



# Dudgeon and Sheringham Shoal Offshore Wind Farm Extensions

Preliminary Environmental Information Report

**Volume 3**

**Appendix 19.1** - Land Quality Desk Study and  
Preliminary Risk Assessment Report

April 2021

Title:	
<b>Dudgeon and Sheringham Shoal Offshore Wind Farm Extensions Preliminary Environmental Information Report Appendix 19.1 Land Quality Desk Study and Preliminary Risk Assessment Report</b>	
Document no.: PB8164-RHD-ZZ-ZZ-RP-Z-0016	
Date:	Classification
29 <sup>th</sup> April 2021	Final
Prepared by:	
<b>Royal HaskoningDHV</b>	
Approved by:	Date:
<b>Jo Rodriguez, Equinor</b>	29 <sup>th</sup> April 2021

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## Glossary of Acronyms

BGS	British Geological Survey
BRE	Building Research Establishment
BS	British Standard
CIRIA	Construction Industry Research Information Association
CSM	Conceptual Site Model
CoCP	Code of Construction Price
DEFRA	Department for the Environment and Rural Affairs
DEP	Dudgeon Extension Project
EA	Environment Agency
GIS	Geographical Information System
GQRA	Generic Quantitative Risk Assessment
HDD	Horizontal Directional Drilling
HVAC	High-Voltage Alternating Current
MAGIC	Multi Agency Government Information for the Countryside
NGR	National Grid Reference
NVZ	Nitrate Vulnerable Zone
OS	Ordnance Survey
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PCL	Potential Contaminant Linkage
PEIR	Preliminary Environmental Information Report
PHE	Public Health England
PRA	Preliminary Risk Assessment
SAC	Special Conservation Area
SEP	Sheringham Shoal Extension Project
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SCOV	Semi Volatile Organic Compound
UXB	Unexploded Bomb
VOC	Volatile Organic Compound
WFD	Water Framework Directive

## Glossary of Terms

The Applicant	Equinor New Energy Limited
DCO boundary	The area subject to the application for development consent, including all permanent and temporary works for DEP and SEP. The DCO boundary will be subject to updated impact assessment and further development of mitigation proposals to inform the ES.
Dudgeon Offshore Wind Farm Extension site	The Dudgeon Offshore Wind Farm Extension lease area.
Landfall	The point on the coastline at which the offshore export cables are brought onshore and connected to the onshore export cables.
Onshore export cables	The cables which would bring electricity from the landfall to the onshore substation. 220 – 230kV
Onshore substation sites	Parcels of land within onshore substation zones A and B, identified as the most suitable location for development of the onshore substation. Two sites have been identified for further assessment within the PEIR.
Onshore Substation Zone	Parcels of land within the wider onshore substation search area identified as suitable for development of the onshore substation. Two substation zones (A and B) have been identified as having the greatest potential to accommodate the onshore substation.
PEIR boundary	The area subject to survey and preliminary impact assessment to inform the PEIR, including all permanent and temporary works for DEP and SEP. The PEIR boundary will be refined down to the final DCO boundary ahead of the application for development consent.
Sheringham Shoal Offshore Wind Farm Extension site	Sheringham Shoal Offshore Wind Farm Extension lease area.
Study area	Area where potential impacts from the project could occur, as defined for each individual EIA topic.
The Dudgeon Offshore Wind Farm Extension Project (DEP)	The Dudgeon Offshore Wind Farm Extension site as well as all onshore and offshore infrastructure.
The Sheringham Shoal Offshore Wind Farm Extension Project (SEP)	The Sheringham Offshore Wind Farm Extension site as well as all onshore and offshore infrastructure.

## 19.1 LAND QUALITY DESK STUDY AND PRELIMINARY RISK ASSESSMENT REPORT

### 19.1.1 Introduction

1. Royal HaskoningDHV has been commissioned by Equinor New Energy Limited (hereafter referred to as Applicant) to carry out a Land Quality Desk Study and Preliminary Risk Assessment (PRA). The report has been written to support the Preliminary Environmental Information Report (PEIR) for the onshore elements of the Dudgeon Offshore Wind Farm Extension Project (DEP) and Sheringham Shoal Offshore Wind Farm Extension Project (SEP). The study area for this PRA is described within **Section 19.1.6** of this report.
2. DEP and SEP will consist of a number of offshore and onshore elements including offshore wind turbines and subsea array cables, up to two offshore substations, offshore and onshore export cables, and a new area for up to two onshore substations to accommodate the connection of DEP and SEP to the transmission grid. A full description of DEP and SEP is provided within **Chapter 5 Project Description**.

### 19.1.2 Objectives

3. The objectives of the PRA are to:
  - Provide information on the current conditions of the study area with respect to land contamination;
  - Provide an initial Conceptual Site Model (CSM) to identify and assess potential contaminant linkages associated with the study area and DEP and SEP;
  - Provide recommendations for further works and assessments, if required, to quantify the potential risks, liabilities and constraints associated with the study area and the proposed DEP and SEP.

### 19.1.3 Scope of Works

4. To assist in meeting the objectives stated in **Section 19.1.2**, the scope of the report comprises:
  - Purchase and review of Envirocheck Geographical Information System (GIS) data, including historical maps to identify former land uses and potential contaminative activities within the study area;
  - A review of publicly available regulatory databases and information relating to hydrogeological features, hydrogeology, land use, ecologically sensitive areas and geology to establish the environmental setting of the study area and sensitivity of the location;
  - The development of a preliminary CSM following a source-pathway-receptor contaminant linkage approach; and
  - Provision of an outline of the environmental risks with regards to ground, groundwater and ground gas conditions, which may potentially arise as liabilities or constraints associated with the onshore elements of DEP and SEP.

### 19.1.4 Legislative Context and Guidance

5. The assessment has been undertaken in the legislative context of:

- Part 2A of the Environmental Protection Act (1990); and
  - The National Planning Policy Framework (2012).
6. The following good practice and statutory guidance was considered, and the assessment was undertaken in general accordance with:
- Environment Agency (EA) 'Land Contamination: Risk Management Framework', May 2020 (which has replaced the Environment Agency (EA) 'Model Procedures for the Management of Land Contamination', CLR11 (2004));
  - Construction Industry Research Information Association (CIRIA) 'Assessing Risks Posed by Hazardous Ground Gases to Buildings', C665 (2007);
  - British Standard 'Investigation of Potentially Contaminated Sites - Code of Practice', BS EN10175:2011;
  - Department for Environment, Food and Rural Affairs (Defra) 'Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance', PB13735 (2012);
  - British Standard 'Guidance on Investigations for Ground Gas - Permanent Gases and Volatile Organic Compounds (VOCs)' BS 8576:2013;
  - British Standard 'Code of Practice for Ground Investigations', BS 5930:2015; and
  - CIRIA 'Contaminated Land Risk Assessment - A Guide to Good Practice', C552 (2001).

### 19.1.5 Sources of Information

7. The following information sources have been reviewed to inform the PRA:
- Envirocheck GIS data comprising historical maps, environmental sensitivity data and permitting records within the study area;
  - British Geological Survey (BGS) Onshore Geindex web portal;
  - Coal Authority Interactive Map Viewer;
  - Multi Agency Government Information for the Countryside (MAGIC) map application; and
  - Public Health England UK maps of Radon.

#### 19.1.5.1 Limitations

8. At the time of writing, information relating to private water supplies held by local authorities has yet to be received and reviewed. Once the information has been received by Royal HaskoningDHV it will be reviewed and the PRA will be updated accordingly.
9. Limitations associated with this report are provided as **Annex A**.

### 19.1.6 Study Area

10. The study area is located within the County of Norfolk in East Anglia and includes part of the north Norfolk coastline, agricultural land and woodland (**Figure 19.1.1**).
11. The study area for the PRA consists of the PEIR boundary, which includes the landfall, onshore cable corridor and the substation sites. The PEIR boundary will be refined down to the final DCO boundary ahead of the application for development consent.



12. There are no settlements located within the study area, although several settlements are in close proximity including the towns and villages of Weybourne, Bodham, Attlebridge and Colton. There are a series of roads and railway lines that cross the study area.

### 19.1.7 Environmental Setting

#### 19.1.7.1 Geological Conditions

13. Information on geological conditions within the study area has been collated from the BGS datasets, including 1: 50,000 scale geological mapping, historical BGS borehole records and Envirocheck GIS data. The anticipated geological sequence, as shown on the BGS online viewer is outlined in **Table 19.1.1**. Descriptions from the BGS borehole logs is provided within **Annex B**.

*Table 19.1.1: Anticipated geology*

Stratum	Age	Unit	Description
Topsoil	-	-	Very soft to soft organic clay and peat.
Made Ground	-	-	Manmade or re-worked ground of variable description.
Superficial Deposits	Quaternary	Marne Beach Deposits	Shingle, sand, silt and clay; may be bedded or chaotic; beach deposits may be in the form of dunes, sheets or banks; in association with the marine environment.
		River Terrace Deposits	Sand and gravel, locally with lenses of silt, clay or peat.
	Holocene	Head Deposits	Poorly sorted and poorly stratified, angular rock debris and/or clayey hillwash and soil creep, mantling a hillslope and deposited by solifluction and gelifluction processes. Gravel, sand and clay depending on upslope source and distance from source. Locally with lenses of silt, clay or peat and organic material.
		Alluvium	Clay, silt, sand and gravel. Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel.

Stratum	Age	Unit	Description
	Pleistocene	Sheringham Cliffs Formation	Consists of a thick glacial sequence that contains several distinctive subdivisions varying from stratified fine-grained sands, matrix-supported diamictons, clay and sand.
		Briton's Lane Sand and Gravel Member	Horizontal, massive and low angle planar cross-bedded gravels and cobble gravels with thin seams of horizontal and rippled sand. The lithology has a distinctive high flint content (c.85-89%) of which the majority is of non-chatter marked variety (c.78-85%). The gravels also contain a wide range of far-travelled crystalline erratics including rocks of British and Scandinavian provenance.
		Weybourne Town Till Member	A highly calcareous silt and chalk-rich matrix supported diamicton.
		Lowestoft Formation	Chalky till, together with outwash sands and gravels, silts and clays. The till is characterised by its chalk and flint content.
		Happisburgh Glacial Formation	A range of diamictons, sands and gravels, sands and laminated silts and clays.
		Bacton Green Till Member	An extensive diamicton complex that consists of a stratified assemblage of stony diamicton with beds/laminae of sorted material including sand, silt and clay.
Bedrock	Pleistocene	Wroxham Crag Formation	Interbedded gravels, sands, silts and clays. The gravels are dominated by flint (up to c.80%) and by quartz and quartzite (up to c.60%).
	Cretaceous	White Chalk Subgroup (Lewes Nodular Chalk, Seaford Formation,	Chalk with flints. With discrete marl seams, nodular chalk, sponge-rich and flint seams throughout.

Stratum	Age	Unit	Description
		Newhaven Chalk Formation, Culver Chalk Formation, Portsdown Chalk Formation)	

### 19.1.7.2 Mining and Mineral Extraction

14. Information provided in the Envirocheck GIS data indicates that there has been localised underground mining of chalk and extraction of sands, gravels and clay within the study area, all have now ceased operation. There are 20 BGS records of mineral sites within the study area boundary, details of which are provided below in **Table 19.1.2** and shown on **Figures 19.1.2 – 19.1.5**.
15. A review of active extraction sites recorded on the Norfolk County Council website indicates that there are two active mineral extraction sites within the study area. Mangreen Quarry is located within the PEIR boundary surrounding the onshore substation zone, adjacent to the A140 (NGR: 622047, 303208). Ketteringham Quarry is located 215 m west of an access road to the onshore cable corridor (NGR: 617289, 302567 at its closest point).

Table 19.1.2: BGS recorded mineral sites

Site Name	Commodity	Site type	Status	National Grid Coordinates (NGR)
<b>Onshore Cable Corridor</b>				
Carvel Farm Pit (two records)	Sand and gravel	Opencast	Ceased	610425, 343423 610052, 343528
Bodham Street Pit	Clay and shale	Opencast	Ceased	613192, 339399
Walnut Farm Pit	Sand and gravel	Opencast	Ceased	613150, 339981
Manor Farm House Pit	Sand and gravel	Opencast	Ceased	613380, 336508
Ellmeldale Gravel Pit	Sand and gravel	Opencast	Ceased	613156, 329512
Bluestone Hall Marl Pit	Sand and gravel	Opencast	Ceased	614329, 326072
Bluestone Lodge Gravel Pit	Sand and gravel	Opencast	Ceased	614580, 325714
The Grange Pit	Clay and shale	Opencast	Ceased	613873, 322384
Guton Hall Pit	Clay and shale	Opencast	Ceased	613632, 320411
Breck Barn Gravel Pit	Sand and gravel	Opencast	Ceased	612123, 314073
Breck Clump Pit	Sand and gravel	Opencast	Ceased	612077, 312523
Easton Pit	Clay and shale	Opencast	Ceased	612746, 310962
Barford Pit (two records)	Sand and gravel	Opencast	Ceased	611869, 308051 611866, 308011
Barford Pit	Clay and shale	Opencast	Ceased	611818, 307908
Pockthorpe Pit	Clay and shale	Opencast	Ceased	612469, 306160

Site Name	Commodity	Site type	Status	National Grid Coordinates (NGR)
<b>Onshore Substation Area – preferred areas</b>				
Swardeston Hall Green Pit (two records)	Clay and shale	Opencast	Ceased	621029, 301968 620982, 301869

16. A review of the Coal Authority Interactive Viewer indicates that the study area is not within an area affected by coal mining activity, in that there are no recorded mine entries, abandoned mines, past coal workings (both shallow and deep) recorded within the study area.
17. The study areas contain clay, sand and gravel resources associated with the glacial deposits and chalk. A Mineral Safeguarding Area is an area designated by the Mineral Planning Authority to protect deposits of mineral resources from unnecessary sterilisation by non-mineral development. A review of the Norfolk County Council interactive Mineral Safeguarding Areas map indicates that the study area crosses several Mineral Safeguarding Area.

#### 19.1.7.3 Ground Stability

18. The ground stability hazard classification for the study area, as provided in the Envirocheck GIS data are:

##### 19.1.7.3.1 Landfall

- No hazard to very low risk of collapsible ground being encountered;
- No hazard to very low risk of compressible ground being encountered;
- No hazard to very low risk of ground dissolution being encountered;
- Very low risk of landslides;
- No hazard to moderate risk of running sands being encountered; and
- No hazard to very low risk of shrinking or swelling clay.

##### 19.1.7.3.2 Onshore Cable Corridor

- No hazard to very low risk of collapsible ground being encountered;
- No hazard to moderate risk of compressible ground being encountered;
- No hazard to high risk of ground dissolution being encountered;
- No hazard to low risk of landslides;
- No hazard to low risk of running sands being encountered; and
- No hazard to low risk of shrinking or swelling clay.

##### 19.1.7.3.3 Onshore Substation Area

- Very low risk of collapsible ground being encountered;
- No hazard of compressible ground being encountered;
- Very low risk of ground dissolution being encountered;
- Very low risk of landslides;
- Very low risk of running sands being encountered; and
- Low risk of shrinking or swelling clay.

#### 19.1.7.4 Radon Gas

19. The presence of radon gas is assessed in the UK according to the number of homes likely to be above the 'Radon Action Level' (200 becquerels per m<sup>3</sup> (Bq m<sup>3</sup>)). Under building regulations, the requirement for protection measures (described in Building Research Establishment (BRE, 2001)) in the construction of new buildings, conversions or extension is dependent on radon potential.
20. The radon potential dataset is a definitive map of 'Radon Affected Area in Great Britain and Northern Ireland', created jointly by Public Health England (PHE) and the BGS using long-term radon measurements made in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland (without affecting householders' confidentiality), combined with geological map data.
21. PHE recommends that radon level should be reduced in homes where the annual average is at or above 200Bq m<sup>3</sup>. This is termed the Radon Action Level.
22. BGS data indicate that the study area is located within a lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level), therefore no protective measures are necessary in the construction of new buildings.

#### 19.1.7.5 Unexploded Ordnance

23. An unexploded ordnance (UXO) risk map has been obtained from Zetica and is presented as **Annex C**. The map indicates that the study area is located within an area deemed as containing a low risk of UXO being encountered. The UXO risk map also indicates that there is a Luftwaffe target recorded within the onshore cable corridor, located to the west of Weybourne at approximately NGR 610434, 343318.. No additional targets were identified within 250m of the study area.

#### 19.1.7.6 Hydrogeology and Groundwater Vulnerability

24. Hydrogeological information for the study area has been collated from an Envirocheck GIS data, BGS hydrogeological maps and the Environment Agency website. Superficial and bedrock strata are classified by the Environment Agency according to their resource value and vulnerability as shown in **Table 19.1.3**.

*Table 19.1.3: Environment Agency groundwater classification*

Stratum	Unit	Class
Superficial Deposits	Marne Beach Deposits	Secondary A Aquifer
	River Terrace Deposits	Secondary A Aquifer
	Head Deposits	Secondary (undifferentiated)
	Alluvium	Secondary A Aquifer
	Sheringham Cliffs Formation	Secondary (undifferentiated)
	Briton's Lane Sand and Gravel Member	Secondary A Aquifer

Stratum	Unit	Class
	Weybourne Town Till Member	Secondary (undifferentiated)
	Lowestoft Formation	Secondary (undifferentiated)
	Happisburgh Glacial Formation	Secondary B / Unproductive Strata
	Bacton Green Till Member	Secondary B Aquifer/ Unproductive strata
Bedrock	Wroxham Crag Formation	Principal Aquifer
	White Chalk Subgroup	Principal Aquifer

25. Principal Aquifers are defined by the Environment Agency as layers of rock or drift deposits that have high intergranular and / or fracture permeability. This means they usually provide a high level of water storage. They may support water supply and / or river base flow on a strategic scale.
26. Secondary A Aquifers are defined by the Environment Agency as permeable layers capable of supporting water supplies at a local scale rather than strategic scale, and in some cases form an important source of base flow to rivers.
27. Secondary B Aquifers are defined by the Environment Agency as containing predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.
28. Secondary Undifferentiated Aquifers are defined by the Environment Agency as being assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
29. The MAGIC map application reports that the study area is located within an area of medium to high groundwater vulnerability. Areas of high groundwater vulnerability are areas that are easily able to transmit pollution to groundwater. They are characterised by high leaching soils and the absence of low permeability superficial deposits. Medium groundwater vulnerability areas offer some protection to the underlying groundwater.
30. BGS flood risk information contained within the Envirocheck GIS data indicates that the study area is located in an area with limited potential for groundwater flooding to occur at the surface. Isolated areas throughout the study area are located within areas that have the potential for groundwater flooding to occur at the surface, these are largely located adjacent to recorded rivers within the study area.
31. There are two Water Framework Directive (WFD) groundwater bodies recorded within the study area, these include the North Norfolk Chalk WFD groundwater body and the Broadland Rivers Chalk and Crag WFD groundwater body.



### 19.1.7.7 Groundwater Abstractions

32. Information provided by Environment Agency indicates the following groundwater abstractions are present within the study area:
- Seven private groundwater abstractions classified as being for domestic purposes within the PEIR boundary;
  - Six licensed abstractions (uses not reported within the information received) within 250m of PEIR boundary (all within the chalk) and one within 250m of the onshore substation area (abstraction from within the chalk);
  - 34 domestic groundwater abstractions within 250m of the PEIR boundary and four within 250m of the onshore substation area; and
  - 17 deregulated abstractions within 250m of the PEIR boundary and two within 250m of the onshore substation area.
33. Groundwater abstraction points are illustrated on **Figure 20.4** within PEIR **Chapter 20 Water Resources and Flood Risk**.

### 19.1.7.8 Groundwater Source Protection Zones

34. Groundwater Source Protection Zones (SPZs) are defined around abstraction boreholes used for potable water supply, to delineate the area where release of a contaminant into the aquifer could impact on the abstraction.
35. A large proportion of the onshore cable corridor is within a total catchment, SPZ 3 with the exception of the area between the landfall and north of the village of Weybourne and area between the villages of Matlaske and Oulton. It is likely that the SPZ is protecting groundwater within the Principal Bedrock Aquifers that underlie the study areas. No areas designated as SPZ 1 or SPZ 2 are within the study area. An area designated as SPZ 1 is recorded approximately 365m east of the onshore cable corridor near the village of Matlaske. The locations of the SPZ are illustrated on **Figures 19.1.6 – 19.1.9**.

