ES NON-TECHNICAL SUMMARY

Proposed Solar Farm at Caudwell Farms, Holbeach St. Matthew Lincolnshire

NI2709
17 July 2023

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
Final	Planning Application	MP	SF	SF	17.0702023

Approval for issue

Seamus Fay		17 July 2023

Prepared by:

RPS

Seamus Fay
Director - Planning

Elmwood House
74 Boucher Road, Belfast
Co. Antrim BT12 6RZ

T +44 2890 667 914
E seamus.fay@rpsgroup.com

Prepared for:

Green Energy International

Mathew Bayley
Associate Director

Contents

Tables

Figures

1 INTRODUCTION

1.1 Preamble

This Non-Technical Summary (NTS) forms part of the Environmental Statement (ES) provided in support of a planning application submitted by Green Energy International Ltd. (hereafter referred to as 'GEI/the Applicant') to South Holland District Council in respect of the Applicants' proposal for a new solar farm located at Caudwell Farms, Holbeach St. Matthew in Lincolnshire.

The purpose of the NTS is to provide a summary, in non-technical terms, of the findings of the Environmental Impact Assessment process for the construction, operation and de-commissioning of a proposed ground mounted solar photovoltaic energy generation, battery energy storage and cable connection to the grid together with all associated ancillary development.

1.2 Legislative Context & Need for EIA

The Applicants sought a formal screening opinion from South Holland District Council ('the Council') under regulation 6 of The Town and Country Planning (Environmental Impact Assessment) Regulations 2017, (EIA Regulations) on 11th January 2021 ES, (Appendix 1.1).

The Council undertook an EIA screening exercise on 30th April 2021 (ES, Volume 2, Appendix 1.2) which confirmed that the development proposed is Environmental Impact Assessment development and will require an Environmental Statement to be submitted.

1.3 Consultations & Scoping of the EIA Process

The Applicants undertook pre-application consultations with South Holland District Council which informed the scope of the information that should be contained in the ES.

The Council EIA screening matrix (ES, Volume 3, Appendix 1.2) confirmed the following key points:

- **Agricultural Land:** Higher grade agricultural land involved but there is the potential for grazing sheep, thereby allowing some agricultural activity to continue. Reversible after decommissioning and arguably more fertile. In that context the Applicant have commissioned an assessment of Agricultural Considerations which is included as an appendix to Chapter 10, Other Environmental Considerations.
- **Waste:** Waste production during construction phase would be limited as most components arrive at site ready-made/pre-assembled. The matter is addressed under Other Environmental Considerations in Chapter 10 of this ES.
- **Population & Human Health:** The Council has confirmed that there is no likely significant impact on population and human health. In that context this matter has been scoped out of the EIA process.
- **Water Resources:** The Council has confirmed that the Proposed Development is not likely to have a significant impact due to the nature of the development proposed and limited output/run-off. The assessment in that context is therefore focused on flood risk and drainage issues (Chapter 6).
- **Landscape & Visual:** The Council has confirmed that there are no areas or features on or around the location which are protected for their landscape and scenic value, and/or any non-designated / non-classified areas or features of high landscape or scenic value on or around the location that could be affected by the Proposed Development. There are very small number of properties with 1kms of the site and a Public Right of Way runs through the site, half of which is already screened by hedgerow which could be continued along the remainder of its length within the site. In that context the ES contains a chapter on the Landscape & Visual impact Assessment including the assessment and mitigation proposed.
- **Cultural Heritage:** The Council confirmed that, although it is unlikely that there is any below ground archaeology in or around the site, Hartley House Farm is a historic farmstead and can be considered a non-designated heritage asset. In that context an assessment of the potential impact on the cultural heritage resource, including Hartley House has been included as an appendix to Chapter 10, Other Environmental Considerations.
- **Traffic & Transport:** The Council has confirmed that there are no transport routes on or around the location which are susceptible to congestion, or which cause environmental problems, which could be affected by the project. In this case the Applicants have instructed an assessment of traffic & transport

impacts (Chapter 4) primarily focused on the construction phase of the development and a Construction Traffic Management Pan is provided as an appendix to Chapter 2, Project Description.

- **Land Use:** The Council confirmed that any disturbance during construction and decommissioning phases could be mitigated by a Construction Management Plan which could be secured via condition. Disturbance during operation phase is considered likely to be minimal. In terms of visual impact, the majority of properties are either screened by on-plot planting or there is intervening screening that would minimise views of the proposed development. A Construction Environmental Management Plan (CEMP) will be provided prior to commencement of construction.
- **Ecology & Ornithology:** Detailed comments have been provided by RSPB and Natural England and these have informed the preparation of Chapter 8 and associated technical reports.
- **Cumulative Impacts:** While the Council had confirmed that the there are no existing or planned developments in the locality that, together with the proposed development, would result in a significant adverse cumulative impact during the construction/operation phase when taking into account the nature of the development proposed, the Applicants have identified a number of projects in the locality, either approved or in the planning system and have included assessment of potential cumulative impacts in each relevant chapter of this ES. The other developments considered are:
    - Decoy Park solar farm, Crowland, Spalding.
    - Proposed solar farm at Gunthorpe Road Solar Farm Land South of Gunthorpe Road Walpole Marsh
    - Proposed photovoltaic solar array, grid connection, access improvement works, and ancillary development on land west of Cowbridge Road, Bicker Fen, Boston, and South Holland
    - Proposed solar farm is at Land North of Roman Bank and East of Middle Marsh Road at Red House Farm, Holbeach Bank, Spalding

1.4 Structure of the Environmental Statement

This ES comprises technical studies on each of the aspects of the environment identified as likely to be significantly affected by the Proposed Development, which are supported with figures and technical appendices where appropriate.

The exception to this structure is Chapter 10: Other Environmental Considerations which presents assessments relating to topics where no individual chapter was warranted, either due to the brevity of the assessment or the small impact associated with the Proposed Development as confirmed in the ES screening exercise undertaken with the Council.

Each chapter also presents the potential cumulative effects resulting from other present, or reasonably foreseeable projects together (i.e. cumulatively) with the Proposed Development.

The aim of Environmental Impact Assessment is to ensure that the decision-making authority and the relevant consultation bodies, when deciding whether to grant planning permission for the Proposed Development, does so in the full knowledge of the likely significant effects on the environment and takes this environmental information into account in the determination of the application.

The Environmental Statement follows the broad structure set out below:

- Volume 1: Environmental Statement Main Text
- Volume 2: Appendices containing Technical Reports relevant to each chapter
- Volume 3: Figures and Drawings which form part of the ES and the planning application
- Non-Technical Summary which provides a summary in non-technical terms, of the outcome of the environmental assessment process and the measures proposed to mitigate or to avoid adverse effects of the Proposed Development.

Each of the chapters (4-9) that provide structured assessments of specific environmental effects follows the following broad approach:

- **Introduction:** setting out the scope of assessment and the competency of the author to undertake EIA.
- **Methodology:** providing a summary in non-technical terms of the methodology of assessment, making reference to relevant legislative context and guidance followed, identifying the study area.
- **Baseline:** provides a list of baseline studies and surveys undertaken and a summary of the existing environmental for the purpose of the assessment.

- **Assessment Criteria and Assignment of Significance:** each chapter provides **an explanation of the** approach taken to identifying the magnitude of an impact and the sensitivity/value of receptor in respect of classification of low, medium and high to describe sensitivity and magnitude (except where topic methodologies dictate otherwise.
- **Significance of the Effects:** the significance of potential effects are presented in respect of the consideration of the magnitude of the effect against the sensitivity of the consideration.
- **Impact Assessment:** each chapter considers the potential impact of the construction, operation, cumulative effects prior to mitigation and then in respect of any residual effects following mitigation.
- **Summary of Likely Environmental Effects:** key points emerging from the assessment.

Each chapter also identifies where relevant if there were any difficulties in completing the assessment, including technical deficiencies or limitations in available data.

1.5 Statement of Authority

In line with Regulation 18(5) of the EIA Regulations, the ES and all technical assessments have been undertaken by suitably qualified 'competent experts'. The consultants who have contributed to the preparation of this ES are set out in Table 1.1 below.

Each relevant chapter of the ES includes a statement on the competence of the author to carry out and report on that assessment.

Role	Name (Company)
Applicant	Green Energy International (GEI)
Project Manager	GEI
EIA Review	RPS
Introduction	GEI/RPS
Project Description	GEI/RPS
Assessment of Alternatives	GEI/RPS
Traffic and Transport	ADL Traffic & Highways
Noise Impact	ITP Energised
Flood Risk and Drainage	Weetwood
Glint and Glare	Pager Power
Biodiversity (Including Ecology and Ornithology)	Atmos Consulting
Landscape and Visual Impact Assessment	HELPA
Other Environmental Effects - **Heritage and Archaeology Assessment** - **Soils and Land Quality**	GEI/RPS Richard Conolly (RPS) Kernon Consultants
Interactions	GEI/RPS

Table 1-1 EIA Team & Responsibilities

1.6 Planning Drawings

The planning application will be supported a drawing pack comprising the following maps & plans:

- GEI-IH-2023-D4: Site Location Plan
- GEI-IH-CDW-LP: Redline Boundary Plan
- GEI-IH-CDW-LP: Layout Plan
- GEI-IH-CDW-LP: Landscape Plan
- Panel Array Details
- CCTY Details
- Security Fence & Gateway Details
- Access Tracks - Hard Standing
- Storage Container

- Battery Storage Compound
- Customer Substation Switch Room
- Customer Control Room
- DNO Substation Details
- Grid Connection Cable Route
- Inverter Transformer Details
- Development Zones

1.7 The Applicant

The ES and planning application have been prepared by Green Energy International Limited alongside specialist reports provided by third-party consultants.

