Cottam Solar Project

EIA Scoping Report (Part 2 of 4)

Prepared by: Lanpro Services Ltd.

January 2023

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Issue Sheet

Report Prepared for: Cottam Solar Project Ltd.

EIA Scoping Report Submission

Cottam Solar Project: EIA Scoping Report

Appendices (Part 1 of 3): Chapters 3-9

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Date: January 2022

Revision: 1

Cottam Solar Project

EIA Scoping Report
Appendix to Chapter 3:
Figures: Site and Development Plans

January 2022

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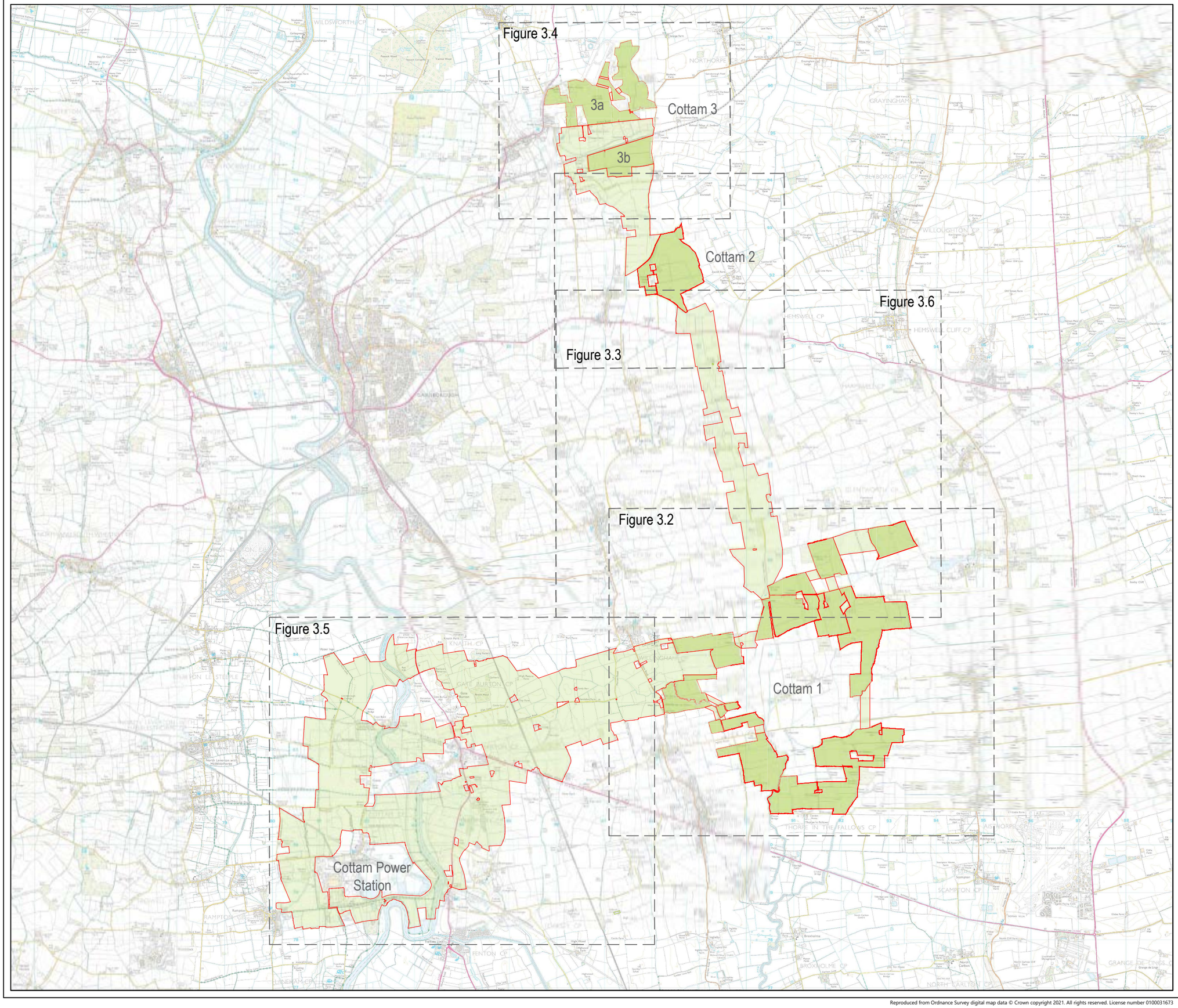

Island GREEN POWER

Key

Area for solar panels and associated development

Cable Route Search Corridor

Note: Energy Storage to be located within Cottam 1 only

N

1:75,000 @ A3

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Figure 3.1
Site Plan

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Island GREEN POWER

Lanpro

Key

Area for solar panels and associated development

Cable Route Search Corridor

Note: Energy Storage to be located within Cottam 1 only

N

1:25,000 @ A3

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Figure 3.2
Site Plan
Cottam 1

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Island GREEN POWER

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Key

Area for solar panels and associated development

Cable Route Search Corridor

Note: Energy Storage to be located within Cottam 1 only

N

1:15,000 @ A3

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Figure 3.3
Site Plan
Cottam 2

COTTAM SOLAR PROJECT

Island GREEN POWER

Lanpro

Key

Area for solar panels and associated development

Cable Route Search Corridor

Note: Energy Storage to be located within Cottam 1 only

N

1:15,000 @ A3

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Figure 3.4
Site Plan
Cottam 3

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Island GREEN POWER

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Key

Area for solar panels and associated development

Cable Route Search Corridor

Note: Energy Storage to be located within Cottam 1 only

N

1:25,000 @ A3

Drawn by: LH	REF:2981-REP-PL-CO-3.5
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Figure 3.5
Cottam Cable Route Search Area 1

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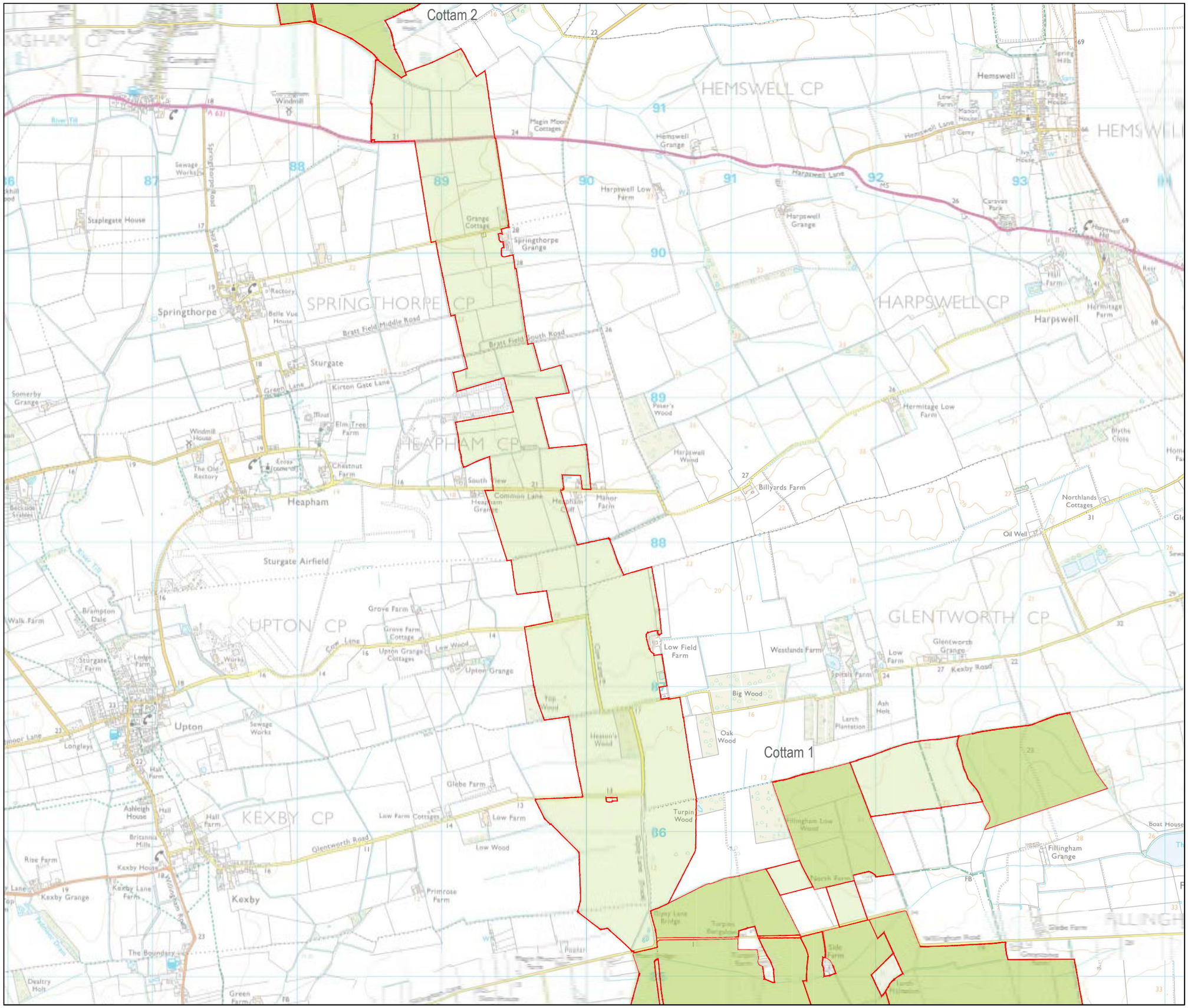

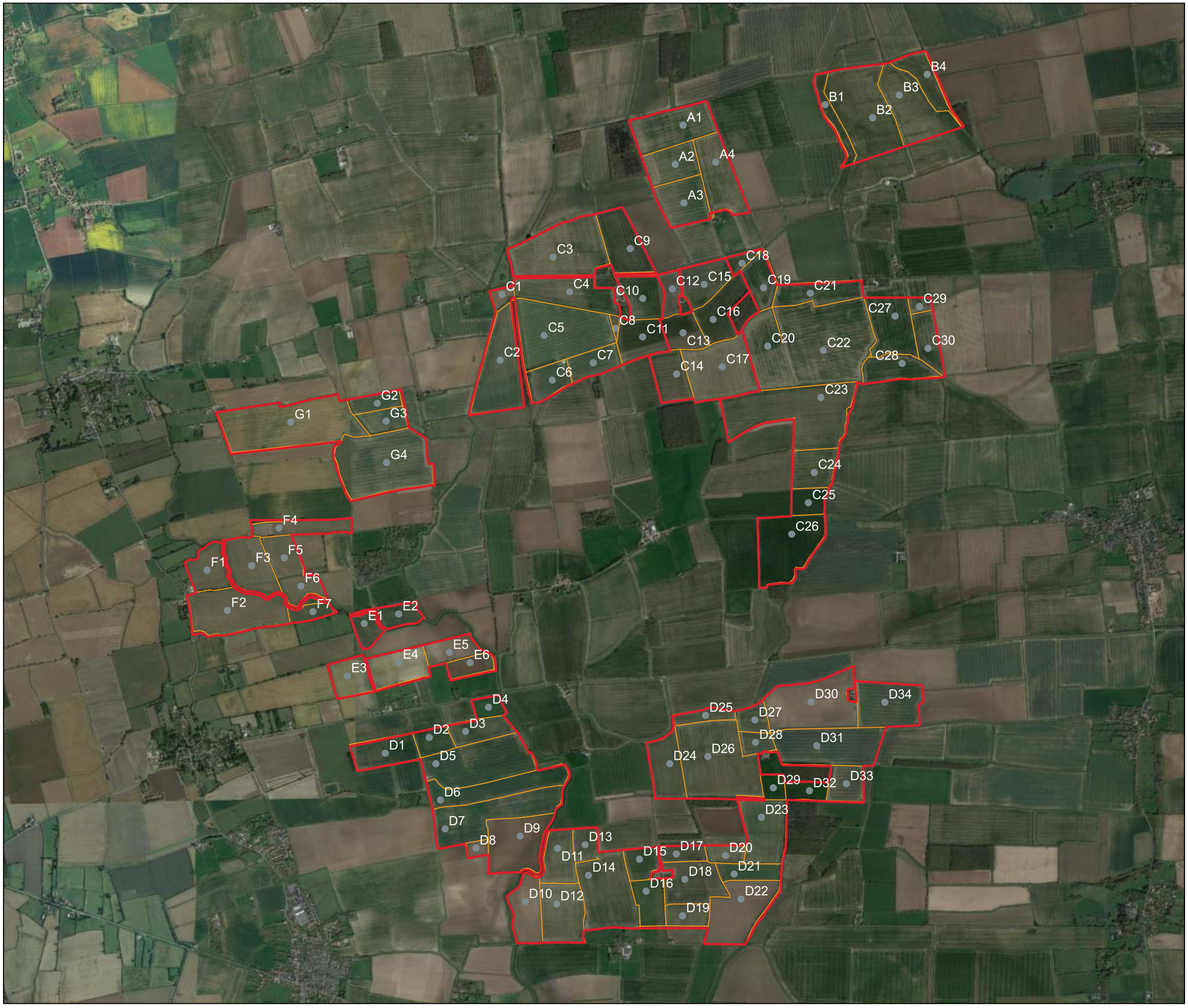

Island GREEN POWER

Lanpro

Key

Site Boundary

Field Parcel Reference

N

1:25000 @A3

0 0.5 1 1.5 km

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Figure 3.7
Field Numbering Plans
Cottam 1

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Island GREEN POWER

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Key

Site Boundary

Field Parcel Reference

N

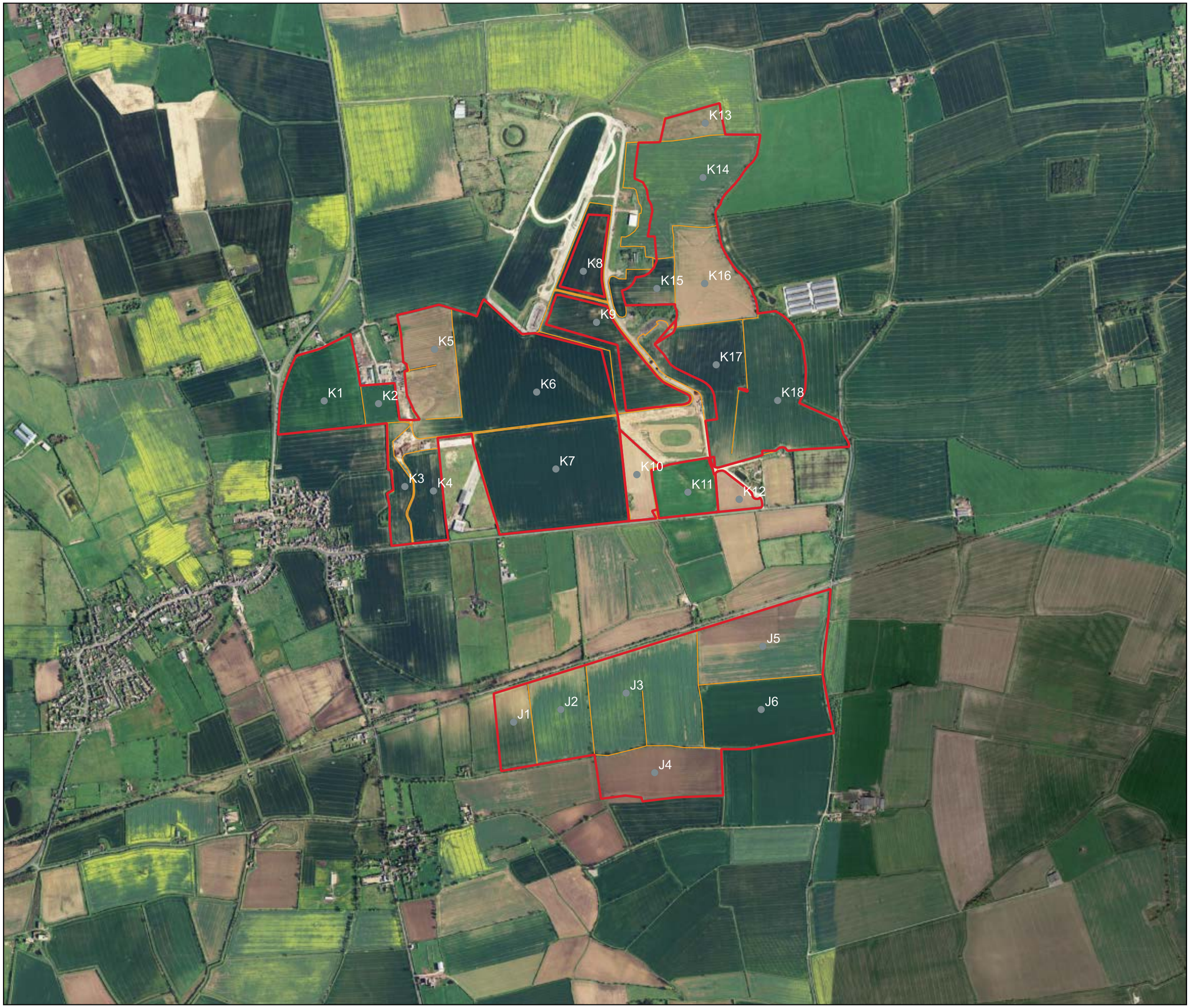
1:15000 @A3

0 0.25 0.5 0.75 km

Drawn by: LH	REF:2981-REP-PL-CO-3.8
Checked By: ID	Date:05/01/2022

Figure 3.8
Field Numbering Plans
Cottam 2

COTTAM SOLAR PROJECT



Island GREEN POWER

Lanpro

Key

Site Boundary

Field Parcel Number

N

1:15000 @A3

0 0.25 0.5 0.75 km

Drawn by: LH	REF:2981-REP-PL-CO-3.9
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Figure 3.9
Field Numbering Plans
Cottam 3

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EIA Scoping Report
Appendices to Chapter 5:
Legislative Context and Energy Policy

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5.1 Introduction

5.1.1 The ES will contain a chapter on Legislative Context and Energy Policy.

5.1.2 Regard will be had to the primary legislation and Energy Policy, national planning polices and guidance, and local planning policies in establishing receptors, likely effects and potential mitigation.

5.2 Primary Legislation

5.2.1 The Planning Act 2008 sets out the process for the consenting of major infrastructure projects as is the principal legislation governing the Examination of an application for a Nationally Significant Infrastructure Project (NSIP) and the basis for the decision whether to grant development consent.

5.2.2 Under the Act the Development constitutes an NSIP if:

- It consists of "the construction or extension of a generating station" (Section 14 (1)(a) of the Act);
- "it is in England" (Section 15(2)(a) of the Act); and
- "its capacity is more than 50 megawatts" (Section 15 (2) of the Act).

5.2.3 If a national policy statement (NPS) has effect in relation to the type of development to which the DCO relates then the Secretary of State must decide the DCO application in accordance with the relevant NPS (unless an exception applies) (Section 104 of the Act). If the DCO application relates to a type of development where no NPS has effect then the Secretary of State must have regard to the local impact report and any other important and relevant matters (Section 105 of the Act).

5.3 Energy Policy

5.3.1 National Policy Statements (NPS) set out the policy basis for NSIPs. At present, there is no NPS which specifically deals with ground mounted solar developments, and therefore Section 105 of the Act applies. However there are aspects of three Energy NPSs which are relevant to decision making and are important material considerations, in addition to other relevant and important national and local planning policies.. The Secretary of State will therefore have regard to: -

- National Policy Statement for Energy (EN-1);
- National Policy Statement for Renewable Energy Infrastructure (EN-3); and,
- National Policy Statement for Electricity Networks (EN-5)

5.3.2 It should be noted that the Department for Business, Energy and Industrial Strategy is currently undertaking a review of the six NPSs for energy infrastructure which was due to be complete by the end of 2021. As drafted the updated NPS EN3 on renewable energy has been expanded to provide policy on solar developments. Once the updated NPS EN3 has effect, the DCO application for the Scheme will be determined under s104 of the Act. Until the updated NPSs are designated, the existing NPSs remain the applicable national policy.

5.3.3 However, as confirmed in paragraph 1.6.3 of draft NPS EN-1, any emerging draft NPSs (or those designated but not having effect) are potentially capable of being important and relevant considerations in the decision-

making process. The extent to which they are relevant is a matter for the Secretary of State to consider within the framework of the Planning Act and with regard to the specific circumstances of each development consent order application. The relevant provisions of the emerging draft of NPS EN-3 are set out below for information and the relevant provisions of draft EN-1 and EN-5 will be included in the ES.

Adopted NPS EN-1: Energy

5.3.4 The key points from each of the five sections for these applications are set out below.

Part 1

5.3.5 This section introduces the role of the NPS in the planning system in providing national policy for energy infrastructure development, setting out the scope and geographic extent of the policies' application. This section describes the relationship between the overarching policy set out in the rest of NPS EN-1 with the other five associated energy NPSs, and the way in which the Planning Inspectorate (PINS) will use the NPSs for decision making is set out.

Part 2

5.3.6 This confirms the Government's commitments to meeting legally binding targets to reduce greenhouse gas emissions; acknowledges the need to transition to a low carbon economy in this; and emphasises the importance of maintaining a secure and reliable energy supply in the transition to a low carbon economy.

Part 3

5.3.7 The need for energy infrastructure is set out, confirming that the UK needs all the types of energy infrastructure covered in this NPS in order to achieve energy security at the same time as dramatically reducing greenhouse gas emissions. The need is described as urgent.

5.3.8 The NPS is clear that NSIP applications should therefore be assessed on the basis that the Government has already demonstrated that there is a need for those types of infrastructure and that the scale and urgency of that need is as described in the EN-1.

5.3.9 In considering the importance of the need for these projects the NPS is clear that the determining authority should give substantial weight to the contribution which projects would make towards satisfying this need when considering applications for development consent under the Planning Act 2008.

5.3.10 Part 3.4 of EN-1 covers renewable energy, including its importance in tackling climate change, reducing carbon dioxide emissions and job creation.

Part 4

5.3.11 Part 4 covers the provisions to be covered in making an assessment of energy applications. Importantly, this includes:

- The determining authority should start with the presumption in favour of granting consent to applications for energy NSIPs. That presumption applies unless any more specific and relevant polices set out in the relevant NPSs clearly indicate that consent should be refused.

- In making a judgement, the determining authority should consider the development's potential benefits including its contribution to meeting the need for energy infrastructure, job creation and any long-term or wider benefits; and its potential adverse impacts, including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.

5.3.12 Development Consent Obligations should be relevant to planning, necessary to make the proposed development acceptable in planning terms, directly relates to the proposed development, fairly and reasonably related in scale and kind to the proposed development, and reasonable in all other respects.

5.3.13 Whilst applicants are required to consider alternatives through the EIA process, the NPS does not require this, and it states that there is no requirement to establish whether the proposed project represents the best option.

5.3.14 Part 4 also covers design and technical considerations, which are summarised here:

- Design: Applying "good design" to energy projects should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible. It is acknowledged, however that the nature of much energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area.
- Capacity: The connection of a proposed electricity generation plant to the electricity network is an important consideration for applicants wanting to construct or extend generation plant. In the market system, it is for the applicant to ensure that there will be necessary infrastructure and capacity within an existing or planned transmission or distribution network to accommodate the electricity generated.
- Land Use: Justification should be provided for locating sites on best and most versatile agricultural land. there may be little that can be done to mitigate the direct effects of an energy project on the existing use of the proposed site.
- Landscape and Visual: Projects need to be designed carefully, having regard to siting, operational and other relevant constraints the aim should be to minimise harm to the landscape, providing reasonable mitigation where possible and appropriate.
- Biodiversity and Geological Conservation: Development should aim to avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives; where significant harm cannot be avoided, then appropriate compensation measures should be sought.
- Historic Environment: As part of the ES the applicant should provide a description of the significance of the heritage assets assessed by the proposed development and the contribution of their setting to that significance. The level of detail should be

proportionate to the importance of the heritage asset and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset. In considering the impact of the proposed development on any heritage asset, the determining authority should take into account the particular nature of the significance of the heritage assets and the value that they hold for this and future generations. This understanding should be used to avoid or minimise conflict between conservation of that significance and proposals for development.

- Dust, Odour and Artificial Lighting: Some impacts on amenity for local communities is likely to be unavoidable. The aim should be to keep impacts to a minimum, and at a level that is acceptable.
- Flood Risk: projects should not increase the volume or flow rate of surface water leaving the site.
- Air Quality and Emissions: Where the project is likely to have adverse effects on air quality the applicant should undertake an assessment of the impacts of the proposed project as part of the Environmental Statement. This should cover emissions at different stages of the projects, including construction. Environmental impacts need to also be considered, including eutrophication.
- Socio Economic: Impacts should be considered through the ES. These should include services, infrastructure, tourism, phasing, population change and social cohesion and cumulative effects.
- Traffic and Transport: Impacts should be mitigated where possible. PINS will consider additional requirements where the mitigation measures are insufficient to reduce the impacts.
- Water Quality: Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent

Adopted NPS EN-3: Renewable Energy Infrastructure

5.3.15 EN-3 applies to renewable energy projects but does not cover ground mounted solar projects and therefore is not considered to be relevant to the Scheme as currently adopted.

Adopted NPS EN-5: Electricity Networks

5.3.16 EN-5 should be applied where an application includes an electricity generating station and any associated underground cables and substations therefore constitute associated development. Part 2 of the Statement outlines technical and assessment criteria, as well as outlining the technical relationship between existing electrical infrastructure and the location of new generating developments.

Draft Revised National Policy Statement EN-3 'Renewable Energy Infrastructure'

Description of Development and Flexibility

5.3.17 Draft EN3 outlines the key considerations which should be had in relation to flexibility. The draft (p.85, paragraphs 2.49.14-2.49.17) outlines:

'Many different makes and models of solar panel arrays are available, each with differing size, mounting, and generating capacity. Associated infrastructure (such as inverters or transformers) may also vary depending on the model of the panels.

As set out in Chapter 4 of EN-1, at the time of application, solar farm operators may have multiple commercial agreements under consideration and may not know precisely which panels will be procured for the site until sometime after any consent has been granted. If panel details, or any other relevant information, are not available, then the applicant should assess the worst-case effects that the project could have (as set out in EN-1 paragraph 4.2.6) to ensure that the project as it may be constructed has been properly assessed. In this respect some flexibility should be provided in the consent.

In the case of solar farms, it is likely that this flexibility will be needed in relation to the dimensions of the panels and their layout and spacing. It may also be the case that applicants seek flexibility for the installation of energy storage, with the option to install further panels as a substitute. When this is the case, applications may include a range of options based on different panel numbers, types and layout, with and without storage. The maximum impact case scenario will be assessed and the Secretary of State will consider the maximum adverse effects in its consideration of the application and consent.

Where other specific details of the design of the site are uncertain at the time of application, this should be made clear by the applicant with the reasons for the uncertainty given. Where elements of the design of the scheme are unknown, the maximum impact case scenario should be assessed, and the Secretary of State should consider the maximum adverse effects in its consideration of the application and consent'.

Temporary nature of solar farms

5.3.18 Draft EN3 outlines the key considerations which should be had in relation to the temporary nature of solar farms, and their decommissioning. The draft (pp.84-85, paragraphs 2.49.9-2.49.13) outlines:

'Solar panels typically have a design life of between 25 and 30 years, although this can sometimes be longer, and can be decommissioned relatively easily and cheaply. Solar panel efficiency deteriorates over time and applicants may elect to replace panels during the lifetime of the site. Applicants may apply for consent for a specified period, based on the design life of the panels. Such consent, where granted, is described as temporary because there is a finite period for which it exists, after which the project would cease to have consent and therefore must seek to extend the period of consent or be decommissioned and removed.

The nature and extent of decommissioning of a site can vary. Generally, the panel arrays and mounting structures will always be decommissioned with any underground cabling dug out to ensure that prior use of the site can continue.

Applications should set out what would be decommissioned and removed from the site at the end of the operational life of the generating station. There may be some instances where it may be less harmful for the ecology of the site to keep or retain certain types of infrastructure. Furthermore, there may be socio-economic benefits in retaining site infrastructure after the operational life, such as retaining pathways through the site or a site substation.

Where the consent for a solar farm is to be time-limited, the DCO should impose a requirement setting that time-limit from the date the solar farm starts to generate electricity. Such a requirement should also secure the decommissioning of the generating station after the expiration of its permitted operation to ensure that inoperative plant is removed after its operational life. A limit of 25 years is typical, although applicants may seek consent for differing time-periods for operation.

The time-limited nature of solar farms, where a time-limit is sought by an applicant as a condition of consent, is likely to be an important consideration for the Secretary of State when assessing impacts such as landscape and visual effects and potential effects on the settings of heritage assets. Such judgements should include consideration of the period of time sought by the applicants for the generating station to operate. The extent to which the site will return to its original state may also be a relevant consideration'.

Site Selection

5.3.19 The Draft National Policy Statement for Renewable Energy Infrastructure outlines what the Government consider to be the 'key considerations involved in the siting of a solar farm' (p.79, paragraph 2.48.1).. They are generally representative of how the industry undertakes site selection:

Considerations 1 and 3: Irradiance and site topography and capacity of a site

Irradiance

5.3.1 Draft EN3 (pp.79-80, paragraph 2.48.2-2.483) outlines:

'Irradiance will be a key consideration for the applicant in identifying a potential site as the amount of electricity generated on site is directly affected by irradiance levels. Irradiance of a site will in turn be affected by surrounding topography, with an uncovered or exposed site of good elevation and favourable south-facing aspect more likely to increase year-round irradiance levels. This in turn affects the carbon emission savings and the commercial viability of the site.

In order to maximise irradiance, applicants may choose a site and design its layout with variable and diverse panel aspects, and panel arrays may also follow the movement of the sun in order to further maximise the solar resource.'

Capacity

5.3.2 Draft EN3 (pp.80-81, paragraphs 2.48.5-2.48.9) outlines:

'In order for a solar farm to generate electricity efficiently, site layout must be designed so as to maximise irradiance levels, and the panel array spacing should also seek to maximise the potential power output of the site. The type, spacing and aspect of panel arrays will depend on the physical characteristics of the site such as site elevation. However, this is a matter for the applicant.

Solar panels generate electricity in direct current (DC) form. A number of panels feed an external inverter, which is used to convert the electricity to alternating current (AC). After inversion a transformer will step-up the voltage for export to the grid. Because the inverter is separate from the panels, the total capacity of a solar farm can be measured either in terms of the combined capacity of installed solar panels (measured in DC) or in terms of combined capacity of installed inverters (measured in AC).

For the purposes of determining the capacity thresholds in Section 15 of the 2008 Act, all forms of generation other than solar are currently assessed on an AC basis, while solar farms are assessed on their DC capacity. Having reviewed this matter, the Secretary of State is now content that this disparity should end, particularly as electricity from some other forms of generation is switched between DC and AC within a generator before it is measured. Therefore, from the date of designation of this NPS, for the purposes of Section 15, the combined capacity of the installed inverters (measured in AC) should be used for the purposes of determining solar site capacity. The capacity threshold is 50MW (AC) in England and 350MW (AC) in Wales.

It should also be noted that the DC installed generating capacity of a solar farm will decline over time in correlation with the reduction in panel array efficiency. Light induced degradation affects most solar panels and on average panels degrade at a rate of up to 1% each year. Applicants may account for this by overplanting solar panel arrays. Therefore, AC installed export capacity should not be seen as an appropriate tool to constrain the impacts of a solar farm. Other measurements, such as panel size, total area and percentage of ground cover should be used to set the maximum extent of development when determining the planning impacts of an application.

Nothing in this section should be taken to change any development consent or other planning permission granted prior to the designation of this NPS. Any such permission should be interpreted on the basis upon which it was examined and granted. In particular, any permissions granted on the basis of a DC installed generating capacity should be built on that basis, unless an amendment is made to that permission and the difference in impacts is considered.'

Consideration 2: Proximity of a site to dwellings

5.3.3 Draft EN3 (p.80, paragraph 2.48.4) outlines:

'Utility-scale solar farms are large sites that may have a significant zone of visual influence. The two main impact issues that determine distances to sensitive receptors are therefore likely to be visual amenity and glint and glare. These are considered in Landscape, Visual and Residential Amenity (Section 2.51) and Glint and Glare (Section 2.52) impact sections below.'

Consideration 4: Grid connection

5.3.4 Draft EN3 (p.81, paragraphs 2.48.10-2.48.12) outlines:

'The connection of the proposed solar farm into the relevant electricity network will be an important consideration for applicants of solar. The grid connection text at Section 4.10 in EN-1 sets out the important issues.

Most solar farms are connected into the local distribution network. The capacity of the local grid network to accept the likely output from a proposed solar farm is critical to the technical feasibility of a development and as such some larger developments may seek connection to the

transmission network if there is available network capacity and/or supportive infrastructure. The connection voltage, availability of network capacity, and the distance from the solar farm to the existing network can have a significant effect on the commercial feasibility of a development proposal.

The applicant may choose a site based on nearby available grid export capacity. Locating solar farms at places with grid connection capacity enables the applicant to maximise existing grid infrastructure, minimise disruption to local community infrastructure or biodiversity and reduce overall costs. Where this is the case, consideration should be given to the cumulative impacts of situating a solar farm in proximity to other energy generating stations and infrastructure'.

Consideration 5: Agriculture land classification and land type

5.3.5 Draft EN3 (p.82, paragraphs 2.48.13-2.48.15) outlines:

'Solar is a highly flexible technology and as such can be deployed on a wide variety of land types. Where possible, ground mounted Solar PV projects should utilise previously developed land, brownfield land, contaminated land, industrial land, or agricultural land preferably of classification 3b, 4, and 5 (avoiding the use of "Best and Most Versatile" cropland where possible). However, land type should not be a predominating factor in determining the suitability of the site location.

The Agricultural Land Classification (ALC) is the only approved system for grading agricultural quality in England and Wales and should be used to establish the ALC and identify the soil types to inform soil management at the construction, operation and decommissioning phases. This should be extended to the underground cabling and access routes. The soil survey may also inform the suitable beneficial use of the land during the operational phase. Criteria for grading the quality of agricultural land using the Agricultural Land Classification (ALC) of England and Wales is decided by Natural England and considerations relating to land classification are expected to be made with reference to this guidance, or any successor to it.

Whilst the development of ground mounted solar arrays is not prohibited on sites of agricultural land classified 1, 2 and 3a, or designated for their natural beauty, or recognised for ecological or archaeological importance, the impacts of such are expected to be considered and are discussed under paragraphs 2.50 and 2.53. It is recognised that at this scale, it is likely that applicants' developments may use some agricultural land, however applicants should explain their choice of site, noting the preference for development to be on brownfield and non-agricultural land'.

Consideration 6: Accessibility

5.3.6 Draft EN3 (p.82, paragraph 2.48.16) outlines:

'Applicants will need to consider the suitability of the access routes to the proposed site for both the construction and operation of the solar farm with the former likely to raise more issues. Section 5.14 of EN-1 advises on generic traffic and transport impacts while those which are specific to solar farms are considered under Section 2.54 of this NPS. Given that potential solar farm sites are largely in rural areas, access for the delivery of solar arrays and associated infrastructure during construction can be a significant consideration for solar farm siting.'

Site Layout, Design and Appearance

5.3.7 Draft EN3 (pp.83-84, paragraphs 2.49.3-2.49.8) outlines:

'Developers will consider several factors when considering the location and layout of sites including levels of solar irradiance, proximity to available grid capacity to accommodate the scale of generation, predominance of open land, topography (a flat topography is often favoured), previous land use and ability to mitigate environmental impacts and any flood risk.

In terms of design and layout, developers may favour a south-facing arrangement of panels to maximise output although other orientations may be chosen. For example, an east-west layout, whilst likely to result in reduced output compared to south-facing panels on a panel-by-panel basis, may allow for a greater density of panels to compensate and therefore for generation to be spread more evenly throughout the day.

Considering the likely extent of solar sites, it is possible that proposed developments may affect the provision of local footpath networks and public rights of way. Public rights of way may need to be temporarily stopped up to enable construction; however it should be the applicant's intention, where practicable and safe, to keep all public rights of way that cross the proposed development site open during construction and to protect users where a public right of way borders or crosses the site. Developers are encouraged to design the layout and appearance of the site to ensure continued recreational use of public rights of way, where possible during construction, but in particular across the operation of the site, and to minimise as much as possible the visual outlook from existing footpaths. It should be noted that sites may provide the opportunity to facilitate enhancements to the local footpath network and the adoption of new public rights of way through site layout and design of access.

It is anticipated that detail on how public rights of way would be managed to ensure they are safe to use is detailed in an outline Public Rights of Way Management Plan.

It is likely that extensive underground cabling will be required to connect the electrical assets of the site, such as from the substation to the panel arrays or storage facilities. In the case of underground cabling, developers are expected to provide a method statement describing cable trench design, installation methodology, as well as details of the operation and maintenance regime.

Security of the site is likely to be a key consideration for developers. When considering sites, developers may wish to consider the availability of natural defences such as steep gradients, hedging and rivers. Perimeter security measures such as fencing, electronic security, CCTV and lighting may also be needed, with the measures chosen considered on a site-specific basis. The visual impact of these security measures, as well as the impacts on local residents, including for example issues relating to intrusion from CCTV and light pollution in the vicinity of the site, should be assessed'.

Landscape and Arboriculture

5.3.8 Draft EN3 section 2.51 outlines:

'Generic landscape and visual impacts are covered in Section 5.10 of EN-1. In addition, there are specific considerations which apply to solar panels, which are set out in the following paragraphs.

The approach to assessing cumulative landscape and visual impact of large-scale solar farms is likely to be the same as assessing other onshore energy infrastructure. Solar farms are likely to be in low lying areas of

good exposure and as such may have a wider zone of visual influence than other types of onshore energy infrastructure. However, whilst it may be the case that the development covers a significant surface area, in the case of ground-mounted solar panels it should be noted that with effective screening and appropriate land topography the area of a zone of visual influence could be zero.

Applicant's assessment

The applicant should carry out a landscape and visual assessment and report it in the ES. Visualisations may be required to demonstrate the effects of a proposed solar farm on the setting of heritage assets and any nearby residential areas or viewpoints.

Applicants should follow the criteria for good design set out in Section 4.6 of EN-1 when developing projects and will be expected to direct considerable effort towards minimising the landscape/visual impact of solar PV arrays. Whilst there is an acknowledged need to ensure solar PV installations are adequately secured, required security measures such as fencing should consider the need to minimise the impact on the landscape and visual impact.

The applicant should have regard in both the design layout of the solar farm, and future maintenance plans, to the retention of growth of vegetation on boundaries, including the opportunity for individual trees within the boundaries to grow on to maturity. The landscape and visual impact should be considered carefully at the pre-application stage. Existing hedges and established vegetation, including mature trees, should be retained wherever possible. Trees and hedges should be protected during construction. The impact of the proposed development on established trees and hedges should be informed by a tree survey or a hedge assessment as appropriate.

Mitigation

Applicants should consider the potential to mitigate landscape and visual impacts through, for example, screening with native hedges. Efforts should be made to minimise the use and height of security fencing. Where possible projects should utilise existing features, such as hedges or landscaping, to screen security fencing and use natural features, such as vegetation planting, to assist in site security. Projects should minimise the use of security lighting. Any lighting should utilise a passive infra-red (PIR) technology and should be designed and installed in a manner which minimises impact.

Secretary of State decision making

The Secretary of State will consider visual impact of any proposed solar PV farm, taking account of any sensitive visual receptors, and the effect of the development on landscape character, together with the possible cumulative effect with any existing or proposed development'.

Ecology and Biodiversity

5.3.9 Draft EN3 section 2.50 outlines:

'Generic biodiversity, ecology and geological impacts are covered in Section 5.4 of EN-1. In addition, there are specific considerations which apply to solar farms as set out below.

Assessment

The applicant's ecological assessments should identify any ecological risk from developing on the proposed site. Issues that may need assessment include habitats, ground nesting birds, wintering birds, bats, dormice, reptiles, great crested newts, water voles and badgers. The use of an advising ecologist during the design process can ensure that adverse impacts are mitigated, and biodiversity enhancements are maximised, although this is a decision for the individual applicant. The assessment may be informed by a 'desk study' of existing ecological records, an evaluation of the likely impacts of the solar farm upon ecological features and should specify mitigation to avoid or minimise these impacts, and any further surveys required.

The assessment should consider earthworks associated with construction compounds, access roads and cable trenching. Where such soil stripping occurs topsoil and subsoil should be stripped, stored, and replaced separately in order to minimise soil damage and to provide optimal conditions for site restoration. Soil handling may be informed through a soil and Agricultural Land Classification (ALC) survey, with detailed guidance available in Defra's guidance on Construction Code of Practice for the Sustainable Use of Soils on Construction Sites46 or any subsequent updates.

The assessment should consider how security and lighting installations may impact on the local ecology. Where pole mounted CCTV facilities are proposed the location of these facilities should be carefully considered in order to minimise impact. If lighting is necessary, it should be minimised and directed away from areas of likely habitat.

The assessment should consider how site boundaries are managed. If any hedges/scrub are to be removed, further surveys may be necessary to account for impacts. Buffer strips between perimeter fencing and hedges may be proposed, and the construction and design of any fencing should account for enabling mammal, reptile and other fauna access into the site if required to do so in the ecological report.

The assessment should consider the impacts of mobile arrays or trackers (if proposed) to avoid animals becoming trapped in moving parts….

The assessment should consider enhancement, management, and monitoring of biodiversity. Solar farms have the potential to increase the biodiversity value of a site, especially if the land was previously intensively managed. In some instances, the increase in biodiversity caused by the repurposing of previously developed or intensely managed land for solar generation may equate to a net positive impact….

Mitigation

Proposed enhancements should take account of the above factors and as set out in Section 5.4 of EN1 and aim to achieve environmental and biodiversity net gain in line with the ambition set out in the 25 Year Environment Plan. This might include maintaining or extending existing habitats and potentially creating new important habitats, for example by instating: cultivated strips/plots for rare arable plants, rough grassland margins, bumble bee plant mixes, and wild bird seed mixes. It is advised that an ecological monitoring programme is developed to monitor impacts upon the flora of the site and upon any particular ecological receptors (e.g., bats and wintering birds). Results of the monitoring will then inform any changes needed to the land management of the site, including, if appropriate, any livestock grazing regime.

Secretary of State decision making

.....

In addition to Section 5.4 of EN-1 there are specific considerations which should inform Secretary of State decision-making where developments are proposed on peat. In these cases, the Secretary of State should be satisfied that the solar farm layout and construction methods have been designed to minimise soil disturbance when building and maintaining roads and tracks and other infrastructure. This is to ensure the development will result in minimal disruption to the ecology, or release of CO2 and that the carbon balance savings of the scheme are maximised'.

Built Heritage and Archaeology

5.3.10 Draft EN3 section 2.53 outlines:

'Historic environment impacts are covered in Section 5.9 of EN-1. However, with respect to solar farms, the following considerations also apply.

The impacts of solar PV developments on the historic environment will require expert assessment in most cases. Solar PV developments may affect heritage assets (sites, monuments, buildings, and landscape) both above and below ground. Above ground impacts may include the effects of applications on the setting of Listed Buildings and other designated heritage assets as well as on Historic Landscape Character. Below ground impacts may include direct impacts on archaeological deposits through ground disturbance associated with trenching, cabling, foundations, fencing, temporary haul routes etc. Equally archaeological finds may be protected by a solar PV farm as the site is removed from regular ploughing and shoes or low-level piling is stipulated.

Applicant's assessment

It is anticipated that the applicant's assessment will be informed by a consultation with the Historic Environment Record (HER). Alternatively, the applicant may contact the local authority for this information. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, the applicant should submit an appropriate desk-based assessment and, where necessary, a field evaluation. These are expected to be carried out, using expertise where necessary and in consultation with the local planning authority, and should identify archaeological study areas and propose appropriate schemes of investigation, and design measures, to ensure the protection of relevant heritage assets.

In some instances, field studies may include investigative work such as trial trenching beyond the boundary of the proposed site to assess the impacts of any underground cabling on archaeological assets. The extent of investigative work should be proportionate to the sensitivity of, and extent of proposed cabling in, the associated study area.

Applications should take account of the results of historic environment assessments in their design, for instance through the sensitive planning of installations. The applicant should consider what steps can be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting. As the significance of a heritage asset derives not only from its physical presence, but also from its setting, careful consideration should be given to the impact of large-scale solar farms on such assets. Depending on their scale, design and prominence, a large-scale solar farm within the

setting of a heritage asset may cause substantial harm to the significance of the asset. Visualisations may be required to demonstrate the effects of a proposed solar farm on the setting of heritage assets.

Mitigation

The ability of the applicants to microsite specific elements of the proposed development during the construction phase should be an important consideration by the Secretary of State when assessing the risk of damage to archaeology. Therefore, where requested by the applicant, the Secretary of State should consider granting consents which allow for the micro siting within a specified tolerance of elements of the permitted infrastructure so that precise locations can be amended during the construction phase in the event that unforeseen circumstances, such as the discovery of previously unknown archaeology, arise.

Secretary of State decision making

Consistent with the generic policy on historic environmental impacts in EN1 (Section 5.9) the Secretary of State should be satisfied that solar farms and associated infrastructure have been designed sensitively taking into account known heritage assets and their status.

Solar farms are generally consented on the basis that they will be time-limited in operation. The Secretary of State should therefore consider the length of time for which consent is sought when considering the impacts of any indirect effect on the historic environment, such as effects on the setting of designated heritage assets'.

Flood Risk and Drainage

5.3.11 Draft EN3 section 2.50 outlines:

'The applicant's assessment may be accompanied by a Flood Risk Assessment. This will need to consider the impact of drainage. As solar PV panels will drain to the existing ground, the impact will not in general be significant. Where access tracks need to be provided, permeable tracks should be used, and localised Sustainable Drainage Systems (SuDS), such as swales and infiltration trenches, should be used to control any run-off where recommended. Given the temporary nature of solar PV farms, sites should be configured or selected to avoid the need to impact on existing drainage systems and watercourses. Culverting existing watercourses/drainage ditches should be avoided. Where culverting for access is unavoidable, it should be demonstrated that no reasonable alternatives exist and where necessary it will only be in place temporarily for the construction period...

The applicant should consider whether they need to provide geotechnical and hydrological information (such as identifying the presence of peat at each site) including the risk of landslide connected to any development work...

Secretary of State decision making

Water management is a critical component of site design for ground mount solar plants. Where previous management of the site has involved intensive agricultural practice, solar sites can deliver significant ecosystem services value in the form of drainage, flood attenuation, natural wetland habitat, and water quality management. The maximum impact case scenario will be assessed, and the Secretary of State will consider the maximum adverse effects in its consideration of the application and consent'.

Highways and Access

5.3.12 Draft EN3 (p.83, paragraph 2.49.2) outlines:

'Applicants will sometimes need to construct access tracks to connect solar farms to the public road network. Applications should include the full extent of the access tracks necessary and an assessment of their effects. Developers will usually need to construct on-site access routes for operation and maintenance activities, such as footpaths, earthworks or landscaping. Applications should include the full extent of the access routes for operation and maintenance and their effects'.

5.3.13 Draft EN3 section 2.54 outlines:

'*Generic traffic and transport impacts are covered in EN-1, Section 5.14. In addition, there are specific considerations which apply to solar farms as set out below. Public perception of the construction phase of solar farm will derive mainly from the effects of traffic movements.*

Many solar farms will be sited in areas served by a minor road network. Modern solar farms are large sites that are mainly comprised of small structures that can be transported separately and constructed on-site. It is likely that applicants will designate a construction compound on-site for the delivery and assemblage of the necessary components. Traffic is likely to involve smaller vehicles than typical onshore energy infrastructure but may be more voluminous. It is important that all sections of roads and bridges on the proposed delivery route can accommodate the weight and volume of the loads.

Applicant's assessment

The applicant should have assessed the various potential routes to the site for delivery of materials and components where the source of the materials is known at the time of the application and selected the route that is the most appropriate. It is possible that the exact location of the source of construction materials, such as crushed stone or concrete will not be known at the time of the application to the Secretary of State. In these circumstances, the impact of additional vehicles on the likely potential routes should have been assessed.

The applicant should assess whether the access roads are suitable for the transportation of components which will include whether they are sufficiently wide for the proposed vehicles, or bridges sufficiently strong for the heavier components to be transported to the site. It is unlikely that sections of the route will require modification to allow for the transportation of components to the site, given the nature of solar developments, but any potential modifications should be identified, and potential effects assessed as part of the ES.

There may be several other energy infrastructure developments proposed that use a common port and/or access route and pass through the same towns. It is common for solar farms to locate where there is existing or surplus grid capacity, for instance. Where a cumulative impact is likely then a cumulative transport assessment should form part of the ES to consider the impacts of abnormal traffic movements relating to the project in question in combination with those from any other relevant development. Consultation with the relevant local highways authorities is likely to be necessary.

Mitigation

In some cases, the local highways authority may request that the Secretary of State impose controls on the number of vehicle movements to and from the solar farm site in a specified period during its construction and, possibly, on the routeing of such movements particularly by heavy vehicles. Where the Secretary of State agrees that this is necessary considering all representations, this could be achieved by imposing suitable requirements on development consent.

Where cumulative effects on the local road network or residential amenity are predicted from multiple solar farm developments, it may be appropriate for applicants for various projects to work together to ensure that the number of abnormal loads and deliveries are minimised, and the timings of deliveries are managed and coordinated to ensure that disruption to local residents and other highway users is reasonably minimised. It may also be appropriate for the highway authority to set limits for and coordinate these deliveries through active management of the delivery schedules through the abnormal load approval process.

Once consent for a scheme has been granted, applicants should liaise with the relevant local highway authority (or other coordinating body) regarding the start of construction and the broad timing of deliveries. It may be necessary for an applicant to agree a planning obligation to secure appropriate measures, including restoration of roads and verges. It may be appropriate for any non-permanent highway improvements carried out for the development (such as temporary road widening) to be made available for use by other subsequent solar farm developments.

Secretary of State decision making

Consistent with the generic policy set out in EN-1, the Secretary of State should be satisfied, taking into account the views of the relevant local highway authorities, that if there are abnormal loads proposed, they can be safely transported in a way that minimises inconvenience to other road users and that the environmental effects of this and other construction traffic, after mitigation, are acceptable.

Once solar farms are in operation, traffic movements to and from the site are generally very light, in some instances as little as a few visits each month by a light commercial vehicle or car. Should there be a need to replace machine components, this may generate heavier commercial vehicle movements, but these are likely to be infrequent. Therefore, it is very unlikely that traffic or transport impacts from the operational phase of a project would prevent it from being approved by the Secretary of State'.

Glint and Glare

5.3.14 Draft EN3 section 2.52 outlines:

'Solar panels may reflect the sun's rays, causing glint and glare. Glint is defined as a momentary flash of light that may be produced as a direct reflection of the sun in the solar panel. Glare is a continuous source of excessive brightness experienced by a stationary observer located in the path of reflected sunlight from the face of the panel. The effect occurs when the solar panel is stationed between or at an angle of the sun and the receptor.

In some instances, it may be necessary to seek a glint and glare assessment as part of the application. This may need to account for 'tracking' panels if they are proposed as these may cause differential diurnal and/or seasonal impacts. The potential for solar PV panels, frames

and supports to have a combined reflective quality should be assessed. This assessment needs to consider the likely reflective capacity of all of the materials used in the construction of the solar PV farm.

Mitigation

Applicants should consider using, and in some cases the Secretary of State may require, solar panels to be of a non-glare/ non-reflective type and the front face of the panels to comprise of (or be covered) with a non-reflective coating for the lifetime of the permission.

Secretary of State decision making

Solar PV panels are designed to absorb, not reflect, irradiation. However, the Secretary of State should assess the potential impact of glint and glare on nearby homes and motorists.

There is no evidence that glint and glare from solar farms interferes in any way with aviation navigation or pilot and aircraft visibility or safety. Therefore, the Secretary of State is unlikely to have to give any weight to claims of aviation interference as a result of glint and glare from solar farms'.

5.4 Other Planning Policies

5.4.1 The planning policies considered relevant to the scheme, and will be used in assessment comprise the following.

National Planning Policy

5.4.2 National Planning Policy Framework (NPPF) (as amended February 2019)

- Paragraph 11 - presumption in favour of sustainable development.
- Paragraph 148 - low carbon future in a changing climate
- Paragraph 150 - Planning for Climate Change
- Paragraph 151 - renewable and low carbon energy
- Paragraph 154 - determining planning applications for renewable and low carbon development
- Paragraphs 170 to 173 - the natural environment landscape value
- Paragraphs 174 to 177 - protecting and enhancing habitats and biodiversity
- Paragraphs 189 to 198 - proposals affecting heritage assets,
- Section 16 - Conserving and enhancing the historic environment
- Paragraphs 193 to 202 - conservation and enhancement of the historic environment
- Paragraph 193 - heritage assets
- Paragraph 195 - harm to the significance of a designated heritage asset

5.4.3 Planning Practice Guidance (PPG) (as amended March 2015):

- Paragraph ID 5-013 – Impacts of Solar Farms

5.4.4 Host Authority Planning Policies from the following documents:

- Central Lincolnshire Local Plan 2012-2036 (Adopted 2017)
- Neighbourhood Plans:
  - Saxilby with Ingleby Neighbourhood Plan
  - Sturton by Stow and Stow Neighbourhood Plan
  - Corringham Neighbourhood Plan (emerging)
  - Laughton Neighbourhood Plan (emerging)
- Bassetlaw District Council Core Strategy (Adopted 2011)
- Nottinghamshire Minerals Local Plan (2021)Lincolnshire Minerals and Waste Local Plan (Core Strategy & Development Management Policies (June 2016) and Site Locations (Dec. 2017) documents).
- Greater Lincolnshire Enterprise Partnership Strategic Economic Plan
- Growth Strategy for Lincoln
- Lincolnshire Joint Health and Wellbeing Strategy
- Lincolnshire Joint Strategic Needs Assessment
- Corporate Plans for City of Lincoln, North Kesteven and West Lindsey
- Lincolnshire Biodiversity Action Plan
- Lincolnshire Local Transport Plan and local transport strategies
- Joint Lincolnshire Flood Risk and Drainage Management Strategy

Cottam Solar Project

EIA Scoping Report
Appendix to Chapter 7: Landscape and Visual

January 2022

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7.1 Landscape and Visual Figures

Figure 7.1 Site Location and Study Area
Figure 7.2 Aerial Photography
Figure 7.3 Landform
Figure 7.4 Landscape Character: National
Figure 7.5 Landscape Character: Regional
Figure 7.6 Landscape Receptors
Figure 7.7 Visual Receptors
Figure 7.8 Bare Earth ZTV: Cottam 1
Figure 7.9 Bare Earth ZTV: Cottam 2
Figure 7.10 Bare Earth ZTV: Cottam 3
Figure 7.11 Augmented ZTV: Cottam 1
Figure 7.12 Augmented ZTV: Cottam 2
Figure 7.13 Augmented ZTV: Cottam 3

Island GREEN POWER

Lanpro

Key

- Site Boundary
- 5 km Landscape Study Area
- 2 km Landscape Study Area
- Main roads
- Secondary roads
- Road (generally more than 4m wide)
- Road (generally less than 4m wide)
- Other road, drive or track
- Path
- PRoW Footpath
- PRoW Bridleway
- PRoW Byway open to all traffic
- PRoW Restricted byway
- Other routes with public access
- Recreational route
- Watercourses
- Woodlands

N

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1:100,000 SCALE @A3

Drawn by: LH	Ref: 2893-REP-LAN-CO-7.1
Checked by: MT	Date: 23/11/2021

Figure 7.1
Cottam 1, 2 & 3
Site Location & Study Area

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Landscape and Visual Impact Assessment
Scoping

Island GREEN POWER

Lanpro

Key

- Site Boundary
- 5 km Landscape Study Area
- 2 km Landscape Study Area

N

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1:100,000 SCALE @A3

Drawn by: LH	Ref: 2893-REP-LAN-CO-7.2
Checked by: MT	Date: 23/11/2021

Figure 7.2
Cottam 1, 2 & 3
Aerial Photography

COTTAM SOLAR PROJECT
Landscape and Visual Impact Assessment
Scoping

Island GREEN POWER

Lanpro

Key

- Site Boundary
- 5 km Landscape Study Area
- 2 km Landscape Study Area

Landform (Digital Surface Model)

103 AOD (Above Ordinance Datum)

0 AOD

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Drawn by: LH	Ref: 2893-REP-LAN-CO-7.3
Checked by: MT	Date: 23/11/2021

Figure 7.3
Cottam 1, 2 & 3
Landform

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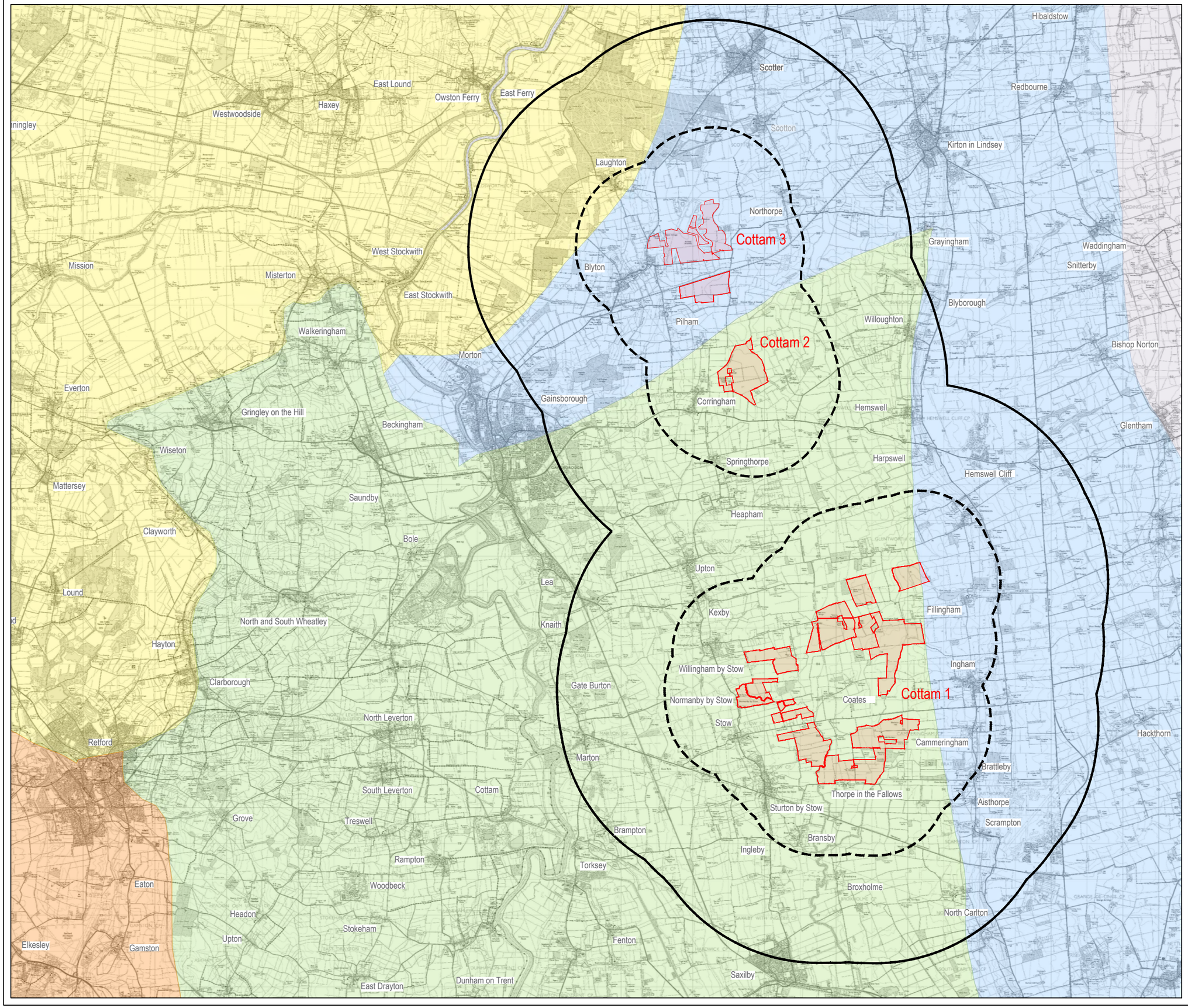
Landscape and Visual Impact Assessment
Scoping



Island GREEN POWER

Lanpro

Key

- Site Boundary
- 5 km Landscape Study Area
- 2 km Landscape Study Area

National Character Areas (NCA)

- 39 Humberhead Levels
- 45 Northern Lincolnshire Edge
- 48 Trent and Belvoir Vales
- 49 Sherwood

N

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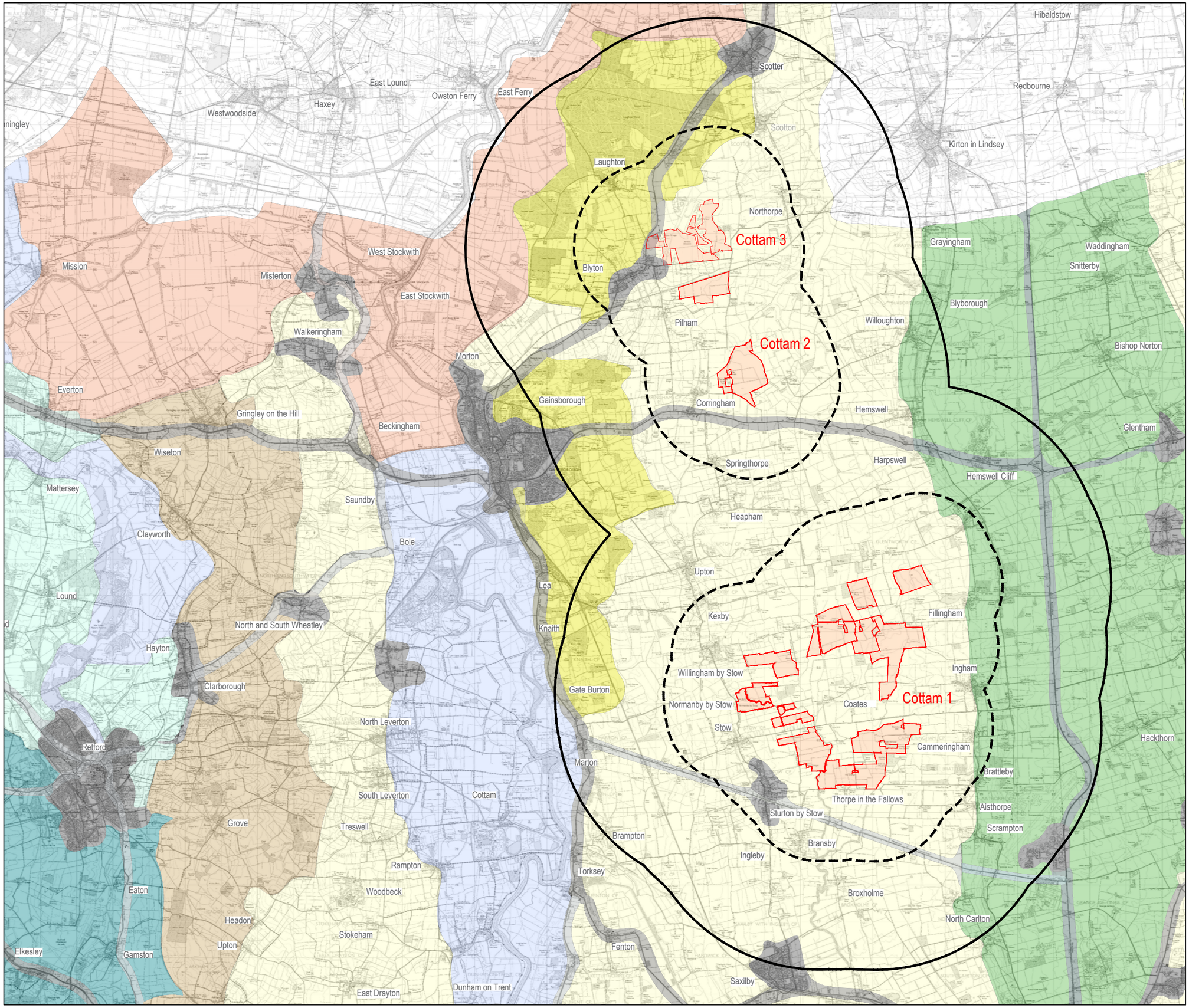
Drawn by: LH	Ref: 2893-REP-LAN-CO-7.4
Checked by: MT	Date: 23/11/2021

Figure 7.4
Cottam 1, 2 & 3
Landscape Character - National

COTTAM SOLAR PROJECT
Landscape and Visual Impact Assessment
Scoping



Island GREEN POWER

Lanpro

Key

- Site Boundary
- 5 km Landscape Study Area
- 2 km Landscape Study Area

East Midlands Regional Landscape Character Areas

- 4a: Unwooded Valleys
- 4b: Wooded Valleys
- 6a: Limestone Scarps and Dipslopes
- 3a: Floodplain Valleys
- 2b: Planned and Drained Fens and Carrlands
- 5b: Wooded Village Farmlands
- 3b: Planned and Drained Fens and Carrlands
- 10b: Sandstone Forests and Heaths

N

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Drawn by: LH	Ref: 2893-REP-LAN-CO-7.5
Checked by: MT	Date: 23/11/2021

Figure 7.5
Cottam 1, 2 & 3
Landscape Character - Local

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Landscape and Visual Impact Assessment
Scoping

Island GREEN POWER

Lanpro

Key

- Site Boundary
- 5 km Landscape Study Area
- 2 km Landscape Study Area
- Conservation Area
- Listed buildings - Grade I
- Listed buildings - Grade II*
- Listed buildings - Grade II
- Scheduled Ancient Monuments
- Registered Parks and Gardens
- Ancient Woodlands
- Local Nature Reserves
- Local Wildlife Sites (Bassetlaw)
- Sites of Specific Scientific Interest (SSSI)
- Area of Great Landscape Value (West Lindsey)
- Statutory Main River
- Airfields / Airports
- Power Stations

Note: There are no SACs or SPAs in the area covered within this plan.

