Great North Road Solar and Biodiversity Park

Environmental Statement Report

Volume 4 – Technical Appendices

TA A10.7 – Desk Study and Preliminary Risk Assessment – Study Area 7

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Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, APFP Regulation 5(2)(a)

Contents

A10.7.1. INTRODUCTION

A10.7.1.1. PREAMBLE

1 RPS Consulting Services Ltd (RPS) was commissioned by Elements Green Trent Ltd to undertake a Desk Study and Preliminary Risk Assessment (DTS and PRA) of The Great North Road Solar and Biodiversity Park (GNR; "the Development"), within the Order Limits. The report has been commissioned prior to the submission of the application for DCO consent for the Development.

2 The Development would be located to the north-west of Newark, in the Newark and Sherwood district, Nottinghamshire, East Midlands. The Development would be within an area bound by the Order Limits. The Order Limits are to the west of the A1, north of the A617, east of Eakring, and south of Egmanton, to the north and north-west of Staythorpe. The Development essentially consists of discrete land parcels proposed to be occupied by solar PV panels, BESS and associated infrastructure, and connected by cable route areas. The eastern side of the Development runs from the north of Norwell to Egmanton in the north (with additional parcels of land for mitigation/enhancement around North Muskham). The western side of the Development runs north-west from Staythorpe Power Station and then splits at Maplebeck, with spurs running to Eakring in the north-west and Kneesall to the north-north-east, then connecting with the eastern side of the Development.

3 A plan showing the location and Order Limits for the Development is provided as Figure 10.1: Site Desk Study Zoning Plan in Volume 2 Chapter 10 – Ground Conditions and Land Contamination [EN010162/APP/6.2.10]. In order to provide sufficient detail for the PRA, the Development has been subdivided by RPS into eight study areas (referenced as Study Areas 1 – 8). It should be noted that the split of the Study Areas are based on the previous Order Limits for PEIR and therefore the DTS and PRA presents an assessment of an area that is inclusive of the current Order Limits. It should be noted that where cable routes extend beyond the Study Area, along existing public highway, these cable routes have not been subject to specific desk based review or considered within the conceptual site model on the basis that these public highways would have been constructed to adoptable standards and therefore are not considered to represent potentially contaminated areas.

4 This report presents the Desk Top Study (DTS) information and Preliminary Risk Assessment (PRA) for Study Area 7, as shown in Figure A10.7.1: Study Area 7 Boundaries. This constitutes Field Parcel ID's 5, 13, 23, 27, 28, 29, 37, 47, 64, 72, 82, 93, 102, 109, 121, 127, 133, 142, 149, 150, 151, 152, 153, 577, 154, 155, 156, 157, 158, 159, 160, 171, 181, 192, 195, 198, 199, 259, 261, 318, 358, 421, 464, 465, 466, 470, 471, 476, 477, 478, 479, 480, 525, 551, 576 and 598, and are shown on Figure A10.7.2: Study Area 7 Field Boundaries.

5 The wider area within and surrounding the Order Limits are generally composed of agricultural land, interspersed by occasional woodlands. Surrounding villages and hamlets are connected by rural roads and public

rights of way. Smaller fields and tree cover are more common close to the villages and along water courses, with larger and more open fields set further away. The total area of the Development Site is approximately 1,765 hectares (ha), the majority of which is currently used for arable crops or pasture.

6 The Desk Study assessment is based upon a review of published information available from local, regional, and national agencies. The desk study information is derived from Insight Reports provided by Groundsure, Ref. GSIP-2024-16448-21124_C which are presented within Volume 4 Technical Appendix A10.11 – Desk Study and Preliminary Risk Assessment Groundsure Data [EN010162/APP/ 6.4.10.11]. Please note the terms and conditions attached to the supply of data from Groundsure. It should be noted that the Study Area boundaries presented within the Groundsure Insights Reports are based on the previous Preliminary Environmental Information Report site boundary which was provided at the time of purchasing the Groundsure data. Only information relating to the Study Areas and a data search buffer of 250 m, where relevant, has been included within this assessment.

A10.7.1.2. OBJECTIVES

7 The principal objectives of this assessment were as follows:

Establish from published sources the geological sequence for Study Area 7 and potential for ground instability to occur through development proposals.
To assess potential sources of contamination associated with historical and current land uses both on Study Area 7 and within a data search area of 250 m radius.
To review the environmental setting to assess the sensitivity of the surrounding area to contamination/pollution.
To produce an outline Conceptual Site Model (CSM) detailing how any contamination may impact the identified receptors via pollutant linkages; and
To conclude on the likely requirement for any further assessment and ground investigation required in support of the DCO application.

8 The PRA methodology utilised in the preparation of this assessment is presented in detail in Annex B.

A10.7.1.3. LEGISLATION AND GUIDANCE

9 The assessment has been undertaken in general accordance with British Standard BS EN ISO 21365:2020[1] and is considered suitable to meet the initial requirements of planning as outlined within the National Planning Policy Framework (NPPF)[2]. The assessment also reflects the

[1] British Standards Institution (2020). BS EN ISO 21365:2020 soil quality. Conceptual site models for potentially contaminated sites. Available at: https://standardsdevelopment.bsigroup.com/projects/2017-02617 (accessed 21.05.2025)
[2] Ministry of Housing, Communities and Local Government, National Planning Policy Framework (Dec 2024/ Amended Feb 2025) Available at: https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF_December_2024.pdf (accessed 21.05.25)

recommendations of Environment Agency guidance, Land Contamination: Risk Management, (LCRM, 2023)[3].

10 This report has been produced in general accordance with:

Contaminated Land (England) Regulations 2006 (as amended);
DEFRA Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance (2012);
Environment Agency (2023) Land Contamination: Risk Management (LCRM 2023);
National Planning Policy Framework (2024);
CIRIA Document C665 (2007): Assessing Risks Posed by Hazardous Ground Gases to Buildings;
British Standard requirements for the 'Investigation of potentially contaminated sites – Code of practice' (ref. BS10175:2011+A2:2017);
British Standard requirements for the 'Code of practice for ground investigations' (ref. BS5930:2015+A1:2020); and,
British Standard requirements for the 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' (ref BS8485:2015+A1:2019).

11 Details of the limitations of this type of assessment are described in Annex C.

A10.7.2. DESCRIPTION OF STUDY AREA 7 AND DESK STUDY

12 Study Area 7 is located at National Grid Reference (NGR) SK 76195, 66449 and comprises the northern portion of the Order Limits. The extent of Study Area 7 is presented in Figure 10.7.1: Study Area 7 Boundaries.

