
FENWICK SOLAR FARM

Preliminary Environmental Information Report
Volume IV Non-Technical Summary

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Fenwick Solar Project Limited

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1. Introduction

1.1 Overview

- 1.1.1 This document has been prepared by AECOM on behalf of Fenwick Solar Project Limited (the Applicant) and provides a Non-Technical Summary (NTS) of the Preliminary Environmental Information Report (PEIR) for the proposed Fenwick Solar Farm (hereafter referred to as the Scheme).
- 1.1.2 The Scheme will involve the construction, operation (including maintenance), and decommissioning of ground mounted solar photovoltaic (PV)¹ panels, together with associated infrastructure including a Battery Energy Storage System (BESS) and import and export connection to the national grid via the Existing National Grid Thorpe Marsh Substation. The Scheme also includes land for ecological mitigation and enhancement.
- 1.1.3 The Scheme is a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008, as it will have the capacity to generate more than 50 megawatts (MW) of electricity. Under the Planning Act, a type of planning consent called a Development Consent Order (DCO) is required to build an NSIP.
- 1.1.4 The Applicant will carry out additional design and environmental assessment work after statutory consultation (of which the PEIR is a key part), with the intention of submitting an application for a DCO in autumn 2024. Following an examination by the Planning Inspectorate, this application will then be decided by the Secretary of State for Energy Security and Net Zero.
- 1.1.5 AECOM is a registrant to the Environmental Impact Assessment (EIA) Quality Mark scheme run by the Institute of Environmental Management and Assessment (IEMA).



1.2 What is an Environmental Impact Assessment?

- 1.2.1 EIA is a process to ensure that planning decisions are made with full knowledge of the likely significant environmental effects of a proposed development. The outcome of the EIA process is reported within an Environmental Statement (ES) which is submitted with a DCO Application. The ES is an update to the PEIR, based on further environmental information and assessment.
- 1.2.2 The objective of the EIA is to identify any likely significant effects which may arise from a proposed development and to identify measures to prevent, reduce or offset any adverse effects and to enhance any beneficial effects. During the EIA process for the Scheme to date, opportunities and management measures have been identified and incorporated within the development proposals to prevent or reduce any adverse effects, and to enable sustainable design and construction principles to be embedded within

¹ Photovoltaic means the conversion of light to energy.

the Scheme. Such opportunities and measures will continue to be identified and incorporated into the Scheme throughout the EIA process.

1.3 The Applicant

1.3.1 Fenwick Solar Project Limited (the Applicant) is a wholly owned subsidiary of BOOM Developments Limited who specialise in non-subsidised solar and battery storage projects. BOOM Developments Limited was founded in 2020, and the name BOOM is an acronym for Build Own Operate Maintain. This reflects the organisation's intentions to be involved in sustainable energy projects from day one right the way through to operation. The BOOM Managing Director and team have been responsible in previous roles for constructing more than 700 MW of solar developments in the UK between 2015 and 2017 and developing more than 850 MW of solar projects including the UK's first nationally significant infrastructure solar PV project, Cleve Hill, which was granted a Development Consent Order in 2020, and East Yorkshire Solar Farm which was accepted for examination at the end of 2023. In 2021, the UK based BOOM partnered with the Pelion Green Future group of companies based across Australia, America and the European mainland.

1.4 The Site

1.4.1 The land for which DCO consent is being sought is referred to as 'the Site' and comprises approximately 536 ha of land. It is located between the villages of Fenwick, Moss and Sykehouse as well as the hamlet of Topham.

1.4.2 The Site is shown on **Figure 1** and **Figure 2** of this NTS.

1.4.3 The Site comprises the following elements as shown on **Figure 3** of this NTS:

- a. The Solar PV Site, which has an approximate area of 421 ha, centred on approximate National Grid Reference SE60416. The Solar PV Site will contain the ground mounted Solar PV Panels, BESS Area, On-Site Substation, Grid Connection Line Drop and associated infrastructure. The Solar PV Site will also include areas of habitat creation/enhancement and landscaping;
- b. The Grid Connection Corridor, which has an approximate area of 115 ha, centred on the approximate National Grid Reference SE602125. This comprises the Grid Connection Cables, linking the On-Site Substation (located within the Solar PV Site) to the Existing National Grid Thorpe Marsh Substation (approximately 5 km south of the Solar PV Site); and
- c. The Existing National Grid Thorpe Marsh Substation, centred on approximate National Grid Reference SE605095. This would comprise a substation bay where the Grid Connection Cables would connect to the grid.

1.4.4 The Site is located entirely within the City of Doncaster Council's administrative area.

1.4.5 A description of the physical characteristics of the Scheme and the land-use requirements during the construction, operational, and decommissioning phases is presented in Section 4: Scheme Description of the NTS.



Plate 1: Landscaped Solar PV Facility

1.5 The Purpose of the PEIR and NTS

- 1.5.1 The purpose of the PEIR is to accompany formal statutory pre-application consultation under sections 42, 47 and 48 of the Planning Act 2008 and to enable “*consultees (both specialist and non- specialist) to understand the likely environmental effects of the Proposed Development and helps to inform their consultation responses on the Proposed Development during the pre-application stage*” (Planning Inspectorate, Planning Advice Note 7). It has been prepared to meet the requirements of Regulation 12(2) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations).
- 1.5.2 The PEIR therefore presents an overview of the preliminary environmental information available about the Scheme, based on the design information available at this stage of the Scheme. The PEIR is intended to provide members of the public, statutory consultees and other stakeholders with preliminary information on the Scheme’s likely significant environmental effects.
- 1.5.3 The EIA information contained within the PEIR is ‘preliminary’ and does not represent a final Scheme design or include final environmental assessment conclusions. The Applicant is seeking consultation responses to the information presented in order to continue to refine the Scheme design. The Applicant will continue to obtain information that will inform the impacts, which will then be contained within the ES that will accompany the DCO Application and report the findings of the EIA. When the conclusions are finalised in the ES, because further certainty and information will be available, the significance of the effects identified in the PEIR may be revised so that adverse effects decrease in significance.

- 1.5.4 The various assessments are therefore at different stages due to ongoing design work and continued gathering of baseline information.
- 1.5.5 The purpose of this NTS is to provide a summary of the PEIR in non-technical language.

2. EIA Process and Methodology

2.1.1 **PEIR Volume I Chapter 5: EIA Methodology** describes the approach the EIA has taken to assessing impacts associated with the Scheme, including the significance criteria against which impacts have been assessed.

2.2 Overview

2.2.1 EIA is the process undertaken to identify and evaluate the likely significant effects of a proposed development on the environment and to identify measures to mitigate or manage any significant negative effects. The EIA should be informed by consultation with statutory consultees, other interested bodies, and members of the public. The purpose of identifying significant effects is to ensure decision makers can make an informed judgement on the environmental impacts of a proposal.

2.2.2 The PEIR provides the latest environmental information obtained and assessed as part of the EIA and forms an essential part of the statutory consultation materials.

2.2.3 Following statutory consultation, the environmental impact assessment presented in the PEIR will be updated and presented in the ES accompanying the DCO application. The assessments within the ES will reflect the feedback received during statutory consultation, the findings of the ongoing surveys, and the Scheme design refinements. The ES will accompany the DCO Application and will follow a similar systematic approach to EIA and Scheme design as the PEIR. The process of identifying environmental effects is both iterative and cyclical, running in tandem with the iterative design process.

2.3 EIA Scoping

2.3.1 The purpose of the EIA Scoping process is to identify expected key environmental issues at an early stage, to determine which elements of the Scheme are likely to result in significant effects on the environment and to establish the extent of survey and assessment requirements for the EIA, including identifying which topics should be included in the EIA and the level of detail to which they should be assessed.

2.3.2 An EIA Scoping Report and a request for an EIA Scoping Opinion under Regulation 10 of the EIA Regulations was submitted to the Planning Inspectorate on 1 June 2023 (**PEIR Volume III Appendix 1-1: EIA Scoping Report**).

2.3.3 The Scoping Opinion was received on 11 July 2023, which presents the formal response from the Planning Inspectorate (on behalf of the Secretary of State) and statutory consultees (**PEIR Volume III Appendix 1-2: EIA Scoping Opinion**).

2.3.4 Key issues raised in the Scoping Opinion are summarised in **PEIR Volume III Appendix 1-3: EIA Scoping Opinion Responses** and have been considered during the EIA process.

2.4 Consultation

2.4.1 The main consultation activities undertaken so far include:

- a. Preparation of the Statement of Community Consultation involving consultation with relevant local authorities;
- b. EIA Scoping;
- c. Non-statutory (informal) Consultation Events; and
- d. Other meetings with a wide range of consultees and stakeholders.

2.4.2 In addition, a project website has been set up to provide information on the Scheme: <https://www.boom-power.co.uk/fenwick/> and communication channels (email, Freepost, and phone line) have been open for stakeholders to enquire about the Scheme.

3. Site Selection and Design Evolution

- 3.1.1 The Site was identified through a site search exercise undertaken by the Applicant. **PEIR Volume I Chapter 3: Alternatives and Design Evolution** presents an overview of the reasons for selecting the Site, a description of and justification for the evolution of the Site Boundary, a description of how the design has evolved since EIA Scoping, and a discussion of the reasonable alternatives.
- 3.1.2 A range of technical, environmental and economic factors are considered when investigating and assessing any potential site for NSIP-scale ground-mounted solar PV development. The key factors which were considered by the Applicant when selecting land for the Scheme included (in no particular order):
- a. Topography and shading;
 - b. Proximity to an available grid connection;
 - c. Agricultural Land Classification (i.e. the quality of agricultural land) and other land use constraints;
 - d. Access to the site for construction and operation and maintenance;
 - e. Field size;
 - f. Engagement with local landowners; and
 - g. Environmental and social parameters described in this document, including proximity to local population, archaeological interest, landscape designations, nature conservation designations, and flood risk, for example.
- 3.1.3 Following consideration of the above factors, the area in which the Scheme has been located was identified as having good potential for a large-scale ground mounted solar PV facility.
- 3.1.4 The preparation of the PEIR has led to a variety of key changes to the layout and technology, including for example:
- a. Selecting fixed south facing Solar PV Panels;
 - b. Providing buffers and offsets from existing landscape features such as residential properties, Public Rights of Way, trees and hedgerows, and watercourses;
 - c. Integrating areas of habitat creation (grassland habitat, woodland habitat and screening) into the Site design;
 - d. Integrating screening and planting into the Site design to reduce visual impact by providing environmental enhancement areas, off-sets and buffer zones;
 - e. Refinement of the layout plan following desktop analysis and site surveys; and
 - f. Carefully locating the larger built elements of the solar farm, such as the On-Site Substation and Field Stations, away from residential dwellings.

4. Scheme Description

4.1 Description of the Scheme

- 4.1.1 The Scheme comprises Solar PV Panels and associated infrastructure, including BESS Battery Containers and the On-Site Substation. The Solar PV Panels will convert the sun's energy into electricity for export to the national electricity transmission network (also known as the national grid) via cables.
- 4.1.2 The environmental impacts of some conventional forms of power generation are a direct result of the amount of electricity it can generate, for example through the import of fuel to power the process or the level of atmospheric emissions it produces. This is not the case for solar PV energy generation and for this reason it is not proposed that the Scheme is restricted by imposing a limit on how much electricity it can generate.
- 4.1.3 Instead, the Scheme will seek a DCO that would restrict the aspects of the solar farm which have potential environmental impacts – such as the height of the solar panels, dimensions of the associated infrastructure and the On-Site Substation, and where within the Site solar panels would be located. These are known as the 'design parameters'. This approach also ensures the Scheme will be able to generate electricity as efficiently as possible, using technology which is constantly improving and may allow greater amounts of electricity to be generated in the future, within the existing design parameters. Further information about the design parameters is presented in the sections below, and in **PEIR Volume I Chapter 2: The Scheme**.

Scheme Components

- 4.1.4 The Scheme will consist of the principal infrastructure described below. To ensure that the likely significant environmental effects of the Scheme are no worse than those assessed in the preliminary EIA presented in the PEIR, the design parameters are the basis upon which the Scheme has been assessed. Indicative images to show the types of equipment which may be used within the Scheme presented in Plate 2 to Plate 5.
- 4.1.5 The Solar PV Panels will be located within the Solar PV Site, as illustrated by **Figure 3**, however the exact locations of Solar PV Panels have not yet been determined and will only be decided upon at the detailed design stage, which will occur after the determination of the DCO Application. For the purposes of the PEIR and environmental assessments therefore, where flexibility needs to be retained, worst case assumptions have been used for the assessments. The final design will be determined post consent and will be within the design parameters in the DCO Application and assessed in the accompanying ES.
- 4.1.6 The Site is formed by the Solar PV Site, Grid Connection Corridor and the Existing National Grid Thorpe Marsh Substation. The location of the Scheme components has been carefully considered and designed around specific areas, in order to mitigate the impacts of these components.

4.1.7 The key Scheme components comprise:

- a. Solar PV Panels made up of multiple PV cells which convert sunlight into direct current (DC) electricity. These will be at a maximum height of 3.5 m;
- b. Solar PV Mounting Structures that will be a fixed south facing system which is the most common approach for utility scale solar PV facilities in the UK to date (and therefore are the most commonly seen layout – see Plate 2);
- c. Field Stations incorporating transformers, centralised inverters and switchgear;
- d. String inverters as standalone within the Solar PV Panel array if central inverters are not used (shown on Plate 3);
- e. On-Site Substation within Field SW8 of the Solar PV Site to increase the voltage of electricity generated so that it can be transported to the national grid and to receive excess electricity generated by the Solar PV Panels and from the grid and send to BESS for storage;
- f. BESS Battery Containers and associated infrastructure to store excess electricity generated from the Solar PV Panels or excess energy in the grid. The individual BESS Battery Containers would have built-in fire detection and be fitted with an automatically operated fire extinguisher system. Fire water will be stored on-site in above ground tanks;
- g. On-Site Cables connecting the Solar PV Panels to inverters and the inverters to transformers. Cabling between Solar PV Panels and string inverters is typically above ground level (along a row of racks fixed to the Solar PV Mounting Structure or fixed to other parts of nearby components) and then underground;
- h. Grid Connection Cables to transfer electricity between the On-Site Substation and Existing National Grid Thorpe Marsh Substation. The feasibility of connecting the On-Site Substation via a Grid Connection Line Drop from existing overhead power lines running north-south across the east of the Solar PV Site is also currently being explored. Should this option be practicable, this could supersede the requirement for the Grid Connection Cables;
- i. Operations and Maintenance Hub with welfare facilities;
- j. Fencing and security measures (for example CCTV);
- k. Access tracks;
- l. Temporary construction compounds/laydown areas; and
- m. Landscaping and biodiversity enhancement which includes new planting, field boundary enhancement and planting of seed mixes.

4.1.8 At the Field Stations, if the centralised inverters (if used instead of string inverters), transformers and switchgear will be housed together in shipping-type containers such as illustrated in Plate 4, each container measuring 12.5 m by 2.5 m in footprint and up to 3.5 m in height. BESS Battery Containers will also look similar to this.

- 4.1.9 The perimeter fence of the Solar PV Site is likely to be a 'stock proof fence' or other mesh-type security fencing, such as illustrated in Plate 5. The perimeter fence will be at a maximum height of 2.2 m, and there will be a minimum space of 5 m from the field edge to the perimeter fence and a further 5 m from fence to the Solar PV Panels.
- 4.1.10 During the construction phase, one or more temporary construction compound(s) will be required as well as temporary roadways to facilitate access to all land within the Solar PV Site as well as the Grid Connection Corridor;
- 4.1.11 Opportunities for landscaping and habitat management will be explored in areas around the solar infrastructure to contribute to achieving Biodiversity Net Gain (BNG).



Plate 2: Example South Facing Solar PV Panels



Plate 3: Typical String Inverter Installed Next to Solar PV Panels



Plate 4: Typical Unit Housing the Transformers and Switchgear



Plate 5: Typical Stock Proof Mesh and Wooden Post Perimeter Fencing

4.2 Construction

Construction Programme

- 4.2.1 Subject to being granted consent and following a final investment decision, the earliest construction could start is in 2028. Construction of the Grid Connection Cables is anticipated to require 12 months, whereas construction of the solar farm will require an estimated 24 months, with operation therefore anticipated to commence in 2030.

Construction Activities

- 4.2.2 Construction activities will include:
- a. Site preparation to include:
 - i. Installation of fencing;

- ii. Import of construction materials, plant and equipment to Site;
 - iii. The establishment of construction compounds;
 - iv. The establishment of the Operation and Maintenance Hub;
 - v. Upgrading of existing Site tracks/access roads and construction of new tracks;
 - vi. The upgrade or construction of crossing points (bridging structures) over drainage ditches (it is noted that no new permanent culverts will be created as a result of the Scheme; although where existing culverts are to be used they may be strengthened and widened);
 - vii. Marking out the location of the infrastructure.
- b. Solar PV Site construction to include:
- i. Import of components to the Site;
 - ii. Erection of Solar PV Mounting Structures;
 - iii. Mounting of Solar PV Panels;
 - iv. Installation of electric cabling;
 - v. Construction of Field Stations;
 - vi. Installation of BESS Battery Containers;
 - vii. Construction of the On-Site Substation and Grid Connection Line Drop;
- c. Grid Connection Cables installation:
- i. The establishment of mobilisation areas;
 - ii. The establishment of temporary construction compounds;
 - iii. Stripping of topsoil in sections;
 - iv. Trenching in sections;
 - v. Appropriate storage and capping of soil;
 - vi. Appropriate construction drainage with pumping where necessary;
 - vii. Sectionalised approach of duct installation;
 - viii. Excavation and installation of jointing pits and link box pits;
 - ix. Cable joint and link box installation;
 - x. Cable pulling;
 - xi. Implementation of crossing methodologies for watercourses, infrastructure (including roads and rail), and sensitive habitats (horizontal directional drilling);
- d. Testing and commissioning;
- e. Site reinstatement, including topsoil reinstatement and repair and reinstatement of existing field drainage; and
- f. Habitat creation.

Site Access

- 4.2.3 Where practicable the Scheme will utilise existing access tracks. Where required new access tracks will be constructed across the Solar PV Site. These would typically be 4.0 m wide (8.0 m wide for BESS Battery Container access tracks) compacted stone tracks with gradient slopes on either side (where required).
- 4.2.4 There is no requirement for a stoned haul road to be created for the Grid Connection Corridor. Track matting may be used if ground conditions dictate and passing places created where required.
- 4.2.5 Indicative access appraisals for the Solar PV Site and Grid Connection Corridor as well as a high-level route assessment are summarised in **PEIR Volume I Chapter 13: Transport and Access** and presented in its appendices (**PEIR Volume III, Appendix 13-5 to Appendix 13-7**). These will be subject to ongoing review and presented at ES.
- 4.2.6 Accesses will be designed to ensure there are no impacts on veteran and mature trees generated by vehicle movements, however there may be localised removal of hedgerows where required e.g. for visibility splays for safety purposes. Figure 4 illustrates the indicative Site layout including proposed accesses.

Construction Staff

- 4.2.7 Based on the Applicant's experience of other similar sized solar projects, it is currently estimated the Scheme will generate an average of 200 full-time equivalent (FTE) on-site staff per day during the construction phase. The size of the workforce is based on activities required and will fluctuate during the phase, therefore, being both higher and lower than average at times.
- 4.2.8 Up to 250 FTE staff per day are expected to be required to work on the Scheme during the peak construction phase, which is likely to include construction of the On-Site Substation, Grid Connection Corridor or Line Drop and solar PV infrastructure. This is expected to be a worst case based on the build out programme, and there will be noticeably fewer workers outside peak activities.

Construction Controls

- 4.2.9 The construction phase will be subject to management documents which will limit and control activities. The outline documentation that will be produced with the DCO Application to mitigate effects associated with this phase will include:
- a. Framework Construction Environmental Management Plan (CEMP) (also provided as **PEIR Volume III Appendix 2-1: Framework Construction Environmental Management Plan**);
 - b. Framework Soil Management Plan (SMP);
 - c. Framework Site Waste Management Plan (SWMP); and
 - d. Framework Construction Traffic Management Plan (CTMP).
- 4.2.10 The production of detailed (construction issue) versions of these plans will be secured through DCO requirement, meaning that they must be in place

before development can lawfully begin. A Water Management Plan will be prepared in advance of construction again secured through DCO requirement.

4.3 Operation

- 4.3.1 During operation, activity on the Solar PV Site would be restricted principally to vegetation management, equipment maintenance and servicing (including panel cleaning), periodic replacement of components, periodic fence inspection, and monitoring to ensure the continued effective operation of the Scheme.
- 4.3.2 It is anticipated there would be up to two permanent staff on-site at any one time during the operation and maintenance phase, based at the Operations and Maintenance Hub. Additional staffing/visitors, such as maintenance workers and deliveries, would be occasional as needed. It is assumed this would equate to an average of four additional workers per month.
- 4.3.3 The design life of the Scheme is 40 years with decommissioning to commence 40 years after final commissioning (currently anticipated to be 2030 to 2070).
- 4.3.4 Along the routes of the Grid Connection Cables, the land will be reinstated to its original condition and land use at the end of the construction phase. Therefore, operational activity will consist of routine inspections and any reactive maintenance such as where a cable has been damaged (this will be infrequent and very localised).

Operational Controls

- 4.3.5 The operation and maintenance phase will be subject to management documents which will limit and control activities. The outline documentation that will be produced with the DCO Application to mitigate effects associated with this phase will include:
- a. Framework Operational Environmental Management Plan (OEMP);
 - b. Framework Landscape and Ecological Management Plan (LEMP);
 - c. Outline Surface Water Drainage Strategy; and
 - d. Framework Battery Safety Management Plan.
- 4.3.6 The delivery of detailed versions of these plans will be secured through DCO requirement.

