



## **REPORT**

# **Cocker Tidal Channel and Cockerham Marsh SSSI Restoration Investigation**

### **Task 4 – Cockerham Marsh SSSI**

Client: Lancashire Wildlife Trust, Natural England & Environment Agency

Reference: PC7494-RHD-XX-XX-RP-X-0006

Status: Final/P02

Date: 6 January 2026

## Project related

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## Contents

<b>Preamble</b>	<b>1</b>
<b>1 Introduction</b>	<b>2</b>
<b>2 Task 4a – Baseline Habitat Assessment</b>	<b>6</b>
2.1 Methodology	6
2.2 Results	11
2.3 Task 4a Conclusions	37
<b>3 Task 4b – Restoration Opportunities</b>	<b>43</b>
3.1 Cockerham Marsh SSSI	43
<b>4 Task 4c – Management of Restored Habitats at Cockerham Marsh SSSI</b>	<b>44</b>
4.1 Natural Development of Habitats	44
4.2 Management and Maintenance	44
<b>5 Task 4d – Potential BNG and Carbon Credits</b>	<b>45</b>
5.1 Early Stage BNG Assessment	45
<b>6 References</b>	<b>54</b>

## Tables

Table 2-1 Data used for the desk study	9
Table 2-2 Statutory nature conservation designated sites within 2 km of both Survey Areas	12
Table 2-3 Timeline of natterjack toads in Cockerham Marsh SSSI 1969 – 2009, adapted from the SSSI Management Plan	18
Table 2-4 Cockerham Marsh SSSI pools, numbered in accordance with the SSSI's Management Plan	21
Table 2-5 Priority habitats within 2 km of both Survey Areas	26
Table 2-6 UKHab baseline habitats present in both Survey Areas	29
Table 2-7 Baseline habitat descriptions	30
Table 2-8 Protected and notable species and associated potential construction effects, mitigation and further survey recommendations	40
Table 5-1 Biodiversity metric rules, taken from the Defra Statutory Biodiversity Metric User Guide	48
Table 5-2 Trading rules (Rule 1) to compensate for losses, taken from the Defra Statutory Biodiversity Metric User Guide	48
Table 5-3 UKHab baseline habitats present and their corresponding habitat classification within the Metric	49
Table 5-4 On-site area habitat baseline summary from the Metric calculation	52
Table 5-5 On-site watercourse baseline summary from the Metric calculation	53

## Figures

Figure 1 Location plan	4
Figure 2 Key channel features	5
Figure 3 Task 4 Cockerham Marsh SSSI survey coverage	7
Figure 4 Designated sites for nature conservation within 2km of both Survey Areas	16
Figure 5 Cockerham Marsh SSSI aerial imagery from the years 2000 and 2023	25
Figure 6 Priority habitats within 2km of both Survey Areas	28
Figure 7 UKHab baseline plan of both Survey Areas	32
Figure 8 Historic maps of Cockerham Marsh SSSI from 1862, 1910, 1951 and 1970	51

## Appendices

- Appendix A Target Notes
- Appendix B Site Photos
- Appendix C Statutory Biodiversity Metric

## Preamble

The present study forms part of an initiative called 'Our Future Coast', which is instigated by the Department for Environment Food and Rural Affairs (Defra), Wyre Council and the Environment Agency.

'Our Future Coast' is focused on working with nature to safeguard coastal communities through seventeen projects across the North West of England, from Formby in the south to Millom Marshes in the north.

The 'Cocker Tidal Channel & Cockerham Marsh SSSI Restoration Investigation' is one of these projects, being led by Natural England in partnership with Lancashire Wildlife Trust and the Environment Agency.

The 'Our Future Coast' programme aims to develop a suite of natural buffer strips to increase coastal resilience of vulnerable hot spots in the North West. Natural coastal buffer strips can provide multiple benefits, including reducing flood risk, reducing coastal erosion, increasing biodiversity and water quality, providing carbon capture and other ecosystem services such as recreation and well-being.

Buffer strips with their rich vegetation, act as natural means of capturing sediment and dissipating wave energy. Buffer strips include developing salt marsh, managed realignment, reclaiming redundant brownfield sites, dune systems, and intertidal lagoons to provide storage of surface water during high tide.

Further information about the programme can be found here:

[Our Future Coast | The Flood Hub](#)

## 1 Introduction

The downstream reach of the River Cocker in Lancashire flows in a north-westerly direction, discharging into southeast Morecambe Bay across the intertidal expanse of Cockerham Sands (**Figure 1**). The 1.5 km reach between a sluice gate at Cocker Bridge and Morecambe Bay is tidal, flowing within an artificially straightened channel, which was cut in the 1960s.

The cut Cocker channel joins into a naturally meandering channel (Patty's Farm Creek) at a confluence just seaward of Bank End Farm. Beyond this confluence, the Outer Cocker Channel flows in a meandering manner across intertidal areas of Cockerham Sands.

Prior to the new cut in the 1960s (shown red in **Figure 2**), the natural outflow of the River Cocker was a meandering channel across Cockerham Marsh (shown orange in **Figure 2**). There is some argument that the new cut has placed increased energy at the confluence (shown as a yellow box in **Figure 2**) between the cut River Cocker channel and Patty's Farm Creek (shown blue in **Figure 2**), increasing the tendency for this combined outer channel to incise close to the flood embankment near this point.

Morecambe Bay is a highly dynamic environment, and the alignment of channels can change significantly within a short timescale in response to the governing tidal and sedimentary processes, freshwater discharge from rainfall across the catchment, and the effects of winds, waves and surges during storms.

Following a period of notable channel movement towards the north at the confluence of the cut Cocker Channel and Patty's Farm Creek in 2012, residents alerted the Environment Agency to the loss saltmarsh fronting the flood embankment and raised concerns at that time about potential flood risk to Bank End Farm and Caravan Park and the nearby Bank Houses Caravan Park.

This prompted a Geomorphological Appraisal by the Environment Agency (Swift, 2013) which incorporated Historic Trends Analysis (HTA) of historic maps and datasets as well as Expert Geomorphological Assessment (EGA) informed by observations from a site visit. Recognising the uncertainties associated with the future extent of saltmarsh erosion due to the dynamic nature of the physical environment, the study recommended enhanced monitoring be undertaken, in combination with further assessment of the suitability of options to address the flood risk (whilst allowing the system to respond as naturally as possible to wider environmental forcing) by means of: (i) enhancing protection of the existing channel bank using bio-engineered brushwood mattresses (or similar); (ii) in-channel flow deflectors; and (iii) strengthening of the main flood embankment near Bank End Farm. The study also suggested that options to re-naturalise the tidal channel of the River Cocker could be considered if that too would alleviate erosion and associated flood risk pressure at Bank End Farm.

The present Cocker Tidal Channel and Cockerham Marsh SSSI Restoration Investigation more widely investigates potential for restoration of natural processes, morphology and habitat in this area and how this might provide other benefits to the estuary and the wider catchment, particularly land drainage and flood risk. The study comprises four main tasks, namely:

- Task 1 – Desk-Based Review and Site Visit
- Task 2 – Optioneering, Modelling and Design
- Task 3 – Catchment Nature Based Solutions
- Task 4 – Cockerham Marsh Site of Special Scientific Interest (SSSI)

This report relates to **Task 4 – Cockerham Marsh SSSI**.

## Project related

This Task 4 report is split into four subsections, comprising:

- Task 4a – Baseline Habitat Assessment (**Section 2**);
- Task 4b – Restoration Opportunities (**Section 3**);
- Task 4c – Habitat Management of Restored Habitats (**Section 4**); and
- Task 4d – Potential BNG and Carbon Credits (**Section 5**).

# Project related

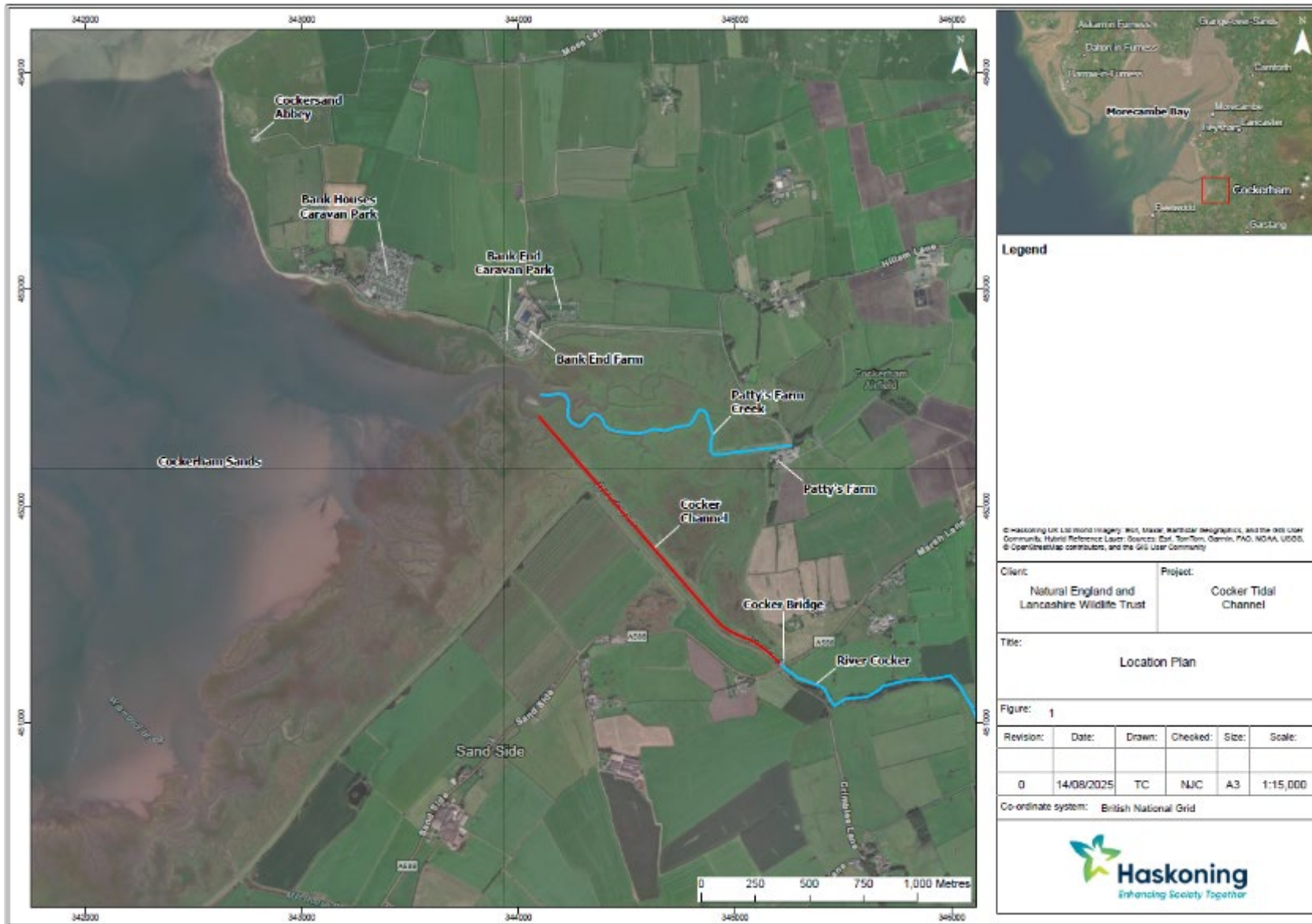


Figure 1 Location plan

Project related

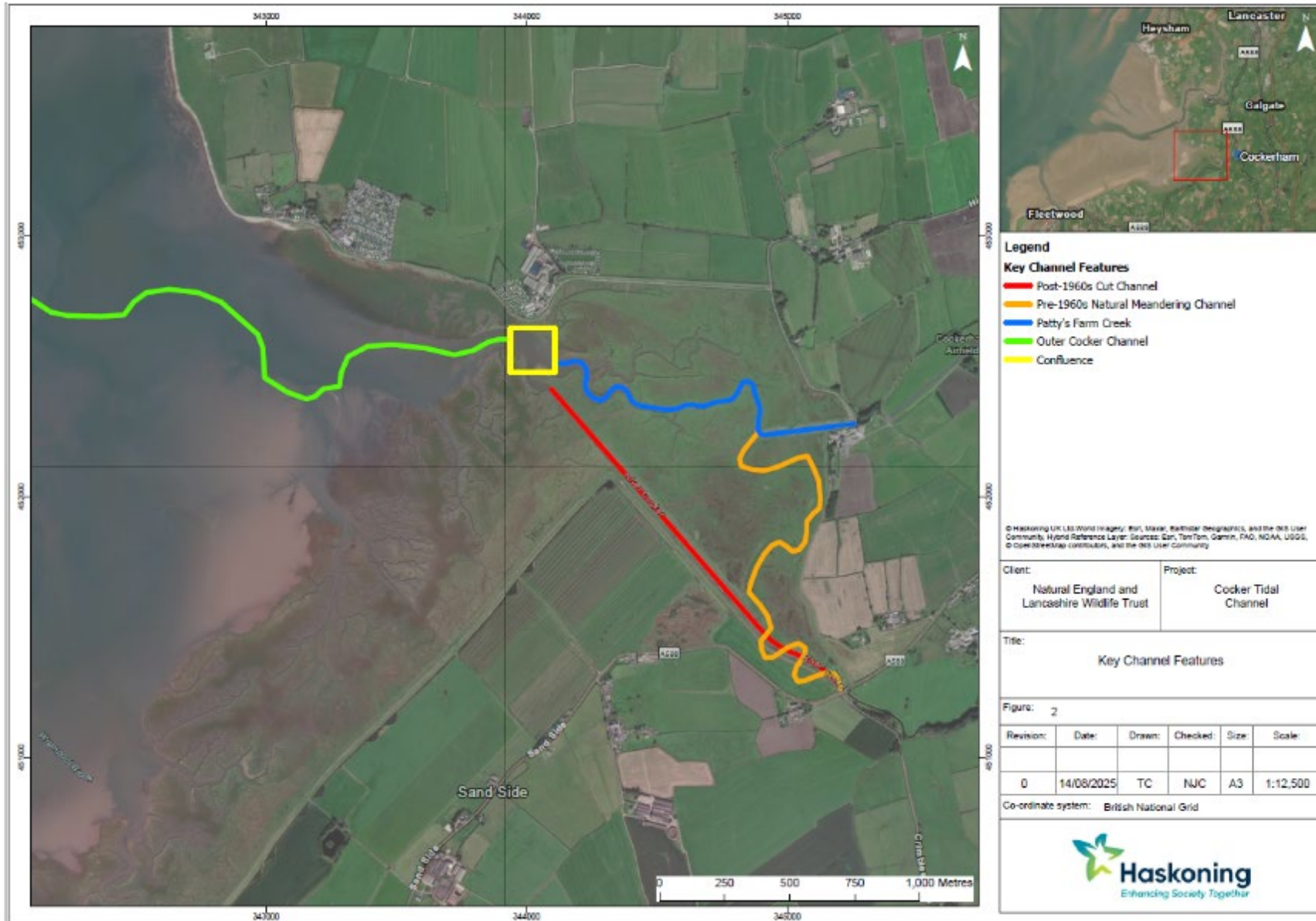


Figure 2 Key channel features (after Swift, 2013)

## 2 Task 4a – Baseline Habitat Assessment

The purpose of Task 4a – Baseline Habitat Assessment is to provide an initial assessment of the ecological value of the Cockerham Marsh SSSI and to highlight any potential ecological receptors and constraints present on site or in the surrounding area that may be affected by the proposed restoration options that have been considered in Task 2 of the investigation.

Identification of ecological receptors and constraints allows for the development of appropriate avoidance, mitigation and compensation measures where needed, and for these to be incorporated into any proposed works that may ultimately be required to deliver a preferred management option for restoration.

This baseline habitat assessment also identifies where further data collection on specific receptors may be needed.

### 2.1 Methodology

#### 2.1.1 Spatial scope of study

This baseline habitat assessment comprises a desk study, findings from a field survey, and conclusions that have been drawn from these results. The field survey, discussed further in **Section 2.1.4**, covered the extents shown in Figure 3.

For the purposes of this Task 4a, these extents are ‘Survey Area A’ (refers to the boundary of Cockerham Marsh SSSI) and ‘Survey Area B’ (refers to additional areas surveyed outwith the SSSI). Survey Area B has been included in the survey scope primarily to inform the other Tasks of the main study, and the conclusions of Task 4 relate to Survey Area A.



