

# Proposed Electricity Substation and Overhead Line Works at Weston Marsh

Phase 1 Geoenvironmental Desk Study

- Part 1 of 2

June 2026

# Proposed Electricity Substation and Overhead Line Works at Weston Marsh

## Document control

| Document Properties         |                                     |
|-----------------------------|-------------------------------------|
| <b>Organisation</b>         | SLR Consulting                      |
| <b>Approved by</b>          | National Grid                       |
| <b>Title</b>                | Phase 1 Geoenvironmental Desk Study |
| <b>Document Register ID</b> | GWNC-WAA-SS50-XXXXXX-RPT-ES-000001  |
| <b>Data Classification</b>  | Public                              |

| Version History |         |        |   |
|-----------------|---------|--------|---|
| Document        | Version | Status | Description / Changes                           |
| May 2026        | 1.0     | Final  | First Issue                                     |
| June 2026       | 2.0     | Final  | Second Issue – minor update to cross references |
|                 |         |        |   |
|                 |         |        |   |

# Contents

---

|           |   |           |
|-----------|---|-----------|
| <b>1.</b> | <b>Introduction</b>                           | <b>1</b>  |
| 1.1       | Overview                                      | 1         |
| 1.2       | Summary of the Scheme                         | 1         |
| 1.3       | Purpose of this report                        | 2         |
| <b>2.</b> | <b>Legislative and Policy Framework</b>       | <b>4</b>  |
| 2.1       | Overview                                      | 4         |
| 2.2       | Legislation and National Policy               | 4         |
|           | National Planning Policy Framework            | 4         |
| 2.3       | Regional and Local Policy                     | 5         |
| <b>3.</b> | <b>Methodology</b>                            | <b>6</b>  |
| 3.1       | Scope of the Assessment                       | 6         |
| 3.2       | Study Area                                    | 6         |
| 3.3       | Data Collection                               | 6         |
| 3.4       | Assessment Approach                           | 7         |
| 3.5       | Assumptions and Limitations                   | 7         |
| <b>4.</b> | <b>Site History and Current Land Use</b>      | <b>9</b>  |
| 4.1       | Site History                                  | 9         |
| 4.2       | Current Land Use                              | 11        |
| 4.3       | Asbestos                                      | 11        |
| 4.4       | Ecology                                       | 12        |
| <b>5.</b> | <b>Geological and Hydrogeological Setting</b> | <b>13</b> |
| 5.1       | Geology                                       | 13        |
|           | BGS Borehole Records                          | 14        |
| 5.2       | Hydrogeology                                  | 15        |
| 5.3       | Groundwater Vulnerability Classification      | 16        |
| 5.4       | Hydrology                                     | 16        |
| <b>6.</b> | <b>Mining and Quarrying</b>                   | <b>18</b> |
| 6.1       | General                                       | 18        |
| 6.2       | Coal Mining                                   | 18        |
| 6.3       | Non-Coal Mining                               | 18        |
|           | BritPits                                      | 18        |
|           | Surface Workings                              | 18        |

|  |           |
|--|-----------|
| Non-Coal Underground Mining  | 18        |
| Natural and Mining Cavities  | 18        |
| <b>7. Environmental Setting and Consultations</b>                    | <b>19</b> |
| 7.1 Statutory Sources  | 19        |
| 7.2 Contaminated Land Register Entries and Notices                   | 19        |
| 7.3 Waste Management   | 19        |
| Landfills  | 19        |
| Licensed Waste Sites   | 19        |
| Waste Exemptions   | 19        |
| 7.4 Radon  | 20        |
| 7.5 Soil Geochemistry  | 20        |
| 7.6 Environmental Issues   | 21        |
| Recent Industrial Land Uses  | 21        |
| Hazardous Substances   | 21        |
| Licensed Industrial Activities                                       | 21        |
| Licensed Pollutant Release   | 21        |
| Discharges to Controlled Waters                                      | 21        |
| Pollutants and Pollution Incidents                                   | 22        |
| Unexploded Ordnance  | 22        |
| <b>8. Preliminary Risk Assessment</b>                                | <b>23</b> |
| 8.1 Introduction to Assessment                                       | 23        |
| 8.2 Sources  | 23        |
| 8.3 Receptors  | 24        |
| 8.4 Pathways   | 24        |
| Human Health   | 25        |
| Contaminant Leaching   | 25        |
| Ground Gas Migration   | 25        |
| Direct Contact Between Structures and Contaminated Soils/Groundwater | 25        |
| 8.5 Qualitative Risk Assessment – Contamination                      | 25        |
| 8.6 Climate Change   | 35        |
| <b>9. Summary</b>  | <b>37</b> |

---

|           |  |    |
|-----------|--|----|
| Table 1.1 | Components of the Scheme   | 1  |
| Table 4.1 | Summary of Land Use  | 9  |
| Table 5.1 | Summary of Relevant Geological Data                                    | 13 |
| Table 5.2 | Summary of BGS Boreholes within the Scheme Site Boundary               | 14 |
| Table 5.3 | Groundwater Vulnerability Classification                               | 16 |
| Table 7.1 | Summary of BGS Estimated Soil Geochemistry                             | 21 |
| Table 8.1 | Tabulated Conceptual Site Model: Plausible Contaminant Linkage Summary | 26 |
| Table 8.2 | Considered Generic Climate Change Effects                              | 35 |
| Table B.1 | Consequence of Risk Being Realised                                     | B4 |
| Table B.2 | Probability of Risk Being Realised                                     | B6 |
| Table B.3 | Risk Classification Matrix   | B7 |
| Table B.4 | Risk Classification Definitions  | B7 |

---

|          |   |    |
|----------|---|----|
| Figure 1 | Scheme Site Boundary  | 41 |
| Figure 2 | Proposed Substation and Overhead Line Works                       | 43 |
| Figure 3 | Superficial Geology   | 45 |
| Figure 4 | Bedrock Geology   | 47 |
| Figure 5 | Aquifer Designations Superficial Geology                          | 49 |
| Figure 6 | Aquifer Designations Bedrock Geology                              | 51 |
| Figure 7 | Landfills, Waste and Potentially Contaminative Previous Land Uses | 53 |

---

|            |                           |
|------------|---------------------------|
| Appendix A | Groundsure Report         |
| Appendix B | Guidance on Contamination |
| Appendix C | Site Walkover Photographs |

# 1. Introduction

## 1.1 Overview

- 1.1.1 This Phase 1 Geoenvironmental Desk Study has been prepared on behalf of National Grid Electricity Transmission plc (National Grid).
- 1.1.2 National Grid is proposing to undertake works to construct a new electricity substation, new sections of overhead line and modification of existing overhead lines west of the Spalding Tee-Point in the Weston Marsh area, within the administrative boundary of South Holland District Council (SHDC) in Lincolnshire.

## 1.2 Summary of the Scheme

- 1.2.1 In totality, the Scheme consists of four components, each planned to be progressed via separate consenting routes. These are summarised in **Table 1.1**.

Table 1.1 Components of the Scheme

| Works Required   | Consenting Regime  |
|--|--|
| Construction of the new Air Insulated Substation (AIS) – 400kV Weston Marsh Substation A, associated landscaping and environmental mitigation works, drainage, highways and other associated works.      | Town and Country Planning Act 1990 (TCPA) (Ref 1)<br>Component referred to as ‘ <b>Substation Works</b> ’  |
| Construction of a new sections of overhead line to connect the new substation into the existing 4ZM overhead line.<br>Removal of a section of the existing 4ZM overhead line.<br>Other associated works. | Section 37 of the Electricity Act 1989 (Ref 2) and deemed consent pursuant to section 90(2) of the Town and Country Planning Act T1990.<br>Component referred to as ‘ <b>S37 4ZM Overhead Line Works</b> ’                           |
| Construction of new section of overhead line to connect the existing 2WS overhead line into the new substation.<br>Removal of a section of the existing 2WS overhead line.<br>Other associated works.    | Section 37 of the Electricity Act 1989 and deemed consent pursuant to section 90(2) of the Town and Country Planning Act 1990<br>Component referred to as ‘ <b>S37 2WS Overhead Line Works</b> ’                                     |
| Reconductoring works required on the existing 4ZM overhead line.<br>Two spans of temporary overhead lines.   | Town and Country Planning (General Permitted Development) (England) Order 2015 (Ref 3) The Overhead Lines (Exemption) (England and Wales) Regulations 2009 (Ref 4)<br>Component referred to as ‘ <b>Exempt Overhead Line Works</b> ’ |

- 1.2.2 The Substation Works will require consent from SHDC under the TCPA.
- 1.2.3 The S37 4ZM Overhead Line Works and S37 2WS Overhead Line Works (collectively referred to as ‘the S37 Overhead Line Works’) will require consent from the Secretary of State for Energy Security and Net Zero under Section 37 of the Electricity Act 1989 (Section 37).
- 1.2.4 The Exempt Overhead Line Works constitute permitted development under Part 15 Class B of the Town and Country Planning (General Permitted Development) (England) Order 2015 and The Overhead Lines (Exemption) (England and Wales) Regulations 2009.
- 1.2.5 The Scheme Site Boundary, which consists of the land required to construct and operate the Scheme in its entirety, is illustrated on **Figure 1**. The areas of land required to construct and operate each individual component described in **Table 1.1** are also illustrated on **Figure 1**.
- 1.2.6 The Scheme in its totality is a standalone development to enable connection of the Outer Dowsing Offshore Wind Farm to the national electricity transmission system. Each component stated in **Table 1.1** above is required for the Scheme to fully function as part of the National Electricity Transmission System (NETS).

### 1.3 Purpose of this report

- 1.3.1 This study has been prepared in support of the necessary consent applications required to deliver the Scheme. It has been informed by engagement between National Grid and the relevant consenting authorities.
- 1.3.2 This study considers the Scheme in its entirety. Where the potential impacts and effects of the Scheme are associated with specific components as set out within **Table 1.1**, this is clearly identified within the following sections. This approach enables the relevant consenting authority to readily identify and consider only those impacts and effects that are associated with the application before them, whilst also maintaining a clear understanding of the Scheme in its wider context.
- 1.3.3 This study has been prepared in accordance with the Pre-Application Letter to SHDC, which noted the requirement for a Phase 1 Geoenvironmental Desk Study. The purpose of this report is to identify and assess the relevant information relating to the:
  - 1) Past and current uses of the Scheme Site Boundary (defined as the consolidated extent of land required to construct and operate the Scheme in its totality, see **Figure 1**) and surrounding areas. The extent of our Study Area is described within Section 3.2 of this Report;
  - 2) Environmental setting of the Scheme Site Boundary, including geology, mining, hydrogeology and hydrology;
  - 3) Potential contamination sources, pathways and receptors as part of a Preliminary Conceptual Site Model (CSM) that may arise in connection with the present and historical use; and
  - 4) Requirement or otherwise for future studies including potential intrusive ground investigation.

- 1.3.4 This study has been prepared in general accordance with Environment Agency's (EA) Land Contamination Risk Management (LCRM) guidance dated October 2020, updated June 2025 (Ref 5).

## 2. Legislative and Policy Framework

### 2.1 Overview

2.1.1 Legislation and national policy relevant to the Scheme and this study is described in further detail in the Planning, Design and Access Statement (TCPA application) and Section 37 Statement (S37 applications). Key legislation and policy relevant to this study is summarised in the following sections.

### 2.2 Legislation and National Policy

#### National Planning Policy Framework

2.2.1 The National Planning Policy Framework (NPPF) (Ref 6) sets out the Government's planning policies for England and how these should be applied and considered for any planning decisions. The NPPF was last updated in December 2024 and amended in February 2025. The sections within this document relevant to this Phase 1 Geoenvironmental Study are set out below.

2.2.2 Paragraph 125 of Section '11. Making effective use of land' states that:

*'Planning policies and decisions should:*

*[...]*

- c) give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, proposals for which should be approved unless substantial harm would be caused, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land [...]*

2.2.3 Paragraph 187 of Section '15. Conserving and enhancing the natural environment' states that:

*'Planning policies and decisions should contribute to and enhance the natural and local environment by:*

- a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan) [...];*
- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*
- f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'*

- 2.2.4 Paragraph 192 of ‘Habitats and biodiversity’ states that:  
*“To protect and enhance biodiversity and geodiversity, plans should:  
[...]*
- a) *‘identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation [...].’*
- 2.2.5 Paragraph 196 of ‘Ground Conditions and Pollution’ states that:  
*‘Planning policies and decisions should ensure that:*
- a) *a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);*
- b) *after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and,*
- c) *adequate site investigation information, prepared by a competent person, is available to inform these assessments.’*
- 2.2.6 Paragraph 197 states that: *‘Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.’*
- 2.2.7 Paragraph 198 states that: *‘Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development [...].’*

## **2.3 Regional and Local Policy**

- 2.3.1 Regional and local plans or policies relevant to this study are as follows:
- 2.3.2 South East Lincolnshire Local Plan 2011 – 2036, Adopted March 2019 (Ref 7):
- 1) Policy 28 – The Natural Environment: sets out the requirements for development proposals to prevent impacts on locally designated sites (relevant for Geological Conservation Sites).
  - 2) Policy 30 – Pollution: sets out requirements for development proposals to prevent impacts on the land quality/condition (relevant for geology receptors) and groundwater quality (relevant for hydrogeology receptors).
- 2.3.3 Greater Lincolnshire Nature Partnership, 2021. Geodiversity Strategy 2022 – 26 (Ref 8): this document sets out the Geodiversity Action Plan (GAP) and a summary of geodiversity sites within Lincolnshire, along with planning and conservation advice for sites of geodiversity value.

# 3. Methodology

## 3.1 Scope of the Assessment

- 3.1.1 The scope of this assessment has been informed through consultation and engagement with relevant consultees, as well as a screening process for both the Substation Works and S37 Overhead Line Works.
- 3.1.2 The scope of the construction and operational assessment covers the following receptor types:
- 1) Human health (construction workers, adjacent land users, future land users);
  - 2) Groundwater quality (aquifers and abstractions);
  - 3) Soil/land quality; and
  - 4) Structures.
- 3.1.3 The scope of the construction and operational assessment excludes Geological Conservation Sites (there are none present within the Study Area).

## 3.2 Study Area

- 3.2.1 For the purposes of this assessment, a study area of the Scheme Site Boundary plus a 250 m buffer for geological receptors and a 500 m buffer for hydrogeological receptors has been applied (Study Area). Hydrogeological receptors further from the Scheme Site Boundary are more susceptible to effects from the Scheme than geological receptors due to the mobile nature of groundwater and corresponding potential for the Scheme to affect receptors at a greater distance, hence the larger study area for hydrogeological receptors. The extent of the Study Area is shown on Figure 1.

## 3.3 Data Collection

- 3.3.1 The Phase 1 Geoenvironmental Desk Study has been prepared through consultation of a range of available information and archive sources, including:
- 1) Groundsure Enviro Insights Report (reference GS-EFR-FOE-CIC-UV9, dated 06 February 2026), obtained for the New Weston Marsh Substation A footprint with a 1 km buffer (**Appendix A**). Beyond this buffer, this data has been supplemented by EA and Local Authority data requests;
  - 2) Groundsure Geo Insights Report (reference GS-NV6-ZB7-JZM-7H5, dated 06 February 2026), obtained for the New Weston Marsh Substation A footprint with a 1 km buffer (**Appendix A**). Beyond this buffer, this data has been supplemented by EA and Local Authority data requests;
  - 3) Landmark Information Group historical mapping, including County Series and National Grid at 1:1,250, 1:2,500, 1:10,000 and 1:10,560 scale, to identify potentially contaminative former land uses;

- 4) UK Health Security Agency radon mapping (Ref 9);
- 5) Geological mapping (1:50,000 scale) published online by the British Geological Society (BGS) (Ref 10);
- 6) Historical borehole records held by the BGS (Ref 10);
- 7) Groundwater abstraction details (public and private), discharge consents, historical pollution incident records, and historical and authorised landfills, as available from the EA, obtained through formal data requests. Any relevant information is shown on Drawing G2W\_TCPA\_GH\_7 Landfills, Waste and Potentially Contaminative Previous Land Uses;
- 8) Department for Environment, Food and Rural Affairs (DEFRA) groundwater aquifer information, provided through MAGIC (Multi-Agency Geographic Information for the Countryside) (Ref 11);
- 9) Source Protection Zones (SPZ) data, available under Open Government License (Ref 12);
- 10) Natural England designated Sites, i.e. Geological Sites of Special Scientific Interest (SSSI) (Ref 11);
- 11) Zetica Unexploded Ordnance (UXO) online hazard mapping (Ref 13);
- 12) Information on private water supplies obtained through a formal data request submitted to SHDC (none were found to be present within the Study Area); and
- 13) Relevant local planning documentation and readily available local geo-conservation documents to identify Local Geological Sites (none were found to be present within the Study Area).