4.4 Decommissioning

- 4.4.1 Decommissioning is expected to take between 12 and 24 months and could be undertaken in phases. A Decommissioning Environmental Management Plan (DEMP) will be prepared prior to decommissioning and will be secured through a DCO requirement. A Framework DEMP will be provided with the DCO Application.
- 4.4.2 All Solar PV Panels, Solar PV Mounting Structures, cabling, inverters, transformers, switchgear, BESS Battery Containers and the containerised unit of the Operations and Maintenance Hub would be removed from the

- Solar PV Site and recycled or disposed of in accordance with good practice and market conditions at that time.
- 4.4.3 The future of the On-Site Substation and the Grid Connection Cables or Grid Connection Line Drop would be agreed with National Grid Electricity Transmission (NGET) and/or the asset owners prior to the commencement of decommissioning and taking into account market conditions and environmental good practice at the time.
- 4.4.4 Currently, the most environmentally acceptable option for the decommissioning of the Grid Connection Cables (if not retained) is considered to be leaving the cables in place to avoid disturbance to overlying land and habitats and to neighbouring communities. Alternatively, the cables can be removed by opening up the ground at regular intervals and pulling the cable through to the extraction point, avoiding the need to open up the entire length of the Grid Connection Corridor.
- 4.4.5 It is anticipated that some areas of habitat and biodiversity mitigation and enhancement within the Solar PV Site may be left in-situ given they could contain protected species and so relevant licences at the time would be obtained for any changes. However, it is anticipated that the majority of the Solar PV Site would be available to be returned to its original use after decommissioning.
- 4.4.6 The effects of decommissioning are usually similar to, or of a lesser magnitude, than construction effects and are considered in the relevant sections of the PEIR. The specific method of decommissioning the Scheme at the end of its design life is uncertain at present as the engineering approaches to decommissioning would evolve over the design life of the Scheme. Assumptions have therefore been made where appropriate in the PEIR. Decommissioning would be undertaken safely and with regard to the environmental legislation at the time of decommissioning, including relevant waste legislation.

5. Assessing Environmental Effects

5.1 Topics Assessed

- 5.1.1 **PEIR Volume I Chapters 1 to 5** provide an introduction to the policy and legislative context, a description of the Site and surrounds, an overview of the Scheme and alternatives that were considered during the design process, and the approach and methodology to the EIA.
- 5.1.2 The following topic specific chapters have been produced and assessed in **PEIR Volume I**:
- a. **Chapter 6: Climate Change;**
 - b. **Chapter 7: Cultural Heritage;**
 - c. **Chapter 8: Ecology;**
 - d. **Chapter 9: Water Environment;**
 - e. **Chapter 10: Landscape and Visual Amenity;**
 - f. **Chapter 11: Noise and Vibration;**
 - g. **Chapter 12: Socio-Economics and Land Use;**
 - h. **Chapter 13: Transport and Access;**
 - i. **Chapter 14: Other Environmental Topics**, including:
 - i. Air Quality;
 - ii. Glint and Glare;
 - iii. Ground Conditions;
 - iv. Major Accidents or Disasters;
 - v. Telecommunications and Utilities;
 - vi. Electric and Electro-magnetic Fields; and
 - vii. Materials and Waste.
- 5.1.3 **PEIR Volume I Chapter 15** describes cumulative effects and effect interactions that lead to combined effects on sensitive receptors.
- 5.1.4 **PEIR Volume I Chapter 16** presents a brief summary of the PEIR outlining the preliminary significant effects identified at this stage of the environmental impact assessment process.

5.2 PEIR Terminology

- 5.2.1 To enable comparison between technical topics and to aid understanding of the PEIR findings, standard terms are used wherever possible to describe the relative significance of effects throughout the PEIR (i.e. 'major', 'moderate', minor', and 'negligible'). The effects are also described as being adverse or beneficial. Where the quality standards for each technical discipline result in deviations in the standard assessment methodology, these are described in the relevant chapters as applicable within PEIR Volume I.

- 5.2.2 Each of the technical chapters within **PEIR Volume I** provides further description and definition of the significance criteria relevant to each topic. Where possible, this has been based upon quantitative and accepted criteria (for example, noise assessment guidelines), together with the use of value judgement and expert interpretation to establish to what extent an effect is significant.
- 5.2.3 Typically, effects that are considered to be negligible or minor are judged to be 'not significant', whereas those that are moderate or major are 'significant'. Where the preliminary EIA presented in the PEIR predicts a significant adverse effect on one or more receptors, it has been considered whether there are further mitigation measures which could avoid or reduce the effect, or reduce the likelihood of it happening. The use of any such mitigation will be secured through the DCO, should it be granted. As the design of the Scheme has evolved to date, the Applicant has worked with environmental specialists to ensure the design avoids or reduces environmental effects on receptors where practicable through the use of embedded mitigation measures (meaning measures that form part of the design or methods for construction or operation), such as the use of a CEMP. These measures are taken into account in the EIA and assessment of effects of the Scheme.

6. PEIR Findings

- 6.1.1 A preliminary assessment of the environmental effects of the Scheme during its construction, operation (including maintenance), and eventual decommissioning has been completed for each of the topics identified in Section 5.1 above.
- 6.1.2 The preliminary conclusions on the likely significant environmental effects of the Scheme are described within PEIR Volume I. This section provides a non-technical summary of the overall findings of the PEIR.

6.2 Climate Change

- 6.2.1 **PEIR Volume I Chapter 6: Climate Change** presents the findings of an assessment of the likely significant effects of the Scheme on the Climate (for example, greenhouse gas emissions from the construction, operation, and decommissioning of the Scheme), outlines the potential effects of Climate Change both on the Scheme and on surrounding receptors as a result of the Scheme and provides information on proposed mitigation measures.

Baseline and Context

- 6.2.2 Consideration has been given to the following aspects of Climate Change assessment:
- a. Lifecycle greenhouse gas (GHG) impact assessment – the impact of GHG emissions arising over the lifetime of the Scheme on the Climate;
 - b. Climate change risk assessment (CCRA) – the resilience of the Scheme to projected future Climate Change impacts, including damage to the Scheme caused by accidents resulting from Climate Change; and
 - c. In-combination climate change impact (ICCI) assessment – this assessment identifies how the resilience of receptors in the surrounding environment are affected by the combined impact of future climate conditions and the Scheme.

Greenhouse Gas Assessment

- 6.2.3 At this stage in the Scheme design, and consistent with the preliminary nature of the assessment, a fully quantified GHG impact assessment of the Scheme has not yet been carried out. The GHG impact assessment has therefore relied on the data used by other comparable schemes being brought forward in the UK, rather than Scheme specific data which will not be available until the design is further evolved.
- 6.2.4 The current baseline applied for the GHG assessment is a “no development” scenario where the Scheme is not implemented. While the current land use within the Site Boundary may have minor levels of associated GHG emissions, it is anticipated that these emissions are not material. Therefore, for the purposes of the lifecycle GHG impact assessment, a GHG emissions current baseline of zero is applied.
- 6.2.5 The future baseline similarly assumes a ‘business as usual’ scenario whereby the Scheme is not implemented. The future baseline comprises of existing carbon stock and sources of GHG emissions within the Site

Boundary from the existing activities on-site. This includes the operational emissions from the generation of electricity that would occur should the Scheme not go ahead but which are displaced in the case of the Scheme being delivered. Embodied GHG emissions are considered zero in the future baseline, as the land use within the Site Boundary has minor levels of associated GHG emissions from agricultural activities and minor carbon sequestration from vegetation.

- 6.2.6 The receptor for the lifecycle GHG impact assessment is the global climate.

Climate Change Risk Assessment

- 6.2.7 The current baseline for the CCRA and ICCI assessment is the climate in the location of the Scheme for the 30-year period of 1981 to 2010 (the standard baseline for climate data). This is based on historic climate data recorded by the closest Met Office station to the Scheme (Finningley, approximately 16 miles south of the Scheme) for the 30-year climate period of 1981 to 2010.
- 6.2.8 The future baseline is expected to differ from the present-day baseline. These have been calculated derived from the United Kingdom Climate Change Projections 2018 (UKCP18).
- 6.2.9 The receptor for the Climate Change Risk Assessment is the Scheme itself, including all infrastructure, assets, and workers on-site during construction, operation, and decommissioning.

In-Combination Climate Change Impact Assessment

- 6.2.10 The current baseline for the ICCI assessment is also the climate in the location of the Scheme for the 30-year period of 1981 to 2010 (the standard baseline for climate data). This is based on historic climate data recorded by the closest Met Office station to the Scheme (Finningley, approximately 16 miles south of the Scheme) for the 30-year climate period of 1981–2010.
- 6.2.11 Again, the future baseline is expected to differ from the present-day baseline. These have been derived from the United Kingdom Climate Change Projections 2018 (UKCP18).
- 6.2.12 In the ICCI assessment, sensitive receptors are determined by each technical discipline. The assessment is undertaken in regard to the identified sensitive receptors and summarised in **PEIR Volume I Chapter 6: Climate Change**.

Assessment of Effects

Greenhouse Gas Assessment

- 6.2.13 The GHG impact of construction and decommissioning are anticipated to result in **minor adverse, not significant** effects on the climate, while the impacts of operation of the Scheme is considered to have a **beneficial, significant effect**.
- 6.2.14 GHG emissions savings are expected to be achieved against the baseline scenario when considering the full lifetime of the Scheme. Therefore, the GHG emissions during construction, operation, and decommissioning of the Scheme can be considered to be balanced by the net positive impact of the Scheme on GHG emissions and the UK's ability to meet its carbon targets.

- 6.2.15 The GHG savings achieved over the lifetime of the Scheme demonstrate the role solar energy generation has to play in the transition to, and longer-term maintenance of, a low carbon economy. Without low-carbon energy generation projects such as the Scheme, the average grid GHG intensity will not decrease as projected, which could adversely affect the UK's ability to meet its carbon reduction targets.
- 6.2.16 As the GHG impact of the Scheme is beneficial because it will play a part in supporting the UK's trajectory towards net zero and avoids atmospheric GHG emissions when assessed against the comparable baseline, it is considered the Scheme overall is considered to have a **beneficial, significant effect** on the climate.

Climate Change Risk Assessment

- 6.2.17 The assessment has considered the resilience of the Scheme to impacts of Climate Change and measures such as flood resilience have been integrated into the Scheme design.
- 6.2.18 Future Climate Change projections have been reviewed and the sensitivity of the Scheme's assets to the impacts of a changing climate have been examined. This review considers the adequacy of the Climate Change resilience measures built into the Scheme and whether they are sufficient to mitigate significant effects on the Scheme's assets. As a result of the proposed resilience measures **no significant** Climate Change risks during the construction, operation, and decommissioning phase have been identified.

In-combination Climate Change Impact Assessment

- 6.2.19 Future Climate Change projections have been reviewed and the sensitivity of identified sensitive receptors to these hazards examined as part of the In-combination Climate Change Impact Assessment. At this stage, **no significant effects** as a result of the effects of the Scheme combined with the impacts of Climate Change have been identified.

Mitigation Measures

- 6.2.20 A number of embedded construction mitigation measures are included within the Scheme, which are outlined in the Framework CEMP (**PEIR Volume III Appendix 2-1: Framework Construction Environmental Management Plan**) and include measures such as storing construction materials outside flood risk zones. The Framework CEMP also includes Climate Change resilience measures embedded in the Scheme. These include measures such as the production of health and safety plans accounting for potential Climate Change impacts on workers. The implementation of construction phase mitigation measures will be secured through the detailed CEMP as a DCO Requirement. Further mitigation measures regarding the operation and decommissioning phase of the Scheme will be developed ahead of the ES by way of an Operational Environmental Management Plan and a Decommissioning Environmental Management Plan.
- 6.2.21 Further Climate Change resilience measures embedded within the Scheme include:

- a. Legislative compliance controls as well as industry standard control measures will be incorporated into the design of the Scheme, as is common practice on construction sites.
- b. Contractors will undertake weather forecast monitoring and receive of Environment Agency flood alerts to allow works to be planned and carried out in managing extreme weather conditions.
- c. Drainage arrangements to attenuate surface water runoff and minimise flood risk to the Scheme location (as described in the **PEIR Volume III Appendix 9-3: Preliminary Drainage Strategy** and **PEIR Volume I Chapter 9: Water Environment** for the construction phase and then for the operational Solar PV Site); and
- d. Regular maintenance activities carried out by the contractor will provide the opportunity to monitor asset performance and condition.

Cumulative Effects

- 6.2.22 It is not possible to define a Study Area for the assessment of cumulative effects of GHG emissions, as the identified receptor is the global climate and effects are therefore not geographically constrained. However, the Scheme is predicted to lead to **significant beneficial effects** on the climate and therefore would not contribute to any significant adverse cumulative effects.

6.3 Cultural Heritage

- 6.3.1 **PEIR Volume I Chapter 7: Cultural Heritage** considers the potential impacts on designated and non-designated heritage assets. Heritage assets include archaeological sites, historic buildings, conservation areas, registered parks and gardens, and historic landscapes.

Baseline and Context

- 6.3.2 There are no designated heritage assets located within the Site Boundary. There are four non-designated heritage assets recorded on the Historic Environment Record (HER) located within the Site Boundary.
- 6.3.3 In addition, there are 59 designated heritage assets, comprising scheduled monuments and listed buildings, and 50 non-designated heritage assets comprising buildings, find spots and archaeological sites, located within the defined Study Areas from the Site Boundary.

Assessment of Effects

- 6.3.4 The assessment of effects has been undertaken while taking embedded mitigation for the Scheme into account. These measures include landscaping/screening around parts of the perimeter of the Scheme and heritage buffer areas around heritage assets (such as Scheduled Monuments and listed buildings) to reduce impacts on the setting of heritage assets.
- 6.3.5 A desk-based assessment is currently being prepared and the information obtained to date has informed this preliminary assessment. A programme of geophysical survey has been completed and consultation with the local authority archaeological advisors is ongoing with regards to further stages of

- evaluation surveys. The full results of these reports (desk-based assessment, geophysical survey and any further evaluation surveys) were not available at time of writing the PEIR but will accompany the DCO Application by being presented in the ES.
- 6.3.6 During the construction phase of the Scheme, there is the potential for physical impacts and/or impacts through change to the setting of heritage assets as a result of construction activities which includes but is not limited to, the presence and movement of construction plant and equipment; the siting of construction compounds; noise and lighting; increased traffic volumes; any below ground activities including but not limited to groundworks, planting, earth-moving operations, topsoil removal, trenches for cabling, the installation of Solar PV Panels and associated infrastructure; and the introduction of the physical form and appearance of the Scheme.
- 6.3.7 During the operation and maintenance phase of the Scheme, there is the potential for impacts through change to the setting of heritage assets as a result of operational activities which includes but is not limited to, the continued presence of the physical form and appearance of the Scheme; increase in traffic movements; operational lighting and/or noise.
- 6.3.8 During the construction phase of the Scheme, **moderate adverse significant effects** have been identified for the following heritage assets arising from construction activities and the physical presence of the Scheme:
- a. Scheduled Monument Thorpe in Balne moated site, chapel and fishpond [1012111] including Grade II* listed remains of chapel [1286641];
 - b. Scheduled Monument Fenwick Hall moated site [1012459];
 - c. Non-designated archaeological remains of unknown date [MSY5651], [MSY13204], [MSY13205], [MSY13206], [MSY5554]; and
 - d. Potential non-designated archaeological remains within the site dating to any period.
- 6.3.9 All significant effects identified through change to the setting of an asset are considered to be reversible upon decommissioning of the Scheme. Physical impacts on heritage assets are considered permanent as they result in the partial or total loss of a heritage asset; these impacts are not reversible.
- 6.3.10 During the operational and maintenance phase of the Scheme, **no additional significant effects** through change to the setting of heritage assets are considered likely over and above those already identified during the construction phase of the Scheme, however further assessment of these elements will be undertaken for the ES.
- 6.3.11 It is not expected that the operational and maintenance of the Scheme would result in any further intrusive activities, and as such no impact to below ground archaeological remains is anticipated during this phase.
- 6.3.12 During the decommissioning phase of the Scheme, it is considered that the Scheme, including the solar panels and associated infrastructure will be removed in accordance with the relevant statutory process at that time. It is expected that the selected method of decommissioning would have due regard to health and safety, environmental impact and benefits, and economic aspects. Any future maintenance, decommissioning and/or

reinstatement works would be subject to prevailing legislation, guidance and permitting regimes. Landscape restoration and remediation to suitable surfaces would be undertaken which will result in the restoration of the rural landscape.

- 6.3.13 A well-designed decommissioning scheme would not have any impact beyond the already-disturbed footprint of the Scheme; therefore, it is not anticipated that there will be additional impacts on below ground archaeological remains during decommissioning activities.
- 6.3.14 During the decommissioning phase of the Scheme, **no additional significant effects** through change to the setting of heritage assets are considered likely over and above those already identified during the construction phase of the Scheme, however further assessment of these elements will be undertaken for the ES.
- 6.3.15 All long-term (for the design life of the Scheme) 'reversible' effects reported in **PEIR Volume I Chapter 7: Cultural Heritage** will be removed during the decommissioning phase. They have been reported as long-term (for the lifespan of the Scheme) due to the length of time they will be in place, but they remain reversible and will be removed upon decommissioning of the Scheme.

Mitigation Measures

- 6.3.16 The following embedded mitigation measures have been incorporated into the Scheme design, with detailed proposals and locations to be submitted with the DCO application:
- a. Refinement of the Scheme design including exclusion of fields from development to avoid built heritage assets, where practicable;
 - b. Buffer areas around heritage assets including Scheduled Monuments and listed buildings to reduce impacts on their setting;
 - c. Enhancement of existing hedgerows to reduce visual intrusion and to screen views of the Scheme from heritage assets;
 - d. Retention/enhancement of existing hedgerows/boundaries that are remnants of the historic landscape in order to maintain connectivity with associated heritage assets;
 - e. Buffer Areas for areas of archaeological interest of potentially high sensitivity to impacts, to remove potential physical impacts to these assets.
- 6.3.17 It is anticipated that it will be possible to mitigate the Scheme's impacts upon buried archaeological remains through a staged programme of archaeological investigation and recording, the purpose of which is to ensure that surviving remains are recorded prior to their loss by construction activities. A programme of geophysical survey has been completed and further evaluation surveys are underway, which will be reported as part of the ES and the full reports submitted with the DCO Application. The results of these surveys will be used to determine appropriate embedded and/or additional mitigation measures such as preservation in-situ or archaeological excavation.

- 6.3.18 The setting of heritage assets will continue to be considered throughout detailed design development and opportunities for further mitigation of significant effects, such as through additional screening or buffer areas, will be considered in the ES, if appropriate.

Cumulative Effects

- 6.3.19 The cumulative effect assessment identified one cumulative development with the potential to result in cumulative effects on cultural heritage assets identified in the assessment. However, it is not considered that the cumulative effect would be greater than the assessed level of impact reported in this chapter or that effects would be significant.

6.4 Ecology

- 6.4.1 **PEIR Volume I Chapter 8: Ecology** presents the findings of a preliminary assessment of the likely significant effects of the Scheme on ecology, which has been informed by a desk study and initial ecological field surveys. The preliminary assessment considers effects on designated sites, habitats, and protected species and is based on information obtained to date.

Baseline and Context

- 6.4.2 A desk study was undertaken to identify sites designated for their biodiversity value and records of protected and/or notable habitats and species (ecology features) and invasive non-native species (INNS) that are relevant to the Scheme. The Doncaster Local Records Centre was contacted in February 2023 to gain information on pre-existing ecological data (i.e., location of Local Wildlife Sites (LWS) existing records of protected, notable, and invasive non-native species within 2 km of the Site), and again in November 2023 (following Scheme changes). A review of available online data was also undertaken using a range of sources (as detailed in **PEIR Volume I Chapter 8: Ecology**).
- 6.4.3 Ecological field surveys are ongoing, having commenced in 2023 and will continue into 2024, to characterise the ecological baseline within the relevant Survey Areas. Details of the Survey Areas, methods, results, survey periods and guidance that have been used for each survey are presented in **Table 8-2 of PEIR Volume I Chapter 8: Ecology** and in technical **Appendices 8-1 to 8-6, PEIR Volume III** where undertaken. Full details of these surveys will be included within the ecology chapter of the ES and the associated technical appendices.
- 6.4.4 Ecological features considered in the PEIR include species and habitats that are important at an international, national, and local level (i.e., how rare and important the species and habitats are). The desk study and Phase 1 habitat surveys undertaken show that the majority of the Site consists of arable land, with areas of grassland, woodland and hedgerows throughout.
- 6.4.5 The desk study identified three international statutory sites for their biodiversity value within 10 km of the Site (Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites) and one national statutory designated site for its biodiversity value (Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Local Nature

Reserves (LNR)) within 5 km of the Site. No SACs designated for bats were identified within 30 km of the Site.

- 6.4.6 There are 43 non-statutory sites designated for their biodiversity value identified within 2 km of the Site (Local Wildlife Site (LWSs), Sites of Importance for Nature Conservation (SINCs) and Candidate and Historic LWS). Four of these sites, namely Went Valley (Part) LWS, Wrancarr Drain and Braithwaite Delves LWS, Trumfleet Pit LWS and Trumfleet Pond LWS lie within the Site. Went Valley (Part) LWS is within the Solar PV Site, but is avoided and outside of the developable areas of the Scheme. The other three sites are within the Grid Connection Corridor.
- 6.4.7 An extended Phase 1 habitat survey of the Site was carried out over several survey visits, in March and April 2023 and protected species surveys and/or associated data analysis commenced in 2023 for: birds (breeding and non-breeding), bats, great crested newt (*Triturus cristatus*), reptiles and badger. Further surveys for aquatic ecology, terrestrial invertebrates, great crested newt, riparian mammals, botanical and hedgerow surveys are ongoing and will be completed in spring and summer 2024.