**Legend**

UKHab Survey Area A (Cockerham Marsh SSSI)

UKHab Survey Area B

© Haskoning UK Ltd. Aerial Imagery courtesy of Channel Coastal Observatory. World Imagery: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Hybrid Reference Layer: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Client: <b>Natural England and Lancashire Wildlife Trust</b>	Project: <b>Cocker Tidal Channel</b>
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Title:  
**Task 4 Cockerham Marsh SSSI  
Survey Coverage**

Figure: **3**

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
0	17/12/2025	TC	BM	A3	1:4,000

Co-ordinate system: British National Grid



### 2.1.2 Legislation and Policy

This report has been compiled with reference to the following relevant national and local nature conservation legislation, planning policy, and guidance from which the protection of sites, habitats and species is derived in England:

- The Wildlife and Countryside Act 1981 (as amended).
- The Town and Country Planning Act 1990.
- The Protection of Badgers Act 1992.
- Countryside and Rights of Way (CROW) Act 2000.
- The Natural Environment and Rural Communities (NERC) Act 2006.
- The Planning Act 2008.
- The Conservation of Habitats and Species Regulations 2017 (as amended) ('Habitats Regulations').
- The Environment Act 2021.
- UK Biodiversity Framework 2024.
- Draft Lancashire Local Nature Recovery Strategy (LNRS) 2025.

### 2.1.3 Desk Study

A desk study was carried out to identify potentially relevant nature conservation designated sites and notable habitats or species that could be affected by the proposed project. The data sources and extents of the search considered are summarised in **Table 2-1**.

## Project related

Table 2-1 Data used for the desk study.

Information source	Receptor	Study area
Multi-Agency Geographical Information for the Countryside (MAGIC) (Defra, 2025a)	Statutory designated sites. Priority habitats. European Protected Species Licence (EPSL) returns.	Within and up to 2 km from both Survey Areas (reduced to 250m for great crested newt <i>Triturus cristatus</i> EPSL returns).
National Biodiversity Network (NBN) Atlas (NBN Atlas Partnership, 2025) <sup>1</sup>	Protected and notable species.	Within and up to 2 km from both Survey Areas (extended to 5 km for birds and bats).
Cockerham Marsh SSSI Management Plan 2010 (Hickling, 2010).	Cockerham Marsh SSSI.	Cockerham Marsh SSSI.
Cockerham Marsh SSSI Citation (Natural England, 1985)		
Cockerham Marsh SSSI Views on Management (English Nature, 2005)		

### 2.1.4 Field Survey

A baseline habitat survey of both Survey Areas was carried out on 2<sup>nd</sup> September 2025 using the UKHab Habitat Classification System version 2.0 (UKHab) (UKHab Ltd., 2023). UKHab is a hierarchal system which comprises five levels of primary habitat, as well as a list of secondary codes that allow the recording of additional information linked to primary habitats. For the purposes of this survey, where possible, habitats were classified to UKHab Level 4 to ensure comprehensive data is recorded to inform this assessment, and any future ecological assessments. The condition of all habitats within both Survey Areas was also assessed, in accordance with the Statutory Biodiversity Metric Condition Assessment Sheets and methodology for the Biodiversity Net Gain (BNG) calculations detailed in **Section 5.1** (Defra, 2025b).

The relative abundance of plant species within each habitat was recorded during the field survey using the DAFOR scale:

- D – Dominant, >75% cover;
- A – Abundant, 51 – 75% cover;
- F – Frequent, 26 – 50%;
- O – Occasional, 11 – 25% cover; and
- R – Rare, 1 – 10% cover.

Both Survey Areas were also surveyed for any signs of other protected and notable species that may be present. Field signs and areas of interest for all protected and notable species were recorded as Target Notes (**Appendix A**). In addition, due consideration of the following survey guidance was used to assess the potential presence or likely absence of:

<sup>1</sup> The NBN Atlas search excluded records held under a CC-BY-NC licence as these cannot be used for commercial purposes, and as such the locations of such records are not reproduced here.

## Project related

- **Badgers:** A systematic search for badger field signs including latrines, feeding signs, sett entrances, footprints, hair and snuffle holes was conducted within both Survey Areas in line with the Surveying for Badgers Good Practice Guidelines (Scottish Badgers, 2018).
- **Bats:** All trees and structures within both Survey Areas were assessed for their potential to support roosting bats, in line with the Bat Conservation Trust's Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th ed): (Collins, 2023). Table 4.1 of the BCT Good Practice Guidelines (Collins, 2023) was used to define what structures (i.e. buildings) or features are considered to be of no, negligible, low, moderate and high suitability for roosting or commuting/foraging bats. The identification of potential roost features (PRF) on structures categorised as low, moderate or high roosting suitability was assessed using a systematic search of the exterior of the structure, highlighting potential bat access points and roosting places. The BCT Good Practice Guidelines (Collins, 2023) Table 6.2 was used for categorising the potential suitability of PRFs on trees. For trees, these suitability categories will include PRF-I (if only suitable for individuals or very small numbers of bats) or PRF-M (if suitable for multiple bats). Any evidence of bats, such as live or dead specimens, droppings, urine splashes, fur-oil staining or squeaking noises was also recorded.
- **Otter:** All suitable otter habitat within both Survey Areas were subject to a systematic search for spraints, paw prints, otter paths, slides, food remains, holts and places used for shelter, in line with standing advice from NatureScot (NatureScot, 2024).
- **Water vole:** Watercourses within both Survey Areas were assessed for their suitability to support water voles was made in line with the Mammal Society guidance (Dean *et al.*, 2016).
- **Reptiles:** Areas of potential reptile habitat were recorded during the field survey. These include habitat transitions (ecotones), rank grassland, piles of debris or bare ground which form part of habitat mosaic providing suitable reptile hibernation, basking and/or foraging habitat (Edgar, Foster and Baker, 2010).
- **Amphibians:** The suitability of accessible waterbodies within 250m of both Survey Areas to support breeding great crested newts will be assessed in line with the great crested newt *Triturus cristatus* Habitat Suitability Index (HSI) (Oldham *et al.*, 2000). Habitat suitability was also considered for natterjack toads, in line with the Natterjack Toad Conservation Handbook (Beebee and Denton, 1996).
- **Other species:** Any other protected or notable species, or more common species present during the field survey were recorded (observed directly or via field signs).
- **Invasive non-native species (INNS):** Where present, the location and extent of invasive non-native species was recorded within both Survey Areas. The survey focused on those species listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

The weather during the survey was overcast and dry throughout the day with temperature highs of 15 °C. The timing of the survey was within the optimal season for botanical surveys (April – September), so floral species identification and accurate habitat classification was possible.

### 2.1.4.1 Limitations

The survey of both Survey Areas presents a 'snapshot' in time and represents the prevailing conditions at that point.

There is potential that species present in both Survey Areas would not have been observed during the field survey and therefore not recorded. The field survey conducted does not provide an exhaustive list of plant species present on both Survey Areas, however the information collected does provide sufficient information to classify habitats present.

## Project related

The field survey coverage was constrained to both Survey Areas shown in Figure 3 due to access restrictions from livestock. Therefore, potential ecological receptors within adjacent and interconnected land parcels will not have been recorded.

In addition, areas of different habitats are dependent on data collected during the survey and transferred to Geographic Information Systems (GIS). The accuracy of these is approximate and would need to be verified by measurements on both Survey Areas where required for design (if relevant).

When considering the objective of the survey, the habitats present and the surrounding areas, it is considered that these constraints would not have a major impact on the findings of this report.

## 2.2 Results

### 2.2.1 Designated Sites

**Table 2-2** provides detail of statutory designated sites for nature conservation within 2 km of both Survey Areas. The location and extent of the designated sites in relation to both Survey Areas are shown in **Figure 4**.

## Project related

Table 2-2 Statutory nature conservation designated sites within 2 km of both Survey Areas

Site name	Designation	Closest proximity to Survey Areas	Reason for designation
Cockerham Marsh	SSSI	Within Survey Area A	See <b>Section 2.2.1.1</b> for more information relating to the Cockerham Marsh SSSI.
Morecambe Bay and Duddon Estuary	Special Protected Area (SPA)	Within Survey Area B	<p>The site qualifies under Article 4.1 (2009/147/EC) for supporting the following:</p> <p><i>Overwintering species</i></p> <ul style="list-style-type: none"> <li>• Whooper swan <i>Cygnus cygnus</i> (113 individuals, 1.0 % of GB population, 5-year peak mean 2009/10 – 2013/14).</li> <li>• Little egret <i>Egretta garzetta</i> (134 individuals, 3.0 % of GB population, 5-year peak mean 2009/10 – 2013/14).</li> <li>• Golden plover <i>Pluvialis apricaria</i> (1,900 individuals, 1.0 % of GB population, Morecambe Bay SPA 1991 citation value).</li> <li>• Ruff <i>Calidris pugnax</i> (8 individuals, 1.0 % of GB population, 5-year peak mean 2009/10 – 2013/14).</li> <li>• Bar-tailed godwit <i>Limosa lapponica lapponica</i> (3,046 individuals, 8.0 % of GB population, 5-year peak mean 2009/10 – 2013/14).</li> <li>• Mediterranean gull <i>Larus melanocephalus</i> (18 individuals, 1.0 % of GB population, 5-year peak mean 2009/10 – 2013/14).</li> </ul> <p><i>Breeding species</i></p> <ul style="list-style-type: none"> <li>• Common tern <i>Sterna hirundo</i> (570 individuals, 2.0 % of the population in Great Britain, Morecambe Bay SPA 1991 citation value).</li> <li>• Sandwich tern <i>Sterna sandvicensis</i> (1,608 individuals, 5.7 % of GB population, summed data from original Morecambe Bay SPA and Duddon Estuary SPA).</li> <li>• Little tern <i>Sternula albifrons</i> (84 individuals, 2.2 % of GB population, RSPB data 2010 – 2014).</li> </ul> <p>The site qualifies under Article 4.2 (79/409/EEC) as:</p> <ul style="list-style-type: none"> <li>• It is regularly used by over 20,000 seabirds in any season, including herring gull <i>Larus argentatus</i>, lesser black-backed gull <i>Larus fuscus</i>, sandwich tern, common tern and little tern.</li> <li>• It is regularly used by over 20,000 waterbirds in any season.</li> </ul> <p><i>It supports the following species on passage:</i></p> <ul style="list-style-type: none"> <li>• Pink-footed goose <i>Anser brachyrhynchus</i> (15,648 individuals, 4.5 % of biogeographical population, 5-year peak mean 2009/10 – 2013/14).</li> <li>• Shelduck <i>Tadorna tadorna</i> (5,878 individuals, 2.0 % of biogeographical population, 5-year peak mean 2009/10 – 2013/14).</li> <li>• Oystercatcher <i>Haematopus ostralegus</i> (55,888 individuals, 6.8 % of biogeographical population, 5-year peak mean 2009/10 – 2013/14).</li> <li>• Ringed plover <i>Charadrius hiaticula</i> (1,049 individuals, 1.4 % of biogeographical population, 5-year peak mean 2009/10 – 2013/14).</li> </ul>

## Project related

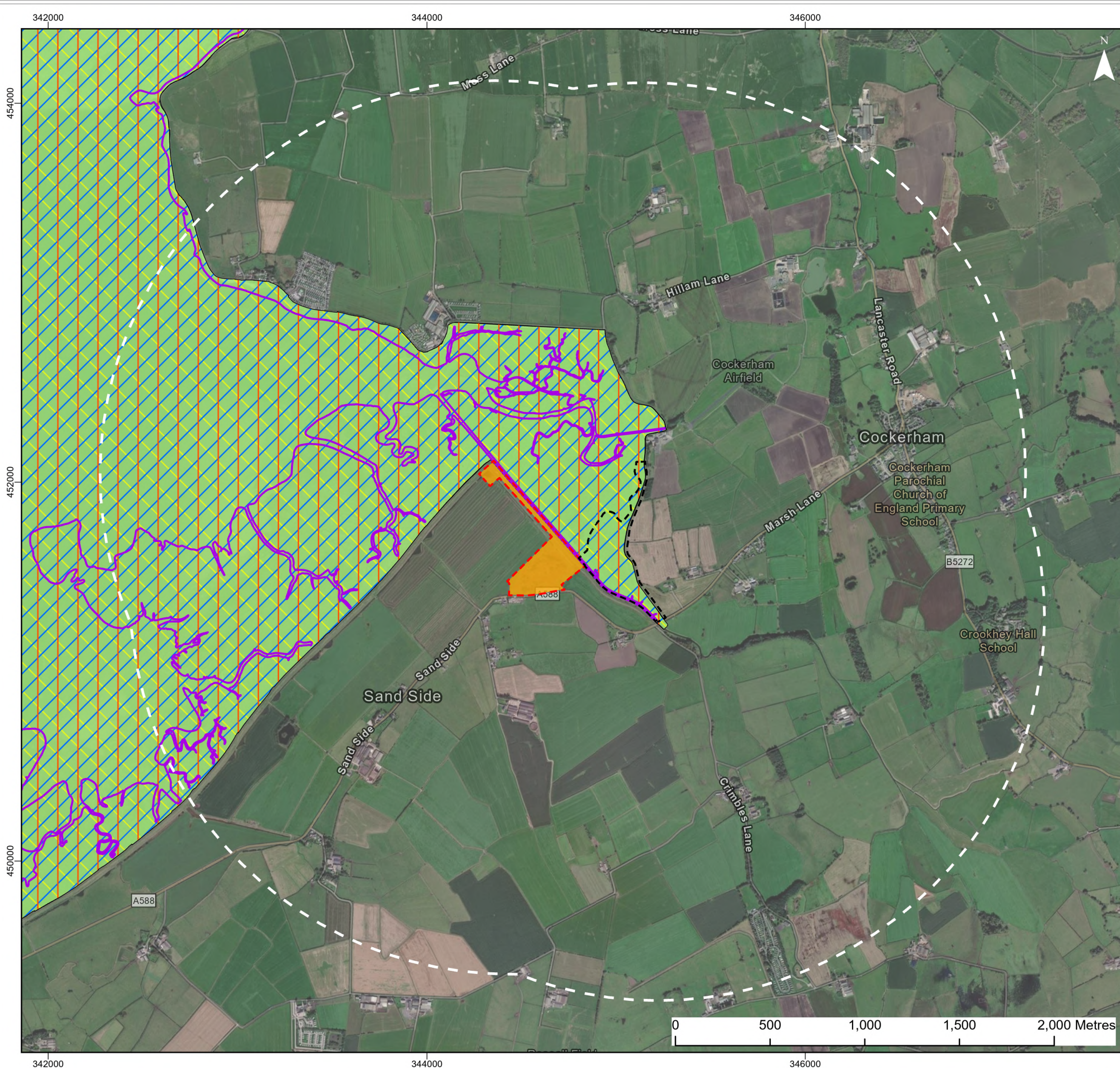
Site name	Designation	Closest proximity to Survey Areas	Reason for designation
			<ul style="list-style-type: none"> <li>Grey plover <i>Pluvialis squatarola</i> (2,000 individuals, 1.0 % of biogeographical population, Morecambe Bay SPA 1991 citation value).</li> <li>Knot <i>Calidris canutus</i> (32,739 individuals, 7.3 % of biogeographical population, 5-year peak mean 2009/10 – 2013/14).</li> <li>Sanderling <i>Calidris alba</i> (3,600 individuals, 3.0 % of biogeographical population (Morecambe Bay SPA citation 1991).</li> <li>Twite <i>Linaria flavirostris</i> (26,982 individuals, 2.0 % of biogeographical population, 5-year peak mean 2009/10 – 2013/14).</li> <li>Black-tailed godwit <i>Limosa limosa</i> (2,413 individuals, 4.0 % of biogeographical population, 5-year peak mean 2009/10 – 2013/14).</li> <li>Curlew <i>Numenius arquata</i> (12,209 individuals, 1.5 % of biogeographical population, 5-year peak mean 2009/10 – 2013/14).</li> <li>Pintail <i>Anas acuta</i> (2,498 individuals, 4.2 % of biogeographical population, 5-year peak mean 2009/10 – 2013/14).</li> <li>Ruddy turnstone <i>Arenaria interpres interpres</i> (1,359 individuals, 1.0 % of biogeographical population, 5-year peak mean 2009/10 – 2013/14).</li> <li>Redshank <i>Tringa totanus</i> (11,133 individuals, 4.6 % of biogeographical population, 5-year peak mean 2009/10 – 2013/14).</li> <li>Lesser black-backed gull (9,450 individuals, 1.7 % of biogeographical population, 5-year peak mean 2009/10 – 2013/14).</li> </ul> <p><i>It supports the following breeding species:</i></p> <ul style="list-style-type: none"> <li>Lesser black-backed gull (9,720 individuals, 2.7 % of biogeographic population, Seabird monitoring programme database 2011 – 2015)</li> <li>Herring gull (20,000 individuals, 1.0 % of biogeographic population, Morecambe Bay SPA 1991 citation value).</li> </ul>
Morecambe Bay	Special Area of Conservation (SAC)	Within Survey Area B	<p>Annex I habitats that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> <li>Estuaries (1130);</li> <li>Mudflats and sandflats not covered by seawater at low tide (1140);</li> <li>Large shallow inlets and bays (1160);</li> <li>Perennial vegetation of stony banks (1220);</li> <li><i>Salicornia</i> and other annual colonizing mud and sand (1310);</li> <li>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) (1330);</li> <li>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (“white dunes”) (2120);</li> <li>Fixed coastal dunes with herbaceous vegetation (“grey dunes”) (2130); and</li> <li>Humid dune slacks (2190).</li> </ul> <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> <li>Sandbanks which are slightly covered by sea water all the time (1110);</li> <li>Coastal lagoons (1150);</li> <li>Reefs (1170);</li> </ul>