Green Energy International (GEI) was first incorporated in 2009, rebranding to 'International' in 2016. The core management team have over 40 years of combined industry experience and to date, GEI has added more than 200MW of renewable energy into the grid with a carbon save in excess of 160,000 tonnes per annum and plans to develop a further 3GW over the next two years, aiding the security of energy supply to the UK during the transition from fossil fuels to a cleaner, more sustainable source.

2 PROJECT DESCRIPTION

2.1 Introduction

For the purposes of the planning application, the full description of the Proposed Development is as follows:

"Erection of a 49.9MW Ground Mounted Solar Array with Associated Underground Cable Route, Substation with POC Mast, Battery Storage and Ancillary Equipment & Structures at Caudwell Farm."

In line with the requirements of the EIA Regulations, the assessment of the effects of the project have been assessed throughout the ES based on what is likely on the basis of this project description, taking account of the site location and the environmental sensitivities of the location. Measures which would reduce or avoid adverse environmental effects arising have been embedded and are integral to the project design.

2.2 Project Summary

It is proposed to install a solar photovoltaic (PV) farm with a maximum export capacity of 49.9MW on an area of agricultural land covering approximately 114 hectares.

The components of the Proposed Development and all related ancillary development and equipment are set out in the bullet points below and described in greater detail in Chapter 2, Project Description.

- Installation of PV Panels, divided into two separate formats with those to the west of the site consisting of tracking solar arrays and those to the east of the site being fixed, south facing solar arrays.
- A containerised Battery Storage Facility.
- Inverter/Transformer (SPS) Stations to be located across the site.
- One point of connection (POS) mast up to 35m in height.
- Distribution Network Operator (DNO) Substation, access and cable route to connect into the 132kV power line.
- Buried underground cable between the site and the DNO Substation.
- On-site substation/ Switchgear and Meter Kiosk.
- Strategically placed CCTV cameras for security purposes.
- Perimeter security fencing.
- Internal service tracks constructed of permeable stone material.
- Temporary construction access & compounds of permeable stone material providing for plant/material storage and Staff Welfare Facilities.
- Embedded/integrated habitat enhancement measures proposed offsetting any impact on habitat and producing a biodiversity net gain.
- It is estimated that the solar panels would generate up to 49.9 MW peak, enough to power approximately 16,581 homes. The Proposed Development benefits from an agreed point of connection ('POC') to a proposed Distribution Network Operator ('DNO') electricity substation located to the south of the site, approximately 1.3km away at National Grid Reference: TF 38437 2896.

Solar Panels, Mounting System & Arrays

The proposed solar farm will use bifacial solar panels on both the fixed and tracking solar arrays (Figure 1). Bifacial solar panels are an innovative technology that enables the generation of electricity from both sides of the module, harnessing sunlight reflected off the ground in addition to direct sunlight.

For the proposed solar farm, 600W panels are anticipated to be utilized and the development will comprise circa 91,000 panels in total.

The front edge to panels is set at over 70cm above ground and will allow mowing equipment and/or sheep to access the grass beneath the leading edge of the solar panels and prevent shading from taller flowers or grasses.

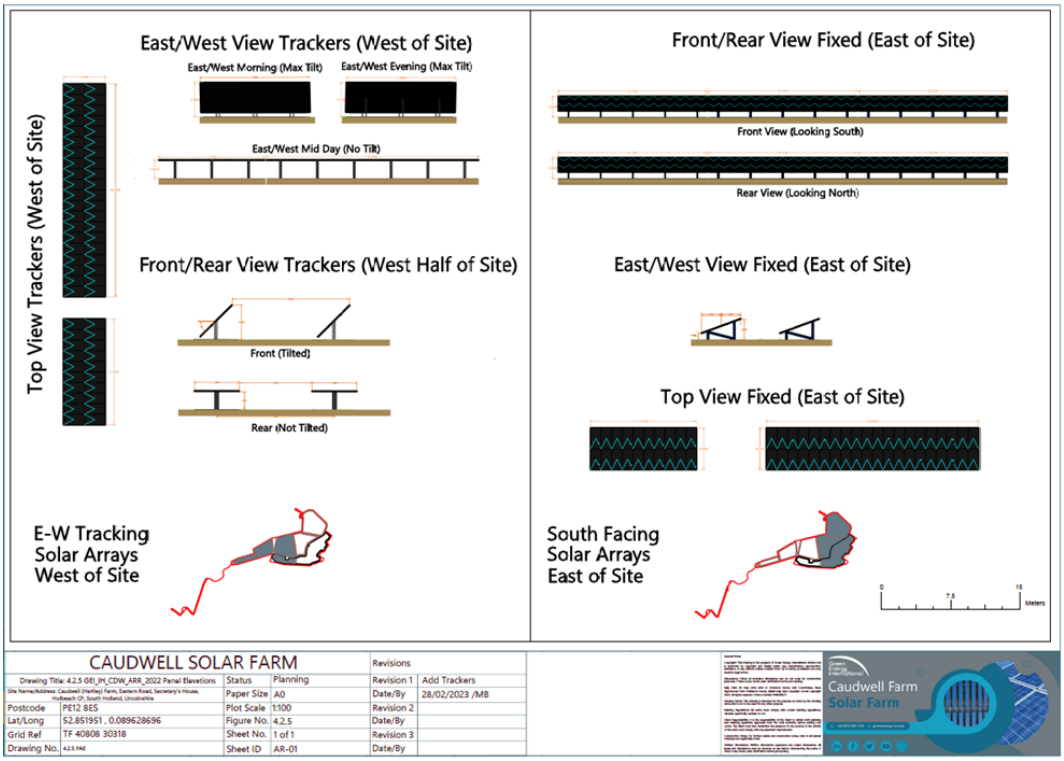

Figure 1 - Solar Arrays

Panels will be placed in arrays atop frame tables which are supported on posts screwed or pile driven into the ground.

The overall photovoltaic (PV) panel heights to be considered are between 0.7m at their lowest point and 3.7m at their highest point as the maximum extent of the development.

Figure 2 - Typical solar array with bi-facial solar panels

The metal framework that houses the modules will be supported at intervals by either single or double mounted posts approximately 5 m apart, depending on the orientation/configuration of the panels. The posts will be driven into the ground at an approximate depth of 1.5-2.5m. The solar panels will be constructed of non-reflective glass. Each solar panel would be connected to an inverter via a cable buried to a depth of approximately 0.8m.

Figure 3 - Typical Solar Arrays

Inverter/Transformer Substations

Inverter stations are required to convert Direct Current (DC) electricity generated by the panels into Alternating Current (AC) electricity which is compatible with transfer to the local electricity grid. The inverters would be contained within shipping containers or similar cabin type structures, each unit would measure around 2.9 m high, 12.2 m long and 2.5 m wide.

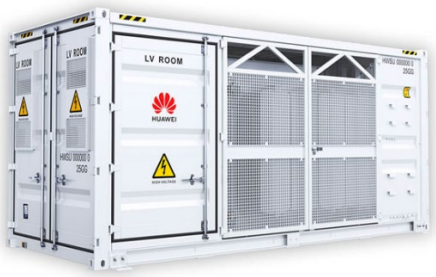

Figure 4 - Typical Inverter Unit

Substation

The proposed development will include two substations, one for the DNO (District Network Operator) located near to the point of connection (POC) and another switch room located on the Site. The substation compound for the DNO grid connection would measure up to 50m by 25m.

The DNO control building would measure approximately 6m long, 8m wide and 4.1m high.

The substation, inverters and solar panels would be connected by underground electrical cables (buried approximately 1 - 1.5 m below ground level).

Figure 5 - Typical Switch Room & Substation in Containerised format

The proposed Site compound includes the utilization of repurposed shipping containers to enhance functionality and efficiency. Painted green to blend in with the surrounding environment, these containers serve as practical storage solutions for spare parts and equipment necessary for ongoing maintenance operations. Additionally, a second shipping container will be allocated for staff welfare facilities, offering a comfortable and dedicated space for rest and recuperation during maintenance work.

Battery Storage

Battery storage is a critical role in the solar energy project by storing excess energy generated during the day and releasing it during peak demand periods or lower power output periods which helps to stabilize the power output and make it nearly continuous, addressing the intermittency issues associated with solar energy generation. The proposed facility has been designed to reduce visual impacts by reducing the number of storage containers while still retaining its load-shifting potential.

The battery storage containers are likely to be 6m long and 2.4m wide/high (like a average shipping container). The overall compound contained around 48 battery containers and 8 STS units, covering an area of 6,500m² and will be surrounded by 2m high security fencing will planting to ensure that any visual impact is minimised.

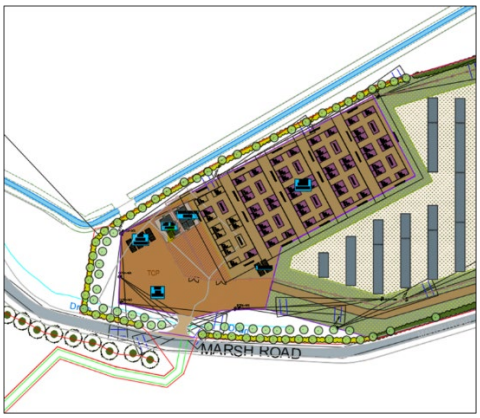

Figure 6 - Battery Storage Compound Location

Figure 7 - Typical Battery Storage Containers

Grid Connection & Cable Route

The proposal includes a buried cable connection between the solar farm and the substation, covering a distance of 1.91km. Cables are to be buried, and the trenches are created by removing topsoil and subsoil into separate piles, then, following installation of the cables, reinstating the land back to its original profile.

The intention for the Proposed Development is to connect to the 132Kv power line which runs north-south through fields to the south of the Site. All cabling required for the Proposed Development and cable route would be installed in buried trenches. To connect the site to the DNO substation, the cabling will be required to cross Marsh Road which will be delivered through either open-cut and fill or Horizontal Directional Drilling (HDD).

The cabling would follow the field boundaries to a POC Mast of up to 35m in height located within a compound.