## **3.4 Assessment Approach**

- 3.4.1 The data collected as listed above has been used to establish the baseline conditions across the Study Area. This has then been used to identify potential source-pathway-receptor contaminant linkages and allow a risk-based assessment of the effects of the Scheme. This approach follows published guidance (LCRM), as discussed within Section 1 of this report.

## **3.5 Assumptions and Limitations**

- 3.5.1 The following assumptions and limitations are applicable to the Phase 1 Geoenvironmental Desk Study:
- 1) The scope of assessment within this Phase 1 Geoenvironmental Desk Study is based on the current design information, as described within the Planning, Design and Access Statement (TCPA application) and Section 37 Statement (S37 applications);
  - 2) The Groundsure Enviro and Geo Insights reports have been obtained for the New Weston Marsh Substation A footprint plus a 1 km buffer. This is considered appropriate for this assessment, as this area covers the new infrastructure required for the Scheme, including the Substation Works and the Proposed Overhead Line Works. This does not cover the Exempt Overhead Line Works, which extend to approximately 2.3 km north west and 1.6 km south east of the

New Weston Marsh Substation A, and will involve minimal ground disturbance (reconductoring of existing pylons only), although the two temporary pylons which will require ground disturbance are within the area covered by this report. The datasets within this report have a variable coverage beyond the New Weston Marsh Substation A footprint and 1 km buffer;

- 3) The limitation of coverage as provided within the Groundsure Enviro report is also relevant for the assessment of groundwater vulnerability, which is based upon 1 km grid squares. The area covered by the Groundsure Enviro report includes the Substation Works, the Proposed Overhead Line Works and the two temporary pylons within the Exempt Overhead Line Works, but not the full Study Area; and,
- 4) This Geo-Environmental Desk Study provides an assessment of the Scheme in relation to land contamination. As such, a geotechnical assessment has not been undertaken as this is outside of the scope of this report.

## 4. Site History and Current Land Use

### 4.1 Site History

- 4.1.1 Historical maps provided by Landmark Information Group have been used to identify previous land uses, including any significant potentially contaminative uses (included in bold text). Some descriptions are provided primarily for context.
- 4.1.2 **Table 4.1** below summarises the history of the Study Area from the earliest available mapping, which is the year 1887, to the present day.

Table 4.1 Summary of Land Use

| Date                              | Land Use within the Scheme Site Boundary   | Land Use within Study Area  |
|-----------------------------------|--|---|
| 1887 – 1889                       | <p>The land within the Scheme Site Boundary is shown as comprising agricultural land, with local access tracks and roads throughout.</p> <p>Surface water features are present across the Scheme Site Boundary, including drains. The River Welland crosses through the north west of the Scheme Site Boundary (from south west to north east), and again in the south west of the Scheme Site Boundary. The Lord’s Drain and the Dominorum Drain are present within the east of the Scheme Site Boundary (from north to south).</p> <p>No structures are shown within the Scheme Site Boundary.</p> | <p>The land within the Study Area outside of the Scheme Site Boundary is also shown as comprising agricultural land with several farms, localised residential properties, schools, and access roads/tracks throughout. Small structures are recorded adjacent to (but outside of) the Scheme Site Boundary.</p> <p>Surface water features are also shown across the Study Area, as field drains and ponds.</p> <p>The village of Weston is located within the south east of the Study Area.</p> <p>Several pumps are shown across the Study Area, adjacent to farm compounds.</p> <p>A Smithy is recorded in the north of the Study Area, approximately 150 m north east of the Scheme Site Boundary.</p> |
| 1904 – 1908                       | No significant change.   | The Smithy is no longer recorded. No other significant change.  |
| 1931 – 1933<br>(partial coverage) | <p>A <b>tramway</b> is recorded within the Scheme Site Boundary in the north of the Study Area, off Marsh Road and adjacent to a school. This runs to the north east beyond the Study Area and connects to additional tramways at Wragg Marsh.</p>   | <p>Allotment gardens are now present in the north of the Study Area, located approximately 270 m north east of the Scheme Site Boundary.</p>  |

| Date             | Land Use within the Scheme Site Boundary   | Land Use within Study Area   |
|------------------|--|--|
| 1938 – 1951      | No significant change.   | A nursery is now recorded in the south of the Study Area at Weston, approximately 180 m south of the Scheme Site Boundary.   |
| 1956 – 1959      | The tramway within the north of the Scheme Site Boundary is no longer recorded, it is assumed this has been dismantled. Minor development of agricultural development throughout the Scheme Site Boundary. | No significant change.   |
| 1965 – 1979      | No significant change.   | <p>A <b>tank</b> is recorded approximately 330 m south east of the Scheme Site Boundary at Top Yard, it is not clear what was stored within this tank.</p> <p>Limited commercial developments within the Study Area outside of the Scheme Site Boundary, including a <b>depot with tanks</b> in the north west (approximately 400 m west of the Scheme Site Boundary), a <b>packing shed</b> in the south (adjacent to the Scheme Site Boundary) and a <b>vegetable store</b> in the north (directly north of the Scheme Site Boundary).</p> <p>A pumping station is also now recorded in the north west of the Study Area adjacent to the Scheme Site Boundary.</p> |
| 1990 – 1995      | No significant change.   | <p>The tank at Top Yard is no longer recorded.</p> <p>The packing shed in the south east of the Study Area is now recorded as one larger warehouse.</p> <p>The allotment gardens north of the Scheme Site Boundary have increased substantially in size to the east and south east, but not within the Scheme Site Boundary.</p> <p>The vegetable store directly north east of the Scheme Site Boundary is now recorded as having <b>tanks</b>.</p>  |
| Present (aerial) | No significant change.   | <p>Limited development from the previous mapping edition through to present day, including construction of additional agricultural buildings, residential properties and commercial facilities, particularly in the south east of the Study Area.</p> <p>The large area of allotment gardens in the north of the Study Area is no longer visible.</p>  |

## 4.2 Current Land Use

- 4.2.1 The current land use of the Study Area has been described based on a review of the Groundsure Geo Insights Report (within **Appendix A**), aerial imagery and the results of the walkover survey.
- 4.2.2 The land across the Study Area is shown on aerial imagery as predominantly comprising agricultural land, with no structures within the Scheme Site Boundary. Localised farm buildings are present immediately adjacent to the Scheme Site Boundary, with access roads and tracks present throughout the Scheme Site Boundary and Study Area. The primary areas of built development (including residential and commercial) are in the south west and south east of the Study Area, associated with Spalding and Weston, respectively. Surface water features are present throughout the Study Area, such as drains, streams and ponds. The River Welland crosses through the north west and south west of the Scheme Site Boundary. The Lord's Drain passes through the east of the Scheme Site Boundary from north to south, to the west of existing pylon 4ZM406. Existing overhead lines cross through the Scheme Site Boundary, with one orientated south west to north east, and another north west to south east, with pylons at regular intervals.
- 4.2.3 A walkover survey was undertaken on 19 March 2026 to support this assessment. The walkover survey was focused around the areas of new infrastructure within the centre of the Study Area, including the New Weston Marsh Substation A location and new pylons. A Photographic Record from the walkover survey is provided in **Appendix C**.
- 4.2.4 During the walkover survey, the land was found to comprise flat-lying agricultural land at various levels of production or vegetation growth, from widespread grass cover (Photographs 10 and 13) to no grass/vegetation cover (Photographs 5, 6 and 7), crossed by private roads or access tracks. A public footpath was identified off Marsh Road, from west to east, located north of the New Weston Marsh Substation A location (Photographs 11, 12 and 14). Drainage ditches of varying width and depth were encountered along field boundaries across the Study Area showing variable water levels. Surface water was noted in flat lying areas (Photographs 1 to 5), considered likely to be a result of recent rainfall and not necessarily an indication of shallow groundwater.
- 4.2.5 Hardstanding and evidence of Made Ground was limited to existing roads and is not anticipated to be of significant thickness. Five small boulders of concrete with metal rebar were observed to the east of Marsh Road and west of the New Weston Marsh Substation A location (Photograph 4), although this is not considered to represent a risk to sensitive receptors. No evidence of contamination or contaminated materials were identified during the walkover survey.

## 4.3 Asbestos

- 4.3.1 The Health and Safety at Work Act 1974 (Ref 14), the Control of Asbestos Regulations 2012 (Ref 15), and the Construction (Design and Management) Regulations 2015 (Ref 16) impose duties upon employers, site owners, their agents, and contractors in respect of hazardous materials including asbestos. Other health and safety and welfare regulations place duties on employers to undertake appropriate risk assessments. This could include the commissioning of surveys, and

the identification and management of hazardous materials including any proposals for remedial works.

- 4.3.2 As described within **Table 4.1** above, there are no buildings/properties currently present within the Scheme Site Boundary. Access tracks and roads cross through the Scheme Site Boundary in several places, and existing pylons are present throughout the Scheme Site Boundary. Localised Made Ground deposits (defined as soil that has been artificially placed or modified) therefore may be present in proximity to these features and historical features (i.e. the former tanks in the centre/south east of the Scheme Site Boundary), which could contain asbestos, although this is considered unlikely to represent a significant risk to receptors. There is also considered to be a generally low risk of asbestos across agricultural land. No evidence of asbestos was identified during the walkover survey, although the walkover survey was focused within the centre of the Study Area to target the areas of new infrastructure.

## 4.4 Ecology

- 4.4.1 Ecology is relevant to this report in relation to potential effects of land or groundwater contamination, or changes in groundwater flows, on designated ecological receptors. However, reference to the Groundsure Enviro Insights Report (**Appendix A**) and MAGIC database (Ref 11) indicates that there are no Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Local Nature Reserves (LNR) or National Nature Reserves (NNR) within the Scheme Site Boundary or Study Area.
- 4.4.2 This report does not consider ecological issues beyond the scope of effects from land contamination (e.g. protected species), as these are assessed elsewhere in the application (**Ecological Impact Assessment**).

# 5. Geological and Hydrogeological Setting

## 5.1 Geology

5.1.1 The assessment of geology is based upon the published geological mapping from the BGS at 1:50,000 scale and the Groundsure Geo Insights Report within **Appendix A**. Online data from the BGS has also been reviewed, including published borehole records. A summary of the relevant geological information is provided below in **Table 5.1**.

Table 5.1 Summary of Relevant Geological Data

| Strata                       | Description   |
|------------------------------|---|
| Made Ground                  | No Made Ground is recorded to be present within the Scheme Site Boundary from the published mapping. Made Ground is anticipated in minimal thickness across the Study Area, associated with farms, access tracks and roads. No significant thicknesses of Made Ground are anticipated.  |
| Natural Superficial Deposits | The entire Study Area is recorded to be underlain by Tidal Flat superficial deposits comprising clay and silt. These are defined by the BGS as mud flat and sand flat deposits, forming extensive nearly horizontal marshy land in the intertidal zone that is alternately covered and uncovered by the rise and fall of the tide. They consist of unconsolidated sediment, mainly mud and/or sand. They may form the top surface of a deltaic deposit.<br><br>The superficial deposits are shown on Drawing G2W_TCPA_GH_3 Superficial Geology. |
| Solid Strata                 | The Scheme Site Boundary and majority of the Study Area are underlain by mudstone bedrock of the Oxford Clay Formation. The far south east of the Study Area (not within the Scheme Site Boundary) is underlain by mudstone and siltstone bedrock of the West Walton Formation.<br><br>The solid strata are shown on Drawing G2W_TCPA_GH_4 Bedrock Geology.   |
| Geological Structure         | The published geological mapping within the Study Area does not record any indication of strata dip. Geological sections across the wider area show the strata as sitting generally horizontal with a very minor dip to the east. There are no linear geological features (e.g. faults, breaklines) within the Study Area.  |
| Ground Stability Risk        | The BGS Geohazards data set classifications for the areas of the Substation Works and S37 Overhead Line Works are listed below. Geohazards data has not been obtained for the full area of Exempt   |

| Strata | Description  |
|--------|--|
|        | Overhead Line Works given that these involve only reconductoring of existing pylons (i.e. above ground work), although the two temporary pylons required are within the coverage of this data.<br><b>Collapsible deposits:</b> Negligible – Class A (believed not to be present).<br><b>Compressible deposits:</b> Moderate – Class D (probably present).<br><b>Dissolution:</b> Negligible – Class A (not thought to be present, or not prone to dissolution).<br><b>Landslides:</b> Very Low – Class B (not likely to occur).<br><b>Running sands:</b> Moderate – Class D (probably present).<br><b>Shrinkage/swelling:</b> Low – Class C (predominantly medium plasticity). |

## BGS Borehole Records

5.1.2 There are a number of boreholes within the Study Area, nine of which are located within the Scheme Site Boundary. These boreholes are generally located adjacent to/at the location of current electricity pylons within the north of the Study Area. A summary of the information from each of these boreholes is presented in **Table 5.2** below.

Table 5.2 Summary of BGS Boreholes within the Scheme Site Boundary

| Borehole ID | Location<br>(Easting, Northing) | Location Description   | Stratigraphy  |
|-------------|---------------------------------|--|---|
| TF23SE12    | 528190, 330740                  | Immediately adjacent to existing pylon 4ZM415  | 0 – 12.19 m: Silty sand/sandy silt  |
| TF23SE11    | 528460, 330460                  | Immediately adjacent to existing pylon 4ZM414  | 0 – 0.30 m: Topsoil<br>0.30 – 1.22 m: Sandy clay<br>1.22 – 10.06 m: Clayey/silty sand                   |
| TF23SE10    | 528660, 330190                  | Immediately adjacent to existing pylon 4ZM413  | 0 – 0.15 m: Silty sandy clay<br>0.15 – 12.19 m: Silty sand  |
| TF22NE13    | 529050, 329660                  | Immediately adjacent to existing pylon 4ZM411  | 0 – 0.30 m: Topsoil<br>0.30 – 1.22 m: Sandy clay<br>1.22 – 10.36 m: Silty sand<br>10.36 – 12.19 m: Sand |
| TF22NE10    | 529710, 328800                  | Immediately adjacent to existing pylon 4ZM408, approximately 100 m north east of the New | 0 – 12.19 m: Silty sandy clay/sandy silt/silty sand   |

| Borehole ID | Location<br>(Easting, Northing) | Location Description  | Stratigraphy  |
|-------------|---------------------------------|---|---|
|             |                                 | Weston Marsh<br>Substation A  |   |
| TF22NE9     | 529940, 328500                  | Directly south of new pylon 4ZM407-N, approximately 370 m south east of the New Weston Marsh Substation A | 0 – 12.19 m: Sandy silt/silty sand                  |
| TF32NW13    | 530130, 328250                  | Immediately adjacent to existing pylon 4ZM406   | 0 – 12.19 m: Silty sand/sandy silt                  |
| TF32NW12    | 530350, 327970                  | Beneath existing pylon 4ZM405   | 0 – 12.27 m: Silty sandy clay/sandy silt/silty sand |
| TF32NW14    | 530570, 327700                  | Immediately adjacent to existing pylon 4ZM404   | 0 – 12.50 m: Silty sandy clay/silty sand            |

5.1.3 As presented above in **Table 5.2**, the borehole records generally encountered variable superficial deposits with both granular and cohesive constituents. None of the boreholes were extended into the underlying bedrock, therefore it can be assumed that there is a local thickness of superficial cover in excess of 12 m. Boreholes beyond the Study Area to the south west record superficial cover in excess of 20 m.