N

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1:100,000 SCALE @A3

Drawn by: LH	Ref: 2892-REP-LAN-CO-7.6
Checked by: MT	Date: 23/11/2021

Figure 7.6
Cottam 1, 2 & 3
Landscape Receptors

COTTAM SOLAR PROJECT
Landscape and Visual Impact Assessment
Scoping

Island GREEN POWER

Lanpro

Key

- Site Boundary
- 5 km Landscape Study Area
- 2 km Landscape Study Area
- Conservation Area
- Listed buildings - Grade I
- Listed buildings - Grade II*
- Listed buildings - Grade II
- Scheduled Ancient Monuments
- Registered Parks and Gardens
- Area of Great Landscape Value (West Lindsey)
- Statutory Main River
- PRoW Footpath
- PRoW Bridleway
- PRoW Byway open to all traffic
- PRoW Restricted byway
- Main A Roads
- B Roads
- Railway

N

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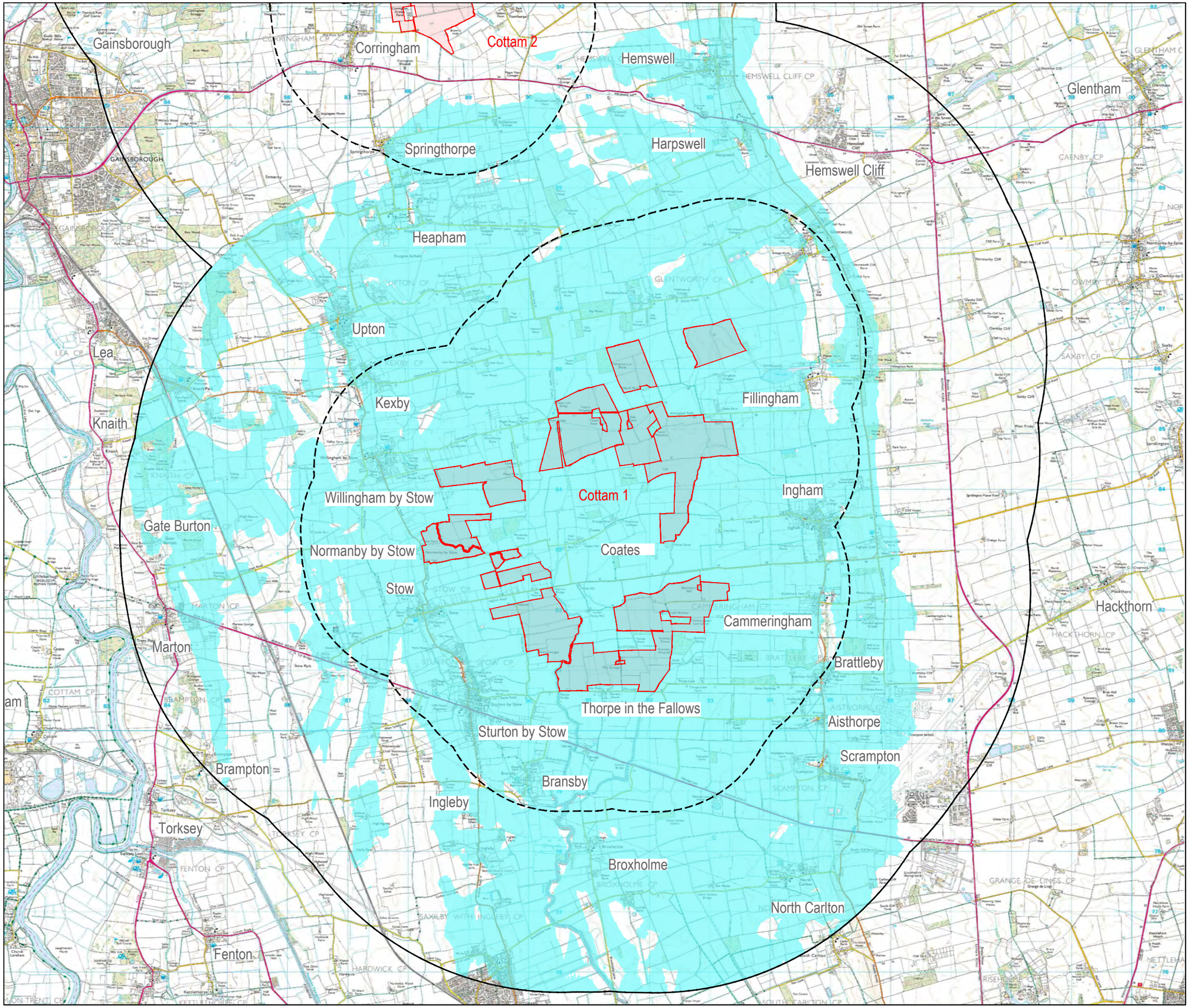
Drawn by: LH	Ref: 2893-REP-LAN-CO-7.7
Checked by: MT	Date: 23/11/2021

Figure 7.7
Cottam1, 2 & 3
Visual Receptors

COTTAM SOLAR PROJECT
Landscape and Visual Impact Assessment
Scoping



Island GREEN POWER

Lanpro

Key

- Site Boundary
- 5 km Landscape Study Area
- 2 km Landscape Study Area
- Bare Earth ZTV
- Views of the Development may be visible

Note: Terrain data was used to produce this Zone of Theoretical Visibility (ZTV) which demonstrates where the development may be visible from, without consideration of any screening elements such as trees, hedgerows or built form. This ZTV was produced to indicate theoretical visibility as a worst case, with an assumption that panels would fill the Site boundary in its entirety at a maximum height of 4.5m.

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Drawn by: LH	Ref: 2893-REP-LAN-CO-7.8
Checked by: MT	Date: 23/11/2021

Figure 7.8
Cottam 1
Bare Earth ZTV

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Landscape and Visual Impact Assessment
Scoping

Island GREEN POWER

Lanpro

Key

- Site Boundary
- 5 km Landscape Study Area
- 2 km Landscape Study Area
- Bare Earth Zone of Theoretical Visibility to 5km
- Views of the Development may be visible

Note: Terrain data was used to produce this Zone of Theoretical Visibility (ZTV) which demonstrates where the development may be visible from, without consideration of any screening elements such as trees, hedgerows or built form. This ZTV was produced to indicate theoretical visibility as a worst case, with an assumption that panels would fill the Site boundary in its entirety at a maximum height of 4.5m.

N

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1:60,000 SCALE @ A3

Drawn by: LH	Ref: 2892-REP-LAN-CO-7.9
Checked by: MT	Date: 23/11/2021

Figure 7.9
Cottam 2
Bare Earth ZTV

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Landscape and Visual Impact Assessment
Scoping

Island GREEN POWER

Lanpro

Key

- Site Boundary
- 5 km Landscape Study Area
- 2 km Landscape Study Area
- Bare Earth Zone of Theoretical Visibility to 5km
- Views of the Development may be visible

Note: Terrain data was used to produce this Zone of Theoretical Visibility (ZTV) which demonstrates where the development may be visible from, without consideration of any screening elements such as trees, hedgerows or built form. This ZTV was produced to indicate theoretical visibility as a worst case, with an assumption that panels would fill the Site boundary in its entirety at a maximum height of 4.5m.

N

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1:60,000 SCALE @ A3

Drawn by: LH	Ref: 2892-REP-LAN-CO-7.10
Checked by: MT	Date: 23/11/2021

Figure 7.10
Cottam 3
Bare Earth ZTV

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Landscape and Visual Impact Assessment
Scoping

Island GREEN POWER

Lanpro

Key

- Site Boundary
- 2 km Landscape Study Area
- Augmented Zone of Theoretical Visibility to 2km
- Views of the Development may be visible
- Proposed Viewpoints

Note: A combination of Terrain data and screening features including buildings, trees and hedgerows, was used to produce this Zone of Theoretical Visibility (ZTV) which demonstrates where the development may be visible from, when considering existing screening elements. This ZTV was produced with an assumption that panels would fill the Site boundary in its entirety at a maximum height of 4.5m.

N

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Drawn by: LH	Ref: 2892-REP-LAN-CO-7.11
Checked by: MT	Date: 23/11/2021

Figure 7.11
Cottam 1
Augmented ZTV

COTTAM SOLAR PROJECT
Landscape and Visual Impact Assessment
Scoping

Island GREEN POWER

Lanpro

Key

- Site Boundary
- 2 km Landscape Study Area
- Augmented Zone of Theoretical Visibility to 2km
- Views of the Development may be visible
- Proposed Viewpoints

Note: A combination of Terrain data and screening features including buildings, trees and hedgerows, was used to produce this Zone of Theoretical Visibility (ZTV) which demonstrates where the development may be visible from, when considering existing screening elements. This ZTV was produced with an assumption that panels would fill the Site boundary in its entirety at a maximum height of 4.5m.

N

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Drawn by: LH	Ref: 2892-REP-LAN-CO-7.12
Checked by: MT	Date: 23/11/2021

Figure 7.12
Cottam 2
Augmented ZTV

COTTAM SOLAR PROJECT
Landscape and Visual Impact Assessment
Scoping

Island GREEN POWER

Lanpro

Key

- Site Boundary
- 2 km Landscape Study Area
- Augmented Zone of Theoretical Visibility to 2km
- Views of the Development may be visible
- Proposed Viewpoints

Note: A combination of Terrain data and screening features including buildings, trees and hedgerows, was used to produce this Zone of Theoretical Visibility (ZTV) which demonstrates where the development may be visible from, when considering existing screening elements. This ZTV was produced with an assumption that panels would fill the Site boundary in its entirety at a maximum height of 4.5m.

N

1:30,000 @ A3

Drawn by: LH	Ref: 2892-REP-LAN-CO-7.13
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Figure 7.13
Cottam 3
Augmented ZTV

COTTAM SOLAR PROJECT
Landscape and Visual Impact Assessment
Scoping

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EIA Scoping Report
Appendices to Chapter 8: Ecology

January 2022

Cottam
SOLAR PROJECT

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8.1 Preliminary Ecological Appraisal

PRELIMINARY ECOLOGICAL APPRAISAL

COTTAM SOLAR PROJECT

carried out by

CLARKSON & WOODS
ECOLOGICAL CONSULTANTS

commissioned by

COTTAM SOLAR PROJECT LTD.

NOVEMBER 2021

Project title:	Cottam Solar Project		
Document title:	Preliminary Ecological Appraisal	Project number:	7479
Client:	Cottam Solar Project Ltd.	Author:	Harry Fox
Version 1	Final Report	Issued on:	11th November 2021
Quality Assurance	Checked by:	Approved by:	
	Tom Clarkson	Tom Clarkson	
	[redacted]	[redacted]	

The information data and advice which has been prepared and provided is true and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's (CIEEM) Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions. This report and its contents remain the property of Clarkson and Woods Ltd. until payment has been made in full.

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KEY ECOLOGICAL CONSTRAINTS AND OPPORTUNITIES

Item	Key Constraints	Key Opportunities
Local Policy: Central Lincolnshire Local Plan (Adopted 2017)	• Policy LP20: Green Infrastructure Network. *Protection, integration, enhancement and creation of GI wherever possible.* • Policy LP21: Protecting Biodiversity and Geodiversity. *Protection, management and delivery of net gain for biodiversity, focusing on Habitats and Species of Principal Importance.* • Biodiversity Opportunities Mapping (BOM) will drive achievement of local Net Gain targets within forthcoming *draft* version of Central Lincolnshire Local Plan.	Policy compliance achievable through: • Arable reversion to grassland. • Hedgerow planting, in-filling and positive aftercare. • Positive grassland management within adequate buffer zones. • Protection of hedgerows and watercourses during construction. • Strategic use of BOM in guiding habitat enhancements. • Locally-appropriate tree planting in screening. Pre-emptive replacement of ash affected by dieback.
Local Biodiversity Action Plan: Key habitats and species	• Arable field margins • Hedgerows and hedgerow trees • Lowland meadows • Ponds, lakes and reservoirs • Rivers, canals and drains • Bats • Farmland birds • Freshwater fish • Newts • Water vole	Positive effects likely to arise on all features through: • Adequate buffering of hedgerows, ditches and watercourses. • Blend of habitat enhancement options within buffer zones. • Selective grassland enhancement options within array. • Habitat feature provision for bats, reptiles, amphibians for birds as discussed individually.
Biodiversity Net Gain	• Recent amendments to the Environment Bill will extend obligation to deliver 10% net gain to NSIPs. • **Cottam 1**: All bar F153 of Coates West, all of Coates North north of the Willingham to Fillingham road, and the western half of Coates South is located within BOM. Designated for key habitat grassland, hedgerow and woodland creation and management opportunities.	High confidence in deliverability of BNG due to: • Large scale reversion of arable to grassland. • Cost-effective positive management of field margin buffers. • Hedgerow enhancements and tree planting. • Discrete grassland habitat creation options. Will require habitat mapping (pre-construction state mapping complete) and completion of Habitat Unit change using Defra Metric 3.0 using iterations of landscape proposals and habitat management plans.
Designated Sites	• Willingham to Fillingham Road Verges LWS – Located along road verges within red line boundary of **Cottam 1** (Coates North) • Laughton and Scotton Commons SSSIs (and component woodland and heathland/grassland LWSs). Located 1.5km north of **Cottam 3.**	• Willingham to Fillingham Road Verges LWS – simple habitat enhancement measures (cut-and-collect, over sowing) should realise increases in species diversity.
Arable fields	• Only constraints relate to ground nesting birds.	BNG and Policy contribution can be maximised through adoption of sensitive grassland management (see Section 3.2): • 'Shade cutting' rather than wholesale mowing • Conservation grazing rates and timings • Selective meadow restoration • 'Aftermath' grazing • Cut-and-collect rather than leaving arisings
Field Margins	• Habitat of Principal Importance (HPI) and on Lincs BAP. • Some in Cottam 1 are species rich and broad. • Many on all Sites hold potential for reptiles.	• Significant BOM overlap at Cottam 1. • River Till corridor a significant enhancement opportunity. • Grassy banks in Cottam 3 a potential priority. • Semi-improved grassland fragments in Cottam 2 stand to gain from conservation management.

Item	Key Constraints	Key Opportunities
Hedgerows	• HPI and on Lincs BAP. • Most contain at least occasional mature trees. • Abundant nesting birds – constraint to removal. • Key habitat for bats. Minimum recommended buffer zones from hedgerow edge to security fence: • Species-poor hedgerows or hedgerows without trees: 8m • Species-rich hedgerows or hedgerows with trees: 10m	• In-filling or replanting defunct hedgerows • New hedgerow planting along bare field boundaries • Possible new hedgerows in strategic locations for maximum green infrastructure/connectivity benefit. • Pre-emptive replacement of large number of ash-dieback affected trees.
Ditches and Watercourses	• HPI (rivers) and on Lincs BAP (rivers and drains). • Minimum recommended buffer zones from banktop to security fence proposed of 8m up to 30m depending on significance.	• River Till corridor grassland mosaic enhancement – Cottam 1 • Corringham and Yarthorpe Beck corridor grassland and scrub mosaic creation. • Northorpe Beck corridor grassland creation.
Badgers	• Main setts found within woodland edge at Cottam 1. • Cottam 3 contained a suspected small main sett at field boundary. • All Sites contained small setts in boundary features.	• Reversion to grassland will significantly benefit foraging opportunities.
Bats	• Hedgerows and trees of moderate value while arable fields of low value. • Potential for roosts within hedgerow trees and buildings. Potentially at risk of fragmentation. Minimum recommended buffer zones from feature edge to security fence proposed: • Ditches, species-poor hedgerows and hedgerows without trees: 8m • Minor watercourses (streams, becks), species-rich hedgerows and hedgerows with trees of low or negligible roost potential: 10m • Woodland, in-field trees, hedgerows with trees of moderate or high roost potential: 20m • Rivers, confirmed roosts in buildings or trees: 30m	• Grassland management (under array and at buffer zones) will significantly enhance foraging potential. • Standalone and tree-mounted roosting features.
Otters and water voles	• All Sites contained habitat of potential value to otters and water voles as well as local records. • Cottam 1 contained most extensive field signs and habitat. • Buffering of ditches and watercourses to avoid disturbance and habitat damage.	• Periodic ditch and grassland margin maintenance. • Deepening and wetting of ditches to improve connectivity.
Amphibians (incl. GCN) and Reptiles	• One pond positive for GCN eDNA immediately adjacent to Cottam 1. Potential for licensing constraints and adoption of precautionary methods within 250m of positive ponds. • All Sites contained habitat suitable for reptiles and amphibians in hedgerows, watercourses and field margins. Precautions/supervision during any habitat clearance required.	• Selective deepening of on Site ponds to enhance their value. • Construction of new ponds in locations suitable for linking known populations.
Birds	• Significant numbers of skylark and other ground nesting birds at all Sites, particularly Cottam 1 (due in part to spring sown-cereal) and Cottam 3. • Displacement of territories by solar array anticipated. • Avoidance of disturbance and damage to nests during breeding season.	• Targeted management of field margin buffers and grassland under panels for birds such as quail, partridge and turtle dove as well as foraging skylark and yellow wagtail. • Nesting and roosting boxes and standalone habitat features.
Invertebrates	• Low to moderate habitat suitability for invertebrates limited to field margins, hedgerows and ditches/watercourses at all Sites.	• Targeted management of field margins to include scrub and ruderal vegetation mosaic.

1 INTRODUCTION

1.1.1 Clarkson and Woods Ltd. was commissioned by Cottam Solar Project Ltd. to carry out a Preliminary Ecological Appraisal across three parcels of land known as Cottam 1, 2 and 3 situated in the West Lindsey District of Central Lincolnshire. These parcels are referred to hereafter as 'the Sites', or individually as given above. Proposals are understood to be in an early design stage and comprise the development of an NSIP-scale solar park, containing solar energy production and storage components.

1.1.2 This Preliminary Ecological Appraisal discusses the results collected during an Extended Phase 1 Habitats Survey carried out in April and May 2021 by Clarkson and Woods Ltd, supplemented by partial datasets from breeding bird surveys, bat surveys and great crested newt eDNA surveys carried out in spring and summer 2021.

1.2 Report Aims

1.2.1 The aims of this report are:

- To describe the habitats present within the Sites and their potential to support protected or otherwise notable species and habitats capable of being material considerations within the planning process.
- To set out the results of a desk study based on third party ecological records from the Site and its surroundings supplied by the Lincolnshire Environmental Records Centre (LERC) and in the context of Local Planning Policy.
- To outline any key potential ecological constraints to development of the Site.
- To broadly discuss avoidance, mitigation or compensation measures likely to be required to minimise potential ecological impacts.
- To identify where further surveys to establish baseline conditions or develop mitigation or compensatory measures may be required.
- To identify where further consultation with statutory bodies, planning authorities or other key consultees would be advantageous to determine a robust and acceptable assessment scope.
- To outline options for ecological enhancement and Biodiversity Net Gain and how they may be secured, managed and monitored.

1.3 Appraisal Scope and Limitations

1.3.1 The appraisal recorded habitat information from within the red line boundaries (the option land boundaries) only. However, a desk-based general assessment of the surrounding landscape was made, supported by extensive visual appraisal from public rights of way in the land immediately surrounding the Sites. This information has been factored into the appraisal of habitat suitability for certain species and advice on opportunities for Biodiversity Net Gain.

1.3.2 No appraisal of proposed cable routes is contained within this report.

1.3.3 To date, no consultation with statutory or non-statutory third parties has been carried out. Considering the potential for impacts upon a number of protected and notable species combined with the desired timescales applied to the project, it is recommended that the indicated scope and approach to further survey is consulted on with local authorities, their nature conservation consultees and Natural England at an early stage.

1.3.4 Under CIEEM guidelines, PEA reports are not considered suitable on their own for inclusion with an eventual DCO application. However, information has been provided below with a view to support and enhance the masterplanning process.

1.3.5 It is anticipated that the results of further detailed survey work will be reported separately in due course and will serve to underpin an eventual Preliminary Environmental Information Report and Environmental Impact Assessment.

1.3.6 Records obtained from LERC are not exhaustive or complete and an absence of records for a species does not preclude their possible presence.

1.3.7 The appraisal has been prepared by Harry Fox, an experienced ecologist, who is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). The report has been subject to quality assurance review by appropriately experienced senior consultants who are full members of CIEEM.

1.3.8 Unless the client indicates to the contrary, information on the presence of species collected during the surveys will be passed on to the Lincolnshire Environmental Records Centre following submission of a planning

application in order to augment their records for the area. This is in line with the CIEEM code of professional conduct[1].

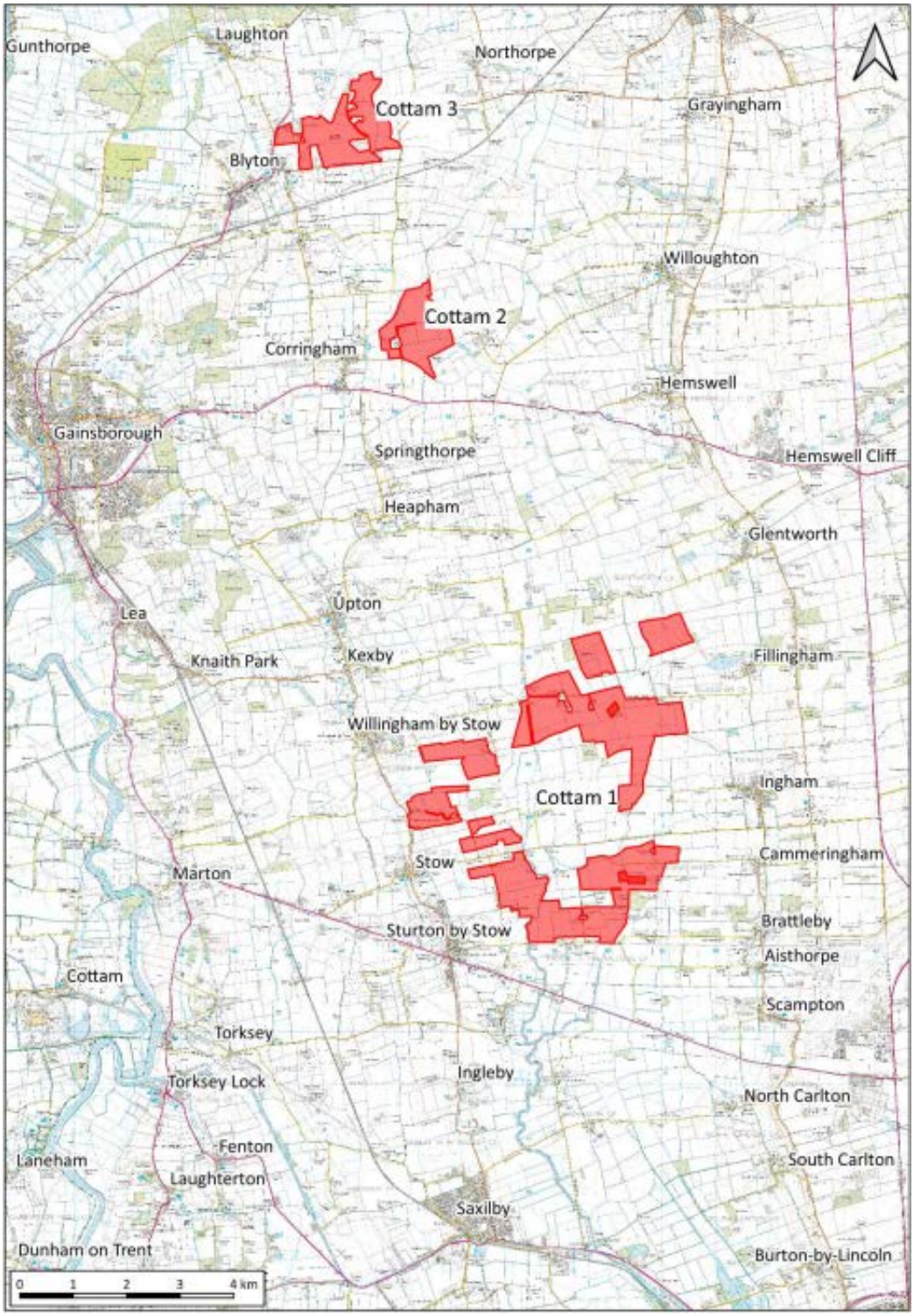

Figure 1. Locations of the Three Proposed Development Sites

[1] Code of Professional Conduct. CIEEM, January 2019.

1.4 Consultation

1.4.1 The following statutory bodies will be consulted in due course:

- Natural England – Advisor assigned at onset of consultation. Paid-for Discretionary Advice Service available outside of statutory consultation process should this prove advantageous.
- West Lindsey District Council – No district ecology officer. Ecology issues dealt with by planning officer team with reference to Natural England Standing Advice. Therefore, pre-application consultation response likely to be very limited.
- Lincolnshire County Council – No County ecologist – ecology matters likely referred to Environmental Services Team and Wildlife Trusts/NE Standing Advice referenced.

1.4.2 It is recommended due to the specific impacts and constraints at the sites that the following organisations are consulted with at the appropriate stage:

- RSPB have been approached for consultation but have declined due to a lack of capacity.
- Lincolnshire Wildlife Trust will be consulted in due course as part of the pre-application process.

1.5 Site Description Summary

1.5.1 The Sites are spread over an approximately 17Km area stretching from south to north between the settlements of Coates and Thorpe in the Fallows (Cottam 1), Corringham (Cottam 2) and Blyton (Cottam 3) as shown in Figure 1 above. The Sites all predominantly comprise large, open and generally flat arable fields characterised by winter-sown cereal crops, bounded by a network of managed hedgerows and ditches with narrow field margins, where present.

1.5.2 These Sites' habitats are very much typical of the surrounding landscape which is dominated by arable farmland interspersed with small settlements and farmsteads linked by minor and single track roads. The surrounding landscape is mostly flat but becomes more undulating north past Blyton and rises to the east of the Sites at the 'Lincoln Cliff' some 4-5Km away which is a significant north-south escarpment. The River Trent is located approximately 5km west of the Sites as it flows north towards the Humber Estuary, itself some 27km north of Cottam 3. While no woodland is present within the Sites, several small stands of managed and unmanaged woodland are present adjacent and in the surrounding landscape, often the result of historical game management. Standing water is generally absent from the Sites and the surroundings following the in-filling of traditional livestock drinking ponds, save for a very small number of agricultural pools/pits, decoy ponds or managed recreational fisheries. Flowing water occurs sparsely, centred on the minor River Till (in the case of Cottam 1, and Cottam 2 via the Corringham and Yarthorpe Becks) and River Eau (around Cottam 3 via the Northorpe Beck) and their various feeder streams and managed agricultural drainage ditches which regularly dry out.

1.6 Surveys Carried out to Date

1.6.1 To date, the following surveys have been carried out across all the above sites in 2021:

- Extended Phase 1 Habitats Survey of all land within red line boundaries (completed April/May 2021)
- Four breeding bird survey visits of all land within red line boundaries (May - July 2021)
- One nocturnal/crepuscular bird survey visit (focus on quail and owls) of all land within red line boundaries (late June to early July 2021)
- GCN eDNA survey of all accessible ponds within red line boundaries and land within 250m under same land ownership (June 2021)
- Monthly static bat detector surveys utilising 42 detector locations per month between June and September 2021 inclusive.
- Autumn survey of all water courses and ditches within red line boundaries for water vole and otters.

1.6.2 Surveys currently planned to be carried out at the Sites are:

- Extended Phase 1 Habitats Survey of cable route corridor (estimated Q1 2022)
- Additional early-season breeding bird survey visit of all land within red line boundaries (April 2022)
- Four wintering bird surveys of all land within red line boundaries (monthly November 2021 to February 2022).

- GCN eDNA survey of all accessible ponds within 250m of red line boundaries on third-party land (Mid-April - June 2022)
- Ground-based assessment of all trees within red line boundaries for potential to support roosting bats (under way – expected completion December 2021).
- Daytime inspections of all buildings within red line boundaries for their potential to support roosting bats (December 2021).
- Spring survey of all water courses and ditches within red line boundaries for water vole and otters (May 2022).

2 DESK STUDY

2.1 Local Planning Policy

2.1.1 The following nature conservation-related policies taken from the Central Lincolnshire Local Plan are considered pertinent to the Sites and the proposals. The text of each policy is given in turn in Appendix C at the end of this report.

Central Lincolnshire Local Plan (Adopted April 2017)

- Policy LP19: Renewable Energy Proposals
- Policy LP20: Green Infrastructure Network
- Policy LP21: Biodiversity and Geodiversity

Central Lincolnshire Local Plan (Under Consultation - Anticipated adoption of revised plan in April 2022)

- Policy S13: Renewable Energy
- Policy S58: Green Infrastructure Network
- Policy S59: Protecting Biodiversity and Geodiversity
- Policy S60: Biodiversity Opportunity and Delivering Measurable Net Gains
- Policy S65: Trees, Woodland and Hedgerows

2.1.2 Several Neighborhood Areas have been designated for the purposes of creating Neighborhood Plans. At the time of writing, only Corringham Neighborhood Area (pertinent to Cottam 2) had submitted a Plan, which was under review by the District Council. Relevant policies are as follows and are also detailed in Appendix C.

- CNP1: Sustainable Development Principles
- CNP5: Local character and the design of new development
- CNP12: Countryside management
- CNP13: Nature conservation and biodiversity

2.2 Local Biodiversity Action Plan

2.2.1 The following habitats and species have been identified within Lincolnshire Biodiversity Action Plan (BAP) 2011-2020 (3rd Edition) and are considered relevant to the Site. As mentioned above, it is anticipated that alongside the re-drafting and eventual adoption of the new Central Lincolnshire Local Plan, the Lincolnshire BAP will be replaced by a Local Nature Recovery Strategy.

Habitats

- Arable field margins
- Grazing marsh
- Hedgerows and hedgerow trees
- Lowland calcareous grassland
- Lowland meadows
- Lowland dry acid grassland
- Ponds, lakes and reservoirs
- Rivers, canals and drains
- Lowland mixed deciduous woodland
- Wet woodland

Species

- Bats
- Farmland birds
- Freshwater fish
- Greater water-parsnip
- Newts
- Water vole
- White-clawed crayfish
- Invasive non-native species

Habitats

2.3 Protected and Designated Sites

2.3.1 Statutory and non-statutory sites designated for nature conservation were identified within the desk study and are summarised for each Site in Tables 1 and 2 below. Appendix C provides maps showing the relationship between the designated sites and the development Sites.

2.3.2 Many of these sites present potential ecological opportunities for the enhancement of local biodiversity and ecological connectivity.

2.3.3 'International' designated sites are statutory sites designated in response to international law or conventions, including Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar wetland sites. The search radius from each Site for these sites used was 10Km

2.3.4 National sites are statutorily protected sites which include Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs). The search radius from each Site for these sites used was 5Km. Local Nature Reserves (LNRs) are statutorily protected local sites and thus are searched for within 5Km.

2.3.5 Local sites are predominantly non-statutory sites designated by Local Planning Authorities (in this case West Lindsey in collaboration with the Greater Lincolnshire Nature Partnership), including Sites of Nature Conservation Interest (SNCIs) and Local Wildlife Sites (LWSs). The search radius from each Site for these sites used was 2Km.

Cottam 1

2.3.6 Only three designated sites were found in proximity to Cottam 1, which were all Local Wildlife Sites. Two of these were linear features following botanically rich road verges, while the other was a small collection of botanically notable grassland fields. These sites present potential opportunities for enhancement of local ecological connectivity.

Table 1: Designated Sites in Proximity to Cottam 1

Site Name and Map Reference	Size (Ha)	Distance and Direction from Site	Reason for Designation
Local Sites			
1. Willingham to Fillingham Road Verges LWS	1.75	Within or adjacent to Site	These road verges are wide and contain indicators of unimproved/ semi-improved calcareous and neutral grassland. Both verges run alongside ditches with a species-rich hedgerow. A walkover inspection of this site in September 2021 found the verges to be in a sub-optimal condition owing to aggressive management. While a moderate diversity of species was in evidence, they would benefit from further enhancement via sympathetic management.
2. Willingham Parish Fields LWS	1.2	165m north-west	These are two adjacent fields beside Stone Pit Lane that together support a good range of neutral grassland plants, as well as a botanically-rich pond, some woody vegetation and an interesting fauna. The northern field is well grazed by sheep throughout, which have limited access to the southern field late in the growing season.
3. Upton Grange Road Verges LWS	3.1	1.1km north	The north and east verges are exceptionally species-rich with a particular abundance of both meadow barley and zigzag clover. The south and west verges comprise linear herb-rich neutral grassland with adjacent species-poor hedgerows. It is considered that the invertebrate diversity on these verges is likely to be high given the floral diversity and abundance of nectar resources.

Cottam 2

2.3.7 No designated sites in proximity to Cottam 2 were found by the desk study.

Cottam 3

2.3.8 Five SSSIs and one LNR were located at least 1.5Km north of the Site. The SSSIs were components of a complex of sites within Laughton Woods and Scotton common which are large, contiguous Forestry Commission woodland sites which contain important habitats and reserves for protected habitats and species. Similarly, the six LWSs given are also associated with the above SSSI sites, overlapping with, or augmenting them.

Table 2: Designated Sites in Proximity to Cottam 3

Site Name	Size (Ha)	Distance and Direction from Site	Reason for Designation
National Sites			
1. Scotton Common SSSI	15.1	1.5km north	One of the few extant areas of lowland heathland once prevalent over the cover sands of north-west Lincolnshire, Scotton Common's range of habitats support a succession of communities rich in species. Supports adder and common lizard, scarce plants and a diverse assemblage of moths
2. Scotton Beck Fields SSSI	16.7	1.6km north	Scotton Beck Fields comprise an extensive area of acidic unimproved grassland, a habitat of considerable scarcity in the county owing to agricultural improvement and afforestation of much of the cover sands of north-west Lincolnshire. Continued grazing of these fields by cattle has maintained their botanical diversity, which includes several heathland species both of a restricted county and national distribution. The site supports the only known grassland community of this type in the County.
3. Laughton Common SSSI	54.7	2.3km north-west	Laughton Common supports an extensive and diverse range of vegetation communities characteristic of the north Lincolnshire Coversands, including nationally notable areas of lowland acid grassland, inland dune grassland and lowland heath which are scarce in the county and restricted in their distribution across England.
4. Scotton and Laughton Forest Ponds SSSI	48.3	2.4km north	Scotton and Laughton Forest Ponds comprise a number of peaty heathland pools associated with open acid grassland, birch woodland and a distinctive marginal wetland vegetation. This latter habitat, the most important on the site, is a type of base-poor fen/mire with a characteristic suite of plant species, which has formed on permanently wet acid soils. It represents the county's largest resource of this nationally scarce plant community
5. Tuetoes Hills SSSI	12.5	5.0km north	Tuetoes Hills support an important mosaic of dry acid grassland vegetation including an inland example of acid dune grassland dominated by sand sedge Carex arenaria. This type of vegetation, formerly characteristic of active inland dunes of the north Lincolnshire Coversands, is now rare in Lincolnshire and very restricted in its distribution nationally.
6. Owlet LNR	50.3	2.2km west	Birch, oak and pine areas are interspersed among more open heath with scattered mature oak trees. Remnant heath vegetation occurs on more open areas and is home to a wealth of butterflies like the brimstone, small copper and purple hairstreak.
Local Sites			
7. Dallison Plantation LWS	26.8	0.9km north	This is an exceptionally important site that supports a huge number of scarce and interesting plants within a wide range of habitats, some of which are: pine plantation with birch; dry heathland; wet heathland; bracken; neutral grassland; damp grassland and wetland.
8. Scotton Road Verges LWS	1.4	1.5km north	The northern verge comprises species-rich neutral grassland with elements of acidic grassland and heathland. There are also mature trees and scrub in places. The southern verge is exceptionally diverse and contains areas of neutral and acidic grassland and patches of heathland dominated by heather, all three of the county's Erica species being present. There is a central wet ditch extending for the majority of the length of the verge, with three county rare plants present within this ditch: flea sedge, common butterwort and bog pimpernel, the sedge and pimpernel being present in abundance. Multi-stalked spike-rush was also present. A particular feature of these verges was the

			spectacular abundance of common twayblade. Heath spotted orchid was also recorded.
9. Scotton Common, Loates Field LWS	8.2	1.6km north	This is a square-sided sheep pasture within Scotton Common nature reserve. It is bordered to the east by Scotton Beck Fields Site of Special Scientific Interest (SSSI) and to the south by Scotton Common SSSI. A combination of sympathetic management, sandy soil and variable hydrology has encouraged a diverse grassland flora to develop, with the primary habitat being semi-improved neutral grassland.
10. Laughton Forest South-east LWS	51.3	1.6km north	This is a diverse area mostly comprising blocks of pine or beech plantation of various ages separated by rides supporting botanically-rich acidic grassland. One area holds much silver birch and gorse regenerating after clear-fell; another is dominated by bracken. The fern flora is also excellent.
11. Scotton Common East LWS	23.6	1.6km north-east	Contains grazed, semi-improved neutral grassland and unimproved acid grassland with good structural diversity, as well as ditches and a pond
12. Laughton Forest East LWS	56.5	1.8km north	Large areas of heathland and acid peatland occur in this area of Laughton Forest and these were exceptionally species rich with several county rare species of flora and fauna. The site is of importance for breeding birds, including Schedule 1 protected species. Several common lizards were also recorded in the heathland areas.

2.4 Ancient Woodland

2.4.1 According to Defra's Magic Map Application, no stands of ancient woodland occur within 2Km of the Sites.

2.5 Biodiversity Opportunities Mapping

2.5.1 Central Lincolnshire Local Plan Policy S60 relates to the delivery of measurable net gains for biodiversity within the county. Biodiversity Opportunity Mapping (BOM) has been created to show which areas and habitats are of greatest potential strategic value for enhancement in order to achieve this goal. This study built on a previous Central Lincolnshire Green Infrastructure Study and factors in potential beneficial outcomes for the local economy and society as well as nature. Key drivers for the inclusion of land within the mapping included agri-environment scheme targeting, restoring, buffering and connecting Local Wildlife Sites, and targets under Lincolnshire's Biodiversity Action Plan.

2.5.2 Figures 2 and 3 overleaf show the layout of BOM in relation to the Sites (within approximately 2Km).

2.5.3 Large areas of Cottam 1; approximately all of Coates West, half of Coates South and a third of Coates North (land north of the Willingham to Fillingham road) fall within land parcels designated as "Opportunity for Creation". Notably, no areas within the site fall within land classed as "Ecological Network – High Quality". Only one small field of permanent pasture within the north west edge of Coates South is classed as "Ecological Network – Opportunity for Management". Consequently, the BOM presents extensive, LPA-recognised opportunities for ecologically favourable habitat management and very few constraints.

2.5.4 No part of Cottam 2 falls within or lies within 1Km of any land classed under the BOM. Approximately 2Km west of the Site lies an extensive area of land classed as "Opportunity for Creation".

2.5.5 No part of Cottam 3 falls within any land classed under the BOM, however the north eastern boundary is adjacent to a large extent of land classed as "Opportunity for Creation", contiguous with high quality ecological sites associated with Laughton and Cotton commons.

2.5.6 According to "Central Lincolnshire Policy S60: Biodiversity Opportunity and Net Gain Evidence Report", dated June 2021, work has begun on the preparation of a Local Nature Recovery Strategy (LNRS) for Lincolnshire which will replace the BAP. The LNRS will be a new system of spatial strategies for nature to support the delivery of biodiversity net gain and provide a tool for the public authorities to guide their approach. The LNRS will map the most valuable habitats for nature and provide specific proposals for effecting net gain opportunities. This will build upon the existing Biodiversity Opportunity Mapping and Areas work.

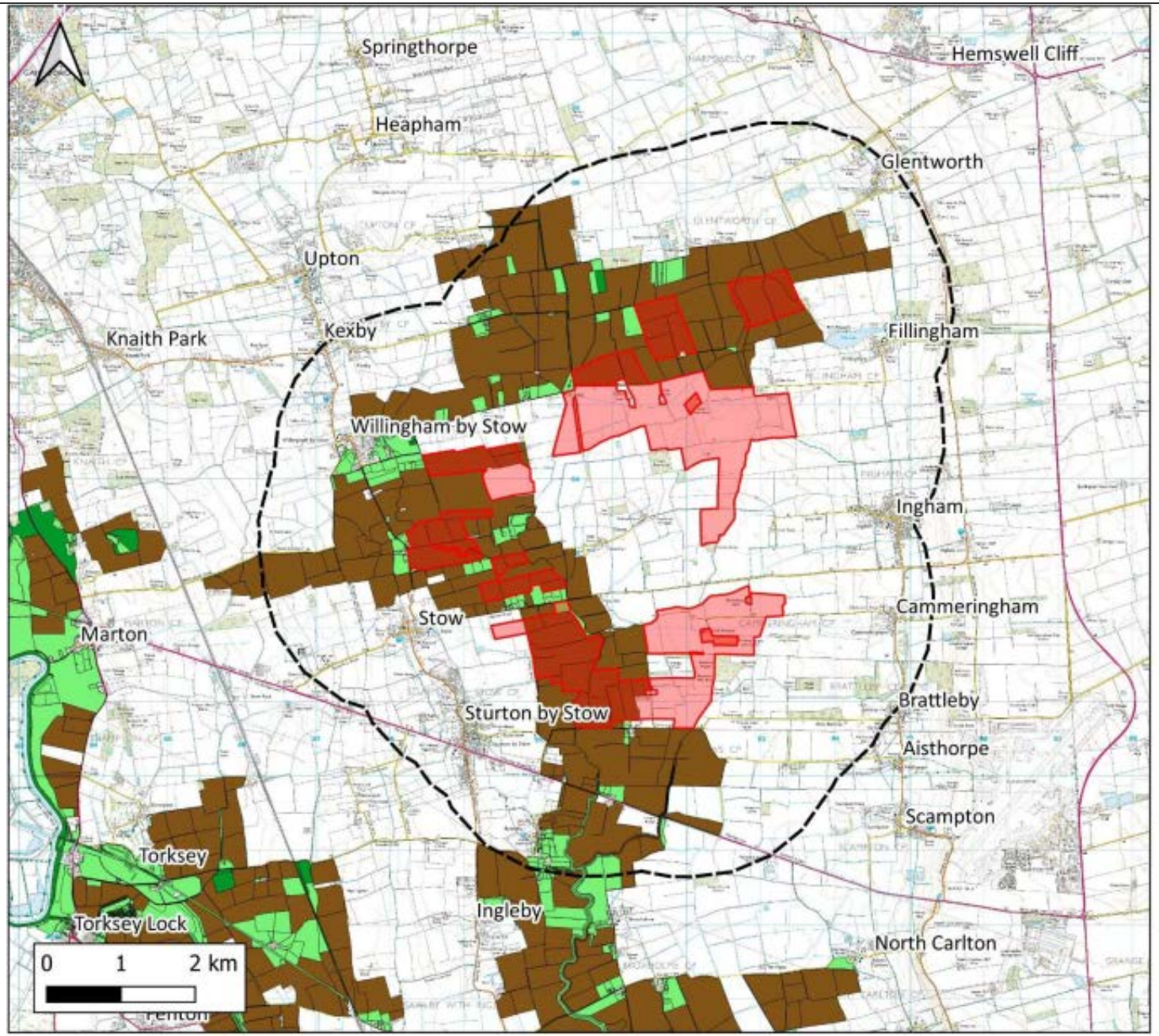

Figure 2. Biodiversity Opportunity Mapping for Cottam 1.

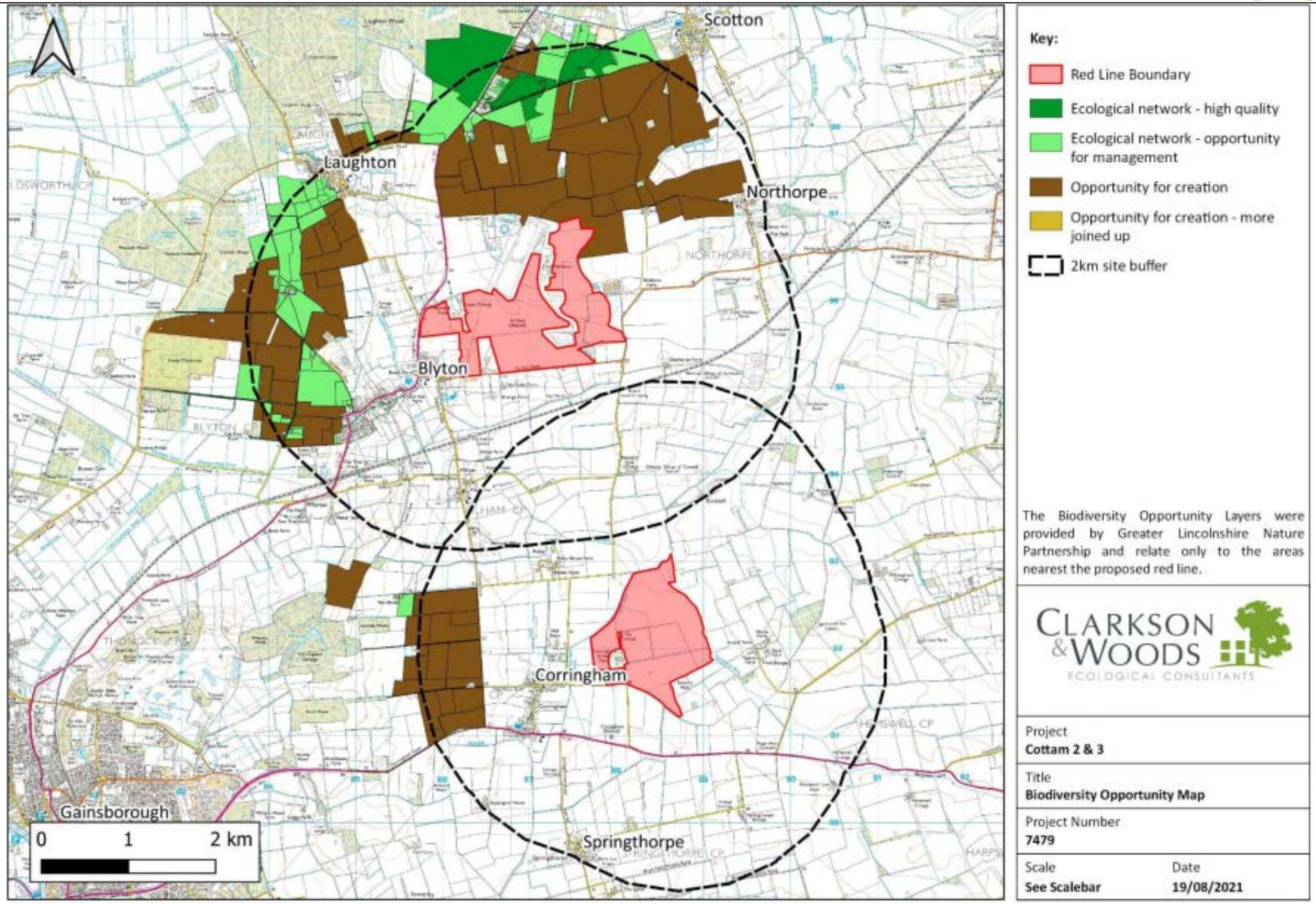

Figure 3. Biodiversity Opportunity Mapping for Cottam 2 and 3.

3 HABITAT SURVEY

3.1.1 The findings of the habitat survey are discussed in this section, beginning with an overview of habitats common to each Site and a discussion of general opportunities for Biodiversity Net Gain. Thereafter, habitat features and findings particular to each Site are discussed in turn, with suggestions for Site-specific enhancements. Phase 1 habitat maps of each Site are given in Appendix H (supplied as a separate volume) and referred to in the text, along with target notes relating to specific habitat features. Each boundary is given a reference code (D# for ditch and H# for hedgerow), however hedgerows with ditches are referred to with an H# code only.

3.2 Common Habitat Constraints and Opportunities

Arable Fields

3.2.1 The arable fields occupied the vast majority of the Site's areas and were intensively farmed monocultures which are likely to receive periodic fertiliser and pesticide treatments. Vegetated field boundaries were sparse and historical field boundaries can be expected to have been progressively removed over preceding years since the industrialisation of farming. The arable fields across all Sites are therefore generally botanically poor and contained little particular ecological interest, save for their value to a relatively small number of ground-nesting bird species and arable specialists including hunting raptors (several of which are notable species of conservation concern) and brown hare, as described later in this document.

3.2.2 The removal of arable fields is unlikely to result in any intrinsic loss of ecological importance, particularly given the local abundance of this habitat. The arrays and the creation of grassland should help to promote local ecological diversity.

<u>Opportunities for Enhancement and Biodiversity Net Gain</u>

3.2.3 Considerable opportunities for the enhancement of these fields' ecological value compatible with a solar array are available. The reversion from intensive agriculture to low (or no) inputs (fertiliser and soil improvers) grassland alone would be expected to provide a modest net gain in plant and invertebrate species diversity. When multiplied over the large combined area of the Sites, this effect is likely to be significant at a County or District scale.

3.2.4 The benefit described above is able to be further enhanced through favourable and ecologically-led approaches to the ongoing management of the grassland. It is recommended that if grazing is desired, it forms a component of an overall management plan where grassland cutting and meadow management is also present, whereby some areas are not grazed. The establishment of a network of species-rich meadow within the ongoing site management would help realise especially significant net gain. Lowland meadows are a Habitat of Principal Importance under the NERC Act (2006) and are a Lincolnshire BAP priority. Areas identified within the Lincolnshire Biodiversity Opportunities Mapping (especially within Cottam 1) would be well suited to creation of this habitat. Furthermore, the proximity to nesting habitat for skylark and ground nesting birds (either on or off-site, if secured) could be another consideration for the most beneficial siting of high-value grassland management.

3.2.5 Further options for grassland habitat management and creation which could be incorporated under panels are given in 3.2.25 below, in relation to field margins and buffers.

3.2.6 While grazing is not necessarily incompatible with net gain for biodiversity or the creation of ecologically valuable grassland, grazing too often or too densely carries the risk of depleting botanical diversity through the raising of nutrient levels, favouring of fewer vigorous species, and inhibition of flowering and seed-setting. Ideal grazing regimes would include the limiting of number of animals per hectare/acre to 'conservation grazing' or Higher Level Stewardship (agri-environment scheme) rates, the seasonal restriction of animals from the land to allow flowering and recovery, or the use of sheep in 'aftermath' grazing in short periods following hay cuts.

3.2.7 Cutting or mowing can be carried out relatively quickly and cost-effectively, although cutting under panels can present a problem where weeds and scrubby vegetation takes hold. This should be treated through spraying or specialist cutting – advances are being made in these areas within solar arrays.

3.2.8 Where possible cutting should be carried out using a cut-and-collect system so as to minimise nutrient build up in the soil which stifles species diversity. Cutting regimes are often dictated by the perceived need to keep the sward height low to minimise shading risk. This can be simply avoided through the use of a 'shade cut', as shown in Figure 4 below, which aims to cut the first 50-100cm of grass out from the toe of each string during spring and mid-summer, while maintaining the invertebrate, bird and mammal value of the remaining grassland.

Figure 4. Photographs to show a 'Shade Cut' along the first 1m of grassland from the toe edge of the array, leaving flowering and seeding meadow grassland elsewhere.

3.2.9 In order to calculate a reasonably accurate forecast of Biodiversity Net Gain as a result of development, it will be necessary to formulate an operational land management plan which integrates the above broad management options. As different management techniques will have different ecological outcomes or targets, the management plan will be able to provide representative information on which a calculation can be based. The management approaches and management plan will therefore need to be formulated in due course and ideally in advance of completing a Net Gain assessment.

3.2.10 Regardless of chosen management regimes, the preparation of the fields before reversion to grassland will be key and must aim to minimise the impact of competition between desirable, sown species and unsown agricultural weeds and cereals.[2] This should be done through application of herbicide and, ideally, full cultivation followed by an additional herbicide treatment. Sowing of well-selected (locally-derived and appropriate) seed mixes (and to a lesser extent plug planting, in specific areas) would be carried out in the autumn. This should be followed by regular spring mowing with removal of arisings to control annual weed and nutrient levels in the following year, before establishing the final management regime, whether cut or grazed, from year three onwards. These are basic principles, which should be further investigated and tailored to site-specific conditions.

3.2.11 All habitat restoration and management approaches should be subject to periodic ecological monitoring to establish their success or otherwise to guide future management. This would be set out within a management plan (e.g. Landscape and Ecological Management Plan (LEMP)).

3.2.12 Solar development will drive a diversification of local habitats toward that of historical land use patterns where agriculture in the region was characterised by a mix of arable and pasture farming, which supported a greater abundance of wildlife. It is possible that, other concerns notwithstanding, the reversion of large areas of

[2] Blakesley, D. and Buckley, G.P. (2016) *Grassland Restoration and Management*. Exeter: Pelagic Publishing, UK

intensive arable to grassland, especially if managed with an emphasis on ecological benefit, would be perceived favourably in the local area.

Hedgerows

3.2.13 Hedgerows and Hedgerow Trees are a Habitat of Principal Importance and listed on the Lincolnshire BAP.

3.2.14 The hedgerow network is extensive across the majority of the Sites and is generally well-managed and species-poor, although several sections of species-rich hedgerow are present. It is also generally intact, with few gaps.

3.2.15 Roughly half of the hedgerows were accompanied by drainage ditches or streams, most of which were dry or partially wetted and were relatively narrow features.

3.2.16 Roughly half of the hedgerows contained at least sporadic mature and semi-mature trees. Trees were predominantly restricted to outer boundary hedgerows, while minor internal hedgerows were normally devoid of trees. Typical tree species recorded included ash (showing extensive signs of dieback), field maple, oak, rowan, holly, elder and grey willow. Woody shrub species most frequently recorded in hedgerows were hawthorn, blackthorn, and field rose.

3.2.17 Should any loss of hedgerow or boundary feature be required, it should be replaced on a 2:1 basis through supplementary planting in appropriate locations nearby.

3.2.18 The hedgerow network is probably the single most valuable habitat feature within the Sites and should be protected adequately during construction and operation with sufficient buffers. As a general rule, and in line with recommendations for watercourses and field margins below, recommended minimum buffer widths from hedgerow edge to the security fence are:

- Species-poor hedgerows or hedgerows without trees: 8m
- Species-rich hedgerows or hedgerows with trees: 10m

3.2.19 Perhaps the most pertinent driver of buffer width is the hedgerow's value to bats, therefore recommended buffer widths are likely to vary and increase according to the value of the hedgerows and trees present to bats, as discussed further in the species section.

Opportunities for Enhancement and Biodiversity Net Gain

3.2.20 Much of the hedgerow network will require periodic cutting to maintain a reasonable height and structure. While specific hedgerows may require different management, cutting should generally be carried out on a 3-yearly rotation, with only either side or the top being cut each year. Significant net gains can be had by allowing the currently highly-managed hedgerows to fill out and broaden, encouraging a height of 3m or more, where currently they are often below 1.5m.

3.2.21 Additional hedgerow, tree or shrub planting would also provide significant net gains for biodiversity while contributing to visual screening. This can take the form both of in-filling of gaps in defunct or patchy hedgerows or new hedgerows laid at bare fenced boundaries. Additionally, it may be possible to reinstate a small number of old historical hedgerows which have been grubbed out in the past where the scheme allows (e.g. where advantageous for screening or at easements for PROW and services etc.). Maps such as those on www.old-maps.co.uk can be consulted for this. The planting of a small number of new hedgerows parallel to current ones to create a double hedgerow would contribute significantly to Green Infrastructure policies and aid the connectivity across sites if strategically located.

3.2.22 Species suitable for additional planting due to their abundance locally include blackthorn, hawthorn, elder, field maple, field and dog rose, grey willow, oak and dogwood. Site specific planting recommendations are given in the appropriate sections below.

3.2.23 It may be appropriate and well-received if an emphasis is placed on planting long-lived standard native trees, especially oak, sycamore and disease-resistant elm (but also potentially field maple, birch, lime, rowan, and alder) in order to replace the many ash trees which can be expected to be lost in the next five years due to ash dieback.

Field Margins and Semi-Improved Grassland

3.2.24 Arable field margins are a Habitat of Principal Importance and listed on the Lincolnshire BAP.

3.2.25 The uncultivated arable field margins across the Sites are predominantly absent or very narrow (<2m wide), apart from some areas in Cottam 1 which have be purposefully left wide, in places approximately 5m. Generally they are species poor and poor in terms of structure, being mown most years in order to halt any scrub encroachment from hedgerows. Parcels of richer grassland habitat have been individually noted within the corresponding Site maps, although these are infrequent.

Opportunities for Enhancement and Biodiversity Net Gain

3.2.26 Considerable cost-effective opportunities for the enhancement of field margins to become wider and more diverse are present. Diversification of grassland management maximises the available niches for invertebrates to lay eggs, overwinter and feed and in turn drive opportunities for diversification up the food chain. Furthermore, widening of existing margins as ecological buffer zones has the beneficial effect of enhancing the neighbouring hedgerows and ditches they frequently run parallel with. This in turn increases the interconnectedness of habitats within the site and within the neighbouring landscape, a key tenet of the NPPF and local planning policy.

3.2.27 The field margins lend themselves to being incorporated into wider buffer zones between hedgerows/field boundaries and the security fence line. Within these, a variety of straightforward management options can be pursued and ideally a mosaic of several techniques would be incorporated into the management of each Site according to Site-specific species conservation opportunities (dealt with separately in sections below). Management would ideally seek to avoid a uniform, regularly-mown grassland habitat as this reduces habitat structure and species diversity and instead follow a low-maintenance regime. Management options include:

- Tussocky grassland, mown no more than once per year (arisings can be left in situ). This can be extended to once per two or three years on a rotational basis where monitoring indicates. A very low-maintenance technique providing habitat for small mammals, invertebrates and winter bird seed sources. See Figure 5.
- Sown and annually mown (arisings removed using cut-and-collect systems) species-rich meadow, potentially with aftermath grazing. Promotes low-growing flowering plants key for spring and summer invertebrate lifestages. See Figure 6.
- Sown wild bird-seed crop (millet, quinoa, kale, linseed, teasel etc). Requires annual or bi-annual cultivation. Provides excellent autumn and winter food for birds.
- Encouragement of a scattered scrub/ruderal vegetation habitat mosaic on a three-year rotational cut basis. Provides invertebrate overwintering habitats as well as year-round foraging habitat for many bird species. See Figure 7.
- Pollen and nectar strips. Fine grassland dominated by low-growing nectar rich species such as clover, bird's-foot trefoil and sainfoin. Requires cultivation and/or sowing approximately every 3 years. See Figure 8.

3.2.28 It is recommended that these field margin buffer zones measure a minimum of approximately 7-10m from boundary (e.g. nearest hedgerow edge) to security fence in order to realise most ecological benefits[3]. Specific ecological constraints can be expected to increase this recommendation as discussed accordingly in the Site-specific species sections.

3.2.29 Locations within Cottam 1 which appear on the Biodiversity Opportunities Mapping would be well suited to the more diverse habitat management options and mosaics. It is considered that sympathetically managed grassland buffer zones would constitute Arable Field Margin habitat in line with the Lincolnshire BAP.

[3] BRE (2014) Biodiversity Guidance for Solar Developments. Eds G E Parker and L Greene.

Figure 5. Low-maintenance tussocky grassland can provide excellent habitat for small mammals.

Figure 6. Species-rich meadow can be created through well-timed cutting, aftermath grazing and collection of arisings.

Figure 7. Ruderal-encroached grassland can form ecologically valuable habitat in field margins.

Figure 8. Low-growing nectar-rich mixes (clover picutred) are cost-effective under panels and are of value to invertebrates.