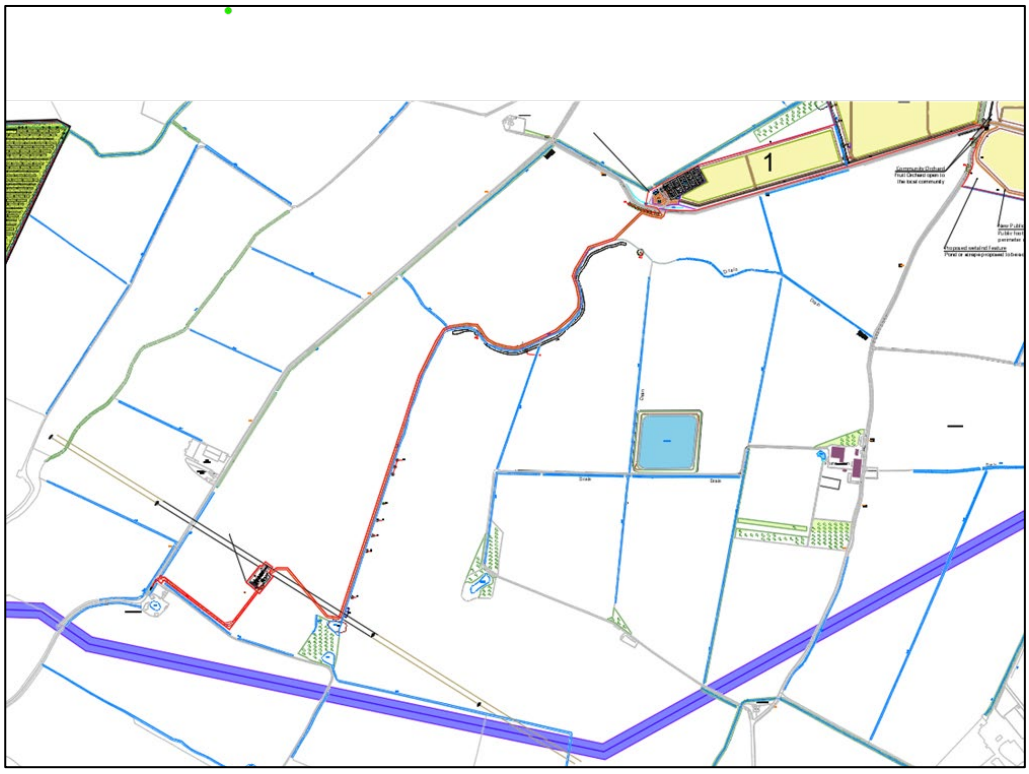

Figure 8 - Proposed Cable Connection Route

Access & Internal Tracks

The primary access routes to the Site are from Eastern Road. In addition, there is an access from Marsh Road, primarily to serve as the site exit, and as a backup access to the Site which would be used infrequently. Appropriate visibility splays are achievable from all access junctions with some vegetation clearance.

The roads to/ from the Site are considered suitable to accommodate all construction and operational vehicle types, as all of the roads on these routes are currently used by large vehicles. Therefore, the construction vehicles and operational traffic associated with the development will be easily accommodated. It is anticipated that the vehicle routing for the construction, operational and decommissioning phases will be the same.

Internal access tracks will be required during the construction phase with existing farm tracks retained, enhanced and used wherever possible. Smaller HGV's will be able to drive directly onto the field of the construction site using a small track of compacted gravel which will connect the construction site to the primary access track into the site. Thereafter access to repair panels and to carry out routine maintenance can be undertaken by small vehicles.

Vehicles will access the site in a one-way method, with the HGVs accessing the site from Eastern Road through an existing access gateway by-passing the farmyard using a new track and running along existing tracks through the centre of the site. All vehicles will exit the site at the existing gateway onto Marsh Road.

Where additional internal tracks and hard standings are required, they will typically be constructed on a sub-base consisting of a layer of compacted crushed stone, of locally sourced limestone, granite, or other suitable materials, which provides a stable foundation for the track or hard standing area.

Two temporary construction compounds will be included on the site, shown in the images below.

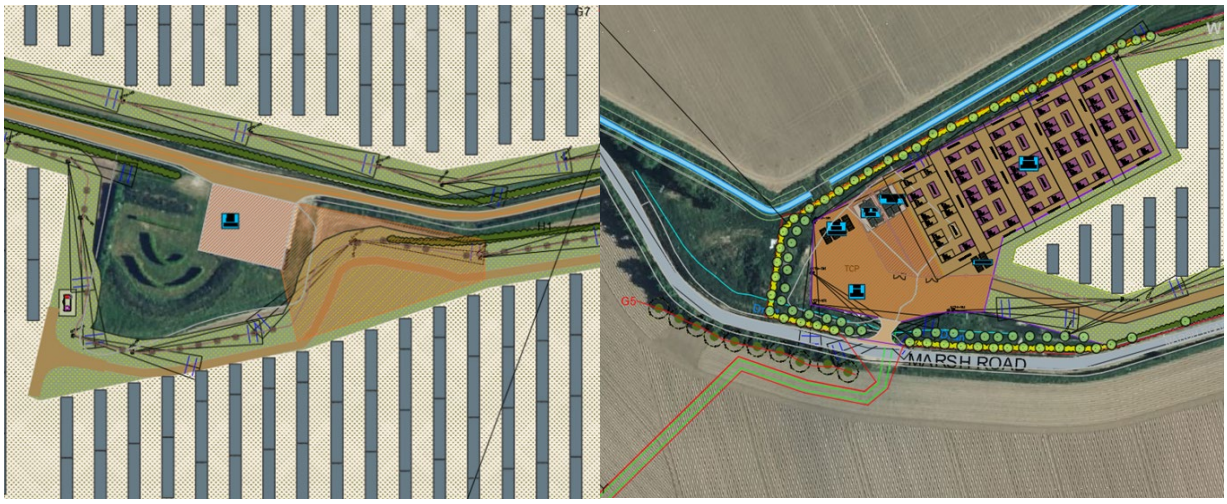

Figure 9 - Temporary Construction Compounds

The existing PRoW which runs through the centre of the Site will be suitably managed throughout construction and operation of the development. Therefore, there would be no impacts upon these PRoWs, and they shall remain accessible at all times.

In response to the feedback received from the local community during the pre-application community engagement process, the Applicant has incorporated the addition of a new permissive footpath into the project design and layout. This footpath, established around the site's perimeter, will serve as an invaluable amenity for local residents and visitors alike.

Security

It is proposed that stock-proof fencing (mesh with wooden posts or similar) to a height of approximately 2 m would be installed along the outer edges of the Site in order to restrict unauthorised access. The security fence will be erected on the inside of the hedgerows, so that it will be screened by the hedgerows in views from the surrounding area, further mitigating any visual impact. The fence line will normally be set approximately 4-5m inside the hedge, keeping it separate from the hedge and allowing ease of maintenance for both the hedge and the fence. Although where necessary the buffer between the security fence and the hedge has been enhanced for ecological reasons. Gates would be installed at the Site access point for maintenance access. These would be the same design, material and colour as the fencing.

Figure 10 - Typical example of a security fence

The perimeter of the Site would be protected by a system of CCTV cameras, which would provide full 24-hour surveillance around the entire perimeter. The cameras would be on poles of approximately 2.5 m high, spaced at approximately 50 m intervals along the security fence meaning there would be a total of around 240 cameras. The cameras are controlled by an external manned operations room and will not overlook adjacent property.

2.3 Construction, Operation & Decommissioning

The proposed solar farm development has a **lifespan of 40 years**, after which the site will be decommissioned and restored to agricultural use. The planning application for the project is expected to be submitted in Spring 2023, and work will commence once all necessary permissions have been obtained and pre-commencement planning conditions have been discharged.

Construction Phase

The construction period is estimated to last approximately 6 months, beginning in 2024, subject to all necessary permissions being obtained. During the construction period, there will be temporary effects on landscape and visual amenity, such as the construction of new built forms, temporary construction compounds and fencing, machinery and material storage, plant and vehicle movements, HGV and abnormal load deliveries, construction site lighting, and reinstatement work.

To minimize the environmental impacts during the construction phase, mitigation measures such as good housekeeping, protection of valued features, minimal external lighting, and protection of trees and vegetation will be implemented. Additionally, light pollution will be minimized through the use of cowls/shielding of lights and directional lighting.

The construction of the solar array will follow a 4-stage program over 20 weeks. Working hours are 08:00-18:00 Monday to Friday and 08:00-13:00 on Saturdays.

There shall be no construction works or deliveries on Sundays, public holidays or bank holidays. Ground piling works shall be limited to 09:00 - 17:00 each day Monday - Friday, and there shall be no ground piling works on Saturdays, Sundays, public holidays, or bank holidays.

During the construction period, construction vehicles and deliveries will visit the site, with vehicles limited to HGV tippers for road/track stone and sand, HIAB flatbed crane trucks, other HGVs, and light vehicle movements associated with staff working on the site.

In the case of the Caudwell solar farm, the risk of pollution to the local area is expected to be low. Most of the materials used in the development are designed to be recycled and reused at the end of the project's life, minimizing waste and its impact on the environment. It is important that waste is managed effectively

throughout the construction phase to ensure the project's sustainability and avoid any adverse effects on the surrounding area. The appointed contractor will be required to sign up to a detailed Site Waste Management Plan to control how waste will be handled and disposed of during the construction phase.

Operational Phase

Regular inspections and maintenance of solar panels, inverters, and other equipment are necessary to ensure maximum energy efficiency and minimal downtime. Maintenance procedures may include cleaning solar panels, repairing or replacing faulty equipment, and checking wiring and electrical connections. The frequency of maintenance checks may vary, but it is typically carried out every six months, with more frequent inspections during periods of high demand or inclement weather conditions.

