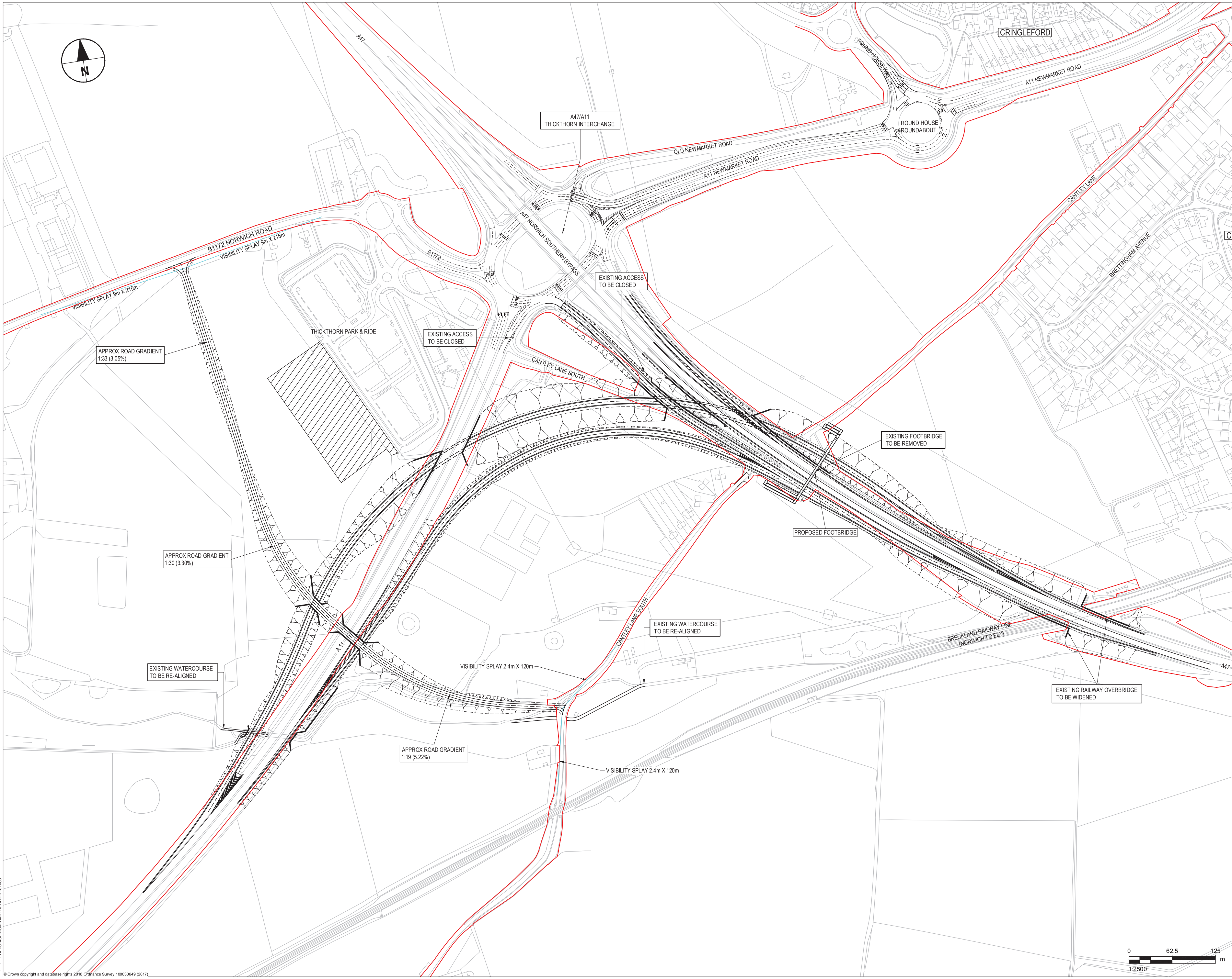

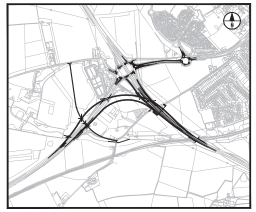

KEY LOCATION PLAN
SCALE 1:25000

KEY

- POTENTIAL FUTURE PARK & RIDE EXPANSION
- EXISTING HIGHWAY BOUNDARY
- PROPOSED VISIBILITY SPLAY 9m X 215m

Revision Details	By / Check	Date	Suffix

Purpose of issue

INFORMATION

Client
Highways England
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Working on behalf of highways england

Project Title

A47/A11 THICKTHORN INTERCHANGE IMPROVEMENTS PCF STAGE 2

Drawing Title

CANTLEY LANE OPTION 4

Designed	Drawn	Checked	Approved	Date
KN	PJB	PRB	JN	Jun 2017

Scale @ A1 1:2500 | Suitability

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Drawing Number
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Rev

Plot Date : 6/19/2017 12:01 PM
File Name HE551492-ACM-HML-TJ-DR-HE-01065

Appendix B: List of Historic Borehole Logs

Hole ID	Source	Date	Depth (m)	Coordinates	
				Eastings	Northings
TG10NE140	A47 NORWICH SOUTHERN BY PASS	10/05/1982	15.5	618250	305890
TG10NE141	A47 NORWICH SOUTHERN BY PASS	24/05/1982	3	618335	305760
TG10NE142	A47 NORWICH SOUTHERN BY PASS	12/05/1982	16.75	618470	305515
TG10NE143	A47 NORWICH SOUTHERN BY PASS	29/04/1982	3.5	618450	305605
TG10NE144	A47 NORWICH SOUTHERN BY PASS	29/04/1982	3.5	618360	305580
TG10NE145	A47 NORWICH SOUTHERN BY PASS	13/05/1982	16.5	618540	305485
TG10NE146	A47 NORWICH SOUTHERN BY PASS	13/05/1982	3	618730	305520
TG10NE147	A47 NORWICH SOUTHERN BY PASS	17/05/1982	15.5	618660	305360
TG10NE148	A47 NORWICH SOUTHERN BY PASS	06/04/1982	17.5	618812	305164
TG10NE149	A47 NORWICH SOUTHERN BY PASS	07/04/1982	10	618840	305180
TG10NE150	A47 NORWICH SOUTHERN BY PASS	02/04/1982	12	618880	305070
TG10NE174	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	05/05/1982	3	617905	305000
TG10NE175	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	06/05/1982	4.5	617950	305130
TG10NE176	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	07/05/1982	10	618100	305310

TG10NE177	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	06/05/1982	4.5	618290	305455
TG10NE178	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	06/05/1982	3	618135	305040
TG10NE179	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	06/05/1982	3	618215	305210
TG10NE180	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	06/05/1982	4.5	618340	305335
TG10NE208	A47 NORWICH SOUTHERN BY PASS	09/08/1988	3	618122	305939
TG10NE209	A47 NORWICH SOUTHERN BY PASS	12/08/1988	10	618396	305570
TG10NE210	A47 NORWICH SOUTHERN BY PASS	11/08/1988	10	618408	305530
TG10NE211	A47 NORWICH SOUTHERN BY PASS	15/08/1988	10	618457	305467
TG10NE212	A47 NORWICH SOUTHERN BY PASS	16/08/1988	10	618462	305435
TG10NE213	A47 NORWICH SOUTHERN BY PASS	05/08/1988	4	618700	305153
TG10NE214	A47 NORWICH SOUTHERN BY PASS	21/08/1988	20.1	618776	305141
TG10NE215	A47 NORWICH SOUTHERN BY PASS	25/08/1988	20.01	618734	305101
TG10NE417	A47 NORWICH SOUTHERN BY PASS	24/08/1983	3.87	618149	306068
TG10NE71	WALPOLE-NORWICH 400KV	07/12/1969	17.07	618100	305990
TG10SE100	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	05/05/1982	5.05	617980	304870
TG10SE102	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	10/10/1985	11	616950	304110

TG10SE103	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	11/10/1985	5	617025	304100
TG10SE104	A47 NORWICH SOUTHERN BY PASS	31/08/1988	10	618921	304926
TG10SE105	A47 NORWICH SOUTHERN BY PASS	16/08/1988	25.05	619102	304857
TG10SE106	A47 NORWICH SOUTHERN BY PASS	16/09/1988	24	619122	304812
TG10SE107	A47 NORWICH SOUTHERN BY PASS	09/09/1988	25	619078	304814
TG10SE108	A47 NORWICH SOUTHERN BY PASS	02/09/1988	10.5	619643	304554
TG10SE109	A47 NORWICH SOUTHERN BY PASS	31/05/1988	10.5	619642	304513
TG10SE128	PUMP STATION HETHERSETT 2	16/07/1979	20	617370	303940
TG10SE129	PUMP STATION HETHERSETT 2	18/07/1979	20	617360	303970
TG10SE130	A47 NORWICH SOUTHERN BY PASS	10/08/1988	25	619049	304851
TG10SE21	WALPOLE NORWICH 400KV	20/12/1969	16.15	618540	304990
TG10SE22	WALPOLE NORWICH 400KV	02/01/1970	9.45	619110	304770
TG10SE24	WALPOLE NORWICH 400KV	21/12/1969	10.67	619600	304500
TG10SE61	A47 NORWICH SOUTHERN BY PASS	07/04/1982	8.5	619010	304970
TG10SE62	A47 NORWICH SOUTHERN BY PASS	08/04/1982	6.5	619100	304940
TG10SE63	A47 NORWICH SOUTHERN BY PASS	30/04/1982	10	619130	304870
TG10SE64	A47 NORWICH SOUTHERN BY PASS	04/05/1982	6.2	619170	304880
TG10SE65	A47 NORWICH SOUTHERN BY PASS	28/04/1982	10	619250	304820
TG10SE66	A47 NORWICH SOUTHERN BY PASS	27/04/1982	20	619200	304810

TG10SE67	A47 NORWICH SOUTHERN BY PASS	19/04/1982	8.65	619290	304750
TG10SE68	A47 NORWICH SOUTHERN BY PASS	17/05/1982	5.4	619430	304670
TG10SE69	A47 NORWICH SOUTHERN BY PASS	20/04/1982	15	619460	304620
TG10SE70	A47 NORWICH SOUTHERN BY PASS	21/04/1982	15	619490	304650
TG10SE71	A47 NORWICH SOUTHERN BY PASS	17/05/1982	3.2	619580	304575
TG10SE72	A47 NORWICH SOUTHERN BY PASS	20/04/1982	10	619698	304490
TG10SE74	A47 NORWICH SOUTHERN BY PASS	22/04/1982	20	619724	304476
TG10SE87	A47 NORWICH SOUTHERN BY PASS	29/04/1982	4	616630	304000
TG10SE88	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	29/04/1982	4.5	616800	304100
TG10SE89	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	06/05/1982	20.02	616955	304230
TG10SE90	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	12/05/1982	25.1	617005	304140
TG10SE91	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	14/05/1982	20	617000	304100
TG10SE92	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	05/05/1982	3	617135	304365
TG10SE93	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	29/04/1982	2.2	617345	304520
TG10SE94	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	05/05/1982	4.5	617530	304640

TG10SE95	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	05/05/1982	4.7	617625	304750
TG10SE96	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	06/05/1982	10	617800	304875
TG10SE97	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	29/04/1982	3	617380	304440
TG10SE98	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	05/05/1982	3.2	617630	304550
TG10SE99	A11 IMPROVEMENT WYMONDHAM-CRINGLEFORD	05/05/1982	3	617840	304750

Appendix C: Geological Maps & Memoirs

Country	Map Title	Map Type	Sheet No	Scale	Pubn. Year
UK	Norfolk	Geological map	TG 10 NE 161	1:63360	1969
UK	East Anglia	Quatenary Geology	52°N	1:250,000	1991
UK	United Kingdom - South	Geological Map - Solid, 3rd edition	-	1: 500,000	1979

TG 10 NE (NORFOLK) TG 10 N

GEOLOGICAL SURVEY OF GREAT BRITAIN (ENGLAND AND WALES)

ORDNANCE SURVEY

Scale 1:10,560 or 6 Inches to 1 Mile

Provisional Edition

SHEET TG 10 NE

SHEET TG 10 NE

NORFOLK

BAWBURGH

COLNEY

LITTLE MELTON

CRINGLEFORD

Hawburgh

Colney

Little Melton

GENERALIZED VERTICAL SECTION

INDEX AND EXPLANATION

THE NATIONAL GRID

SHEET TG 10 NE

SHEET TG 10 NE
NORFOLK

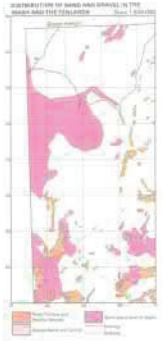
EAST ANGLIA

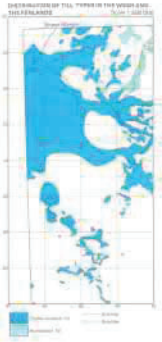
Sheet 52°N-00°

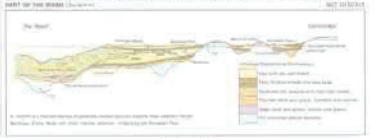
British Geological Survey

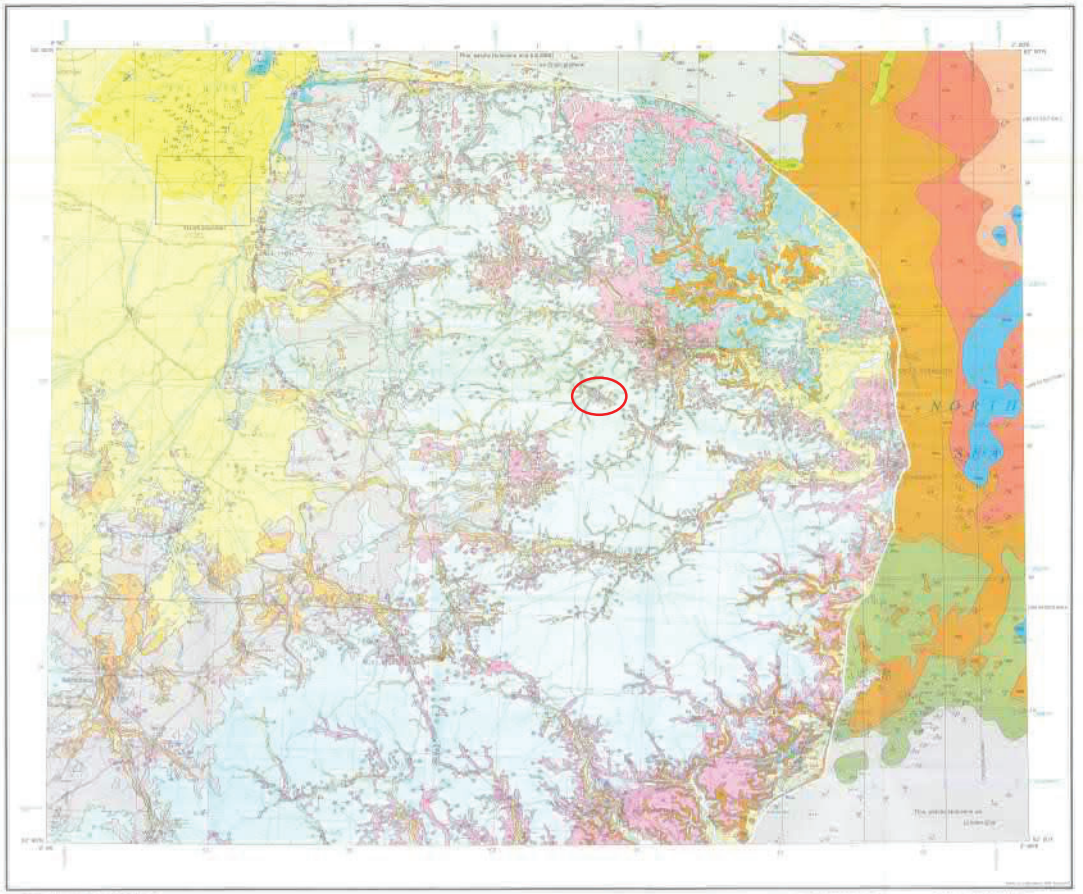
1:250 000 Series

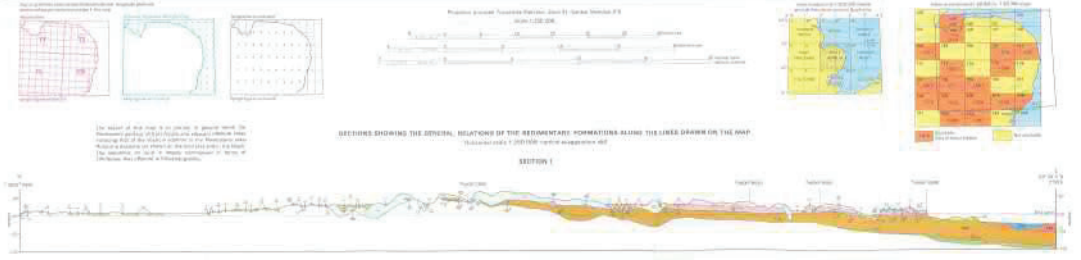
QUATERNARY GEOLOGY

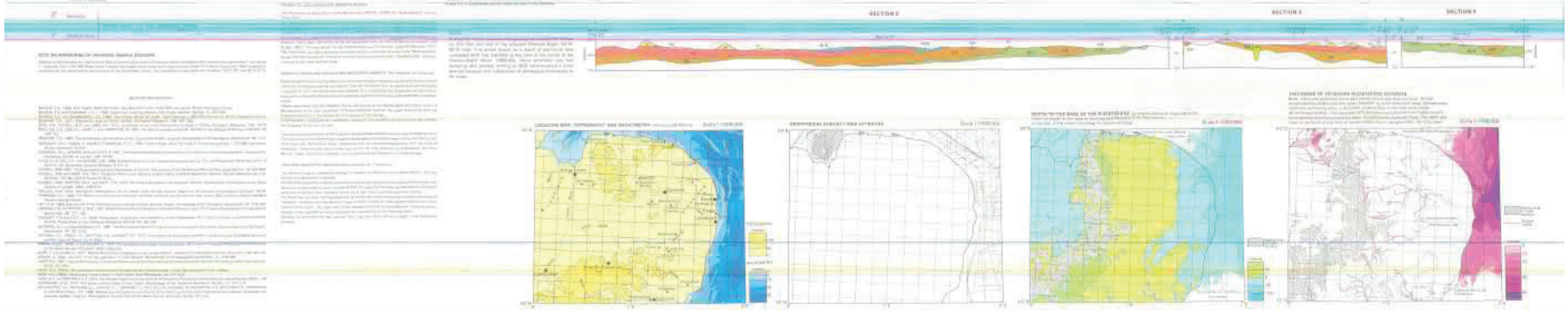


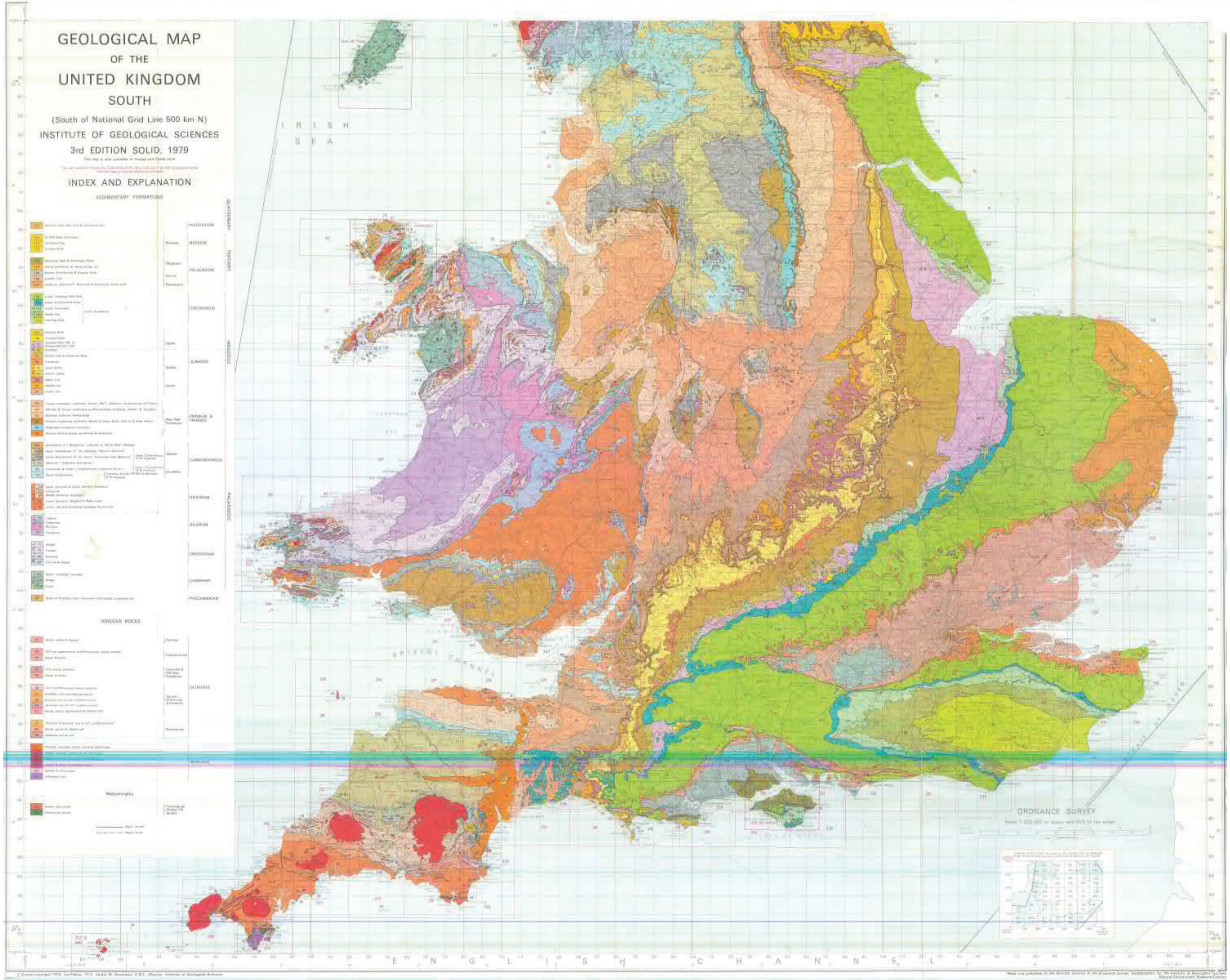






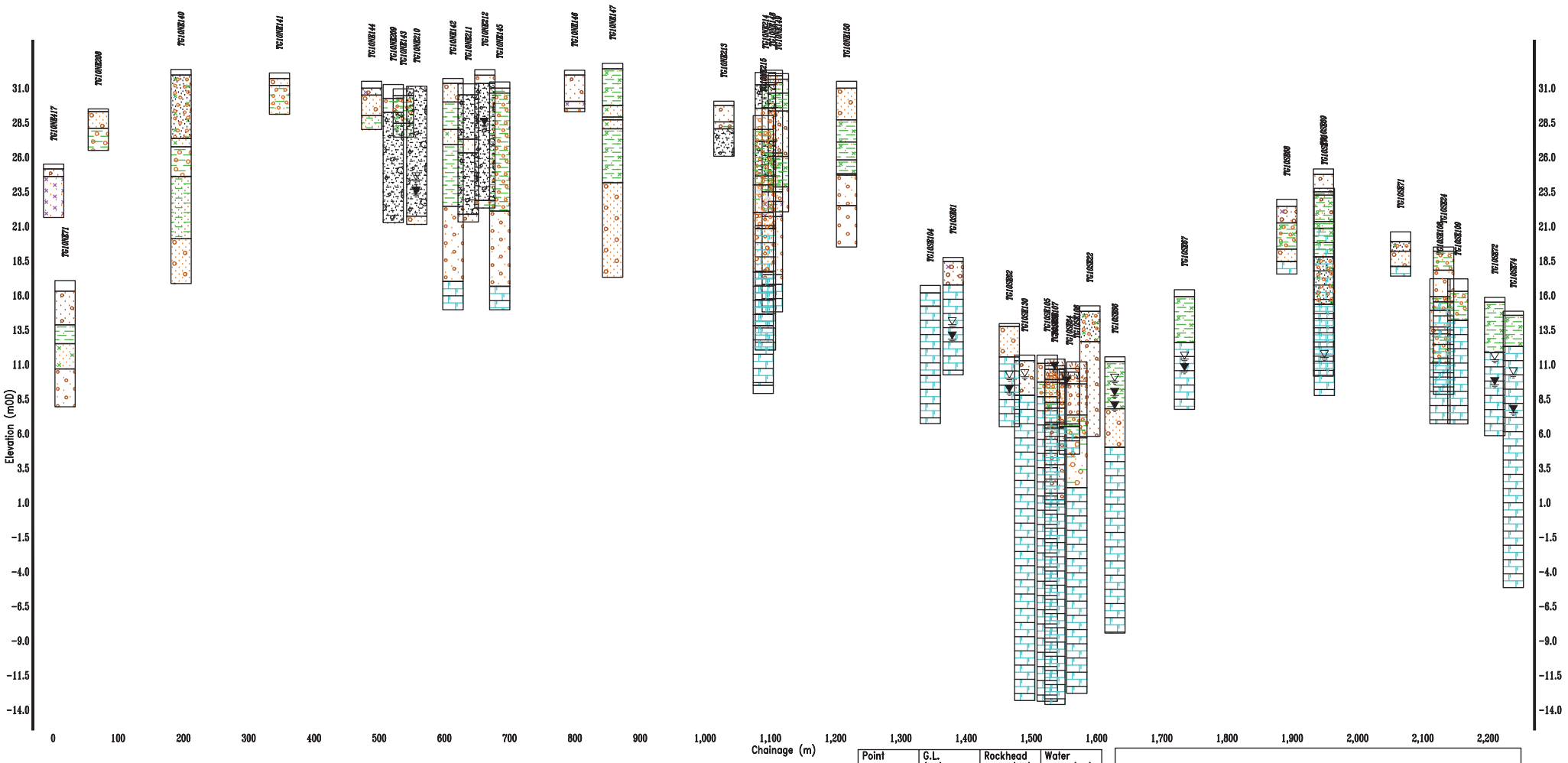





GEOLOGICAL MAP
OF THE
UNITED KINGDOM
SOUTH
(South of National Grid Line 500 km N)
INSTITUTE OF GEOLOGICAL SCIENCES
3rd EDITION SOLID, 1979
INDEX AND EXPLANATION
SEDIMENTARY FORMATIONS
QUATERNARY
TERTIARY
MESOZOIC
PALAEOZOIC
PLEISTOCENE
MIOCENE
PALAEOGENE
CRETACEOUS
JURASSIC
PERMIAN & TRIASSIC
CARBONIFEROUS
DEVONIAN
SILURIAN
ORDOVICIAN
CAMBRIAN
PRECAMBRIAN
IGNEOUS ROCKS
INTRUSIVE
Metamorphic
I R I S H
S E A
BRISTOL CHANNEL
E N G L I S H C H A N N E L
ORDNANCE SURVEY

Appendix D: Cross Sections & Typical Borehole Logs

Cross section locations (BGS plan view)



Scale: h=1:6222; v=1:294 (At A3)

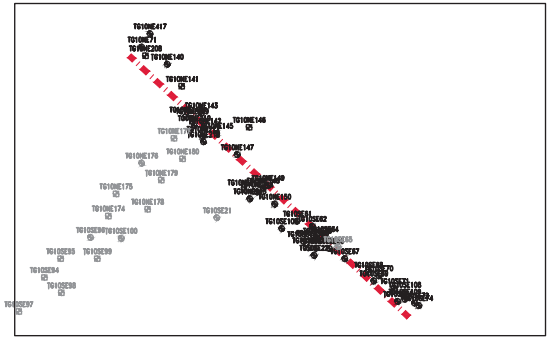
TOPSOIL	Sandy Gravelly CLAY	Sandy Silty CLAY	Sandy CLAY
Sandy gravelly Clay	Gravelly clayey SAND	Sandy Silty CLAY	Clayey Sandy SILT
Sandy SILT	Silty CLAY	Gravelly clayey SAND	Clayey SAND and GRAVEL
Clayey Silty SAND	Clayey SAND	Sandy Peat	Gravelly Sand

Water Strike Rise

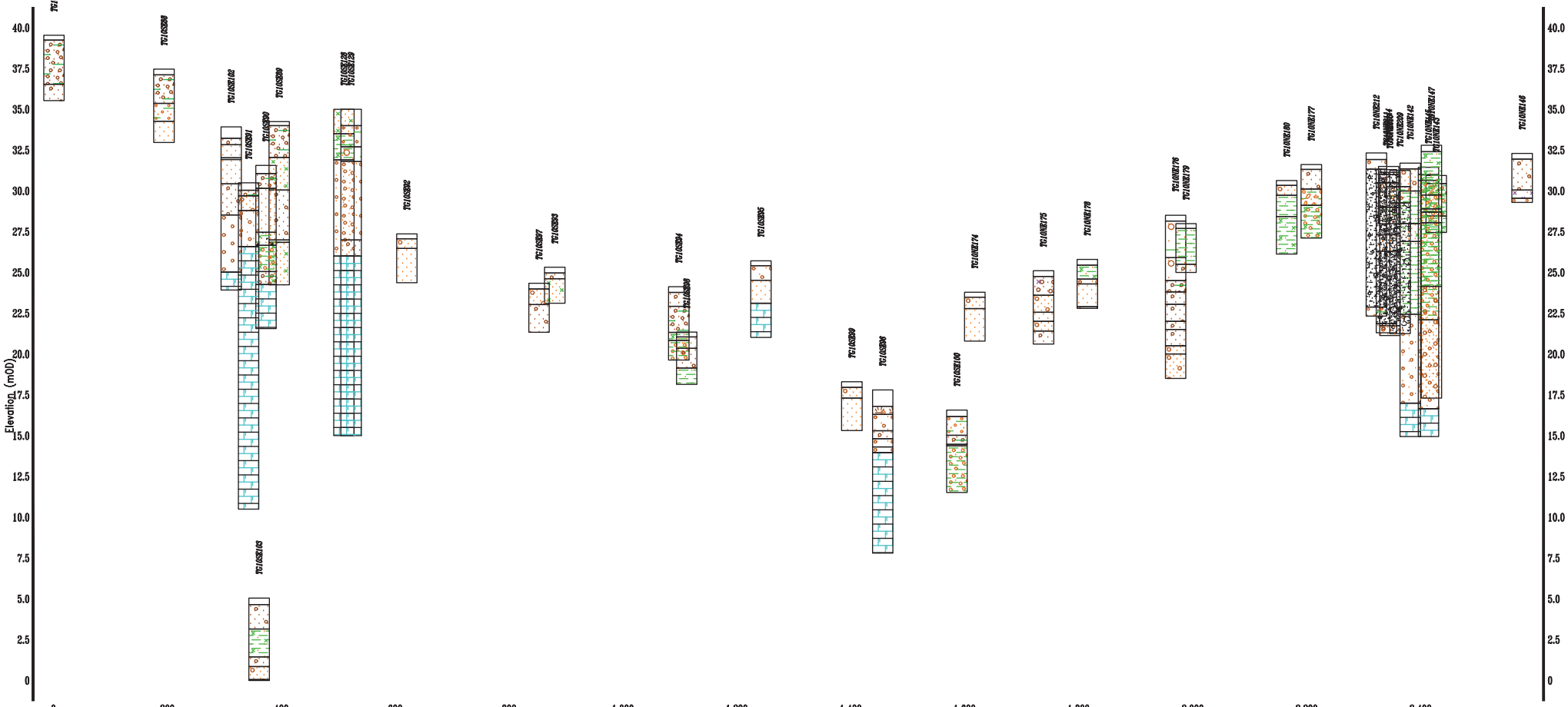
Water Strike

Highest Recorded Standpipe Reading

Point	G.L. (OD)	Rockhead Level (OD)	Water Level (OD)
TG10NE140	32.35		
TG10NE141	32.1		
TG10NE142	31.7		
TG10NE143	30.95		
TG10NE144	31.5		
TG10NE145	31.45		
TG10NE146	32.3		
TG10NE147	32.8		
TG10NE148	32.3		
TG10NE149	32.05		
TG10NE150	31.5		
TG10NE208	29.49		
TG10NE209	31.26		
TG10NE210	31.14		
TG10NE211	31.31		
TG10NE212	32.33		
TG10NE213	30.06		
TG10NE214	32.14		
TG10NE215	29		
TG10NE417	25.5		
TG10NE71	17.07		
TG10SE104	16.72		



Section 1



Scale: h=1:7167; v=1:250 (At A3)

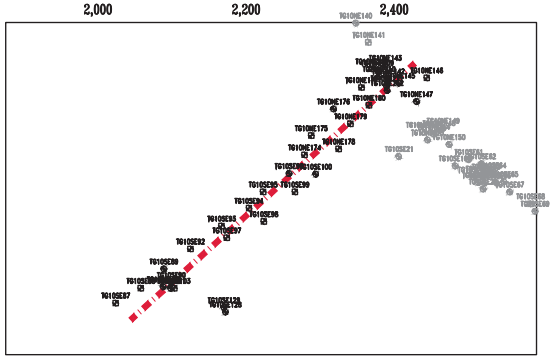
TOPSOIL	Sandy Gravelly CLAY	Sandy Silty CLAY	Sandy CLAY
Sandy gravelly Clay	Sandy Silty CLAY	Sandy SILT	Silty CLAY
Clayey SAND and GRAVEL	Clayey Silty SAND	Clayey SAND	Clayey Silty SAND
Silty Gravelly SAND	Silty sand	SAND	GRAVEL

Water Strike Rise

Water Strike

Highest Recorded Standpipe Reading

Point	G.L. (OD)	Rockhead Level (OD)	Water Level (OD)
TG10NE142	31.7		
TG10NE143	30.95		
TG10NE144	31.5		
TG10NE145	31.45		
TG10NE146	32.3		
TG10NE147	32.8		
TG10NE174	23.793		
TG10NE175	25.111		
TG10NE176	28.507		
TG10NE177	31.616		
TG10NE178	25.803		
TG10NE179	28		
TG10NE180	30.636		
TG10NE209	31.26		
TG10NE210	31.14		
TG10NE211	31.31		
TG10NE212	32.33		
TG10SE100	16.574		
TG10SE102	33.93		
TG10SE103	5.05		
TG10SE128	35		
TG10SE129	35		



Section 2

TG 10 NE/142

ENGINEER C. MAUNSELL AND PARTNERS	PROJECT A47 NORWICH SOUTHERN BYPASS	GROUND LEVEL 31.70 mOD	HOLE NO. 104
LOGGED BY: GROUND ENGINEERING LIMITED	EXCAVATION METHODS PERCUSSIVE (PILCON WAYFARER)	COORDINATES 618 470 E 305 515 N	FIGURE A
FIELDWORK BY: " " "		DATES 11-12/5/82	SHEET 1 OF 2
LAB. TESTING BY: " " "	200mm casing to 14.90m		OTHER TESTS AND NOTES

DATE/TIME AT DEPTH	DEPTH OF CASING	DEPTH TO WATER	Piez.	STRATA DESCRIPTION	LEG.	LEVEL m.O.D.	DEPTH m	SAMPLING/ IN SITU TESTING NO.	DEPTH m	TYPE	BLOWS	V / Cr / RQD	LAB TESTING % <425	W %	PL %	LL %	MCV	γ Mg/m³	Cu kN/m²	OTHER TESTS AND NOTES
11.5.82 08.30				TOPSOIL		31.70	0.00													
						31.35	0.35													
				Medium dense pale brown silty fine to medium SAND with some fine to medium subrounded to subangular gravel (Glacial Sand and Gravel)				1	0.60	D									
								2	1.00	BC	N=12									
									1.45											
						30.00	1.70	3	1.80	D										
				Stiff mottled orange-brown grey blue silty very sandy CLAY with occasional fine to medium subrounded to subangular gravel with silt laminations (Boulder Clay)				4	2.00	U	(23)			15			2.07	0	
									2.45										Øu=	
								5	2.50	D									27.5°	
				--- with lenses of grey brown clayey silt			3.00	6/	3.00	DS/B	N=21			15						
								7	3.45											
						28.00	3.70													
				Medium dense orange-brown silty fine to medium SAND with some fine gravel and occasional lumps of brown clay (Glacial Sand and Gravel)				8/	4.00	DS/B	N=18									
								9	4.45											
						26.90	4.80	10	4.90	D			90	18	15	27		2.13	28	
				Soft pale brown silty very sandy CLAY with mottled black staining (Boulder Clay)				11	5.00	U	(19)									
									5.45											
								12	5.50	D										
				--- with occasional fine gravel			6.00	13	6.00	D										
				--- becoming firm to stiff			6.50	14	6.50	U	(21)		93	15	NP	NP		2.02	5	
									6.95										Øu = 27°	
				--- becoming reddish brown mottled brown silty sandy CLAY			7.00	15	7.00	D										
								16	7.50	D										
								17	7.90	D										
				--- becoming stiff with chalk lumps			7.90	18	8.00	U	(36)									
									8.45											
								19	8.50	D										
								20	9.00	D										
						22.45	9.25	21	9.40	D										
11.5.82 17.30	10.00	DRY		Dense brown medium to coarse sandy fine to coarse subrounded to subangular GRAVEL (Glacial Sand and Gravel)				22	9.50	BC	N=46									
									9.95											

Water added from 9.25m to 14.70m

WATER
1— First water strike
2— Subsequent water strikes
3— Highest water level in open hole
▽ Highest water level in open hole

PIEZOMETER
Upper seal
Response length
Lower seal
(Installation only, readings elsewhere)

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
W Water sample
U Undisturbed sample
P Piston sample
R Rotary core recovery to scale
V Insitu vane test
S Standard penetration test
C Cone penetration test
K Permeability test
PR Pressuremeter test

Blows N = N value 26/150, blows for 150mm drive after seating 26*, blows for part or whole of seating drive only. (26) Undisturbed sample blow count

V Vane strength kN/m² Natural Remould
Cr Core recovery %
RQD Rock quality designation
<425 Sample % passing 425µm sieve

J. Tiplady BSC C Eng FICE, FIHE
Director (Transport)
Eastern Regional Office (Transport)
49-51 Goldington Road, Bedford

SHEET 1 OF 2 | FIG A | HOLE NO 104

114-180/82

TG 10 NE/142

ENGINEER G. MAUNSELL AND PARTNERS	PROJECT A47 NORWICH SOUTHERN BYPASS	GROUND LEVEL 31.70 mOD	HOLE NO. 104
LOGGED BY: GROUND ENGINEERING LIMITED	EXCAVATION METHODS PERCUSSIVE (PILCON WAYFARER)	COORDINATES 618 470 E 305 515 N	FIGURE A
FIELDWORK BY: " " "	200mm casing to 14.90m	DATES 11-12/5/82	SHEET 2 OF 2
LAB. TESTING BY: " " "			OTHER TESTS AND NOTES

DATE/TIME AT DEPTH	DEPTH OF CASING	DEPTH TO WATER	Piez.	STRATA DESCRIPTION	LEG.	LEVEL m.O.D.	DEPTH m	SAMPLING/IN SITU TESTING NO.	DEPTH m	TYPE	BLOWS	V / Cr / RQD	LAB TESTING % <425	W %	PL %	LL %	MCV	γ Mg/m³	Cu kN/m²
12.5.82 08.30				AS SHEET 1				23	10.50	D									
				becoming dense light brown medium to coarse SAND and fine to coarse subrounded to subangular GRAVEL			11.00	24	11.00 11.45	BC	N=36								
								25	12.00	D									
								26	12.50 12.95	BC	N=59								
								27	13.50	D									
								28	14.00 14.45	BC	N=37								
				Cream yellow partly weathered intact lumps of CHALK in a remoulded chalk matrix with flints (Upper Chalk) GRADE V		17.00	14.70	29	14.80	D									
								30/31	15.00 15.45	D&B	N=11								
								32	16.15 16.60	U	(30)								
12.5.82 14.00	14.90	DRY				14.95	16.75	33	16.65	D									
				BOREHOLE COMPLETED															

WATER
1 First water strike
2 Subsequent water strikes
3 Highest water level in open hole

PIEZOMETER
Upper seal
Response length
Lower seal
(Installation only, readings elsewhere)

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
W Water sample
U Undisturbed sample
P Piston sample
R Rotary core recovery to scale
V Insitu vane test
S Standard penetration test
C Cone penetration test
K Permeability test
PR Pressuremeter test

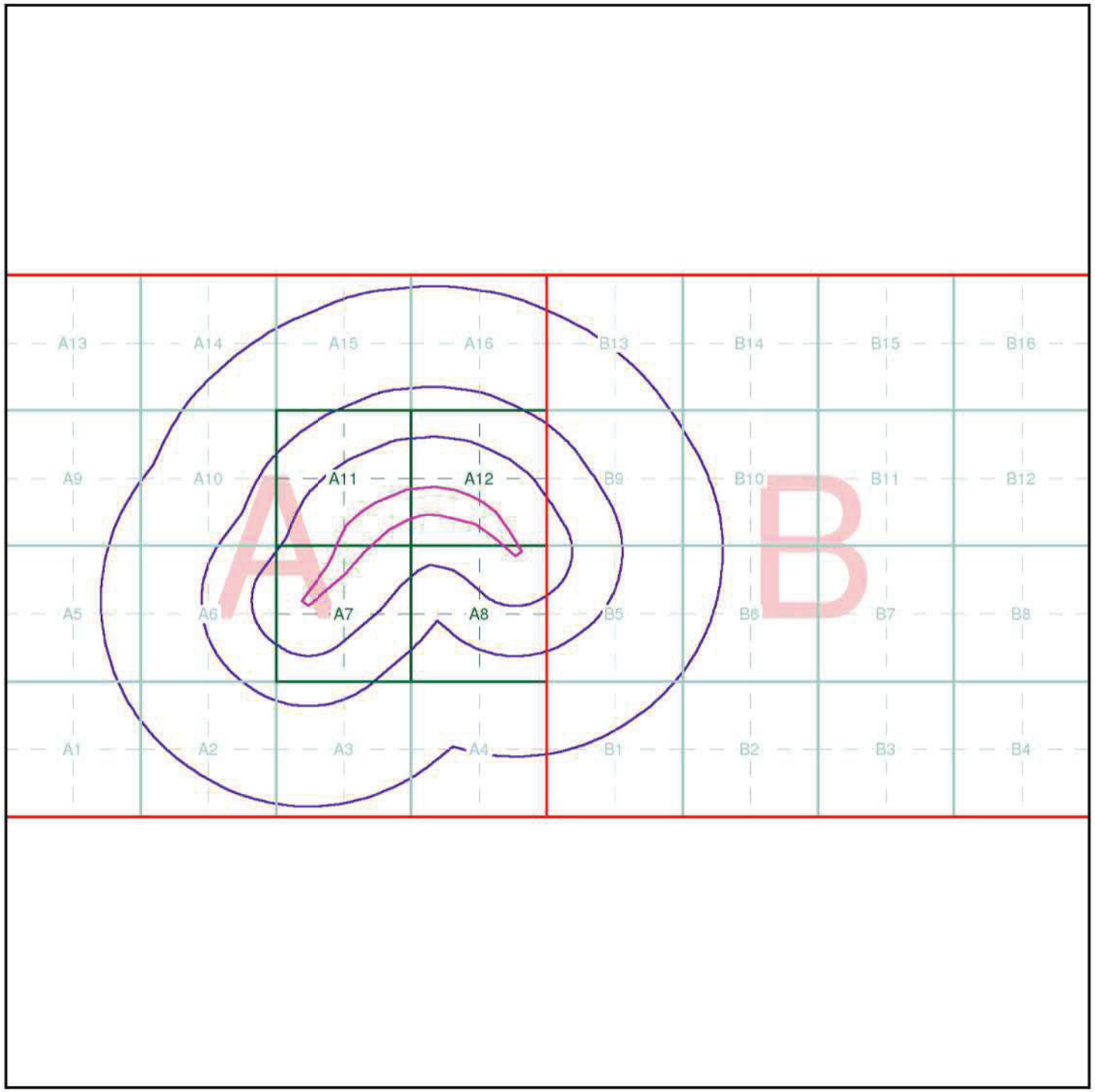
Blows N = N value 26/150, blows for 150mm drive after seating 26*, blows for part or whole of seating drive only. (26) Undisturbed sample blow count

V Vane strength kN/m² Natural / Remould
Cr Core recovery %
RQD Rock quality designation
<425 Sample % passing 425μm sieve

J. Tiplady BSC C Eng FICE, FIHE
Director (Transport)
Eastern Regional Office (Transport)
49-51 Goldington Road, Bedford

SHEET 2 OF 2 | FIG. A | HOLE NO. 104

Appendix E: Landmark Envirocheck Report



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Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:

Map data

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

NATURAL ENGLAND

Envirocheck reports are compiled from 136 different sources of data.