Ditches and Watercourses

3.2.30 Rivers are a Habitat of Principal Importance while Rivers, Canals and Drains are listed on the Lincolnshire BAP.

3.2.31 The River Till (Cottam 1 and to a lesser extent, Cottam 2 fed by the Corringham and Yarthorpe Becks) and Northorpe Beck (Cottam 3) were small but relatively significant watercourses associated with the Sites and were fed by various drainage ditches present at field boundaries. Most of the wetted ditches and becks/streams held emergent vegetation and grassy banks, some of which were relatively diverse. The River Till and the larger watercourses (Predominantly Cottam 1) featured wide grassy margins which formed large field headlands and were seen to be relatively diverse and provide key habitat for birds, small mammals and invertebrates.

3.2.32 Water quality appeared to vary, and in many cases was relatively poor owing to the presence of agricultural run-off. Water quality can be expected to significantly increase post-development due to the anticipated reversion to permanent grassland under the array (reduced sediment run-off) and cessation of application of fertilisers and pesticides.

3.2.33 Wetted ditches and watercourses are likely also to be key habitats for otter and water vole, both being legally protected species recorded near to or within all Sites. This will need to be considered when carrying out any engineering works close to or within ditches or river corridors.

3.2.34 Buffer zones along wet ditches and watercourses should be wider than many other simpler boundaries (such as defunct hedgerows or fences) owing to their elevated greater value to wildlife and the pollutant/sediment-attenuating properties of dense grassland vegetation and rich soils. Appropriate buffer widths from feature to security fence should range from 8 to 30m depending on the significance of the watercourse and associated protected species habitat value (e.g. bats, otters, water voles). 8m as a minimum offset from watercourses (including drainage ditches) is a standard Environment Agency and Internal Drainage Board requirement in order to preserve maintenance access and limit risk of pollution events. Significant watercourses clearly attract a wider buffer. These measurements are also discussed in the relevant Site-specific sections below.

Opportunities for Enhancement and Biodiversity Net Gain

3.2.35 The Green Infrastructure value of these features would be maximised through the creation of a wide buffering grassland habitat swathe, contributing to local policy aims and strengthening the value of the watercourse corridor. Habitat management options as listed for arable field margins could be implemented, as well as scattered tree planting.

Ponds and Standing Water

3.2.36 Ponds are a Habitat of Principal Importance and listed on the Lincolnshire BAP.

3.2.37 Few ponds were present at the Sites, most having been filled following the decline of pasture and mixed farming in favour of arable intensification. Those which remain on the Sites tend to be formed by wider, pooled sections of drainage ditches, are agricultural sumps/slurry pits, or are associated with woodland or woodland edge as shooting decoys. Cottam 2 features the most actual in-field ponds, located toward field margins.

3.2.38 Ponds should receive a buffer of at least 10m unless other ecological constraints are present.

Opportunities for Enhancement and Biodiversity Net Gain

3.2.39 Ponds are of significant ecological value, and as a strong, high-quality pond network is absent within the local landscape, any creation of such features would be beneficial and likely to be favourably received by the LPA. Ponds could be created within field margin buffer zones and have a role to play in flood risk alleviation and water attenuation. These could take the form of linear ponds such as deepened swales as shown in Figure 9 below.

Figure 9. Swales can form intermittently drying linear pond features of value to wildlife if sufficiently deep.

3.3 Cottam 1 Habitat Assessment (Coates North, West and South)

Habitat Map and Target Notes

3.3.1 Please Appendix H (separate document) for individual Phase 1 habitat survey maps for Coates North, West and South. Table 3, below, gives a description of the features referred to on the map by numbered Target Notes.

Table 3: Target Notes For Cottam 1 (Constraints and Opportunities)

No.	Description
Coates North	
TN1	3+ badger sett entrances
TN2	Large main badger sett
TN3	Patch of bramble and ruderal scrub – reptile potential
TN4	Groups of mature crack willows with nesting bird and roosting bat potential
TN5	Disturbed ground – opportunity for seeding to diverse habitat
TN6	Ditch has been filled – opportunity for reinstatement
TN7	Good potential for water voles in ditch
TN8	Badger latrine
TN9	Lime stockpile
TN10	Strong mammal path
TN11	Pellet (not owl) found beneath mature ash
TN12(2x)	Rough grassland suitable for reptiles
TN13	Rubble pile colonised by tall ruderal vegetation – reptile potential
TN14	Shrew in grassland observed –opportunity for retention and enhancement of habitat
TN15(2x)	Several skylark seen
TN16	Southern margin of drain comprises 5m of tussocky grassland and ruderals – reptile potential
TN17	Strong mammal paths in margin
TN18	6 Greylag geese seen
TN19	Mixed woodland with game feeders
TN20	Lapwing seen
TN21	Mature oak in field with high bat potential
Coates West	
TN1(7x)	Rabbit warren
TN2(2x)	Riverbank very tussocky and suitable for reptiles
TN3	Mature ash with high bat roost potential
TN4	Single badger sett/rabbit burrow entrance
TN5	Old badger sett
TN6	Potential badger sett
TN7	Likely rat burrows on south ditch bank
TN8	Woodland copse – opportunity for enhancement of woodland edges
TN9	Log pile (recently felled ash) – reptile potential
TN10	Compost/manure pile – reptile potential
TN11	Blackthorn scrub – opportunity for enhancement
TN12	Potential water vole burrow
TN13	Likely rat burrows on south ditch bank
TN14(2x)	High reptile potential habitat
TN15	Moderately rich semi-improved grassland banks – opportunity for enhancement
TN16	Tussocky wet grassland – lots of rushes and sedges – opportunity for enhancement
TN17	Scrub and tussock rich margin – opportunity for enhancement
TN18	Two lapwing seen
Coates South	
TN1	Badger sett – single partially used entrance

TN2	Badger sett – two entrances, possibly old and now used by rabbits.
TN3	Tussocky grassland with reptile potential
TN4	Badger sett – subsidiary sett or small main – 4 well used, 2 partially used entrances Close to margin of semi improved grassland with marsh orchids.
TN5	Grass snake seen on edge of ditch
TN6	Short eared owl sighted flying towards woodland
TN7	Buzzard nest in woodland
TN8	Probable water vole burrow on north ditch bank
TN9	Mammal paths in grassy margin
TN10	Semi-improved grassland with farm machinery and dumped wood
TN11	Rabbit warren with 1 badger-sized entrance
TN12	Pond just off site. 15m², very shaded with poor water quality
TN13(3x)	Pair of lapwing seen
TN14(2x)	Lime and spoil piles. Colonised by ruderal vegetation with reptile potential.
TN15	Barn owl box – likely occupied.

Habitat Overview

3.3.2 Cottam 1 measures approximately 800ha and is characterised by generally large or very large arable fields dominated by winter sown wheat and some areas of spring sown wheat and barley (predominantly Coates South) with a small proportion of permanent pasture and improved grassland silage fields. These fields are separated by drainage ditches of widely varying sizes and habitat value and a network of managed hedgerows, often with intermittent mature trees. Field margins are generally narrow, although in many cases they have been allowed to occupy up to 5-7m widths at headlands. The Site also bordered several small and medium sized copses (often the result of plantation) used as game cover and for pheasant rearing. Several clusters of agricultural buildings, farmsteads and agricultural tracks were present alongside the red line boundary. The River Till bisected parcels of land within Coates South and West.

Arable Fields and Field Margins

3.3.3 The arable fields are all of low botanical interest and general ecological value save for their value to certain species (ground nesting birds and hares, predominantly).

3.3.4 Field margins were wider at Cottam 1 than either of the other Sites, being up to 6 and 7m in places, although generally they were 3-4m. In many areas, predominantly Coates South and close to the River Till in Coates West, the field margins were tussocky and received little management, presumably as part of an agri-environment management option and so held greater species diversity. Some margins, such as those in Coates South between F138 and F139, and next to F107 and F21 (where marsh orchids were recorded – TN4) also in Coates South, also contained greater species diversity. Elsewhere, most margins showed signs of annual mowing and were of a uniform structure with a relatively low diversity.

3.3.5 Most often, margins were dominated by perennial ryegrass, Yorkshire fog, dandelion, rough meadow-grass, with occasional cowslip, cow parsley, wood sage, teasel, yarrow, oxe-eye daisy, rib-wort plantain, docks, meadowsweet, red clover, ground ivy, creeping thistle and cut-leaved cranesbill.

3.3.6 Clearly, the existing grassy field margins hold some key ecological value and should be retained and incorporated into buffer zones extending from their corresponding hedgerows/ditches wherever possible.

<u>Opportunities for Enhancement and Biodiversity Net Gain</u>

3.3.7 As Coates 1 was dominated by cultivated land and did not include any discrete semi-improved grassland or pasture fields, there are few locations where traditional meadow creation would be considered a natural succession of existing habitats. This is not to say that it would not be valuable, but, as set out in Section 3.2, proper ground preparation and aftercare will be essential in order to be successful and minimise the encroachment by unsown arable plants.

3.3.8 Areas in which high value grassland creation, such as traditional meadow, would be most effective would be within the BOM zones, as shown in Figure 2 (pending latest data from LERC). This occupies all of Coates West (apart from Field 153) and much of the western half of Coates South. Presumably the main reason for the BOM

designation here is the proximity of the River Till and the uncultivated field margins shown on the Phase 1 map as semi-improved grassland. All cereal fields would benefit from their reversion to permanent grassland receiving ecologically-sympathetic management as set out in Section 3.2.

3.3.9 An additional consideration for siting such enhancement measures would be the proximity to any on or off-site land secured for skylark mitigation. The success of skylark nesting enhancements off Site can be further improved by better access to productive foraging grounds. As young skylarks are almost exclusively fed on invertebrates, it would be of benefit to have these management methods adjacent to known or targeted skylark nesting habitats. While arrays are not known to support optimally nesting skylarks, they have been found to support foraging skylarks.

3.3.10 TN5 (Coates North) and TN15-17 (Coates West) give further direction on small scale habitat creation. Bee banks and bunds could be created on existing banks

3.3.11 The grassland field margins are generally currently similar in width to the hedgerow and ditch buffer zone widths recommended in Section 3.2. A site of this scale would certainly benefit from a mosaic of several habitat management options as suggested in 3.2.55.

3.3.12 The Willingham to Fillingham Road Verges LWS would stand to gain substantially from an effort to manage them favourably as a species-rich grassland habitat. This would also contribute to local policy objectives. Further botanical details should be taken from them to determine whether oversowing or simple hay-cut management would be most beneficial.

Hedgerows

3.3.13 While most hedgerows were considered species-poor, the majority featured at least intermittent mature and semi-mature trees with accompanying drainage ditches and had been allowed to grow above 1.5m in width and height, in places up to 4m making them valuable nonetheless.

3.3.14 Hedgerows were invariably dominated by hawthorn and blackthorn, with other woody species including elder, dogwood, field and dog rose and bramble. Occasional trees were typically made up of mature ash, horse chestnut, rowan, sycamore and oak with immature field maple, hazel, beech, lime, birch and bird cherry.

Opportunities for Enhancement and Biodiversity Net Gain

3.3.15 A small number of gappy or defunct hedgerows are noted at Cottam 1 which would benefit from planting up and infilling. Other hedgerows without trees would benefit from locally-appropriate planting of intermittent trees managed to become emergent above the surrounding hedgerow as per existing trees. This would also encourage the diversification of species-poor hedgerows to species-rich ones over time.

3.3.16 Bare ditches could have hedgerows or individual trees planted, for instance. However, this should be carefully considered as it may be more appropriate to encourage wide tussocky grassland margins, for example alongside the River Till and many of the larger ditches. It may be appropriate to plant trees or a hedgerow along one banktop only, with the other being enhanced through wide grassland buffer management in order to maintain access.

3.3.17 Pre-emptive replacement of ash trees as described in Section 3.2 would be a good opportunity at Cottam 2.

3.3.18 Generally, the management of hedgerows in order to encourage a tall and bushy form, with incremental and rotational trimming, is advised as per Section 3.2.

Ditches

3.3.19 The ditches on site were predominantly wet and associated with hedgerows, although many significant drainage ditches and watercourses were recorded. These measured up to 7-8m wide and 3-4m deep in places, with tussocky grassland banks colonised by ruderal and marginal wetland plant species. Generally, the ditches at Cottam 1 were of good quality and species diversity so should be protected as far as possible.

Opportunities for Enhancement and Biodiversity Net Gain

3.3.20 Few specific enhancements for the Site's ditches are recommended over and above that of periodic inspection and maintenance wherever necessary in order to ensure proper drainage function, for example at D5 (TN8). However, it is recommended that ditches are not overly dredged or cleared unless they are causing

a drainage issue or at a frequency in line with EA/IDB recommendations. Grassy buffers would help to maintain water quality and mitigate pollution risks.

Ponds and Standing Water

3.3.21 Very few ponds were present within the red line boundary and these were all liable to regular drying. However, the Site was adjacent to land containing many ponds.

Opportunities for Enhancement and Biodiversity Net Gain

3.3.22 Outside of the western half of Coates South which lies adjacent to a pond know to support great crested newts and lies within the BOM zone, pond creation is not considered to be a key priority at Cottam 2. It is therefore suggested that small-scale pond creation could be investigated within this zone, especially within wayleaves, buffers and any suitable habitat found to be within flood risk zones. Swales and other attenuation features could double as valuable aquatic habitat.

3.3.23 Ongoing monitoring and reactive management would help to significantly enhance the ecological contribution made by them. It can be expected that water quality would improve following the reversion of arable to grassland and the completion of construction.

3.4 Cottam 2 Habitat Assessment

Habitat Map and Target Notes

3.4.1 Please refer to Appendix H (separate document) for a Phase 1 habitat survey maps for Cottam 2. Table 4, below, gives a description of the features referred to on the map by numbered Target Notes.

Table 4: Target Notes For Cottam 2 (Constraints and Opportunities)

No.	Description
TN1(5x)	Species rich margin – reptile potential
TN2	Small, wooded coarse grassland strip – opportunity for enhancement
TN3	3 entrance badger sett with fresh bedding material
TN4	Area of set-aside grassland with ruderal vegetation, scattered mature trees and scrub – opportunity for enhancement
TN5	Game pen and feeders
TN6	Moderately herb-rich area – opportunity for enhancement to meadow
TN7	Grassy bank with high levels of ruderal vegetation – reptile potential
TN8	Ditch choked with common reed and greater willowherb – opportunity for restoration

Habitat Overview

3.4.2 Cottam 2 measures approximately 132ha and is characterised by moderately large winter-sown wheat fields separated by mostly species-poor intermittently managed hedgerows with occasional trees and with ditches. Field margins are generally narrow, although many were wider at around 5m, with several further patches of moderately rich uncultivated grassland occurring at some boundaries.

Arable Fields and Field Margins

3.4.3 The wheat fields are all of low botanical interest and general ecological value save for their value to certain species (principally ground nesting birds) discussed in the species section below.

3.4.4 Field margins were generally narrow, although wider semi-improved grassland margins of up to 5m were present at F1, F4 and F9, with patches of moderately diverse semi-improved grassland present at F1 (TN4), and F9 (TN2 and P4) each surrounding in-field ponds which have clearly be avoided during cultivation. Dominant species were cock's foot, meadow foxtail, false oat-grass with hogweed, teasel, cowslip and willowherbs.

3.4.5 Grassy field margins should be retained and incorporated into buffer zones extending from their corresponding hedgerows/ditches wherever possible.

Opportunities for Enhancement and Biodiversity Net Gain

3.4.6 F8 is a field of cattle-grazed semi-improved grassland dominated by perennial ryegrass but which was seen to have a moderate species diversity, including meadow foxtail, oxeye daisy and cowslip. Comfrey, lady's bedstraw and nipple wort frequently present toward the edges. It is considered to hold the potential to be significantly enhanced to a species rich traditional meadow through cessation of regular grazing and introduction of a single hay cut (cut-and-collect) potentially with aftermath grazing. This should have the effect of stifling ryegrass dominance and allowing finer grasses and flowering plants to compete. The sward can be further diversified through over sowing within an appropriate meadow seed mix.

3.4.7 F11 is another grassland field showing signs of heavier enrichment and improvement, being dominated by perennial ryegrass and cocks-foot. However, the northern margins were more diverse (TN6) with cowslip, meadow foxtail, cow parsley, garlic mustard, soft brome, field speedwell and nipplewort. This field would be another good candidate for a potential restoration to traditional meadow as set out above.

3.4.8 All cereal fields would benefit from their reversion to permanent grassland receiving ecologically-sympathetic management as set out in Section 3.2.

3.4.9 Field margin enhancements at Cottam 2 would lend themselves to simple tussocky grassland management, with desirable encroachment by ruderal and scattered scrub habitats, in line with the conditions of the similar habitat fragments found on Site mentioned above.

Hedgerows

3.4.10 Most hedgerows on Site were species-poor, but contained trees and ditches and received minimal management, causing many to have become quite tall and bushy, improving their ecological value. Several internal hedgerows were gappy and classed as defunct. Hedgerows should be adequately buffered as set out in Section 3.2.

3.4.11 Dominant species were hawthorn and blackthorn, with rose, field maple, grey willow, ash, crab apple, elder all regularly present.

Opportunities for Enhancement and Biodiversity Net Gain

3.4.12 The gappy hedgerows (H6, H12, H18, H21, H22, H24, H27 and H29) would lend themselves to being made intact through new planting, including standard trees managed to become emergent above the surrounding hedgerow as per existing trees.

3.4.13 Bare ditches could have hedgerows or individual trees planted, for instance along D2, D5, D6, D7, D9 and D10. However, this should be carefully considered as it may be more appropriate to encourage wide tussocky grassland margins, for example alongside D1.

3.4.14 Pre-emptive replacement of ash trees as described in Section 3.2 would be a good opportunity at Cottam 2.

Ditches

3.4.15 The ditch numbers which form the north western boundary (D7, D9, H9 and H10) are together known as the Corringham Beck which is a minor stream. Similarly, those along the north eastern boundary, predominantly D1, are known as the Yarthorpe Beck, another minor stream. These are the two most significant watercourses on Site and should attract a wider buffer of approximately 10-12m. All other ditches should be buffered by at least the standard 8m as set out in Section 3.2.

3.4.16 Most wetted ditches featured grassy banks and were approximately 2-4m deep and 2-4m wide with emergent vegetation.

Opportunities for Enhancement and Biodiversity Net Gain

3.4.17 Few specific enhancements for the Site's ditches are recommended over and above that of periodic inspection and maintenance wherever necessary in order to ensure proper drainage function, for example at D5 (TN8). However, it is recommended that ditches are not routinely dredged or cleared unless they are causing a drainage issue. Grassy buffers would help to maintain water quality and mitigate pollution risks.

Ponds and Standing Water

3.4.18 Four ponds were present within the Site boundary. These ponds were generally shallow and susceptible to drying out and contained moderate to poor water quality with a comparatively low diversity of aquatic plants.

3.4.19 A buffer of 10m from the pond edges to security fences is considered appropriate for these ponds.

Opportunities for Enhancement and Biodiversity Net Gain

3.4.20 Pond creation is not considered to be a priority at Cottam 2. However, the ponds present would all benefit from positive management, including selective deepening and the planting of marginal and emergent aquatic plants. Ongoing monitoring and reactive management would help to significantly enhance the ecological contribution made by them. It can be expected that water quality would improve following the reversion of arable to grassland, the cessation of fertiliser and pesticide use in the adjacent areas, and the completion of construction.

3.5 Cottam 3 Habitat Assessment

Habitat Map and Target Notes

3.5.1 Please refer to Appendix H (separate document) for a Phase 1 habitat survey maps for Cottam 3. Table 5, below, gives a description of the features referred to on the map by numbered Target Notes.

Table 5: Target Notes For Cottam 3 (Constraints and Opportunities)

No.	Description
TN1	Likely badger sett – single hole – probable outlying sett. Nearby rabbit warren.
TN2(2x)	Earth bund. Covered with grass and ruderal species. Good reptile habitat. Contains rabbit warrens.
TN3	Ditch with pond-like features
TN4	Possible badger sett
TN5	Pond (P7) – located next to spoil heaps containing reptile habitat, rabbit warrens and a small single entrance badger sett.
TN6(2x)	Ditch with pond-like features – opportunity for enhancement.
TN7	Two-entrance badger sett in bank/field margin
TN8	Willow and field maple woodland with badger sett potential. Contains woodland pond (P8).
TN9(5x)	Vegetated bank with high reptile potential
TN10	Pile of brash, wood hay and buried carpet with high reptile potential
TN11	Large pile of cut straw – reptile potential
TN12	Beehives
TN13	Large vegetated spoil pile containing clay beads with leachate ponds around the base. Two rabbit sized burrows noted and high potential for reptiles.
TN14(3x)	Pile of horse manure, mud and straw.
TN15	Willow trees in small patch of semi-improved grassland – opportunity for enhancement
TN16(2x)	1x well used badger sett entrance with high numbers of mammal paths into this hedge and up the bank.
TN17(2x)	Area with large number of badger snuffle holes
TN18(2x)	Half-buried rubble pile – suitable reptile hibernaculum
TN19	Patch of mature hawthorns with 1.5m semi-improved grassland margin and dead wood in understorey – opportunity for enhancement
TN20	Pylon surrounded by scrub-encroach semi-improved grassland – opportunity for enhancement
TN21	3 well-used badger sett entrances with additional paths noted on bank – suspected main or subsidiary sett
TN22	Large pile of garden waste including ornamental plants and rubble – reptile potential

Habitat Overview

3.5.2 Cottam 3 measures approximately 170ha and is characterised by arable fields separated by ditches and is surrounded at the red line boundary by hedgerows. The agricultural fields are occasionally interspersed with features such as earth banks, spoil heaps, tipped material, occasional storage buildings and stored manure.

3.5.3 The Site is dominated principally by large and very large arable fields formed of both spring and winter-sown wheat and barley, with one bean field in the south west. Two fields of improved grassland, presumably fodder crop, were present in the eastern half. Some smaller fields and patches of semi-improved grassland were sporadically distributed in uncultivated corners around earth bunds and storage buildings. Two fallow fields of bare ground were present (F13 and F7) at the time of survey.

3.5.4 The hedgerow network was generally limited to the far perimeter of the Site following the red line boundary. Internal hedgerows were mostly absent in favour of ditches and tracks.

3.5.5 The Site featured an array of drainage ditches which were generally wet, mainly in the eastern half of the Site which connected to the Northorpe Beck which forms the Site's eastern boundary along with a hedgerow and several mature trees.

3.5.6 Immediately surrounding the Site was former airfield infrastructure and an active racetrack with associated facilities. A single wind turbine was present at the south eastern boundary.

Arable and Improved Grassland Fields

3.5.7 The arable and improved grassland fields are all of low botanical interest and general ecological value apart from their value to certain species (ground nesting birds and hares). The crop rotation at Cottam 3 was noted to leave several fields bare and/or uncultivated at certain points through the spring, particularly F13 and F7, which may provide value to birds which feed on fallow or set-aside type vegetation, such as turtle dove.

Opportunities for Enhancement and Biodiversity Net Gain

3.5.8 Considerable opportunities for reversion to grassland or meadows exist at Cottam 3 in line with general grassland creation advice previously discussed in Section 3.2. For example, it is recommended to maintain a small degree of set aside-mimicking habitat mosaic (such as inclusion of ruderal habitat, bird seed crop or scattered scrub) of particular value to species such as turtle dove which are of high conservation concern and have been recorded foraging at the Site.

Field Margins and Semi-Improved Grassland

3.5.9 Uncultivated grassy field margins were generally very poor in terms of extent (0-2m from field boundaries), species diversity and structure. Field margins typically contained species such as cocks-foot, red fescue, false-oat grass, couch grass, perennial ryegrass, common nettle, hogweed, hedge mustard, dandelion and creeping thistle. Most narrow field margins appeared to be periodically mown or strimmed to halt scrub encroachment with arising left in situ. Several grassy banks and other patches of semi-improved grassland were also recorded.

Opportunities for Enhancement and Biodiversity Net Gain

3.5.10 The field margins on Site would benefit significantly from reduced management and extension in width to create either tussocky grassland, species-rich meadow habitat, cultivated wild bird cover crop or scrub-ruderal grassland mosaic.

3.5.11 Grassland bunds and banks which are found in several places, associated with waste ground surrounding the race track and former airfield, could be enhanced for invertebrates and reptiles through periodic scarification (to provide bare ground for basking and burrowing) and rotational cutting to create a mixed habitat structure.

3.5.12 Small patches of semi-improved grassland were present in corners of the Site which were difficult to cultivate or maintain and as such had become tall and tussocky. Although they hold little botanical interest, they offer invertebrate habitat and habitat for small mammals which are hunted by birds of prey. The creation of wide, infrequently maintained grassland buffer zones at the edges of the array would be of considerable value to various species.

Hedgerows

3.5.13 All except three sections of hedgerow at the north eastern and south eastern boundaries of the Site were species-poor. Nearly all hedgerows were managed and featured regular or intermittent semi-mature and mature trees such as ash, elder, hazel, sycamore, and goat willow. The majority of the fields were not bounded

by hedgerows internally. Most hedgerows around the red line boundary, predominantly in the east of the Site, had been allowed to grow tall and bushy, with a height and width of up to 3m.

3.5.14 Dominant hedgerow species within hedgerows were hawthorn and blackthorn, with occasional field rose, elder and dogwood.

Opportunities for Enhancement and Biodiversity Net Gain

3.5.15 Cottam 3 presents many opportunities for new hedgerow planting, particularly at either side of access tracks, bare minor ditches and at field boundaries which currently have no boundary feature (see F2, F3, F5, F6, F10, F11 and F13). New hedgerows each bisecting F9 and F10 interconnecting with new perimeter hedgerows and widened field margins would significantly contribute to local green infrastructure around the Site.

3.5.16 The wider and more vegetated ditches present, such as D1, D7 and D11 would be better suited to grassland margin management than hedgerow creation. Potentially, hedgerow on one side and broad diverse grassland margin on the other would be a good option.

3.5.17 Pre-emptive replacement of ash trees as described in Section 3.2 would be a good opportunity at Cottam 3.

Ditches and Standing Water

3.5.18 Ditches are only present toward the western and eastern edges of the Site. Ditches at H2 and H3 form part of the Northorpe Beck. Generally, ditches are between 1.5 and 4m wide and typically feature grassy banks with some surface and emergent vegetation such as hemlock, hogweed, duckweed, water figwort and willowherbs.

3.5.19 No ponds are present on Site although several occur just off site and had varying levels of water quality and marginal habitat. One ditch contained a pond like feature which could be easily enhanced (TN3).

Opportunities for Enhancement and Biodiversity Net Gain

3.5.20 Few specific enhancements for the Site's ditches are recommended over and above that of periodic inspection and maintenance wherever necessary in order to ensure proper drainage function. However, it is recommended that ditches are not routinely dredged or cleared unless they are causing a drainage issue. Grassy buffers would help to maintain water quality and mitigate pollution risks.

3.5.21 Pond creation is not considered to be a priority at Cottam 3. The single pond-like feature at TN3 could be deepened and widened to provide an online pond connected to flowing watercourses, within a linear feature of ecological value.

4 SPECIES INFORMATION COLLATED TO DATE

4.1.1 This section sets out the results of preliminary species survey work and an appraisal of the Sites' value to various protected and notable species. It also gives recommendations and suggestions for mitigation of potential impacts and opportunities for biodiversity net gain. In the interests of brevity and to avoid repetition, the site-specific results and recommendations are given together under each species' sub-heading in turn.

4.2 Badgers

Desk Study Information

4.2.1 The desk study revealed 18 records within the red line boundary for Cottam 1, recorded between 2006 and 2012. These are distributed with six records at Coates North and 12 at Coates West. A further three records are present within 250m of Coates South and another 26 records beyond 250m from the Site boundary.

4.2.2 For Cottam 2, eight records all beyond 250m of the Site were revealed.

4.2.3 For Cottam 3, 11 records all beyond 500m of the Site were revealed.

Field Survey Results

4.2.4 Woodlands were not extensively searched for badgers during the extended Phase 1 survey as they generally lay outside of the red line boundary. Setts were noted where there was clear evidence visible from the field edges, or within hedgerows.

4.2.5 Several badger setts were recorded within woodland stands adjacent to the likely development footprint, at Cottam 1, which contained the greatest number of woodland copses. In addition, smaller badger setts were recorded within hedgerows around this Site.

4.2.6 Only one badger sett (TN3 at H18) was recorded in a hedgerow at Cottam 2, located at the southern tip.

4.2.7 Four badger setts, including one subsidiary or small main sett (TN21) were recorded within boundary features at Cottam 3. The Site contains several grassy banks at field boundaries that are conducive to digging of setts by badgers.

Potential Constraints, Mitigation and Further Work

4.2.8 An operational solar array would most likely present at worst a neutral impact on badgers provided that appropriate protective measures outlined below are undertaken during construction and maintenance. Potentially, the diversification of habitats by introduction of permanent grassland may help to provide better foraging opportunities for badger in the long term.

4.2.9 The grassland habitats beneath the array are highly likely remain conducive to foraging by badgers (whether grazed or cut) and access to other woodland and farmland likely to remain unimpeded.

4.2.10 The perimeter fencing of the array is not considered to pose a limitation to badger dispersal unless it is deeply buried and of a tight mesh size which is not typical of solar arrays. For this reason, buried fencing is not advised as it would risk leading to its excavation by the badgers in the long term and potential fragmentation of badger social groups.

4.2.11 The use of badger gates in perimeter fencing is also not recommended although is something that is commonly encountered. This is considered unnecessary unless fencing is significantly buried and in our experience of monitoring arrays across the UK we have not encountered a single badger gate in a section of linear fencing which showed any evidence of use. By contrast we have recorded multiple locations where badgers squeeze beneath fencing (often adjacent to a badger gate). Badger gates represent an unnecessary expense and likely just compromise the integrity of the fencing should the intention be to graze areas with livestock.

Protection and Avoidance of Setts

4.2.12 Badgers and their setts are legally protected from disturbance and damage when active (likely to be occupied). Badgers are unlikely to pose a significant constraint to the development at the Site given the general lack of activity at the Site and potential for impact onto significant setts. Constraints are likely only to apply to the construction phase of the development.

4.2.13 As badgers are liable to dig new setts at any time, a pre-construction survey (approximately 3-6months prior) of woodland edges and hedgerows within approximately 30m of any development activities is recommended to ensure any new setts can be mitigated for in advance of commencement. Any setts capable of being impacted should be examined to determine whether they are active or disused. Disused setts generally do not pose a constraint. Such investigation work may require monitoring using cameras over a (minimum) three-week period.

4.2.14 To ensure that construction and operational maintenance works do not cause unlawful impacts on badgers and setts, a 20-30m buffer zone should be established from the perimeter of any active sett. The size of the buffer zone should reflect the status and activity levels within the sett and the nature of the local topography and the direction of tunnels associated with the sett entrances. Within this buffer zone, there should be no movement of plant, excavations or installation of array structures or buried cabling for the life of the scheme. Protective fencing and signage should be installed at the beginning of the construction phase.

4.2.15 If it is not possible to retain an active sett within the proposals, or maintain adequate buffer zones, it is likely to be possible to close (either temporarily or permanently) them under a licence from Natural England. For any main setts, it is probable that an alternative badger sett will need to be constructed in a suitable nearby location in order to ensure sufficient alternative shelter. The artificial sett will also need to be created well in advance of closure operations and uptake by the badgers will need to have been demonstrated by means of video surveillance or similar. It is therefore advisable to undertake artificial sett creation at least six months in advance of sett closure. Sett closure under licence can only take place between the months of July and November inclusive so as to avoid impacts on dependent young underground.

4.2.16 Badgers will forage within grassland creating shallow pits and scrapes down to approximately 15-20mm when excavating earthworms and grubs. To date we have not come across any examples of badger activity causing issues with buried cabling on active solar arrays. We believe that the standard armouring surrounding buried cabling is sufficiently robust enough to not be damaged by badger foraging or digging activity.

Opportunities for Enhancement and Biodiversity Net Gain

4.2.17 The substitution of grassland within areas previously supporting arable land will provide a greater diversity of habitats. Badgers are reliant upon a diversity of foraging opportunities, exploiting different habitat types and areas through the year in response to availability.

4.2.18 The grasslands within arrays generally present good opportunities for forage, the stability and undisturbed nature of soils promotes earth worm abundance, and invertebrate and small mammal populations are generally improved within arrays, all of which provide foraging opportunities for badger.

4.2.19 Consideration might be given to the incorporation of fruiting trees (crab apple, apple and pear for example) within marginal areas as windfall fruits provide an important foraging resource in the autumn when badgers are looking to build weight for the winter period.

4.3 Bats

Desk Study Information

4.3.1 For Cottam 1, approximately 200 records for six species were recorded within the desk study data, none of which were recorded within the red line boundary and the vast majority beyond 250m of the Site. The most commonly recorded species was common pipistrelle, followed by brown-long eared bat, Myotis bats (Natterer's and Daubenton's) and noctule bats. This represents a relatively low diversity of species, all of which can be expected to roost within buildings and/or trees in the local area. The species present in the data were generally common and widespread. Most records were made post-2000.

4.3.2 For Cottam 2 there were only 12 records of bats across two species (common pipistrelle and brown long-eared bat), all of which were located over 1Km from the Site boundary.

4.3.3 For Cottam 3, there were only 11 records of bats across two species (common pipistrelle and noctule bat), all of which were located over 700m from the Site boundary.

4.3.4 Bats are Species of Principal Importance under the NERC Act (2006) and are listed on the Lincolnshire BAP.

Field Survey Results

Bat Detector Survey

4.3.5 21 bat detector locations were utilised, with 13 at Cottam 1 and four each at Cottam 2 and 3.

4.3.6 A preliminary inspection of data gathered indicated that a relatively moderate diversity of species was present across the Sites.

4.3.7 The majority of activity was made up of common and soprano pipistrelle, noctule bat and several *Myotis* species, which was expected. Brown long-eared bat is another relatively common species which featured regularly within the assemblage.

4.3.8 Two rarer species featured sporadically and in very low numbers, which were barbastelle and Nathusius' pipistrelle. The Sites are located at the northern edge of the range for these two species. Barbastelle are rare and Nathusius' pipistrelle uncommon in Lincolnshire according to the Lincolnshire BAP. Both species are considered to be most closely linked with woodland edge habitats and tree roosts although they will occasionally roost in buildings. A significant colony of barbastelle bats is known in Norfolk. Nathusius' pipistrelle bats are known to migrate long distances and have strongholds in the east and south east of England. Leisler's bat may also be present within the dataset. This is a rarer species but is difficult to fully separate from noctule bats by call so further analysis will be necessary.

4.3.9 It is considered probable that roosts for some of the species recorded within the data occur either in trees within the Sites, or in trees and buildings in proximity to the Sites.

Habitat Appraisal

4.3.10 Initial fieldwork determined that the suitability of habitats for bats across the option land was generally low, being dominated by monoculture arable and a simple network of managed hedgerows. The arable and relatively small proportion of pasture are intensively farmed environments, receiving pesticide treatments, and would be expected to support a lower abundance and diversity of prey items upon which bats feed.

4.3.11 The linear natural features along which bats tend to navigate and disperse, as well as forage in preference to monoculture arable, were generally highly managed and restricted in size and structure. Woodland stands were sparse within the landscape and generally poorly interlinked, with historic hedgerow removal resulting in large open expanses of arable.

4.3.12 Mature trees are only sporadically present within the hedgerow networks and field edges, along with at the edges of any woodland adjacent to the option land. In-field trees are absent from the option land. Many of these trees hold potential for roosting by bats.

4.3.13 A relatively small number of agricultural buildings and farm dwellings (of varying levels of use and disuse) were present adjacent to the red line boundary

4.3.14 At Cottam 1, most hedgerows contained trees, and many mature trees were present within this, especially mature ash with signs of dieback. A small number of in-field trees were present, mainly mature ash in Coates North, as shown on the Phase 1 maps. Many clusters of agricultural buildings were also present, associated with current or disused farmsteads.

4.3.15 At Cottam 2, most hedgerows contained at least intermittent semi-mature and mature trees. The farm buildings at Corringham Grange Farm and further north to Corringham Grange Cottage may hold potential to support roosting bats.

4.3.16 At Cottam 3, nearly all hedgerows contained trees, although the most abundant and mature trees were located along the Northorpe Beck at the eastern periphery. Many buildings associated with the race track were noted around the perimeter of the Site (beyond the red line boundary) while agricultural buildings were present in the west. Most of these were unlikely to hold any significant bat roost potential but it is considered prudent to inspect those most closely located where possible.

Potential Constraints, Mitigation and Further Work

4.3.17 It is unclear to what extent roosting, foraging and dispersing bats are affected by large scale solar development as research evidence is sparse. Arrays have been demonstrated to increase invertebrate

abundance in comparison with surrounding arable landscapes[4] which is likely to be of benefit to foraging bats, particularly around the perimeters of the arrays. Whether bats use or avoid the centres or arrays and forage within or commute along array strings is currently ambiguous. *Montag et al* found non-significant reduction in abundance of bats from within the centres of arrays compared with surrounding arable fields. There is currently no evidence to significant change in the sizes or abundance of populations of bats in proximity to established array sites, although research on the subject is sparse. As such the most reasonable assumption at this stage is that arrays are broadly neutral upon foraging and commuting bats with the potential to offer enhancement where they are able to promote night flying invertebrate abundance and reinforce or enhance green infrastructure as well as retain all potential roosting features.

Roosts in Buildings and Trees

4.3.18 Clarkson and Woods should be consulted to review any proposals to prune or fell any mature or semi-mature trees, or remove built structures, within or adjacent to the option land.

4.3.19 Inspections of buildings adjacent to the red line boundaries for bat roosts should be carried out to determine the potential for impacts from an array of this scale. Daytime inspections can take place at any time of year to determine levels of potential. Structures with roost potential can be followed up with emergence surveys or static detector surveys completed between May and September.

4.3.20 It may be prudent to carry out close inspections (via a climbing survey) of any semi-mature and mature trees situated in locations at risk of being encircled or at least partially enclosed by solar array. This would establish the potential for impacts upon any roosts therein. Close inspections should be preceded by ground-based inspections to ascertain levels of potential for roosting from negligible to high. Alternatively, a pre-emptive buffer of c.30+m may be appropriate. Such inspection work can be carried out at any time of year, with the potential for follow-up emergence surveys within the months of May and September inclusive.

4.3.21 Likely mitigation for roosts present in trees and buildings will revolve around adequate buffering from development in order to avoid fragmentation of populations.

Habitat Buffers

4.3.22 Pending the detailed results revealed by the static detector surveys and above further surveys, it is likely that few constraints are posed by bats, as long as steps are taken within the design of the scheme to sufficiently buffer the linear vegetated features (hedgerows of differing habitat value, ditches, watercourses and woodland edges) and any adjacent buildings containing bat roosts from the nearest array structures.

4.3.23 For development of this scale, cumulative impacts (both in combination with the other Sites and West Burton Solar Project and other potential forthcoming solar schemes) upon the already limited local dispersal route network and access to foraging habitat are possible and will need to be carefully assessed.

4.3.24 It would be prudent to apply an absolute minimum buffer zone of 8m between all such above key habitat features and the nearest panels. It can be expected that this would increase to around habitat of elevated value to bats, such as hedgerows with trees, buildings with roost potential (or confirmed roosts), woodland edges and watercourses such as the River Till and other rivers and streams. This reflects their importance to navigating and foraging bats in sustaining population movement and long-term genetic flow.

4.3.25 The following is therefore recommended as buffers from habitat edges to nearest array structures (rather than fencing)(in line with Section 3.2), subject to consultation.

- Ditches, species-poor hedgerows and hedgerows without trees: 8m
- Minor watercourses (streams, becks), species-rich hedgerows and hedgerows with trees of low or negligible roost potential: 10m
- Woodland, in-field trees, hedgerows with trees of moderate or high roost potential: 20m
- Rivers, confirmed roosts in buildings or trees: 30m

[4] Montag, H., Parker, G.T., Clarkson, T. (2016) *The effects of solar farms on local biodiversity: a comparative study.* Clarkson and Woods and Wychwood Biodiversity, UK.

Lighting

4.3.26 Lighting can act as a significant barrier to the movement of bats, potentially also causing unlawful obstruction of roost accesses within trees or adjacent buildings. Any construction phase lighting should be carefully considered and positioned. Details of, and the need for, construction phase lighting should be reviewed by Clarkson and Woods as early as possible. Solar development does not typically require permanent lighting installation, however the need for any such lighting at substations or the proposed battery facility should be reviewed by Clarkson and Woods.

Opportunities for Enhancement and Biodiversity Net Gain

4.3.27 Suggested strategic focal locations for habitat creation and enhancement will follow as part of the bat survey report once bat survey data has been analysed. Bats are Species of Principal Importance and listed on the Lincolnshire BAP, therefore enhancements for them would be favourably received.

4.3.28 Habitat creation opportunities will revolve around the planting of new linear features such as hedgerows and tree lines within the local landscape. Replacement of former, grubbed out hedgerows (through examination of historical maps) could be a valuable technique where the scheme allows. This would benefit dispersal and navigation (providing connectivity and green infrastructure) as well as foraging resources (and in turn, increased reproductive success and population viability).

4.3.29 The most significant habitat enhancement opportunities revolve around the management of the following locations sympathetically for bats in order to maximise their productivity for invertebrates.

- Buffers between boundary habitats and the array
- Grassland habitat beneath the array
- Any off site mitigation land

4.3.30 Sympathetic management for bats generally involves leaving plants to flower before any cutting or mowing, encouragement of a tussocky sward at margins through rotational (less than annual) cutting, and grazing at a low "conversation" density of animals. It is likely that a blended approach to these management techniques would be appropriate across the option sites, to be tailored according to local nature conservation priorities and the results of the surveys.

4.3.31 Roosting opportunities should be incorporated into the scheme through the installation of tree and building-mounted bat roost boxes. A rate of approximately 1-2 boxes per 10ha of development land would be appropriate.

4.3.32 Specialist, bespoke roost buildings could be created in key flyways, for example close to the River Till or stands of woodland at intersections in the hedgerow network or at eventual habitat enhancement zones. Such features, also known as 'wildlife towers' (see Figure 9 below) would comprise small, free-standing timber, brick or block buildings with crevice and void-roosting opportunities on the vertical faces and roof pitches. Alternatively, buildings associated with the array infrastructure could be modified to include roosting features such as roost boxes, but also wooden waney-edge cladding.

Figure 9. Example of a wildlife tower and waney-edge cladding modifications for bats.

4.4 Otter

Desk Study Information

4.4.1 For Cottam 1, ten records of otters were present within the red line boundary, all within Coates South, showing association with the River Till and tributaries. A further 15 records were present within 250m of Coates West.

4.4.2 No records of otter within 2Km of Cottam 2 were present in the Desk Study data.

4.4.3 For Cottam 3, there were four pre-2000 records of otter approximately 2Km from the Site.

4.4.4 Otter are a Species of Principal Importance under the NERC Act (2006).

Field Survey Results

4.4.5 Habitat for otters was restricted to river corridors, wet ditches and streams present on or adjacent to the sites. No direct observations of holts or field signs for otters were encountered during the initial walkover survey. Summarised results of the autumn survey of ditches and watercourses found the following.

4.4.6 Cottam 1 bordered the River Till and several substantial tributaries across Coates West, South and North. One ditch with signs of otter was recorded at the south eastern corner of Coates South and another at the northern boundary of Coates south. Five ditches with field signs were recorded in Coates North while none were recorded in Coates West.

4.4.7 Cottam 2 contained a moderate number of wetted ditches of good interconnectedness and moderate overall suitability including the Corringham and Yarthorpe Becks. No signs of otter were recorded at Cottam 2.

4.4.8 Cottam 3 was bordered on its eastern boundary by a tributary of the Northorpe Beck. A single field sign for otter was recorded along the eastern boundary of Cottam 3.

Potential Constraints, Mitigation and Further Work

4.4.9 Otters, as well as their resting places, are legally protected. Should any habitat clearance, excavation or engineering works be required within 5m of any ditch and 10m of any watercourse, a prior survey of the affected area for signs of otters and its suitability should be undertaken. In the event that evidence of any otter shelter is discovered (either in advance through a specific otter survey or during supervised works), works may require a licence from Natural England in order to proceed. In the absence of evidence of a holt or other shelter, the potential for disturbance or damage to habitat should be mitigated for by carrying works out under an Ecological Watching Brief attended by an experienced ecologist.

4.4.10 Otters are able to range over considerable distances and use small streams and ditches occasionally for dispersal and reaching inland waterbodies for hunting. Consequently, the potential for otters within field boundary features should not be entirely ruled out at any of the Sites. The most effective design based mitigation would be to adopt sufficient buffers (>10m) between watercourses and the nearest zone of development activity.

Opportunities for Enhancement and Biodiversity Net Gain

4.4.11 The relative distribution of suitable habitat between the Sites is reflected in the relative distribution of desk study records, in that Cottam 1 is of elevated potential value to otters than Cottam 2 and Cottam 3, being better connected to river corridors. Habitat enhancements for otter are mostly limited to the favourable management of river and stream banks to encourage a dense growth of vegetation cover in the form of tussocky grassland, as well as thick shrubs and mature trees. Consequently, new tree planting schemes could include a small degree of planting of alder, willow and birch whips at stream and river banks. Grassland field margins should be left to grow long and tussocky within approximately 5-10m from streams and rivers where possible.

4.4.12 Depending on the results of the spring field survey, further opportunities to provide habitat links and improve connectivity between watercourses potentially by deepening or wetting ditches and planting scrub and trees may be possible. Any new waterbodies (for example as GCN enhancement) and swales may also contribute positively to otter conservation.

4.4.13 The potential for pollution events and discharge of sediments and excess agricultural and soil runoff during construction should be avoided through best practice construction measures.

4.5 Water Vole

Desk Study Information

4.5.1 For Cottam 1, 12 records of water vole were present within the red line boundary, all within Coates North, showing association with ditch network on Site. A further 19 records were present within 250m of the Site showing association with the ditches and also the River Till. 82 further records are located between 250m and 2km from the Site. Most records were made post-2000.

4.5.2 For Cottam 2, 14 records of water vole were present, six of which were located within the red line boundary between 2002 and 2011. Two were located within 250m of the Site.

4.5.3 For Cottam 3, 31 records of water vole were present, all located at least 250m from the Site boundary.

4.5.4 Water voles are a Species of Principal Importance under the NERC Act (2006) and listed on the Lincolnshire BAP.

Field Survey Results

4.5.5 As with otters, suitable habitat for water vole was restricted to river corridors, wet ditches and streams present on or adjacent to the Sites. Habitat requirements for water vole are simpler than for otter, just requiring shelter (diggable earth banks), aquatic vegetation and reliable access to water. Consequently water vole are considered likely at all three Sites, although probably in greatest numbers at Cottam 1 where likely water vole burrows were recorded (see Target Notes TN7 – Coates North, TN12 – Coates West and TN8 – Coates South).

4.5.6 In summary, the autumn field survey recorded no field signs at Cottam 3, three ditches with field signs at Cottam 2 and nine at Cottam 1.

Potential Constraints, Mitigation and Further Work

4.5.7 Water voles are legally protected from harm as well as disturbance while within burrows. As with otters, should any habitat clearance, excavation or engineering works be required within 5m of any ditch and 10m of any watercourse, a prior survey of the affected area for signs of water voles and its suitability should be undertaken. In the event that evidence of any burrows is discovered (either in advance through a specific water vole survey or during supervised works), works may require a licence from Natural England in order to proceed. In the absence of water voles signs, the potential for minor disturbance or damage to habitat should be mitigated for by carrying works out under an Ecological Watching Brief attended by an experienced ecologist. The most effective design-based mitigation for water voles would be to adopt sufficient buffers (>10m) between watercourses and the nearest zone of development activity.

Opportunities for Enhancement and Biodiversity Net Gain

4.5.8 Enhancements for water voles are similar to those given for otters and revolve around the preservation of stream and river banks, protection from disturbance and damage by buffering and avoidance of pollution events.

4.6 Dormouse

4.6.1 Dormice are not known to be present in the Lincoln to Gainsborough area and are only very locally distributed in Lincolnshire at all. No records for dormice were revealed by the desk study. Habitats on the Sites were considered poor for dormice, being restricted to managed simple hedgerow networks alone. It is highly unlikely that the Sites could be functionally linked to any populations of dormice, therefore this species is not considered a potential constraint to development.

4.7 Great Crested Newts and Other Amphibians

Desk Study Information

4.7.1 For Cottam 1, 76 great crested newt records are present beyond 250m of the Site, the closest being 475m south west of the Site. 43 records of toad were present in the dataset, the closest being located 600m west of the

Site. A small number of other amphibian records (smooth newt, common frog and palmate newt) were revealed between 250m and 2km form the Site.

4.7.2 No amphibian records were present within 2Km of Cottam 2.

4.7.3 For Cottam 3, 36 records of toad were present, mostly made pre-2000, the closest located 500m west of the Site. In addition, there were 34 records of common frog similarly distributed.

4.7.4 Clusters of records persist predominantly around Lincoln, presumably due to a more diverse sub-urban landscape with more permanent coverage and interconnectivity of scrub, grassland, gardens and woodland and greater recording effort. Clusters of records are also present around the Trent valley – especially on floodplain grassland between Cottam power station and Torksey. The dearth of records within the arable landscape may also indicate the influence of under-recording away from established settlements.

4.7.5 Great crested newt and common toad are Species of Principal Importance under the NERC Act (2006) and newts are listed on the Lincolnshire BAP.

Field Survey Results

4.7.6 At Cottam 1, 16 ponds were visited to test for GCN environmental DNA. Of these, one was positive (Pond 3, Coates South). Six of the ponds visited were dry at the time of survey. See Figure 10 below.

4.7.7 At Cottam 2, 6 ponds were visited to test for GCN and none were positive. Three of these ponds were dry at the time of survey.

4.7.8 At Cottam 3, 4 ponds were visited to test for GCN and none were positive. All ponds held water but one gave an 'indeterminate' result due to high sediment or pollutant content.

Figure 10. GCN Positive Pond – Coates South (Pond 3)

4.7.9 An indeterminate result occurs where factors such as the presence of contaminants or silt make DNA extraction difficult, as in the case of slurry pits, or waterbodies subject to accumulated leachate or agricultural runoff.

4.7.10 Several waterbodies were found to be dry. This is considered partly as a result of the period of warm weather at the time of surveys, and the fact that many of the mapped waterbodies were in actual fact ephemeral field ponds or are subject to regular drying. Drying out in three or more years in every ten is considered to significantly reduce the suitability of a pond for GCN.

4.7.11 GCN records are very sparsely distributed within the West Lindsey district, reflecting the fact that the intensive agricultural land-use which characterises the landscape provides generally poor habitat for this species. Nevertheless, the Cottam and West Burton project sites are considered to be consistently sub-optimal for GCN in terms of intrinsic habitat value and local population densities.

Potential Constraints and Mitigation

4.7.12 Legal protection afforded to GCN extends to their habitat (breeding and resting places), which includes both aquatic and terrestrial types. Arable and actively cut grassland or grazed pasture, which make up the vast majority of the option land, are considered sub-optimal habitats. Scrub, tussocky or uncultivated grassland, woodland and hedgerows are all optimal (as well as wetland and other aquatic habitat). These habitats typically occur within field margins and boundaries and at field headlands, or in a relatively low number of uncultivated fields, such as those present sporadically within the **Cottam 1** (predominantly Coates South and West) land and to a minor extent in the south eastern corner of **Cottam 3** and in discrete patches within **Cottam 2**. Few other habitats occur within the sites. Hard standing and bare ground are considered unsuitable.

4.7.13 Despite the majority of the option land - or certainly the likely development footprints - occupying sub-optimal habitat, a zoned approach to the risk of unlawful habitat clearance or direct disturbance to GCN should be adopted, in accordance with best practice guidance. This recognises the fact that the likelihood of encountering newts within potentially suitable habitat decreases with distance from ponds known to support them. Table 6 provides general constraints during the construction phase and working methods recommended for all Sites containing or adjacent to positive GCN ponds.

Table 6. Summary of Constraints and Working Methods in Proximity to GCN Breeding Ponds

Zone (Distance from perimeter of nearest known breeding pond)	Temporary or Permanent Loss of, or Disturbance to:	
	Optimal Habitat	**Sub-Optimal Habitat**
0-100m	• Licence from Natural England likely to be required – *see further information below*. • Newt exclusion exercise likely required, involving installation of partially buried fencing and pitfall traps, to be checked daily for 30+ days to declare habitat clear of GCN in advance of works commencing. • Constrained to **active season** (March to October inclusive, weather depending) in order to avoid impacts on hibernating individuals. • Ecological Clerk of Works (ECoW) required to supervise. • Destructive Search methodology to precede works – consists of a staged cutting (mowing or strimming) of vegetation before being methodically removed using an excavator.	• Licence from Natural England potentially required, but unlikely. To be informed through pre-application consultation with LPA and NE. • Due to negligible hibernation potential within these habitats, works likely to be constrained to **winter period** (November to February inclusive, weather depending). • Ecological Clerk of Works (ECoW) required to give tool-box talk to contractors.
101-250m	• Licence only required where approx. 5000m² (0.5ha) impacted. • Additional constraints as above.	• Licensing constraints **unlikely** - to be informed through pre-application consultation with LPA and NE. • Potential for restriction to winter working methodology.
251m +	• Licence only required where approx. 50,000m² (5ha) impacted. • Additional constraints as above.	• Licensing constraints highly unlikely.

4.7.14 The above construction phase constraints will be the subject of discussion with LPA consultees and Natural England. An acceptable approach to construction during the DCO process will need to be established, therefore the information given in Table 6 above is indicative at this stage subject to amendment. The final, agreed approach to construction and licensing will be detailed within an eventual EIA (and its great crested newt survey report technical appendix) and Construction Ecological Management Plan, or similar document.

4.7.15 Currently, licensing for great crested newts in this region generally involves recourse to a traditional mitigation licence. This typically requires the need for an exclusion, trapping and translocation exercise where suitable habitats in close proximity to breeding ponds are to be lost or temporarily affected. This is seasonally constrained and may require 30 or more days to undertake prior to construction commencement. Licence determination post-construction also takes a statutory 30-day period.

4.7.16 An alternative option exists, known as the Low Impact Class Licence, which is applicable for developments where impacts in proximity to breeding ponds are considered to be small, and do not affect the ponds themselves. These licences are streamlined and far less onerous to apply for and have determined. Should the scheme be designed to minimise impacts to suitable habitats within 100m as far as possible, this licence type may be available. Further consultation will be necessary to determine this.

4.7.17 Finally, it is probable that by the time the scheme is consented, Lincolnshire will be added to the regions eligible to use the District Licence scheme for GCN mitigation. This scheme permits all but the most damaging impacts to breeding ponds and habitat in return for a tailored and proportionate financial contribution to local great crested newt conservation schemes.

Further Work

4.7.18 To underpin the DCO application and finalisation of ES, CEMP and any future licence, water testing of ponds within 250m of the site should be carried out. Best efforts to gain access to third party land should be made. Samples can only be taken between the months of mid-April to end June each year.

4.7.19 It is recommended that a proportion of the indeterminate or dry ponds encountered during the 2021 surveys are re-visited in 2022 for completeness and to demonstrate best efforts.

4.7.20 Survey requirements for the cable routes should be determined and planned for the 2022 survey season, especially given the known populations close to Cottam power station.

4.7.21 Recommendations and constraints given above would apply to any newly confirmed breeding ponds.

Opportunities for Enhancement and Biodiversity Net Gain

4.7.22 Construction of new waterbodies within 250m of known breeding ponds would improve the long-term viability of currently sparse and poorly connected local populations. This would contribute substantially to local and national green infrastructure policy and the restoration of local biodiversity.

4.7.23 Planting of new hedgerows, woodland strips and scrub/shrub vegetation in locations strategic to improving corridors for dispersal between existing (and any new) ponds would serve to improve green infrastructure for amphibians and long-term population sustainability.

4.7.24 Management of field edges, hedgerow/woodland/ditch/watercourse buffer zones, wayleaves and easements within 250m of known breeding ponds to create coarse, tussocky grassland or meadow habitat would also contribute to the above aims.

4.7.25 Sympathetic management of fields beneath arrays within 250m of known breeding ponds to form a taller, more diverse grassland sward (managed through low-density/intensity conservation grazing or collection of a late-season hay cut.

4.7.26 As set out in Section 3.4, basic water and habitat quality enhancements at the four ponds within Cottam 2 would be of benefit for any amphibian populations present. This includes selective deepening and planting.

4.8 Reptiles

Desk Study Information

4.8.1 At Cottam 1, 6 historical (pre-2000) records for common lizard located beyond 250m of the Site were present, as well as 32 records for grass snake (4 post 2000) again all beyond 250m from the Site.

4.8.2 No reptile records were present within 2Km of Cottam 2.

4.8.3 All reptile records for Cottam 3 were located approximately 2Km from the Site to the north, presumably close to the populations within Laughton and Scotton commons. These comprised 35 records of common lizard, 39 records of adder and 14 records of grass snake.

4.8.4 Reptiles are Species of Principal Importance under the NERC Act (2006).

Field Survey Results

4.8.5 Habitats for reptiles are generally limited in quality and extent across all the sites, being restricted to hedgerow bases, tussocky field margins and woodland edges only. Almost universally, the development will be sited on

land of poor habitat quality for reptiles. Furthermore, the desk study data shows a lack of records for reptile species within 2km of the sites, with an absence generally within 250m.

4.8.6 Cottam 1 contained significant habitat of potential suitability for reptiles in field margins and areas of unmanaged grassland (See Target Notes). A grass snake was also seen on the edge of a ditch in Coates South (TN5).

4.8.7 At Cottam 2, several tussocky grass margins (TN1) and a grassy bank (TN7) were of some potential for reptiles and connected to the hedgerow network.

4.8.8 At Cottam 3, there were many bunds, features of tipped and buried material and earth banks scattered around the peripheries of the arable fields and associated with the agricultural yards and wasteland adjacent the race track which were all considered optimal habitat for reptiles. No reptiles were observed during the survey, however.

Potential Constraints, Mitigation and Further Work

4.8.9 Reptiles are legally protected from reckless and intentional harm, therefore it is recommended that all field margins and hedgerows, as well as target noted locations of discrete reptile habitat are retained and protected wherever possible.

4.8.10 Given the limited records, habitat quality and extent within the development footprint, it is unlikely that a targeted reptile survey would be necessary. Should proposals seek to significantly remove or alter boundary features, the requirement for a reptile survey may need to be re-assessed. Further consultation with LPAs would determine acceptability of this approach.

4.8.11 It should be possible to avoid any impacts on reptiles through the installation of sufficient protective fencing, adherence to a construction methodology which avoids damage to such habitats and the avoidance of any widening of field accesses. A suitable buffer of at least 5m from these habitats would ensure accidental damage during construction and ongoing maintenance is avoided.

4.8.12 A best practice approach to habitat clearance and management is considered appropriate. Where habitat suitable for reptiles (all field margins, hedgerows, tussocky grassland and river corridors) is proposed for clearance, a Reasonable Avoidance Method Statement should be followed. Depending on the amount of land affected, this is likely to involve the phased removal of vegetation in order to dissuade reptiles from that area, followed by a destructive search supervised by an ecologist. Should particularly large areas of habitat be earmarked for removal, a survey and translocation exercise may be a last resort, although considered unlikely.

4.8.13 Should any of the arable fields become dominated by a long or tussocky sward, either through the cessation of cultivation or cutting prior to development, site clearance/preparation may need to be carried out in a sensitive manner. This is to avoid impacts to any reptiles which may have dispersed onto the development footprint as the habitat has increased in suitability. A suitable habitat cutting/clearance methodology (Risk Avoidance Method Statement) would be set out in an eventual Construction Environmental Management Plan.

Opportunities for Enhancement and Biodiversity Net Gain

4.8.14 Optimal reptile habitat includes tussocky grassland, scattered scrub and ruderal vegetation interspersed with physical features conducive to basking on and hibernating in.

4.8.15 The local area is unlikely to support significant populations of reptile species and therefore enhancements specifically for these species are of a low priority, however the following basic measures are suggested.

4.8.16 The creation of a number of appropriately located reptile hibernaculum would improve the Sites' habitat suitability by providing features within which to hibernate during the winter and to bask during the summer. The construction of these habitat piles using partially buried dead wood, earth and stone would also provide invertebrate prey items. Further advice on numbers and locations can be given as the proposals evolve.

4.8.17 The reversion of intensive agriculture to diverse grassland is encouraged as this would improve the plant species diversity and habitat structure within the Sites. In turn, this would provide improved foraging and hibernation habitat for reptiles. Advice on the favourable management of the grasslands on Site for the benefit

of reptiles and other wildlife would be agreed with you and provided within a Landscape Environmental Management Plan.

4.9 Birds

Desk Study Information

4.9.1 At Cottam 1, numerous records of 56 species of notable birds, or birds of conservation concern, were revealed by the Desk Study. These are detailed in Appendix B. The only species with records made within the Site boundary was house sparrow (Coates West). The majority of these species records comprise farmland birds such as corn bunting, quail, barn owl and turtle dove as well as waders and raptors.

4.9.2 For Cottam 2, numerous records of 23 species of birds were recorded, as detailed in Appendix C. These included several within the red line boundary of the site, which where; two records of barn owl, four records of lapwing and four records of skylark. All other bird species were recorded beyond 250m from the Site, including curlew, tree sparrow and yellowhammer.

4.9.3 For Cottam 3, numerous records of 17 bird species were recorded as detailed in Appendix D. One record of cuckoo was located within 250m of the red line boundary. All other records were located beyond approximately 500m of the Site, including species such as yellowhammer, yellow wagtail, nightjar, lapwing and barn owl.

4.9.4 Farmland birds are listed on the Lincolnshire BAP and many species are Species of Principal Importance under the NERC Act (2006).

Field Survey Results

4.9.5 Four daytime breeding bird surveys and one dusk, nocturnal bird survey (with a focus on quail) has been carried out. Winter bird surveys are scheduled for November 2021 to February 2022.

4.9.6 In general, considering the broad similarities in habitat arrangement, topography, field size and agricultural management, the breeding bird species assemblage is consistent across the option sites. Results can be broadly divided into those for ground-nesting birds, birds of hedgerows and boundaries and other bird species.

Ground-nesting Birds

Skylark

4.9.7 This is a red-listed species on account of its declining population trend as a result of agricultural intensification and land-use change. It is also a Species of Principal Importance (SPI) under the NERC Act 2006. Skylark are a resident species whose numbers swell each winter from an influx of visitors from northern Europe. Skylark require long, unbroken sightlines in grassland (including arable or set-aside up to 40cm high) of at least approximately 200m for predator avoidance.

4.9.8 Skylark were recorded on all Sites in varying densities. On average, territories occurred at a density of 1 per 5ha. This means there would be approximately 250 territories among all Cottam sites combined.