### 19.1.7.9 Surface Water

#### 19.1.7.9.1 Hydrology and Drainage

36. Information provided in the Envirocheck GIS data indicates that seven EA main rivers are crossed by the PEIR boundary as described in **Table 19.1.4**:

*Table 19.1.4: Environment Agency main rivers with river quality.*

River	Overall Quality	Quality
Spring Beck	Not listed on the Environment Agency Catchment Explorer.	
River Bure	Poor	Ecological quality - poor Chemical quality - good
River Wensum	Moderate	Ecological quality - moderate, Chemical quality - good
River Yare	Moderate	Ecological quality - moderate, Chemical quality - good
River Tiffey	Not listed on the Environment Agency Catchment Explorer.	

River	Overall Quality	Quality
River Tud	Not listed on the Environment Agency Catchment Explorer.	

37. In addition to the larger named rivers presented in **Table 19.1.4**, there are a number of unnamed watercourses, agricultural drains and drainage channels as well as lakes and ponds too numerous to be listed individually that are located either wholly or partially within the study area.

38. The landfall area is located on the coast of the North Sea.

#### 19.1.7.10 Surface Water Abstractions

39. Information provided by Environment Agency indicates that there are four licenced surface water abstractions located within the onshore cable corridor. The use of the abstracted water is not recorded within the information received. Named surface water bodies from which abstraction takes place include the River Yare and the River Bure.

#### 19.1.7.11 Flood Risk Zones

40. Information provided in the Envirocheck GIS data indicates that the study area is within both Flood Zones 2 and 3, these areas (which contain both Zones 2 and 3) are associated with the following rivers and streams:

- River Bure;
- Swannington Beck;
- River Wensum;
- River Tud;
- River Yare;
- River Tiffey; and
- Intwood Stream.

41. There are several other areas associated within both Flood Zones 2 and 3 that are associated with unknown streams, including within the Village of Weybourne towards the North Sea.

#### 19.1.7.12 Sensitive Land Use

42. Information contained within the Envirocheck GIS data indicates that parts of the study area are located within nitrate vulnerable zones (NVZ), these areas are designated, by DEFRA and the EA, as being at risk from agricultural nitrate pollution. Within the study area, the following NVZ have been identified:

##### 19.1.7.12.1 Landfall

- Anglia Chalk (groundwater)

##### 19.1.7.12.2 Onshore Cable Corridor

- Anglia Chalk (groundwater);
- Glaven NVZ (surface water);
- Saxthorpe (groundwater);
- Bure Broads Eutrophic Lake (eutrophic water);

- Norwich Crag and Gravels (groundwater) OCC; and
- Tud NVZ (surface water).

#### 19.1.7.12.3 Onshore Cable Corridor and Onshore Substation Area

- Yare NVZ (surface water).

43. A section of the PEIR boundary bisects the River Wensum which is designated as a Special Conservation Area (SAC) and a Site of Special Scientific Interest (SSSI) due to it being an enriched, calcareous lowland river.
44. There are no additional SSSIs located within the study area, however the following designated sites are location within 250 m buffer zone of the PEIR boundary:
- Alderford Common (located adjacent to an access road of the onshore cable corridor at NGR: 613196, 318348 at its closest point), designated as a SSSI due to wide range of habitats that have developed there in response to variations in soils and topography;
  - North Norfolk Coast (located approximately 140m west of landfall at NGR: 609532, 343949 at its closest point), designated as a SSSI due to the range of coastal habitats that are present within the area representing the largest expanse of undeveloped coastal habitat in Europe;
  - Swannington Upgate Common (located approximately 200 m east of the onshore cable corridor at NGR: 614220, 318235 at its closest point, designated as a SSSI due to supporting a wide variety of habitat types within a small area.
  - Kelling Heath (located approximately 220 m west of the onshore cable corridor at NGR: 610431, 342549 at its closest point) designated as a SSSI due to the area containing the best example of a glacial outwash plain in England; and
  - Weybourne Cliffs (located immediately adjacent to the eastern edge of the 250m buffer at landfall, NGR: 611102, 343686), designated as a geological SSSI categorised as an historic site with outstanding Pleistocene section of national importance.
45. **Figures 19.1.10 – 19.1.13** illustrate the sensitive sites within the study area.

### 19.1.8 Historical Land Use and Regulatory Information

#### 19.1.8.1 Study Area History

46. Historical Ordnance Survey (OS) maps contained within the Envirocheck GIS data has been reviewed to identify potentially contaminative former land uses within the study area and a 250m buffer in order to identify potential sources of contamination that may directly impact the study area.
47. The majority of the study area is shown to comprise agricultural land and woodland from the earliest available OS maps (1883 - 1887) to date. The study area has been used for mineral extraction with multiple marl, sand and gravel pits dispersed throughout the area in the earliest available OS maps (1893 - 1897). Some of the pits are no longer shown on recent maps suggesting they may have been infilled. Bodham Street Gravel Pit is shown to have been used as a refuge tip from the 1970s.

48. The Midland and Great Northern Railway, Eastern and Midlands Railway and East Norfolk Railway lines are shown to bisect the study area from the late 1800s to date, with some of the lines shown as being dismantled on recent maps. A camp, potentially used by the military, is shown on maps from the 1950s to the 1990s to the north west of Weybourne. A sewage works is recorded from 1972 to date adjacent to a former camp in the landfall area. A second sewage works is recorded south of Colton from the 1970s to 1990s. The 1957 OS maps records a disused airfield bisecting the onshore cable corridor at Brandiston. A second disused airfield is shown to the north of Bluestone station during the same period. A small airstrip (approximately 550 m in length) is recorded on Google Earth Imagery dated 1999 onwards (images prior to this date were not available) within the onshore cable corridor. Two quarries, Ketteringham Quarry and Mangreen Quarry are recorded on the Norfolk County Council viewer for 2021. Ketteringham Quarry is located to the west of the onshore cable corridor (within 250m) and Mangreen Quarry is located within the PEIR boundary of the onshore substation area extending offsite to the south west.
49. This history of the study area and the surrounding area (250m) is described in **Table 19.1.5.**

Table 19.1.5: Historical map review

Map Dates	On-Site Features	Off-Site Features
<b>Landfall</b>		
1883 - 1887 (OS map 1:2,500 and 1:10,560)	The landfall area is predominantly coastline with agricultural land and woodland directly to the south.	Agricultural land and woodland surround the landfall study area.
1906 - 1907 (OS map 1:2,500 and 1:10,560)	No significant change.	No significant change.
1928 (OS map 1:2,500)	No significant change.	No significant change.
1929 (OS map 1:10,560)	No significant change.	No significant change.
1957 (OS map 1:10,560)	No significant change.	No significant change.
1972 (OS map 1:2,500)	No significant change.	No significant change.
1974 (OS map 1:2,500 - partial coverage)	No significant change.	Area not covered by mapping.
1979 - 1988 (OS map 1:2,500 - partial coverage)	No significant change.	No significant change.
1995 (OS map 1:10,000 - partial coverage)	No significant change.	No significant change.
<b>Onshore Cable Corridor</b>		
1883 - 1887 (OS map 1:2,500 and 1:10,560)	There are multiple small pits located throughout the onshore cable corridor. Larger pits are discussed in the sections below:	The four railway lines located within the study area continue off-site.

Map Dates	On-Site Features	Off-Site Features
	<p>A gravel pit east of Bodham (Bodham Street Gravel Pit – the corner of which is located within the onshore cable corridor, (NGR:613199, 340439).</p> <p>One gravel pit is shown to the north of Oulton, adjacent to Blickling Road (NGR 613157, 329512).</p> <p>A marl pit is located south of Bluestone Hall (NGR: 614327, 326085) and a gravel pit is located south of Bluestone Lodge (NGR:614576, 325718).</p> <p>A pit is located to the north west of the village of Weybourne (NGR: 610057, 343529). A second smaller pit is also located to the north west of the Weybourne (NGR: 610419, 343421).</p> <p>The Eastern and Midlands Railway (running north-west to south-east) is recorded as bisecting the study area (NGR 613176, 327496) with Bluestone Station recorded within the study area (NGR 614115, 326756).</p>	<p>A brick works is located approximately 60m west of the onshore cable corridor boundary to the east of the village of Cawston (NGR 614034, 323738).</p> <p>A brick works is recorded approximately 75m west of the onshore cable corridor boundary adjacent to the village of Weston (NGR 611464 315761).</p> <p>A marl pit is located south of the village of Weston, 20m for the study boundary (NGR 611352, 315507).</p> <p>The majority of Bodham Street Gravel pit is located to the immediate east of the onshore cable corridor (NGR 613199, 340439). A marl pit is located adjacent to Bodham Farm (NGR 613201, 338592), 9m north of the onshore cable corridor.</p> <p>A gravel pit is shown at NGR 613312, 329547, 74m east of the onshore cable corridor. Another pit is located approximately 110m west in the fields</p>

Map Dates	On-Site Features	Off-Site Features
	<p>A second railway line, the East Norfolk Line, Western Extension, is shown travelling on a south-west to north-east axis, bisecting the study area (NGR 614495 325100)</p> <p>The Eastern and Midland Railway is shown travelling east to west across the onshore cable corridor (NGR 613123, 317428).</p> <p>The Great Eastern Railway travelling south-west to north-east, bisects the study area near the village of Ketteringham (NGR 615396 303200)</p> <p>An L shaped building and a smaller rectangular building is recorded to the west of the village of Weybourne (NGR: 610050, 343425).</p>	<p>south of Ellmeldale (NGR 612820, 329249).</p> <p>A marl pit is located 45m north of the onshore cable corridor to the south of Morton (NGR 612474, 316172), a second is located 100m north of the onshore cable corridor (NGR 612324, 316461).</p> <p>An 'Old Gravel Pit' is located near Blackbreck Plantation (NGR 612115, 314070), 8m east of the onshore cable corridor.</p> <p>A gravel pit is located near Telegraph Hill (NGR 611634, 313471), 50m east of the onshore cable corridor.</p> <p>A sand pit is located to the north of Ketteringham, (NGR 615677, 303780), to the north of an onshore cable corridor access road.</p>

Map Dates	On-Site Features	Off-Site Features
1906 - 1907 (OS map 1: 2,500 and 1:10,560)	<p>The Eastern and Midland Railway (NGR 613123, 317428) is now recorded as the Midlands and Great Northern Joint Railway.</p> <p>The marl pit is located south of Bluestone Hall (NGR: 614327, 326085) and gravel pit south of Bluestone Lodge (NGR:614576, 325718) are no longer shown.</p> <p>Weybourne Pits are recorded adjacent to Sandy Hill Lane (NGR:611672, 341577).</p>	<p>Weybourne Station is present immediately to the north of the study area boundary (NGR 611812, 341908).</p>
1928 (OS map 1: 2,500 - Weybourne and east of Ketteringham only)	<p>A gravel pit is located to the east of Vernon Wood (NGR 617554, 303154).</p> <p>The L shaped building and smaller rectangular building are recorded as Carvel Farm.</p>	<p>No significant change.</p>
1929 (OS map 1:10,560 - partial coverage).	<p>No significant change.</p>	<p>No significant change.</p>
1952 (OS map 1:10.560)	<p>An unnamed camp, likely to be military is located to the west of Weybourne (NGR 610407 490910). The site contains more than 50 small to medium sized rectangular buildings throughout the site, possibly barracks and 16 larger rectangular and H</p>	<p>No significant change.</p>



Map Dates	On-Site Features	Off-Site Features
	<p>shaped buildings which are predominately located within the eastern half of the camp.</p>	
<p>1957 (OS map 1: 10,560)</p>	<p>Bluestone Station (NGR: 614115, 326756) is now labelled 'Bluestone Sidings'.</p> <p>A disused airfield is shown to partially extend into the onshore cable corridor north of Bluestone Sidings (NGR 614154, 1437520). A second disused airfield bisects the onshore cable corridor in Brandiston (NGR 613672 320991).</p>	<p>The disused airfield in Bluestone extends to the north east of the study area (NGR614192 326832).</p> <p>The second disused airfield at Brandiston extends beyond the study area to the east.</p> <p>A brick works recorded 60m west of the onshore cable corridor boundary to the east of the village of Cawston (NGR 614034, 323738) is now labelled as 'Works'.</p> <p>A gravel pit is shown at Grove Planation (NGR 612052, 309277) 134m west of the onshore cable corridor.</p>
<p>1970 to 1975 (OS maps 1:2,500)</p>	<p>The unnamed camp to the west of Weybourne is labelled 'disused' (NGR 610407 490910). The camp comprises multiple buildings and nine tanks. The smaller buildings that may potentially be barracks are no longer recorded.</p>	<p>The marl pit is located adjacent to Bodham Farm (NGR 613201, 338592), 9m north of the onshore cable corridor is no longer recorded.</p>

Map Dates	On-Site Features	Off-Site Features
	<p>A sewage works is shown north of Weybourne (NGR: 610833, 343615).</p> <p>The Midland and Great Northern Joint Railway in the north of the study area (NGR 612556, 342760) is now labelled 'North Norfolk Railway'.</p> <p>The marl pit to the east of Weybourne (NGR: 611394, 343051) is labelled 'disused'.</p> <p>The Eastern Midlands Railway line is recorded as a dismantled railway, Bluestone station is still labelled.</p> <p>'The Midlands and Great Northern Joint Railway is no longer active and labelled 'Marriott's Way'.</p> <p>The gravel pit east of Vernon Wood (NGR 617554, 303154) is no longer show.</p>	<p>The gravel pit shown at Grove Planation (NGR 612052, 309277) 134m west of the onshore cable corridor is recorded as disused.</p> <p>The gravel pit located approximately 110m west in the fields south of Ellmeldale (NGR 612820, 329249) is labelled as disused.</p> <p>The gravel pit located near Telegraph Hill (NGR 611634, 313471), 50m east of the onshore cable corridor, is no longer recorded.</p> <p>The gravel pit (Bodham Street Gravel Pit); to the immediate east of the onshore cable corridor (NGR:613199, 340439) is now labelled 'refuse tip'.</p> <p>The marl pit located 45m north of the onshore cable corridor to the south of Morton (NGR 612474, 316172), is no longer recorded.</p>

Map Dates	On-Site Features	Off-Site Features
		<p>The 'Old Gravel Pit' located near Blackbreck Plantation (NGR 612115, 314070), 8m east of the onshore cable corridor is no longer shown.</p> <p>The sand pit located to the north of Ketteringham, (NGR 615677, 303780), to the north of an onshore cable corridor access road is no longer shown.</p> <p>A filling station is recorded 228m north east of the Onshore Cable Corridor boundary to the west of Ketteringham (NGR 614287 303790).</p> <p>An electrical substation is recorded approximately 38m south of the end of the onshore cable corridor (NGR 620740, 301227).</p> <p>The brick works recorded approximately 75m west of the onshore cable corridor boundary, adjacent to the village of Weston (NGR 611464 315761) is no longer shown.</p>

Map Dates	On-Site Features	Off-Site Features
		<p>The marl pit south of the village of Weston, 20m from the study area boundary (NGR 611352, 315507) is now shown to be a pond.</p> <p>A sewage works is shown in the village of Swardeston, 166m north east of onshore cable corridor (NGR 619628, 302705).</p> <p>The brick works recorded 60m west of the onshore cable corridor to the east of the village of Cawston (614034, 323738) is no longer shown.</p>
1974 (OS map 1:2,500 - partial coverage)	No significant change.	No significant change.
1979 - 1988 (OS map 1:2,500 - partial coverage)	The A11 has been constructed travelling in a south west to north east direction and bisecting the onshore cable corridor (NGR 615350, 303212).	No significant change.
1981 (OS map 1:10,000)	<p>A wireless station is recorded within the disused unnamed camp (NGR: 609935, 343702).</p> <p>Carvel Farm is no longer recorded.</p>	No significant change.
1984 (OS map 1:10,000 - partial coverage)	No significant change.	No significant change.

Map Dates	On-Site Features	Off-Site Features
1993 to 1995 (OS map 1:10,000 - partial coverage and 1:2:500)	<p>The unnamed camp to the west of Weybourne (NGR 610407 490910) is no longer shown. Three small circular structures are located in the area of the former camp (NGR: 609728, 343822).</p> <p>The East Norfolk Line, Western Extension, (NGR 614986, 325421) is now labelled Marriott's Way (path).</p> <p>The pits located to the north west of the village of Weybourne are no longer recorded.</p>	<p>A sand and gravel pit is shown 50m to the south of the onshore cable corridor near Vernon Wood (NGR 617035 303158). This is also recorded as an historical landfill site.</p> <p>A sewage works south of Colton (NGR: 611293, 309255) is no longer labelled.</p>
1999 to 2019 (Google Earth imagery)	A small airstrip (approximately 550 m in length) is located within the onshore cable corridor at NGR: 609895, 343545.	No significant change.
2021 (Norfolk County Council interactive map)	No significant change.	Ketteringham Quarry is located 215 m west of an access road to the onshore cable corridor (NGR: 617289, 302567 at its closest point)
<b>Onshore Substation Area</b>		
1883 - 1887 (OS map 1: 2,500 and 1:10,560)	<p>Study area comprises agricultural land with some woodland.</p> <p>Sprow's Pits are recorded within the onshore substation area (NGR 621440, 301727).</p>	A railway line (Eastern Union Line) borders the eastern edge of the onshore substation area.

Map Dates	On-Site Features	Off-Site Features
		<p>The Henstead Union Workhouse is recorded approximately 180m south of the onshore substation area (NGR 621208, 301199).</p> <p>A blacksmith (Smy) is shown in area of land contained within the north west of the onshore substation area that is not included within the PEIR boundary (NGR 620378 302776).</p>
1906 - 1907 (OS map 1: 2,500 and 1:10,560)	Two pits are shown to the south of Swardeston Hall Green (NGR 621018, 301957).	No significant change.
1928 (OS map 1: 2,500)	No significant change.	The Henstead Union Workhouse is recorded as the Poor Law Institution (180m south). A water tower is recorded to the north of the institution (134m south of the onshore substation area).
1929 (OS map a:10,560 - partial coverage)	No significant change.	The blacksmith (Smy) is no longer labelled (NGR 620378 302776).
1957 (OS map 1: 10,560)	No significant change.	No significant change.
1972 (OS map 1: 2,500)	One of the pits south of Swardeston Hall Green is shown as a pond and the second is no longer shown (NGR 621018, 301957).	The historical blacksmith (Smithy) (NGR 620378 302776) is now a residential property.

Map Dates	On-Site Features	Off-Site Features
		The Poor Law Institute (180m south) is recorded as The Vale Hospital (psycho-geriatric).
1993 (OS map 1: 2,500 - partial coverage)	Pylons recorded bisecting the study area.	An Electricity Grid Transformation Station recorded approximately 66m east of the onshore substation area.
1995 (OS map 1:10,000 - partial coverage)	No significant change.	No significant change.
2021 (Norfolk County Council interactive map)	Mangreen Quarry is partially located within the PEIR boundary surrounding the onshore substation area (NGR: 622047, 303208)	Mangreen Quarry extends to the south west of the PEIR boundary (centered at NGR: 621813, 302821).

### 19.1.9 Regulatory Information

50. Regulatory information relating to potentially contaminative activities in the study area has been summarised in **Table 19.1.6**. Further details are provided in the Envirocheck GIS data.