## 5.2 Hydrogeology

5.2.1 Hydrogeological information has been obtained from a review of:

- 1) Groundsure Enviro Insights Report (provided in Appendix A);
- 2) BGS and EA (Ref 11) Aquifer Classification mapping;
- 3) Hydrogeological maps published by the BGS (Ref 17); and
- 4) Public and private abstraction information obtained from statutory bodies and local authorities.

5.2.2 The superficial deposits and bedrock underlying the Study Area are both designated as Unproductive Strata. These are defined as rock layers or superficial deposits with low permeability that have negligible significance for water supply or river base flow. The aquifer designations data is shown on Drawing G2W\_TCPA\_GH\_5 Aquifer Designations – Superficial Geology and Drawing G2W\_TCPA\_GH\_6 Aquifer Designations – Bedrock Geology.

5.2.3 There are no recorded public groundwater abstractions within the Study Area, given the unproductive designation of both the superficial and bedrock strata. SHDC also do not have any records of private groundwater abstractions within the Study Area. The closest private abstraction is recorded approximately 2.2 km south east of the Scheme Site Boundary, near Loosegate, and is recorded to be a domestic supply borehole.

- 5.2.4 The Study Area is not located within any groundwater bodies monitored by the EA as part of the Water Framework Directive (WFD) due to the unproductive strata.
- 5.2.5 The Study Area does not lie within a Source Protection Zone (SPZ), Drinking Water Safeguard Zone or nitrate vulnerable zone (NVZ).
- 5.2.6 Of the nine BGS borehole records within the Scheme Site Boundary, seven encountered groundwater during drilling. The groundwater levels were recorded between 0.9 and 2.7 m below ground level (BGL), although these are dated 1963 and are not considered representative of current levels. However, these records do indicate the potential for shallow/perched groundwater within granular pockets of the superficial deposits which may be encountered during construction.

### 5.3 Groundwater Vulnerability Classification

- 5.3.1 The groundwater vulnerability classification is based upon the physical and chemical properties of the geology, hydrology and hydrogeology, which affect the migration of water and contaminants.
- 5.3.2 The classification is applied over a one-kilometre square grid. A worst-case vulnerability is therefore assumed until proven otherwise. The risks assigned correspond to:
  - 1) High – Areas able to transmit pollution to groundwater. They are likely to be characterised by high leaching soils and absence of low permeability superficial deposits;
  - 2) Medium – Intermediate between high and low vulnerability; and
  - 3) Low – Areas that provide the greatest protection for pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.
- 5.3.3 The on-site risk, summarised below in **Table 5.3**, is characterised by the leaching class. For the Study Area, the groundwater vulnerability is noted to be negligible, based on the unproductive superficial and bedrock strata, for all nine 1 km squares covered by the data search, as described in Section 3 of this report.

Table 5.3 Groundwater Vulnerability Classification

| Soil                         | Superficial Geology         | Bedrock Geology                          |
|------------------------------|-----------------------------|--|
| Leaching class: High         | Vulnerability: Unproductive | Vulnerability: Unproductive              |
| Infiltration Value: >70%     | Aquifer type: Unproductive  | Aquifer type: Unproductive               |
| Dilution value: <300 mm/year | Thickness: >10m             | Flow mechanism: Well connected fractures |
|                              | Patchiness value: >90%      |  |
|                              | Recharge potential: Low     |  |

### 5.4 Hydrology

- 5.4.1 As discussed within the Current Land Use section of this report, there are surface water features present within the Study Area which could be affected by the Scheme as a result of construction and disturbance of potential contamination sources.

- 5.4.2 The River Welland is present within the north west of the Study Area, crossing through the Site from south west to north east, between existing pylons 4ZM412 and 4ZM413, approximately 50 m south east of existing pylon 4ZM413. The Lord's Drain is present within the east of the Study Area, crossing through the Site from north to south, approximately 60 m north west of existing pylon 4ZM406. This feature merges with another minor watercourse south east of the Scheme Site Boundary, named Domino Drainium.
- 5.4.3 A pond is noted within the north of the Study Area, within the Scheme Site Boundary and approximately 220 m south east of existing pylon 4ZM412. Several further minor field drains are noted across the Scheme Site Boundary and Study Area.

## 6. Mining and Quarrying

### 6.1 General

- 6.1.1 Research of the mining setting is based on examination of the published topographical and geological information as described in Sections 4 and 5 of this Report, along with mining archive information.

### 6.2 Coal Mining

- 6.2.1 The Study Area is not located within a Coal Mining Reporting Area, and therefore no further assessment is considered to be required within this assessment with respect to coal mining.

### 6.3 Non-Coal Mining

#### BritPits

- 6.3.1 British Pits (BritPits) is a database maintained by the BGS consisting of currently active and closed surface and underground mineral workings. This dataset was obtained within the Groundsure Report (**Appendix A**) for coverage of the Substation Works and Proposed Overhead Line Works, and therefore only has partial coverage of the Study Area. Within this dataset, there are no records within the Study Area.

#### Surface Workings

- 6.3.2 This dataset was also obtained within the Groundsure Geo Insights Report (**Appendix A**) with partial coverage of the Study Area, as described above. One area of surface workings is recorded within the Study Area, in the north of the Scheme Site Boundary approximately 230 m south east of existing pylon 4ZM412 and is recorded as a pond. Current aerial imagery and Ordnance Survey (OS) mapping suggests this feature is still present.

#### Non-Coal Underground Mining

- 6.3.3 Within the area covered by the Groundsure dataset, there are no records of non-coal underground mining. The BGS also does not report any mines or quarries within the Scheme Site Boundary or Study Area.

#### Natural and Mining Cavities

- 6.3.4 The strata within the Scheme Site Boundary and wider Study Area does not comprise soluble rocks. Therefore, there are not anticipated to be any natural cavities within the Scheme Site Boundary or surrounding areas. The Groundsure Geo Insights Report (**Appendix A**) also does not report any natural or mining cavities within 1.5 km of the Substation Works.

# 7. Environmental Setting and Consultations

## 7.1 Statutory Sources

7.1.1 Information from various statutory sources is summarised within the Groundsure report with partial coverage of the Site and Study Area. This section of the report has also been prepared using data obtained through formal data requests and published online information. Any features identified in relation to the Environmental Setting are shown on Drawing G2W\_TCPA\_GH\_7 Landfills, Waste and Potentially Contaminative Previous Land Uses.

## 7.2 Contaminated Land Register Entries and Notices

7.2.1 The Groundsure dataset does not show any Contaminated Land Register Sites within the Scheme Site Boundary or Study Area.

## 7.3 Waste Management

### Landfills

7.3.1 The Groundsure Enviro Insights Report (**Appendix A**) does not record any active, recent or historical landfills within 1.5 km of the New Weston Marsh Substation A boundary, which includes a review of BGS, EA and Local Authority records, although this only provides partial coverage of the Study Area.

7.3.2 Within the published database, the EA does not have records of active or recent landfills within the Study Area.

7.3.3 Within the BGS historical landfill records, one landfill is recorded in the north west of the Study Area, approximately 350 m north west of the Scheme Site Boundary off Surfleet Bank. This landfill is recorded to have accepted inert waste, with a license issue date in 1993 and a surrender date in 2006.

### Licensed Waste Sites

7.3.4 The Lincolnshire Local Plan records a waste site in the north west of the Study Area, approximately 360 m west of the Scheme Site Boundary, and is recorded for Boardsides Recycling.

### Waste Exemptions

7.3.5 The Groundsure database (covering the New Weston Marsh Substation A footprint plus a 1.5 km buffer) records no waste exemptions within the Scheme Site Boundary, although there are a large number recorded within the Study Area. Many of these represent duplicate licenses for similar activities at the same locations and there are nine separate sites within the Groundsure Report, none of which are located within

the Scheme Site Boundary. However, these are generally registered at a farm address and such activities may have occurred within a field parcel within the Scheme Site Boundary.

7.3.6 The recorded waste exemptions relate to activities such as:

- 1) Disposing of waste (burning of waste, deposit of waste, disposal by incineration);
- 2) Storing waste (storage within secure containers or a secure place, storage of sludge);
- 3) Treatment of waste (cleaning, washing, spraying or coating waste, aerobic composting, preparatory treatment, screening and blending of waste, treatment of waste aerosol cans); and
- 4) Using waste (use of waste in construction, burning of waste as a fuel, spreading of waste on agricultural land to confer benefit, use of waste for a specified purpose, use of mulch).

## 7.4 Radon

7.4.1 Radon can be a hazard within built developments and especially within enclosed or confined spaces. Under the Health and Safety at Work Act 1974 (Ref 14), the employer is responsible for the health and safety of employees and protection from exposure to radon at work is specified in the Ionising Radiation Regulations 2017 (Ref 18).

7.4.2 The regulations apply to work where the level of radon exceeds a defined threshold, when the employer is required to notify the Health and Safety Executive (HSE) of work in such environments. This generally applies when the average radon level measured during the winter months exceeds 400 Bq/m<sup>3</sup>.

7.4.3 The UK Health and Security Agency have produced “UK Maps of Radon” (2022) which provide a summary of homes in a given area above the “Action Level” of 200 Bq/m<sup>3</sup> of radon.

7.4.4 Reference to these maps indicates that the entire Study Area is located within an area of the lowest radon potential within this dataset, where less than 1% of properties are at risk from the ingress of radon. This is confirmed by the radon data provided within the Groundsure Geo Insights Report (**Appendix A**).

7.4.5 It can be concluded that radon protection measures are unlikely to be required for any enclosed spaces associated with the New Weston Marsh Substation A construction and operation.

## 7.5 Soil Geochemistry

7.5.1 Natural concentrations for a selection of determinands have been estimated by the BGS and are provided within the Groundsure Report and summarised below in **Table 7.1**. These are estimated on a regional basis and should not be taken as representative of the actual soil geochemistry at the Site.

Table 7.1 Summary of BGS Estimated Soil Geochemistry

| Determinand                     | Arsenic  | Cadmium   | Chromium      | Lead      | Nickel        |
|---------------------------------|----------|-----------|---------------|-----------|---------------|
| Estimated Concentration (mg/kg) | 15 mg/kg | 1.8 mg/kg | 60 – 90 mg/kg | 100 mg/kg | 15 – 30 mg/kg |

## 7.6 Environmental Issues

### Recent Industrial Land Uses

- 7.6.1 The Groundsure Enviro Insights Report (**Appendix A**) lists a number of current/recent industrial land uses within 1.5 km of the New Weston Marsh Substation A boundary, thirteen of these are current electricity pylons. The remaining features include a silo immediately adjacent to (outside of) the Scheme Site Boundary at Crowtree Farm, and slipways/moorings off the River Welland, north west of the Scheme Site Boundary.
- 7.6.2 No other current potentially contaminative industrial sites or features were recorded within the Groundsure Enviro Insights Report (**Appendix A**) within the Study Area.

### Hazardous Substances

- 7.6.3 There are no records of Control of Major Accident Hazards (COMAH) Sites or hazardous substance storage/usage within the Groundsure Enviro Insights Report (**Appendix A**).

### Licensed Industrial Activities

- 7.6.4 There are no licensed industrial activities under Part A(1) Environmental Permitting (England and Wales) Regulations (2016) (Ref 19) within 1.5 km of the New Weston Marsh Substation A boundary. There are also no records of historical licensed industrial activities within the Groundsure Enviro Insights Report (**Appendix A**).

### Licensed Pollutant Release

- 7.6.5 There are no records of licensed pollutant release under the Environmental Permitting (England and Wales) Regulations (2016) (Ref 19) within the Groundsure Enviro Insights Report (**Appendix A**).

### Discharges to Controlled Waters

- 7.6.6 Within the data obtained from the EA for the Scheme, there are no recorded discharge consents within the Study Area. The closest is located approximately 1.6 km south west and 1.3 km south east of the Scheme Site Boundary, located off Cross Gate. This is associated with Lincolnshire Field Products as a discharge for a commercial facility. The data within the Groundsure Enviro Insights Report (**Appendix A**) does not record any licensed discharges within 1 km of the New Weston Marsh Substation A boundary.

## Pollutants and Pollution Incidents

- 7.6.7 There are no records of List 1 or 2 Dangerous Substances within the Groundsure Enviro Insights Report (**Appendix A**). These are defined as substances identified on List I or II of the European Directive E 2006/11/EC (Ref 20) and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015 (Ref 21). The Groundsure Enviro Insights Report (**Appendix A**) does not record any pollution incidents.
- 7.6.8 Within the data obtained from the EA, there are no recorded pollution incidents within the Study Area. The closest pollution incident is located approximately 200 m north of the Scheme Site Boundary, recorded as a Category 4 (no impact) incident for land, air and water associated with fly-tipping.

## Unexploded Ordnance

- 7.6.9 Historical plans indicate that the area within the Scheme Site Boundary and Study Area have not had any previous military use. The online Zetica unexploded ordnance (UXO) database has been consulted, to identify any information on (UXO finds, military targets and other features of interest) from WWII bombardment. Examination of this database shows that the Study Area sits within an area of low risk from UXO (defined as 15 bombs per 1,000 acre or less). There are no strategic targets within 1 km of the Study Area, the closest strategic targets to the Site are several kilometres to the south west in Spalding.

# 8. Preliminary Risk Assessment

## 8.1 Introduction to Assessment

- 8.1.1 Conclusions are drawn from the preceding information in terms of potential sources of contamination, possible receptors that may be affected by any sources of contamination and pathways that exist between the source and the receptor. The risk assessment allows identification of the suitability of the Study Area for its proposed use.
- 8.1.2 The risk assessment can be broadly divided as follows: land contamination, groundwater contamination, surface water contamination and ground gas.
- 8.1.3 The main issues considered in the risk assessment are:
- 1) The geoenvironmental risks identified, if any, that may have implications for the proposed development of the Study Area;
  - 2) How likely it is that the geoenvironmental risks identified may affect the Study Area. This is considered against a background for the Study Area to be redeveloped in accordance with the Scheme; and
  - 3) Other areas of primary concern from a ground engineering and geoenvironmental viewpoint that may have been revealed as a result of the research carried out. These features are limited to the scope of work/research carried out.

## 8.2 Sources

- 8.2.1 A review of the available historical and environmental information has indicated that the Study Area has remained primarily as agricultural land throughout its history. There have been minimal developments within this area outside of agricultural buildings/storage areas and changes to minor road/track layouts. The most significant urbanisation/redevelopment activities have been within the far south west and south east of the Study Area, associated with the expansion of Spalding and Weston respectively.
- 8.2.2 Based on the review within this report, the following potential sources of contamination have been identified:
- 1) Within the Scheme Site Boundary:
    - a) Historical tramway within the north of the Scheme Site Boundary off Marsh Road, approximately 330 m north east of existing pylon 4ZM411;
    - b) Leaks and spills associated with vehicles across the Study Area for agricultural activities and other developments;
    - c) Herbicides and pesticides from agricultural land use across the majority of the Study Area;
    - d) Localised Made Ground deposits associated with access roads, tracks and other developments across the Study Area;

- e) Historical recorded surface workings for a pond in the north of the Scheme Site Boundary, approximately 230 m south east of pylon 4ZM412; and
  - f) Potential for unrecorded areas of discarded or buried asbestos or other materials associated with farming activities.
- 2) Outside of the Scheme Site Boundary, but within the Study Area:
- a) Historical tank south east of the Scheme Site Boundary 380 m south east of existing pylon 2SW015;
  - b) Anticipated Made Ground deposits across the Study Area;
  - c) A historical depot with tanks (now warehouses and a recycling centre) in the north west of the Study Area, approximately 400 m west of the Scheme Site Boundary and 770 m south west of existing pylon 4ZM415;
  - d) A warehouse (formerly packing shed) in the south directly adjacent to the Scheme Site Boundary, approximately 1.9 km south of existing pylon 2WS014;
  - e) A historical vegetable store with tanks (now agricultural farm buildings) in the north of the Study Area, approximately 360 m north of the Scheme Site Boundary and 680 m north east of existing pylon 4ZM411; and
  - f) Historical inert waste landfill and current waste site at Boardsides Recycling, located approximately 350 m north west of the Scheme Site Boundary in the north west of the Study Area.