4.9.9 Particularly dense populations were located at Cottam 1 and Cottam 3 as these featured some of the largest arable fields within a similarly open landscape. In addition, some of the barley (predominantly Cottam 1) was planted in the spring, allowing for greater nesting success on second broods (due to the lower sward height) and better wintering habitat in the form of stubbles. Therefore a larger residual population is associated with Cottam 1. Together, Cottam supports significant populations of skylark, although this would be expected to be in line with population densities in the local landscape.

4.9.10 Winter-sown wheat - as is ubiquitous across most of the Sites - is considered to be a suitable but sub-optimal habitat for skylark on account of its growth above 60cm at a time when skylark are looking to have second or third broods in the mid-late summer. It can reasonably be assumed that a large proportion of the nests present, if not all, would be displaced from solar arrays. There is no robust, long-term evidence indicating that skylark nest within solar arrays, although the reversion from arable to grassland in solar development has been shown to improve foraging opportunities for skylark which are able to include array land within their adjacent territories. This effect is likely to increase nesting and breeding success in adjacent suitable (non-array) habitats. Some nesting may persist within buffers and wayleaves, although it is considered that this reflects a tendency for site-fidelity which may persist for approximately one to three seasons post-construction.

Yellow wagtail

4.9.11 For the same reasons as skylark, yellow wagtail are also red listed, and a SPI. Yellow wagtail migrate to the UK from Africa each spring. Yellow wagtail are a far less numerous bird than skylark and were recorded across all Sites at significantly lower rates than skylark. As above, sites supporting greater numbers were Cottam 1 and Cottam 3. As for skylark, it is likely that yellow wagtail nests would be displaced through solar development, although solar development could be expected to improve foraging opportunities for birds with nearby territories.

Grey Partridge

4.9.12 This is a red listed species and an SPI, typical of lowland arable farmland although having suffered marked recent declines. Grey partridge were recorded across all Sites, especially at Cottam 1 where many pairs have been introduced and specifically managed for the game shoot there. The effects of solar development on grey partridge is unknown. Preferring field edges and proximity to sources of cover, grey partridge may continue to use solar arrays, although potentially at the edges and in lower overall densities. It may also transpire that solar array may provide a desirable shelter from nearby game shooting and therefore provide a valuable refuge for the population.

Quail

4.9.13 This is an amber-listed species for which population and conservation research in the UK is limited on account of its cryptic nature and difficulty of survey. Quail are a summer migrant from Africa and the Mediterranean and closely associated with arable habitats. Quail were recorded on relatively few occasions at all Sites. It is not understood whether quail would be displaced by solar development as they do not rely on surveillance for predator avoidance, rather camouflage, secrecy and restriction of most activity to evenings and early mornings. In some regions and countries, quail rely on open woodland and a landscape with a mosaic of grassland and woody cover. It is possible that quail may continue to use solar arrays although further research is needed as the extent and type of cover and shading created by solar installations is not directly analogous to such open woodland habitat. This project would pose a good opportunity to study this effect further.

Birds of Field Boundary Habitats

4.9.14 Significant populations of birds typical of hedgerows, woodland edges, scrub and river corridors in a lowland agricultural setting were recorded throughout the Sites, principally yellowhammer, linnet, common whitethroat, lesser whitethroat, tree sparrow, reed bunting and great spotted woodpecker. Many of these birds will forage within arable field edges or nest in ditches, hedgerow bases or grassy margins as well as the hedgerows themselves. It is expected that the assemblage and abundance would not be significantly affected provided that sufficient buffering is designed into the schemes. These species have been seen to persist on established small and medium-scale solar arrays, although impacts are largely untested at this scale. Given the scale of proposals and likely unbroken expanse of array, it would be prudent to instigate an increased degree of buffering compared to small and medium sized array schemes.

Other Birds

4.9.15 Curlew and lapwing are red listed species and also SPIs. These waders were recorded at Cottam 1, close to the banks of the River Till. Solar development can be expected to displace nesting locations for these species for the same reasons of predator surveillance as listed for skylark.

4.9.16 Turtle dove are a red listed species and an SPI and one was recorded one time foraging in uncultivated land at the eastern end of Cottam 3. This species is increasingly rare and in danger of extinction in the UK. Turtle dove rely on uncultivated land and arable weeds for seeds, as well as tall hedgerows, open woodland and scrub. Again, no research exists on the effect of solar development on turtle dove, however opportunities exist for the enhancement of foraging habitat and planting of nesting habitat for this key species of local conservation concern.

4.9.17 Barn owl, little owl, short-eared owl and tawny owl were all recorded during the evening surveys, with barn owl being recorded at almost every site in good numbers. Short-eared owl was only recorded at Cottam 1 (Coates South). Tawny owl and little owl were only recorded in stands of woodland adjacent to the option land. Barn owl and short-eared owl were the most likely owl species to be recorded within the arable fields themselves. River banks, especially at the River Till were regularly-used foraging corridors for these species. The impacts of

solar development on owls are unclear as barn owls in particular as associated with open hunting habitat. However, it is likely that tussocky margins and buffers, as well as sympathetically managed grassland beneath arrays (longer grassland suitable for voles and other small rodents) would support a far greater abundance of prey items than intensive arable.

4.9.18 Buzzard, peregrine, hobby, kestrel, marsh harrier and red kite were all observed during the bird surveys. Nesting buzzard were regularly recorded within woodland edge at the majority of the sites. Potential hobby nesting activity was observed at Cottam 3.

Potential Constraints and Options for Mitigation

4.9.19 On account of their status as birds listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) nests of hobby, peregrine, barn owl, quail and red kite will need to be protected from disturbance during any development activity. Consequently, pre-commencement precautionary survey work is likely to be required to establish risks immediately prior to the construction phase.

4.9.20 Similarly, all nests for other species are protected from harm, therefore any potential nesting habitat clearance will need to be carried out either during the period September to February inclusive, under the supervision of an ecologist, or following further survey to confirm absence.

4.9.21 In order to ensure that boundary habitats remain suitable for use by the species recorded, as well as being able to be re-visited and discovered, it is recommended that sufficient buffers to the nearest arrays are implemented. The size of these should be coordinated with other constraints, for example bats, in due course following the completion of survey work and analysis. The following is therefore likely to be recommended, subject to consultation. Hedgerows: 10m. Ditches and minor watercourses: 15m. Woodland, in-field trees and major watercourses: 20m. Ancient woodland: 30m

<u>Skylark and Other Ground Nesting Birds</u>

4.9.22 Impacts on ground nesting birds can be mitigated for either by the creation of newly-available (i.e. not already suitable) compensatory nesting habitat, or the enhancement of existing habitat by the improvement of foraging opportunities causing an increase in carrying capacity and likely knock-on nesting success. Given the scale of likely impacts on these species, mitigation should be achieved through a blend of different mitigation techniques and land management approaches on Site and, potentially locally off-Site. As has been described, solar arrays are not considered suitable nesting habitat for ground nesting species which require long sightlines for predator monitoring, therefore mitigation for these will need to occupy contiguous blocks of land free of solar array and other structures.

4.9.23 On Site, land unviable for development could be managed specifically for ground nesting birds, ideally reverting from intensive arable to non-rotational set-aside or meadow for the greatest capacity to absorb displaced territories. Careful site selection will be necessary as suitable mitigation land for skylark in particular usually requires a radius of >100m from all vegetation and structures above 100cm in height.

4.9.24 Off site, winter sown cereals can be reverted to spring (March) sown crop to enable existing birds to successfully rear a second or third brood. This technique should be supplemented through the inclusion of 'bird foraging plots' whereby 5x5m squares of unsown land are introduced at a rate of at least 2 per hectare into fields by temporarily halting the seed drill during sowing. This has the effect of increasing invertebrate food item abundance, improving the breeding success, number of young reared and densities of territories able to be supported. Additionally, agricultural land can be reverted from unsuitable or sub-optimal habitat to meadow, long cut-rotation silage (>7weeks), and have reduced application of inorganic fertiliser and insecticide. Again, only large, open fields with vegetation below 50-60cm during the majority of the breeding season would be considered suitable.

4.9.25 The precise quantum of land required to achieve an acceptable mitigation for the species can be calculated once bird survey data has been analysed. This would then be refined according to the combination of mitigation techniques listed above that are employed. It is likely that impacts in terms of territory displacement would be greatest at Cottam 1 owing to the already productive field margins (for invertebrate prey items) and proportion of spring sown barley and winter stubbles.

4.9.26 Furthermore, consultation with Natural England and Local Authorities would be key in establishing an acceptable approach. Indeed, Local Authorities (as well as consultees such as the RSPB and BTO) may be in a position to assist with recommending local conservation initiatives to which the schemes can contribute. The

above mitigation techniques can be expected to be of benefit to a wide variety of birds, not limited to the listed ground nesting species.

Opportunities for Enhancement and Biodiversity Net Gain

4.9.27 Beyond the mitigation options for ground-nesting birds outlined above, substantial nesting and foraging habitat can be created through the planting of new hedgerows, lines of trees and scrub, as well as the management of buffers, wayleaves and other easements for invertebrate and seed eating species. These measures can be tailored to each site and particular bird species of note. For example the creation of tall, bushy hedgerows and thickets at Cottam 3 for turtle dove would increase nesting opportunities, while sowing strips of wild-bird cover containing kale, quinoa and millet within buffers would create ideal foraging habitat for this key species within agreed buffers and would also benefit other seed-eating birds such as yellowhammer, goldfinch and linnet.

4.9.28 Buffer areas and easements can be managed preferentially for different species. Where raptors such as owls and kestrels are targeted, tussocky grassland valuable for small rodents can be encouraged. This can be diversified with ruderal and flowering meadow plants to be of greater benefit to invertebrate-eating species such as whitethroat, skylark and yellow wagtail. Hobby can be targeted through the inclusion of waterbodies to encourage dragonflies. Further options would be discussed within the dedicated bird survey reports.

4.9.29 An additional consideration for siting such enhancement measures would be the proximity to any on or off-site land secured for skylark mitigation. The success of off Site skylark nesting enhancement can be further improved by better access to productive foraging grounds. As young skylarks are almost exclusively fed on invertebrates, it would be of benefit to have these treatments adjacent to known or targeted skylark nesting habitats. While arrays are not known to support optimally nesting skylarks, they have been found to support foraging skylarks.

4.9.30 Nesting opportunities should be incorporated into the scheme through the installation of tree and building-mounted bird boxes. A rate of approximately 1-2 boxes per 10ha of development land would be appropriate.

4.9.31 Specialist boxes for raptors and owls can be installed in appropriate key locations within the schemes.

Further Survey Considerations

4.9.32 Wintering bird surveys will need to be carried out to determine the potential for impacts upon wetland birds, winter migrants and bird associated with the Humber Estuary SPA.

4.9.33 It may be prudent to carry out further daytime inspection of buildings and mature trees adjacent to the sites capable of being encircled or at least partially surrounded by arrays (for example, all buildings at Cottam 2), to determine any impacts on movements or access to habitat by birds such as barn owls nesting or roosting within them.

4.10 Invertebrates

4.10.1 Habitat quality for invertebrates within the development sites is generally low, owing to the intensive agricultural land use and regularity of pesticide use. Boundary habitats are also generally poor for invertebrates, while the River Till corridor, waterbodies and watercourses represent some elevated habitat value. The desk study data on invertebrates will be fully analysed in due course, alongside further consultation, to determine whether any further targeted invertebrate survey may be useful. At this stage, this is considered unlikely.

Desk Study Information

4.10.2 At Cottam 1, numerous records of 27 species of notable invertebrate species (three butterfly and 24 moth species), were revealed by the Desk Study. These are detailed in Appendix D. All species were recorded beyond 250m of the Site boundary.

4.10.3 No invertebrate records within 2Km of Cottam 2 were present in the Desk Study.

4.10.4 The only records of invertebrates given within 2Km of Cottam 3 were of hazel pot beetle, wall butterfly and two moth species all between 500m and 2Km north of the Site.

Field Survey Results

4.10.5 Habitat quality for invertebrates within the development sites is generally low, owing to the intensive agricultural land use and regularity of pesticide use. Boundary habitats are also generally of lower to moderate value for invertebrates, while the species rich hedgerows, trees, River Till corridor, waterbodies and watercourses represent relatively elevated habitat value.

Potential Constraints, Mitigation and Further Work

4.10.6 The desk study data on invertebrates did not raise any concerns regarding the need for further survey.

Opportunities for Enhancement and Biodiversity Net Gain

4.10.7 The creation of more diverse grassland over time (both under panels and within field margin buffer zones) should provide an increase in habitat value for invertebrates. Alternatively, a new meadow or diverse grassland can be created by cultivation and over seeding, followed by monitoring and timed cutting as described in the Habitats section. The final approach can be discussed for inclusion within an Ecological Management Plan.

4.11 Other Protected Species and Species of Conservation Concern

Desk Study Information

Cottam 1

4.11.1 80 records of brown hare present, with two within Coates West and three close to Coates South.

4.11.2 One record of polecat was present 1.2Km south east of Coates South.

4.11.3 One record of hedgehog close to Coates South was recorded.

4.11.4 40 records of European eel were recorded within 2km of the site, with 23 records located close to Coates West, predominantly associated with the River Till. Similarly, 10 spined loach records in the same locations were recorded.

4.11.5 The only flowering plant records present are for bluebell, of which there were 41 records all beyond 250m from the Site.

4.11.6 Three notable butterfly species (wall, white-letter hairstreak and small heath) were recorded 21 times well beyond 250m from the Site.

4.11.7 25 notable moth species were recorded, almost all of which were 640m west of the Site in 2010.

Cottam 2

4.11.8 31 records of brown hare present, the closest of which being 600m south of the Site.

4.11.9 32 records of hedgehog were present, the closest being approximately 1Km west of the Site.

4.11.10 The only flowering plant records present are for bluebell, of which there were 5 records all beyond 250m from the Site.

Cottam 3

4.11.11 44 records of brown hare were made, the closest located 400m north of the Site.

4.11.12 One record of European eel and one of barbel were recorded between 700m and 1Km west of the Site.

4.11.13 57 records of hedgehog were present, the closest being 600m north west of the Site.

4.11.14 Six records of harvest mouse were present, the closes being 1.6Km north of the Site.

Field Survey Results

4.11.15 At all sites, large numbers of brown hare were noted within the fields. All sites were conducive to the presence of species such as hedgehog, polecat and other small mammals within hedgerows and field margins. Harvest

mice are assumed to be present to some degree. The larger watercourses are likely to support several species of fish and other aquatic life.

Potential Constraints, Mitigation and Further Work

4.11.16 It is unlikely that significant effects on any of these species would arise from the development provided that steps are taken to protect existing boundary features and maximise their habitat value through simple and sympathetic management practices for the life of the scheme. Mitigation measures given for other species above would serve species mentioned here well. It has been observed that brown hare, in particular, appear to benefit from solar array installations and favour the shelter and longer grass associated with them in preference to pasture grassland. Security fencing is not considered likely to impede movement by these species as long as the mesh size is large enough (e.g. standard deer fencing).

5 FURTHER WORK AND NEXT STEPS

5.1 Recommended and Optional Further Surveys

5.1.1 As derived from the above species and habitats discussions, the following further surveys are either recommended or suggested pending the outcome of consultation on the current proposed survey and assessment scope.

Further Survey to Inform DCO Application			
Species/Item	**Survey Type**	**Timing**	**Comments**
Great Crested Newts	Water sampling	Mid-April and end-June 2022	Survey of all accessible ponds on third party land within 250m of red line boundaries, plus on-site dry ponds. Survey of ponds in proximity to cable route, especially at Torksey/Cottam likely required.
Birds	Wintering birds	Monthly visits between November 2021 and February 2022	Scheduled
Birds	Tree and building inspection	Any time of year, best March to September any year	Scheduled
Bats	Tree and building inspection	Daytime work: any time of year. Emergence Survey (if needed) May to September inclusive.	Scheduled
Otters and Water Voles	Watercourse inspection	spring	Scheduled
Cable Routes	Phase 1 Walkover	Any time of year for walkover	Further survey for GCN, otters and water voles, designated habitats as a minimum likely to be required.

5.2 Anticipated Reporting/Design Milestones

- Input into Pre-App/Early Consultation Docs. Basis formed by PEA but with relevant additions – September 2021
- Opinions received on proposed survey scope and early mitigation approach – August-October 2021
- Breeding Bird Survey Report – October 2021 –

  Expanded thereafter following completion of any tree/building surveys.
  Will enable finalisation of on and off-Site mitigation requirements for skylark and associated species.
- Bat Survey Report – October/November 2021

  Expanded thereafter following completion of any tree/building surveys.
  Will enable finalisation of buffer widths from hedgerows and trees to security fence.
- Preliminary Biodiversity Net Gain Analysis – October/November 2021 –

  Will facilitate habitat management plan and landscape enhancement design.
- Wintering Bird Survey Report – March/April 2022 –

  May have implications for on and off-Site bird mitigation if not already catered for.
- Otter and Water Vole Survey Report (if required by consultees – considered likely) - March/April 2022

  Interim report can be provided on basis of 2021 data for purposes or PEIR, scoping and consultation.
  Will help refine recommendations for watercourse buffering and habitat management.
- Great Crested Newt Survey Report following 2022 survey of off-Site ponds – May 2022

  Interim report can be provided on basis of 2021 data.
  Will refine constraints in proximity to some ponds.
- PEIR – Spring 2022
- ES Chapter – Summer/Autumn 2022
- Construction Ecological Management Plan (or similar) – TBC in support of PEIR/ES
- Landscape and Ecological Management Plan (or similar) – TBC in support of PEIR/ES
- Final Biodiversity Net Gain Analysis Report - TBC in support of PEIR/ES

5.3 Construction and Landscape Environmental Management Plans (CEMP and LEMP)

5.3.1 The PEIR and ES will likely need to be supported by a document setting out how construction-phase impacts upon sensitive ecological receptors will be avoided and minimised. Typically, a Construction Environmental Management Plan is prepared in collaboration with other environmental and landscape disciplines and an ecology chapter produced. Alternatively, a specific Construction Ecological Protection Plan can be produced as a standalone document.

5.3.2 This document would set out the following:

- Details of protective and permanent fencing including distances from habitat features etc.
- Working methods adopted to avoid accidental damage (including root compaction, contamination and pollution) to retained features such as trees, hedgerows and watercourses.
- Examples of and a plan to show where signage will be installed.
- The roles of different site personnel in protecting and maintaining retained habitat during construction.
- The role of an Ecological Clerk of Works to ensure inspections are carried out and that activities carrying a risk of harm to protected and notable species and habitats can be appropriately planned and carried out.
- Steps taken to prevent the spread of invasive non-native species potentially present.
- Considerations for the minimisation of damage to the ground during the winter months.

5.3.3 The achievement and success of Biodiversity Net Gain is likely to be contingent on the efforts made in the long term management of the Site's habitats. A Landscape and Ecological Management Plan (LEMP) would set out the agreed habitat creation and planting to be undertaken during and immediately after the construction

phase as well as an ecologically-sensitive management schedule for a period of at least 20years. Details on the installation of features of value to wildlife including reptile hibernacula, invertebrate habitats and bird and bat habitat boxes will also be given alongside a monitoring and maintenance schedule. The LEMP is likely to be a requirement of an eventual PEIR/ES in order to demonstrate how proposed mitigation and enhancement will be secured and the various roles and responsibilities for carrying this out.

5.4 Cumulative Impacts

5.4.1 An assessment of cumulative impacts arising from between the sub-sites, between Cottam and West Burton applications and with other large-scale solar in the District will be an essential part of the PEIR/ES. Given the similarities of habitat and value to protected and notable species between the Sites and other applications, the potential for significant cumulative impacts on certain receptors, especially ground nesting birds. This factor will be a key consideration when formulating acceptable mitigation (i.e. its location, quantity and habitat management), not least for ground nesting birds. Preliminary recommendations given in this document, such as buffer widths etc., attempt to take this effect (and the effect of the project scale) into account and apply a precautionary approach.

5.5 Future Baseline and Decommissioning Effects

5.5.1 An assessment of a potential future baseline will be necessary as part of the PEIR/ES in understanding possible effects of decommissioning. Fundamentally, it is impossible to accurately predict the nature of future legal and planning constraints related to ecology in 30-40 years' time. However, on the basis of the current legal and policy situation, it is likely that the biodiversity value of the Sites within the red lines boundaries will overall increase moderately over time and in response to Biodiversity Net Gain-led management principles.

5.5.2 The majority of land where new habitats of value will be created, and colonisation by species of conservation concern most likely to take place, will be at the Sites' boundaries and relatively separated from array infrastructure. This means that future constraints would likely remain similarly distributed to how they are at present. It is considered that the likely DCO requirement (and that of Policy S13 of Central Lincolnshire Local Plan) of an eventual reversion to pre-construction state following decommissioning is compatible with the management of the Sites up to that point as grassland of varying management types.

5.5.3 It is worth noting our experience to date that PINS have been broadly accepting of the view that whilst a robust strategy to protecting valuable ecological features will be required they have also agreed that it is difficult, if not impossible, to prepare or write an ecological strategy to decommissioning now as the conditions and legislative framework at this future point will direct how it would proceed.

APPENDIX A: WILDLIFE LEGISLATION SUMMARY

BADGERS

Badgers and their setts are protected under the Protection of Badgers Act 1992 (as amended) against damage or destruction of a sett, or disturbance, death or injury to the badgers. The Act defines a sett as "any structure or place which displays signs indicating current use by a badger". The definition of current use is subject to considerable debate. Natural England have produced guidance on the definition of current use. (*Badgers and Development – A guide to best practice and development. Natural England 2011*). Given the ambiguity surrounding the definition in all circumstances we would recommend an assessment of current use is always undertaken by a qualified ecologist. Natural Resources Wales (NRW) have a slightly different definition of current use. Please see the NRW website for further information. Penalties for offences against badgers or their setts include fines of up to £5,000 and/or up to six months in prison.

Disturbance of badgers could be caused by any digging activity or scrub clearance within 30 metres of an occupied sett and therefore every case needs to be assessed individually. Felling of trees close to a badger sett may also cause disturbance in some situations. Some activities such as pile driving may cause disturbance at even greater distances, and should be discussed with Natural England or NRW.

Licences are issued by Natural England (or NRW in Wales) to allow the disturbance of badgers, and the destruction of their setts in certain circumstances, in relation to development. Full planning permission must be obtained before a licence application will be considered. Although licences can be applied for at any time of year, disturbance of badgers or exclusion of badgers from a sett can only take place between 1 July and 30 November, to avoid the breeding season when dependant young may be underground. This restriction may be relaxed in some cases where a sett is seasonal and badgers can be shown to be absent from a sett at that time of year.

This report contains information of a confidential nature relating to the location of badger setts. Public access to this data should be restricted to those who have a legitimate need to assess the information and to know the exact situation of the setts rather than simply that badgers are present.

BATS

All 17 species of bat known to breed in England and Wales, and their roost sites, are protected under the Conservation of Habitats and Species Regulations 2017, known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure a bat, or to deliberately disturb a bat such that its ability to hibernate, breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place. Intentional or reckless disturbance of bats in their resting places, and damage to or obstruction of resting places are also offences under the Wildlife and Countryside Act 1981 (as amended). Under UK law a bat roost is "any structure or place which any wild [bat]...uses for shelter or protection". As bats tend to reuse the same roosts, legal opinion is that the roost is protected whether or not the bats are present at the time. Penalties for offences against bats or their roosts include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of or alteration to roost sites, or which could result in killing of or injury to bats, need to take place under licence. Works which could disturb bats may also be licensable, though this needs to be assessed on a case by case basis, as bats' sensitivity to disturbance varies depending on normal background levels, and the definition of disturbance offences under the Habitats Regulations is complex. In practice this means that works involving modification or loss of roosts (typically in buildings, trees or underground sites) or significant disturbance to bats in roosts are likely to be licensable.

Licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of bats in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

AMPHIBIANS

Great Britain supports seven native amphibian species. The four most widespread species; smooth and palmate newts, common frog, and common toad, receive partial protection under the Wildlife and Countryside Act 1981 (as amended) which prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy. The great crested newt, pool frog and natterjack toad are also fully protected in England and Wales under the Conservation of Habitats and Species Regulations 2017. Penalties for offences against amphibian species include fines of up to £5,000 and/or up to six months in prison.

Four amphibian species (great crested newt, pool frog, common toad, natterjack toad) are listed as priority species under the UK Biodiversity Action Plan, and are therefore considered to be Species of Principal Importance in England and Wales (excluding the pool frog, which does not occur in Wales) under the Natural Environment and Rural Communities (NERC) Act 2006. All public bodies including local and regional authorities have a duty under this legislation to have regard for the conservation of biodiversity.

GREAT CRESTED NEWTS

Great crested newts are protected in England and Wales under the Conservation of Habitats and Species Regulations 2017, known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure a great crested newt, or to deliberately disturb a great crested newt such that its ability to hibernate, breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place for great crested newts. Intentional or reckless disturbance of great crested newts in places of shelter (ponds or terrestrial refuges), and damage to or obstruction of places of shelter are also offences under the Wildlife and Countryside Act 1981 (as amended). Penalties for offences against great crested newts include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of ponds or terrestrial habitat, or which could result in killing of or injury to great crested newts, need to take place under licence. Works which could disturb great crested newts may also be licensable, though this is rarely the case unless loss of great crested newt habitat is also proposed, and should be assessed on a case by case basis. In practice this means that works involving any removal of or significant modification to ponds or terrestrial habitats (typically rough grassland, scrub, hedgerow bases and woodland) supporting great crested newts are likely to be licensable.

Licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of great crested newts in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

REPTILES

All six native reptile species receive protection under the Wildlife and Countryside Act 1981 (as amended). The four more common species (common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, adder *Vipera berus* and grass snake *Natrix natrix*) receive partial protection which makes it an offence to intentionally kill or injure a reptile. The two other reptile species (smooth snake *Coronella austriaca* and sand lizard *Lacerta agilis*), both of which are rare with very restricted UK ranges receive full protection under the Conservation of Habitats and Species Regulations 2017. Penalties for offences against reptile species include fines of up to £5,000 and/or up to six months in prison.

Works such as site clearance or topsoil stripping which could result in killing or injury of reptiles could be considered result in an offence unless measures are taken to minimise the risk of this occurring. Any inadvertent impacts on common reptile species despite these mitigation measures being in place would be considered an 'incidental result of an otherwise lawful operation' which 'could not reasonably have been avoided' and therefore not an offence. Works which could affect smooth snakes or sand lizards, or their habitats, would need to take place under licence from Natural England or Natural Resources Wales. However sites supporting smooth snakes or sand lizards are very rarely affected by development proposals.

In practice, mitigation for impacts of development on common reptiles generally comprise one or more of the following techniques: displacement, in which reptiles are encouraged to move to suitable retained habitat by changing the management of areas affected by development; exclusion, where reptile-resistant fencing is provided between a development site and suitable retained habitat allowing reptiles to be trapped from the development footprint and released elsewhere on the site; and translocation, where animals are trapped from a development site and released on another suitable site nearby. Reptile mitigation proposals, particularly those involving translocation of animals, should be agreed in advance with the local planning authority.

BIRDS

All British birds, their nests and eggs (with certain exceptions) are protected under the Wildlife & Countryside Act 1981 (as amended) which makes it an offence to: intentionally kill, injure or take a wild bird; intentionally take, damage or destroy nests which are in use or being built; intentionally take or destroy birds' eggs; or possess live or dead wild birds or eggs. A number of species receive additional protection through inclusion on Schedule 1 of the Wildlife and Countryside Act; for these it is also an offence to intentionally or recklessly disturb birds while nest building, or at a nest containing eggs or young, or to disturb the dependant young of such a bird. Penalties for offences against bird species include fines of up to £5,000 and/or up to six months in prison.

General licences for control of some bird species are issued by Natural England and Natural Resources Wales in order to prevent damage or disease, or to preserve public health or public safety, but it is not possible to obtain a licence for control of birds or removal of eggs/nests for development purposes. Consequently if nesting birds are present on a development site when works are programmed to start it is usually necessary to delay works, at least in the areas supporting nests, until any chicks have fledged and left the nest. It is usually possible, once chicks have hatched, for an experienced ecologist to predict approximately when they are likely to fledge, in order to inform programming of works on site.

OTTERS

Otters and their holts are protected in England and Wales under the Conservation of Habitats and Species Regulations 2017, known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure an otter, or to deliberately disturb an otter such that its ability to breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place. Intentional or reckless disturbance of otters in their holts, and damage to or obstruction of

holts are also offences under the Wildlife and Countryside Act 1981 (as amended). Penalties for offences against otters or their holts include fines of up to £5,000 and/or up to six months in prison.

Any development works which are likely to involve the loss of holts, or which could result in killing of or injury to otters (which are only likely to occur extremely rarely), need to take place under licence. Works which could disturb otters may also be licensable, though this is also rarely the case as the majority of developments on watercourses and coastal areas where otters are present can be carried out in a way which avoids significant disturbance.

Where it is necessary, licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of otters in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

WATER VOLES

Water voles *Arvicola amphibius* receive protection under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to: intentionally kill, injure, or take a water vole; intentionally or recklessly disturb a water vole whilst in its place of shelter; intentionally or recklessly damage, obstruct or destroy a water vole's place of shelter; or intentionally or recklessly obstruct access to a place of shelter. Penalties for offences against water voles include fines of up to £5,000 and/or up to six months in prison.

Works such as watercourse re-profiling, installing culverts, or topsoil stripping close to watercourses and ponds which could result in destruction or obstruction of burrows could be considered reckless, and/or could be considered intentional if water voles are killed or injured, unless measures are taken to minimise the risk of this occurring. Any inadvertent impacts on water voles despite these mitigation measures being in place would be considered an 'incidental result of an otherwise lawful operation' which 'could not reasonably have been avoided' and therefore not an offence.

In practice, mitigation for impacts of development on water voles generally comprise one or more of the following techniques: displacement, in which water voles are encouraged to move to suitable retained habitat by changing the management of areas affected by development; exclusion, where water vole-resistant fencing is provided between a development site and suitable retained habitat allowing animals to be trapped from the development footprint and released elsewhere on the site; and translocation, where animals are trapped from a development site and released on another suitable site nearby. Water vole mitigation proposals, particularly those involving translocation of animals, should be agreed in advance with Natural England or Natural Resources Wales.

PLANNING POLICY IN RELATION TO BIODIVERSITY

The National Planning Policy Framework (NPPF), was published in March 2012 and revised in July 2021. Additional guidance can be found online at http://planningguidance.planningportal.gov.uk/blog/guidance/. The NPPF simplifies and collates a number of previous planning documents and outlines the government's objective towards biodiversity.

The NPPF identifies ways in which the planning system should contribute to and enhance the natural and local environment (Paragraph 174), including:

- (a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
- (b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- (d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
- (e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
- (f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate. protecting and enhancing valued landscapes, geological conservation interests and soils;

It also emphasises the importance of conserving biodiversity and areas covered by landscape designations (Paragraph 176):

Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty. The conservation of wildlife and cultural heritage are important considerations in all these areas, and should be given great weight in National Parks and the Broads. The scale and extent of development within all these designated areas should be limited, while development within their setting should be sensitively located and designed to avoid or minimise adverse impacts on the designated areas.

When determining planning applications, the NPPF states that local planning authorities should aim to conserve and enhance biodiversity (Paragraph 175) by applying principles including:

- (a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

- (b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;
- (c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons[6] and a suitable compensation strategy exists; and
- (d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate..

The following should be given the same protection as habitats sites:

- (a) potential Special Protection Areas and possible Special Areas of Conservation;
- (b) listed or proposed Ramsar sites7; and
- (c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

There is a general presumption in favour of sustainable development within the NPPF. It is noted in Paragraph 182 that this presumption does not apply where the plan or project is likely to have a significant effect on a habitat site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

ECOLOGICAL ENHANCEMENTS

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity can include restoring or enhancing a population or habitat"".

In England, the National Planning Policy Framework (NPPF), issued in July 2021, states that the planning system should contribute to "*minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*. It also states that "*opportunities to incorporate biodiversity in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity*".

UK BIODIVERSITY ACTION PLANS

The UK Biodiversity Action Plan (UK BAP) 2011 is a policy first published in 1994 to protect biodiversity and stems from the 1992 Rio Biodiversity Earth Summit. The policy is continuously revised to combine new and existing conservation initiatives to conserve and enhance species and habitats, promote public awareness and contribute to international conservation efforts. Each plan details the status, threats and unique conservation strategies for the species or habitat concerned, to encourage spread and promote population numbers.

Species or habitats identified as priorities under the UK Biodiversity Action Plan receive some status in the planning process through their identification as Species/Habitats of Principal Importance in England and Wales, under the Natural Environment and Rural Communities (NERC) Act 2006 (as amended).

Current planning guidance in England, the National Planning Policy Framework, does not specifically refer to Species or Habitats of Principal Importance, though it includes guidance for conservation of biodiversity in general. Supplementary guidance is available online at http://planningguidance.planningportal.gov.uk/blog/guidance/ and this guidance indicates that it is '*useful to consider*' the potential effects of a development on the habitats or species on the Natural Environment and Rural Communities Act 2006 section 41 list.

PROTECTED PLANTS

All wild plants receive some protection under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence for any unauthorised person to intentionally uproot any wild plant. Additionally, certain rare species of plants listed on Schedule 8 of the Act are given greater protection. For these species, it an offence to intentionally pick, uproot or destroy them, or to possess or sell them (live or dead), or anything derived them. Penalties for offences under this legislation include fines of up to £5,000 and/or up to six months in prison.

Schedule 8 of the Act is reviewed every 5 years, but currently it includes 185 species or sub-species of vascular plants, bryophytes (mosses, liverworts and hornworts), lichens and stoneworts (see www.jncc.gov.uk for current list), all protected due to their rarity and/or restricted distributions.

Works which could result in uprooting or destruction of plants listed on Schedule 8 of the Act could result in an offence being committed, unless measures are taken to minimise the risk of this occurring. Any inadvertent impacts on Schedule 8 plants despite these mitigation measures being in place, and impacts on other plant species during development works, would be considered an 'incidental result of an otherwise lawful operation' which 'could not reasonably have been avoided' and therefore not an offence.

In practice, the mitigation measures required on the very rare occasions when Schedule 8 plants are affected by development proposals will be determined by the ecological requirements of the species concerned, and any mitigation strategy should be agreed in advance with Natural England or Natural Resources Wales.

THE HEDGEROWS REGULATIONS

In England and Wales the Hedgerows Regulations (1997) as amended confer a level of protection on hedgerows (though hedgerows within or bordering domestic gardens are excluded), particularly those hedgerows classified as 'Important' under the legislation. The Regulations require those wishing to remove hedgerows to submit a Hedgerow Removal Notice to the Local Planning Authority (LPA), which will then determine whether the hedgerow affected is classified as 'Important' under the Regulations. If it is, the LPA will either approve the proposed hedgerow removal, or issue a retention notice. It is an offence to remove or destroy a hedgerow which is subject to a retention notice, or to remove one without a removal notice.

Routine management of hedgerows, removal of hedgerows for development which has been granted planning consent, and certain other situations are allowed under the Regulations, which also specifically exclude hedgerows within or bordering domestic gardens. Determination of whether a hedgerow should be classified as 'Important' is based on a number of criteria including assessment of its likely historic value (e.g. old parish boundary or part of an ancient monument), ecological value (e.g. presence of protected species, and/or diversity of tree/shrub species in the hedgerow), and landscape value (e.g. associated with a public footpath, or being associated with hedgebanks, ditches, hedgerow trees etc).

Ancient and species-rich hedgerows are listed as a priority habitat in the UK Biodiversity Action Plan (2011)

JAPANESE KNOTWEED

Japanese knotweed *Fallopia japonica* is a non-native invasive species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). This Act states that it is an offence to plant or otherwise cause this species to grow in the wild. Penalties for offences under this legislation include fines of up to £25,000 and/or up to six months in prison.

In addition to this legislation, all parts of the plant and soil contaminated with plant fragments, is classified as contaminated waste under the Environmental Protection Act 1990, and will require a special waste licence and/or waste transfer note under the Environmental Protection (Duty of Care) Regulations 1991 (as amended).

The Environment Agency has produced a 'Code of Practice for the Management, Destruction and Disposal of Japanese Knotweed' (2001), which provides guidance for developers.

HIMALAYAN BALSAM

Himalayan balsam *Impatiens glandulifera* is a non-native invasive species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). This Act states that it is an offence to plant or otherwise cause this species to grow in the wild. Penalties for offences under this legislation include fines of up to £25,000 and/or up to six months in prison.

Advice on management and control of Himalayan balsam is provided in the Environment Agency's leaflet 'Managing Invasive Non-native Plants' (2010).

APPENDIX B – SUMMARY OF METHODOLOGIES

Desk Study Methodology

Statutory designated sites for nature conservation were identified using the Natural England/DEFRA web-based MAGIC map database (www.MAGIC.gov.uk). International-level sites such as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) within 10km from the Site were searched for. National-level sites such as National Nature Reserves (NNRs) and Sites of Special Scientific Interest (SSSIs) within 5km of the Site were searched for.

The Lincolnshire Environmental/ Biological Records Centre (LERC) was consulted for records of protected species and species of conservation concern within 2km of the Site as well as details of locally-designated and non-statutory sites for nature conservation within 2km of the Site.

Ordnance Survey maps (1:25,000) and aerial images of the Site were examined online (bing.com/maps and maps.google.co.uk) to allow a better understanding of the context of the Site and its connections to potentially important habitats, known species records and protected sites.

The data presented within this report constitutes a summary of the data obtained from the local records centre. Should additional detail be required on any of the records described within this report Clarkson and Woods Ltd. should be contacted.

Species of Conservation Concern are defined as those appearing in any of the following; Priority Habitats and Species under Section 41 of the Natural Environment and Rural Communities Act (2006); red or amber-listed birds within the British Trust for Ornithology's Birds of Conservation Concern (2015); and any specific local conservation priority species such as those listed in Red Data Books.

Habitat Survey Methodology

A habitat survey was carried out based on standard field methodology set out in the *Handbook for Phase 1 Habitat Survey* (2010 edition)[5]. The survey was co-ordinated and led by Harry Fox BSc MCIEEM, Principal Ecologist. Harry has 13 years' experience undertaking ecological surveys and has a BSc in ecology. Harry was assisted by the following personnel in completing the Phase 1 surveys:

- Peter Timms BSc MSc MCIEEM – Senior Ecologist
- Henry Sturgess BSc MCIEEM – Senior Ecologist
- Belinda Howell BSc MCIEEM – Senior Ecologist
- Joel Wright BSc MSc MCIEEM – Senior Ecologist
- Mike Hockey BSc ACIEEM – Senior Ecologist
- Charlie Durigan BSc MSc PgCert ACIEEM - Ecologist

Botanical names follow Stace (1997)[6] for higher plants and Edwards (1999)[7] for bryophytes.

Badgers

A search was made for badger *Meles meles* setts, and any sett entrances found were checked for signs of use by badgers or other mammals. Setts were classified into the following categories; Main, Subsidiary, Annexe or Outlying[8]. Sett entrances found were counted and mapped to record tunnel direction and their relative level of usage.

Field signs such as 'snuffle holes' (holes dug by badgers when searching for invertebrates), pathways through vegetation, 'latrines' (small pits in which badgers deposit their faeces) and 'day nests' (nests of bedding material made by badgers for sleeping above ground) were also mapped, if found.

Areas with dense ground cover (hedges, scrub, woodland etc. were examined closely. If impenetrable vegetation prevented entry then the perimeter was examined in order to detect badger paths suggesting a hidden sett within the area. It cannot be guaranteed that all the entrances have been located, especially if a small sett is currently inactive or used seasonally and concealed in an area of thick scrub. Badgers may dig new holes and create new setts in a very short space of time.

Bats

The assessment of the suitability of the site for foraging and roosting bats was based on current guidance set out by the Bat Conservation Trust[9].

The habitats within the sites were appraised for their suitability for use by foraging and commuting bats. In particular, the connectivity of the habitats on site to those lying beyond was taken into account. Vegetated linear features are typically important for many species to navigate around the landscape, while the presence of woodland, scrub, gardens, grassland and wetland features increases a site's foraging resource value to bats. The potential for noise or lighting disturbance which may affect commuting links was also recorded.

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[5] Nature Conservancy Council. (1990 - 2010 edition). *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit*, Joint Nature Conservation Committee

[6] Stace, C. (1997). *New Flora of the British Isles Second Edition*. Cambridge University Press

[7] Edwards, S.R. (1999). *English Names for British Bryophytes*. BBS, Cardiff

[8] Lewns, P., Clarkson, T. & Lewns, D. (2019). *Badger Survey and Mitigation Guidelines (The Mammal Society Mitigation Guidance Series)*. Eds. Fiona Mathews and Paul Chanin. The Mammal Society, London. (*as yet unpublished*)

[9] Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1.

It was considered impractical to conduct walked evening transect of all option land given their extent. In accordance with best practice guidance, it was elected that baseline data would be most effectively collected through the use of static bat detectors. An elevated number of detectors and deployments compared to that recommended within The Bat Conservation Trusts' Good Practice Guidelines was used in lieu of walked transect surveys. The guidelines also recommend that, "*if the habitat has been classified as having low suitability for bats, an ecologist should make a professional judgment on how to proceed based on all of the evidence available. It may or may not be appropriate for bat activity survey to be carried out in low suitability habitats.*" It was therefore considered that 42 static bat detector locations spread across all option land, installed at field boundaries and surveyed once per month between June and September inclusive, would enable the proportionate collection of an adequate baseline. It was considered impractical to install detectors within the centres of fields on account of ongoing agricultural activities such as crop spraying and harvesting. In any case, these arable habitats are of comparatively the lowest value to bats within the option sites and the field edges were considered the most conducive to bat activity.

Otter

A brief search was made along the banks of water courses and water bodies and their adjacent habitats for otter *Lutra lutra* signs including spraints, tracks, castling, and rolling. The banks of any water courses were searched for the presence or potential for holts or other sheltering areas.

Water Vole

The banks of the water course were searched for water vole *Arvicola amphibius* signs including latrines, burrow entrances, feeding stations, 'runways' and footprints. Surveys and field recording followed the protocol set out within the Water Vole Mitigation Handbook[10]

GCN and Toads

All waterbodies within 250m / 500m of the Sites were identified using Ordnance Survey maps and aerial imagery. Waterbodies within the site ownership were assessed during the field survey for their suitability to support amphibian species where access was possible.

Where suitable water bodies were identified on accessible land a Habitat Suitability Index (HSI) score was calculated for each one following the methodology described by Oldham et al[11]. HSI scores give a relative indication of the likelihood that a water body would support breeding great crested newts. Factors which increase these scores include the presence of other ponds nearby, water quality, pond size, absence of fish/waterfowl, vegetation cover and shading.

Terrestrial habitats were also assessed for their suitability for foraging and sheltering great crested newts. This species requires habitats such as grassland, scrub, woodland and hedgerows for dispersal and hibernation. Further hibernation features include buried rubble and logs, or mammal burrows.

Where eDNA surveys were taken, a standard methodology was followed according to Natural England best practice guidance and ADAS' laboratory requirements, carried out between the period of 15th April and 30th June.

Reptiles

Features on the Sites were assessed for their potential to provide suitable habitats for use by reptile species. These include rough, tussocky grassland, scrub, disturbed land or refugia such as wood piles, rubble or compost heaps. Where present, suitable existing refugia were inspected for sheltering reptiles, and the ground was scanned whilst walking to look for basking species.

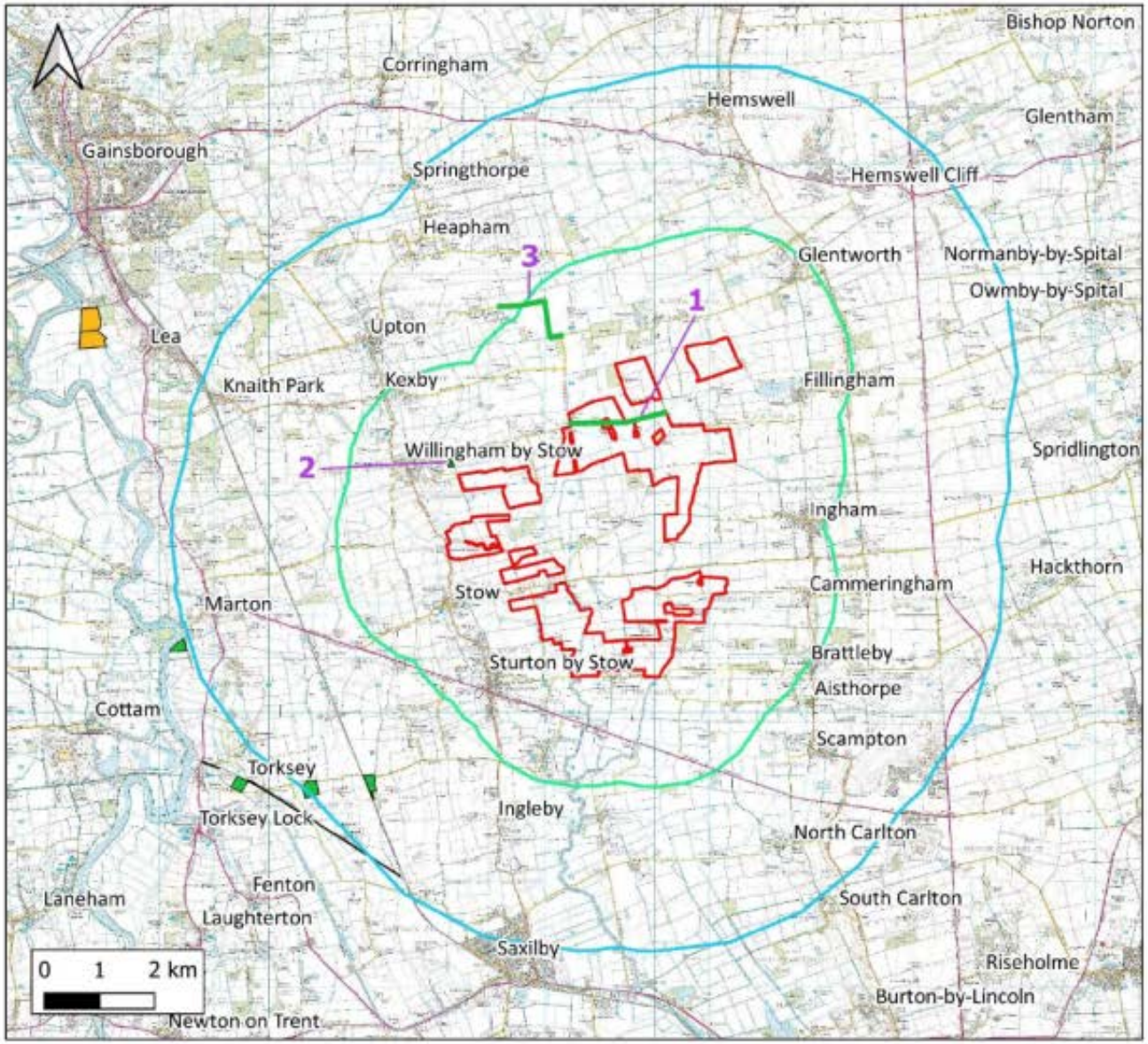
Birds

Any buildings and vegetation were surveyed for signs of use by nesting birds and any birds seen or heard during the survey were noted. The site's potential to support bird species of particular conservation concern (i.e. Schedule 1, NERC S41 and Red List species) was assessed, taking into consideration the bird species assemblage observed during the survey, the habitats present on and around the site, the context of the site in the wider landscape and the results of the desk study.

[10] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series).* Eds. Fiona Mathews and Paul Chanin. The Mammal Society, London.
[11] Oldham. R.S., Keeble L., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10 (4), 143-155.

APPENDIX C – DESIGNATED SITES MAPS

Cottam 1



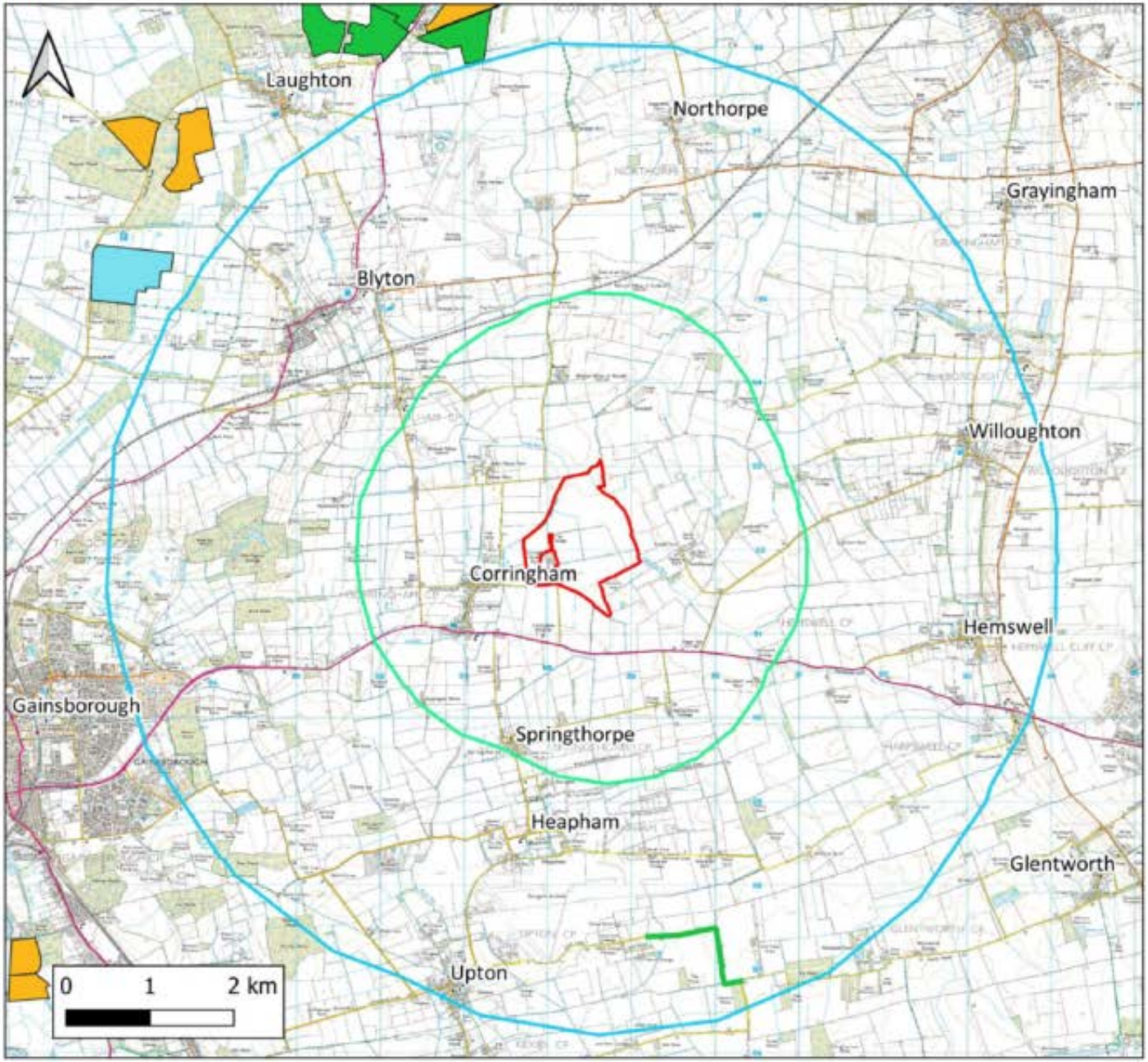
Key:

- Sites of Special Scientific Interest (SSSIs)
- Local Nature Reserves (LNRs)
- Local Wildlife Sites (LWSs)
- 5km Buffer
- 2km Buffer
- Red Line Boundary
- 1 Site Reference

Un-numbered sites are those which occur outside of the scope of the relevant search radius for their level of designation, i.e. 2Km for non-statutory sites and 5Km for statutory sites.

CLARKSON & WOODS
ECOLOGICAL CONSULTANTS

Project	**Cottam 1**
Title	**Designated Sites**
Project Number	**7479**
Scale	**See Scalebar**
Date	**12/08/2021**



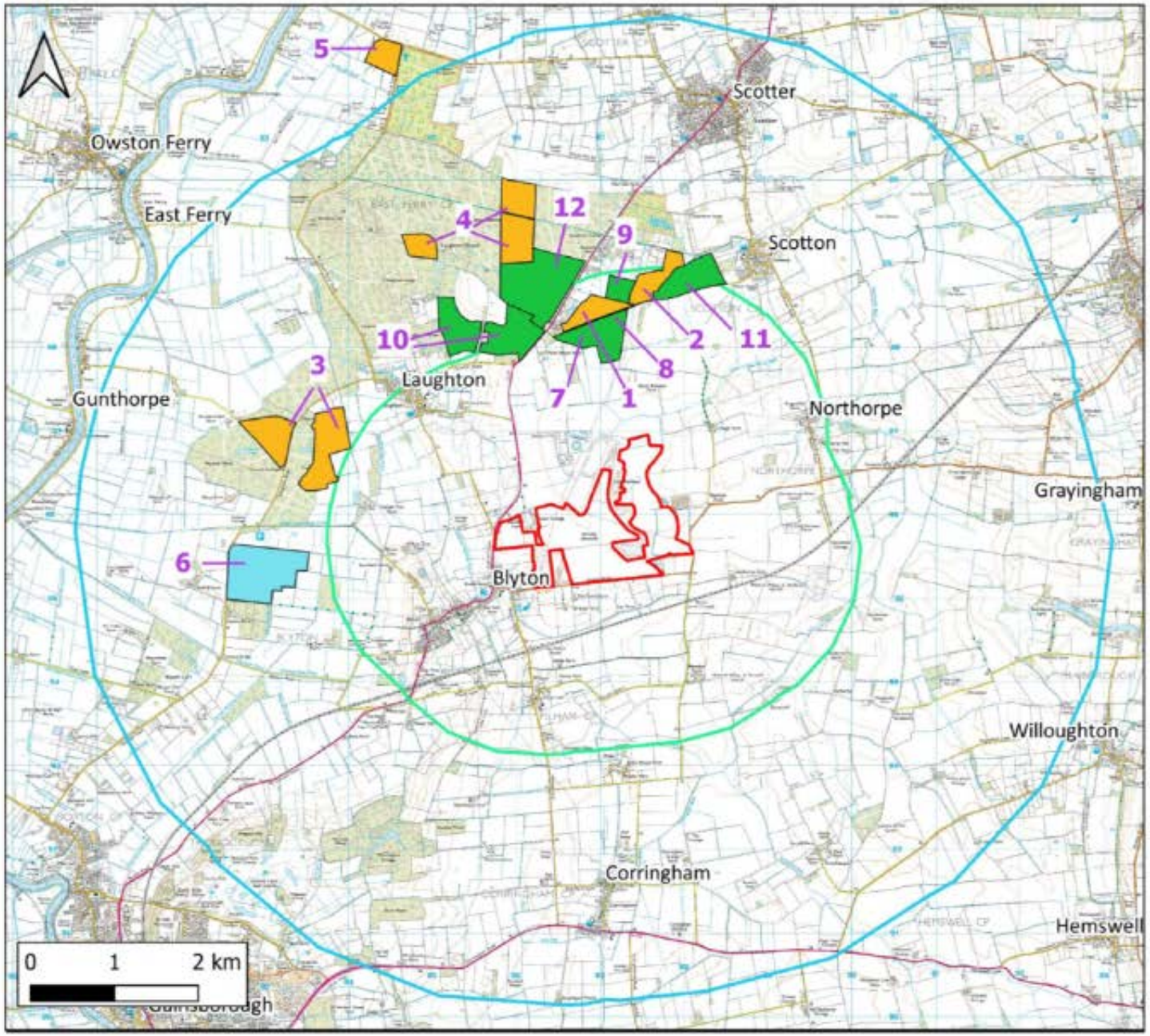
Key:

- Sites of Special Scientific Interest (SSSIs)
- Local Nature Reserves (LNRs)
- Local Wildlife Sites (LWSs)
- 5km Buffer
- 2km Buffer
- Red Line Boundary
- 1 Site Reference

Un-numbered sites are those which occur outside of the scope of the relevant search radius for their level of designation, i.e. 2Km for non-statutory sites and 5Km for statutory sites.

CLARKSON & WOODS
ECOLOGICAL CONSULTANTS

Project	**Cottam 2**
Title	**Designated Sites**
Project Number	**7479**
Scale	**See Scalebar**
Date	**12/08/2021**



Key:

- Sites of Special Scientific Interest (SSSIs)
- Local Nature Reserves (LNRs)
- Local Wildlife Sites (LWSs)
- 5km Buffer
- 2km Buffer
- Red Line Boundary
- 1 Site Reference

Un-numbered sites are those which occur outside of the scope of the relevant search radius for their level of designation, i.e. 2Km for non-statutory sites and 5Km for statutory sites.