*Table 19.1.6: Regulatory information.*

Environmental Records	Description
Discharge consents	There are ten discharge consents recorded within the study area, all within the onshore cable corridor. There are eight entries that relate to the discharge of sewage and two entries that relate unknown discharges.
Pollution incidents to controlled waters	<p>There is one pollution incident recorded within the study area, onshore cable corridor, details of which are provided below:</p> <ul style="list-style-type: none"> <li>• A Category 3 - minor incident involving miscellaneous pollutants occurred in 1992 with the receiving water recorded as the River Tud (NGR 611300,313400).</li> </ul>
Pollution incidents	There are no recorded pollution incidents within the study area.
Registered landfill, historical landfill or other waste disposal sites	<p>There are no current authorised landfill sites within the study area.</p> <p>There are no historical landfill sites recorded within the study area. However, anecdotal information indicates that an area of land adjacent to a property off Chapel Street, Barford was historically used as a landfill (NGR 611901, 307906).</p> <p>There are four historical landfill sites within 250m of the study areas:</p> <ul style="list-style-type: none"> <li>• Bodham Pit, immediately to the east of the study area, was authorised to accept commercial waste, the dates of operation are not provided in the information reviewed (NGR 613100,340400).</li> <li>• Morbays Tip immediately south of the study area, authorised to accept inert, industrial and commercial waste. Operational between 1964 and 1984 (NGR: 617100, 303000).</li> <li>• Central Depot, 70m north of the study area. No information provided on accepted waste (NGR:617300, 303600)</li> <li>• Land south of Roseacre Estate, 210m west of the study area. Details of waste accepted and dates it was operational are not provided in the information reviewed (NGR 612600,339800).</li> </ul>



Environmental Records	Description
Licensed waste management facilities	There are no records of licensed waste management sites within the study area.
Integrated Pollution Prevention and Control (IPPC) authorisations	Information relating to integrated pollution prevention and control authorisations was not available for review at the time of writing (February 2021).
Local Authority Pollution Prevention and Control (LAPPC) authorisations	Information relating to Local Authority Pollution Prevention and Control authorisations was not available for review at the time of writing (February 2021).
Hazardous substances consents and handling notifications	Information relating to hazardous substances consents and handling notifications was not available for review at the time of writing (February 2021).
Prosecutions relating to authorised processes	Information relating to prosecutions relating to authorised processes was not available for review at the time of writing (February 2021).
Prosecutions relating to controlled waters	Information relating to prosecutions relating to controlled waters was not available for review at the time of writing (February 2021).
Registered radioactive substances	Information relating to registered radioactive substances was not available for review at the time of writing (February 2021).
Historical tanks	There are ten records of historical tanks recorded within the onshore cable corridor. Eight of these tanks are associated with the former (military) camp to of the village of Weybourne, the two remaining tanks are of unknown origin. The contents of these tanks are not recorded within the information reviewed.
Electrical features	There is one record of an electrical substation facility also recorded within the onshore cable corridor within an area adjacent to the former (military) camp (NGR: 610465, 342883).
Fuel sites	Information relating to fuel sites was not available for review at the time of writing (February 2021).

Environmental Records	Description
Contemporary trade directory records (active and former)	<p>There is one record of a former contemporary trade directory business within the study area which may include potentially contaminative activities:</p> <ul style="list-style-type: none"> <li>Griffin Diesel Northants Ltd - engine rebuilding and reconditioning (onshore substation area). (NGR 620666, 320562).</li> </ul>

### 19.1.10 Preliminary Conceptual Site Model and Qualitative Risk Assessment

51. Land contamination is assessed through the identification of Potential Contaminant Linkages (PCLs). The assessment involves the development of a CSM which describes the relationship between on and off-site potential sources of contamination (and contaminants), potential receptors to such contamination and anticipated pathways between the two. Where all three (source-pathway-receptor linkage) are present or considered to be present, they are described as a PCL which can be subject to the risk assessment process.
52. The following discusses the potential sources, pathways and receptors present within the study area and the 250m buffer.

#### 19.1.10.1 Potential Sources

53. Based on the information reviewed as part of this PRA, historical activities have been undertaken within and neighbouring the study area which are potential sources of contamination. Potential sources within the study area are summarised in **Table 19.1.7**.

Table 19.1.7: Potential sources.

Potential Source	Potential Contaminants of Concern
Railway land	<p>Railway land (both current and historical) is a potential source of contamination and Made Ground may be encountered. Contaminants associated with railway land include herbicides, metals, fuel hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and sulphates. Asbestos can also be associated with the materials used within the track bedding material and fill used in the formation of embankments.</p>
Potentially infilled land (former pits), brick works and landfill	<p>Many former pits are located throughout the study area, some of which may have been infilled through unregulated waste disposal activity or as a licensed landfill. Contaminants of concern associated with the infilling of land are dependent on the age of emplacement of materials and the nature of materials used. Potential contaminants include ground gas, semi-volatile and volatile organic contaminants (SVOCs and VOCs), metals, asbestos, sulphates, fuel hydrocarbons, polycyclic</p>

Potential Source	Potential Contaminants of Concern
	aromatic hydrocarbons, phenols, cyanides, PCBs and dioxins, furans and asbestos.
Sewage Works	The processing of sewage could release contaminants into the environment depending on the site's full operational history and usage. Potential contaminants could include metals, cyanides, nitrates, sulphates, asbestos, fuel hydrocarbons, SVOCs, VOCs and PCBs.
Airfields and Military Camps.	Potential contaminants may include metals, asbestos, VOCs and SVOCs, glycols, fuel hydrocarbons, and polychlorinated biphenyls (PCBs). If aircraft dismantling occurred within the historical airfield there is the potential for radiological contamination (radium226) to be present.

54. Several current and historical activities undertaken within 250m of the study area may have released contaminants into the ground, which may have subsequently migrated to the study area. These are identified in **Table 19.1.8**.

Table 19.1.8: Potential off-site sources

Potential Source	Potential Contaminants of Concern
Railway land	Asbestos, metals and metalloids, polycyclic aromatic hydrocarbons (PAHs), fuel and oil hydrocarbons, volatile and semi-volatile organic compounds (VOCs and SVOCs), inorganic and organic contaminants, herbicides, polychlorinated biphenyls (PCBs). Ground gas.
Brick works	
Potentially infilled land / refuse sites	
Airfield and military camp	
Electricity substation	
Filling station	

### 19.1.10.2 Potential Receptors

55. Based on the current and proposed use of the site, potential receptors include:
56. Human Health
- Current future site users during the operational phases of DEP and SEP and following completion, these include landowners, tenants, members of the public and future workers at the substation;
  - Ground workers or development workers during construction and maintenance; and
  - Neighbouring site users such as local residents, landowners and tenants.
57. Controlled Waters

- Groundwater within superficial deposits designated as a Secondary A, Secondary B and Secondary Undifferentiated Aquifer;
- Groundwater within bedrock (White Chalk Subgroup and Wroxham Crag Formation) designated as a Principal Aquifer;
- SPZ 3 and their associated groundwater abstractions;
- Local groundwater abstractions.
- North Sea; and
- The Rivers Bure, Wensum, Tud, Yare and Tiffey, their tributaries, streams, ditches, pond, lakes and other surface water bodies.

#### 58. Buildings, Structures and New Services

- Existing buildings; and
- Future substation buildings and utilities including drinking water supply pipes.

#### 59. Environmentally Sensitive Area

- Environmentally sensitive protected areas, including River Wensum SAC/SSSI and geological SSSI.

### 19.1.10.3 Potential Pathways

#### 60. Human Receptor Pathways

- Direct exposure through dermal contact, ingestion or inhalation of soils and dusts;
- Inhalation of soil or groundwater derived vapours which volatilise to the surface or accumulate in buildings; and
- Inhalation of ground gas.

#### 61. Controlled Water Pathways

- Leaching and dissolution of contaminants from unsaturated soils;
- Surface water run-off;
- Groundwater migration and discharge into surface water receptors;
- Vertical and lateral groundwater migration into aquifers; SPZ or groundwater abstractions; and
- Vertical migration through the creation of preferential pathways e.g. via piling (if required) associated with the construction of the substation or HDD.

#### 62. Buildings and Utilities Pathways

- Migration and accumulation of ground gases / vapours within new buildings and structures;
- Direct contact; and
- Diffusion into services such as new potable water pipes.

#### 63. Sensitive Environmental Receptors

- Migration in groundwater; and
- Migration of wind-blown dusts.

#### 19.1.10.4 Preliminary Conceptual Site Model and Qualitative Risk Assessment

64. The CSM and Preliminary Qualitative Risk Assessment are presented **Table 19.1.9**. Definitions of probability and consequence have been based on guidance outlined in CIRIA 552 and summarised in **Annex D**. A combination of probability and consequences produces a risk level based on the risk evaluation and likely action required. The land contamination risk, which is a function of the probability and the consequence, can then be defined using the risk matrix.

*Table 19.1.9: Conceptual site model and preliminary risk assessment.*

Source	Pathway	Receptor	Associated hazard	Potential consequence of contaminant linkage	Likelihood of contaminant linkage	Risk classification	Justification
On site sources as described in <b>Table 19.1.7.</b>	Direct exposure via dermal contact, ingestion and inhalation of soils, dusts and / or asbestos fibers.	Humans - current and future site users and neighboring site users.	Health risk	Medium	Likely	Moderate risk	The study area is predominantly agricultural or undeveloped land which are considered low risk in terms of contamination. However, there is the potential for there to be localised contamination associated with the sources described in <b>Table 19.1.7.</b> In these areas, contaminants may be brought to the surface or mobilised during construction which if not mitigated could present an unacceptable risk to human health.
	Direct exposure via dermal contact, ingestion and	Construction / ground workers and neighboring	Health risk	Medium	Unlikely	Low risk	Exposure to potential contaminants can be mitigated during construction with the use of appropriate working methods incorporated

Source	Pathway	Receptor	Associated hazard	Potential consequence of contaminant linkage	Likelihood of contaminant linkage	Risk classification	Justification
	inhalation of soils, dusts and / or asbestos fibers, inhalation of vapours or ground gases.	ing site users during construction.					into a Code of Construction Price (CoCP).
	Direct contact and diffusion through drinking water pipes	Existing and new buildings	Building and foundation corrosion and impact to potable water	Mild	Low likelihood	Low risk	Buildings and services could be impacted if built on contaminated land. Potential areas of concern are described in <b>Table 19.1.7</b> .  Potential contamination could impact on the integrity of concrete foundations through creating aggressive ground conditions. Potential organic contaminants could permeate potable water supplies and

Source	Pathway	Receptor	Associated hazard	Potential consequence of contaminant linkage	Likelihood of contaminant linkage	Risk classification	Justification
							have detrimental impacts on human health.
	Leaching and migration/migration via piling.	Controlled waters - groundwater including Secondary Aquifers associated with the superficial deposits and groundwater abstraction.	Pollution of controlled waters.	Medium	Likely	Moderate risk	Contaminants present in soils have the potential to be mobilised during construction and leach into the underlying aquifer potentially impacting groundwater and associated abstractions.
	Leaching and migration/migration via piling	Controlled waters - groundwater including	Pollution of controlled waters.	Severe	Likely	High risk	A large proportion of the study area is within Zone III SPZ and underlain by a Principal Aquifer. These zones are not considered to be at risk from



Source	Pathway	Receptor	Associated hazard	Potential consequence of contaminant linkage	Likelihood of contaminant linkage	Risk classification	Justification
		Principal Aquifer/ SPZ and groundwater abstractions					the general cable construction works as excavations generally be shallow. However, where deeper trenchless crossing techniques (e.g. HDD) or piling (for the construction of the substation) are to be undertaken these could present a risk to the Principal Aquifer, SPZs and abstractions and requires further consideration.
	Groundwater migration/ surface water runoff	Controlled waters - surface waters	Pollution of controlled waters	Medium	Likely	Moderate risk	Surface water receptors across the study area may be impacted by the works if appropriate mitigation is not implemented.
	Groundwater migration/ migration of wind-blown dusts	Environmental sensitive areas	Adverse impacts on protected areas	Medium	Low likelihood	Low to moderate risk	SSSIs within the study area may be impacted by the migration of contaminants in groundwater or via windblown dusts.

Source	Pathway	Receptor	Associated hazard	Potential consequence of contaminant linkage	Likelihood of contaminant linkage	Risk classification	Justification
Off-site sources	Direct exposure via windblown soils and dusts and asbestos fibres, lateral migration of vapours or contaminate groundwater.	Humans - current and future site users and construction workers.	Health risk	Medium	Likely	Moderate risk	Areas of localised potential contamination lie adjacent to the study areas such as landfills and infilled land. There is the potential for contaminants within soils, leachates and groundwater to migrate into the study area and cable route and be encountered, exposed or mobilised during construction works.
	Lateral migration of dissolved phase contaminants in groundwater and migration	Controlled waters - surface water and groundwater	Pollution of controlled waters	Medium	Unlikely	Low risk	

Source	Pathway	Receptor	Associated hazard	Potential consequence of contaminant linkage	Likelihood of contaminant linkage	Risk classification	Justification
	onto site including non-aqueous liquids						

### 19.1.10.5 Uncertainties with the Conceptual Model

65. At this stage in the process there are a number of uncertainties associated with the preliminary conceptual site model, specifically associated with defining the potential sources and the respective pathways as summarised below:
- The exact location of the landfall, cable route and substation are subject to further refinement, and it is therefore uncertain if construction works will be within potential source areas.
  - The presence, magnitude and extent of the PCOC within source areas needs to be established prior to construction to determine risks to human health, controlled waters, the environment and property;
  - The geological and hydrogeological regime at the site should be established prior to construction to determine the potential for contaminant migration.

### 19.1.11 Conclusions and Recommendations

#### 19.1.11.1 Conclusions

66. The key objectives of the desk study and PRA was to identify potential sources of contamination within or around the study area and the risks and constraint these may present to DEP and SEP.
67. The study area has largely been used as agricultural land, woodland or residential development since the late 1800s. However, there are localised areas which have had a potentially contaminative use including the unregulated infilling of pits, landfills, railway land, airfields, military land and sewage works.
68. BGS records indicate the study area is predominantly underlain by superficial deposits laid during the Pleistocene ranging from sands and gravels to clayey Glacial Till. These are underlain by bedrock comprising the Wroxham Crag Formation and White Chalk Subgroup. The superficial deposits are classified as a Secondary A, Secondary B, Secondary undifferentiated Aquifers and the bedrock is classified as a Principal Aquifer. Parts of the study area site lie within a Zone 3, SPZ which is likely to protect large groundwater abstractions. Main rivers, their tributaries, ponds, lakes and other surface water features are also present within the study area.
69. The site use as predominantly undeveloped agricultural land, woodland and residential development is considered to be low risk in terms of contamination. Made Ground and associated contamination may be present within the study area where there has been infilling or land raising, landfills, railway land, airfields, military land and sewage works. These areas are considered to be a moderate risk in terms of contamination and if the landfall area, onshore cable corridor or onshore substation area is to be constructed in these areas investigation is required prior to construction to evaluate soil and groundwater contamination and identify if these areas present a development constraint.
70. Potential off-site sources include railway land, unregulated infilled land, landfills, filling stations and substation. These may also present a moderate risk in terms of contamination and have the potential to present a constraint to DEP and SEP.

71. It should be noted that the PRA has been developed based on a desk-based review of information, and in the absence of ground investigation data, the CSM had adopted a precautionary approach.

#### 19.1.11.2 Recommendations

72. Based on the findings of the PRA the following work is recommended prior to construction:

- Targeted intrusive site investigation in potential source areas and generic quantitative risk assessment (GQRA) to help better determine the presence, magnitude and extent of contaminants within the study area and the risks and constraints they may pose to the proposed DEP and SEP;
- Site specific UXO Desktop Assessment or similar due to the moderate risk rating of UXO being encountered within the Landfall area;
- Development of a Code of Construction Practice (CoCP) for use during construction works to protect construction workers, neighbouring site users, groundwater and surface water. The report should be informed by the results of the targeted intrusive site investigation;
- To protect construction workers, the works should be undertaken in accordance with the requirements of the Health and Safety at Work Act 1974 and the Construction (Design and Management) (CDM) Regulation 2015;
- Protocols for dealing with unexpected contamination should be set in place prior construction to ensure that procedures are known and agreed with the Regulators should unexpected contaminated materials be encountered;
- Hydrogeological risk assessment to be undertaken for piling, HDD and excavation works to protect the Principal Aquifer, SPZ and potable groundwater abstractions;
- The movement and reuse of materials on site should be undertaken in accordance with the CL:AIRE Code of Practice (CL:AIRE 2011) 'The definition of waste: Development Industry Code of Practice', where applicable; or an environmental permit that authorises the deposit of excavated material for recovery; and
- The management of any waste material off-site must be at a site with an environmental permit and any waste activity must consider the waste hierarchy; hazardous waste must be managed in accordance with Hazardous Waste Regulations 2005; and any disposal of materials off-site to landfill should be undertaken in accordance with the Landfill Regulations 2002.

73. It is also recommended that the Regulators (local authority and Environment Agency) are consulted at an early stage (pre site investigation) to agree the scope of works and gain agreement to the proposed approach.

### 19.1.12 References

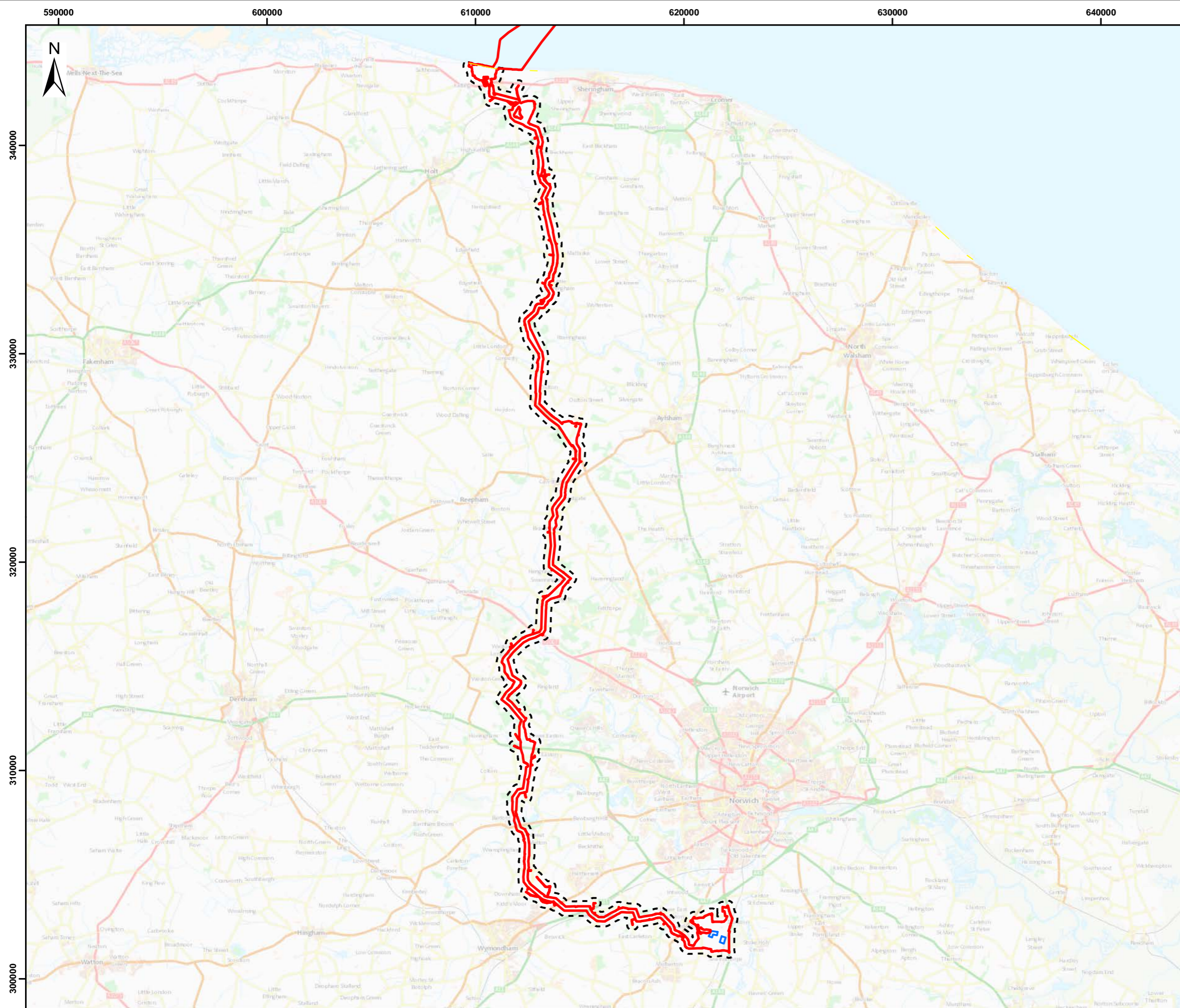
British Geological Survey (BGS) online geology viewer. Available at URL: <a href="http://mapapps.bgs.ac.uk/geologyofbritain/home.html">http://mapapps.bgs.ac.uk/geologyofbritain/home.html</a> [Accessed August 2020]
Multi Agency Government Information for the Countryside (MAGIC) map application. Available at URL: <a href="https://magic.defra.gov.uk/MagicMap.aspx">https://magic.defra.gov.uk/MagicMap.aspx</a> [Accessed August 2020]
British Standards Institute, 2011. Investigation of potentially contaminated sites - code of practice (BS10175)
British Standard 'Guidance on Investigations for Ground Gas - Permanent Gases and Volatile Organic Compounds (VOCs)' BS 8576:2013
British Standard 'Code of Practice for Ground Investigations', BS 5930:2015
Building Research Establishment (BRE), 2015. BR 211 Radon: Guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment projects)
Construction Industry Research Information Association (CIRIA) 'Gases to Buildings', C665 (2007)
CIRIA 'Contaminated Land Risk Assessment - A Guide to Good Practice', C552 (2001)
Department for Environment, Food and Rural Affairs (Defra) 'Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance', PB13735 (2012)
Environment Agency (EA) 'Land Contamination: Risk Management Framework', May 2020 (formerly known as Environment Agency (EA) 'Model Procedures for the Management of Land Contamination', CLR11 (2004)
Environment Agency Catchment Data Explorer. Available at URL: <a href="https://environment.data.gov.uk/catchment-planning/">https://environment.data.gov.uk/catchment-planning/</a> [Accessed August 2020]
Google Earth (2021) Available at URL: <a href="https://www.google.co.uk/intl/en_uk/earth/">https://www.google.co.uk/intl/en_uk/earth/</a> [Accessed March 2021]
Natural England designated sites viewer. Available at URL: <a href="https://designatedsites.naturalengland.org.uk/">https://designatedsites.naturalengland.org.uk/</a> [Accessed August 2020]
Norfolk County Council Safeguarded Mineral Resources Viewer. Available at URL: <a href="https://norfolk.opus4.co.uk/planning/localplan/maps/norfolk-minerals#/x:599969/y:312790/z:2/b:15/o:1157,o:1165,o:1252">https://norfolk.opus4.co.uk/planning/localplan/maps/norfolk-minerals#/x:599969/y:312790/z:2/b:15/o:1157,o:1165,o:1252</a> [Accessed August 2020]
Norfolk County Council (2021) Adopted Revised Policies Map. Available at URL: <a href="https://norfolk.opus4.co.uk/planning/localplan/maps/globalmap#/x:622443/y:302163/z:9/b:15/o:1253,o:1254,o:1255,o:1262,o:1263,o:1264,o:1265,o:1266,o:1267,o:1268,o:1295,o:1302,o:1303,o:1304,o:1305,o:1306,o:1307,o:1308,o:1309,o:1490,o:1491,o:1492,o:1493,o:1494,o:4227,o:4228">https://norfolk.opus4.co.uk/planning/localplan/maps/globalmap#/x:622443/y:302163/z:9/b:15/o:1253,o:1254,o:1255,o:1262,o:1263,o:1264,o:1265,o:1266,o:1267,o:1268,o:1295,o:1302,o:1303,o:1304,o:1305,o:1306,o:1307,o:1308,o:1309,o:1490,o:1491,o:1492,o:1493,o:1494,o:4227,o:4228</a> [Accessed March 2021]