8.2.3 As listed above, there are a number of potential sources of contamination. For land or groundwater to be designated as contaminated, a linkage must exist between:

- 1) A source of contamination capable of causing harm;
- 2) Human or environmental receptors; and
- 3) A pathway by which the contamination can reach the receptor.

## 8.3 Receptors

8.3.1 Based on the current understanding of the Study Area, its historical and current use, and the Scheme, the following potential receptors have been identified:

- 1) Perched/shallow groundwater within granular Tidal Flat superficial deposits;
- 2) Surface water – the River Welland in the north west of the Scheme Site Boundary, the Lord's Drain, drains and ponds across the Site and Study Area;
- 3) Construction workers, adjacent land users, future site users; and
- 4) Proposed structures – including the New Weston Marsh Substation A, new and modified pylons.

## 8.4 Pathways

8.4.1 In order for the potential sources discussed above to pose a contamination risk, a viable pathway to a receptor must exist. There are several potential pathways associated with the Study Area/Scheme, and these are discussed below.

## Human Health

- 8.4.2 Construction and maintenance workers for the Scheme may be exposed to soil contamination through accidental ingestion of the soil, inhalation of dust or gas/vapours and/or contact with the skin. Adjacent land users (residents, workers) may also be exposed through inhalation of dust or gas/vapours generated during construction.

## Contaminant Leaching

- 8.4.3 As outlined above, there is a possibility of contaminants to be present in near surface soils surrounding the identified potential sources. These may pose a risk to perched/shallow groundwater within the Tidal Flat deposits or surface water features through leaching.

## Ground Gas Migration

- 8.4.4 Any ground gases/vapours generated from soil contamination and Made Ground on or within the vicinity of the Study Area have the potential to migrate and accumulate into enclosed spaces (such as trenches and buildings) via permeable strata, where they may pose a risk to both human health (via inhalation and/or explosion) and property (via explosion).
- 8.4.5 Gas migration is dependent on the permeability of the near surface geology. The superficial deposits across the Study Area are recorded to comprise Tidal Flat deposits consisting of clay and silt. However, the review of borehole records within the Study Area indicates a significant granular constituent locally, suggesting a potential for gas migration to occur.

## Direct Contact Between Structures and Contaminated Soils/Groundwater

- 8.4.6 In addition to risks posed by ground gas, property (i.e. foundations for new substation infrastructure, pylons etc) may incur damage through direct contact with contaminated soil/groundwater. The most common manifestation of this is sulphate attack on cement from contaminated soils. The Oxford Clay is also known to be sulphate bearing, which can also induce sulphate attack on cement.

## 8.5 Qualitative Risk Assessment – Contamination

- 8.5.1 In line with the LCRM guidance (Ref 5), plausible source, pathway and receptor linkages have been identified through the preliminary Conceptual Site Model (CSM) presented in **Table 8.1** below and have been used to undertake a qualitative risk assessment. The risks have been assigned in line with the principles of CIRIA C552 (Ref 22) and LCRM as summarised in **Appendix B**.
- 8.5.2 A qualitative assessment of the potential geoenvironmental risk based on the development for the Scheme is provided below in **Table 8.1**. The understanding of the potential source, pathway, receptor linkages which form the preliminary understanding of the CSM are also set out within **Table 8.1**. Where indicated, these risks may need to be considered further for the Scheme.

8.5.3 The effect of the present land use outside of the Scheme Site Boundary is assessed with regard to possible contaminant migration from within the Scheme Site Boundary, outside of the Scheme Site Boundary and with regard to the general environmental setting and land quality.

Table 8.1 Tabulated Conceptual Site Model: Plausible Contaminant Linkage Summary

| Potential Sources   | Potential Pathways   | Potential Receptors  | Risk Classification and Rationale   |
|---|--|--|---|
| <b>Within the Scheme Site Boundary</b>  |  |  |   |
| Historical tramway in the north, c. 330 m north east of existing pylon 4ZM411 | <ul style="list-style-type: none"> <li>• Dermal contact with soil and soil derived dust;</li> <li>• Inhalation of dust or vapours;</li> <li>• Direct ingestion of soil and soil derived dust;</li> <li>• Direct ingestion of groundwater; and</li> <li>• Dermal contact with groundwater.</li> </ul> | <b>Human health:</b> <ul style="list-style-type: none"> <li>• Construction workers;</li> <li>• Adjacent land users; and</li> <li>• Future site users (operation and maintenance workers).</li> </ul> | <p><b>Low</b></p> <p>This feature was identified from the historical mapping review and is located within the Scheme Site Boundary at a proposed environmental mitigation access route along an existing agricultural track. This feature was present on historical mapping between the 1930's and 1950's, before the land was restored to agriculture (its current use). It is considered likely that any contamination associated with this feature was appropriately treated/removed during restoration back to agriculture, as no evidence of this feature is present from current aerial imagery. No evidence of this feature was identified during the walkover survey. Significant ground disturbance within this area of the Scheme Site Boundary is also not anticipated as part of the Scheme, as there is no new infrastructure within this area and this access route is intended for use to access an environmental mitigation only. It is therefore considered unlikely that any remaining contamination within this area would be disturbed by the Scheme.</p> <p>The control measures within the <b>Outline Construction Environmental Management</b></p> |

| Potential Sources  | Potential Pathways   | Potential Receptors  | Risk Classification and Rationale  |
|--|--|--|--|
|  |  |  | <p><b>Plan</b> (CEMP) would be required during construction, which would include the use of personal protective equipment (PPE) and an emergency protocol for encountering contamination (control measure GH11). This would prevent risks for both on-site and adjacent land users.</p>  |
|  | <ul style="list-style-type: none"> <li>• Antropogenic (man-made) preferential pathways (e.g. drains);</li> <li>• Vertical and lateral migration in permeable strata (granular horizons within the superficial deposits); and</li> <li>• Surface water runoff.</li> </ul>                             | <p><b>Controlled Waters:</b></p> <ul style="list-style-type: none"> <li>• Groundwater (perched/shallow) within the Tidal Flat deposits; and</li> <li>• Surface water – River Welland (c. 1.1km west of the New Weston Marsh Substation A), Lord’s Drain (c. 470 m east of the New Weston Marsh Substation A), and other small drains and ponds.</li> </ul> | <p><b>Very Low</b></p> <p>As discussed above for human health receptors, the tramway is located within an area of environmental mitigation access only, and significant ground disturbance is not anticipated. Therefore, it is considered unlikely that new pathways would be created or contamination mobilised during construction.</p> <p>The control measures within the <b>Outline CEMP</b> would also include control and management of surface water run off to prevent migration (control measure W11).</p> |
| Leaks and spills associated with vehicles for agricultural activities and other developments | <ul style="list-style-type: none"> <li>• Dermal contact with soil and soil derived dust;</li> <li>• Inhalation of dust or vapours;</li> <li>• Direct ingestion of soil and soil derived dust;</li> <li>• Direct ingestion of groundwater; and</li> <li>• Dermal contact with groundwater.</li> </ul> | <p><b>Human health:</b></p> <ul style="list-style-type: none"> <li>• Construction workers;</li> <li>• Adjacent land users; and</li> <li>• Future site users (operation and maintenance workers).</li> </ul>  | <p><b>Low</b></p> <p>The Study Area has been primarily used as agricultural land throughout its history and is likely to have been subject to leaks and spillages from machinery usage across its entirety.</p> <p>However, the control measures within the <b>Outline CEMP</b> include the use of PPE and protocol for encountering contamination during construction (control measure GH11), to limit release or disturbance for human health receptors.</p>   |

| Potential Sources                                    | Potential Pathways   | Potential Receptors  | Risk Classification and Rationale  |
|--|--|--|--|
|  | <ul style="list-style-type: none"> <li>• Antropogenic (man-made) preferential pathways (e.g. drains);</li> <li>• Vertical and lateral migration in permeable strata (granular horizons within the superficial deposits); and</li> <li>• Surface water runoff.</li> </ul>                             | <p><b>Controlled Waters:</b></p> <ul style="list-style-type: none"> <li>• Groundwater (perched/shallow) within the Tidal Flat deposits; and</li> <li>• Surface water – River Welland (c. 1.1km west of the New Weston Marsh Substation A), Lord’s Drain (c. 470 m east of the New Weston Marsh Substation A), and other small drains and ponds.</li> </ul> | <p><b>Very Low</b></p> <p>The presence of potential contamination from spillages/leaks from machinery cannot be discounted from the available information. The control measures within the <b>Outline CEMP</b> will prevent induced migration of such contamination if encountered during construction (control measure GH11).</p>   |
| Herbicides and pesticides from agricultural land use | <ul style="list-style-type: none"> <li>• Dermal contact with soil and soil derived dust;</li> <li>• Inhalation of dust or vapours;</li> <li>• Direct ingestion of soil and soil derived dust;</li> <li>• Direct ingestion of groundwater; and</li> <li>• Dermal contact with groundwater.</li> </ul> | <p><b>Human health:</b></p> <ul style="list-style-type: none"> <li>• Construction workers;</li> <li>• Adjacent land users; and</li> <li>• Future site users (operation and maintenance workers).</li> </ul>  | <p><b>Low</b></p> <p>The majority of the Study Area has been used as agricultural land from the earliest mapping through to present day. The first stage during construction will likely include a topsoil strip within the areas of new infrastructure, although this will likely be reinstated at pylon locations or placed within landscaping areas. Best practice, including the use of PPE, and the control measures within the <b>Outline CEMP</b> (including GH11) would appropriately mitigate any risk to human health.</p> |
|  | <ul style="list-style-type: none"> <li>• Antropogenic (man-made) preferential pathways (e.g. drains);</li> <li>• Vertical and lateral migration in permeable strata (granular horizons within</li> </ul>   | <p><b>Controlled Waters:</b></p> <ul style="list-style-type: none"> <li>• Groundwater (perched/shallow) within the Tidal Flat deposits;</li> <li>• Surface water – River Welland (c. 1.1km west of the New Weston Marsh Substation A), Lord’s Drain</li> </ul>   | <p><b>Low</b></p> <p>It is considered unlikely that there was significant herbicides and pesticides use within the Study Area that would lead to persistent contamination of the soils. The controlled waters receptors are considered to be of low sensitivity for groundwater and medium</p>   |

| Potential Sources  | Potential Pathways   | Potential Receptors  | Risk Classification and Rationale  |
|--|--|--|--|
|  | <ul style="list-style-type: none"> <li>the superficial deposits); and</li> <li>Surface water runoff.</li> </ul>  | (c. 470 m east of the New Weston Marsh Substation A), and other small drains and ponds.  | sensitivity for surface water, and additional protection would be provided through cohesive horizons within the Tidal Flat deposits, preventing contamination migration.   |
| Localised Made Ground deposits along access roads and at developments adjacent to Scheme Site Boundary | <ul style="list-style-type: none"> <li>Dermal contact with soil and soil derived dust;</li> <li>Inhalation of dust or vapours;</li> <li>Direct ingestion of soil and soil derived dust;</li> <li>Direct ingestion of groundwater; and</li> <li>Dermal contact with groundwater.</li> </ul> | <p><b>Human health:</b></p> <ul style="list-style-type: none"> <li>Construction workers;</li> <li>Adjacent land users; and</li> <li>Future site users (operation and maintenance workers).</li> </ul>  | <p><b>Low</b></p> <p>There are no recorded Made Ground deposits at the Site. These are, however, anticipated in minor thicknesses along existing roads and tracks through the Scheme Site Boundary. Due to the lack of historical industrial/contaminative land use within the Scheme Site Boundary, Made Ground deposits of substantial thickness or contamination potential are not anticipated. The use of appropriate PPE and best practice alongside the control measures within the <b>Outline CEMP</b> (including control measures GH11, GH12 and GH13) would be appropriate to prevent any significant risks should Made Ground deposits be encountered during construction.</p> |
|  | <ul style="list-style-type: none"> <li>Antropogenic (man-made) preferential pathways (e.g. drains);</li> <li>Vertical and lateral migration in permeable strata (granular horizons within the superficial deposits); and</li> <li>Surface water runoff.</li> </ul>                         | <p><b>Controlled Waters:</b></p> <ul style="list-style-type: none"> <li>Groundwater (perched/shallow) within the Tidal Flat deposits; and</li> <li>Surface water – River Welland (c. 1.1km west of the New Weston Marsh Substation A), Lord’s Drain (c. 470 m east of the New Weston Marsh Substation A), and other</li> </ul> | <p><b>Very Low</b></p> <p>As detailed above for human health receptors, there are not anticipated to be widespread Made Ground deposits with significant contamination potential within areas of ground disturbance. The controlled waters receptors are also considered to be of low sensitivity for groundwater and medium sensitivity for surface water. The cohesive superficial deposits will provide additional protection against</p>   |

| Potential Sources  | Potential Pathways   | Potential Receptors  | Risk Classification and Rationale  |
|--|--|--|--|
|  |  | small drains and ponds.  | contamination migration. The control measures within the <b>Outline CEMP</b> (including W11) would prevent release of such contamination towards controlled waters receptors, if encountered.  |
| Historical recorded surface workings (pond) in the north, c. 230 m south east of existing pylon 4ZM412 | <ul style="list-style-type: none"> <li>• Dermal contact with soil and soil derived dust;</li> <li>• Inhalation of dust or vapours;</li> <li>• Direct ingestion of soil and soil derived dust;</li> <li>• Direct ingestion of groundwater; and</li> <li>• Dermal contact with groundwater.</li> </ul> | <p><b>Human health:</b></p> <ul style="list-style-type: none"> <li>• Construction workers;</li> <li>• Adjacent land users; and</li> <li>• Future site users (operation and maintenance workers).</li> </ul>  | <p><b>Low</b></p> <p>This feature is located within the Scheme Site Boundary but directly south of a proposed construction access route. This feature is recorded as historical workings, although it is anticipated this was primarily excavated only to create the small pond, and not for importing/placement of fill materials. Therefore, the potential for contamination within this area is considered to be low.</p> <p>The use of appropriate PPE and best practice, along with the control measures within the <b>Outline CEMP</b> (including GH11, GH12 and GH13) are considered appropriate to mitigate any human health risks associated with this feature.</p> |
|  | <ul style="list-style-type: none"> <li>• Antropogenic (man-made) preferential pathways (e.g. drains);</li> <li>• Vertical and lateral migration in permeable strata (granular horizons within the superficial deposits); and</li> <li>• Surface water runoff.</li> </ul>                             | <p><b>Controlled Waters:</b></p> <ul style="list-style-type: none"> <li>• Groundwater (perched/shallow) within the Tidal Flat deposits; and</li> <li>• Surface water – River Welland (c. 1.1km west of the New Weston Marsh Substation A), Lord’s Drain (c. 470 m east of the New Weston Marsh Substation A), and other</li> </ul> | <p><b>Very Low</b></p> <p>As above for human health, significant contamination associated with this feature is not anticipated. Significant ground disturbance is not anticipated within this area.</p> <p>The control measures within the <b>Outline CEMP</b> would prevent introduction of contaminant migration towards the controlled waters receptors (control measures W11, GH02).</p>   |