## Project related

Site name	Designation	Closest proximity to Survey Areas	Reason for designation
			<ul style="list-style-type: none"> <li>Embryonic shifting dunes (2110);</li> <li>Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) (2150); and</li> <li>Dunes with <i>Salix repens ssp. argentea</i> (<i>Salicion arenariae</i>) (2170).</li> </ul> <p>Annex II species that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> <li>Great crested newt <i>Triturus cristatus</i> (1166).</li> </ul>
	Ramsar site		<p>The site qualifies under Ramsar Criterion 4 as it is a staging area for migratory waterfowl including internationally important numbers of passage ringed plover.</p> <p>The site qualifies under Ramsar Criterion 5 as it supports an internationally important assemblage of 223,709 wintering waterfowl (5-year peak mean 1998/9 – 2002/3).</p> <p>The site qualifies under Ramsar Criterion 6 as it supports the following species/populations occurring at levels of international importance:</p> <p><i>Species regularly supported during the breeding season</i></p> <ul style="list-style-type: none"> <li>Lesser black-backed gull (19,666 occupied nests, representing 13/3% of the breeding population).</li> <li>Herring gull (10,431 occupied nests, representing 2.8% of the breeding population).</li> <li>Sandwich tern (290 pairs, representing 2.8% of the GB population, 5-year peak mean 1992 – 1996).</li> </ul> <p><i>Species with peak counts in spring /autumn</i></p> <ul style="list-style-type: none"> <li>Cormorant <i>Phalacrocorax carbo carbo</i> (967 individuals, representing 4.2% of the GB population, 5-year peak mean 1998/9 – 2002/3).</li> <li>Shelduck (7,032 individuals, representing 2.3% of the population, 5-year peak mean 1998/9-2002/3).</li> <li>Pintail (3,743 individuals, representing 6.2% of the population, 5-year peak mean 1998/9-2002/3).</li> <li>Eider <i>Somateria mollissima</i> (5,657 individuals, representing 7.7% of the GB population, 5-year peak mean 1998/9-2002/3).</li> <li>Oystercatcher (66,577 individuals, representing 6.5% of the population, 5-year peak mean 1998/9-2002/3).</li> <li>Ringed plover (1,041 individuals, representing 1.4% of the population, 5-year peak mean 1998/9-2002/3).</li> <li>Grey plover (1,655 individuals, representing 3.1% of the GB population, 5-year peak mean 1998/9-2002/3).</li> <li>Sanderling (703 individuals, representing 3.4% of the GB population, 5-year peak mean 1998/9- 2002/3 - spring peak).</li> <li>Curlew (20,018 individuals, representing 4.7% of the population, 5-year peak mean 1998/9-2002/3).</li> <li>Ruddy turnstone (1,371 individuals, representing 1.4% of the population, 5-year peak mean 1998/9-2002/3).</li> <li>Lesser black backed gull (40,393 individuals, representing 7.6% of the population, 5-year peak mean 1998/9-2002/3).</li> </ul> <p><i>Species with peak counts in winter</i></p> <ul style="list-style-type: none"> <li>Great crested grebe <i>Podiceps cristatus cristatus</i> (217 individuals, representing 1.3% of the GB population, 5-year peak mean 1998/9- 2002/3).</li> <li>Pink-footed goose (3,665 individuals, representing 1.5% of the population, 5-year peak mean 1998/9-2002/3).</li> </ul>

## Project related

Site name	Designation	Closest proximity to Survey Areas	Reason for designation
			<ul style="list-style-type: none"> <li><i>Wigeon Anas penelope</i> (6,133 individuals, representing 1.5% of the GB population, 5-year peak mean 1998/9-2002/3).</li> <li>Goldeneye <i>Bucephala clangula</i> (285 individuals, representing 1.1% of the GB population, 5-year peak mean 1998/9-2002/3).</li> <li>Red-breasted merganser <i>Mergus serrator</i> (327 individuals, representing 3.3% of the GB population, 5-year peak mean 1998/9- 2002/3).</li> <li>Golden plover (4,073 individuals, representing 1.6% of the GB population, 5-year peak mean 1998/9-2002/3).</li> <li>Northern lapwing <i>Vanellus vanellus</i> (16,492 individuals, representing 1% of the GB population, 5-year peak mean 1998/9- 2002/3).</li> <li>Knot (66,335 individuals, representing 14.7% of the population, 5-year peak mean 1998/9-2002/3).</li> <li>Dunlin <i>Calidris alpina alpina</i> (26,416 individuals, representing 1.9% of the population, 5-year peak mean 1998/9-2002/3).</li> <li>Bar-tailed godwit (4,579 individuals, representing 3.8% of the population, 5-year peak mean 1998/9-2002/3).</li> </ul>
Lune Estuary	SSSI	Within Survey Area B	<p>The following species and assemblages are notified features of the Lune Estuary SSSI:</p> <ul style="list-style-type: none"> <li>Curlew (non-breeding, favourable condition).</li> <li>Dunlin (non-breeding, favourable condition).</li> <li>Grey plover (non-breeding, condition not recorded).</li> <li>Knot (non-breeding, condition not recorded).</li> <li>Oystercatcher (non-breeding, favourable condition).</li> <li>Pink-footed goose (non-breeding, favourable condition).</li> <li>Redshank (non-breeding, favourable condition).</li> <li>Ringed plover (non-breeding, condition note recorded).</li> <li>Sanderling (non-breeding, condition note recorded).</li> <li>Turnstone (non-breeding, condition not recorded).</li> <li>Vascular plant assemblage (favourable condition).</li> </ul> <p>The following habitats are cited features of the Lune Estuary SSSI:</p> <ul style="list-style-type: none"> <li>Littoral sediment (condition not recorded).</li> <li>Saltmarsh (favourable condition).</li> </ul>
Wyre-Lune	Marine Conservation Zone (MCZ)	Within Survey Area B	<p>The Wyre-Lune MCZ is designated for the presence of smelt <i>Osmerus eperlanus</i>. Smelt were once common throughout UK estuaries, but their numbers have declined over the last two centuries. They typically gather in large groups in the lower parts of estuaries and migrate into freshwater to spawn during the spring. Estuaries like the Wyre and Lune are therefore essential, providing the habitats smelt need for feeding, spawning, and early development. Because smelt are highly sensitive to environmental changes such as overfishing, habitat loss, migration barriers, and water quality issues, they serve as important indicators of ecosystem health.</p>



**Legend**

- UKHab Survey Area A (Cockerham Marsh SSSI)
- UKHab Survey Area B
- 2km buffer
- Wyre-Lune Marine Conservation Zone (MCZ)
- Morecambe Bay & Duddon Estuary Special Protection Area (SPA)
- Morecambe Bay Ramsar Site
- Morecambe Bay Special Area of Conservation (SAC)

**Site of Special Scientific Interest (SSSI)**

- Cockerham Marsh SSSI
- Lune Estuary SSSI

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Client: <b>Natural England and Lancashire Wildlife Trust</b>	Project: <b>Cocker Tidal Channel</b>
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Title:  
**Designated sites for nature conservation  
within 2km of the Survey Area**

Figure: 4

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
0	17/12/2025	TC	BM	A3	1:20,000

Co-ordinate system: British National Grid



### 2.2.1.1 Cockerham Marsh SSSI

#### SSSI Features and Conservation Objectives

Cockerham Marsh SSSI's sole notified feature is the natterjack toad *Bufo calamita*. The most recent condition assessment for the SSSI (30/07/2020) assessed the natterjack toad as being in unfavourable – declining condition, with a comment that the habitat is inappropriate for natterjack toads. Natterjack toads are extinct on the SSSI Site – with no toadlet production observed after 1982, the last calling male recorded in 1988, two females seen in 1990, but no signs of any life stages found since 1990. Natterjack toad spawn and tadpoles were released into the SSSI's pools each year between 2002 and 2004; however, this reintroduction was unsuccessful. Three key pressures are recognised on the SSSI - Flood and Coastal Erosion Risk Management (FCERM) measures, scrub encroachment and undergrazing. The list of Operations Requiring Natural England's Consent (ORNECs), as these would likely damage the SSSI's special interest, largely align with these pressures and the SSSI's history of being reclaimed saltmarsh.

The SSSI's nature conservation objectives are as follows:

- Reinststate and maintain suitable short sward conditions for natterjack toads as a hunting and feeding ground adjacent to their breeding ponds (cattle grazing to be preferred to that of sheep).
- Reinststate and maintain suitable open water bodies as natterjack toad breeding habitat.
- Establish and maintain sufficient natterjack toad hibernation sites (such as small piles of rubble or gorse *Ulex europaeus* scrub).
- Re-introduce natterjack toads by the translocation of spawn from sites elsewhere.

#### Historic Management

In 2005, English Nature provided a statement on their views about the management of Cockerham Marsh SSSI, giving advice as to the ideal habitat for supporting Natterjack toads, which should comprise:

- A mosaic of terrestrial and aquatic habitats with extensive areas of closely-cropped turf, areas of bare ground and scattered patches of taller vegetation such as rushes to provide foraging habitat;
- Shallow temporary pools with gradually sloping edges for breeding;
- Turf maintained by grazing, for example, by domestic livestock or rabbits, to maintain open conditions and prevent scrub encroachment; and
- Presence of embankments, small dune areas or dry-stone wall to provide cover.

The SSSI's management plan (Hickling, 2010) details the status of the SSSI Site from 1969 – 2009 as well as describing several ephemeral ponds within the SSSI Site which have not greatly changed in terms of area coverage since 1992, however, are now notably drier and overgrown with various grasses, scrub and sea rush *Juncus maritimus*. The document states that the hydrological isolation of the SSSI Site as a result of the sea embankment and various surrounding land drainage ditches has resulted in it drying out, which in turn has allowed the sea rush to dominate over time. Vegetation within the SSSI has not been managed by an appropriate grazing regime using cattle, as sheep, which have been used to graze the SSSI Site in the past, do not graze on rushes. The SSSI's management plan details the following works are needed in order to meet the SSSI's nature conservation objectives:

- Clear areas of sea rush and level undulating ground in late summer, to create a network of open short, cropped areas between pools, earth mounds and gorse scrub on embankments.
- Control and reduce the overall amount of gorse on the SSSI Site by at least 50% during the months of September and February, where necessary treating cut stumps with a herbicide to prevent re-growth. Gorse should be retained on the banks on the northern most margins of the SSSI Site.
- Re-excavate pools where necessary to remove silt and or vegetation.

## Project related

- Create natterjack toad hibernation sites using piles of stone, concrete and sand - locating these close to the edges of pools and along the rises and embankments to provide refuges during wet winters. Roofing slates and tiles placed around the edges of pools are also good as refugia for emerging toadlets.
- Translocation of further natterjack toad spawn from Ainsdale or another Cumbrian natterjack toad site, as required, once the above SSSI Site management works have been carried out.
- Ensure that SSSI Site is grazed to maintain a low grassy sward with few clumps of rush, especially in interconnecting areas between pools. Stocking levels/grazing should be reduced between the months of June and August in order to prevent the trampling of emerging toadlets.
- Annually cut rushes between pools, as and when required, between the months of November and March when the ground conditions are relatively dry in order to maintain open short grassy sward condition with few if any clumps of rush as a hunting ground for natterjack toads. No more than one third of the SSSI Site should be cut in any one year.
- Annually cut gorse, as and when required, treating cut stumps with an approved herbicide, ensuring at least 50% cover is maintained on earth embankments and mounds as a habitat for hibernation by natterjack toads.

### Historic Condition

A review of available historic mapping shows the SSSI Site mapped as saltmarsh, prior to the 1981 land reclamation, as far back as the 1830s – 1880s (National Library of Scotland, 2025). Historic maps showing this site history can be found in Section 2.11.1 of the Cocker Tidal Channel and Cockerham Marsh SSSI Restoration Investigation Task 1 - Desk-Based Review and Site Visit (Haskoning, 2025. Document reference: PC7494-RHD-XX-XX-RP-X-0001). Further review of historic mapping in a BNG context is detailed in **Section 5.1.3** below.

A timeline of natterjack toads' historic status from 1969 – 2009 within the SSSI is detailed below in **Table 2-3**. In the subsequent years since 2009, no natterjack toad activity has been recorded within the SSSI Site.

*Table 2-3 Timeline of natterjack toads in Cockerham Marsh SSSI 1969 – 2009, adapted from the SSSI Management Plan (Hickling, 2010).*

Year	Natterjack toad status within SSSI and notable events
1969	• First recording of natterjack toads within Cockerham Marsh. Breeding probable but not confirmed.
1970	
1971	• Breeding confirmed with tadpoles and/or spawn strings.
1972	
1976	• Breeding confirmed by presence of spawn but was unsuccessful due to exceptional spring flooding causing pools to be too saline preventing spawn development (1976) and due to pools drying up (1977).
1977	
1978	• Breeding confirmed and successful metamorphosis occurred. Where required, spawn was transferred from drying pools to those retaining water.
1979	• SSSI Site notified as part of the Lune Estuary SSSI in December 1979.
1980	• Breeding confirmed. Spawn collected and tadpoles reared and released after all but one pool dried up. • Several days of rain in June resulted in a second period of spawning, but successful metamorphosis was not confirmed.
1981	• Breeding confirmed and metamorphosis probably successful, surveying to confirm was not possible due to very wet spring conditions. • No spawn or tadpoles were collected as there was no danger of pools drying up.