Public Health England Radon map viewer. Available at URL: <http://www.ukradon.org>  
[Accessed August 2020]

Zetica UXO Risk Map. Available at URL: <https://zeticauxo.com/downloads-and-resources/risk-maps/> [Accessed August 2020]

## Figures





# Sheringham Shoal and Dudgeon Extension Projects

## Figure 19.1.1

### Land Quality Study Area

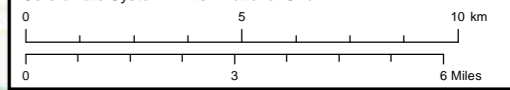
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- PEIR Boundary
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  - Onshore Substation Site
  - 250m Study Area

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 Preliminary Environmental Information Report (PEIR)



**Sheringham Shoal and Dudgeon Extension Projects**  
**Figure 19.1.2**  
**Mineral Safeguarding Areas**  
**Sheet 1 of 4**

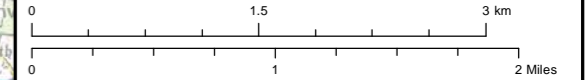
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  -  Mineral Safeguarding Area

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 Preliminary Environmental Information Report (PEIR)



**Sheringham Shoal and Dudgeon Extension Projects**  
**Figure 19.1.3**  
**Mineral Safeguarding Areas**  
**Sheet 2 of 4**

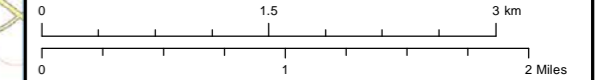
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  -  Mineral Site Locations
  -  Mineral Safeguarding Area

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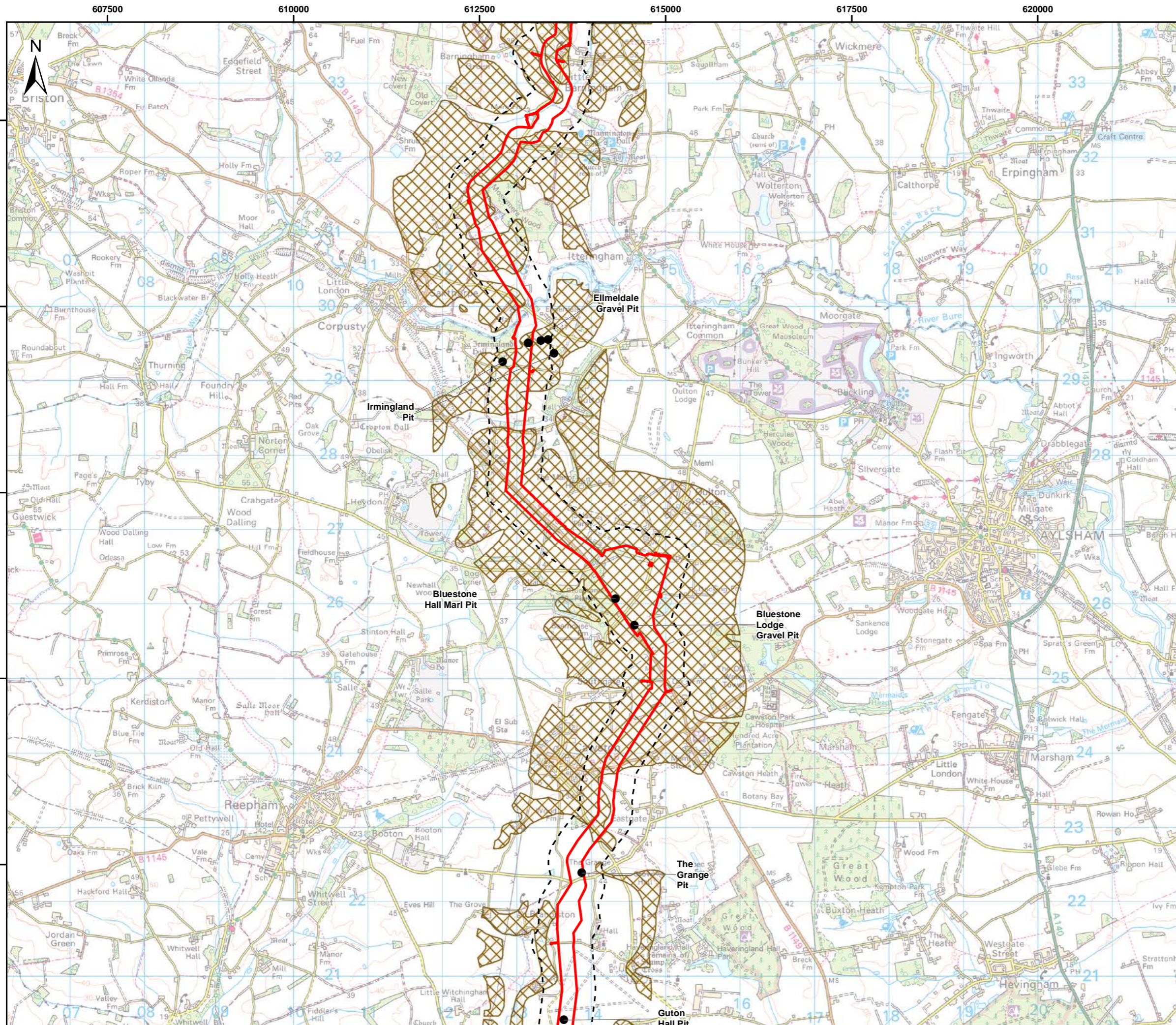
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 Preliminary Environmental Information Report (PEIR)



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**Figure 19.1.4**  
**Mineral Safeguarding Areas**  
**Sheet 3 of 4**

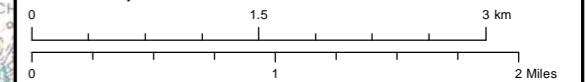
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  - 250 m Study Area
  - Mineral Site Locations
  - Mineral Safeguarding Area

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Co-ordinate System: British National Grid








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**Sheringham Shoal and Dudgeon Extension Projects**  
**Figure 19.1.5**  
**Mineral Safeguarding Areas**  
**Sheet 4 of 4**

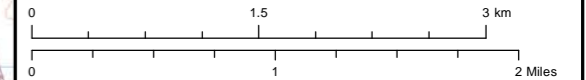
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  -  250 m Study Area
  -  Mineral Site Locations
  -  Mineral Safeguarding Area

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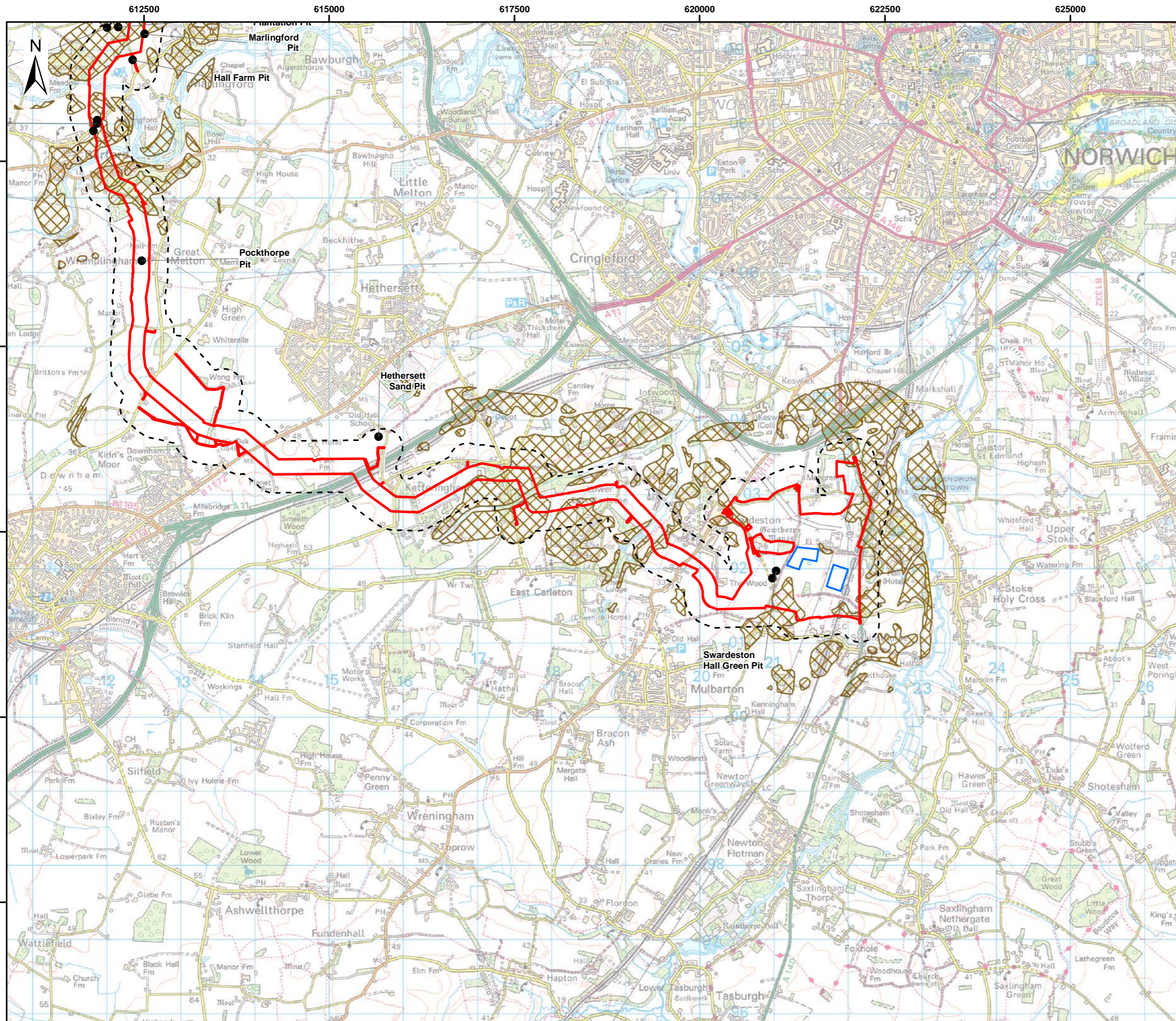
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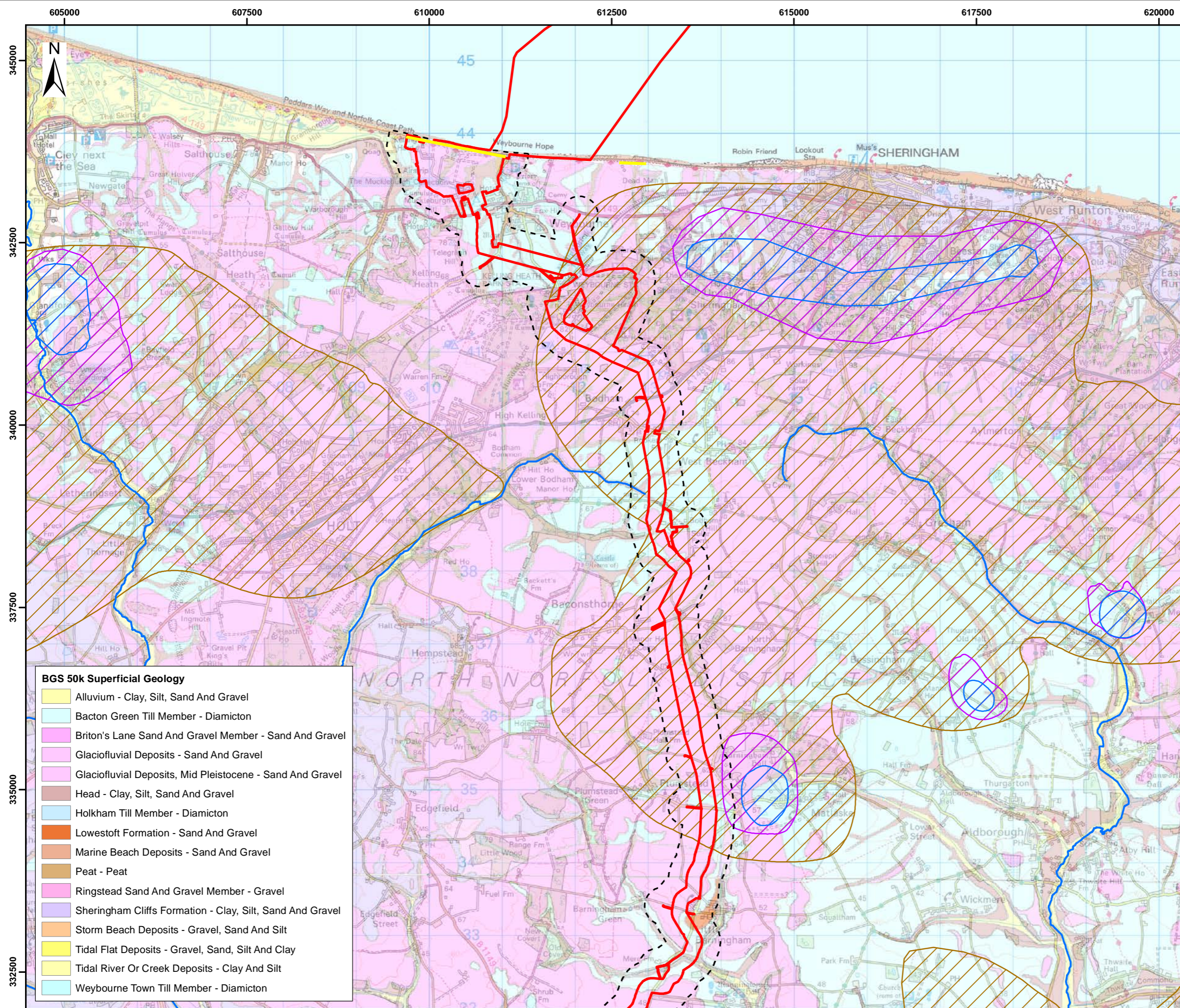


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**Sheringham Shoal and Dudgeon Extension Projects**  
**Figure 19.1.6**  
**Geology and Ground Conditions**  
**Sheet 1 of 4**



- Legend:**
- PEIR Boundary
  - Proposed Landfall Area
  - 250 m Study Area
  - WFD Waterbody
- Source Protection Zones**
- 1
  - 2
  - 3

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- BGS 50k Superficial Geology**
- Alluvium - Clay, Silt, Sand And Gravel
  - Bacton Green Till Member - Diamicton
  - Briton's Lane Sand And Gravel Member - Sand And Gravel
  - Glaciofluvial Deposits - Sand And Gravel
  - Glaciofluvial Deposits, Mid Pleistocene - Sand And Gravel
  - Head - Clay, Silt, Sand And Gravel
  - Holkham Till Member - Diamicton
  - Lowestoft Formation - Sand And Gravel
  - Marine Beach Deposits - Sand And Gravel
  - Peat - Peat
  - Ringstead Sand And Gravel Member - Gravel
  - Sheringham Cliffs Formation - Clay, Silt, Sand And Gravel
  - Storm Beach Deposits - Gravel, Sand And Silt
  - Tidal Flat Deposits - Gravel, Sand, Silt And Clay
  - Tidal River Or Creek Deposits - Clay And Silt
  - Weybourne Town Till Member - Diamicton