Assessment of Effects

- 6.4.8 Effects on ecological features from infrastructure projects can arise from direct and indirect impacts upon designated sites, habitats or species, and be of a temporary or permanent nature. Indirect effects can occur for example through pollution of air and water, and via changes in lighting, noise or hydrology.
- 6.4.9 The construction of the Grid Connection Corridor has the potential to directly impact upon habitats within Wrancarr Drain and Braithwaite Delves LWS, Trumfleet Pit LWS and Trumfleet Pond LWS which has the potential to result in a temporary **moderate adverse** effect, that is potentially significant in EIA terms. However, the Scheme will seek to avoid or minimise any effects on these LWS through careful routing of the Grid Connection Corridor.
- 6.4.10 The permanent loss of areas of neutral grassland will potentially occur during construction of the Scheme, however, the value and condition of this grassland type is to be determined through further survey in spring and summer 2014. , There is the potential that this could result in a **moderate adverse** effect that is potentially significant in EIA terms. However, the Scheme will seek to avoid or minimise any effects on this habitat and reduce the potential significance of any residual effect.
- 6.4.11 The construction of the Scheme has the potential to result in the temporary loss of running water habitat (which will be restored post-construction) which may result in a temporary **moderate adverse** effect, that is potential significant in EIA terms. However, the Scheme will seek to avoid and minimise these impacts, with Standard environmental protection measures implemented during construction of the Scheme to prevent indirect impacts occurring.
- 6.4.12 The construction of the Scheme also has the potential to cause temporary fragmentation and disturbance of running water habitat (which will be restored post-construction) which may result in a temporary **moderate adverse** effect, that is potentially significant in EIA terms.

- 6.4.13 The change in land use from arable farming systems has the potential to result in the permanent loss of arable habitats used by ground-nesting birds, which may result in a **moderate adverse** effect, that is potentially significant in EIA terms. However, the Scheme will create areas of open grassland habitats that will provide higher quality nesting and foraging opportunities for ground-nesting birds.
- 6.4.14 The potential loss of small sections of hedgerows within the Site as a result of Grid Connection Cables, fences and access routes has the potential to result in a **moderate adverse** effect that is potentially significant in EIA terms. Whilst the extent of any loss of habitat is currently unknown, the majority of hedgerows across the Site will be avoided and any replanting required has been embedded within the Scheme design. Once hedgerows establish along with additional hedgerow planting proposed across the Site, it is predicted that the Scheme will be able to deliver a net gain in this habitat and the overall impact will be beneficial.
- 6.4.15 The operation of the Scheme will not lead to any impacts on the above ecological receptors. At this stage, the effects of decommissioning of the Scheme are likely to be similar to those for construction and will need to follow legislation and policy requirements at the time of decommissioning.

Mitigation Measures

- 6.4.16 Whilst there is the potential for effects upon ecological receptors during construction, mitigation measures designed to prevent adverse impacts upon ecological receptors will be embedded in the Scheme, including measures within the Construction Environmental Management Plan (CEMP) which will be secured as part of the DCO Application requirements. These measures are provided on the basis of baseline conditions known at the time of reporting. It is anticipated that further measures may be required as the baseline conditions are fully established. If required, the scheme design will be further refined to embed mitigation, as appropriate.
- 6.4.17 This will also include measures to improve ecological connectivity and the creation of habitat to mitigate and compensate for habitat loss during construction and operation. A Biodiversity Net Gain (BNG) report will be prepared with the ES and submitted as part of the DCO application but is not available at this stage as the design for the Scheme continues to evolve.
- 6.4.18 Examples of embedded mitigation for ecological features include:
- Avoidance of protected species, such as 30 m from active badger setts and 10 m buffer from watercourses (where open cut is not required);
 - Undeveloped buffers will be included in the Scheme design to protect hedgerows, woodland, individual trees and ponds during construction; and
 - Horizontal Directional Drilling (HDD) for section of the Grid Connection Corridor.
- 6.4.19 Surveys for ecology are ongoing and at this stage, it is not confirmed (in the absence of full survey data) the extent of any additional mitigation required (including whether any additional mitigation measure are needed at all) over and above the embedded and standard environmental protection measures

the Scheme has already committed to. However, it is expected that the implementation of appropriate mitigation measures will reduce the magnitude of impact identified and the significance of effects won't exceed that presented. With the implementation of further enhancements the Scheme has the potential to generate beneficial effects for biodiversity.

Cumulative Effects

- 6.4.20 No plans or projects identified in **PEIR Volume I Chapter 15: Cumulative Effects and Interactions** are considered in combination to impact important ecological features identified in the assessment. It is expected that all of the cumulative developments included in the preliminary assessment will implement suitable mitigation measures in line with relevant legislative and policy requirements and best practice. Therefore, the potential for impacts to important ecological features during the construction, operation and maintenance, and decommissioning phases of the Scheme is considered within the Site Boundary itself. Other developments are not likely to contribute to the effects on important ecological features identified therefore the effects are **not significant**.

6.5 Water Environment

Baseline and Context

- 6.5.1 **PEIR Volume I Chapter 9: Water Environment** presents the findings of a preliminary assessment of the likely significant effects of the Scheme on the water environment. It identifies and proposes measures to address the potential impacts and effects of the Scheme on surface waterbodies (e.g. rivers, streams, ditches, canals, lakes and ponds) including water quality, groundwater flow and quality, flood risk, drainage and water resources during construction, operation and decommissioning of the Scheme.
- 6.5.2 Baseline desk study and site survey have identified a number of surface and groundwater features of importance within the 1 km Study Area. The Scheme is located within the Humber River Basin Management Plan (RBMP) area. It extends across the Don and Rother Management Catchment. All watercourses in the Study Area ultimately drain to the River Humber (Humber Upper Water Framework Directive (WFD) waterbody within the Humber TraC Management Catchment) although it is not in the Study Area itself.
- 6.5.3 Significant surface water features in the Study Area include the Water Framework Directive (WFD) designated River Went, River Don and Smallholme and Tilts Drain/Thorpe Marsh Drain. Named and unnamed drains, ditches and ponds (many being artificial) are present across the Study Area, associated with agriculture and land drainage. There are also designated habitats sites in close proximity to the Study Area including the West Ings Meadows SSSI.
- 6.5.4 The majority of the south and west areas of the Solar PV Site are located within Flood Zone 1, including the BESS Area and On-Site Substation. The north and east areas of the Solar PV Site are located within Flood Zone 2 and Flood Zone 3 associated with the River Went and Fleet Drain. Areas of Flood Zone 3 within the Solar PV Site are shown to be in areas where there

is a reduction in risk of flooding from rivers and the sea due to the presence of flood defences.

- 6.5.5 The Grid Connection Corridor is largely located within areas of Flood Zone 3 with smaller areas of Flood Zone 2 along its central section. Approximately 0.7 km of the Grid Connection Corridor is located within Flood Zone 1 towards its northern extent.
- 6.5.6 The risk of surface water flooding within the Study Area is generally very low (chance of flooding of less than 1 in 1000 annual probability) for the majority of the Scheme, with areas of low (chance of flooding between 1 in 1000 annual probability and 1 in 100 annual probability), medium (chance of flooding of between 1 in 100 annual probability and 1 in 30 annual probability) and high risk (chance of flooding of greater than 1 in 30 annual probability) generally associated with flow pathways following topographic low points, including drains and agricultural ditches, where surface water sits and pools rather than draining away, or areas at risk of flooding from smaller ordinary watercourses and/or local land drains.
- 6.5.7 Further flood risk details are provided in the Preliminary Flood Risk Assessment (FRA) (**PEIR Volume III Appendix 9-3**).

Assessment of Effects

- 6.5.8 A number of activities during the construction, operation, and decommissioning phases are likely to generate impacts, which, if unmitigated, have the potential to affect the water environment.
- 6.5.9 A number of standard and embedded mitigation measures have been identified, which would be implemented during construction to manage the impacts and reduce the effects that the construction of the Scheme would have on the water environment. The construction of the Scheme will take place in accordance with a detailed CEMP (a Framework CEMP is included in **PEIR Volume III Appendix 2-1: Framework Construction Environmental Management Plan**). The CEMP will detail the measures that would be undertaken during construction to mitigate the temporary effects on the water environment. The measures within the CEMP will focus on managing the risk of pollution to surface waters and the groundwater environment. It will also include measures regarding the management of activities within floodplain areas (i.e. kept to a minimum and with temporary land take required for construction to be located out of the floodplain as far as reasonably practicable).
- 6.5.10 The topography of the Site is relatively flat, and apart from where the Grid Connection Cables are to be installed across watercourses, the construction works across the Solar PV Site, Grid Connection Corridor are buffered from watercourses. As such, the risk to watercourses from construction activities is considered minimal. The greater risks of adverse impacts are where direct works are required within a watercourse, for instance for watercourse crossings for Grid Connection Cable installation and access tracks. Suitable mitigation measures for these works are outlined in the Framework CEMP (**PEIR Volume III Appendix 2-1: Framework Construction Environmental Management Plan**) including the use of sub-surface HDD drilling where practicable.

- 6.5.11 Following implementation of the embedded mitigation set out in the PEIR, including good practice measures secured via the CEMP, the effect for water quality impacts in the River Went, Eil Wood Drain, Fenwick Grange Drain, Fenwick Common Drain and Fleet Drain from construction within the Solar PV Site, the construction compounds, and the construction of outfalls, and temporary impacts on Hydromorphology, are all considered to have a **negligible effect**. Internal cabling will cross water features within the Solar PV site, for Fenwick Common Drain and the tributaries to Fleet Drain this is considered to result in a **minor adverse** effect. Access over watercourses may be required on a temporary basis using culverts It is considered this could result in a **minor adverse** effect.
- 6.5.12 For groundwater receptors, there may be impact from risk of pollution from construction works, and construction compounds. With the implementation of the embedded mitigation measures set out in the PEIR, including good practice measures secured via the CEMP, it is considered there would be a **neutral** effect. Similarly, there would be a **neutral** effect of the Private Water Supply (PWS) located 600 m from the Solar PV Site. There would be a **neutral** effect on groundwater flow within the underlying Sherwood Sandstone, and a **negligible** effect on groundwater flow within the underlying superficial aquifer. Any effects from groundwater dewatering are considered to be **negligible** and **neutral**.
- 6.5.13 Effects from flood risk, both to the site, and from the site, are considered to be a no change impact, which results in a **neutral** effect.
- 6.5.14 During the operation and maintenance phase , there is the potential for adverse impacts on the water environment. The principal mitigation will be implementation of an appropriate Surface Water Drainage Strategy to be secured through DCO requirement. A Framework Surface Water Drainage Strategy will be submitted with the DCO Application. This will ensure that there is no increase in flooding as a result of the Scheme and will provide water quality treatment for any discharges from the Site, if required.
- 6.5.15 The potential for impacts from diffuse pollution on the local watercourses (listed above), or from the use of water for containing fires, on hydrology, and from outfalls from the drainage system into the watercourses is considered to be a **neutral** effect. For morphology, it is considered to be a **negligible** effect on the watercourses within the Solar PV site from the open span watercourse crossings. The removal of a section of culvert on Fleet Drain is considered to result in a **minor beneficial** effect.
- 6.5.16 For groundwater during operation, with the Operational Environmental Management Plan in place, it is considered there would be a **negligible** effect on groundwater quality, flow and level, and a **neutral** effect on the local PWS.
- 6.5.17 Operational use of water to suppress fires is considered to be a **negligible** effect on groundwater.
- 6.5.18 Effects from flood risk, both to the site, and from the site, with the mitigation measures in place, are considered to be a no change impact, which results in a **neutral** effect.
- 6.5.19 All of the above effects are, therefore, **not significant**.

Mitigation Measures

- 6.5.20 The Scheme has been designed, as far as practicable, to avoid and reduce impacts and effects on the water environment through the process of design development, and by embedding measures into the design of the Scheme.
- 6.5.21 Construction works undertaken adjacent to, beneath and within watercourses will comply with relevant guidance and good practice measures. This will include requirements of the Environment Agency for main rivers, and requirements of the Lead Local Flood Authority and Internal Drainage Boards for ordinary watercourses.
- 6.5.22 A Drainage Strategy will be submitted with the DCO Application which will provide for the attenuation of surface water runoff from the Scheme, whilst minimising flood risk to the Site and surrounding areas. A preliminary Drainage Strategy has been provided in **PEIR Volume III Appendix 9-4: Preliminary Drainage Strategy**.
- 6.5.23 Solar PV infrastructure will be off set from watercourses by a minimum of 10 m, the point of measurement (e.g. bank top or centreline of watercourse) will be agreed with the Environment Agency through further consultation.
- 6.5.24 Solar PV infrastructure within Flood Zones 2 and 3 will be raised above the modelled design flood level and are not expected to impact existing flood extents or mechanisms. The volume of floodplain storage lost as a result of panel mounts within Flood Zone 3 and provision of compensatory storage will be assessed as part of the full FRA to ensure flood risk is not increased elsewhere. This will inform the Scheme design and set out any proposed mitigation requirements that are to be addressed within the Surface Water Drainage Strategy. A preliminary FRA has been provided at **PEIR Volume III Appendix 9-3: Preliminary Flood Risk Assessment**. The Grid Connection Corridor is buried, therefore, there is no risk to, or from, the Grid Connection Corridor during operation.
- 6.5.25 A WFD Screening and Scoping Assessment has been undertaken (**PEIR Volume III Appendix 9-2: Water Framework Directive Screening and Scoping Report**) and identified the potential for impacts on WFD status and objectives for certain waterbodies in the area of the Scheme. A full impact assessment (Stage 3) will be conducted alongside the ES, if agreed to be necessary during consultation with the Environment Agency.

Cumulative Effects

- 6.5.26 Of the developments scoped in for cumulative effects assessment (**PEIR Volume I Chapter 9: Water Environment**), it is considered that, provided standard and good practice mitigation is implemented during construction and operation through their respective CEMPs and relevant planning permissions, environmental permits and licences, as is being proposed for this Scheme, the cumulative effects risk can be effectively managed and there would not be a significant increase in the risks to any relevant waterbodies.

6.6 Landscape and Visual Amenity

6.6.1 **PEIR Volume I Chapter 10: Landscape and Visual Amenity** presents the findings of a preliminary assessment of the potential significant effects on landscape character and visual amenity that would result due to the Scheme.

Baseline and Context

6.6.2 A 2 km Study Area from the Solar PV Site was defined as the area within which there is potential for significant landscape and visual effects. Elevated land at Askern (approximately 4.8 km from the Solar PV Site) affords longer distance views towards the Solar PV Site. Visual receptors in Askern were therefore also included in the visual assessment as a single receptor beyond the Study Area. A narrower Study Area was defined for the Grid Connection Corridor, measuring 500m either side, given that the Grid Connection Cables would be underground during operation and that construction would be short in duration.

6.6.3 The preliminary Landscape and Visual Impact Assessment (LVIA) identifies the sensitivity and overall significance of landscape and visual effects within the Study Area. The landscape and visual baseline and assessments are based on desk-based research and field work undertaken between April–November 2023.

6.6.4 Landscape receptors with potential to be changed due to the Scheme are published Landscape Character Types (LCTs), published Landscape Character Areas (LCAs), and Local Landscape Character Areas (LLCAs) which were identified specifically for this preliminary LVIA.

6.6.5 Visual receptors with potential to experience change to their visual amenity due to the Scheme are residents, people walking on the local Public Right of Way network, people travelling on the local road network, and people travelling on the East Coast Mainline.

Assessment of Effects

6.6.6 Embedded mitigation has been included in the Scheme to reduce the potential for significant landscape and visual effects. Mitigation embedded into the Scheme design can be summarised as:

- a. Careful siting in the landscape;
- b. Conserving existing vegetation patterns;
- c. Creating new green infrastructure; and
- d. Sensitive design of lighting.

6.6.7 Potential landscape and visual impacts, accounting for embedded mitigation, are assessed for the construction phase (winter), operation year 1 (winter), operation year 15 (winter and summer), and decommissioning (winter).

Landscape Effects During Construction (Winter)

District Level

- 6.6.8 At the district level, construction across the Solar PV Site would physically alter the landscape of the Solar PV Site and the Grid Connection Corridor, increasing activity and causing localised alterations to the condition of the landscape across part of LCA F2: Owston to Sykehouse Settled Clay Farmlands, resulting in a **moderate adverse (significant) effect**. The Scheme would not result in significant effects to any other published LCAs.

Local Level

- 6.6.9 At the local level, construction activity, would result in the following significant effects on LLCAs:
- a. LLCA 01: Fenwick Village: Construction activity within the Solar PV Site, including the construction of Solar PV Mounting Structures, digging of trenches to accommodate cabling, and the installation of the Solar PV Panels, would occur within three fields, namely NW3, NW4 and NW8, within this LLCA. The construction activity across the remainder of the Site would also be perceived to varying degrees. This would result in a **moderate adverse (significant) effect**.
 - b. LLCA 02: Fenwick Farmlands: The majority of the south western and south eastern extents of the Solar PV Site are located within LLCA 02, covering approximately two thirds of the LLCA. Therefore, construction activity would introduce direct landscape effects across a large part of the LLCA resulting in a **major adverse (significant) effect**.
 - c. LLCA 03: River Went Farmlands (South): The vast majority of the northern extents of the Solar PV Site are located within LLCA 03, although covering less than half of the LLCA. Construction activity would introduce physical change to the landscape across the eastern half of the LLCA that falls within the Site Boundary resulting in a **moderate adverse (significant) effect**.
 - d. LLCA 05: River Went Corridor: The northern edge of the Solar PV Site falls within LLCA 05, however, no development apart from ecological enhancements and landscape mitigation is proposed within the River Went corridor. Therefore, there would be no heavy construction activity within LLCA 05. There would be a perception of construction activity occurring in the neighbouring LLCA 03 which would erode the relatively high tranquillity experienced along the river corridor resulting in a **moderate adverse (significant) effect**.
 - e. LLCA 08: Moss Village: A northern section of the Grid Connection Corridor passes along the eastern edge of the LLCA. Localised construction activity would occur along the Grid Connection Corridor to excavate the trench and lay the Grid Connection Cables resulting in a **moderate adverse (significant) effect**.
 - f. LLCA 09: Moss Farmlands: A very small portion of LLCA 09 is located within the south west of the Solar PV Site, comprising fields SW11 and SW12. Construction activity would be introduced into these fields. Construction activity within fields SW7, SW8 and SW10 would be

perceptible from the north eastern edge of the LLCA. Construction within the northern part of the Grid Connection Corridor would also physically alter this LLCA resulting in a **moderate adverse (significant) effect**.

6.6.10 The effect of the Scheme on the remaining LLCAs would not be significant.

Visual Effects During Construction (Winter)

Residential Receptors

- 6.6.11 During construction, the following residential receptors would experience significant effects:
- a. Residents of Fenwick living to the north of Lawn Lane would experience partially filtered views of construction activity in Fields NW3 and NW4 of the Solar PV Site from north-facing windows resulting in **moderate adverse (significant) effects**.
 - b. Residents of properties in the east of Moss, Lilac Cottage and Jet Hall Farm would experience filtered views of construction, resulting in **moderate adverse (significant) effects**.
 - c. Residents of West End Cottage would experience direct, semi-open views towards construction activity within Field SE3 of the Solar PV Site from north-facing windows, resulting in a **moderate adverse (significant) effect**.
 - d. Residents of Desiderata, Lowgate Bungalow and Linton House Farm would experience views of construction activity within the north of the Solar PV Site due to a lack of intervening vegetation and south facing windows that permit views towards the Site, resulting in **moderate adverse (significant) effects**.
- 6.6.12 All other residential receptors, including the majority living in Fenwick and Moss, would not experience significant effects during construction.

Recreational Receptors

- 6.6.13 During construction, the following recreational receptors would experience significant effects:
- a. Users of the PRoW network within the Solar PV Site walking on PRoW Fenwick 10, 11, 12, 13, 14, 15, 16 and Moss 5, and Sykehouse 29 would experience close and open views of construction activity occurring within the south west of the Solar PV Site resulting in **major adverse (significant) effects**.
 - b. Users of the PRoW network to the north of the Solar PV Site walking on PRoW 35.3/15/1, 35.3/15/2 and 35.3/8/1 would experience direct and open views towards construction activity occurring in the north of the Solar PV Site resulting in **major adverse (significant) effects**.
 - c. Users of the PRoW network to the south of the Solar PV Site walking on PRoW Moss 6, 7, 20 and 21, and Thorpe in Balne 5, 6, 7, 11 and 13 would experience direct views of construction activity within the Solar PV Site resulting in **major adverse (significant) effects**.

- 6.6.14 All other recreational receptors, including those walking on the Trans Pennine Trail and those cycling on National Cycle Network 62, would not experience significant effects during construction.

Receptors Travelling by Road and Rail

- 6.6.15 Receptors travelling by road and rail would not experience any significant effects during construction.

Landscape Effects During Operation, Year 1 (Winter)

District Level

- 6.6.16 At the district level, LCA F2 would be the only LCA to be significantly effected. This is due to the change in land use across all fields occupied by Solar PV Panels or other associated equipment within the Solar PV Site. These changes would only alter a small geographic part of the LCA which covers the Solar PV Site. The Scheme would be perceived from only the immediate surroundings of the Solar PV Site. The Scheme would result in a **moderate adverse (significant) effect** to LCA F2. The Scheme would not result in significant effects to any other published LCAs.