## Project related

Year	Natterjack toad status within SSSI and notable events
	<ul style="list-style-type: none"> <li>Flood embankment built separating Cockerham Marsh from tidal influence by the Northwest Water Authority (NWWA), leaving behind a delph ditch on its landward side. This work was completed in September having excavated a pool c.40 x 15 m alongside the delph ditch. Both the ditch and pool contained saline water.</li> </ul>
1982	<ul style="list-style-type: none"> <li>Spawning confirmed and toadlets were reared artificially and released on the SSSI Site after a period of rain.</li> <li>The NWWA pool and delph ditch remained too saline for breeding toads</li> </ul>
1983	<ul style="list-style-type: none"> <li>Breeding was confirmed and successful within marsh pools as well as the delph ditch.</li> <li>The NWWA pool was still not suitable for breeding toads.</li> </ul>
1984	<ul style="list-style-type: none"> <li>Several tens of natterjack toads were present, with breeding and subsequent metamorphosis presumably occurring.</li> <li>Where required, spawn was transferred from drying pools to those retaining water.</li> <li>The NWWA pool was filled in as it remained unsuitable for natterjack toads.</li> <li>Fencing was erected along the inside of the SSSI boundary close to the breeding pools. This fencing separated the improved grass dominated pastures from the saltmarsh within the SSSI.</li> </ul>
1985	<ul style="list-style-type: none"> <li>Cockerham Marsh SSSI notification made.</li> </ul>
1986	<ul style="list-style-type: none"> <li>Breeding not confirmed.</li> <li>A very wet spring led to more standing water than normal, large amounts of filamentous algae and dense vegetation establishing in Pool 4.</li> </ul>
1987	<ul style="list-style-type: none"> <li>Substantial filamentous algae growth remained in the pools.</li> <li>Numbers of calling males were lower than in 1986 when conditions were similar.</li> <li>Tadpoles were noted and a few probably completed metamorphosis.</li> <li>Common frog tadpoles were recorded in Pool 4 for the first time.</li> <li><b>This was the last time that natterjack toads were known to have bred on the SSSI Site.</b></li> </ul>
1988	<ul style="list-style-type: none"> <li>One toad sighted.</li> <li>Pool 4 cleared of vegetation prior to breeding season.</li> </ul>
1989	<ul style="list-style-type: none"> <li>No toads were recorded on the SSSI Site.</li> <li>Pool 4 was re-scraped, removing vegetation and was deepened by 15-20 cm.</li> <li>Several clumps of soft rush were also transplanted towards the margins of the Pool 4 to provide cover for toadlets, but none were found.</li> <li>Large numbers of diving beetles were noted in Pool 4, before it was re-profiled.</li> <li>Sea water put into Pool 4 at high tide, in order to fill it.</li> <li>Salinity levels and diving beetle numbers were monitored regularly over the ensuing months to see how long it took for salinity levels to drop off and beetles to re-colonise pool.</li> </ul>
1990	<ul style="list-style-type: none"> <li>Two adult toads were found on the SSSI Site- one was dead and was positively identified as a female.</li> <li>No water was present in any of the pools by 10 June.</li> <li>Thick green filamentous algal mats were again present in Pool 4 by the end of April.</li> </ul>
1991	<ul style="list-style-type: none"> <li>Pool 4 was once more inundated with sea water on 29 February and carefully monitored over the ensuing months for the predicted drop of salinity levels and also to see how long it would take diving water beetles to re-colonise the pool.</li> <li>No adult toads found on the SSSI Site.</li> </ul>
1997	<ul style="list-style-type: none"> <li>English Nature, the Environment Agency and the Herpetological Conservation Trust agreed a package of measures for the re-introduction of natterjack toads at Cockerham Marsh including the construction of two new lined ponds, the clearance of rush, the re-excavation of existing pools followed by the reintroduction of spawn to the new ponds.</li> </ul>
1999	<ul style="list-style-type: none"> <li>Funds set aside to grant aid purchase Cockerham Marsh by British Herpetological Conservation Trust withdrawn, since owner not willing to negotiate sale.</li> <li>For the first time in just over twenty years no toads were found on the SSSI Site.</li> </ul>

## Project related

Year	Natterjack toad status within SSSI and notable events
2000	<ul style="list-style-type: none"> <li>All seven ponds held water but abundant green filamentous algae, float grass and pondweeds were present.</li> <li>No toads were found on the SSSI Site.</li> <li>The flood embankment and land reclamation were highlighted as a cause for the SSSI becoming unsuitable for natterjack toads.</li> </ul>
2001	<ul style="list-style-type: none"> <li>New pools (8 and 9) were excavated by the Environment Agency during the month of October, whilst some areas of gorse scrub and rush surrounding the pools were cut/removed before the translocation of natterjack toad spawn.</li> </ul>
2002	<ul style="list-style-type: none"> <li>Natterjack toad spawn translocated to newly excavated pools on Cockerham Marsh on 29 April from Sandscale Haws SSSI, Cumbria</li> </ul>
2003	<ul style="list-style-type: none"> <li>No toads from the 2002 introductions were found. Approximately 2,500 tadpoles were introduced to the new pools on 11 June.</li> <li>Water levels were artificially topped up in the pools.</li> <li>Areas of rush cut during 2001 had grown back around the pools due to the lack of a grazing regime.</li> </ul>
2004	<ul style="list-style-type: none"> <li>Approximately 500 tadpoles were introduced to each of the new pools.</li> <li>Water levels were artificially topped up in the pools.</li> </ul>
2005	<ul style="list-style-type: none"> <li>It was agreed that there was a need to undertake large scale habitat restoration works to ensure that more favourable habitat conditions were present on the SSSI Site for natterjack toads before any more re-introductions were made.</li> </ul>
2006	<ul style="list-style-type: none"> <li>Marsh visited during the months of April, May, and June to look for natterjack toads.</li> <li>No natterjack toads were found or heard calling.</li> <li>Hundreds of frog tadpoles were found in all pools together with much water and encroaching vegetation during the month of May.</li> </ul>
2009	<ul style="list-style-type: none"> <li>SSSI Site visited on 26 February to consider and draw up plans for future site management works - namely the levelling of land around pools and the removal of rushes to create an interconnecting area of grassy lawns between pools, further pool management work including minor re-profiling work and vegetation/rush clearance, as well as and further gorse removal from mounds/rises on the SSSI Site.</li> </ul>

### Field survey

The conditions present within Cockerham Marsh SSSI match those described in the desk-based review (Haskoning, 2025), being overgrown and unmanaged with expanding scattered rushes and scrub. The previous ponds and scrapes created as part of the Cockerham Marsh SSSI management were no longer wet and were either overgrown with grassland species or were bare ground, as detailed in **Table 2-4**.

More detailed information on habitats and species observed during the field survey of the SSSI are set out in **Sections 2.2.2** and **2.2.3**.

## Project related

Table 2-4 Cockerham Marsh SSSI pools, numbered in accordance with the SSSI's Management Plan (Hickling, 2010).

Pool number	Target Note (TN) number (Appendix A)	Description	Photo
1	TN2	Completely dry, overgrown and dominated by rushes.	
3	TN9	Dry and overgrown with short grasses.	
4	TN6	Dry and overgrown with Yorkshire fog <i>Holcus lanatus</i> .	

Project related

Pool number	Target Note (TN) number (Appendix A)	Description	Photo
6	TN7	Dry and overgrown with short grasses and rushes.	
7	TN4	Dry but not overgrown and surrounded by gorse scrub. Bare ground and short grasses present across majority of the pond area.	
8	TN12	Both dry and overgrown with common reed <i>Phragmites australis</i> .	
9			

## Project related

Pool number	Target Note (TN) number (Appendix A)	Description	Photo
Un-numbered but present in SSSI management plan	TN3	Completely dry, overgrown, dominated by rushes.	
Un-numbered but present in SSSI management plan	TN5	No signs of the pool being present.	

### SSSI Site Pressures

As stated above, there are three key pressures influencing the SSSI - FCERM, scrub encroachment and under grazing.

FCERM pressure has been present on the SSSI Site since 1981 as a direct result of construction of the flood embankment to reclaim the upper saltmarsh, cutting off natural tidal influence to the SSSI Site. Construction of the embankment has altered the tidal nature of the SSSI Site, as well as having an indirect effect on the amount of fresh surface water now held back on the SSSI Site following the lowering of the high-water mark which has been pushed seaward by the sea wall (Hickling, 2010). Tidal inundation of upper saltmarsh habitats is a key process in maintaining breeding pool suitability for natterjack toads, as the inundation periodically flushes out such pools and can prevent tadpoles of invertebrate predators from establishing. Additionally, natterjack toads have a higher salinity tolerance than other common UK amphibian species, particularly when in their tadpole life stage, thus periodic tidal inundation reduces the probability of other amphibian species being present and potentially outcompeting the natterjack toads (Gomez-Mestre and Tejedo, 2005). Therefore, the presence of FCERM pressure has notably reduced habitat suitability for breeding natterjack toads within the SSSI Site.

## Project related

Scrub encroachment has been a known pressure on the SSSI Site since the land reclamation took place in 1981. A review of available Google Earth aerial imagery shows a visual increase in scrub encroachment, becoming thicker and more established between 2000 (earliest available imagery at a suitable resolution) and 2023 (the latest available imagery) (**Figure 5**). Scrub encroachment reduces habitat suitability for natterjack toads by reducing the areas of available open turf or bare ground, encouraging other common amphibians to colonise that are better suited to the shadier conditions. Namely, common toads directly compete with natterjack toads and are known to utilise scrub habitat as well as breeding earlier in the year than natterjack toads. Therefore, if scrub is present near suitable breeding ponds, common toads would be attracted to the SSSI Site and breed in the ponds before the natterjacks can. After years of scrub encroachment, as seen on Cockerham Marsh SSSI, numbers of competing common amphibian species will have increased over time and thus the competition for breeding habitats. Gorse was the most abundant species within the patches of scrub on the SSSI observed during the field survey, a species known to form monotypic stands when left unmanaged and has ability to remain as seedstock within soils for long periods (Merryweather, 2014).

As noted in **Section 2.2.1.1**, one of the conservation objectives for the SSSI is to maintain the presence of some gorse scrub to provide hibernation habitat for natterjack toads. It is therefore important to distinguish between the *presence* of scrub and the *encroachment* of scrub. The CIEEM Scrub Management Handbook (CIEEM, 2003) refers to the 'presence of scrub' as scrub that is already established within a habitat and is considered part of the natural or managed mosaic of vegetation, whereas 'scrub encroachment' refers to the uncontrolled spread or invasion of scrub into habitats where it was previously absent or minimal, such as open grasslands or heathlands. It is noted that scrub encroachment around ponds is likely to limit their value for a range of amphibians, however, maintaining pioneer scrub with a diverse structure near ponds can benefit both amphibians and reptiles as it provides shelter and a rich source of food in the form of invertebrates.

Under-grazing as a pressure has become more prevalent over recent years as the SSSI Site has been left unmanaged, allowing sea rush to spread exponentially. As with scrub encroachment, Google Earth aerial imagery shows a visual increase in rush coverage between 2000 and 2023 as a direct result of the lack of appropriate management and grazing regime (**Figure 5**). When grazing was present on the SSSI Site, this was undertaken by sheep which would not have grazed on the sea rush present. In 1979 and 1984, sheep grazing was reduced on the SSSI Site by installation of netting and fencing around Pool 4. As such, the lack of consistent and appropriate grazing with cattle has allowed the sea rush to spread. Similar to scrub encroachment, rush spread from a lack of grazing reduces habitat suitability for natterjack toads by reducing the areas of available open turf or bare ground, encouraging other common amphibians to colonise that are better suited to the shadier conditions.

Project related



Figure 5 Cockerham Marsh SSSI aerial imagery from the years 2000 (top image) and 2023 (bottom image), sourced from Google Earth ©.

## 2.2.2 Habitats

### 2.2.2.1 Priority Habitats

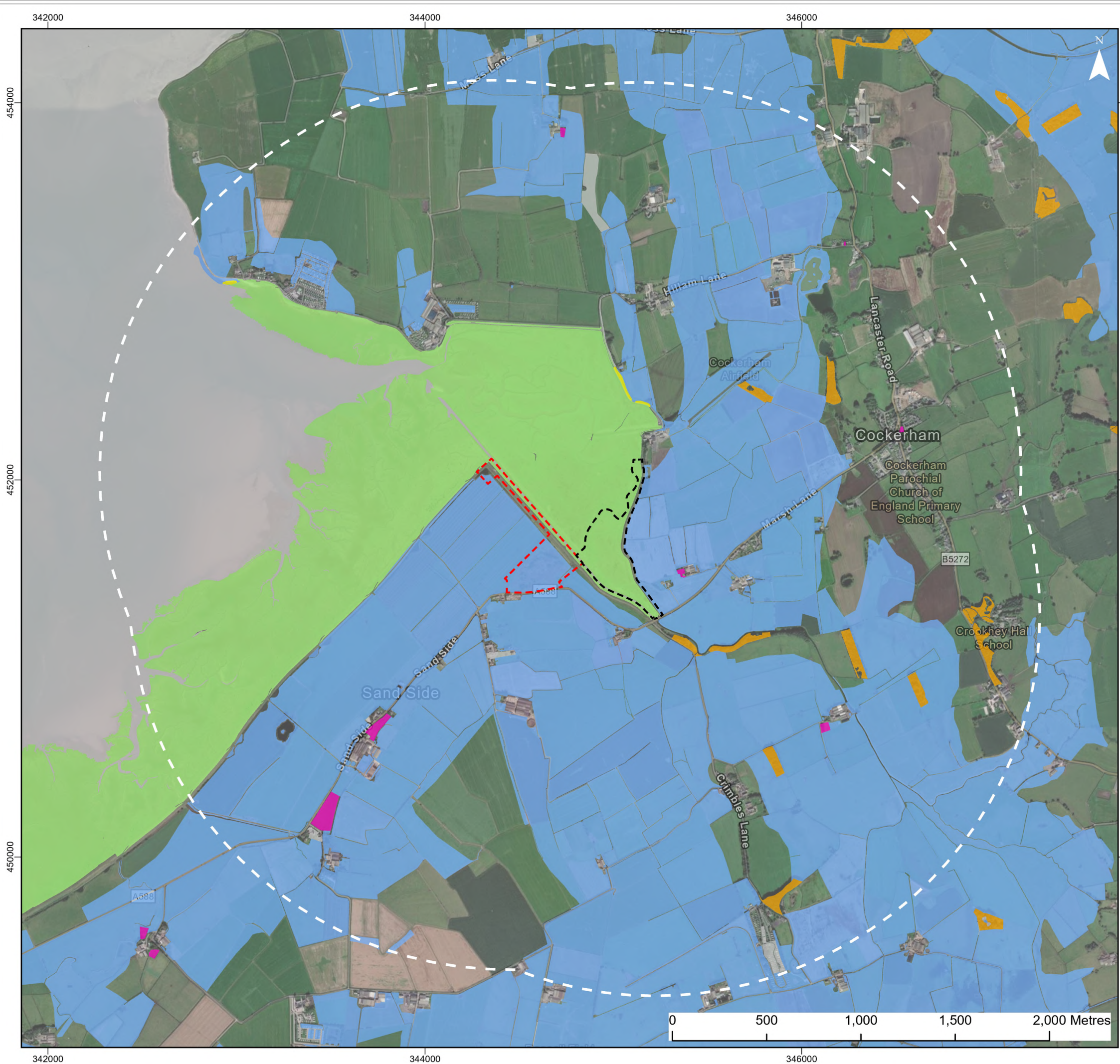
Section 41 (S41) priority habitats in England are habitats whereby public bodies must have regard to their conservation under the NERC Act. Five priority habitats are present within 2 km of both Survey Areas, as detailed in **Table 2-5**. The location and extent of the priority habitats in relation to both Survey Areas are shown in Figure 6.

Table 2-5 Priority habitats within 2 km of both Survey Areas.

Priority habitat	Closest proximity to the Survey Areas	Habitat description
Coastal and floodplain grazing marsh (CFGM)	Within Survey Area A	CFGM habitat includes periodically inundated pasture or meadow with standing, brackish or freshwater ditches that maintain their water levels (UKHab, 2023). This priority habitat occurs most commonly on the floodplains of rivers or on reclaimed land behind sea walls. Coastal floodplain grazing marsh can comprise a variety of grassland types including lowland meadows, modified grassland and other neutral grasslands.
Coastal saltmarsh	Within Survey Area B	Coastal saltmarsh comprises the upper, vegetated portions of intertidal mudflats (UKHab, 2023). Their vegetation consists of a limited number of halophytic species that are adapted to regular immersion by the tides. Natural saltmarsh systems have clear zonation, with pioneer Glassworts <i>Salicornia</i> spp. at the lowest level.
No main habitat but additional habitat exists	Within Survey Area B	<p>These habitats consist of a mixture of coastal saltmarsh and CFGM as described above, in addition to intertidal mudflats, reedbeds and Annex I Estuaries (H1130).</p> <p>Intertidal mudflats are intertidal habitats often associated with estuaries and sheltered areas, created by deposition in low energy coastal environments (UKHab, 2023). Their sediments consist mostly of silt and clay, with a high level of organic content (UKHab, 2023).</p> <p>Reedbeds are wetlands that are dominated by &gt;5 m wide stands of the common reed and where the water table is at or above ground level for most of the year (UKHab, 2023). Reedbeds are associated with areas of open water and ditches and other species present may include common club-rush <i>Schoenoplectus lacustris</i> and reed canary-grass <i>Phalaris arundinacea</i>.</p> <p>Estuaries (H1130) Annex I habitats are defined in UKHab (2023) as “the downstream part of a river valley that is subject to the tide, extending from the limit of brackish waters. River estuaries are coastal inlets where there is generally a substantial freshwater influence.” Such habitats comprise intertidal mudflats and sands, as finer sediments are deposited as a direct result of fresh and seawater mixing, and reduced current flows.</p>
Deciduous woodland	0.13 km southeast of Survey Area B	Lowland mixed deciduous woodland includes woodland growing on the full range of soil conditions, from very acidic to base-rich, and takes in most semi-natural woodland in southern and eastern England. It thus complements the ranges of upland

## Project related

Priority habitat	Closest proximity to the Survey Areas	Habitat description
		oak and upland ash types. It occurs largely within enclosed landscapes, usually on sites with well-defined boundaries, at relatively low altitudes, although altitude is not a defining feature (UKHab, 2023).
Traditional orchards	0.24 km east of Survey Area B	<p>Traditional orchards are defined by their habitat structure rather than specific vegetation present, soil conditions or topography (UKHab, 2023). Structurally they comprise open-grown trees set in herbaceous vegetation and have the following characteristics:</p> <ul style="list-style-type: none"> <li>Species composition being primarily in the Rosaceae family;</li> <li>Dense arrangement of trees;</li> <li>Small scale of individual habitat patches; and</li> <li>Wide dispersion of habitat patches in the countryside.</li> </ul>



**Legend**

- UKHab Survey Area A (Cockerham Marsh SSSI)
- UKHab Survey Area B
- 2km buffer
- Priority Habitats**
- Coastal and floodplain grazing marsh
- Coastal and floodplain grazing marsh, Coastal saltmarsh
- Coastal saltmarsh
- Deciduous woodland
- Traditional orchard
- No main habitat but additional habitats present

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Title:  
**Priority habitats within 2km  
of the Survey Area**

Figure: 6

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Co-ordinate system: British National Grid



## Project related

### 2.2.2.2 Field survey habitats

Eight UKHab primary habitat types were recorded within the Survey Areas during the field survey. These habitats are summarised in **Table 2-6** and **Table 2-7** with their location and extents in relation to both Survey Areas shown in **Figure 7**.