Client Details

Mr A Mckenzie, AECOM Ltd, Saxon House, 27 Duke Street, Chelmsford, Essex, CM1 1HT

Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618310, 305120
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Full Terms and Conditions can be found on the following link:
http://www.landmarkinfo.co.uk/Terms/Show/515

Landmark INFORMATION GROUP

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
108824762_1_1

Customer Reference:
A47 Thickthorn

National Grid Reference:
618010, 304990

Slice:
A

Site Area (Ha):
15.75

Search Buffer (m):
1000

Site Details:

A47 Thickthorn Junction
Cringleford
Norfolk

Client Details:

[redacted]
AECOM Ltd
Saxon House
27 Duke Street
Chelmsford
Essex
CM1 1HT

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Contents

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Natural England Copyright Notice

Ove Arup Copyright Notice

Peter Brett Associates Copyright Notice

Radon Potential dataset Copyright Notice

Report Version v50.0

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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 4				3
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 5		1		
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature		Yes			
Pollution Incidents to Controlled Waters	pg 5		2	1	3
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality					
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions	pg 6				4 (*27)
Water Industry Act Referrals					
Groundwater Vulnerability	pg 14	Yes	n/a	n/a	n/a
Drift Deposits	pg 14	1	n/a	n/a	n/a
Bedrock Aquifer Designations	pg 14	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 14	Yes	n/a	n/a	n/a
Source Protection Zones	pg 14		2		
Extreme Flooding from Rivers or Sea without Defences	pg 14	Yes		n/a	n/a
Flooding from Rivers or Sea without Defences	pg 14	Yes		n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
Detailed River Network Lines	pg 15	Yes	Yes	Yes	n/a
Detailed River Network Offline Drainage	pg 16			Yes	n/a

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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites	pg 17		1		
Historical Landfill Sites	pg 17		1		1
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)	pg 17				3
Local Authority Landfill Coverage	pg 18	2	n/a	n/a	n/a
Local Authority Recorded Landfill Sites	pg 18	1			
Potentially Infilled Land (Non-Water)	pg 18		1		1
Potentially Infilled Land (Water)					
Registered Landfill Sites					
Registered Waste Transfer Sites	pg 18				1
Registered Waste Treatment or Disposal Sites	pg 19				1
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					

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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Geological					
BGS 1:625,000 Solid Geology	pg 20	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 20	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites	pg 23		6	2	1
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
Brine Compensation Area			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability			n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain	pg 24	Yes	Yes	n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 25	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 25	Yes		n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 25	Yes	Yes	n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 25	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 26	Yes		n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 26	Yes	Yes	n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 28		2	3	7
Fuel Station Entries	pg 29		1		
Points of Interest - Commercial Services	pg 29		2		5
Points of Interest - Education and Health					
Points of Interest - Manufacturing and Production	pg 29		1		1
Points of Interest - Public Infrastructure	pg 29		4	1	3
Points of Interest - Recreational and Environmental					
Gas Pipelines					
Underground Electrical Cables					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Ancient Woodland					
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas	pg 31				1
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones	pg 31	2			
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NE (N)	0	2	618011 305000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NE (S)	0	2	618011 304950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NE (SE)	0	2	618050 304950
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7NE (E)	0	2	618050 304992
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NW (NW)	0	2	618000 305000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7NE (E)	0	2	618050 305000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (E)	0	2	618700 304992
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NE (SW)	0	2	618011 304992
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A7NW (W)	0	2	618000 304992
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7NE (E)	0	2	618150 305000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NE (SE)	18	2	618100 304900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (E)	23	2	618800 304950
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7NE (E)	26	2	618150 304992
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A11SW (NW)	29	2	617950 305100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NW (SW)	41	2	617750 304800
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (E)	54	2	618750 304950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NE (S)	56	2	618011 304800
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (E)	63	2	618950 304992
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8NE (E)	73	2	618850 304900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NW (S)	74	2	618000 304700
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (E)	76	2	618950 304950
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NW (E)	81	2	618650 304992

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (E)	87	2	618650 304950
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7NE (S)	94	2	618011 304750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NE (SE)	96	2	618150 304900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (E)	109	2	618500 304992
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A11SW (NW)	114	2	617900 305150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8NE (E)	123	2	618800 304850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7SW (S)	124	2	617850 304600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A7NE (SE)	128	2	618150 304850
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (E)	146	2	619000 304900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NE (S)	159	2	618100 304750
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NW (E)	165	2	618400 304992
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NE (E)	167	2	618250 304900
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7SE (S)	203	2	618050 304650
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	(E)	213	2	619100 305000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	(E)	213	2	619100 304992
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (E)	214	2	618400 304950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (E)	223	2	618700 304750
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7SW (S)	224	2	618000 304500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	(E)	232	2	619100 304900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A6NE (SW)	241	2	617550 304800
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7SE (S)	247	2	618100 304600
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7SW (SW)	257	2	617700 304500

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	(E)	257	2	619100 304850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A7NE (SE)	264	2	618200 304700
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (E)	265	2	619000 304750
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (E)	273	2	618850 304700
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A6SE (SW)	284	2	617650 304500
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A6NE (W)	291	2	617500 304800
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (SE)	293	2	618700 304700
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	(E)	293	2	619050 304750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A6NE (W)	296	2	617500 304850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	(E)	299	2	619150 304850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A6NE (W)	304	2	617600 305000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A6NE (W)	308	2	617500 304900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	(E)	313	2	619200 305000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A6SE (SW)	325	2	617650 304450
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	(E)	326	2	619150 304800
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10SE (W)	334	2	617600 305050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A6SE (SW)	355	2	617450 304650
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A6NE (W)	356	2	617450 304900
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	(E)	362	2	619100 304700
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10SE (W)	364	2	617600 305100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A6NE (W)	373	2	617450 304950
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A6NE (W)	404	2	617400 304900

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10SE (W)	404	2	617550 305100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	(E)	411	2	619250 304800
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A6NE (W)	420	2	617400 304950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10SE (W)	434	2	617550 305150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A6NE (W)	440	2	617400 304992
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A6SE (SW)	453	2	617450 304450
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	(E)	463	2	619350 305000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A6SE (SW)	465	2	617350 304600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	(E)	466	2	619350 305050
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A6NE (W)	467	2	617350 304950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A10SE (W)	474	2	617500 305150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A6NE (W)	485	2	617350 304992
1	**Discharge Consents** Operator: Intwood Farms Ltd Property Type: Arable Farming Location: Home Farm Intwood, Norwich, Norfolk, Nr4 6tg Authority: Environment Agency, Anglian Region Catchment Area: Catchment 29 Unknown Detail Reference: Gwelf50318 Permit Version: 1 Effective Date: 1st April 1999 Issued Date: 10th May 2000 Revocation Date: 6th August 2008 Discharge Type: Trade Discharge - Agricultural And Surface Discharge Environment: Onto Land Receiving Water: Groundwater **Status: Deemed Groundwater Regulations Authorisation** Positional Accuracy: Located by supplier to within 100m	A3SE (S)	906	3	618200 303900
2	**Discharge Consents** Operator: Norse Environmental Services Limited Property Type: WASTE COLLECTION/TREATMENT/DISPOSAL/MATERIALS RECOVERY Location: Ketteringham Household Waste Rec Ct Station Road, Ketteringham, Norwich, Norfolk, Nr9 3az Authority: Environment Agency, Anglian Region Catchment Area: Not Supplied Reference: Eprkb3690ny Permit Version: 1 Effective Date: 1st December 2013 Issued Date: 27th September 2013 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Tips) Discharge Environment: Pond - No Outlet Receiving Water: Balancing Pond **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A2SW (SW)	912	3	617296 303981

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
3	**Discharge Consents** Operator: Ben Burgess Holdings Ltd Property Type: WWTW (NOT WATER CO) (NOT STP AT A PRIVATE PREMISES) Location: Station Farm Station Lane, Hethersett, Norwich, Norfolk, Nr9 3ax Authority: Environment Agency, Anglian Region Catchment Area: Upper River Yare / River Tiffey Reference: Prenf19656 Permit Version: 1 Effective Date: 10th October 2005 Issued Date: 10th October 2005 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Trib River Yare **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A1NE (SW)	981	3	616931 304275
4	**Local Authority Pollution Prevention and Controls** Name: Thickthorn Service Station Location: Norwich Road, Hethersett, NORWICH, Norfolk, NR9 3AU Authority: South Norfolk District Council, Environmental Health Department Permit Reference: PPC/12/1/1.2 Dated: 31st December 1998 Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A11NE (NE)	106	4	618302 305407
	Nearest Surface Water Feature	A7NW (SW)	0	-	617909 304859
5	**Pollution Incidents to Controlled Waters** Property Type: Road Location: Norwich District Authority: Environment Agency, Anglian Region Pollutant: Chemicals - Paints / Dyes Note: River Yare Catchment Incident Date: 25th April 1997 Incident Reference: 3767 Catchment Area: Not Given Receiving Water: Potential River Cause of Incident: Accidental Spillage/Leakage Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (NE)	185	3	618500 305495
5	**Pollution Incidents to Controlled Waters** Property Type: Road Location: A11 Road Near, CRINGLEFORD Authority: Environment Agency, Anglian Region Pollutant: Chemicals - Paints / Dyes Note: River Yare Catchment Incident Date: 25th April 1997 Incident Reference: 3767 Catchment Area: Not Given Receiving Water: Potential River Cause of Incident: Accidental Spillage/Leakage Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (NE)	190	3	618500 305500
6	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Norwich District Authority: Environment Agency, Anglian Region Pollutant: Unknown Note: Tributary Of Intwood Stream Incident Date: 26th April 1993 Incident Reference: 1891 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NE (SE)	275	3	618300 304800

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
7	**Pollution Incidents to Controlled Waters** Property Type: Paper Industry Location: Norwich District Authority: Environment Agency, Anglian Region Pollutant: Miscellaneous - Fire water / Foam Note: River Yare Catchment Incident Date: 22nd September 1997 Incident Reference: 3988 Catchment Area: Not Given Receiving Water: Groundwater Cause of Incident: Fire Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A2SE (SW)	927	3	617400 303900
8	**Pollution Incidents to Controlled Waters** Property Type: Other General Premises Location: Norwich District Authority: Environment Agency, Anglian Region Pollutant: Miscellaneous - Fire water / Foam Note: Not Supplied Incident Date: 22nd December 1998 Incident Reference: 4531 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Fire Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A2NW (SW)	947	3	617100 304100
9	**Pollution Incidents to Controlled Waters** Property Type: Scrapyards Location: Norwich District Authority: Environment Agency, Anglian Region Pollutant: Miscellaneous - Fire water / Foam Note: Ground Incident Date: 9th November 1998 Incident Reference: 4497 Catchment Area: Not Given Receiving Water: Groundwater Cause of Incident: Fire Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A2NW (SW)	962	3	617000 304200
10	**Water Abstractions** Operator: M P Kemp Ltd Licence Number: 7/34/13/*G/0079 Permit Version: 100 Location: Bore,Thickthorn Farm Authority: Environment Agency, Anglian Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: E chalk; Status: Perpetuity Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 1st October 1987 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A15SW (NW)	693	3	617680 305750
11	**Water Abstractions** Operator: [redacted] Licence Number: 7/34/13/*G/0179 Permit Version: 102 Location: Bore,Hall Fm,Keswick Authority: Environment Agency, Anglian Region Abstraction: General Farming And Domestic Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 8th June 2011 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A4NE (SE)	933	3	618880 304040

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
11	**Water Abstractions** Operator: [redacted] Licence Number: 7/34/13/*G/0179 Permit Version: 101 Location: Bore,Hall Fm,Keswick Authority: Environment Agency, Anglian Region Abstraction: General Farming And Domestic Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 20th September 2007 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A4NE (SE)	933	3	618880 304040
11	**Water Abstractions** Operator: Intwood Farms Ltd Licence Number: 7/34/13/*G/0018 Permit Version: 100 Location: Bore,Hall Fm,Keswick Authority: Environment Agency, Anglian Region Abstraction: General Farming And Domestic Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: E chalk; Status: Perpetuity Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st December 1995 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A4NE (SE)	938	3	618880 304035
	Water Abstractions Operator: M P Kemp Ltd Licence Number: 7/34/13/*G/0079 Permit Version: 100 Location: Well,Thickthorn Farm Authority: Environment Agency, Anglian Region Abstraction: General Farming And Domestic Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Glacial Sand and Gravel; Status: Perpetuity Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st October 1987 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A14SW (NW)	1104	3	617210 305880
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/*S/0259 Permit Version: 101 Location: Ketteringham Stream, Hethersett Authority: Environment Agency, Anglian Region Abstraction: General Agriculture: Spray Irrigation - Storage Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Status: Perpetuity Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 1st April 1999 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A5NW (W)	1251	3	616560 304970

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/*G/164 Permit Version: Not Supplied Location: Stream Fed Res, , HETHERSETT, Norfolk Authority: Environment Agency, Anglian Region Abstraction: Spray Irrigation Abstraction Type: Not Supplied Source: Stream Daily Rate (m3): 27 Yearly Rate (m3): 455000 Details: Status: Perpetuity Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A5NW (W)	1262	3	616550 304975
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/**/164 Permit Version: Not Supplied Location: Bore , HETHERSETT Authority: Environment Agency, Anglian Region Abstraction: Spray Irrigation Abstraction Type: Not Supplied Source: Surface Daily Rate (m3): 27 Yearly Rate (m3): 455000 Details: Not Supplied Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A5NW (W)	1263	3	616550 304980
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/*S/0259 Permit Version: 101 Location: Tributary Of The Ketteringham Stream, Hethersett Authority: Environment Agency, Anglian Region Abstraction: General Agriculture: Spray Irrigation - Storage Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Status: Perpetuity Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 1st April 1999 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A5NW (W)	1272	3	616540 304980
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/*G/0258a Permit Version: 1 Location: Borehole At Hethersett Authority: Environment Agency, Anglian Region Abstraction: General Agriculture: Spray Irrigation - Storage Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Hethersett Norwich Norfolk Authorised Start: 01 May Authorised End: 30 September Permit Start Date: 1st October 2008 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A5NW (W)	1308	3	616500 304960

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/*G/0258 Permit Version: 101 Location: Borehole At Hethersett Authority: Environment Agency, Anglian Region Abstraction: General Agriculture: Spray Irrigation - Storage Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: E chalk; Status: Temporary Authorised Start: 01 May Authorised End: 30 September Permit Start Date: 1st May 1999 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A5NW (W)	1308	3	616500 304960
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/*G/164 Permit Version: Not Supplied Location: Bore At, , HETHERSETT, Norfolk Authority: Environment Agency, Anglian Region Abstraction: Unspecified Abstraction Type: Not Supplied Source: Well And Borehole Daily Rate (m3): 7 Yearly Rate (m3): 23000 Details: E chalk; Status: Perpetuity Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A5NW (W)	1480	3	616335 305015
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/*G/0164 Permit Version: 100 Location: Borehole, Hethersett Authority: Environment Agency, Anglian Region Abstraction: Private Water Undertaking: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: E chalk; Status: Perpetuity Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st September 1978 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A5NW (W)	1485	3	616330 305015
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/*G/0164 Permit Version: 100 Location: Borehole, Hethersett Authority: Environment Agency, Anglian Region Abstraction: General Farming And Domestic Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: E chalk; Status: Perpetuity Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st September 1978 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A9SW (W)	1486	3	616330 305020

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/*G/164 Permit Version: Not Supplied Location: Bore At, , HETHERSETT, Norfolk Authority: Environment Agency, Anglian Region Abstraction: Private Water Undertaking Abstraction Type: Not Supplied Source: Well And Borehole Daily Rate (m3): 1 Yearly Rate (m3): 4000 Details: E chalk; Status: Perpetuity Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(W)	1531	3	616305 305115
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/**/164 Permit Version: Not Supplied Location: Stream Fed Res, HETHERSETT Authority: Environment Agency, Anglian Region Abstraction: Unspecified Abstraction Type: Not Supplied Source: Well And Borehole Daily Rate (m3): 6 Yearly Rate (m3): 19000 Details: Not Supplied Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(W)	1536	3	616300 305115
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/*G/164 Permit Version: Not Supplied Location: Bore At, , HETHERSETT, Norfolk Authority: Environment Agency, Anglian Region Abstraction: Agriculture (General) Abstraction Type: Not Supplied Source: Well And Borehole Daily Rate (m3): 6 Yearly Rate (m3): 19000 Details: E chalk; Status: Perpetuity Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(W)	1537	3	616300 305120
	Water Abstractions Operator: John Innes Centre Licence Number: 7/34/13/*G/0161 Permit Version: 100 Location: Bore At Cringleford Authority: Environment Agency, Anglian Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: E chalk; Status: Perpetuity Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st April 2004 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(NE)	1547	3	618790 306830

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/**/164 Permit Version: Not Supplied Location: Bore , HETHERSETT Authority: Environment Agency, Anglian Region Abstraction: Unspecified Abstraction Type: Not Supplied Source: Well And Borehole Daily Rate (m3): 6 Yearly Rate (m3): 19000 Details: Not Supplied Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(W)	1575	3	616250 305075
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/*g/020 Permit Version: Not Supplied Location: Well South Of, COLNEY Authority: Environment Agency, Anglian Region Abstraction: Agriculture (General) Abstraction Type: Not Supplied Source: Well And Borehole Daily Rate (m3): 0 Yearly Rate (m3): 500 Details: E chalk; Status: Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(N)	1631	3	617800 306850
	Water Abstractions Operator: Norwich City Football Club Licence Number: 7/34/13/*G/0233 Permit Version: 100 Location: Borehole At Training Ground Authority: Environment Agency, Anglian Region Abstraction: Sports Grounds/Facilities: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: E chalk; Status: Temporary Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st March 1994 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(NW)	1666	3	617200 306600
	Water Abstractions Operator: [redacted] Licence Number: 7/34/13/*G/0124 Permit Version: 100 Location: Bore At Ivyhouse Fm,Kett'Gham Authority: Environment Agency, Anglian Region Abstraction: General Farming And Domestic Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: E chalk; Status: Perpetuity Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st October 1981 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(SW)	1719	3	616700 303420

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Norwich City Football Club Plc Licence Number: 7/34/13/*G/0287a Permit Version: 2 Location: Borehole At Training Ground, Colney Authority: Environment Agency, Anglian Region Abstraction: Sports Grounds/Facilities: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Norwich City F C At Colney Norwich Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 10th March 2016 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(NW)	1754	3	617190 306700
	Water Abstractions Operator: Norwich City Football Club Plc Licence Number: 7/34/13/*G/0287a Permit Version: 1 Location: Borehole At Training Ground, Colney Authority: Environment Agency, Anglian Region Abstraction: Sports Grounds/Facilities: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Norwich City F C At Colney Norwich Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 5th January 2016 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(NW)	1754	3	617190 306700
	Water Abstractions Operator: Norwich City Football Club Ltd Licence Number: 7/34/13/*G/0287 Permit Version: 1 Location: Borehole At Training Ground, Colney Authority: Environment Agency, Anglian Region Abstraction: Sports Grounds/Facilities: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Norwich City Football Club Colney Norwich Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 15th June 2004 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(NW)	1754	3	617190 306700
	Water Abstractions Operator: M P Kemp Ltd Licence Number: An/034/0013/016 Permit Version: 1 Location: Borehole At Little Melton Authority: Environment Agency, Anglian Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 April Authorised End: 31 October Permit Start Date: 1st April 2010 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(NW)	1781	3	617001 306601

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: M P Kemp Ltd Licence Number: 7/34/13/*G/0297a Permit Version: 1 Location: Borehole At Little Melton Authority: Environment Agency, Anglian Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Little Melton, Norwich Authorised Start: 01 April Authorised End: 31 October Permit Start Date: 1st November 2008 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(NW)	1781	3	617000 306600
	Water Abstractions Operator: M P Kemp Ltd Licence Number: 7/34/13/*G/0297 Permit Version: 1 Location: Borehole At Little Melton Authority: Environment Agency, Anglian Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Little Melton, Norwich Authorised Start: 01 April Authorised End: 31 October Permit Start Date: 23rd August 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(NW)	1781	3	617000 306600
	Water Abstractions Operator: M P Kemp Ltd Licence Number: 7/34/13/*G/0277 Permit Version: 1 Location: Borehole At Little Melton Authority: Environment Agency, Anglian Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Little Melton, Norwich Authorised Start: 01 April Authorised End: 31 October Permit Start Date: 1st October 2002 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(NW)	1781	3	617000 306600
	Water Abstractions Operator: Mp Kemp Ltd Licence Number: 7/34/13/*G/0226 Permit Version: 100 Location: Borehole At Little Melton Authority: Environment Agency, Anglian Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 1st February 1993 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(NW)	1781	3	617000 306600

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: M P Kemp Limited Licence Number: 7/34/13/**/144 Permit Version: Not Supplied Location: River Yare , COLNEY Authority: Environment Agency, Anglian Region Abstraction: Agriculture (General) Abstraction Type: Not Supplied Source: Well And Borehole Daily Rate (m3): 7 Yearly Rate (m3): 23000 Details: Glacial Sand and Gravel; Status: Time Limit Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(N)	1921	3	617600 307085
	Groundwater Vulnerability Soil Classification: Soils of Intermediate Leaching Potential (I1) - Soils which can possibly transmit a wide range of pollutants Map Sheet: Sheet 26 East Norfolk Scale: 1:100,000	A7NE (SW)	0	3	618011 304992
	Drift Deposits Drift Deposit: Low permeability drift deposits occuring at the surface and overlying Major and Minor Aquifers are head, clay-with-flints, brickearth, peat, river terrace deposits and marine and estuarine alluvium Map Sheet: Sheet 26 East Norfolk Scale: 1:100,000	A11SE (N)	0	3	618010 305030
	Bedrock Aquifer Designations Aquifer Designation: Principal Aquifer	A7NE (SW)	0	2	618011 304992
	Bedrock Aquifer Designations Aquifer Designation: Principal Aquifer	A7NE (N)	0	2	618011 305000
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - Undifferentiated	A11SW (N)	0	2	617980 305079
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A7NE (SW)	0	2	618011 304992
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A7NE (N)	0	2	618011 305000
12	**Source Protection Zones** Name: Various Source: Environment Agency, Head Office Reference: Not Supplied Type: Zone II (Outer Protection Zone): Either 25% of the source area or a 400 day travel time whichever is greater.	A11SW (N)	60	3	617967 305231
13	**Source Protection Zones** Name: Various Source: Environment Agency, Head Office Reference: Not Supplied Type: Zone III (Total Catchment): The total area needed to support the discharge from the protected groundwater source.	A11SW (NW)	64	3	617908 305184
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A7NE (S)	0	3	618011 304905
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A7NE (S)	0	3	618011 304905
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
14	**Detailed River Network Lines** River Type: Secondary River River Name: Not Supplied Hydrographic Area: B05 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Other Rivers Management Status: Water Course Name: Not Supplied Water Course Reference:	A7NE (S)	0	3	618030 304901
15	**Detailed River Network Lines** River Type: Tertiary River River Name: Drain Hydrographic Area: B05 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Other Rivers Management Status: Water Course Name: Not Supplied Water Course Reference: Not Supplied	A7NW (S)	0	3	617972 304857
16	**Detailed River Network Lines** River Type: Secondary River River Name: Drain Hydrographic Area: B05 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Other Rivers Management Status: Water Course Name: Not Supplied Water Course Reference: Not Supplied	A7NW (S)	0	3	617972 304857
17	**Detailed River Network Lines** River Type: Tertiary River River Name: Drain Hydrographic Area: B05 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Other Rivers Management Status: Water Course Name: Not Supplied Water Course Reference: Not Supplied	A8NE (E)	106	3	618836 304868
18	**Detailed River Network Lines** River Type: Tertiary River River Name: Drain Hydrographic Area: B05 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Other Rivers Management Status: Water Course Name: Not Supplied Water Course Reference: Not Supplied	A8NE (E)	125	3	618834 304848
19	**Detailed River Network Lines** River Type: Tertiary River River Name: Drain Hydrographic Area: B05 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Other Rivers Management Status: Water Course Name: Not Supplied Water Course Reference: Not Supplied	A8NE (E)	127	3	618834 304848

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
20	**Detailed River Network Lines** River Type: Secondary River River Name: Drain Hydrographic Area: B05 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A8NE (E)	140	3	618832 304831
21	**Detailed River Network Lines** River Type: Lake/Reservoir River Name: Not Supplied Hydrographic Area: B05 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A10SE (W)	456	3	617470 305086
22	**Detailed River Network Offline Drainage** River Type: Tertiary River Hydrographic Area: D005	A11NE (N)	267	3	618162 305528

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
23	**BGS Recorded Landfill Sites** Site Name: Contley Lane Location: Cringleford, NORWICH, Norfolk Authority: British Geological Survey, National Geoscience Information Service Ground Water: Information not available Surface Water: Information not available Geology: N/A Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Derived	A7NE (E)	6	-	618100 304980
24	**Historical Landfill Sites** Licence Holder: Forehoe and Henstead Rural District Council Location: Cringleford, Norwich, Norfolk Name: Cantley Lane Operator Location: Ber House, 158 Ber Street, Norwich, Norfolk Boundary Accuracy: As Supplied Provider Reference: EAHLD31115 First Input Date: 31st December 1961 Last Input Date: 31st December 1969 Specified Waste Type: Deposited Waste included Inert, Industrial, Commercial and Household Waste EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 2600/0042 BGS Ref: 2876 Other Ref: Not Supplied	A7NE (E)	6	3	618100 304980
25	**Historical Landfill Sites** Licence Holder: Not Supplied Location: Heathersett, Norwich, Norfolk Name: Central Depot Operator Location: Ber House, 158 Ber Street, Norwich, Norfolk Boundary Accuracy: As Supplied Provider Reference: EAHLD31108 First Input Date: 31st December 1971 Last Input Date: 31st December 1973 Specified Waste Type: Deposited Waste included Industrial and Commercial Waste EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: Not Supplied BGS Ref: 2648 Other Ref: Not Supplied	A2SE (SW)	891	3	617491 303898
26	**Licensed Waste Management Facilities (Locations)** Licence Number: 70498 Location: D A Culling Scrap Metal, Station Lane, Hethersett, Norwich, Norfolk, NR9 3AX Operator Name: Culling D A Operator Location: Not Supplied Authority: Environment Agency - Anglian Region, Eastern Area Site Category: Metal Recycling Sites (Mixed) **Licence Status: Issued** Issued: 21st March 1994 Last Modified: Not Supplied Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: Not Supplied IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 10m	A5SE (SW)	916	3	616930 304436
27	**Licensed Waste Management Facilities (Locations)** Licence Number: 71327 Location: Station Road, Ketteringham, Norfolk, NR9 3AZ Operator Name: M W White (Norwich) Ltd Operator Location: Not Supplied Authority: Environment Agency - Anglian Region, Eastern Area Site Category: Household, Commercial And Industrial Transfer Stations **Licence Status: Modified** Issued: 10th September 2004 Last Modified: 23rd November 2010 Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: Not Supplied IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 10m	A2SE (SW)	946	3	617390 303884

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
28	**Licensed Waste Management Facilities (Locations)** Licence Number: 70509 Location: Station Lane, Hethersett, Norfolk Operator Name: Norfolk Environmental Waste Services Ltd Operator Location: 51 Station Lane, Horsham St Faith, Norwich, Norfolk, NR10 3HH Authority: Environment Agency - Anglian Region, Eastern Area Site Category: Household, Commercial And Industrial Transfer Stations **Licence Status: Issued** Issued: 21st January 1993 Last Modified: Not Supplied Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: Not Supplied IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 100m	A2SW (SW)	977	3	617300 303900
	Local Authority Landfill Coverage Name: Norfolk County Council - Has supplied landfill data		0	5	618011 304992
	Local Authority Landfill Coverage Name: South Norfolk District Council - Has no landfill data to supply		0	4	618011 304992
29	**Local Authority Recorded Landfill Sites** Location: Cringleford Reference: Not Supplied Authority: Norfolk County Council, Planning & Transportation - Minerals & Waste **Last Reported Status: Closed** Types of Waste: Not Supplied Date of Closure: Not Supplied Positional Accuracy: Positioned by the supplier Boundary Quality: Moderate	A7NE (E)	0	5	618088 304983
30	**Potentially Infilled Land (Non-Water)** Bearing Ref: E Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1995	A7NE (E)	98	-	618337 304994
31	**Potentially Infilled Land (Non-Water)** Bearing Ref: SW Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1995	A2SW (SW)	997	-	617270 303896
32	**Registered Waste Transfer Sites** Licence Holder: Norfolk Environmental Waste Servs.Ltd Licence Reference: NFK/TS/003/0 Site Location: Ketteringham C/A, Station Lane, Hethersett, Wymondham, Norfolk Operator Location: 51 Norwich Road, Horsham St Faith, NORWICH, Norfolk, NR10 3HH Authority: Environment Agency - Anglian Region, Eastern Area Site Category: Civic Amenity Max Input Rate: Very Small (Less than 10,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Operational as far as is knownOperational Dated: 1st March 1991 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Quality: Not Supplied Authorised Waste Prohibited Waste: Non-Haz. Household Waste Industrial Waste Liquid Waste N.O.S. Special Wastes Trade Or Business Waste	A2SW (SW)	947	3	617295 303940

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Registered Waste Treatment or Disposal Sites				
33	Licence Holder: [redacted] Licence Reference: NFK/SY/024/0 Site Location: Station Lane, Hethersett, Norwich, Norfolk Operator Location: Railway Arches, Trowse, NORWICH, Norfolk, NR1 2EF Authority: Environment Agency - Anglian Region, Eastern Area Site Category: Scrapyard Max Input Rate: Very Small (Less than 10,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Operational as far as is knownOperational Dated: 21st March 1994 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Quality: Not Supplied Authorised Waste: Max.Waste Permitted By Licence Norfolk Cat.Biii Gen.W-Scrapmet.Nonsol Prohibited Waste: Liquid Waste N.O.S. Waste N.O.S.	A5SE (SW)	930	3	616915 304435

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: White Chalk Subgroup	A7NE (SW)	0	2	618011 304992
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A11SE (N)	0	2	618065 305174
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7NE (S)	0	2	618013 304908
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 20 - 40 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: <15 mg/kg	A7NE (SW)	0	2	618011 304992
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 20 - 40 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: <15 mg/kg	A7NE (S)	0	2	618018 304812
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: <15 mg/kg	A11SW (N)	0	2	617980 305079
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A11SW (N)	0	2	618000 305089

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A8NE (E)	36	2	618705 305010
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7SE (S)	168	2	618016 304655
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: <15 mg/kg	A7SW (S)	168	2	618000 304653
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: <15 mg/kg	A6NE (W)	176	2	617660 304878
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 20 - 40 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: <15 mg/kg	A11SW (NW)	231	2	617765 305140
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: <15 mg/kg	A6NE (W)	391	2	617400 304753

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A16SW (NE)	579	2	618513 305896
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: <15 mg/kg	A3NW (S)	599	2	618000 304129
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A4SE (SE)	787	2	618813 303954
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A16NE (NE)	899	2	618925 306128
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: <15 mg/kg	A16NE (NE)	921	2	619000 306123
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 20 - 40 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: <15 mg/kg	A2NW (SW)	939	2	617177 304038

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 40 - 60 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A15NE (N)	959	2	618053 306225
34	**BGS Recorded Mineral Sites** Site Name: Cantley Wood Pit Location: , Cringleford, Norfolk, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 221648 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Pleistocene Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A7NE (E)	11	2	618100 304971
35	**BGS Recorded Mineral Sites** Site Name: Cantley Wood Pit Location: , Cringleford, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197664 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A7NE (E)	66	2	618177 304970
36	**BGS Recorded Mineral Sites** Site Name: Hethersett Pit Location: Hethersett Racecourse, Cringleford, Norfolk, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 221649 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Pleistocene Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A7NW (SW)	95	2	617711 304798
37	**BGS Recorded Mineral Sites** Site Name: Cantley Lane Pit Location: , Cringleford, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197662 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A12SW (E)	148	2	618480 305022
38	**BGS Recorded Mineral Sites** Site Name: American Farm Gravel Pit Location: , Intwood, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197649 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A8NW (E)	162	2	618596 304974

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
39	**BGS Recorded Mineral Sites** Site Name: Cantley Lane Pit Location: , Cringleford, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197663 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A8NW (E)	166	2	618375 304994
40	**BGS Recorded Mineral Sites** Site Name: Cantley Farm Pit Location: , Intwood, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197650 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A8NW (SE)	391	2	618368 304701
41	**BGS Recorded Mineral Sites** Site Name: Thickthorn Hall Pit Location: , Cringleford, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197661 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Lowestoft Formation Commodity: Common Clay and Shale Positional Accuracy: Located by supplier to within 10m	A6NE (W)	451	2	617342 304785
42	**BGS Recorded Mineral Sites** Site Name: Hethersett Gravel Pit Location: , Hethersett, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197559 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A5NE (W)	964	2	616830 304827
	BGS Measured Urban Soil Chemistry No data available				
	BGS Urban Soil Chemistry Averages No data available				
	Coal Mining Affected Areas In an area that might not be affected by coal mining				
	Non Coal Mining Areas of Great Britain Risk: Rare Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	2	618018 304812
	Non Coal Mining Areas of Great Britain Risk: Rare Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	2	618011 304992
	Non Coal Mining Areas of Great Britain Risk: Rare Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	2	618011 305000
	Non Coal Mining Areas of Great Britain Risk: Unlikely Source: British Geological Survey, National Geoscience Information Service	A11SW (NW)	124	2	617897 305183
	Non Coal Mining Areas of Great Britain Risk: Likely Source: British Geological Survey, National Geoscience Information Service	A11SW (NW)	224	2	617843 305267

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	2	618013 304908
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	2	618011 305000
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	2	618018 304812
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	2	618011 304992
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	2	618011 305000
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	2	618013 304908
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	2	618011 304992
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	2	618018 304812
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	2	618011 304992
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NW (SW)	0	2	617913 304898
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	2	618011 305000
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SE)	12	2	618242 304814
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	43	2	618930 305000
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	104	2	618991 305000
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A6SE (SW)	186	2	617661 304614
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SE)	226	2	618245 304749
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	2	618011 304992
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	2	618011 305000
	Potential for Landslide Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	102	2	618913 304876
	Potential for Landslide Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	104	2	618991 305000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	139	2	618962 304877

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	160	2	619002 304881
	Potential for Landslide Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	226	2	618845 304744
	Potential for Landslide Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NW (E)	235	2	618650 304789
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	2	618011 304992
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	2	618018 304812
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	2	618013 304908
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	2	618011 305000
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	102	2	618913 304876
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	104	2	618991 305000
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	226	2	618845 304744
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NW (E)	235	2	618650 304789
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	2	618011 304992
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	2	618013 304908
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11SW (N)	0	2	617980 305079
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	2	618018 304812
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	2	618011 305000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	36	2	618705 305010
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	38	2	618706 305000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NW (W)	117	2	617830 305000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7SE (S)	168	2	618016 304655
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A6NE (W)	176	2	617660 304878

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SW (NW)	231	2	617765 305140
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	2	618011 304992
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	2	618011 305002
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	2	618011 304992
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	2	618011 305002

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
43	**Contemporary Trade Directory Entries** Name: Shell (Uk) Ltd Location: Norwich Road, Hethersett, Norwich, NR9 3AU Classification: Petrol Filling Stations **Status: Active** Positional Accuracy: Automatically positioned to the address	A11NE (NE)	105	-	618303 305406
44	**Contemporary Trade Directory Entries** Name: Rontec Llp Location: Norwich Rd, Hethersett, Norwich, Norfolk, NR9 3AU Classification: Petrol Filling Stations **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A11NE (NE)	194	-	618258 305488
45	**Contemporary Trade Directory Entries** Name: Classic Covers - Marine Military & General Covers Location: West Barn, Cantley Lane, Norwich, NR4 6TF Classification: Boat Cleaning Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A7SE (S)	375	-	618105 304471
46	**Contemporary Trade Directory Entries** Name: R A Wineracks Ltd Location: Round House, 98, Newmarket Road, Cringleford, Norwich, NR4 6UD Classification: Furniture - Reproduction **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12NE (NE)	432	-	618877 305631
46	**Contemporary Trade Directory Entries** Name: Roundhouse Engineering Location: Round House, 98, Newmarket Road, Cringleford, Norwich, NR4 6UD Classification: Precision Engineers **Status: Active** Positional Accuracy: Automatically positioned to the address	A12NE (NE)	432	-	618877 305631
47	**Contemporary Trade Directory Entries** Name: John Kemp Ltd Location: Thickthorn Farm, Norwich Road, Hethersett, NORWICH, NR9 3AU Classification: Car Dealers - Used **Status: Active** Positional Accuracy: Automatically positioned to the address	A11NW (NW)	610	-	617710 305669
48	**Contemporary Trade Directory Entries** Name: Steam On Ironing Location: 1, Oriole Drive, Cringleford, Norwich, NR4 7LU Classification: Ironing & Home Laundry Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A16SE (NE)	664	-	618885 305885
48	**Contemporary Trade Directory Entries** Name: Pressed Express Location: 1, Oriole Drive, Cringleford, Norwich, NR4 7LU Classification: Ironing & Home Laundry Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A16SE (NE)	665	-	618886 305886
49	**Contemporary Trade Directory Entries** Name: Kap-Electrical Services Location: 15, Lavender Drive, Cringleford, NORWICH, NR4 7SQ Classification: Electrical Engineers **Status: Active** Positional Accuracy: Automatically positioned to the address	A16NE (NE)	915	-	618742 306197
50	**Contemporary Trade Directory Entries** Name: Culling Scrap Metals Location: Station Lane, Hethersett, NORWICH, NR9 3AX Classification: Scrap Metal Merchants **Status: Active** Positional Accuracy: Automatically positioned to the address	A5SE (SW)	927	-	616906 304472
51	**Contemporary Trade Directory Entries** Name: C J'S Garden Machinery Location: 3, Station Lane, Hethersett, Norwich, NR9 3AX Classification: Lawnmowers & Garden Machinery - Sales & Service **Status: Active** Positional Accuracy: Automatically positioned to the address	A5SE (W)	982	-	616830 304547
52	**Contemporary Trade Directory Entries** Name: M W White Ltd Location: Station Lane, Hethersett, Norwich, NR9 3AZ Classification: Recycling Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A2SW (SW)	990	-	617235 303928

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
53	**Fuel Station Entries** Name: Shell Cringleford Location: Norwich Road, Old Norwich Road, Hethersett, Norwich, Norfolk, NR9 3AU Brand: Shell Premises Type: Petrol Station **Status: Open** Positional Accuracy: Manually positioned to the address or location	A11NE (NE)	104	-	618303 305406
54	**Points of Interest - Commercial Services** Name: Shell Cringleford Location: Norwich Road, Old Norwich Road, Hethersett, Norwich, NR9 3AU Category: Personal, Consumer and other Services Class Code: Vehicle Cleaning Services Positional Accuracy: Positioned to address or location	A11NE (NE)	104	6	618303 305406
54	**Points of Interest - Commercial Services** Name: Car Wash Location: Norwich Road, Old Norwich Road, Hethersett, Norwich, Norfolk, NR9 3AU Category: Personal, Consumer and other Services Class Code: Vehicle Cleaning Services Positional Accuracy: Positioned to address or location	A11NE (NE)	104	6	618303 305406
55	**Points of Interest - Commercial Services** Name: Scrap Yard Location: NR9 Category: Recycling Services Class Code: Scrap Metal Merchants Positional Accuracy: Positioned to address or location	A5SE (SW)	924	6	616919 304441
55	**Points of Interest - Commercial Services** Name: Culling Scrap Metals Location: Station Lane, Hethersett, Norwich, NR9 3AX Category: Recycling Services Class Code: Scrap Metal Merchants Positional Accuracy: Positioned to address or location	A5SE (SW)	927	6	616906 304472
55	**Points of Interest - Commercial Services** Name: [redacted] Location: Station Lane, Hethersett, Norwich, NR9 3AX Category: Recycling Services Class Code: Scrap Metal Merchants Positional Accuracy: Positioned to address or location	A5SE (SW)	928	6	616903 304479
56	**Points of Interest - Commercial Services** Name: Kettering Recycling Centre Location: Station Lane, Hethersett, Norwich, NR9 3AZ Category: Recycling Services Class Code: Recycling, Reclamation and Disposal Positional Accuracy: Positioned to address or location	A2SW (SW)	935	6	617273 303969
56	**Points of Interest - Commercial Services** Name: M W White Ltd Location: Station Lane, Hethersett, Norwich, NR9 3AZ Category: Recycling Services Class Code: Recycling, Reclamation and Disposal Positional Accuracy: Positioned to address or location	A2SW (SW)	990	6	617235 303928
57	**Points of Interest - Manufacturing and Production** Name: Gravel Pit Location: NR4 Category: Extractive Industries Class Code: Sand, Gravel and Clay Extraction and Merchants Positional Accuracy: Positioned to an adjacent address or location	A12SE (E)	38	6	618740 305023
58	**Points of Interest - Manufacturing and Production** Name: Tank Location: NR9 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A2SE (SW)	977	6	617346 303873
59	**Points of Interest - Public Infrastructure** Name: Total UK Ltd Location: Norwich Road, Hethersett, Norwich, NR9 3AU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A11NE (NE)	104	6	618303 305406
59	**Points of Interest - Public Infrastructure** Name: TCS Thickthorn Location: Norwich Road, Old Norwich Road, Hethersett, Norwich, Norfolk, NR9 3AU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A11NE (NE)	104	6	618303 305406

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
59	**Points of Interest - Public Infrastructure** Name: Shell (UK) Ltd Location: Norwich Road, Hethersett, Norwich, NR9 3AU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A11NE (NE)	105	6	618303 305406
59	**Points of Interest - Public Infrastructure** Name: Tcs Thickthorn Location: Norwich Road, Hethersett, Norwich, NR9 3AU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A11NE (NE)	105	6	618303 305406
60	**Points of Interest - Public Infrastructure** Name: Weir Location: NR9 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A10SE (W)	447	6	617470 305065
60	**Points of Interest - Public Infrastructure** Name: Weir Location: NR9 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A10SE (W)	516	6	617385 305067
61	**Points of Interest - Public Infrastructure** Name: Sluice Location: NR9 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A10SW (W)	676	6	617274 305185
62	**Points of Interest - Public Infrastructure** Name: Waste Disposal Site Location: NR9 Category: Infrastructure and Facilities Class Code: Refuse Disposal Facilities Positional Accuracy: Positioned to an adjacent address or location	A2SW (SW)	951	6	617307 303927

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
63	**Environmentally Sensitive Areas** Name: Broads Multiple Areas: Y Total Area (m2): 382941888.19 Source: Natural England	(E)	719	7	619600 304897
64	**Nitrate Vulnerable Zones** Name: Not Supplied Description: Groundwater Source: Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	A7NE (SW)	0	8	618011 304992
65	**Nitrate Vulnerable Zones** Name: Not Supplied Description: Surface Water Source: Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	A7NE (SW)	0	8	618011 304992

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices		
Broadland District Council - Environmental Health Department	April 2014	Annual Rolling Update
South Norfolk District Council - Environmental Health Department	December 2014	Annual Rolling Update
Norwich City Council - Environmental Health Department	November 2014	Annual Rolling Update
Discharge Consents		
Environment Agency - Anglian Region	October 2016	Quarterly
Enforcement and Prohibition Notices		
Environment Agency - Anglian Region	March 2013	As notified
Integrated Pollution Controls		
Environment Agency - Anglian Region	October 2008	Not Applicable
Integrated Pollution Prevention And Control		
Environment Agency - Anglian Region	October 2016	Quarterly
Local Authority Integrated Pollution Prevention And Control		
South Norfolk District Council - Environmental Health Department	June 2014	Annual Rolling Update
Norwich City Council - Environmental Health Department	March 2015	Annual Rolling Update
Broadland District Council - Environmental Health Department	September 2014	Annual Rolling Update
Local Authority Pollution Prevention and Controls		
South Norfolk District Council - Environmental Health Department	June 2014	Annual Rolling Update
Norwich City Council - Environmental Health Department	March 2015	Annual Rolling Update
Broadland District Council - Environmental Health Department	September 2014	Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements		
South Norfolk District Council - Environmental Health Department	June 2014	Annual Rolling Update
Norwich City Council - Environmental Health Department	March 2015	Annual Rolling Update
Broadland District Council - Environmental Health Department	September 2014	Annual Rolling Update
Nearest Surface Water Feature		
Ordnance Survey	July 2012	Quarterly
Pollution Incidents to Controlled Waters		
Environment Agency - Anglian Region	September 1999	Not Applicable
Prosecutions Relating to Authorised Processes		
Environment Agency - Anglian Region	March 2013	As notified
Prosecutions Relating to Controlled Waters		
Environment Agency - Anglian Region	March 2013	As notified
River Quality		
Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points		
Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points		
Environment Agency - Head Office	July 2012	Annually
Substantiated Pollution Incident Register		
Environment Agency - Anglian Region - Eastern Area	October 2016	Quarterly
Water Abstractions		
Environment Agency - Anglian Region	October 2016	Quarterly
Water Industry Act Referrals		
Environment Agency - Anglian Region	October 2016	Quarterly
Groundwater Vulnerability		
Environment Agency - Head Office	April 2015	Not Applicable
Drift Deposits		
Environment Agency - Head Office	January 1999	Not Applicable
Bedrock Aquifer Designations		
British Geological Survey - National Geoscience Information Service	August 2015	As notified

Agency & Hydrological	Version	Update Cycle
Superficial Aquifer Designations British Geological Survey - National Geoscience Information Service	August 2015	As notified
Source Protection Zones Environment Agency - Head Office	October 2016	Quarterly
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	October 2016	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	October 2016	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	October 2016	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	October 2016	Quarterly
Flood Defences Environment Agency - Head Office	October 2016	Quarterly
Detailed River Network Lines Environment Agency - Head Office	September 2014	Annually
Detailed River Network Offline Drainage Environment Agency - Head Office	March 2012	Annually
Surface Water 1 in 30 year Flood Extent Environment Agency - Head Office	October 2013	As notified
Surface Water 1 in 100 year Flood Extent Environment Agency - Head Office	October 2013	As notified
Surface Water 1 in 1000 year Flood Extent Environment Agency - Head Office	October 2013	As notified
Surface Water Suitability Environment Agency - Head Office	October 2013	As notified
BGS Groundwater Flooding Susceptibility British Geological Survey - National Geoscience Information Service	May 2013	Annually

Waste	Version	Update Cycle
BGS Recorded Landfill Sites		
British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites		
Environment Agency - Head Office	August 2016	Quarterly
Integrated Pollution Control Registered Waste Sites		
Environment Agency - Anglian Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries)		
Environment Agency - Anglian Region - Eastern Area	August 2016	Quarterly
Licensed Waste Management Facilities (Locations)		
Environment Agency - Anglian Region - Eastern Area	October 2016	Quarterly
Local Authority Landfill Coverage		
Broadland District Council	May 2000	Not Applicable
Norfolk County Council - Planning & Transportation - Minerals & Waste	May 2000	Not Applicable
Norwich City Council	May 2000	Not Applicable
South Norfolk District Council - Environmental Health Department	May 2000	Not Applicable
Local Authority Recorded Landfill Sites		
Broadland District Council	May 2000	Not Applicable
Norfolk County Council - Planning & Transportation - Minerals & Waste	May 2000	Not Applicable
Norwich City Council	May 2000	Not Applicable
South Norfolk District Council - Environmental Health Department	May 2000	Not Applicable
Potentially Infilled Land (Non-Water)		
Landmark Information Group Limited	December 1999	Not Applicable
Potentially Infilled Land (Water)		
Landmark Information Group Limited	December 1999	Not Applicable
Registered Landfill Sites		
Environment Agency - Anglian Region - Eastern Area	March 2003	Not Applicable
Registered Waste Transfer Sites		
Environment Agency - Anglian Region - Eastern Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites		
Environment Agency - Anglian Region - Eastern Area	March 2003	Not Applicable
Hazardous Substances	**Version**	**Update Cycle**
Control of Major Accident Hazards Sites (COMAH)		
Health and Safety Executive	July 2016	Bi-Annually
Explosive Sites		
Health and Safety Executive	September 2016	Bi-Annually
Notification of Installations Handling Hazardous Substances (NIHHS)		
Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements		
Broadland District Council	February 2016	Annual Rolling Update
Norfolk County Council - Planning & Transportation - Minerals & Waste	June 2007	Annual Rolling Update
Norwich City Council	October 2015	Annual Rolling Update
South Norfolk District Council	October 2015	Annual Rolling Update
Planning Hazardous Substance Consents		
Broadland District Council	February 2016	Annual Rolling Update
Norfolk County Council - Planning & Transportation - Minerals & Waste	June 2007	Annual Rolling Update
Norwich City Council	October 2015	Annual Rolling Update
South Norfolk District Council	October 2015	Annual Rolling Update

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	January 2009	Not Applicable
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	October 2015	As notified
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	October 2016	Bi-Annually
Brine Compensation Area Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	As notified
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	As notified
Industrial Land Use	**Version**	**Update Cycle**
Contemporary Trade Directory Entries Thomson Directories	October 2016	Quarterly
Fuel Station Entries Catalist Ltd - Experian	November 2016	Quarterly
Gas Pipelines National Grid	July 2014	Quarterly
Points of Interest - Commercial Services PointX	September 2016	Quarterly
Points of Interest - Education and Health PointX	September 2016	Quarterly
Points of Interest - Manufacturing and Production PointX	September 2016	Quarterly
Points of Interest - Public Infrastructure PointX	September 2016	Quarterly
Points of Interest - Recreational and Environmental PointX	September 2016	Quarterly
Underground Electrical Cables National Grid	January 2016	Bi-Annually

Sensitive Land Use	Version	Update Cycle
Ancient Woodland Natural England	August 2016	Bi-Annually
Areas of Outstanding Natural Beauty Natural England	September 2016	Bi-Annually
Environmentally Sensitive Areas Natural England	September 2016	Annually
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves Natural England	September 2016	Bi-Annually
Marine Nature Reserves Natural England	September 2016	Bi-Annually
National Nature Reserves Natural England	September 2016	Bi-Annually
National Parks Natural England	August 2016	Bi-Annually
Nitrate Sensitive Areas Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	April 2016	Not Applicable
Nitrate Vulnerable Zones Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	October 2015	Annually
Ramsar Sites Natural England	April 2016	Bi-Annually
Sites of Special Scientific Interest Natural England	April 2016	Bi-Annually
Special Areas of Conservation Natural England	September 2016	Bi-Annually
Special Protection Areas Natural England	September 2016	Bi-Annually
World Heritage Sites English Heritage - National Monument Record Centre	September 2015	Bi-Annually

Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	
Centre for Ecology and Hydrology	
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Peter Brett Associates	

Useful Contacts

Contact	Name and Address	Contact Details
2	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: [redacted] Fax: [redacted] Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
3	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: [redacted] Email: enquiries@environment-agency.gov.uk
4	**South Norfolk District Council - Environmental Health Department** South Norfolk House, Swan Lane, Long Stratton, Norwich, Norfolk, NR15 2XE	Telephone: [redacted] Fax: [redacted] Website: www.south-norfolk.gov.uk
5	**Norfolk County Council - Planning & Transportation - Minerals & Waste** County Hall, Martineau Lane, Norwich, Norfolk, NR1 2DH	Telephone: [redacted] Fax: [redacted] Email: information@norfolk.gov.uk Website: www.norfolk.gov.uk
6	**PointX** 7 Abbey Court, Eagle Way, Sowton, Exeter, Devon, EX2 7HY	Website: www.pointx.co.uk
7	**Natural England** County Hall, Spetchley Road, Worcester, WR5 2NP	Telephone: [redacted] Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
8	**Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)** Government Buildings, Otley Road, Lawnswood, Leeds, West Yorkshire, LS16 5QT	Telephone: [redacted] Fax: [redacted]
9	**Environment Agency - Head Office** Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD	Telephone: [redacted] Fax: [redacted]
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: [redacted] Fax: [redacted] Email: radon@phe.gov.uk Website: www.ukradon.org
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: [redacted] Fax: [redacted] Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.

Geology 1:10,000 Maps Legends

Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	WGR	Worked Ground (Undivided)	Void	Holocene - Holocene

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Flandrian - Pleistocene
	HPLO	Happisburgh Glacigenic Formation And Lowestoft Formation (Undifferentiated)	Sand and Gravel	Anglian - Flandrian
	LOFT	Lowestoft Formation	Diamicton	Anglian - Flandrian

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	LPCK	Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation (Undifferentiated)	Chalk	Campanian - Turonian

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Geology 1:10,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:10,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around a site. This mapping may be more up to date than previously published paper maps.