Local Level

- 6.6.17 At the local level, operation of the Scheme, would result in the following significant effects on LLCAs:
- a. LLCA 01: The Solar PV Site would be located within three fields within the LLCA. The remainder of the Solar PV Site would be perceived to varying degrees. This would cause an alteration to the perception of character of LLCA 01 resulting in a **moderate adverse (significant) effect**.
 - b. LLCA 02: The south west and south east of the Solar PV Site would occupy approximately two thirds of LLCA02. This would introduce an evident change in land use and character, reducing the agricultural character and degree of openness due to the introduction of equipment resulting in a **major adverse (significant) effect**.
 - c. LLCA 03: The north of the Solar PV Site would occupy under half of LLCA03. This would introduce energy infrastructure into the landscape, and an evident change in land use in comparison to the existing agricultural character resulting in a **moderate adverse (significant) effect**.
 - d. LLCA 05: Perception of the Solar PV Site would affect part of LLCA 05 between Topham and the East Coast Mainline. There would be no perception of the Scheme beyond the stretch of the River Went that directly adjoins the Solar PV Site. The Scheme would result in a **moderate adverse (significant) effect**.
- 6.6.18 The effect of the Scheme during year 1 of operation on the remaining LLCAs would not be significant.

Visual Effects During Operation – Year 1 (Winter)

Residential Receptors

- 6.6.19 During year 1 of operation, residents of properties to the north of Lawn Lane would experience the introduction of Solar PV Panels in fields NW3 and NW4, resulting in a **moderate adverse (significant) effect**.
- 6.6.20 Residents of Jet Hall Farm and Lilac Cottage in Moss would experience the introduction of Solar PV Panels in fields SW11 and SW12, resulting in a **moderate adverse (significant) effects**.
- 6.6.21 Residents of West End Cottage would experience direct views towards Solar PV panels in Field SE3 resulting in a **moderate adverse (significant) effect**.
- 6.6.22 Residents of Desiderata, Lowgate Bungalow and Linton House Farm would experience views of the back of Solar PV Panels located in the north of the site from south facing windows, resulting in a **moderate adverse (significant) effect**.
- 6.6.23 All other residential receptors, including the majority living in Fenwick and Moss, would not experience significant effects during year 1 of operation.

Recreational Receptors

- 6.6.24 During year 15 of operation, the following recreational receptors would experience significant effects:
- Users of the PRoW network within the Solar PV Site walking on PRoW Fenwick 10, 12, 13, 14, 15, 16 and Moss 5, and Sykehouse 29 would experience visibility of Solar PV Panels in the south west of the Solar PV Site at close range resulting in **major adverse (significant) effects**. Users of PRoW Fenwick 11 would experience **moderate adverse (significant) effects** during winter.
 - Users of the PRoW network to the north of the Solar PV Site walking on PRoW 35.3/15/1, 35.3/15/2 and 35.3/8/1 would experience direct and open views of the rear of Solar PV Panels within fields on the northern edge of the Solar PV Site resulting in **moderate adverse (significant) effects** during winter conditions, reducing to minor adverse (not significant) during summer conditions.
 - Users of the PRoW network to the south of the Solar PV Site walking on PRoW Moss 6 and 7 would experience direct and close views of the Scheme, resulting in a **major adverse (significant) effect**.
- 6.6.25 All other recreational receptors, including those walking on the Trans Pennine Trail and those cycling on National Cycle Network 62, would not experience significant effects during year 1 of operation.

Receptors Travelling by Road and Rail

- 6.6.26 Receptors travelling by road and rail would not experience any significant effects during year 1 of operation.

Landscape Effects During Operation, Year 15 (Winter and Summer)

District Level

- 6.6.27 At the district level, operation of the Scheme across the Solar PV Site in year 15 would not result in any significant effects on landscape character in winter or summer conditions. This is due to the establishment of planting proposed as part of the Scheme, including grassland beneath the panels and structural vegetation which would enclose the Scheme, reducing perception of any change.

Local Level

- 6.6.28 By year 15 of operation planting proposed as part of the Scheme would have established, enhancing the structure of the landscape, reducing the area from which the Scheme is perceptible. However, approximately two thirds of the LLCAs would be occupied by Solar PV Panels, continuing to introduce an evident change in land use and character. The Scheme would therefore result in a **moderate adverse (significant)** effect on LLCAs 02: Fenwick Farmlands.
- 6.6.29 The effect of the Scheme during year 15 of operation on the remaining LLCAs would not be significant.

Visual Effects During Operation – Year 15 (Winter and Summer)

Residential Receptors

- 6.6.30 During year 15 of operation, residents of Jet Hall Farm would experience **moderate adverse (significant)** effects during winter given visibility of the Scheme from upper-storey windows, reducing to minor adverse (not significant) during summer when vegetation is in leaf.
- 6.6.31 All other residential receptors, would not experience significant effects during year 15 of operation.

Recreational Receptors

- 6.6.32 During year 15 of operation, the following recreational receptors would experience significant effects:
- Users of the PRow network within the Solar PV Site walking on PRow Fenwick 10, 12, 13, 14, 15, 16 and Moss 5, and Sykehouse 29 would experience close range views of the Scheme and therefore experience **major adverse (significant)** effects in winter and summer. Users of PRow Fenwick 11 would experience **moderate adverse (significant) effects** during winter.
 - Users of the PRow network to the north of the Solar PV Site walking on PRow 35.3/15/1, 35.3/15/2 and 35.3/8/1 would experience views of the rear of Solar PV Panels located in the north of the site resulting in **moderate adverse (significant) effects** in winter, reducing to minor adverse (not significant) during summer.
 - Users of the PRow network to the south of the Solar PV Site walking on PRow Moss 6 and 7 would experience visibility of the Scheme from the northern extent of the footpaths resulting in **moderate adverse**

(significant) effects during winter, reducing to minor adverse in summer.

- 6.6.33 All other recreational receptors, including those walking on the Trans Pennine Trail and those cycling on National Cycle Network 62, would not experience significant effects during year 15 of operation.

Receptors Travelling by Road and Rail

- 6.6.34 Receptors travelling by road and rail would not experience any significant effects during year 15 of operation.

Landscape Effects During Decommissioning (Winter)

District Level

- 6.6.35 At the district level, decommissioning across the Solar PV Site would physically alter the landscape of LCA F2, resulting in a **moderate adverse (significant)** effect. Decommissioning of the Scheme would not result in significant effects to any other published LCAs.

Local Level

- 6.6.36 At the local level, decommissioning activity, would result in the following significant effects on LLCA:
- a. LLCA 02: the effects of decommissioning would be similar to those of construction; however, the On-Site Substation would remain in place, meaning the extent of land affected would be slightly less than during construction. The perception of decommissioning would also be slightly less due to the more established vegetation structure which would be retained. Decommissioning would result in a **moderate adverse (significant)** effect.
- 6.6.37 The effect of decommissioning the Scheme on the remaining LLCAs would not be significant.

Visual Effects During Decommissioning (Winter)

Residential Receptors

- 6.6.38 During decommissioning, the following residential receptors would experience significant effects:
- a. Residents of Jet Hall Farm would experience glimpses of decommissioning activity resulting in a **moderate adverse (significant) effect**.
- 6.6.39 All other residential receptors, including the majority living in Fenwick and Moss, would not experience significant effects during decommissioning.

Recreational Receptors

- 6.6.40 During decommissioning, the following recreational receptors would experience significant effects:
- a. Users of the PRow network within the Solar PV Site walking on PRow Fenwick 10, 12, 13, 14, 15, 16 and Moss 5, and Sykehouse 29 would

experience close range views of activity including vehicle movements and the removal of Solar PV Panels and Solar PV Mounting Structures. This would result in a **major adverse (significant) effect**. People walking on PRow Fenwick 11 would experience partially filtered views, resulting in a **moderate adverse (significant) effect**.

- b. Users of the PRow network to the north of the Solar PV Site walking on PRow 35.3/15/1, 35.3/15/2 and 35.3/8/1 would experience filtered views of decommissioning, resulting in **moderate adverse (significant) effects**.
- c. Users of the PRow network to the south of the Solar PV Site walking on PRow Moss 6, 7 would experience filtered views of decommissioning, resulting in a **moderate adverse (significant) effect**.

- 6.6.41 All other recreational receptors, including those walking on the Trans Pennine Trail and those cycling on National Cycle Network 62, would not experience significant effects during construction.

Receptors Travelling by Road and Rail

- 6.6.42 Receptors travelling by road and rail would not experience any significant effects during construction.

Mitigation Measures

- 6.6.43 The preliminary landscape and visual impact assessment has, and continues to, inform the iterative design process, incorporating design principles in response to policy requirements, published landscape character assessments and fieldwork analysis. This embedded mitigation has been considered throughout the preliminary assessment of effects on landscape character and visual amenity.
- 6.6.44 The Scheme design has undergone a series of design iterations to embed mitigation measures into the design during the PEIR process. The design development will be completed during the Environmental Impact Assessment (EIA) process. The Scheme will continue to be designed to integrate with the local green infrastructure network, improving ecological and recreational connectivity across the Site. Any further measures will be detailed in the ES.

Cumulative Effects

- 6.6.45 Effects for all identified landscape and visual receptors do not increase as a result of the introduction of the Scheme and other cumulative developments.

6.7 Noise and Vibration

Baseline and Context

- 6.7.1 Baseline noise monitoring was carried out to establish the existing noise climate in the area. Sensitive receptors which have the potential to be affected by the Scheme were identified.

Assessment of Effects

- 6.7.2 The duration of any construction and decommissioning noise effects is considered to be temporary, short-term, with no permanent residual effect once works are completed. Core working hours during construction and decommissioning will be from 7am to 7pm Monday to Friday and 7am to 1pm on Saturday. The assessment considers that noise is generated throughout these periods, however it is noted that working hours will be shortened if working would necessitate artificial lighting and therefore the working day will be shorter in the winter months.
- 6.7.3 Construction and decommissioning noise levels will be controlled through implementation of the detailed CEMP and DEMP. A Framework CEMP is provided in **PEIR Volume III Appendix 2-1: Framework Construction Environmental Management Plan**, and the Framework DEMP will be prepared as part of the ES.
- 6.7.4 Noise generated by typical construction and decommissioning activities during core work hours are **not significant**. However, the installation of cabling using horizontal directional drilling (HDD) to avoid surface obstacles is likely to require continuous work outside the core work periods during the construction phase. Drilling activities are not predicted to exceed the noise limit during daytime and evening (weekdays and weekends), at any receptors; however, if works cannot stop safely and extend into the night, the limit may be exceeded. As drilling locations are not yet fixed, noise calculations are based on the potential closest location to a sensitive receptor that works may occur.
- 6.7.5 Noise calculations indicate that one sensitive location has the potential to result in significant noise effects if drilling activities extend into the night-time period. The hierarchy of mitigation measures for drilling activities will ensure that drilling activity noise effects will be reduced as far as reasonably practicable. This hierarchy includes maximising the distance from drill entry or exit pits to sensitive receptors and the use of acoustic fencing, if required. As such, it is anticipated that embedded mitigation measures can be suitably adopted that noise effects due to drilling activities are considered to be **not significant**.
- 6.7.6 The distance between sensitive receptors and locations where high vibration generating construction and decommissioning activities will occur is such that construction induced vibration effects are **not significant**.
- 6.7.7 For the assessment of operational noise, the typical background noise levels at sensitive receptors have been defined from the night-time period, which provide the lowest levels. During operation, plant will operate continuously so there will not be any noticeable impulsive or intermittent characteristics from noise emissions. Operational noise levels may be perceptible at some receptors; however, noise would not be of sufficient magnitude to result in significant effects on health and quality of life. Consequently, predicted noise levels of operational solar plant at the nearest receptors are **not significant**. All reasonable measures to reduce noise have been adopted through provision of embedded mitigation secured in the OEMP to demonstrate compliance with requirements set out in the Noise Policy Statement for England.

Mitigation Measures

- 6.7.8 Embedded mitigation for construction and decommissioning includes the use of best practical means identified in the Framework CEMP (**PEIR Volume III Appendix 2-1: Framework Construction Environmental Management Plan**) and the Framework DEMP (to be prepared as part of the ES), such as the sequential start-up of plant and vehicles rather than all together and regular plant maintenance.
- 6.7.9 Appropriate routing of construction and decommissioning traffic on public roads and along access tracks will be detailed in the Construction Traffic Management Plan (CTMP) (to be prepared as part of the ES).
- 6.7.10 Where practicable, drilling works will be avoided within 200 m (the distance at which significant effects are predicted at night) of residential receptors, and where drilling activities may occur within 200 m of sensitive receptors, the option for open cut cable laying will be explored as an alternative to drilling. The potential for the use of quieter equipment than listed in the ES will also be explored.
- 6.7.11 A construction noise monitoring scheme shall be developed alongside a communication strategy and noise complaint system. Voluntary consent under Section 61 of the Control of Pollution Act 1974 will be sought prior to noisy work required outside core work hours being carried out to demonstrate that noise and vibration has been minimised as far as reasonably practicable.
- 6.7.12 During operation, embedded mitigation includes plant selection and design layout to minimise noise at receptors, with noise generating plant located at distance from sensitive receptors, such that noise emissions are less impactful. The Applicant has made a commitment that noise at sensitive receptors will be no higher than the noise levels that will be presented in the ES following detailed design.

Cumulative Effects

- 6.7.13 No developments identified in **PEIR Volume I Chapter 15: Cumulative Effects and Interactions** are considered in combination to impact the receptors identified in this assessment. The potential for noise and vibration impacts during the construction, operation and maintenance, and decommissioning phases of the Scheme is considered within the Site Boundary itself. Other schemes are not likely to contribute to the effects on noise and vibration receptors identified in this chapter and therefore the cumulative effects are not significant.

6.8 Socio-Economics and Land Use

Baseline and Context

- 6.8.1 **PEIR Volume I Chapter 12: Socio-Economics and Land Use** presents the findings of an assessment of the likely significant effects on socio-economics as a result of the Scheme.

- 6.8.2 The Scheme has the potential to have a range of effects, some of which would be temporary whilst others would be permanent. Due consideration is given to the Scheme in terms of effects on the following:
- a. Employment generation;
 - b. Impacts on local services and facilities, comprising local accommodation services;
 - c. Gross Value Added (GVA);
 - d. Public Rights of Way (PRoW);
 - e. Other private and community assets (comprising residential properties, community facilities including GP surgeries, local businesses, open space, visitor attractions, agricultural land holdings and development land); and
 - f. Best and Most Versatile (BMV) agricultural land and soils.
- 6.8.3 The baseline conditions are summarised in the sections below.

Existing Site and Land Use

- 6.8.4 The Site is located within the area administered by the City of Doncaster Council. The boundary of the North Yorkshire Council administrative area is also located within the Site Study Area, to the north of the Site. The Site and the immediate adjacent area is mostly used for agricultural purposes, characterised by large-scale regular arable fields across several land-holdings.
- 6.8.5 Other existing energy infrastructure within the surrounding areas include overhead powerlines carried by pylons and the Existing National Grid Thorpe Marsh Substation.

Population and Employment

- 6.8.6 According to the ONS Mid-Year Population Estimates, in 2020, the resident population of the economic Study Area (the 60-minute drive time radius) was 6,288,728, having increased by 4.9% since 2011.
- 6.8.7 According to the Annual Population Survey, in 2022 the economic activity rate (amongst 16- to 64-year-olds) was 76.6% in Doncaster, lower than the rates in Selby (80.9%), Yorkshire and the Humber (77.4%) and England (78.7%).
- 6.8.8 In 2021, the unemployment rate for working-age residents was 6.6% in Doncaster – higher than the average rates across the Yorkshire and The Humber (4.5%) and England (4.6%). The July 2023 unemployment claimant count data was 4.7% in Doncaster, which is higher than the rates across the Yorkshire and the Humber (4.1%) and England (3.8%). The claimant count was 2.1% in Selby.

Local Economy

- 6.8.9 GVA per head in North Yorkshire County Council (which includes Selby) is slightly higher (£22,915) than in Doncaster (£17,404) and the wider Yorkshire and the Humber region (£21,748) but below England (£27,949).

6.8.10 The highest levels of employment in the Study Area are recorded in Health, Manufacturing and Education.

PRoW

6.8.11 There are no national trails or national cycle routes within the Solar PV Site. The Trans Pennine Trail runs through the Grid Connection Corridor by Thorpe in Balne but will not be impacted.

6.8.12 PRoW local to the Site are shown in **Figure 5** of this NTS. There are 11 PRoW either located entirely within the Solar PV Site, or which pass through the Solar PV Site and continue outside of it and 20 PRoW which are located along or abutting the Solar PV Site, but which do not traverse it.

6.8.13 There are approximately 24 PRoW located within the Grid Connection Corridor Study Area. Of these, eight are within or intersect the Grid Connection Corridor.

Local Receptors

6.8.14 There are no residential properties within the Site Boundary. The closest settlement to the Solar PV Site is Fenwick 100 m to the south west.

6.8.15 There are residential properties within 500 m of the Grid Connection Corridor at Moss, Hawkhouse Green, Thorpe in Balne and Barnby Dun. The closest settlement is Moss which is approximately 130 m west of the Grid Connection Corridor.

6.8.16 The Moss and Fenwick Village Hall, which also accommodates a pupil referral unit (Phoenix Education) providing alternative education services, is located adjacent to the Solar PV Site Order Limits on Fenwick Common Lane.

6.8.17 There are a range of community and recreational facilities within 2 km of the Scheme. There are no police or fire stations within 2 km of the Site Boundary.

6.8.18 There are multiple agricultural land holdings and the Existing National Grid Thorpe Marsh Substation located within the Site Boundary. There are approximately 11 businesses within 500 m of the Site Boundary.

6.8.19 There are no visitor attractions within 500 m of the Site Boundary.

6.8.20 At the current time, there are two cumulative developments that have been identified which could coincide with the Scheme (both within the Grid Connection Corridor).

BMV Agricultural Land

6.8.21 ALC surveys have been undertaken between February and May 2023 of the agricultural land and soils within the Solar PV Site. The survey covered 315.8 ha of land, and the results presented below relate to that area. Following completion of the survey, the Solar PV Site was expanded by the addition of 105.2 ha of land in the south west and a single field in the east of the Solar PV Site, totalling 421 ha for the entire Solar PV Site. This additional land will be surveyed for the ES.

- 6.8.22 Approximately 12.6 ha of the land surveyed (4%) within the Solar PV Site comprised of Subgrade 3a land (BMV land). The Solar PV Site is predominantly located in ALC Grade 3b land (91%) (non-BMV land) and the remaining land comprises Grade 4 (4%) ALC and non-agricultural land (1%).
- 6.8.23 The mapping of agricultural land and soils within the Grid Connection Corridor has been based on the Defra Natural England Provisional ALC dataset. The Grid Connection Corridor is predominantly located in ALC Grade 4 (poor quality agricultural land) with some in Grade 3 (good to moderate quality agricultural land).

Assessment of Effects

Construction

- 6.8.24 The estimated construction phase is expected to last a minimum of 24 months. Therefore, likely effects will be of a medium-term temporary nature. Although construction jobs are temporary, they represent a positive economic effect for a substantial period. It is estimated that the Scheme will require a peak workforce of 250 full-time equivalent (FTE) staff per day, and create an average of 200 gross FTE jobs on-site per day during the construction phase (assumed to be equivalent to 200 FTE jobs per annum). Of these construction jobs, 45% are expected to be taken up by people living within 60 minutes travel time of the Site. Taking this into account, the impact of construction employment generation in the Study Area has been assessed to be a short-term temporary **minor beneficial** effect. This is considered to be **not significant**.
- 6.8.25 Analysis of the hotel, bed and breakfast and inns accommodation sector has been undertaken to assess the likely capacity against the demand from the potential peak construction workforce. It indicates, considering existing seasonal demand and typical occupancy, that capacity is sufficient, and the workforce can be accommodated within existing provision within a 30-minute drive time radius of the Site. Given this, there would be **no effect** on the hotel, bed and breakfast, and inns accommodation sector arising from the Scheme.
- 6.8.26 The impact of direct GVA generation from the construction phase on the economy within the Study Area has been assessed as a temporary **minor beneficial** effect on both a local and regional scale. This is considered **not significant**.
- 6.8.27 Changes to journey times, local travel patterns, and certainty of routes for users could arise from any temporary diversions or impacts on ProW. The Scheme would require the temporary diversion of ProW Fenwick 16 into the agricultural field on the other side of the hedge adjacent to Hags Lane; the diverted route would follow the same alignment as the existing ProW but on the other side of the hedge. This would increase the journey length by approximately 5 m. ProW Sykehouse 29 would be permanently diverted, however the diversion would follow the route taken by existing users. This diversion would increase the journey length by 40 m. Due to the limited scale of impacts upon both ProW, the effect is assessed to be very low adverse, which results in a **negligible effect**. This is considered to be **not significant**.