CLARKSON & WOODS
ECOLOGICAL CONSULTANTS

Project	**Cottam 3**
Title	**Designated Sites**
Project Number	**7479**
Scale	**See Scalebar**
Date	**12/08/2021**

APPENDIX D – SPECIES RECORDS WITHIN 2KM OF COTTAM 1 (COATES)

Records of Protected and Notable Species Derived from the Desk Study Data Search (LERC)

Group	Scientific Name	Common Name	Records	Location	Date
Amphibians	Bufo bufo	Common Toad	43 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~600m west of the site with 3 individuals recorded in 2012 (Grid Reference SK876833 - Thorpe Lane Drain Sturton).	35 records pre 2000 8 records post 2000
Amphibians	Rana temporaria	Common Frog	53 records within 2km	All records are located beyond 250m of the site. Closest records: located 500m west of the site with two individuals recorded in 1988 (Grid Reference SK8884 - Willingham Stone Pits) Located 515m south-west of the site in 2008 (Grid Reference SK901803 - Sturton by Stow) Located 550m east of the site in 2004 (Grid Ref SK9485 - Fillingham Lake)	40 records pre 2000 13 records post 2000
Amphibians	Triturus cristatus	Great Crested Newt	76 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~475m south-west of the site (Grid Reference SK902803) with up to 56 individuals recorded between 2014 and 2017.	13 records pre 2000 63 records post 2000
Amphibians	Lissotriton helveticus	Palmate Newt	1 record within 2km	Exact location unknown – within 2km of the site.	1 record pre 2000 (1977) 0 records post 2000
Amphibians	Lissotriton vulgaris	Smooth Newt	20 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~550m south-west of the site (Grid Reference SK902802) with up to 4 individuals recorded during bottle traps survey between May and June 2008.	9 records pre 2000 11 records post 2000
Reptiles	Zootoca vivipara	Common Lizard	6 records within 2km	Exact location unknown – within 2km of the site.	6 records pre 2000 (1977) 0 records post 2000
Reptiles	Natrix helvetica	Grass Snake	32 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~290m south-west of the site (Grid Reference SK902807 Sturton Drain) in 2008.	28 records pre 2000 (1977) 4 records post 2000
Terrestrial mammal	Arvicola amphibius	European Water Vole	113 records within 2km	12 records (10 dated August 2011 and 2 dated September 2010) are located within the red line boundary all in Coates North. These records are associated with the ditch network present at the site. 19 records are located within 250m of the site (6 records around Coates North 4 records around Coates West and 9 records around Coates South). Three of these records are located along the River Till corridor and the other records are associated with the ditch network. 82 records are located beyond 250m of the site.	22 records pre 2000 91 records post 2000
Terrestrial mammal	Lepus europaeus	Brown Hare	80 records within 2km	Two records dated 2001 are located within the red line boundary in Coates South. 3 records are located within 250m of the site around Coates South. 75 records are located beyond 250m of the site.	41 records pre 2000 39 records post 2000
Terrestrial mammal	Meles meles	Eurasian Badger	45 records within 2km	18 records are located within the red line boundary and were recorded between 2006 and 2012. Six records are at Coates North and 12 at Coates West. One record is located within 250m of the site around Coates West. 26 records are located beyond 250m of the site.	2 records pre 2000 43 records post 2000
Terrestrial mammal	Lutra lutra	European Otter	37 records within 2km	10 records are located within the red line boundary and were recorded between 1999 and 2009 all in the Coates South area. Two of these records are located along the River Till corridor. 15 records are located within 250m of the site around Coates West and South. Three of these records are located along the River Till corridor. 32 records are located beyond 250m of the site.	16 records pre 2000 21 records post 2000

Terrestrial mammal	Mustela putorius	Polecat	1 record within 2km	Record is located 1.2km south-east of Coates South (Grid Reference SK939810) and is dated 2014.	0 records pre 2000 1 record post 2000 (2014)
Terrestrial mammal	Erinaceus europaeus	West European Hedgehog	136 records within 2km	One record is located within 250m of the site around Coates South (dated 2015). All other records are located beyond 250m of the site. Closest of which is located ~480m east of Coates South (Grid Reference SK937827) in 2015.	41 records pre 2000 95 records post 2000
Bats	Plecotus auritus	Brown Long-eared Bat	16 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~700m west of the site (Grid Reference SK882821) in 2003.	2 records pre 2000 14 records post 2000
Bats	Pipistrellus pipistrellus sensu stricto	Common Pipistrelle	121 records within 2km	Two records are located within 250m of the site around Coates West (dated 2018). All other records are located beyond 250m of the site.	0 records pre 2000 121 records post 2000
Bats	Myotis daubentonii	Daubenton's Bat	1 record within 2km	Record is located 615m east of Coates North (Grid Reference SK940858) and is dated 2007.	0 records pre 2000 1 record post 2000 (2007)
Bats	Myotis nattereri	Natterer's Bat	4 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 4 records post 2000
Bats	Nyctalus noctula	Noctule Bat	4 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~800m west of the site (Grid Reference SK877846) in 2009.	3 records pre 2000 1 record post 2000
Bats	Pipistrellus	Pipistrelle Bat species	22 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~560m east of the site (Grid Reference SK877846) in 2009.	6 records pre 2000 16 records post 2000
Bats	Pipistrellus pygmaeus	Soprano Pipistrelle	1 record within 2km	Record is located 940m east of Coates North (Grid Reference SK945863) and is dated 2015.	0 records pre 2000 1 record post 2000 (2015)
Bats	Unidentified Bat	Unidentified Bat	88 records within 2km	Exact location unknown – within 2km of the site.	20 records pre 2000 68 records post 2000
Birds	Tyto alba	Barn Owl	163 records within 2km	Three records are located within 250m of the site around Coates North and South (dated 2008 and 2016). All other records are located beyond 250m of the site. Closest of which is located ~315m west of Coates South (Grid Reference SK902807) in 2016.	2 records pre 2000 161 records post 2000
Birds	Phoenicurus ochruros	Black Redstart	5 records within 2km	Exact location unknown – within 2km of the site.	1 record pre 2000 4 records post 2000
Birds	Chlidonias niger	Black Tern	1 record within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 1 record post 2000 (2010)
Birds	Limosa limosa	Black-tailed Godwit	1 record within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 1 record post 2000 (2009)
Birds	Motacilla flava subsp. flava	Grey Wagtail	2 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 2 records post 2000 (2017)
Birds	Fringilla montifringilla	Brambling	6 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 6 records post 2000
Birds	Loxia curvirostra	Common Crossbill	1 record within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 1 record post 2000 (2002)
Birds	Emberiza calandra	Corn Bunting	15 records within 2km	Exact location unknown – within 2km of the site.	1 record pre 2000 14 records post 2000
Birds	Crex crex	Corncrake	1 record within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 1 record post 2000 (2015)
Birds	Cuculus canorus	Cuckoo	6 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 6 records post 2000
Birds	Numenius arquata	Curlew	7 records within 2km	The only known record location is 1.6km west of the site. Exact location unknown for all other records – within 2km of the site.	0 records pre 2000 7 records post 2000

Birds	Anser albifrons subsp. albifrons	European Greater White-fronted Goose	1 record within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 1 record post 2000 (2015)
Birds	Turdus pilaris	Fieldfare	43 records within 2km	The only known record location is 1.9km west of the site. Exact location unknown for all other records – within 2km of the site.	0 records pre 2000 43 records post 2000
Birds	Oriolus oriolus	Golden Oriole	1 record within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 1 record post 2000 (2009)
Birds	Bucephala clangula	Goldeneye	1 record within 2km	Exact location unknown – within 2km of the site.	1 record pre 2000 (1997) 0 records post 2000
Birds	Locustella naevia	Grasshopper Warbler	5 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 5 records post 2000
Birds	Tringa nebularia	Greenshank	3 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 3 records post 2000
Birds	Perdix perdix	Grey Partridge	69 records within 2km	All records are located beyond 250m of the site. Closest known location record is ~1.6km east of the site dated 2017.	2 records pre 2000 67 records post 2000
Birds	Anser anser	Greylag Goose	108 records within 2km	Exact location unknown – within 2km of the site.	35 records pre 2000 73 records post 2000
Birds	Coccothraustes coccothraustes	Hawfinch	2 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 2 records post 2000
Birds	Circus cyaneus	Hen Harrier	5 records within 2km	The only known record location is 1.4km east of the site. Exact location unknown for all other records – within 2km of the site.	0 records pre 2000 5 records post 2000
Birds	Falco subbuteo	Hobby	18 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 18 records post 2000
Birds	Pernis apivorus	Honey-buzzard	2 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 2 records post 2000
Birds	Upupa epops	Hoopoe	1 record within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 1 record post 2000 (2008)
Birds	Passer domesticus	House Sparrow	94 records within 2km	Two records are located within the red line boundary and were recorded 2009 in the Coates West area. All other records are located beyond 250m of the site.	0 records pre 2000 94 records post 2000
Birds	Alcedo atthis	Kingfisher	33 records within 2km	The only known record location is 1.6km north-west of Coates North in 2014. Exact location unknown for all other records – within 2km of the site.	2 records pre 2000 31 records post 2000
Birds	Vanellus vanellus	Lapwing	42 records within 2km	The only known record locations are 1.5km west of Coates West in 2010 and 1.8km north-west of Coates North in 2014. Exact location unknown for all other records – within 2km of the site.	2 records pre 2000 40 records post 2000
Birds	Acanthis cabaret	Lesser Redpoll	4 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 4 records post 2000
Birds	Linaria cannabina	Linnet	21 records within 2km	The only known record locations are 1.6km west of Coates West in 2010 and 1.7km east of Coates South in 2002. Exact location unknown for all other records – within 2km of the site.	1 record pre 2000 20 records post 2000
Birds	Circus aeruginosus	Marsh Harrier	9 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 9 records post 2000
Birds	Falco columbarius	Merlin	2 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 2 records post 2000 (2015)
Birds	Circus pygargus	Montagu's Harrier	1 record within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 1 record post 2000 (2018)
Birds	Pandion haliaetus	Osprey	1 record within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 1 record post 2000 (2004)
Birds	Falco peregrinus	Peregrine	9 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 9 records post 2000

Birds	Anas acuta	Pintail	1 record within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 1 record post 2000 (2015)
Birds	Coturnix coturnix	Quail	2 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 2 records post 2000 (2012)
Birds	Milvus milvus	Red Kite	6 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 6 records post 2000
Birds	Tringa totanus	Redshank	3 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 3 records post 2000
Birds	Turdus iliacus	Redwing	22 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 22 records post 2000
Birds	Emberiza schoeniclus	Reed Bunting	24 records within 2km	The only record locations are 1.6km west of Coates West in 2010 (Padmoor Drain) and 940m south of Coates South in 2016 (Thorpe Catchwater Drain). Exact location unknown for all other records – within 2km of the site.	0 records pre 2000 24 records post 2000
Birds	Alauda arvensis	Skylark	21 records within 2km	The only record locations are 1.6km west of Coates West in 2010 (Padmoor Drain) and and 1.7km east of Coates South in 2016. Exact location unknown for all other records – within 2km of the site.	1 record pre 2000 20 records post 2000
Birds	Gallinago gallinago	Snipe	6 records within 2km	Exact location unknown – within 2km of the site.	4 records pre 2000 2 records post 2000
Birds	Turdus philomelos	Song Thrush	37 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~745m west of Coates West in 2009 (Grid Reference SK877844).	0 records pre 2000 37 records post 2000
Birds	Muscicapa striata	Spotted Flycatcher	85 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 85 records post 2000
Birds	Sturnus vulgaris	Starling	90 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~525m west of Coates West in 2009 (Grid Reference SK888821).	0 records pre 2000 90 records post 2000
Birds	Apus apus	Swift	61 records within 2km	The closest known record location is 790m west of the site in 2012.	0 records pre 2000 61 records post 2000
Birds	Passer montanus	Tree Sparrow	73 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 73 records post 2000
Birds	Streptopelia turtur	Turtle Dove	14 records within 2km	Exact location unknown – within 2km of the site.	2 records pre 2000 12 records post 2000
Birds	Numenius phaeopus	Whimbrel	3 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 3 records post 2000
Birds	Haliaeetus albicilla	White-tailed Eagle	1 record within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 1 record post 2000 (2005)
Birds	Cygnus cygnus	Whooper Swan	4 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 4 records post 2000
Birds	Motacilla flava	Yellow Wagtail	24 records within 2km	Exact location unknown – within 2km of the site.	0 records pre 2000 24 records post 2000
Birds	Emberiza citrinella	Yellowhammer	35 records within 2km	The closest known record location is 1.3km south-west of the site in 2018.	6 records pre 2000 29 records post 2000
Bony fish (Actinopterygii)	Anguilla anguilla	European Eel	40 records within 2km	23 records are located within 250m of the site around Coates West (22 records) and South (one record) between 1985 and 2014. Most of the records are associated with the River Till. All other records are located beyond 250m of the site.	35 records pre 2000 5 records post 2000
Bony fish (Actinopterygii)	Cobitis taenia	Spined Loach	15 records within 2km	10 records are located within 250m of the site around Coates West between 1985 and 2014. Most of the records are associated with the River Till. All other records are located beyond 250m of the site.	12 records pre 2000 3 records post 2000

Flowering plant	Hyacinthoides non-scripta	Bluebell	41 records within 2km	The closest known record location is 340m north of the site in 2008.	33 records pre 2000 8 records post 2000
Insect - butterfly	Coenonympha pamphilus	Small Heath	6 records within 2km	The closest known record location is 1.5km south-east of the site in 2016.	3 records pre 2000 3 records post 2000
Insect - butterfly	Lasiommata megera	Wall	14 records within 2km	The closest known record location is 560m west of the site in 1996.	11 records pre 2000 3 records post 2000
Insect - butterfly	Satyrium w-album	White-letter Hairstreak	1 record within 2km	Record located 1.4km north of Coates North in 2010 (Grid Reference SK901868).	0 records pre 2000 1 record post 2000 (2010)
Insect - moth	Agrochola lychnidis	Beaded Chestnut	1 record within 2km	Record located 2km south-east of Coates South in 2014 (Grid Reference SK948809).	0 records pre 2000 1 record post 2000 (2014)
Insect - moth	Timandra comae	Blood-vein	5 records within 2km	All records are located 640m west of the site between 2007 and 2010 (Grid Reference SK878844).	0 records pre 2000 5 records post 2000
Insect - moth	Agrochola litura	Brown-spot Pinion	1 record within 2km	Record located 2km south-east of Coates South in 2014 (Grid Reference SK948809).	0 records pre 2000 1 record post 2000 (2014)
Insect - moth	Spilosoma lutea	Buff Ermine	29 records within 2km	28 records are located 640m west of the site between 2007 and 2010 (Grid Reference SK878844).	0 records pre 2000 29 records post 2000
Insect - moth	Atethmia centrago	Centre-barred Sallow	5 records within 2km	All records are located 640m west of the site between 2007 and 2010 (Grid Reference SK878844).	0 records pre 2000 5 records post 2000
Insect - moth	Tyria jacobaeae	Cinnabar	2 records within 2km	All records are located beyond 250m of the site. Closest of which is 640m west of the site in 2010 (Grid Reference SK878844).	0 records pre 2000 2 records post 2000
Insect - moth	Xanthorhoe ferrugata	Dark-barred Twin-spot Carpet	1 record within 2km	Record 640m west of the site in 2010 (Grid Reference SK878844).	0 records pre 2000 1 record post 2000 (2010)
Insect - moth	Melanchra persicariae	Dot Moth	8 records within 2km	7 known location records are located 640m west of the site in 2010 (Grid Reference SK878844).	1 record pre 2000 7 records post 2000
Insect - moth	Graphiphora augur	Double Dart	1 record within 2km	Exact location unknown – within 2km of the site.	1 record pre 2000 (1988) 0 records post 2000
Insect - moth	Ennomos fuscantaria	Dusky Thorn	2 records within 2km	All records are located 640m west of the site in 2007 (Grid Reference SK878844).	0 records pre 2000 2 records post 2000
Insect - moth	Acronicta psi	Grey Dagger	1 record within 2km	Exact location unknown – within 2km of the site.	1 record pre 2000 (1988) 0 records post 2000
Insect - moth	Acronicta rumicis	Knot Grass	1 record within 2km	Record 640m west of the site in 2010 (Grid Reference SK878844).	0 records pre 2000 1 record post 2000 (2010)
Insect - moth	Malacosoma neustria	Lackey	1 record within 2km	Exact location unknown – within 2km of the site.	1 record pre 2000 (1988) 0 records post 2000
Insect - moth	Rhizedra lutosa	Large Wainscot	1 record within 2km	Record located 2km south-east of Coates South in 2014 (Grid Reference SK948809).	0 records pre 2000 1 record post 2000 (2014)
Insect - moth	Caradrina morpheus	Mottled Rustic	4 records within 2km	All records are located 640m west of the site in 2007 (Grid Reference SK878844).	0 records pre 2000 4 records post 2000
Insect - moth	Amphipyra tragopoginis	Mouse Moth	1 record within 2km	Record 640m west of the site in 2007 (Grid Reference SK878844).	0 records pre 2000 1 record post 2000 (2007)
Insect - moth	Hydraecia micacea	Rosy Rustic	7 records within 2km	All records are located 640m west of the site between 2007 and 2010 (Grid Reference SK878844).	0 records pre 2000 7 records post 2000
Insect - moth	Hydraecia micacea	Rustic	11 records within 2km	All records are located 640m west of the site between 2007 and 2010 (Grid Reference SK878844).	0 records pre 2000 11 records post 2000
Insect - moth	Cirrhia icteritia	Sallow	1 record within 2km	Record located 2km south-east of Coates South in 2014 (Grid Reference SK948809).	0 records pre 2000 1 record post 2000 (2014)
Insect - moth	Leucania comma	Shoulder-striped Wainscot	3 records within 2km	All records are located 640m west of the site in 2010 (Grid Reference SK878844).	0 records pre 2000 3 records post 2000 (2010)
Insect - moth	Diarsia rubi	Small Square-spot	2 records within 2km	All records are located 640m west of the site in 2007 (Grid Reference SK878844).	0 records pre 2000

					2 records post 2000 (2007)
Insect - moth	Spilosoma lubricipeda	White Ermine	10 records within 2km	All records are located 640m west of the site between 2007 and 2010 (Grid Reference SK878844).	0 records pre 2000 10 records post 2000

APPENDIX E – SPECIES RECORDS WITHIN 2KM OF COTTAM 2 (CORRINGHAM)

Records of Protected and Notable Species Derived from the Desk Study Data Search (LERC)

Group	Scientific Name	Common Name	Records	Location	Date
Terrestrial mammal	Arvicola amphibius	European Water Vole	14 records within 2km	Six records are located within the red line boundary of the site with two in the north east area two separate individuals recorded in 2011 (grid ref SK887926) and four records in the north west area from 2002 (grid ref SK880924). Two records are located within 250m of the site to the north east. Both records are individuals identified through field observations in 2002 (grid ref SK878924).	2 records pre 2000 12 records post 2000
Terrestrial mammal	Lepus europaeus	Brown Hare	31 records within 2km	All records are located beyond 250m of the site. Closest being ~600m south of the site with field observations in 2006 (grid ref SK892911).	18 records pre 2000 13 records post 2000
Terrestrial mammal	Meles meles	Eurasian Badger	8 records within 2km	All records are located beyond 250m of the site. The closest being ~1.7km south east of the site with an observation recorded in 2019 (roadkill) (grid ref SK897907).	No records pre 2000 8 records post 2000
Terrestrial mammal	Erinaceus europaeus	West European Hedgehog	32 records within 2km	All records are located beyond 250m from the site. The closest being ~1km west of the site (Grid ref SK869916) with two records (one field observation one roadkill) in 2009.	18 records pre 2000 14 records post 2000
Bats	Pipistrellus sp.	Pipistrelle Bat species	2 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~1.8km south west of the site (Grid Reference SK870909) in 2011.	No records pre 2000 2 records post 2000
Bats	Pipistrellus pipistrellus	Common Pipistrelle	5 records within 2km	All records are located beyond 250m of the site. Closest located ~1.1km south west of the site with a field observation of an individual in 2011 (grid ref SK873916).	No records pre 2000 5 records post 2000
Bats	Plecotus auritus	Brown Long-eared	5 records within 2km	All records are located beyond 250m of the site. Closest located ~1.8km south west of the site with four records from 2005 to 2011 (grid ref SK870909).	No records pre 2000 5 records post 2000
Birds	Tyto alba	Barn Owl	11 records within 2km	Two records were found within the red line boundary of the site to the north west area. Two field observations were recorded in 2011 (grid ref SK880924).	1 records pre 2000 10 records post 2000
Birds	Pyrrhula pyrrhula	Bullfinch	14 records within 2km	All records located beyond 250m of the site. Closest being ~1.2km west of the site as a field observation in 2018. Grid ref SK853964.	4 records pre 2000 10 records post 2000 (2017)
Birds	Cuculus canorus	Cuckoo	4 records within 2km	All records are located beyond 250m of the site. Closest being ~1.5km north west of the site with six records of field observations between 1998 and 2013 (grid ref SK872929).	1 records pre 2000 3 records post 2000
Birds	Numenius arquata	Curlew	15 records within 2km	All records are located beyond 250m of the site. Closest being ~600m south of the site with two records in 2006 (grid ref SK889909).	No records pre 2000 15 records post 2000
Birds	Turdus pilaris	Fieldfare	12 records within 2km	All records are located beyond 250m of the site. Closest being six records of individuals 1.5km north west of the site between 1998 and 2014 (grid ref SK872929).	2 records pre 2000 10 records post 2000
Birds	Perdix perdix	Grey Partridge	29 records within 2km	All records are located beyond 250m of the site. Closest known location record is ~600m south of the site dated 2006. (grid ref SK889909).	No records pre 2000 29 records post 2000
Birds	Anser anser	Greylag goose	17 records within 2km	All records are located beyond 250m of the site. Closest being two records of individuals 1.5km north west of the site in 2013 (grid ref SK872929).	No records pre 2000 17 records post 2000
Birds	Falco subbuteo	Hobby	11 records within 2km	All records are located beyond 250m of the site. Closest being six records of individuals 1.5km north west of the site in 1998 (grid ref SK872929).	6 records pre 2000 5 records post 2000
Birds	Passer domesticus	House Sparrow	18 records within 2km	All records are located beyond 250m of the site. Closest known location record is ~600m south of the site for two individual sightings dated 2006. (grid ref SK889909).	No records pre 2000 18 records post 2000
Birds	Alcedo atthis	Kingfisher	10 records within 2km	All records are located beyond 250m of the site. Closest being two records of individuals 1.5km north west of the site in 1998 (grid ref SK872929).	2 records pre 2000 8 records post 2000

Birds	Vanellus vanellus	Lapwing	45 records within 2km	Four records were found within the red line boundary of the site to the north west area. Four field observations were recorded in 2002 (grid ref SK880924).	4 records pre 2000 41 records post 2000
Birds	Linaria cannabina	Linnet	10 records within 2km	All records are located beyond 250m of the site. Closest being ~1.6km west of the site with a single field observation in 2013 (grid ref SK872929).	2 records pre 2000 8 records post 2000
Birds	Milvus milvus	Red kite	17 records within 2km	All records are located beyond 250m of the site. Closest being 16 records of individuals 1.5km north west of the site in 2013-2014 (grid ref SK872929).	No records pre 2000 17 records post 2000
Birds	Turdus iliacus	Redwing	2 records within 2km	All records are located beyond 250m of the site. Closest being two records of individuals 1.5km north west of the site in 1998 (grid ref SK872929).	2 records pre 2000 No records post 2000
Birds	Alauda arvensis	Skylark	18 records within 2km	Four records were found within the red line boundary of the site to the north west area. Four field observations were recorded in 2002 (grid ref SK880924).	2 records pre 2000 18 records post 2000
Birds	Turdus philomelos	Song Thrush	8 records within 2km	All records are located beyond 250m of the site. Closest being ~1.5km north of site with four individuals identified in 2012 (grid ref SK872929).	No records pre 2000 8 records post 2000
Birds	Sturnus vulgaris	Starling	17 records within 2km	All records are located beyond 250m of the site. Closest being ~1.1km west of the site with a field observation in 2003 (grid ref SK871915).	No records pre 2000 17 records post 2000
Birds	Apus apus	Swift	4 records within 2km	All records are located beyond 250m of the site. Closest being ~1km west of the site with a field observation in 2019 (grid ref SK873916).	No records pre 2000 4 records post 2000
Birds	Passer montanus	Tree Sparrow	29 records within 2km	All records are located beyond 250m of the site. Closest being ~1.6km north west of the site with four records (two in 1983 two in 2013) (grid ref SK872929).	2 records pre 2000 27 records post 2000
Birds	Emberiza citrinella	Yellowhammer	15 records within 2km	All records are located beyond 250m of the site. Closest being ~800m north of the site with 2 breeding individuals observed in 2009 (grid ref SK878931).	4 records pre 2000 11 records post 2000
Flowering plant	Hyacinthoides non-scripta	Bluebell	5 records within 2km	All records are located beyond 250m of the site. Closest being ~900m west of the site observed in a field in 1989 (grid ref SK873916).	2 records pre 2000 3 records post 2000

APPENDIX F – SPECIES RECORDS WITHIN 2KM OF COTTAM 3 (BLYTON)

Records of Protected and Notable Species Derived from the Desk Study Data Search (LERC)

Group	Scientific Name	Common Name	Records	Location	Date
Amphibians	Bufo bufo	Common Toad	36 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~500m west of the site buffer with one individual recorded in 2007 (Grid Reference SK867968).	31 records pre 2000 5 records post 2000
Amphibians	Rana temporaria	Common Frog	34 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~750m west of the site buffer with one individual recorded in 2007 (Grid Reference SK867968).	30 records pre 2000 4 records post 2000
Reptiles	Zootoca vivipara	Common Lizard	35 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~2km north of the site buffer with 17 individuals observed in a field (Grid ref. SK8798) in 1995.	25 records pre 2000 (1977) 10 records post 2000
Reptiles	Vipera berus	Adder	39 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~1.8km north of the site buffer with 17 individuals observed in a field (Grid ref. SK8798) in 1995.	26 records pre 2000 13 records post 2000
Reptiles	Natrix helvetica	Grass Snake	14 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~2km north of the site buffer in 2018 with 3 individuals observed in a field (Grid ref. SK869984).	10 records pre 2000 (1977) 4 records post 2000
Terrestrial mammal	Arvicola amphibius	European Water Vole	31 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~250m west of the site with a field observation of individuals in 2003 and in 2013.	11 records pre 2000 20 records post 2000
Terrestrial mammal	Lepus europaeus	Brown Hare	44 records within 2km	All records are located beyond 250m of the site. Closest being ~400m north west of the site with a field observation of one individual in 2003.	33 records pre 2000 11 records post 2000
Terrestrial mammal	Meles meles	Eurasian Badger	11 records within 2km	All records are located beyond 250m of the site. The closest being ~500m south east of the site with a field observation recorded in 2003.	1 records pre 2000 10 records post 2000
Terrestrial mammal	Lutra lutra	European Otter	4 records within 2km	All records are located beyond 250m of the site. The closest being ~2km west of the site with a field observation recorded in 1995.	4 records pre 2000 No records post 2000
Terrestrial mammal	Micromys minutus	Harvest mouse	6 records within 2km	All records are located beyond 250m of the site. Closest is one record located 1.6km north of the site (Grid Reference SK873985) in 2019 (deceased).	4 records pre 2000 2 records post 2000 (2014)
Terrestrial mammal	Erinaceus europaeus	West European Hedgehog	57 records within 2km	All records are located beyond 250m from the site. The closest being ~600m north west of the site (Grid ref SK8797) with one record (field observation) in 2003.	29 records pre 2000 28 records post 2000
Bats	Nyctalus noctula	Noctule Bat	4 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~700m north west of the site (Grid Reference SK867968) in 2003.	1 records pre 2000 3 record post 2000
Bats	Pipistrellus	Pipistrelle Bat species	7 records within 2km	All records are located beyond 250m of the site. Closest of which is located ~1.4km north of the site (Grid Reference SK872977) in 2003.	3 records pre 2000 4 records post 2000
Birds	Tyto alba	Barn Owl	43 records within 2km	All records are located beyond 250m of the site. The closest being five records of field observations between 1998 and 2009 ~2km north of the site.	5 records pre 2000 38 records post 2000
Birds	Pyrrhula pyrrhula	Bullfinch	70 records within 2km	All records located beyond 250m of the site. Closest being ~1.2km west of the site as a field observation in 2018. Grid ref SK853964.	16 records pre 2000 54 records post 2000 (2017)
Birds	Cuculus canorus	Cuckoo	102 records within 2km	One record is found within the 250m buffer to the north of the site as a field observation in 2003 (grid ref SK871968). The rest are more than 250m from the site with the closest being ~1.8km north of the site in 2009.	76 records pre 2000 26 records post 2000
Birds	Accipiter gentilis	Goshawk	2 records within 2km	All records are located beyond 250m of the site. Closest being two records in 1996 and 1999 respectively with individuals observed in a field ~1.9km north of the site (grid ref SK871982).	2 records pre 2000 2 record post 2000 (2009)
Birds	Perdix perdix	Grey Partridge	51 records within 2km	All records are located beyond 250m of the site. Closest known location record is ~600m north east of the site dated 2003. (grid ref SK867968).	10 records pre 2000 41 records post 2000
Birds	Passer domesticus	House Sparrow	84 records within 2km	All records are located beyond 250m of the site. Closest being ~500m south east of the site with one field observation of four breeding individuals in 2003 (grid ref SK859953).	3 records pre 2000 26 records post 2000
Birds	Vanellus vanellus	Lapwing	66 records within 2km	All records are located beyond 250m of the site. Closest being ~600m north of the site with a single field observation in 2009 (grid ref SK869970).	33 records pre 2000 33 records post 2000

Birds	Linaria cannabina	Linnet	48 records within 2km	All records are located beyond 250m of the site. Closest being ~600m north of the site with a single field observation in 2003 (grid ref SK869970).	10 records pre 2000 38 records post 2000
Birds	Caprimulgus europaeus	Nightjar	182 records within 2km	All records are located beyond 250m of the site. Closest being ~1.8km north of the site with 27 observations between 1971 and 2004 (grid ref SK871982).	49 records pre 2000 133 records post 2000
Birds	Emberiza schoeniclus	Reed Bunting	23 records within 2km	All records are located beyond 250m of the site. Closest being ~600m north of the site with field observations of individuals in 2003 (grid ref SK869970).	7 records pre 2000 16 records post 2000
Birds	Alauda arvensis	Skylark	71 records within 2km	All records are located beyond 250m of the site. Closest being ~600m north of the site with two breeding individuals observed in 2003 (grid ref SK869970).	12 records pre 2000 59 records post 2000
Birds	Turdus philomelos	Song Thrush	56 records within 2km	All records are located beyond 250m of the site. Closest being ~550m north of site with four breeding individuals identified in 2003 (grid ref SK869970).	21 records pre 2000 35 records post 2000
Birds	Sturnus vulgaris	Starling	59 records within 2km	All records are located beyond 250m of the site. Closest being ~600m north of the site with two breeding individuals observed in 2003 (grid ref SK869970).	25 records pre 2000 34 records post 2000
Birds	Apus apus	Swift	25 records within 2km	All records are located beyond 250m of the site. Closest being ~1.3km south east of the site with two breeding individuals observed in 2003 (grid ref SK852948).	7 records pre 2000 18 records post 2000
Birds	Passer montanus	Tree Sparrow	50 records within 2km	All records are located beyond 250m of the site. Closest being ~600m north of the site with breeding individuals observed in 2003 (grid ref SK869970).	17 records pre 2000 33 records post 2000
Birds	Motacilla flava	Yellow Wagtail	15 records within 2km	All records are located beyond 250m of the site. Closest being ~600m north of the site with multiple breeding individuals observed in 2003 (grid ref SK869970).	3 records pre 2000 12 records post 2000
Birds	Emberiza citrinella	Yellowhammer	80 records within 2km	All records are located beyond 250m of the site. Closest being ~600m north of the site with 6 breeding individuals observed in 2003 (grid ref SK869970).	32 records pre 2000 48 records post 2000
Bony Fish	Barbus barbus	Barbel	1 records within 2km	All records are located beyond 250m of the site. Closest being ~700m north west of the site with a field observation of an individual in 2007 (grid ref SK867968).	No records pre 2000 1 records post 2000
Bony Fish	Anguilla anguilla	European Eel	1 records within 2km	All records are located beyond 250m of the site. Closest being ~1km west of the site seen in a highland drain in 2010 (grid ref SK852958).	No records pre 2000 1 records post 2000
Insect (beetle)	Cryptocephalus coryli	Hazel Pot Beetle	3 records within 2km	All records are located beyond 250m of the site. Closest being ~2km north of the site photographed in a field in 2015 (grid ref SK871980).	No records pre 2000 3 records post 2000
Insect (butterfly)	Lasiommata megera	Wall	105 records within 2km	All records are located beyond 250m of the site. Closest being ~550m north of site with individuals identified in 2003 (grid ref SK869970).	96 records pre 2000 18 records post 2000
Insect (moth)	Acronicta psi	Grey Dagger	10 records within 2km	All records are located beyond 250m of the site. Closest being ~1.9km north of site with individuals identified in a light trap from 1990 to 2010 (grid ref SK871980).	7 records pre 2000 3 records post 2000
Insect (moth)	Cirrhia icteritia	Sallow	8 records within 2km	All records are located beyond 250m of the site. Closest being ~1.9km north of site with one individual identified in a light trap in 2010 (grid ref SK871980).	4 records pre 2000 4 records post 2000
Insect (moth)	Scotopteryx chenopodiata	Shaded Broad-bar	7 records within 2km	All records are located beyond 250m of the site. Closest being ~1.9km north of site with individuals identified in a light trap in 2010 (grid ref SK871980).	3 records pre 2000 4 records post 2000

APPENDIX G: LOCAL PLANNING POLICY

Policy Reference	Key Policy Text
Central Lincolnshire Local Plan (Adopted April 2017)	
Policy LP19: Renewable Energy Proposals	Proposals for non-wind renewable technology will be assessed on their merits, with the impacts, both individual and cumulative, considered against the benefits of the scheme, taking account of the following: The surrounding landscape and townscape; • Heritage assets; • Ecology and diversity; • Residential and visual amenity; • Safety, including ensuring no adverse highway impact; • MoD operations, including having no unacceptable impact on the operation of aircraft • movement or operational radar; and • Agricultural Land Classification (including a presumption against photovoltaic solar farm proposals on the best and most versatile agricultural land). Proposals will be supported where the benefit of the development outweighs the harm caused and it is demonstrated that any harm will be mitigated as far as is reasonably possible. Renewable energy proposals which will directly benefit a local community, have the support of the local community and / or are targeted at residents experiencing fuel poverty, will be particularly supported.
Policy LP20: Green Infrastructure Network	The Central Lincolnshire Authorities will aim to maintain and improve the green infrastructure network in Central Lincolnshire by enhancing, creating and managing multifunctional green space within and around settlements that are well connected to each other and the wider countryside. Development proposals which are consistent with and help deliver the opportunities, priorities and initiatives identified in the latest Central Lincolnshire Green Infrastructure Study and Biodiversity Opportunity Mapping Study, will be supported. Proposals that cause loss or harm to this network will not be permitted unless the need for and benefits of the development demonstrably outweigh any adverse impacts. Where adverse impacts on green infrastructure are unavoidable, development will only be permitted if suitable mitigation measures for the network are provided. Development proposals should ensure that existing and new green infrastructure is considered and integrated into the scheme design from the outset. Where new green infrastructure is proposed, the design should maximise the delivery of ecosystem services and support healthy and active lifestyles. Development proposals must protect the linear features of the green infrastructure network that provide connectivity between green infrastructure assets, including public rights of way, bridleways, cycleways and waterways, and take opportunities to improve such features. Development will be expected to make contributions proportionate to their scale towards the establishment, enhancement and on-going management of green infrastructure by contributing to the development of the strategic green infrastructure network within Central Lincolnshire, in line with guidance set out in LP12.
Policy LP21: Biodiversity and Geodiversity	All development should: • protect, manage and enhance the network of habitats, species and sites of international, national and local importance (statutory and non-statutory), including sites that meet the criteria for selection as a Local Site; • minimise impacts on biodiversity and geodiversity; and • seek to deliver a net gain in biodiversity and geodiversity. Development proposals that will have an adverse impact on a European Site or cause significant harm to a Site of Special Scientific Interest, located within or outside Central Lincolnshire, will not be permitted, in accordance with the NPPF.

Policy Reference	Key Policy Text
	Planning permission will be refused for development resulting in the loss, deterioration or fragmentation of irreplaceable habitats, including ancient woodland and aged or veteran trees, unless the need for, and benefits of, the development in that location clearly outweigh the loss or harm. Proposals for major development should adopt an ecosystem services approach, and for large scale major development schemes (such as Sustainable Urban Extensions) also a landscape scale approach, to biodiversity and geodiversity protection and enhancement identified in the Central Lincolnshire Biodiversity Opportunity Mapping Study. Development proposals should create new habitats, and links between habitats, in line with Biodiversity Opportunity Mapping evidence to maintain a network of wildlife sites and corridors to minimise habitat fragmentation and provide opportunities for species to respond and adapt to climate change. Development should seek to preserve, restore and re-create priority habitats, ecological networks and the protection and recovery of priority species set out in the Lincolnshire Biodiversity Action Plan and Geodiversity Action Plan. Where development is within a Nature Improvement Area (NIA), it should contribute to the aims and aspirations of the NIA. Development proposals should ensure opportunities are taken to retain, protect and enhance biodiversity and geodiversity features proportionate to their scale, through site layout, design of new buildings and proposals for existing buildings. Mitigation Any development which could have an adverse effect on sites with designated features and / or protected species, either individually or cumulatively, will require an assessment as required by the relevant legislation or national planning guidance. Where any potential adverse effects to the biodiversity or geodiversity value of designated sites are identified, the proposal will not normally be permitted. Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species. In exceptional circumstances, where adverse impacts are demonstrated to be unavoidable, developers will be required to ensure that impacts are appropriately mitigated, with compensation measures towards loss of habitat used only as a last resort where there is no alternative. Where any mitigation and compensation measures are required, they should be in place before development activities start that may disturb protected or important habitats and species.
Policy LP22: Green Wedges	Green Wedges, as identified on the Policies Map, have been identified to fulfil one or more of the following functions and policy aims: • Prevention of the physical merging of settlements, preserving their separate identity, local character and historic character; • Creation of a multi-functional 'green lung' to offer communities a direct and continuous link to the open countryside beyond the urban area; • Provision of an accessible recreational resource, with both formal and informal opportunities, close to where people live, where public access is maximised without compromising the integrity of the Green Wedge; • Conservation and enhancement of local wildlife and protection of links between wildlife sites to support wildlife corridors. Within the Green Wedges planning permission will not be granted for any form of development, including changes of use, unless: a) it can be demonstrated that the development is not contrary or detrimental to the above functions and aims; or b) it is essential for the proposed development to be located within the Green Wedge, and the benefits of which override the potential impact on the Green Wedge. Development proposals within a Green Wedge will be expected to have regard to: c) the need to retain the open and undeveloped character of the Green Wedge, physical separation between settlements, historic environment character and green infrastructure value;

Policy Reference	Key Policy Text
	d) the maintenance and enhancement of the network of footpaths, cycleways and bridleways, and their links to the countryside, to retain and enhance public access, where appropriate to the role and function of the Green Wedge; e) opportunities to improve the quality and function of green infrastructure within the Green Wedge with regard to the Central Lincolnshire Green Infrastructure network and Biodiversity Opportunity Mapping. Development proposals adjacent to the Green Wedges will be expected to demonstrate that: f) they do not adversely impact on the function of the Green Wedge, taking into account scale, siting, design, materials and landscape treatment; g) They have considered linkages to and enhancements of the adjacent Green Wedge.
Policy LP23: Local Green Space and other Important Open Space	An area identified as a Local Green Space on the Policies Map will be protected from development in line with the NPPF, which rules out development on these sites other than in very special circumstances. An area identified as an Important Open Space on the Policies Map is safeguarded from development unless it can be demonstrated that: a) In the case of publicly accessible open space, there is an identified over provision of that particular type of open space in the community area and the site is not required for alternative recreational uses or suitable alternative open space can be provided on a replacement site or by enhancing existing open space serving the community area; and b) In the case of all Important Open Spaces, there are no significant detrimental impacts on the character and appearance of the surrounding area, ecology and any heritage assets.
Central Lincolnshire Local Plan Review – Consultation Draft (June 2021)	
Policy S13: Renewable Energy	The Central Lincolnshire Joint Strategic Planning Committee is committed to supporting the transition to a net zero carbon future and will seek to maximise appropriately located renewable energy generated in Central Lincolnshire (such energy likely being wind and solar based). Proposals for renewable energy schemes, including ancillary development, will be supported where the direct, indirect, individual and cumulative impacts on the following considerations are,or will be made, acceptable: i. As a result of its scale, siting or design, the impacts on the following issues are satisfactorily addressed: landscape character; visual amenity; biodiversity; geodiversity; flood risk; townscape; historic assets; and highway safety… Testing compliance with part (i) above will be via applicable policies elsewhere in a development plan document for the area (i.e. this Local Plan; a Neighbourhood Plan, if one exists; any applicable policies in a Minerals or Waste Local Plan; and any further guidance set out in a Supplementary Planning Document). For all matters in (i)-(iii), the applicable local planning authority may commission its own independent assessment of the proposals, to ensure it is satisfied what the degree of harm may be and whether reasonable mitigation opportunities are being taken. Where significant adverse effects are concluded by the local planning authority following consideration of the above assessment(s), such effects will be weighed against the wider environmental, economic, social and community benefits provided by the proposal. In this regard, and as part of the planning balance, significant additional weight in favour of the proposal will arise for any proposal which is community-led for the benefit of that community. In areas that have been designated for their national importance, as identified in the National Planning Policy Framework, renewable energy infrastructure will only be permitted where it can be demonstrated that it would be appropriate in scale, located in areas that do not contribute positively to the objectives of the designation, is sympathetically designed and includes any necessary mitigation measures. Additional matters for solar based energy proposals Proposals for solar thermal or photovoltaics panels to be installed on existing property will be under a presumption in favour of permission unless there is clear and demonstrable significant harm arising. Proposals for ground based photovoltaics, including commercial large scale proposals, will be under a presumption in favour unless: • there is clear and demonstrable significant harm arising; or

Policy Reference	Key Policy Text
	• the proposal is (following a site specific soil assessment) to take place on Best and Most Versatile (BMV) agricultural land, unless such land is peat based and the proposal is part of a wider scheme to protect or enhance the carbon sink of such land; or • the land is allocated for another purpose in this Local Plan or other statutory based document (such as a nature recovery strategy or a Local Transport Plan), and the proposal is not compatible with such other allocation. Decommissioning renewable energy infrastructure Permitted proposals will be subject to a condition that will require the facility to be removed and the site fully restored to its original condition (or as near as reasonably practical to its original condition) within one year of that facility becoming non-operational.
Policy S58: Green Infrastructure Network	The Central Lincolnshire Authorities will safeguard green infrastructure in Central Lincolnshire from inappropriate development and work actively with partners to maintain and improve the quantity, quality, accessibility and management of the green infrastructure network. Proposals that cause loss or harm to the green infrastructure network will not be supported unless the need for and benefits of the development demonstrably outweigh any adverse impacts. Where adverse impacts on green infrastructure are unavoidable, development will only be supported if suitable mitigation measures for the network are provided. Development proposals should ensure that existing and new green infrastructure is considered and integrated into the scheme design from the outset. Where new green infrastructure is proposed, the design and layout should take opportunities to incorporate a range of green infrastructure to maximise the delivery of multi-functionality and ecosystem services, support climate change adaptation and encourage healthy and active lifestyles. Development proposals must protect the linear features of the green infrastructure network that provide connectivity between green infrastructure assets, including public rights of way, bridleways, cycleways and waterways, and take opportunities to improve and expand such features. Development will be expected to make a contribution proportionate to their scale towards the establishment, enhancement and on-going management of green infrastructure by contributing to the development of the strategic green infrastructure network within Central Lincolnshire, in accordance with the Developer Contributions SPD.
Policy S59: Protecting Biodiversity and Geodiversity	All development should: a) protect, manage and enhance the ecological network of habitats, species and sites of international, national and local importance (statutory and non-statutory), including sites that meet the criteria for selection as a Local Site; b) minimise impacts on biodiversity and features of geodiversity value; c) deliver measurable and proportionate net gains in biodiversity; and d) protect and enhance the aquatic environment within or adjoining the site, including water quality and habitat. Part One: Designated Sites The following hierarchy of sites will apply in the consideration of development proposals: 1. International Sites The highest level of protection will be afforded to internationally protected sites. Development proposals that will have an adverse impact on the integrity of such areas, will not be supported other than in exceptional circumstances, in accordance with the NPPF. Development proposals that are likely to result in a significant adverse effect, either alone or in combination, on any internationally designated site, must satisfy the requirements of the Habitats Regulations (or any superseding similar UK legislation). Development requiring Appropriate Assessment will only be allowed where it can be determined, taking into account mitigation, that the proposal would not result in significant adverse effects on the site's integrity. 2. National Sites (NNRs and SSSIs as shown on the Policies Map)

Policy Reference	Key Policy Text
	Development proposals should avoid impact on these nationally protected sites. Development proposals within or outside a national site, likely to have an adverse effect, either individually or in combination with other developments, will not normally be supported unless the benefits of the development, at this site clearly outweigh both the adverse impacts on the features of the site and any adverse impacts on the wider network of nationally protected sites. 3. Irreplaceable Habitats Planning permission will be refused for development resulting in the loss, deterioration or fragmentation of irreplaceable habitats, including ancient woodland and aged or veteran trees, unless there are wholly exceptional reasons and a suitable compensation strategy will be delivered. 4. Local Sites (LNR, LWS and LGS as shown on the Policies Map) Development likely to have an adverse effect on locally designated sites, their features or their function as part of the ecological network, will only be supported where the need and benefits of the development clearly outweigh the loss, and the coherence of the local ecological network is maintained. Where significant harm cannot be avoided, the mitigation hierarchy should be followed. Part Two: Species and Habitats of Principal Importance All development proposals will be considered in the context of the relevant Local Authority's duty to promote the protection and recovery of priority species and habitats. Development should seek to preserve, restore and re-create priority habitats, ecological networks and the protection and recovery of priority species set out in the Natural Environment and Rural Communities Act 2006, Lincolnshire Biodiversity Action Plan, Lincolnshire Geodiversity Strategy and Local Nature Recovery Strategy. Where adverse impacts are likely, development will only be supported where the need for and benefits of the development clearly outweigh these impacts. In such cases, appropriate mitigation or compensatory measures will be required. Part Three: Mitigation of Potential Adverse Impacts Development should avoid adverse impact on existing biodiversity and geodiversity features as a first principle, in line with the mitigation hierarchy. Where adverse impacts are unavoidable they must be adequately and proportionately mitigated. If full mitigation cannot be provided, compensation will be required as a last resort where there is no alternative. Development will only be supported where the proposed measures for mitigation and/or compensation along with details of net gain are acceptable to the Local Planning Authority in terms of design and location, and are secured for the lifetime of the development with appropriate funding mechanisms that are capable of being secured by condition and/or legal agreement. If significant harm to biodiversity resulting from development cannot be avoided, adequately mitigated, or, as a last resort, compensated for, then planning permission will be refused.
Policy S60: Biodiversity Opportunity and Delivering Measurable Net Gains	Following application of the mitigation hierarchy, development proposals should ensure opportunities are taken to retain, protect and enhance biodiversity and geodiversity features proportionate to their scale, through site layout, design of new buildings and proposals for existing buildings. Development proposals should create new habitats, and links between habitats, in line with Central Lincolnshire Biodiversity Opportunity and Green Infrastructure Mapping evidence, the biodiversity opportunity area principles set out in Appendix 4 to this Plan and the Local Nature Recovery Strategy, to maintain a network of wildlife sites and corridors, to minimise habitat fragmentation and provide opportunities for species to respond and adapt to climate change. Proposals for major and large scale development should seek to deliver wider environmental net gains where feasible. All development proposals must deliver, as a minimum, a 10% measurable biodiversity net gain attributable to the development. The net gain for biodiversity should be calculated using DEFRA's biodiversity metric. Appendix 4: Principles for Development within Biodiversity Opportunity Areas The following guidance provides a set of development principles which should be used when considering site allocations and determining planning applications in the context of the Central Lincolnshire Biodiversity

Policy Reference	Key Policy Text
	Opportunity Mapping (BOM) and the ecological network it alludes to. These principles are to be used in conjunction with policy S60 within this Local Plan. Ecological networks are key to creating a more robust natural environment which will be resilient to future pressures25. They will play an integral role in the creation of Nature Recovery Networks and likely act as the basis of any local work towards a national strategy, for example Local Nature Recovery Strategies. Central Lincolnshire Biodiversity Opportunity Mapping Categories Dark Green: Ecological network - high quality Consists of Priority habitat, these are the core areas of an ecological network and are of high value in terms of distinctiveness. These may require management to either maintain or improve their current condition. Light Green: Ecological network - opportunity for management These areas are not currently Priority habitat, but are important for biodiversity and the functionality of the ecological network of which they are part. They provide an opportunity for their quality to be improved through management, with positive results for biodiversity. Dark Brown: Opportunity for creation - more joined up These are not currently part of an ecological network, but provide opportunities to connect together two or more ecological networks through habitat creation. Light Brown: Opportunity for creation These areas are not currently part of an ecological network, but provide opportunities for increasing the size of an ecological network through habitat creation. Guidance regarding site allocations and planning permission applications in a Biodiversity Opportunity Mapping context. Biodiversity opportunity mapping developed by the Greater Lincolnshire Nature Partnership highlights both the existing ecological network and where the best opportunities lie for improvement in regards to the extent of habitat in the network, the condition or distinctiveness of said habitat and overall connectivity of the network. All policy and decisions should take into account the impact of development to these networks and where possible avoid permitting proposals which may negatively affect the existing network. Where this is not possible, or where development is planned on areas identified as an opportunity for creation, principles should call for quality design which will protect and enhance the existing network. Biodiversity net gain should prioritise onsite habitat creation and management over offsite. Where land earmarked for development contains, either partially or entirely, any areas highlighted by the BOM, these should be seen as opportunities to contribute to onsite biodiversity net gain requirements in a way that will also conserve, restore and enhance ecological connectivity. However, it should be recognised that Ecological network - opportunity for management areas and Opportunity for creation areas identified by the BOM, which are not part of a development area, are well placed as locations for habitat creation or management. Doing so contributes towards any required offsite biodiversity net gain commitments for development. Additionally, habitat created in an ecologically desirable location or in an area identified for biodiversity by a **local strategy are valued more highly by Defra's biodiversity net gain metric**. Any sites recognised by the BOM which apply to be included on the register of biodiversity gain sites should be given due regard in planning for their importance to enhancing ecological networks. Notes on Development Principles For the purpose of ecological networks **"habitat creation" refers to semi natural or natural** habitats. Any habitat created should fit with the existing ecological network and be either the same habitat type or related habitat. A related habitat refers to habitats often found in association as part of a dynamic complex. Ecological advice should be sought in the preservation and enhancement of ecological networks and achievement of biodiversity net gain. Development Principles Where allocated sites or sites submitted for planning permission contain or overlap with any **Ecological network – high quality area**, the following principles should apply: 1. **High quality ecological network areas** consist of Priority habitat and contain the most valuable habitats. It should not be built on and should be buffered against impacts of development. Where development is permitted on land containing areas of **high quality ecological network**, the development layout should use the principles of the Mitigation Hierarchy and be designed in such a way as to avoid damage to these areas.

Policy Reference	Key Policy Text
	2. **High quality ecological network areas** should be recognised as a potential opportunity to achieve biodiversity net gain requirements by improving condition through sensitive management. Where allocated sites or sites submitted for planning permission contain or overlap with any Ecological network – opportunity for management area, the following development principles should apply: 1. Proposals should avoid development on **Ecological network – opportunity for management areas** where possible. 2. Where this is not possible, the development layout should ensure that connectivity of the network is maintained. This can be achieved through quality design, for example by leaving strategically important habitat in place to create wildlife corridors or the use of green/brown roofing to act as stepping stones between larger areas of habitat; or through the effective creation of new habitat as part of a landscaping scheme which allows for the migration and dispersal of species. 3. Proposals should fulfil onsite net gain requirements through creation and sensitive management of habitats, in a way that will enhance the ecological network either by ensuring connectivity or improving condition. Where allocated sites or sites submitted for planning permission contain or overlap with any mapped **Opportunity for creation areas**, the following development principles should apply: 1. Where development takes place on **Opportunity for creation areas**, applications should include information clearly demonstrating how opportunities to maintain or enhance the ecological network (in regards to the extent of habitat in the network, the condition or distinctiveness of said habitat) and overall connectivity in the network, have or will be taken. It should include aspects of quality design; for example, by leaving strategically important habitat in place where possible to create wildlife corridors or the use of green/brown roofing to act as stepping stones between larger areas of habitat. It should also take any opportunities for effective habitat creation as part of a landscaping scheme which ensures connectivity between habitats for the species which utilise them. 2. Proposals should prioritise any **Opportunity for creation areas** within the development site for habitat creation. This will ensure that requirements for both biodiversity net gain and the enhancement of ecological networks are achieved in an effective way. Habitat creation onsite should maximise the potential for the ecological network in regards to: the extent of habitat in the network, the condition or distinctiveness of said habitat and the overall connectivity of the network. Additionally, habitat created onsite in an ecologically desirable location or in an area identified by a local strategy, are valued more highly by Defra's biodiversity net gain metric.
Policy S65: Trees, Woodland and Hedgerows	Development proposals should be prepared based on the overriding principle that: • the existing tree and woodland cover is maintained, improved and expanded; and • opportunities for expanding woodland are actively considered, and implemented where practical and appropriate to do so. Existing Trees and Woodland Planning permission will only be granted if the proposal provides evidence that it has been subject to adequate consideration of the impact of the development on any existing trees and woodland found on-site (and off-site, if there are any trees near the site, with 'near' defined as the distance comprising 12 times the stem diameter of the off-site tree). If any trees exist on or near the development site, 'adequate consideration' is likely to mean the completion of a British Standard 5837 Tree Survey and, if applicable, an Arboricultural Method Statement. Where the proposal will result in the loss or deterioration of: a) ancient woodland; and/or b) the loss of aged or veteran trees found outside ancient woodland, permission will be refused, unless and on an exceptional basis the need for, and benefits of, the development in that location clearly outweigh the loss. Where the proposal will result in the loss or deterioration of a tree protected by a Tree Preservation Order or a tree within a Conservation Area, then permission will be refused unless: c) there is no net loss of amenity value which arises as a result of the development; or d) the need for, and benefits of, the development in that location clearly outweigh the loss.

<table>
<tr><th>Policy Reference</th><th>Key Policy Text</th></tr>
<tr><td></td><td>
Where the proposal will result in the loss of any other tree or woodland not covered by the above, then the Council will expect the proposal to retain those trees that make a significant contribution to the landscape or biodiversity value of the area, provided this can be done without compromising the achievement of good design for the site.

Mitigating for loss of Trees and Woodland

Where it is appropriate for higher value tree(s) (category A or B trees (BS5837)) and/or woodland to be lost as part of a development proposal, then appropriate mitigation, via compensatory tree planting, will be required. Such tree planting should be on-site wherever possible and should:

e) take all opportunities to meet the five Tree Planting Principles (see supporting text); and

f) unless demonstrably impractical or inappropriate, provide the following specific quantity of compensatory trees:

<table>
<tr><th>Trunk diameter(mm) at 1.5m above ground of tree lost to development</th><th>Number of replacement trees required, per tree lost*</th></tr>
<tr><td>75-200</td><td>1</td></tr>
<tr><td>210-400</td><td>4</td></tr>
<tr><td>410-600</td><td>6</td></tr>
<tr><td>610-800</td><td>9</td></tr>
<tr><td>810-1000</td><td>10</td></tr>
<tr><td>1000+</td><td>11</td></tr>
</table>
* replacement based on selected standards 10/12 cm girth at 1m

New Trees and Woodland

Where appropriate and practical, opportunities for new tree planting should be explored as part of all development proposals (in addition to, if applicable, any necessary compensatory tree provision). Where new trees are proposed, they should be done so on the basis of the five Tree Planting Principles. Proposals which fail to provide practical opportunities for new tree planting will be refused.

Planting schemes should include provision to replace any plant failures within five years after the date of planting. Planting of trees must be considered in the context of wider plans for nature recovery which seeks to increase biodiversity and green infrastructure generally, not simply planting of trees, and protecting / enhancing soils, particularly peat soils. Tree planting should only be carried out in appropriate locations that will not impact on existing ecology or opportunities to create alternative habitats that could deliver better enhancements for people and wildlife, including carbon storage. Where woodland habitat creation is appropriate, consideration should be given to the economic and ecological benefits that can be achieved through natural regeneration. Any tree planting should use native and local provenance tree species suitable for the location.

Management and Maintenance

In instances where new trees and/or woodlands are proposed, it may be necessary for the council to require appropriate developer contributions to be provided, to ensure provision is made for appropriate management and maintenance of the new trees and/or woodland.

Hedgerows

Proposals for new development will be expected to retain existing hedgerows where appropriate and integrate them fully into the design having regard to their management requirements.

Proposals for new development will not be supported that would result in the loss of hedges of high landscape, heritage, amenity or biodiversity value unless the need for, and benefits of, the development clearly outweigh the loss and this loss can be clearly demonstrated to be unavoidable.
</td></tr>
</table>

Policy Reference	Key Policy Text
	Development requiring the loss of a hedgerow protected under The Hedgerow Regulations will only be supported where it would allow for a substantially improved overall approach to the design and landscaping of the development that would outweigh the loss of the hedgerow. Where any hedges are lost, suitable replacement planting or restoration of existing hedges, will be required within the
Corrignham Draft Neighbourhood Plan	
CNP1: Sustainable Development Principles	All proposals for development should: (i) Be appropriately located; (ii) Be of an appropriate scale and demonstrate a high standard of design; (iii) Have regard to their setting and the character of the local area; (iv) Take account of the key landscape views identified in Policy CNP5; (v) Not adversely affect the amenity of nearby residents; (vi) Where appropriate, provide for sustainable transport modes, including walking and cycling; (vii) Respect the local built, social, cultural, historic and natural heritage assets, and (viii) Encouragement will be given to proposals that seek to achieve (or preferably exceed) design and construction standards for sustainable development and minimise CO2 emissions, including domestic scale green energy solutions and provision for electric vehicles. Whilst the Parish Council supports appropriate development in Corringham, it is clearly recognised that this should not increase the risk of flooding and/or exacerbate existing drainage problems. This is line with the requirements of national policy, advice from the Environment Agency and the provisions set out in Policy LP 14 of the adopted Central Lincolnshire Local Plan (2017).
CNP5: Local character and the design of new development	(A) All development should recognise and complement the local character of the areas identified and described in the Corringham Character Assessment. Where applicable to the development proposal, some or all the following detailed criteria will need to be satisfied: (i) Development should respect; existing plot boundaries, ratios, orientation, historic or traditional forms and the established grain of development within the character area. (ii) The predominant materials used in the area should be respected. These include red brick with red-clay pantiles and natural slate and the occasional use of the local "Waterstone." (iii) The height of new buildings should be in keeping with the height of neighbouring properties and not be over-bearing or dominant in the existing street-scene. (iv) Existing predominant boundary treatments in the immediate area should be reflected. These consist of brick or stone walls or hedges, often behind grass verges. (v) Off-road parking; servicing and access arrangements should be in accordance with the most recently published standards by Lincolnshire County Council. (vi) The open character of prominent private gardens should be retained within any development. (vii) Watercourses should be protected and retained as open features, alongside other Sustainable Urban Drainage (SuDS) measures. (B) Any development alongside or serviced from rural lanes (Pilham Lane, Mill Mere Road, the lanes to and around Aisby and Yawthorpe and Springthorpe Road, as shown on the Proposals Map) should not have an adverse impact upon (and where possible enhance) the rural appearance of these byways and their green verges/hedgerows.
CNP12: Countryside management	Development in the open countryside, related to agriculture, forestry, equine, recreation, tourism, utility infrastructure and other rural land uses, will be supported provided that it does not cause demonstrable harm to: (i) Landscape character and quality. (ii) Sites of ecological value, including roadside verges. (iii) Heritage assets and other sites of archaeological interest. (iv) The intrinsic character, beauty and tranquillity of the countryside. (v) The rural quality and character of lanes, including verges. (vi) The "Dark Skies" quality of the Parish.
CNP13: Nature conservation and biodiversity	Proposals with an impact on biodiversity will be required to demonstrate how any potential effect on local wildlife sites, habitats and species networks has been considered, noting that. (i) If development is permitted, any consequent loss of biodiversity must be minimised and mitigated by the creation of new habitats or the enhancement of existing places. (ii) Development resulting in loss or damage to trees and hedgerows will be resisted and in the event of approval, a scheme for replacements must be agreed. (iii) Projects to enhance wildlife habitats and species based on the Lincolnshire Biodiversity Action Plan and the Natural Environment Strategy will be supported. (iv) Tree planting and hedgerow creation aimed at providing a network of wildlife corridors across the Parish will be supported.

APPENDIX H – PHASE 1 HABITATS MAPS

A3 maps supplied as a separate volume:

Cottam 1 – Coates North
Cottam 1 – Coates West
Cottam 1 – Coates South
Cottam 2
Cottam 3

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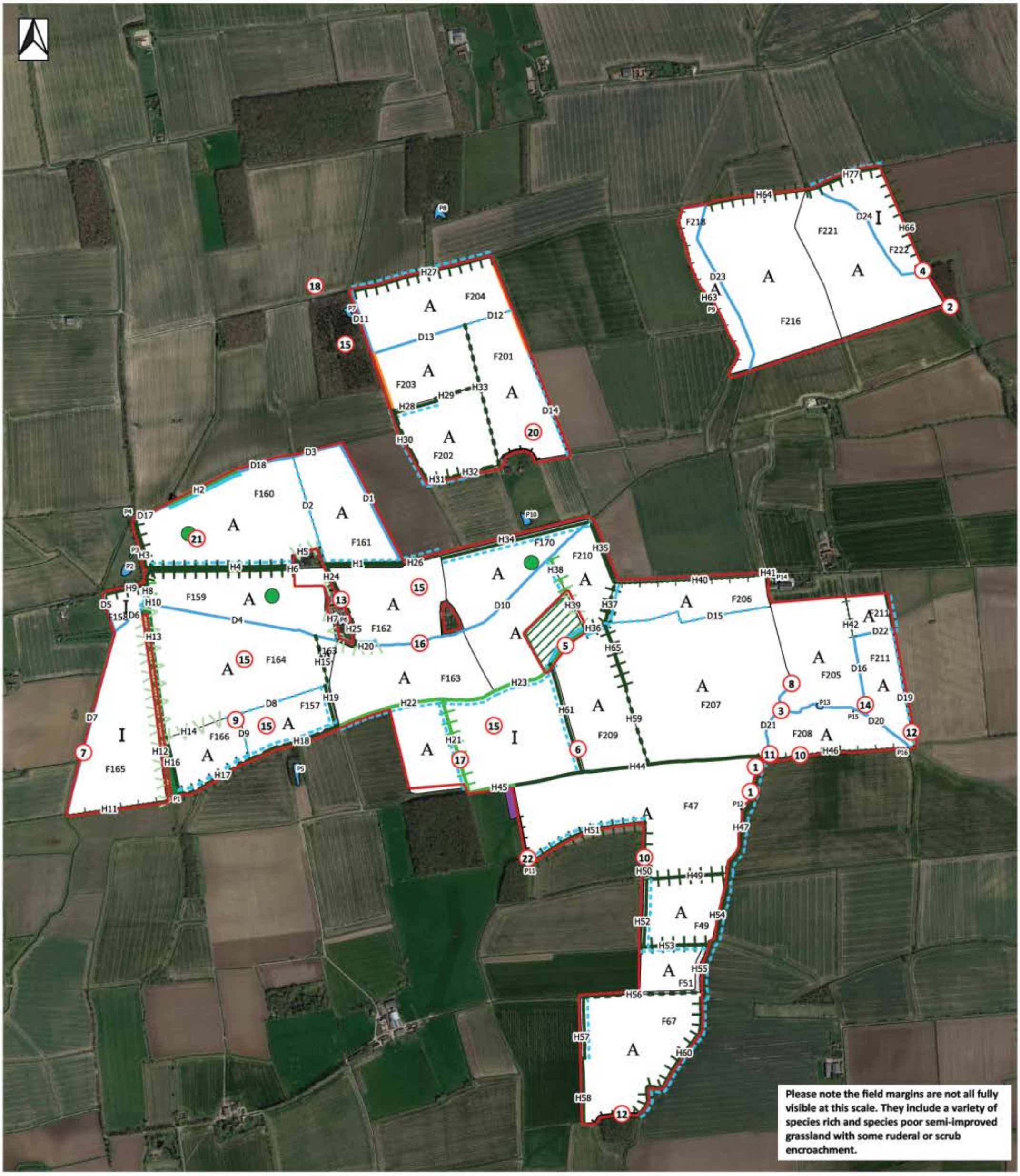
8.2 Extended Phase 1 Habitat Survey Maps



Please note the field margins are not all fully visible at this scale. They include a variety of species rich and species poor semi-improved grassland with some ruderal or scrub encroachment.

Key:

- Red line boundary - approx. location
- Target note
- In-field broadleaved tree
- Arable
- Bare ground
- Broadleaved plantation
- Broadleaved woodland
- Improved grassland
- Pond
- Tall ruderal vegetation
- Dry ditch
- Wet ditch
- Fence
- Intact species rich hedgerow
- Intact species poor hedgerow
- Defunct species rich hedgerow
- Defunct species poor hedgerow
- Intact species rich hedgerow with trees
- Intact species poor hedgerow with trees
- Defunct species rich hedgerow with trees
- Defunct species poor hedgerow with trees
- Line of trees
- Bank of semi-improved grass

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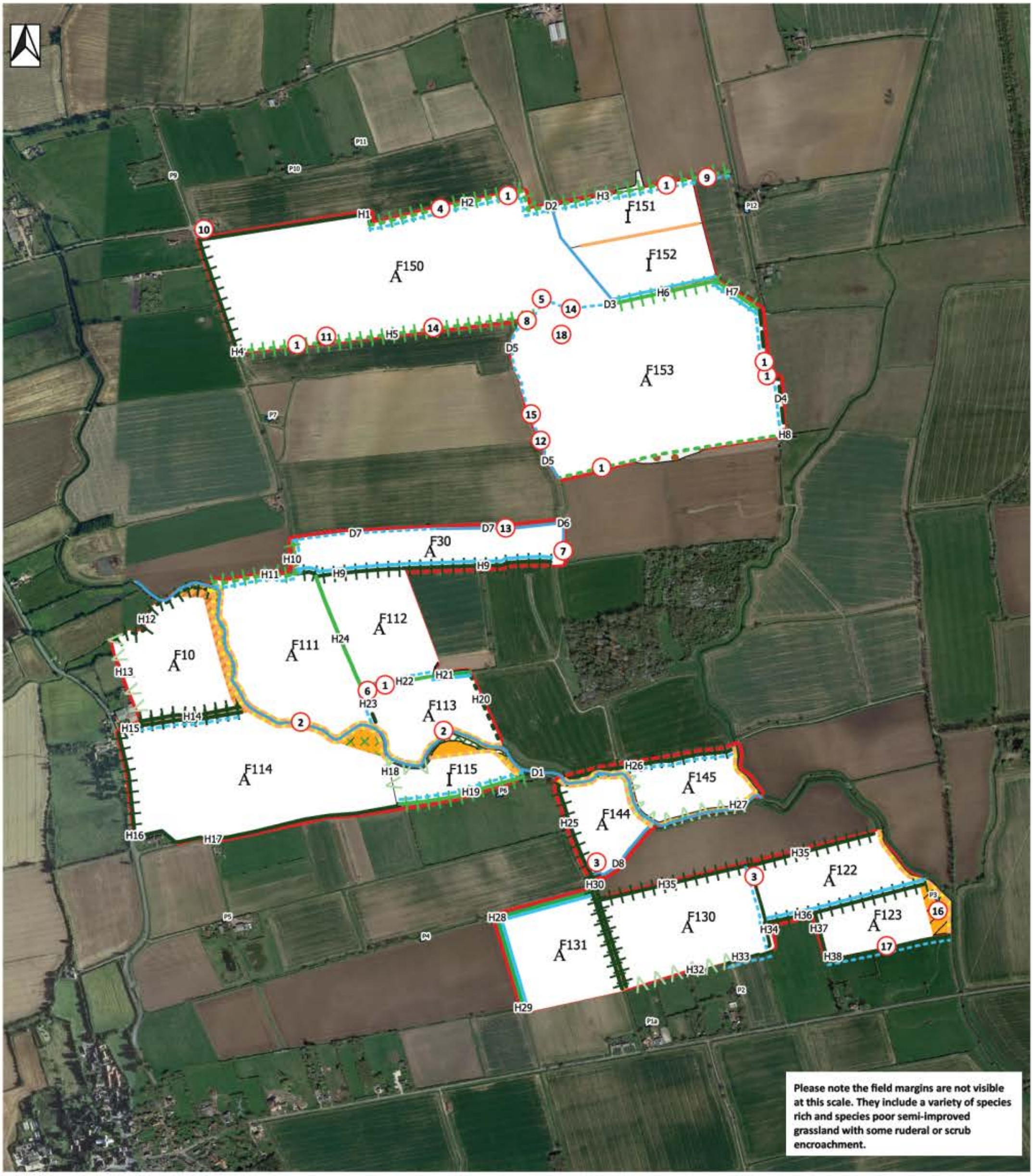
Project
Cottam 1 - Coates North

Title
Phase 1 Habitat Survey Map

Date
12/08/2021

Scale 0 250 500 m



Key:

- Red line boundary - approx. location
- Target note
- Dry ditch
- Wet ditch
- Intact species rich hedgerow
- Intact species poor hedgerow
- Defunct species rich hedgerow
- Defunct species poor hedgerow
- Intact species rich hedgerow with trees
- Intact species poor hedgerow with trees
- Defunct species rich hedgerow with trees
- Defunct species poor hedgerow with trees
- Line of trees
- Species poor semi-improved grass verge
- Bank off semi-improved grassland
- A Arable
- Poor semi-improved grassland
- Rich semi-improved grassland
- Wild bird cover
- I Improved grassland
- Bare ground
- Semi-natural broadleaved woodland
- Dense scrub
- Marshy grassland
- Scattered scrub over species rich semi-improved grassland
- Pond

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Project
Cottam 1 - Coates West

Title
Phase 1 Habitats Survey Map

Date
12/08/2021

Scale
0 250 500 m

Please note the field margins are not all fully visible at this scale. They include a variety of species rich and species poor semi-improved grassland with some ruderal or scrub encroachment.