Decommissioning

Planning permission for the facility is temporary and will cease to have effect on 40 years from the date of energization. After this date, all solar PV array infrastructure, including modules, mounting structures, cabling inverters, and transformers, will be removed from the development site and recycled or disposed of according to good practice and market conditions at the time.

The decommissioning process is expected to take approximately 20 weeks, during which the removal and disposal of the infrastructure associated with the development will occur, followed by site restoration. Some removal works will happen concurrently to maximize efficiency and minimize time spent on site. Restoration of the site will occur in tandem with the removal of structures and is incorporated into the relevant timescales.

Upon completion of the decommissioning process, the land usage will be returned to its original condition, likely as agricultural land.

2.4 Design Principles

Construction work on the Proposed Development, assuming planning permission is granted, would not commence until a final investment decision has been made by the Applicant (and a contractor appointed. Following the award of the contract(s), the appointed contractor would carry out a number of detailed studies to inform the technology selection for the Proposed Development and also to optimise its layout and design before starting work at the Site. It follows that it has not been possible for the Applicant to be expressly definitive in relation to all of the design details of the Proposed Development at this stage.

The Applicant is therefore seeking to incorporate a degree of design flexibility. This relates to the dimensions and layout of structures forming part of the Proposed Development, including the precise layout of the Site and the height of the solar panels. In order to ensure a robust assessment of the likely significant environmental effects of the Proposed Development, the assessments that form part of the ES have been undertaken adopting the principles of the ‘Rochdale Envelope’ in common with the approach for other similar developments including the ‘Layer Solar Farm’, Colchester which is one of a number of approved solar farm planning applications following this principle.

The approach involved assessing the maximum parameters for those elements where flexibility is required. For example, the solar panels have been assessed for the purposes of landscape and the visual impact as being a maximum of 3.7m high, which is the worst-case scenario. The approach also involved defining development zones, rather than having a defined layout. For the purposes of assessment, the development zones define the maximum extent of the developed area.

A number of key design principles have underpinned the design evolution of this project. These include:

- The layout has been informed by the existing topography and landscape features so that development proposals reflect and respect the existing site constraints including field boundaries, existing vegetation and site topography.
- There will be no cut and fill or regrading of land to facilitate panel placement and excavation is only required for cable laying and access tracks as well as inverter and substation bases. This constitutes a minimal percentage of the site area.
- To protect against damage to landscape features the layout has evolved to include a buffer zone between existing hedgerows and solar panels. Internal access tracks will utilise existing field openings where possible.
- As detailed further below, areas of greatest environmental sensitivity within the wider site are excluded from development and a package of environmental management proposals including landscape proposals and ecological enhancement measures are integral components of the project.

The proposals are set out in detail in the Landscape & Ecological Management Plan (LEMP, ES, Volume 3).

The proposals involve substantial habitat enhancement measures including the creation of species-rich grassland, botanically diverse wildflower grassland, new native species-rich hedgerows, tree belts and groups, a community orchard, beehives, significant enhancements areas for skylarks and fieldfares, bat roost boxes and bird nest boxes, otter holts, hedgehog nest boxes, insect hotels, log piles, amphibian and reptile hibernacula features, and mammal gates or small gaps. These measures will result in a biodiversity net gain of 17.48% for habitat units and 94.35% for hedgerow units, with a significant improvement in the support for wildlife and the biodiversity of the site.

The proposed community orchard will consist of a variety of local and English fruit tree varieties, providing a sustainable source of food, supporting local biodiversity, and promoting environmentally friendly practices. The orchard will also be a valuable resource for the local community, offering access to fresh, locally grown fruit, and enhancing community cohesion. The ongoing management of the orchard will require community involvement, providing opportunities for education and skill-building.

Overall, the proposed development of the Caudwell Solar Farm will improve the site's biodiversity and the species it supports through habitat enhancement and creation measures. The mitigation measures implemented for nesting birds, disused badger setts, roosting bats, and great crested newts will ensure no significant effects on the wildlife present on the site. The implementation of these measures will result in a significant biodiversity net gain, providing a positive contribution to the environment and the local community.

2.4 Site Location

The application site (‘the Site’) extends to circa 114 hectares of agricultural land located in the countryside at Caudwell Farm between Holbeach St Matthew, approximately 1.7kms to the north and Holbeach St Marks, around 3.5kms west. As shown on Figure 2.1, the site is approximately 15kms northeast of the market town of Holbeach.

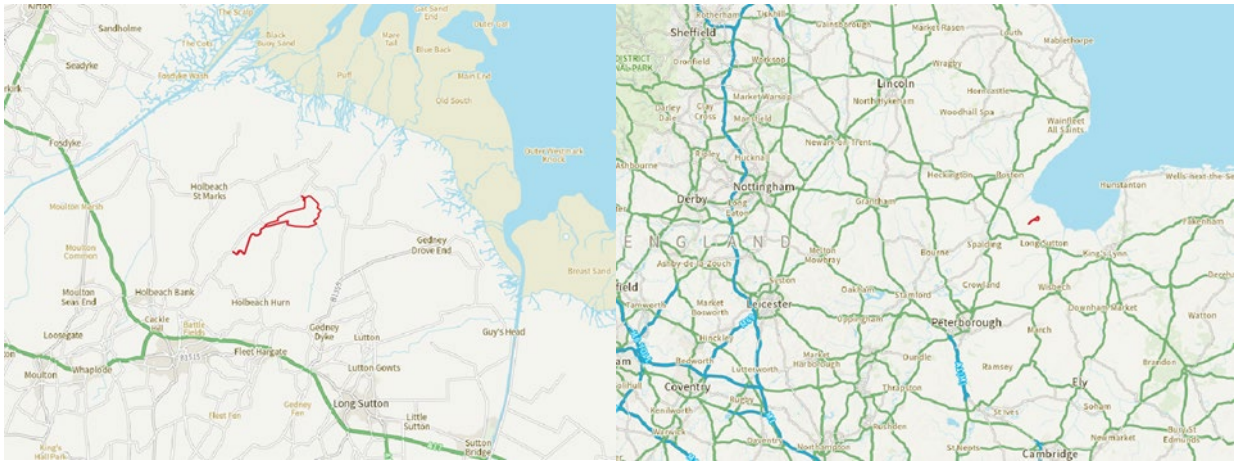

Figure 11 - Site Location

The application site comprises six large fields, currently arable. The fields are divided by hedges which are typically 2 – 6m high and support the occasional large tree. Two field boundaries also include two small deciduous copses and in the centre of the site, there is a hardstanding used for agricultural use alongside a series of hedgerows arranges for shooting. Tracks for farm vehicles run alongside most of the internal hedges and some of these are the routes of the public rights of way (PRoW). There are no landscape features within the fields, such as mature trees or structures.

The flat agricultural landscape is relatively sparsely settled with occasional farms and cottages, accessed from minor road networks and private tracks. Typically, the farm buildings are surrounded by larger modern barns and sheds. Hedgerows and some woodland contain some views in this open landscape.

Holbeach St Matthew and Holbeach St Marks form the main villages in the area, with clusters of houses in the villages softened by well-treed settings.

The proposed Site is not subject to any statutory environmental designations, ancient woodland within or directly adjacent to the site boundary, or designated groundwater source protection zones. The site is not heritage-sensitive, having no statutory or local designations protecting it nor is it subject to any landscape designation. The Site lies 3 km southwest of The Wash SPA and The Wash and North Norfolk Coast SAC. The Wash is an important area for wildlife, particularly for migratory birds and seals.

In 2013, Caudwell Farm Solar Limited was granted approval by South Holland District Council for two planning applications to construct solar arrays to the north and south of Caudwell Farm, Sutton Bridge. The southern solar farm, which was completed in 2015, has been operational and producing renewable electricity. In addition, Caudwell Farms received approval for the construction of a winter storage reservoir at Hartley Farm in August 2013. This reservoir is now operational, ensuring reliable water supply during dry periods, mitigating flood risks, and offering a habitat for wildlife.

3 CONSIDERATION OF ALTERNATIVES

3.1 Introduction

Chapter 3 of the Environmental Statement (ES) describes the main alternatives considered during the development of proposals for Caudwell Solar Farm. It sets out the rational for the selection of the site for the Proposed Development in the context of prevailing national and international obligations, national and regional planning policy and the key environmental considerations that have been instrumental in informing the location and nature of the development proposed.

In line with the EIA requirements, the assessment comprises the following stages:

- Consideration of the "*Do Nothing*" Scenario
- Considerations in selecting the Site
- Considerations in selection of infrastructure and design options.

Do Nothing Scenario

The "*do nothing scenario*" is an assessment of the likely effects of the development proposals not being taken forward considering the option of *the possibility of not carrying out the Proposed Development at all."*
In this instance the "*do nothing scenario*" must be discounted as an option given the UK's obligations to the imperative to generate more electricity from renewable sources, deriving from international commitments and associated Government policy and energy targets. Renewable energy generation and storage is recognised as an established and important part of the solution for climate change and can help achieve the climate and energy targets set at international and national levels. The need for the Proposed Development is set within the context of legislation, policy and guidance and renewable energy targets set at international and national levels.

The most relevant renewable energy and climate change legislation and obligations are:

- **International Commitments:**
  - The Kyoto Protocol:
  - The United Nations Adoption of the Paris Agreement COP21
  - Conference of Parties 26th Session (COP26)
- **National Legislation & Policy:**
  - UK Climate Change Act 2008
  - National Planning Policy Framework (NPPF)
  - Clean Growth Strategy 2017
  - Energy White Paper Powering Our Future 2020 & UK Government Net Zero 2050
  - Sixth Carbon Budget: UK's Path to Net Zero 2020
  - Net Zero Strategy
  - National Infrastructure Strategy 2020

3.2 Site Selection

Site selection is a crucial component of any development project, and it involves a thorough and systematic approach to ensure the chosen site is suitable for the proposed development. This section provides a rationale for the proposed scale of the solar farm development and outlines the requirements and considerations that the applicant has undertaken in identifying a search area and selecting the site as suitable for the proposed development.