13 Study Area 7 covers an approximate area of 486 hectares (ha), excluding plots of land excluded from the development, and currently comprises undeveloped agricultural land, sporadic mature trees, mature hedgerow, small sections of mature woodland and in the north electricity pylons. Study Area 7 is noted as topographically ranging from approximately 54 m Above Ordnance Datum (AOD) in the south-west, 40 m AOD in the north-west, 37 m AOD in the south-east sloping towards the centre and northwards to an elevation of approximately 20 m AOD.

14 Given the absence of potentially significant contaminative land uses / sources, as identified from environmental data searches, within the Study Area, a targeted site inspection has not been required of this Study Area.

15 Study Area 7 is in an area of predominantly agricultural land use. The south-west includes land west of Ossington previously utilised as a wartime airfield with minor roadways, runways and remains of demolished structures evident. Based on images reviewed, the neighbouring land consisted of the following:

[3] Environment Agency (2023). Land Contamination: Risk Management (LCRM). Available at: https://www.gov.uk/government/publications/land-contamination-risk-management;lcrm (accessed on 25.01.2025).

Table A10.7.1: Neighbouring Land Uses

Direction	Description
North	A1 roadway, undeveloped agricultural land, mature woodland, Weston Village, Ladywood Farm, disused oil borehole.
East	Undeveloped agricultural land, Crow Park Farm, Common Farm, mature woodland, Study Area 6.
South	The Grange, undeveloped agricultural land, disused sewage works, mature woodland, Study Area 8.
West	Moorhouse Village, undeveloped agricultural land, mature woodland, Primrose Farm, Knapeney Farm, Breck Farm.

A10.7.2.1. THE DEVELOPMENT

A10.7.2.1.1. The Great North Road Solar and Biodiversity Park (GNR) ("the Development")

16 Full details and a detailed description of The Development are outlined in Environmental Statement (ES) Volume 2 Chapter 5 - Development Description [EN010162/APP/6.2.5].

A10.7.2.1.2. Study Area 7

17 The majority of this study area comprises fields allocated as Work Area No 1 Solar PV panels. These areas include solar PV panels, mounting structures and poles, switchgear, inverters and controls/monitoring equipment, transformers and switchgear, local medium voltage substations/switchrooms, low voltage switchrooms and equipment, cabling and earthing conductors/cables, fencing, security cameras, SuDS measures, operating staff welfare/office facilities (intermediate substations) and storage containers.

18 Eighteen fields are designated as Work Area No 3 environmental mitigation/enhancement areas, mainly to the north of North Wood and through a north-south aligned central belt of fields either side of Moorhouse Beck. These areas may contain fencing/gates, SUDs measures, archaeological investigations, plantings/vegetation management, paths, bridleways or cycle paths but will not form part of proposed PV panel construction areas.

19 Also within this study area are fields allocated as Work Area No 2 cable corridors and cable areas linking with Study Area 8 to the south-west and Study Area 6 to the south-east. Cable Areas, are shown as a "corridor" 60 m wide, typically – this is the corridor within which the cable route is expected to be located, to give flexibility for the designer post-consent.

A10.7.2.2. SITE HISTORY

A10.7.2.2.1. Historical Map Review

20 The following review is based on past editions of readily available Ordnance Survey (OS) maps, aerial photographs and anecdotal information from BGS sources. These include scales of 1:1,250, 1:2,500, 1:10,560 and 1:10,000 dated 1885 to 2024. Extracts are provided in Volume 4 Technical Appendix A10.11 – Desk Study and Preliminary Risk Assessment Groundsure Data [EN010162/APP/ 6.4.10.11]. Historical site uses are presented in Table A10.7.2, below.

Table A10.7.2: Historical Site Uses within Study Area 7

Study Area 7 Land Use and Features	Dates
Undeveloped agricultural land, hedgerow, mature trees and associated farming structures.	1885 – 2024
Disused oil boreholes formed by the drilling of Egmanton Oil Boreholes Refs 9, 19, 36, 53, 58, 59 and 60 in the 1950s, becoming disused by 1974. Believed to have been drilled as part of the wider Nottinghamshire oil field extraction works. The locations of former oil boreholes are evident on the Study Area on the south side of the A1 (field no 4, 5).	1972 – 1974
The south-west of Study Area 7 comprises former World War 2 (WWII) RAF Ossington Airfield. In active use from 1941 to 1946 comprising three hard runways, structures and training targets. After WWII, the runways were understood to have been partially broken up for use in the A1 construction, in the east, parts of the runway and linked minor roads are still evident on recent aerial photographs.	1941 – 2024

21 Pertinent historical site uses within 250 m of Study Area 7 are presented below.

Table A10.7.3: Historical Neighbouring Land Uses within 250 m

Surrounding Land Use	Orientation	Distance from Study Area 7	Dates	
			From	To
Egmanton Oil and Gas Field (discussed in more detail in the following section)	north	0 m	1955	2024
Railway Cuttings Railway Station	South-East	58 m	1950	2024

Surrounding Land Use	Orientation	Distance from Study Area 7	Dates	
			From	To
Ossington Airfield	South.	0 m	1941	2024
Disused Sewage Works	South-East	20 m	1971	1994
Oil Boreholes	North	9 – 236 m	1972	1974
Oil Depot and Tanks	North	10 m	1972	2010
Electricity Sub Station	North	120 m.	1972	2010
Agricultural Land	surrounds	0 -250 m	1888	2024
Common Farm	East.	10 m	1888	2024
Thorpe Farm	West	10 m	1888	2024
Ladywood Farm	North	10 m	1888	2024

22 Egmanton Oil and Gas Field is indicated to have been operating and active in the extraction and production of oil and gas from the Carboniferous Coal Measures and Millstone Grit bedrock since 1955, and the oil field is understood to have last produced in May 2023. Data from 2019 indicates a production volume of zero oil barrels (bbl) per year, and a natural gas volume of zero m^3/yr. It is suggested that in 2012, three well sites were still in operation, and others used for reservoir monitoring and management.