Key:

- Red line boundary - approx. location
- Target note
- Dry ditch
- Wet ditch
- Fence
- Bank of semi-improved grass
- Intact species rich hedgerow
- Intact species poor hedgerow
- Defunct species rich hedgerow
- Defunct species poor hedgerow
- Intact species rich hedgerow with trees
- Intact species poor hedgerow with trees
- Defunct species rich hedgerow with trees
- Defunct species poor hedgerow with trees
- Line of trees
- Arable
- Improved grassland
- Poor semi-improved grassland
- Rich semi-improved grassland
- Tall ruderal vegetation
- Semi-natural broadleaved woodland
- Dense scrub
- Bare ground
- Hardstanding
- Pond

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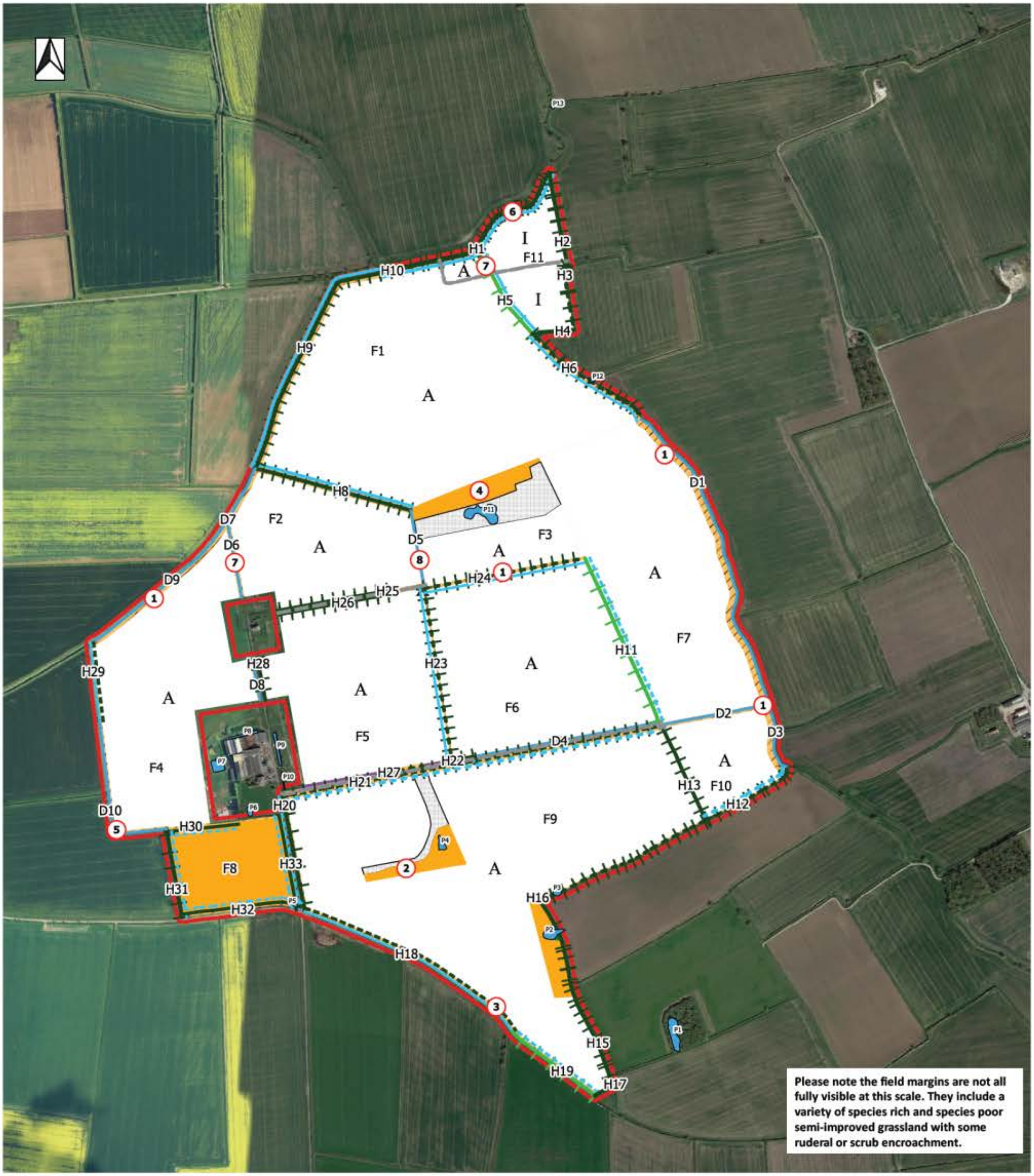
Project
Cottam 1 - Coates South

Title
Phase 1 Habitat Survey Map

Date
12/08/2021

Scale
0 250 500 m



Key:

- Red line boundary - approx. location
- Target note
- Dry ditch
- Wet ditch
- Fence
- track
- Defunct species poor hedgerow
- Intact species rich hedgerow with trees
- Defunct species poor hedgerow with trees
- Intact species poor hedgerow with trees
- Intact species poor hedgerow
- A — Arable
- Bare ground
- Broadleaved woodland
- I — Improved grassland
- Semi-improved grassland
- Tall ruderal vegetation
- Track
- Species rich semi-improved grassland
- Pond

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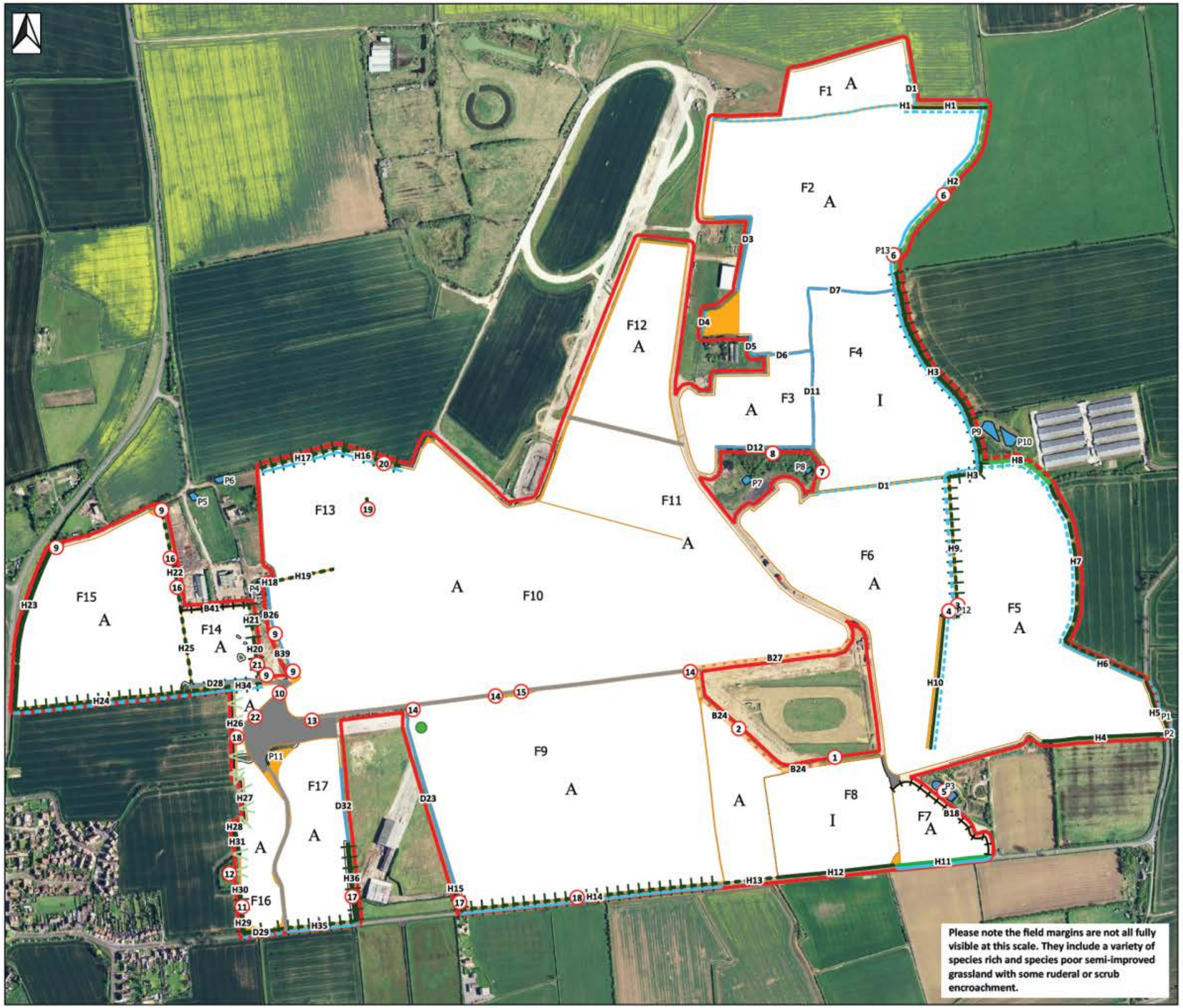
Project
Cottam 2

Title
Phase 1 Habitats Survey Map

Date
16/08/2021

Scale 0 100 200 m



Key:

- Red line boundary - approx. location
- Target note
- In field broadleaved tree
- Fence
- Track/footpath
- Bank of semi-improved grass
- Dry ditch
- Wet ditch
- Intact species rich hedgerow
- Intact species poor hedgerow
- Defunct species rich hedgerow
- Defunct species poor hedgerow
- Defunct species rich hedgerow with trees
- Defunct species poor hedgerow with trees
- Intact species rich hedgerow with trees
- Intact species poor hedgerow with trees
- Line of trees
- A Arable
- Bare ground
- Hardstanding
- I Improved grassland
- Pond
- Semi-Improved grassland
- Track

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Project
Cottam 3

Title
Phase 1 Habitat Survey Map

Date
12/08/2021

Scale
0 200 400 m

Cottam Solar Project

EIA Scoping Report
Appendices to Chapter 9:
Hydrology, Flood Risk and Drainage

January 2022

Cottam
SOLAR PROJECT

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9.1 Flood Risk Screening Report – Cottam 1 (North)

Appendix B – Flood Risk Screening Assessment

Cottam 1 (North) – Cottam Solar Project

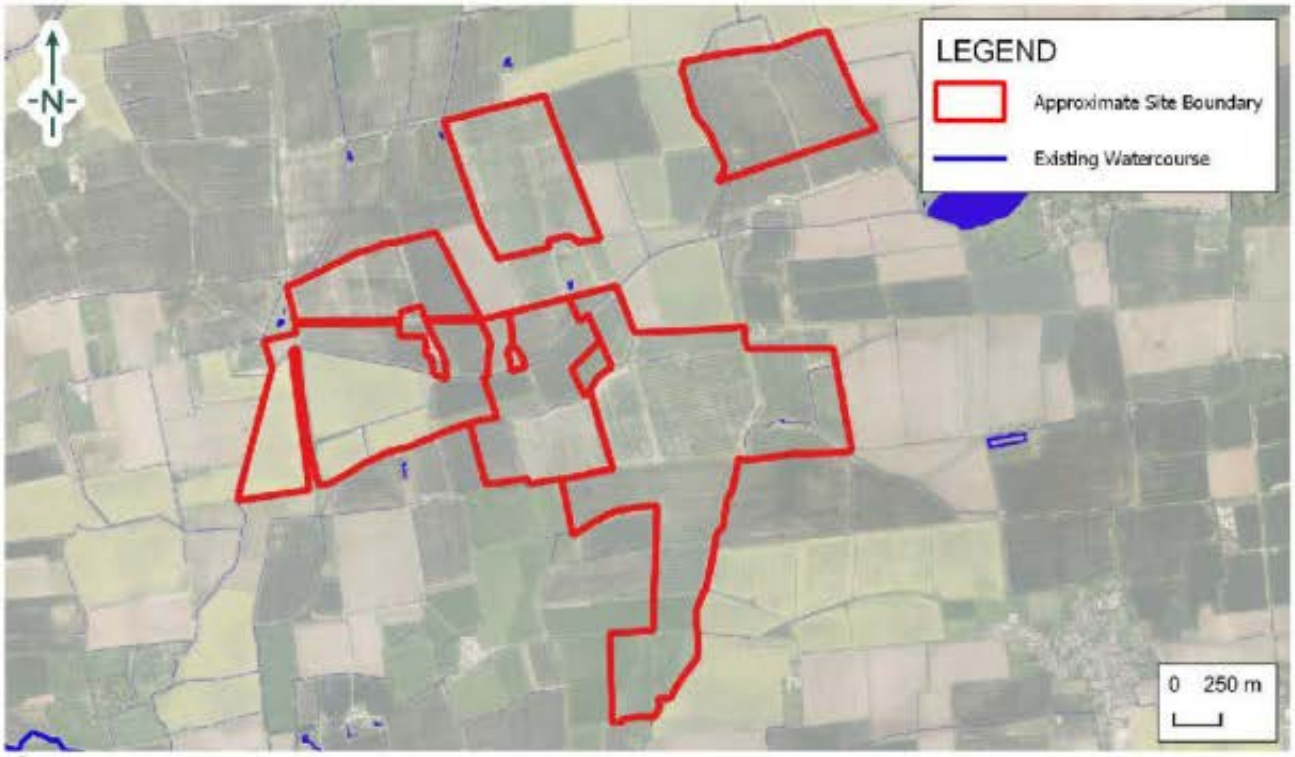
Presented to **Island Green Power**

Issued: January 2022

Delta-Simons Project No. 21-1088.01

1.0 Site Description

The aim of this section of the note is to outline key environmental information associated with the baseline environment.

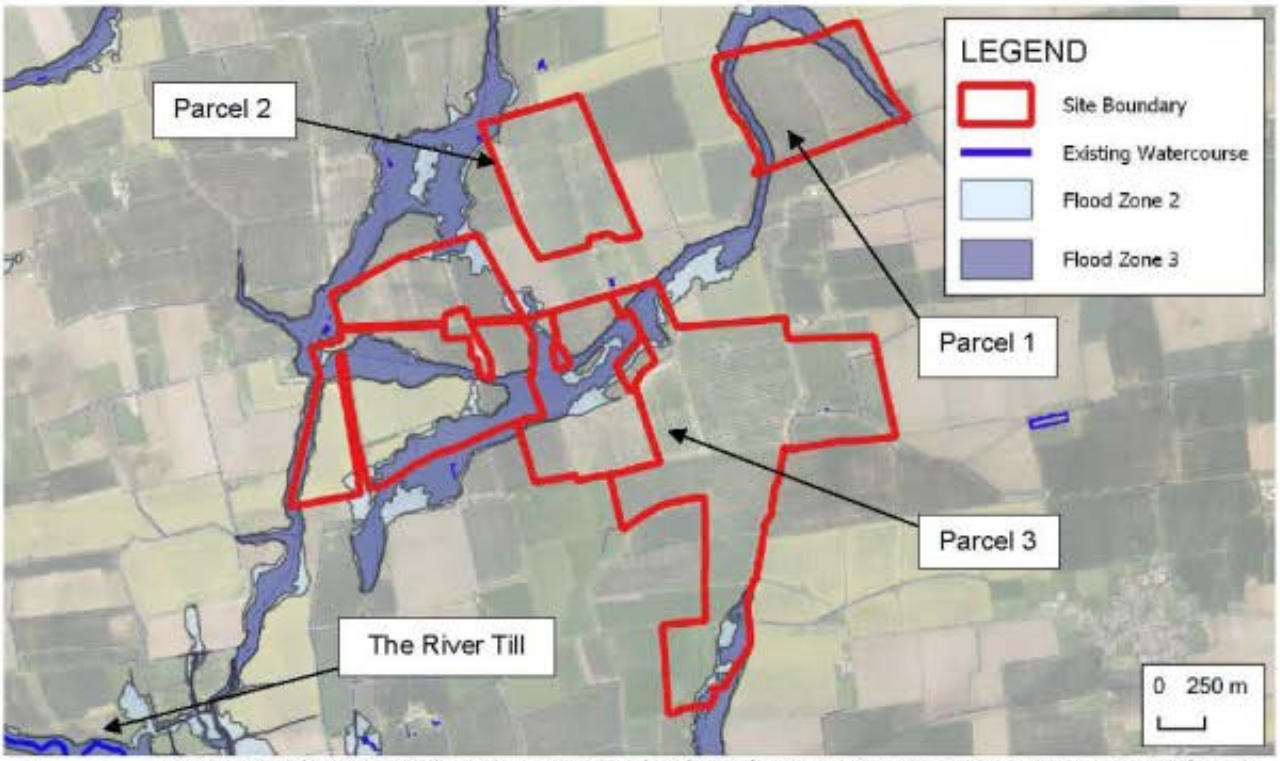


Illustrative Site Layout Plan			
Co-ordinates	Centred approximately at National Grid Reference 492273 , 384793	**Area** (approx.)	322 Ha
Site Location	The Site is located within a rural setting and comprises multiple parcels of agricultural fields, approximately 1.6 km north-west of the village of Ingham.		
Topography	Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1 m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR ground elevation data shows that the Site slopes from approximately 24 m AOD in the north-east to approximately 8 m AOD in the west. A LiDAR extract is included in Annex A.		

2.0 Flood Risk Screening Assessment

Fluvial Flood Risk

Figure 1: EA Flood Map for Planning



EA Online Flood Maps

The EA's Flood Risk Map for Planning indicates that the eastern and western boundaries of Parcel 1 are within the extents of Flood Zone 3. A minor extent of the north-western corner of Parcel 2 is located in Flood Zone 3. Parcel 3 is covered by the extents of Flood Zone 3 in the predominantly in the west and in the southern corner.

Flood Zone 3 defined as land assessed as having a 1 in 100) or greater (>1% Annual Exceedance Probability annual probability of river flooding.

Fluvial risk across the Parcels within the Site is associated with a series of land drains and an Ordinary Watercourse to the west of Parcel 3 which is discharges into the River Till approximately 1.7 km south-west of the Site.

The EA's Historic Flood Map indicates that the Site has not been flooded previously.

The EA's Spatial Flood Defences Dataset indicates that there are no flood defences present within the vicinity of the Site.

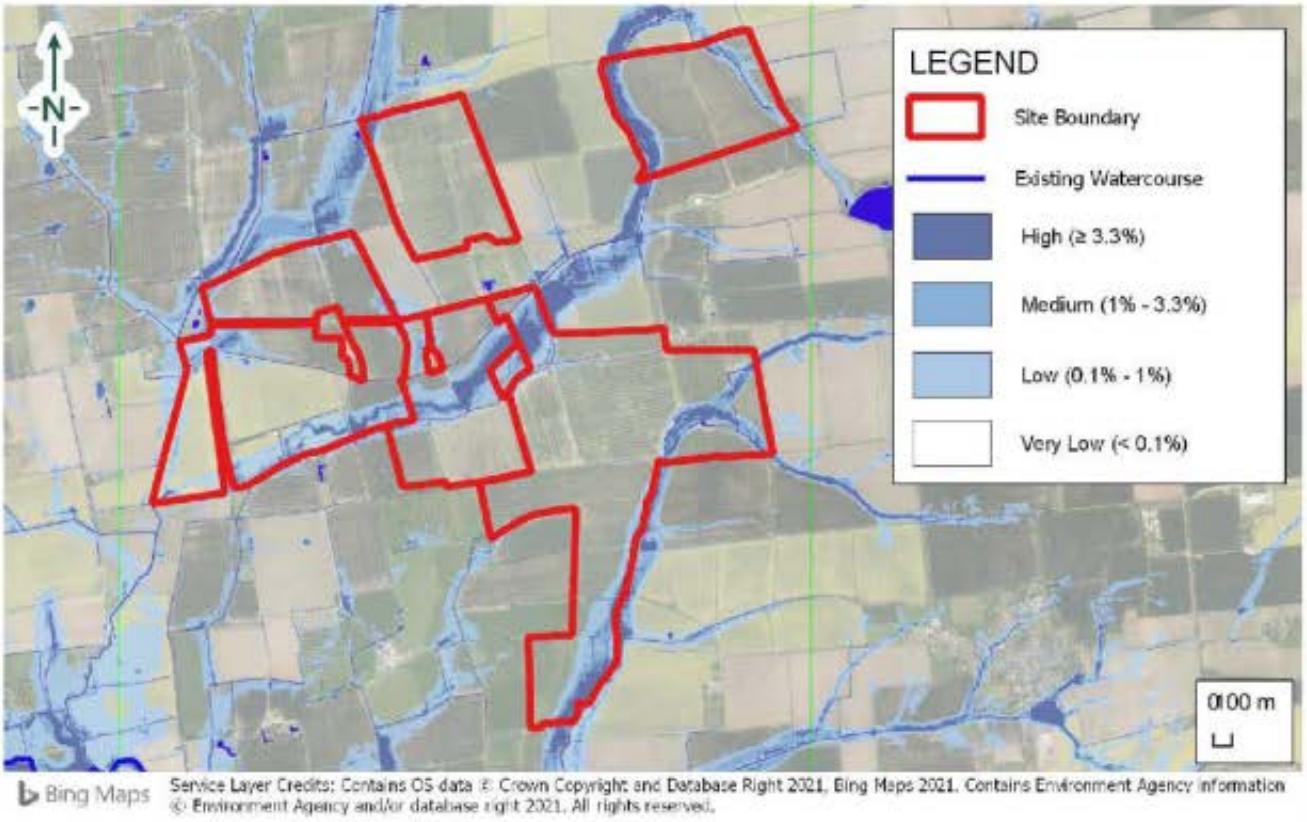
The Site is partly located within the Upper Witham Internal Drainage Board (IDB)[1].

It should be noted that all the flood maps are indicative and do not accurately take into account the impacts of climate change.

[1] Internal Drainage Board Map : https://www.ada.org.uk/idb-map

Surface Water Risk

Figure 2: EA Long-Term Flood Risk Map (Surface Water)



EA Online Flood Maps

The EA's Long-Term Flood Risk Map indicates that Surface Water flooding with a High Risk (>3.3% Annual Probability) of occurrence is present across the Site, predominantly within Parcels 1 and 3.

The surface water extents shown on the EA's Long-Term Flood Risk Map largely concur with the Flood outlines shown on the EA Flood Map for Planning associated with land drains and an Ordinary Watercourse which crosses the Site. Additional Surface Water Risk extents are shown along the eastern boundary of parcel 3 which emanates from flow paths running towards the Site from the east.

Surface water flooding is indicative and typically difficult to predict as it depends on localised heavy rainfall, localised topography and the adequacy of the local drainage network.

Summary of Flood Risk

Flood Risk Status	Amber

Key Constraints

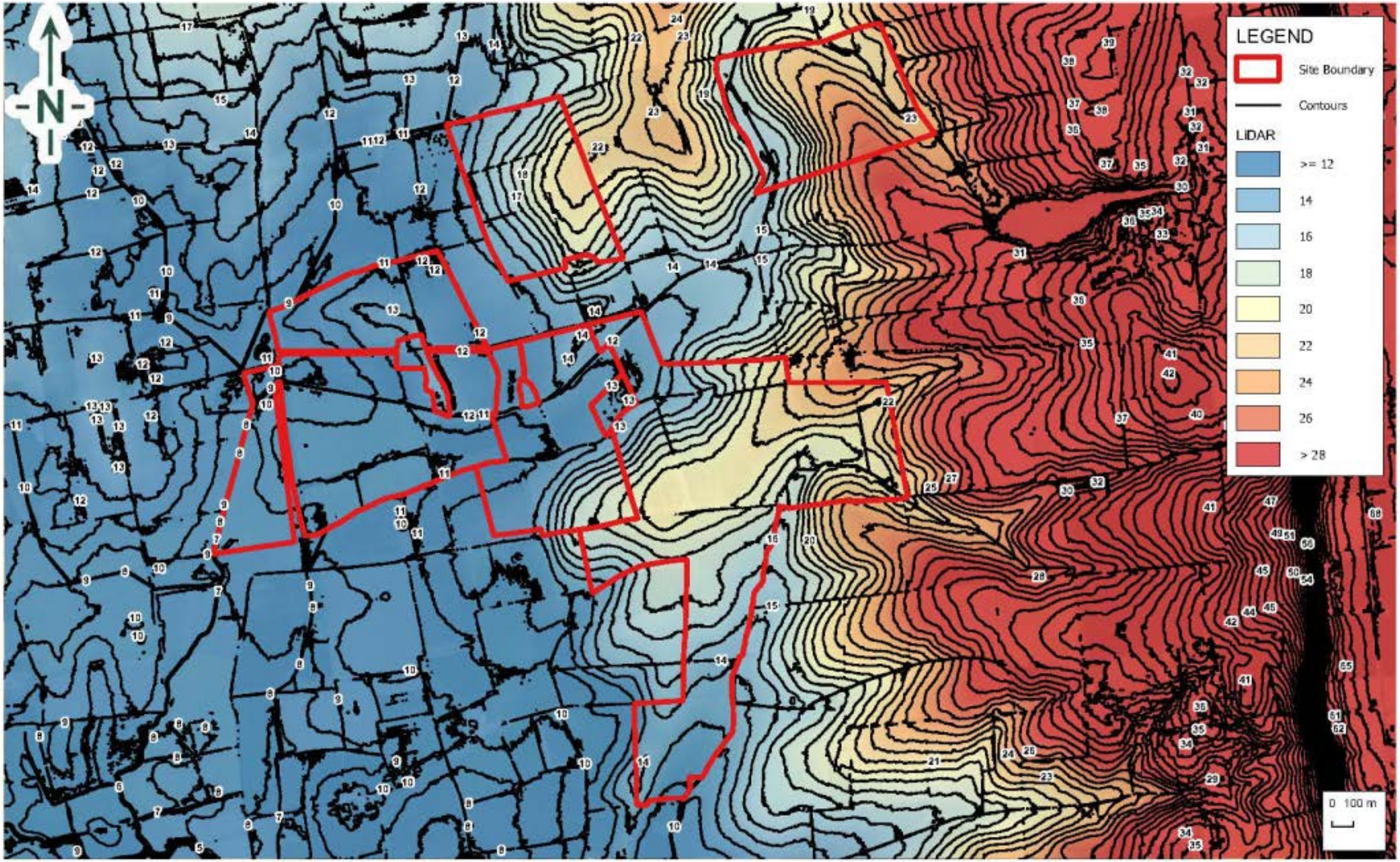
Fluvial and Surface Water Risk Flood Risk associated with land drains and Unnamed Ordinary Watercourse which flows through Parcels 1 and 3.

Next Steps

In order to fully inform the masterplanning and planning submission process the following works will be completed prior to completion of the Flood Risk Assessments:

- Obtain available EA flood data for the land drains and River Till;
- Determine Flood Depths / Levels and velocities where possible, based on the available information;
- Consult Stakeholders where necessary regarding the acceptable depth of flooding for equipment to be placed within.

Annex A – LiDAR Plan



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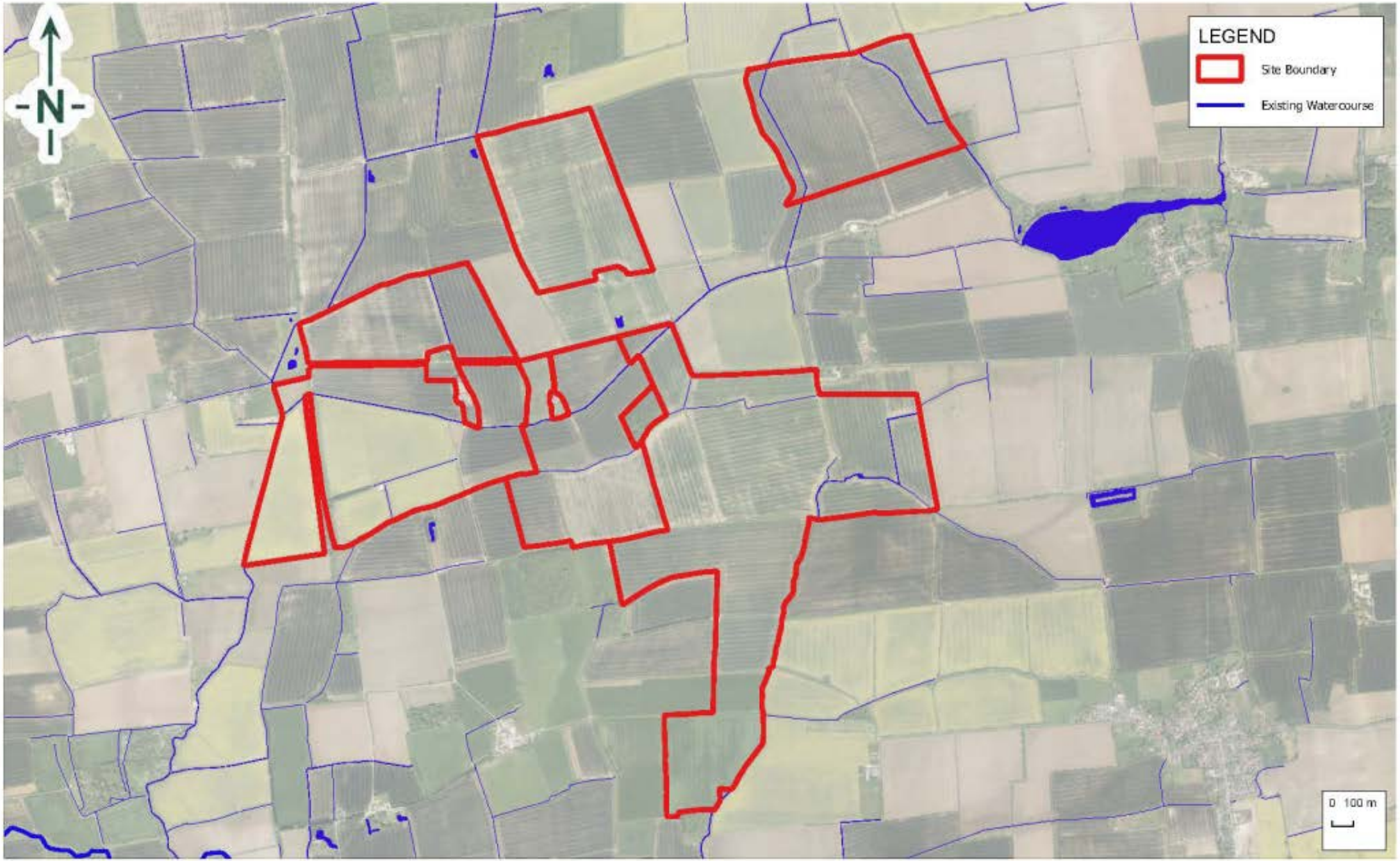
Environment - Health & Safety - Sustainability

TITLE:
LiDAR pan
Cottam 1 (N) - Cottam Solar Project

DRAWN BY:	SCALE (@A3):	PROJECT NO:
EB	1:23,000	21-1088.01
CHECKED BY:	COMMENTS:	FIGURE NO:
JR	-	
DATE:		
17 January 2022		

Annex B – Overview



Site Plan Provided by Client

deltasimons
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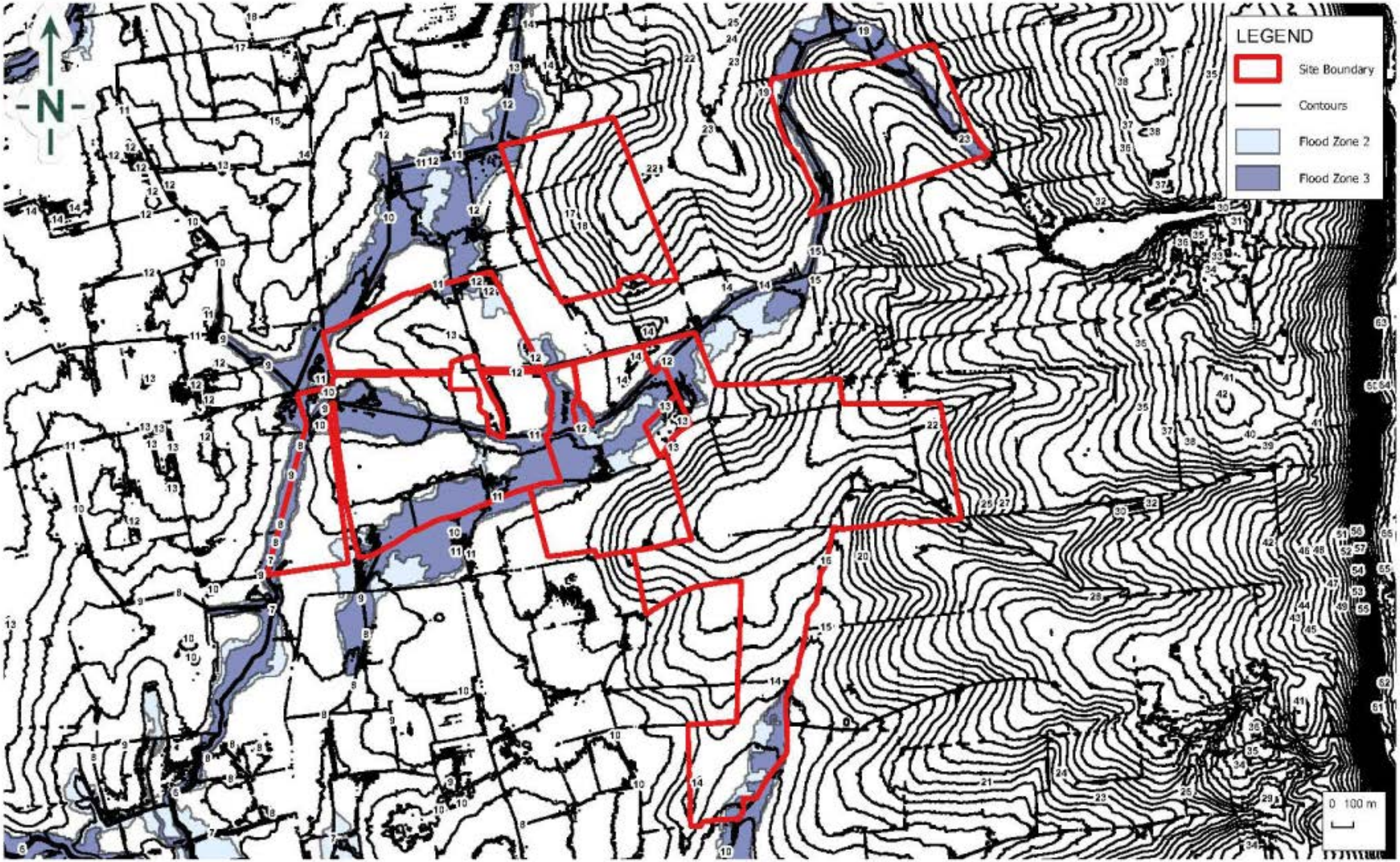
TITLE:
Overview
Cottam 1 - North

DRAWN BY: EB	SCALE (@A3): 1:23,000	PROJECT NO: 21-1088.01
CHECKED BY: JR	NUMBER: -	FIGURE NO:
DATE: 17 January 2022		

Annex C – EA Flood Map for Planning



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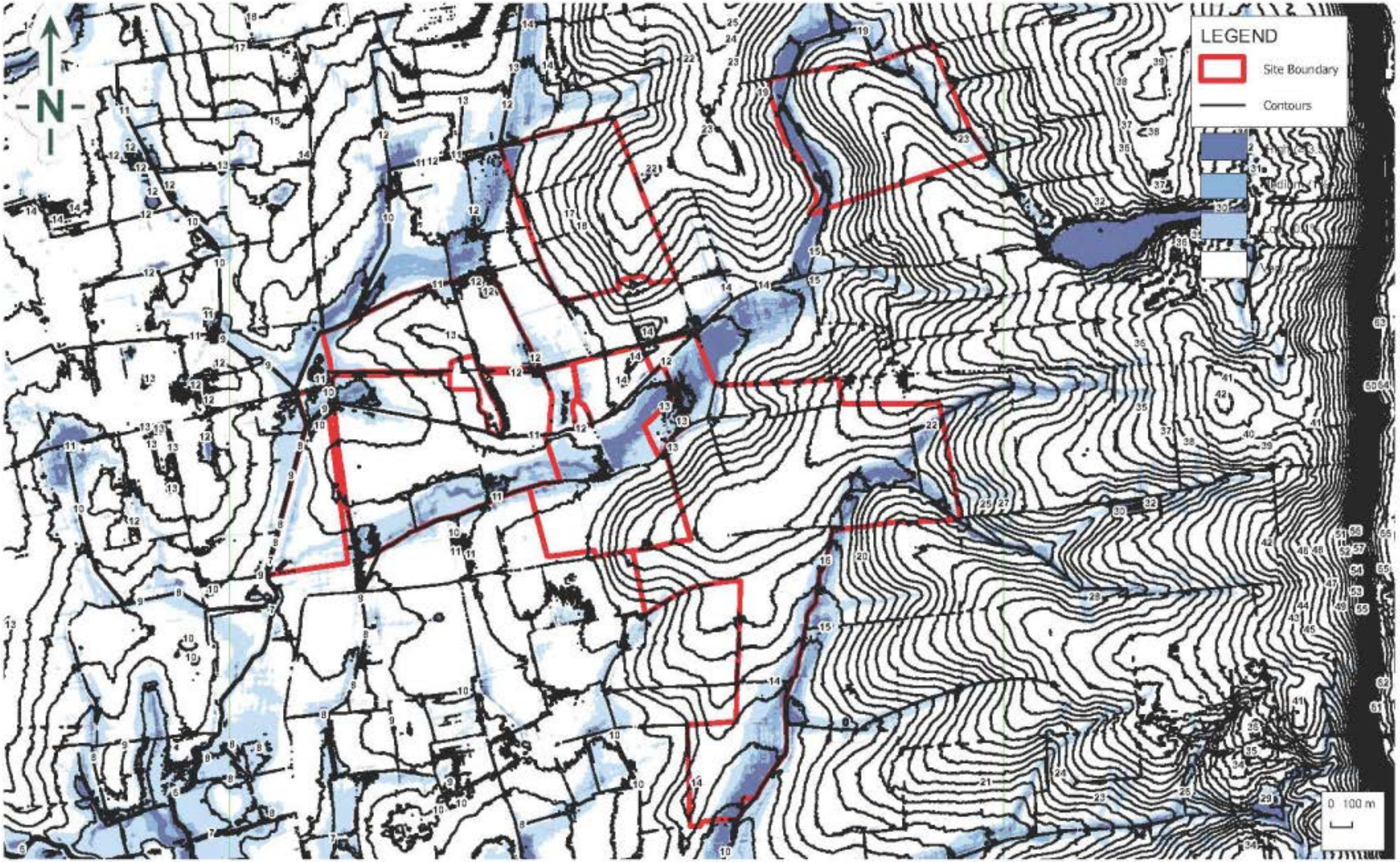
TITLE:
EA Flood Map for Planning
Cottam 1 (N) - Cottam Solar Project

DRAWN BY: EB	SCALE (@A3): 1:23,000	PROJECT NO: 21-1088.01
CHECKED BY: DP	VERSION: -	FIGURE NO:
DATE: 17 January 2022		

Annex D – EA Long Term Flood Risk Map (Surface Water)



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TITLE:
EA Long Term Flood Risk Map (Surface Water)
Cottam 1 (N) - Cottam Solar Project

DRAWN BY: EB	SCALE @ A3: 1:23,000	PROJECT NO: 21-1088.01
CHECKED BY: JR	VERSION: -	FIGURE NO:
DATE: 17 January 2022		

9.2 Flood Risk Screening Report – Cottam 1 (West)

Appendix C – Flood Risk Screening Assessment

Cottam 1 (West) – Cottam Solar Project

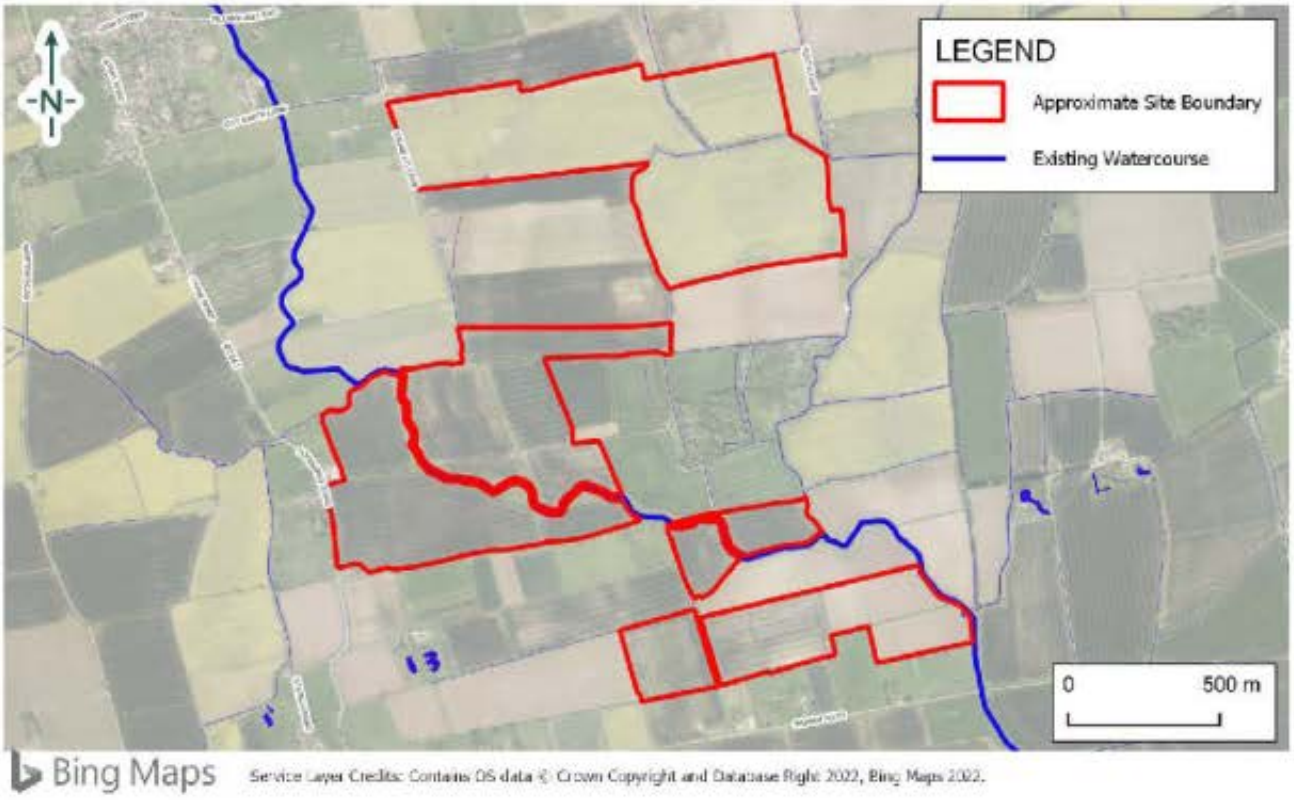
Presented to **Island Green Power**

Issued: January 2022

Delta-Simons Project No. 21-1088.01

1.0 Site Description

The aim of this section of the note is to outline key environmental information associated with the baseline environment.

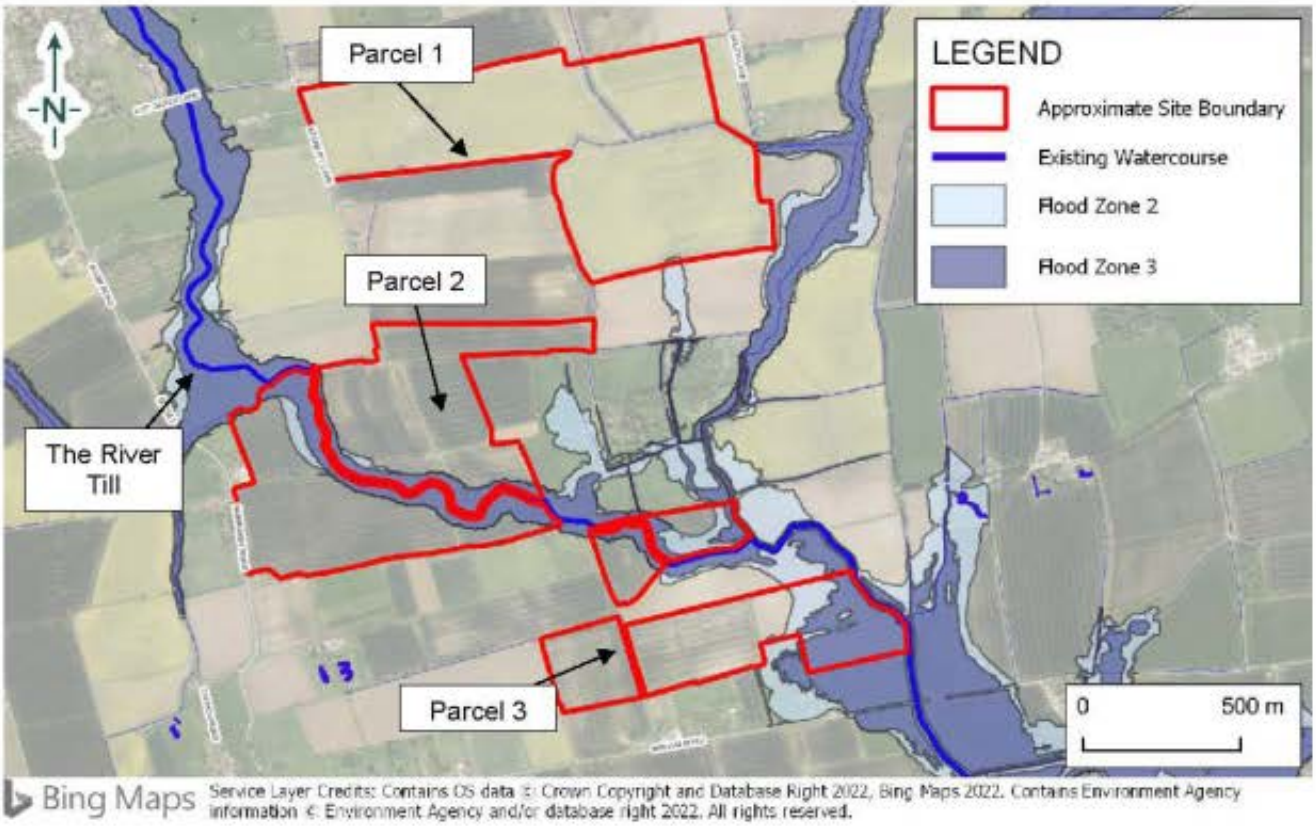


Illustrative Site Layout Plan			
Co-ordinates	Centred approximately at National Grid Reference 488996 , 383201	**Area** (approx.)	62 Ha
Site Location	The Site is located within a rural setting and comprises multiple parcels of agricultural fields, approximately 1.5 km north-east of the village of Stow.		
Topography	Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1 m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR ground elevation data shows that the Site slopes from approximately 15 m AOD in its eastern extent to approximately 7 m AOD in the south western corner. A LiDAR extract is included in Annex A.		

2.0 Flood Risk Screening Assessment

Fluvial Flood Risk

Figure 1: EA Flood Map for Planning



EA Online Flood Maps

The EA's Flood Risk Map for Planning indicates that Parcels 2 and 3 are located within Flood Zone 3.

Flood Zone 3 defined as land assessed as having a 1 in 100) or greater (>1% Annual Exceedance Probability annual probability of river flooding.

Fluvial risk across the is associated with the River Till (Main River – responsibility of the EA to maintain) which flows in a south-easterly direction through Parcels 2 and 3,

The EA's Historic Flood Map indicates that the Site has not been impacted by historic flooding.

The EA's Spatial Flood Defences dataset indicates that formal EA Flood Defences are present along the length of the River Till that runs through the Site. The defences are shown as 'embankments' on the dataset which upon inspection of Google StreetView appear to be raised grassy banks. The Standard of Protection (SoP) of the defence is shown as up to the 1 in 10 year event. The upstream crest level of the defence is stated as 10.45 m AOD and the downstream crest level as 8.41 m AOD.

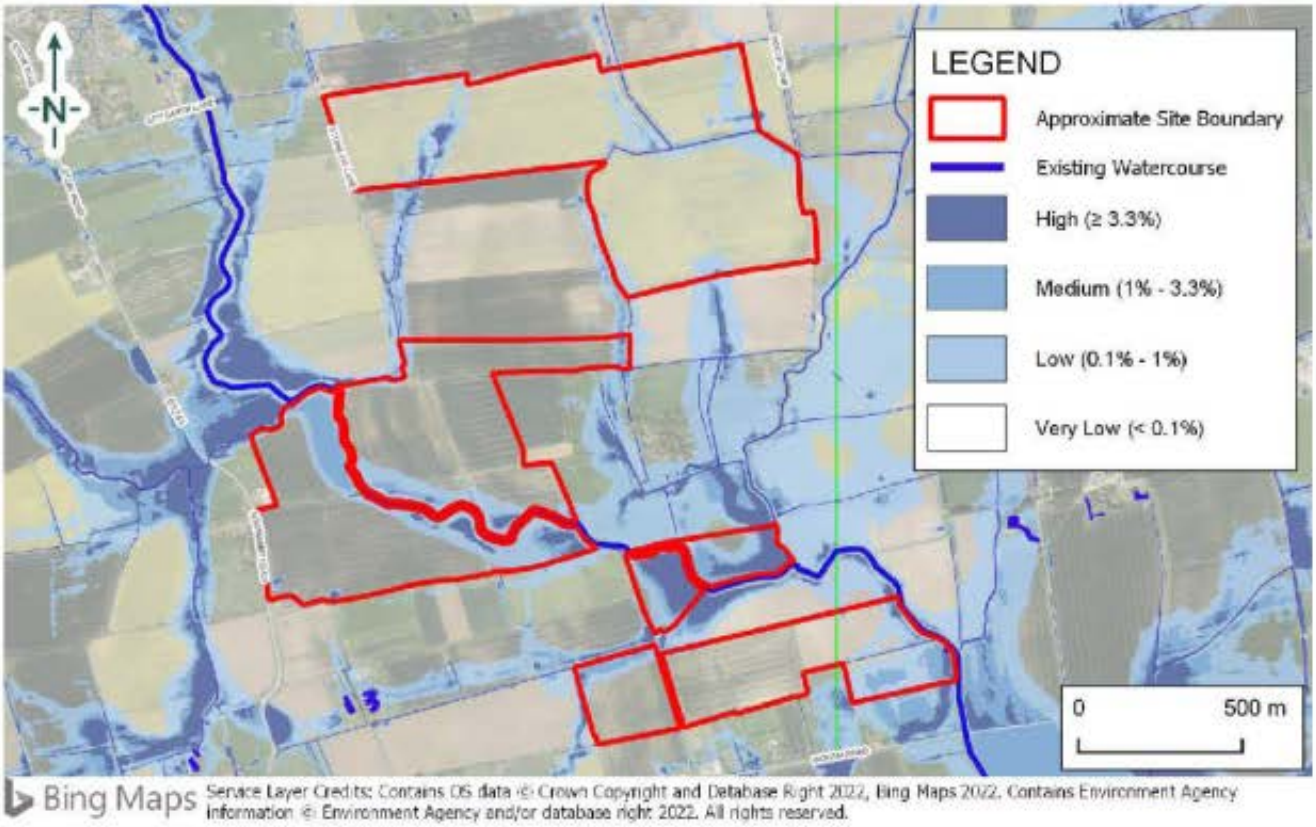
The Site is partly located within the Upper Witham Internal Drainage Board (IDB)[1].

It should be noted that all the flood maps are indicative and do not accurately take into account the impacts of climate change.

[1] Internal Drainage Board Map: https://www.ada.org.uk/idb-map/

Surface Water Risk

Figure 2: EA Long-Term Flood Risk Map (Surface Water)



EA Online Flood Maps

The EA's Long-Term Flood Risk Map indicates that Surface Water flooding with a High Risk (>3.3% Annual Probability) of occurrence is present across the Site.

Parcel 1 has High Risk areas associated with some land drains that cross the Parcel is the east and a topographical low point in the west. Parcels 2 and 3 have High Risk areas associated with the route of the River Till. There are multiple flow paths in the surrounding area that flow towards the Site.

Surface water flooding is indicative and typically difficult to predict as it depends on localised heavy rainfall, localised topography and the adequacy of the local drainage network.

Summary of Flood Risk

Flood Risk Status	Amber

Key Constraints

Fluvial Flood Risk associated with The River Till (Main River) and Surface Water Risk associated with land drains.

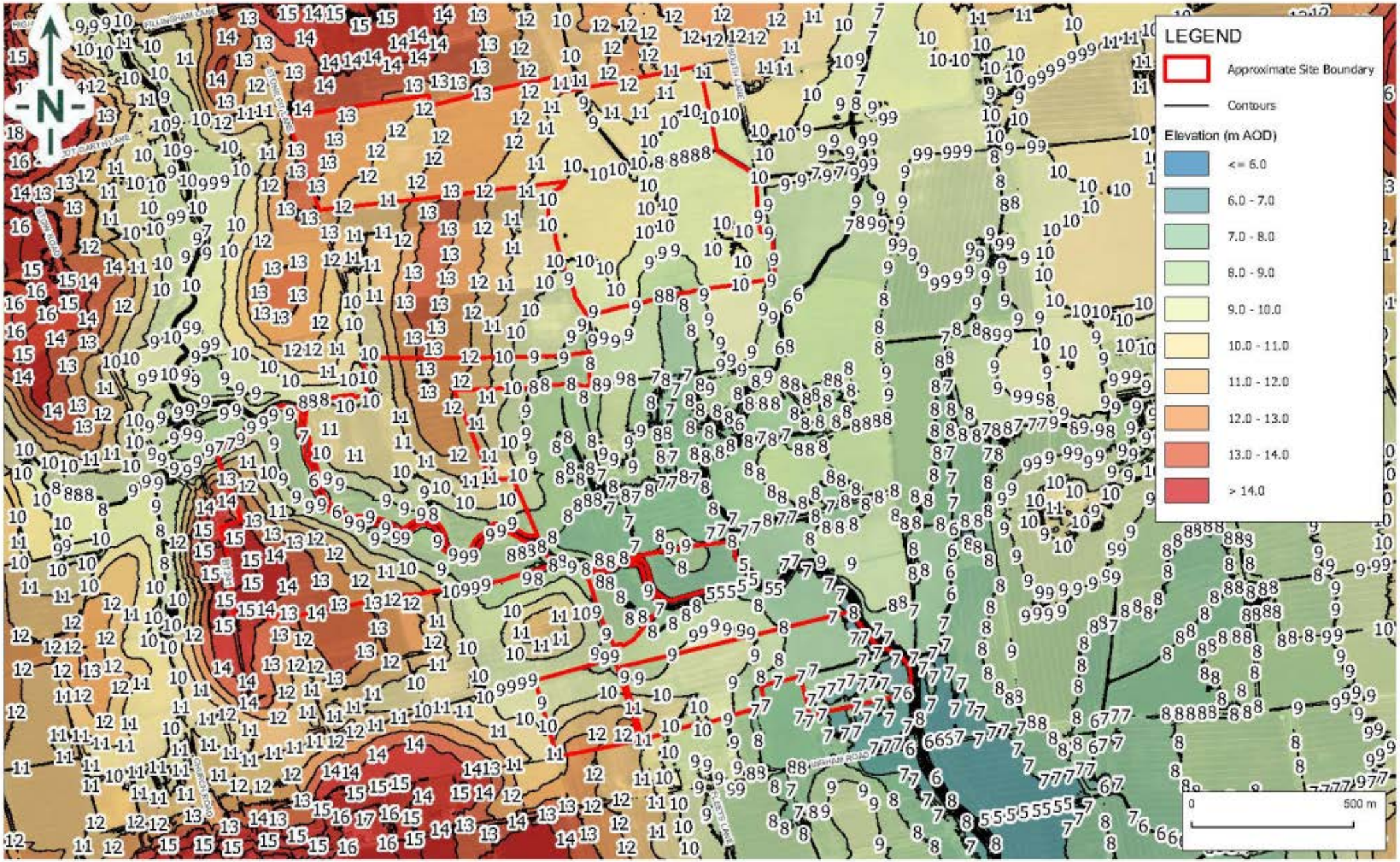
Next Steps

In order to fully inform the master planning and planning submission process the following works will be completed prior to completion of the Flood Risk Assessments:

- Obtain available EA flood data for the land drains and River Till;

- Determine Flood Depths / Levels and velocities where possible, based on the available information;
- Consult Stakeholders where necessary regarding the acceptable depth of flooding for equipment to be placed within.