Table 2-6 UKHab baseline habitats present in both Survey Areas.

Habitat type	UKHab primary code	UKHab secondary code(s)	BNG Condition	Area (Ha)	Relevant Survey Area(s)	Priority habitat
Temporary grass and clover leys	c1b	<ul style="list-style-type: none"> <li>CFGM (19)</li> </ul>	Condition Assessment N/A	0.56	Survey Area A	✓
Other neutral grassland	g3c	<ul style="list-style-type: none"> <li>CFGM (19)</li> <li>Scattered rushes (14)</li> <li>Wet (503)</li> <li>Unmanaged (251)</li> </ul>	Poor	4.98	Survey Area A	✓
Modified grassland	g4	<ul style="list-style-type: none"> <li>CFGM (19)</li> <li>Cattle grazed (101)</li> <li>Sheep grazed (102)</li> <li>Bare ground (510)</li> <li>Track (839)</li> </ul>	Poor	3.93	Both Survey Areas A and B	✓ (only areas of CFGM)
Mixed scrub	h3h	<ul style="list-style-type: none"> <li>Unmanaged (521)</li> </ul>	Poor	0.72	Survey Area A	-
Other standing water	r1g	<ul style="list-style-type: none"> <li>Non-priority pond (41)</li> <li>Ditch (50)</li> <li>Seasonally wet (502)</li> </ul>	Poor	0.34 (including 0.23km length of ditches)	Survey Area A	-
Rivers and streams	r2	<ul style="list-style-type: none"> <li>Estuaries H1130 (74)</li> </ul>	Poor	0.46 (1.22km length)	Both Survey Areas A and B	✓
Coastal saltmarsh	t2a	<ul style="list-style-type: none"> <li>Rushes dominant (15)</li> <li>Sheep grazed (102)</li> <li>Wet (503)</li> <li>Mudbanks (314)</li> <li>Saline influence (702)</li> </ul>	Moderate	10.58	Both Survey Areas A and B	✓
Artificial unvegetated, unsealed surface	u1c	<ul style="list-style-type: none"> <li>Bare ground (510)</li> </ul>	N/A - Other	0.02	Survey Area A	-

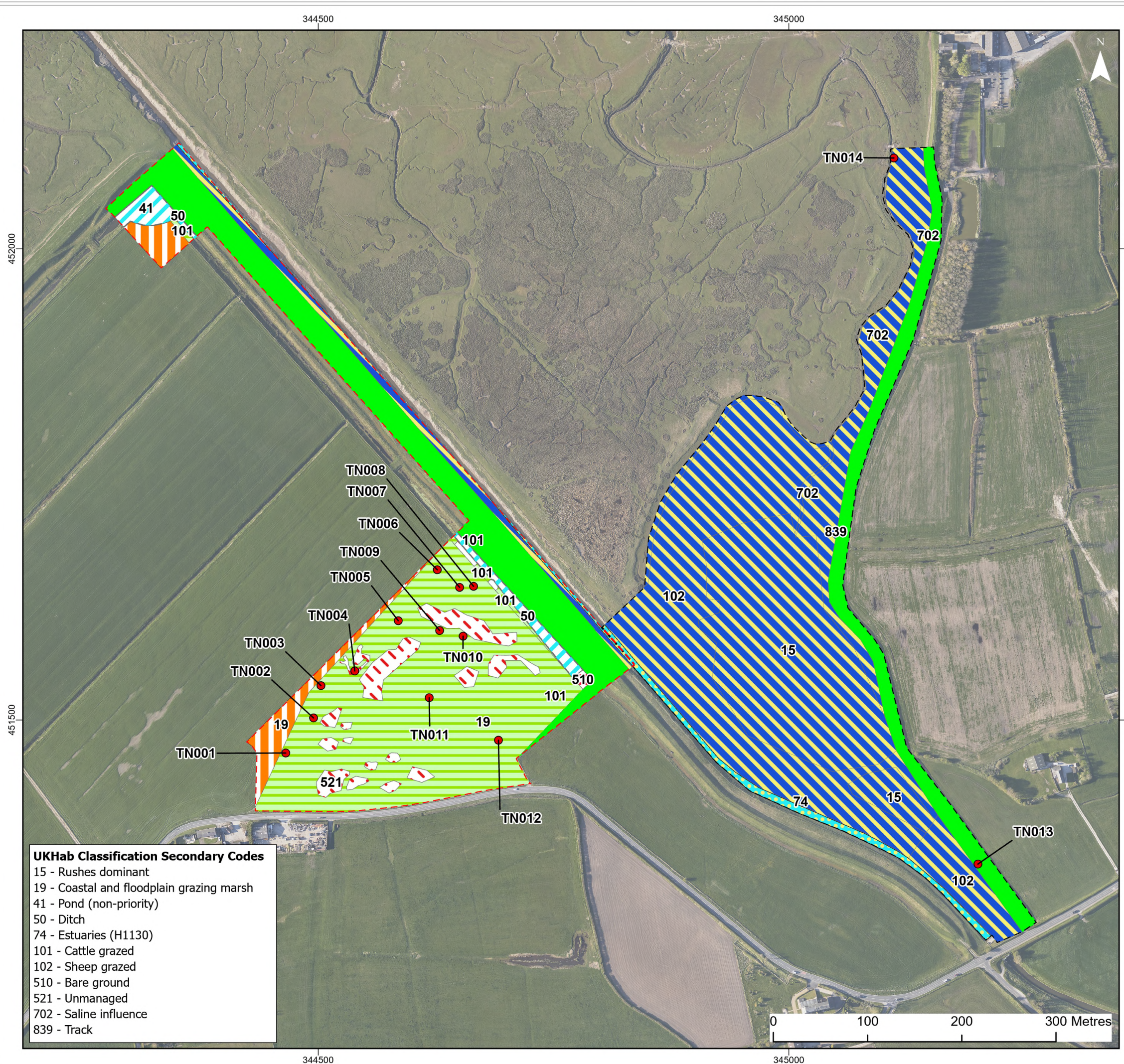
## Project related

Table 2-7 Baseline habitat descriptions.

Habitat type	Description	Photo reference (Appendix B)
Temporary grass and clover leys	A field of temporary grass and clover ley was located adjacent to the east of the Cockerham Marsh SSSI, within Survey Area A. This field was dominated by perennial ryegrass <i>Lolium perenne</i> which had visibly been artificially sown. This area is considered to be CFGM priority habitat.	2 and 9
Other neutral grassland	Majority of the Cockerham Marsh SSSI area (Survey Area A) comprised other neutral grassland habitat. This habitat was overgrown and unmanaged, with scattered rushes present in wetter patches of the area. Previous ponds and scrapes created as part of the Cockerham Marsh SSSI management were no longer wet and were either overgrown with other neutral grassland species or were bare ground. This habitat is considered to be CFGM priority habitat. Vegetation species present included: Yorkshire fog (A), common nettle <i>Urtica dioica</i> (A), cocksfoot <i>Dactylis glomerata</i> (A), soft rush <i>Juncus effusus</i> (A), common bent <i>Agrostis capillaris</i> (A), heath rush <i>Juncus squarrosus</i> (F), common reed (F), silverweed <i>Argentina anserina</i> (F), false oatgrass <i>Arrhenatherum elatius</i> (F), creeping buttercup <i>Ranunculus repens</i> (O), creeping thistle <i>Cirsium arvense</i> (O), curly dock <i>Rumex crispus</i> (O), tufted vetch <i>Vicia cracca</i> (O), rosebay willowherb <i>Chamaenerion angustifolium</i> (O), sea rush (O), common birds foot trefoil <i>Lotus corniculatus</i> (O), common hogweed <i>Heracleum sphondylium</i> (R), common ragwort <i>Jacobaea vulgaris</i> (R) and marsh pennywort <i>Hydrocotyle vulgaris</i> (R).	2, 7, 8, 10, 12, 14, 21 and 24.
Modified grassland	Modified grassland was present on the embankment (Survey Area A), field adjacent to the east of Cockerham Marsh SSSI (Survey Area A), and on the Public Right of Way (PRoW) track on the eastern boundary of Survey Area B. All areas of this habitat were grazed, either by sheep or cattle. Both areas of modified grassland on the embankment and PRoW were not priority habitats. The field adjacent to the east of Cockerham Marsh SSSI however is considered to be CFGM priority habitat. Vegetation species present included: perennial ryegrass (D), white clover <i>Trifolium repens</i> (F), red clover <i>T. pratense</i> (F), creeping buttercup <i>Ranunculus repens</i> (O), yarrow <i>Achillea millefolium</i> (O), Yorkshire fog (O) and saltmarsh sandspurry <i>Spergularia marina</i> (O).	29
Mixed scrub	Mixed scrub was present across the main field of the Cockerham Marsh SSSI (Survey Area A) and was also currently unmanaged. This habitat is not a priority habitat. Vegetation species present included: gorse <i>Ulex europaeus</i> (A), hawthorn <i>Crataegus monogyna</i> (F), bramble <i>Rubus fruticosus</i> (F) and goat willow <i>Salix caprea</i> (O).	3, 7, 8, 10, 14, 21 and 24.
Other standing water	A drainage ditch was present landward of the embankment, north of the Cockerham Marsh SSSI (Survey Area A). This ditch was only partially wet during the survey, suggesting its water levels would fluctuate seasonally. The ditch was unvegetated and visibly damaged cattle encroachment. This habitat is not a priority habitat.  A pond was also present on the northwestern branch of the SSSI Site (Survey Area A). This pond was not accessible during the survey due to a bull being present in the area, restricting access. This pond is however known to be encroached regularly by cattle as well as being connected to the poor-quality ditches. Therefore, based on professional judgement, this pond is not considered priority habitat.	22, 23, 25 and 26.
Rivers and streams	The canalised Cocker Channel was present seaward of the embankment of Survey Area A, extending along the southwestern edge of Survey Area B. This channel had exposed fine sediments and was void of in-channel or marginal vegetation. This habitat is considered to be Annex I Estuaries (H1130) habitat.	15, 16 and 17.
Coastal saltmarsh	Coastal saltmarsh habitat was present across majority of Survey Area B and seaward of the embankment within Survey Area A. All areas of coastal saltmarsh are priority habitat and were sheep grazed.	1, 4, 5, 6, 11, 13, 17, 18, 19, 27, 28, 30 and 31.

## Project related

Habitat type	Description	Photo reference (Appendix B)
	<p>On both banks of the canalised Cocker Channel upper saltmarsh species were present, including spear-leaved orache <i>Atriplex prostrata</i> (D), sea aster <i>Tripolium pannonicum</i> (F), saltmarsh sea spurrey (O) and sea couch <i>Elymus pungens</i> (R).</p> <p>Areas of saltmarsh present in Survey Area B adjacent to the A588 contained a mix of typical saltmarsh and modified grassland species, namely perennial ryegrass (D), silverweed (A), sea rush (O), sea plantain <i>Plantago maritima</i> (O), common ragwort (O), common reed (O), false oatgrass (O), curly dock (R) and sea thrift <i>Armeria maritima</i> (R).</p> <p>Majority of the saltmarsh area of Survey Area B comprised perennial ryegrass (A), sea rush (A), sea aster (F), glasswort <i>Salicornia</i> sp. (F), sea thrift (O), cuckoo flower <i>Cardamine pratensis</i> (R) and bladder wrack <i>Fucus vesiculosus</i> (R). Additionally, several patches of saltmarsh within the wider saltmarsh area had the same species present but were dominated by sea rush.</p> <p>The creeks present in Survey Area B were not vegetated and comprised bare fine sediments. There is potential such area could be colonised by pioneer saltmarsh species, such as glassworts, in the future as the saltmarsh continues to expand.</p>	
Artificial unvegetated, unsealed surface	One small area of artificial unvegetated, unsealed surface was present in the form of bare ground next to an agricultural gate in Survey Area A as a result of poaching from cattle. This habitat is not a priority habitat.	32



- UKHab Classification Secondary Codes**
- 15 - Rushes dominant
  - 19 - Coastal and floodplain grazing marsh
  - 41 - Pond (non-priority)
  - 50 - Ditch
  - 74 - Estuaries (H1130)
  - 101 - Cattle grazed
  - 102 - Sheep grazed
  - 510 - Bare ground
  - 521 - Unmanaged
  - 702 - Saline influence
  - 839 - Track



- Legend**
- UKHab Survey Area A (Cockerham Marsh SSSI)
  - UKHab Survey Area B
  - Target Notes
- UKHab Classification Primary Habitat**
- c1b - Temporary grass and clover leys
  - g3c - Other neutral grassland
  - g4 - Modified grassland
  - h3h - Mixed scrub
  - r1 - Standing open water and canals
  - r2 - Rivers and streams
  - t2a - Coastal saltmarsh
  - u1c - Artificial unvegetated, unsealed surface

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Title:  
Survey Area UKHab baseline plan  
of the Survey Area

Figure: 7

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid



## 2.2.3 Protected and Notable Species

The below sections set out the protected and notable species identified within the desk study and field survey. Field survey observations in the form of TNs (and accompanying photos where applicable) can be found in **Appendix A** and general Survey Area photos are shown in **Appendix B**.

### 2.2.3.1 Badgers

#### Desk study

The Protection of Badgers Act 1992 prohibits the killing, injuring or taking of badgers and damage or interference with a badger sett in UK, unless licensed to do so by a statutory authority.

No records of badger were held by NBN Atlas within 2km of both Survey Areas.

#### Field survey

No field signs of badgers were observed within the survey, such as setts, latrines, snuffle holes, pathways, footprints or hair.

Both Survey Areas overall are of low suitability for supporting badgers due to the limited foraging opportunities and habitat suitable for sett establishment. Badgers however are likely present in the agricultural land in the wider landscape and badgers are known to forage in a variety of habitats, showing preference for habitats which support a high biomass of earthworms (NatureScot, 2018). In terms of worm biomass, ungrazed grassland and scrub areas of Survey Area A would potentially act as secondary foraging habitat for badgers present within the wider local area.

### 2.2.3.2 Bats

#### Desk study

Bat species in the UK are protected under the Wildlife and Countryside Act 1981 (as amended) Schedule 5 and the Habitats Regulations Schedule 2, making it a criminal offence to deliberately disturb or harm bats and their roosts. Additionally, select species are listed as NERC S41 species.

MAGIC (Defra, 2025a) showed one EPSL return for bat species within 2km of both Survey Areas. This licence was for common pipistrelles *Pipistrellus pipistrellus* and was in place 09/07/2013 – 30/04/2014.