23 The Egmanton Gathering Centre (EGC) relating to oil and gas extraction and transportation was present directly north of Study Area 7 comprising some 14 tanks of varying sizes, areas of hardstanding and associated building structures. Anecdotal information suggests that direct filling of tankers was undertaken here in 2012, facilitating transport for processing. In the 1950's, wells were connected to the Egmanton Gathering Centre by underground pipeline. No information is available on the location of these pipelines.

24 Initial production wells are indicated to have been drilled from the 1950's encompassing a wide area between the village of Egmanton and the village of Weston. Multiple wells were present within the north of this Study Area, however, available data indicates that these were not actively used for oil and gas extraction.

25 The closest wells reported as used for extraction relate to Egmanton wells 7, 20 and 68 present along the northern boundary to the south of Lady Wood. An IGas review report (Ref. Island Gas Ltd. Periodic Review of Mining Sites, Section 96 of Schedule 14 of the Environment Act 1995, July 2012), indicates, at the time of writing, for these wells to comprise the well cellars, associated valves and pipe manifolds secured by a metal cage. All plant/machinery and boundary fencing, except for some posts, are indicated to have been removed.

26 Current satellite imagery indicates the areas that surround the wells to generally remain in a similar condition, having become grassed over. Some areas of hardstanding are still visible. The works plant (EGC) directly north is indicated to have been demolished, currently comprising open land.

A10.7.2.2.2. Planning History

27 There are no available planning records associated with Study Area 7 on the Newark and Sherwood District Council planning website as of November 2024.

A10.7.2.3. ENVIRONMENTAL SETTING

28 The Groundsure Insight Reports used in preparation of the environmental setting assessment are included within Volume 4 Technical Appendix A10.11 – Desk Study and Preliminary Risk Assessment Groundsure Data [EN010162/APP/ 6.4.10.11].

A10.7.2.3.1. Geology

29 Based on British Geological Survey (BGS)[4] mapping (1:50,000-scale) and the Environment Agency (EA) Groundwater Vulnerability mapping (1:100,000-scale), the stratigraphic sequence and aquifer classifications beneath the Study Area is indicated to be as follows:

Table A10.7.4: Descriptions of Geological Strata

Stratum	Description & approx. thickness (based upon BGS Lexicon of Rock Units and borehole data)	Aquifer Classification
Superficial Deposits		
Alluvium	Limited to the central part of the study area following the route of Moorhouse Beck , generally comprises unconsolidated clay, silt, sand and gravel deposited through fluvial action. No mapped extent across the south of the study area including the former airfield. Approx. Thickness – unproven.	Secondary A Aquifer
Bedrock		
Mercia Mudstone Group (MMG) – Mudstone	Present across the whole of the Study Area and generally	Secondary B Aquifer

[4] British Geological Survey (2025). Geoindex Onshore. Available at: https://www.bgs.ac.uk/map-voewers/geoindex-onshore/ (accessed on 21.05.2025).

Stratum	Description & approx. thickness (based upon BGS Lexicon of Rock Units and borehole data)	Aquifer Classification
	comprises red, green-grey mudstones with subordinate siltstones and widespread beds of gypsum/anhydrite. Rare thin sandstone beds possible. Approx. Thickness – 182 m.	
Mercia Mudstone Group – Siltstone, Dolomitic	Present in irregular bands across the Study Area, generally comprises siltstones and thick-halite bearing units set within green-grey mudstones. Approx. Thickness – 182 m.	Secondary Undifferentiated

30 The majority of Study Area 7 is shown to be devoid of superficial deposit cover. The alluvial deposits are relatively localised consisting of a band running east to west through the centre of Study Area 7 following the course of Moorhouse Beck.

31 BGS Borehole records indicate eight boreholes to be present within the Study Area 7. Seven records are located within the north of the study area, in relation to the Egmanton Oil Field., none of which are for groundwater abstraction wells. One record (SK76NE/74) is located within the south-east of the study area drilled for proving depth to Coal Measures. A summary of these records is presented below.

32 Borehole SK76NE/36 (Egmanton Oil Field reference 'Egmanton 53') is in the north of Study Area 7, approximately 780 m east of Moorhouse Road. The borehole is indicated to have been drilled in 1958 by BP Exploration Co Ltd. as part of the wider oil field exploration/test area. A summary of the geological strata encountered, is presented in the table below.

Table A10.7.5: Descriptions of Borehole SK76NE/36

Stratum	General Description	Depth (m BGL)
Superficial Deposits		
None recorded.	-	0.00 – 3.00.
Bedrock		
Mercia Mudstone Group.	Red-brown siltstone with rare gypsum beds becoming red-brown and grey green with some gypsum, becoming dark brown to red-brown mudstone	3.00 – 160.00.

Stratum	General Description	Depth (m BGL)
	with rare siltstone beds, sandy beds and rare gypsum. Tr. Bitumen noted at 15.00, 45.00 and 100.00 m BGL.	
Bunter Sandstone Formation.	Well cemented calcareous quartz sandstone with flint and pebbles, becoming sandstone with interbedded gypsum with micaceous mudstone. Tr. Bitumen noted at 235.00 and 340.00 m BGL.	160.00 – 340.00.

33 'Tr. Bitumen', noted throughout the borehole, are indicative of residual/trace of coal tar. The remaining depths of this borehole are indicated to comprise Permian strata underlain by the Pennine Middle Coal Measures Formation including Tr. Bitumen, trace coal and coal seams from a depth of 487.00 m to a termination depth of 1086.00 m BGL.

34 Other boreholes within Study Area 7, ref. SK76NE/38 (Egmanton 58), SK76NE26/26A (Egmanton 36/36A), SK76NE/14 (Egmanton 19) and SK76NE/39 (Egmanton 59), also relate to the Egmanton Oil Field Study Area 7 and confirm similar underlying geological strata sequence to SK76NE/36.

35 Records for the Ossington Borehole (SK76SW/27), located within the former airfield extents and approximately 340 m south-east of Study Area 7, indicate an absence of superficial deposits and outcropping MMG strata described as red-brown and grey-green marls and siltstones with thin gypsum beds with a proven thickness of 109.80 m before a recorded sandstone band was encountered.

A10.7.2.3.2. Hydrogeology

36 Superficial deposits (Alluvium) occupying the centre of Study Area 7 have been classed by the EA, as a Secondary A Aquifer.

37 The underlying/outcropping Mercia Mudstone Group bedrock is classed as a Secondary B Aquifer of high vulnerability and a Secondary Undifferentiated Aquifer of high vulnerability relating to the Dolomitic Siltstone banding. These are defined below:

- Secondary A Aquifers represent formations that are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers.
- Secondary B Aquifers represent formations that are generally formed of lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.
- Secondary Undifferentiated Aquifers represent formations that have varying characteristics in different locations.