Annex A – LiDAR Plan



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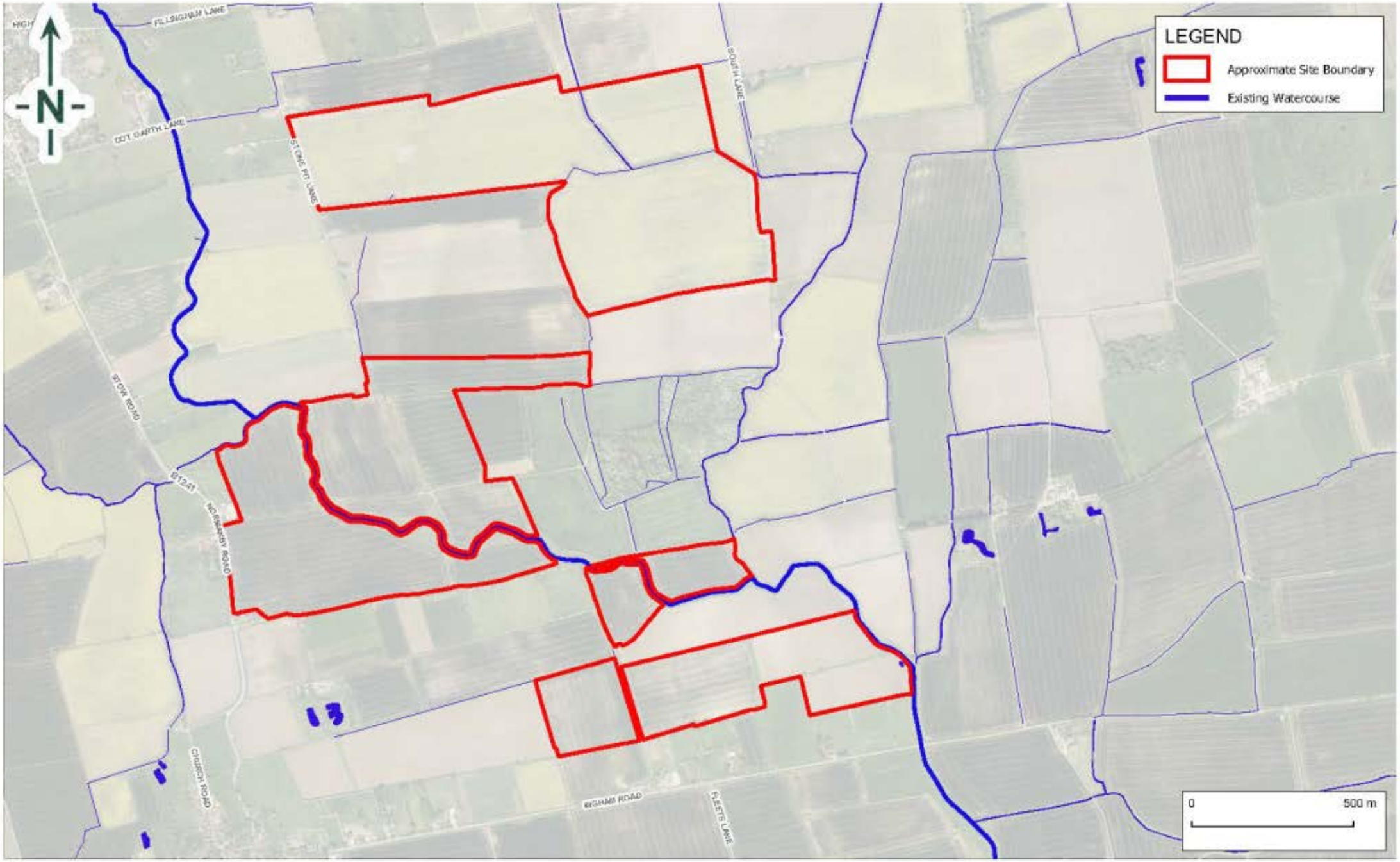
TITLE:
LiDAR Plan
Cottam 1 - West

DRAWN BY: EB	SCALE (@A3): 1:15,000	PROJECT NO: 21-1088.01
CHECKED BY: JR	COMMENTS: -	APPENDIX:
DATE: 17 January 2022		

Annex B – Overview

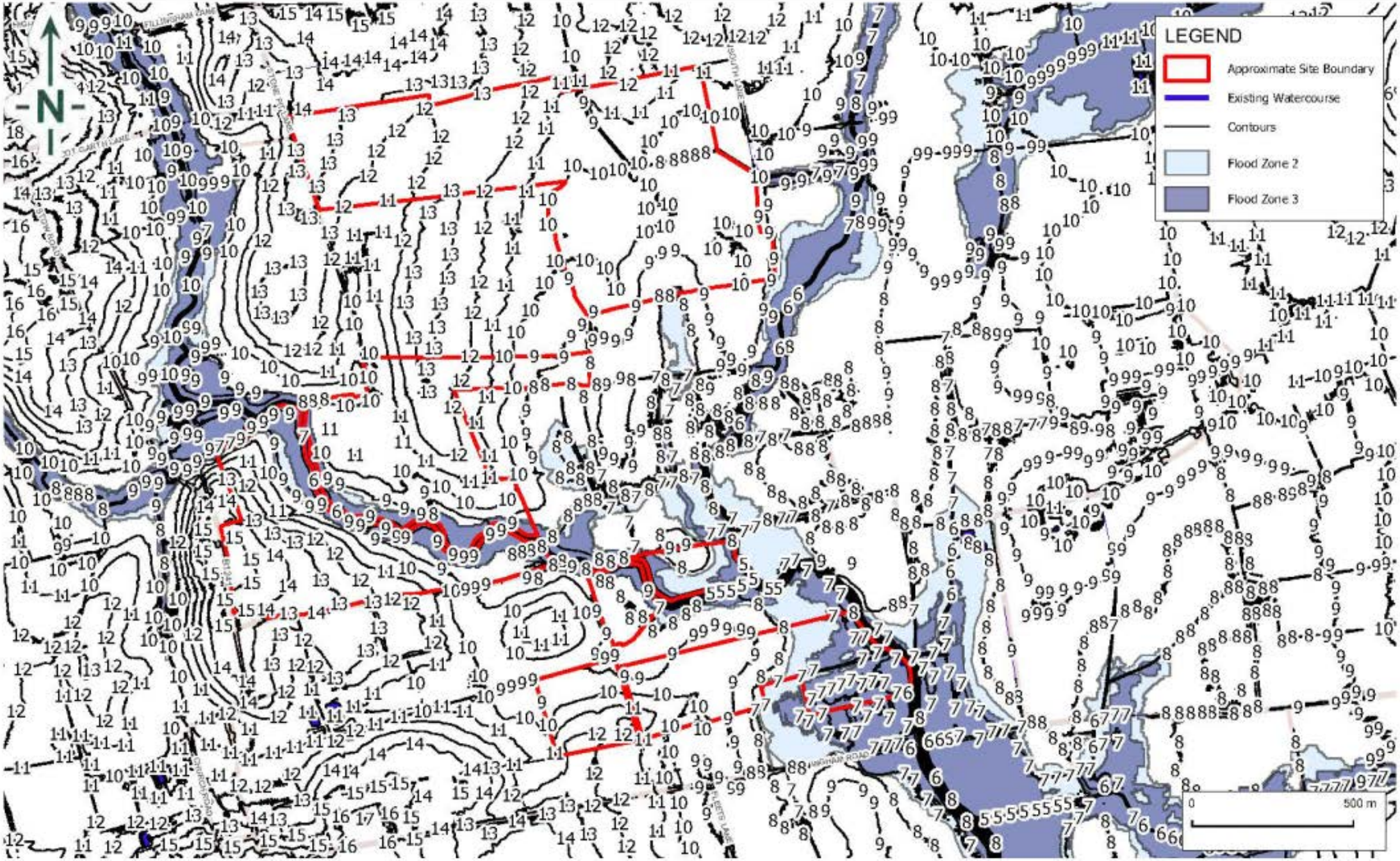


deltasimons
Environment - Health & Safety - Sustainability

TITLE:
Overview
Cottam 1 - West

DRAWN BY: EB	SCALE (@A3): 1:15,000	PROJECT NO: 21-1088.01
CHECKED BY: JR	REVISED: -	APPENDIX:
DATE: 17 January 2022		

Annex C – EA Flood Map for Planning



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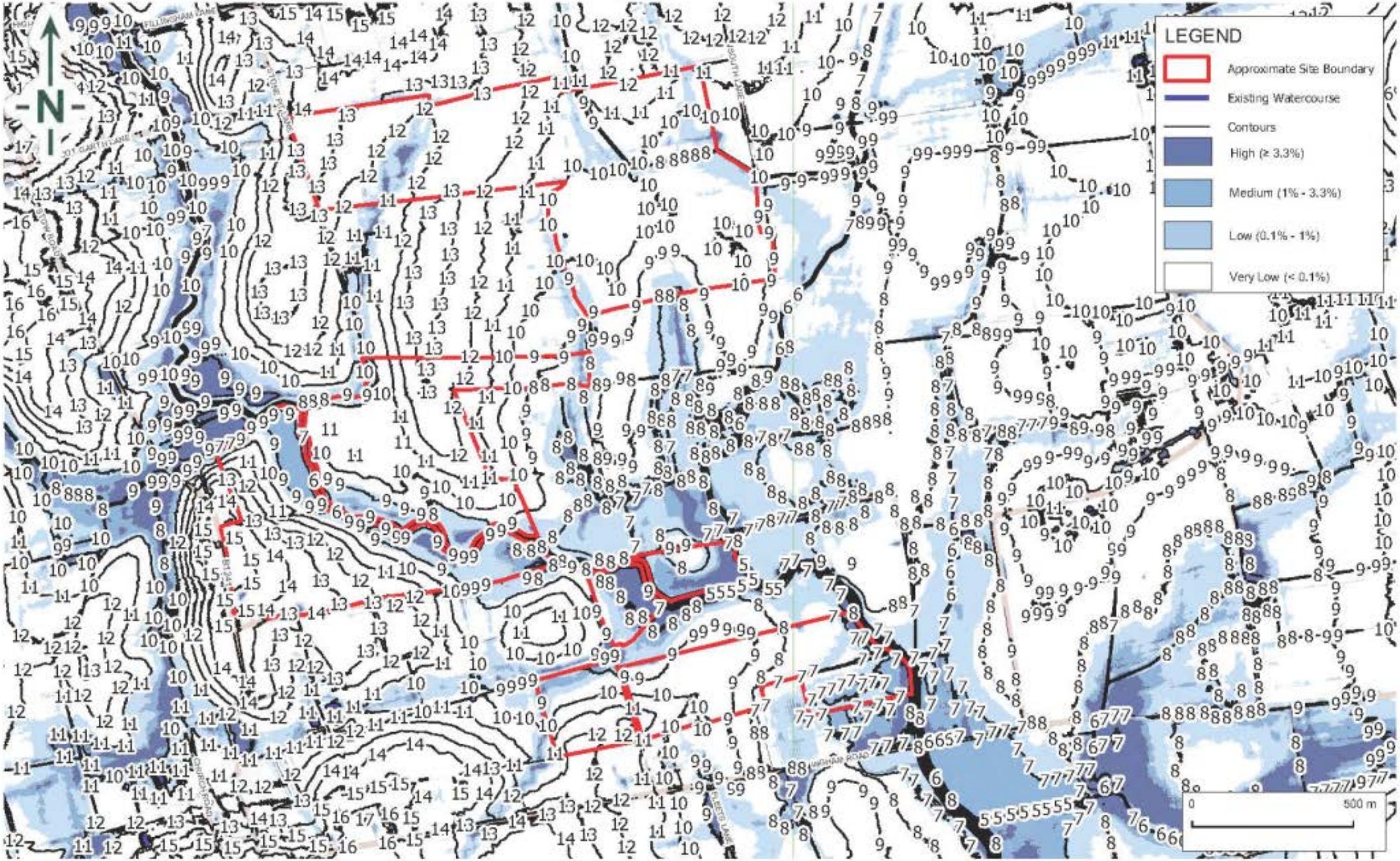
TITLE:
EA Flood Map for Planning
Cottam 1 - West

DRAWN BY: EB	SCALE @ A3: 1:15,000	PROJECT NO: 21-1088.01
CHECKED BY: JR	TORBAY: -	APPENDIX:
DATE: 17 January 2022		

Annex D – EA Long Term Flood Risk Map (Surface Water)



deltasimons
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TITLE:
EA Long Term Flood Risk Map (Surface Water)
Cottam 1 - West

DRAWN BY: EB	SCALE (@A3): 1:15,000
CHECKED BY: JR	VERSION: -
DATE: 17 January 2022	

PROJECT NO: 21-1088.01
APPENDIX:

9.3 Flood Risk Screening Report – Cottam 1 (South)

Appendix D – Flood Risk Screening Assessment

Cottam 1 (South) – Cottam Solar Project

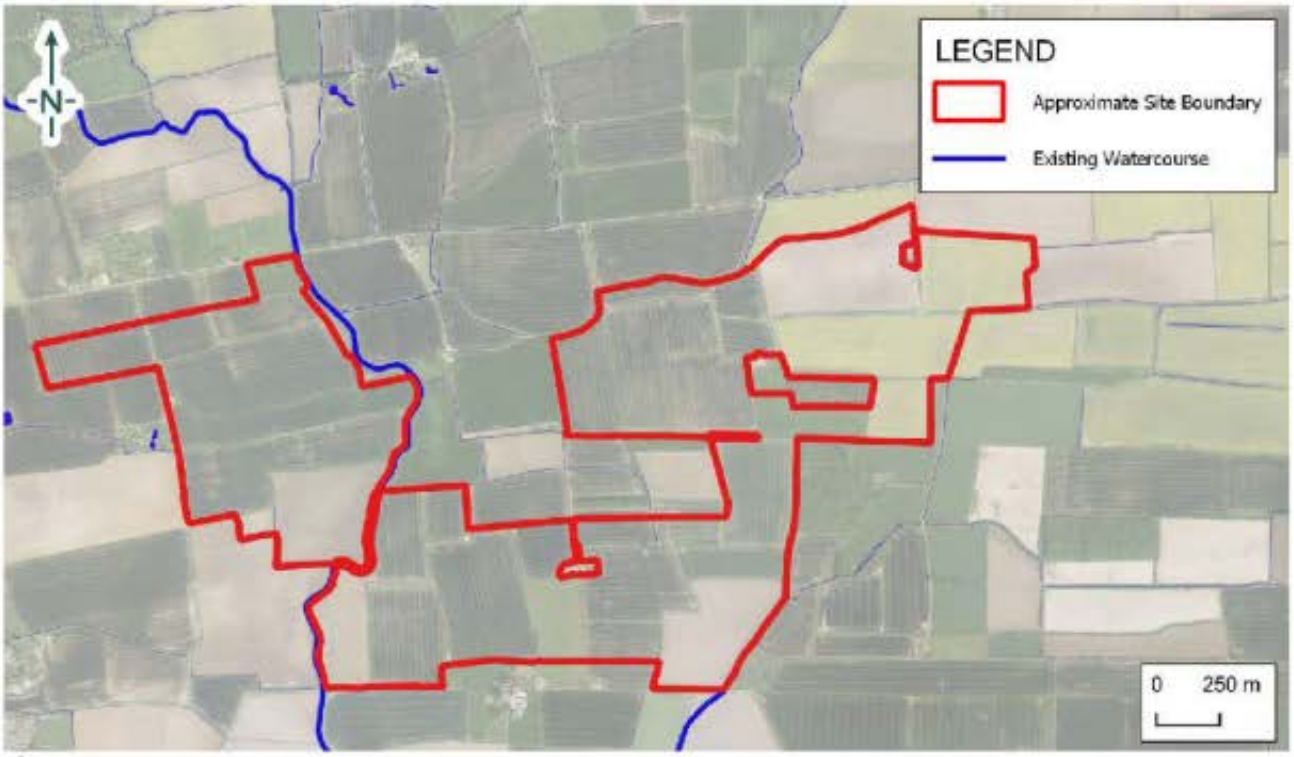
Presented to **Island Green Power**

Issued: January 2022

Delta-Simons Project No. 21-1088.01

1.0 Site Description

The aim of this section of the note is to outline key environmental information associated with the baseline environment.

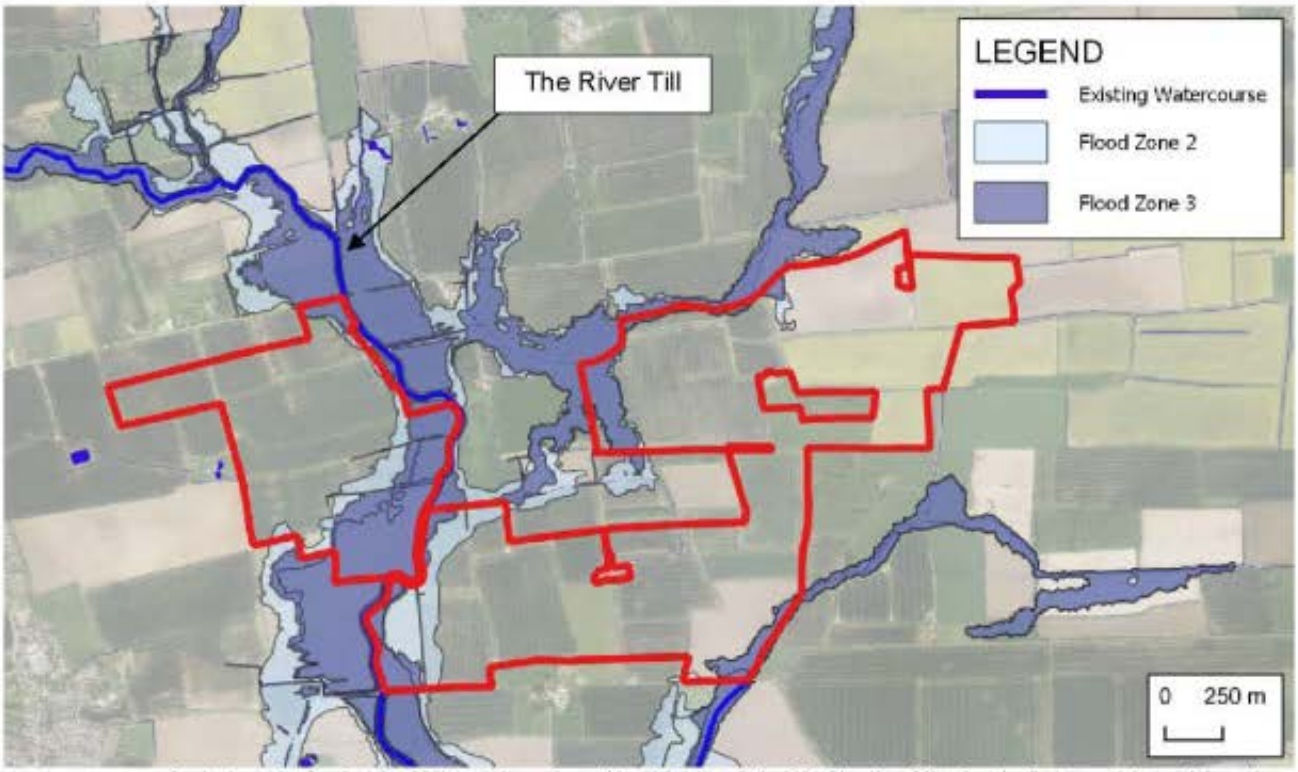


Illustrative Site Layout Plan			
Co-ordinates	Centred approximately at National Grid Reference 491009 , 381236	**Area** (approx.)	321 Ha
Site Location	The Site is located within a rural setting and comprises multiple parcels of agricultural fields, approximately 4.4 km south-west of the village of Ingham and 2 km east of the village of Sturton-on-Stow.		
Topography	Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1 m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR ground elevation data shows that the Site slopes from approximately 13 m AOD in the east, west and southern peripheries to approximately 6 m AOD within the western extent which the River Till runs through. A LiDAR extract is included in Annex A.		

2.0 Flood Risk Screening Assessment

Fluvial Flood Risk

Figure 1: EA Flood Map for Planning



EA Online Flood Maps

The EA's Flood Risk Map for Planning indicates that the northern, western and a minor portion of the south-eastern extent of the Site are within Flood Zone 3.

Flood Zone 3 defined as land assessed as having a 1 in 100) or greater (>1% Annual Exceedance Probability annual probability of river flooding.

Fluvial risk across the is associated with the River Till (Main River – responsibility of the EA to maintain) which flows southwards through the Site, the risk extents along some land drains in the north of the Site. The South Spinney/Beck Spinney is an Ordinary Watercourse (responsibility of the LLFA to maintain) and runs along the part of the south-eastern Site boundary.

The EA's Historic Flood Map (Annex E) indicates that the south-western corner has been historically flooded along the River Till. The dataset indicates that the flood occurred in November 2019 due to 'overtopping of defences'.

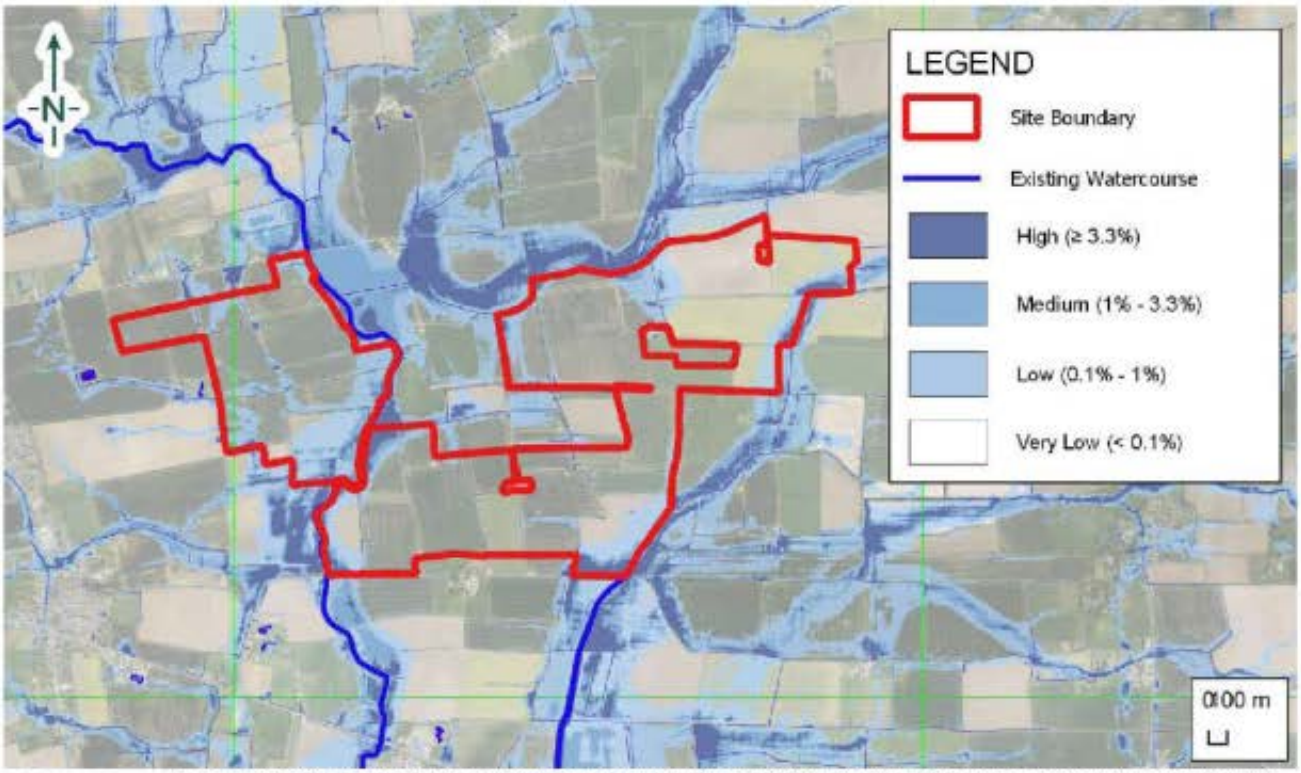
The EA's Spatial Flood Defences dataset indicates that formal EA Flood Defences are present along the length of the River Till that runs through the Site. The defences are shown as 'embankments' on the dataset which upon inspection of Google Streetview appear to be raised grassy banks. The Standard of Protection (SoP) of the defence is shown as up to the 1 in 10 year event. The upstream crest level of the defence is stated as 7.62 m AOD and the downstream crest level as 7.20 m AOD.

The Site is partly located within the Upper Witham Internal Drainage Board (IDB).

It should be noted that all the flood maps are indicative and do not accurately consider the impacts of climate change.

Surface Water Risk

Figure 2: EA Long-Term Flood Risk Map (Surface Water)



EA Online Flood Maps

The EA's Long-Term Flood Risk Map indicates that Surface Water flooding with a High Risk (>3.3% Annual Probability) of occurrence is present across the western and eastern extents of the Site.

The surface water extents shown on the EA Flood Map concur with the course of the watercourses that run through the west of the Site and along the eastern periphery.

Surface water flooding is indicative and typically difficult to predict as it depends on localised heavy rainfall, localised topography and the adequacy of the local drainage network.

Summary of Flood Risk

Flood Risk Status	Amber

Key Constraints

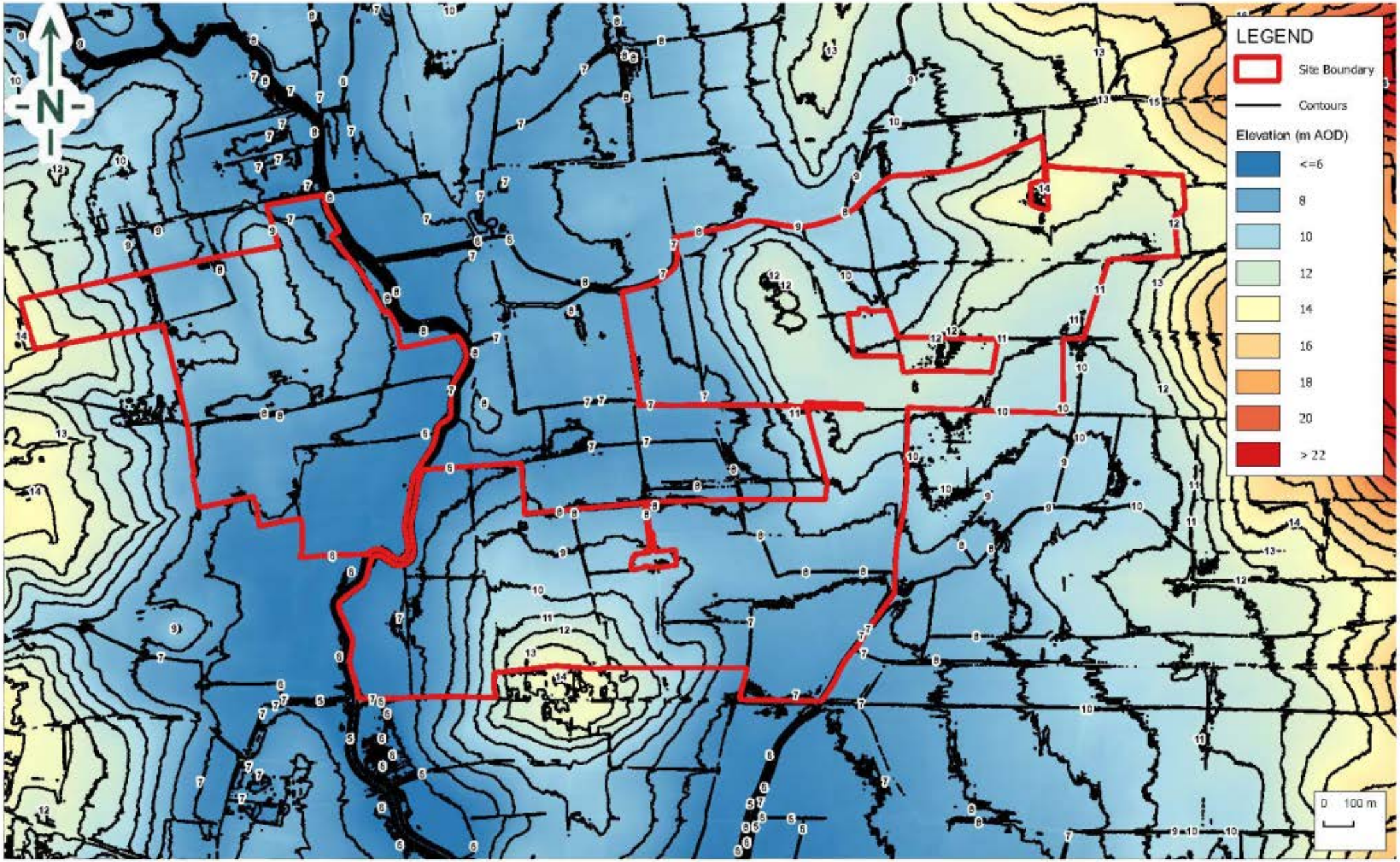
Fluvial and Surface Water Risk Flood Risk associated with The River Till (Main River), South Spinney/Beck Spinney (Ordinary Watercourse) and land drains.

Next Steps

In order to fully inform the masterplanning and planning submission process the following works will be completed prior to completion of the Flood Risk Assessments:

- Obtain available EA flood data for the land drains and River Till;
- Determine Flood Depths / Levels and velocities where possible, based on the available information;
- Consult Stakeholders where necessary regarding the acceptable depth of flooding for equipment to placed within.

Annex A – LiDAR Plan



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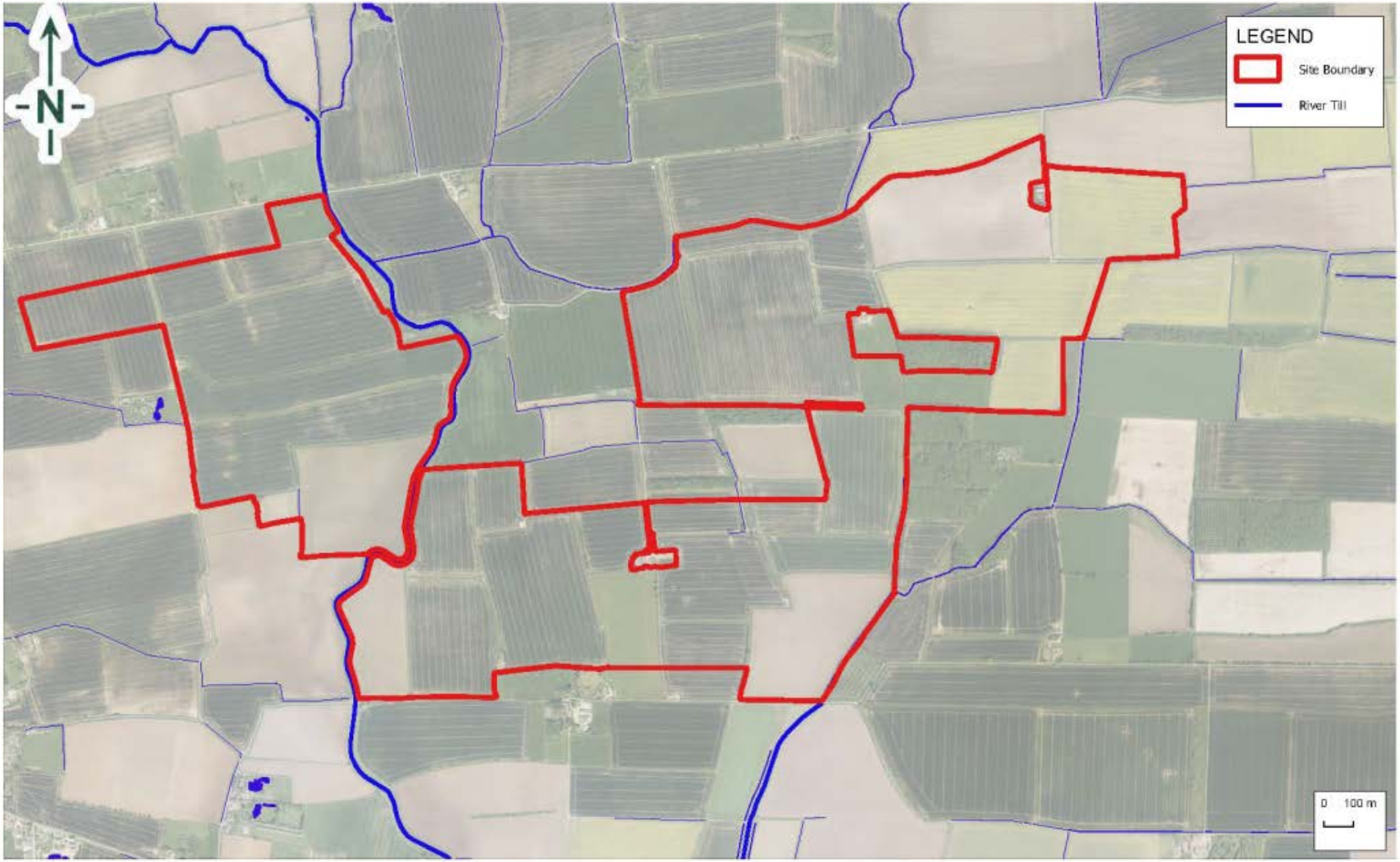
TITLE:
LiDAR pan
Cottam 1 (S) - Cottam Solar Project

DRAWN BY: EB	SCALE (@A3): 1:16,500	PROJECT NO: 21-1088.01
CHECKED BY: JR	REVISION: -	FIGURE NO:
DATE: 17 January 2022		

Annex B – Overview



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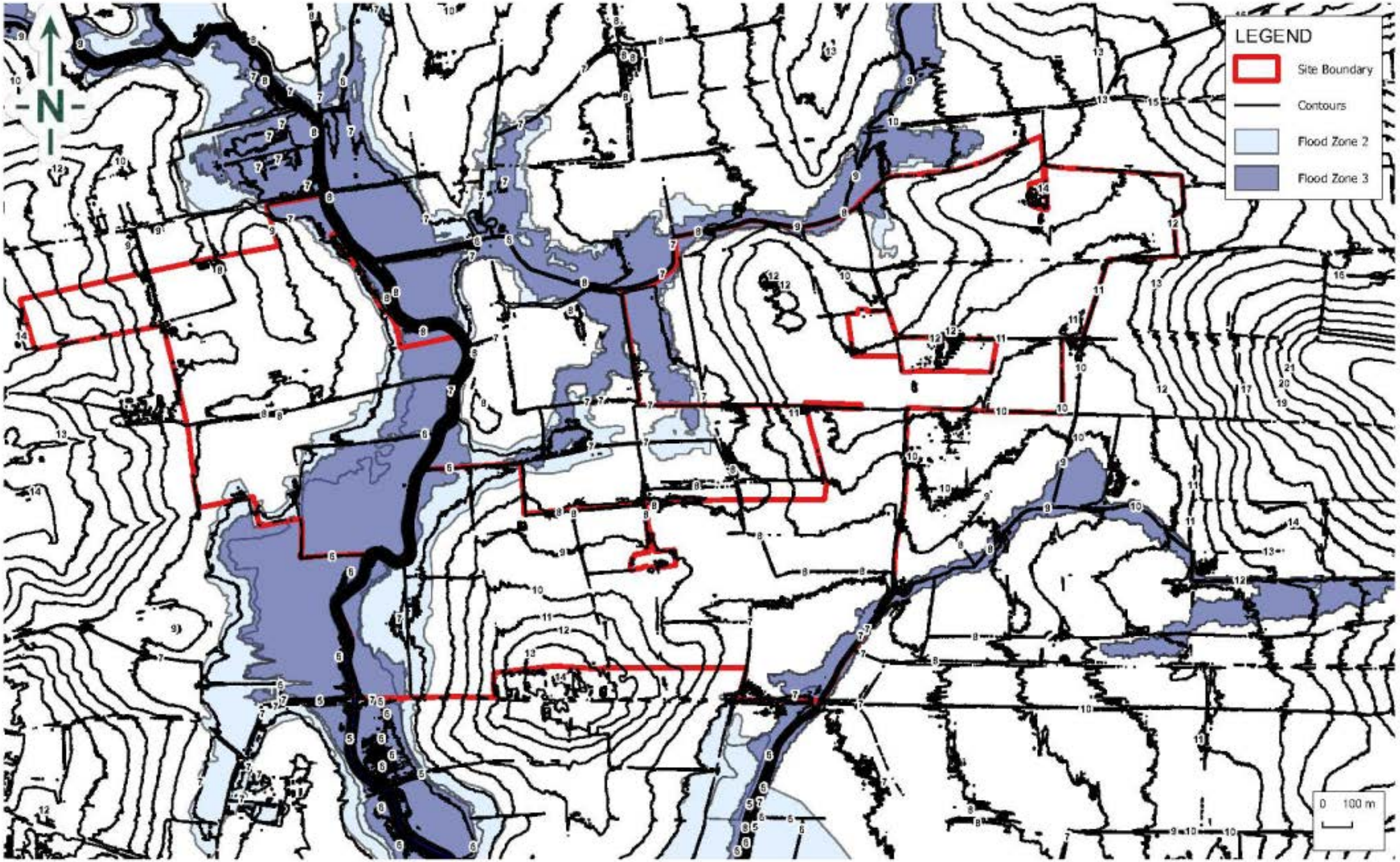
TITLE:
Overview
Cottam 1 (S) - Cottam Solar Project

DRAWN BY: EB	SCALE (@A3): 1:16,500	PROJECT NO: 21-1088.01
CHECKED BY: JR	REVISED: -	FIGURE NO:
DATE: 17 January 2022		

Annex C – EA Flood Map for Planning



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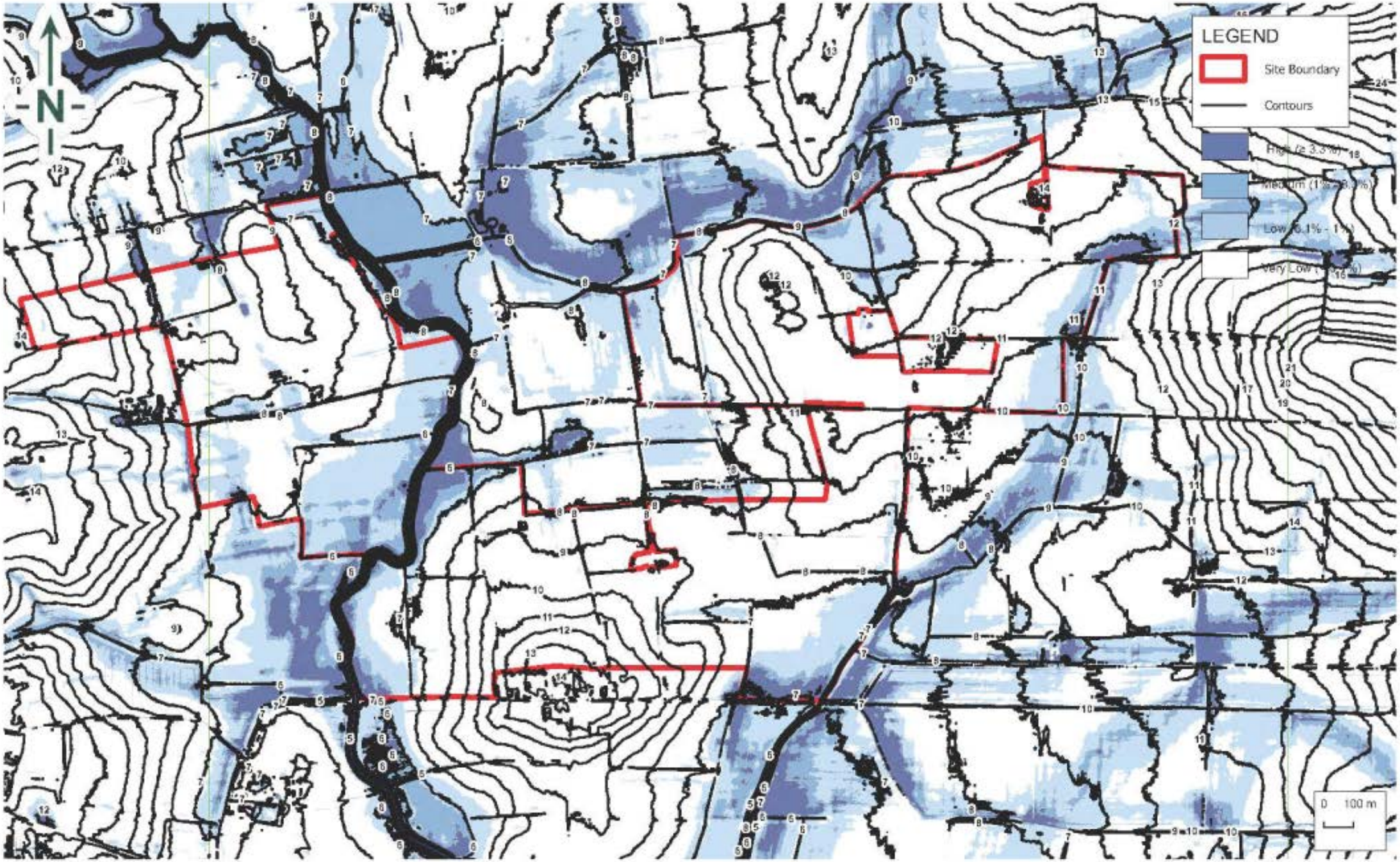
TITLE:
EA Flood Map for Planning
Cottam 1 (S) - Cottam Solar Project

DRAWN BY: EB	SCALE @ A3: 1:16,500	PROJECT NO: 21-1088.01
CHECKED BY: JR	VERSION: -	FIGURE NO:
DATE: 17 January 2022		

Annex D – EA Long Term Flood Risk Map (Surface Water)



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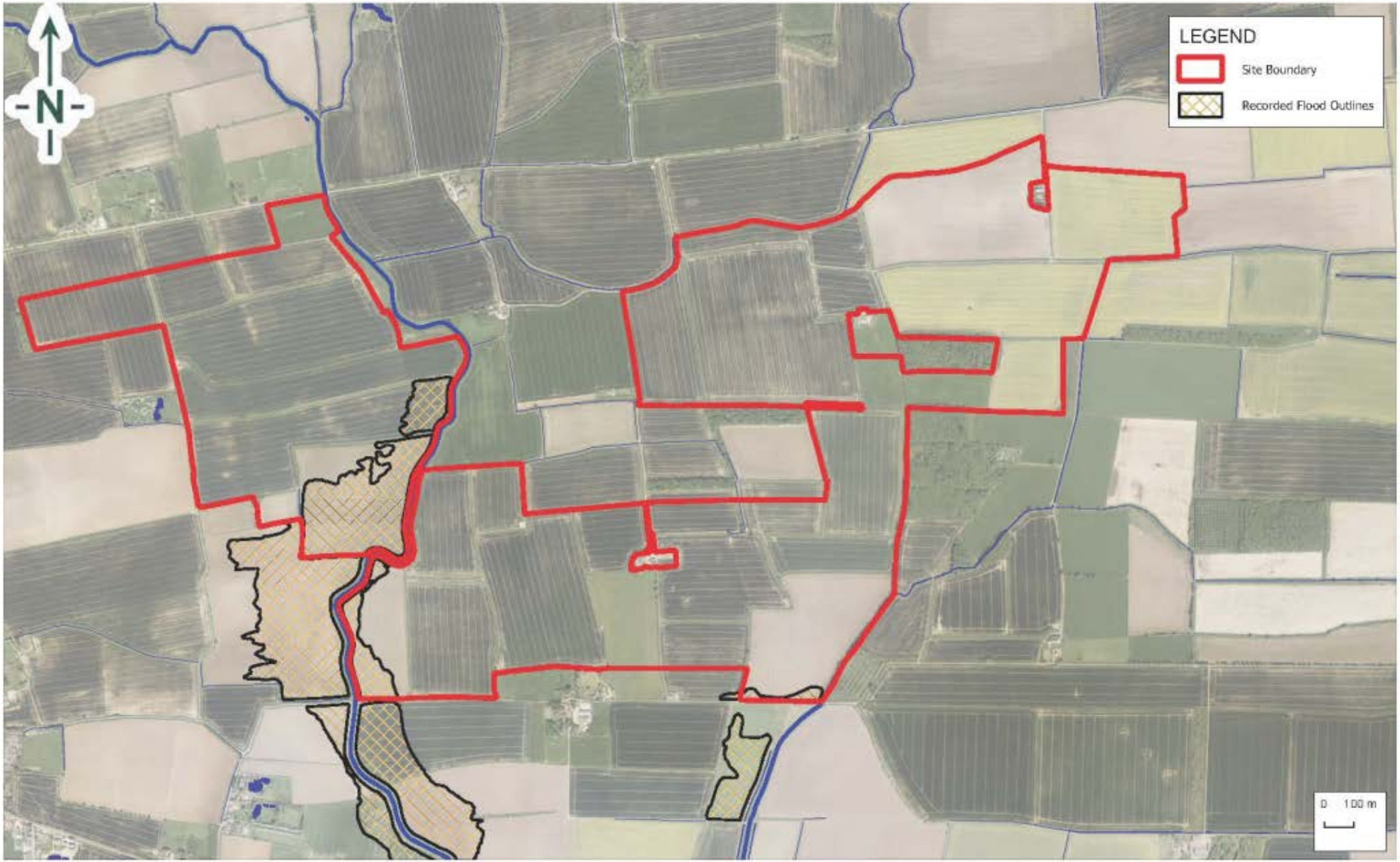
TITLE:
EA Long Term Flood Risk Map (Surface Water)
Cottam 1 (S) - Cottam Solar Project

DRAWN BY: EB	SCALE @ A3: 1:16,500	PROJECT NO: 21-1088.01
CHECKED BY: JR	VERSION: -	FIGURE NO:
DATE: 17 January 2022		

Annex E – EA's Historic Flood Map



deltasimons
Environment - Health & Safety - Sustainability

TITLE:
Overview
Cottam 1 (S) - Cottam Solar Project

Drawn by: EB	Scale @ A3: 1:16,500
Checked by: JR	Version: -
DATE: 17 January 2022	

PROJECT NO: 21-1088.01
FIGURE NO:

9.4 Flood Risk Screening Report – Cottam 2

Appendix E – Flood Risk Screening Assessment

Cottam 2 – Cottam Solar Project

Presented to **Island Green Power**

Issued: January 2022

Delta-Simons Project No. 21-1088.01

1.0 Introduction

1.1 Appointment

Delta-Simons Environmental Consultants Limited ("Delta-Simons") was instructed by Island Green Power (the "Client") to undertake a Flood Risk Screening Assessment (FRSA) of Cottam 2 (the Site).

1.2 Context & Purpose

On the Environment Agency (EA) Flood Map for Planning, the Site is shown to encroached by Flood Zone 3 (High Probability), which is defined as land assessed as having greater than a 1 in 100 chance (>1%) of flooding from rivers in any given year.

The Client has therefore requested a Flood Risk Screening Assessment is prepared to assess the Site's suitability for the proposed solar farm development.

1.3 Scope of Works

The scope of works has been as follows:

- Build a bespoke semi-automated model utilising GIS software, identifying the flood risks at each Site using EA flood datasets;
- Identify key constraints at the Site and apply Red, Amber, Green (RAG) status of Sites to be assessed further;
- Produce bespoke flood maps for each Site highlighting the flood extents, watercourses, surface water features and Site terrain / contours;
- Present findings for all Sites within FRSA Reports; and
- Utilise the screening to inform detailed proposals for the Flood Risk Assessments and Drainage Strategies

1.4 Sources of Information

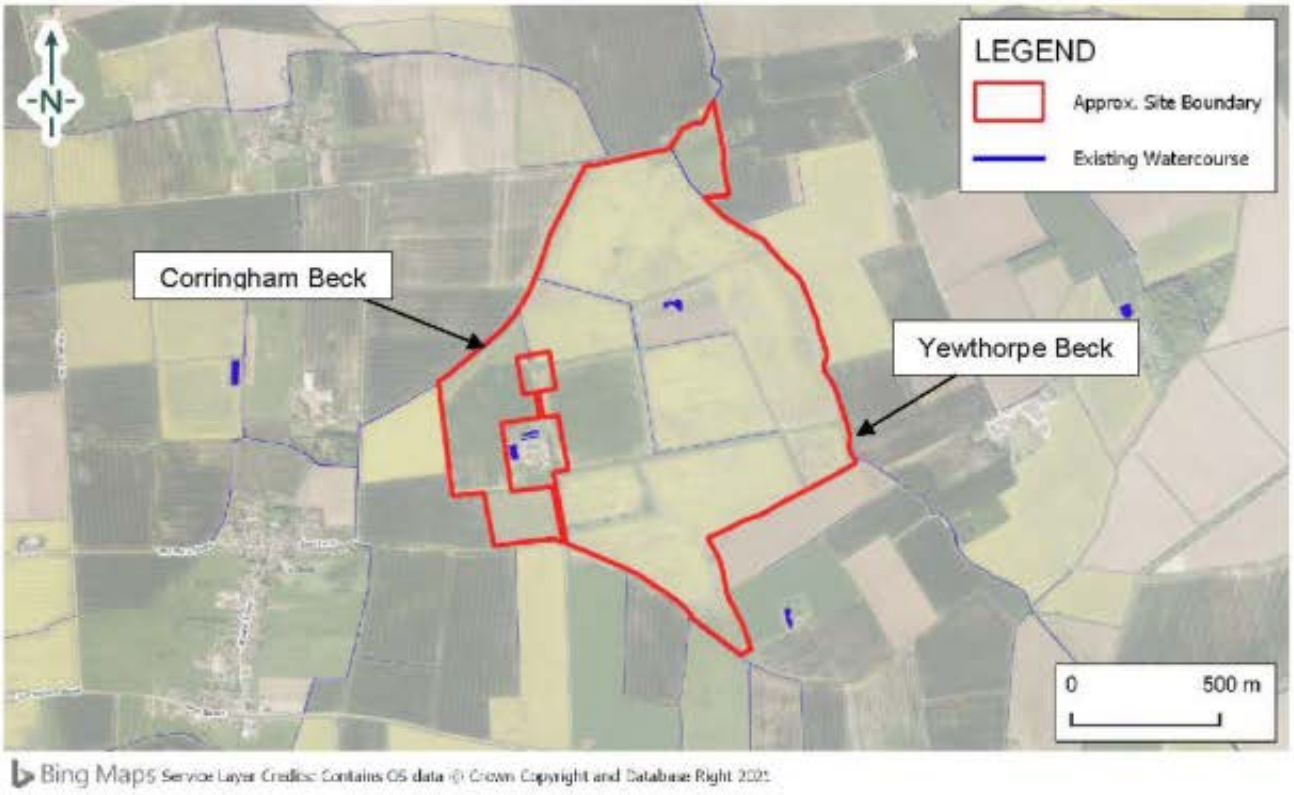
The following sources of information have been reviewed and assessed:

- Environment Agency online Flood Maps[1];
- British Geological Society (BGS) Interactive Map[2];
- MAGIC Interactive Map[3];

1 https://flood-map-for-planning.service.gov.uk/
2 http://mapapps.bgs.ac.uk/geologyofbritain/home.html
3 http://www.magic.gov.uk/

2.0 Site Description

The aim of this section of the note is to outline key environmental information associated with the baseline environment.

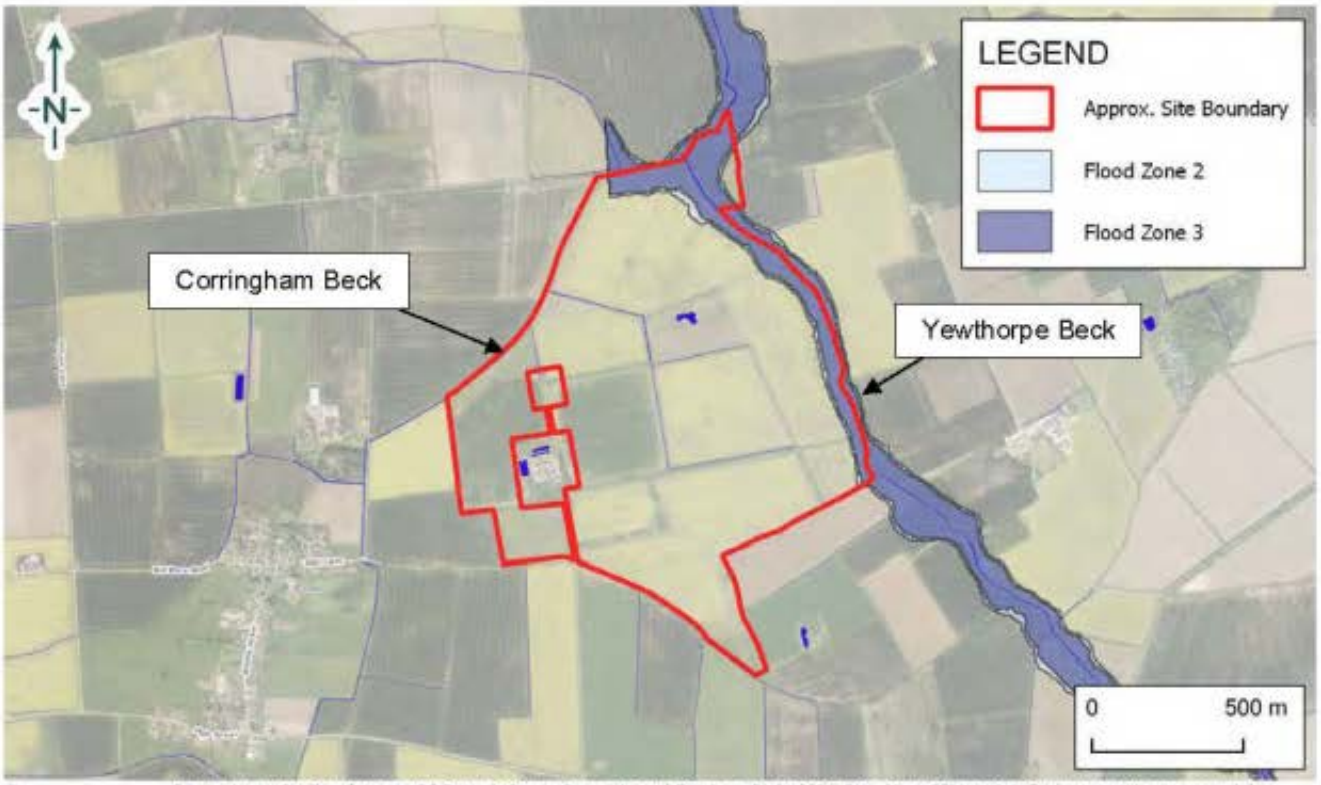


Illustrative Site Layout Plan			
Co-ordinates	Centred approximately at National Grid Reference 488333, 392155	**Area** (approx.)	132.69 Ha
Site Location	The Site is located within a rural setting and comprises multiple parcels of agricultural fields, approximately 500 m north-east of the village of Corringham.		
Topography	Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1 m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR ground elevation data shows that the Site slopes from approximately 16 - 18 m AOD in centre of the Site to approximately 13 - 16 m AOD in the east and west perimeters where the two watercourses are situated. A LiDAR extract is included in Annex B.		

3.0 Flood Risk Screening Assessment

Fluvial Flood Risk

Figure 1: EA Flood Map for Planning



EA Online Flood Maps

The EA's Flood Risk Map for Planning indicates that the north and eastern boundary of the Site are enriched by Flood Zone 3. Flood Zone 3 defined as land assessed as having a 1 in 100) or greater (>1% Annual Exceedance Probability annual probability of river flooding. The remainder of the Site is of Low Risk in Flood Zone 1.

The flood risk area is associated with Yewthorpe Beck (Ordinary Watercourse – responsibility of the LLFA to maintain) that runs down the perimeter of the East of the Site. Therefore, fluvial flooding could occur if the Yewthorpe Beck overtopped or breached its banks during or following an extreme rainfall event.

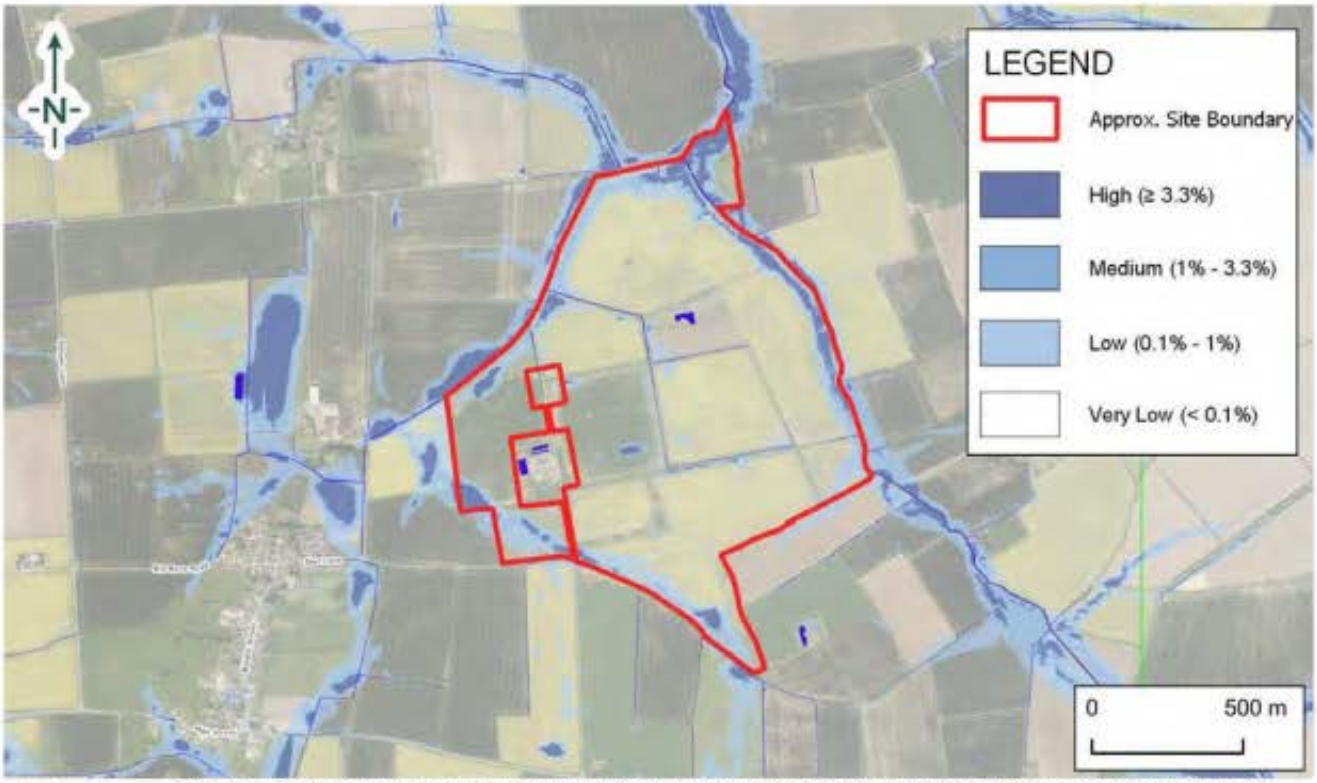
The Site is not located within a Flood Warning Area or Flood Alert Area and has not previously flooded based on the EA's Historic Flood Map.

The EA's Spatial Flood Defences Dataset indicates that there are no flood defences present within the vicinity of the Site.

It should be noted that all the flood maps are indicative and does not consider the impacts of climate change.

Surface Water Risk

Figure 2: EA Long-Term Flood Risk Map (Surface Water)



EA Online Flood Maps

The EA's Long-Term Flood Risk Map indicates that Surface Water flooding with a High Risk (>3.3% Annual Probability) of occurrence is present across the boundaries of the Site, predominantly surrounding the north, east and west. The Site shows little surface water risk within the boundaries, aside from a small parcel within the centre of the site which is shown to be a Medium Risk (1% - 3.3%).

The surface water extents shown on the EA's Long-Term Flood Risk Map largely concur with the Flood outlines shown on the EA Flood Map for Planning associated with the Ordinary Watercourses that runs to the east and west of the Site; Yewthorpe Beck and Corringham Beck. The risk is not likely to impact the main extents of the Site, as the topography ranges from 16 – 18 m AOD within the Site's boundaries, as opposed to 13 – 16 m AOD where the watercourses are situated.

Surface water flooding is indicative and typically difficult to predict as it depends on localised heavy rainfall, localised topography and the adequacy of the local drainage network.

Summary of Flood Risk

Flood Risk Status	Green

Key Constraints

Fluvial and Surface Water Risk Flood Risk associated with Ordinary Watercourses Yewthorpe Beck and Corringham Beck which flow on the boundaries in the East and West of the Site.

Next Steps
In order to fully inform the masterplanning and planning submission process the following works will be completed prior to completion of the Flood Risk Assessments: ▲ Obtain available EA flood data for the Ordinary Watercourses; ▲ Determine Flood Depths / Levels and velocities where possible, based on the available information; ▲ Consult Stakeholders where necessary regarding the acceptable depth of flooding for equipment to be placed within.

Annex A – Limitations

Limitations

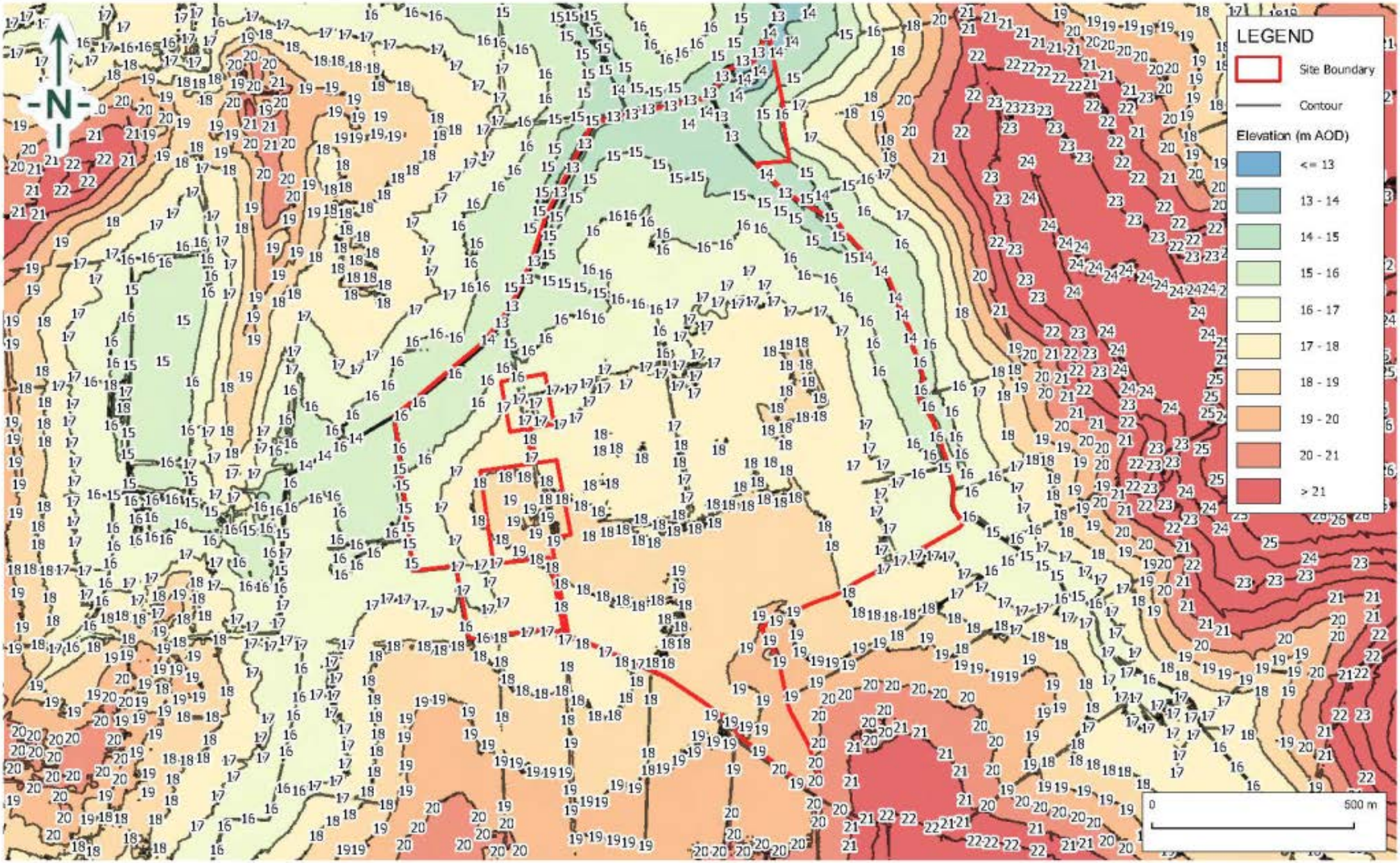
The recommendations contained in this Report represent Delta-Simons professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Delta-Simons does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Delta-Simons obtained, reviewed and evaluated information in preparing this Report from the Client and others. Delta-Simons conclusions, opinions and recommendations has been determined using this information. Delta-Simons does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which Delta-Simons has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

This Report was prepared by Delta-Simons for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. In particular, Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

The EA Climate Change Guidance was updated in 2016, therefore it is possible that the data shown on the EA Flood Map for Planning and the EA Long-Term Map does not consider the implications of climate change. For Sites on the periphery of defended areas and or in close proximity to Flood Zone 3, further work may be required to determine the flood risk more accurately.