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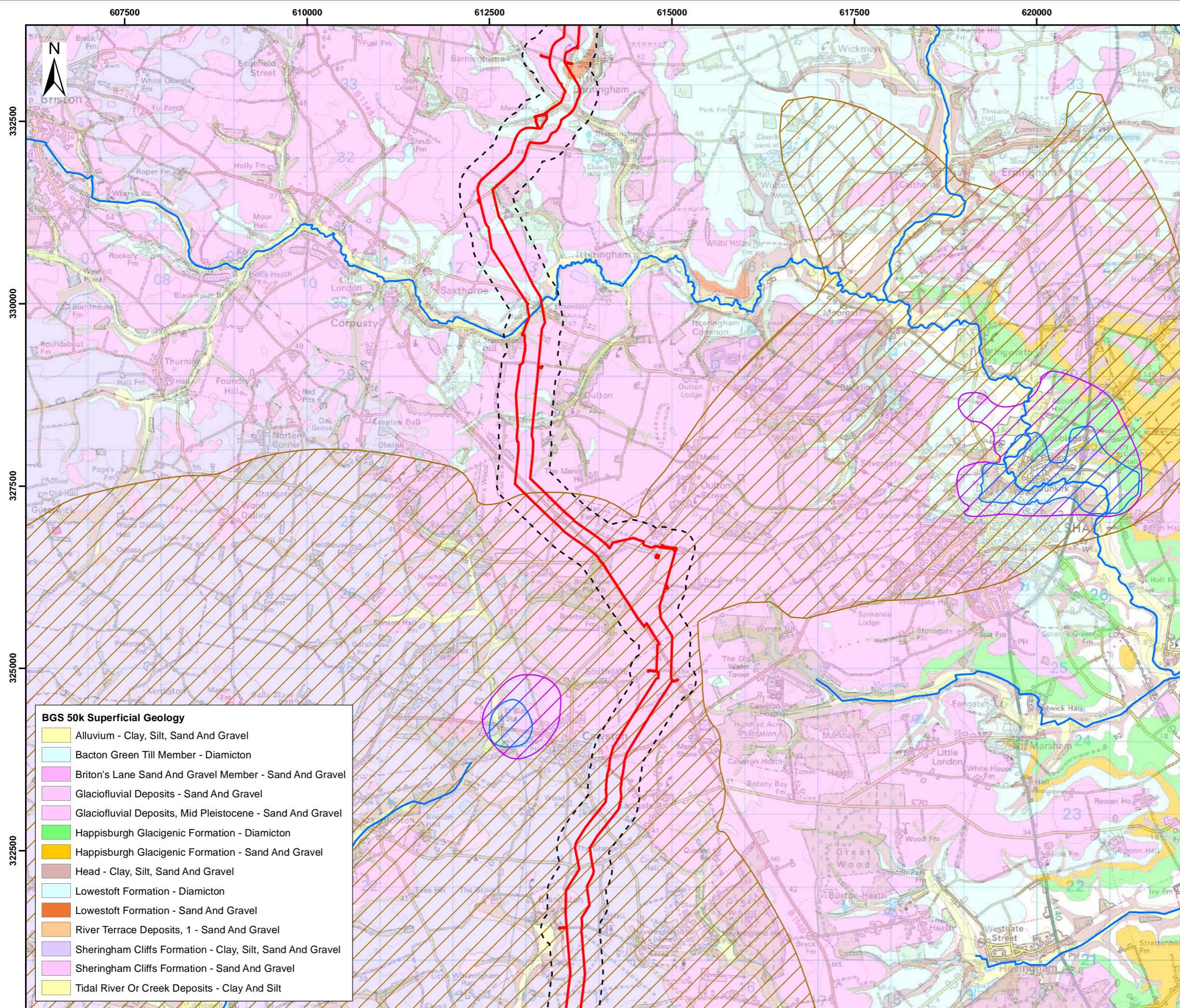
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**Sheringham Shoal and Dudgeon Extension Projects**  
**Figure 19.1.7**  
**Geology and Ground Conditions**  
 Sheet 2 of 4



**Legend:**

- PEIR Boundary
- 250 m Study Area
- WFD Waterbody

**Source Protection Zones**

- 1
- 2
- 3

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**BGS 50k Superficial Geology**

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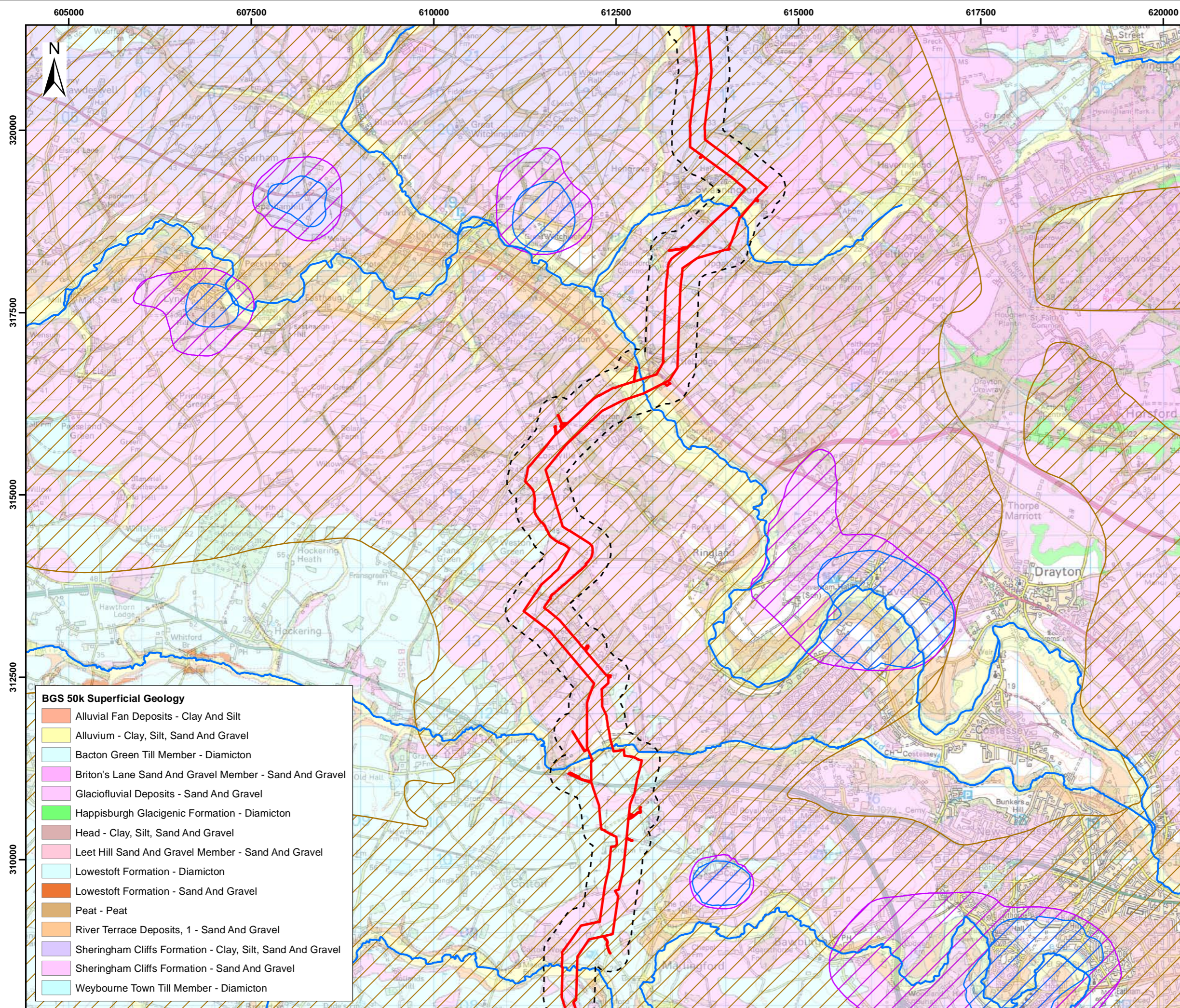
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**Sheringham Shoal and Dudgeon Extension Projects**  
**Figure 19.1.8**  
**Geology and Ground Conditions**  
**Sheet 3 of 4**



- Legend:**
- PEIR Boundary
  - 250 m Study Area
  - WFD Waterbody
- Source Protection Zones**
- 1
  - 2
  - 3

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- BGS 50k Superficial Geology**
- Alluvial Fan Deposits - Clay And Silt
  - Alluvium - Clay, Silt, Sand And Gravel
  - Bacton Green Till Member - Diamicton
  - Briton's Lane Sand And Gravel Member - Sand And Gravel
  - Glaciofluvial Deposits - Sand And Gravel
  - Happisburgh Glacigenic Formation - Diamicton
  - Head - Clay, Silt, Sand And Gravel
  - Leet Hill Sand And Gravel Member - Sand And Gravel
  - Lowestoft Formation - Diamicton
  - Lowestoft Formation - Sand And Gravel
  - Peat - Peat
  - River Terrace Deposits, 1 - Sand And Gravel
  - Sheringham Cliffs Formation - Clay, Silt, Sand And Gravel
  - Sheringham Cliffs Formation - Sand And Gravel
  - Weybourne Town Till Member - Diamicton

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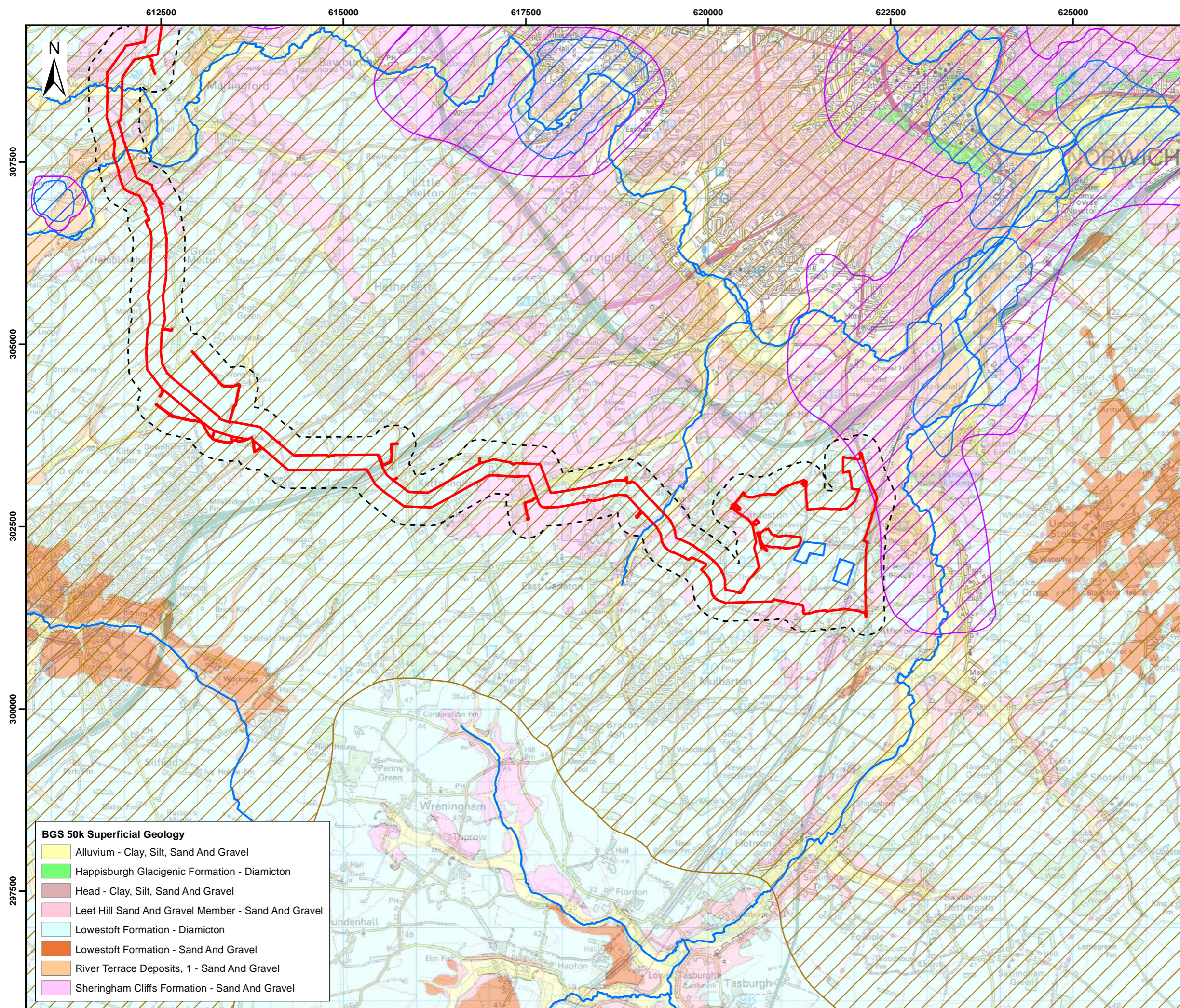
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**Sheringham Shoal and Dudgeon Extension Projects**  
**Figure 19.1.9**  
**Geology and Ground Conditions**  
**Sheet 4 of 4**



- Legend:**
- PEIR Boundary
  - Onshore Substation Site
  - 250 m Study Area
  - WFD Waterbody
- Source Protection Zones**
- 1
  - 2
  - 3

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- BGS 50k Superficial Geology**
- Alluvium - Clay, Silt, Sand And Gravel
  - Happisburgh Glacigenic Formation - Diamicton
  - Head - Clay, Silt, Sand And Gravel
  - Leet Hill Sand And Gravel Member - Sand And Gravel
  - Lowestoft Formation - Diamicton
  - Lowestoft Formation - Sand And Gravel
  - River Terrace Deposits, 1 - Sand And Gravel
  - Sheringham Cliffs Formation - Sand And Gravel

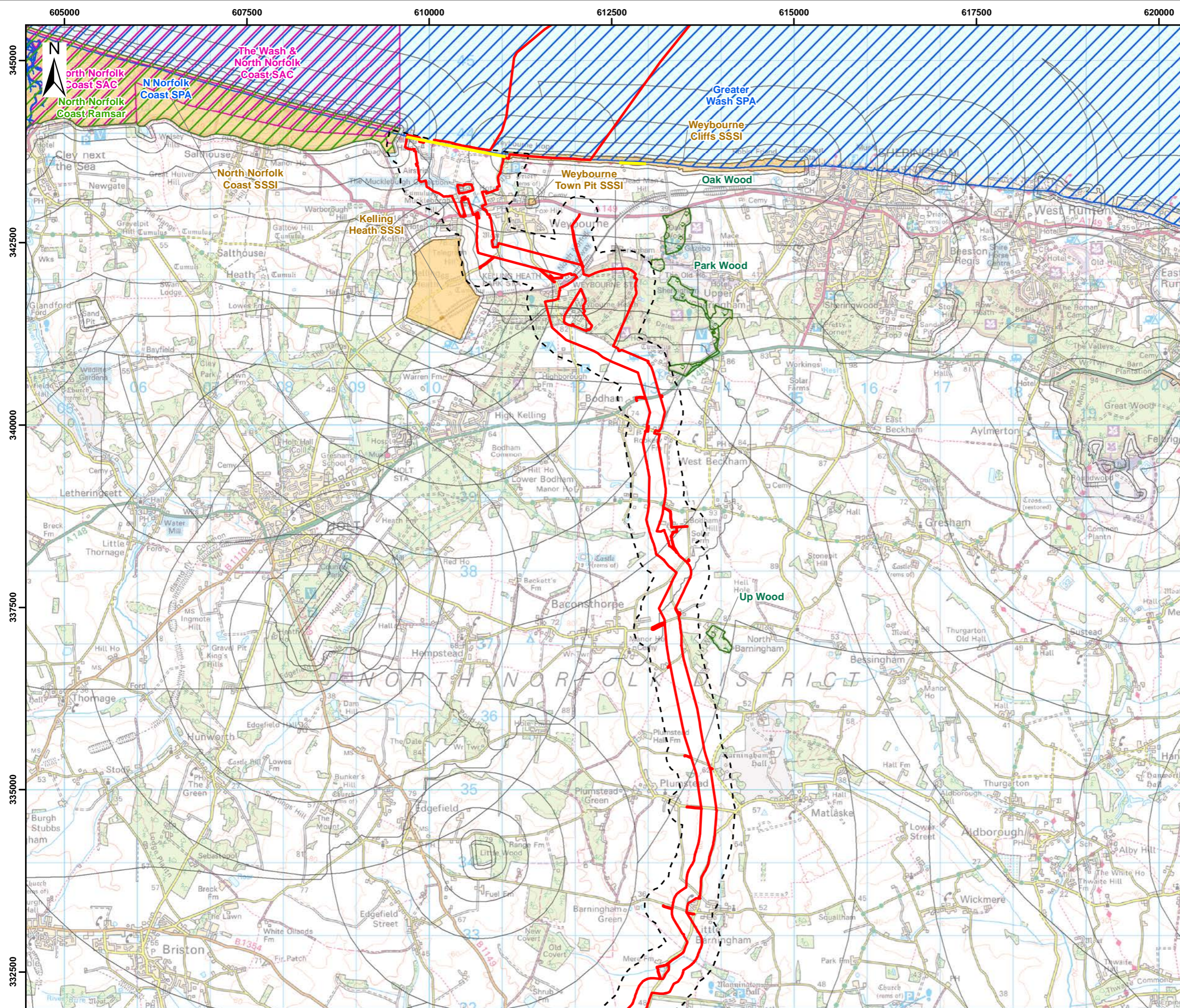
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**Sheringham Shoal and Dudgeon Extension Projects**  
 Figure 19.1.10  
 Sensitive Land Uses  
 Sheet 1 of 4

- Legend:
- PEIR Boundary
  - Proposed Landfall Area
  - 250 m Study Area
  - Ramsar
  - Special Protection Area (SPA)
  - Special Area of Conservation (SAC)
  - Sites of Special Scientific Interest (SSSI)
  - Ancient Woodland
  - SSSI Impact Risk Zone

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 Preliminary Environmental Information Report (PEIR)



**Sheringham Shoal and  
Dudgeon Extension Projects**  
Figure 19.1.11  
Sensitive Land Uses  
Sheet 2 of 4

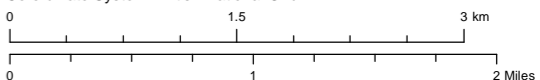
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  -  SSSI Impact Risk Zone

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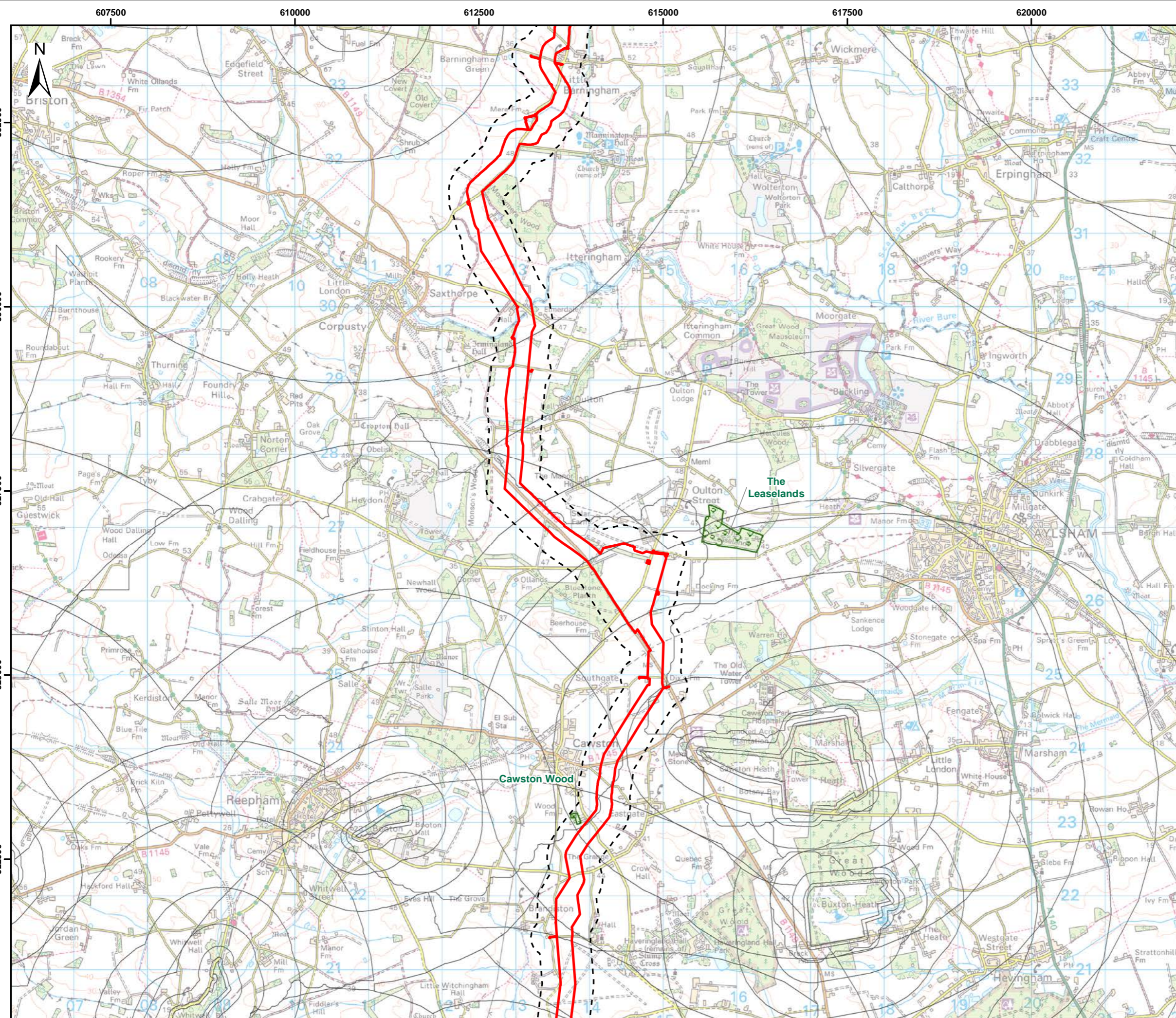
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**Sheringham Shoal and  
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Figure 19.1.12  
Sensitive Land Uses  
Sheet 3 of 4