Within 5km of both Survey Areas, 24 records of four different bat species were reported by NBN Atlas:

- Daubenton's bat *Myotis daubentonii* (three records, most recent of which from 2012);
- Common noctule *Nyctalus noctula* (one record from 1982);
- Common pipistrelle (15 records, most recent of which from 2018); and
- Long-eared *Plecotus sp.* (five records, most recent of which from 1991).

#### Field survey

No structures or trees suitable for supporting roosting bats were present in both Survey Areas. Therefore, there is negligible potential for roosting bats within both Survey Areas.

Generally, bat species utilise linear features such as hedgerows for their foraging and commuting routes, thus the foraging potential for most species within both Survey Areas are inherently low. Some bat species however, such as Daubenton's bat identified in the NBN Atlas data, are known to forage over open coastal habitats such as those present within both Survey Areas (JNCC, 2001). As such, there is some potential that such bat species may be present and foraging within saltmarsh habitats of both Survey Areas. Land reclamations, such as the one within the Survey Area A, are known to pose a major threat to insect species

associated with saltmarshes and other coastal habitats which would act as a food source for bats – meaning foraging and commuting potential within Survey Area A itself is very limited (JNCC, 2001). Overall, there is low potential for commuting and foraging bats within the Survey Area.

### 2.2.3.3 Otter and water vole

#### Desk study

Otter *Lutra lutra* and water vole *Arvicola amphibious* are both legally protected under the Wildlife and Countryside Act 1981 (as amended) and the Habitats Regulations 2017, making it an offence to deliberately harm both species and their habitats. In addition to legislation, both otter and water vole are listed as S41 species, making them species of conservation and biodiversity priority.

No records of otters or water voles were held by NBN Atlas within 2km of both Survey Areas.

#### Field survey

No field signs of otters were observed within both Survey Areas, such as holts, spraints, feeding remains, pathways, footprints, or couches. Otters are known to forage within coastal and intertidal habitats throughout the UK, such as those present in Survey Area B. Additionally, ditches present in both Survey Areas would provide coastal otters with a fresh water source to clean salt from their fur, as well as to generally forage and explore.

Additionally, no water vole, field signs or any other indicators of water vole activity were found during the field survey of both Survey Areas. The ditches in both Survey Areas contained no debris or visible pollutants such as oil and scum, had slow-flowing water, soft earth banks suitable for burrowing, connectivity to a wider watercourse network, and some bankside cover (though this was mostly limited to slumped earth banks as opposed to being a result of emergent vegetation – see **Photo 4 in Appendix B**). However, these ditches are subject to some saline influence (water voles can inhabit brackish habitats but show a preference for freshwater) and had negligible emergent and marginal vegetation. Overall, the ditches in both Survey Areas were deemed to be of low suitability in supporting water voles.

### 2.2.3.4 Other terrestrial mammals

#### Desk study

No records of any other protected and notable terrestrial mammals were held by NBN Atlas within 2km of both Survey Areas.

#### Field survey

As stated in **TN14**, a Brown hare *Lepus europaeus* was observed within Survey Area B running across the grazed saltmarsh. Brown hares are a protected S41 species under the NERC Act.

Additionally, a small mammal burrow approximately 10cm in diameter was present within Survey Area A, likely attributable to a European rabbit *Oryctolagus cuniculus* (**TN8**). European rabbits have no specific legal protection in England.

Two roe deer *Capreolus capreolus* (**TN10**) were seen within the scattered scrub of Survey Area A. Roe deer are protected in the UK under the Deer Act 1991, which prohibits killing them at night and sets close seasons.

### 2.2.3.5 Birds

#### Desk Study

All wild bird species in the UK are protected under the Wildlife and Countryside Act 1981 (as amended), making it an offence to intentionally kill, injure or take any wild bird. It is also an offence intentionally take or

## Project related

destroy the nest or egg of any wild bird. However, some species found within 5 km of both Survey Areas are afforded extra protection from intentionally disturbing or causing harm to their nests while in use or being built under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), and others are also named on the Birds of Conservation Concern (BoCC) amber or red lists.

NBN held records for a total of 101 protected and notable bird species within 5km of both Survey Areas: 59 of which are BoCC amber listed, 32 are BoCC red listed and 13 are NERC S41 listed. The following key bird species recorded within 5km of both Survey Areas are listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended):

- Avocet *Recurvirostra avosetta* (49 records, most recent of which from 2023);
- Brambling *Fringilla montifringilla* (one record from 2003);
- Chough *Pyrrhocorax pyrrhocorax* (one record from 2007);
- Long-tailed duck *Clangula hyemalis* (one record from 2020);
- Fieldfare *Turdus pilaris* (ten records, most recent of which from 2023);
- Black-tailed godwit *Limosa limosa* (26 records, most recent of which from 2021);
- Greenshank *Tringa nebularia* (17 records, most recent of which from 2023);
- Kingfisher *Alcedo atthis* (23 records, most recent of which from 2022);
- Merlin *Falco columbarius* (12 records, most recent of which from 2020);
- Osprey *Pandion haliaetus* (one record from 2020);
- Barn owl *Tyto alba* (30 records, most recent of which from 2023);
- Peregrine *Falco peregrinus* (20 records, most recent of which from 2021);
- Little ringed plover (one record from 2021);
- Redwing *Turdus iliacus* (nine records, most recent of which from 2023);
- Scaup *Aythya marila* (one record from 2019);
- Whooper swan *Cygnus cygnus* (36 records, most recent of which from 2023);
- Cetti's warbler *Cettia cetti* (2 records, most recent of which from 2021);
- Whimbrel *Numenius phaeopus* (six records, most recent of which from 2021);
- Goldeneye *Bucephala clangula* (19 records, most recent of which from 2023);
- Greylag goose *Anser anser* (56 records, most recent of which from 2023); and
- Pintail (six records, most recent of which from 2020).

### Field Survey

During the field survey two groups of curlews were observed standing on the arable field west of Survey Area A (Cockerham Marsh SSSI) – one group of seven, and one group of 22 (**TN1**). Curlews are protected under Schedule 1 of the WCA 1981, listed on the BoCC red list and are a qualifying feature of the following nearby designated sites: Morecambe Bay Ramsar Site, Morecambe Bay and Duddon Estuary SPA, and Lune Estuary SSSI. Survey Area A itself is not of particular value for curlew, but would still constitute Functionally Linked Land (FLL) evidenced by the observations made in **TN1**. The surrounding saltmarsh habitats Survey Area B would also support foraging and overwintering curlew and are within the Morecambe Bay Ramsar Site, Morecambe Bay and Duddon Estuary SPA, and Lune Estuary SSSI. As highlighted in **Table 2-2**, majority of the qualifying bird species of these designated sites are waterbirds and would therefore similarly utilise saltmarsh habitats for foraging and overwintering.

An additional curlew and gaggle of 14 greylag geese were also observed calling and flying overhead during the survey (**TN11**). Greylag geese are also protected under Schedule 1 of the WCA 1981 and are listed on the BoCC amber list. Greylag geese are not a qualifying feature of any nearby designated sites.

## Project related

The ryegrass ley and modified grassland fields adjacent to Survey Area A (Cockerham Marsh SSSI) would provide suitable overwintering foraging habitat for similar wading waterbirds and pink-footed geese – a Schedule 1 and BoCC amber listed species listed as a qualifying feature of the Morecambe Bay Ramsar, SPA and Lune Estuary SSSI and would therefore constitute FLL.

### 2.2.3.6 Amphibians

#### Desk study

All native amphibians in the UK are afforded legal protection from sale under the Wildlife and Countryside Act 1981 Schedule 5 – with great crested newts, natterjack toads and pool frogs *Pelophylax lessonae* also being fully protected from harm under the same legislation. Additionally, some of our native amphibian species are S41 listed and are therefore a national conservation priority.

No records of any other protected and notable amphibian species were held by NBN Atlas within 2km of both Survey Areas. No EPSL returns for great crested newts were shown by MAGIC within 2km of both Survey Areas.

#### Field survey

One juvenile common frog *Rana temporaria* was observed on the PRoW lining the saltmarsh of Survey Area B (TN13). This juvenile frog would have hatched in the 2025 breeding season, demonstrating frogs and potentially other common amphibian species are actively breeding in the local area.

All ponds within 250 m of the of both Survey Areas were assessed for their suitability to support GCN. Within the Natural England SSSI Management Plan, seven ponds were identified within Survey Area A and assigned identification (ID) numbers (as shown in TN1, TN2, TN4, TN6, TN7, TN9, and TN12, respectively). A further two ponds were identified, though they were not assigned ID numbers (as shown in TN3 and TN5, respectively). All ponds were completely dry at the time of survey, (some were bare earth and others were overgrown by grass, rushes and scrub) and therefore had negligible potential to support GCN. Consequently, Survey Area A was also deemed to have negligible potential to support smooth newt *Lissotriton vulgaris* or palmate newt *Lissotriton helveticus*, and no signs of these species were identified.

No signs or suitable habitat for natterjack toads was observed within the Cockerham Marsh SSSI (Survey Area A), which mirrors the information provided in the desk-based review in **Section 2.2.1.1**.

### 2.2.3.7 Reptiles

#### Desk study

All reptile species in the UK are protected under the Wildlife and Countryside Act 1981 (as amended). Sand lizards *Lacerta agilis* and smooth snake *Coronella austriaca* are also afforded protection under the Habitats Regulations, however both are absent from this part of the UK.

No records of any other protected and notable reptile species were held by NBN Atlas within 2km of both Survey Areas.

#### Field survey

No field signs of reptiles or any other indicators of reptile activity were found during the field survey of both Survey Areas. The scrub and other neutral grassland areas of Survey Area A would provide potential foraging and hibernation habitat for common reptile species.

### 2.2.3.8 Fish

#### Desk study

Select fish species in the UK are protected from harm under the Wildlife and Countryside Act 1981 Schedule 5, as well as some being listed as S41 species.

NBN Atlas held one record of plaice *Pleuronectes platessa*, a NERC S41 species, within 2km of both Survey Areas from 2003. No other protected or notable fish records were present within 2km of both Survey Areas.

#### Field survey

Specific sampling of watercourses for fish species was not undertaken during the field survey. No incidental observations of protected and notable fish were found during the field survey of both Survey Areas, however, this does not rule out fish presence from such watercourses. The estuarine conditions within the canalised channel could potentially support smelt associated with the Wyre-Lune MCZ.

### 2.2.3.9 Invasive Non-Native Species (INNS)

#### Desk study

Invasive non-native species (INNS) are all listed under Schedule 9 of the Wildlife and Countryside Act 1981, which lists species of plants and animals for which it is a specific offence to plant or cause to grow in the wild (plants) or release or allow to escape into the wild (animals).

NBN Atlas held one record of Himalayan balsam *Impatiens glandulifera*, a plant INNS, within 2km of both Survey Areas from 2023. No other INNS records were present within 2km of both Survey Areas.

#### Field survey

No INNS were found during the field survey of both Survey Areas.

## 2.3 Task 4a Conclusions

Survey Area B has been included in the above results primarily to inform the other Tasks of the main study. As such, the below conclusions focus primarily on findings made in relation to Survey Area A.

### 2.3.1 Cockerham Marsh SSSI

Based on the information outlined in **Section 2.2.1.1**, it can be concluded that the absence of natterjack toads from the Cockerham Marsh SSSI is likely a direct result of the flood embankment constructed in 1981 and a lack of ongoing suitable management to favour natterjack toads. Both factors' impacts have been compounded over time when not addressed – resulting in the failure of the various attempts to re-establish ponds through landscaping and reintroduce natterjack toads to the SSSI through spawn translocation.

The presence of the flood embankment has cut off the tidal influence on the SSSI's breeding ponds, removing the vital process of periodic inundation which flushes out breeding pools with saline water, which prevents invertebrate predators of tadpoles from establishing and prevents competing common amphibian species from utilising the breeding ponds. The presence of the flood embankment has also made the fresh surface water resources on the SSSI unstable, causing more drying events in the breeding pools and further limiting breeding opportunities for natterjack toads. Additionally, without holding a stable water supply the pools are more susceptible to scrub and rush encroachment, which is exacerbated by the lack of ongoing management regime or grazing.

**Sections 3 and 4** (Tasks 4b and 4c) below discuss the SSSI Site's habitat restoration options and associated habitat management in more detail.

### 2.3.2 Other Designated Sites

In addition to Cockerham Marsh SSSI (Survey Area A), several other designated sites were present within Survey Area B:

- Morecambe Bay and Duddon Estuary SPA;
- Morecambe Bay SAC;
- Morecambe Bay Ramsar site;
- Lune Estuary SSSI; and
- Wyre-Lune MCZ.

These sites are mainly designated for the extensive saltmarsh and marine habitats present and their associated bird species, which could be supported by FLL within Survey Area A. Effects on the qualifying species and habitats of the above listed designated sites are not anticipated as a result of any interventions on the Cockerham Marsh SSSI.

The extent to which any benefits are experienced by designated sites and their qualifying features is discussed further within **Section 3**, based on the restoration options that have been assessed within Task 2a of the investigation.

### 2.3.3 Priority Habitats

Coastal and floodplain grazing marsh priority habitat was identified within Survey Area A, namely within the main field of the SSSI Site and adjacent agricultural fields.

The coastal and floodplain grazing marsh of the SSSI Site will require a management regime to be adopted to facilitate the return of natterjack toads, however this will not compromise its status as priority habitat. **Sections 3** and **4** below discuss the extent to which these benefits are experienced, habitat restoration options and associated habitat management in more detail.

Additionally, traditional orchards and lowland mixed deciduous woodland were identified within 2km of Survey Area A, however, will not be affected by the proposed scheme and therefore do not require additional mitigation.

### 2.3.4 Protected and Notable Species

Survey Area A is suitable for, and supports, a range of protected and notable species, as demonstrated through the desk study and field survey data. Therefore, further surveys are required prior to any construction that may subsequently be undertaken to adequately understand the nature of constraints imposed by potential presence of certain species. Furthermore, during any construction works that may subsequently be undertaken associated with restoring the tidal Cocker Channel, various safeguards and mitigatory measures will be required. The further surveys and construction mitigation measures are summarised in **Table 2-8**.

**Sections 3** and **4** below discuss habitat restoration options and associated habitat management in more detail, including those that will benefit natterjack toads and other protected and notable species.

Certain overarching measures should be implemented during any construction works to minimise the effects on protected and notable species. These include:

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- Any vegetation clearance or demolition works should be carried out in a precautionary manner in relation to all wildlife present within both Survey Areas.
- Any animals encountered should be allowed to move off of their own accord if disturbed, or, in the case of hedgehogs, be carefully moved to a safe location away from the works, if necessary.
- If works are to be undertaken outside daylight hours, a sensitive lighting scheme should be implemented to avoid indirect disturbance to any nocturnal protected and notable species that may be using both Survey Areas. Guidance from the Bat Conservation Trust (BCT) and Institute of Lighting Professionals' (ILP) *Guidance Note 08/23 Bats and Artificial Lighting at Night* (BCT and ILP, 2023) should be used to inform any such sensitive lighting scheme.

## Project related

Table 2-8 Protected and notable species and associated potential construction effects, mitigation and further survey recommendations.