| Potential Sources   | Potential Pathways   | Potential Receptors   | Risk Classification and Rationale  |
|---|--|---|--|
|   |  | small drains and ponds.   |  |
| Ground gases associated with anticipated Made Ground and identified contamination sources | <ul style="list-style-type: none"> <li>• Migration through natural and/or anthropogenic pathways (e.g. services); and</li> <li>• Inhalation of ground gases (indoors and outdoors).</li> </ul> | <p><b>Human health:</b></p> <ul style="list-style-type: none"> <li>• Construction workers (especially in confined spaces);</li> <li>• Future site users (operation and maintenance workers); and</li> <li>• Adjacent land users.</li> </ul> | <p><b>Low *</b></p> <p>Confined spaces during construction may include temporary cabins and offices, deep/long-lived excavations for foundations, and any enclosed spaces within the New Weston Marsh Substation A once operational. Made Ground deposits are only anticipated in minor thicknesses within the Scheme Site Boundary and the identified contamination sources within the Scheme Site Boundary are considered unlikely to be generating substantial ground gases. Additionally, none of the identified sources or Made Ground deposits are recorded directly beneath the New Weston Marsh Substation A or new pylons.</p> <p>The control measures within the <b>Outline CEMP</b> would include appropriate PPE for enclosed spaces (control measure GH12), including gas monitors where required to alert site staff of potential risks.</p> |
|   | <ul style="list-style-type: none"> <li>• Migration through natural pathways; and</li> <li>• Explosion (methane only).</li> </ul>   | <p><b>Building Materials, Structures and Services:</b></p> <ul style="list-style-type: none"> <li>• Structures; and</li> <li>• Confined spaces (including underground services).</li> </ul>   | <p><b>Low *</b></p> <p>As above for human health, the environmental setting is such that there is considered to be a low risk of ground gas generation and accumulation. Additionally, if there are any confined spaces within the Scheme, it is reasonable to assume that these would be risk assessed to satisfy the Confined Spaces Regulations.</p>  |

| Potential Sources                        | Potential Pathways   | Potential Receptors   | Risk Classification and Rationale   |
|--|--|---|---|
| Potential for buried/unrecorded asbestos | <ul style="list-style-type: none"> <li>Inhalation of dust; and</li> <li>Direct ingestion of soil and soil derived dust;</li> </ul> | <p><b>Human health:</b></p> <ul style="list-style-type: none"> <li>Construction workers; and</li> <li>Adjacent land users.</li> </ul> | <p><b>Low</b></p> <p>Although no sources of asbestos have been identified within this report, there is potential for buried/unrecorded asbestos to be present, associated with agricultural activities. No evidence of asbestos or asbestos containing materials were identified at surface during the walkover survey. Should any suspected asbestos or suspicious materials be identified during construction, works should be paused and appropriate samples taken to confirm its nature and advise of next steps, i.e. removal from site and appropriate disposal. The control measures within the <b>Outline CEMP</b> would include appropriate PPE in the instance of encountering asbestos (control measures GH11 and GH13).</p> |

#### Within the Study Area (Outside of the Scheme Site Boundary)

|  |  |   |  |
|--|--|---|--|
| <p>Contaminants from historical and current land use including:</p> <ul style="list-style-type: none"> <li>Recorded and anticipated Made Ground deposits;</li> <li>Recorded tank at Top Yard;</li> <li>Historical depot/tanks;</li> <li>Warehouses; and</li> <li>Vegetable store and tanks;</li> </ul> | <ul style="list-style-type: none"> <li>Dermal contact with soil and soil derived dust;</li> <li>Inhalation of dust or vapours;</li> <li>Direct ingestion of soil and soil derived dust;</li> <li>Direct ingestion of groundwater; and</li> <li>Dermal contact with groundwater.</li> </ul> | <p><b>Human health:</b></p> <ul style="list-style-type: none"> <li>Construction workers;</li> <li>Adjacent land users; and</li> <li>Future site users (operation and maintenance workers).</li> </ul> | <p><b>Low</b></p> <p>There are a number of potential contamination sources which have been identified within the Study Area outside of the Scheme Site Boundary, and therefore outside of any areas of ground disturbance associated with the Scheme, although these are not considered to present a high contamination risk. These sources are generally located adjacent to access routes along existing routes, where nearby works are anticipated to have minimal ground disturbance, in comparison to areas of new infrastructure (i.e.</p> |
|--|--|---|--|

| Potential Sources  | Potential Pathways  | Potential Receptors  | Risk Classification and Rationale  |
|--|---|--|--|
| <ul style="list-style-type: none"> <li>Historical landfill and recycling centre.</li> </ul>  |   |  | <p>New Weston Marsh Substation A, pylons).</p> <p>The control measures within the <b>Outline CEMP</b> would mitigate any risk to human health should contamination associated with these off-site sources be encountered within the Scheme Site Boundary during construction (control measures GH11 and GH13).</p>   |
|  | <ul style="list-style-type: none"> <li>Anthropogenic (man-made) preferential pathways (e.g. drains);</li> <li>Vertical and lateral migration in permeable strata (granular horizons within the superficial deposits); and</li> <li>Surface water runoff.</li> </ul> | <p><b>Controlled Waters:</b></p> <ul style="list-style-type: none"> <li>Groundwater (perched/shallow) within the Tidal Flat deposits; and</li> <li>Surface water – River Welland, Lord’s Drain, and other small drains and ponds.</li> </ul> | <p><b>Very Low</b></p> <p>As above for human health, significant levels of contamination associated with the identified potential sources are not anticipated within the Scheme Site Boundary and working areas for the Substation Works and S37 Overhead Line Works, due to the proximity of these features to the Scheme Site Boundary. Construction activities within the Scheme Site Boundary are not considered likely to mobilise any potential contamination through creation of preferential pathways within the Scheme Site Boundary.</p> |
| <p>Ground gas associated with historical and current land uses including:</p> <ul style="list-style-type: none"> <li>Historical inert landfill (c. 350 m north west of the Scheme Site Boundary and 760 m south west of existing pylon 4ZM415).</li> </ul> | <ul style="list-style-type: none"> <li>Migration through natural and/or anthropogenic pathways (e.g. services); and</li> <li>Inhalation of ground gases (indoors and outdoors).</li> </ul>  | <p><b>Human health:</b></p> <ul style="list-style-type: none"> <li>Construction workers (especially in confined spaces);</li> <li>Future site users (operation and maintenance workers); and</li> <li>Adjacent land users.</li> </ul>        | <p><b>Low *</b></p> <p>Only one potential source of ground gases has been identified within the Study Area and this is located away from any areas of anticipated ground disturbance or confined spaces associated with the Scheme and the superficial geology between this source and working areas are primarily cohesive, preventing migration towards the Scheme Site Boundary. Therefore, the risk to receptors is considered to be low.</p>  |

| Potential Sources | Potential Pathways   | Potential Receptors  | Risk Classification and Rationale   |
|-------------------|--|--|---|
|                   |  |  | A Pre-construction ground investigation will be undertaken at the New Weston Marsh Substation A site, including gas monitoring. Should this monitoring identify an elevated risk of ground gas from off-site sources, the control measures within the <b>Outline CEMP</b> would include appropriate PPE and gas protection measures (control measure GH12). |
|                   | <ul style="list-style-type: none"> <li>• Migration through natural pathways;</li> <li>• Explosion (methane only).</li> </ul> | <b>Building Materials, Structures and Services:</b> <ul style="list-style-type: none"> <li>• Structures;</li> <li>• Confined spaces (including underground services).</li> </ul> | <b>Low *</b><br>As above for human health, the potential source of ground gases is located away from any areas of anticipated ground disturbance or confined spaces associated with the Scheme, therefore there is considered to be a low risk of migration and explosion within the Scheme Site Boundary.  |

\* Professional judgement has been used to reduce the risk rating from Moderate/Low to Low, based on the Severe consequence but Unlikely probability, as per the assessment tables in **Appendix B**. The recorded ground conditions and nature of the Scheme are such that there is considered to be a Low overall risk, compared to the Moderate/Low outcome of the assessment tables.

- 8.5.4 As shown above in **Table 8.1**, the preliminary risk assessment has concluded a very Low to Low risk from contamination and gas sources for the New Weston Marsh Substation A, for all receptors including human health, controlled waters and structures. It has been determined that the control measures within the **Outline CEMP** would be sufficient to mitigate any risks arising from these features, as they are all considered to be of low risk of contamination potential, or sufficient distance from the Scheme Site Boundary or working areas that contaminant migration is not likely to create significant effects for on-site receptors.
- 8.5.5 Ground investigation is currently ongoing, including laboratory testing of shallow soils and monitoring for groundwater and ground gas. The outcomes of the above CSM will be verified against the results of this ground investigation once all testing and monitoring has been completed.
- 8.5.6 There is also potential for new contamination sources to be introduced to the Study Area as a result of all aspects of the Scheme (Substation Works, S37 Overhead Line Works, Exempt Overhead Line Works). These have not been assessed within the table above, as this considers existing potential risks. New sources associated with the Scheme may include the use and storage of chemicals and fuels required during

construction, and accidental spillages or leaks associated with construction and maintenance vehicles. It is considered that the Scheme will include all necessary and appropriate control measures to prevent any effects associated with such activities. Therefore, these have not been considered further within this assessment.

## 8.6 Climate Change

- 8.6.1 As part of this Geoenvironmental Assessment, the likely changes from the current known baseline have been considered, which may occur during the Schemes lifespan as a result of climate change. Climate models indicate that there will be an increase in extreme weather cycle events, such as heatwaves and floods, as well as changes to the hydrological cycle, with the resulting impacts (drier summers, shorter wetter winters) having an effect on all levels of society.
- 8.6.2 There may be several effects of climate change on ground and groundwater conditions such as mobilising contaminants or increase in transport beyond the Scheme Site Boundary, altering the nature of contaminants, undermining structures through erosion or soil volume changes, degrading land quality by causing subsidence or landslides, encouraging wildfires, and/or altering the biodiversity. This is relevant for all aspects of the Scheme (Substation Works, S37 Overhead Line Works, Exempt Overhead Line Works).
- 8.6.3 The changes that may occur as a result of climate change are outlined in **Table 8.2** below.

**Table 8.2** Considered Generic Climate Change Effects

| Change                        | Effect                              | Result  |
|-------------------------------|-------------------------------------|---|
| Hotter drier seasonal periods | Drying out of surface soils         | Desiccation of surface soils, with increase in wind may lead to airborne migration of contaminants. |
| Wetter seasonal periods       | Increased percolation of rainwater  | Increase in leachate generation potential within zones of mobile contaminants.                      |
|                               | Increase in groundwater level       | Rapid displacement of ground gases from infilled ground.  |
| Colder seasonal periods       | Decrease in contaminant degradation | Slower breakdown of contaminants may allow migration further from their sources.                    |

- 8.6.4 Drier ground conditions as a result of increasing temperatures and lower precipitation levels will increase the desiccation of any cohesive soils within the Study Area. As desiccation occurs, dust and other contaminants can become airborne which can migrate along source-pathway-receptor (SPR) linkages. The superficial deposits within the Study Area are recorded as primarily cohesive in nature, although local borehole records indicate a significant presence of granular horizons.
- 8.6.5 An increase in precipitation on soils that are impacted with any contaminants could cause these contaminants to become mobile through leachate generated. These mobile contaminants may migrate to nearby surface waters or a surface in which receptors can become exposed.

8.6.6 Overall, as discussed within **Table 8.1**, there is a Low to Very Low risk of contamination across the Study Area. Therefore, regardless of the potential climate changes in **Table 8.2** above, there is not considered to be a significant risk of contamination to be mobilised.

## 9. Summary

- 9.1.1 This Phase 1 Geoenvironmental Assessment has been undertaken to provide information on the geoenvironmental nature of the Study Area and assess potential associated risks relating to the Scheme. The Study Area is considered overall to present a Low risk of contamination associated with past land use, current land use and ground conditions.
- 9.1.2 Information obtained as part of this assessment indicates that the Study Area does not have a complex history and has been used primarily as agricultural land from the earliest available mapping through to present day. Localised areas of industrial and commercial activities have been recorded, although these are generally outside of the Scheme Site Boundary and away from working areas associated with the new infrastructure.
- 9.1.3 The review of available information identified potential sources of contamination within the Scheme Site Boundary including a historical tramway, agricultural activities (i.e. leaks and spills, use of herbicides and pesticides) and localised Made Ground deposits. Sources identified outside of the Scheme Site Boundary but within the Study Area include likely Made Ground deposits, warehouses and historical depots with tanks, and a recycling centre.
- 9.1.4 The Preliminary CSM identified several potential contaminant source-pathway-receptor linkages, and a qualitative risk assessment of these linkages has identified a Low risk to human health, controlled waters and structures.
- 9.1.5 The Outline CEMP includes control measures relevant for existing and unexpected/unrecorded potential contamination sources across the Study Area. It is recommended that any pre-construction ground investigation undertaken for the Substation Works and Proposed Overhead Line Works includes an appropriate suite of laboratory geochemical testing and ground gas monitoring, informed by the Preliminary CSM, to confirm the absence of contamination and risks to receptors within the Study Area or establish any additional control and protection measures, if required. It is considered this can be satisfactorily addressed by way of an appropriately worded condition.

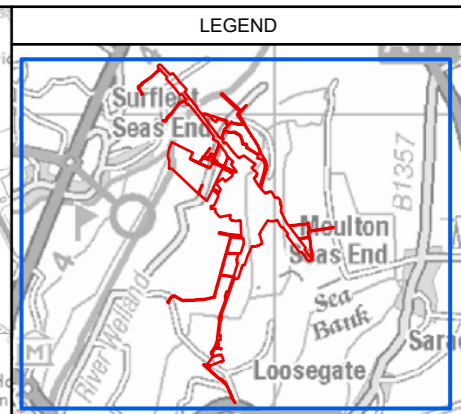
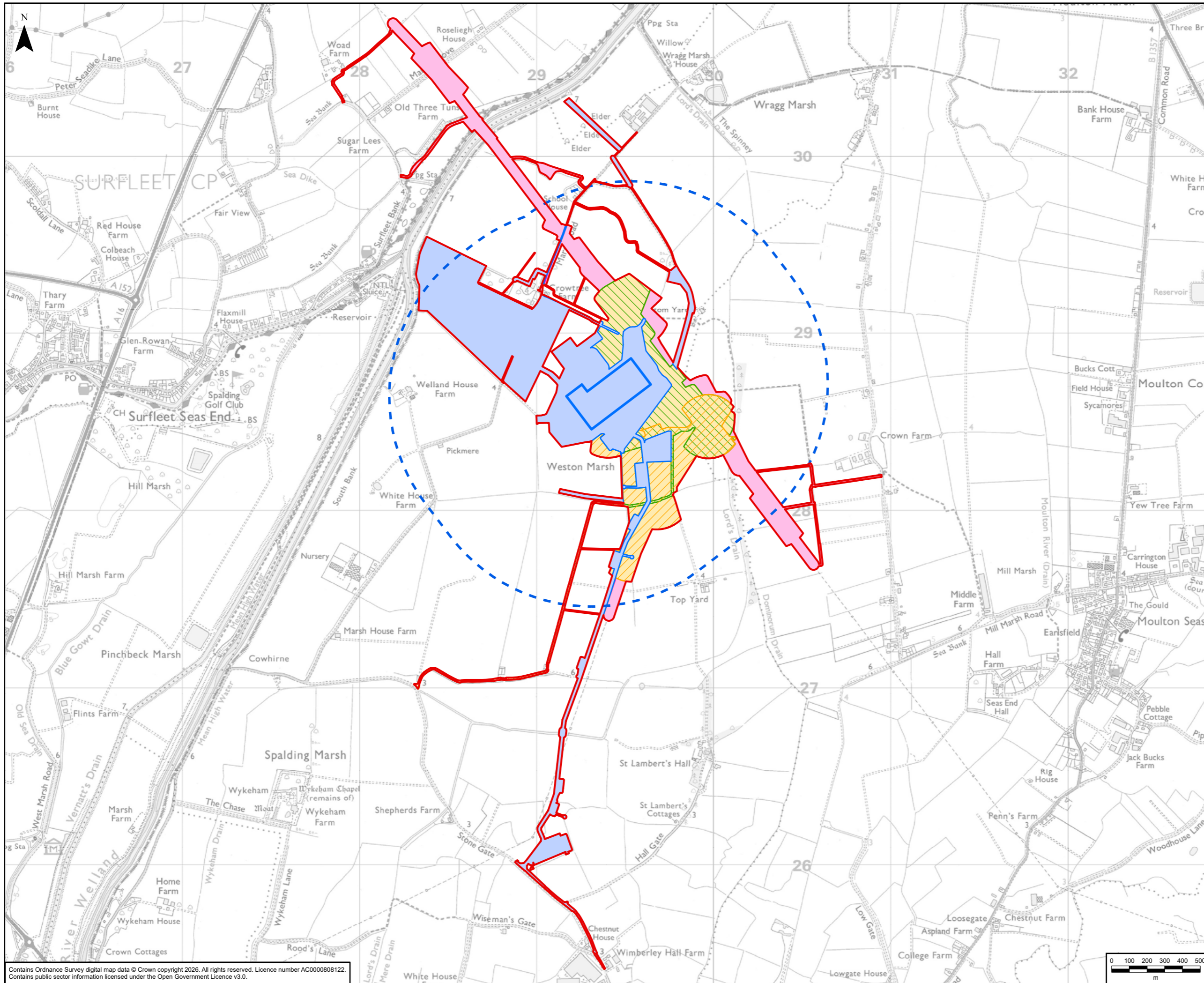
# References