The site selection process involved a phased approach:

- desktop assessment of technical feasibility, grid connection, planning considerations, site availability, and evaluation of environmental constraints, such as flood risk, agricultural land classification, and proximity to sensitive receptors.
- site visit to confirm technical suitability and assess potential visual impacts.
- pre-application engagement with relevant authorities to ensure the principle of development is acceptable and to address any detailed studies required to accompany the application.

Throughout the process, the Applicant took a balanced approach to minimize the impact of the proposals upon local receptors and constraints with wider and longer-range impacts, ensuring a sustainable and successful development. The thorough and systematic approach taken by the Applicant in site selection and design is a testament to their commitment to delivering a successful and sustainable renewable energy project.

The critical factors therefore in the site selection process are summarised below.

- **Capacity of the electricity grid network and the availability of a suitable grid connection**. the grid capacity analysis and engagement with the DNO has confirmed that there is capacity in this part of the South Holland District and a connection for a 49.9MW solar farm can be accommodated on the Walpole to Boston 132kv circuit 2, specifically between towers 48HW60 and 48HW59. An export connection offer at Caudwell Solar Farm is formally accepted and that grid connection location dictates the search area for appropriate lands for the Proposed Development.
- **Consideration of environmental and planning constraints:** The site selection process sought to avoid areas that are protected by statutory designations for nature conservations interests and landscape quality including Areas of Outstanding Natural Beauty. The Site was also deemed suitable due to its relatively flat topography, the capacity of the road network to provide safe access and the low risk of flooding. While the land is within an area identified as 'Best & Most Versatile' for agriculture the whole search area falls within this classification and it is accepted that the Proposed Development will not result in unacceptable impacts on agriculture.
- **Pre-application engagement with the Planning Authority and Statutory Agencies**: Pre-application engagement with statutory agencies confirmed that the Site is suitable in relation to likely visual impacts, low potential for impacts on residential properties, heritage features and provides opportunities to enhance biodiversity. It is therefore considered compatible with adjoining land uses.
- **Land availability**: When considering potential sites for development solar farm developers require land holdings of between 50 and 300 acres in order to deliver viable projects that will make a positive contribution to the national renewable energy objectives, taking account of development costs including connection to the national grid. The Caudwell solar farm proposal falls within a larger operation farm, Hartley Farm which is a substantial farming enterprise. In that context any temporary loss of agricultural land to renewable energy production does not materially affect the overall farming operations and the land owner appreciates the potential benefit for the land in longer term through resting it from intensive agricultural practices.

3.3 Design Development

Design Principles

The design development has been informed and influenced by the feedback received in pre-application consultations with the Council and statutory bodies and the completion of baseline environmental assessments.

A number of key design principles have underpinned the design evolution of this project. These include:

- Ensuring that the layout respects the existing topography, landscape features - existing site constraints including field boundaries, existing vegetation and site topography.
- Avoiding the need for cut and fill or regrading of land to facilitate panel placement so that excavation is only required for cable laying, creation of any new access tracks required and inverter and substation bases. This constitutes a minimal percentage of the site area.
- Safeguarding landscape features through ensuring that appropriate buffer zones are provided between existing hedgerows and solar panels and that internal access tracks will utilise existing field openings where possible.

- Excluding areas of greatest environmental sensitivity within the wider site from development and a developing a package of environmental management proposals including landscape proposals and ecological enhancement measures as integral components of the project.

3.3.1 Solar Panels, Mounting System & Arrays

Selection of Panels

Alternative options were considered in relation to the nature of the solar PV panels to be utilised and specifically the choice between traditional style mono-facial solar cells and the bifacial option. Bifacial solar panels are an innovative technology that enables the generation of electricity from both sides of the module, harnessing sunlight reflected off the ground in addition to direct sunlight. These panels are designed with a transparent back-sheet or dual-layer glass, allowing them to capture and convert light from the front and rear faces, thereby increasing their overall efficiency. The applicant has opted to utilise bifacial solar panels on both the fixed and tracking solar arrays in order to maximise the efficiency of the generation facility and contribute more to the renewable energy generation targets with a fewer number of panels than would otherwise be the case with the mono-facial option.

Mounting System

A number of alternative design options are proposed by which panels will be fixed to the ground. Each frame table will incorporate either 48 or 24 panels and will be supported on aluminium and steel posts/frames that will be driven or screwed into the ground to depths of up to 1.5m. Where posts are pushed into the ground this is via typical agricultural methods routinely used to erect fence posts on farms and in the rural area. The design development builds in flexibility to allow for local conditions, including the nature of the subsoils, environmental consideration such as potential archaeological assets and opportunities to increase output.

Consideration was given to the optimum height of panels in respect of balancing the potential visual impacts against the objective of providing a sustainably managed sward under the panels. For static panels the option is to set the front edge of the panels a minimum if 700mm off the to allow mowing equipment or preferably sheep to access the grass beneath the leading edge of the solar panels. For tracker panels the minimum separation off the ground is 1.9m which raises the overall height of the panel with potential implications for visual impacts. In that context the maximum height of the panels is to be set at 3.7m.

3.3.2 Site Layout

The site layout being brought forward for planning has been adapted in response to the outcome of baseline assessments and feedback from pre-application engagement with Council and environmental agencies.

Built Heritage: Engagement with the Historic Environment Officer at Lincolnshire County Council resulted in revisions to the layout to ensure that the Proposed Development will not result in and unacceptable impact on the setting of Hartley House which is regarded as a non-designated heritage asset.

Natural Heritage Considerations: Feedback from Natural England and RSPB was taken into account and the site layout was modified to retain important environmental features on and around the site and to incorporate new features into the proposals to enhance biodiversity and meet Biodiversity Net Gain objectives.

The proposals are set out in detail in the Landscape & Ecological Management Plan (LEMP, ES, Volume 3).

The proposed layout has been adapted in response to this feedback which was supported by ecology baseline studies.

The layout of the rows of panels and the width of field margins has incorporated agri-environmental measures including strengthening hedgerows, planting new ones, and creating areas for wildlife to maintain the land in "good agricultural and environmental condition", including a 5m buffers to facilitate retention an dmaintence of hedgerows.

It is proposed that stock-proof fencing (mesh with wooden posts or similar) to a height of approximately 2 m would be installed along the outer edges of the Site in order to restrict unauthorised access and is lifted off the ground to allow passage of mammals. The security fence will be erected on the inside of the hedgerows, so that it will be screened by the hedgerows in views from the surrounding area, further mitigating any visual impact.

Further, the layout has been adjusted to incorporate substantial habitat enhancement measures including the creation of species-rich grassland, botanically diverse wildflower grassland, new native species-rich

hedgerows, tree belts and groups, a community orchard, beehives, significant enhancements areas for skylarks and fieldfares, bat roost boxes and bird nest boxes, otter holts, hedgehog nest boxes, insect hotels, log piles, amphibian and reptile hibernacula features, and mammal gates or small gaps.

The proposed community orchard will consist of a variety of local and English fruit tree varieties, providing a sustainable source of food, supporting local biodiversity, and promoting environmentally friendly practices. The orchard will also be a valuable resource for the local community, offering access to fresh, locally grown fruit, and enhancing community cohesion. The ongoing management of the orchard will require community involvement, providing opportunities for education and skill-building.

Overall, the Proposed Development of the Caudwell Solar Farm will improve the site's biodiversity and the species it supports through habitat enhancement and creation measures. The mitigation measures implemented for nesting birds, disused badger setts, roosting bats, and great crested newts will ensure no significant effects on the wildlife present on the site. The implementation of these measures will result in a significant biodiversity net gain, providing a positive contribution to the environment and the local community.

These measures will result in a biodiversity net gain of 17.48% for habitat units and 94.35% for hedgerow units, with a significant improvement in the support for wildlife and the biodiversity of the site.

4 ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS

The ES comprises technical studies on each of the aspects of the environment identified as likely to be significantly affected by the Proposed Development, which are supported with figures and technical appendices where appropriate.

The exception to this structure is Chapter 10: Other Environmental Considerations which presents assessments relating to topics where no individual chapter was warranted, either due to the brevity of the assessment or the small impact associated with the Proposed Development as confirmed in the ES screening exercise undertaken with the Council.

Each chapter also presents the potential cumulative effects resulting from other present, or reasonably foreseeable projects together (i.e. cumulatively) with the Proposed Development.

The aim of Environmental Impact Assessment is to ensure that the decision-making authority and the relevant consultation bodies, when deciding whether to grant planning permission for the Proposed Development, does so in the full knowledge of the likely significant effects on the environment and takes this environmental information into account in the determination of the application.

A summary of the assessments undertaken and the conclusions of those assessments is set out below.

4.1 Traffic & Transport

Chapter 4 of the ES, Traffic and Transport sets out the detailed assessment and conclusions of the EIA process sin relation to traffic and transport considerations.

Pre-application advise has been received and the Highway Authority have concluded they have no objection to the proposals subject to the provision of a Construction Traffic Management Plan (CTMP). The CTMP is provided separately in the ES (Volume 2, Appendix 4.1).

A review of the existing site determines that there are not any apparent highway safety concerns which require mitigation as a result of this planning application and the prevailing traffic flows on the local road network are very low.

The proposal is for erection of a 49.9MW Ground Mounted Solar Array with Associated Underground Cable Route, Substation with POC Mast, Battery Storage and Ancillary Equipment & Structures at Caudwell Farm.

Given that the site will be accessed by vehicles during the construction period, and then only require access by maintenance vehicles intermittently through the year, it is not considered appropriate to review the accessibility of the site by walking, cycling or public transport however the TS (accompanied by the CTMP) seek to address all other items as you would expect. Existing tracks within and/or nearby to the site will not be detrimentally impacted by the proposals.