- 6.8.28 The other ProW crossed by the Solar PV Site or Grid Connection Corridor are not anticipated to be impacted and therefore a **negligible effect** is assessed, which is considered **not significant**.
- 6.8.29 No direct land use impacts on residential properties, businesses, community facilities, open spaces or visitor attractions are anticipated. Activities related to the construction of the Scheme may restrict, or create severance to, the accessibility of residential properties, business premises, community facilities, open space, visitor attractions, agricultural land holdings and development land for residents in the Study Area. However, only a **minor adverse** effect is anticipated in this regard, which is considered **not significant**.
- 6.8.30 From the construction phase, temporary use of agricultural land will occur, which will involve temporary land take. Given that that only a small proportion of the agricultural land is BMV land (less than 20 ha) and the loss of the BMV agricultural land is temporary and reversible (after operation for the Solar PV Site and after construction for the Grid Connection Corridor), the magnitude of impact is assessed to be very low. Therefore, the effect is assessed to be **negligible**, which is considered **not significant**.
- 6.8.31 Temporary land take will also be required within the Solar PV Site for the construction of the BESS Area. As none of the land required is BMV land, the magnitude of impact is assessed to be **very low**. Therefore, the temporary effect of the Scheme on the use of the BMV agricultural land required for the construction of the BESS Area is assessed to be **negligible**, which is **not significant**.
- 6.8.32 Permanent land take will be required for the construction of the sub-station. As none of the land required is BMV land, the magnitude of impact is assessed to be **very low**. Therefore, the permanent effect of the Scheme on the use of the BMV agricultural land required for the construction of the sub-station is assessed to be **negligible**, which is **not significant**.
- 6.8.33 No severance or direct land take would be required from development land during construction of the Scheme. Only minor connectivity impacts are anticipated for the development site associated with the demolition of Grade II listed 'Lily Hall' and erection of one replacement residential farmworker's dwelling and associated works (22/01537/LBC and 22/01536/FUL). Therefore, the effect is assessed to be **minor adverse**, which is considered **not significant**.
- 6.8.34 Construction of the Grid Connection Cables would require limited temporary land take from extraction areas within the MSA for sand and gravel (Land to the east of Doncaster between Thorne and Bawtry). It is considered that cabling works can take place without preventing the economically viable mineral resource (if present) to be extracted in the future. Therefore, the effect is assessed to be **minor adverse**, which is considered **not significant**.

Operation

- 6.8.35 The jobs created by the operation and maintenance phase of the Scheme would offset the agricultural jobs lost as a result of the Scheme. Therefore, it

has been assessed that there will be **no effect** with regard to operational employment associated with the Scheme.

- 6.8.36 The temporary diversion of ProW Fenwick 16 footpath would be reinstated to the original route during the operation and maintenance phase. The permanent diversion of ProW Sykehouse 29 footpath would remain during the operation and maintenance phase. There would be no additional effects on ProW. Therefore, there would be a **negligible effect** on local community severance and users of ProW arising from the Scheme, which is considered **not significant**.
- 6.8.37 Operational traffic is anticipated to be very low and therefore it is not anticipated that there would be any adverse impacts on community connectivity due to traffic generation during the operation and maintenance phase. It is assessed that there would be **no effect** on private and community assets, including development land, in the operation and maintenance phase of the Scheme.
- 6.8.38 The agricultural land located within the Solar PV Site which is required for the duration of the Scheme will be unavailable for farming activities, except where these could collocate with the infrastructure (e.g. grazing of sheep). Given that only a small proportion of the agricultural land is BMV land (less than 20 ha), the loss of the BMV agricultural land is temporary and reversible, and it is likely that soil function would improve during the operation and maintenance phase due to the removal of tillage leading to soil structural improvement and increased carbon sequestration, the effect is assessed as **negligible**. This is considered **not significant**.
- 6.8.39 To access the extraction areas which overlap with the Grid Connection Corridor, during the operation of the Scheme, further construction work would be required to divert cabling. If a specific area along the Grid Connection Corridor was deemed to be commercially viable for mineral extraction in the future, it is considered that it would be possible to divert the Grid Connection Cables (subject to the appropriate consents and agreements being in place) in order to allow for mineral extraction to be undertaken. Therefore, it is considered that non-mineral development can potentially take place without preventing the economically viable mineral resource (if present) to be extracted in the future. Therefore, the effect is assessed to be **minor adverse**, which is considered **not significant**.

Decommissioning

- 6.8.40 Based on the activities taking place, it is assumed that the same number of jobs required for constructing the Scheme would be needed to carry out the activities required to remove the infrastructure from the Site. Therefore, the impact of decommissioning employment generation in the Study Area has been assessed to be **minor beneficial** effect, which is considered to be **not significant**.
- 6.8.41 ProW crossing the Grid Connection Corridor may be disrupted by traffic management or temporary diversions, but these disruptions would be short-term in duration. Therefore, the impact of decommissioning on ProW is assessed to be **negligible** which is considered **not significant**.

- 6.8.42 No direct land use impacts on residential properties, businesses, community facilities, open spaces or visitor attractions are anticipated. Activities related to the decommissioning of the Scheme may restrict, or create severance to, the accessibility of residential properties, business premises, community facilities, open space, visitor attractions, agricultural land holdings and development land for residents in the Study Area. However, only a **minor adverse** effect is anticipated in this regard, which is considered **not significant**.
- 6.8.43 There would only be a short time frame of any disruption to farming activities during decommissioning activities and the Site would be returned to landowners in the condition as at the end of operation including seeded and grassed land following completion of the decommissioning. Therefore, the effect is assessed to be **negligible** which is considered **not significant**.
- 6.8.44 The impacts on development land during the decommissioning phase would be expected to be in line with the impacts assessed during the construction phase. No severance or land take would be required from development land during decommissioning of the Scheme. Only minor connectivity impacts are anticipated for the development site associated with the demolition of Grade II listed 'Lily Hall' and erection of one replacement residential farmworker's dwelling and associated works (22/01537/LBC and 22/01536/FUL). Therefore, the effect is assessed to be **minor adverse**, which is considered **not significant**.
- 6.8.45 If the Grid Connection Cables are removed, the impacts on the MSA during the decommissioning phase would be expected to be in line with the impacts assessed during the construction phase. If the Grid Connection Cables are not removed, the impacts on the MSA during the decommissioning phase would be in line with those identified for the operation and maintenance phase. Therefore, the effect is assessed to be **minor adverse**, which is considered **not significant**.

Mitigation Measures

- 6.8.46 Embedded mitigation measures are described below. No additional mitigation measures are required, due to no significant adverse effects associated with Socio-Economics and Land Use being identified.
- 6.8.47 Mitigation measures are embedded within the Scheme to reduce construction and operational effects relating to transport, which in turn will mitigate the effects on the local community and existing facilities from a Socio-Economic and Land Use perspective. The relevant mitigation measures are set out in the **Section 6.9: Transport and Access** of this NTS.
- 6.8.48 The Scheme has been designed to take into account the quality of agricultural land such as positioning the permanent infrastructure to avoid BMV land as far as practicable, and avoiding other socio-economic and other sensitive environmental receptors, where practicable.
- 6.8.49 The Scheme has been designed so that the ProW within the Solar PV Site remain open during the construction, operation and decommissioning phases of the Scheme. The ProW will also be buffered from the perimeter fencing, with fencing being installed a minimum distance of 20 m either side

of the centre of the ProW where solar infrastructure lies to both sides (creating a 40 m wide corridor between the fence lines), or 15 m if solar infrastructure is to one side only. Any ProW that are crossed by the Grid Connection Cables would only be impacted during the short-term trenching and restoration operations and would remain open.

Cumulative Effects

- 6.8.50 No significant adverse cumulative effects are anticipated during the construction phase. Cumulative effects on residential properties, business premises, community facilities, development land and MSAs is assessed to remain **minor adverse**, which is considered **not significant**. The impacts on employment and GVA during the construction phase will remain as **minor beneficial**, which is considered **not significant**.
- 6.8.51 No significant adverse cumulative effects are anticipated during the operation and maintenance phase. It is assessed that the cumulative effect on residential properties, business premises, community facilities, development land and MSAs is assessed to remain **minor adverse**, which is considered **not significant**.
- 6.8.52 No significant adverse cumulative effects are anticipated during the decommissioning phase. It is assessed that the cumulative effect on residential properties, business premises, community facilities, development land and MSAs is assessed to remain **minor adverse**, which is considered **not significant**. The impacts on employment and GVA during the decommissioning phase will remain as **minor beneficial**, which is considered **not significant**.

6.9 Transport and Access

Baseline and Context

- 6.9.1 **PEIR Volume I Chapter 13: Transport and Access** presents the findings of an assessment of the likely significant effects on transport and access as a result of the Scheme during construction, operation and decommissioning.
- 6.9.2 The key roads described below are shown in Figure 6.

Strategic Highway Network

- 6.9.3 The M62 forms part of the Strategic Road Network (SRN) and is a 172 km motorway that connects Liverpool to Hull via Bradford and Leeds. The motorway generally has three lanes heading in each direction with a hard shoulder separation. The road is managed by National Highways and provides a link for onward strategic journeys in all directions.
- 6.9.4 The M18 is also located to the east of the Scheme which runs from Junction 35 of the M62 towards Doncaster towards the east of Sheffield in a southerly direction. The M18 is characterised by two lanes between the M18 Junction 5 and Junction 2 with three lanes on the remainder of the M18.
- 6.9.5 Furthermore, the M180 joins the M18 at Junction 5 near Stainforth which provides travel in an easterly direction towards the Humber Estuary and Scunthorpe, Grimsby and Cleethorpes.

- 6.9.6 The M62 Junction 34 is approximately 14 km to the northwest of Fenwick which provides the nearest vehicular access from the SRN to the Scheme. This link provides access from major urban areas such as Leeds to the north west of the Scheme, as well as other small surrounding towns.
- 6.9.7 To the east the M62 meets the M18 at Junction 35, which provides access from areas to the north of the Humber Estuary such as Hull. This then leads onto the M18 in which access to the Scheme is then achieved through the local road network which is described in the section below.

Local Highway Network

- 6.9.8 From the west the A19 runs for approximately 18 km between the M62 Junction 34 and St Mary's Roundabout in Doncaster to the west of the Scheme. The A19 passes through more built-up areas such as Whitley to the north of the A19 and Askern, where it joins with Moss Road via a 3-arm signalised junction.
- 6.9.9 The A19 is characterised as a primary route with a single carriageway with a variable speed limit ranging between 60mph in the areas with limited urban build-up and 30mph within Askern itself with areas along the link also 40mph. A level crossing is also present to the north of Askern adjacent to the Aldi store approximately 650m from the A19/Station Road junction.
- 6.9.10 Moss Road is a single carriageway road that runs east to west from the A19 through Askern and the village of Moss before changing to Kirkhouse Green Road just before the New Junction Canal near Kirkhouse Green.
- 6.9.11 Moss Road has a speed limit of 30 mph imposed within Askern before changing to 50 mph on the eastern edge of the village which then continues until the outskirts of Moss in which it then changes to 40 mph approximately 650m to the west of the level crossing near the 3-arm priority with Fenwick Common Lane.
- 6.9.12 Fenwick Common Lane runs north from Moss Road for approximately 2km before entering the village of Fenwick which then forms a junction with Lawn Lane and Fenwick Lane.
- 6.9.13 Fenwick Common Lane is characterised by a single-lane carriageway with no lane markings and no footways present on either side of the carriageway. The link is also subject to the national speed limit for much of the link before changing to 30 mph before entering Fenwick approximately 225 m on from the priority junction with Shaw Lane. It is proposed that Fenwick Common Lane will provide the main access route to the Scheme.
- 6.9.14 Approximately 1 km along Fenwick Common Lane, Higgs Lane forms a stopped-up priority junction that is currently not available for vehicular use, however as part of the Scheme will be altered to allow vehicular access. A ProW (namely Footpath Fenwick-16) exists on the northern side of the existing track and separation between vehicles and the ProW will be managed through the CTMP.
- 6.9.15 From the east, access towards the Scheme is achieved via the A614/ Between Rivers Lane priority junction. The A614 runs in a north/south direction in which it forms a roundabout with the A1041 near the village of East Cowick before continuing into the village of Snaith.

- 6.9.16 The A1041 then continues north towards the A63 near Selby. From here the A63 links to both the A1(M) towards Leeds and north towards York along the A19. To the south, the A614 meets the SRN at M18 Junction 6 which then provides further access to the wider area as described in the SRN section above.
- 6.9.17 Between Rivers Lane is located approximately 1 km south of the A1041/A614 roundabout and is accessed from the east off the A614 via a large priority bellmouth junction. Between Rivers Lane is characterised as a rural single-carriageway with verges on either side subject to the national speed limit. Between Rivers Lane leads onto Oak Road near the PD Tattersall trucking depot.
- 6.9.18 Oak Road continues in an east/ west direction onto Pincheon Green Lane, Marsh Hill Lane, Sykehouse Road, Broad Lane, West Lane, and then Flashley Carr Lane before forming into Moss Road in which the link then continues through Moss before meeting Fenwick Common Lane.

Walking and Cycling

- 6.9.19 The Scheme generally falls within a rural setting with local country lanes making up the predominant road type. As a result, there are limited footways and other pedestrian/ cycle facilities in the area apart from in towns and villages such as Askern where there are footways present to facilitate pedestrian movements.
- 6.9.20 There are no segregated footways present along Fenwick Common Lane with only grass verge present on both sides of the carriageway. To the south on Moss Road there are also no footways present meaning a continuous journey by foot would likely be undesirable to the Solar PV Site from the surrounding area.
- 6.9.21 There are no specific cycle facilities on local roads within the Study Area, such as advisory cycle lanes. The nearest section of the National Cycle Network is part of route 62 and lies approximately 4 km to the east and south of the Solar PV Site. However, due to the low traffic volumes and overall nature of some of the smaller local lanes, cycling is likely to be desirable and an option for construction workers travelling to site.
- 6.9.22 It is possible that some construction workers would cycle to the Solar PV Site, due to proximity to population centres, however numbers are likely to be small.
- 6.9.23 In terms of ProW there are a variety of routes that intersect within the Site. These include Footpath Fenwick-16 which continues along Hags Lane in an east west direction (the location of the site access point) into the fields beyond. At the end of Hags Lane, Footpath Fenwick-11 runs in a north-south direction towards the village of Fenwick to the north and into the fields to the south. There are also other ProW that continue off Footpath Fenwick-11 and Fenwick 16 within the Site.
- 6.9.24 This includes Footpath Fenwick-10 which runs in an east-west direction to the north of Hags Lane which connects into the village of Fenwick to the west and into the fields towards Bunfold Shaw surrounding the Scheme to the east. Footpath Fenwick-14 runs from the terminus of Footpath Fenwick-16 in a north-south direction between Fenwick Footpath-10 to the north

before terminating at the Ell Wood and Fenwick Grange Drain and continuing south from there towards Moss via the Footpath Moss-6. Footpath Fenwick 15 also runs through the Site in an east-west direction just to the north of Fenwick Footpath-16 which then meets Footpath Fenwick-13. This runs in a north south direction from Bunfold Shaw in the north before also terminating in the south at Ell Wood and Fenwick Grange Drain to the south before continuing onto the outskirts of Moss via Footpath Moss-7. Observations on site indicated that the routes are infrequently used, and generally used by people for dog walking and leisure purposes.

- 6.9.25 At this stage of the assessment, it is noted that these ProW are the only ones that will be affected directly by the Scheme proposals (e.g. will be subject to management such as temporary closures/diversions). A full ProW Management Plan will be produced alongside the ES chapter to establish any potential impacts on these ProW and how these will be mitigated.
- 6.9.26 It is unlikely that construction workers would walk to the Solar PV Site or other areas of construction, due to proximity to population centres, however numbers are likely to be small.

Public Transport

- 6.9.27 The area surrounding the Scheme is predominately rural in nature with only one bus route (51 Doncaster to Norton) within relative proximity of the Scheme, which runs through Askern off the A19 through a residential estate within Askern and then back onto the A19. However, this bus stop is approximately 4.3 km from the proposed access point into the Scheme.
- 6.9.28 There are bus stops along Moss Road and within Fenwick, however, these are designated as being school bus services and as such operate once in the morning and once in the afternoon. Therefore, these services would not be usable by staff.
- 6.9.29 The relative distance, the lack of sufficient safe footways and the lack of services within the area indicate that public transport will not be a viable option for workers seeking to use the bus to access the Scheme.
- 6.9.30 The nearest rail facilities to the Scheme include Adwick (10 km), Hatfield and Stainforth (10.6 km) and Thorne North (14.7 km), to the west, south, and east respectively. As such, based on these distances and the lack of other public transport facilities alongside insufficient footway provision, using the train from these locations would likely be unviable for workers.

Assessment of Effects

Construction

- 6.9.31 The assessment shows that following the implementation of embedded mitigation, the construction phase impacts (in terms of construction traffic increase, severance of communities, NMU amenity, fear and intimidation, road vehicle driver and passenger delay and road user and pedestrian safety) are considered to be **moderate adverse** within at least one of the assessment criteria at the following locations:
- Link 9: Moss Road – Askern Village;
 - Link 10: Moss Road – East of Askern;

- c. Link 11: Fenwick Common Lane
- d. Link 12: Trumfleet Lane – South of Moss
- e. Link 13: Marsh Road; and
- f. Link 14: Thorpe Bank.

6.9.32 It has therefore been identified that with embedded mitigation measures in place, there could still be potentially **significant effects** at links 9, 10, 11, 12, 13 and 14. These significant effects are generally driven by low baseline traffic movements experienced at these links such that the relatively low number of additional traffic movements as a consequence of the Scheme result in high percentage increases in traffic.

6.9.33 All other sites assessed were determined to have **no significant effects** in terms of construction traffic increase, severance of communities, NMU amenity, fear and intimidation, road vehicle driver and passenger delay and road user and pedestrian safety.

Operation

6.9.34 The impact of additional development-generated traffic on the surrounding road network during the construction and decommissioning phases is anticipated to be the most significant stage of the Scheme, with the operation and maintenance phase anticipated to create much less traffic.

6.9.35 Therefore, as predicted traffic levels owing to the operation and maintenance phase are low, operational effects are therefore expected to be negligible, with **no significant effects**.

Decommissioning

6.9.36 As the decommissioning phase is planned to commence 40 years after final commissioning (e.g. making it very difficult to predict traffic background conditions that far into the future) and expected to result in less traffic than the construction phase (and over a shorter period), decommissioning is expected to lead to effects that are no worse than during construction. The decommissioning phase has therefore not been specifically modelled and the effects and mitigation for construction are considered applicable for decommissioning and represent a worst case scenario.

Mitigation Measures

6.9.37 Mitigation measures are embedded within the Scheme to reduce construction and operational effects relating to transport. The Scheme has been designed, as far as practicable, to avoid and reduce impacts and effects on transport and access through the process of design development, and by embedding measures into the Scheme design. In addition, how the Scheme is constructed, operated, maintained, and decommissioned will be appropriately managed in order to minimise potential environmental effects.

Construction and Decommissioning

6.9.38 During both the construction and decommissioning phases, a CTMP/ DTMP would be in operation to ensure the safe management of traffic in each

phase. These documents will contain the required embedded mitigation for each phase, including:

- a. Suitable access points identified to enable movement of vehicles into sites where appropriate;
- b. Access points that require the creation of a junction bellmouth would be designed based on swept paths undertaken for vehicles requiring access, with visibility requirements based on 85th percentile speeds. Further details on access designs are provided within **PEIR Volume III Appendix 13-5: Indicative Access Appraisal for Solar PV Site** and **PEIR Volume III Appendix 13-6: Indicative Access Appraisal for Grid Connection Corridor**.
- c. Swept path analysis for AILs, HGVs, and tractor/trailers would be conducted to ensure there is knowledge of where routing is appropriate. This information has been compiled within **PEIR Volume III Appendix 13-5: Indicative Access Appraisal for Solar PV Site**, **PEIR Volume III Appendix 13-6: Indicative Access Appraisal for Grid Connection Corridor** and **PEIR Volume III Appendix 13-7: High Level Route Assessment**;
- d. HGVs and AILs will be routed in accordance with the findings of the routing review for large vehicles as set out in the CTMP, which will be produced alongside the ES chapter. There are expected to be five movements associated with the delivery of transformers to the On-Site Substation;
- e. Utilising internal routes within the Solar PV Site to avoid using the existing road network where practicable;
- f. Managing the areas where traffic may have to use the road network, by providing adequate visibility splays between construction vehicles and other road users, implementing traffic management (e.g., advanced signage to advise other users of the works, as well as manned controls at each crossing point (marshals/ banksmen)), with a default priority that construction traffic will give-way to other users. This will also apply where construction traffic and ProW may intersect;
- g. Restricting HGV movements to certain routes as follows:
 - i. Moss Road – SRN, A19, Moss Road
- h. Restricting HGV movements to ensure arrivals/ departures between 09:00 and 17:00 to avoid increasing traffic levels on the surrounding highway network during the traditional weekday peak hours;
- i. Implementing a Delivery Management System to control the bookings of HGV deliveries from the start of the construction phase. This will be used to regulate the arrival times of HGVs via timed delivery slots, as well as to monitor compliance of HGV routing. In addition, adequate space will be made available within the Solar PV Site to ensure no queuing back onto the surrounding road network occurs;
- j. Implementing a monitoring system to record the route of all HGVs travelling to and from the Scheme, to record any non-compliance with the agreed routing strategy/ delivery hours and to communicate any

issues to the relevant suppliers to ensure the correct routes and times are followed;

- k. Directing workers to take the most direct route to the Scheme using 'higher' order roads, such as A and B classified roads or the SRN;
- l. Encouraging local construction workers to car share to reduce single occupancy car trips. This will promote the benefits of car sharing, such as reduced fuel costs. A car share system will be implemented to match potential sharers and to help staff identify any colleagues who could potentially be collected along their route to/ from the Scheme;
- m. Implementing a shuttlebus service to transfer non-local workers to/ from local worker accommodation or pick-up locations (assumed minibus capacity of 25), to reduce vehicle trips on the surrounding highway network;
- n. Providing limited (but sufficient) on-site car and cycle parking to accommodate the expected parking demand of workers for the Scheme;
- o. A specialised haulage service will be employed to allow AILs to transport components with the necessary escort, permits and traffic management, with the contractor consulting the relevant highways authorities to ensure the correct permits are obtained; and
- p. Construction staff will be encouraged to take the most direct route to the Scheme using 'higher' order roads, such as A and B classified roads or the SRN.