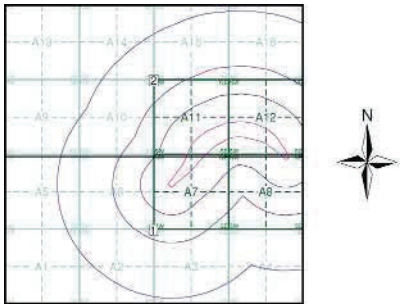
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page.

Please Note: Not all of the layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:10,000 Maps Coverage

Map ID:	1	**Map ID:**	2
Map Name:	TG10SE	**Map Name:**	TG10NE
Map Date:	1976	**Map Date:**	1976
Bedrock Geology:	Available	**Bedrock Geology:**	Available
Superficial Geology:	Available	**Superficial Geology:**	Available
Artificial Geology:	Not Available	**Artificial Geology:**	Available
Faults:	Not Available	**Faults:**	Not Available
Landslip:	Not Available	**Landslip:**	Not Available
Rock Segments:	Not Available	**Rock Segments:**	Not Available

Geology 1:10,000 Maps - Slice A



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Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

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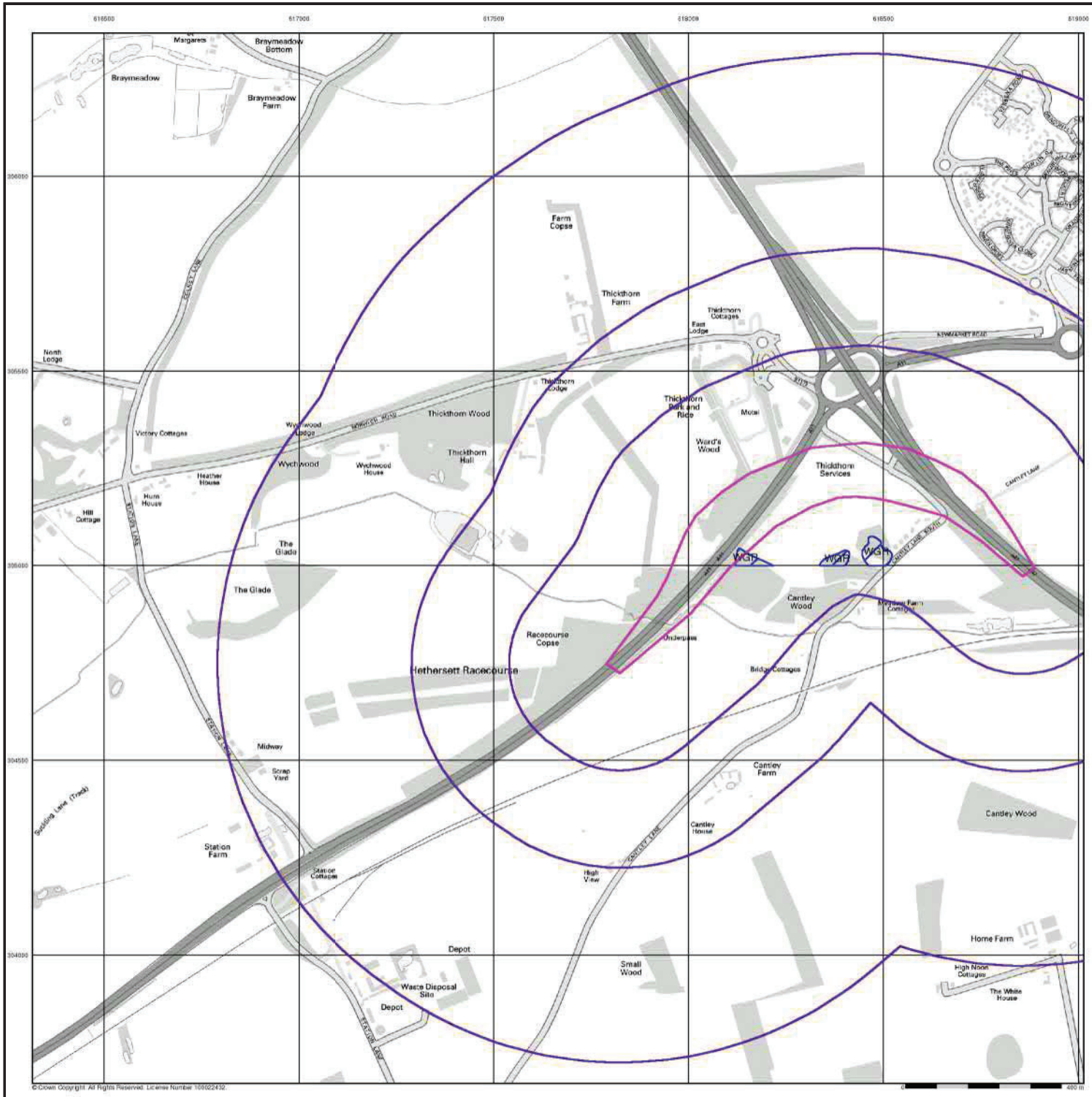

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Artificial Ground and Landslip

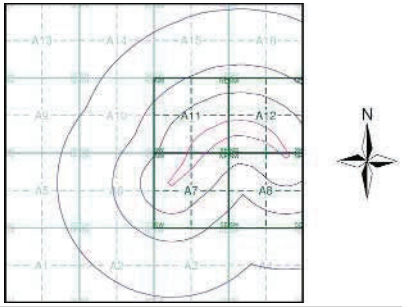
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



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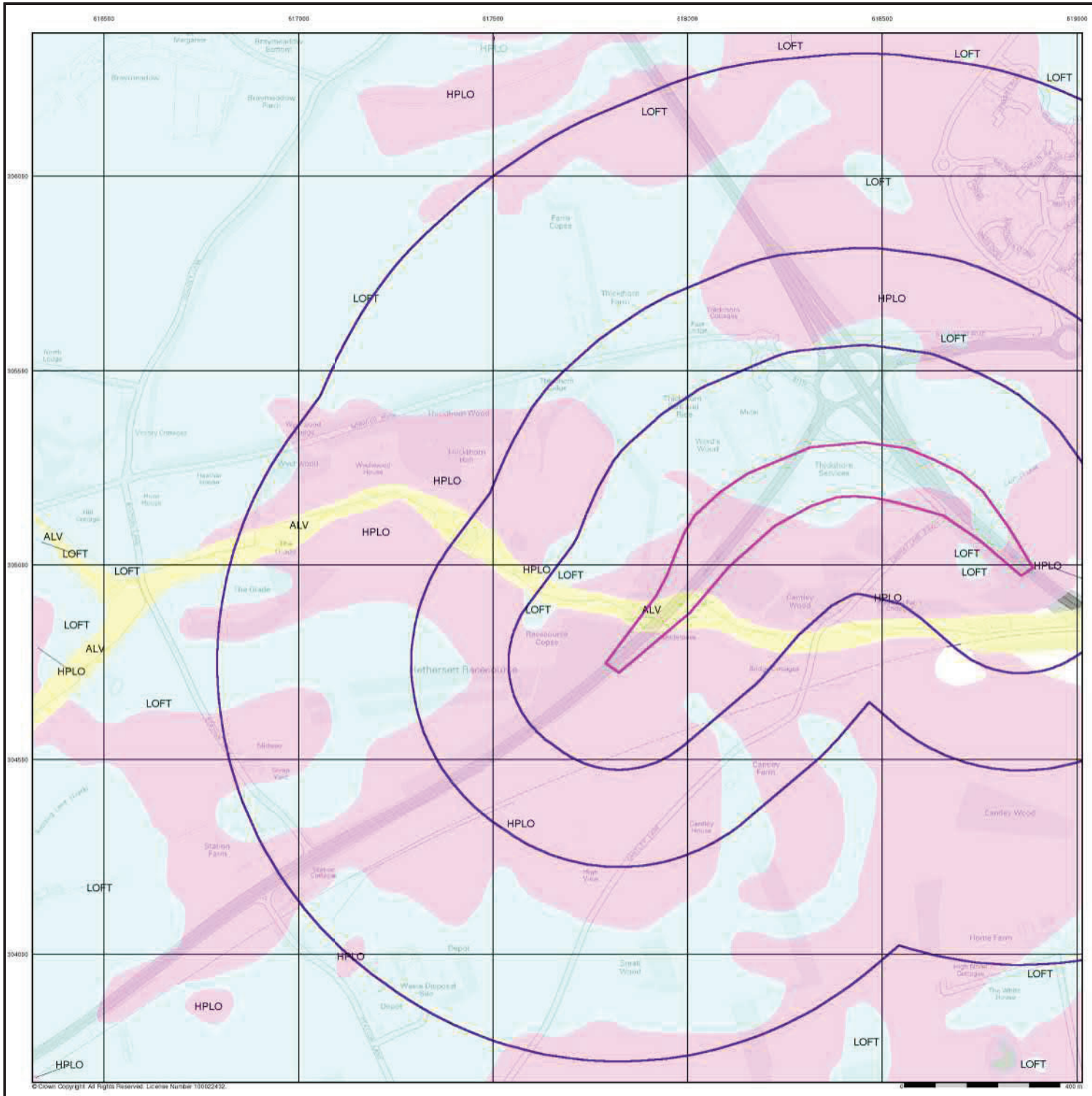

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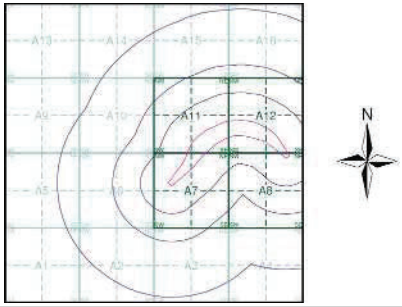
Superficial Geology

BGS 1:10,000 Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



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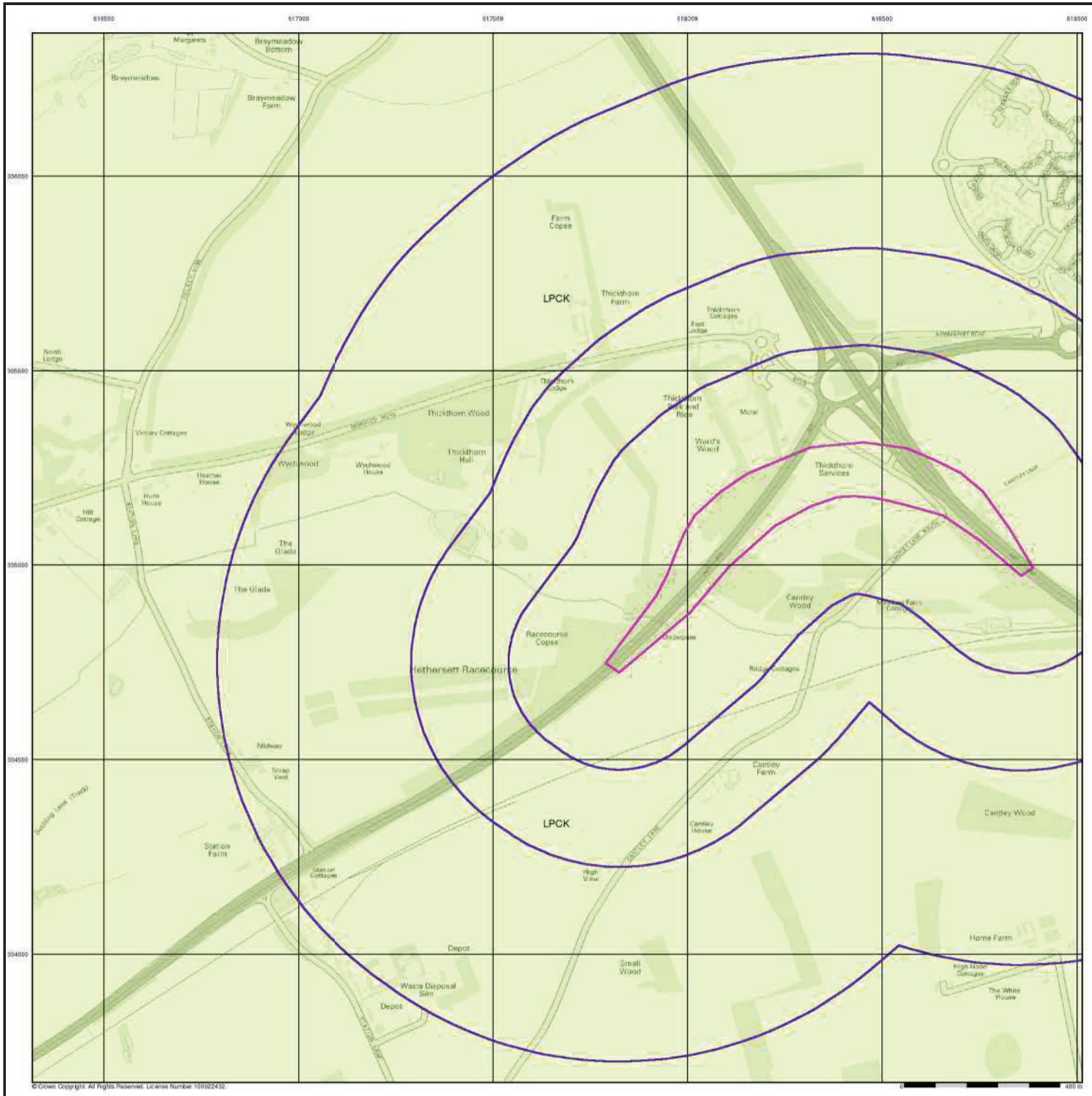

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Bedrock and Faults

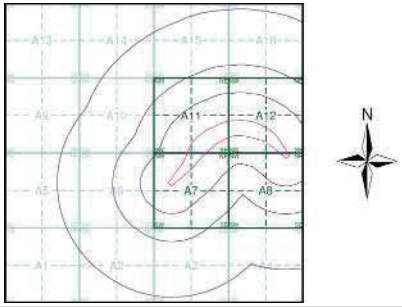
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults and thin beds mapped as lines such as coal seams and mineral veins. These are not restricted by age and could relate to features of any of the 1:10,000 geology datasets.

Bedrock and Faults Map - Slice A



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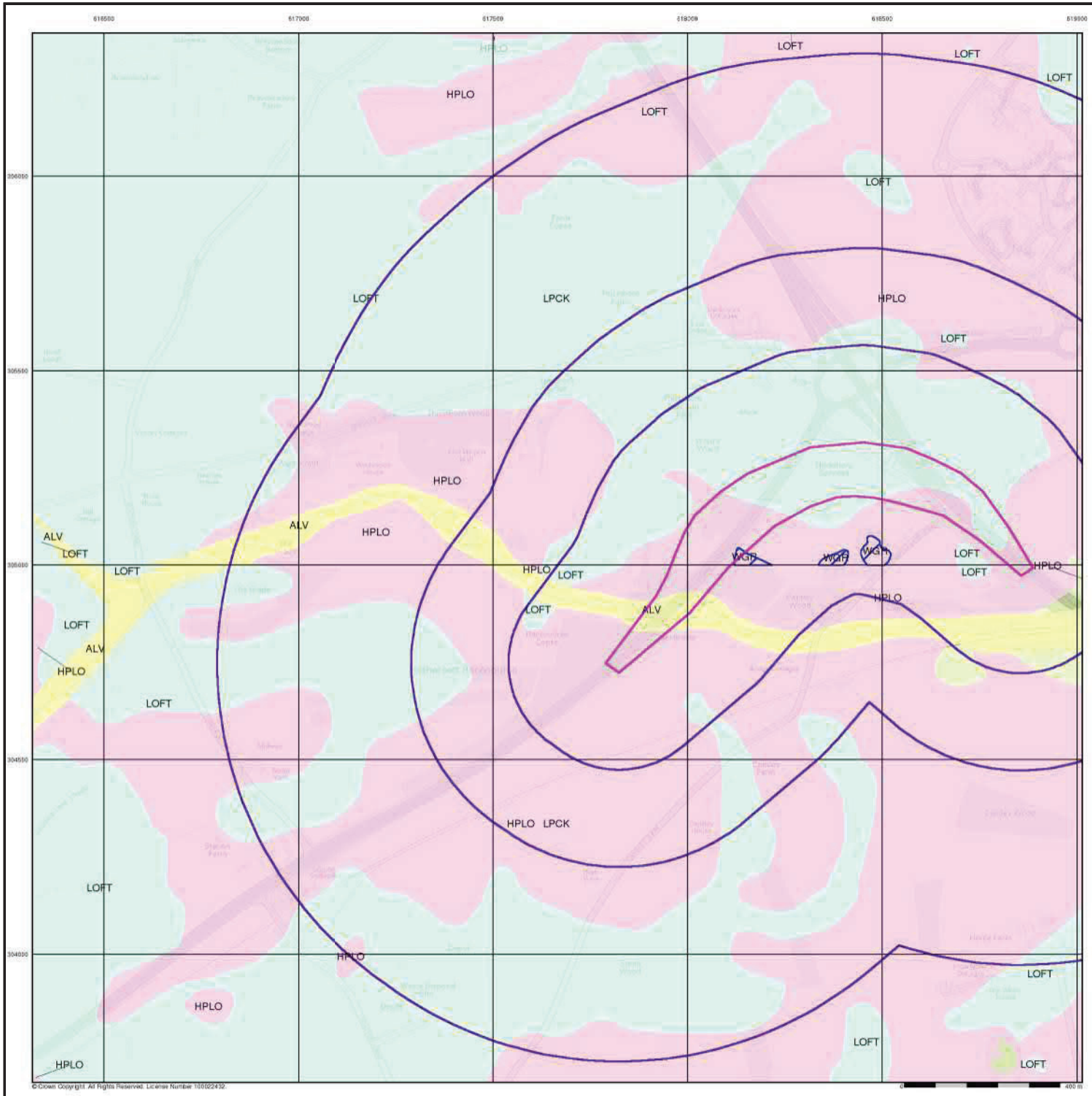
Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP

Tel: [redacted]
Fax
Web



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Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

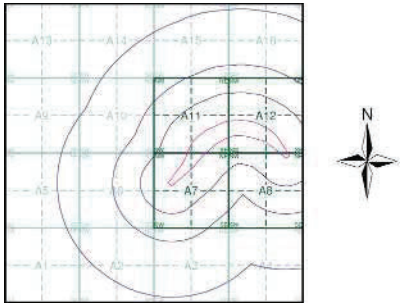
Additional Information

More information on 1:10,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



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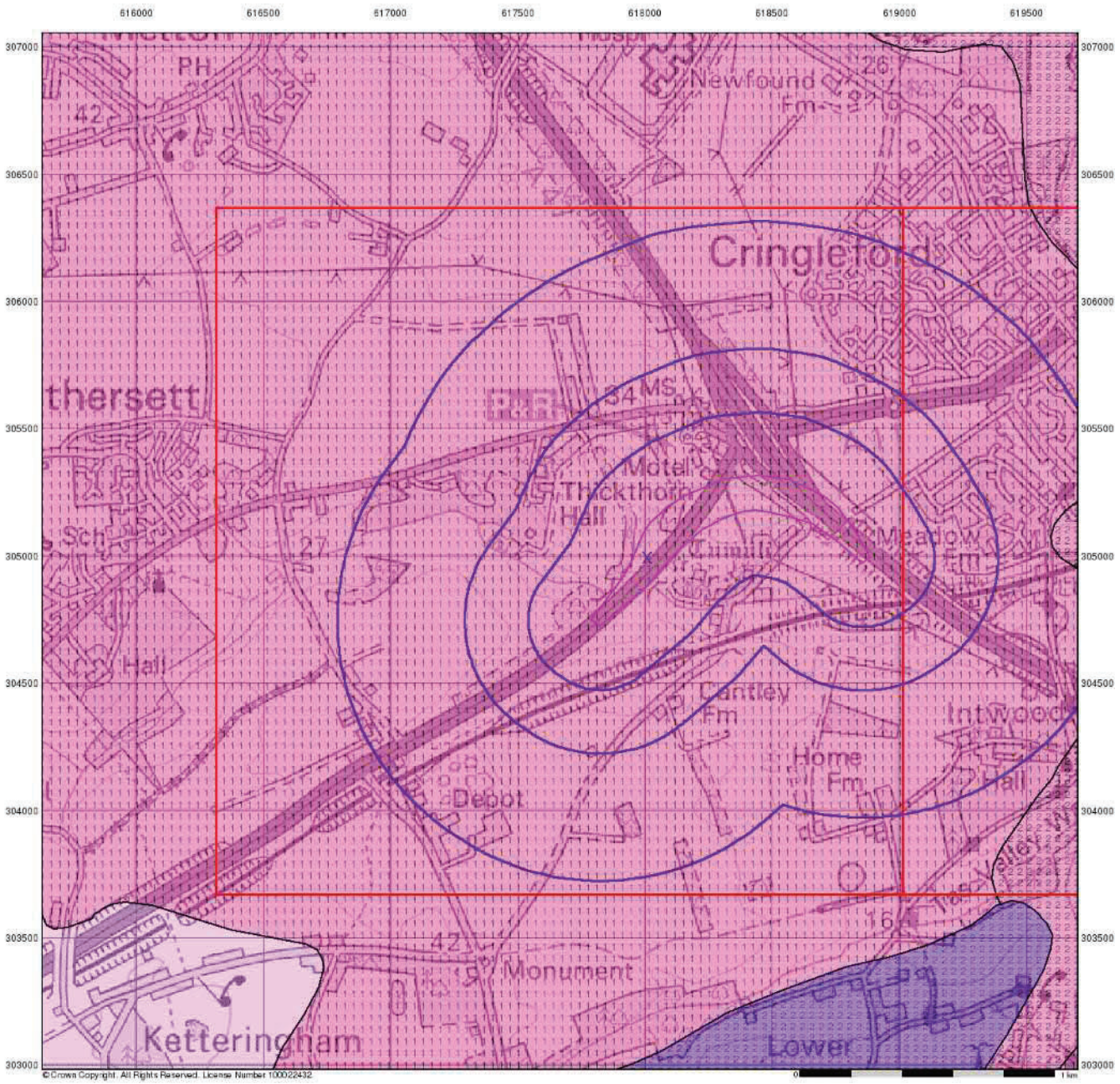

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Groundwater Vulnerability

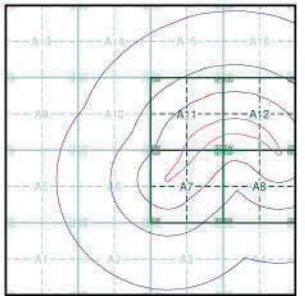
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes	Soil Classes
Major Aquifer (Highly Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Minor Aquifer (Variably Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Non Aquifer (Negligibly Permeable)	
Water or Sea	
Drift Deposit	

Site Sensitivity Context Map - Slice A



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Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

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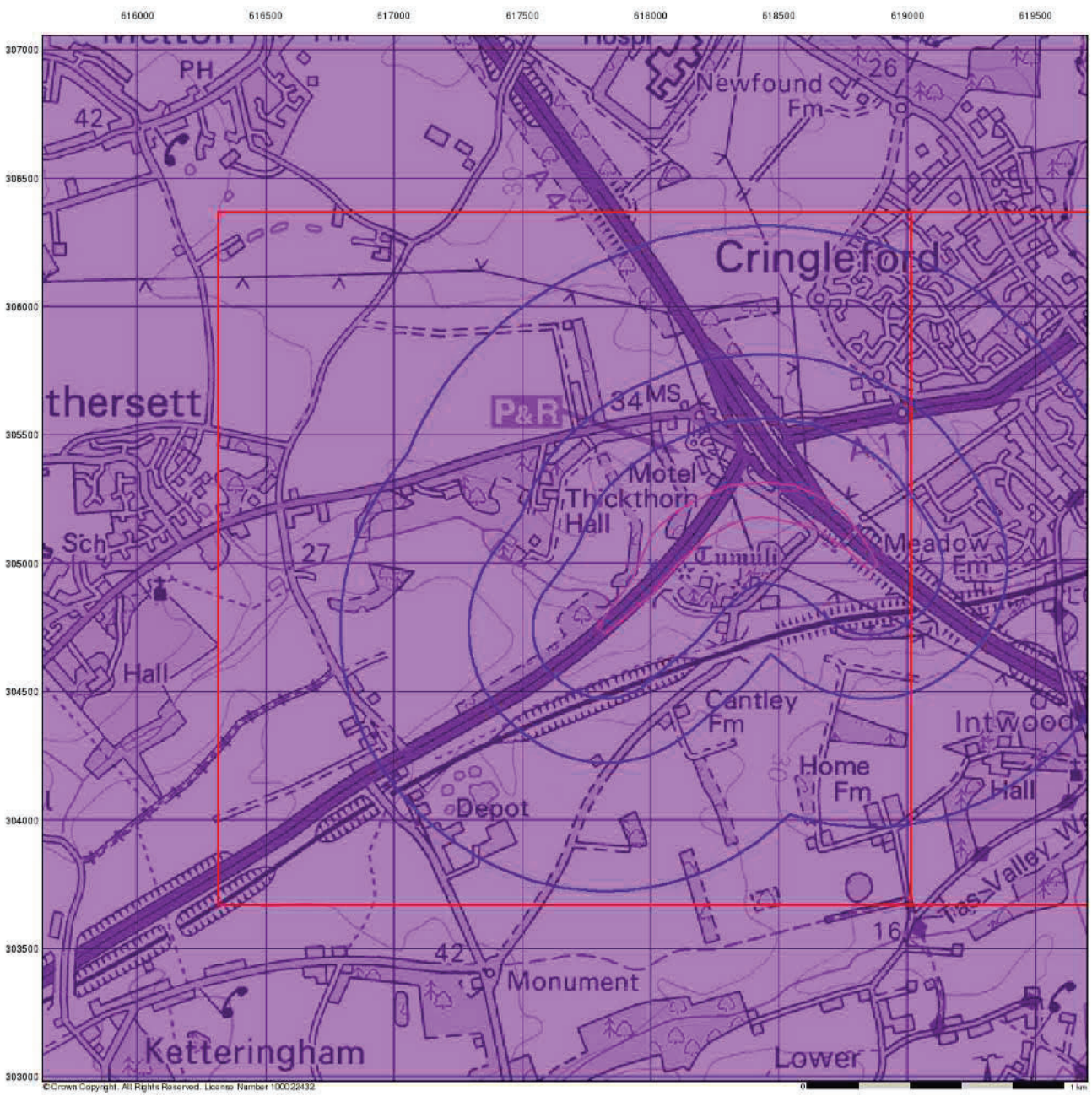

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Bedrock Aquifer Designation

General

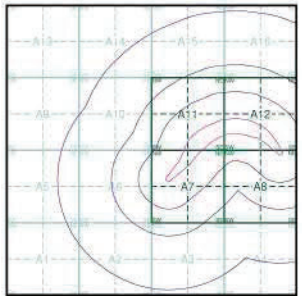
Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



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A47 Thickthorn Junction, Cringleford, Norfolk

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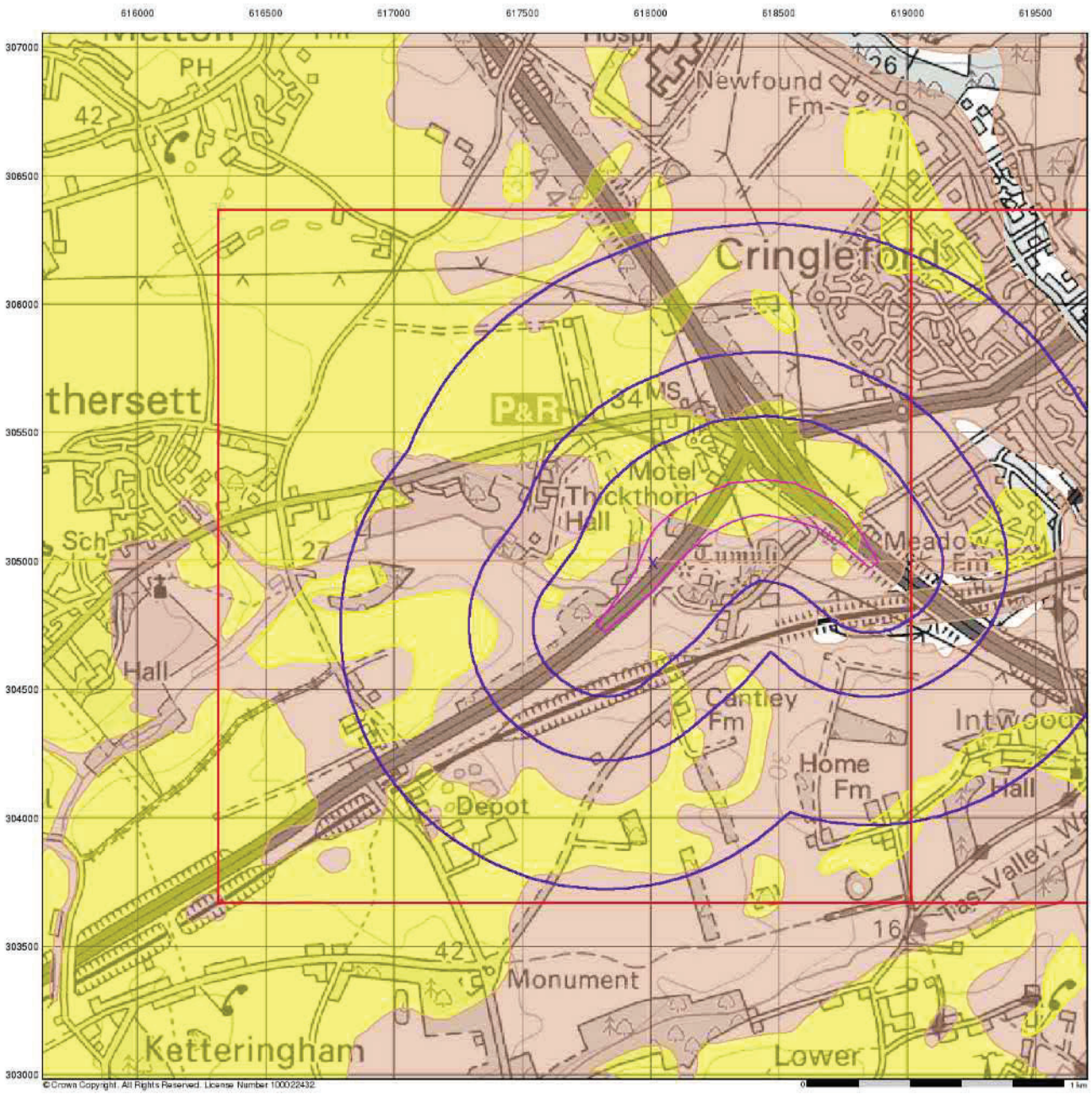

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Superficial Aquifer Designation

General

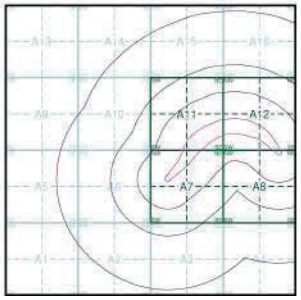
Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



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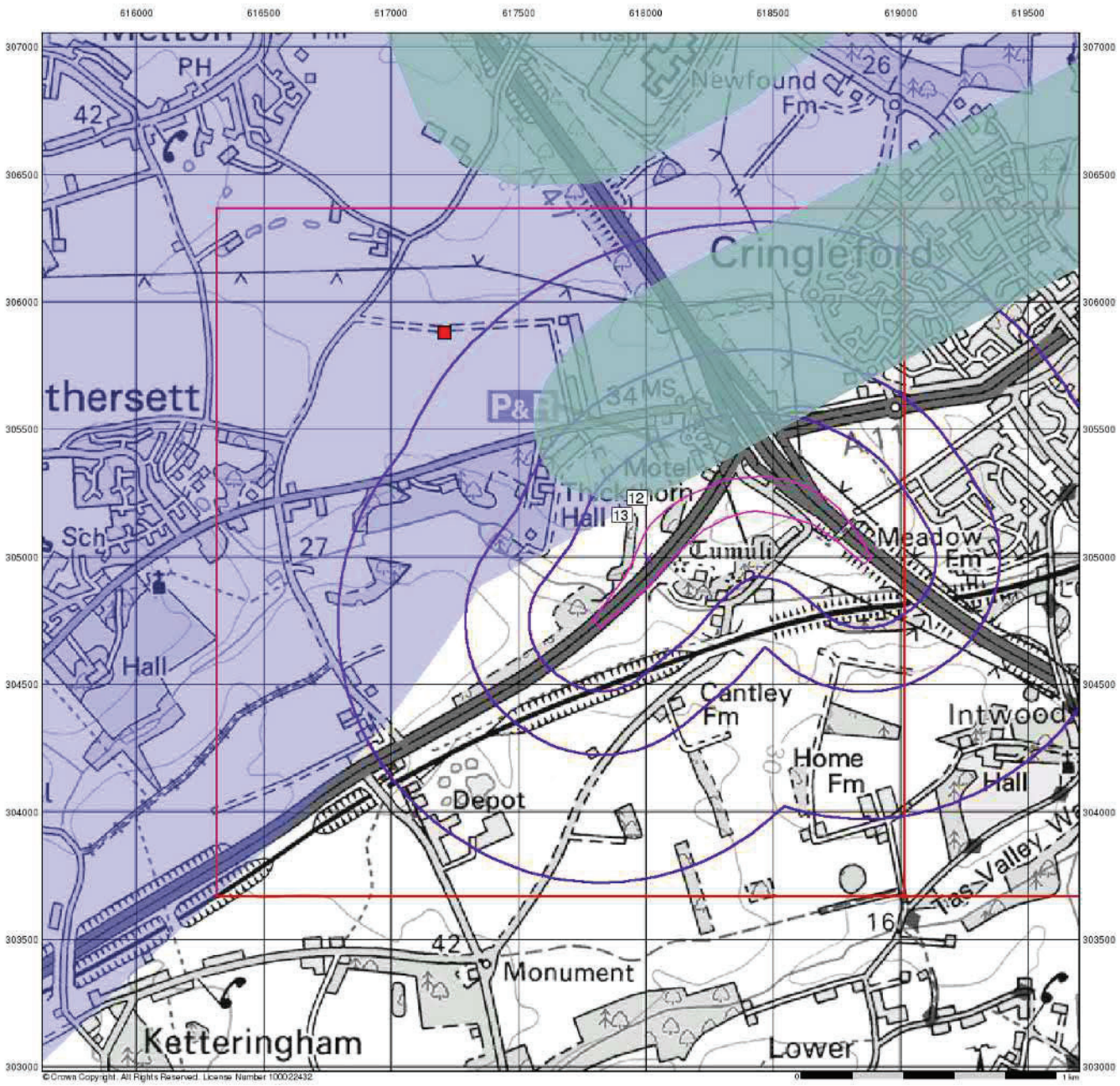

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Source Protection Zones

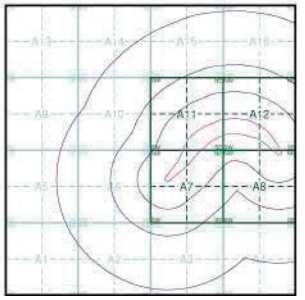
General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)
- Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



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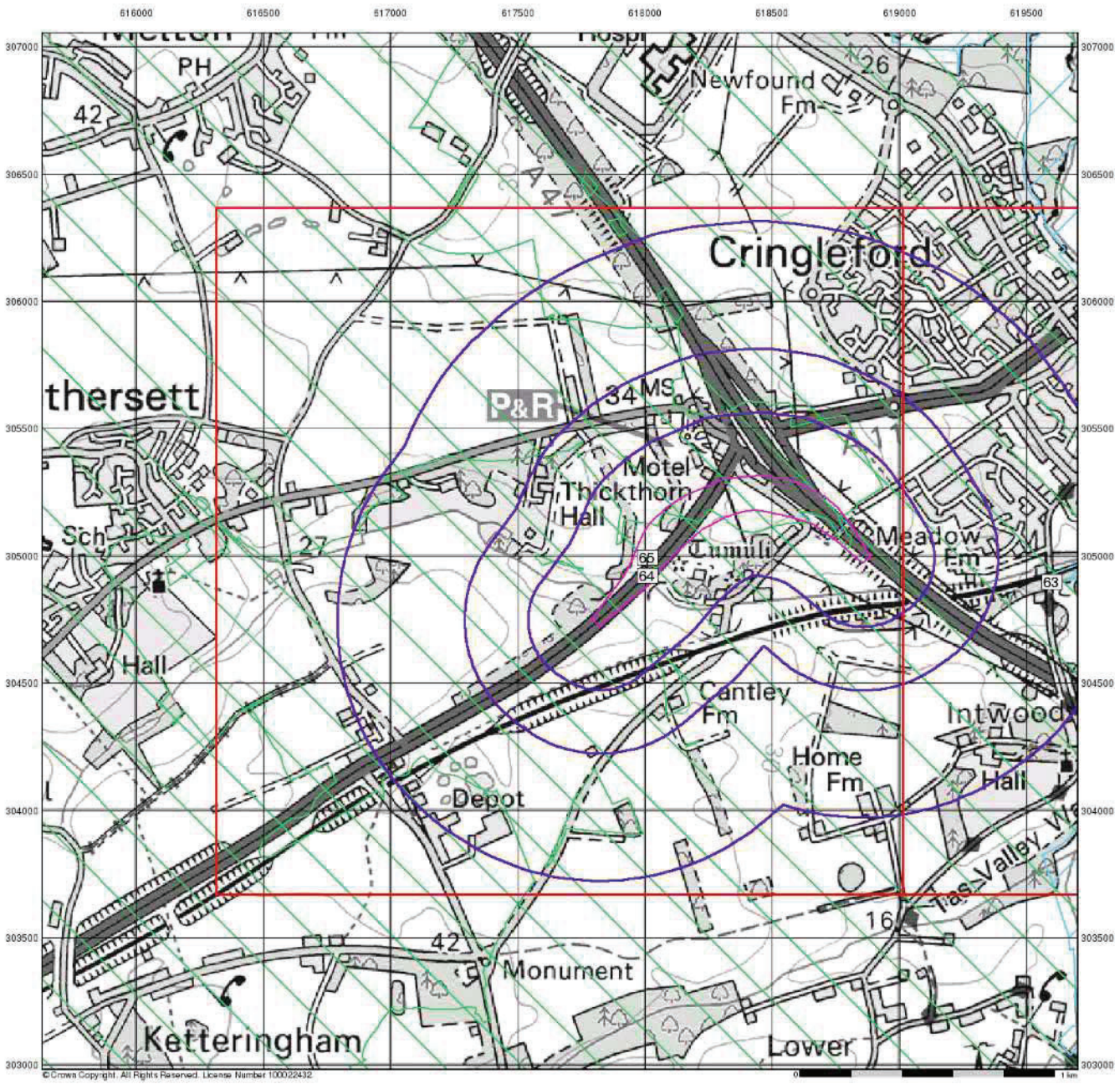

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Sensitive Land Uses

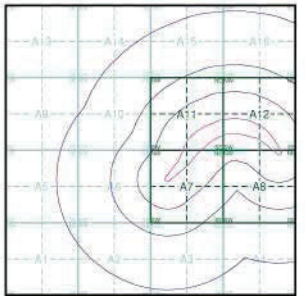
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Sensitive Land Uses

- Ancient Woodland
- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- World Heritage Sites

Site Sensitivity Context Map - Slice A



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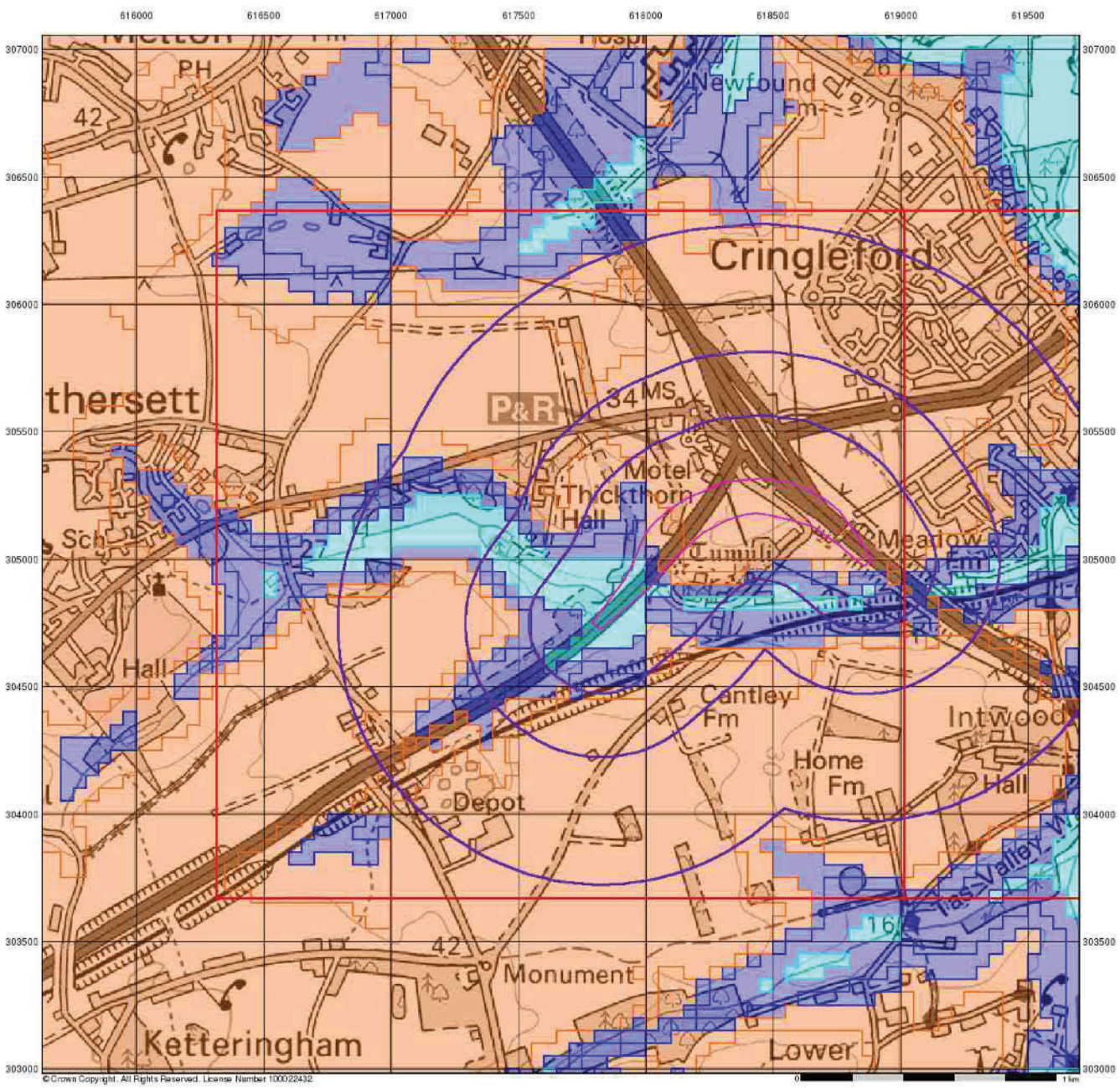

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BGS Flood GFS Data

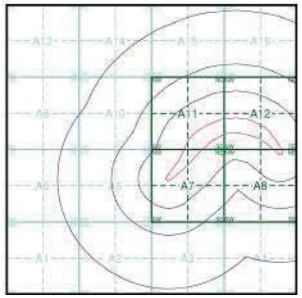
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice

Agency and Hydrological (Flood)

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

Site Sensitivity Context Map - Slice A



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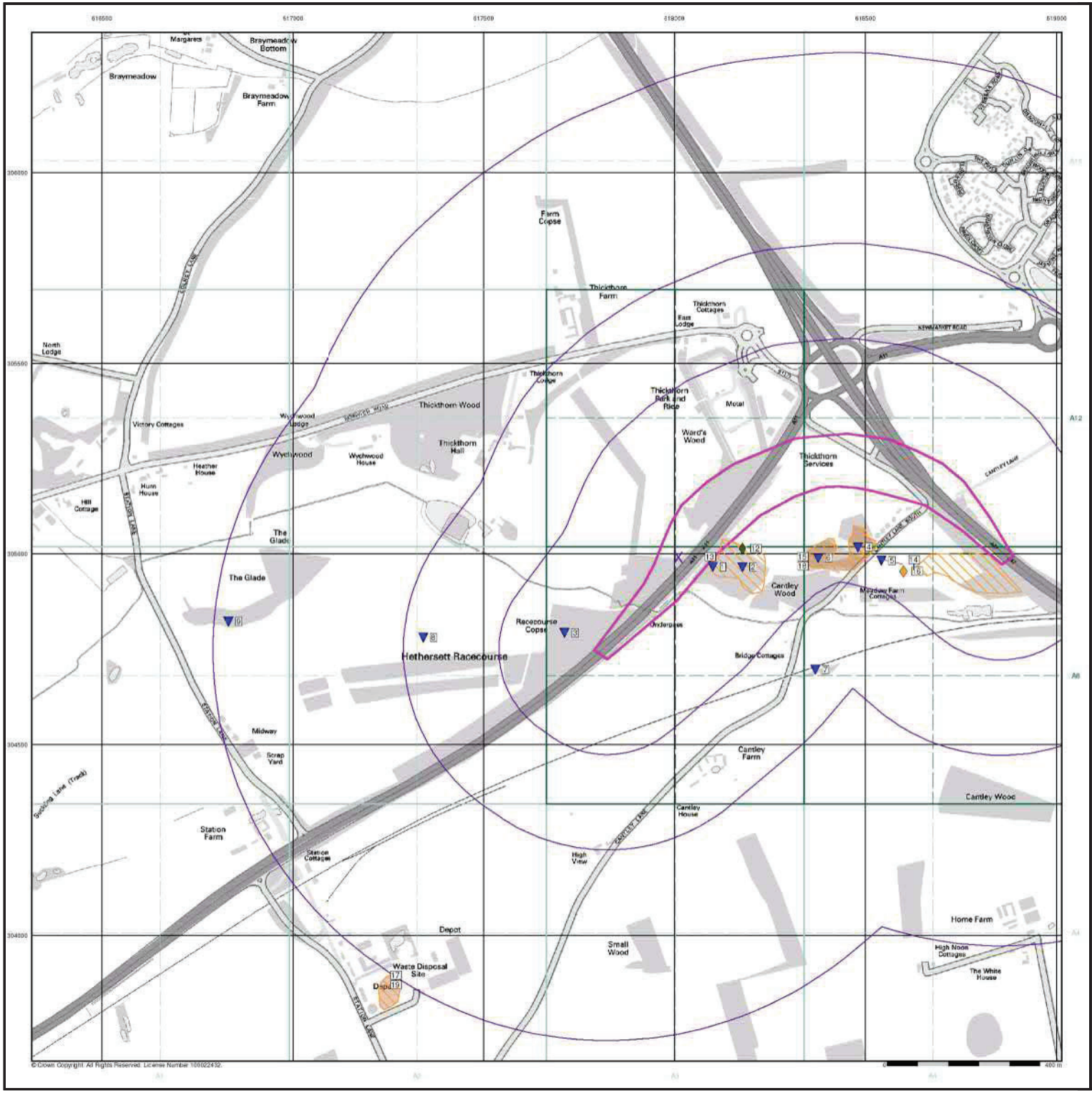

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Historical Land Use Information (1:10,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

Potentially Contaminative Industrial Uses (Past Land Uses - Mining)

	Point	Line	Polygon
Air Shafts			
Disturbed Ground			
General Quarrying			
Heap, unknown constituents			
Mineral Railway			
Mining and Quarrying General			
Mining of Coal & Lignite			
Quarrying of Sand and Clay, Operation of Sand and Gravel Pits			

Historical Land Use

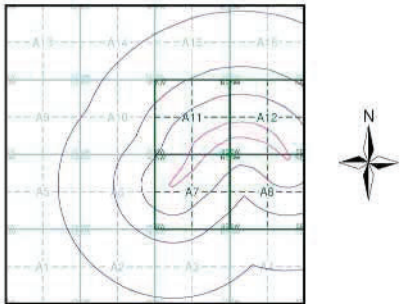
	Point	Line	Polygon
Potentially Infilled Land (Non-Water)			
Potentially Infilled Land (Water)			
Former Marsh			