Access and egress will be via existing farm access / egress points which benefit from very good visibility splays in both directions. Access will be served via Eastern Road, with egress back to Eastern Road via Marsh Road.

As detailed within the CTMP, all construction vehicle journeys would originate from further afield and reach the site via the A17.

From the A17, construction vehicles would access the site via Eastern Road from the north. Constructions vehicles would traverse the site using the internal haul road, where the temporary construction compound is located. To return to the A17, construction vehicles would egress the site via Marsh Road, turning onto Eastern Road and then Peartree House Road/Penny Hill Road.

During the life of the solar array the only traffic movements will be from routine maintenance and repair vehicles which would amount to 3-4 trips a year. There would be no staff based on the site itself.

Given the nature of the site as a farm, the local road network (and its users) would be accustomed to Heavy Goods Vehicles (HGVs) in all directions.

The traffic impact has been assessed with consideration to the prevailing traffic flows and determined the impact will not be severe, and upon completion of the construction phase will be imperceptible.

It can accordingly be concluded that the development proposals would not have a severe residual impact on the network and the development therefore complies with the test of NPPF paragraph 111.

4.2 Noise

A noise impact assessment (NIA) has been undertaken for the Proposed Development as set out in the ES, Chapter 5.

The assessment has been undertaken to demonstrate compliance with criteria set out in relevant British Standards. It has been undertaken in accordance with BS4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound.

The baseline noise environment has been characterised by desk study. The noise environment is typical of a remote, rural environment in which anthropogenic noise is a minor contributor, and noise from natural sources, including bird calls, the wind, and wind-blown vegetation are the primary control on baseline noise levels. Anthropogenic noise is anticipated to be limited to road traffic on the Eastern Road and agricultural machinery.

Appropriate target noise levels have been derived for construction noise. Construction activities will be broadly similar to those commonly associated with agricultural practices in that the supporting structures for the arrays are mainly driven into the ground in a manner similar to fencing operations.

Construction noise impacts will also be controlled by design, such as by production and implementation of a Construction Environmental Management Plan (CEMP). Noise effects during the construction phase have therefore been determined to be “not significant”.

Noise modelling was undertaken to determine noise impacts from the Proposed Development at existing Noise Sensitive Receptors (NSRs). Predicted noise levels have been evaluated in accordance with BS4142 and fixed limit criteria.

Noise impacts at the closest existing NSRs have been determined to be “not significant”.

4.3 Flood Risk & Drainage

Chapter 6 of the ES considers the potential impacts of the Proposed Development on surface water, flood risk management and land drainage.

An assessment of the baseline conditions at the existing Site and within the surrounding area has been undertaken based upon a review of available desktop information within the study area and informed by a Flood Risk and Drainage Assessment for the Proposed Development, which includes an outline surface water drainage strategy.

Surface hydrology receptors of potential environmental effects have been identified and assessed, with mitigation measures proposed where necessary and the residual effects identified and evaluated.

The Wash is located approximately 2.8 km to the north of the Site. There is a network of drainage ditches, on and within the vicinity of the Site including Sot’s Hole, Middle Drain, Fleet Haven Drain and Sot’s Hole and Connection. Most of the drains fall under the jurisdiction of South Holland IDB. A number of unnamed drains are located on-site which flow into the IDB watercourses. There are two existing small water impounded structures within the study area; one adjacent to the west of the site and one approximately 800 m to the south of the site.

The Site is located within the Welland Lower Operational Catchment. There are no WFD defined surface water bodies within the vicinity of the Site which the Proposed Development would impact.

The Environment Agency Flood Map for Planning indicates the Site to be located in flood zone 3, which is defined as having a 'high probability’ of flooding from rivers and/or the sea. Detailed hydraulic modelling indicates that the Site is not at risk of flooding from the sea due to overtopping of the flood defences, but would be at risk of flooding during a breach in sea defences. As such, the risk of flooding from the sea is assessed to be High although the likelihood of the defences failing is assessed to be low, and therefore the direct risk of flooding at the site is considered to be low.

The risk of flooding to the Proposed Development from all other identified sources is assessed to be Negligible/Low over its lifetime (i.e. 40 years).

The Site comprises agricultural farmland. It is possible that field drains are present, but no other formal drainage infrastructure is believed to be present.

The construction and operational phases of the Proposed Development have the potential to reduce surface water quality and increase flood risk.

During the construction phase this would be managed through a range of control and monitoring measures including best practice construction methods that, as a whole, would act to mitigate the potential effects on surface water, flood risk and land drainage.

The likely significant effects during the operational phase of the Proposed Development would be managed by embedded mitigation including flood risk mitigation measures and the implementation of a surface water drainage strategy (including the use of SuDS).

The identified mitigation measures will result in a residual significance of environmental effects on the water environment, which is assessed to be Negligible, and therefore the environmental effects on the water environment is deemed Not Significant.

4.4 Glint & Glare

A Glint and Glare assessment has been completed in respect of the Proposed Development as set out in Chapter 7 and Appendix 7.1 of the ES. This assessment pertains to the possible impact upon surrounding road safety, residential amenity and aviation activity associated with Red House Farm Airfield, Wingland Airfield, and Lutton-Garnsgate Airfield.

The results of the analysis have shown that solar reflections are geometrically possible for six of the eight assessed dwellings. No impacts are predicted for two of these dwellings due to the presence of existing screening in the form of vegetation and buildings significantly obstructing visibility of the reflecting panel area. Therefore, no mitigation is required.

For the remaining four dwellings experiencing solar reflections, a low impact is predicted due to the presence of mitigating factors, including:

- A large separation distance between the dwelling and the reflecting panel area;
- Partial existing screening;
- Effects coinciding with sunlight which is a more prominent source of light.

The roads surrounding the proposed development are considered local roads where traffic densities are likely to be relatively low. Technical modelling is not recommended for local roads as any solar reflections from the proposed development that are experienced by a road user would be considered ‘low’ impact in accordance with the guidance presented in Appendix D.

Therefore, no significant impacts upon road users along the surrounding roads are predicted, and mitigation is not recommended.

Solar reflections are not geometrically possible towards the identified 2-mile approach paths for runways 02/20, 14/32, 16/34, and 06 at Wingland Airfield and runway 02 for Red House Farm Airfield. Therefore, no impacts are predicted and no mitigation is required.

Overall, it is judged that the potential effects towards the runway 20 approach at Red House Farm Airfield can be operationally accommodated. It is expected that operational measures used by pilots to mitigate the effects of direct sunlight (see Appendix 7.1, Section 5.6.3 for further details) will adequately mitigate the effects of solar glare from the panels.

4.5 Ecology & Ornithology

The Caudwell Solar Site supports predominantly arable farmland fields interspersed with hedgerows, trees and dry and running ditches. Some areas of improved grassland and introduced shrub are also present. It is 3.3km south from internationally and nationally designated sites.

Embedded mitigation in the Site design has meant habitat loss is minimised and largely restricted to the open arable farmland, an Important Ecological Feature (IEF) of county importance resulting in a not significant effect. Hedgerows are to be retained, except small sections where existing gateways are to be widened or where existing gaps are to be utilised for new access. Effects on hedgerows, an IEF of local importance, are not

significant. There are no effects on trees or watercourses or field margins as these are retained and protected from development.

The proposals involve substantial habitat enhancement measures including the creation of species-rich grassland, botanically diverse wildflower grassland, new native species-rich hedgerows, tree belts and groups, a community orchard, beehives, significant enhancements areas for skylarks and fieldfares, bat roost boxes and bird nest boxes, otter holts, hedgehog nest boxes, insect hotels, log piles, amphibian and reptile hibernacula features, and mammal gates or small gaps. These measures will result in a biodiversity net gain of 17.48% for habitat units and 94.35% for hedgerow units, with a significant improvement in the support for wildlife and the biodiversity of the site.

The proposed community orchard will consist of a variety of local and English fruit tree varieties, providing a sustainable source of food, supporting local biodiversity, and promoting environmentally friendly practices. The orchard will also be a valuable resource for the local community, offering access to fresh, locally grown fruit, and enhancing community cohesion. The ongoing management of the orchard will require community involvement, providing opportunities for education and skill-building.

Overall, the proposed development of the Caudwell Solar Farm will improve the site's biodiversity and the species it supports through habitat enhancement and creation measures. The mitigation measures implemented for nesting birds, disused badger setts, roosting bats, and great crested newts will ensure no significant effects on the wildlife present on the site. The implementation of these measures will result in a significant biodiversity net gain, providing a positive contribution to the environment and the local community.

If the works were timed during the bird breeding season, significant effects on birds could occur if nests were caused to fail. Mitigation measures including a nesting bird check reduce this to not significant. Disused badger setts and badger field signs were observed on Site. Precautionary mitigation by way of a pre-construction check provides assurance that should a sett be excavated in the working area, mitigation can be put in place to either avoid effects or obtain a development licence from natural England for its' disturbance or destruction, thus resulting in a not significant effect.

The mature trees around the Site could be used by roosting bats, as well as hedgerows and ditches for foraging. These are being retained with no illumination of features resulting in no significant effects.

There are four ponds within 500m of the Site which may support breeding GCN. The works will not impact these ponds, but Reasonable Avoidance Measures have been suggested to protect GCN that may range onto the Site, resulting in no significant effects.

The ditches on Site are suitable to support foraging and commuting otter, but these are to be retained and protected.

The cessation of arable agricultural practices and implementation of habitat enhancement and creation measures will result in a biodiversity net gain of +181.87 % habitat Biodiveristy Units, and 187.47% hedgerow units. A supporting Landscaping Plan illustrates the enhancement of the Site hedgerows and retained grassland as well as creation of further woodland and wildflower areas.

The reduction of farming activities along with enhancements to the existing habitats present mean the Proposed Development has the potential to provide an improvement in the biodiversity of the Site and the species it supports.