Operation

6.9.39 During the operation and maintenance phase, the following embedded design mitigation measures are proposed:

- a. Operational staff will be encouraged to take the most direct route to the Scheme using 'higher' order roads, such as A and B classified roads or the SRN;
- b. HGV movements are anticipated to be low across the 40-year operation and maintenance phase, but when required HGV movements will be restricted to certain times of day (between 09:00 and 17:00) and restricted to the SRN and other "higher" order roads where applicable (M62, M18, M180, A19)
- c. Ensuring operational staff park within the Solar PV Sites during operation as to limit impact on parking available within the local road network; and
- d. Providing sufficient protection/ separation between existing ProW, permissive paths and the Order limits where necessary using perimeter fencing installed at a minimum distance of 20m either side of the centre of the ProW where solar infrastructure lies to both sides, or 15m if solar infrastructure is to one side only.

Residual Effects

6.9.40 Although the majority of mitigation that seeks to reduce the impact of vehicles will be embedded, with the above options developed for inclusion in

the CTMP, other options will also be considered post consultation where practicable.

- 6.9.41 For the purpose of the assessment at this stage, the residual effects will however remain the same as stated in the preliminary assessment.

Cumulative Effects

- 6.9.42 It is considered that there are unlikely to be significant effects arising from cumulative development during the construction phase, due to limited overlap of Study Areas and limited levels of traffic being generated by cumulative sites.

6.10 Other Environmental Topics

Air Quality

- 6.10.1 This section considers the potential for activities to change local air quality during the construction, operation and decommissioning phases of the Scheme. The guidance and methods that have been used are widely applied in England to assess the likelihood of emissions to air affecting the health and amenity of the local community or conditions at designated ecological sites.
- 6.10.2 The current standard of air quality experienced by communities surrounding the site for the Scheme is very good. The concentrations of nitrogen dioxide and particulate matter are less than half the national air quality objective values set for the protection of human health. Baseline rates of dust deposition are typical of rural areas with agricultural practices being the main sources of material deposited locally.
- 6.10.3 The assessment adopts good site practices to minimise the potential for emission to occurring from works (such as earthworks and construction activities) or exhaust emissions from road going vehicles or construction plant (such as excavators or generators). The good site practice measures will be incorporated into the Construction Environmental Management Plan (CEMP) and a Framework CEMP is presented as **PEIR Volume III Appendix 2-1: Framework Construction Environmental Management Plan**. These measures have a strong track record of controlling offsite effects of emissions to air effectively, where they have been applied to other construction sites over the last 20 years.
- 6.10.4 The nature of the activities required to construct, operate and decommission the Scheme have limited potential to generate emissions to air and with the proposed good practice control measures there should be no change to future standard of air quality experienced by local communities, with or without the Scheme. The measures set out in the CEMP require additional effort to be made to control emissions proactively, for example in response to visual inspections by the site manager.
- 6.10.5 Including embedded mitigation, the likely effects of the Scheme on local air quality and public amenity considered to be **not significant**.

6.10.6 With the proposed controls measures for the Scheme and each cumulative development, the likely cumulative effects at air quality receptors are considered unlikely to be significant.

Glint and Glare

6.10.7 Glint and Glare are essentially the unwanted reflection of sunlight from reflective surfaces. 'Glint' refers to a momentary flash of light and 'Glare' refers to a continuous source of bright light. The full study on glint and glare is available in **PEIR Volume III Appendix 14-2: Glint and Glare Assessment**. Several potential receptors are present in the vicinity of the Solar PV Site. These include residents, road vehicles, users of bridleways, railway users and aircraft. Impacts to the users of the local waterways were also considered but not subject to modelling.

6.10.8 A 1 km Study Area around the extent of the Solar PV Site was considered for the assessment of ground-based (residential, road, rail and bridleway) receptors, whilst a 30 km Study Area was defined for aviation receptors.

6.10.9 Detailed modelling (Geometric analysis) was conducted at 124 individual residential receptors, including 12 residential areas, 68 road receptors, 21 rail receptors and four bridleway receptors. In addition, geometric analysis was conducted at 16 runway approach paths and one Air Traffic Control Towers (ATCT) at Doncaster Sheffield Airport, Sherburn-in-Elmet Airport, Church Farm and Bridge Cottage Airfield.

6.10.10 The modelled impact at each receptor does not take consideration of local vegetation or other obstacles and assumes no cloud at any point in the year. It is therefore a conservative and precautionary assessment, likely to overestimate the actual impacts associated with the Solar PV Site.

6.10.11 The assessment concludes that:

- a. Solar reflections are possible at 53 of the 124 residential receptors assessed within the 1 km Study Area. Once actual visibility and mitigation measures were considered, impacts reduce to None at all receptors. Therefore, overall impacts on residential receptors are considered to be None.
- b. Solar reflections are possible at 59 of the 68 road receptors assessed within the 1 km Study Area. Once reviewing the actual visibility of the receptors, glint and glare impacts reduce to None for all road receptors. Therefore, overall impacts are considered to be None.
- c. Solar reflections are possible at 14 of the 21 rail receptors assessed within the 1 km Study Area. Once reviewing the actual visibility of the receptors, glint and glare impacts reduce to None for all rail receptors. Therefore, overall impacts on rail receptors are considered to be None.
- d. Solar reflections are possible at one of the four bridleway receptors assessed within the 1 km Study Area. Once reviewing the actual visibility of the receptors, glint and glare impacts reduce to None for all bridleway receptors. Therefore, overall impacts on bridleway receptors are considered to be None.
- e. 16 runway approach paths and two ATCTs were assessed in detailed at Doncaster Sheffield Airport, Sherburn-in-Elmet Airport, Church Farm and

Bridge Cottage Airfield. Green glare (low potential for after-image) and yellow glare (potential for after-image) impacts were predicted for Runway 08 at Church Farm Airfield. Green glare is an acceptable impact upon runways according to FAA guidance. Upon inspection of the type of aircraft using Church Farm, time of impact, position of the sun and use of existing pilot mitigation strategies when landing in the direction of the sun, as well as the likely landing direction for the runway and Google Earth aerial imagery indicating the airfield is not in use, all impacts at Church Farm can be deemed acceptable. Overall impacts on aviation assets are acceptable and **not significant**.

- f. Navigable waterways are outside of the 1 km Study Area and therefore detailed modelling to assess the impacts on boat users was not undertaken. However, following detailed modelling and implementation of mitigation, the impacts upon ground-based receptors (road, rail, residential and bridleway) in much closer proximity to the Solar PV Site (within the 1 km Study Area) than the rivers are None. Therefore, as the navigable waterways are located further than 1 km away from the Solar PV Site, impacts are assumed to be none.

6.10.12 The effects are considered to be **none (not significant)**, except for overall aviation impacts which are **low and not significant**.

6.10.13 No Mitigation is required due to the Low and None impacts at all residential receptors and the None impacts found for all road and rail receptors. However, mitigation measures were included to screen the Low impact views from Residential Receptors 74, 79 and 88. This includes native hedgerows to be planted/infilled and maintained to a height of at least 3.5m along the southern boundary of the Central Array and along a southwest section and a southern section of the South Array.

6.10.14 There are no other solar developments located/proposed to be located within 2 km of the Solar PV Site to cause any potential cumulative effects. Therefore, no cumulative effects are predicted.

Ground Conditions

6.10.15 Two Phase 1 Preliminary Risk Assessments (PRA) reports for the Solar PV Site and for the Grid Connection Corridor (**PEIR Volume III Appendix 14-3: and 14-4**) identify and evaluate potential land quality risks and development constraints associated with the Scheme. The key risks have been identified on-site, near current and former farm buildings and at the southern edge of the Scheme in the area of the former power station; and in the offsite areas surrounding the former railways lines and surrounding current/recent industrial and commercial activities.

6.10.16 Given the sources identified, and the nature of the likely exposure to current and future human health receptors at the Site, the risk to human health is considered to be **very low to low**. Risks to controlled waters have been identified as up to **low**, considering the presence of a former power station at the southern edge of the Site.

6.10.17 A number of embedded environmental design and management measures will be employed as standard good practice to minimise impacts to both human health and controlled waters during the construction and

decommissioning phases of the Scheme. These are described in Framework CEMP included as **PEIR Volume III Appendix 2-1: Framework Construction Environmental Management Plan** and include measures such as preparation of an Emergency Spillage Action Plan, which staff would have read and understood, and provisions made to contain any leak/spill.

- 6.10.18 The PRAs also recommend additional mitigation measures, including limited intrusive site investigation and Generic Quantitative Risk Assessment to confirm the findings of the assessment.
- 6.10.19 After mitigation (embedded and additional), it is expected that the risk to human health and controlled waters will be **not significant**.
- 6.10.20 The potential for ground conditions impacts during the construction, operation and maintenance, and decommissioning phases of the Scheme is considered within the Site Boundary itself. Other cumulative developments are not likely to contribute to the effects on ground conditions receptors and therefore cumulative effects are **not significant**.

Major Accidents and Disasters

- 6.10.21 This section provides a description of the potential effects of the Scheme on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the Scheme. “Accidents” are an occurrence resulting from uncontrolled developments in the course of construction, operation and decommissioning (e.g. a major emission, fire or explosion). “Disasters” are naturally occurring extreme weather events or ground related hazard events (e.g. subsidence, landslide, earthquake).
- 6.10.22 An initial exercise was undertaken to identify all possible major accidents or disasters that could be relevant to the Scheme, including floods, fire, road accidents, utilities failure and plant disease. Major accidents or disasters with little relevance in the UK, such as volcanic eruptions, were not included.
- 6.10.23 By their very nature, major accidents and disasters have the potential to lead to moderate or major adverse effects, irrespective of the Scheme. Therefore, the focus is on prevention and response planning to reduce any additional risk or effect of this happening which may arise as a result of the Scheme. This exercise is underway and will remain on-going through design development and consultation with relevant statutory consultees. However, at this stage, it is considered that there is **no significant** risk of major accidents and disasters occurring during construction, operation or decommissioning as a result of the Scheme.
- 6.10.24 With the mitigation measures listed in Table 14-14 of **PEIR Volume I Chapter 14: Other Environmental Topics** to reduce the risk of fire and other shortlisted events for the Scheme, it is not expected that any cumulative developments would increase the risk or severity of the residual effects associated with major accidents and disasters affecting the Scheme.

Telecommunications and Utilities

- 6.10.25 Existing infrastructure constraints are in the process of being defined and will be identified and confirmed in the ES. Existing infrastructure constraints identified at and adjacent to the site include the Existing National Grid

Thorpe Marsh Substation, overhead lines and towers, private water supply abstraction boreholes and live water mains.

- 6.10.26 The Scheme is unlikely to interfere with telecommunications infrastructure due to the relatively low height of the Solar PV Panels and infrastructure, which will not provide an obstacle for telecommunication waves. Therefore **no effects** on telecommunication are anticipated in the construction, operation and decommissioning phases.
- 6.10.27 Similarly, as the Scheme consists of fixed low-lying infrastructure, it is unlikely to interfere with digital television signals and therefore **no effects** on digital television signals are anticipated in the construction, operation and decommissioning phases.
- 6.10.28 The potential exists for utilities to be affected during the construction of the Scheme through inadvertent damage caused as a result of excavation and engineering operations.
- 6.10.29 Potential impacts on utilities will be addressed through a number of embedded mitigation measures such as locating the Scheme outside of utilities protected zones, using ground penetrating radar before excavation to identify any unknown utilities, and ensuring adequate clearances are in place when plant and equipment is being moved beneath the overhead lines. With embedded mitigation in place, it is not expected that there will be any adverse effects. The application of embedded mitigation would reduce the likelihood of effects on utilities during construction. Therefore, **no adverse effects are expected during construction**. Additionally, the embedded mitigation measures used during construction would also apply during decommissioning. Therefore, **no adverse effects are predicted during decommissioning**.
- 6.10.30 It is expected that the other developments included within the cumulative developments shortlist would also have no effect on telecommunications and television reception and would adhere to the same mitigation as set out in **PEIR Volume I Chapter 14: Other Environmental Topics** to reduce the risk of damaging utilities. Therefore, no cumulative effects are expected on telecommunications, television reception, or utilities.

Electric and Electromagnetic Fields

- 6.10.31 This section summarises the effects of the Scheme on Electric and Electromagnetic Fields.
- 6.10.32 With the exception of relatively short lengths of On-Site Cables and the Grid Connection Line Drop option, all cables would be buried underground. Underground cables eliminate the electric field altogether as it is screened out by the sheath around the cable, and therefore the assessment only considers electro-magnetic fields.
- 6.10.33 There are two options for connection to the National Grid currently under consideration that may involve above-ground infrastructure with the potential to have EMF effects. Subject to further discussion with National Grid, and to further assessment and consultation, these options and the respective connection routes will be refined. However, for the purpose of this preliminary assessment and as detailed in **PEIR Volume I Chapter 2: The Scheme**, the options being considered are:

- a. 400 kV Grid Connection Line Drop to connect the On-Site Substation to the existing overhead power lines within the Site; or
- b. The installation of 400 kV and associated cables in the Grid Connection Corridor, connecting the On-Site Substation to the Existing National Grid Thorpe Marsh Substation.

6.10.34 In accordance with relevant regulations and policies, the following effects have been scoped out of the assessment:

- a. Construction and decommissioning impacts;
- b. Impacts to workers;
- c. Impacts to agriculture and natural ecosystems; and
- d. Impacts on aviation receptors.

6.10.35 The ICNIRP ‘reference levels’ for the public are 100 microteslas for magnetic fields and 5,000 volts per metre for electric fields. These are the levels above which more investigation is needed if this level of exposure is likely to occur; the permitted levels of exposure are somewhat higher, 360 microteslas and 9,000 volts per metre. They apply where the time of exposure is significant, for instance in a residence. As a worst-case the lower ‘reference level’ of 100 microteslas and 5,000 volts per metre is used in the assessment as the threshold at which potentially significant effects could occur.

6.10.36 Table 1 provides a comparison of typical UK field levels experienced from overhead powerlines that are comparable to the above ground cables between the potential Grid Connection Line Drop Compound and the existing overhead line tower.

Table 1 Typical Ground-level UK Field Levels from Overhead Powerlines

Infrastructure	Distance	Magnetic Field (microteslas)	Electric Field (volts per metre)
The largest steel pylons (275 kV and 400 kV)	0 m (under line, maximum field)	100	11,000
	0 m (under line, typical field)	5 – 10	3,000 – 5,000
	Displaced 25 m to side (typical field)	1 – 2	200 – 500
	Displaced 100 m to side (typical field)	0.05 – 0.1	10 – 40

6.10.37 As illustrated in Table 1, the potential maximum EMFs produced by the Grid Connection Line Drop would be less than the relevant public exposure limits. There are no residential properties within the Site, with the nearest properties more than 10 m away. Therefore, **no significant effects** to residential receptors are predicted to occur. Thus, the proposed overhead lines would meet the relevant exposure limits, the ICNIRP general public guidelines.

- 6.10.38 Public access will be limited within 30 m of the Grid Connection Line Drop should this be the option that is selected for the final design. Some PRoW do cross over the Grid Connection Corridor and may also pass over the On-Site Cables and Grid Connection Line Drop where they are routed within the Site. It is considered that the level of exposure to transient users of PRoW would be similar to that associated with general household appliances (and noticeably less, for example, than that associated with the exposure when using a vacuum cleaner). Therefore, **no significant effects** to users of PRoW are predicted to occur.
- 6.10.39 Therefore **no significant effects** are anticipated from the Scheme on receptors arising from EMFs.
- 6.10.40 It is expected that the EMF associated with other developments included within the cumulative developments shortlist would also have no significant effect on receptors and would adhere to the same relevant Government policy as set out in **PEIR Volume I Chapter 14: Other Environmental Topics** to ensure all EMF is below the relevant exposure limits. Therefore, no cumulative effects are expected due to EMFs.

Materials and Waste

- 6.10.41 Construction materials required to construct, operate and decommission the Scheme are unlikely to be required in large quantities and are anticipated to be small in the context of regional and national construction material availability. Therefore, **no significant effects are anticipated**.
- 6.10.42 All management of waste will be in accordance with the relevant regulations and would aim to prioritise waste prevention, followed by preparing for reuse, recycling, recovery and as a last resort, disposal to landfill as per the waste hierarchy. Waste will be transported by licensed waste carriers to waste management sites which hold the necessary regulatory authorisation and/or permits for those wastes consigned to them.
- 6.10.43 Construction wastes include surplus spoil, scrap, recovered spills, unwanted surplus materials, packaging, site office waste, and broken, worn-out, contaminated or otherwise spoiled plant, equipment, and materials. The overall quantities of construction waste generated by the Scheme are anticipated to be small in the context of regional inert and non-hazardous landfill capacity and national hazardous landfill capacity.
- 6.10.44 During construction, solar panels, inverters, transformers and other supporting equipment will be manufactured off-site to the specified sizes, and wastage during installation is expected to be minimal. Large-scale earthworks are not expected.
- 6.10.45 The construction of the Scheme will be subject to measures and procedures defined within a detailed CEMP. The CEMP will include the implementation of industry standard practice and control measures for environmental impacts arising during construction, such as the control of dust and the approach to materials and waste management on site. A Framework CEMP is presented at **PEIR Volume III Appendix 2-1: Framework Construction Environmental Management Plan** and a Framework Site Waste Management Plan (SWMP) will be included alongside the ES.
- 6.10.46 It is concluded that **no significant effects** are expected during construction.

- 6.10.47 A Framework OEMP will be prepared and accompany the DCO Application – this will set out the general principles to be followed during Scheme operation. A detailed OEMP based on the Framework OEMP will be prepared and agreed with the relevant authorities at that time of Scheme operation, in advance of the commencement of operations. This will be secured through a DCO Requirement.
- 6.10.48 Waste arising from the day-to-day operation of the Scheme would include welfare facility waste and general waste (e.g. paper, cardboard, wood). It is expected that throughout operation there would be ad hoc replacement of any components that fail or reach the end of their lifespan. It is likely that the Solar PV Panel waste generated by the Scheme during operation and maintenance and decommissioning would be managed by specialist regional or national recycling facilities, and that such facilities would be developed over the operation and maintenance phase in response to demand generated by the UK-wide solar panel industry. The quantity of waste disposed of to landfill is unlikely to be significant in the context of regional landfill capacity. Therefore, **no significant effects** are expected during the operation of the Scheme.
- 6.10.49 At the end of the Scheme's 40 year design life, it will be decommissioned. It is not possible to identify at this stage either the waste management routes or specific facilities that would be used, as these are liable to change over such a timescale.
- 6.10.50 Since waste solar panels are unlikely to be disposed of to landfill no cumulative materials and waste impacts have been identified for the Scheme.

6.11 Cumulative Effects and Interactions

- 6.11.1 Cumulative effects have the potential to occur where two (or more) proposed schemes are within close enough proximity for them to both have environmental effects on the same receptor.
- 6.11.2 The assessment of cumulative effects arising from the Scheme in combination with other proposed schemes is based upon a review of current submitted planning and DCO applications as well as a study of planning policy documents.
- 6.11.3 To date, a list of proposed schemes that overlap the Site Boundary or are located close enough to the Scheme that they have the potential to generate significant cumulative effects have been identified. The list of proposed schemes has been shared with City of Doncaster Council, North Yorkshire Council and East Riding of Yorkshire Council for comment.
- 6.11.4 An assessment of the cumulative effects of the Scheme along with these other developments is presented in each technical chapter (**PEIR Volume I Chapter 6 to 14**). Within the majority of technical chapters, no likely significant effects have been identified through the cumulative effects assessment where they were not already predicted for the Scheme in isolation. Nor are any significant effects associated with the Scheme made greater (e.g. Moderate to Major) when considering these other developments alongside the Scheme. Therefore, it is considered that there will not be any

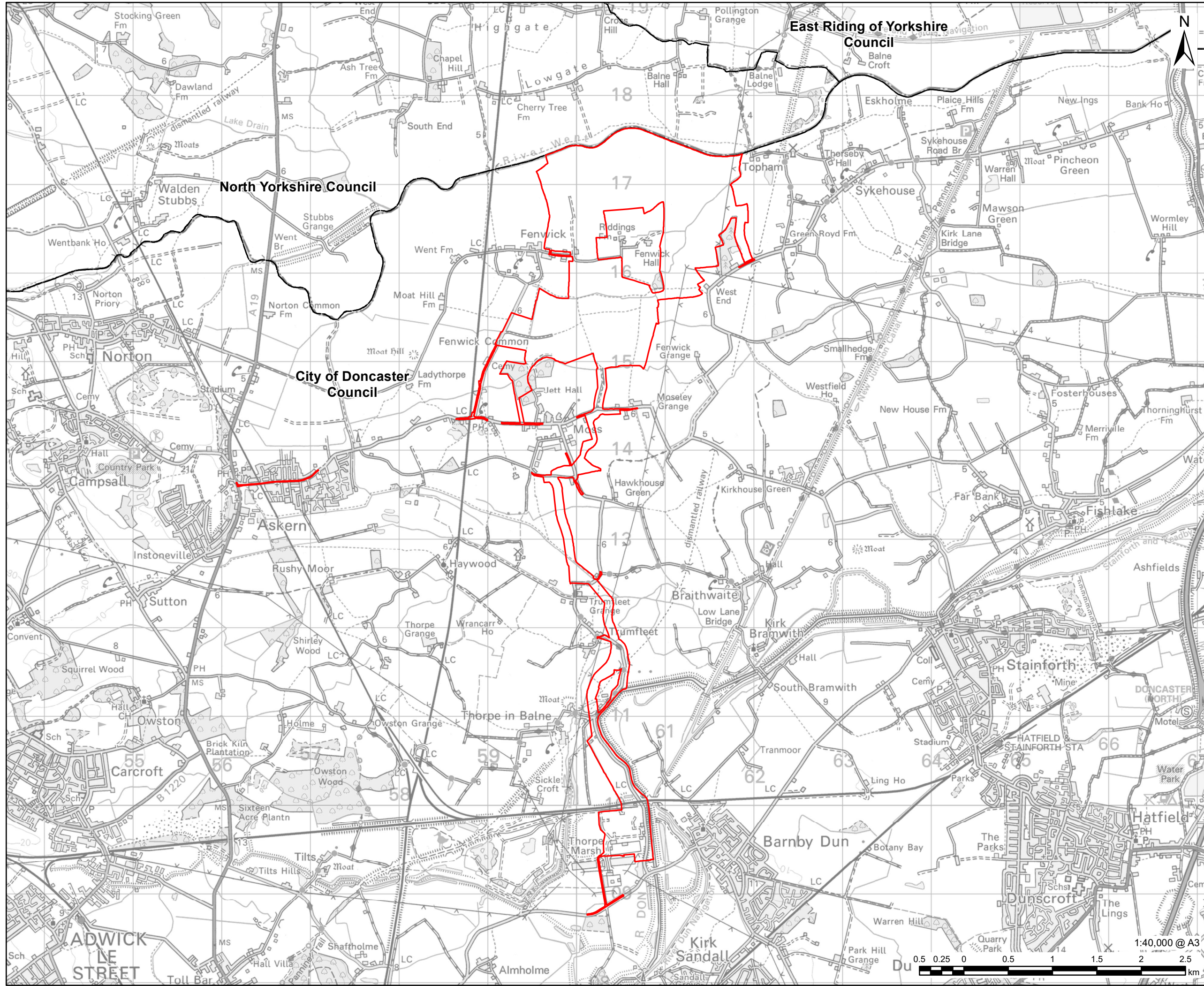
new likely significant effects associated with cumulative effects that are not already accounted for by the assessment of the Scheme.

- 6.11.5 Effect interactions are the combined effect of individual impacts from the Scheme that are considered likely to result in a new or different likely significant effect, or an effect of greater significance, than any one of the impacts on their own. The assessment draws on the assessment of impacts provided in **PEIR Volume I Chapters 6 to 14**.
- 6.11.6 Table 15-2 and Table 15-3 in **PEIR Volume I Chapter 15: Cumulative Effects and Interactions** summarises the potential effect interactions. **No significant effect** interactions are anticipated as a result of the construction, operation and maintenance or decommissioning of the Scheme.

7. Summary and Conclusions

- 7.1.1 The PEIR presents the interim findings of the EIA process that has been undertaken for the Scheme.
- 7.1.2 A number of environmental impact avoidance and mitigation measures have been identified to mitigate and control environmental effects during construction, operation (including maintenance) and decommissioning of the Scheme. It is proposed that these will be secured through appropriate requirements and other controls within the DCO for the Scheme, should this be granted.
- 7.1.3 Feedback from the formal (statutory) consultation process will be taken into account when preparing the DCO Application and in undertaking the EIA process. The PEIR will be revised and further developed to prepare an ES that will accompany the DCO Application. The ES will present the final findings conclusions associated with the EIA process, based on the proposed layout and design.

Figures



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LEGEND
 Site Boundary
 Local Authority Boundary



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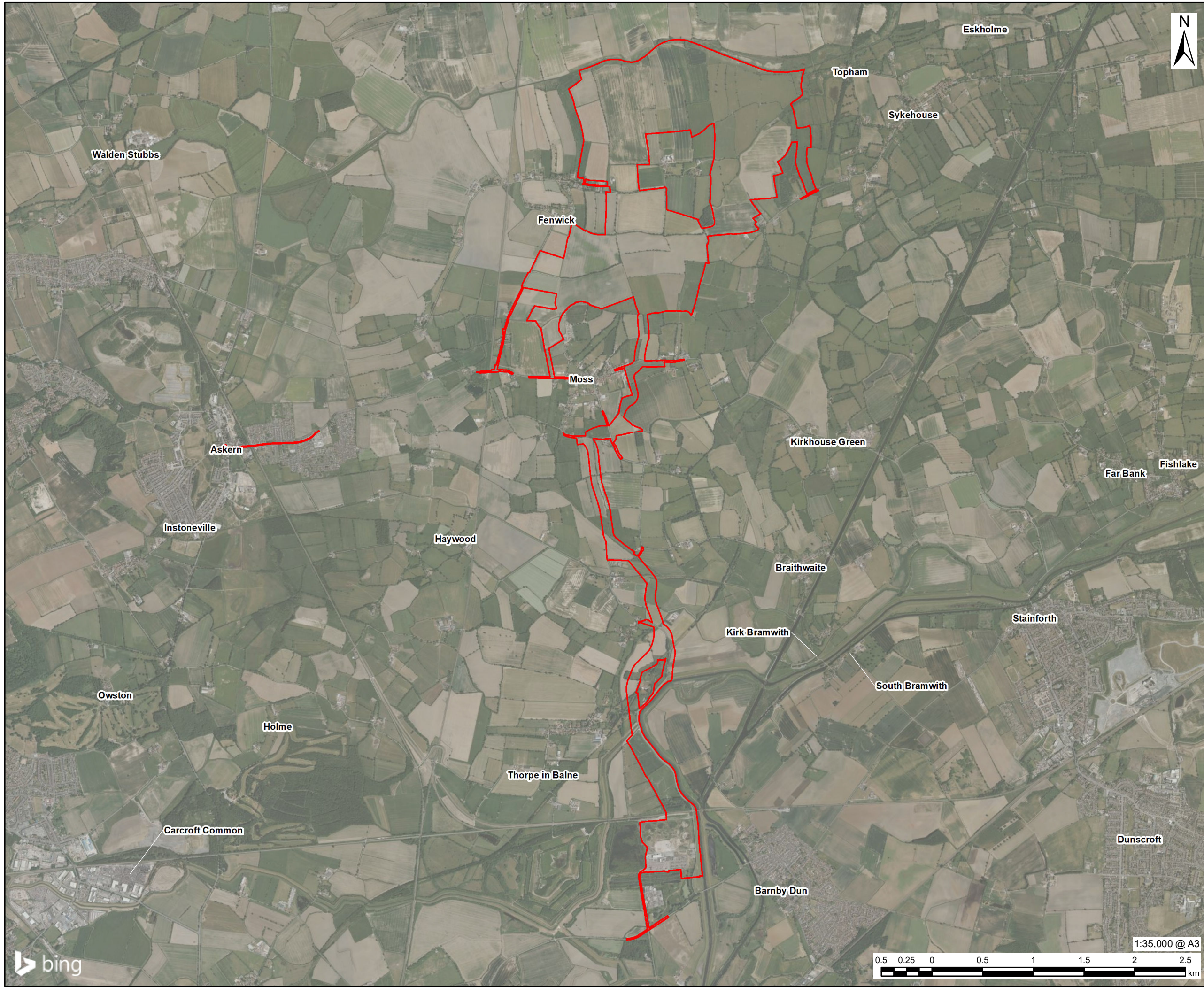
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FIGURE TITLE
Scheme Location

FIGURE NUMBER
Figure 1

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LEGEND
 Site Boundary

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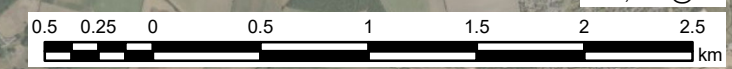
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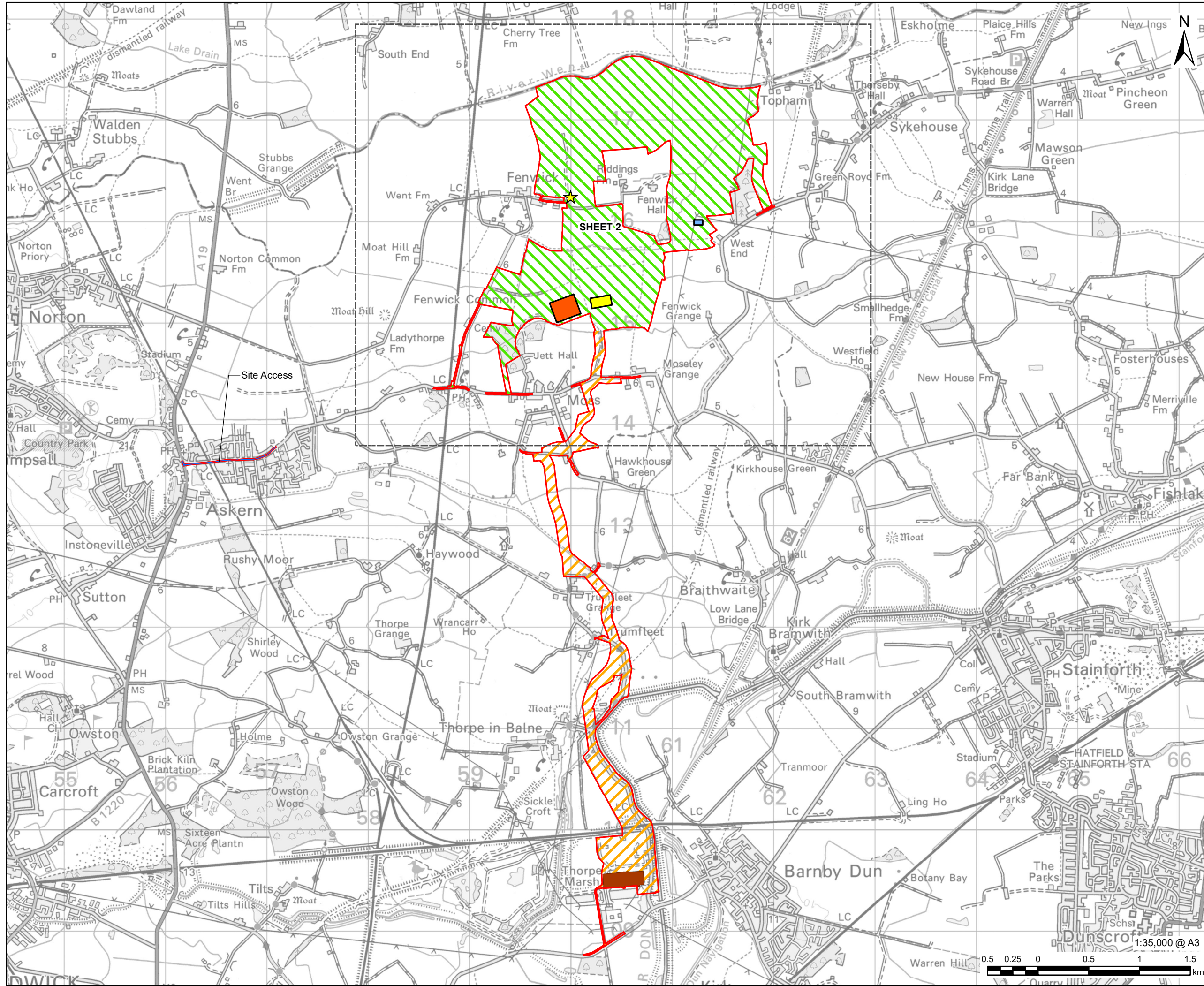
FIGURE TITLE
Site Boundary Plan

FIGURE NUMBER
Figure 2

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- LEGEND**
- Site Boundary
 - ★ Location of Operations and Maintenance Hub
 - BESS Area
 - On-Site Substation
 - Grid Connection Line Drop Compound
 - Solar PV Site
 - Grid Connection Corridor
 - Site Access
 - Existing National Grid Thorpe Marsh Substation

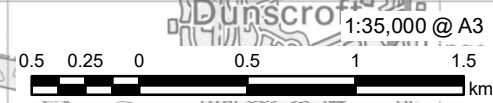
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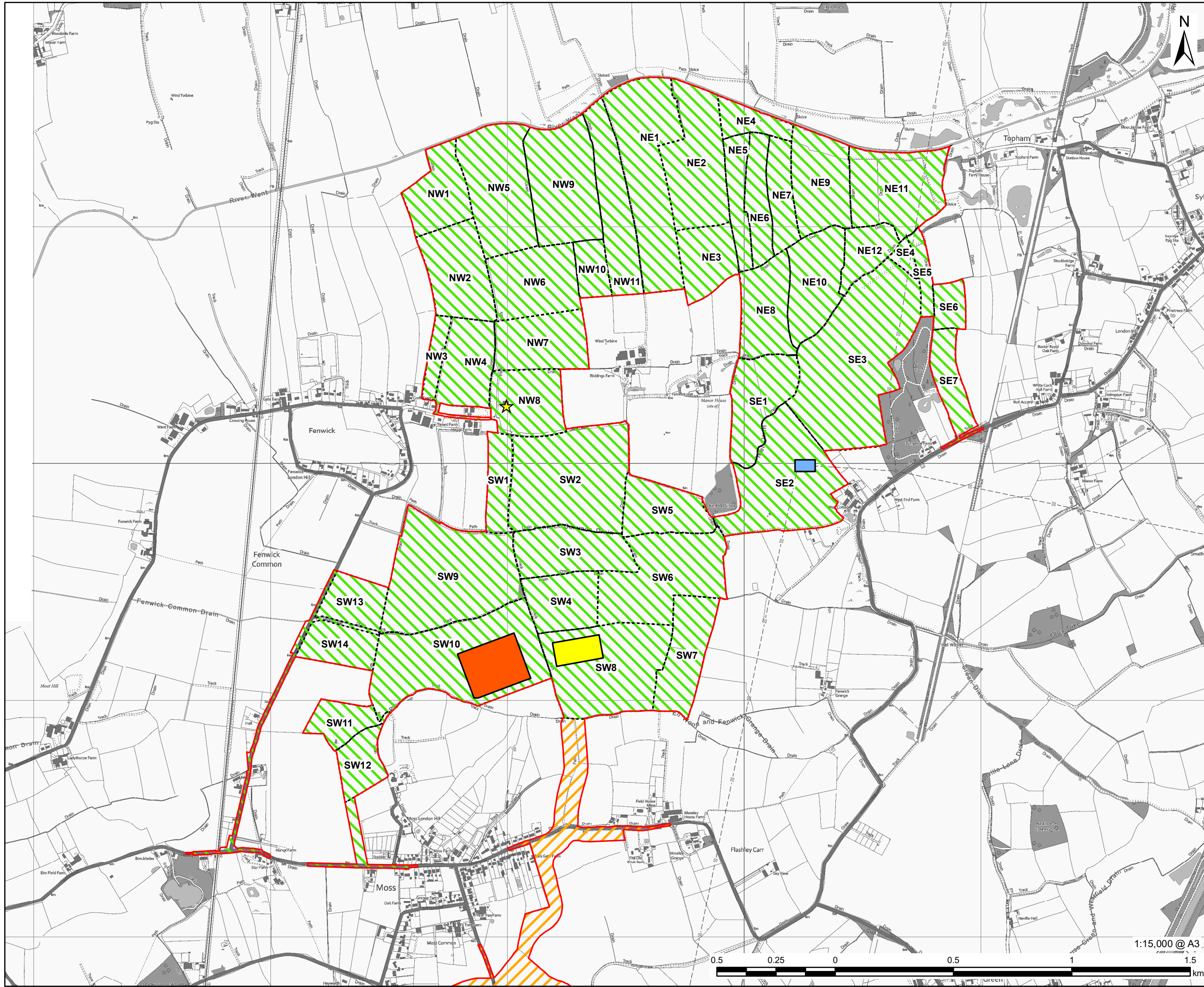
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FIGURE TITLE
Elements of the Site: Site Boundary
Sheet 1 of 2

FIGURE NUMBER
Figure 3



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- LEGEND**
- Site Boundary
 - ★ Location of Operations and Maintenance Hub
 - BESS Area
 - On-Site Substation
 - Grid Connection Line Drop Compound
 - Field Boundary
 - Solar PV Site
 - Grid Connection Corridor

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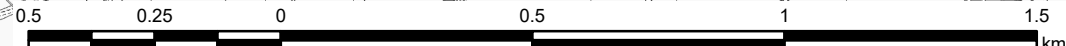
ISSUE PURPOSE
Non-Technical Summary

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FIGURE TITLE
Elements of the Site: Solar PV Site
Sheet 2 of 2

FIGURE NUMBER
Figure 3

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LEGEND

- Site Boundary
- Watercourse
- High Pressure Fuel Pipeline
- Existing Overhead Line (OHL)

Scheme Element

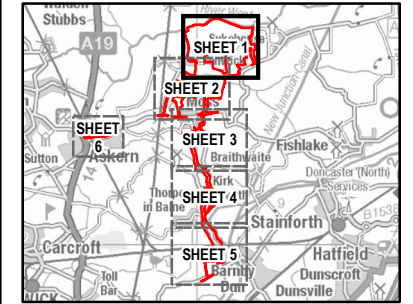
- Perimeter Fencing
- Internal Access Track
- Horizontal Directional Drilling (HDD) Location
- Grid Connection Line Drop
- Existing Hedgerow to be Gapped Up
- ▲ Proposed Access Gate
- ✕ Watercourse Crossing
- ✕ Hedge Removal
- Field Station
- Operations & Maintenance Hub
- Indicative Location of Temporary Construction Compound
- Solar PV Panels (Land Beneath and Surrounding Panels to be Grassed)
- Proposed Screening Area
- Grid Connection Line Drop Compound
- Ecology Mitigation Area
- Heritage Buffer Area

Riddings Farm

Fenwick Hall

Indicative Location of Culvert Removal

Operations and Maintenance Hub Access



ISSUE PURPOSE
Non-Technical Summary

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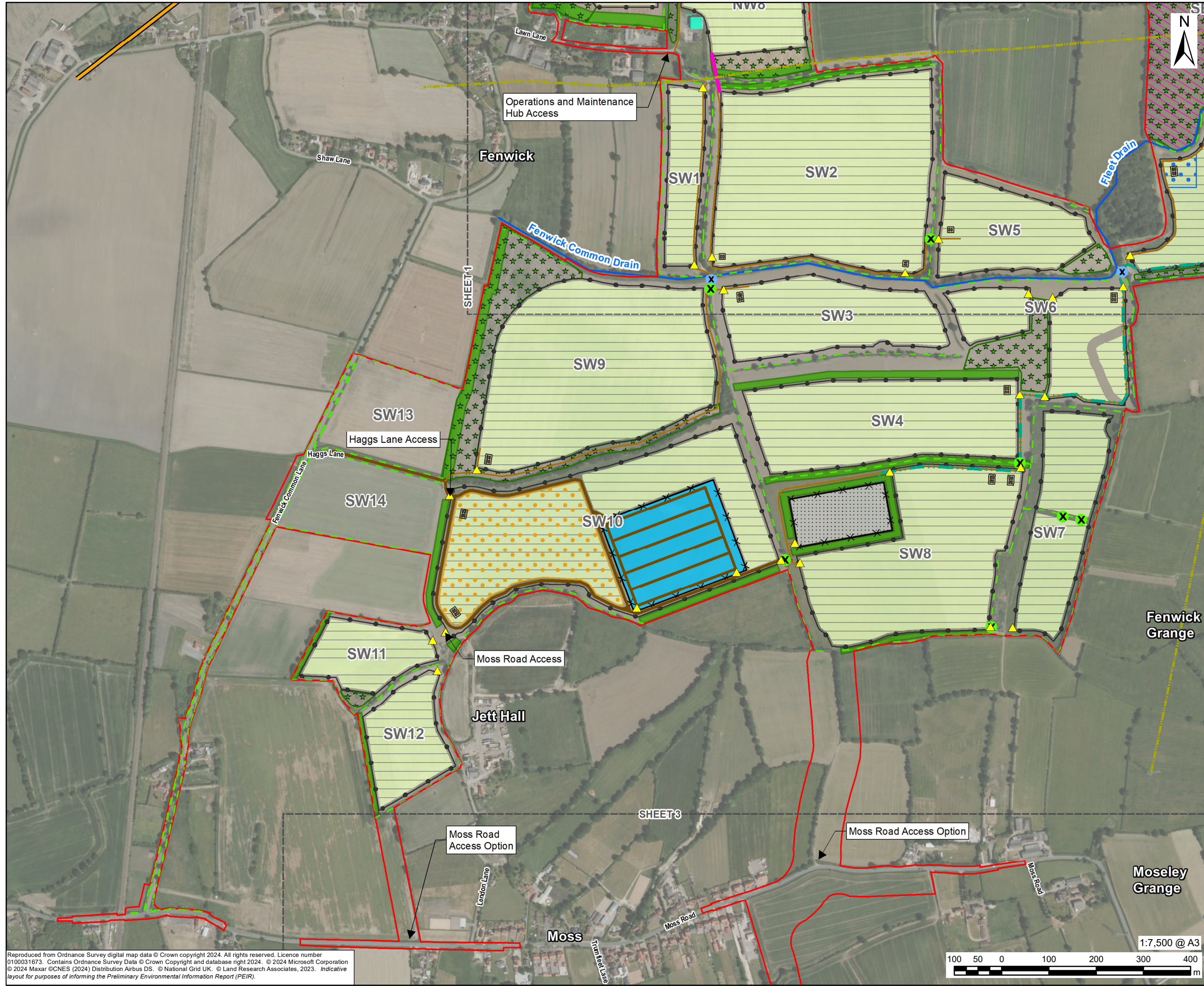
FIGURE TITLE
Indicative Site Layout
Sheet 1 of 6

FIGURE NUMBER
Figure 4

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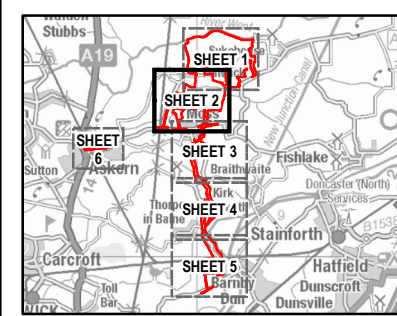


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- LEGEND**
- Site Boundary
 - Watercourse
 - High Pressure Fuel Pipeline
 - Existing Overhead Line (OHL)
 - Scheme Element**
 - Perimeter Fencing
 - Pallisade Fencing
 - Internal Access Track
 - Internal Fire Service Access Track
 - Horizontal Directional Drilling (HDD) Location
 - Grid Connection Line Drop
 - Existing Hedgerow to be Gapped Up
 - ▲ Proposed Access Gate
 - ✕ Watercourse Crossing
 - ✕ Hedge Removal
 - Field Station
 - Operations & Maintenance Hub
 - Main Construction Compound
 - Indicative Location of Temporary Construction Compound
 - BESS Area
 - Grid Connection Substation
 - Solar PV Panels (Land Beneath and Surrounding Panels to be Grassed)
 - Proposed Screening Area
 - Ecology Mitigation Area
 - Heritage Buffer Area



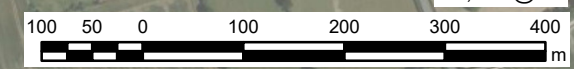
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FIGURE TITLE
Indicative Site Layout
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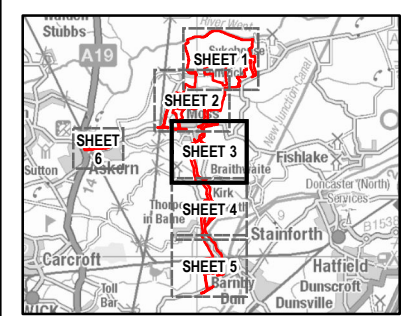
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LEGEND

Scheme Element	
	Site Boundary
	Horizontal Directional Drilling (HDD) Location
	Existing Hedgerow to be Gapped Up
	Indicative Location of Temporary Construction Compound
	Proposed Screening Area



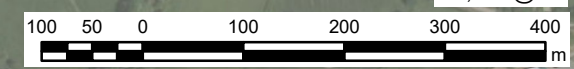
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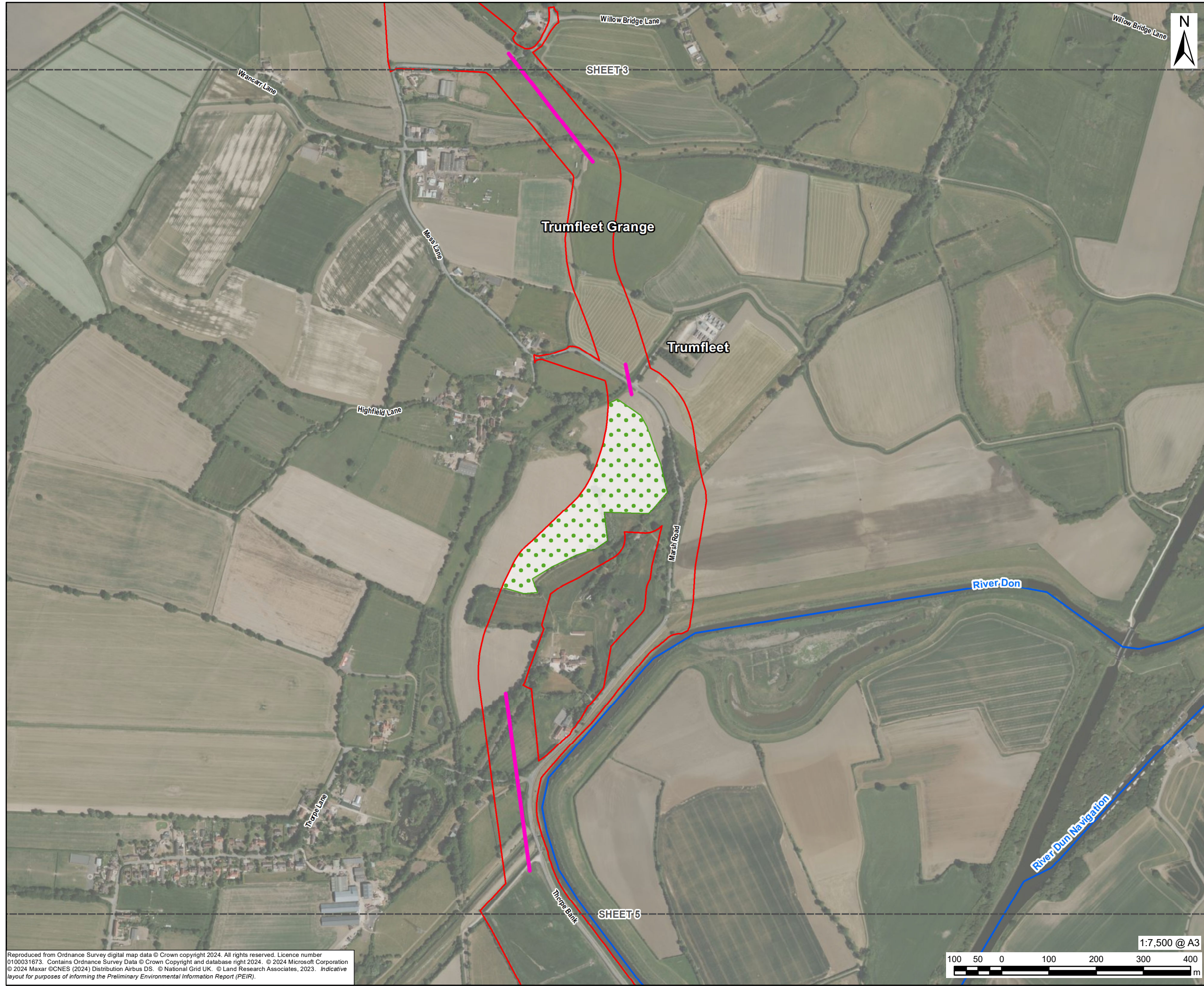
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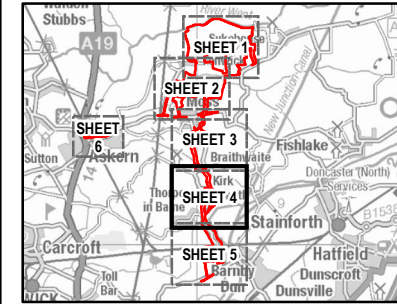
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- LEGEND**
- Site Boundary
 - Watercourse
 - Horizontal Directional Drilling (HDD) Location
 - Indicative Location of Temporary Construction Compound



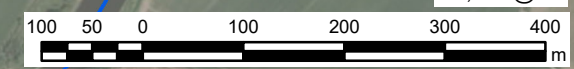
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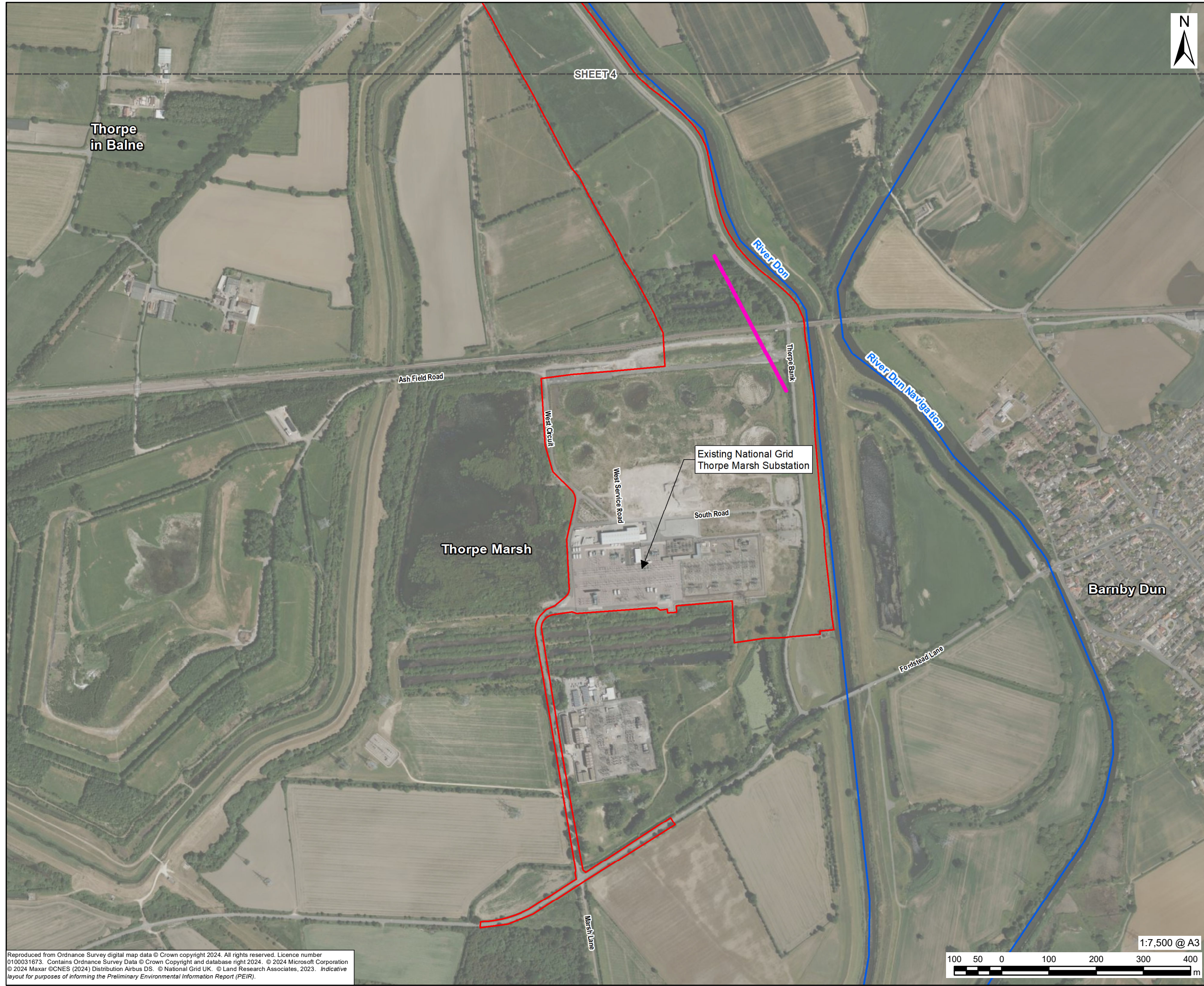
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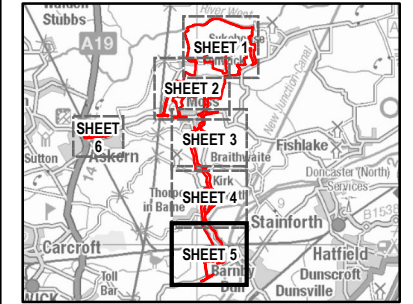
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LEGEND
— Site Boundary
— Watercourse
— Scheme Element
— Horizontal Directional Drilling (HDD) Location



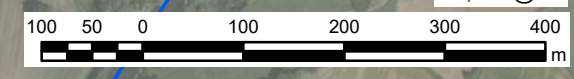
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FIGURE TITLE
Indicative Site Layout
Sheet 5 of 6

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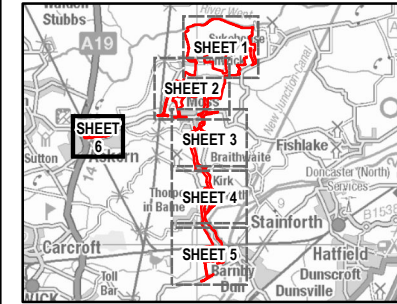
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LEGEND
[Red outline box] Site Boundary



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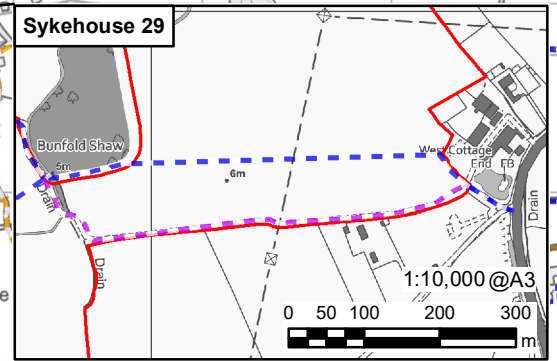
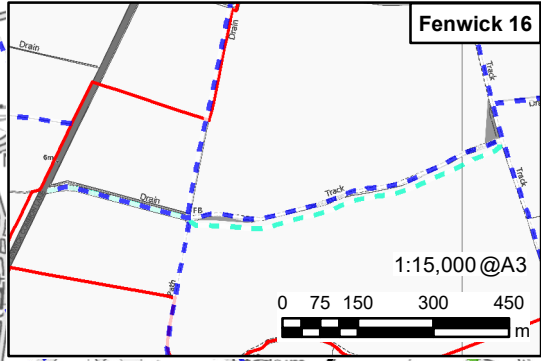
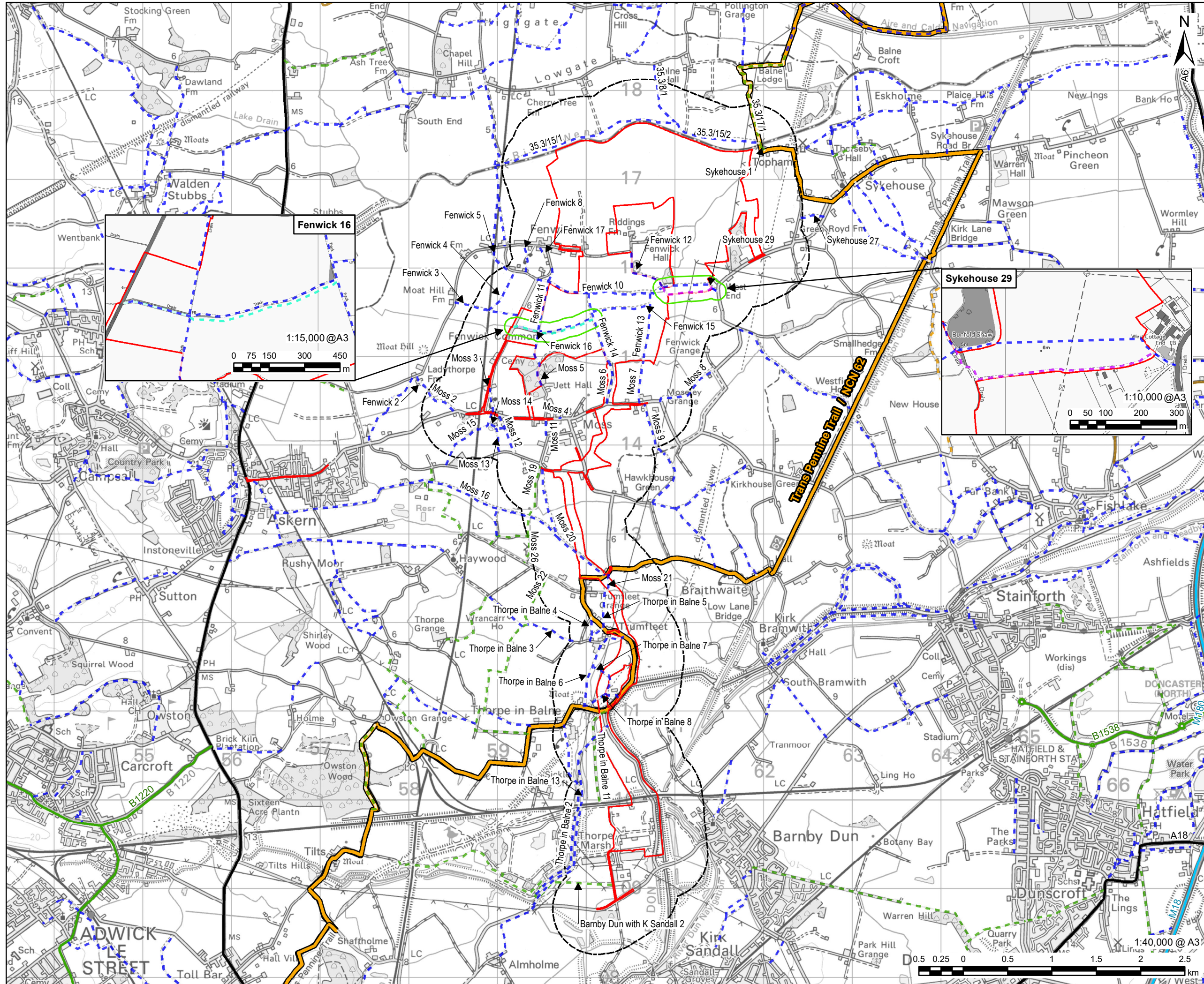
FIGURE TITLE
Indicative Site Layout
Sheet 6 of 6

FIGURE NUMBER
Figure 4

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- LEGEND**
- Site Boundary
 - 500m Buffer of the Site Boundary
 - A Road
 - B Road
 - Motorway
 - Trans Pennine Trail & National Cycle Network (NCN) Route 62
 - Public Right of Way**
 - Bridleway
 - Byway Open to All Traffic (BOAT)
 - Footpath
 - Proposed Permanent Right of Way Diversion
 - Proposed Temporary Right of Way Diversion
 - Restricted Byway
 - Area to be Managed

NOTES

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NCN Route from Sustrans, Licensed under the Open Government License.

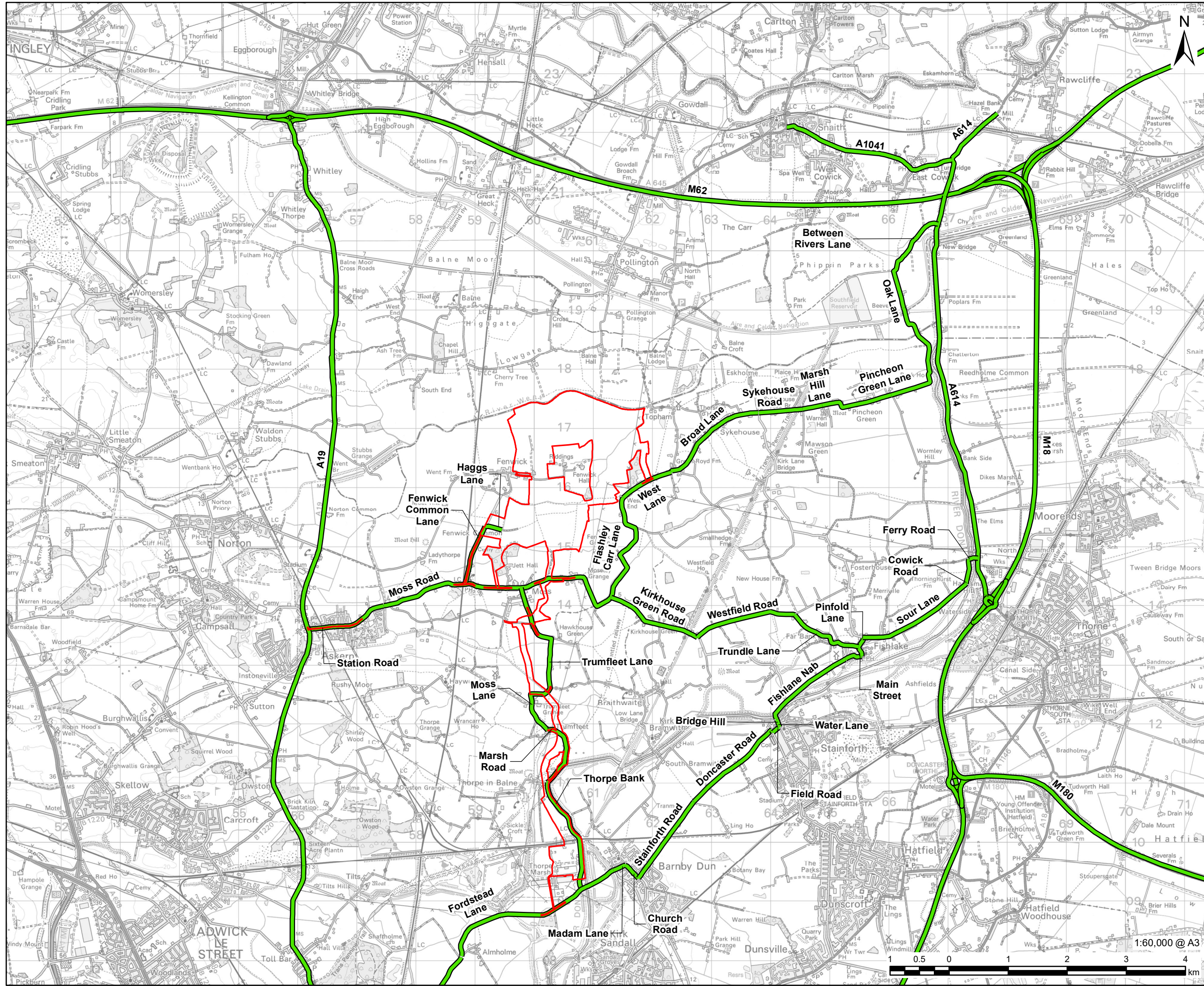
ISSUE PURPOSE
Non-Technical Summary

PROJECT NUMBER
60698207

FIGURE TITLE
Public Rights of Way

FIGURE NUMBER
Figure 5

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PROJECT
Fenwick Solar Farm

CLIENT
Fenwick Solar Project Limited

CONSULTANT
AECOM Limited
Midpoint,
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LEGEND
Site Boundary
Roads to Access Site

NOTES
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ISSUE PURPOSE
Non-Technical Summary

PROJECT NUMBER
60698207

FIGURE TITLE
Roads to Access Site

FIGURE NUMBER
Figure 6

1:60,000 @ A3



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