38 The MMG comprise low-permeability reddish-brown mudstones and siltstones with sandstone bands, albeit likely to be in excess of 100 m depth based upon local borehole records and transmits groundwater mainly through fractures in the occasional thin, impersistent siltstones and sandstones. These commonly possess only a very small outcrop area and consequently recharge is often limited. They tend to vary in thickness and may not be laterally persistent. The thick, extensive mudstone units are likely to act as a barrier to groundwater movement. Evaporite layers may also be present in parts of the MMG, but in this area, as identified in BGS boreholes, they comprise mainly sulphate rich minerals such as gypsum encountered in thin beds, which have little potential as a water resource due to limited volumes and typically high sulphate content.

39 According to EA data, Study Area 7 is not located in a groundwater Source Protection Zone (SPZ).

40 Information provided by the EA indicates that there are no records of active licensed groundwater abstractions within 250 m of Study Area 7.

A10.7.2.3.3. Surface Water

41 There is one watercourse within Study Area 7 which is classified within a River Basin Management Plan published by the EA under the European Water Framework Directive (2000). Details of this watercourse are presented in the table below.

Table A10.7.6: Nearby Watercourses and Water Bodies

Watercourse/Body	Quality Classification	Approx Distance and direction from Study Area 7
Moorhouse Beck (tributary of Goosemoor Dyke).	Overall: Moderate (2019). Chemical: Fail (2019). Ecological: Moderate (2019).	Flowing from south-west to north-east through the central part of the Study Area.

42 Based on satellite imagery and published topographic information, multiple minor watercourses not classified under the WFD are present within and around Study Area 7, primarily relating to drainage across agricultural land and small ponds.

43 Information contained within the Groundsure EnviroInsight Report indicates that there are no records of active licensed surface water abstractions within 250 m of Study Area 7.

A10.7.2.3.4. Ecologically Sensitive Sites

44 The Groundsure EnviroInsight Report indicates that there are no ecologically sensitive sites, that constitute an environmental receptor as defined within Table 1 of the DEFRA Environmental Protection Act 1990: Part 2A -

Contaminated Land Statutory Guidance (2012)[5], located within a 250 m radius of Study Area 7. Ecologically sensitive sites protected under the NPPF are listed in the table below.

Table A10.7.7: Ecologically Sensitive Sites

Environmental Designation	Name	Approx Distance and direction from Study Area 7	Details of Designation
Designated Ancient Woodland	North Wood	Onsite (south-west)	Ancient & semi-natural woodland

A10.7.2.3.5. Radon

45 According to the online Indicative Atlas of Radon in England and Wales published by the UK Health Security Agency (UKHSA)[6] and BGS, Study Area 7 lies within a kilometre grid square with a maximum radon potential of less than 1 %. The Indicative Atlas is based upon Radon Potential Data and classifies areas based upon the likelihood of a property having a radon action level at or above the Action Level of 200 Bq m^3 based upon a dataset of over 500,000 records provided by the UKHSA and geology provided by the BGS. The Radon Potential is calculated from statistics (geometric mean and geometric standard deviation) of indoor radon measurements collected over each geological unit.

46 The higher resolution Radon Potential dataset, as included within the Groundsure GeoInsight report, provides a more accurate assessment of the level of risk and the requirements for inclusion of preventative measures during construction based upon BGS Geology (1:50,000 scale) geological map data. This indicates that Study Area 7 has a maximum radon potential of less than 1 % of properties having a radon level at or above the Action Level in Great Britain.

A10.7.2.3.6. Mining Remediation Authority

47 The Interactive Map Viewer on the Mining Remediation Authority[7] website indicates that the Study Area 7 is not located in a coal mining reporting area or within a Development High Risk Area.

A10.7.2.3.7. Non-coal Mining

48 BGS sources indicate that Study Area 7 is not located in an area of recorded non-coal mining (vein minerals, chalk, oil shale, building stone, bedded ores,

[5] DEFRA (2012). Contaminated Land Statutory Guidance. Available at: www.gov.uk/government/publications/contaminated-land-statutory -guidance (accessed on 21.05.2025).
[6] UK Health Security Agency (2022). UK maps of radon. Available at: https://www.ukradon.org/information/ukmaps (accessed 21.05.2025).

[7] Mining Remediation Authority (2025). Map Viewer. Available at: https://datamine-cauk.hub.arcgis.com (accessed 21.05.25).

evaporites and 'other' commodities including ball clay, jet, black marble, graphite and chert).

49 BGS holds a database of British Pits, abbreviated to 'BritPit', comprising currently active, closed surface and underground mineral workings. Records indicate multiple former BritPits to be present within Study Area 7, and within the 250 m study area. These include the Egmanton oilfield wells and pits/quarries for extraction of sand and gravel, sandstone or clay.

A10.7.2.3.8. BGS Ground Stability Hazard Ratings

50 BGS Ground Stability Hazard ratings for Study Area 7 are summarised as follows:

Table A10.7.8: BGS Ground Stability Hazards

Ground Stability Hazard	BGS Risk Rating
Collapsible Ground	Negligible / Very Low
Compressible Ground	Negligible / Moderate (Alluvium)
Ground Dissolution	Negligible
Landslide	Very Low
Running Sand	Negligible / Low
Shrinking or Swelling Clays	Negligible / Very low

51 A moderate ground stability hazard in relation to compressible ground has been identified within Study Area 7. This relates to compressibility and uneven settlement hazards, which are probably present. Land use should consider specifically the compressibility and variability of the alluvial deposits in this area of The Development.

A10.7.2.4. AUTHORISED PROCESSES AND POLLUTION INCIDENTS

A10.7.2.4.1. Landfill and Waste Sites

52 Information provided by EA and Local Authority sources indicates that there are no recorded licensed or known historical landfill sites on or within 250 m radius. A historical waste site is identified directly north of Study Area 7. The waste site is indicated to have been a Scrap Metal Yard, records relating to operation in 1972.

A10.7.2.4.2. Contaminated Land Register

53 There are no sites designated under Part 2a of the Environmental Protection Act 1990 within Study Area 7 or surrounding 250 m radius.