4.6 Landscape & Visual Impact

The Landscape and Visual Impact Assessment (LVIA) as set out in Chapter 9 of the ES has established that the Proposed Development will change the existing landscape and visual baseline conditions.

Although there will be locally significant effects on both the landscape resource and to visual amenity, these effects will be generally localised and will be seen in the context of the diverse and changing landscape of south-east Lincolnshire.

The Proposed Development will incorporate embedded mitigation measures in relation to the design of the solar array equipment and built form.

The development of the land at Caudwell Farm will cause local change to the immediate setting and give rise to locally significant effects. These effects will quickly reduce over a short distance, as the intervening distance, terrain and enhanced vegetation structure assist in containing views.

The development strategy will incorporate the sections of new hedgerow and tree belts alongside gapping up of lengths of the existing hedgerows and tree belts which surround the proposed site, incorporating a native species-based planting mix. A section of new riparian woodland planting beside the Fleet Haven watercourse is proposed along the south-eastern site boundary. This will establish over the short term to soften and filter direct views to the development. In addition, the existing hedgerows will be maintained at a higher height.

Whilst significant effects will arise due to local change, the sensitive siting of the development and introduction of new mitigation planting will assist in accommodating the Proposed Development within the existing flat agricultural setting. The Proposed Development will fit with the large scale and pattern of the prevailing landscape features and will be seen as an appropriate scale of new development in the wider landscape.

4.7 Other Environmental Effects

Chapter` 10 collates the consideration of other environmental considerations that do not warrant individual chapters, either due to the brevity of the assessment and associated report or the limited impact associated with the Proposed Development.

The level of assessment undertaken has been informed by a combination of baseline assessments undertaken and the feedback received from South Holland District Council and relevant statutory bodies through pre-application engagement and screening of the Proposed Development for the purposes of this EIA.

Where appropriate consideration of individual topics is supported by technical reports that are included as appendices to this chapter. The relevant reports are:

- Agriculture
- Cultural Heritage
- Socio-economic impacts
- Aviation, Defence, Telecommunications & Utilities
- Waste and Pollution
- Health & Safety

Agriculture

A report on the agricultural considerations of the site, in particular the soils, the agricultural land quality and the farming enterprises is provided in the ES, Volume 2, Appendix 10.1.

The site falls within a larger area all of which is shown to be on the predictive Best and Most Versatile (BMV) maps by Natural England (2017) as comprising land falling within the high likelihood of BMV (>60% area BMV) category. In that context there is no land available within the search area that is clear of this predicted land classification and the Applicant has sought to address potential impacts through design development.

The assessment confirms that the proposed development is situated on a very large farming enterprise, extending to c1,200ha. Currently all the land is used for arable purposes, mainly wheat.

The assessment concluded that the construct of the solar farm and ancillary infrastructure will not damage the soils or create localised compaction and if any haul areas do show signs of compaction this can be easily remediated.

Areas affected by the development will be confined to tracks, inverters and substation compounds which amount to c3.5ha in total and this is a temporary loss during the operational phase. In the wider context, it is estimated that there is approximately 3.7million hectares of BMV land in England so the Site is a very small area in the context of BMV nationally and the amount of BMV land temporarily lost from agriculture to the renewable energy development is insignificant.

The assessment also concludes that the land will benefit from the operational phase of the development through the conversion of arable land to grassland which will result in a significant beneficial impact on soil organic carbon. While agricultural use will continue during the operational phase through grazing, there will be additional benefits in that there will be no compacting of soils due to the removal of heavy agricultural machinery over the operational period and the Proposed Development will also result in significant bio-diversity benefits through plans to plant suitable grass seed mixes that will create a better environment for invertebrates and birds while enhancing soil structure.

The land will continue to be used for food production, as it will be grazed by sheep for meat production. The report also concludes that the site's contribution to nationwide food production is limited and reversible.

The EIA screening undertaken by South Holland Council confirms that higher grade agricultural land involved but there is the potential for grazing sheep, thereby allowing some agricultural activity to continue. It is accepted that any impact is reversible after decommissioning and will arguably be more fertile.

Historic Environment

A Cultural Heritage Assessment which is included at ES, Volume 2, Appendix 10.2. The assessment focused on built heritage considerations as the EIA screening assessment undertaken by the Council confirmed that there is unlikely to be any below ground archaeology in or around the site, but that Hartley House Farm is a historic farmstead and can be considered a non-designated heritage asset.

The assessment determined that the development will not cause harm to the significance of any designated built heritage asset, demonstrating compliance with the statutory duties of the Planning (Listed Buildings and Conservation Areas) Act 1990 and paragraphs 201 and 202 of the NPPF.

Although the non-designated Hartley House was identified as sensitive to the proposed development, its important elements of significance and setting will not be affected. This ensures that the development will not cause harm to the heritage significance of the site and maintains compliance with national and local policy concerning built heritage.

The Applicant follows the Solar Trade Association's 10 commitments which are a set of principles designed to ensure that solar energy developments are carried out in a sustainable and responsible manner, including a commitment to protect archaeological assets and cultural heritage sites. In the case of the Caudwell Solar Farm, the assessment found no known archaeological evidence from any time period, and the likelihood of discovering unknown archaeological assets was considered low. However, if any unknown assets were found, they would likely need to be removed, requiring permissions and oversight from a member of the Local Planning Authority and the Applicant is content to accept a planning condition building in this safeguard. This demonstrates a proactive approach to protecting cultural heritage, even in the absence of known assets.

Overall, the Solar Trade Association's commitments and the Built Heritage Statement demonstrate that the proposed Caudwell Solar Farm is being developed with a strong commitment to protecting cultural heritage and built heritage assets. Through a proactive approach to identifying and assessing potential impacts, the development can be carried out in a sustainable and responsible manner, while maintaining compliance with relevant national and local policies. The Proposed Development will not give rise to any unacceptable impact on cultural heritage.

4.8 Socio-Economic Impacts

The proposed solar farm, with an installed power generation capacity of 49.9MW and up to 50MW of battery storage facilities on site, is poised to make a significant contribution to green electrical generation in the region. This development will contribute to the English Government's commitment to meeting its renewable energy generation targets and highlights South Holland as a progressive council that is embracing a low-carbon future.

The Proposed Development will make a positive contribution to:

- Reduction in Carbon emissions by a significant abatement in carbon emissions from electricity production
- Enhanced security of supply which is directly relevant to wider energy policy goals of encouraging the continued development of renewable energy sources and enabling private sector investment in RES projects, in which the proposed project lies
- Biodiversity through a substantial investment in local biodiversity resulting in a 181.87% net gain in habitat units.

In addition to its environmental benefits, the solar farm will also contribute to the local economy through job creation and support for local businesses. Furthermore, the development will promote energy security by diversifying the region's energy mix and reducing dependence on imported fuels. The battery storage facility included in the project will further enhance the solar farm's value by providing a stable and reliable source of electricity. This energy storage capability will help balance supply and demand, ensuring that the electricity generated by the solar farm is available when needed, even during periods of low sunlight or fluctuating demand.

The Proposed Development represents a very substantial financial investment by the Applicants in the South Holland area.

The development of a solar farm presents numerous employment opportunities both direct and indirect for the local community, particularly during the construction phase. With an estimated workforce of around 60 people required for various tasks, the project is poised to create a significant economic impact in the region. During the construction phase, a diverse range of direct jobs will be available, including positions for engineers, electricians, laborers, project managers, and administrative staff. These roles will require different levels of skill and expertise, providing opportunities for a wide spectrum of the local workforce. By prioritizing the hiring of local talent, the solar farm development will not only contribute to the community's economic growth but also help build valuable skills and expertise in the renewable energy sector among residents. It will also give rise to additional spend in the local community.

Once the solar farm is operational, there will be further ongoing opportunities for employment in maintenance, monitoring, and management of the facility.

By prioritizing the hiring of local businesses and residents during the construction phase and beyond, the project demonstrates a commitment to supporting the local economy and contributing to the broader goals of sustainability and renewable energy adoption.

The Community Benefit Fund for the solar farm aims to provide tangible benefits to residents living in close proximity to the site, in accordance with the English Government's emphasis on community involvement in renewable energy generation as outlined in the Energy Strategy. While the specifics of the fund are yet to be finalized, preliminary discussions with local residents have indicated a strong preference for supporting domestic solar panel systems, which the applicant is willing to endorse. In addition to the broader Community Benefit Fund, the solar farm developer, GEI, is committed to ensuring that local communities become active stakeholders in their solar projects. As part of their standard offering, GEI will fund rooftop solar installations of up to 50kW across one or multiple community buildings, such as schools, churches, parish halls, or other facilities. In schools, these rooftop solar installations can be paired with a solar display system in the reception area, enabling students to monitor live solar energy generation and learn about the technology. This initiative will not only help schools and local communities reduce their carbon footprint and costs but also foster sustainable practices within and beyond educational institutions.

The Caudwell solar farm proposal aims to provide an educational resource for the local community, particularly for school children. Two log pile seating areas will serve as outdoor classrooms and meeting spaces for groups interested in learning more about solar farms as a renewable energy resource and their contribution to combatting climate change. The seating area will be constructed using locally felled tree trunks and set within areas of wildflower meadow, creating an attractive environment for visitors and located adjacent to existing and permissive footpaths. In addition, a series of permanent interpretation and information boards will be placed along the footpaths within the site, providing educational benefits to the local communities and visitors. These boards will encourage a better understanding of the solar farm and its benefits in terms of renewable energy and ecological preservation. They will also allow local children to learn about the role of pollinators such as bees in supporting flowers and crops. Partner schools will be offered classroom and on-site lessons on topics such as the technology used at the solar farm, the electricity generated, and the carbon dioxide saved.