- Ref 1 Town and Country Planning Act 1990. Available online: [https://www.legislation.gov.uk/ukpga/1990/8/pdfs/ukpga\\_19900008\\_en.pdf](https://www.legislation.gov.uk/ukpga/1990/8/pdfs/ukpga_19900008_en.pdf). [Accessed 30 April 2026].
- Ref 2 Electricity Act 1989. Available online: <https://www.legislation.gov.uk/ukpga/1989/29/contents>. [Accessed 30 April 2026].
- Ref 3 The Town and Country Planning (General Permitted Development) (England) Order 2015. Available online: <https://www.legislation.gov.uk/uksi/2015/596/contents>. [Accessed 30 April 2026].
- Ref 4 The Overhead Lines (Exemption) (England and Wales) Regulations 2009. Available online: <https://www.legislation.gov.uk/uksi/2009/640/contents/made>. [Accessed 30 April 2026].
- Ref 5 Environment Agency, (2026). Land Contamination Risk Management (LCRM), published October 2020, updated June 2025. Available at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm><http://www.innovation.gov.au/>. [Accessed 26 February 2026].
- Ref 6 National Planning Policy Framework (2024). Available at: [https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF\\_December\\_2024.pdf](https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF_December_2024.pdf). [Accessed 02 April 2026].
- Ref 7 South East Lincolnshire, (2019). *South East Lincolnshire Local Plan 2011 – 2036*. Available at: <https://southeastlincslocalplan.org/article/20102/Adopted-Plan>. [Accessed 26 February 2026].
- Ref 8 Greater Lincolnshire Nature Partnership, (2021). *Geodiversity Strategy 2022 – 2026*. Available at: <https://glnp.org.uk/images/uploads/achieving-more/GeoStrat%202021.pdf>. [Accessed 26 February 2026].
- Ref 9 UK Health Security Agency, (2026). *UK maps of Radon*. Available at: <https://www.ukradon.org/information/ukmaps>. [Accessed 26 February 2026].
- Ref 10 British Geological Survey, (2026). *GeoIndex*. Available at: <https://mapapps2.bgs.ac.uk/geoindex/home.html>. [Accessed 26 February 2026].
- Ref 11 Department for Environment, Food and Rural Affairs, (2026). *MAGIC Interactive Map*. Available at: <https://magic.defra.gov.uk/MagicMap.html>. [Accessed 26 February 2026].
- Ref 12 Environment Agency, (2025). *Source Protection Zones Dataset*. Available at: <https://www.data.gov.uk/dataset/09889a48-0439-4bbe-8f2a-87bba26fbbf5/source-protection-zones-merged1>. [Accessed 26 February 2026].
- Ref 13 Zetica, (2026). *Unexploded Ordnance Risk Mapping*. Available at: <https://zeticiauxo.com/guidance/risk-maps/>. [Accessed 26 February 2026].
- Ref 14 *Health and Safety at Work Act 1974*. Available at: <https://www.legislation.gov.uk/ukpga/1974/37/contents>. [Accessed 26 February 2026].

- Ref 15 *The Control of Asbestos Regulations 2012*. Available at: <https://www.legislation.gov.uk/ukxi/2012/632/contents>. [Accessed 26 February 2026].
- Ref 16 *The Construction (Design and Management) Regulations 2015*. Available at: <https://www.legislation.gov.uk/ukxi/2015/51/contents>. [Accessed 26 February 2026].
- Ref 17 British Geological Survey, (2026). *Hydrogeological Maps of the UK database*. Available at: [https://www2.bgs.ac.uk/groundwater/datainfo/hydromaps/hydro\\_maps\\_scanviewer.html](https://www2.bgs.ac.uk/groundwater/datainfo/hydromaps/hydro_maps_scanviewer.html). [Accessed 26 February 2026].
- Ref 18 Health and Safety Executive, (2017). *Ionising Radiations Regulations*. Available at: <https://www.legislation.gov.uk/ukxi/2017/1075/contents>. [Accessed 26 February 2026].
- Ref 19 Environmental Protection, England, (2016). *The Environmental Permitting (England and Wales) Regulations*. Available at: <https://www.legislation.gov.uk/ukxi/2016/1154/contents>. [Accessed 26 March 2026].
- Ref 20 Official Journal of the European Union, (2006). *Directive 2006/11/EC of the European Parliament and of the Council on pollution caused by certain dangerous substances discharged into the aquatic environment of the community*. Available at: <https://eur-lex.europa.eu/eli/dir/2006/11/oj/eng>. [Accessed 26 February 2026].
- Ref 21 Environmental Protection, England, (2015). *The Environmental Damage (Prevention and Remediation) (England) Regulations*. Available at: <https://www.legislation.gov.uk/ukxi/2015/810/contents>. [Accessed 26 February 2026].
- Ref 22 Construction Industry Research and Information Association (CIRIA), (2001). *Contaminated Land Risk Assessment: A Guide to Good Practice (C552)*. Available at: [https://www.ciria.org/CIRIA/CIRIA/Item\\_Detail.aspx?iProductCode=C552&Category=BOOK](https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C552&Category=BOOK). [Accessed 26 February 2026].
- Ref 23 Town and Country Planning Act 1990. Available online: [https://www.legislation.gov.uk/ukpga/1990/8/pdfs/ukpga\\_19900008\\_en.pdf](https://www.legislation.gov.uk/ukpga/1990/8/pdfs/ukpga_19900008_en.pdf) [Accessed 30 April 2026].
- Ref 24 Electricity Act 1989. Available online: <https://www.legislation.gov.uk/ukpga/1989/29/contents>. [Accessed 30 April 2026].
- Ref 25 The Town and Country Planning (General Permitted Development) (England) Order 2015. Available online: <https://www.legislation.gov.uk/ukxi/2015/596/contents>. [Accessed 30 April 2026].
- Ref 26 The Overhead Lines (Exemption) (England and Wales) Regulations 2009. Available online: <https://www.legislation.gov.uk/ukxi/2009/640/contents/made>. [Accessed 30 April 2026].

# Figures

# Figure 1 Scheme Site Boundary



- Legend**
- Scheme Site Boundary
  - Substation Works Site Boundary
  - S37 OHL Works Site Boundary
  - Exempt Overhead Line Works Site Boundary
  - S37 - 4ZM - OHL Works Site Boundary
  - S37 - 2WS - OHL Works Site Boundary
  - Substation Footprint
  - Substation Footprint 1 km buffer – Represents the area covered by the Groundsure Geo and Enviro Insights Report obtained for the Phase 1 Geo-Environmental Desk Study, dated 06 February 2026

|     |            |             |     |     |     |
|-----|------------|-------------|-----|-----|-----|
| A   | 20/03/2026 | First Issue | DF  | JC  | SG  |
| Rev | Date       | Description | GIS | Chk | App |

**nationalgrid**

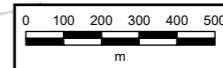
Purpose: GEOLOGY AND HYDROGEOLOGY

Scheme: PROPOSED ELECTRICITY SUBSTATION AND OVERHEAD LINE WORKS AT WESTON MARSH

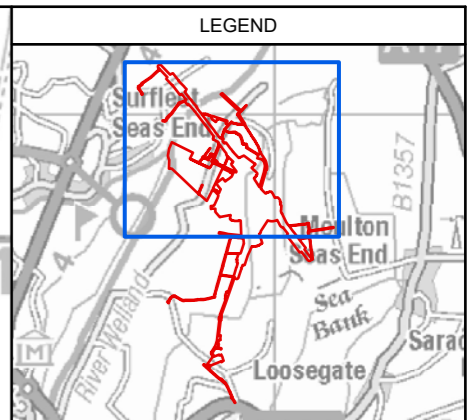
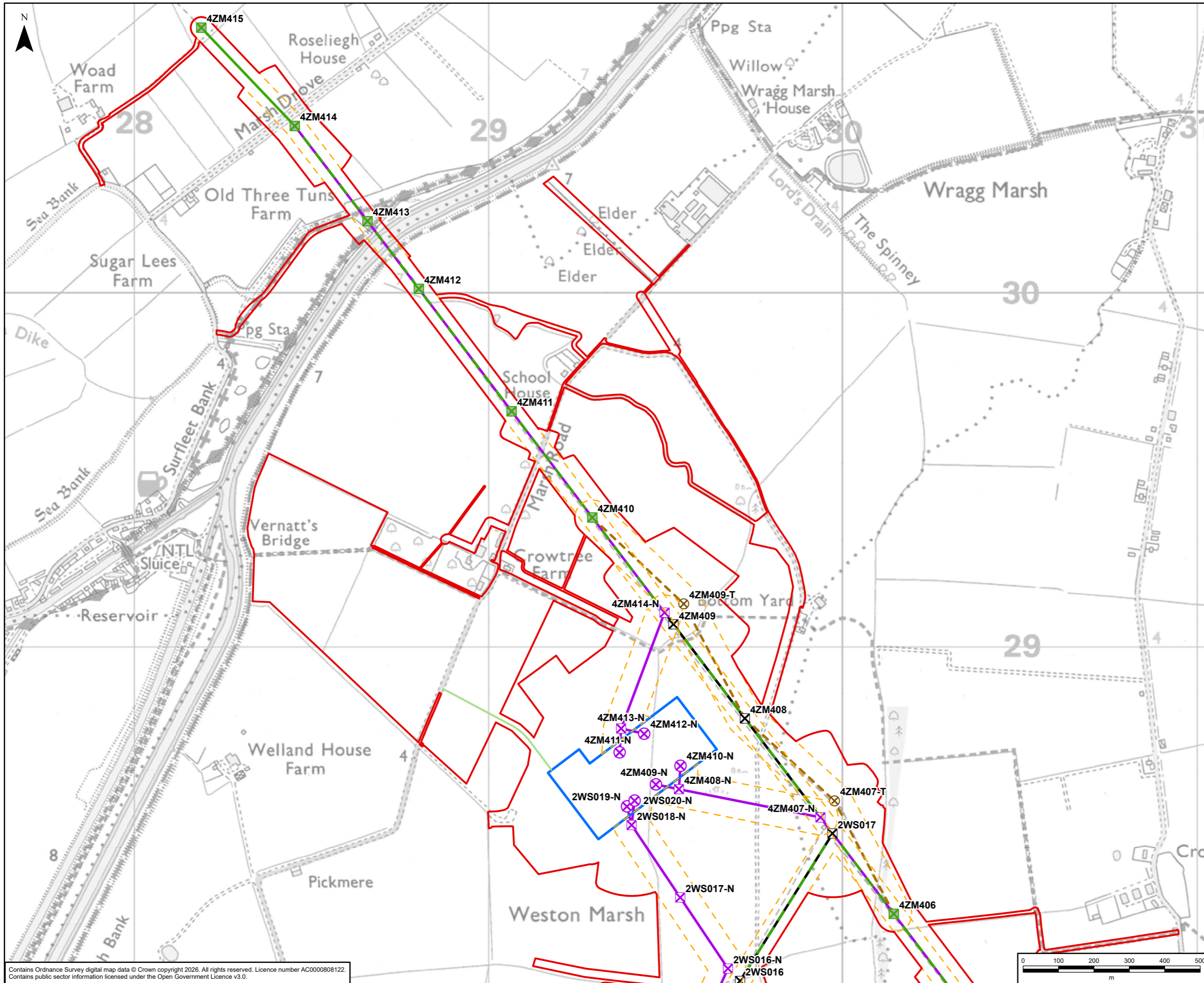
Document Title: FIGURE 1 SCHEME SITE BOUNDARY

|                       |                  |             |                  |              |                  |
|-----------------------|------------------|-------------|------------------|--------------|------------------|
| Creator: DF           | Date: 07/05/2026 | Checker: JC | Date: 07/05/2026 | Approver: SG | Date: 07/05/2026 |
| Document Type: FIGURE | Scale: 1:20,000  | Format: A3  | Sheets: 1 OF 1   | Rev: A       |                  |

Contains Ordnance Survey digital map data © Crown copyright 2026. All rights reserved. Licence number AC0000808122. Contains public sector information licensed under the Open Government Licence v3.0.