A10.7.2.4.3. Environmental Permits

54 EA and Local Authority data indicates that there are two current processes regulated by an Environmental Permit (under the Environmental Permitting Regulations (2016)) on or within 250 m of Study Area 7. These are Part A(1) permits for crude oil extraction immediately north of the Study Area.

A10.7.2.4.4. COMAH Sites

55 There are no records of any operations under the Control of Major Accident Hazards (COMAH) Regulations 1999, located on or within 250 m of Study Area 7.

A10.7.2.4.5. Pollution Incidents

56 Environment Agency data indicates that there is one record of a 'major' or 'significant' pollution incident within 250 m of Study Area 7 as described in the table below. The location would appear to be the A1 on the northern boundary of the Study Area.

Table A10.7.9: Recorded Pollution Events

Location/Address	Approx distance and direction	Receiving Medium and date	Severity of Incident and Type
Not specified.	10 m north-east.	Water 05/11/11.	Category 2 (significant) Diesel spill.

A10.7.2.5. UNEXPLODED ORDNANCE

57 CIRIA Report C681[8] (Stone *et al.,* (2009)) outlines recommendations for dealing with the potential risk associated with the legacy of Unexploded Ordnance Risk, largely relating to WWII bombing and military sites.

58 Historical mapping indicates the south-west of Study Area 7 to have comprised the former WWII RAF Ossington Airfield. It is anticipated that the airfield would have had ordnance present during the period of war time operation.

59 A detailed desk based UXO Risk Assessment was undertaken by Tetra Tech RPS Energy for The Development dated 28th August 2024. The findings of the assessment identifies that Study Area 7 is in a low risk UXO area. No further measures are considered necessary other than provision of tool box talks during site inductions for construction staff and inclusion of UXO in Risk Assessments and emergency plans at pre-construction stage. The Tetra Tech RPS Energy UXO Risk Assessment report is presented in Volume 4 TA A10.10 – Detailed Desk Study (Stage 2) for Potential UXO Contamination [EN010162/APP/6.4.10.10].

A10.7.3. OUTLINE CONCEPTUAL SITE MODEL

A10.7.3.1. BACKGROUND

60 An outline conceptual site model (CSM) consists of an appraisal of the source-pathway-receptor 'contaminant linkages' which is central to the approach used to determine the existence of 'contaminated land' according to the definition set out under Part 2A of the Environmental Protection Act,

[8] CIRIA (2009). Unexploded Ordnance C681: A Guide for the Construction Industry. Available at: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductcode=C681 (accessed on 21.05.2025).

1990. For a risk to exist (under Part 2A), all three of the following components must be present to facilitate a potential 'pollutant linkage'.

- **Source** referring to the source of contamination (Hazard).
- **Pathway** for the contaminant to move/migrate to receptor(s).
- **Receptor** (Target) that could be affected by the contaminant(s).

61 Receptors include human beings, controlled waters and buildings / structures. The National Planning Policy Framework, used to address contaminated land through the planning process, follows the same principles as those set out under Part 2A.

62 As part of the assessment, the potential risks to receptors from potential sources, are given one of the following classifications:

- **Low risk** - it is considered unlikely that issues within the category will give rise to significant harm to identified receptors.
- **Moderate risk** - it is possible, but not certain that issues within the category will give rise to significant harm to receptors.
- **High risk** - there is a high potential that issues within the category will give rise to significant harm to identified receptors.

A10.7.3.2. POTENTIAL POLLUTION LINKAGES

63 Each stage of the potential pollutant linkage sequence has been assessed individually based on information obtained during the desk study exercise and are discussed in the following section.

A10.7.3.2.1. Potential Contaminant Sources

Onsite Current

64 Most of Study Area 7 comprises agricultural land. Whilst there is potential for contaminants such as chemicals such as pesticides, herbicides and insecticides may have been used onsite and in its proximity, these chemicals typically have a low residency time in soils and they degrade rapidly in compliance with the requirements for crops and grazing prior to products being used for human consumption. Therefore, agricultural uses are not considered a potential significant source of contamination.

Onsite Historical

65 The disused Ossington Airfield represents a potential contamination source in the south of the Study Area. Contaminants of concern associated with airfield usage include storage and use of organic solvents, metals, phosphoric acids, PCB's. Given the former military usage the possibility of aircraft dismantling and burial of parts cannot be entirely discounted. If present these may include radioactive elements such as Radium 226.

66 Aerial photographs included as part of the Groundsure report and Google Earth images indicate demolition materials remaining in-situ from former airfield buildings/structures. These may include Asbestos Containing materials (ACMs) used in the fabric of former structures.

67 A low risk for UXO has been concluded from the detailed desk based UXO Risk Assessment undertaken in 2024, and is presented within Volume 4 TA

A10.10 – Detailed Desk Study (Stage 2) for Potential UXO Contamination [EN010162/APP/6.4.10.10].

68 Former oil wells. Although there is no indication that the wells within the Study Area were operational, the potential cannot be discounted and may have resulted in minor oil spills during operation.

Offsite Current

69 No potentially significant current offsite contaminant sources have been identified that could impact on Study Area 7.

Offsite Historical

70 Historical offsite potential sources of contaminants of concern include a disused sewage works circa 1972. Contaminants associated with historical sewage works include metals, asbestos, acids/alkalis, cyanide, nitrates and sulphates.

71 Former scrap metal yard close to the north, possible source of metals and hydrocarbons.

72 Egmanton Gathering Centre immediately north, where oil reserves were collected and temporarily stored in tanks during the period of operation of the oil pumping wells of the Egmanton oilfield. There is potential for leaks to have occurred during filling and transportation and residual contamination from oil/fuel hydrocarbons, metals, phenols, propane, acids/alkalis.

73 Additional areas of Ossington Airfield, the possible range of contaminants as previously described.

A10.7.3.2.2. Potential Pathways

74 Shallow groundwater is likely to be limited to the superficial deposits associated with Moorhouse Beck that are predominantly granular and within which there is potential for mobilisation of gaseous or leachable contaminants of concern via granular horizons or via shallow groundwater. The mapped extents of these deposits coincides with the Work Area No 3 environmental mitigation/enhancement areas in which there is not anticipated to be any construction activities that would impact on water quality or adverse change to the existing groundwater regime.