Through these measures, the Caudwell solar farm proposal aims to provide an educational resource that not only benefits local schools but also the wider community, promoting a better understanding of renewable energy and its benefits. Regarding tourism and recreation, the development is not expected to have significant effects on local interests, which include the coastline and walking in the area. Existing footpaths and bridleways on the site will be retained, and a new permissive footpath will be promoted as a wildlife walk. The walk will feature an outdoor classroom, picnic area, information and interpretation boards, and an insect hotel. New way marker posts will be erected to direct walkers along these footpaths, encouraging local residents and visitors to explore the newly created circular walk and learn about the solar farm development.

Aviation, Defence, Telecommunications & Utilities

The UK Government provides guidance for large solar array developments, which recommends considering aviation matters as part of the application process.

A Glint & Glare Assessment has been undertaken as part of the EIA process (Chapter 7). That assessment incudes consideration of the potential impact on aviation receptors – air traffic control towers and aircraft identified 2 mile approach paths. The assessment covered a 10km area for aviation receptors.

The assessment concludes that:

- Solar reflections are not geometrically possible towards the identified 2-mile approach paths for runways 02/20, 14/32, 16/34, and 06 at Wingland Airfield and runway 02 for Red House Farm Airfield. Therefore, no impacts are predicted and no mitigation is required.

- Solar reflections with a 'low potential for temporary after-image' are geometrically possible towards the 2-mile approach path for runway 24 at Wingland Airfield. This is acceptable in accordance with the associated guidance and industry best practice and mitigation is not required.

- Solar reflections with 'potential for temporary after-image' are geometrically possible towards a 0.8 mile section of the 2-mile approach path for runway 20 at Red house Farm Airfield. There are mitigating factors that reduce the overall impact. In particular, effects are predicted to occur for a short duration of time throughout the year (1,290 minutes which is 0.491% of daylight hours), with a maximum duration of less than 38 minutes on the days when the glare is possible.

- Overall, it is judged that the potential effects towards the runway 20 approach at Red House Farm Airfield can be operationally accommodated. It is expected that operational measures used by pilots to mitigate the effects of direct sunlight (see Section 5.6.3 for further details) will adequately mitigate the effects of solar glare from the panels.

The Proposed Development will result in any unacceptable impact on aviation and will not impact on telecommunications or utilities.

Waste & Pollution

The EIA screening determination has confirmed that:

Waste production during construction phase would be limited as most components arrive at site ready-made/pre-assembled. During operation, only negligible waste will be created. During decommissioning, solar panels and the mounting structures can be recycled at the end of their operational life.

The Applicant is committed to proper management of waste as a crucial consideration for any solar farm development to ensure that it does not cause pollution in the local environment.

It is anticipated that a detailed Construction Environmental Management Plan (CEMP) will be required by condition on any planning permission granted for the Proposed Development. The CEMP will include provision of a Site Waste Management that will detail how any waste arising from the Proposed Development construction phase will be sustainably managed and disposed of. The responsibility of producing this plan lies with the contractors involved in the development.

Most of the materials used in the development are designed to be recycled and reused at the end of the project's life, minimizing waste and its impact on the environment.

There are no likely significant impacts through waste or pollution for the Proposed Development.

Health & Safety

The Council EIA determination has confirmed that the risk to population and human health is not applicable in this instance.

The CEMP will include measures to ensure the health and safety of those involved in the development during the construction phase along with local residents. The site contractor will be responsible for the drafting and implementation of the CEMP.

The health and safety of the workforce during the construction phase would be the responsibility of the contractors themselves. They would have to ensure they practice safe working conditions.

The design of the Proposed Development includes security fencing to prevent unauthorised access. The development is benign and would not adversely affect human health directly and wouldn't pose a health and safety risk.

4.9 Interactions in Environmental Effects

The EIA Directive requires that the ES examines the interactions of the factors assessed in the EIA process and that the interrelationship between these factors must be taken into account as part of the environmental impact assessment process.

Chapter 11 of the ES sets out these considerations.

Table 4.1 below summarises and provides appropriate commentary on the potential interactions.

Environmental Discipline	Interaction With	Interaction
Landscape & Visual	Ecology & Ornithology	The commitment to retain all existing woodland, mature trees & hedgerows and to maintain an appropriate buffer around water features will safeguard these habitats but will also provide safeguard key landscape features. Landscape mitigation measures will enhance biodiversity opportunities. Ecological enhancement measures proposed within Appendix 8.3 – Biodiversity Management Plan will also further enhance the existing landscape setting.
	Flood risk	Increase in site run-off or flooding could potentially impact on the local landscape. However, flood risk has been assessed in Chapter 6 and it concludes that the development is at a low risk of flooding and will not increase flooding elsewhere.
	Cultural Heritage	The Heritage assessment Chapter 10, Appendix 10.2 confirms that the development design provides an appropriate buffer zone around Hartley House identified as being an historic farmstead and considered a non-designated heritage asset. The assessment concludes there will be no significant impact on any identified asset.
	Glint & Glare	Glint & Glare is assessed in Chapter 7. No significant impacts are predicted upon road safety, residential amenity, or aviation activity; therefore, mitigation through landscaping is not required. The design approach to retain boundary trees and vegetation assists in limiting glint & glare impacts. Landscape proposals referred to within Chapter 9, landscape and visual impact assessment will only further enhance screening afforded by vegetation across the site thus further minimising the potential for any glint and glare impacts.

Environmental Discipline	Interaction With	Interaction
	Agriculture	Chapter 10, Appendix 10.1 assesses the potential impact in agriculture. The site is presently in use as arable farming. The introduction of this project to the land will be a partial change - the site will remain in use for livestock grazing. The landscape and visual impacts of this partial change in land use are assessed within Chapter 9 which concludes there are no significant landscape and visual impacts further to the planting enhancement proposals that form part of this proposal.
Ecology & Ornithology	Landscape	The commitment to retain all existing woodland, mature trees & hedgerows and to maintain an appropriate buffer around water features will safeguard these habitats but will also provide safeguard key landscape features. Landscape mitigation measures will enhance biodiversity opportunities. Ecological enhancement measures proposed within Appendix 8.3 – Biodiversity Management Plan will also further enhance the existing landscape setting.
	Flood risk	Increase in site run-off or flooding could potentially impact on ecology & ornithology. However, flood risk has been assessed in Chapter 6 which illustrates that proposals for the site will not increase the rate of discharge from the current pre-development surface water run-off rates, and no formal drainage systems will need to be installed.
	Noise	Disturbance from noise can affect wildlife. Noise impacts have been assessed in Chapter 5 which concludes that there will be no significant impacts arising. The Ecology & Ornithology Chapter (8) confirms that appropriate mitigation measures will be utilised to avoid impacts due to noise and disturbance at critical junctures in the ecology calendar including the breeding season for relevant species.
Flood Risk	Landscape	Increase in site run-off or flooding could potentially impact on the local landscape. However, flood risk has been assessed in Chapter 6 and it concludes that the development is at a low risk of flooding and will not increase flooding elsewhere.
	Ecology & Ornithology	Increase in site run-off or flooding could potentially impact on ecology & ornithology. However, flood risk has been assessed in Chapter 6 which illustrates that proposals for the site will not increase the rate of discharge from the current pre-development surface water run-off rates, and no formal drainage systems will need to be installed.

Environmental Discipline	Interaction With	Interaction
	Agriculture	Increase in site run-off or flooding could potentially impact on adjoining land uses. However, flood risk has been assessed in Chapter 6 which illustrates that proposals for the site will not increase the rate of discharge from the current pre-development surface water run-off rates, and no formal drainage systems will need to be installed.
Cultural Heritage	Landscape	The Heritage assessment Chapter 10, Appendix 10.2 confirms that the development design provides an appropriate buffer zone around Hartley House identified as being an historic farmstead and considered a non-designated heritage asset. The assessment concludes there will be no significant impact on any identified asset.
Glint & Glare	Landscape and Visual	Glint & Glare is assessed in Chapter 7. No significant impacts are predicted upon road safety, residential amenity, or aviation activity; therefore, mitigation through landscaping is not required. The design approach to retain boundary trees and vegetation assists in limiting glint & glare impacts. Landscape proposals referred to within Chapter 9, landscape and visual impact assessment will only further enhance screening afforded by vegetation across the site thus further minimising the potential for any glint and glare impacts.
Agriculture	Landscape and Visual	Chapter 10, Appendix 10.1 assesses the potential impact in agriculture. The site is presently in use as arable farming. The introduction of this project to the land will be a partial change - the site will remain in use for livestock grazing. The landscape and visual impacts of this partial change in land use are assessed within Chapter 9 which concludes there are no significant landscape and visual impacts further to the planting enhancement proposals that form part of this proposal.
	Flood risk	Increase in site run-off or flooding could potentially impact on adjoining land uses. However, flood risk has been assessed in Chapter 6 which illustrates that proposals for the site will not increase the rate of discharge from the current pre-development surface water run-off rates, and no formal drainage systems will need to be installed.
Noise	Ecology & Ornithology	Disturbance from noise can affect wildlife. Noise impacts have been assessed in Chapter 5 which concludes that there will be no significant impacts arising. The Ecology & Ornithology Chapter (8) confirms that appropriate mitigation measures will be utilised to avoid impacts due to noise and disturbance at critical junctures in the ecology calendar including the breeding season for relevant species.

Environmental Discipline	Interaction With	Interaction
	Traffic	Construction traffic noise impacts at existing Noise Sensitive Receptors (NSRs) will be of short duration and can be limited by implementation of appropriate controls during the construction phase. Construction traffic noise is therefore anticipated to be of limited significance and has been scoped out of detailed assessment.
Traffic & Transport	Noise	Construction traffic noise impacts at existing Noise Sensitive Receptors (NSRs) will be of short duration and can be limited by implementation of appropriate controls during the construction phase. Construction traffic noise is therefore anticipated to be of limited significance and has been scoped out of detailed assessment.

Table 4-1 Summary of Interactions

No significant environmental impacts are predicted as a result of interactions - other than those which have been assessed within the respective individual chapters.