## **Figure 2      Proposed Substation and Overhead Line Works**



**LEGEND**

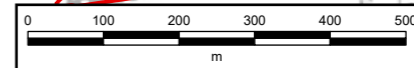
- ▭ Scheme Site Boundary
- LoD
- ▭ Substation, Permanent
- Substation Access
- Dismantled NG OHL
- Existing NG OHL
- Modified NG OHL
- New NG OHL
- Temporary OHL
- ⊠ Existing Pylon
- ⊠ Existing Pylon to be Dismantled
- ⊠ New Gantry
- ⊠ New Pylon
- ⊠ Indicative Temporary Structure

|     |            |             |     |     |     |
|-----|------------|-------------|-----|-----|-----|
| A   | 20/03/2026 | First Issue | DF  | JC  | SG  |
| Rev | Date       | Description | GIS | Chk | App |

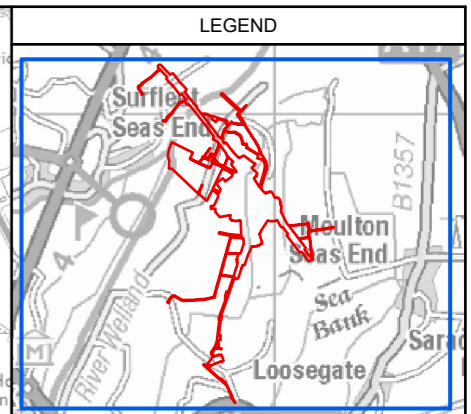
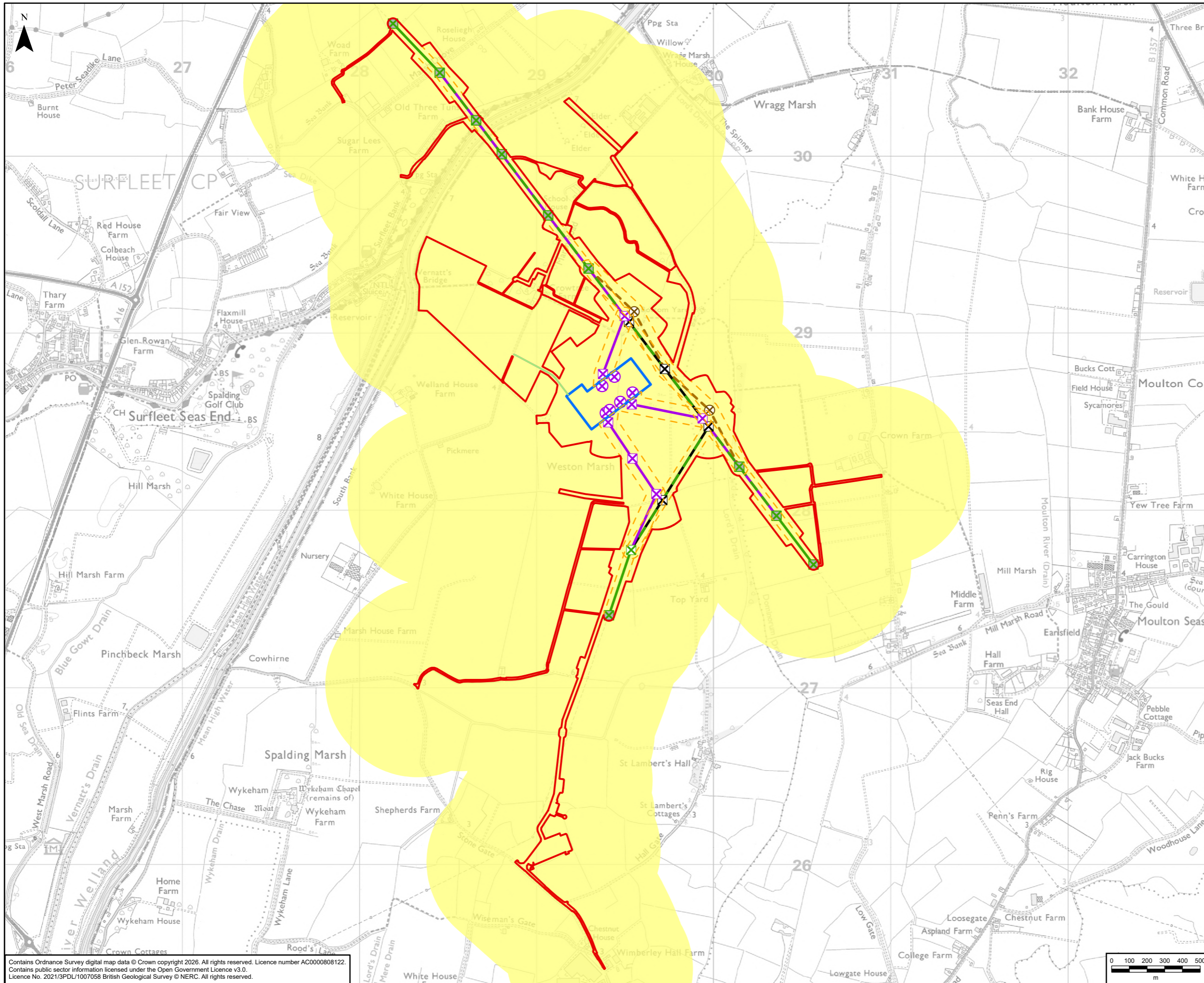
|   |            |          |            |           |            |
|---|------------|----------|------------|-----------|------------|
| <b>nationalgrid</b>   |            |          |            |           |            |
| Purpose: GEOLOGY AND HYDROGEOLOGY                               |            |          |            |           |            |
| Scheme: PROPOSED ELECTRICITY SUBSTATION AND OVERHEAD LINE WORKS |            |          |            |           |            |
| Document Title: FIGURE 2 PERMANENT DESIGN FEATURES              |            |          |            |           |            |
| Creator:  | Date:      | Checker: | Date:      | Approver: | Date:      |
| DF  | 07/05/2026 | JC       | 07/05/2026 | SG        | 07/05/2026 |
| Document Type:  | Scale:     | Format:  | Sheets:    | Rev:      |            |
| FIGURE  | 1:10,000   | A3       | 1 OF 1     | A         |            |

Contains Ordnance Survey digital map data © Crown copyright 2026. All rights reserved. Licence number AC0000808122. Contains public sector information licensed under the Open Government Licence v3.0.

Document Path: \\eu.aecomnet.com\EMIA\UK\IUKNCL2\Jobs\60721024 Grimsby to Walpole\02\_Maps\_WM Substation TCPA\Geology and Hydrogeology\WM\_TCPA\_Geology\_Hydrogeology.aprx



## **Figure 3      Superficial Geology**



**LEGEND**

- Scheme Site Boundary
- LoD
- Substation, Permanent
- Substation Access
- Dismantled NG OHL
- Existing NG OHL
- Modified NG OHL
- New NG OHL
- Temporary OHL
- ⊗ Existing Pylon
- ⊗ Existing Pylon to be Modified
- ⊗ Existing Pylon to be Dismantled
- ⊗ New Gantry
- ⊗ New Pylon
- ⊗ Indicative Temporary Structure

Superficial Geology (BGS 50k)

- Tidal Flat Deposits - Clay and Silt

|     |            |             |     |     |     |
|-----|------------|-------------|-----|-----|-----|
| A   | 20/03/2026 | First Issue | DF  | JC  | SG  |
| Rev | Date       | Description | GIS | Chk | App |

**nationalgrid**

Purpose: GEOLOGY AND HYDROGEOLOGY

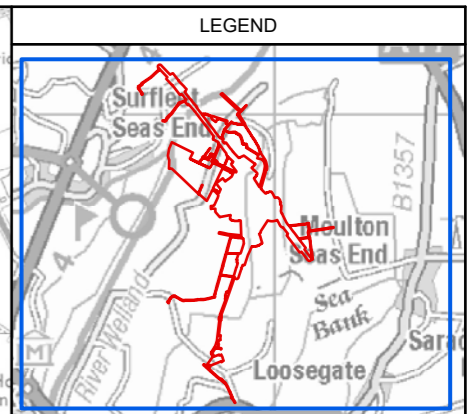
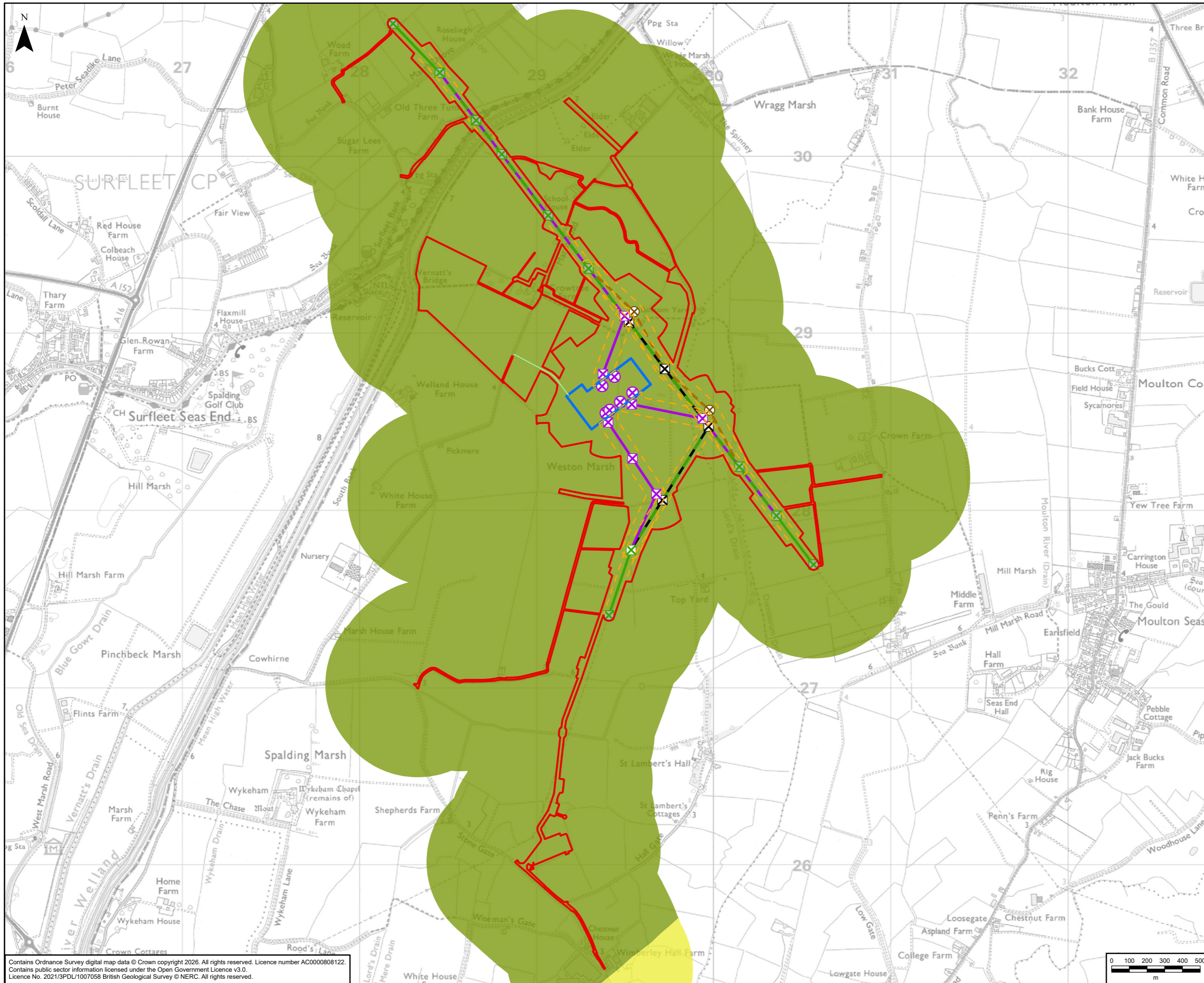
Scheme: PROPOSED ELECTRICITY SUBSTATION AND OVERHEAD LINE WORKS AT WESTON MARSH

Document Title: FIGURE 3 SUPERFICIAL GEOLOGY

|                       |                  |             |                  |              |                  |
|-----------------------|------------------|-------------|------------------|--------------|------------------|
| Creator: DF           | Date: 07/05/2026 | Checker: JC | Date: 07/05/2026 | Approver: DR | Date: 07/05/2026 |
| Document Type: FIGURE | Scale: 1:20,000  | Format: A3  | Sheets: 1 OF 1   | Rev: A       |                  |

Contains Ordnance Survey digital map data © Crown copyright 2026. All rights reserved. Licence number AC0000808122.  
 Contains public sector information licensed under the Open Government Licence v3.0.  
 Licence No. 2021/3PDL/1007058 British Geological Survey © NERC. All rights reserved.

## Figure 4 Bedrock Geology



**LEGEND**

**Legend**

- Scheme Site Boundary
- LoD
- Substation, Permanent
- Substation Access
- Dismantled NG OHL
- Existing NG OHL
- Modified NG OHL
- New NG OHL
- Temporary OHL
- ⊗ Existing Pylon
- ⊗ Existing Pylon to be Modified
- ⊗ Existing Pylon to be Dismantled
- ⊗ New Gantry
- ⊗ New Pylon
- ⊗ Indicative Temporary Structure

**Bedrock Geology (BGS 50k)**

- Oxford Clay Formation - Mudstone
- West Walton Formation - Mudstone and Siltstone

|     |            |             |     |     |     |
|-----|------------|-------------|-----|-----|-----|
| A   | 20/03/2026 | First Issue | DF  | JC  | SG  |
| Rev | Date       | Description | GIS | Chk | App |

**nationalgrid**

Purpose: GEOLOGY AND HYDROGEOLOGY

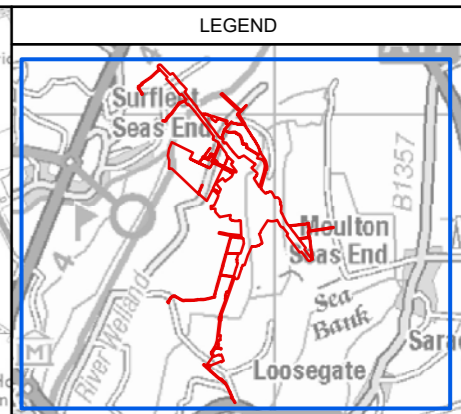
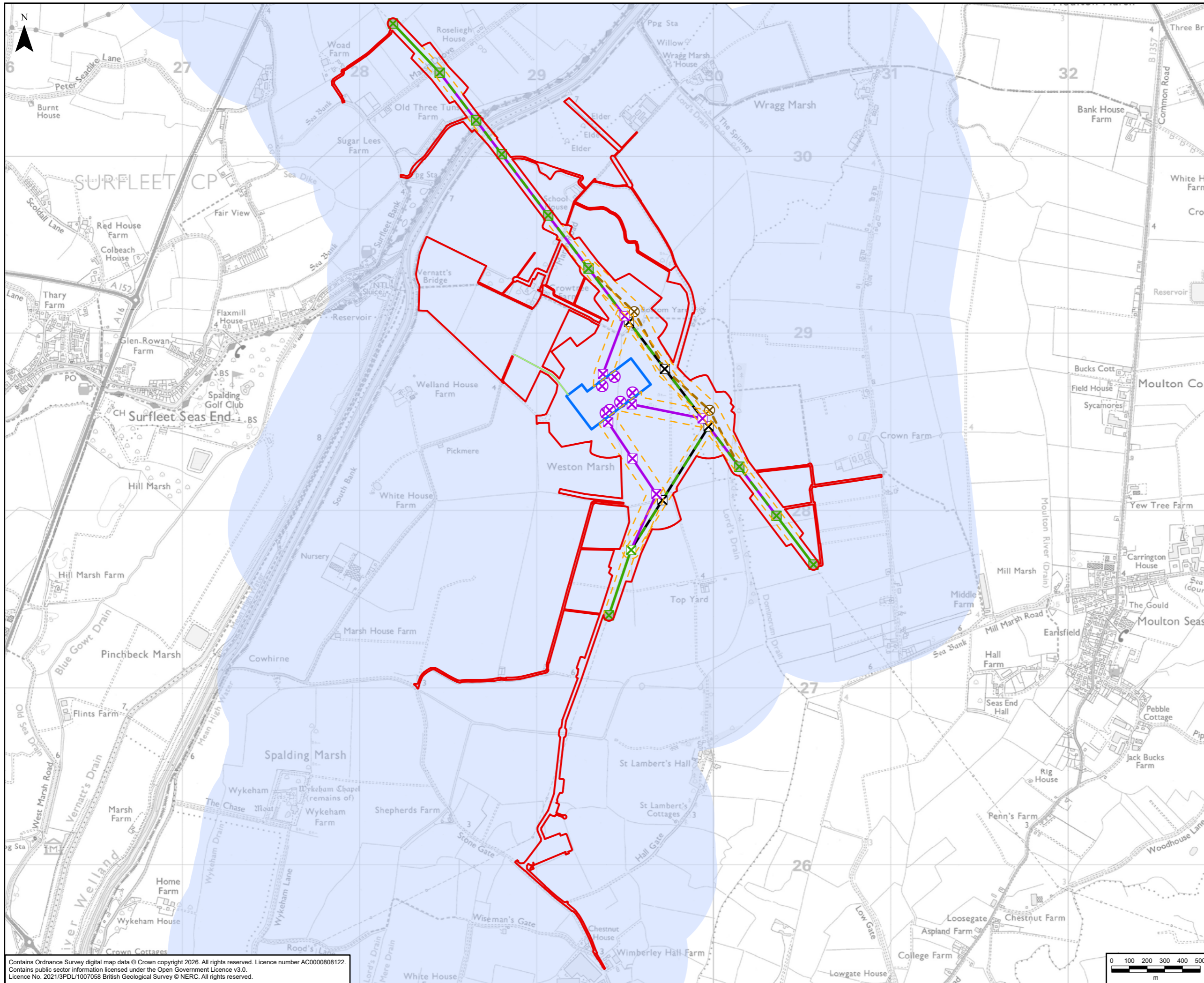
Scheme: PROPOSED ELECTRICITY SUBSTATION AND OVERHEAD LINE WORKS AT WESTON MARSH

Document Title: FIGURE 4 BEDROCK GEOLOGY

|                |            |          |            |           |            |
|----------------|------------|----------|------------|-----------|------------|
| Creator:       | Date:      | Checker: | Date:      | Approver: | Date:      |
| DF             | 07/05/2026 | JC       | 07/05/2026 | SG        | 07/05/2026 |
| Document Type: | Scale:     | Format:  | Sheets:    | Rev:      |            |
| FIGURE         | 1:20,000   | A3       | 1 OF 1     | A         |            |

Contains Ordnance Survey digital map data © Crown copyright 2026. All rights reserved. Licence number AC0000808122.  
 Contains public sector information licensed under the Open Government Licence v3.0.  
 Licence No. 2021/3PDL/1007058 British Geological Survey © NERC. All rights reserved.