Annex B – LiDAR Plan



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TITLE:
LiDAR Plan
Cottam 2 - Cottam Solar Project

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Annex C – Overview

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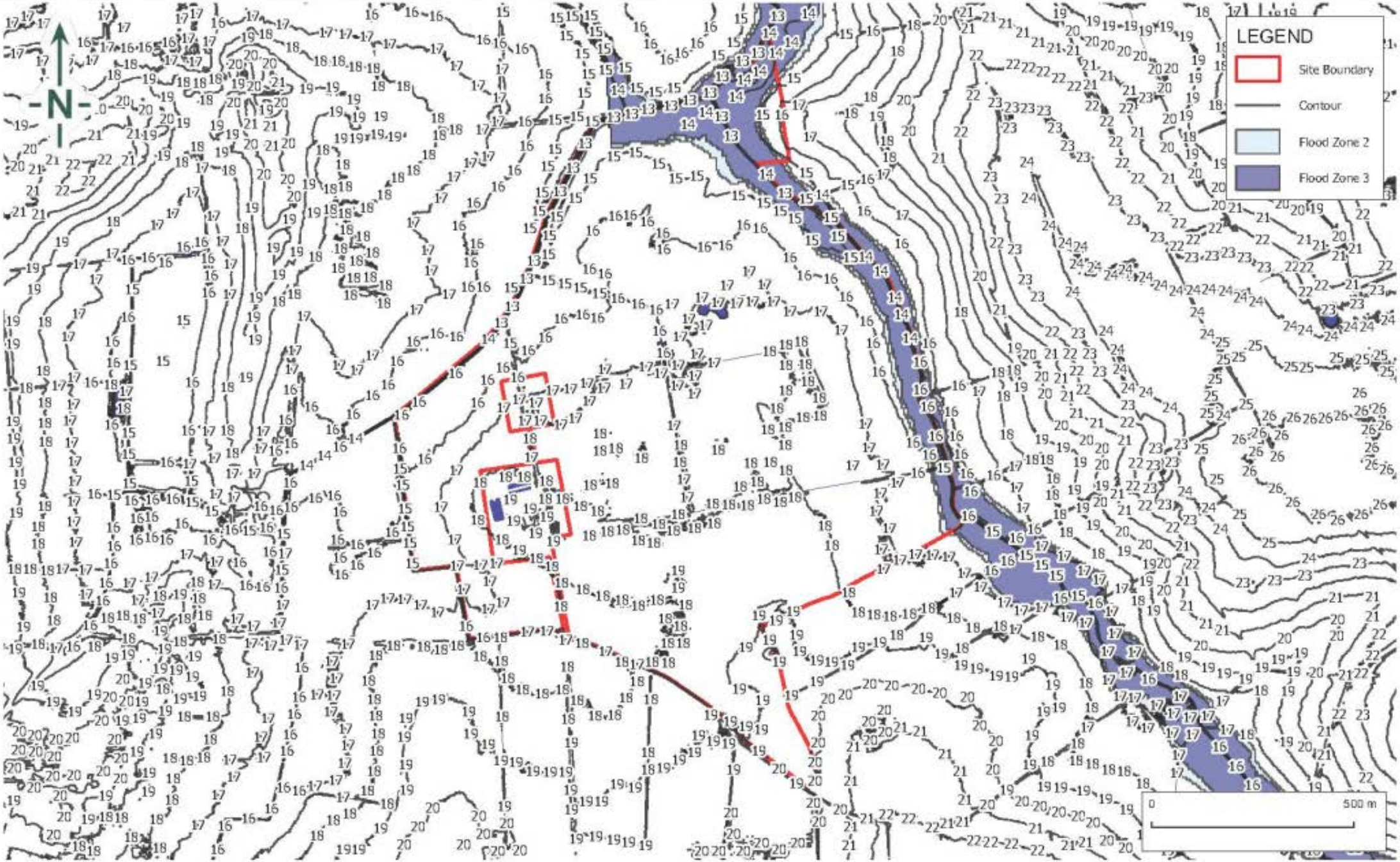
Annex D – EA Flood Map for Planning



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EA Flood Map for Planning
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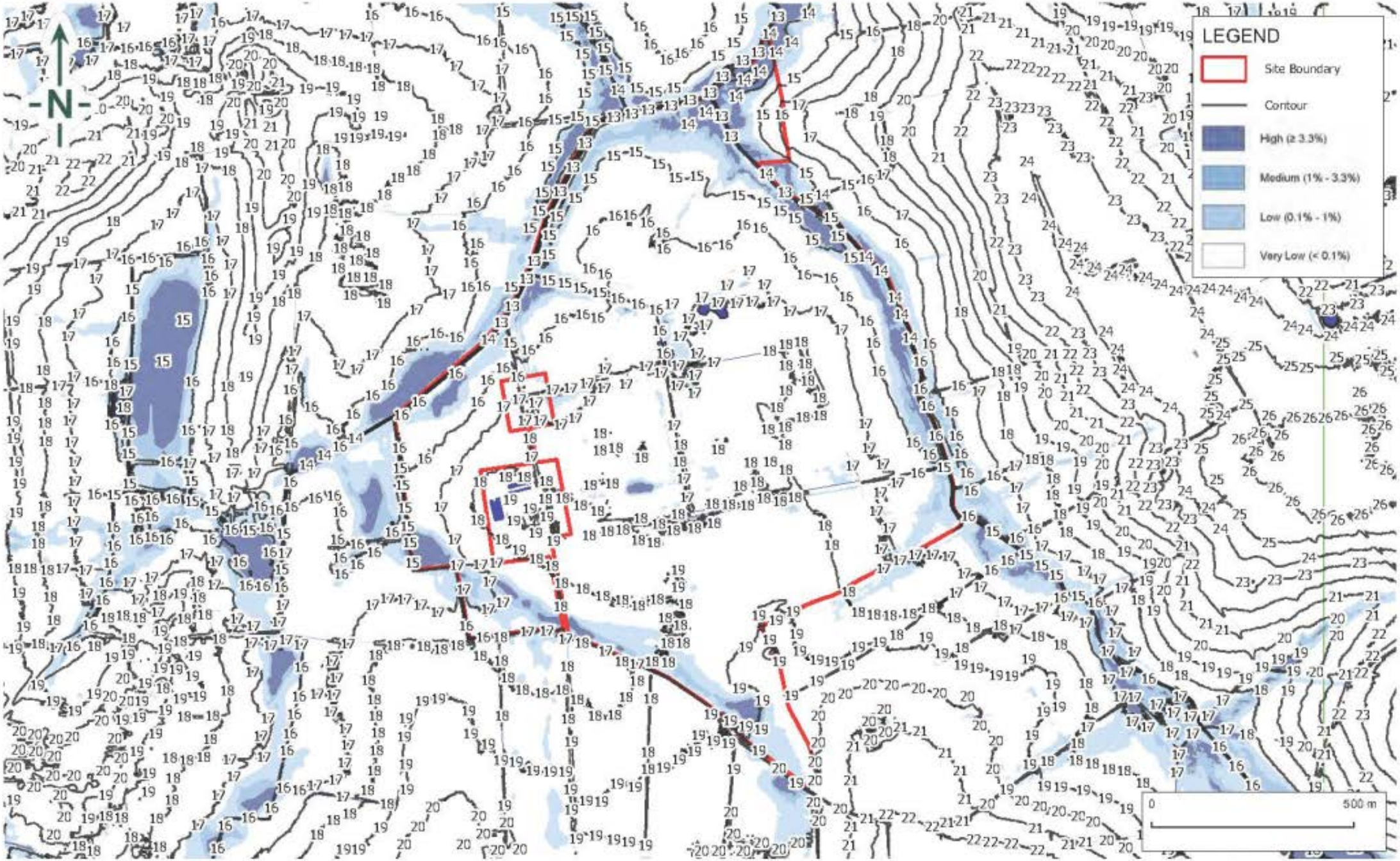
DATE: 17 January 2022		

Annex E – EA Long Term Flood Risk Map (Surface Water)



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9.5 Flood Risk Screening Report – Cottam 3

Appendix F – Flood Risk Screening Assessment

Cottam 3 – Cottam Solar Project

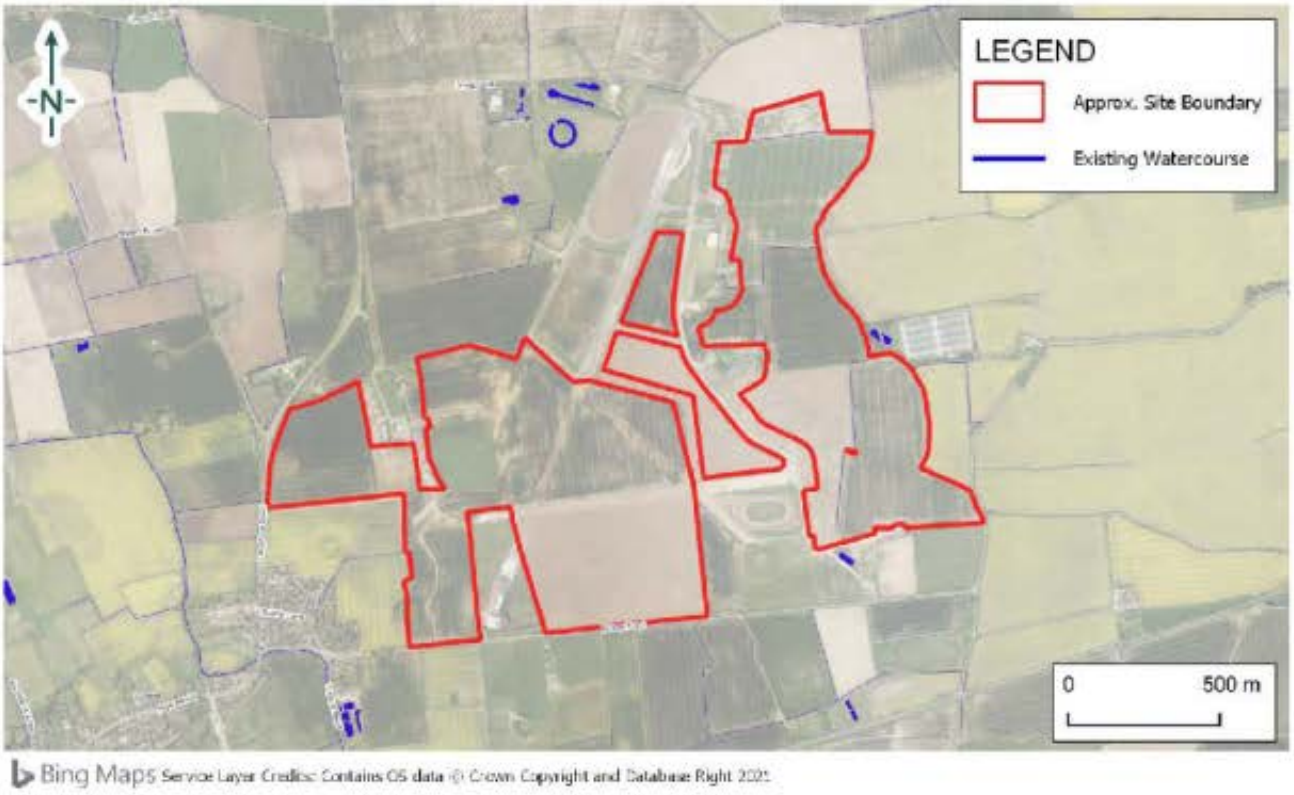
Presented to **Island Green Power**

Issued: January 2022

Delta-Simons Project No. 21-1088.01

1.0 Site Description

The aim of this section of the note is to outline key environmental information associated with the baseline environment.

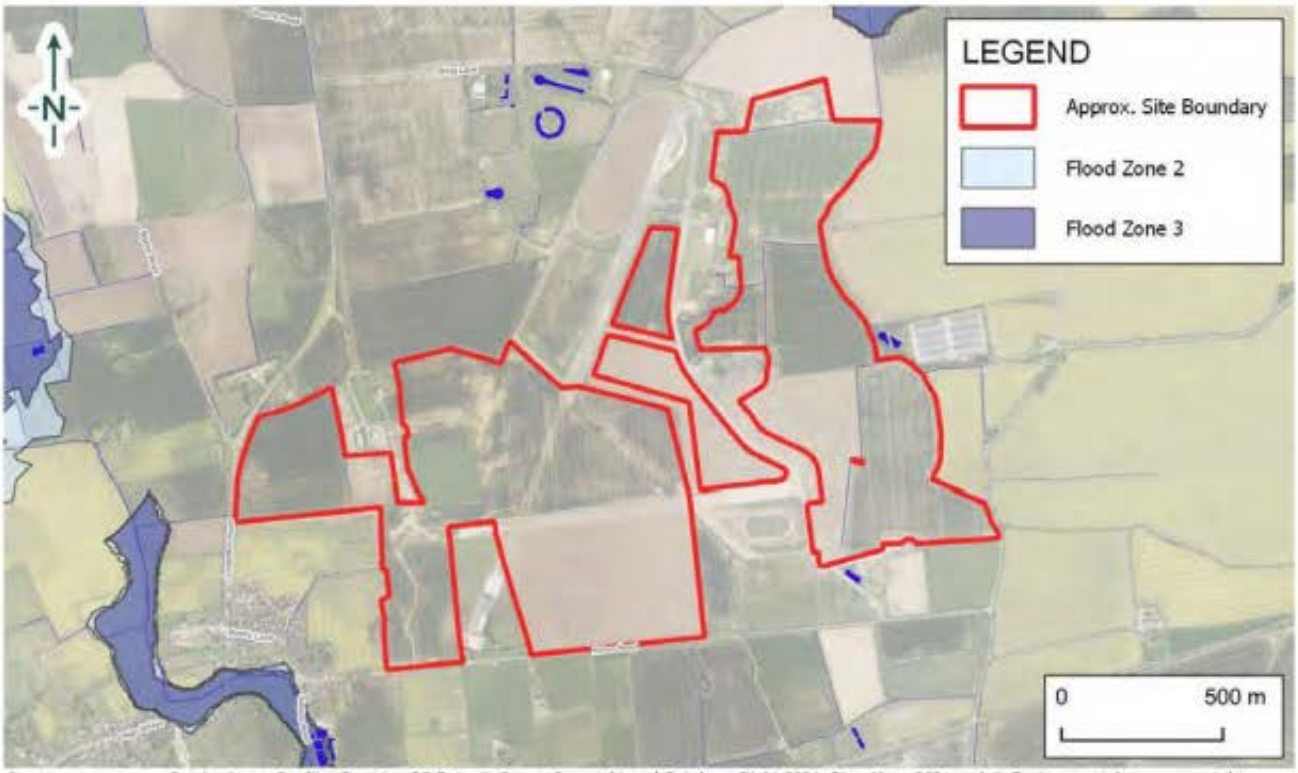


Illustrative Site Layout Plan			
Co-ordinates	Centred approximately at National Grid Reference 487400, 396200.	**Area** (approx.)	172 Ha
Site Location	The Site is located within a rural setting and comprises multiple agricultural fields, approximately 1.8 km north-west of the village of Blyton.		
Topography	Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1 m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR ground elevation data shows that the Site is generally flat, ranging in elevation from approximately 20 to 25 m AOD. A LiDAR extract is included in Annex A.		

2.0 Flood Risk Screening Assessment

Fluvial Flood Risk

Figure 1: EA Flood Map for Planning



EA Online Flood Maps

The EA's Flood Risk Map for Planning indicates that the Site is wholly situated within Flood Zone 1 (Low Probability). Flood Zone 1 defined as land assessed as having a less than 1 in 1000 (<0.1% Annual Exceedance Probability, AEP) chance of river flooding.

A portion of Laughton Highland Drain is located approximately 250 m west of the western extremity of the Site and contains an area within Flood Zone 3. This does not pose any flood risk to the Site.

The EA's Historic Flood Map indicates that the Site has not been flooded previously.

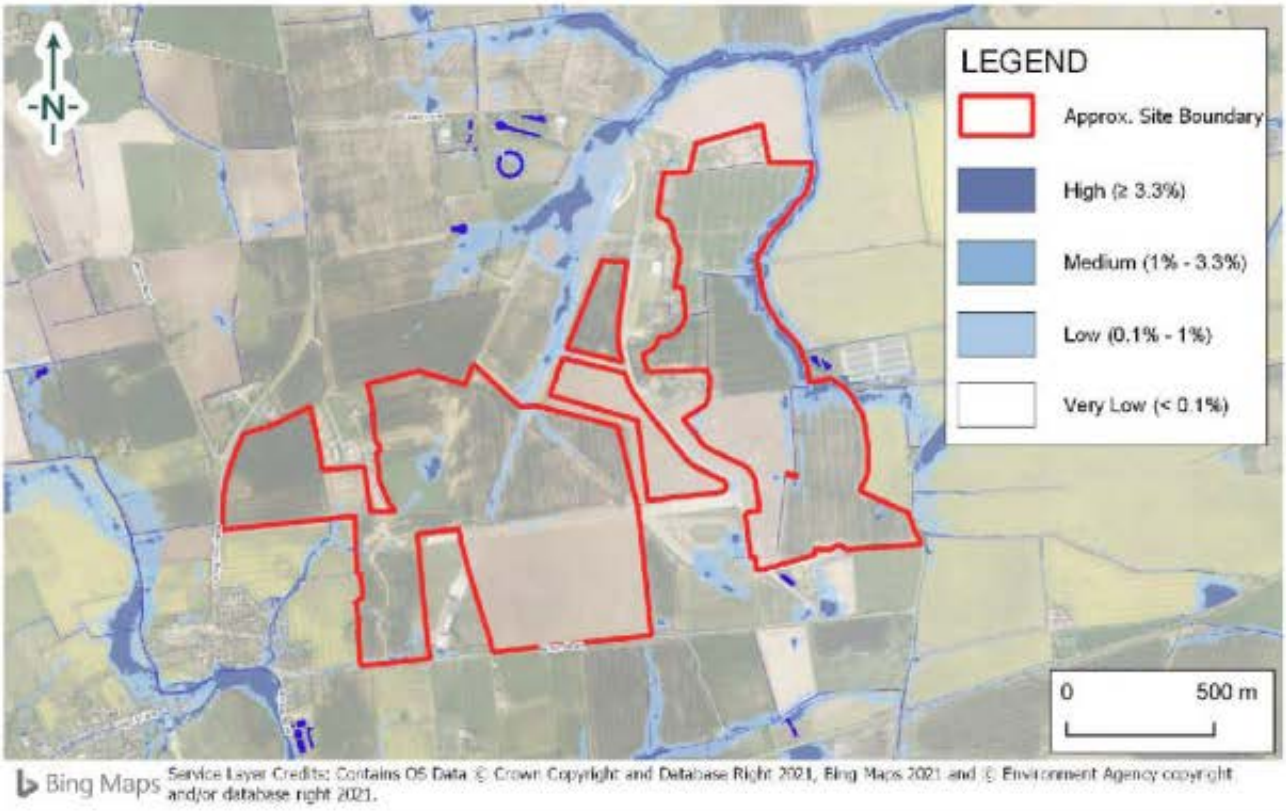
The EA's Spatial Flood Defences Dataset indicates that there are no flood defences present within the vicinity of the Site.

The Site is not located within an Internal Drainage Board (IDB), however numerous land drains are present in the area.

It should be noted that all the flood maps are indicative and do not accurately take into account the impacts of climate change.

Surface Water Risk

Figure 2: EA Long-Term Flood Risk Map (Surface Water)



EA Online Flood Maps

The EA's Long-Term Flood Risk Map indicates that the majority of the Site is at Very Low to Low (<0.1 - 1%) risk of Surface Water flooding. Isolated areas of the Site are at Medium to High Risk (1 - 3.3< % Annual Probability), notably on the north-eastern boundary of the Site for approximately 1 km. This forms a Surface Water flow path, running along the boundary and away from the Site northwards. Other isolated areas of Medium to High Risk on the Site are associated with minor topographic depressions which infill during rainfall events.

Surface water flooding is indicative and typically difficult to predict as it depends on localised heavy rainfall, localised topography and the adequacy of the local drainage network.

Summary of Flood Risk

Flood Risk Status	Green

Key Constraints

None.

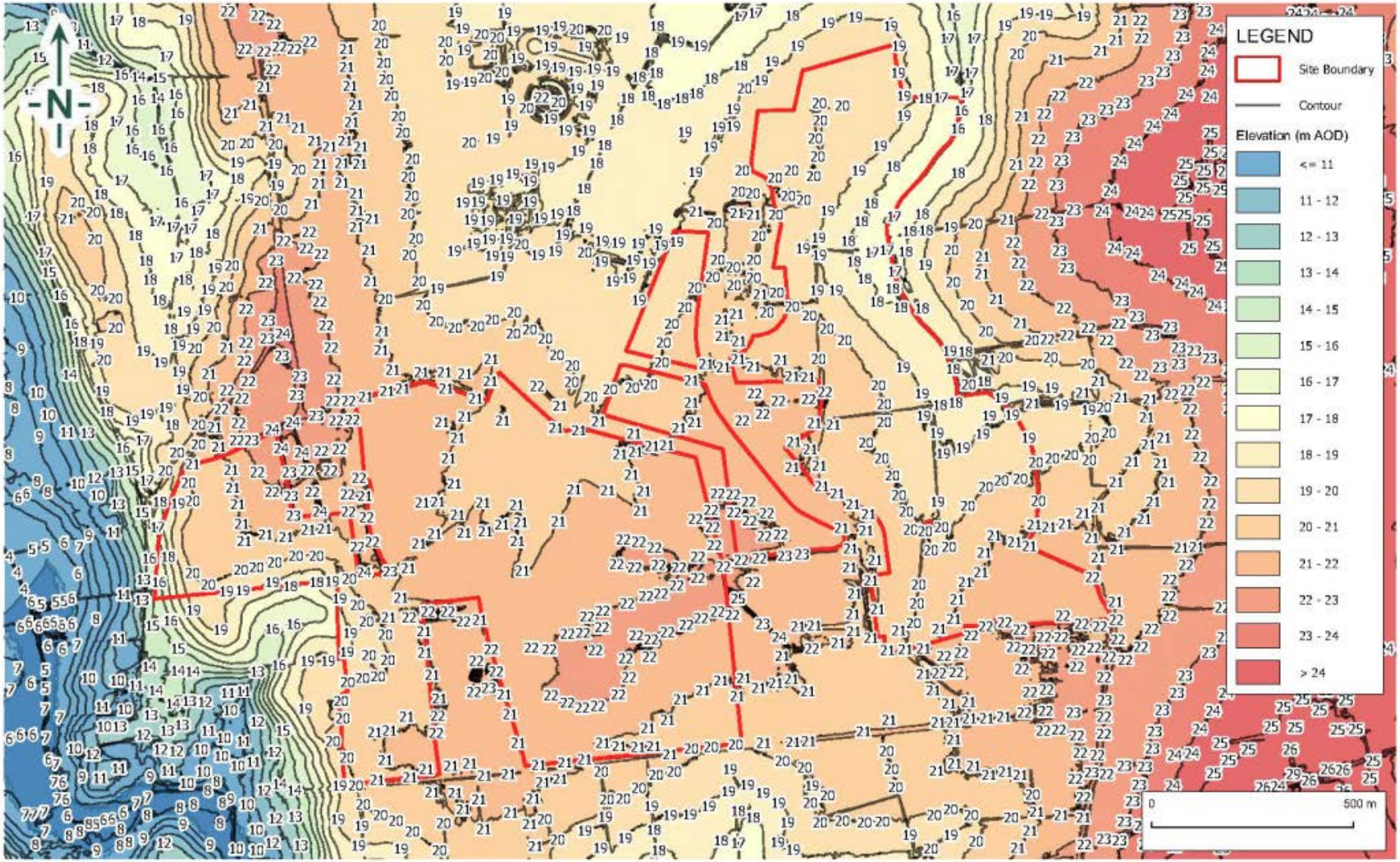
Next Steps

In order to fully inform the masterplanning and planning submission process the following works will be completed prior to completion of the Flood Risk Assessments:

- Obtain available EA flood data for the nearby land drains;

- Determine Flood Depths / Levels and velocities where possible, based on the available information;
- Consult Stakeholders where necessary regarding the acceptable depth of flooding for equipment to place within.

Annex A – LiDAR Plan



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Cottam 3 - Cottam Solar Project

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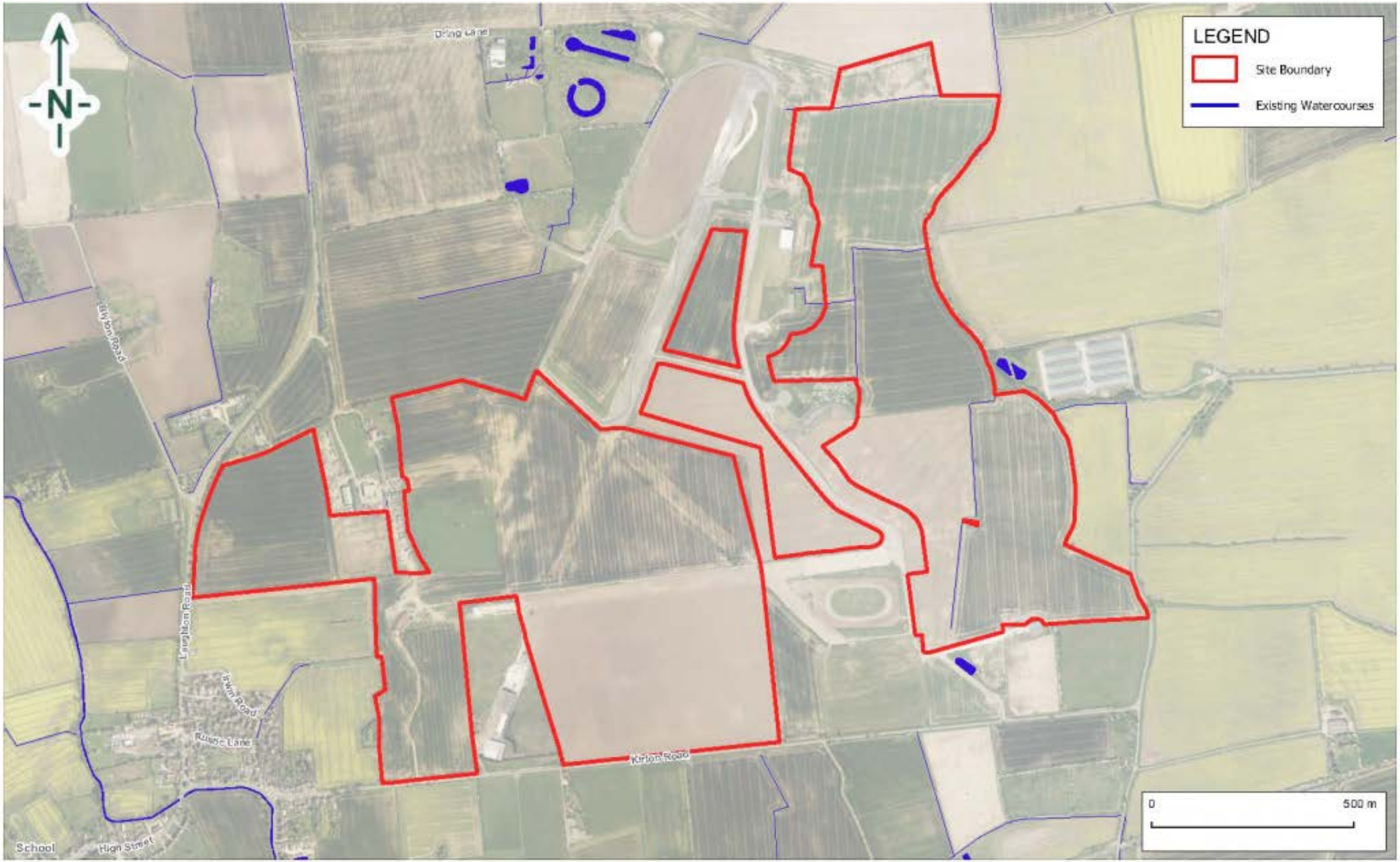
CHECKED BY: JR	VERSION: -	FIGURE NO:
DATE: 17 January 2022		

Annex B – Overview



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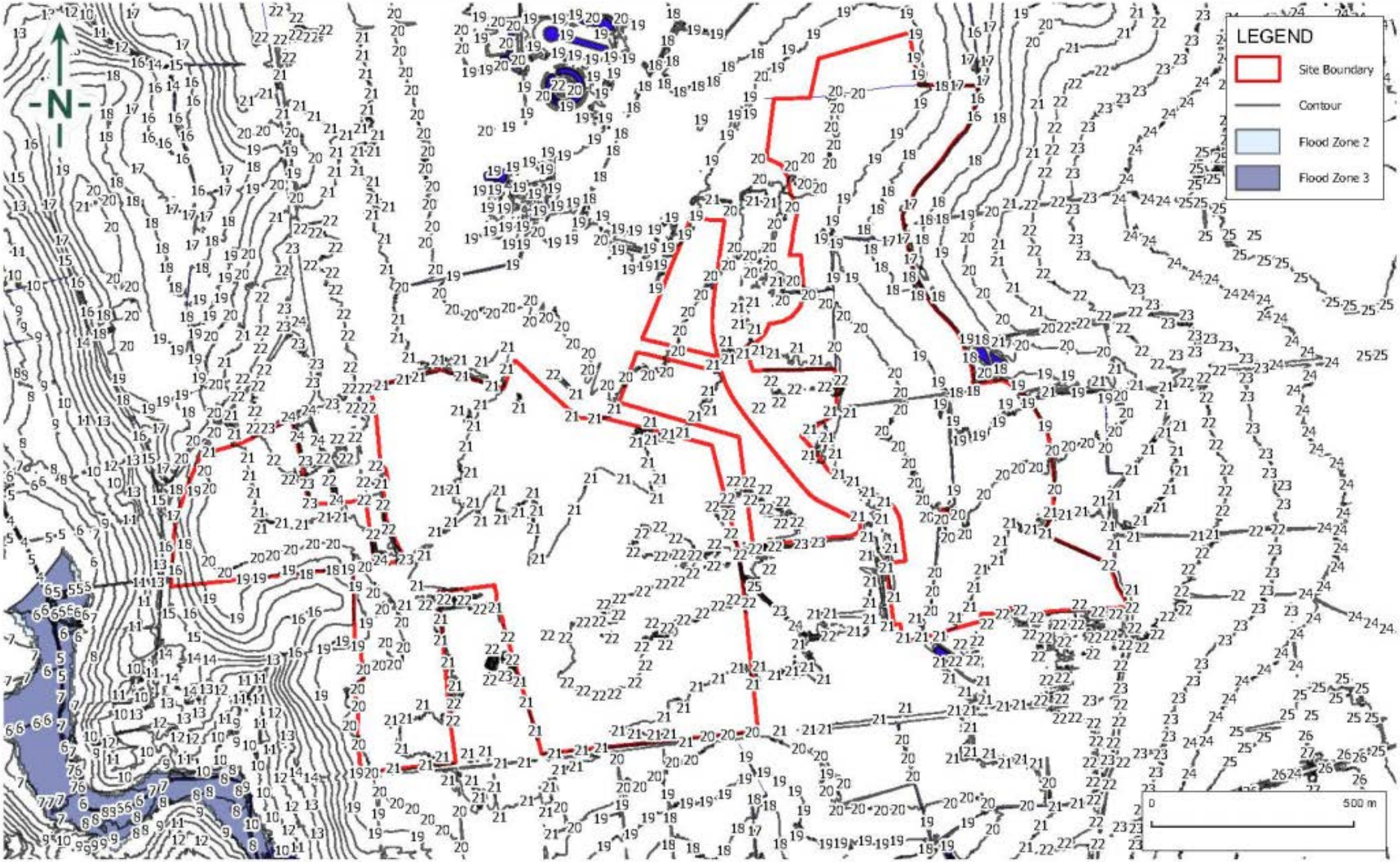
DATE: 17 January 2022		

Annex C – EA Flood Map for Planning



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EA Flood Map for Planning
Cottam 3 - Cottam Solar Project

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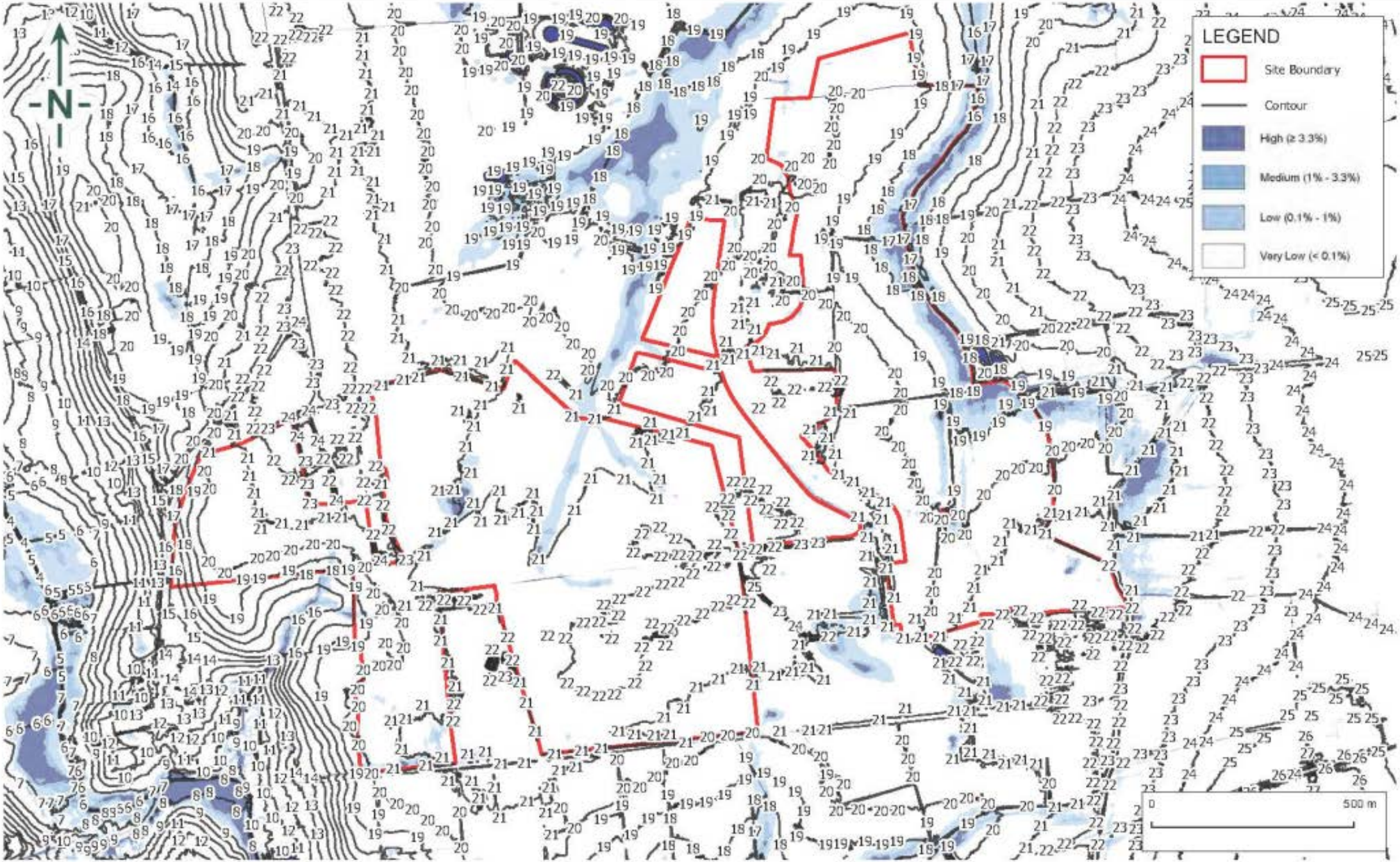
DATE: 17 January 2022		

Annex D – EA Long Term Flood Risk Map (Surface Water)



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Cottam 3 - Cottam Solar Project

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DATE: 17 January 2022		

9.6 Flood Risk Screening Report – Cottam 3B

Appendix G – Flood Risk Screening Assessment

Cottam 3b – Cottam Solar Project

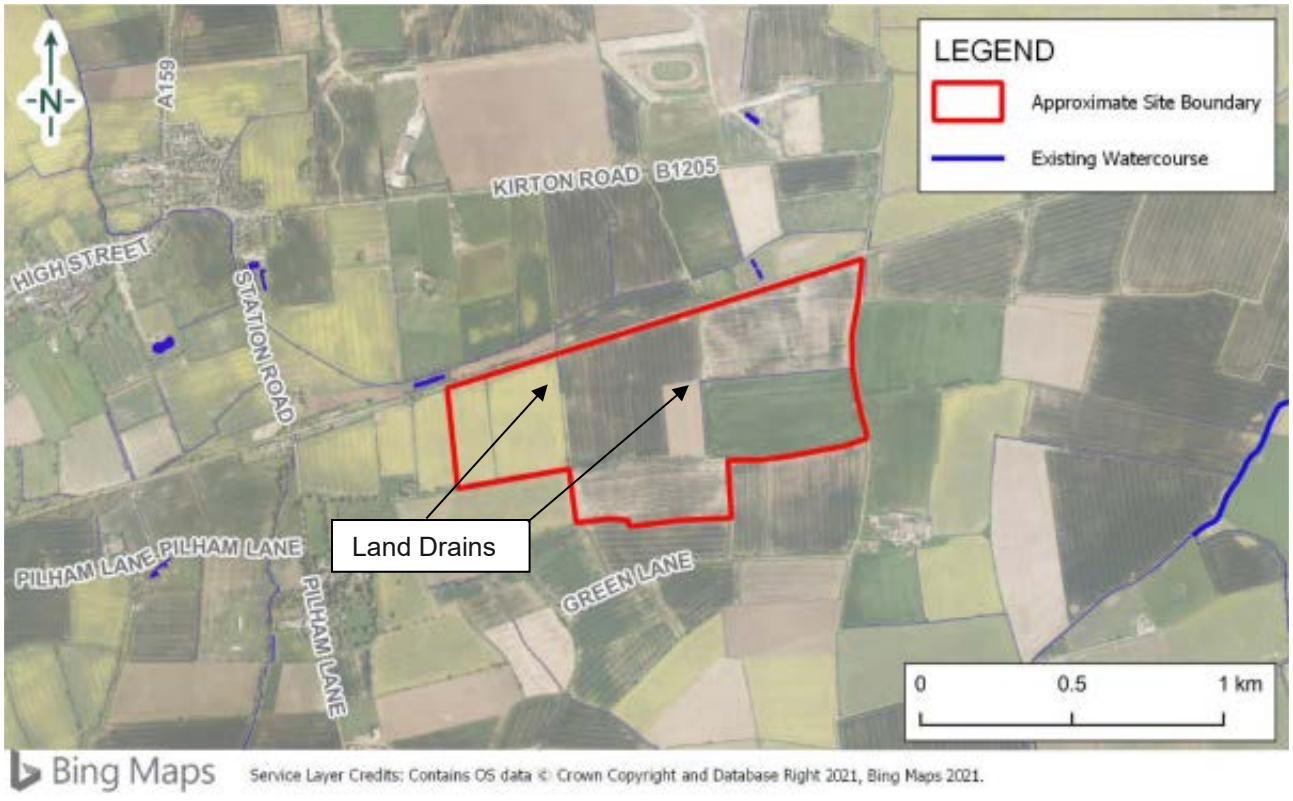
Presented to **Island Green Power**

Issued: January 2022

Delta-Simons Project No. 21-1088.01

1.0 Site Description

The aim of this section of the note is to outline key environmental information associated with the baseline environment.



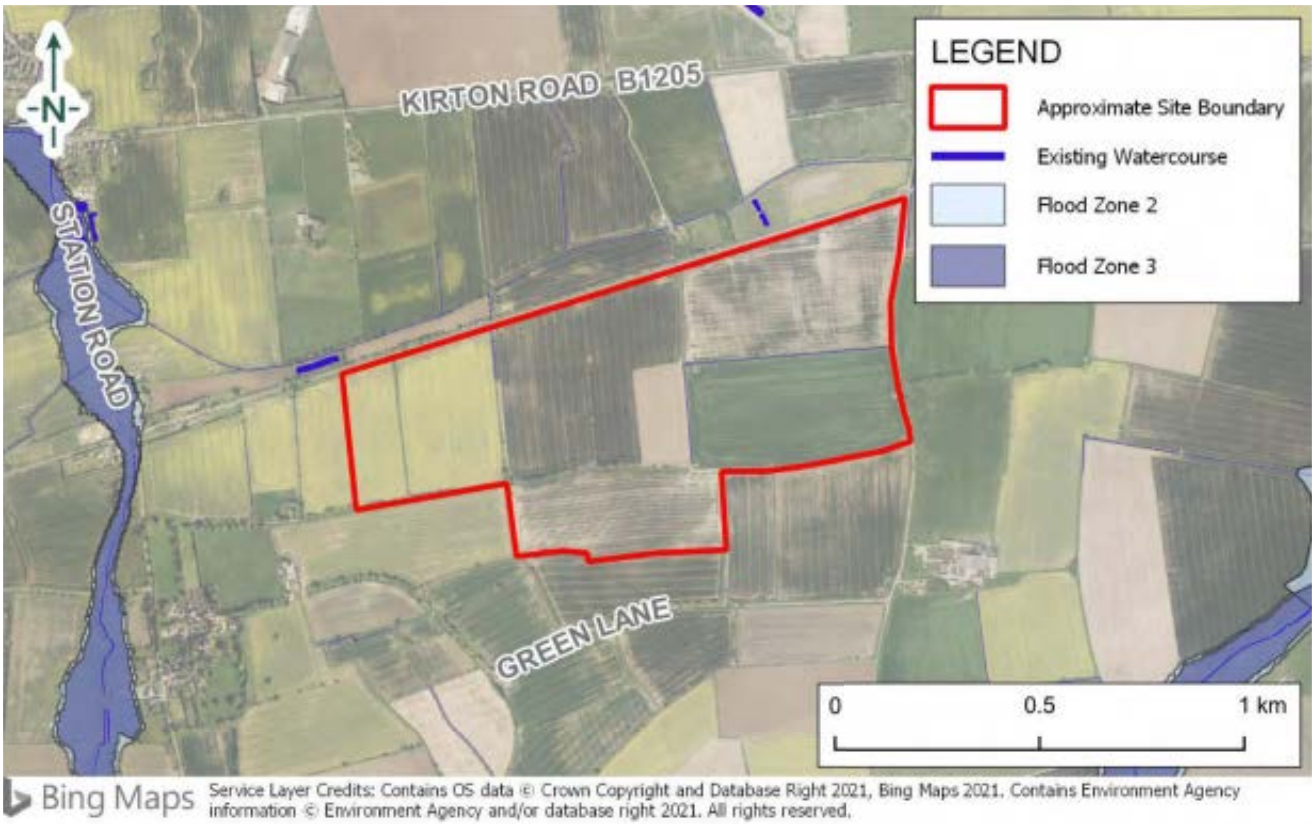
Illustrative Site Layout Plan

Co-ordinates	Centred approximately at National Grid Reference 487330, 394490.	**Area** (approx.)	72.89 Ha
Site Location	The Site is located approximately 500 m north-east of Pilham, Lincolnshire, 6.5 km north-east of Gainsborough railway station and 7.15 km south-west of Kirton Lindsey railway station.		
Topography	Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1 m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR ground elevation data shows that the Site slopes from approximately 25 m AOD in the south-east to approximately 15 m AOD in the north-west. A LiDAR extract is included in Annex A.		

2.0 Flood Risk Screening Assessment

Fluvial Flood Risk

Figure 1: EA Flood Map for Planning



EA Online Flood Maps

The nearest watercourse are the two land drainage ditches located within the Site, located within the northern and eastern extents. There are also land drains along the northern and eastern periphery. Other watercourses in the area include an Ordinary Watercourse approximately 90 m north of the Site which flows east to west.

The EA's Flood Risk Map for Planning indicates that the entirety of the Site is located within Flood Zone 1 (Low Probability). Flood Zone 1 is defined as having a less than 1 in 1000 annual probability of fluvial or tidal flooding (<0.1% Annual Exceedance Probability (AEP)).

The EA's Historic Flood Map indicates that the Site has not been flooded previously.

The EA's Spatial Flood Defences Dataset indicates that there are no flood defences present within the vicinity of the Site.

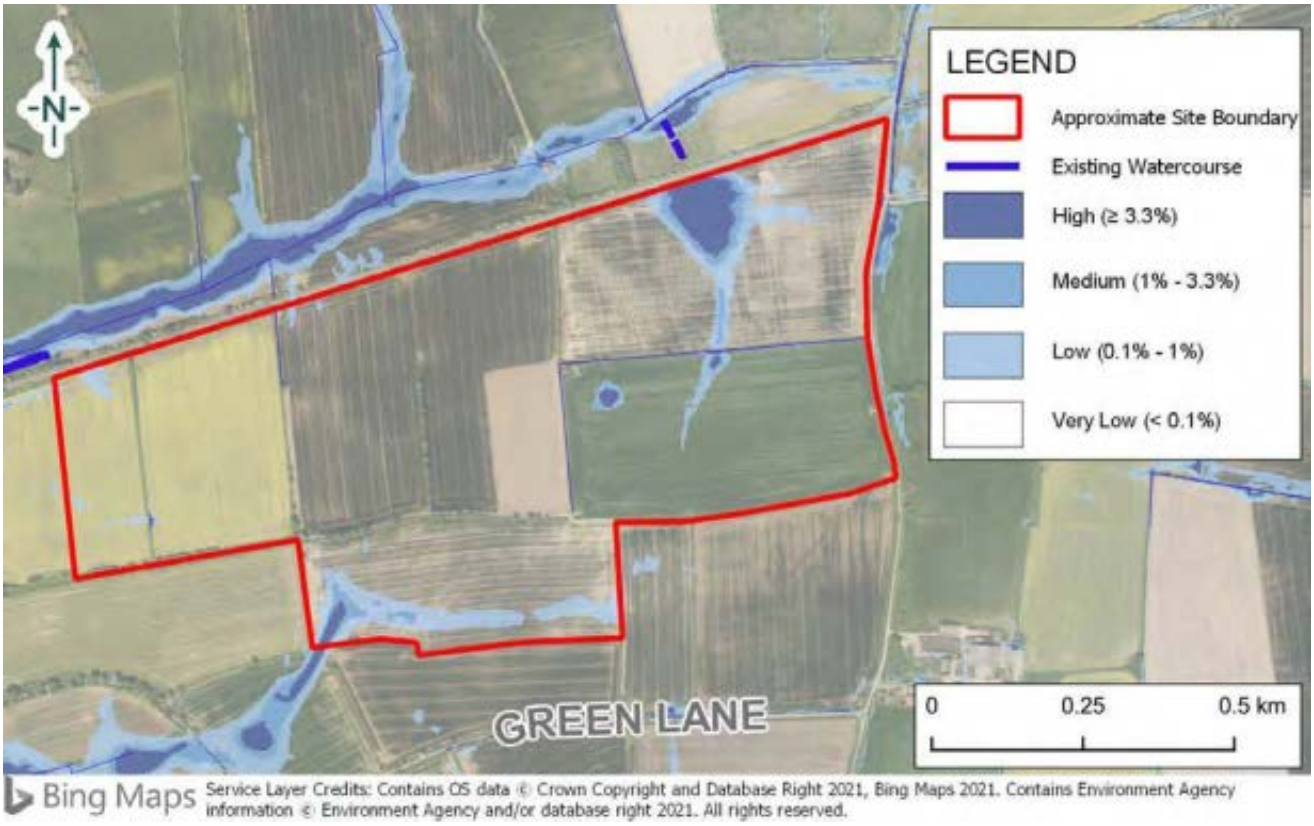
The Site is not located within an Internal Drainage Board (IDB)[1].

It should be noted that all the flood maps are indicative and do not accurately take into account the impacts of climate change.

[1] Internal Drainage Board Map : https://www.ada.org.uk/idb-map

Surface Water Risk

Figure 2: EA Long-Term Flood Risk Map (Surface Water)



EA Online Flood Maps

The EA 'Flood Risk from Surface Water' map indicates that the Site is largely at Very Low risk (<0.1% annual probability) of surface water flooding. However, there are some small areas throughout the Site which are at Low to High risk (0.1 - ≥ 3.3% annual probability) of surface water flooding; these areas are generally confined to the north-east and south-western extents.

Flood depths are expected to remain below 300 mm during the High and Medium Risk scenarios in all areas excluding the north-eastern extents of the Site, which is expected to reach depths between 300 and 900 mm and appears to be as a result of ponding behind the railway which forms the northern boundary of the Site.

Surface water flooding is indicative and typically difficult to predict as it depends on localised heavy rainfall, localised topography and the adequacy of the local drainage network.

Summary of Flood Risk	
Flood Risk Status	Green

Key Constraints

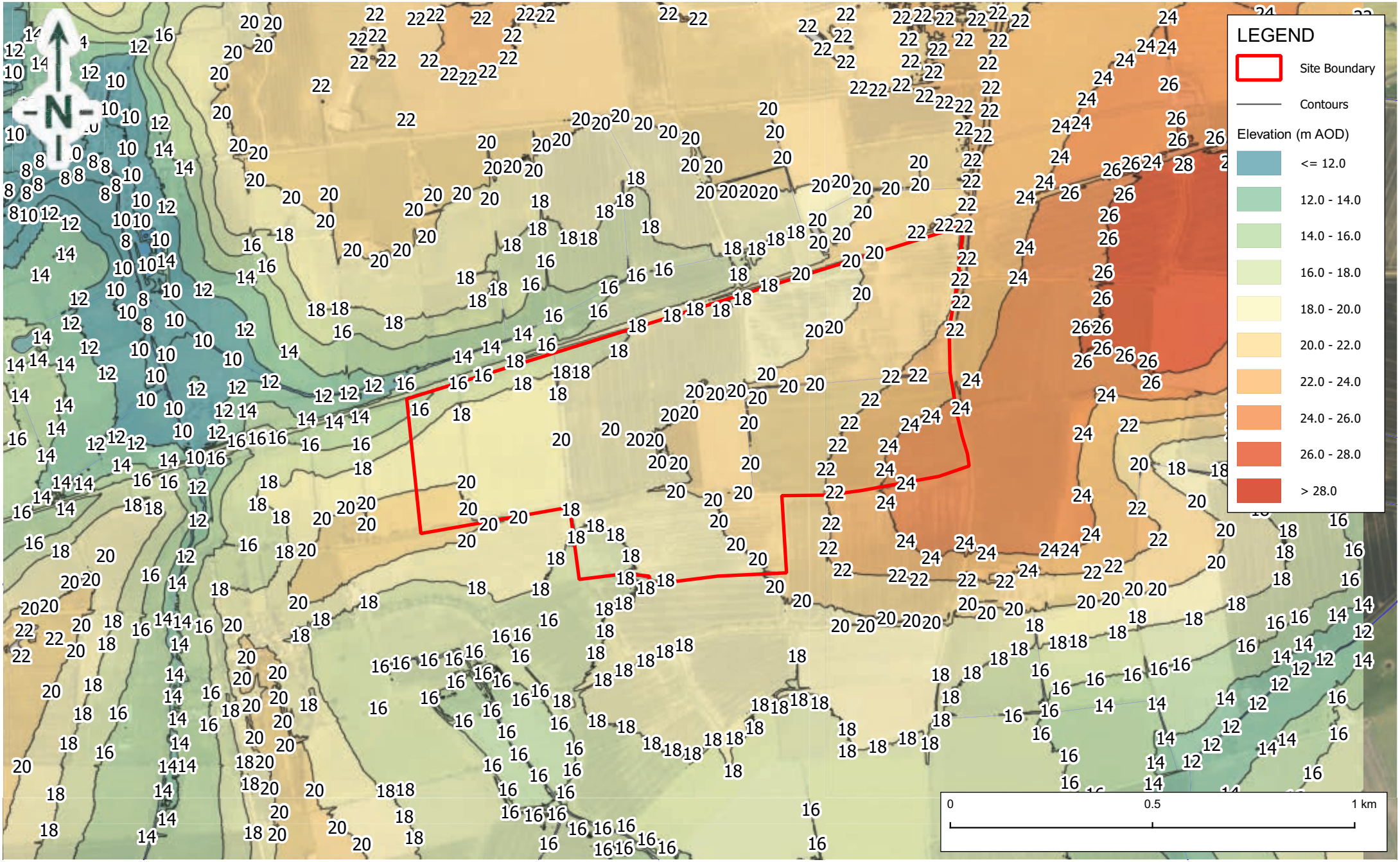
Surface water risk to the north-east and south-western extents.

Next Steps

In order to fully inform the masterplanning and planning submission process the following works will be completed prior to completion of the Flood Risk Assessments:

- Obtain available EA flood data for the land drains;
- Determine Flood Depths / Levels and velocities where possible, based on the available information;
- Consult Stakeholders where necessary regarding the acceptable depth of flooding for equipment to be placed within.

Annex A – LiDAR Plan



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TITLE:
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Cottam 3b – Cottam Solar Project

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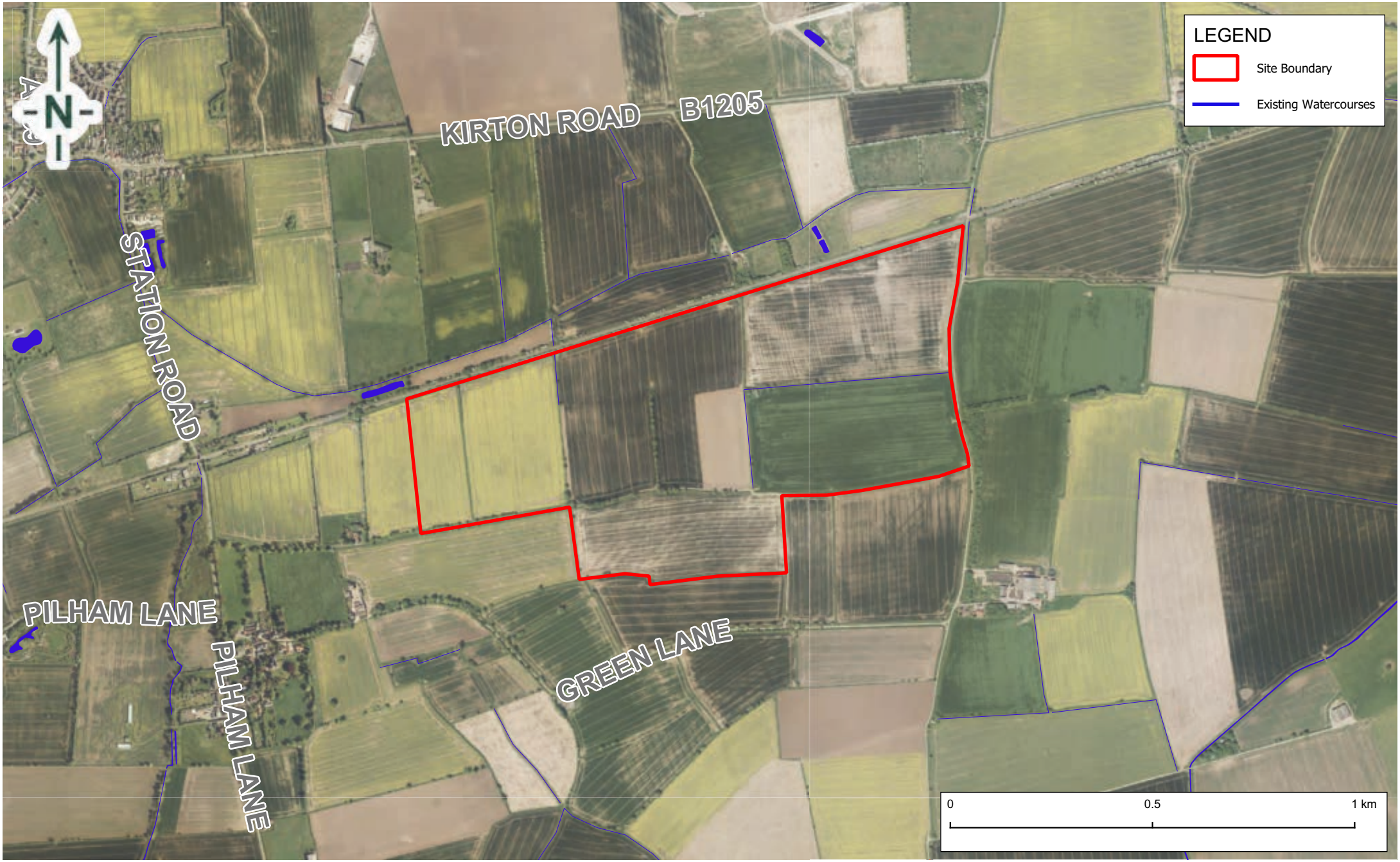
Annex B – Overview



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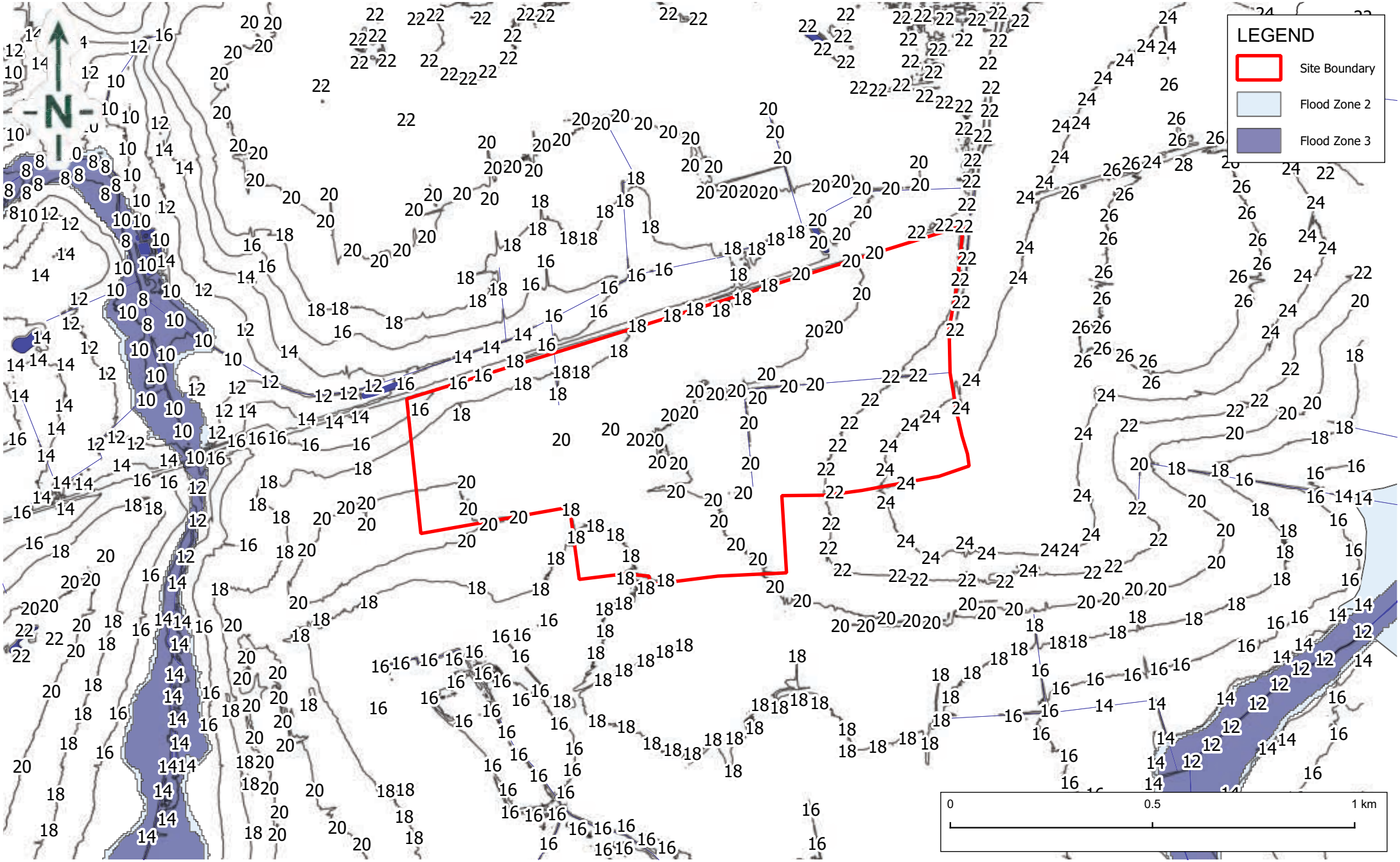
Annex C – EA Flood Map for Planning



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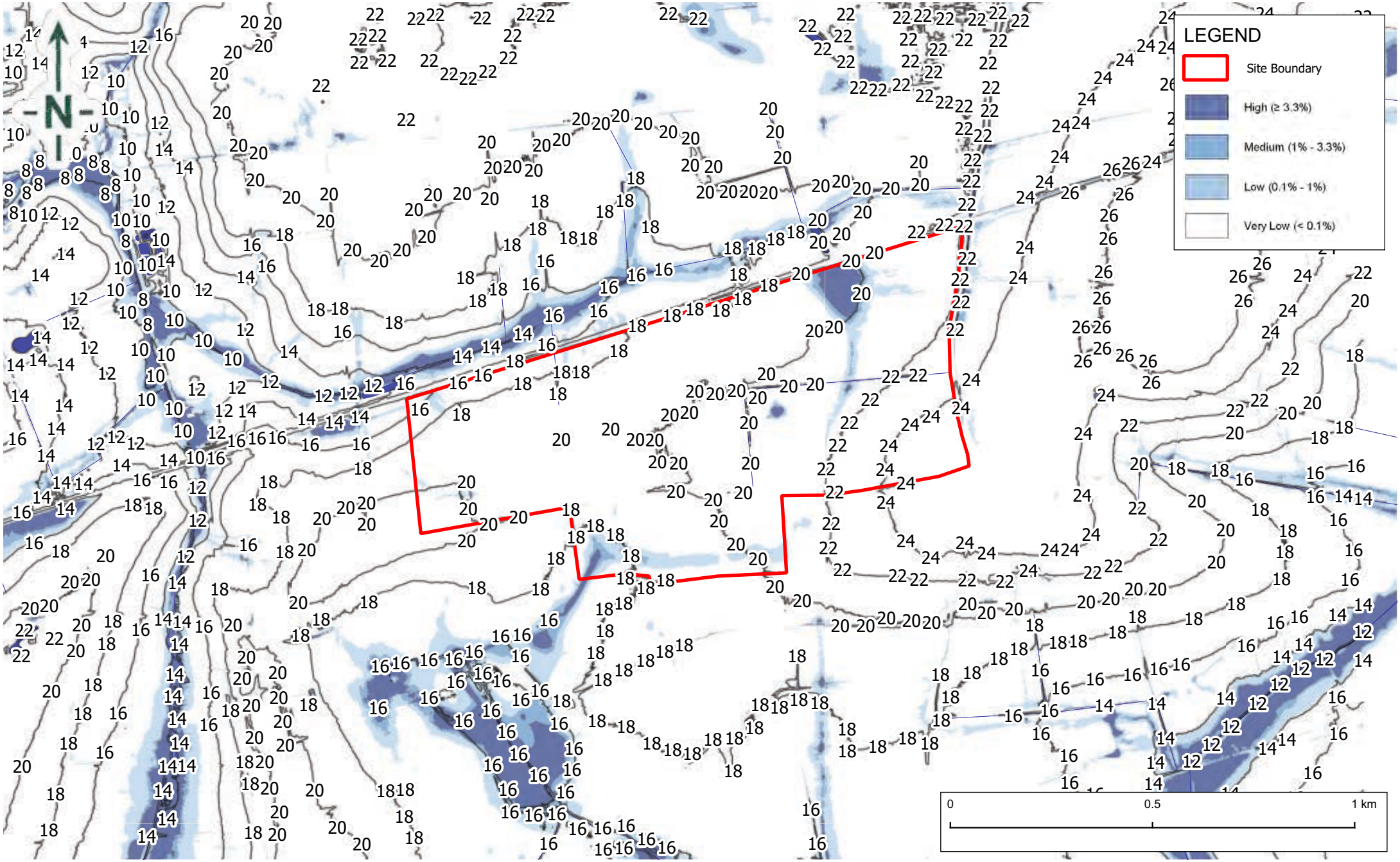
Annex D – EA Long Term Flood Risk Map (Surface Water)



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