Protected and notable species or group	Survey findings	Potential construction effects	Recommended further survey	Recommended mitigation
Badgers	Both Survey Areas are of low suitability for supporting badgers, however, they are likely present in the wider landscape	Changes in foraging habitat	A pre-construction walkover to determine whether any badger setts have established within the works area or SSSI Site should be carried out prior to the commencement of works.	<ul style="list-style-type: none"> <li>All excavations left open overnight should include an escape ramp with adequate grip, at least 30 cm wide and set at an angle of no greater than 45° and fences should be used when the construction site is not manned.</li> <li>A toolbox talk should be provided to contractors by an ECoW prior to works to explain what to do if a badger or active sett is encountered on site.</li> <li>If an active badger sett is encountered during the pre-construction walkover and is present within 30 m of the works, a 30 m protective buffer zone must be clearly marked and maintained, within which no construction activity may take place.</li> <li>If the protective 30 m buffer cannot be maintained, a Natural England licence must be sought to exclude badgers and close the sett in advance of works.</li> </ul>
Bats	<p>No structures or trees suitable for supporting roosting bats were present in both Survey Areas.</p> <p>Low potential for commuting or foraging bats, in particular Daubenton's.</p>	Changes in foraging habitat	N/A	Works should avoid night working to minimise potential disturbance to bat species, as well as, where practicable, avoiding works between April – September (i.e. not working during peak bat activity season).
Otters and water vole	<p>No field signs of otter or water voles were observed within both Survey Areas.</p> <p>Coastal and intertidal habitats suitable for foraging otters.</p> <p>Ditches in both Survey Areas were of low suitability for supporting water voles.</p>	Changes in foraging habitat	A pre-works walkover for the species should be carried out to determine whether any otter holts or water vole burrows have established in proximity to the works. If an active burrows/ holts are found in proximity to the works which could be damaged, disturbed or blocked a Natural England licence will be required.	<ul style="list-style-type: none"> <li>Vegetation on the riverbanks should be retained where practicable.</li> <li>A toolbox talk should be provided to contractors by an ECoW prior to works to explain what to do if a water vole, otter or active burrow/ holt is encountered on site.</li> <li>All excavations left open overnight should include an escape ramp with adequate grip, at least 30 cm wide and set at an angle of no greater than 45° and fences should be used when the construction site is not manned.</li> </ul>

## Project related

Protected and notable species or group	Survey findings	Potential construction effects	Recommended further survey	Recommended mitigation
Other terrestrial mammals	Brown hare observed during survey so known to be present within Survey Area B.	Loss of burrowing habitat for burrowing mammal species (e.g. hare).	N/A	Follow general mitigation measures set out above in <b>Section 2.3.4.</b>
Birds	Observed curlew and greylag geese.  Presence of Functionally Linked Land (FLL) for Morecambe Bay Ramsar, SPA and Lune Estuary SSSI.	Loss of ground nesting bird habitat.  Changes in overwintering and foraging habitat.	Wintering bird surveys and breeding bird surveys to establish baseline use of the Survey Areas by birds associated with designated sites.  Nesting bird checks by a ECoW if vegetation clearance is planned to take place from March to August.	<ul style="list-style-type: none"> <li>• Vegetation clearance should ideally be carried outside of the nesting bird season (March – August inclusive) if practicable to reduce the potential of damage to birds' nests, although it is possible for some species to nest earlier in the year. Guidance should be sought from a suitably qualified ecologist if there is any reason for doubt.</li> <li>• If clearance is planned to take place from March to August, inclusive, an ECoW will be required to check the area for nesting birds a maximum of 48 hours prior to the commencement of works. Active nests and their associated vegetation must remain until young birds have left the nest.</li> <li>• A toolbox talk should be provided to contractors by an ECoW prior to works to explain what to do if active bird nests are encountered on Site.</li> </ul>
Amphibians	Observed juvenile common frog, thus common amphibian species are likely breeding in the wider landscape.  No signs or suitable habitat for natterjack toads.  All ponds within Survey Area A were dry and unsuitable for breeding amphibians.	Mortality during construction	N/A	<ul style="list-style-type: none"> <li>• Any habitat clearance should be done under a Precautionary Method of Working (PMoW) to minimise the risk of killing or injuring reptiles and amphibians. Once complete, the vegetation should be maintained at a low-level (&lt;30 mm) and/or stripped until the start of the proposed works. The PMoW should comprise the following: <ul style="list-style-type: none"> <li>○ An Ecological Clerk of Works (ECoW) will conduct a preconstruction walkover to check for reptile and amphibian refugia, which will be removed by hand if found;</li> <li>○ Once refugia has been cleared, a further walkover survey will be undertaken to thoroughly inspect the areas of vegetation on Site, to ensure no reptiles or amphibians are present;</li> <li>○ Tall vegetation will be cut back using a hand strimmer in stages over three days under ECoW supervision: 150 mm, 75 mm, and finally 30 mm, with checks after each cut. This procedure will be repeated until the vegetation has been cut to ground level and allows for species to naturally leave the area by being carried out in several stages;</li> </ul> </li> </ul>

## Project related

Protected and notable species or group	Survey findings	Potential construction effects	Recommended further survey	Recommended mitigation
Reptiles	The scrub and other neutral grassland areas of Survey Area A would provide potential foraging and hibernation habitat for common reptile species	Mortality during construction	N/A	<ul style="list-style-type: none"> <li>○ Remaining vegetation will be maintained at 30 mm through regular mowing or strimming to prevent reptiles or amphibians from returning.</li> <li>• If any reptiles or amphibians are discovered, these will be carefully removed by the ECoW and transported to a predetermined translocation Site away from any construction activities.</li> <li>• A toolbox talk should be provided to contractors by an ECoW prior to works to explain what to do if herpetofauna are encountered on Site.</li> </ul>
Fish	The estuarine conditions within the canalised channel could potentially support smelt associated with the Wyre-Lune MCZ.	Indirect impacts from siltation and site run-off.	N/A	Best practice, such as Pollution Prevention Guidelines: PPG1 (Environment Agency, 2013) should be followed to avoid effects on fish during the works. This will include prevention of pollution and sedimentation.
INNS	<p>NBN Atlas held one record of Himalayan balsam, a plant INNS, within 2km of both Survey Areas from 2023.</p> <p>No INNS were found during the field survey of both Survey Areas.</p>	Spread throughout construction works.	A pre-construction walkover to determine the presence/ absence of INNS by an ECoW is advised.	<ul style="list-style-type: none"> <li>• Good practice measures should be implemented throughout the works to reduce and minimise the risk of spreading INNS via a variety of pathways for example in water, on clothing, equipment, or other materials.</li> <li>• Biosecurity measures should be put in place in accordance with best practice guidance (Environment and Forestry Directorate, 2022), including a 'Check, Clean, Dry' protocol incorporating the following steps (NNS, 2024): <ul style="list-style-type: none"> <li>○ Check - Check your clothing and work equipment for mud aquatic animals or plant material. Remove anything you find and leave it at the site.</li> <li>○ Clean - Clean everything thoroughly as soon as you can, paying attention to areas that are damp or hard to access. Use hot water if possible.</li> <li>○ Dry - Dry everything for as long as you can before using elsewhere as some invasive plants and animals can survive for over two weeks in damp conditions.</li> </ul> </li> </ul>

### 3 Task 4b – Restoration Opportunities

#### 3.1 Cockerham Marsh SSSI

Since enclosure of the former upper saltmarsh area in 1981, previous attempts at improving the condition status of the sole interest feature of the SSSI (Natterjack toad) have focused on: (i) increasing the number of ponds; (ii) management of the terrestrial habitat; and (iii) spawn translocation, all as recommended by the relevant Natterjack toad guidance (Beebee & Denton, 1996; Baker *et al*, 2011). However, no previous efforts at reinstating (occasional) tidal flushing have been made at the site and this may be deemed the single ‘missing ingredient’ to date from an otherwise potentially successful management approach.

Task 2a of the study has considered a long-list of management options to enable restoration of occasional tidal inundation, namely:

- **Option 1 – Do nothing** (the base case against which other options are assessed)
- **Option 2 - Modify flood embankment**
  - **2a - Full embankment removal**
  - **2b - Breach embankment**
  - **2c - Lower crest (notch weir)**
- **Option 3 - Regulated tidal exchange**
  - **3a - Pipe and Penstock Control**
  - **3b - Channel and Sluice Control**
- Option 4 – Saline Treatment
  - 4a - Pumped Seawater
  - 4b - Sodium Chloride Enrichment
- Option 5 - Optimise site for other uses
  - 5a – Agriculture
  - 5b – Nature conservation / biodiversity
- **Option 6 – New pools adjacent to SSSI**

Those options in the above long-list which are typed in bold font were short-listed for more detailed assessment. Following such assessment and discussion with the Project Steering Group, the preferred option for the Cockerham Marsh SSSI is **Do nothing**.

Factors that have led to this conclusion relate primarily to the niche occupied by suitable breeding habitat for Natterjack toads on upper saltmarshes being highly sensitive to tides (requiring some inundation in spring, but no inundation during breeding periods through the summer) and weather (storm surge or drought). The tolerances that need to be adhered are finer than the magnitude of changes that occur cyclically across natural systems and many of these natural factors which can determine success or failure of breeding are not controllable through management intervention. It is also recognised that even prior to reclamation of the site through construction of the flood embankment in 1981, breeding success at the Cockerham Marsh SSSI was strongly influenced by management intervention, with spawn and tadpoles being moved from pools that were drying-out to pools that remained wet.

Also, in addition to reinstating occasional tidal conditions to the breeding pools on the SSSI site, there would also be a need for ongoing management and maintenance of the pools and surrounding terrestrial habitat, which is further described in section 4, which would add ongoing cost and resource requirements.

## **4 Task 4c – Management of Restored Habitats at Cockerham Marsh SSSI**

### **4.1 Natural Development of Habitats**

The re-introduction of tidal processes to Cockerham Marsh SSSI would be feasible in a controlled manner, but, as discussed in Section 3, the associated costs and low likelihood of long-term success have led to a preferred option of Do nothing at the present time.

Notwithstanding this decision, it is worth noting that if tidal processes were to be re-introduced to the site at some future time, it is likely that potentially suitable breeding pools could become established. However, this would require some initial scrub and vegetation clearance and topographic survey to enable refined detailed design of earthworks (e.g. digging-out of ponds) and potentially construction of some connecting channels on the site to ensure that tidal water reaches all of the pools.

Some of the existing terrestrial vegetation that would become newly affected by re-established (but occasional) tidal processes would slowly die-back and become succeeded by some upper saltmarsh species, with terrestrial vegetation likely remaining dominant due to the low frequency of tidal inundation. It is likely that suitable breeding pond conditions can become established in the first spring after tidal inundation is re-introduced to the site. However, saltmarsh vegetation will take a number of years to establish.

### **4.2 Management and Maintenance**

Another factor influencing the preferred management option of Do nothing for the site is that achieving re-establishment of tidal connectivity to the pools by no means provides certainty that Natterjack toad breeding will occur, because of the high sensitivity of the niche at which the pools exist. Management intervention would likely still be required (by means of translocations and scrub and vegetation control), as it was prior to upper saltmarsh reclamation in 1981, to ensure spawn and tadpoles (if produced) do not suffer from surges or drought.

## 5 Task 4d – Potential BNG and Carbon Credits

### 5.1 Early Stage BNG Assessment

BNG is a quantitative method to measure changes in biodiversity value as a result of a project, taking into consideration a site's biodiversity value (pre- and post-development) as well as any proposed habitat interventions. BNG uses terrestrial habitats above Mean Low Water Springs (MLWS) as a proxy for a site's biodiversity value, working on the principle that more ecologically valuable habitats tend to support more ecologically valuable species. Schedule 14 of the Environment Act 2021 makes provision of BNG a condition of planning permission in England as follows:

*“A biodiversity gain objective is an objective that the biodiversity value attributable to development to which a biodiversity gain statement relates exceeds the pre-development biodiversity value of the on-site habitat by at least 10%”.*

This provision came into force in February 2024 for most developments under the Town and Country Planning Act 1990 (unless exempt) and will apply to Nationally Significant Infrastructure Projects from November 2025.

#### 5.1.1 Methodology

##### 5.1.1.1 Scope of BNG Assessment

The Statutory Biodiversity Metric User Guide (Defra, 2025b) for the purposes of BNG calculations defines on and off-site areas as:

- **On-site:** all land within the red line boundary of a development; and
- **Off-site:** land outside of the red line boundary, which is dedicated to habitat interventions (habitat enhancement or creation), regardless of proximity or ownership.

For this early stage BNG assessment and associated calculations 'on-site' refers to all habitat within the SSSI Site (Survey Area A), as shown in **Figure 3** and **Figure 7**. All habitats outside the SSSI Site for this BNG assessment are considered 'off-site'.

##### 5.1.1.2 Legislation and Policy

This BNG Assessment has been compiled with reference to the following relevant national nature conservation legislation, national and local planning policy and guidance from which the protection of sites, habitats and species is derived in England:

- The Environment Act 2021;
- UK Biodiversity Framework 2024;
- National Planning Policy Framework (NPPF) (HM Government, 2024);
- UK Government's 25 Year Environment Plan (Defra, 2018);
- The Natural Environment and Rural Communities (NERC) Act 2006;
- The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024;
- The Biodiversity Gain Requirements (Exemptions) Regulations 2024; and
- Draft Lancashire Local Nature Recovery Strategy (LNRS) (Lancashire County Council, 2025).

### 5.1.1.3 Statutory Biodiversity Metric

To ensure standardised methodology of assessing BNG, best practice requires the use of biodiversity calculators to evaluate the biodiversity value of habitats pre- and post-development based on habitat type, distinctiveness and condition. A biodiversity index is derived for the baseline and for proposed works, and BNG is considered to be achieved where an increase in value is delivered (on or off-site), and where habitats of a higher value are not replaced exclusively with habitats of a lower value. In England, the required calculator for assessing BNG is the Defra Statutory Biodiversity Metric (herein ‘the Metric’), to be utilised alongside guidance from Defra (Defra, 2025b) by a competent person. Defra defines a competent person as:

*“A competent person has the knowledge and skills to perform specified tasks to complete and review biodiversity metric calculations. You obtain this through training, qualifications, experience, or a combination of them.”*

The competent person for the purposes of this Early Stage BNG Assessment was Beth Millwater, a Terrestrial Ecologist at Haskoning with five years’ experience as a professional ecologist. Her experience includes numerous BNG assessments over a variety of project types and scales. She is also a Qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and is in the process of upgrading to Associate.

As the Metric calculator considers baseline and post-development conditions on and off-site separately, the results of this report will also be presented to reflect this.

#### Biodiversity Units

Biodiversity Units (BUs) are used to describe relative biodiversity value and are produced in three categories: area habitats (measured in ha), hedgerows (km) and watercourses (km). The BUs produced by habitats, watercourses and hedgerows are all treated separately within the Metric, meaning a 10% BNG needs to be met in each of these categories.

The BUs calculated for each area habitat, hedgerow and watercourse parcel/length (referred to as ‘modules’) is calculated within the Metric from the following attributes which are either input by the user or autogenerated by the Metric itself:

- **Broad habitat type:** Derived from field survey of on- and off-site areas, classified using UKHab (UKHab Ltd., 2023), Annex I habitats for Natura 2000, European Nature Information System (EUNIS), or Water Framework Directive (WFD) lake typologies;
- **Habitat type:** derived from field survey of on- and off-site areas and classified using UKHab, Annex I habitats for Natura 2000, EUNIS, or WFD lake typologies;
- **Area (ha) or length (km):** Derived from the field survey of the on- and off-site areas;
- **Distinctiveness:** Defined in the Metric User Guide (Defra, 2025b) as *“A measure based on the type of habitat and its distinguishing features. This includes consideration of species richness and rarity, the extent to which the habitat is protected by designations, and the degree to which a habitat supports species rarely found in other habitats”*.
- **Condition:** Derived from the field survey of the on- and off-site areas and is defined in the Metric User Guide (Defra, 2024) as *“a measure of the habitat against its ecological optimum state. Condition is a way of measuring variation in the quality of patches of the same habitat type.”*; and
- **Strategic significance:** Defined in the statutory biodiversity metric user guide (Defra, 2025b) as *“the local significance of the habitat based on its location and the habitat type”*.

## Project related

### **Metric Rules**

When using the Metric, there are four rules which must be followed. These rules are set out in **Table 5-1**.

## Project related

Table 5-1 Biodiversity metric rules, taken from Table 2 of the Defra (2025b) Statutory Biodiversity Metric User Guide.

Rule	Rule detail
Rule 1	The trading rules of this biodiversity metric must be followed.
Rule 2	Biodiversity unit outputs, for each type of unit, must not be summed, traded, or converted between types. The requirement to deliver at least a 10% net gain applies to each type of unit.
Rule 3	To accurately apply the biodiversity metric formula, you must use the statutory biodiversity metric calculation tool or small sites biodiversity metric tool (SSM) for small sites. The tools remove the need for a user to manually calculate the change in biodiversity value. The tool will summarise the results of the calculation and inform a user whether the biodiversity net gain objective has been met.
Rule 4	In exceptional ecological circumstances, deviation from this biodiversity metric methodology may be permitted by the relevant planning authority.

To determine distinctiveness, the habitat's species richness, rarity, potential designation and ability to support rare species were all considered by Defra, before assigning pre-determined distinctiveness's to each habitat type that can be input into the Metric (Defra, 2025b). Doing so ensures more distinctive and thus more valuable habitats require proportional levels of compensation.