Mining Data

Potential Mining Area

BGS Recorded Mineral Site

Mining and Ground Stability - Slice A



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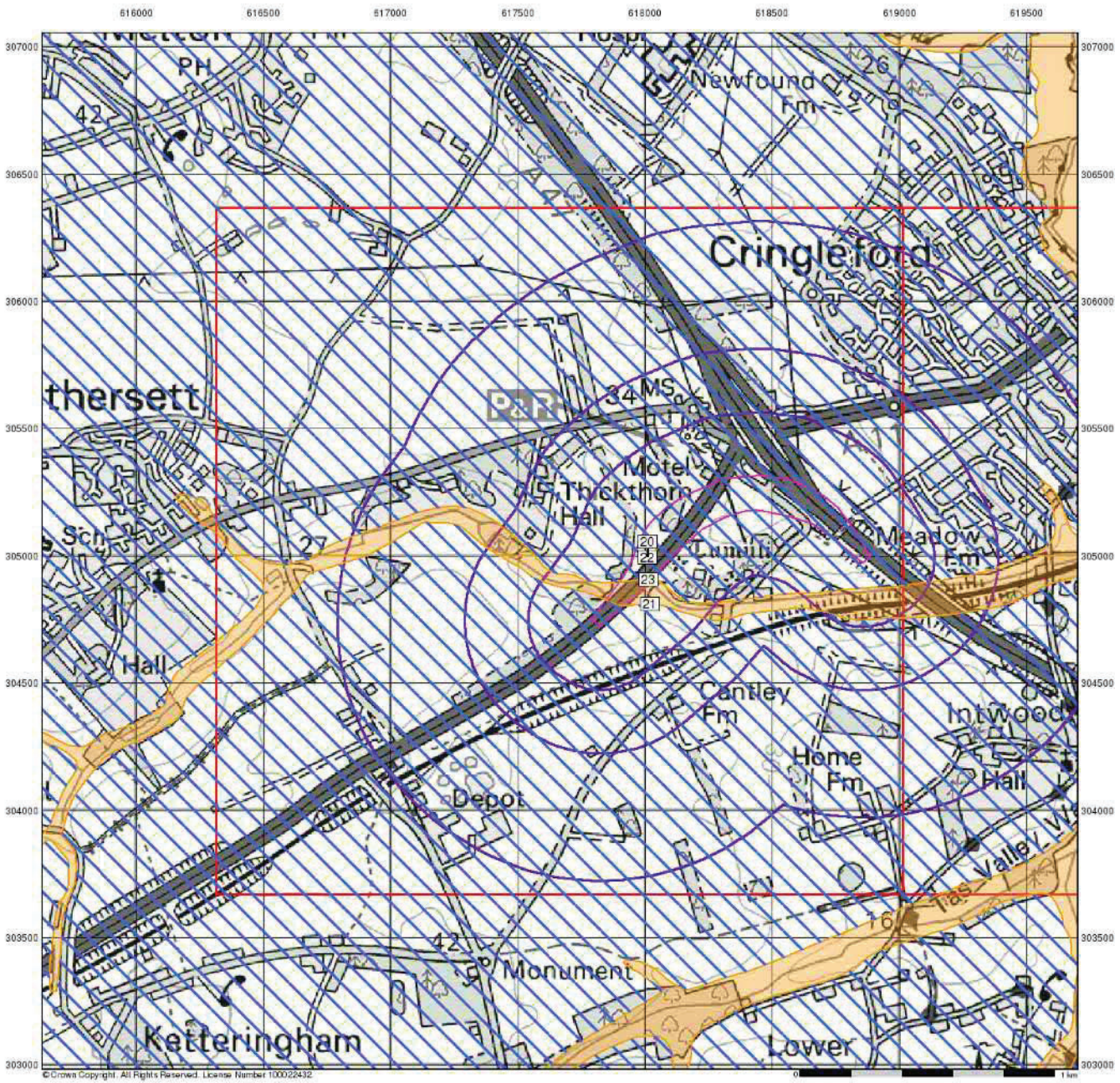

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Ground Stability Data (1:50,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Potential for Compressible Ground Stability Hazards

High | Low | Moderate | Very Low

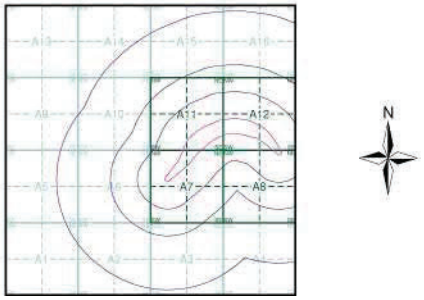
Potential for Collapsible Ground Stability Hazards

High | Low | Moderate | Very Low

Brine Pumping and Salt Mining

	Point	Polygon
Brine Pumping Related Feature	▲	▨
Salt Mining Related Feature	▲	▨

Mining and Ground Stability - Slice A



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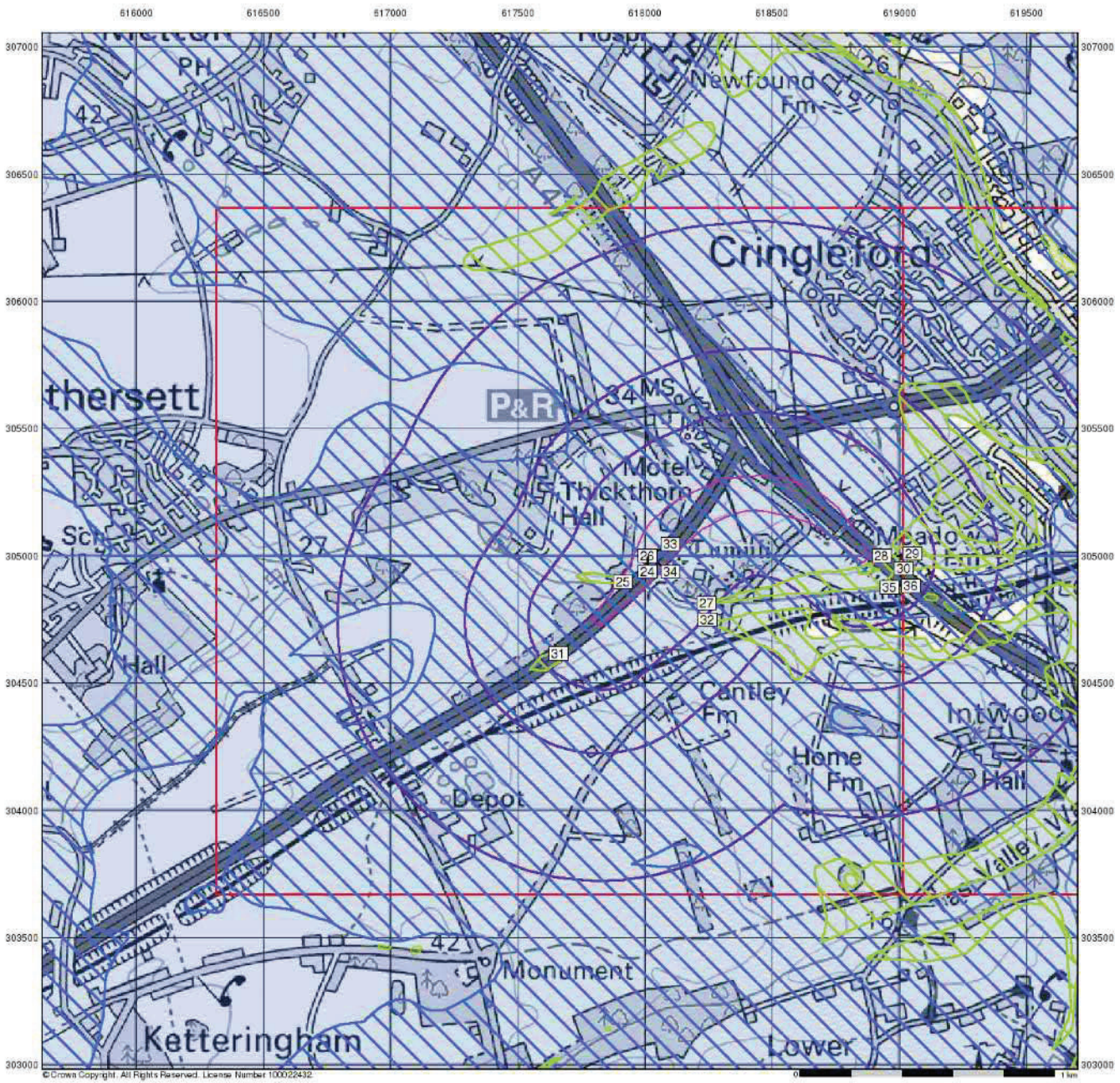
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

[redacted]



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Ground Stability Data (1:50,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

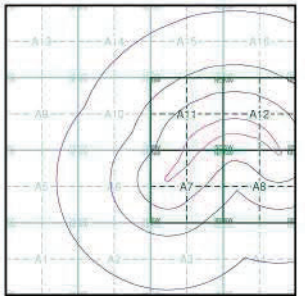
Potential for Landslide Ground Stability Hazards

High | Low | Moderate | Very Low

Potential for Ground Dissolution Stability Hazards

High | Low | Moderate | Very Low

Mining and Ground Stability - Slice A



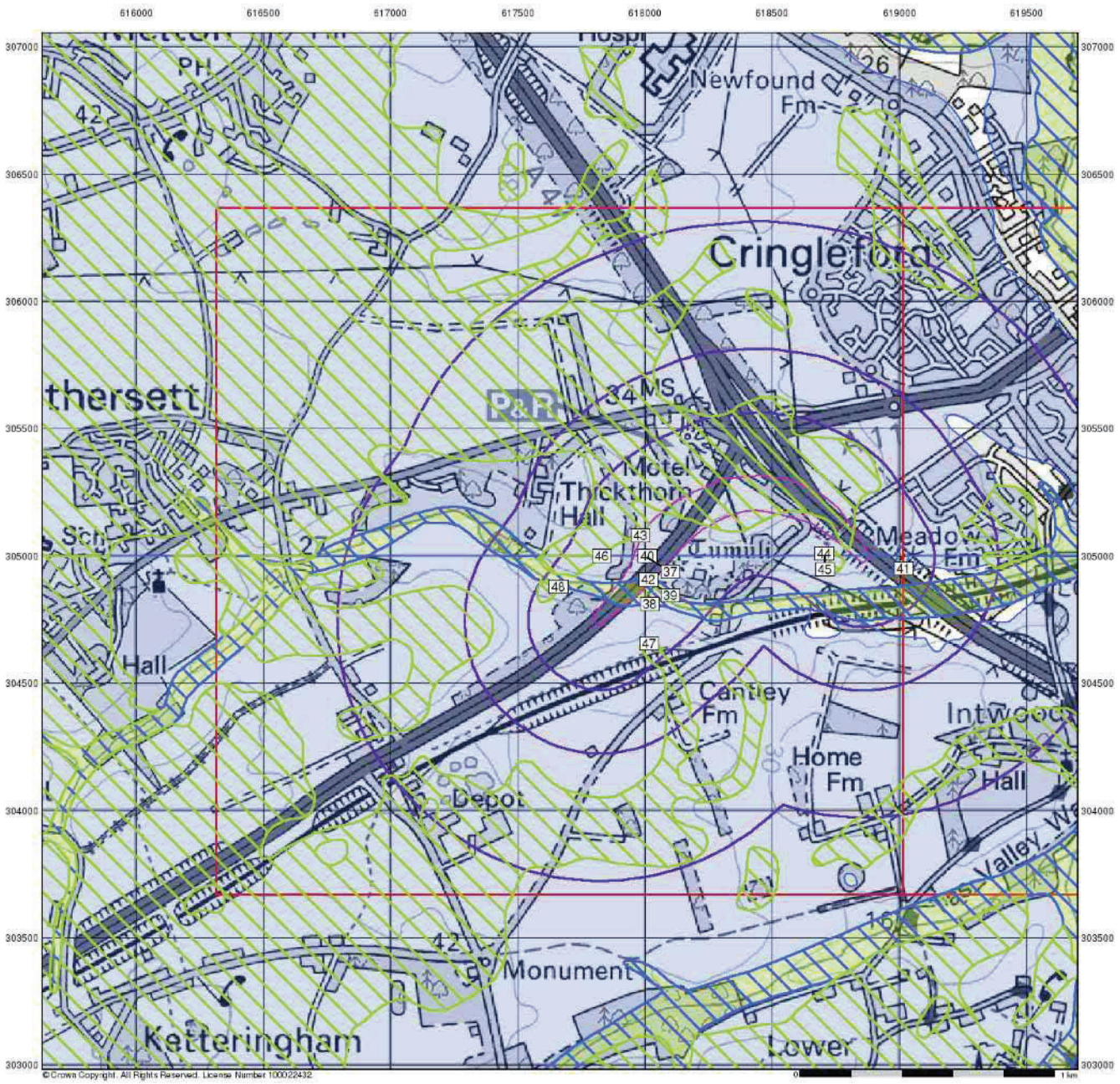
Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

[redacted]



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Ground Stability Data (1:50,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

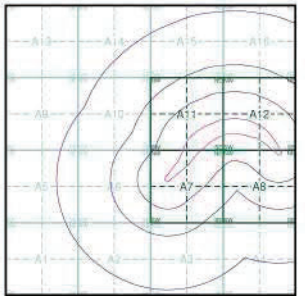
Potential for Running Sand Ground Stability Hazards

High | Low | Moderate | Very Low

Potential for Shrinking or Swelling Clay Ground Stability Hazards

High | Low | Moderate | Very Low

Mining and Ground Stability - Slice A



Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

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LANDMARK INFORMATION GROUP

Envirocheck® Report:

Mining and Ground Stability Datasheet

Order Details:

Order Number:
108824762_1_1

Customer Reference:
A47 Thickthorn

National Grid Reference:
618010, 304990

Slice:
A

Site Area (Ha):
15.75

Search Buffer (m):
1000

Site Details:

A47 Thickthorn Junction
Cringleford
Norfolk

Client Details:

[redacted]
AECOM Ltd
Saxon House
27 Duke Street
Chelmsford
Essex
CM1 1HT

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Contents

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Report Version v50.0

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Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
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Man Made Mining Cavities					
Mining Instability			n/a	n/a	n/a
Natural Cavities					
Non Coal Mining Areas of Great Britain	pg 2	Yes	Yes	n/a	n/a
Potential Mining Areas					
Historical Land Use Information (1:2,500)					
Extractive Industries or Potential Excavations from 1855-1909 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1893-1915 (100m)				n/a	n/a
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Extractive Industries or Potential Excavations from 1924-1949 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1950-1980 (100m)	pg 3	2		n/a	n/a
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Historical Land Use Information (1:10,000)					
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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
Ground Stability Data (1:50,000)					
Brine Compensation Area			n/a	n/a	n/a
Brine Pumping Related Features					
Brine Subsidence Solution Area					
Potential for Collapsible Ground Stability Hazards	pg 5	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 5	Yes		n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 5	Yes	Yes	n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 5	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 6	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 6	Yes	Yes	n/a	n/a
Salt Mining Related Features					
Subsidence Insurance Claims				n/a	n/a
Subsidence Investigations				n/a	n/a
Motion Map Data (1:2,500)					
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Report Version v50.0

Mining and Natural Cavities Data

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**BGS Recorded Mineral Sites** Site Name: Cantley Wood Pit Location: , Cringleford, Norfolk, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 221648 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Pleistocene Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A7NE (E)	11	1	618100 304971
2	**BGS Recorded Mineral Sites** Site Name: Cantley Wood Pit Location: , Cringleford, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197664 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A7NE (E)	66	1	618177 304970
3	**BGS Recorded Mineral Sites** Site Name: Hethersett Pit Location: Hethersett Racecourse, Cringleford, Norfolk, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 221649 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Pleistocene Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A7NW (SW)	95	1	617711 304798
4	**BGS Recorded Mineral Sites** Site Name: Cantley Lane Pit Location: , Cringleford, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197662 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A12SW (E)	148	1	618480 305022
5	**BGS Recorded Mineral Sites** Site Name: American Farm Gravel Pit Location: , Intwood, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197649 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A8NW (E)	162	1	618596 304974
6	**BGS Recorded Mineral Sites** Site Name: Cantley Lane Pit Location: , Cringleford, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197663 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A8NW (E)	166	1	618375 304994

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
7	**BGS Recorded Mineral Sites** Site Name: Cantley Farm Pit Location: , Intwood, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197650 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A8NW (SE)	391	1	618368 304701
8	**BGS Recorded Mineral Sites** Site Name: Thickthorn Hall Pit Location: , Cringleford, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197661 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Lowestoft Formation Commodity: Common Clay and Shale Positional Accuracy: Located by supplier to within 10m	A6NE (W)	451	1	617342 304785
9	**BGS Recorded Mineral Sites** Site Name: Hethersett Gravel Pit Location: , Hethersett, Norwich, Norfolk Source: British Geological Survey, National Geoscience Information Service Reference: 197559 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Sheringham Cliffs Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A5NE (W)	964	1	616830 304827
	Coal Mining Affected Areas In an area which may not be affected by coal mining				
	Non Coal Mining Areas of Great Britain Risk: Rare Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	1	618018 304812
	Non Coal Mining Areas of Great Britain Risk: Rare Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	1	618011 304992
	Non Coal Mining Areas of Great Britain Risk: Rare Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	1	618011 305000
	Non Coal Mining Areas of Great Britain Risk: Unlikely Source: British Geological Survey, National Geoscience Information Service	A11SW (NW)	124	1	617897 305183
	Non Coal Mining Areas of Great Britain Risk: Likely Source: British Geological Survey, National Geoscience Information Service	A11SW (NW)	224	1	617843 305267

Historical Land Use Information (1:2,500)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
10	**Extractive Industries or Potential Excavations from 1950-1980** Use: Pond First Map Published Date: 1966 Last Map Published Date: N/A	A7NW (SW)	0	-	617987 304936
11	**Extractive Industries or Potential Excavations from 1950-1980** Use: Refuse Tip First Map Published Date: 1966 Last Map Published Date: N/A	A7NE (E)	0	-	618088 304988

Historical Land Use Information (1:10,000)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
12	**Heap, unknown constituents** Use: Not Supplied Date of Mapping: 1995	A7NE (E)	33	-	618177 305015
13	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1929 - 1957	A7NE (E)	0	-	618093 304978
14	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1995	A8NW (E)	3	-	618627 304960
15	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1929 - 1957	A7NE (E)	98	-	618337 304994
16	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1889	A8NW (E)	175	-	618599 304955
17	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1880	A2SW (SW)	997	-	617270 303896
18	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1995	A7NE (E)	98	-	618337 304994
19	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1995	A2SW (SW)	997	-	617270 303896

Ground Stability Data (1:50,000)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Brine Compensation Area The site does not fall within the brine compensation area.				
	Brine Subsidence Solution Area The site does not fall within the brine subsidence solution area.				
20	**Potential for Collapsible Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	1	618011 305000
21	**Potential for Collapsible Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	1	618018 304812
22	**Potential for Collapsible Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	1	618011 304992
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	1	618013 304908
23	**Potential for Compressible Ground Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	1	618013 304908
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	1	618011 305000
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	1	618011 304992
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	1	618018 304812
24	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	1	618011 304992
25	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NW (SW)	0	1	617913 304898
26	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	1	618011 305000
27	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SE)	12	1	618242 304814
28	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	43	1	618930 305000
29	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	104	1	618991 305000
30	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	(E)	137	1	619017 304949
31	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A6SE (SW)	186	1	617661 304614
32	**Potential for Ground Dissolution Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SE)	226	1	618245 304749
33	**Potential for Landslide Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	1	618011 304992
34	**Potential for Landslide Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	1	618011 305000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
35	**Potential for Landslide Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	139	1	618962 304877
36	**Potential for Landslide Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	160	1	619002 304881
	Potential for Landslide Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	102	1	618913 304876
	Potential for Landslide Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	104	1	618991 305000
	Potential for Landslide Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	226	1	618845 304744
	Potential for Landslide Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NW (E)	235	1	618650 304789
37	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	1	618011 304992
38	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	1	618018 304812
39	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	1	618013 304908
40	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	1	618011 305000
41	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	(E)	137	1	619017 304949
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	102	1	618913 304876
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	104	1	618991 305000
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	226	1	618845 304744
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A8NW (E)	235	1	618650 304789
42	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	1	618013 304908
43	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11SW (N)	0	1	617980 305079
44	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	36	1	618705 305010
45	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A8NE (E)	38	1	618706 305000
46	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7NW (W)	117	1	617830 305000
47	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A7SE (S)	168	1	618016 304655

Ground Stability Data (1:50,000)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
48	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A6NE (W)	176	1	617660 304878
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (SW)	0	1	618011 304992
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (S)	0	1	618018 304812
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A7NE (N)	0	1	618011 305000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SW (NW)	231	1	617765 305140

Motion Map Data (1:2,500)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
49	**Motion Map** Average Velocity Gradient (mmyear): 0.0	A12SE (E)	40	-	618756 305243
49	**Motion Map** Average Velocity Gradient (mmyear): -0.2	A12SE (E)	41	-	618758 305243
50	**Motion Map** Average Velocity Gradient (mmyear): 0.2	A11SE (NE)	40	-	618321 305343
51	**Motion Map** Average Velocity Gradient (mmyear): -0.1	A11NE (NE)	60	-	618336 305364
51	**Motion Map** Average Velocity Gradient (mmyear): 0.1	A11NE (NE)	64	-	618337 305368
51	**Motion Map** Average Velocity Gradient (mmyear): 0.0	A11NE (NE)	64	-	618334 305369
52	**Motion Map** Average Velocity Gradient (mmyear): -0.8	A11NE (NE)	64	-	618282 305358

Historical Map List

The following mapping has been analysed for Historical Land Use Information (1:2,500):

1:2,500	Mapsheet	Published Date
Norfolk	075_01	1882
Norfolk	075_01	1882
Norfolk	075_05	1882
Norfolk	075_05	1882
Norfolk	075_05	1882
Norfolk	075_05	1882
Norfolk	075_01	1907
Norfolk	075_01	1907
Norfolk	075_05	1907
Norfolk	075_05	1907
Norfolk	075_05	1907
Norfolk	075_05	1907
Norfolk	075_01	1928
Norfolk	075_01	1928
Norfolk	075_05	1928
Norfolk	075_05	1928
Norfolk	075_05	1928
Norfolk	075_05	1928
Ordnance Survey Plan	TG1704	1966
Ordnance Survey Plan	TG1705	1966
Ordnance Survey Plan	TG1705	1966
Ordnance Survey Plan	TG1804	1966
Ordnance Survey Plan	TG1804	1966
Ordnance Survey Plan	TG1904	1966
Ordnance Survey Plan	TG1805	1967
Ordnance Survey Plan	TG1805	1967
Ordnance Survey Plan	TG1805	1967
Ordnance Survey Plan	TG1805	1967

Historical Map List

The following mapping has been analysed for Historical Land Use Information (1:10,000):

1:10,560	Mapsheet	Published Date
Norfolk	075_NW	1889
Norfolk	074_NE	1890
Norfolk	074_NE	1908
Norfolk	075_NW	1908
Norfolk	075_NW	1929
Norfolk	074_NE	1938
Norfolk	075_NW	1938
Ordnance Survey Plan	TG10NE	1957
Ordnance Survey Plan	TG10SE	1957
1:10,000	**Mapsheet**	**Published Date**
Ordnance Survey Plan	TG10NE	1995
Ordnance Survey Plan	TG10SE	1995

Data Currency

Mining and Cavities Data	Version	Update Cycle
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	October 2016	Bi-Annually
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	As notified
Man Made Mining Cavities Peter Brett Associates	November 2016	Bi-Annually
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Natural Cavities Peter Brett Associates	November 2016	Bi-Annually
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Historical Land Use Information (1:2,500)	**Version**	**Update Cycle**
Subterranean Features Landmark Information Group Limited	September 2016	Bi-Annually
Ground Stability Data (1:50,000)	**Version**	**Update Cycle**
Brine Compensation Area Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Subsidence Insurance Claims SP Property Services	November 2016	Quarterly
Subsidence Investigations CET Structures Ltd	November 2016	Quarterly

Motion Map Data (1:2,500)	Version	Update Cycle
Motion Map		
Nigel Press Associates - Hampshire	February 2011	As notified
Nigel Press Associates - Cambridge	January 2011	As notified
Nigel Press Associates - Ipswich	January 2011	As notified
Nigel Press Associates - Norwich	January 2011	As notified
Nigel Press Associates - Peterborough	January 2011	As notified
Nigel Press Associates - Barnstaple	July 2010	As notified
Nigel Press Associates - Derbyshire	July 2010	As notified
Nigel Press Associates - Humberside	July 2010	As notified
Nigel Press Associates - Kent	July 2010	As notified
Nigel Press Associates - Lincolnshire	July 2010	As notified
Nigel Press Associates - Nottinghamshire	July 2010	As notified
Nigel Press Associates - Birmingham	May 2009	As notified
Nigel Press Associates - Bournemouth	May 2009	As notified
Nigel Press Associates - Brighton	May 2009	As notified
Nigel Press Associates - Bristol	May 2009	As notified
Nigel Press Associates - Cardiff	May 2009	As notified
Nigel Press Associates - Central London	May 2009	As notified
Nigel Press Associates - Cheltenahm	May 2009	As notified
Nigel Press Associates - Coventry	May 2009	As notified
Nigel Press Associates - Crawley	May 2009	As notified
Nigel Press Associates - Edinburgh	May 2009	As notified
Nigel Press Associates - Exeter	May 2009	As notified
Nigel Press Associates - Glasgow	May 2009	As notified
Nigel Press Associates - Isle of Wight	May 2009	As notified
Nigel Press Associates - Leeds	May 2009	As notified
Nigel Press Associates - Leicester	May 2009	As notified
Nigel Press Associates - Liverpool	May 2009	As notified
Nigel Press Associates - Manchester	May 2009	As notified
Nigel Press Associates - Milton Keynes	May 2009	As notified
Nigel Press Associates - Newcastle	May 2009	As notified
Nigel Press Associates - Northwich	May 2009	As notified
Nigel Press Associates - Nottingham	May 2009	As notified
Nigel Press Associates - Oxford	May 2009	As notified
Nigel Press Associates - Plymouth	May 2009	As notified
Nigel Press Associates - Portsmouth	May 2009	As notified
Nigel Press Associates - Preston	May 2009	As notified
Nigel Press Associates - Reading	May 2009	As notified
Nigel Press Associates - Sheffield	May 2009	As notified
Nigel Press Associates - Stoke	May 2009	As notified
Nigel Press Associates - Swindon	May 2009	As notified
Nigel Press Associates - Tonbridge	May 2009	As notified
Nigel Press Associates - North London	November 2008	As notified
Nigel Press Associates - Head Office	September 2008	As notified

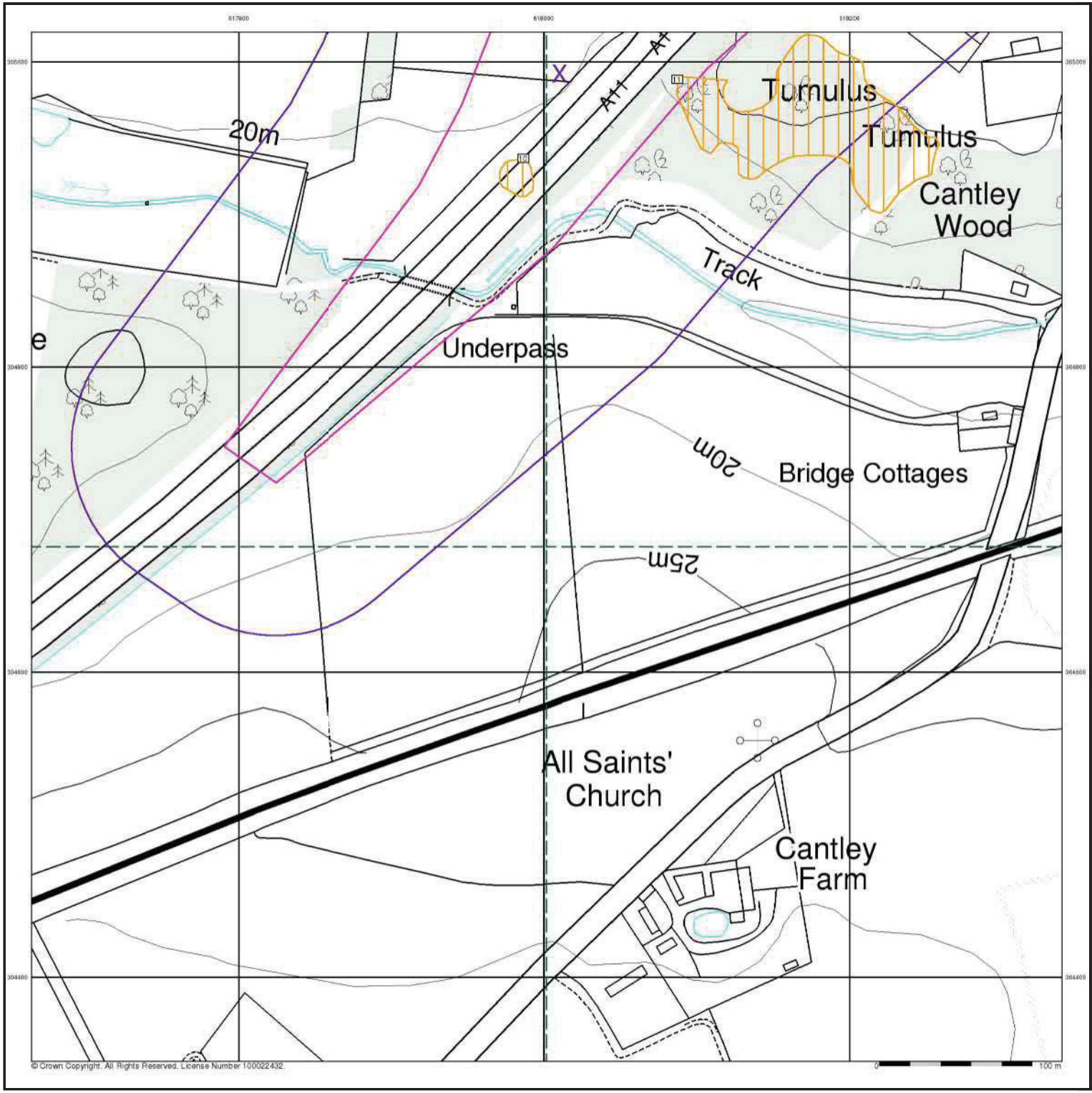
Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	Map data
British Geological Survey	British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL
The Coal Authority	THE COAL AUTHORITY
Ove Arup	ARUP
Peter Brett Associates	pba peterbrett
Wardell Armstrong	wardell armstrong your earth our world
Johnson Poole & Bloomer	JPB

Useful Contacts

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: [redacted] Fax: [redacted] Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: [redacted] Fax: [redacted] Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk



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Historical Land Use Information (1:2,500)

General

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

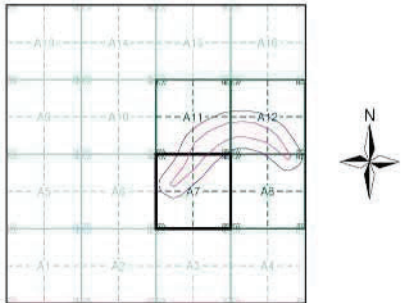
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	▢
Extractive Industries Activity from 1893 - 1915	▲	—	▨
Extractive Industries Activity from 1906 - 1937	▲	—	▤
Extractive Industries Activity from 1924 - 1949	▲	—	▨
Extractive Industries Activity from 1950 - 1980	▲	—	▥

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	- - -	▢

Mining and Ground Stability - Segment A7



Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Plot Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

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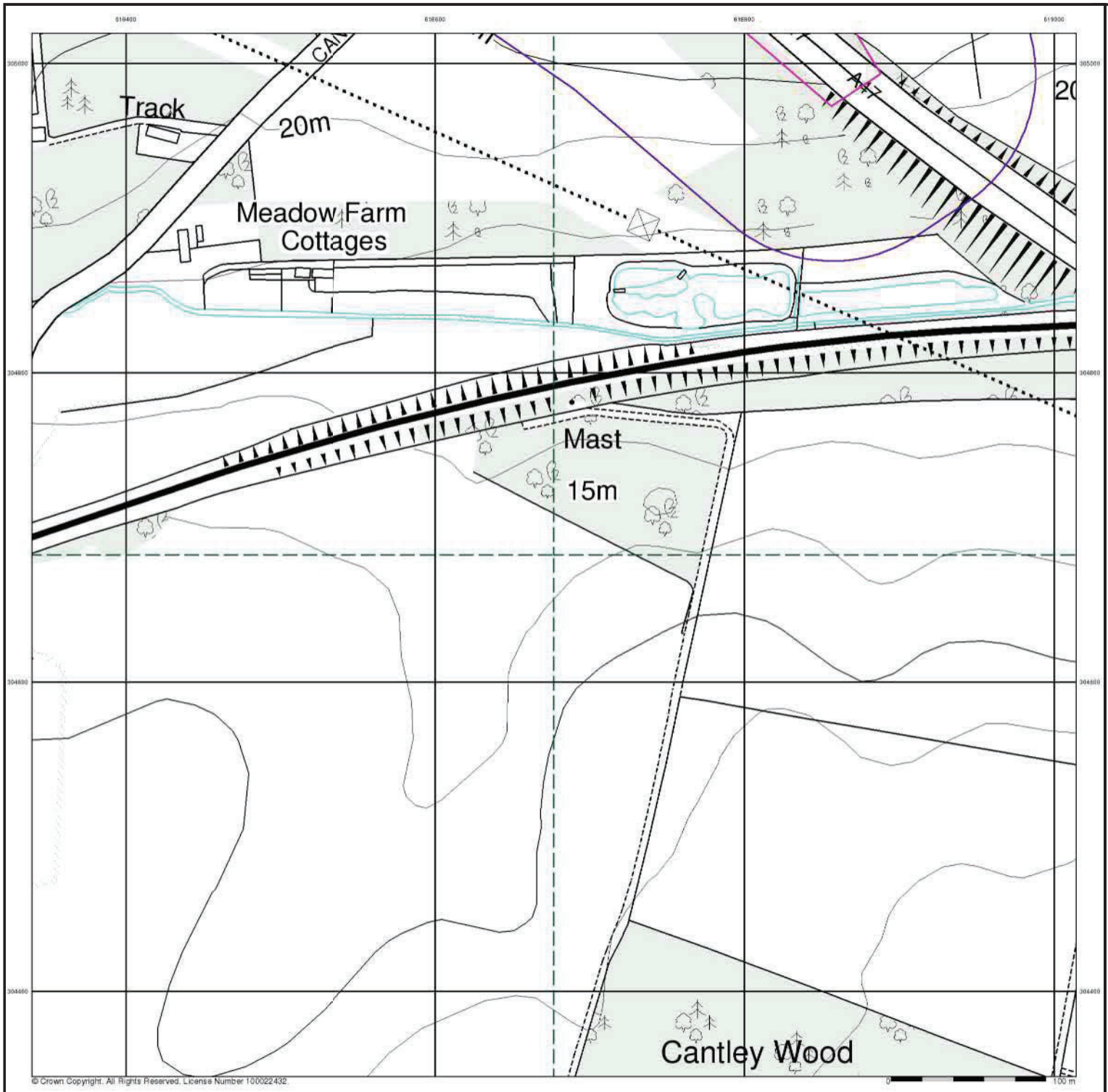

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Historical Land Use Information (1:2,500)

General

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

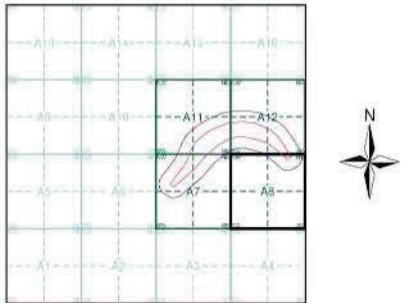
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	▢
Extractive Industries Activity from 1893 - 1915	▲	—	▨
Extractive Industries Activity from 1906 - 1937	▲	—	▤
Extractive Industries Activity from 1924 - 1949	▲	—	▨
Extractive Industries Activity from 1950 - 1980	▲	—	▥

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	- - -	▢

Mining and Ground Stability - Segment A8



Order Details

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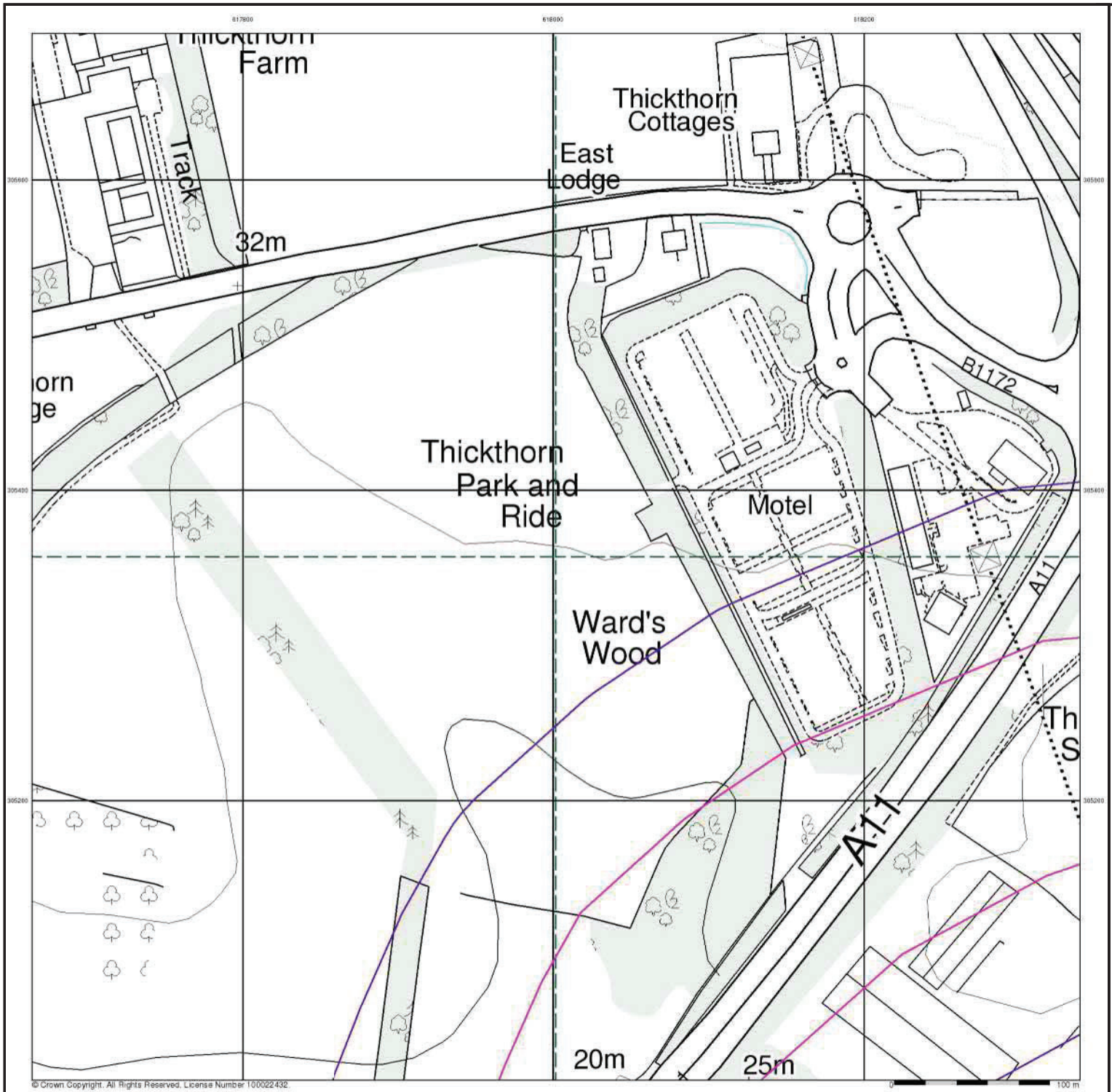
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Plot Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP



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Historical Land Use Information (1:2,500)

General

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

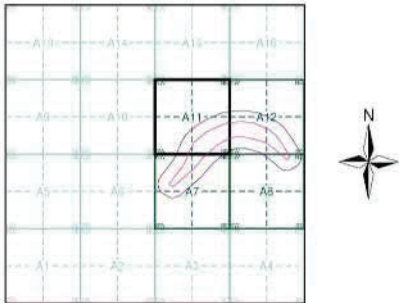
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	▭
Extractive Industries Activity from 1893 - 1915	▲	—	▭
Extractive Industries Activity from 1906 - 1937	▲	—	▭
Extractive Industries Activity from 1924 - 1949	▲	—	▭
Extractive Industries Activity from 1950 - 1980	▲	—	▭

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	- - -	▭

Mining and Ground Stability - Segment A11



Order Details

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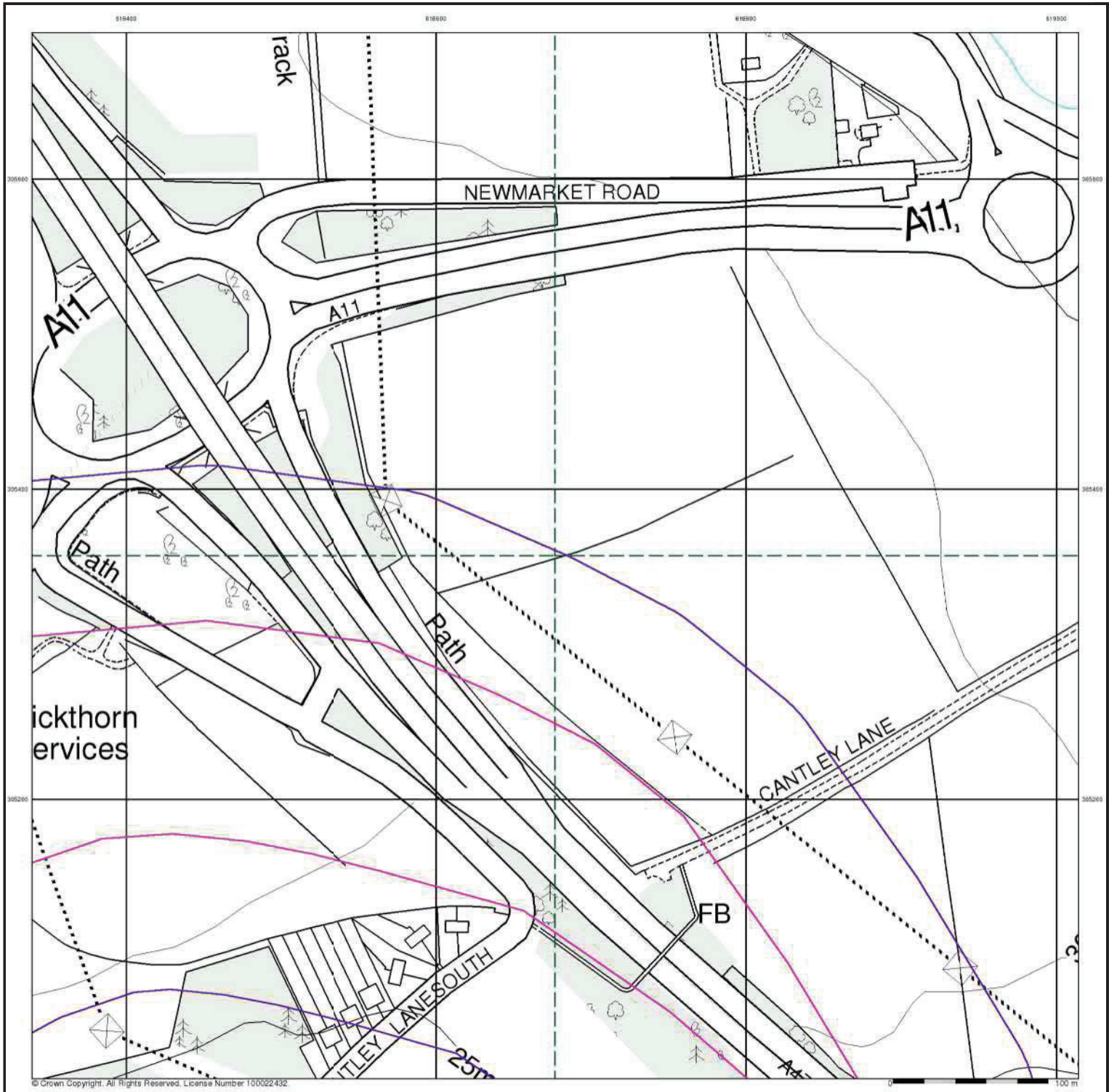
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Plot Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP



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Historical Land Use Information (1:2,500)

General

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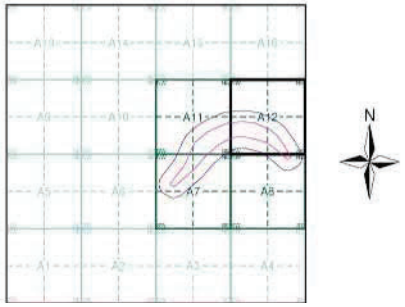
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	▢
Extractive Industries Activity from 1893 - 1915	▲	—	▨
Extractive Industries Activity from 1906 - 1937	▲	—	▤
Extractive Industries Activity from 1924 - 1949	▲	—	▨
Extractive Industries Activity from 1950 - 1980	▲	—	▥

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	- - -	▢

Mining and Ground Stability - Segment A12



Order Details

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Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Plot Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

[redacted]

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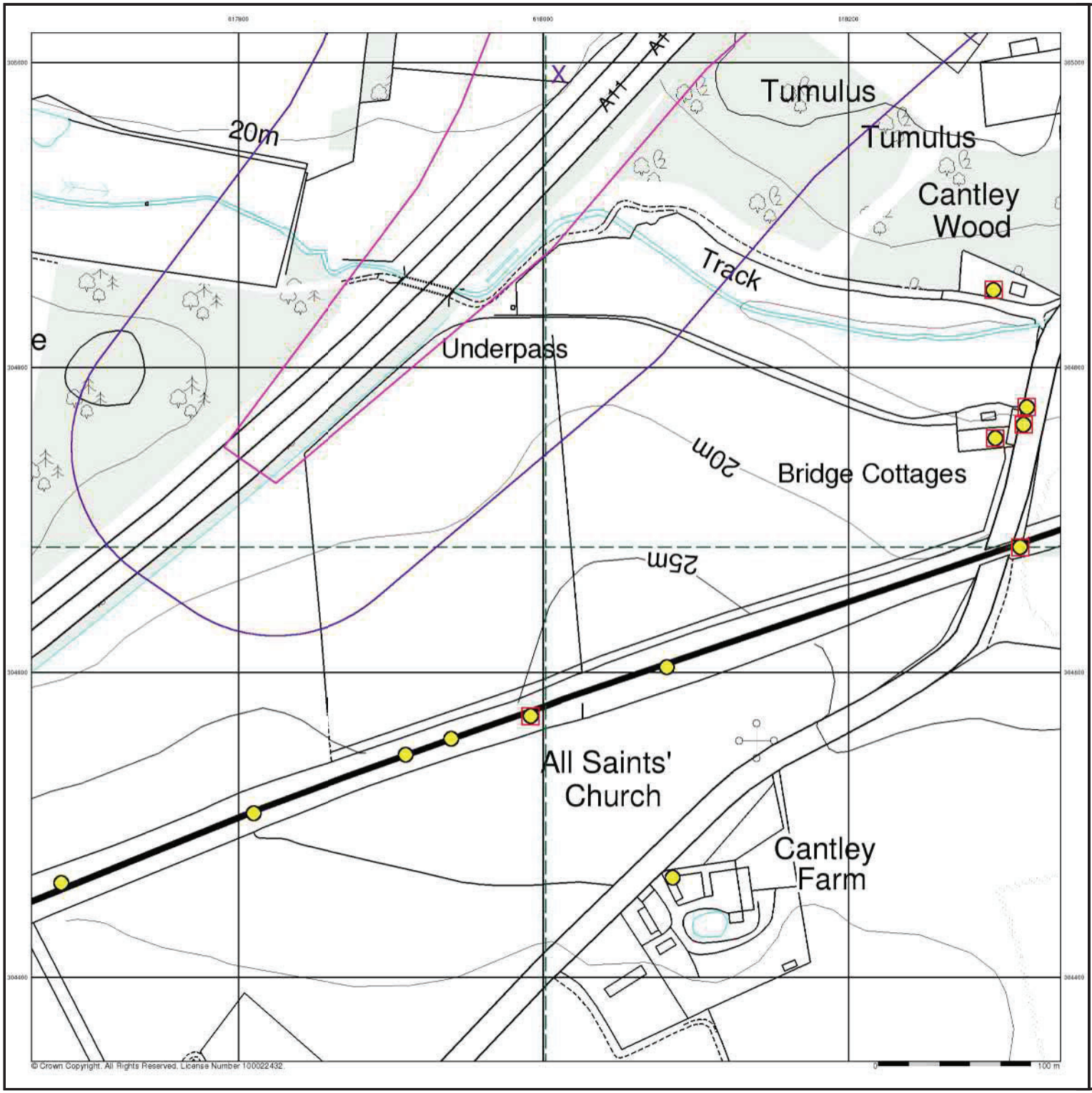

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Motion Map Data (1:2,500)

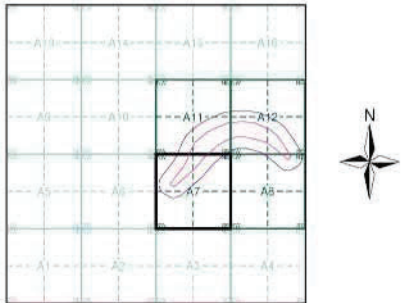
General

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

Average Velocity Gradient

- Upward Movement > 3.5mm per year
- Upward Movement 1.5mm to 3.5mm per year
- Stable 1.5mm to -1.5mm per year
- Downward Movement -1.5mm to -3.5mm per year
- Downward Movement > -3.5mm per year

Mining and Ground Stability - Segment A7



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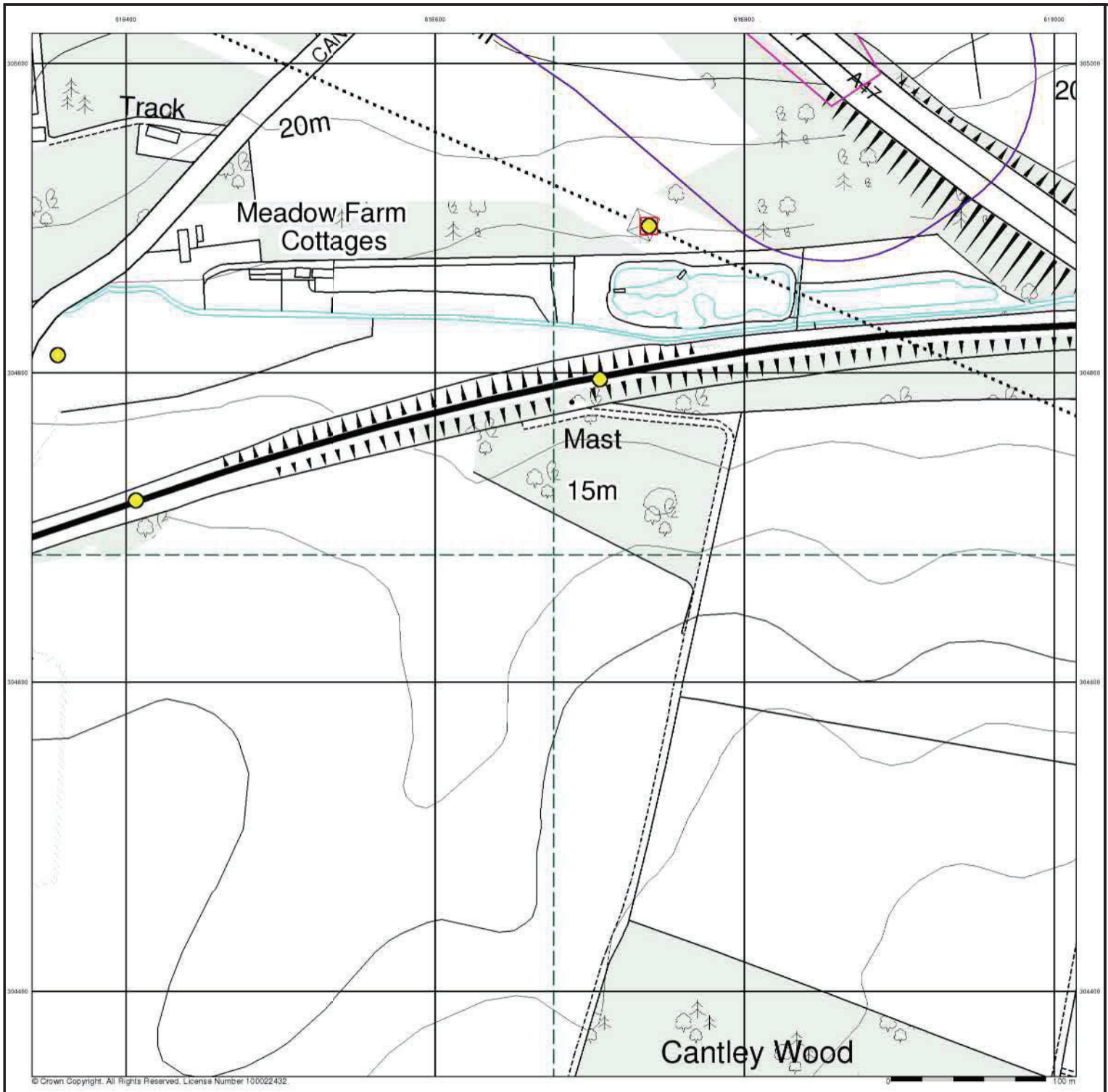
Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Plot Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk



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Motion Map Data (1:2,500)

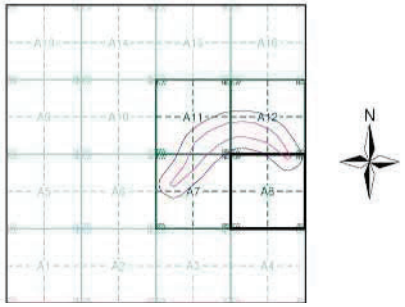
General

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

Average Velocity Gradient

- Upward Movement > 3.5mm per year
- Upward Movement 1.5mm to 3.5mm per year
- Stable 1.5mm to -1.5mm per year
- Downward Movement -1.5mm to -3.5mm per year
- Downward Movement > -3.5mm per year

Mining and Ground Stability - Segment A8



Order Details

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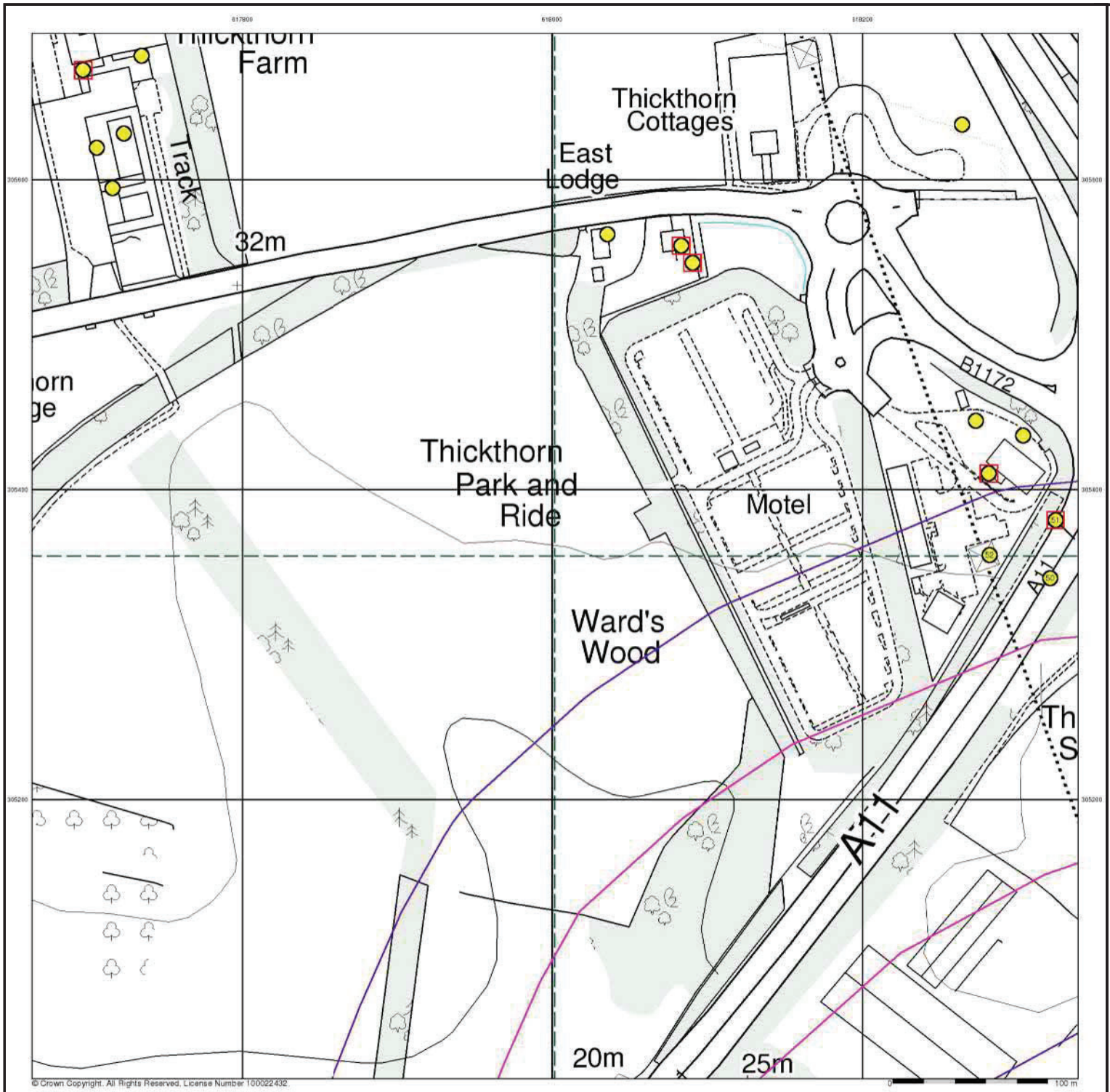
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Plot Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk



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Motion Map Data (1:2,500)

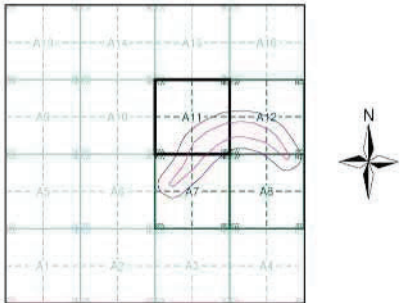
General

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

Average Velocity Gradient

- Upward Movement > 3.5mm per year
- Upward Movement 1.5mm to 3.5mm per year
- Stable 1.5mm to -1.5mm per year
- Downward Movement -1.5mm to -3.5mm per year
- Downward Movement > -3.5mm per year

Mining and Ground Stability - Segment A11



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Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Plot Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

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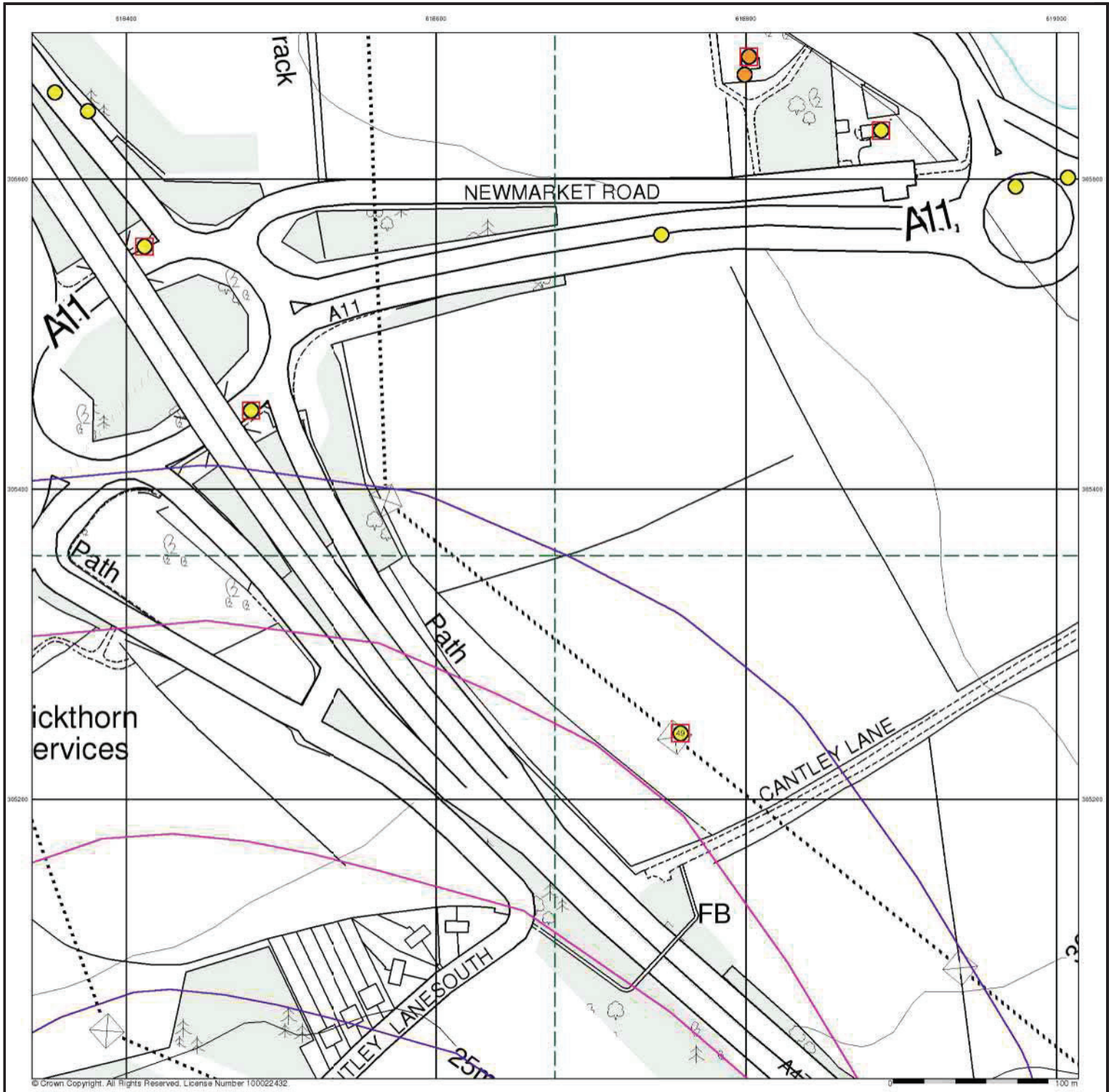

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Motion Map Data (1:2,500)

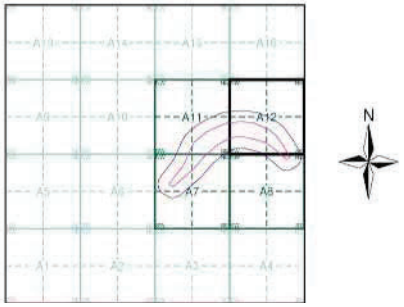
General

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

Average Velocity Gradient

- Upward Movement > 3.5mm per year
- Upward Movement 1.5mm to 3.5mm per year
- Stable 1.5mm to -1.5mm per year
- Downward Movement -1.5mm to -3.5mm per year
- Downward Movement > -3.5mm per year

Mining and Ground Stability - Segment A12



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Slice:	A
Site Area (Ha):	15.75
Plot Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

[redacted]

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Geology 1:50,000 Maps Legends

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Flandrian - Flandrian
	LOFT	Lowestoft Formation	Diamicton	Anglian - Anglian
	HPLO	Happisburgh Glacigenic Formation And Lowestoft Formation (Undifferentiated)	Sand and Gravel	Anglian - Anglian
	SMCL	Sheringham Cliffs Formation	Sand and Gravel	Pleistocene - Pleistocene
	RTD1	River Terrace Deposits, 1	Sand and Gravel	Quaternary - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	LPCK	Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation (Undifferentiated)	Chalk	Campanian - Turonian

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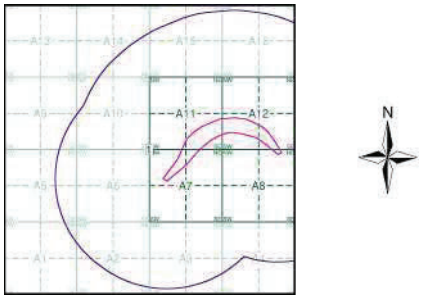
Geology 1:50,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID:	1
Map Sheet No:	161
Map Name:	Norwich
Map Date:	1975
Bedrock Geology:	Available
Superficial Geology:	Available
Artificial Geology:	Available
Faults:	Not Supplied
Landslip:	Not Available
Rock Segments:	Not Supplied

Geology 1:50,000 Maps - Slice A



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Site Details:

A47 Thickthorn Junction, Cringleford, Norfolk

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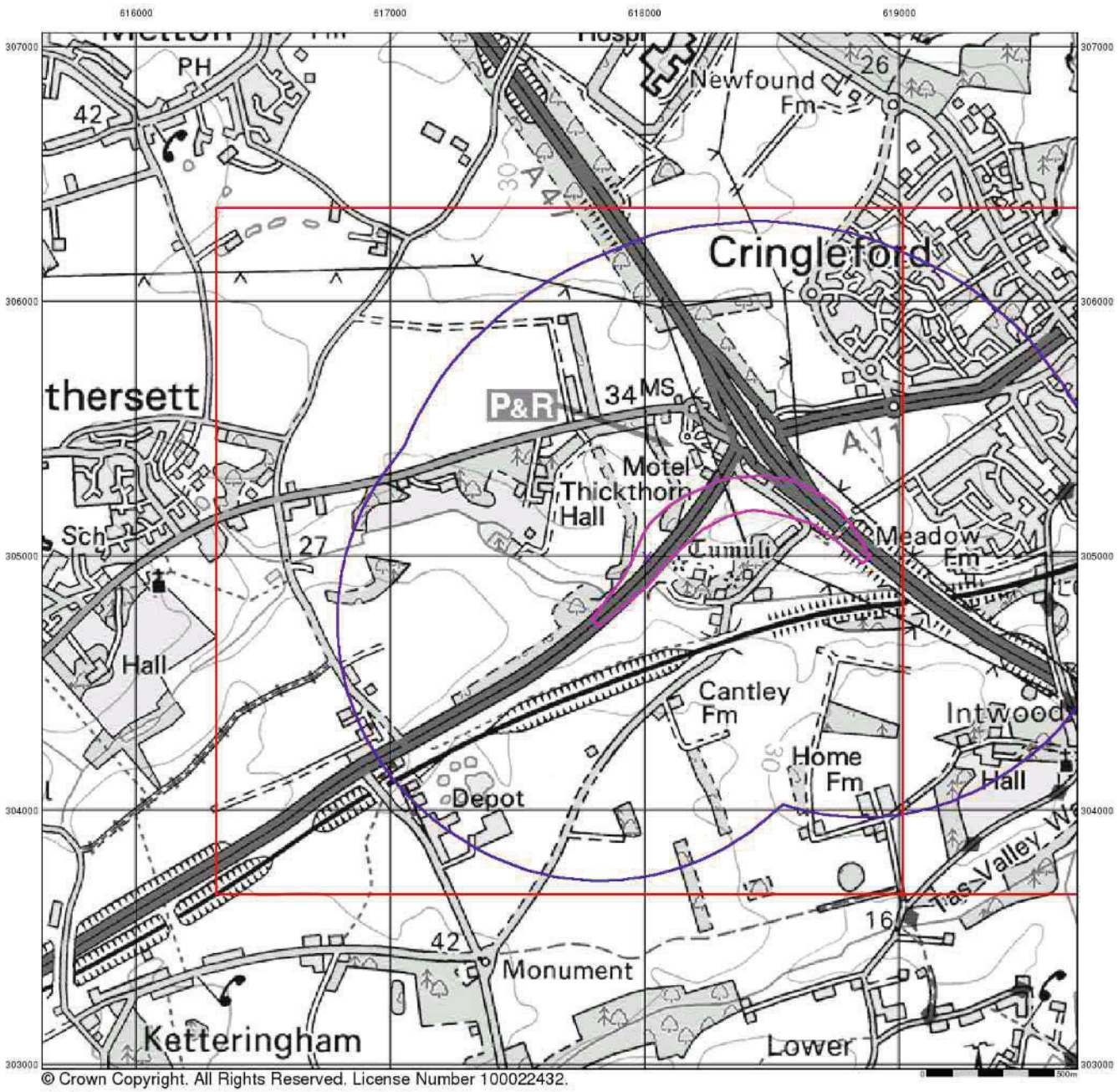

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Artificial Ground and Landslip

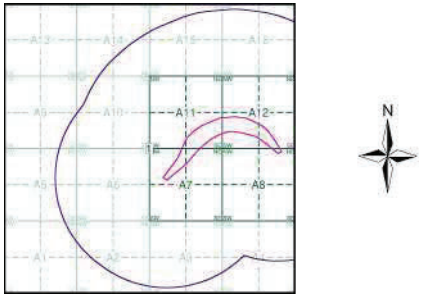
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



Order Details:

Order Number:	108824762_1_1
Customer Reference:	A47 Thickthorn
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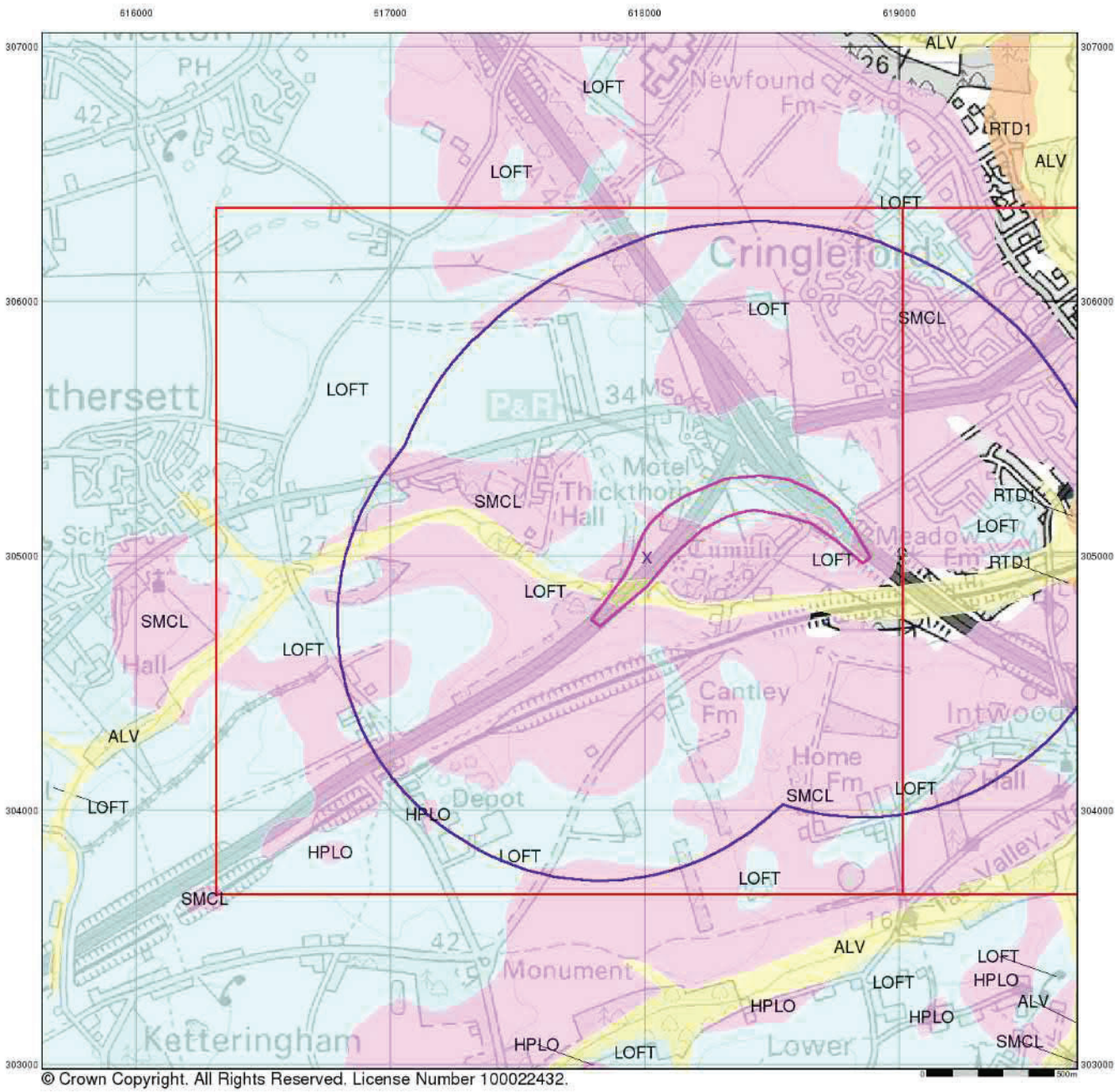
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details:

A47 Thickthorn Junction, Cringleford, Norfolk



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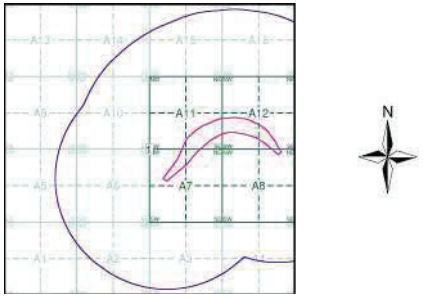
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



Order Details:

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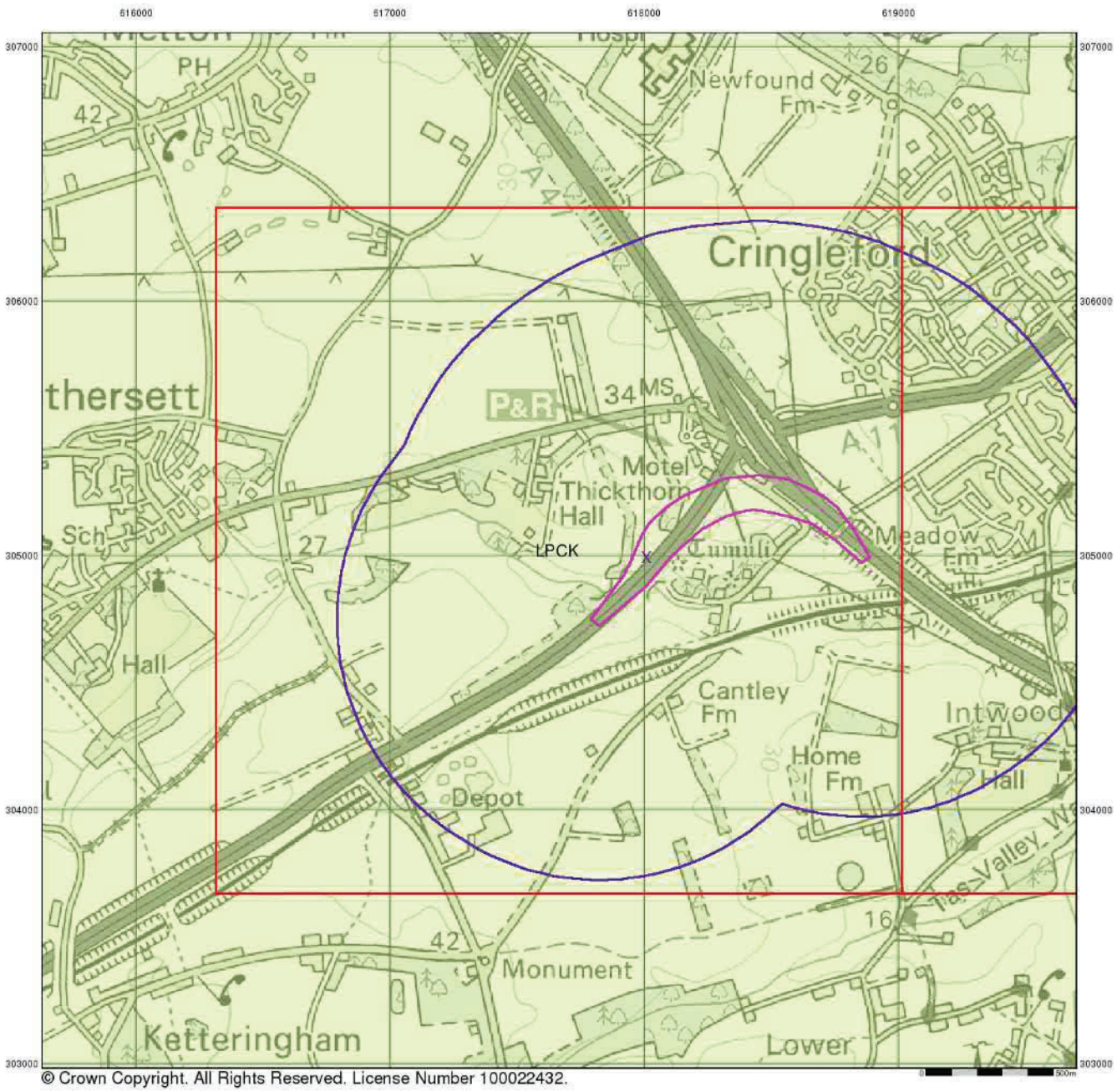
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details:

A47 Thickthorn Junction, Cringleford, Norfolk

[redacted]

Web: www.envirocheck.co.uk



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Bedrock and Faults

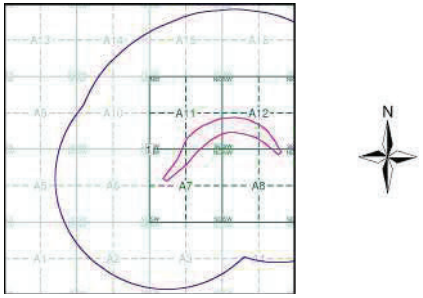
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



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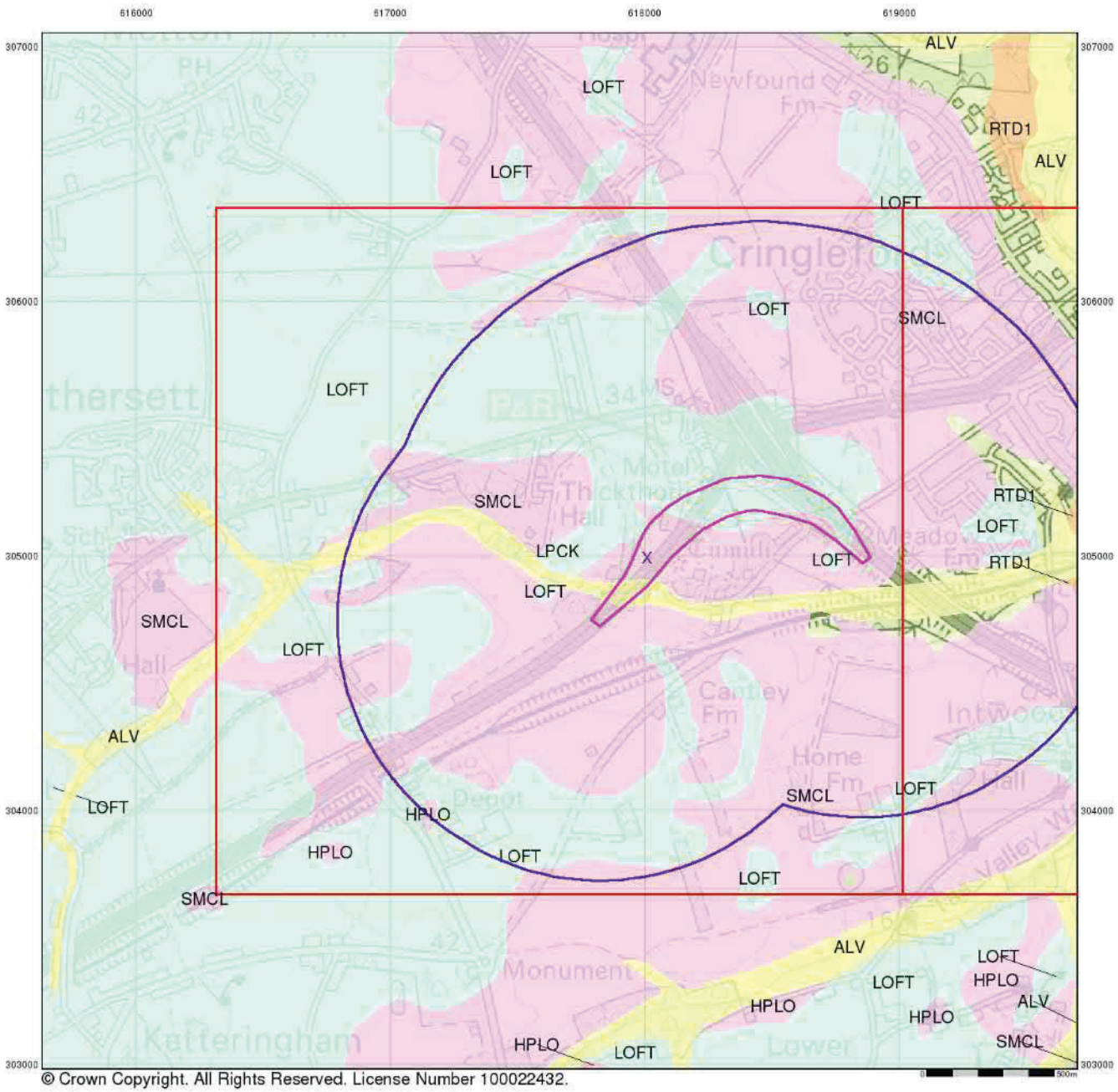
Site Details:

A47 Thickthorn Junction, Cringleford, Norfolk

[redacted]

Web: www.envirocheck.co.uk



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Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

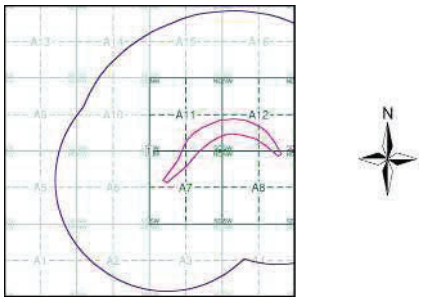
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



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Slice:	A
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Search Buffer (m):	1000

Site Details:

A47 Thickthorn Junction, Cringleford, Norfolk

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

Gravel Pit
Sand Pit
Other Pits
Quarry
Shingle
Orchard
Osiers
Reeds
Marsh
Mixed Wood
Deciduous
Brushwood
Fir
Furze
Rough Pasture
Arrow denotes flow of water
Trigonometrical Station
Site of Antiquities
Bench Mark
Pump, Guide Post, Signal Post
Well, Spring, Boundary Post
·285 Surface Level
Sketched Contour
Instrumental Contour
Main Roads
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
Sunken Road
Raised Road
Road over Railway
Railway over River
Railway over Road
Level Crossing
Road over River or Canal
Road over Stream
Road over Stream
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
R.D. Bdy. Rural District Boundary
Civil Parish Boundary

Ordnance Survey Plan 1:10,000

Chalk Pit, Clay Pit or Quarry
Gravel Pit
Sand Pit
Disused Pit or Quarry
Refuse or Slag Heap
Lake, Loch or Pond
Dunes
Boulders
Coniferous Trees
Non-Coniferous Trees
Orchard
Scrub
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Sloping Masonry
Electricity Transmission Line
Pole
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
Standard Gauge Single Track
Siding, Tramway or Mineral Line
Narrow Gauge
Geographical County
Administrative County, County Borough or County of City
Municipal Borough, Urban or Rural District, Burgh or District Council
Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

1:10,000 Raster Mapping

Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community boundary
District, Unitary, Metropolitan, London Borough boundary
Constituency boundary
Area of wooded vegetation
Non-coniferous trees
Non-coniferous trees (scattered)
Coniferous trees
Coniferous trees (scattered)
Positioned tree
Orchard
Coppice or Osiers
Rough Grassland
Heath
Scrub
Marsh, Salt Marsh or Reeds
Water feature
Flow arrows
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m Bench mark (where shown)
Triangulation station
Point feature (e.g. Guide Post or Mile Stone)
Pylon, flare stack or lighting tower
Site of (antiquity)
Glasshouse
General Building
Important Building

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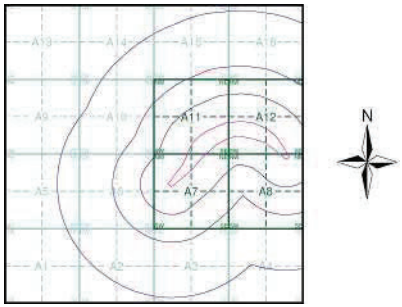
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Norfolk	1:10,560	1886 - 1887	3
Norfolk	1:10,560	1908	4
Norfolk	1:10,560	1919	5
Norfolk	1:10,560	1929	6
Norfolk	1:10,560	1938	7
Norfolk	1:10,560	1951	8
Ordnance Survey Plan	1:10,000	1957	9
Ordnance Survey Plan	1:10,000	1971 - 1975	10
Norwich	1:10,000	1980	11
Ordnance Survey Plan	1:10,000	1982	12
Ordnance Survey Plan	1:10,000	1995	13
10K Raster Mapping	1:10,000	2000	14
10K Raster Mapping	1:10,000	2006	15
VectorMap Local	1:10,000	2016	16

Historical Map - Slice A



Order Details

Order Number: 108824762_1_1
Customer Ref: A47 Thickthorn
National Grid Reference: 618010, 304990
Slice: A
Site Area (Ha): 15.75
Search Buffer (m): 1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP

[redacted] Web: www.envirocheck.co.uk

Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale b. Drawn to scale

- Government and Administrative Buildings
- Military and Industrial Buildings
- Military and Communication Areas
- Subway Entrance
- Fireproof Building
- Prominent Fireproof Building
- Non-fireproof Building
- Non-fireproof Building (non-dwelling)
- Factory, mill, and flour mill, with chimneys
- Factory, mill, and flour mill, without chimneys
- Power Station, drawn to scale
- Hydroelectric Power Station
- Radio Station, drawn to scale
- Telephone Station, drawn to scale
- Abandoned Open-pit Mine or Quarry
- Open-pit Salt Mine
- Pit
- Oil Deposit or Well
- Oil Seepage
- Tailings Pile
- Fuel Storage Tanks
- Natural Gas Tank
- Bench Mark
- Drill Hole
- Burial Mound
- Triangulation Point on Burial Mound
- Single-track Railroad
- Double-track Railroad and Station Building
- Coniferous Forest
- Deciduous Forest
- Mixed Forest
- Lawns
- Citrus Orchard
- Wet Ground
- Scattered Vegetation

243,8 — Values for prominent elevations

186.0 — Numbers for spot elevations, depth soundings, contour lines, etc.

0,2 — Velocity of the current, width of river bed, depth of river

Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

А а (A)	З з (Z)	П п (P)	Ч ч (CH)
Б б (B)	И и (I)	Р р (R)	Ш ш (SH)
В в (V)	Й й (Y)	С с (S)	Щ щ (SHCH)
Г г (G)	К к (K)	Т т (T)	ъ (-)
Д д (D)	Л л (L)	У у (U)	ы (Y)
Е е (E)	М м (M)	Ф ф (F)	ь (')
Ё ё (YO)	Н н (N)	Х х (KH)	Э э (E)
Ж ж (ZH)	О о (O)	Ц ц (TS)	Ю ю (YU or IU)
			Я я (YA or IA)

1:25,000 mapping

a. Not drawn to scale b. Drawn to scale

- Government and Administrative Buildings
- Military and Industrial Buildings
- Military and Communication Areas
- Subway Entrance
- Partly Demolished Buildings
- Demolished Buildings
- Built-Up Area with Fireproof Buildings Predominant
- Built-Up Area with Non-Fireproof Buildings Predominant
- Individual Fireproof Building
- Prominent Industrial Building
- Individual Dwelling, Fireproof
- Ruins of an Individual Dwelling
- Factory or Mill Chimney
- Factory or Mill with Chimney
- Factory or Mill without Chimney
- Mine or Open Pit Mine
- Operating Shaft or Mine
- Non-Operating Shaft or Mine
- Salt Mine
- Tailings Pile
- Pit
- Stone Quarry
- Gas Pump or Service Station
- Fuel Storage or Natural Gas Tank
- Oil or Natural Gas Derrick
- Small Hydroelectric Power Station
- Power Station
- Transformer Station
- Cemetery
- Burial Mound (height in metres)
- Triangulation Point on Burial Mound
- Triangulation Point
- Bench Mark
- Bench Mark (monumented)
- Telegraph Office
- Telephone Station
- Radio Station
- Radio Tower
- Airfield or Seaplane Base
- Landing Strip
- Telegraph/Telephone Lines
- Main Highway
- Highway under Construction
- Improved Dirt Road (former truck road)
- Double-track Railroad with First Class Station
- Dismantled Railroad
- Railroad Under Construction
- Shore Embankment
- River or Ditch with Embankment
- Direction and velocity of current
- Water Level Mark
- Well
- Water Reservoir or Rain Water Pit
- Spring
- Isobath with value
- Heavy (Index) Contour Line
- Contour Line and Value
- Half Contour Line
- Spot Elevation Value
- Coniferous
- Deciduous
- Mixed
- Scrub

Key to Numbers on Mapping

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Norfolk	1:10,560	1886 - 1887	3
Norfolk	1:10,560	1908	4
Norfolk	1:10,560	1919	5
Norfolk	1:10,560	1929	6
Norfolk	1:10,560	1938	7
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Ordnance Survey Plan	1:10,000	1957	9
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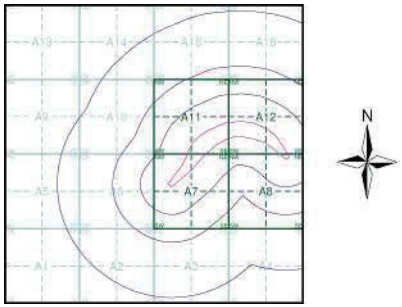
Ordnance Survey Plan	1:10,000	1995	13
10K Raster Mapping	1:10,000	2000	14
10K Raster Mapping	1:10,000	2006	15
VectorMap Local	1:10,000	2016	16

Russian Map - Slice A

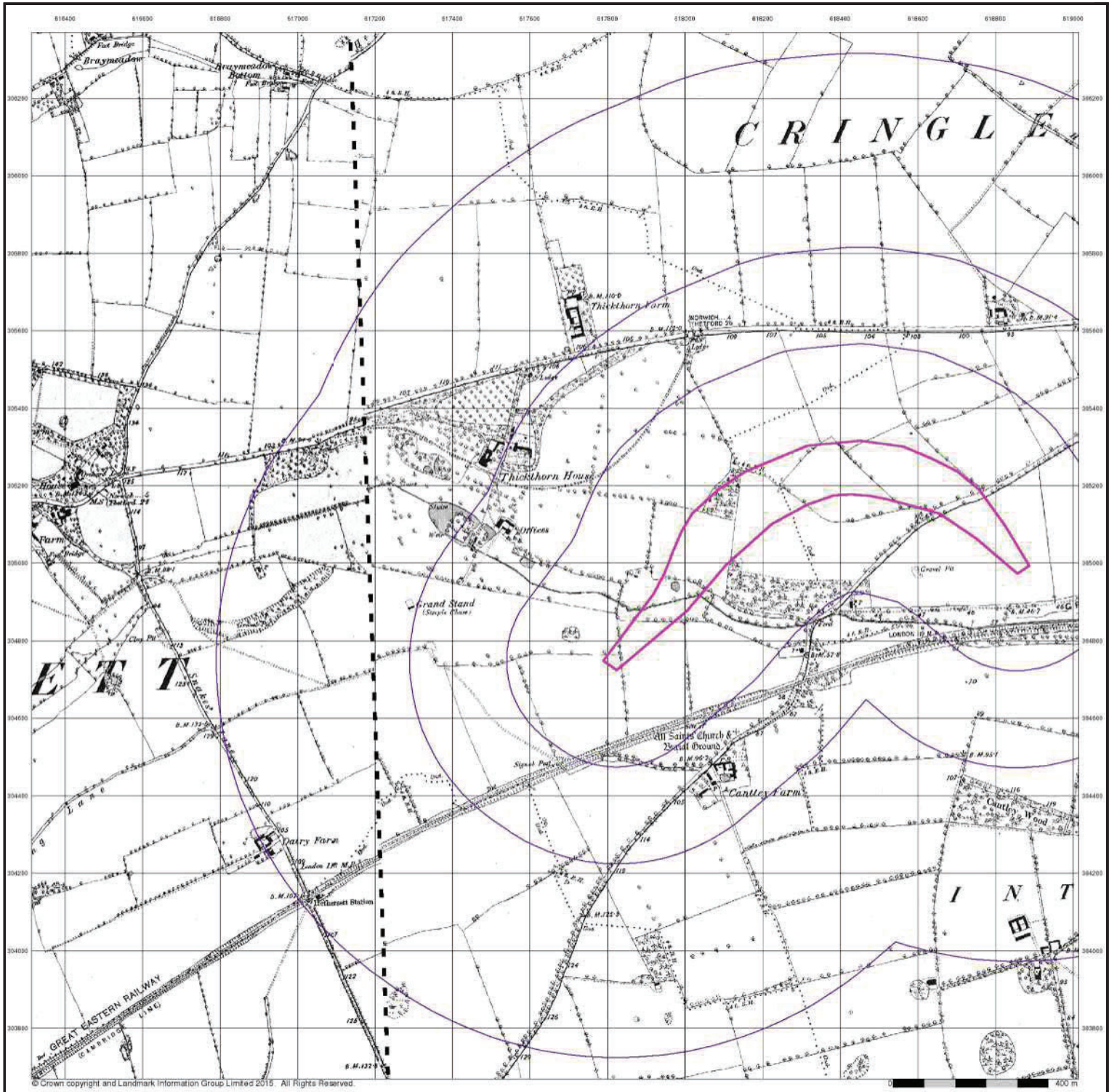


Order Details

Order Number: 108824762_1_1
Customer Ref: A47 Thickthorn
National Grid Reference: 618010, 304990
Slice: A
Site Area (Ha): 15.75
Search Buffer (m): 1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk



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LANDMARK INFORMATION GROUP®

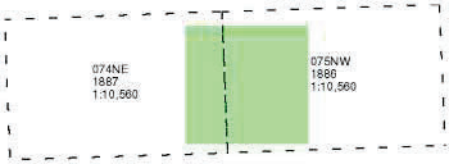
Norfolk

Published 1886 - 1887

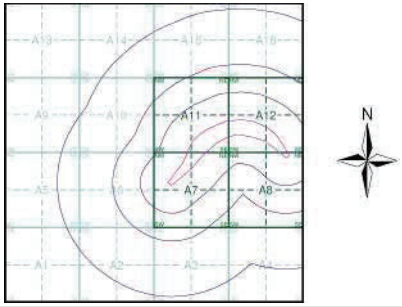
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



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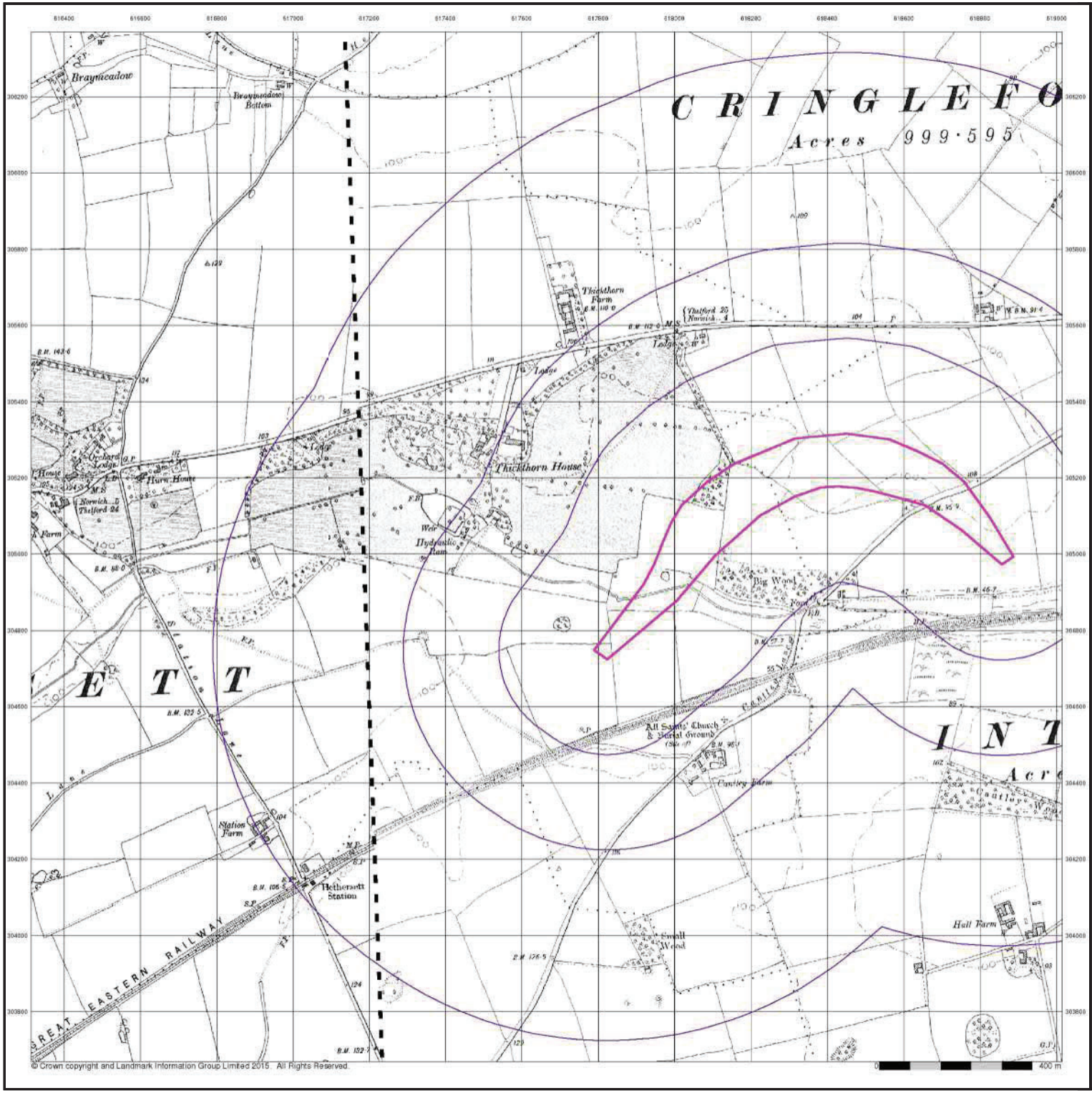
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk



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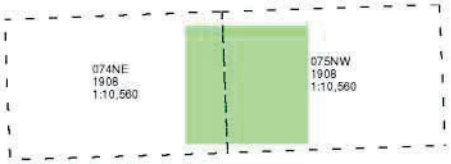
Norfolk

Published 1908

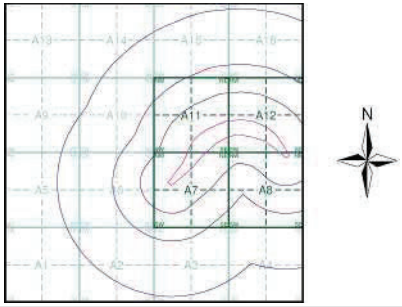
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



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Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

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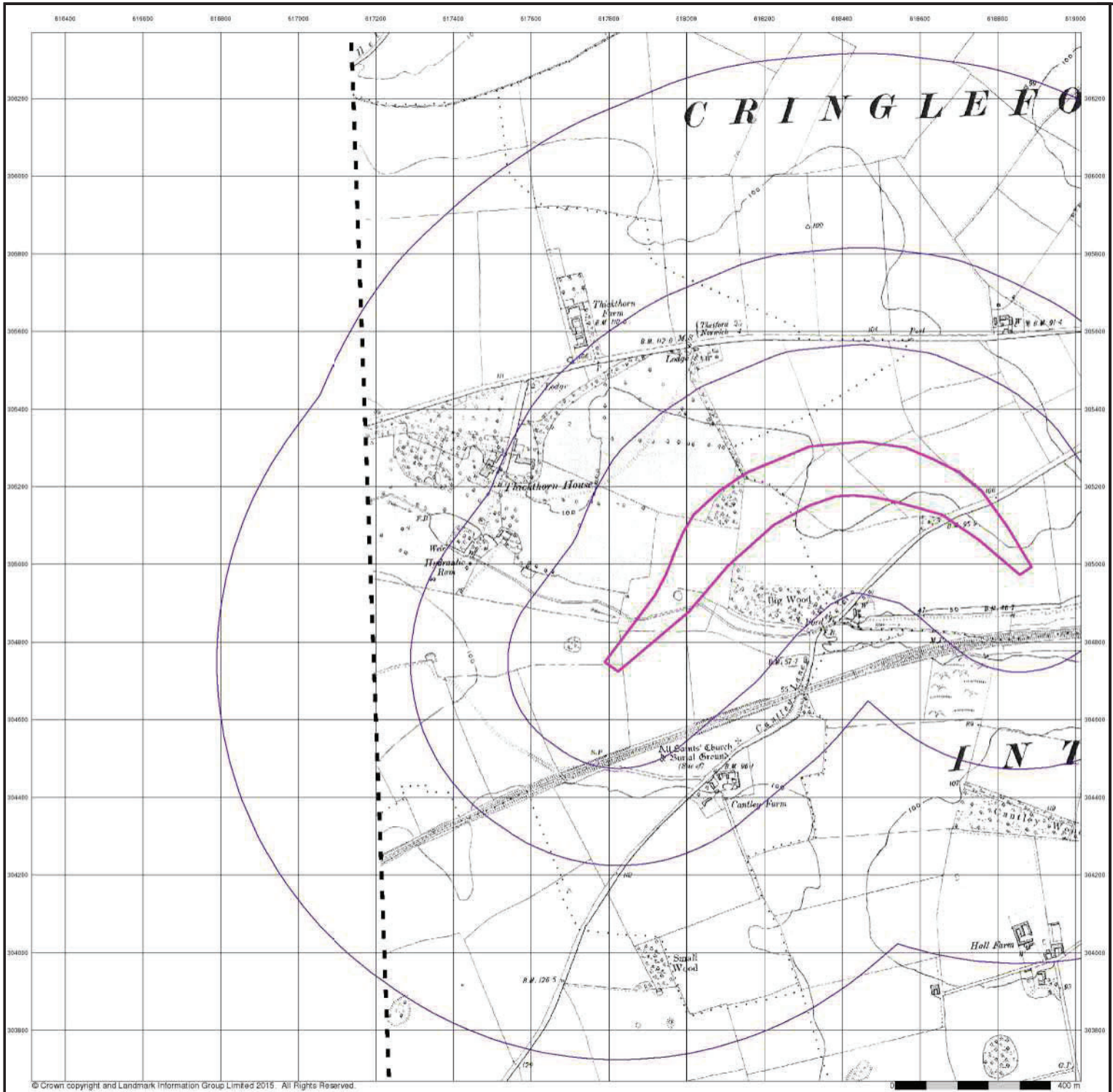

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Norfolk

Published 1919

Source map scale - 1:10,560

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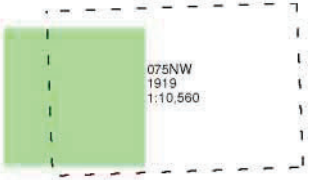
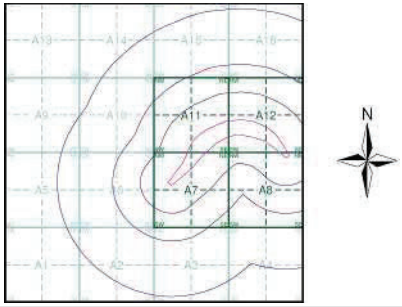


Historical Map - Slice A



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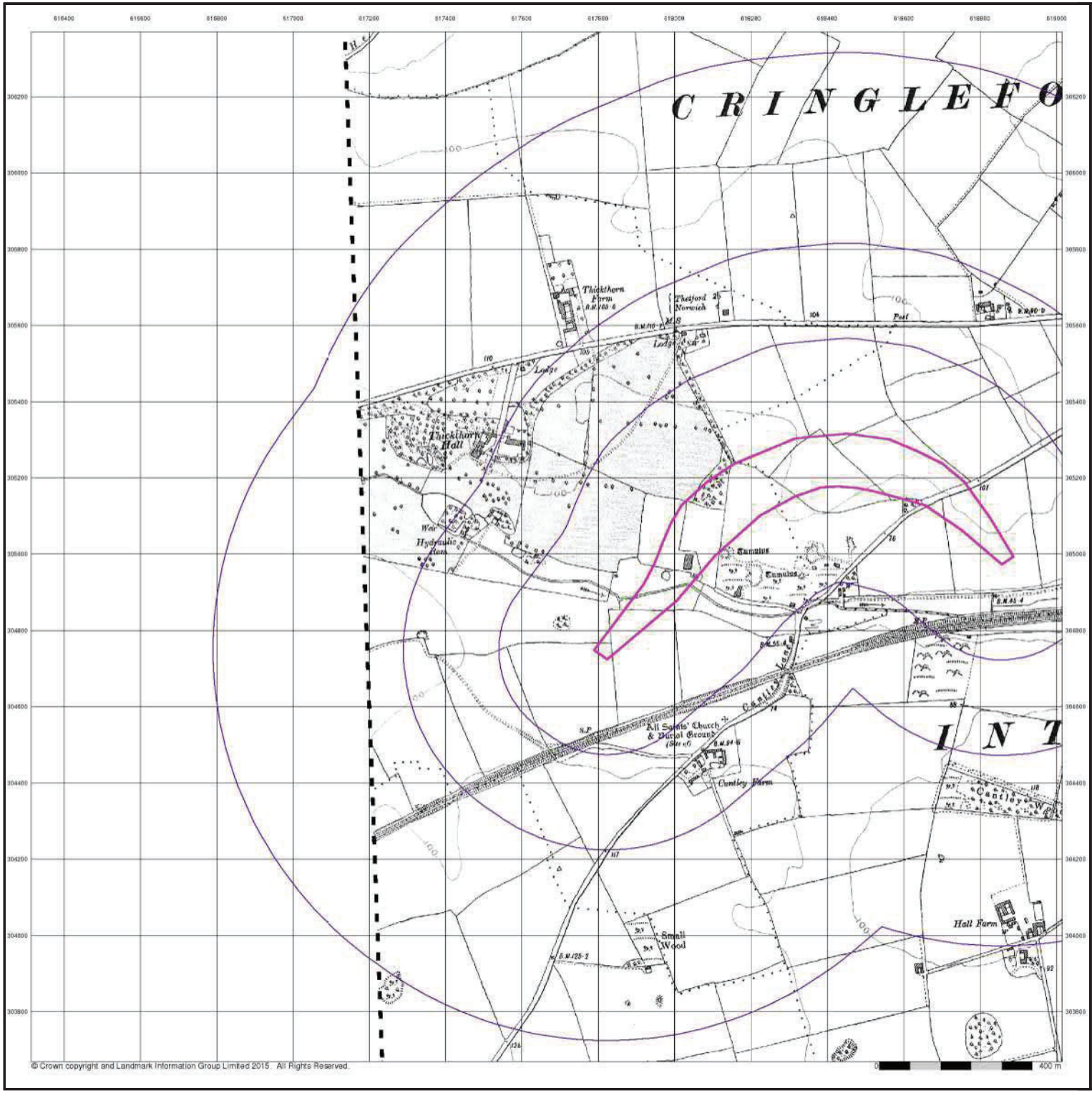
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk



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LANDMARK INFORMATION GROUP®

Norfolk

Published 1929

Source map scale - 1:10,560

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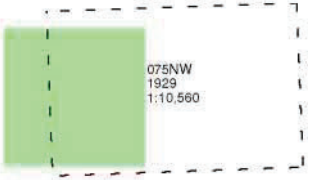
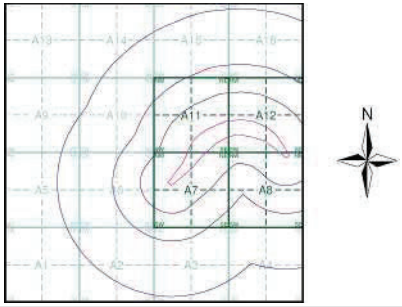


Historical Map - Slice A



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Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP

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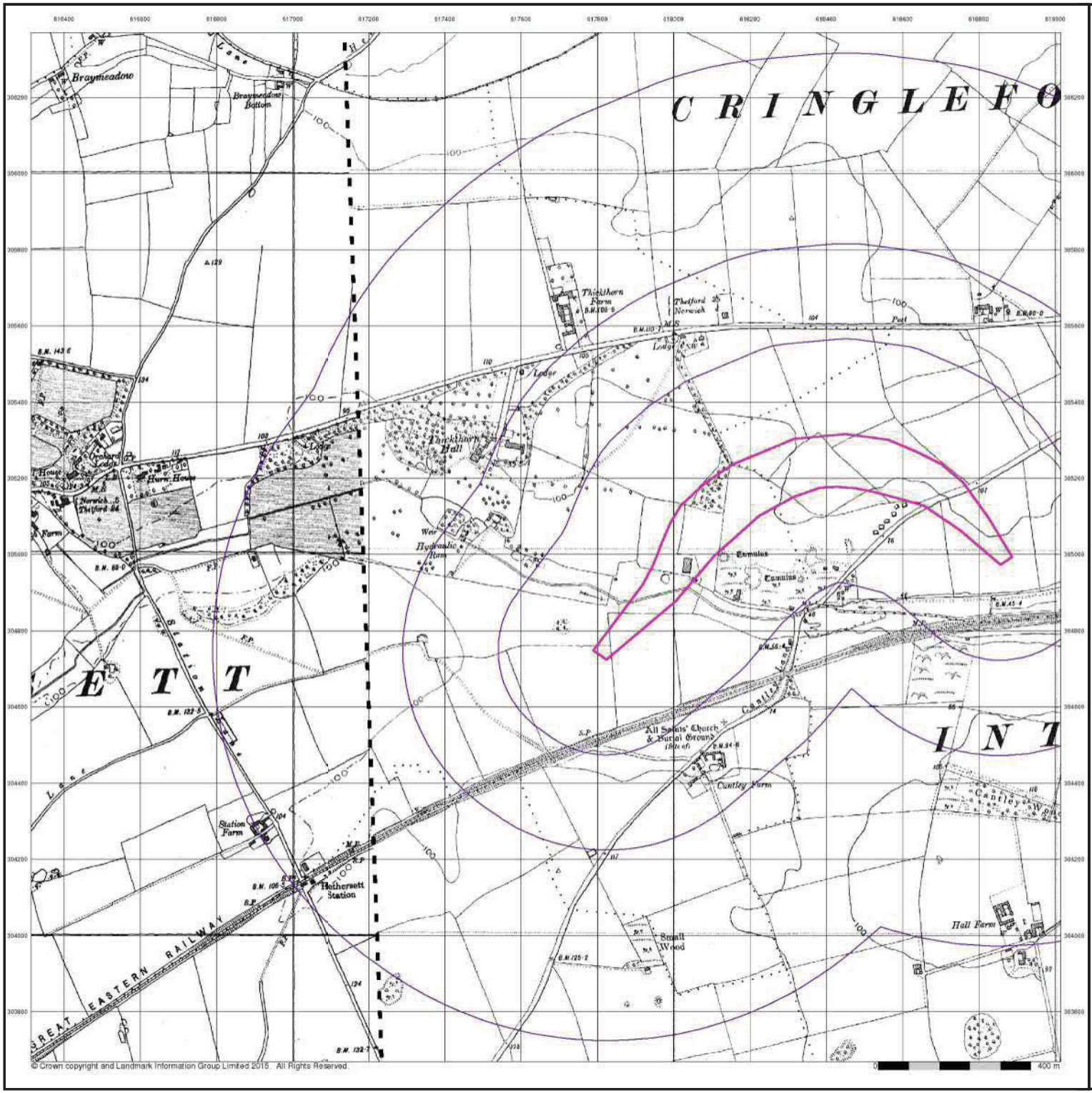
Web: www.envirocheck.co.uk



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Norfolk

Published 1938

Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

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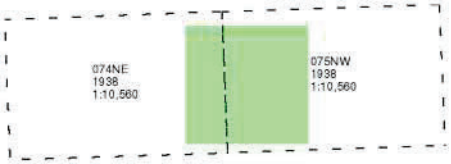
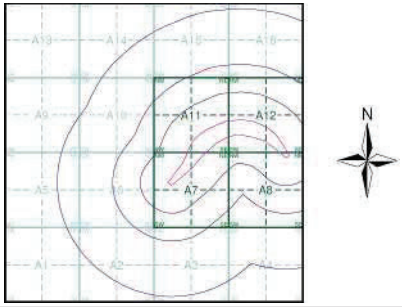


Historical Map - Slice A



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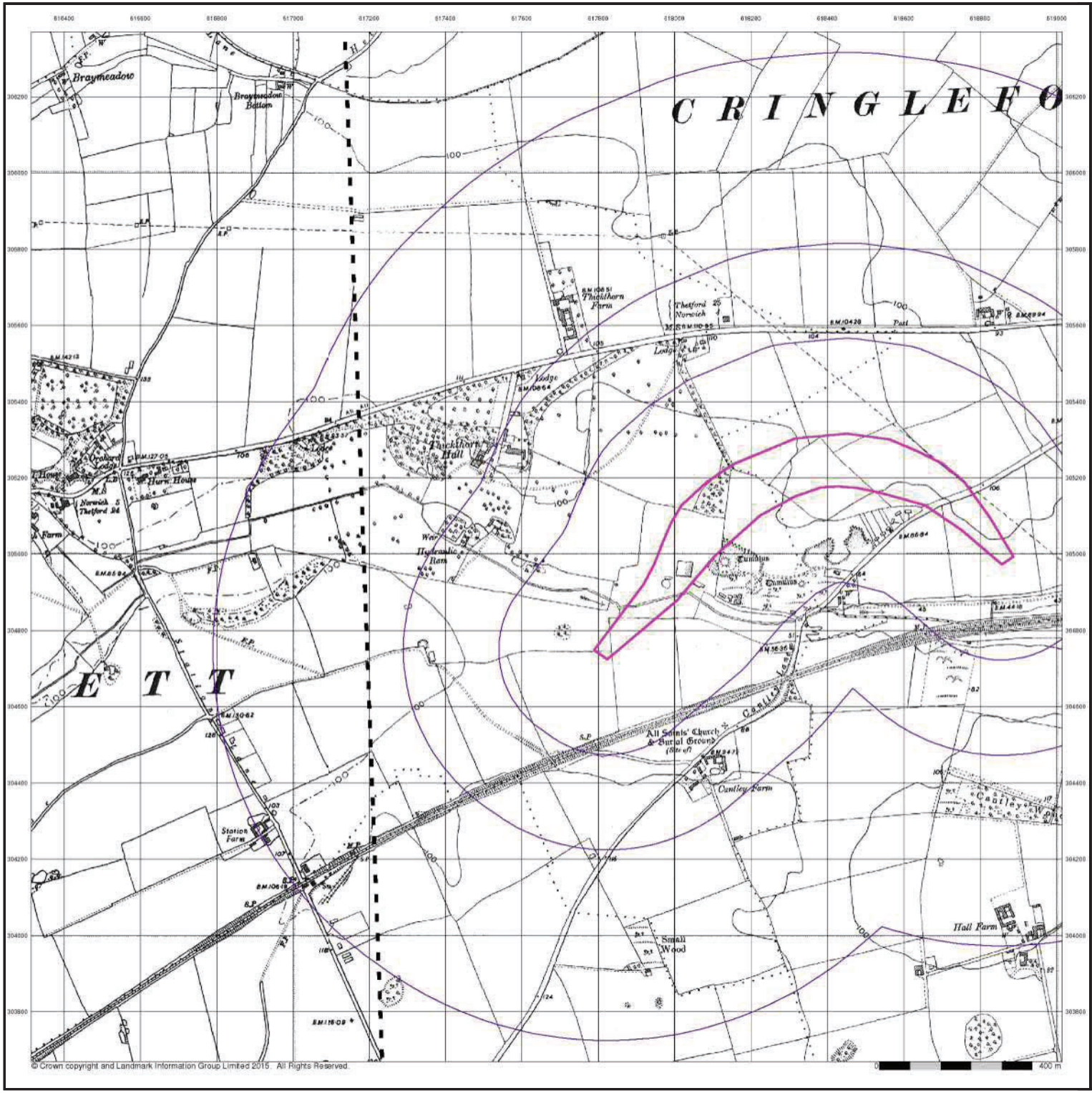
Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP

[redacted]

Web: www.envirocheck.co.uk



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LANDMARK INFORMATION GROUP®

Norfolk

Published 1951

Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

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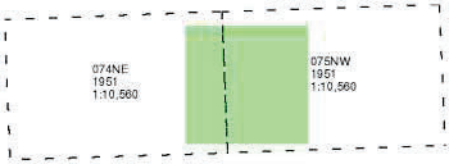
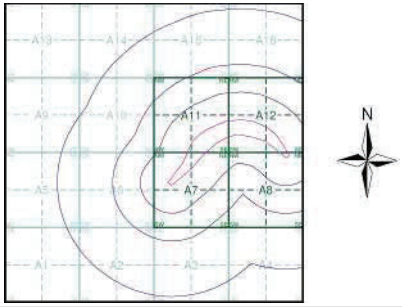


Historical Map - Slice A



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Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP

[redacted]

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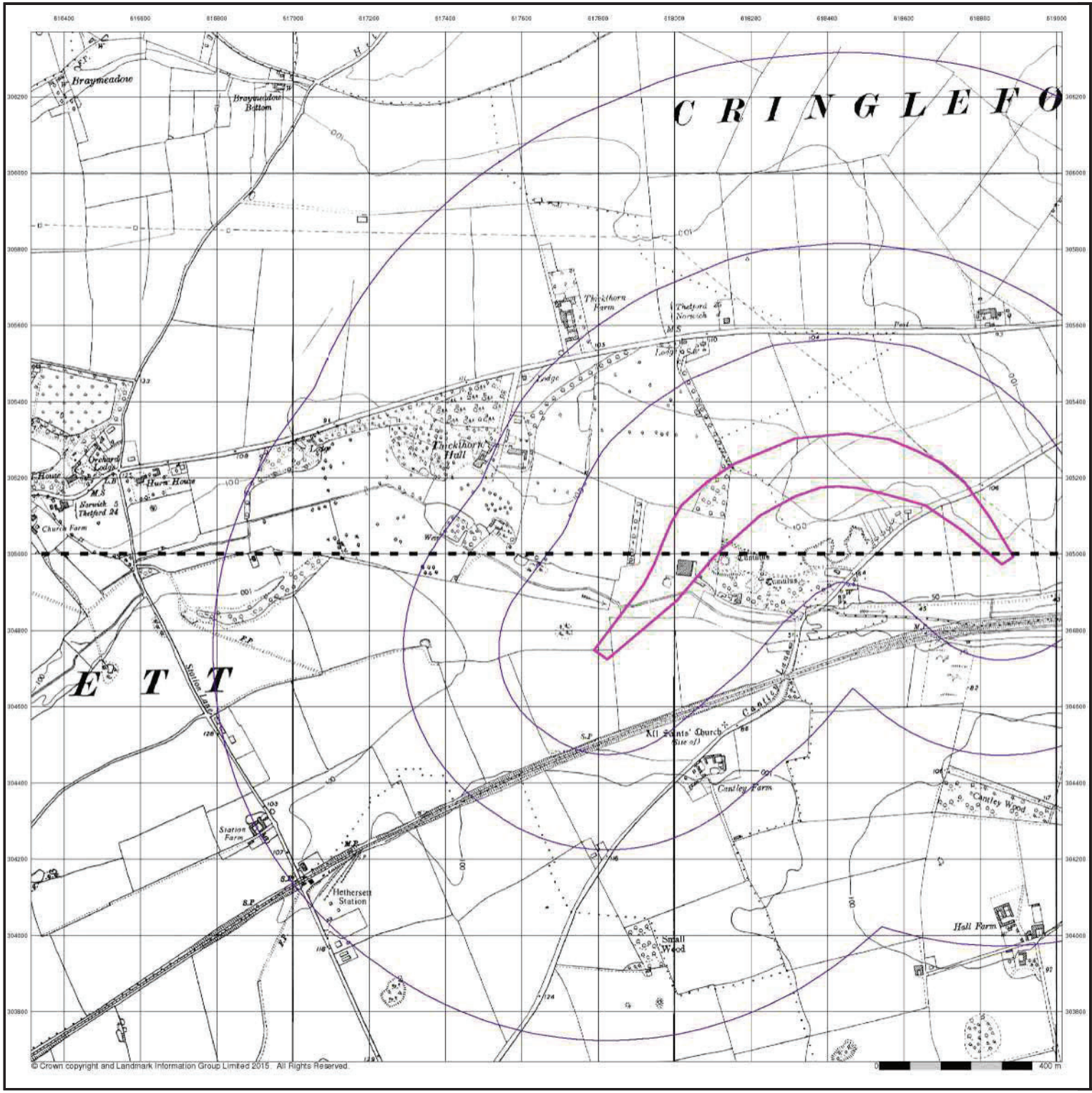

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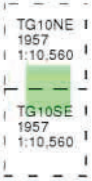
Ordnance Survey Plan

Published 1957

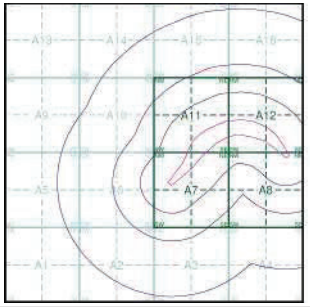
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A

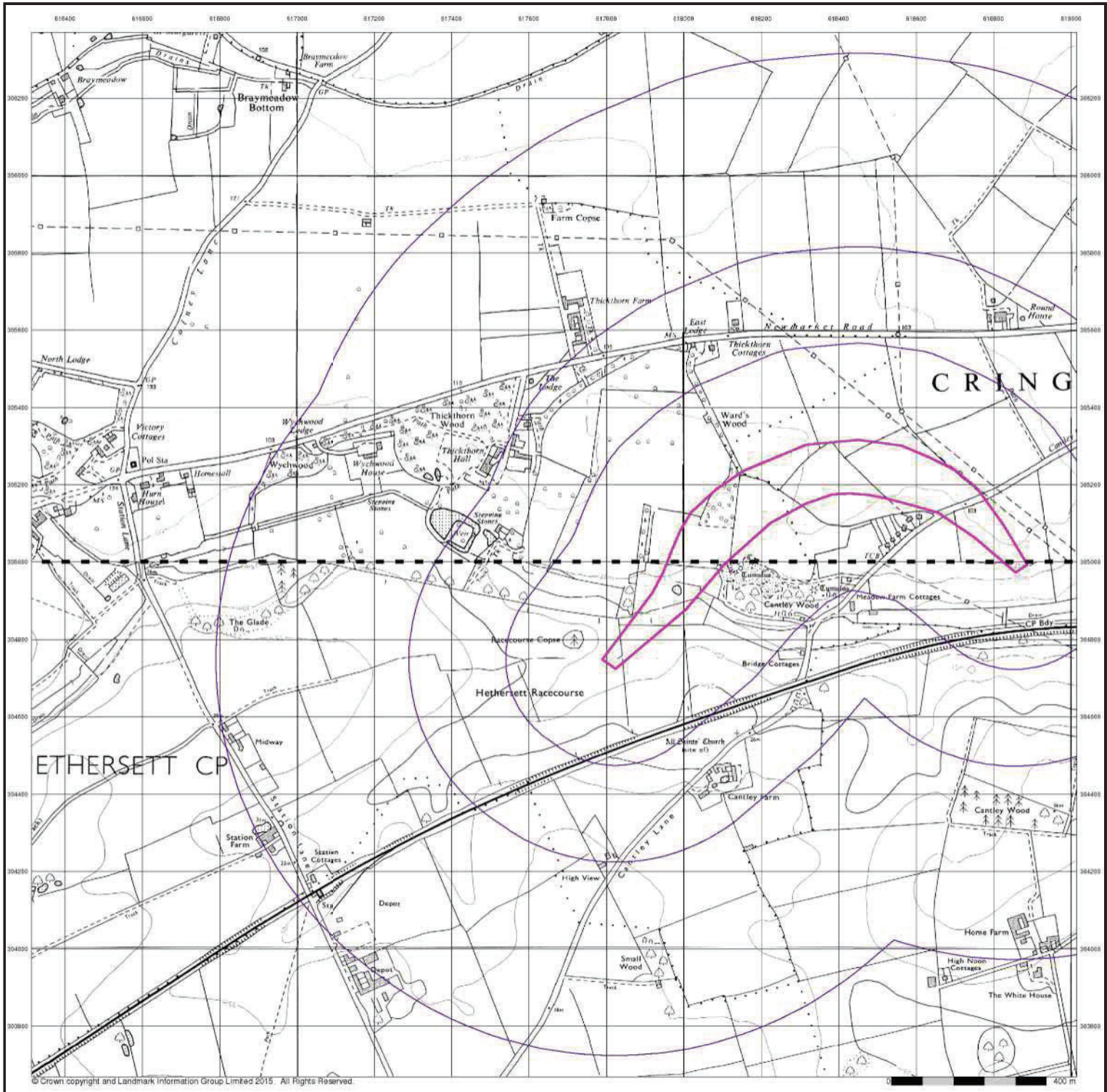


Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk



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LANDMARK INFORMATION GROUP®

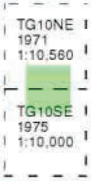
Ordnance Survey Plan

Published 1971 - 1975

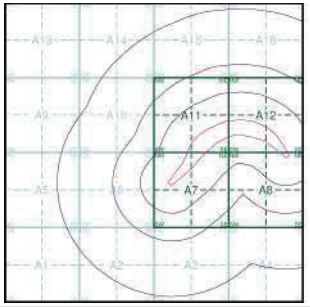
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

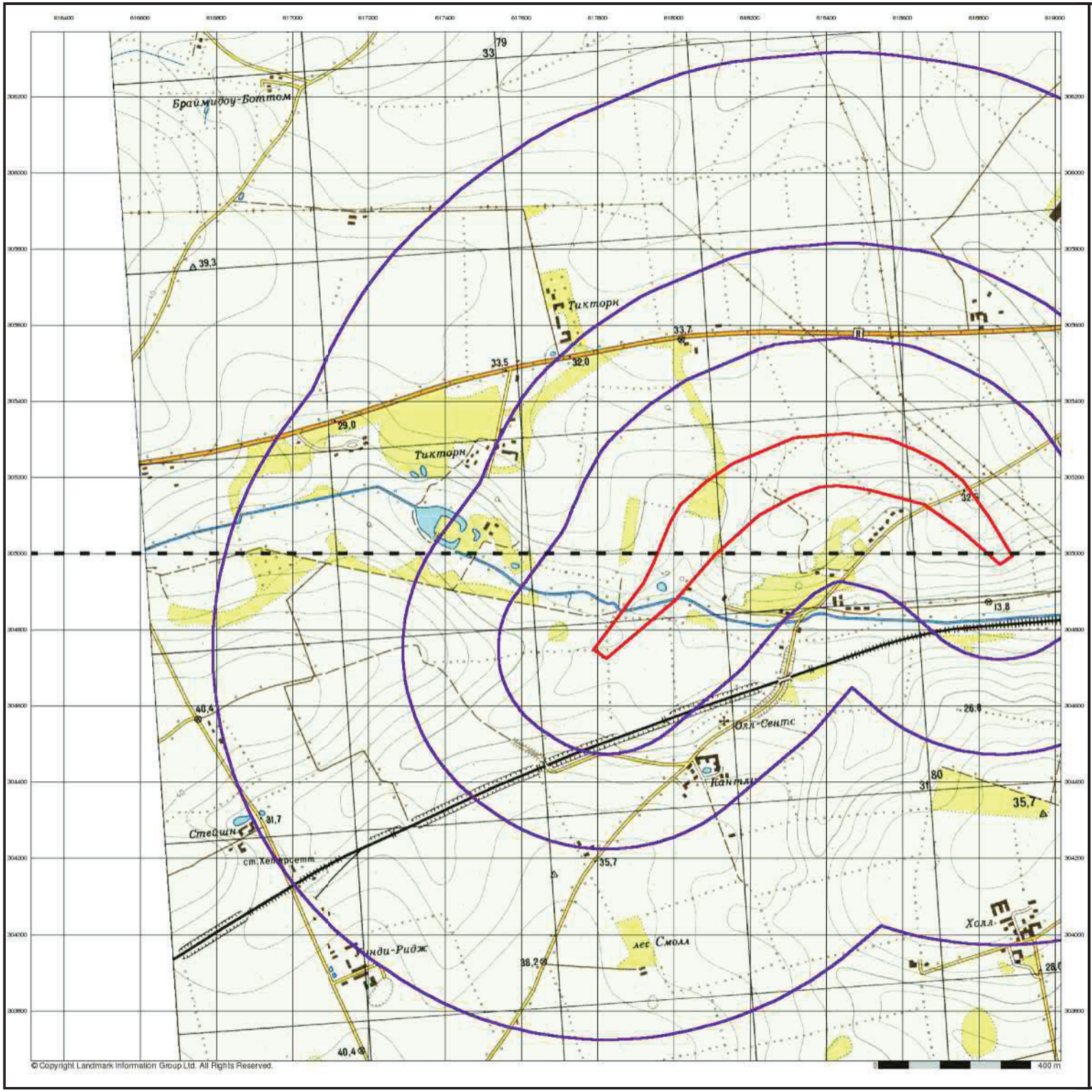
Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

[redacted]

Landmark INFORMATION GROUP

Web: www.envirocheck.co.uk



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LANDMARK INFORMATION GROUP®

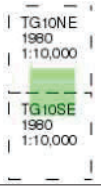
Norwich

Published 1980

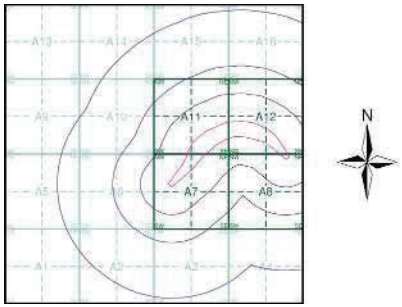
Source map scale - 1:10,000

These maps were produced by the Russian military during the Cold War between 1950 and 1997, and cover 103 towns and cities throughout the U.K. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed areas. Buildings are coloured black and important building uses (such as hospitals, post offices, factories etc.) are numbered, with a numbered key describing their use.
They were produced by the Russians for the benefit of navigation, as well as strategic military sites and transport hubs, for use if they were to have invaded the U.K. The detailed information provided indicates that the areas were surveyed using land-based personnel, on the ground, in the cities that are mapped.

Map Name(s) and Date(s)



Russian Map - Slice A

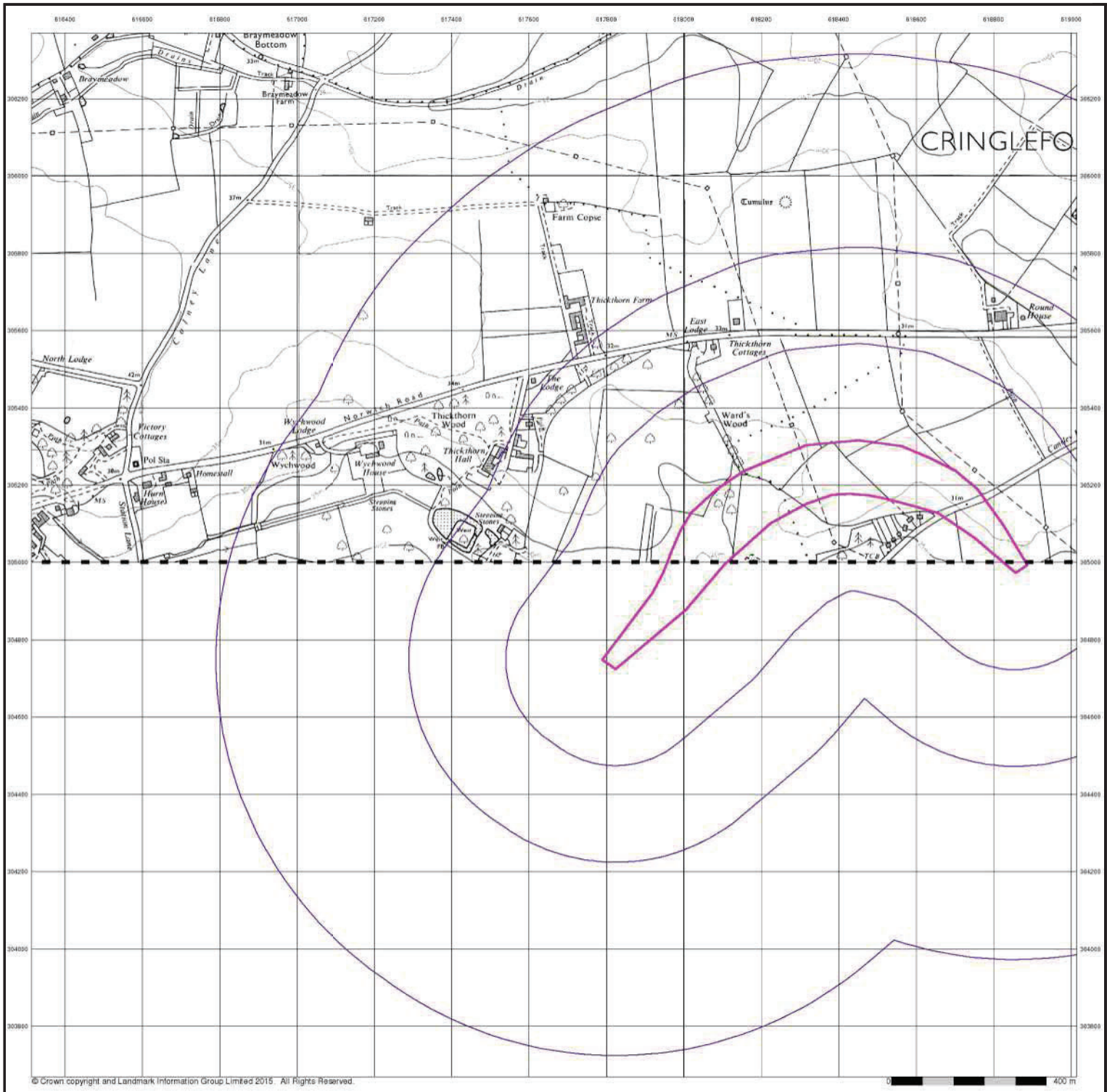


Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk



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LANDMARK INFORMATION GROUP®

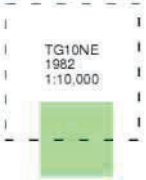
Ordnance Survey Plan

Published 1982

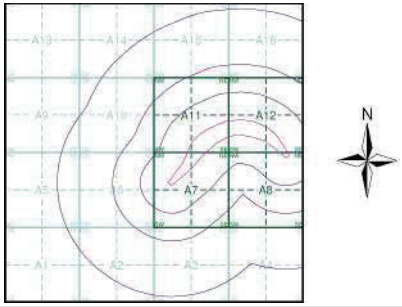
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

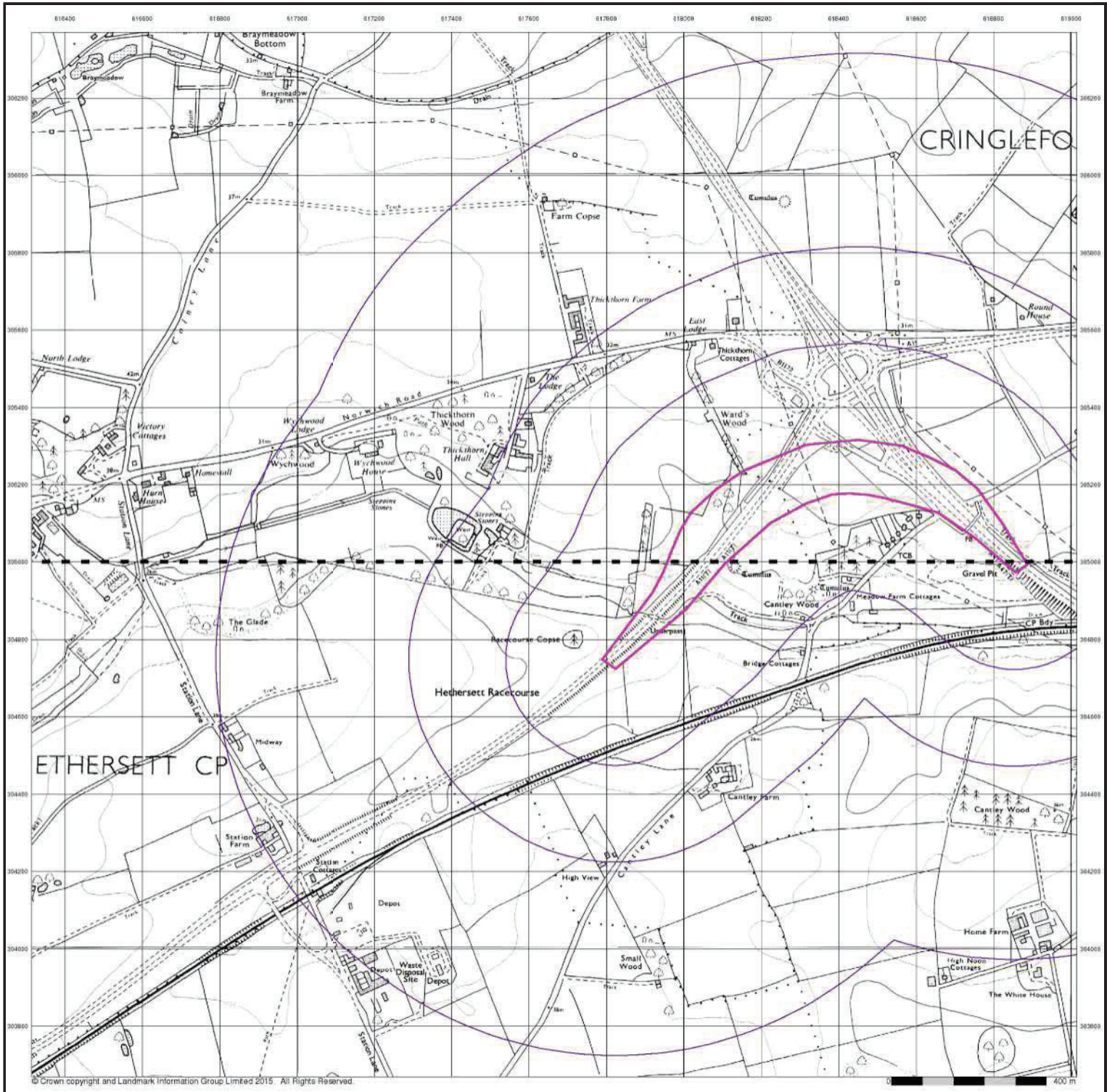
Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP

[redacted]

Web: www.envirocheck.co.uk



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LANDMARK INFORMATION GROUP®

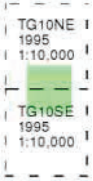
Ordnance Survey Plan

Published 1995

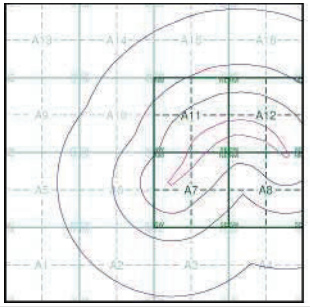
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A

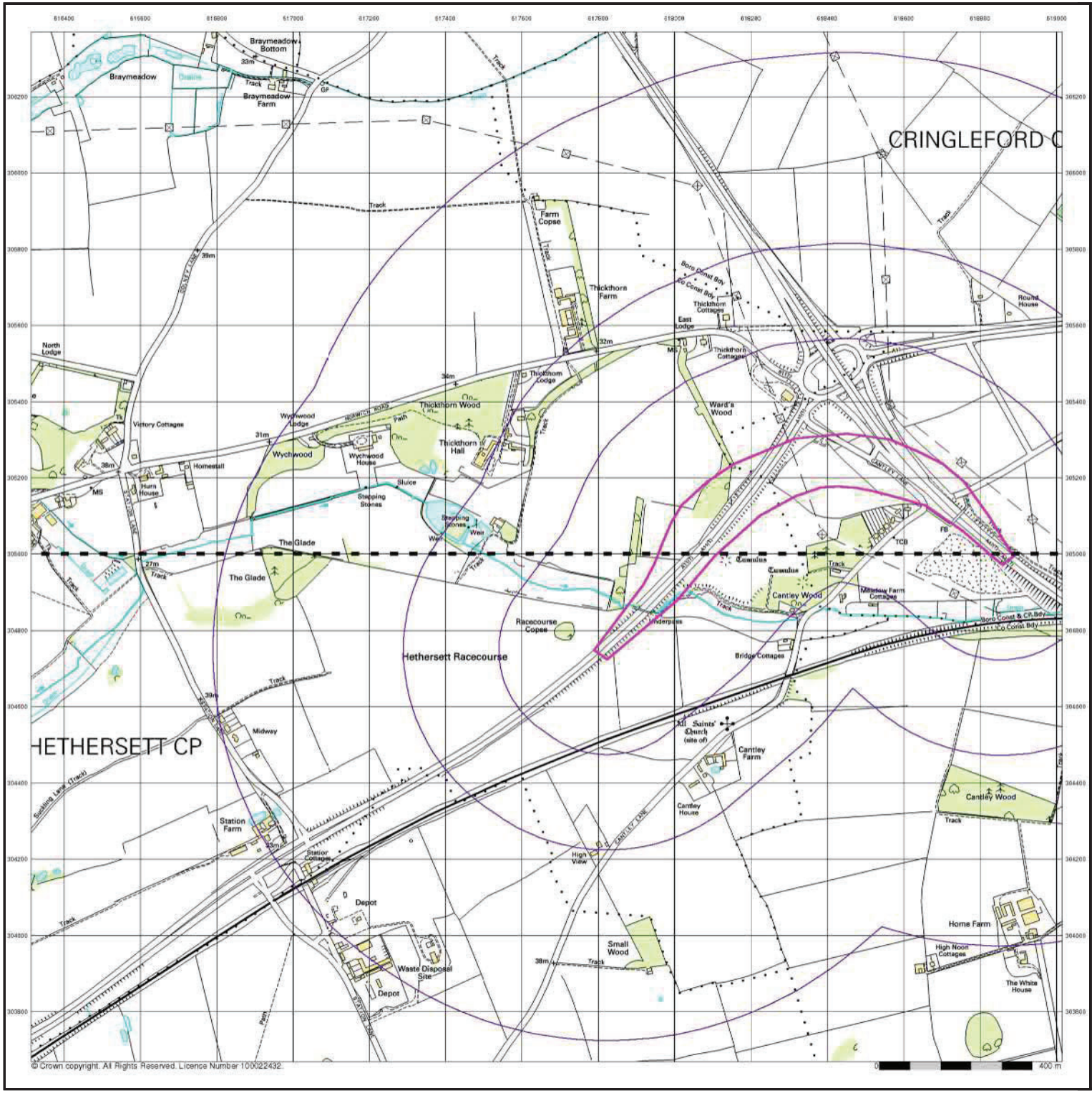


Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk



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LANDMARK INFORMATION GROUP®

10k Raster Mapping

Published 2000

Source map scale - 1:10,000

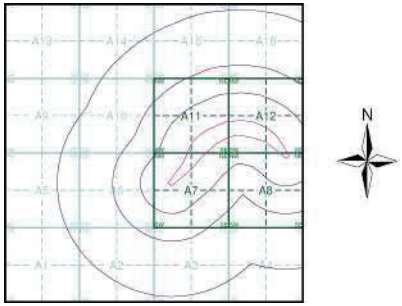
The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

TG10NE 2000 1:10,000

TG10SE 2000 1:10,000

Historical Map - Slice A



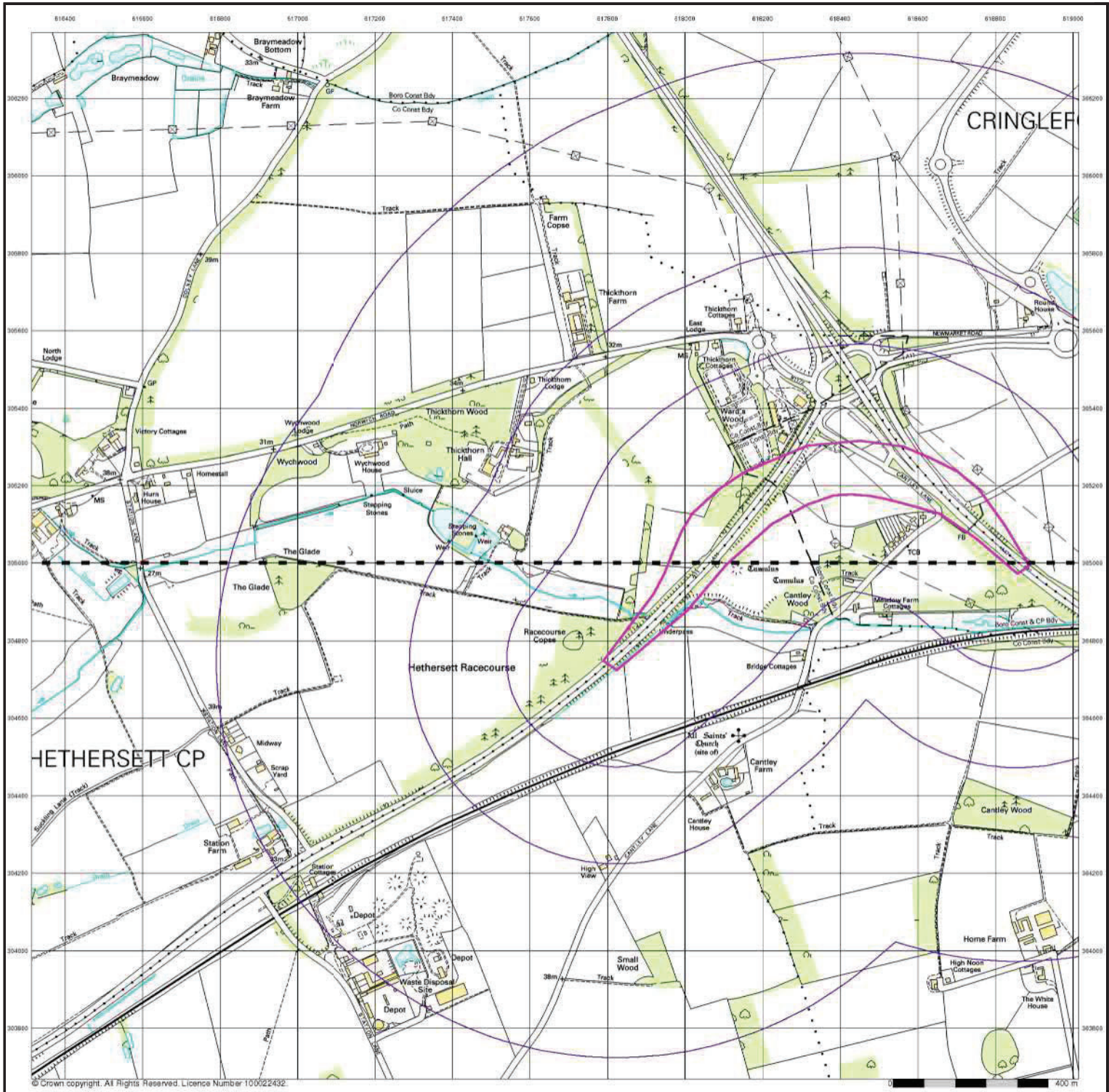
Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP



Envirocheck®

LANDMARK INFORMATION GROUP®

10k Raster Mapping

Published 2006

Source map scale - 1:10,000

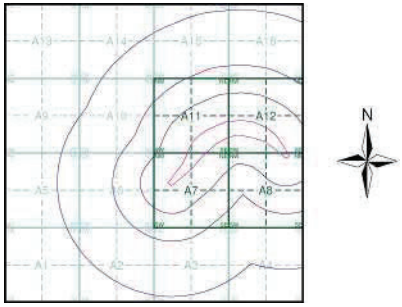
The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

TG10NE 2006 1:10,000

TG10SE 2006 1:10,000

Historical Map - Slice A



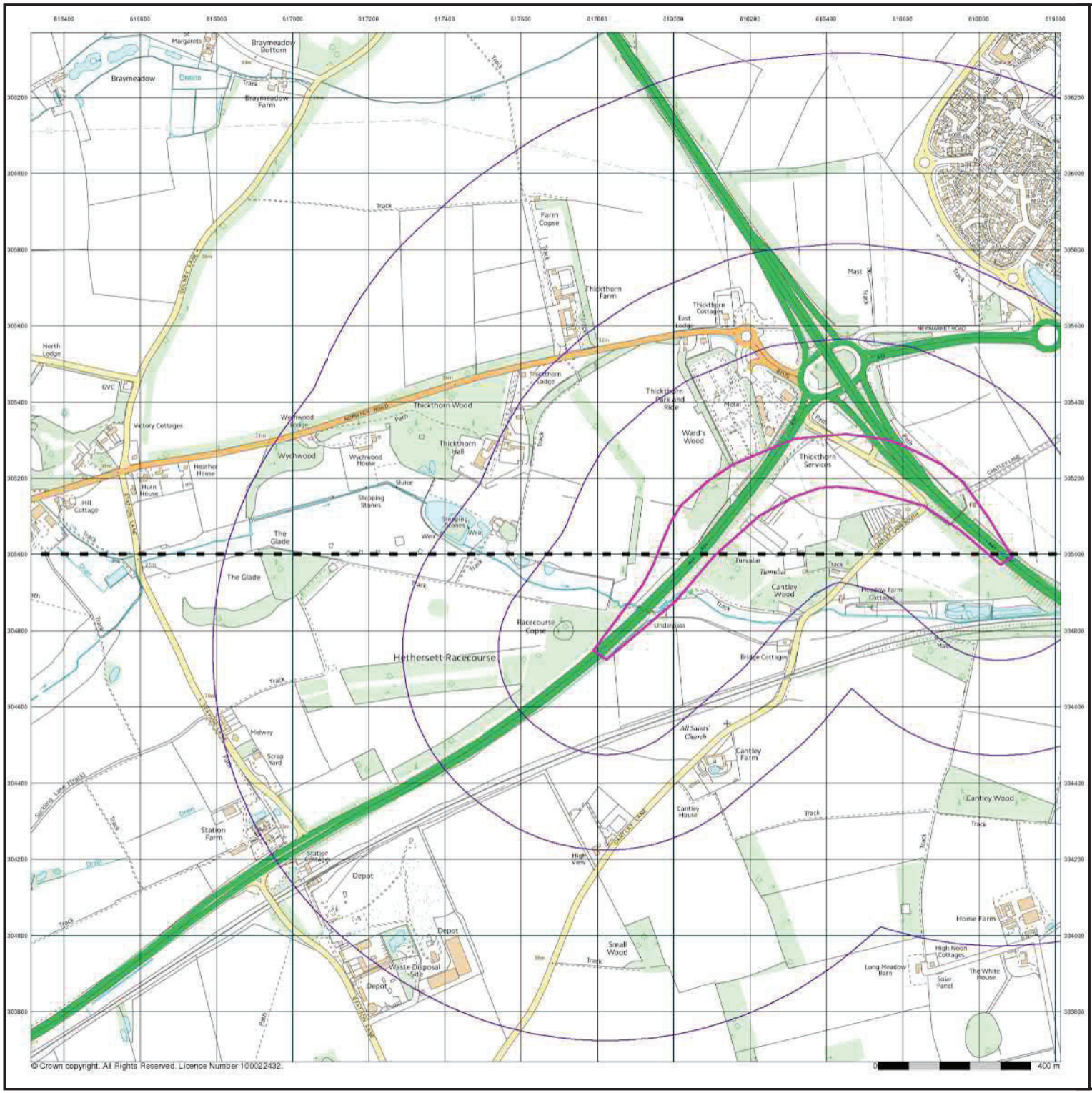
Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP



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LANDMARK INFORMATION GROUP®

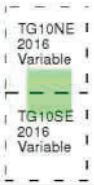
VectorMap Local

Published 2016

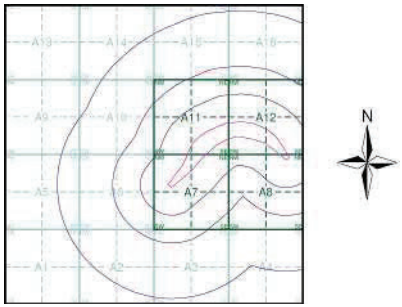
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities),1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)



Historical Map - Slice A



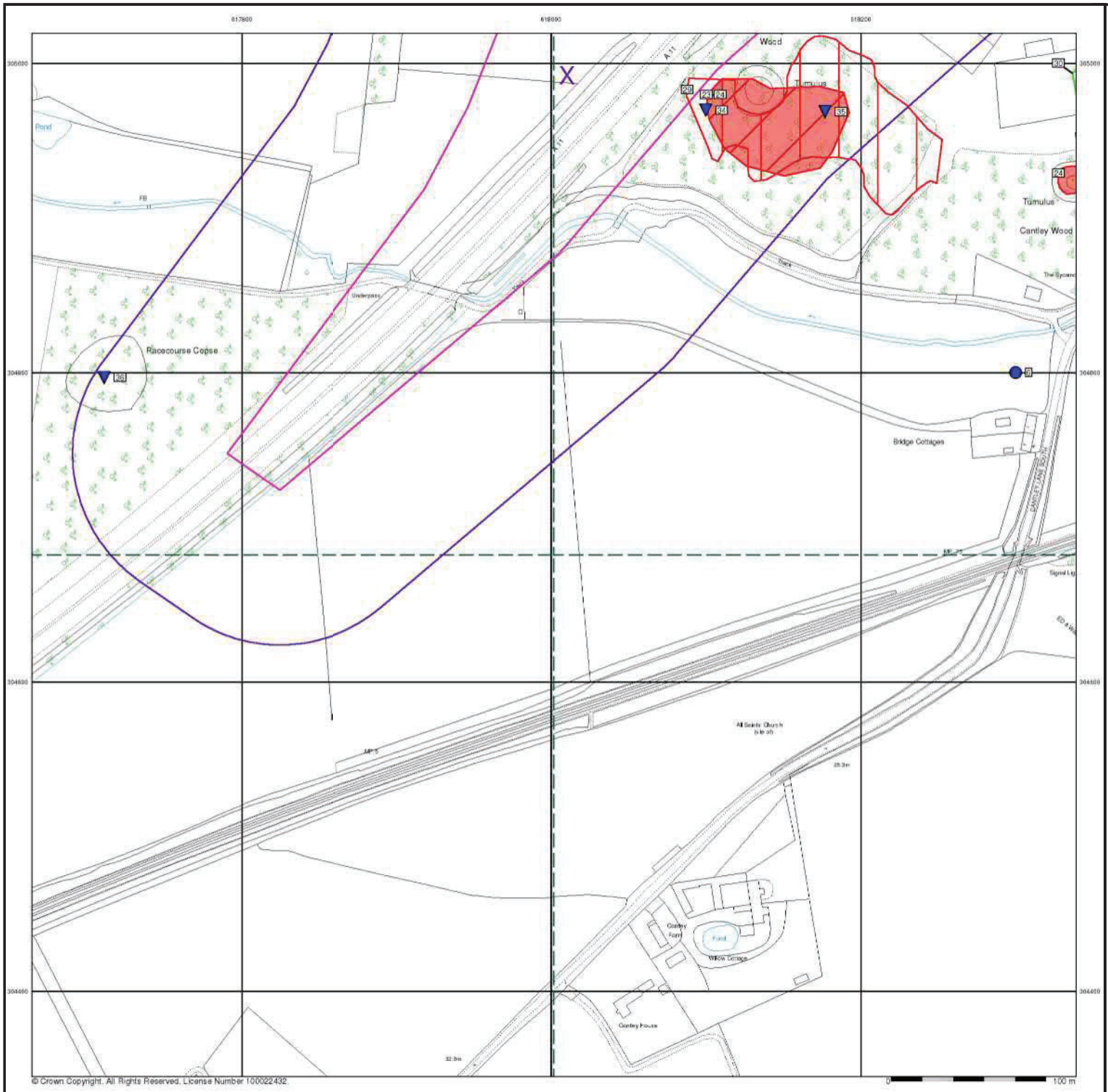
Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP



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LANDMARK INFORMATION GROUP®

General

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

Agency and Hydrological

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

Hazardous Substances

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

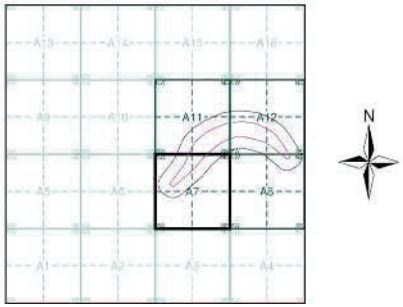
Geological

- BGS Recorded Mineral Site

Waste

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

Site Sensitivity Map - Segment A7



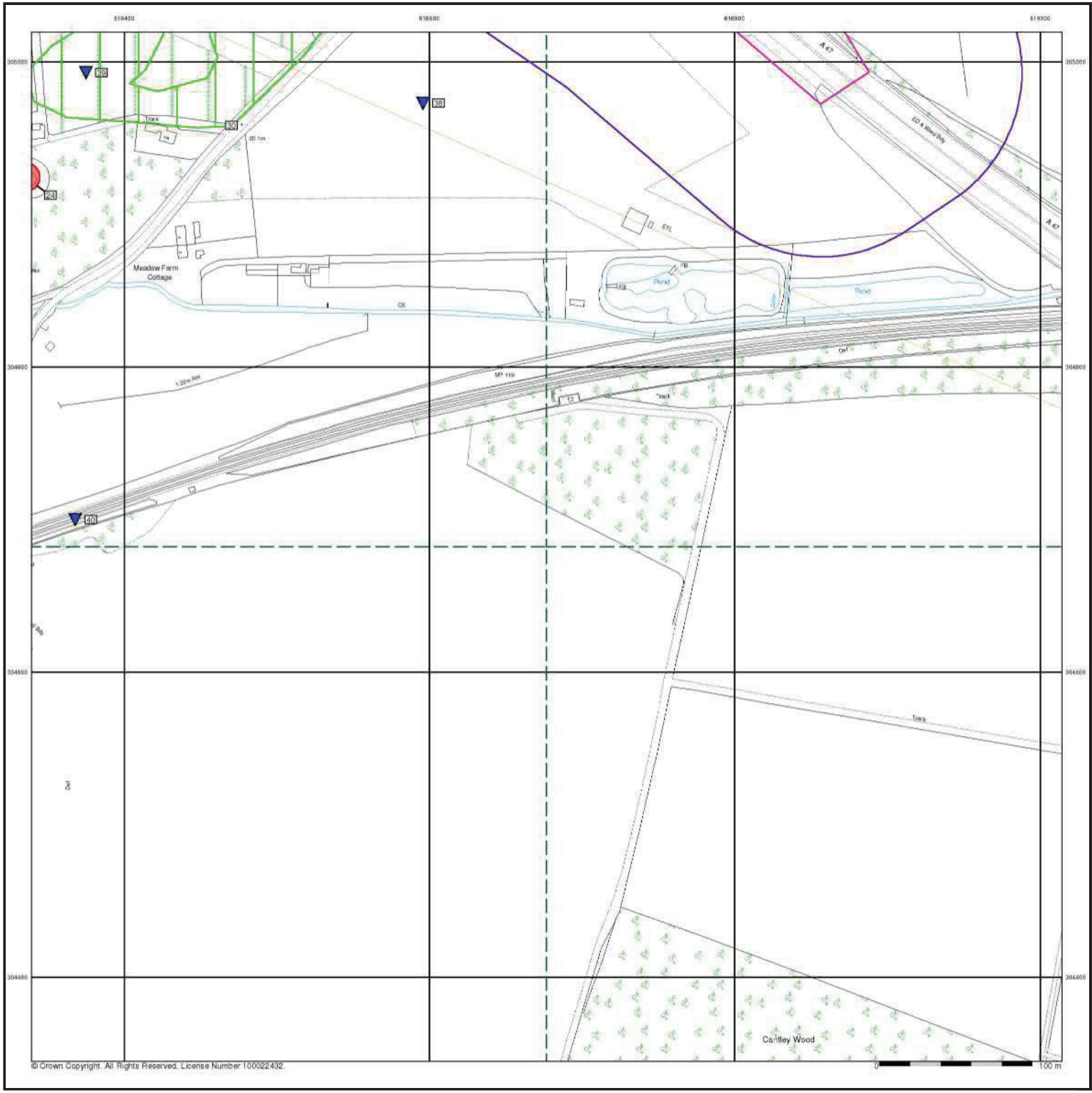
Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Plot Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

[redacted]



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LANDMARK INFORMATION GROUP®

General

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

Agency and Hydrological

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

Hazardous Substances

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

Geological

- BGS Recorded Mineral Site

Waste

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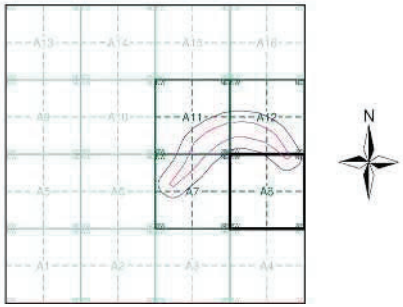
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)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

Site Sensitivity Map - Segment A8



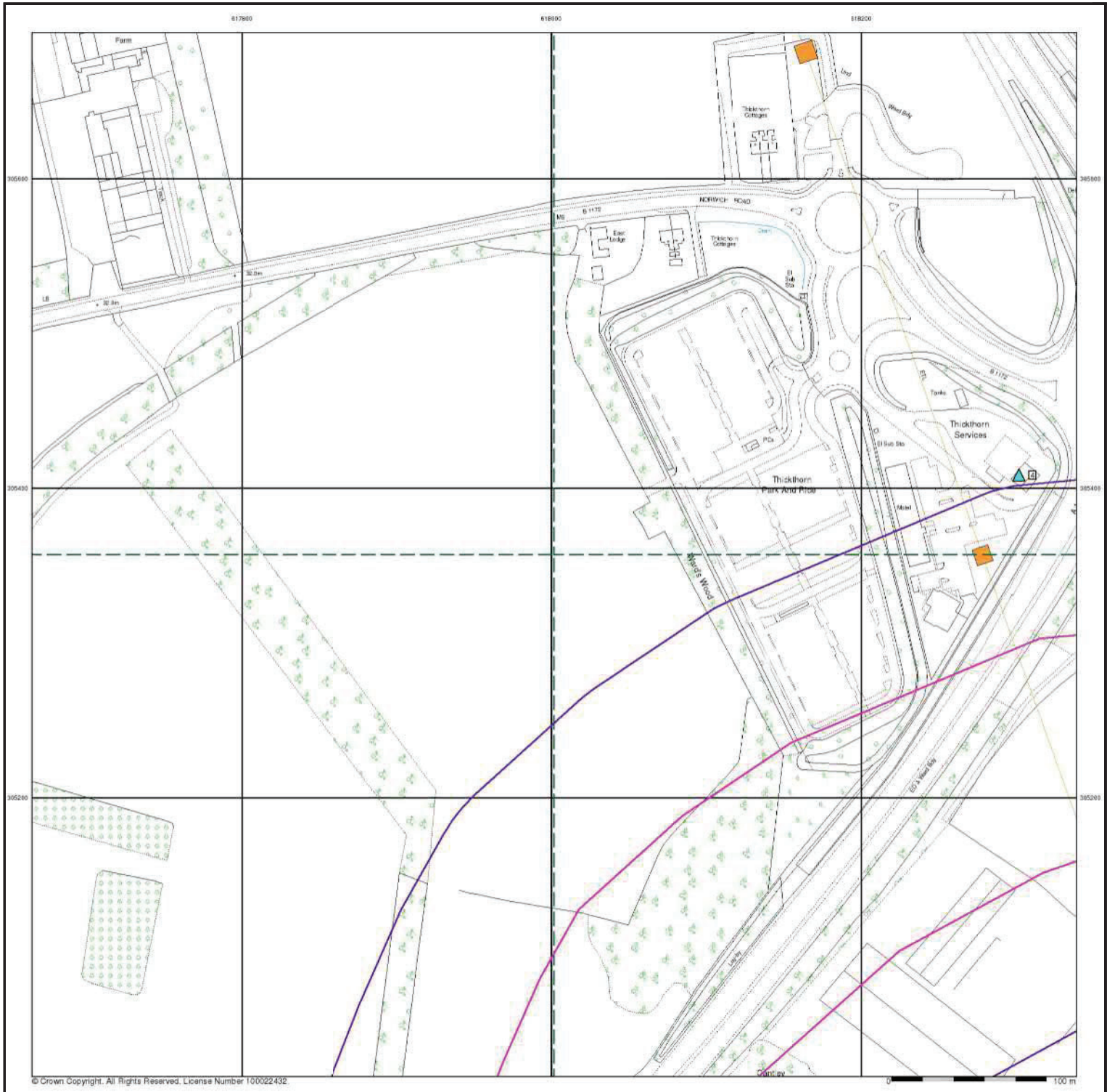
Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Plot Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP



Envirocheck®

LANDMARK INFORMATION GROUP®

General

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

Agency and Hydrological

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

Hazardous Substances

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

Geological

- BGS Recorded Mineral Site

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
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- Licensed Waste Management Facility (Location)
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- Local Authority Recorded Landfill Site
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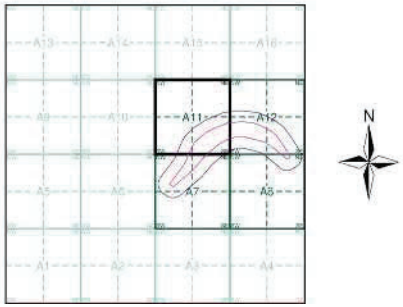
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Segment A11



Order Details

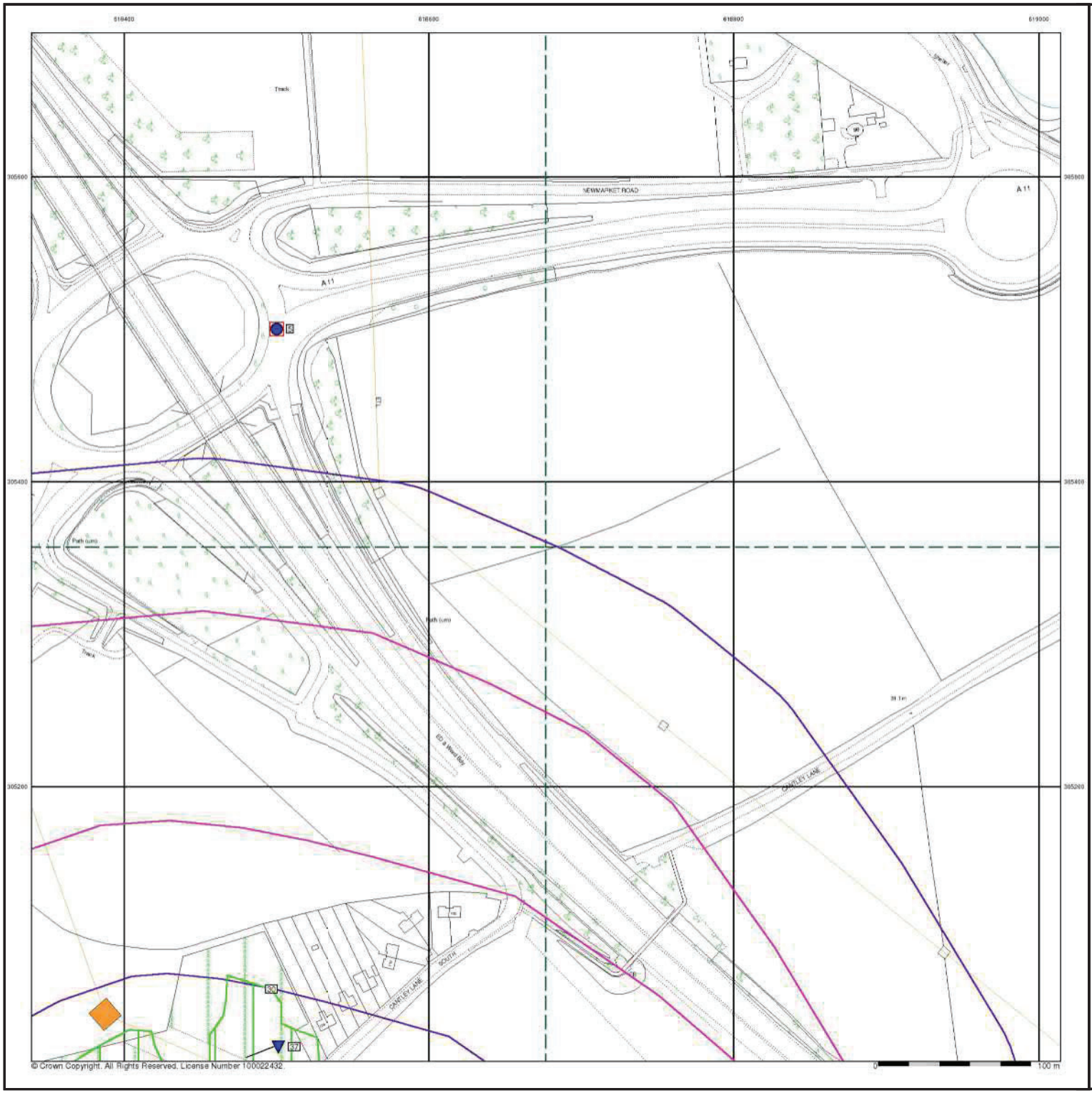
Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Plot Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP

[redacted]



Envirocheck®

LANDMARK INFORMATION GROUP®

General

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

Agency and Hydrological

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

Waste

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

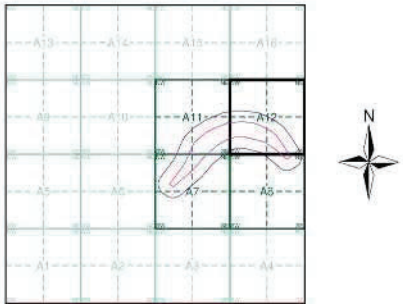
Hazardous Substances

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

Geological

- BGS Recorded Mineral Site

Site Sensitivity Map - Segment A12



Order Details

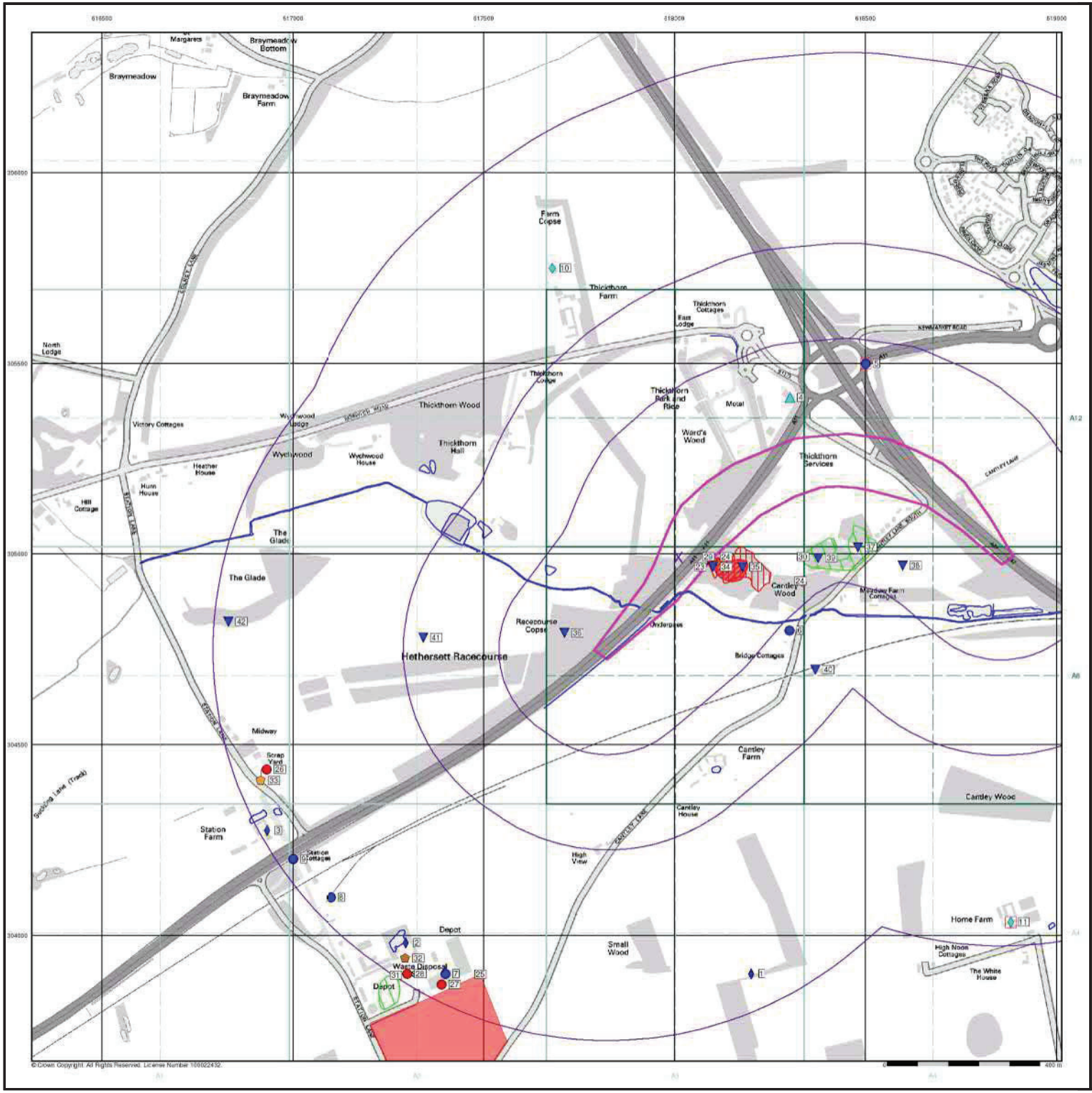
Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Plot Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP

[redacted]



Envirocheck®

LANDMARK INFORMATION GROUP®

General

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

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
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- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
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Hazardous Substances

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- Planning Hazardous Substance Enforcement

Geological

- BGS Recorded Mineral Site

Waste

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- Potentially Infilled Land (Water)
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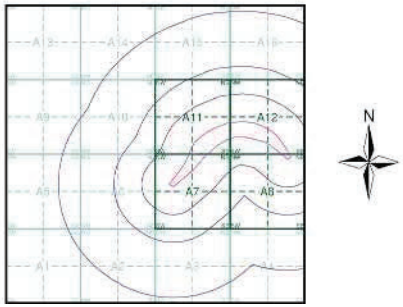
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Slice A



Order Details

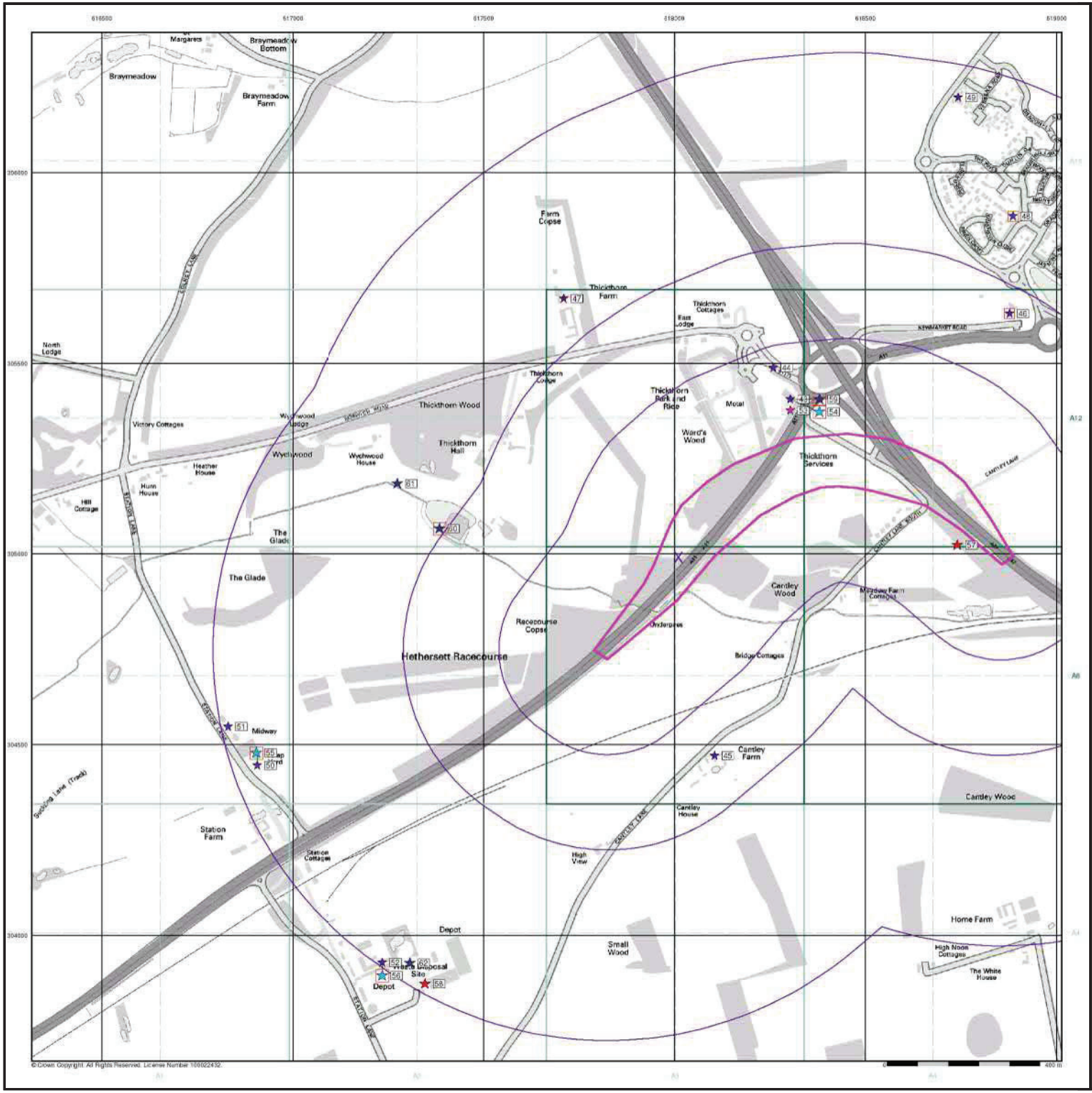
Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP

[redacted]



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Industrial Land Use Map

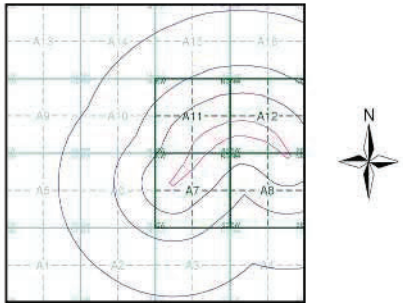
General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Industrial Land Use

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

Industrial Land Use Map - Slice A



Order Details

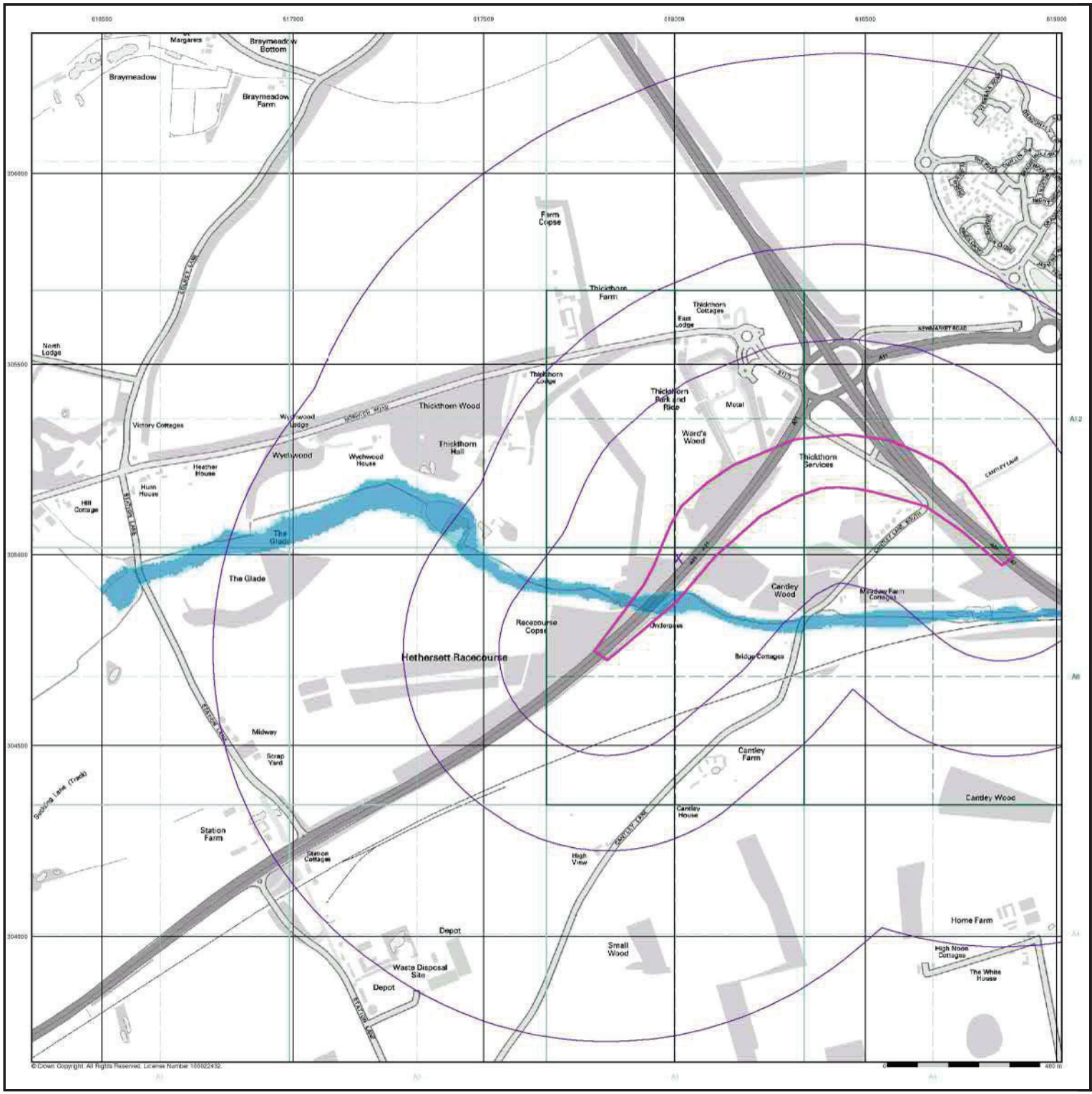
Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP

[redacted]



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LANDMARK INFORMATION GROUP®

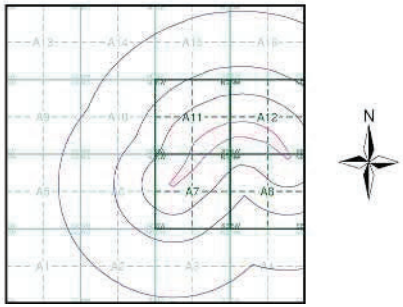
General

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

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



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Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

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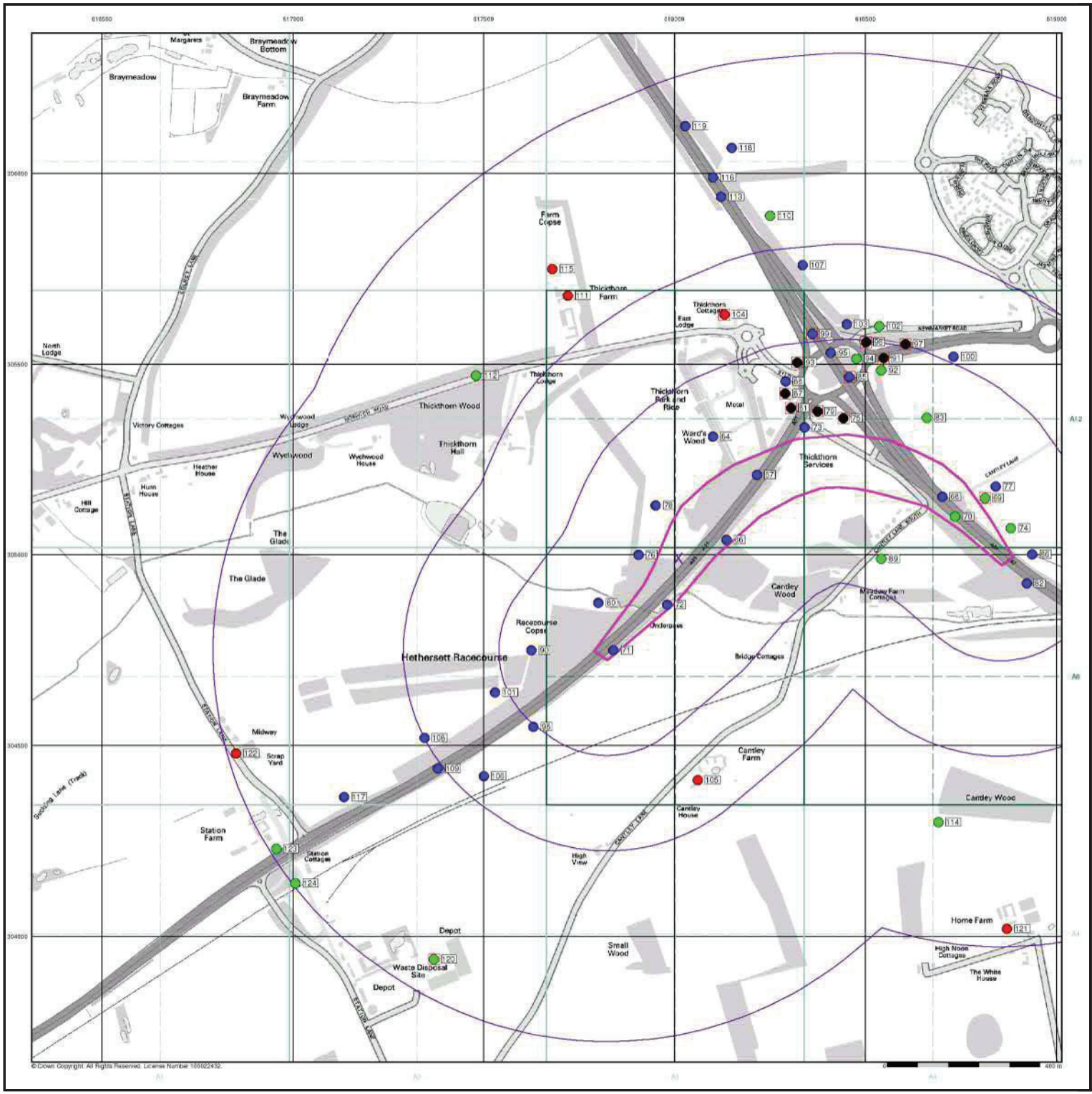

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LANDMARK INFORMATION GROUP®

General

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

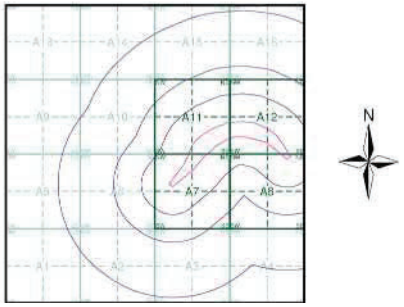
Agency and Hydrological (Boreholes)

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

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

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

Borehole Map - Slice A



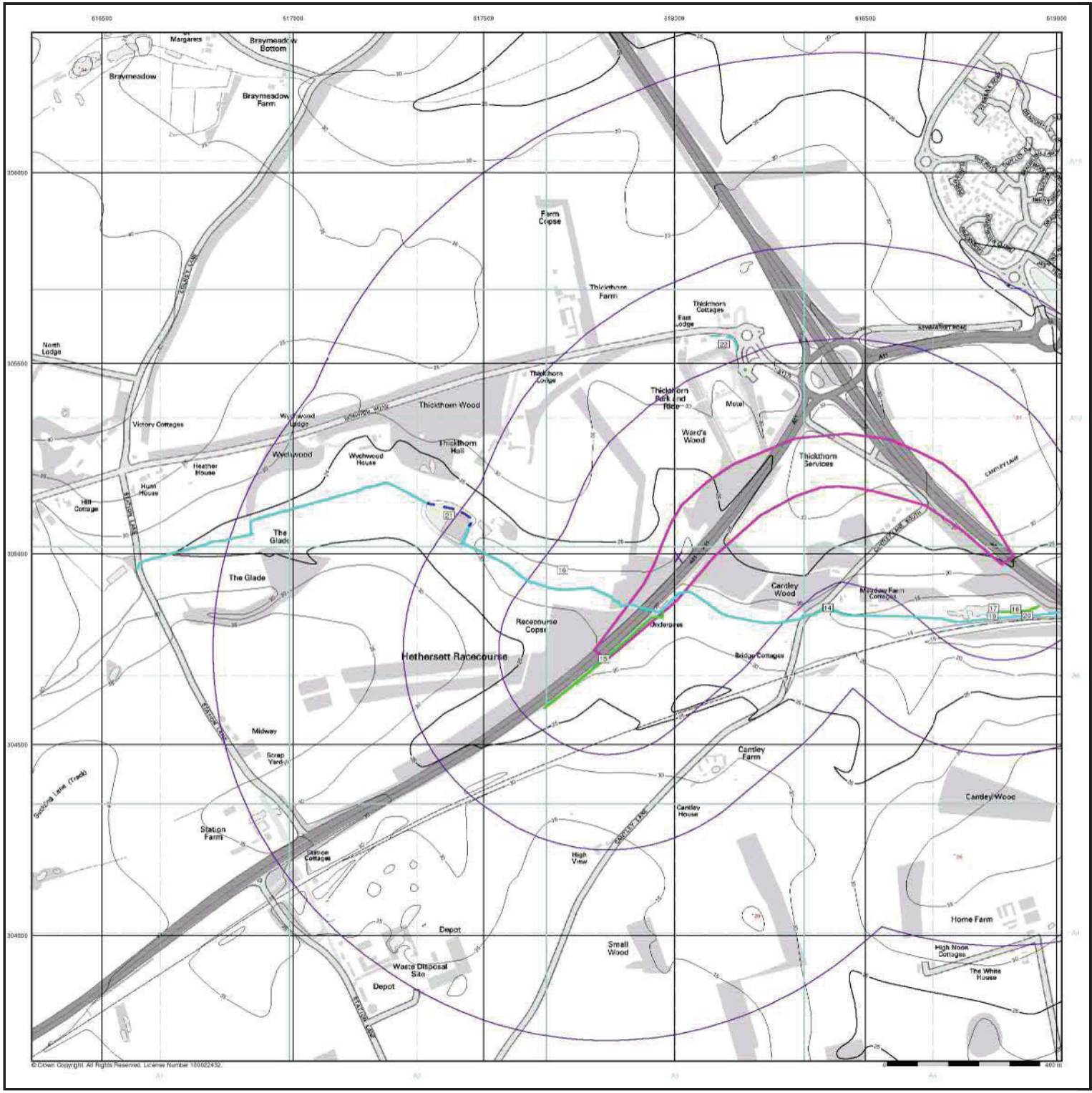
Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

[redacted]



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LANDMARK INFORMATION GROUP®

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID

Detailed River Network Data

- Primary River
- Secondary River
- Tertiary River
- Canal
- Canal Tunnel
- Undefined River
- Lake/Reservoir
- Offline Drainage Feature
- Extended Culvert (greater than 50m)
- Underground River (inferred)
- Underground River (local knowledge)
- Downstream of High Water Mark
- Downstream of Seaward Extension
- Not assigned River feature

Contours (height in metres)

Standard Contour 105 100 95

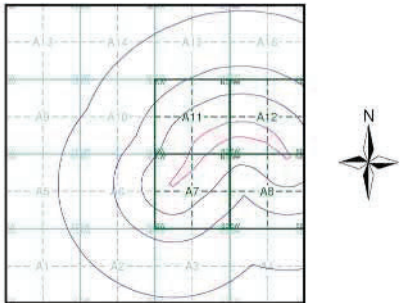
Master Contour

Spot Height 107.3

MLWS Mean Low Water

MHWS Mean High Water

EA/NRW Detailed River Network Map - Slice A



Order Details

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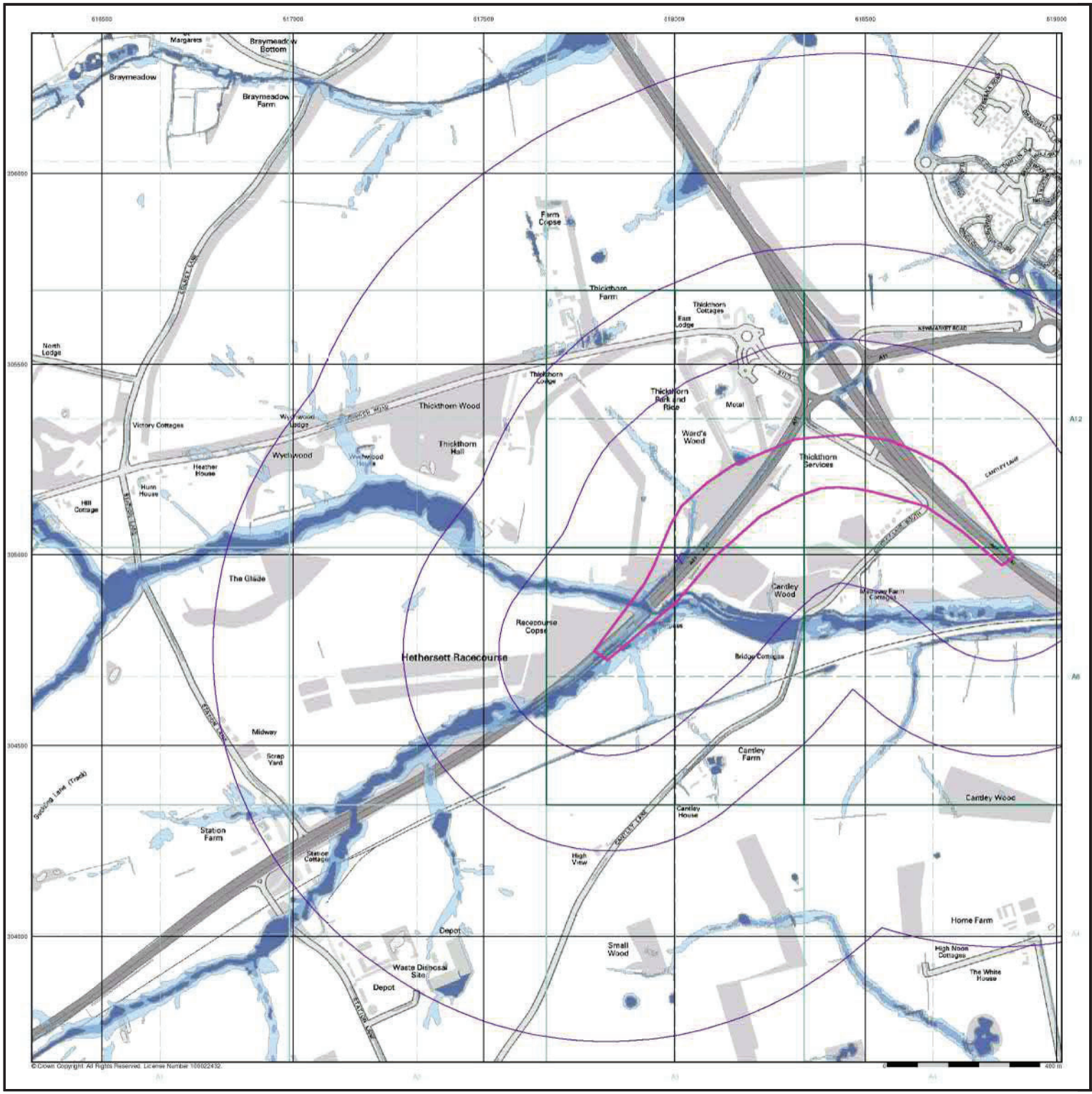
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP



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LANDMARK INFORMATION GROUP®

General

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

Risk of Flooding from Surface Water

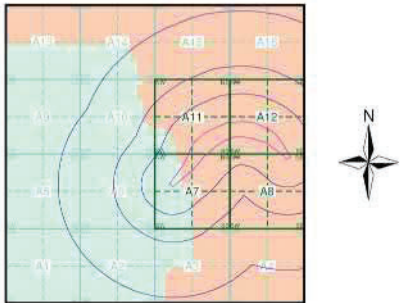
- High - 30 Year Return
- Medium - 100 Year Return
- Low - 1000 Year Return

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A



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Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP

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LANDMARK INFORMATION GROUP®

General

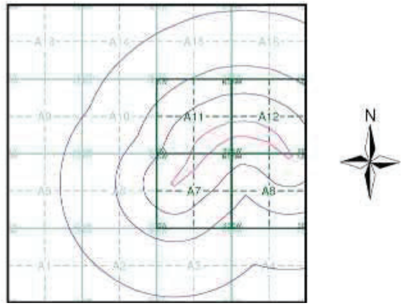
Specified Site   Specified Buffer(s)   X Bearing Reference Point

Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg

Concentration (mg/kg)
< 15
15 - 25
25 - 35
35 - 45
45 - 60
60 - 120
> 120

Estimated Soil Chemistry Arsenic - Slice A



Order Details

Order Details: 108824762_1_1
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National Grid Reference: 618010, 304990
Slice: A
Site Area (Ha): 15.75
Search Buffer (m): 1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

[redacted]

Landmark® INFORMATION GROUP

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LANDMARK INFORMATION GROUP®

General

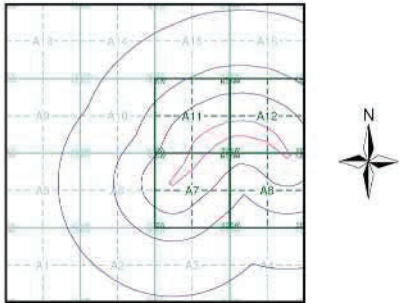
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg

- < 1.8
- 1.8 - 2.2
- 2.2 - 3.0
- > 3.0

Estimated Soil Chemistry Cadmium - Slice A



Order Details

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Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

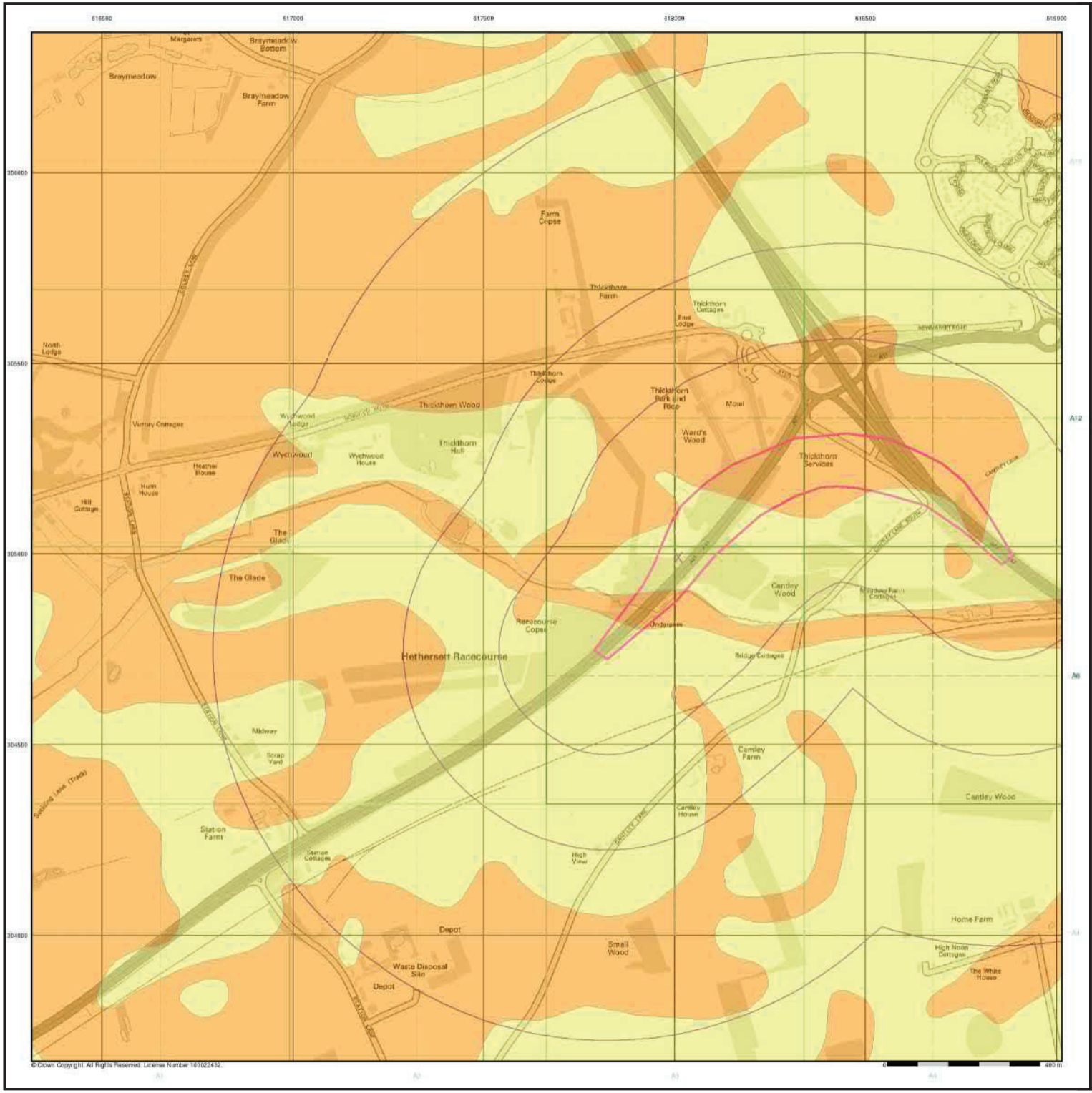
Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

[redacted]

Landmark INFORMATION GROUP

Web: www.envirocheck.co.uk



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LANDMARK INFORMATION GROUP®

General

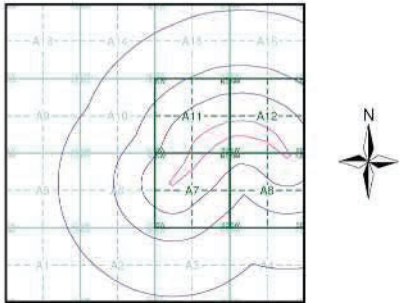
Specified Site | Specified Buffer(s) | Bearing Reference Point

Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg

- < 20
- 20 - 40
- 40 - 60
- 60 - 90
- 90 - 120
- 120 - 180
- > 180

Estimated Soil Chemistry Chromium - Slice A



Order Details

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Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP

Envirocheck®

LANDMARK INFORMATION GROUP®

General

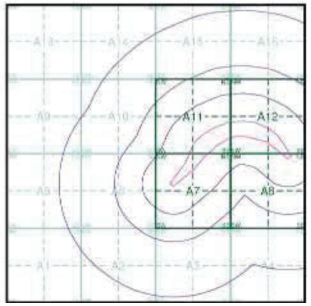
Specified Site   Specified Buffer(s)   X Bearing Reference Point

Estimated Soil Chemistry Lead

Lead Concentrations mg/kg

- <100 mg/kg
- 100 - 200
- 200 - 300
- 300 - 600
- 600 - 1200
- >1200

Estimated Soil Chemistry Lead - Slice A



Order Details

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Customer Ref: A47 Thickthorn
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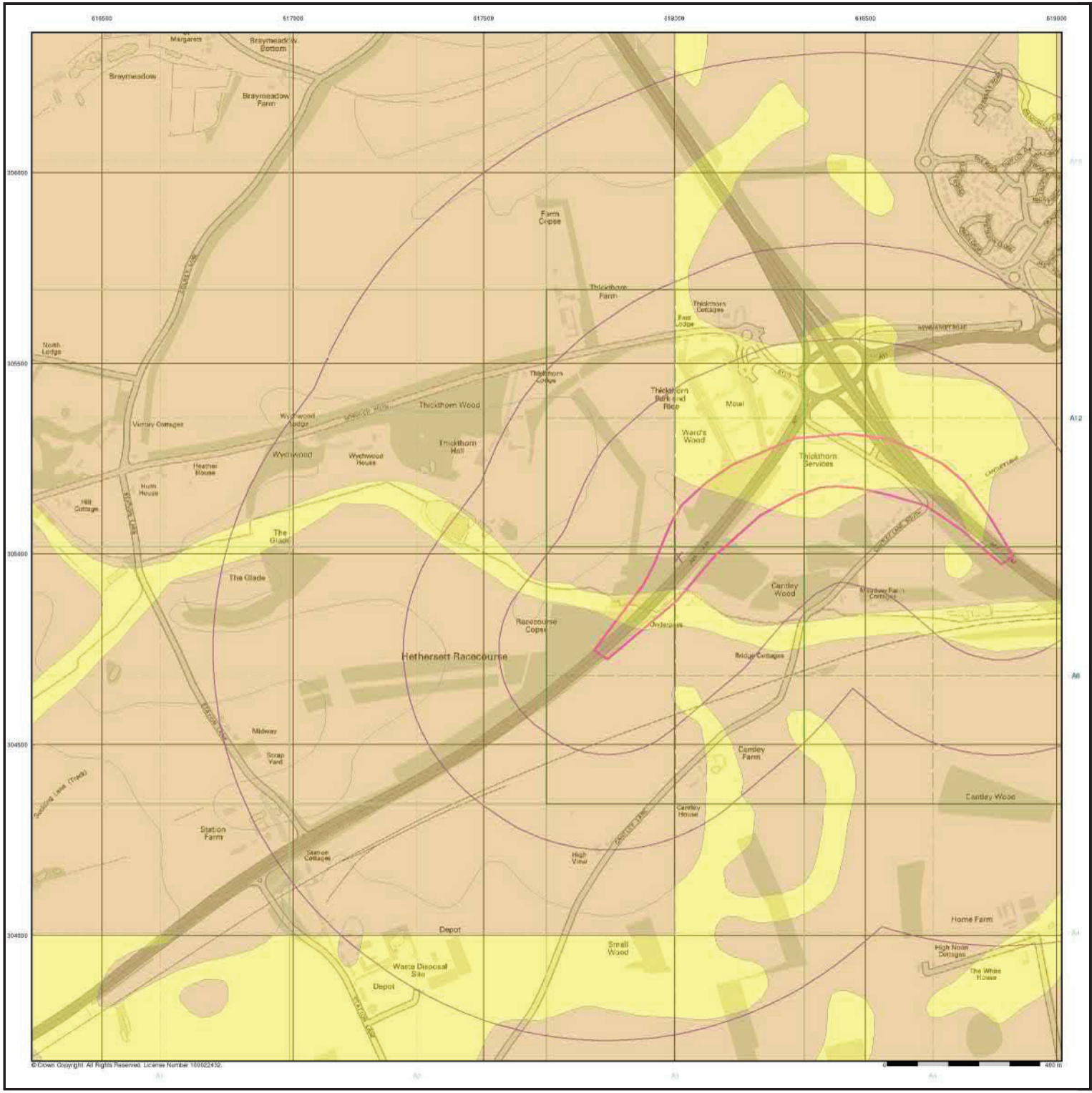
Site Area (Ha): 15.75
Search Buffer (m): 1000

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

[redacted]

Landmark® INFORMATION GROUP



Envirocheck®

LANDMARK INFORMATION GROUP®

General

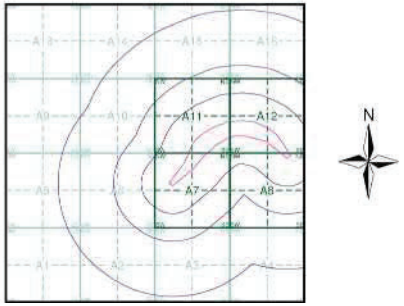
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg

- < 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 80
- 80 - 100
- > 100

Estimated Soil Chemistry Nickel - Slice A



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Search Buffer (m):	1000

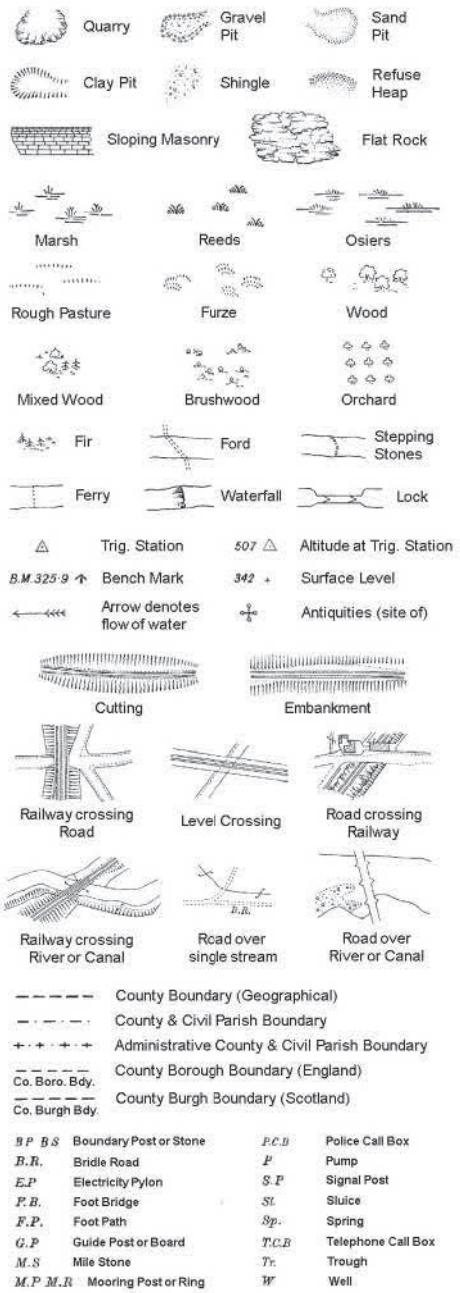
Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

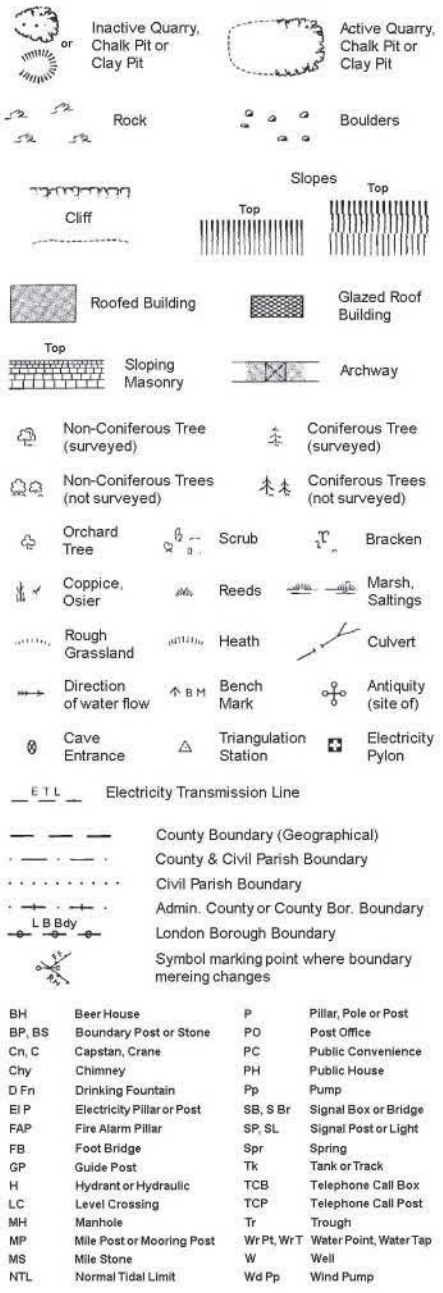
Landmark INFORMATION GROUP

Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500

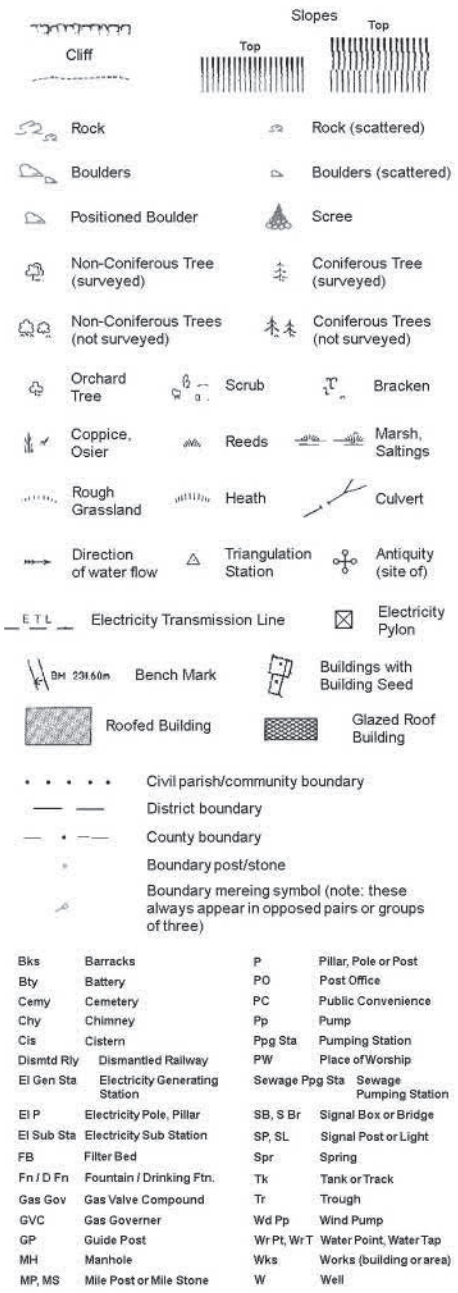


Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250



Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

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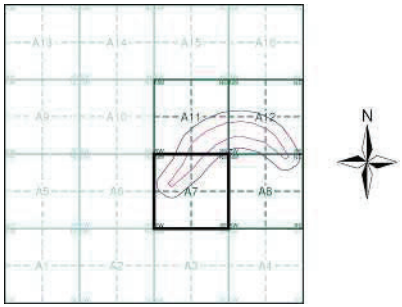
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Norfolk	1:2,500	1882	2
Norfolk	1:2,500	1907	3
Norfolk	1:2,500	1928	4
Ordnance Survey Plan	1:2,500	1966 - 1967	5
Additional SIMs	1:2,500	1966 - 1980	6
Supply of Unpublished Survey Information	1:2,500	1974	7
Additional SIMs	1:2,500	1988 - 1989	8
Additional SIMs	1:2,500	1993	9
Large-Scale National Grid Data	1:2,500	1994	10
Historical Aerial Photography	1:2,500	1999	11

Historical Map - Segment A7



Order Details

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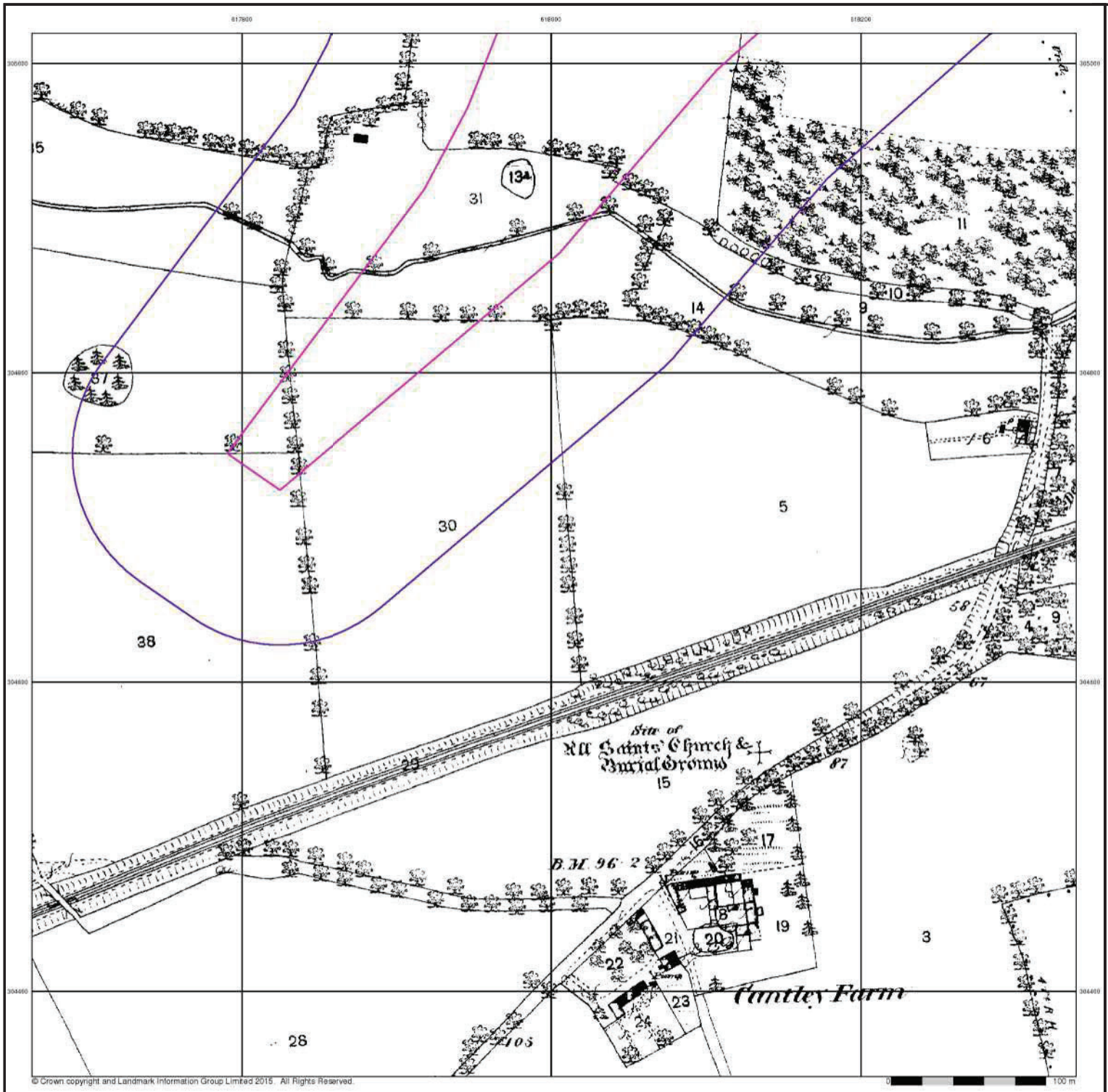
Customer Ref: A47 Thickthorn
National Grid Reference: 618010, 304990
Slice: A
Site Area (Ha): 15.75
Search Buffer (m): 100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP



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LANDMARK INFORMATION GROUP®

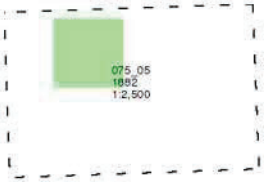
Norfolk

Published 1882

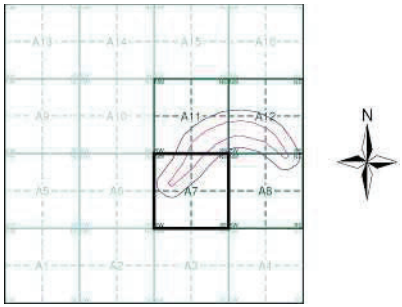
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A7



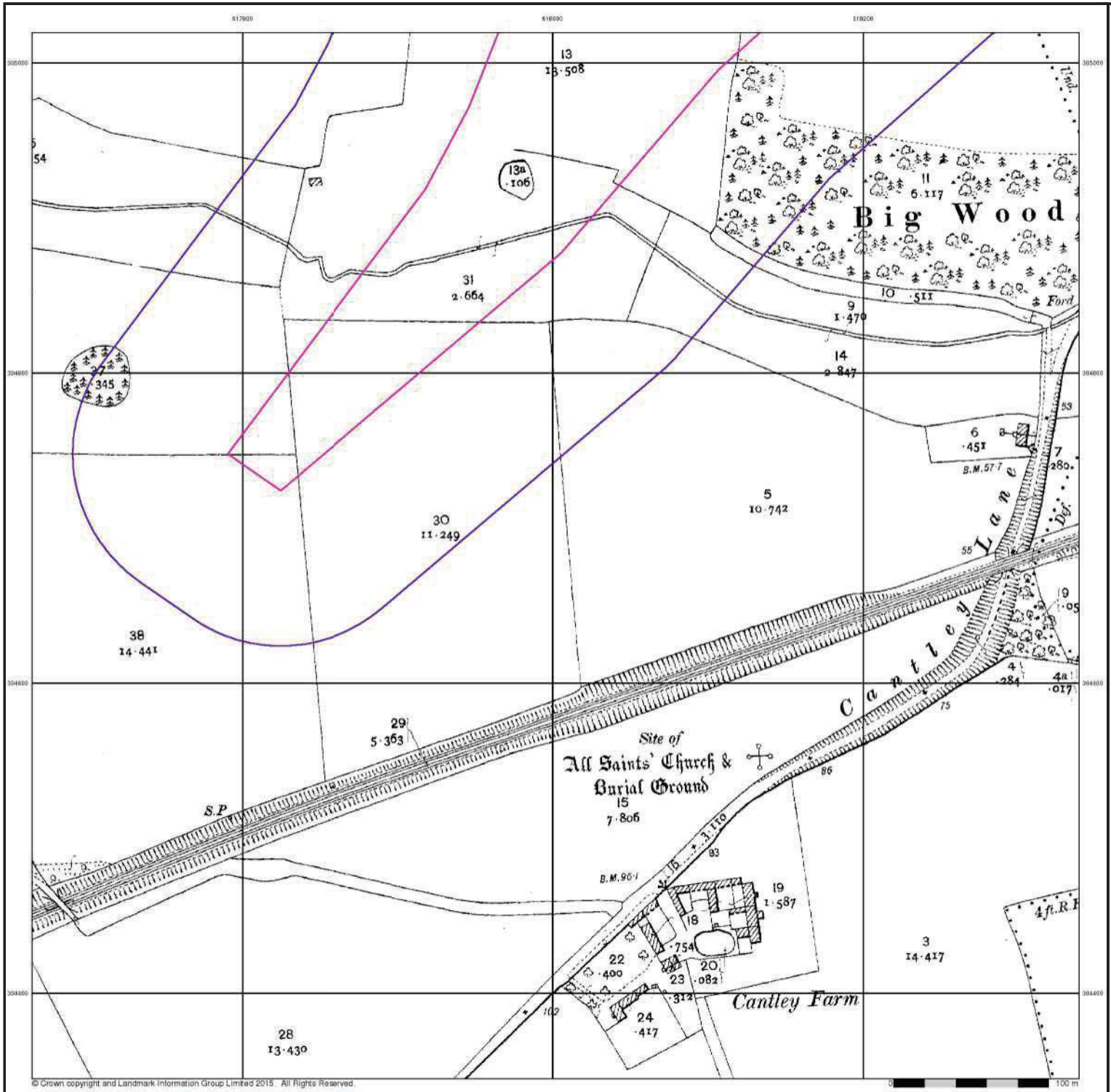
Order Details

Order Number:	108824762_1_1
Customer Ref:	A47 Thickthorn
National Grid Reference:	618010, 304990
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP



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LANDMARK INFORMATION GROUP®

Norfolk

Published 1907

Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

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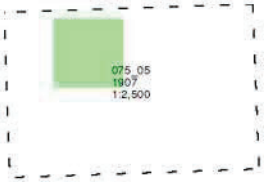
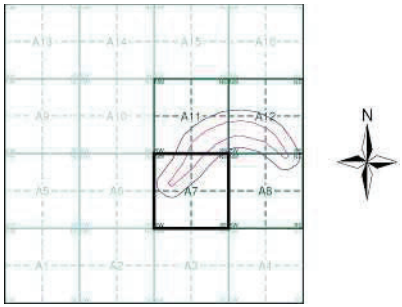


Historical Map - Segment A7



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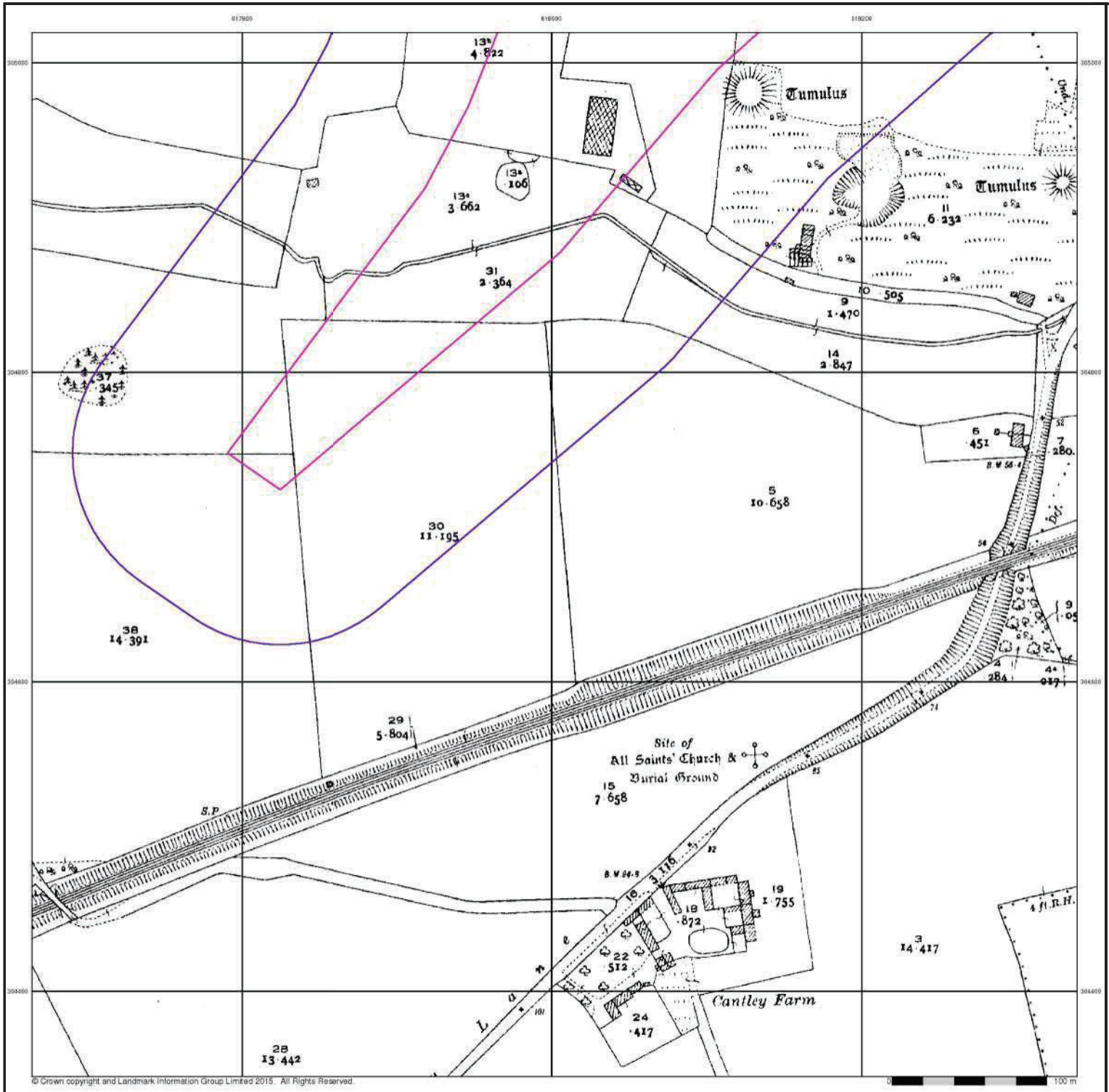
Site Area (Ha):	15.75
Search Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP



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LANDMARK INFORMATION GROUP®

Norfolk

Published 1928

Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

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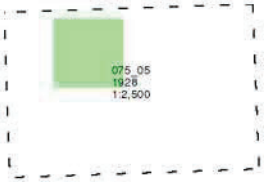
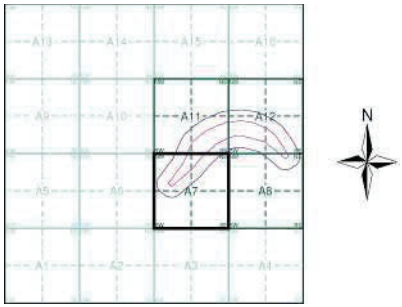


Historical Map - Segment A7



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Site Details

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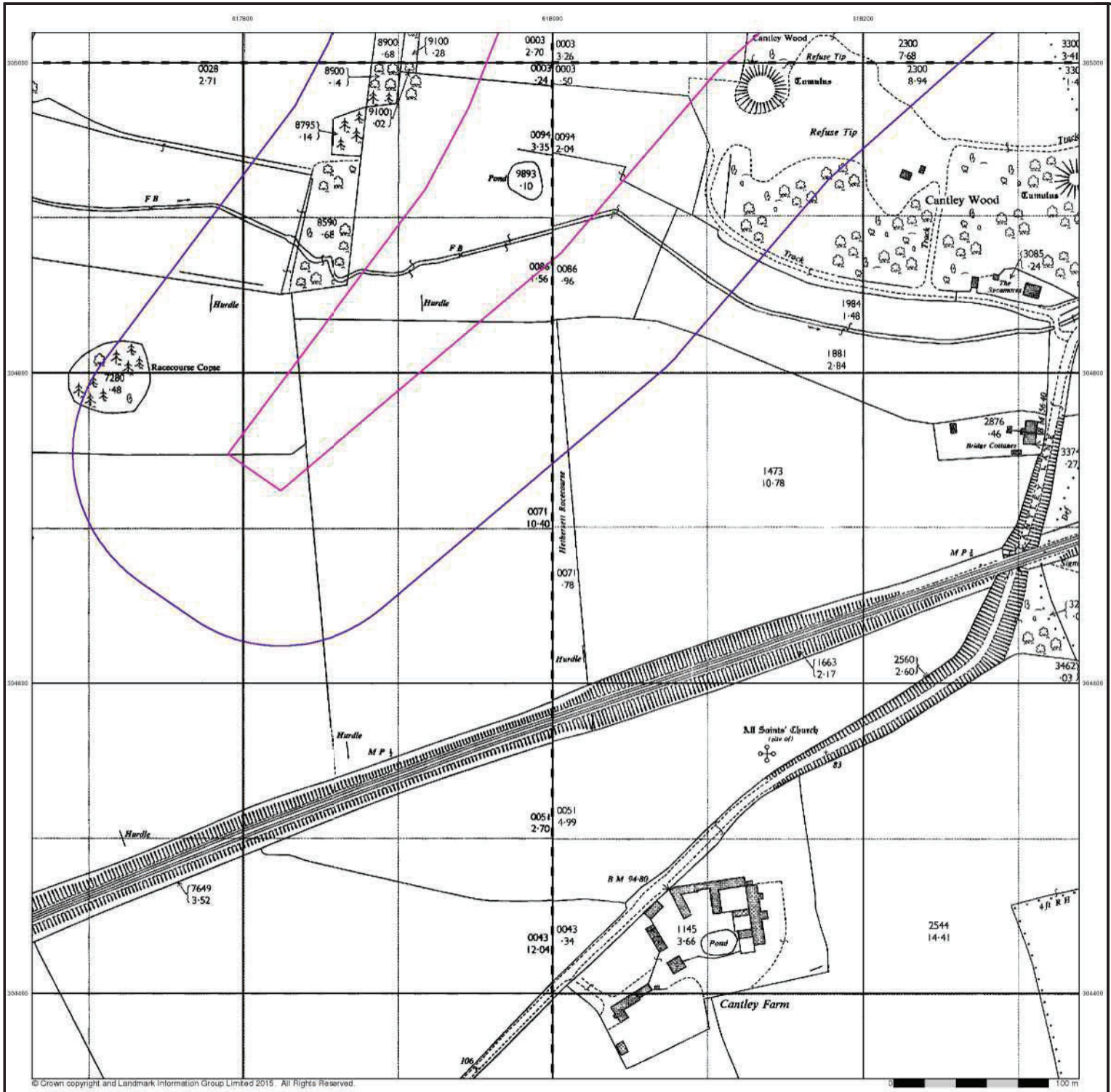
Landmark INFORMATION GROUP



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Ordnance Survey Plan

Published 1966 - 1967

Source map scale - 1:2,500

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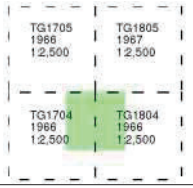
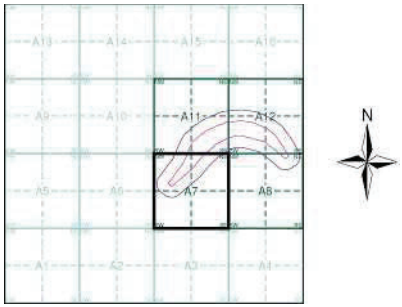
Map Name(s) and Date(s)



Historical Map - Segment A7



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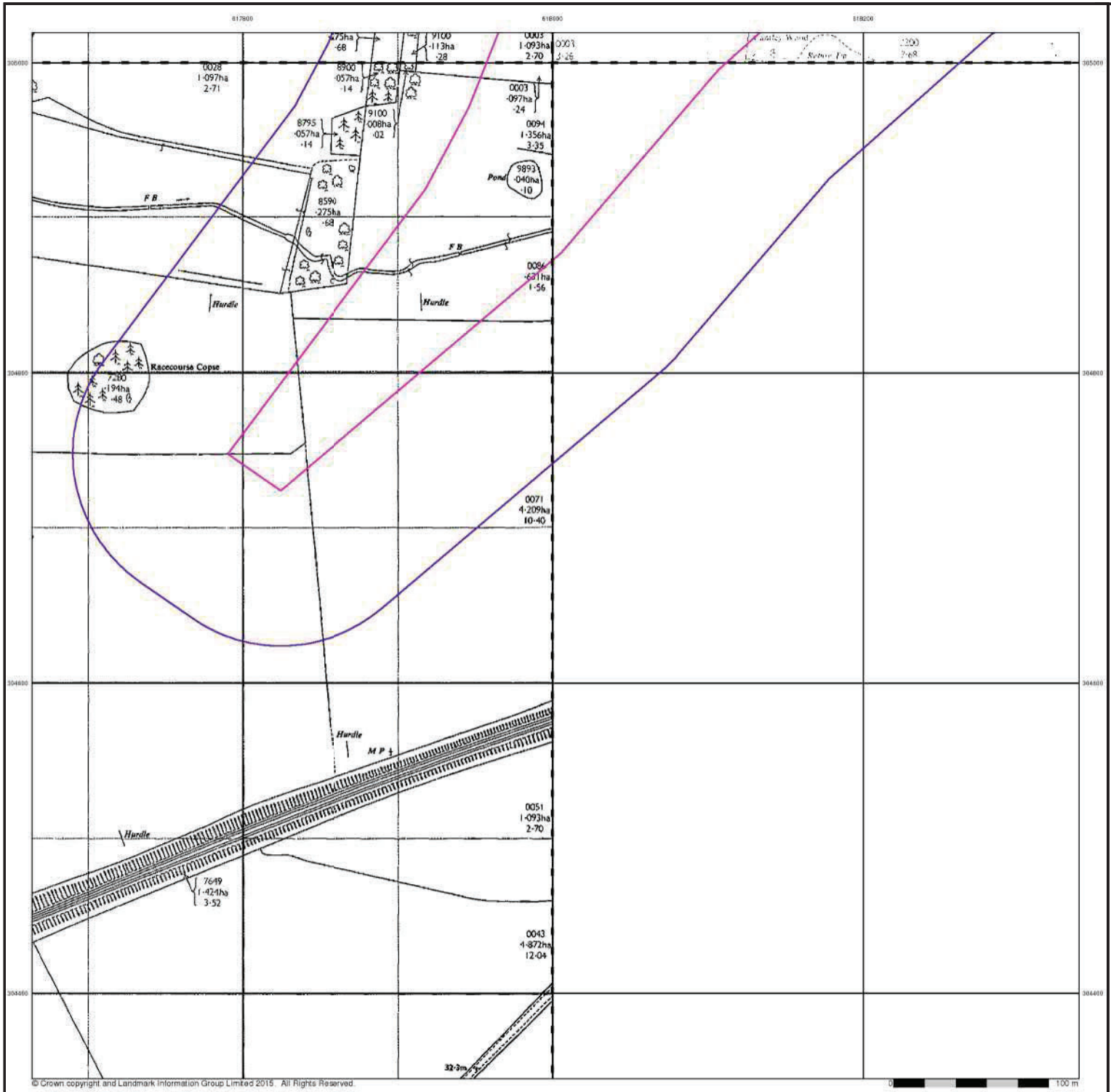
Slice:	A
Site Area (Ha):	15.75
Search Buffer (m):	100

Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

Landmark INFORMATION GROUP



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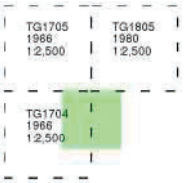
Additional SIMs

Published 1966 - 1980

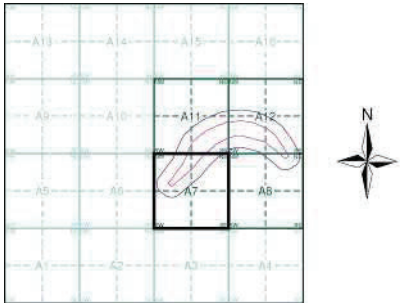
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A7



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Site Details

A47 Thickthorn Junction, Cringleford, Norfolk

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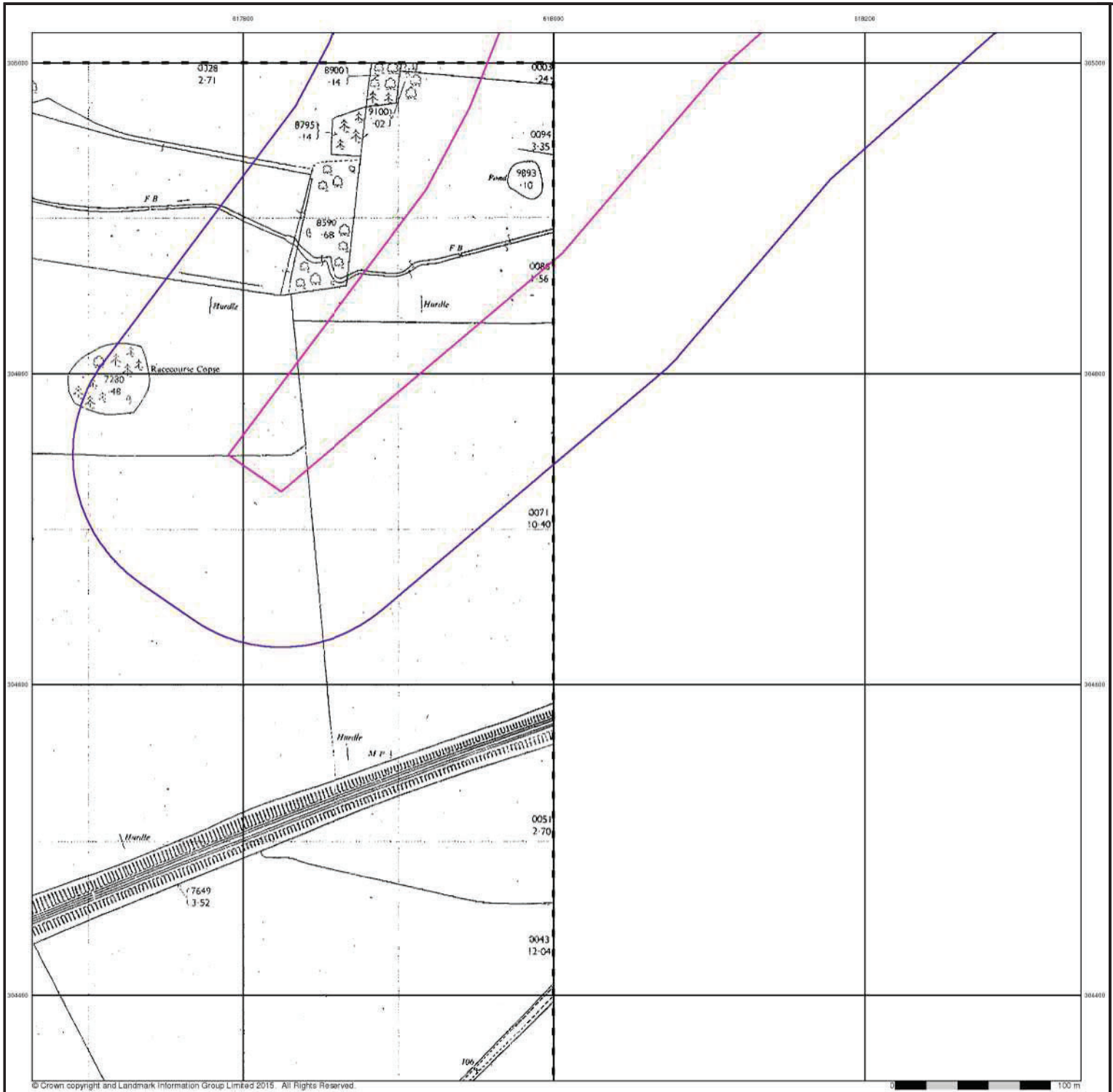

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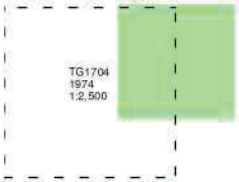
Supply of Unpublished Survey Information

Published 1974

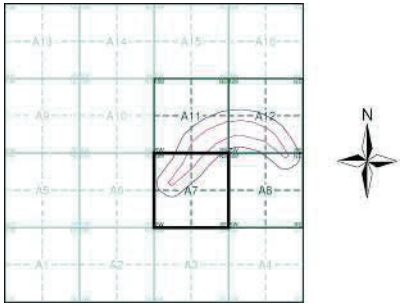
Source map scale - 1:2,500

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A7



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[redacted]