# Figure 5 Aquifer Designations Superficial Geology



**LEGEND**

- Scheme Site Boundary
- LoD
- Substation, Permanent
- Substation Access
- Dismantled NG OHL
- Existing NG OHL
- Modified NG OHL
- New NG OHL
- Temporary OHL
- ⊗ Existing Pylon
- ⊗ Existing Pylon to be Modified
- ⊗ Existing Pylon to be Dismantled
- ⊗ New Gantry
- ⊗ New Pylon
- ⊗ Indicative Temporary Structure

Aquifer Designation: Superficial Deposits

- Unproductive Strata

|     |            |             |     |     |     |
|-----|------------|-------------|-----|-----|-----|
| A   | 20/03/2026 | First Issue | DF  | JC  | SG  |
| Rev | Date       | Description | GIS | Chk | App |

**nationalgrid**

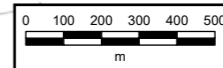
Purpose: GEOLOGY AND HYDROGEOLOGY

Scheme: PROPOSED ELECTRICITY SUBSTATION AND OVERHEAD LINE WORKS AT WESTON MARSH

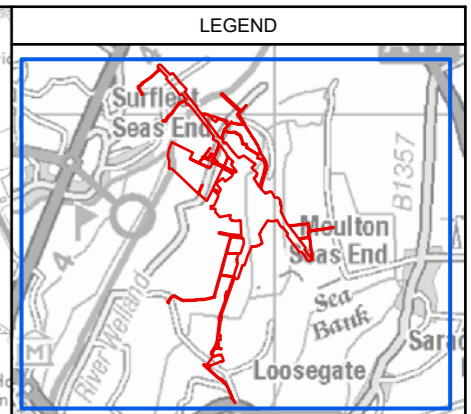
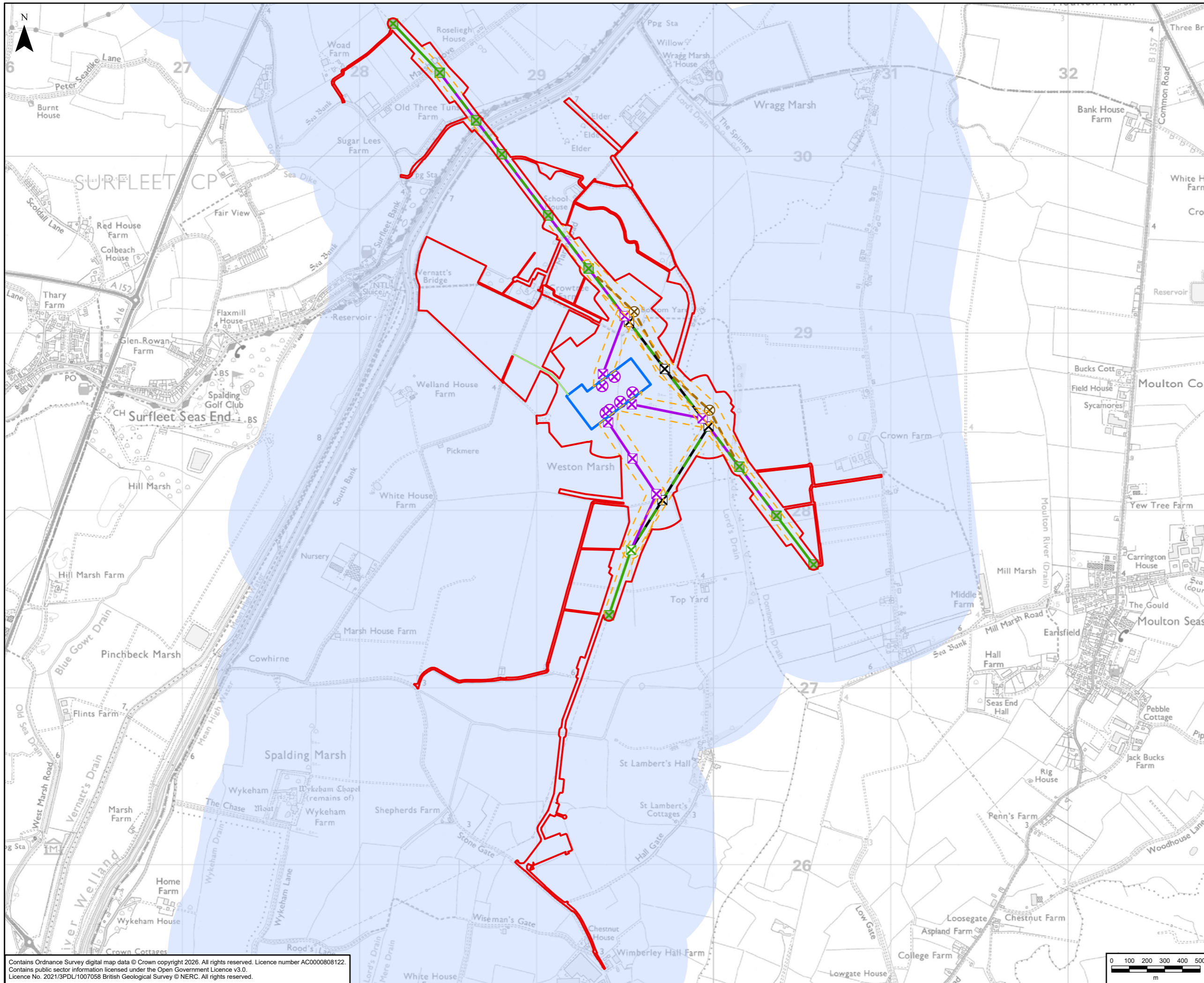
Document Title: FIGURE 5  
AQUIFER DESIGNATIONS: SUPERFICIAL GEOLOGY

|                |            |          |            |           |            |
|----------------|------------|----------|------------|-----------|------------|
| Creator:       | Date:      | Checker: | Date:      | Approver: | Date:      |
| DF             | 07/05/2026 | JC       | 07/05/2026 | DR        | 07/05/2026 |
| Document Type: | Scale:     | Format:  | Sheets:    | Rev:      |            |
| FIGURE         | 1:20,000   | A3       | 1 OF 1     | A         |            |

Contains Ordnance Survey digital map data © Crown copyright 2026. All rights reserved. Licence number AC0000808122.  
 Contains public sector information licensed under the Open Government Licence v3.0.  
 Licence No. 2021/3PDL/1007058 British Geological Survey © NERC. All rights reserved.



# Figure 6      Aquifer Designations Bedrock Geology



**LEGEND**

- Scheme Site Boundary
- LoD
- Substation, Permanent
- Substation Access
- Dismantled NG OHL
- Existing NG OHL
- Modified NG OHL
- New NG OHL
- Temporary OHL
- ⊗ Existing Pylon
- ⊗ Existing Pylon to be Modified
- ⊗ Existing Pylon to be Dismantled
- ⊗ New Gantry
- ⊗ New Pylon
- ⊗ Indicative Temporary Structure

Aquifer Designation: Bedrock Geology

- Unproductive Strata

|     |            |             |     |     |     |
|-----|------------|-------------|-----|-----|-----|
| A   | 20/03/2026 | First Issue | DF  | JC  | SG  |
| Rev | Date       | Description | GIS | Chk | App |

**nationalgrid**

Purpose: GEOLOGY AND HYDROGEOLOGY

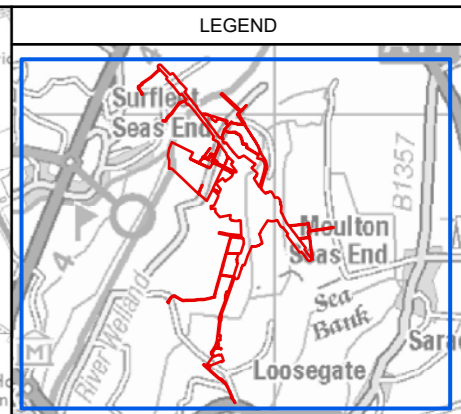
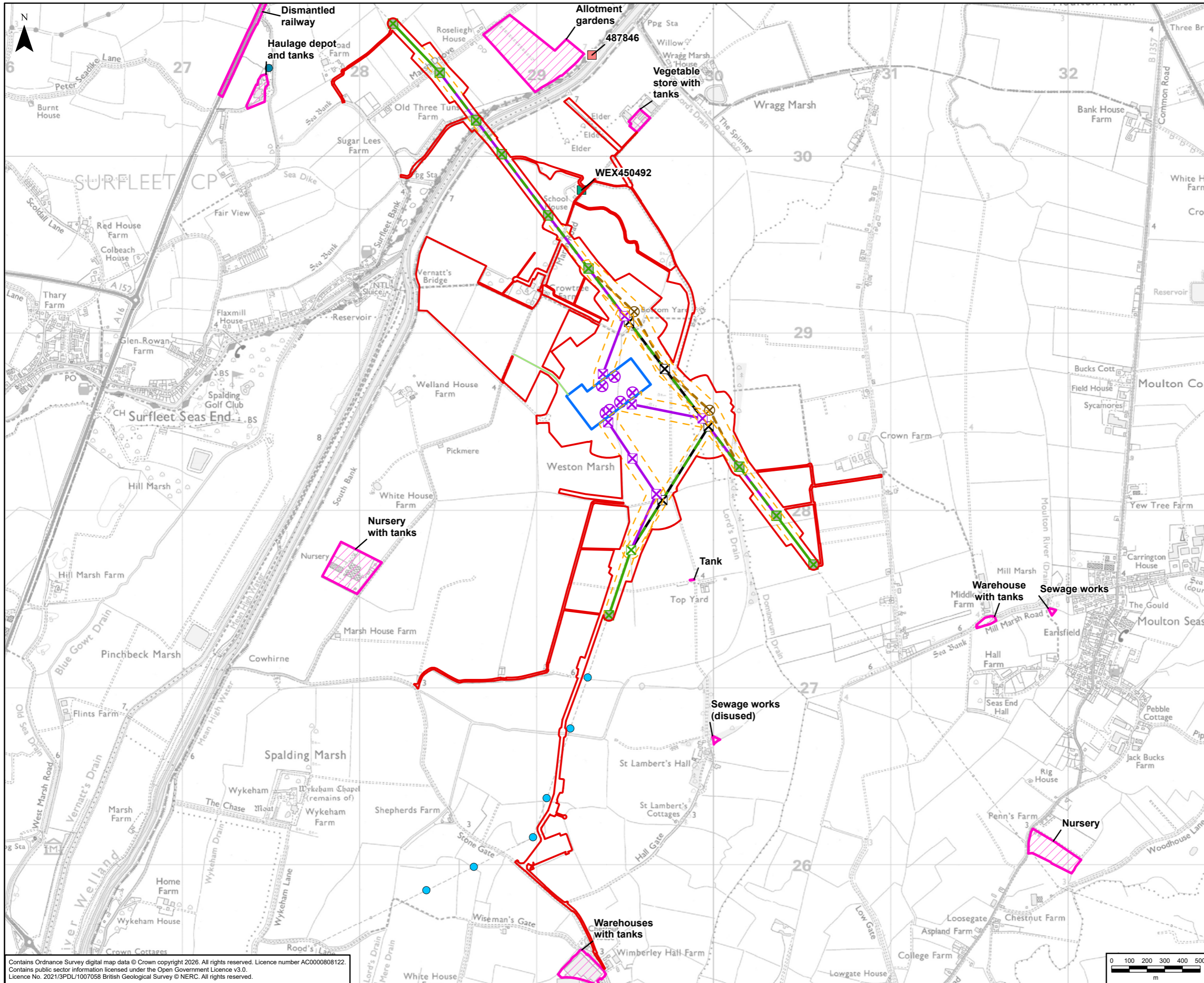
Scheme: PROPOSED ELECTRICITY SUBSTATION AND OVERHEAD LINE WORKS AT WESTON MARSH

Document Title: FIGURE 6  
AQUIFER DESIGNATIONS: BEDROCK GEOLOGY

|                |            |          |            |           |            |
|----------------|------------|----------|------------|-----------|------------|
| Creator:       | Date:      | Checker: | Date:      | Approver: | Date:      |
| DF             | 07/05/2026 | JC       | 07/05/2026 | SG        | 07/05/2026 |
| Document Type: | Scale:     | Format:  | Sheets:    | Rev:      |            |
| FIGURE         | 1:20,000   | A3       | 1 OF 1     | A         |            |

Contains Ordnance Survey digital map data © Crown copyright 2026. All rights reserved. Licence number AC0000808122.  
 Contains public sector information licensed under the Open Government Licence v3.0.  
 Licence No. 2021/3PDL/1007058 British Geological Survey © NERC. All rights reserved.

# **Figure 7      Landfills, Waste and Potentially Contaminative Previous Land Uses**



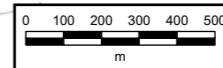
**LEGEND**

- Scheme Site Boundary
- LoD
- Substation, Permanent
- Substation Access
- Dismantled NG OHL
- Existing NG OHL
- Modified NG OHL
- New NG OHL
- Temporary OHL
- X Existing Pylon
- X Existing Pylon to be Modified
- X Existing Pylon to be Dismantled
- X New Gantry
- X New Pylon
- X Indicative Temporary Structure
- Pollution Incident Location (EA)
- Waste Exemption (EA)
- Lincolnshire Waste Site (LCC)
- Recent Industrial Land Uses
- Historical Mapping Identified Features

|     |            |             |     |     |     |
|-----|------------|-------------|-----|-----|-----|
| A   | 20/03/2026 | First Issue | DF  | JC  | SG  |
| Rev | Date       | Description | GIS | Chk | App |

|  |            |          |            |           |            |
|--|------------|----------|------------|-----------|------------|
| <b>nationalgrid</b>  |            |          |            |           |            |
| Purpose: GEOLOGY AND HYDROGEOLOGY  |            |          |            |           |            |
| Scheme: PROPOSED ELECTRICITY SUBSTATION AND OVERHEAD LINE WORKS AT WESTON MARSH            |            |          |            |           |            |
| Document Title: FIGURE 7 LANDFILLS, WASTE AND POTENTIALLY CONTAMINATIVE PREVIOUS LAND USES |            |          |            |           |            |
| Creator:   | Date:      | Checker: | Date:      | Approver: | Date:      |
| DF   | 07/05/2026 | JC       | 07/05/2026 | SG        | 07/05/2026 |
| Document Type:   | Scale:     | Format:  | Sheets:    | Rev:      |            |
| FIGURE   | 1:20,000   | A3       | 1 OF 1     | A         |            |

Contains Ordnance Survey digital map data © Crown copyright 2026. All rights reserved. Licence number AC000808122.  
 Contains public sector information licensed under the Open Government Licence v3.0.  
 Licence No. 2021/3PDL/1007058 British Geological Survey © NERC. All rights reserved.



National Grid plc  
National Grid House,  
Warwick Technology Park,  
Gallows Hill, Warwick.  
CV34 6DA United Kingdom

Registered in England and Wales  
No. 4031152  
[nationalgrid.com](http://nationalgrid.com)