75 The remainder of Study Area 7, including the former Ossington Airfield is indicated to be underlain by the relatively impermeable Mercia Mudstone Group strata, which will likely limit the downward or lateral migration of contaminants of concern via shallow groundwater across the majority of the area. The thick, extensive mudstone units are likely to act as a barrier to groundwater movement with locally beds of sandstone that may be more likely to be water-bearing strata present in excess of 100 m below ground level.

76 For future site users (maintenance workers), pathways for direct contact/ingestion with residual soils or inhalation of airborne dust may exist in areas of soft landscaping.

77 It should be noted that pathways may be modified or exacerbated by disturbance, however the shallow nature of the proposed construction works

is unlikely to create new pathways that could impact on deeper sandstone beds within the MMG that are more likely to be water-bearing strata.

A10.7.3.2.3. Potential Receptors

78 The superficial Alluvium, localised across the centre of Study Area 7, is classed as a Secondary A Aquifer. The underlying MMG bedrock, outcropping across the remainder of the Study Area is classed as a Secondary B Aquifer/Secondary undifferentiated Aquifer of high vulnerability. The main potential groundwater body within the MMG is within sandstone beds which from local borehole records is likely to be in excess of 100 m below ground level.

79 Study Area 7 is not within any recorded SPZ's and there are no licensed groundwater abstractions within 250 m of Study Area 7.

80 The main surface water feature identified on Study Area 7 is Moorhouse Beck. This feature is considered to represent a potentially sensitive controlled waters receptor; however, the proposed usage as mitigation and enhancement areas surrounding the course of the beck and limited lateral migration potential presented by limited shallow groundwater potential in the MMG bedrock present at the location of the potential onsite contamination sources identified would indicate negligible risk of contaminant mobilisation over distance and surface water has been discounted as being a potential viable receptor.

81 During operation of the Development it is not envisaged that there would be any full-time occupancy, however it is expected that there would be periodic requirements for maintenance work/checks. The risks posed to maintenance workers are considered to be limited to any works in the immediate vicinity of the identified potential contamination sources where there may be short-term direct contact, inhalation or ingestion of contaminated soil, asbestos fibres or residual hydrocarbon vapours, albeit exposure is likely to be on a short-term basis and works undertaken in accordance with best practice.

82 Potential post development human health receptors include offsite residents in what is a low-density residential setting. It is unlikely following placement that there will be disturbance of residual soils or creation of new migration pathways, therefore offsite users are unlikely to be adversely impacted by any study area derived contaminants post development.

83 The assessment does not consider the risk to construction workers. These risks would be managed through appropriate Health & Safety legislation via the H&S At Work Act (1974) and in accordance with Construction Design and Management (CDM, 2015) regulations.

84 Based on the identified potential sources and setting there is not considered to be a significant risk to ecological receptors, crops/vegetation or archaeological receptors from contamination.

A10.7.3.3. OUTLINE CONCEPTUAL SITE MODEL

85 An outline CSM has been developed on the basis of the desk study. The CSM is used to identify potential sources, pathways and receptors (i.e.

potential pollutant linkages) post development and is summarised in the table below.

Table A10.7.10: Outline Conceptual Site Model

Potential Source	**Contaminants Of Concern**	**Via**	**Potential Pathways**	**Linkage Potentially Active?**	**Receptors**	**Qualitative Risk Assessment**	**Notes**
Onsite Historical: Made Ground (Ossington Airfield or Egmanton Oil boreholes)	Hydrocarbons, fuels, oils, heavy metals, ACMs, organic solvents, phosphoric acids, PCB's, Radium.	Soil	Inhalation of volatiles, dust and fibres. Direct Contact.	Yes	Future site users	Low	Potential for contaminants in soils or demolition materials cannot be discounted No operational regular occupation and short term exposure assumed.
Onsite/offsite Historical: Made Ground (Ossington Airfield or Egmanton Oil boreholes).	Hydrocarbons, fuels, oils, heavy metals, ACMs, organic solvents, phosphoric acids, PCB's, Radium.	Soil	Vertical migration of contamination	Yes	Secondary Aquifers	Low	Low permeability outcropping strata. Limited potential for vertical groundwater migration, Sandstone beds, likely to be the main water bearing strata, present at depth in Study Area. Proposed shallow excavations unlikely to create new pathways for vertical migration.

Potential Source	Contaminants Of Concern	Via	Potential Pathways	Linkage Potentially Active?	Receptors	Qualitative Risk Assessment	Notes
Offsite Historical: Former sewage works and scrap metal yard.	metals, asbestos, acids/alkalis, cyanide, nitrates and sulphates, hydrocarbons.	Shallow Groundwater	Direct Contact. Inhalation of volatiles.	No	Future site users	-	Onsite migration potential restricted by likely low permeability of outcropping bedrock and low shallow groundwater potential.
Offsite Historical: Egmanton Gathering Centre oil depot.	ACMs, hydrocarbons, fuels, oils, heavy metals.		Direct Contact. Inhalation of volatiles.	No	Future site users	-	

N.B. If a Moderate or High Qualitative Risk Rating is identified further assessment is recommended