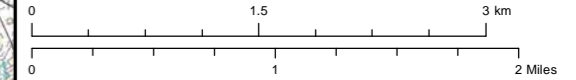
- Legend:
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  - 250 m Study Area
  - Special Area of Conservation (SAC)
  - Sites of Special Scientific Interest (SSSI)
  - Ancient Woodland
  - SSSI Impact Risk Zone

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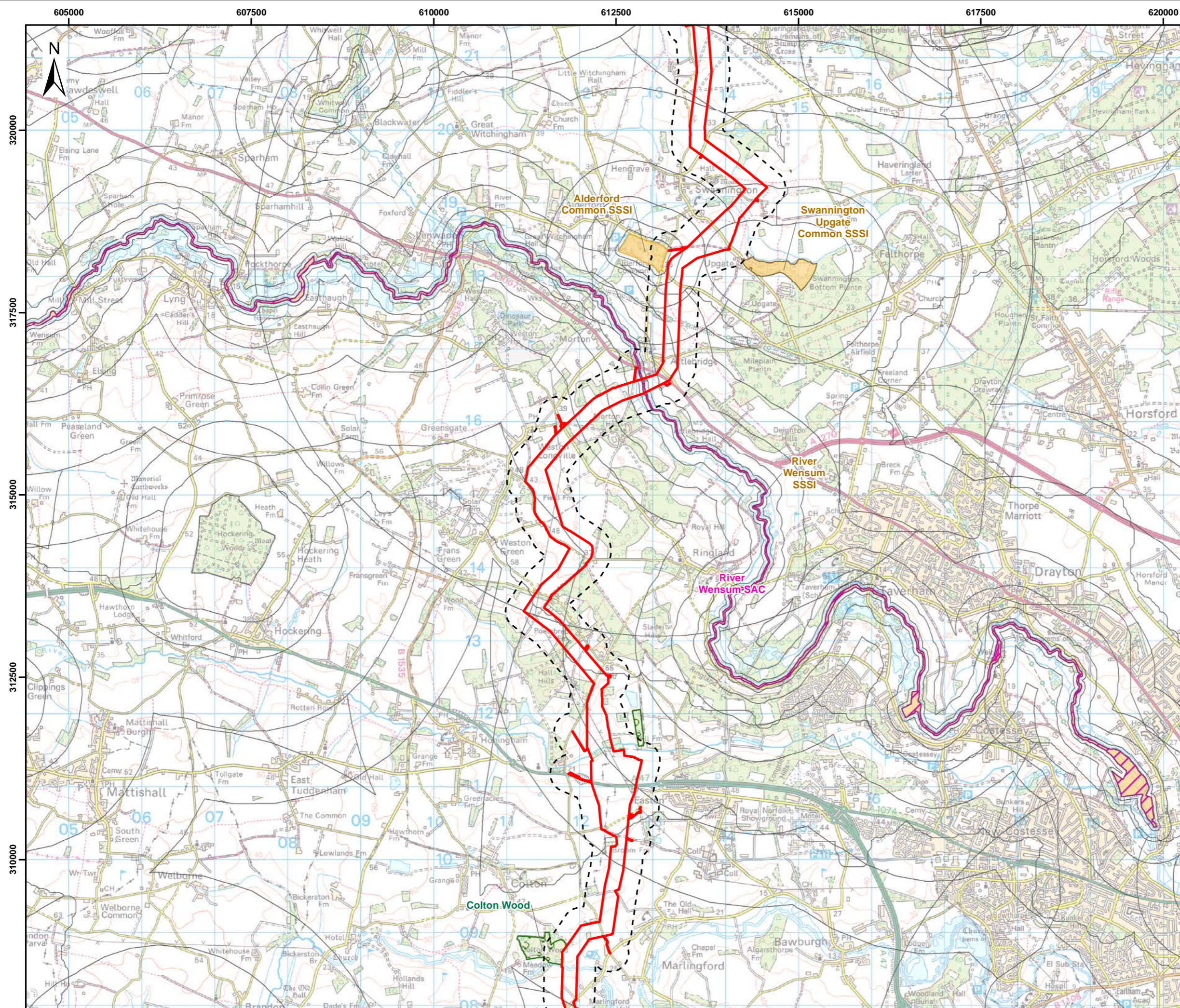
Document No: PB8164-RHD-ZZ-ON-DR-Z-0060

Co-ordinate System: British National Grid








A	24/03/2021	1:50,000	A3	AZ	KD MW
REV	DATE	SCALE	SIZE	DRW	CHK APR

Report:  
 Preliminary Risk Assessment (PRA)  
 Preliminary Environmental Information Report (PEIR)



**Sheringham Shoal and  
Dudgeon Extension Projects**  
Figure 19.1.13  
Sensitive Land Uses  
Sheet 4 of 4

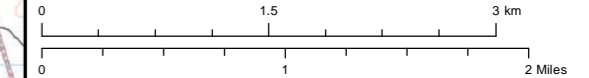
- Legend:
-  PEIR Boundary
  -  Onshore Substation Site
  -  250 m Study Area
  -  Ancient Woodland
  -  SSSI Impact Risk Zone

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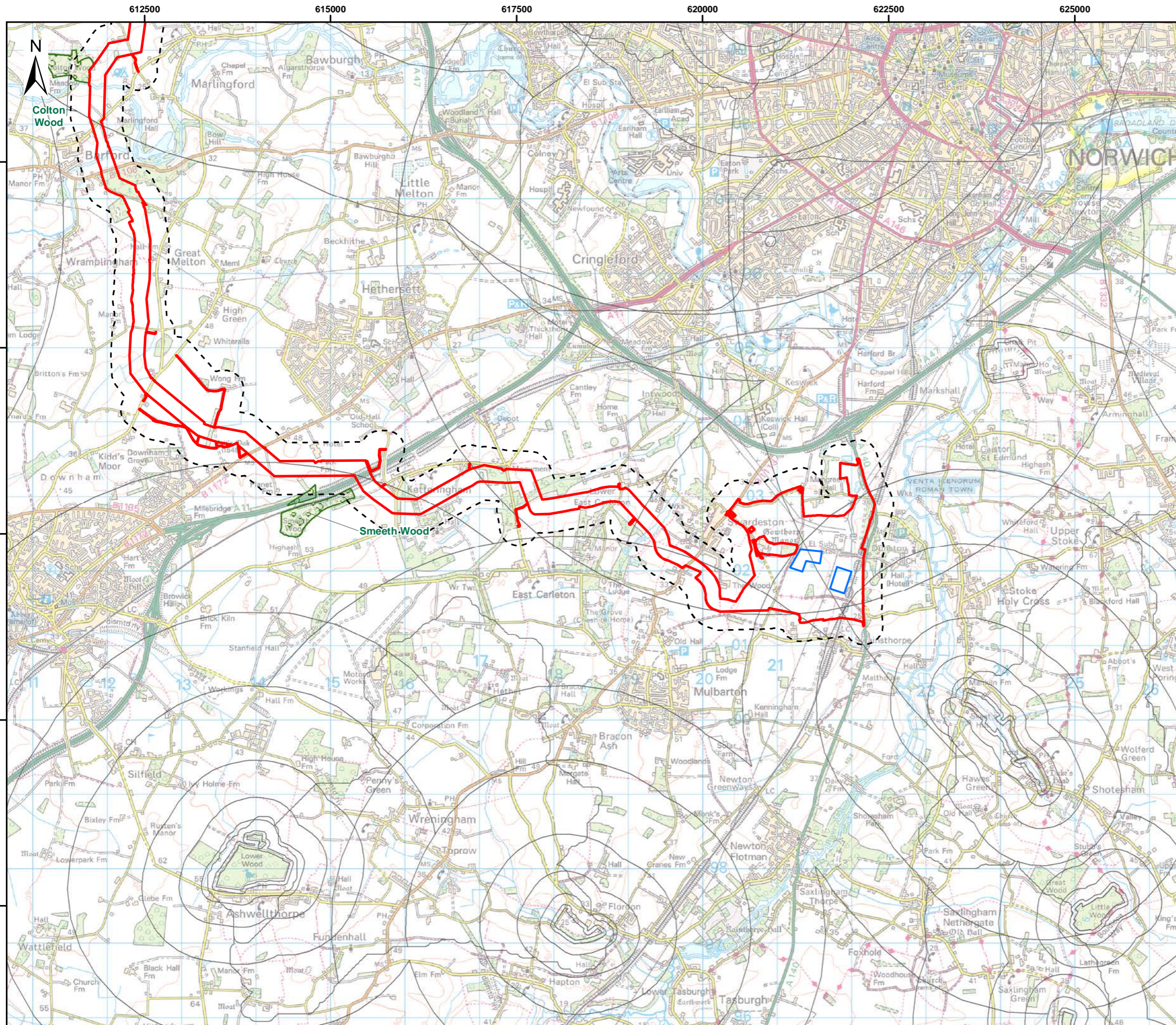
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Co-ordinate System: British National Grid



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Report: Preliminary Risk Assessment (PRA)  
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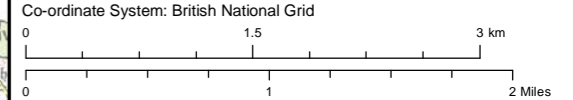
**Sheringham Shoal and Dudgeon Extension Projects**  
**Figure 19.1.14**  
**Potential Sources of Contamination**  
**Sheet 1 of 4**

- Legend:
- PEIR Boundary
  - Proposed Landfall Area
  - 250 m Study Area
  - Authorised Landfill Site
  - Historic Landfill Site

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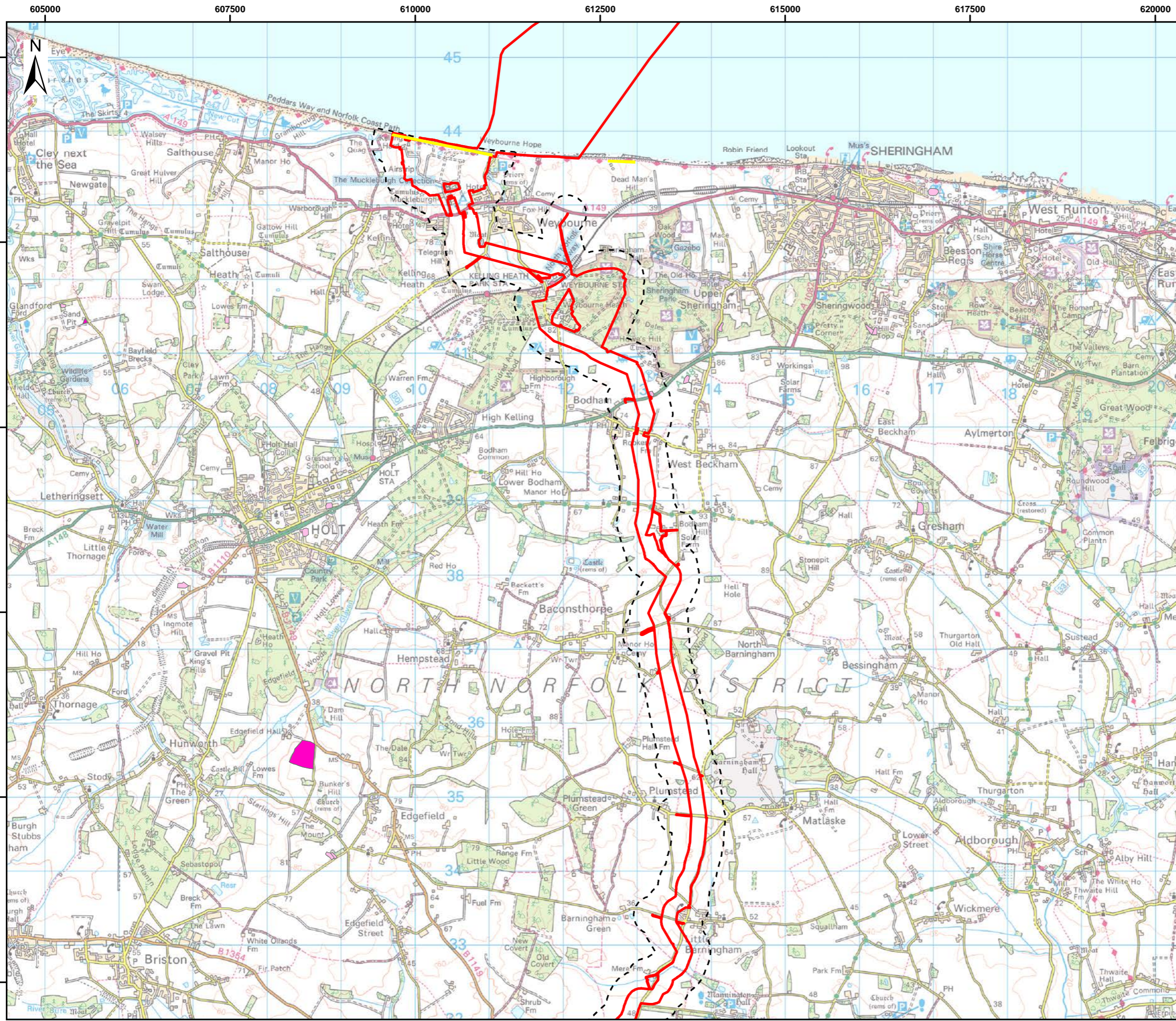


Document No: PB8164-RHD-ZZ-ON-DR-Z-0059



A	15/03/2021	1:50,000	A3	AZ	KD MW
REV	DATE	SCALE	SIZE	DRW	CHK APR

Report: Preliminary Risk Assessment (PRA)  
 Preliminary Environmental Information Report (PEIR)



**Sheringham Shoal and  
Dudgeon Extension Projects**  
Figure 19.1.15  
Potential Sources of Contamination  
Sheet 2 of 4

- Legend:**
- PEIR Boundary
  - 250 m Study Area
  - Historic Landfill Site

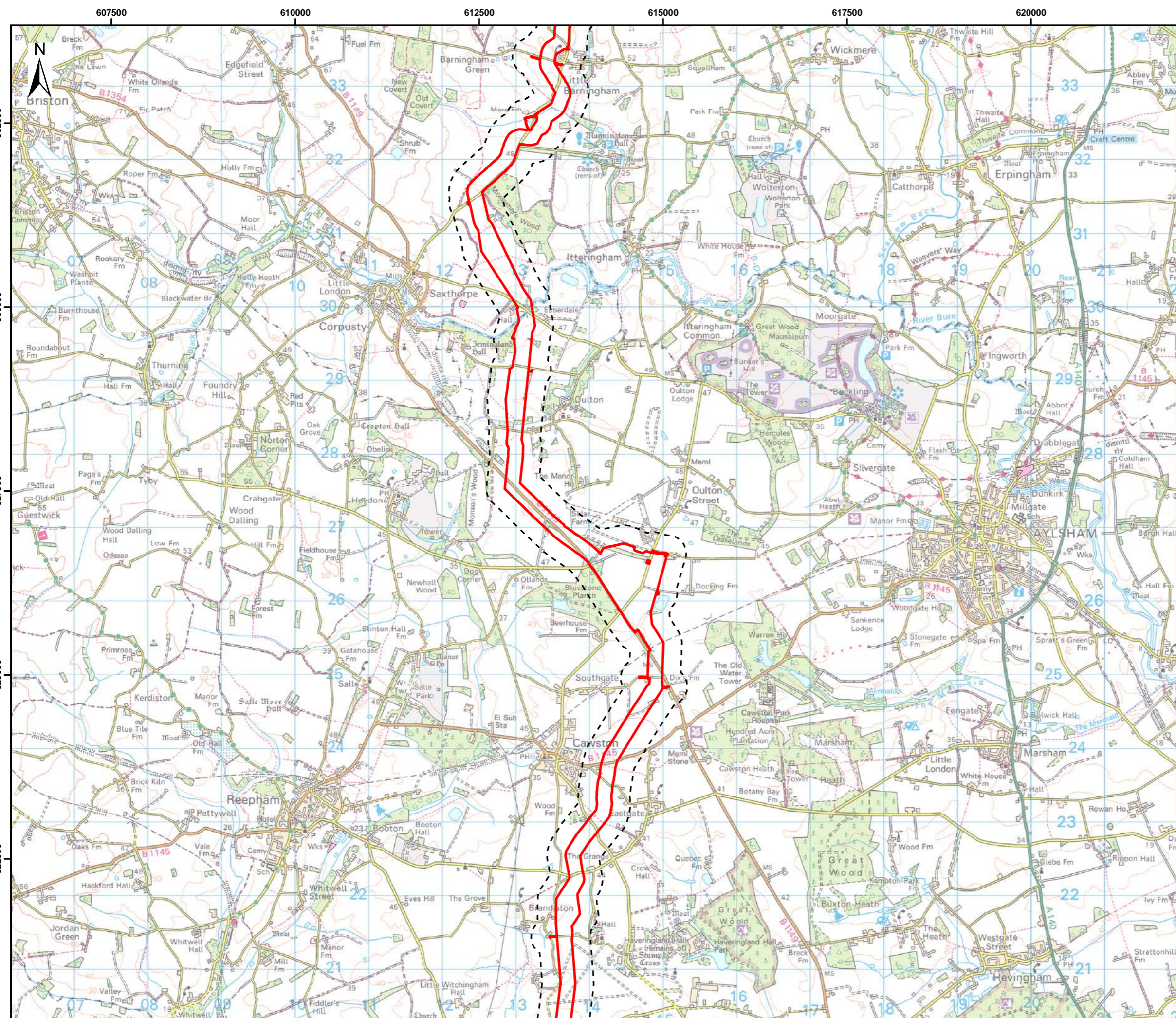
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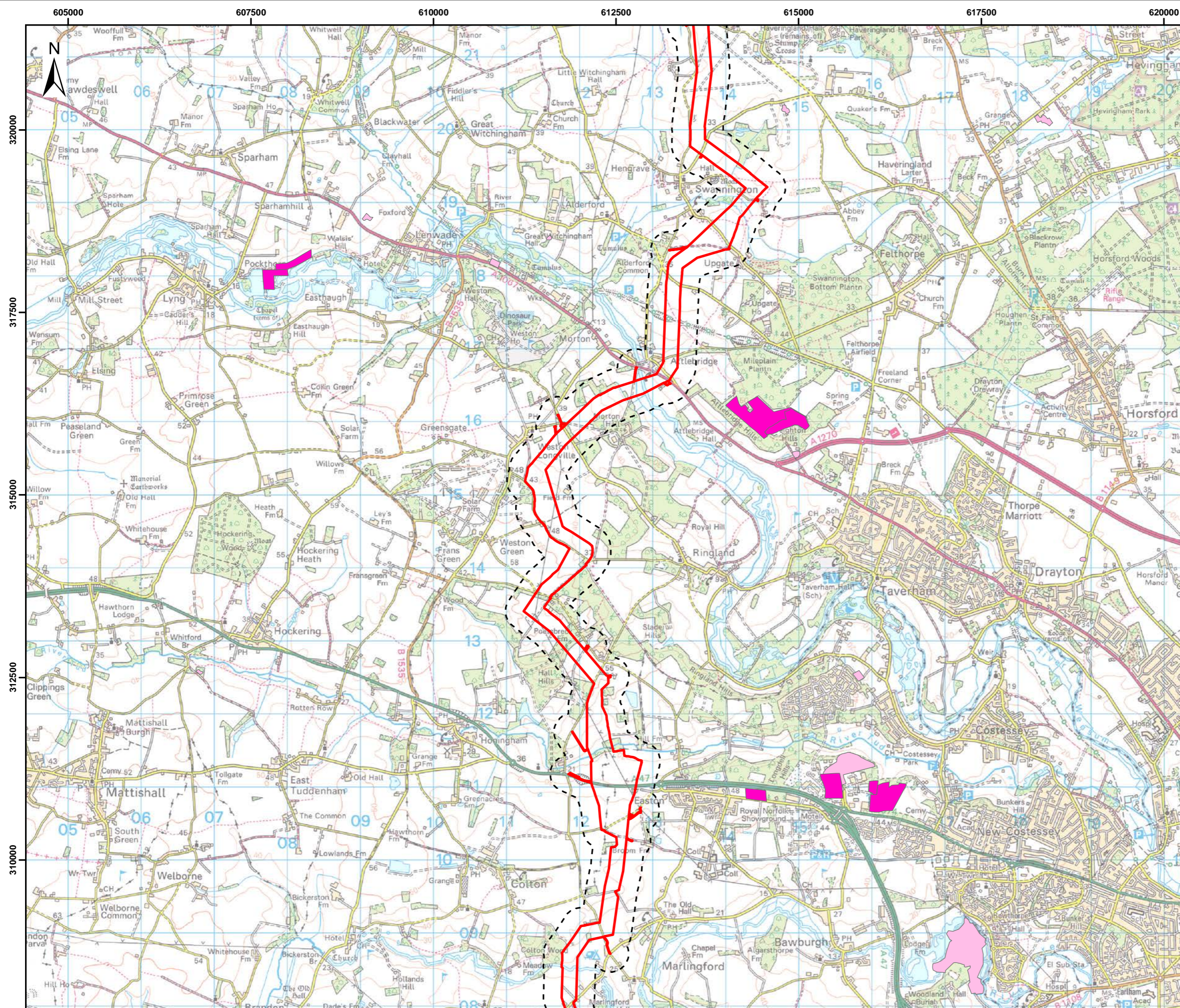


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Report: Preliminary Risk Assessment (PRA)  
 Preliminary Environmental Information Report (PEIR)





**Sheringham Shoal and Dudgeon Extension Projects**  
**Figure 19.1.16**  
**Potential Sources of Contamination**  
 Sheet 3 of 4

- Legend:**
- PEIR Boundary
  - 250 m Study Area
  - Authorised Landfill Site
  - Historic Landfill Site

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Report: Preliminary Risk Assessment (PRA)  
 Preliminary Environmental Information Report (PEIR)





**Sheringham Shoal and Dudgeon Extension Projects**  
**Figure 19.1.17**  
**Potential Sources of Contamination**  
**Sheet 4 of 4**

- Legend:**
- PEIR Boundary
  - Onshore Substation Site
  - 250 m Study Area
  - Authorised Landfill Site
  - Historic Landfill Site

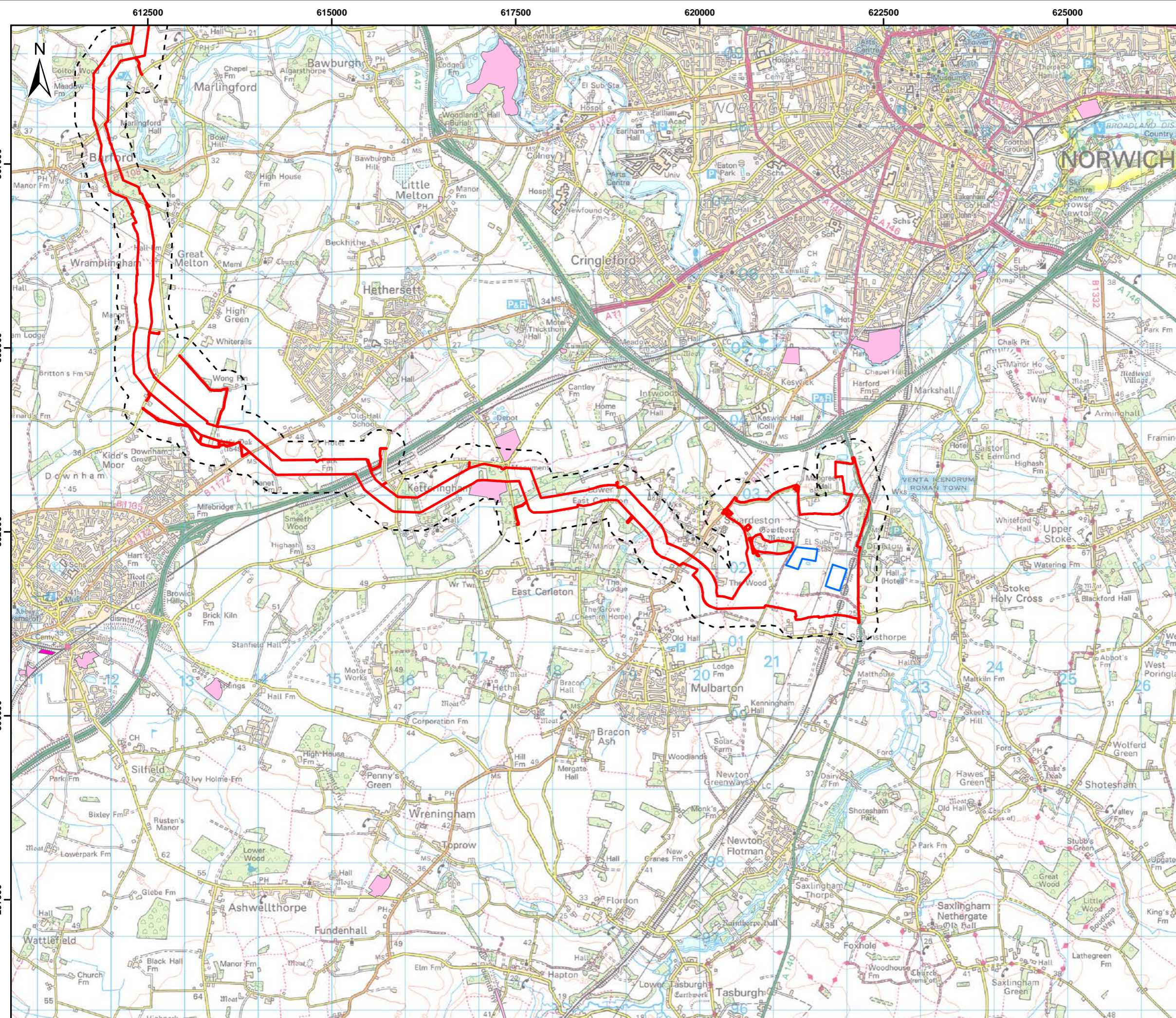
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REV	DATE	SCALE	SIZE	DRW	CHK APR

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 Preliminary Environmental Information Report (PEIR)



## Annex A - Limitations

## Limitations

The direct assessments and judgements given in this report are limited by both the finite data on which they are based and the proposed works to which they are addressed. The acquisitions of data are constrained by both physical and economic factors and, by definition, is subject to limitations. Conditions at the site will change over time due to natural variations and may be affected by human activities.

This document has been prepared for the titled project and should not be relied upon or used for any other project. Royal HaskoningDHV accepts no responsibility or liability for the consequences of this document being used for a purpose other than the purpose for which it was commissioned. The assessments and judgements contained herein should not be relied upon as legal opinion.

The findings and opinions are relevant to the dates of the information reviewed and should not be relied upon to represent conditions at later dates. The opinions included herein are based on the information obtained from the assessments undertaken in the study area and from the experienced of the reviewers.

This Phase 1 Land Quality Assessment has utilised a variety of publicly available data sources such as the Environment Agency, Envirocheck, historical maps and the British Geological Survey. Therefore, the study is limited by the age and limitations inherent in the data described.

## Annex B – BGS Logs

Borehole	Depth (m below ground level)	Description
TG20SW15	0 – 0.9	Made Ground
	0.9 – 7.3	Glacial sand and gravel (sandy gravel with clay. Gravel is fine to medium with a trace of coarse subangular flint; traces of fine subrounded quartz and chalk. Sand is fine to coarse. Clay is slightly chalky, blue to grey, laminated)
	7.3 – 8.5	Boulder Clay (grey to black silty clay)
	8.5 – 9.1	Glacial sand and gravel (slightly silty clayey sand)
TG20SW16	0 – 0.3	Soil
	0.3 – 6.1	Glacial sand and gravel (sandy gravel. Clayey near to top. Gravel is mainly medium, with fine and coarse subangular to subrounded flint; with fine to medium subrounded to well-rounded quartz and quartzite. Sand is fine to coarse)
	6.1 – 9.5	Boulder Clay (brown clay with fine chalk pebbles and occasional sandy layers)
	9.5 – 17.7	Glacial sand and gravel (sandy gravel. Gravel is medium to coarse with fine, occasional cobble of subangular to subrounded flint; with medium and coarse well rounded and subrounded quartz and quartzite. Sand is fine to coarse)
	17.7 - 18.9	Chalk
TG20SW38	0 – 0.76	Topsoil and subsoil
	0.76 – 3.05	Sandy clay with gravel sized pieces of chalk and some flints. Firm, light yellowish grey
	3.05 – 4.57	Sand (light yellow brown, occasional fine irregular gravel)
	4.57 – 5.49	Sandy clay (soft light-yellow grey)
	5.49 – 7.92	Sandy gravel (light yellow brown graded fine to coarse sand and fine to coarse irregular rounded gravel. Small pockets of sandy clay also present at top of stratum)
	7.92 – 9.14	Sandy clay with gravel (firm, orange brown with fine to medium rounded gravel)

Borehole	Depth (m below ground level)	Description
	9.14 -10.67	Sandy gravel (light yellow brown graded fine to coarse sand and rounded irregular fine to coarse gravel)
TG14SW23	0 – 0.05	Topsoil
	0.05 – 1.91	Boulder Clay (rubble sandy chalk and flints, sandy chalk flints and stones, grey chalk flints and stones, light brown clay, chalk stones and flints)
	1.91 – 3.07	Sand and gravel
	3.07 – 6.35	Chalk and flint
TG14SW24A	0 – 38.1	Boulder Clay
	38.1 – 42.67	Sands and gravels
	42.67 - 63.4	Chalk
TG14SW24B	0 – 1.22	Soil
	1.22 – 38.40	Clay and sands
	38.40 – 50.29	Boulder clay
	50.29 – 55.47	Shingle
	55.47 – 68.28	Chalk
TG14SW24C	0 – 0.91	Soil
	0.91 – 38.71	Clay and sands
TG14SW25	0 – 0.91	Soil
	0.91 – 38.71	Clay and sand
	38.71 – 49.99	Boulder Clay
	49.99 – 55.78	Shingle
	55.78 – 67.67	Chalk
TG11SW7	0 – 0.6	Topsoil
	0.6 – 18.3	Clay
TG11NW14	0 – 0.6	Soil
	0.6 – 9.5	Sands and gravels

Borehole	Depth (m below ground level)	Description
	9.5 – 10.4	Chalk
TG11NW16	0 – 0.3	Soil
	0.3 – 7.9	Sandy, chalky clay
	7.9 – 8.5	Clayey sand
	8.5 – 20.1	Clay and chalky clay
	20.1 – 20.7	Sandy gravel
	20.7 – 21.6	Chalk
TG11SW71	0 – 0.3	Soil
	0.3 – 1.5	Boulder Clay (brown mottled white fine and medium very clayey silty sand with root traces and occasional fine round chalk gravel)
	1.5 – 2.9	Glacial sand and gravel (very dense cream brown slightly silty sandy fine to coarse angular flint and rounded chalk gravel with small creamy-grey clay pockets)
	2.9 - 7	Boulder Clay (soft to firm cream-grey silty slightly sandy clay with fine and medium round chalk gravel)
TG11SW72	0 – 0.9	Topsoil (dark brown very sandy silty clay with rootlets and occasional fine to coarse subrounded to subangular gravel)
	0.9 – 3.5	Boulder Clay (firm orange to brown sandy clay with occasional fine to coarse subangular gravel and sand lenses)
TG11SW73	0 – 0.3	Topsoil (brown clayey silty fine and medium sand with occasional fine subangular gravel)
	3.5 – 7.0	Boulder Clay (brown very clayey silty fine to medium sand with occasional fine to coarse angular gravel / stiff yellow brown silty sandy clay with fine to coarse rounded to angular chalk and flint gravel)
TG11SW74	0 – 0.3	Topsoil
	0.3 - 7	Boulder Clay (very stiff greenish brown silty sandy clay with chalk gravel)

Borehole	Depth (m below ground level)	Description
TG10SE5	0 – 2.7	Boulder Clay (soil on soft brown clay merging into brown chalky clay)
	2.7 – 3.9	Glacial sand and gravel (very clayey pebbly sand. Gravel is fine to coarse subangular flint. Sand is medium to coarse)
	3.9 – 8.5	Boulder Clay (brown chalky clay)
	8.5 – 9.1	Glacial sand and gravel (pebbly sand. Gravel is fine to coarse, subangular flint. Sand is medium)
	9.1 – 18.3	Boulder Clay (brown chalky clay with pale grey band)
TG10NW13	0 – 4.9	Boulder Clay (soil and brown clay with traces of sand and gravel and occasional chalk pebbles)
	4.9 – 20.1	Glacial sand and gravel (pebbly sand, clayey in places. Gravel is coarse with fine subangular and some subrounded flint, with traces of fine subrounded quartz. Sand is medium)
	20.1 - 21	Chalk
TG10SE18	0 – 1.2	Made Ground and soil
	1.2 – 1.8	Glacial sand and gravel (very clayey sand. Traces of hard chalk fragments. Gravel is fine, subangular to subrounded, mainly flint with some quartz. Sand is fine to medium, subangular)
	1.8 – 3.9	Boulder Clay (brown sandy clay with some gravel. Gravel is mainly fine, subangular flint. Sand is medium to coarse)
	3.9 – 15.5	Boulder Clay (light brown clay with traces of chalk)
	15.5 – 16.4	Chalk
TG10NW42	0 – 19.81	Boulder Clay
	19.81 – 22.86	Sands and gravels
	22.86 – 28.96	Chalk



## Annex C – UXB Risk Maps

# UNEXPLODED BOMB RISK MAP



## SITE LOCATION

Location: Weybourne, Norfolk  
Map Centre: 611500,342500



## LEGEND

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

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

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

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

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

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

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

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

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

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

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

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

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

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

### If I have any questions, who do I contact?

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

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

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

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

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

# UNEXPLODED BOMB RISK MAP



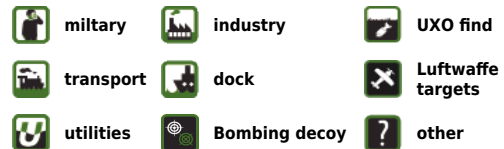
## SITE LOCATION

Location: Bodham, Norfolk  
Map Centre: 612500,340500



## LEGEND

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



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

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# UNEXPLODED BOMB RISK MAP



## SITE LOCATION

Location: West Beckham, Norfolk  
Map Centre: 613500,339500



## LEGEND

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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# UNEXPLODED BOMB RISK MAP



## SITE LOCATION

Location: Baconsthorpe, Norfolk  
Map Centre: 612500,337500



## LEGEND

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

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

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

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

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

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

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

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

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

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# UNEXPLODED BOMB RISK MAP



## SITE LOCATION

Location: Baconsthorpe, Norfolk  
Map Centre: 612500,337500



## LEGEND

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

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

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

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

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

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# UNEXPLODED BOMB RISK MAP



## SITE LOCATION

Location: Baconsthorpe, Norfolk  
Map Centre: 612500,337500



## LEGEND

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

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

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

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

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

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

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

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

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

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

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

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

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

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

### If I have any questions, who do I contact?

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

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

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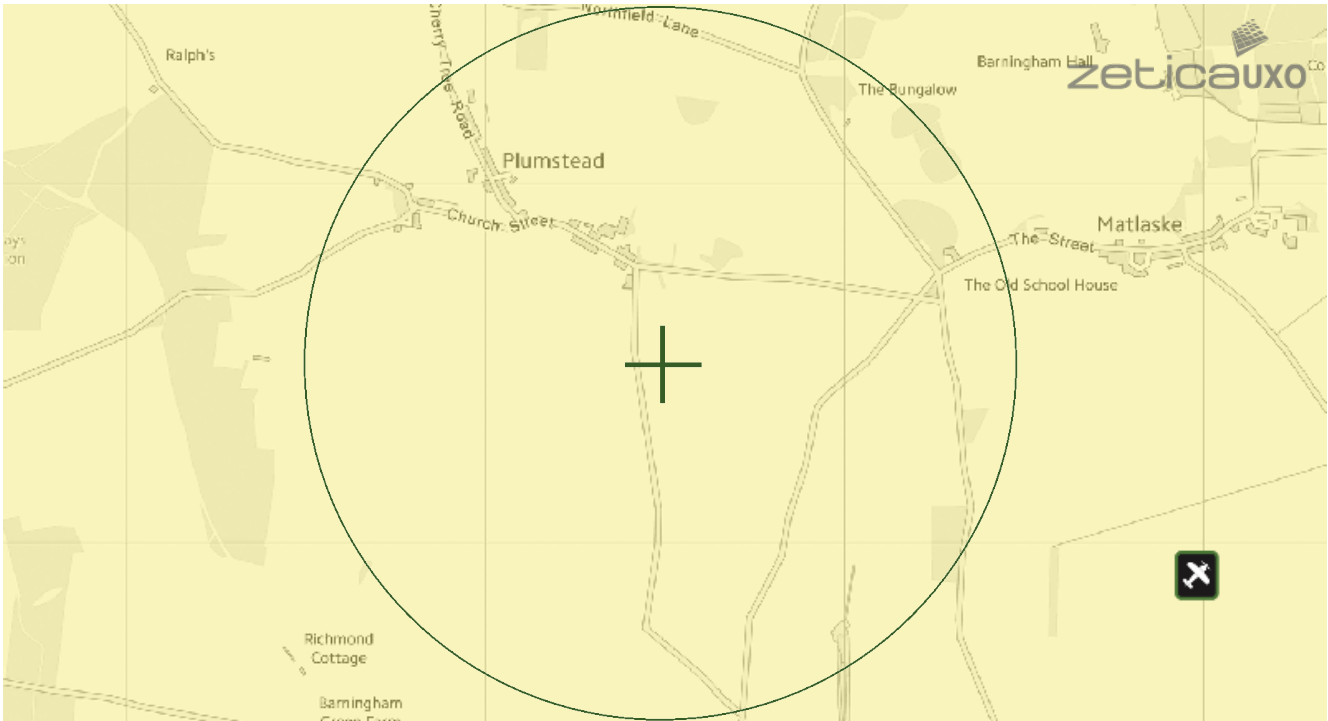
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# UNEXPLODED BOMB RISK MAP



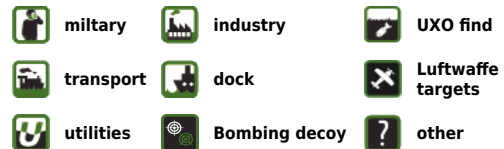
## SITE LOCATION

Location: Plumstead, Norfolk  
Map Centre: 613500,334500



## LEGEND

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



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

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

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# UNEXPLODED BOMB RISK MAP



## SITE LOCATION

Location: Little Barningham, Norfolk  
Map Centre: 613500,333500



## LEGEND

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

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

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

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

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

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# UNEXPLODED BOMB RISK MAP



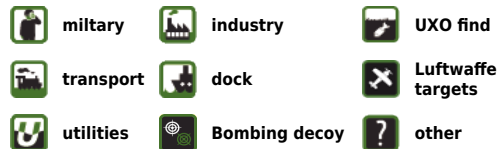
## SITE LOCATION

Location: Oulton, Norfolk  
Map Centre: 613500,328500



## LEGEND

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



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

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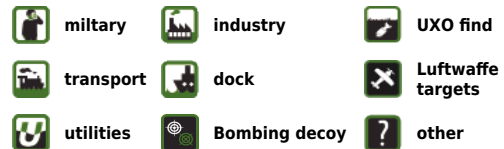
## SITE LOCATION

Location: Southgate, Norfolk  
Map Centre: 586500,334500



## LEGEND

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



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

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# UNEXPLODED BOMB RISK MAP



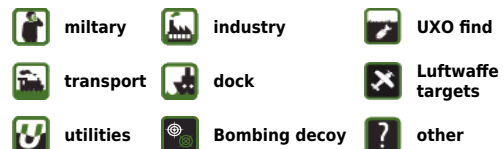
## SITE LOCATION

Location: Eastgate, Norfolk  
Map Centre: 614500,323500



## LEGEND

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



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

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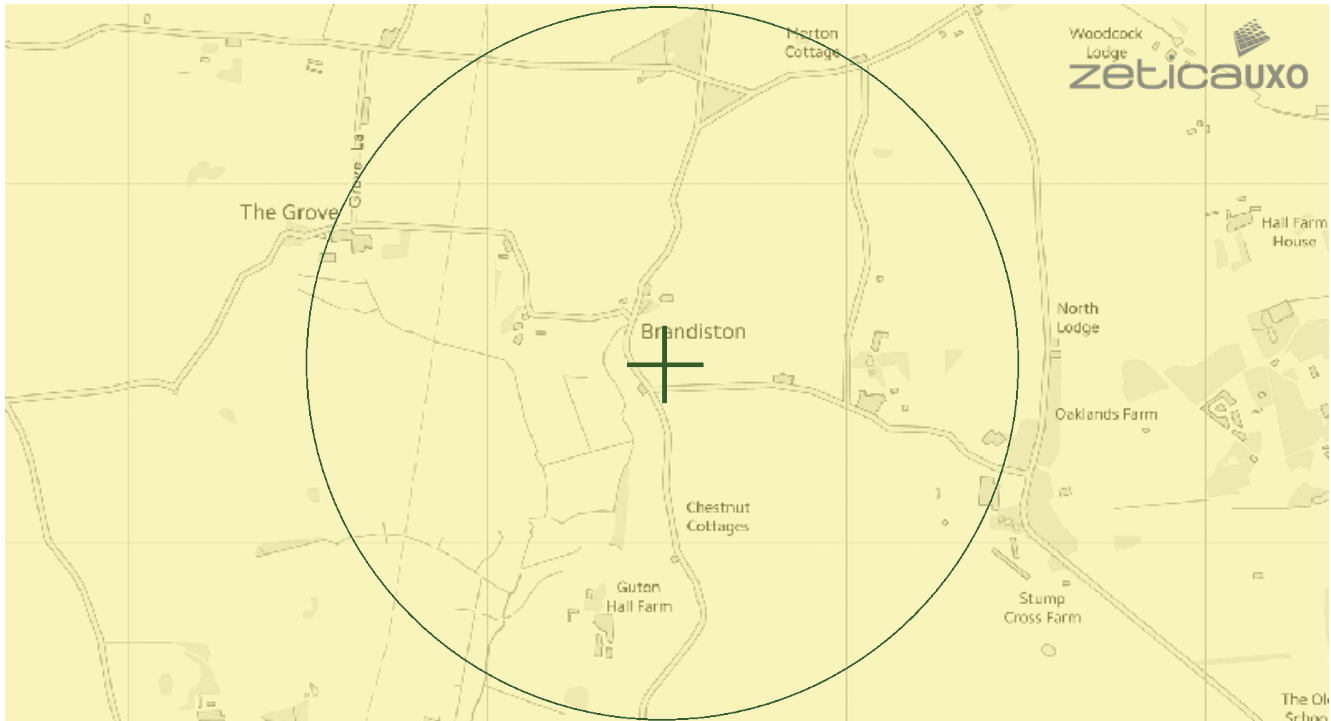
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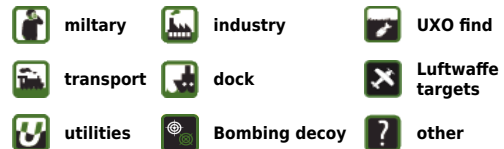
## SITE LOCATION

Location: Brandiston, Norfolk  
Map Centre: 613500,321500



## LEGEND

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



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

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

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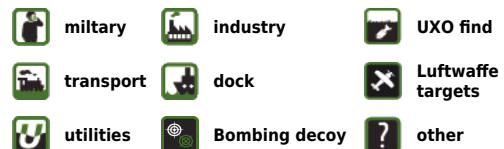
## SITE LOCATION

Location: Swannington, Norfolk  
Map Centre: 613500,319500



## LEGEND

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



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

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

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# UNEXPLODED BOMB RISK MAP



## SITE LOCATION

Location: Weston Green, Norfolk  
Map Centre: 610500,314500



## LEGEND

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

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

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

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

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# UNEXPLODED BOMB RISK MAP



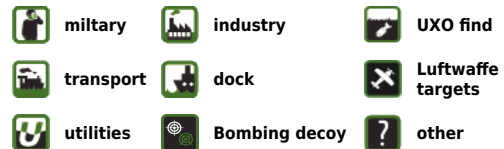
## SITE LOCATION

Location: Colton, Norfolk  
Map Centre: 610500,309500



## LEGEND

- High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
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### How to use your Unexploded Bomb (UXB) risk map?

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

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

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# UNEXPLODED BOMB RISK MAP



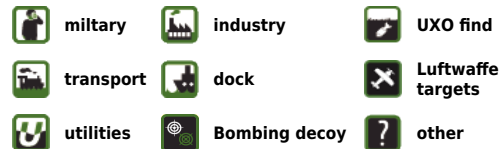
## SITE LOCATION

Location: Honingham, Norfolk  
Map Centre: 610500,311500



## LEGEND

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



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

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

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

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

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

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

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

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

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

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# UNEXPLODED BOMB RISK MAP



## SITE LOCATION

Location: Great Melton, Norfolk  
Map Centre: 613500,306500



## LEGEND

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

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

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

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

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

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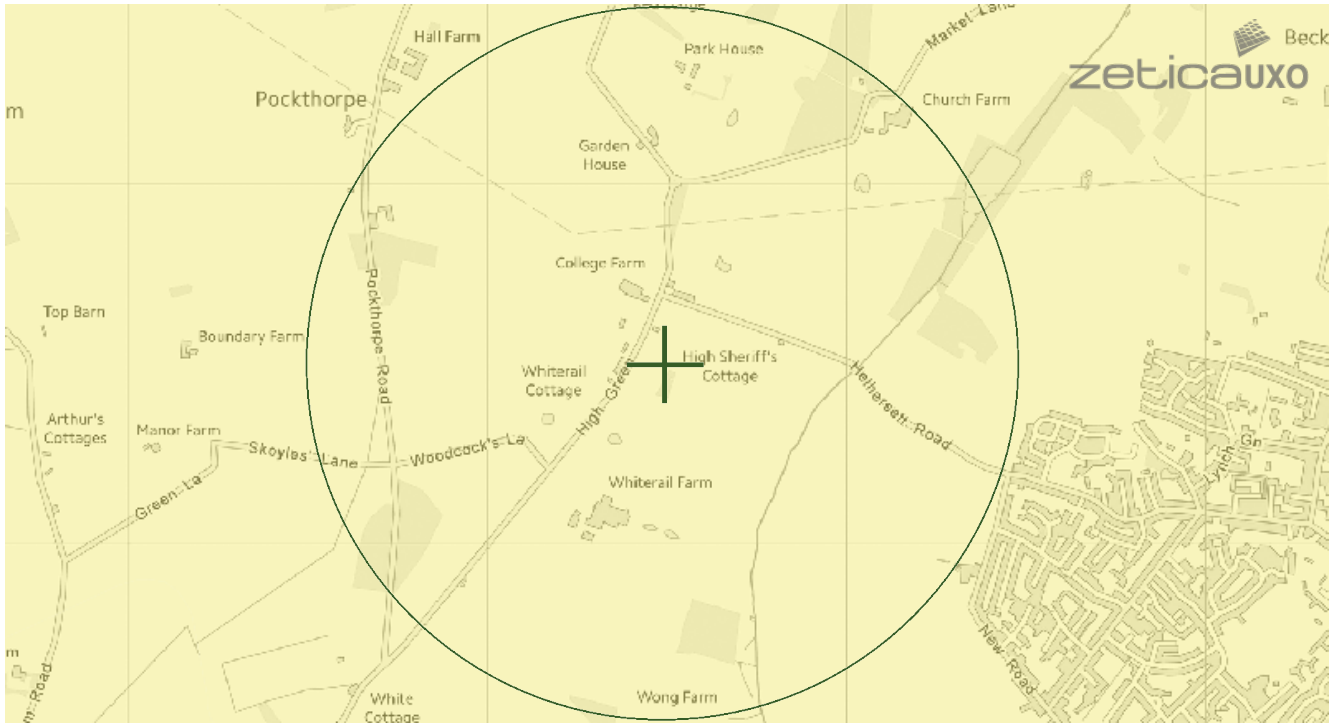
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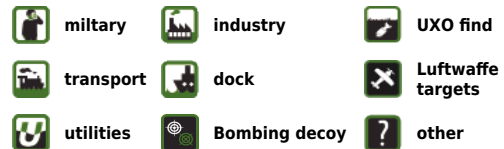
## SITE LOCATION

Location: High Green, Norfolk  
Map Centre: 613500,305500



## LEGEND

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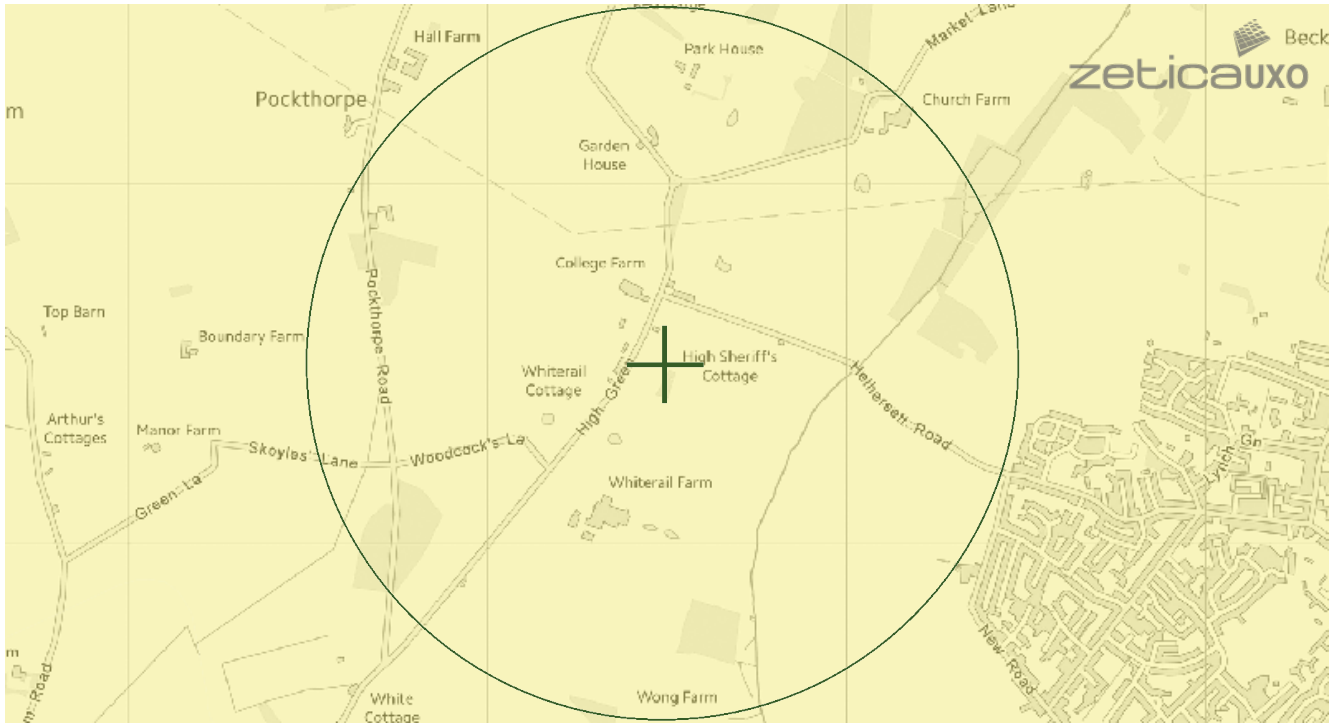
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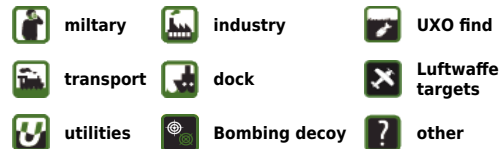
## SITE LOCATION

Location: High Green, Norfolk  
Map Centre: 613500,305500



## LEGEND

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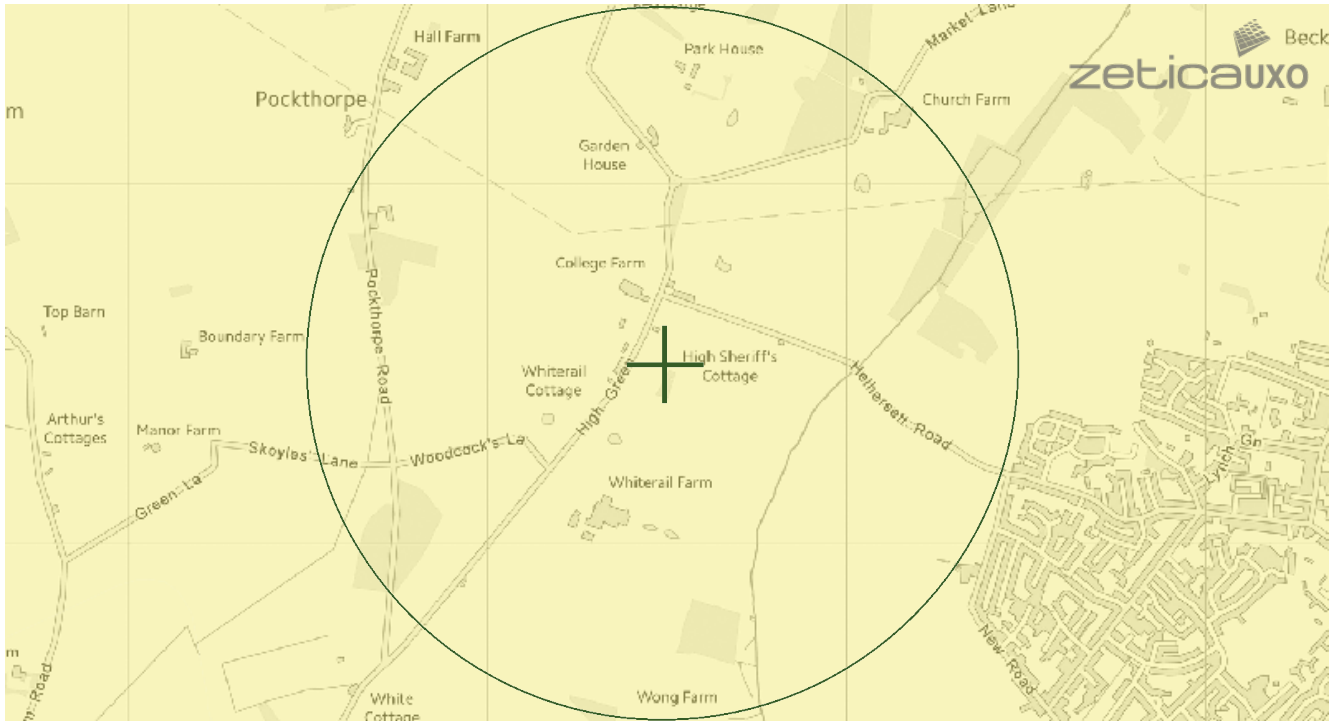
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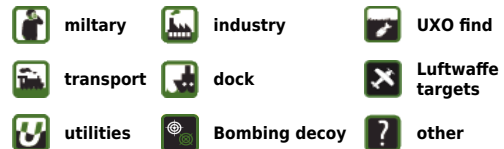
## SITE LOCATION

Location: High Green, Norfolk  
Map Centre: 613500,305500



## LEGEND

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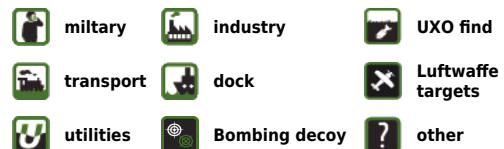
## SITE LOCATION

Location: Ketteringham, Norfolk  
Map Centre: 616500,302500



## LEGEND

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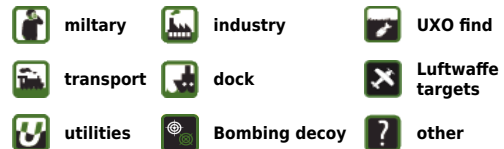
## SITE LOCATION

Location: Swardeston, Norfolk  
Map Centre: 620500,302500



## LEGEND

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



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# UNEXPLODED BOMB RISK MAP



## SITE LOCATION

Location: Attlebridge, Norfolk  
Map Centre: 612500,316500



## LEGEND

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

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

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## **Annex D – Qualitative Human Health & Environment Risk Assessment Methodology**

## Qualitative Methodology

The risk assessment considers the sources and potential receptors identified, together with linking pathways. These linkages are summarised in the Preliminary Conceptual Site Model and Qualitative Risk Assessment within the report, where the associated environmental risk is assessed for a given source and the end-use of the site. This assessment also takes account of specific chemicals of concern or groups of similar chemicals of concern. The column designated as 'Potential Consequence of Source- Pathway – Receptor-Linkage' in the Preliminary Conceptual Site Model and Qualitative Risk Assessment gives an indication of the sensitivity of a given receptor to a particular source/chemical of concern being considered. It is a worst case classification and is based on full exposure via the particular linkage being examined. The derivation of the classes used to rank this particular aspect is as follows based on CIRIA 552 'Contaminated Land Risk Assessment, A Guide to Good Practice' 2001:

Classification	Human Health	Controlled Water	Ecological	Built Environment	Amenity
Severe	Acute risk to human health likely to result in 'significant harm' as defined by the Environmental Protection Act 1990, Part 2A	Substantial pollution of sensitive water resources	Significant change to the number of one or more species or ecosystems	Catastrophic damage to buildings, structures or the environment	Irreversible damage to human health
Moderate	Chronic damage to human health ('significant harm').	Pollution of sensitive water resources	Change to population densities of non-sensitive species	Damage to sensitive buildings, structures or the environment	Non-permanent health effects to humans
Mild	Harm but not necessarily significant harm to humans	Pollution to non-sensitive water resources	Some change to population densities but with no negative effects on the function of the ecosystem	Easily repairable effects of damage to buildings or structures	Slight short term health effects to humans

Classification	Human Health	Controlled Water	Ecological	Built Environment	Amenity
Minor	Harm but not necessarily significant harm to humans which can easily be prevented with the use of PPE.	Slight pollution to non-sensitive water resources	No significant changes to population densities in the environment or in any ecosystem	Very slight non-structural damage or cosmetic harm to buildings or structures	No measurable effects on humans

Subsequently, in the column designated 'Likelihood of PCL, an assessment is made of the probability of the selected source and receptor being linked by the identified pathway. This assessment is ranked based on-site specific conditions as follows:

Classification of probability	Definition
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur  Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term
Low likelihood	There is a pollution linkage and circumstances are possible under which an even could occur.  However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term
Unlikely	There is a pollution linkage, but circumstances are such that it is improbable that an event would occur in the very long term

The 'Risk Classification' column is an overall assessment of the actual risk, which considers the likely consequence of a given risk being realised and the likelihood of that risk being realised. The risk classifications are assigned using the following consequence/likelihood matrix:

<b>Matrix</b>				
<b>Severe</b>	Moderate to low	Moderate	High	Very High
<b>Medium</b>	Low	Moderate to Low	Moderate	High
<b>Mild</b>	Very Low	Low	Moderate to Low	Moderate
<b>Minor</b>	Very Low	Very Low	Low	Moderate to Low
<b>Likelihood</b>	<b>Unlikely</b>	<b>Low likelihood</b>	<b>Likely</b>	<b>High likelihood</b>

Overall risks are described as follows:

Very Low	The presence of the identified source does not give rise to the potential to cause unacceptable harm.
Low	It is possible that harm could arise to a designated receptor from an identified source, however, this is unlikely to be unacceptable.
Moderate	It is possible that harm could arise to a designated receptor from an identified source, but it is likely that such harm would be relatively localised or non-permanent - remedial action may be necessary.
High	A designated receptor is likely to experience unacceptable harm from an identified source without remedial action.
Very High	There is a high probability that severe unacceptable harm could arise to a designated receptor from an identified source without appropriate remedial action.

In cases of physical features, such as foundations and underground services, harm is defined as impact which would result in non-serviceability of the identified receptor or extra over build costs associated with redevelopment.