Rule 1 of the Metric User Guide (Defra, 2025b) sets the minimum habitat creation and enhancement requirements to compensate for specific habitat losses (up to the point of no net loss). These requirements are based on habitat type and distinctiveness, as set out in **Table 5-2**.

Table 5-2 Trading rules (Rule 1) to compensate for losses, taken from Table 3 of the Defra (2025b) Statutory Biodiversity Metric User Guide.

Baseline habitat distinctiveness	Area	Hedgerow	Watercourse
Very high	Priority should be given to replacing losses with area habitat units of the same habitat type.	Losses must be replaced with hedgerow units of the same habitat type.	Priority should be given to replacing losses with watercourse units of the same habitat type.
High	Losses must be replaced with area habitat units of the same habitat type.	Losses must be replaced with hedgerow units of the same habitat type or of a higher band.	Losses must be replaced with watercourse units of the same habitat type.
Medium	Losses must be replaced by area habitat units of either medium band habitats within the same broad habitat type or, any habitat from a higher band from any broad habitat type.	Losses must be replaced with hedgerow units of the same or of a higher band.	Losses must be replaced with watercourse units of the same habitat type.
Low	Losses must be replaced with area habitat units of the same or higher band.	Losses must be replaced with hedgerow units of the same or of a higher band.	Losses must be replaced with watercourse units of a higher band.
Very low	Not applicable.	Losses must be replaced with hedgerow units of the same or of a higher band.	Not applicable.

## Metric Principles

The Metric User Guide (Defra 2025b) defines the following principles to inform the use of the Metric:

- **Principle 1:** the metric assessment should be completed by a competent person.
- **Principle 2:** the use of this biodiversity metric does not override existing biodiversity protections, statutory obligations, policy requirements, ecological mitigation hierarchy or any other requirements. This includes consenting or licensing process, for example woodlands.
- **Principle 3:** this biodiversity metric should be used in accordance with established good practise guidance and professional codes.
- **Principle 4:** this biodiversity metric is not a complex or comprehensive ecological model and is not a substitute for expert ecological advice.
- **Principle 5:** biodiversity units are a proxy for biodiversity and should be treated as relative values.
- **Principle 6:** this biodiversity metric is designed to inform decisions in conjunction with locally relevant evidence, expert input, or guidance.
- **Principle 7:** habitat interventions need to be realistic and deliverable within a relevant project timeframe.
- **Principle 8:** created and enhanced habitats should be, where practical and reasonable, local to any impact and deliver strategically important outcomes for nature conservation.
- **Principle 9:** this biodiversity metric does not enforce a minimum habitat size ratio for compensation of losses. Proposal should aim to:
  - Maintain habitat extent – supporting more, bigger, better and more joined up ecological networks.
  - Ensure that proposed or retained habitat parcels are of sufficient size for ecological function.

### 5.1.2 Baseline Conditions

The baseline UKHab habitat classification for all on-site areas area shown in **Figure 7**. UKHab and the habitat types input to the biodiversity metric do not directly align. The baseline habitats recorded using UKHab, where required, have been translated to the metric's area habitat types. The baseline UKHab habitats, their codes, corresponding Metric habitat classifications and Metric BU module are set out in **Table 5-3**.

No hedgerow habitats were identified on-site and therefore only the area habitat and watercourse modules were utilised within the assessment.

Table 5-3 UKHab baseline habitats present and their corresponding habitat classification within the Metric.

UKHab primary habitat	UKHab secondary habitat(s)	Full UKHab habitat code	Metric habitat	Metric BU module
Temporary grass and clover leys	<ul style="list-style-type: none"> <li>• CFGM (19)</li> </ul>	c1b 19	Floodplain wetland mosaic and CFGM	<b>Area habitat</b>
Other neutral grassland	<ul style="list-style-type: none"> <li>• Scattered rushes (14)</li> <li>• CFGM (19)</li> <li>• Wet (503)</li> <li>• Unmanaged (521)</li> </ul>	g3c 14 19 503 521	Floodplain wetland mosaic and CFGM	<b>Area habitat</b>
	<ul style="list-style-type: none"> <li>• Cattle grazed (101)</li> </ul>	g3c 101	Other neutral grassland	<b>Area habitat</b>
Modified grassland	<ul style="list-style-type: none"> <li>• CFGM (19)</li> <li>• Cattle grazed (101)</li> </ul>	g4 19 101	Floodplain wetland mosaic and CFGM	<b>Area habitat</b>
	N/A	g4	Modified grassland	<b>Area habitat</b>
Mixed scrub	<ul style="list-style-type: none"> <li>• Unmanaged (521)</li> </ul>	h3h 521	Mixed scrub	<b>Area habitat</b>

## Project related

UKHab primary habitat	UKHab secondary habitat(s)	Full UKHab habitat code	Metric habitat	Metric BU module
Standing open water and canals	<ul style="list-style-type: none"> <li>Ditch (50)</li> <li>Seasonally wet (502)</li> </ul>	r1 50 502	Ditches	Watercourse
	<ul style="list-style-type: none"> <li>Pond (non-priority) (41)</li> <li>Seasonally wet (502)</li> </ul>	r1 41 502	Ponds (non-priority)	Area habitat
Rivers and streams	<ul style="list-style-type: none"> <li>Estuaries (H1130) (74)</li> </ul>	r1 74	Other rivers and streams	Watercourse
Coastal saltmarsh	N/A	t2a	Saltmarshes and saline reedbeds	Area habitat
Artificial unvegetated, unsealed surface	<ul style="list-style-type: none"> <li>Bare ground (510)</li> </ul>	u1c 510	Bare ground	Area habitat

### 5.1.3 The Restoration Principle

The Metric User Guide contains a principle (Defra, 2025b - page 32) solely for “*restoration of coastal processes and intertidal habitats which have been historically lost*” (hereafter referred to as ‘the restoration principle’), which clearly is the case for the restoration of Cockerham Marsh SSSI.

The restoration principle allows areas of low and very low distinctiveness habitats, such as historically reclaimed intertidal that is now dominated by poor quality terrestrial habitat, to (administratively) be recorded as a poor condition intertidal habitat in the baseline. For the Cockerham Marsh SSSI, this namely includes modified grassland and bare ground in the habitat baseline.

If a restoration scheme was to be put in place, the adopted restoration principle would result in an enhancement of the same habitat type, i.e. from poor condition intertidal habitat (baseline) to good condition intertidal habitat (with Project). This avoids the potential problems otherwise associated with a ‘loss’ of one type of habitat (i.e. low distinctiveness modified grassland and bare ground in the baseline) and a ‘creation’ of a different type of habitat (such as good quality saltmarsh with the scheme implemented) if modified grassland or bare ground had been recorded as the baseline habitats affected by the scheme.

The restoration principle is also described as a “*permitted deviation from the Statutory Biodiversity Metric for intertidal habitats*” in the Natural England Joint Publication JP056 (Natural England, 2024), stating that such deviation is permitted without requiring the prior consent of the Local Planning Authority.

However, the Metric User Guide (Defra 2025b) states that this approach cannot be used to record areas of medium, high or very high distinctiveness terrestrial habitats as an intertidal habitat at baseline nor used for land that was reclaimed prior to 1850. As stated in **Table 2-3**, the land within the SSSI Site was reclaimed in 1981 when the existing embankment was constructed.

The historic presence of intertidal habitats, namely saltmarsh, prior to this reclamation is evidenced via historic mapping in **Figure 8**. Between the maps from 1862, 1910, 1951 and 1970 it is clear that the entirety of Cockerham Marsh SSSI was saltmarsh prior to its reclamation in 1981. The mapping also shows this saltmarsh expanding seaward over time. The cut channel of the tidal Cocker was made in the 1960s with the intent of improving flow conveyance and land drainage. This straightened cut-channel is visible in the mapping from 1971.

## Project related

The combination of evidence from **Figure 8** and the known reclamation in 1981 means the low distinctiveness habitats present in the UKHab baseline can have the restoration principle applied, and will therefore be recorded as poor condition saltmarsh within the Metric baseline, enhanced to better condition saltmarsh post-development if a restoration option is developed in the future.



Figure 8 Historic maps of Cockerham Marsh SSSI from 1862 (top left), 1910 (top right), 1951 (bottom left) and 1970 (bottom right) (all reproduced with the permission of the National Library of Scotland).

## 5.1.4 Metric Outputs

### 5.1.4.1 On-Site Baseline

Full details of the metric outputs are provided in **Appendix C**. A total of five area habitat types were identified on-site within the SSSI (Survey Area A): mixed scrub, floodplain wetland mosaic and CFGM, other neutral grassland, saltmarshes<sup>2</sup> and saline reedbeds, and ponds (non-priority). An additional two watercourse habitat types were also identified on-site: ditches and other rivers and streams.

In accordance with the Draft Lancashire LNRS (Lancashire County Council, 2025), all habitats on-site have been assigned a high strategic significance as they are within the bounds of Cockerham Marsh SSSI thus are formally recognised within the Draft Lancashire LNRS.

The extents, distinctiveness, assessed condition, strategic significance, compensation requirements, and baseline biodiversity units are summarised below in **Table 5-4** and **Table 5-5**.

Table 5-4 On-site area habitat baseline summary from the Metric calculation.

Habitat type	Area (Ha)	Distinctiveness	Condition	Strategic significance	Compensation requirements	Baseline BUs
Mixed scrub	0.72	Medium	Poor	High - formally identified in local strategy	Same broad habitat or a higher distinctiveness habitat required.	3.24
Floodplain wetland mosaic and CFGM	5.57	High	Poor		Same habitat required	38.41
Saltmarshes and saline reedbeds <sup>3</sup>	2.47	High	Poor		Same habitat required	17.07
Other neutral grassland	0.06	Medium	Poor		Same broad habitat or a higher distinctiveness habitat required.	0.30
Saltmarshes and saline reedbeds	0.47	High	Poor		Same habitat required	3.22
Ponds (non-priority)	0.16	Medium	Poor		Same broad habitat or a higher distinctiveness habitat required.	0.72
<b>Total</b>	<b>9.43</b>	<b>-</b>	<b>-</b>		<b>-</b>	<b>-</b>

<sup>2</sup> Including historic saltmarsh habitats where 'the restoration principle' has been applied to formerly classified low distinctiveness modified grassland and bare ground.

<sup>3</sup> Historic saltmarsh habitats where 'the restoration principle' has been applied to formerly classified low distinctiveness modified grassland and bare ground.

## Project related

Table 5-5 On-site watercourse baseline summary from the Metric calculation.

Habitat type	Length (km)	Distinctiveness	Condition	Strategic significance	Compensation requirements	Baseline BUs
Ditches	0.23	Medium	Poor	High - formally identified in local strategy	Same habitat required.	0.40
Other rivers and streams	0.74	High	Poor			1.90
<b>Total</b>	0.97	-	-	-	-	2.30

### 5.1.4.2 Post-Development

Ordinarily a BNG assessment would contain a post-development assessment to determine how the baseline metrics have been influenced by the project, with the aim of generating a minimum 10% gain in biodiversity.

The total number of baseline BUs (with the restoration principle applied) is 62.94 for area habitats and 2.30 for watercourses. To achieve 10% BNG, at least 69.24 area habitat BUs (an uplift of 6.30 BUs) and 2.53 watercourse BUs (an uplift of 0.23 BUs) would need to be generated via habitat creation or enhancement, either on-site or off-site, should a restoration project proceed.

However, since the preferred option from the study is Do nothing, no post-development BNG assessment is required. Similarly, the requirement for an Ecosystem Services assessment and Carbon Credit assessment have been removed from the scope given the preferred Do nothing option.

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## Appendices

## Appendix A Target Notes

Target Note Reference	Target Note Description	Photo
TN1	Two groups of curlew seen and heard calling: one group of seven flying overhead and one group of 22 stood on arable field west of the SSSI Site.	-
TN2	Pool 1: completely dry, overgrown, dominated by rushes.	
TN3	Un-numbered pool from Natural England SSSI management plan (1-ID). Completely dry, overgrown, dominated by rushes.	

## Project related

Target Note Reference	Target Note Description	Photo
TN4	Pool 7: Dry but not overgrown and surrounded by gorse scrub. Bare ground and short grasses present across majority of the pond area.	
TN5	Location of un-numbered pool from Natural England SSSI management plan, northeast of Pool 7. No signs of the pool being present.	
TN6	Pool 4: Dry and overgrown with Yorkshire fog.	




Project related

Target Note Reference	Target Note Description	Photo
TN7	Pool 6: Dry and overgrown with short grasses and rushes.	
TN8	Small mammal burrow, ~6cm diameter	
TN9	Pool 3: Dry and overgrown with short grasses.	
TN10	Two roe deer observed within scrub.	-

## Project related

Target Note Reference	Target Note Description	Photo
TN11	Single curlew and gaggle of 14 greylag geese seen flying overhead.	
TN12	Pools 8 and 9: Both dry and overgrown with common reed.	
TN13	Juvenile common frog observed. In terrestrial adult body form, ~2.5cm body length.	-
TN14	European hare seen running across saltmarsh.	-




## Appendix B – Site Photos

Photo number	Photo description	Photo
1	Coastal saltmarsh on eastern side of Survey Area B. View looking west.	
2	Western boundary of Cockerham Marsh SSSI (Survey Area A). View looking northeast.	
3	Gorse scrub lining dried up pond within Cockerham Marsh SSSI (Survey Area A). View looking northwest.	

# Project related

Photo number	Photo description	Photo
4	Coastal saltmarsh and creek on eastern side of Survey Area B. View looking north.	
5	Coastal saltmarsh and small pools on eastern side of Survey Area B. View looking north.	
6	Coastal saltmarsh on eastern side of Survey Area B. View looking northwest.	

# Project related

Photo number	Photo description	Photo
7	Cockerham Marsh SSSI (Survey Area A) and scrub in the distance. View looking north.	
8	Cockerham Marsh SSSI (Survey Area A) and scrub in the distance. View looking northwest.	
9	Field to the west of Cockerham Marsh SSSI (Survey Area A). View looking west.	




## Project related

Photo number	Photo description	Photo
10	Cockerham Marsh SSSI (Survey Area A) and scrub in the distance. View looking northeast.	
11	Coastal saltmarsh on eastern side of Survey Area B. View looking west.	
12	Cockerham Marsh SSSI (Survey Area A) grassland. View looking northeast.	

## Project related

Photo number	Photo description	Photo
13	Coastal saltmarsh and creeks on eastern side of Survey Area B. View looking north.	
14	Cockerham Marsh SSSI (Survey Area A) rush dominated grassland and scrub in the distance. View looking north.	
15	Cocker Channel. View looking northwest.	


## Project related

Photo number	Photo description	Photo
16	Cocker Channel. View looking southwest.	
17	Cocker Channel and bankside coastal saltmarsh. View looking southwest.	
18	Coastal saltmarsh. on eastern side of Survey Area B. View looking west.	

## Project related

Photo number	Photo description	Photo
19	Coastal saltmarsh on eastern side of Survey Area B. View looking southwest.	
20	Coastal saltmarsh on eastern side of Survey Area B. View looking south.	
21	Cockerham Marsh SSSI (Survey Area A) rush dominated grassland and scrub in the distance. View looking northeast.	

## Project related

Photo number	Photo description	Photo
22	Delph ditch in Survey Area A, landward of the embankment. View looking northwest.	
23	Delph ditch in Survey Area A, landward of the embankment. View looking northwest.	
24	Cockerham Marsh SSSI (Survey Area A) grassland and scrub in the distance. View looking southwest.	



## Project related

Photo number	Photo description	Photo
25	Cocker Channel. View looking southeast.	
26	Cocker channel. View looking northwest.	
27	Coastal saltmarsh and creek on western side of Survey Area B. View looking northeast.	

## Project related

Photo number	Photo description	Photo
28	Coastal saltmarsh and creek on the eastern side of Survey Area B. View looking northeast.	
29	Modified grassland on flood embankment within Survey Area A. View looking southwest.	
30	Coastal saltmarsh and creek on northeastern extents of Survey Area B. View looking southwest.	

## Project related

Photo number	Photo description	Photo
31	Coastal saltmarsh near Bank End Farm, northwest of Survey Area B.	
32	Bare ground poached by cattle. Located adjacent to the main field of Cockerham Marsh SSSI's northeastern fence line, southwest of the embankment and southeast of the Delph Ditch (Survey Area A). View looking east.	

## **Appendix C – Statutory Biodiversity Metric**