A10.7.4. CONCLUSIONS AND RECOMMENDATIONS

A10.7.4.1. PRELIMINARY GEO-ENVIRONMENTAL CONCLUSIONS

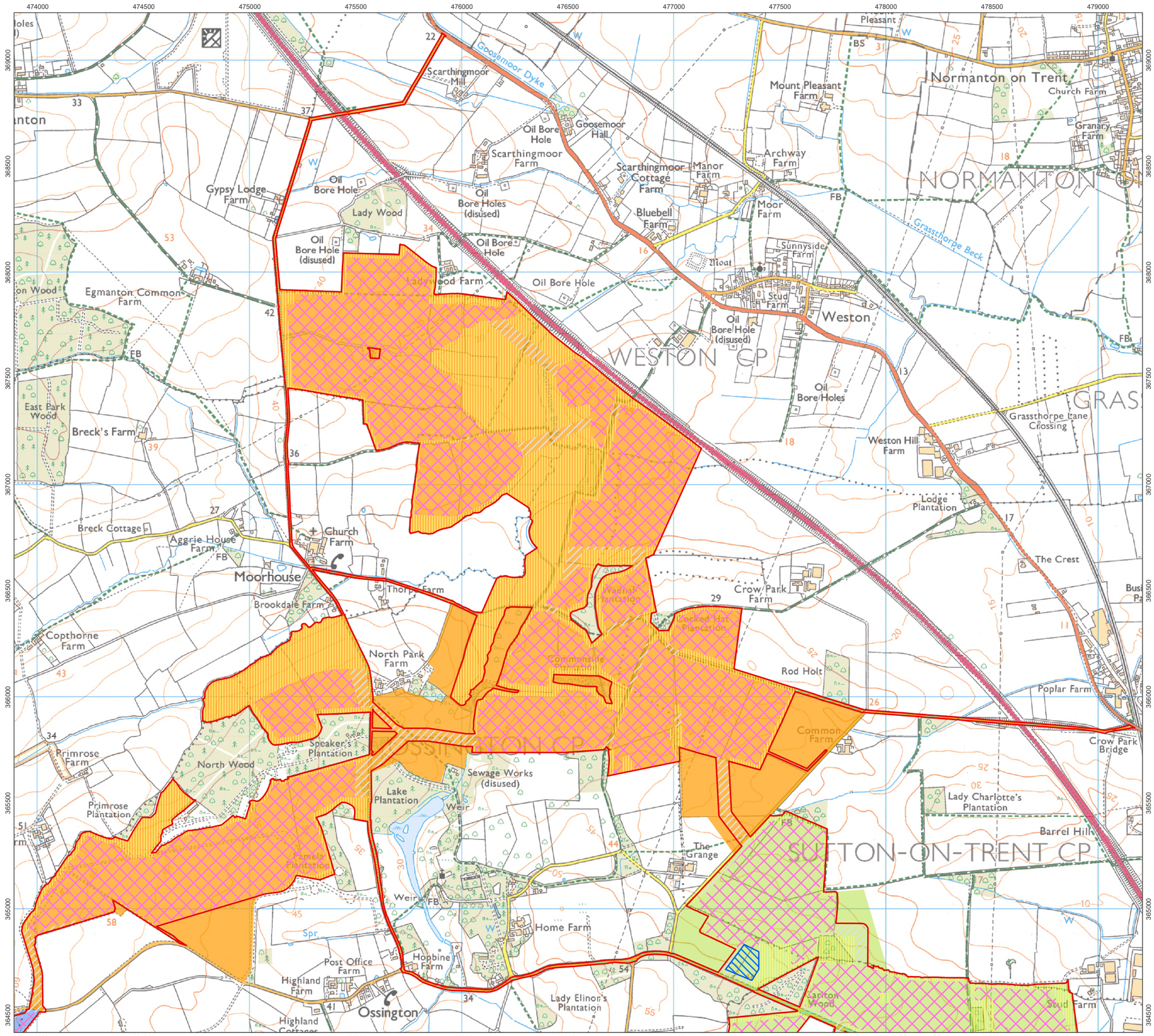
86 The outline CSM produced upon completion of the desk study assessment has identified few potential pollutant linkages that may be active following construction of the Development. Those that have been identified are considered to represent a low risk and no further assessment is considered necessary.

A10.7.4.2. RECOMMENDATIONS

87 The recommendations of the desk based UXO assessment should be taken into consideration during design for this area of the Development, full details included within Volume 4 TA A10.10 – Detailed Desk Study (Stage 2) for Potential UXO Contamination [EN010162/APP/6.4.10.1].

88 It is recommended that any remaining demolition materials stockpiled onsite following demolition of former airfield structures are removed as part of site clearance works to mitigate against risk of mobilisation of contaminants during construction. In addition to waste characterisation for disposal, it is recommended that a non-intrusive radiation survey of the materials is undertaken in the event that the materials include remnants of former aircraft construction materials.

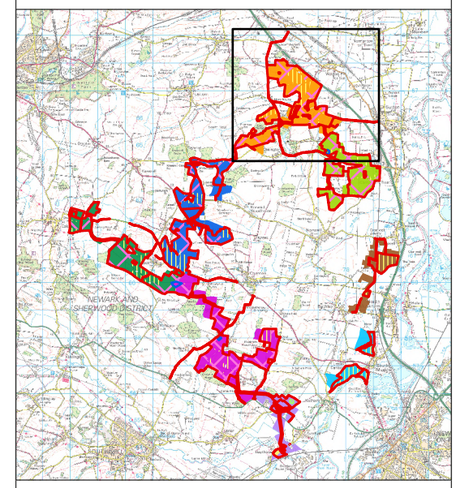
ANNEX A – FIGURES



- Order Limits
- Study Area 7
- Study Area 6
- Study Area 8

Works Areas

- Works Area 1 Solar PV
- Works Area 2 Cable
- Works Area 3 Mitigation
- Works Area 4 Substations
- Works Area 8 Access



1:17,500 Scale @ A3

0 0.15 0.3 0.6 km

Ref: NP12850 | Date: 11/06/2025

Study Area 7
Figure A10.7.1

Great North Solar and Biodiversity Park Environmental Statement

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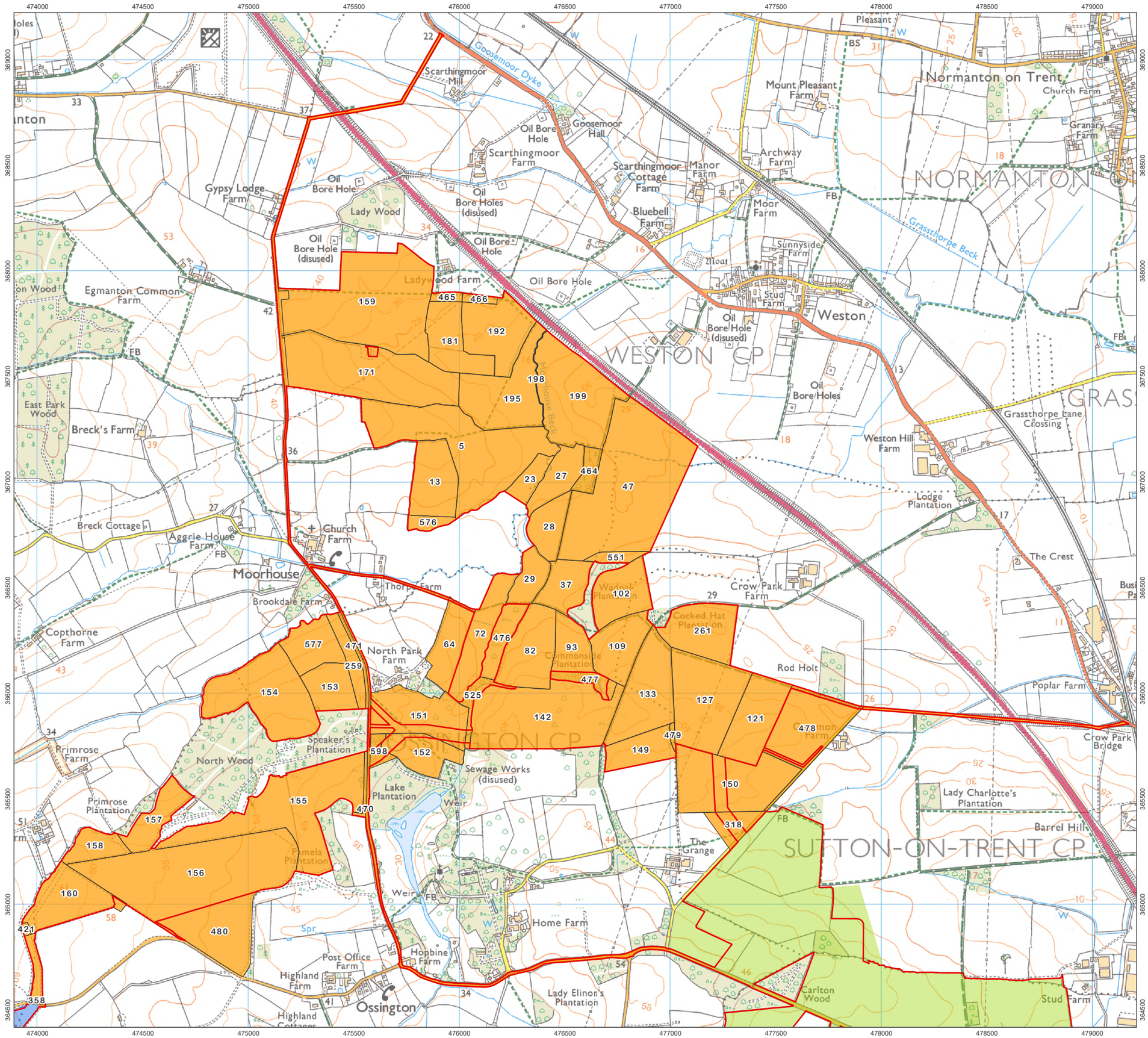


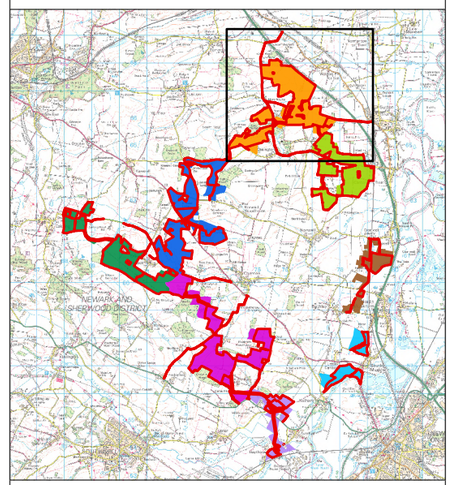
Order Limits

Field Boundaries

Study Area 7

Study Area 6

Study Area 8



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0 0.15 0.3 0.6 km

Ref: NP12850 | Date: 11/06/2025

Study Area 7 Field Boundaries
Figure A10.7.2

Great North Solar and Biodiversity Park
Environmental Statement

ANNEX B - PRA METHODOLOGY

Introduction

89 This report provides available factual data for the site obtained only from the sources described below and related to the site on the basis of the location provided by the Applicant. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources.

90 This report is written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission. The report is provided for sole use by the client and is confidential to them and their professional advisors. No reliance whatsoever is provided to any party other than the Applicant unless otherwise agreed.

Information Sources

Current and Historical Land Use

91 This section establishes the former and current uses of the Study Area and within a 250 m data search radius, which could have caused contamination. Details of the Development including current land use and location provided by the Applicant.

92 Information about the history of the Study Area and a 250 m radius, has been obtained through an inspection of historical maps at 1:10,000, 1:10,560, 1:2,500 and 1:1,250 scales and historical aerial photographs (where available). The accuracy of maps cannot be guaranteed, and it should be recognised that different conditions on-site may have existed between, and subsequent to, the map survey dates.

Regulatory Records

93 Regulatory records including landfills, pollution incidents (‘major’ and ‘significant’ only), industry authorisations and licensed water abstractions are derived from information purchased from Groundsure Ltd (unless otherwise specified).

Environmental Setting

94 The geological sequence underlying the Study Area and the approximate depths of strata are provided by maps published by the British Geological Survey (BGS) 1:50,000 scale and available borehole records held by the BGS.

95 The hydrogeological classification is obtained from Groundwater Vulnerability mapping by the BGS/EA/National Resources Wales (NRW). The vulnerability of groundwater is determined from this mapping and geological information.

96 The location of surface watercourses has been obtained from an inspection of current OS maps. Flood risk details and information on groundwater Source Protection Zones were obtained from readily available EA/NRW information published on-line and supplied by Groundsure Ltd.

97 Details of sensitive ecosystems/habitats and coal mining areas were supplied by Natural England and the Coal Authority respectively via Groundsure Ltd and inspection of the MAGIC website.

98 Radon is a radioactive gas produced naturally by certain types of geology. This report uses the Indicative Atlas of Radon in England and Wales (2007) produced by the Health Protection Agency (HPA) and the British Geological Survey (BGS) to determine whether the Study Area is located in an area at risk from radon gas. Where potential issues are identified, a site-specific radon report is obtained from the HPA and BGS to provide a more accurate estimate of the probability of the site being affected by radon gas ingress.

ANNEX C – ASSUMPTIONS AND LIMITATIONS

100 A "desk study" means that no site visits have been carried out as part of an assessment, unless otherwise specified.

101 This report provides available factual data for the Study Area obtained only from the sources described in the text and related to the Study Area and a 250 m radius, where relevant, on the basis of the location information provided by the Applicant.

102 The desk study information is not necessarily exhaustive and further information relevant to the Study Area may be available from other sources.

103 The accuracy of maps cannot be guaranteed, and it should be recognised that different conditions within the Study Area may have existed between and subsequent to the various map surveys.

104 No sampling or analysis has been undertaken in relation to this desk study.

105 Any borehole data from British Geological Survey sources is included on the basis that: "The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation".

106 Where any data supplied by the Applicant or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by RPS for inaccuracies in the data supplied by any other party.

107 This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission.