



Brighter strategies
for greener projects



Client: Cumberland Council

Project: Iron Line

Report: Shadow Appropriate Assessment

QUALITY ASSURANCE

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1.0 INTRODUCTION

Greengage Environmental Limited (Greengage) was commissioned by Cumberland Council to undertake a shadow Appropriate Assessment (sAA) to inform a planning application at Hodbarrow Nature Reserve and a parcel of land immediately north of the nature reserve proposed for development as a Visitor Centre and car park, located on the south-west coast of Cumbria. For the purpose of this report the 'site' refers to the nature reserve and the land proposed for the Visitor Centre and car park, as shown in Appendix A, Figure A.1.

The planning application for the site seeks “*Erection of visitor centre with café/shop, group room, staff/volunteer, toilet facilities and vehicle parking; consolidation, repair and installation of interpretive sculpture to Towsey Hole Windmill; refurbishment of existing Tern Island Hide; new bird hides, pathways, gateway features, street furniture, and demarcation of spaces at existing car park; enhancement of wildlife habitats; associated landscaping and drainage infrastructure; and maintenance of byway with restricted vehicular access - The Iron Line Project.*” For the purpose of this report the 'planning application boundary' refers to the nature reserve and land proposed for the Visitor Centre and car park excluding the Hodbarrow Lagoon, as shown in Appendix A, Figure A.1.

This document is to inform Cumberland Council, as the Competent Authority, about whether there is potential for Likely Significant Effects (LSEs) arising from the Proposed Development upon the following statutory designated sites:

- Morecambe Bay and Duddon Estuary Special Protection Area (SPA);
- Morecambe Bay Special Area of Conservation (SAC); and,
- Duddon Estuary Ramsar site.

The planning application boundary forms part of wider statutory designated sites above as well as Duddon Estuary Site of Special Scientific Interest (SSSI) (see Figure A.2 for statutory site boundaries).

The SPA and SAC sites are European designated sites referred to as National Site Network (NSN) sites (formally Natura 2000) under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019¹ which aims to:

- Maintain or, where appropriate, restore habitats and species listed in Annexes I and II of the Habitats Directive² to a favourable conservation status (FCS); and,
- Contribute to ensuring, in their area of distribution, the survival and reproduction of wild birds and securing compliance with the overarching aims of the Wild Birds Directive³.

Ramsar sites do not form part of the NSN however the Duddon Estuary Ramsar overlaps the SACs and SPA designations and all Ramsar sites remain protected in the same way as SACs and SPAs.

sAA's relate specifically and exclusively to the qualifying interests of European sites. SSSIs are designated under the Wildlife and Countryside Act 1981, however, the conservation objectives of European sites are underpinned by SSSI designations and, accordingly, are protected under the Habitats Regulations.

This sAA has considered an effect to be 'likely' if it 'cannot be excluded on the basis of objective information' and as 'significant' if it 'undermines the conservation objectives'.

Legislation and Policy of relevance to receptors and sites described in this report are outlined in Appendix B. The Morecambe Bay and Duddon Estuary SPA, Morecambe Bay SAC and Duddon Estuary Ramsar is designated for the presence of internationally important coastal habitats which support internationally and nationally important assemblages of breeding, overwintering and migratory birds. Other species present include great crested newts (*Triturus cristatus*), natterjack toads (*Epidalea calamita*). Figure A.3 in Appendix A highlights the qualifying features that are relevant to the site.

This report should be read in conjunction with the Ecological Impact Assessment (EclA)⁴, shadow Habitat Regulations Assessment (sHRA)⁵, Visitor and Action Management Plan (VAMP) (ref: Appletons 2022)⁶, Construction Environmental Management Plan (CEMP)⁷ and Construction Phase Safety, Health & Environment (SHE) Plan⁸.

Given the ecological sensitivities on site and within its surroundings a CEMP⁷ has been produced to minimise environmental impacts. The CEMP is a live document and includes control measures which can be updated to include additional control measures. The control measures set out within the CEMP have been relied on throughout this sAA to evaluate the potential effects on the NSNs.

1.1 SITE DESCRIPTION

The site extends to 57.91 ha and is centred on Ordnance Survey National Grid Reference (OS NGR): SD 17718 78724, OS Co-ordinates 317718, 478724.

The site is located on the edge of the Duddon Estuary in south-west Cumbria and encompasses the Hodbarrow Nature Reserve (excluding Hodbarrow Lagoon) and land proposed for the development of a Visitor Centre and car park, extending to 57.91 ha in total. The Hodbarrow Nature Reserve including Hodbarrow Lagoon extends to 105 ha in total (hereafter referred to as 'the nature reserve'). The nature reserve is part of a popular 3-mile circular walk with paths through dense willow and bramble scrub, calcareous grasslands, sand dunes and along the sea wall looking out over Hodbarrow Lagoon to the north and the Irish sea to the south. The nature reserve is a former iron mine which opened in the early 1860's and closed in 1968. The majority of buildings associated with the mine have been removed however the nature reserve is scattered with remnant structures from the mine in the form of old stone walls, quarries, lighthouses, beacons and the partial remains of an old sea wall. In 1905 a new sea wall, comprising large tidal breakwater, was built to further protect the ironworks from the sea and still stands today. There is a Byway Open to All Traffic (BOAT) along the length of the new sea wall which loops across to a caravan park 0.3km east of Haverigg. Following the mines' closure the area behind the new sea wall was flooded and formed a, now freshwater, lagoon which supports large populations of breeding and wintering wildfowl and waders.

The Royal Society for the Protection of Birds (RSPB) purchased the site in 1986 and their management practices included scrub clearance and the creation of limestone slag islands within the lagoon which have successfully encouraged and sustained breeding populations of little terns (*Sternula albifrons*), common terns (*Sterna hirundo*), sandwich terns (*Thalasseus sandvicensis*) and overwintering

bird assemblages. The populations of breeding terns and overwintering wildfowl contribute to the wider designation of Duddon Estuary and Morecambe Bay SPA and Duddon Estuary Ramsar Site.

The mosaic of habitats on the nature reserve also support rich and diverse plant communities and assemblages of invertebrates. The nature reserve currently attracts over 40,000 visitors a year, 10,000 of which are not local.

Land immediately to the north of the nature reserve, proposed for development as a Visitor Centre and car park, extends to approximately 2.1 ha and comprises dense scrub, calcareous grassland and an access road which leads to a Household Waste Recycling Centre off-site to the north.

The planning application boundary extends to approximately 57.69 ha and is centred on National Grid Reference SD 17718 78724, OS Co-ordinates 317718, 478724.

1.2 SITE PROPOSALS

Proposals seek:

“Erection of visitor centre with café/shop, group room, staff/volunteer, toilet facilities and car park; consolidation, repair and installation of interpretive sculpture to Towsey Hole Windmill; refurbishment of existing Tern Hide; new bird hides, pathways, gateway features and street furniture; enhancement of wildlife habitats; associated landscaping and drainage infrastructure; and maintenance of BOAT with restricted vehicular access.”

There will be a visitor centre and carpark with 63 spaces and three new bird hides created on site. Works to path networks will involve resurfacing of existing footpath with self binding gravel and also the formalisation of some of the desire lines with either self binding gravel, timber boardwalks or raised pathways. The maintenance of the BOAT will involve scraping along its surface, pot holes to be filled in with a crushed aggregate and then levelled appropriately by machine.

1.3 POLICY CONTEXT AND GUIDANCE

The site falls within the local authority of Cumberland Council which is still subject to the former borough council's, Copeland Local Plan 2021-2039⁹. Prior to adoption, the Copeland Local Plan was subject to a Habitats Regulations Assessment (HRA)¹⁰ which has been used to inform the sHRA⁵ and this sAA.

As the site is located within an internationally protected site with multiple designations, in order for permission for development to be granted, a HRA under Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations)¹¹ is a requirement.

The requirement for HRA of projects is set out under the provisions of Article 6 of the Habitats Directive (92/43/EEC)² which, together with the Wild Birds Directive (2009/147/EC)³, aims to protect and improve Europe's most important habitats and species and has been transposed into law English law by the Habitats Regulations.

Under Regulation 63 of the Habitats Regulations, competent authorities are required to undertake an HRA in respect of a plan or project which:

- Either alone or in combination with other plans or projects would be likely to have a significant effect on a Habitats site; and,
- Is not directly connected with the management of the site for nature conservation.

Regulation 63 further makes it clear that the person applying for the authorisation of the plan or project must provide such information as the Competent Authority may reasonably require for the purposes of the assessment or to enable them to determine whether an Appropriate Assessment (AA) is required. This document provides such information.

1.4 OBJECTIVES

This report specifically aims to:

- Provide a conclusion as to whether a Stage 2 'shadow' AA is required for the planning application boundary; and,
- Provide a report, which can be used by Cumberland Council, as the Competent Authority, to inform the Habitats Regulations Assessment.

To inform this report Stage 1 was undertaken at the sHRA⁵ stage which should be read in conjunction with this report. The sHRA collected and analysed up-to-date information regarding all Habitats sites that could potentially be affected by the Proposed Development, including their conservation objectives and qualifying interest features. It included a Stage 1 Screening assessment, detailing likely impacts of the Proposed Development assessed against the conservation objectives and qualifying interest features of all identified Habitats sites within the zone of influence individually and in combination with other plans and projects.

2.0 METHODOLOGY

The HRA methodology follows a structured process. Stage 1 has been completed within the sHRA⁵ which assessed if a proposal:

- Is directly connected with or necessary for the conservation management of a European site; and,
- Risks having a significant effect on a European site on its own or in combination with other proposals is directly connected with or necessary for the conservation management of a European site risks having a significant effect on a European site on its own or in combination with other proposals.

Potential mitigation measures (i.e. measures that have been added to a project to achieve the purpose of reducing effects on the European site) were not considered at the screening stage, however measures that form an inherent part of the scheme, that could reduce ecological effects, but are not specifically designed as European Site mitigation measures, can be considered.

2.1 STAGE 2: APPROPRIATE ASSESSMENT

Where LSEs cannot be ruled out at the screening stage, the Competent Authority conducts an AA.

The AA involves a more detailed and thorough check than the screening stage, based on information gathering of both the development plan and data on the European sites and their conservation objectives, conducting an integrity test on whether the sites will be adversely affected.

The AA considers mitigation measures, and where appropriate measures can be put in place, and the Competent Authority considers that the development plan will not adversely affect the integrity of the European site, planning permission can be granted.

2.2 COMPETENCIES

Laura Thomas, Senior Consultant, has a BSc (Hons) in Biology and an MSc in Evolutionary and Behavioural Ecology. She also holds a Natural England Bat Survey Level 1 Class Licence and is a Qualifying member of CIEEM. Laura has over seven years' experience in the commercial sector.

Daniel Perlaki, Senior Consultant, has a BSc (Hons) degree in Ecology and a MSc in Conservation Science and Policy and is a Graduate member of CIEEM. Dan has over 7 years' experience in ecology survey and consultancy.

Jennie Caddick, Associate Consultant, holds a BSc (Hons) in Ecology and full CIEEM membership. She has 20 years consultancy experience working for a varied client base, with a focus on complex schemes where requirement for consultation and bespoke surveying has been used and holds Natural England Survey Licences for Bats (Class 2), Great Crested Newt, Water Vole and White-clawed Crayfish. In addition, she has also held mitigation licences for Otter.

This report was prepared by Laura Thomas, reviewed by Daniel Perlaki and authorised by Jennie Caddick, who confirms that the report is in line with the following:

-
- Represents sound industry practice;
 - Reports and recommends correctly, truthfully and objectively;
 - Is appropriate given the local site conditions and scope of works proposed; and,
 - Avoids invalid, biased and exaggerated statements.

3.0 SCREENING SUMMARY

Table 3.1 A summary of the screening for the construction and operation phases taken from the sHRA Screening Assessment⁵

	Feature of interest	Loss of supporting habitat	Reduced Water Quality	Altered Hydrology	Reduced Air Quality	Recreational Pressure and Disturbance	Non-recreational disturbance
Construction							
SAC	Habitats	No LSE	No LSE	No LSE	LSE	N/A	LSE
SPA	Breeding Birds	No LSE	LSE	No LSE	LSE		LSE
	Overwintering Birds	No LSE	LSE	No LSE	LSE		LSE
Ramsar	Natterjack Toads	No LSE	LSE	No LSE	LSE		LSE
Operation							
SAC	Habitats	N/A	No LSE	No LSE	No LSE	LSE	N/A
SPA	Breeding Birds		No LSE	No LSE	No LSE	LSE	
	Overwintering Birds		No LSE	No LSE	LSE	LSE	
Ramsar	Natterjack Toads		No LSE	No LSE	No LSE	LSE	LSE

4.0 APPROPRIATE ASSESSMENT

All impacts to cited habitats, breeding birds, non-breeding birds and natterjack toads that require mitigation need to be escalated and assessed through the AA. Owing to the overlapping qualifying features, LSEs are assessed by impact pathway rather than designated site.

A summary of the impacts that require further assessment is as follows:

- Construction Phase
 - Habitats (SAC)
 - reduced air quality and non-recreational pressure
 - Breeding birds (SPA and Ramsar)
 - reduced water quality, reduced air quality, non-recreational disturbance
 - Overwintering birds (SPA and Ramsar)
 - reduced water quality, reduced air quality, non-recreational disturbance
 - Natterjack toads (Ramsar)
 - reduced water quality, reduced air quality, non-recreational disturbance
- Operational Phase
 - Habitats (SAC)
 - recreational pressure and disturbance
 - Breeding birds (SPA and Ramsar)
 - recreational pressure and disturbance
 - Overwintering birds (SPA and Ramsar)
 - reduced air quality, recreational pressure and disturbance
 - Natterjack toads (Ramsar)
 - recreational pressure and disturbance, non-recreational disturbance

5.0 APPROPRIATE ASSESSMENT - CONSTRUCTION PHASE

5.1 HABITATS (SAC)

Reduced Air Quality

Potential Effects

Airborne nitrogen oxide (NO_x) concentrations from vehicle emissions within the atmosphere can lead to greater rates of nitrogen deposition to soils and increase in soil fertility, which can have a serious negative effect on the quality of nitrogen-limited terrestrial habitats.

There has been only one Annex I habitat identified on the site which is Fixed coastal dunes with herbaceous vegetation ("grey dunes"). The European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) supporting documentation for the conservation status assessment for this habitat has identified mixed source air pollution, air-borne pollutants as a high-ranking pressure/threat for this habitat.

The Department for Transport's Transport Analysis Guidance¹² notes that beyond 200m "*the contribution of vehicle emissions to local pollution levels is not significant*" and works taking place outside of 200m of the Fixed coastal dunes with herbaceous vegetation ("grey dunes") are considered to have no LSE.

Figure 5.1 200m Biodiversity Protection Zone from Annex I Fixed coastal dunes with herbaceous vegetation ("grey dunes") habitat



Proposals

Maintenance works will be undertaken to the BOAT and the repair and installation of interpretive sculpture to Towsey Hole Windmill, within 200 meters (m) of the Annex 1 Fixed coastal dunes with herbaceous vegetation ("grey dunes"). These actions have potential to reduce air quality through pollution events such as increased dust deposition and increase the NO_x concentrations from machinery. The works within 200m of the Fixed coastal dunes with herbaceous vegetation ("grey dunes") will take between approximately six to 10 weeks. During this time there will be increased vehicle movements to and from site and use of machinery during construction which contractors have estimated there will be approximately up to 26 two way trips per day.

Assessment

A review of the Air Pollution Information System (APIS) summary of the features for Morecambe Bay SAC (UK0013027) identifies that Fixed coastal dunes with herbaceous vegetation (grey dunes) have critical loads for Nitrogen (N) deposition (minimum and maximum) between 5-15 kg N ha⁻¹ yr and the critical load for NO_x is 30 ug/m³¹³.

A review of the APIS interactive map¹⁴ has identified the area with this habitat has a 3-year average for 2021 (which is the latest dataset available) of 11.1 Nitrogen Deposition Kg N ha⁻¹ yr and a 3-year average of NO_x concentrations of 3.4 ug/m³.

However, Greengage have the transport data for Mainsgate Road for October 2018 (see Figure 5.2 and Figure 5.3 which shows quadrats a hectare in size) and as such have reviewed the 3-year average N Deposition and NO_x levels for 2018. This also ensures that N Deposition and NO_x reduction as a result of Covid is not captured as this was a period where vehicle use changed from the typical routines. The 2018 average has an average of 11.8 Nitrogen Deposition Kg N ha⁻¹ yr and a 3-year average of NO_x concentrations of 6 ug/m³.

Figure 5.2 3-year average of Nitrogen Deposition KgN/ha/yr

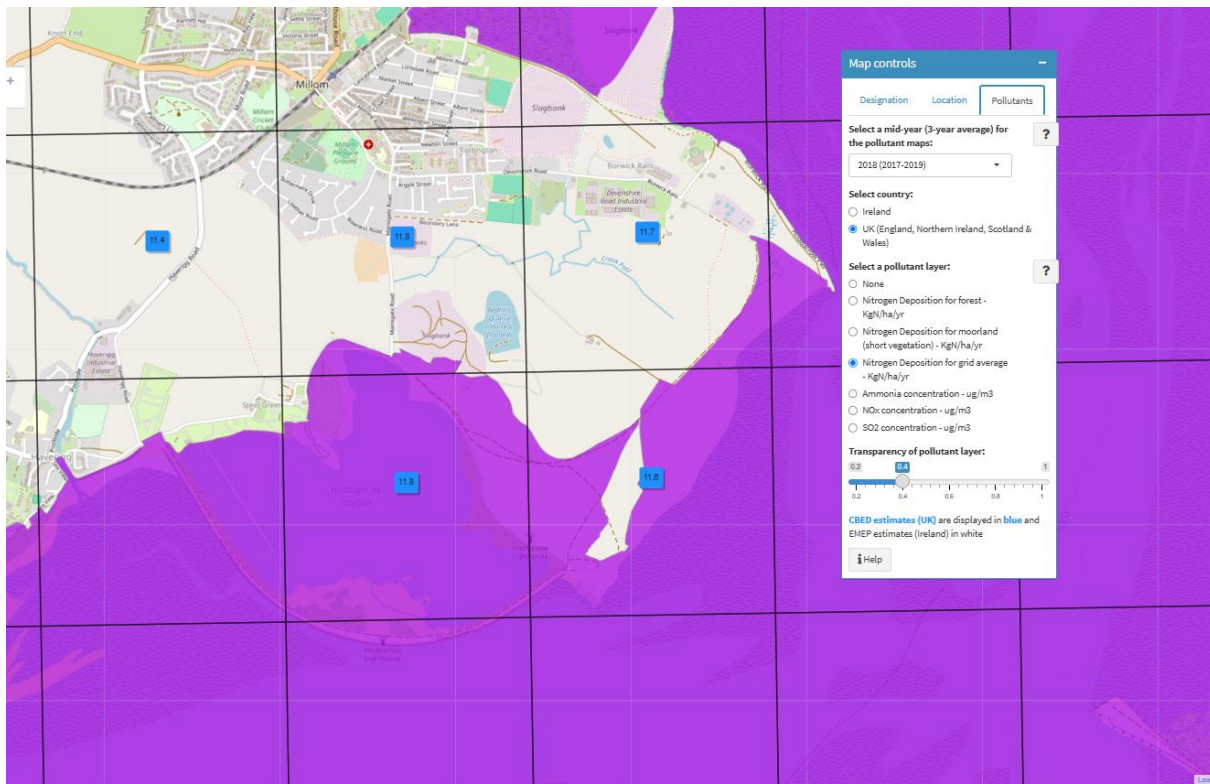
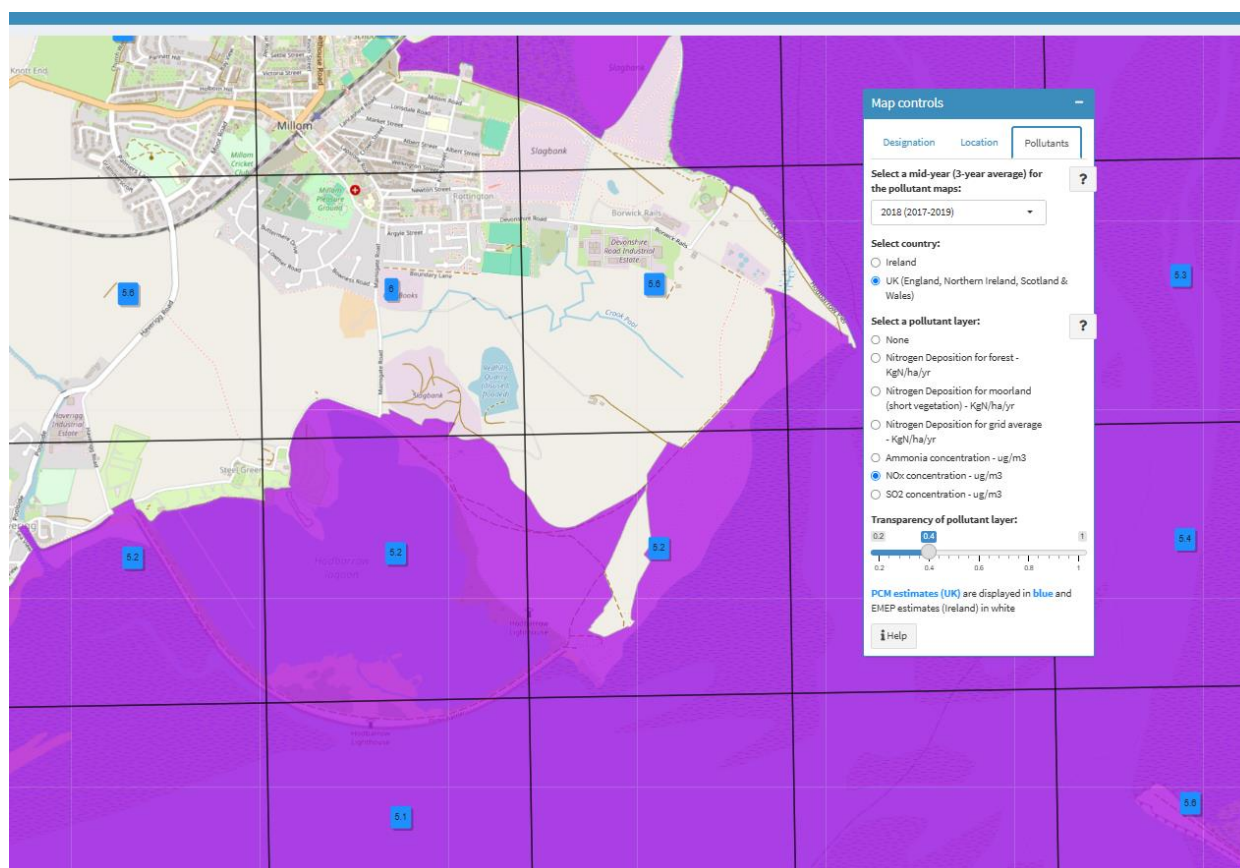


Figure 5.3 3-year average of NO_x concentrations ug/m³



The Transport Assessment¹⁵ identified that in October 2018, Mainsgate Road had a 7 day average of 908 two way trips for all vehicles. This quadrat has a level of 11.8 N Deposition Kg N /ha/-1 yr and a 3-year average of NO_x concentrations ranging of 6 ug/m³.

Due to the temporary and small-scale nature of the works, it is considered highly unlikely that the construction works will exceed the level of 908 trips per day N deposition and NO_x of Mainsgate Road and therefore the construction works are unlikely to reach the critical loads of 15 kg N ha⁻¹ yr and NO_x of 30 ug/ m⁻³ for the Annex 1 Fixed coastal dunes with herbaceous vegetation ("grey dunes"). However, as the increase in N deposition and NO_x emissions cannot be measured or predicted mitigation outlined below will be implemented.

Mitigation

Air Quality and Dust Emissions Management

Table 5.1 outlines the air quality, dust and emissions requiring attention and identifies the control measures to be implemented which are detailed with the CEMP⁷. The CEMP is a live document and includes but is not limited to the following control measures.

Table 5.1 Air Quality, Dust and Emissions Management

Air Quality, Dust and Emission Management	Control Measure
Site set-up and operation	• Toolbox talk on dust and air quality management
Air quality and emissions	• Vehicles, plant and equipment on site to be well maintained and regularly serviced. • Fleet is largely Electric Vehicles (EV) or Hybrids. • Vehicles, plant and equipment to be switched off when not in use. • Where reasonably practicable, fixed items of construction plant will be electrically powered in preference to diesel or petrol driven.
Dust/debris	• Site roads will be periodically swept to prevent a build up of materials. In periods of dry weather, dampening down will be undertaken to prevent dust blow off. • Any dust generating materials transported to and from site to be securely covered. • Any dust generating materials stored on site to be located out of the wind, screened or covered. • Any dust generating activities such as cutting of blocks, bricks, roof tiles will be controlled via dust dampening techniques. Control measures will be detailed in task specific Risk Assessment Method Statement (RAMS) in addition to the CEMP.
Monitoring	• Regular visual checks for dust, debris and emissions arising will be undertaken across the site and log of results maintained.

Vehicle and Machinery Emissions

There will be increased vehicle movements to and from site and use of machinery during construction. In accordance with the CEMP⁷, there will be a maximum of 25 personnel on site at one time. The contractors fleet is largely Electric Vehicles (EV) or Hybrids and vehicle sharing is encouraged (and as such a minimum of an additional five cars increase). These actions which will reduce the NO_x emissions and N deposition from construction vehicles emissions.

Timing

The works within 200m of this the Annex 1 Fixed coastal dunes with herbaceous vegetation ("grey dunes") are predicted to take between six and 10 weeks and as such will be temporary.

In Combination Effects

There were no other developments within 200m of the Annex 1 Fixed coastal dunes with herbaceous vegetation ("grey dunes") and as such in combination effects are not predicted.

Conclusion

In light of the temporary and small-scale nature of the works and the use of appropriate mitigation measures secured with the CEMP, LSEs associated with reduced air quality upon qualifying Annex 1 Fixed coastal dunes with herbaceous vegetation ("grey dunes") are highly unlikely.

Non-recreational Pressure

Potential Effects

During construction, Annex 1 H2130 Fixed coastal dunes with herbaceous vegetation ("grey dunes") could be subject to habitat degradation through pollution events from increased surface run-off, dust deposition, nitrogen deposition from machinery and direct impacts trampling from construction workers degrading habitat and spreading invasive species.

Proposals

Maintenance works undertaken along a stretch of the the BOAT and repair and installation of interpretive sculpture to Towsey Hole Windmill will be within close proximity to the Annex 1 H2130 Fixed coastal dunes with herbaceous vegetation ("grey dunes") and are estimated to take approximately between six to 10 weeks.

Assessment

The majority of Annex 1 H2130 Fixed coastal dunes with herbaceous vegetation ("grey dunes") is at a higher elevation than the BOAT and as such surface runoff is not likely to runoff onto this habitat. However, the formalisation of the existing desire line to the Towsey Hole Windmill could run off onto the adjacent Annex 1 H2130 Fixed coastal dunes with herbaceous vegetation ("grey dunes") habitat and as the increase in dust deposition, nitrogen deposition cannot be measured or predicted the below mitigation will be implemented in order to prevent habitat degradation of the nearby Annex 1 Fixed coastal dunes with herbaceous vegetation ("grey dunes").

Mitigation

The mitigation measures addressed in Table 5.1 should be applied to address air quality, dust and emissions.

Materials and Waste

Table 5.2 outlines the materials and waste issues requiring attention and identifies the control measures to be implemented.

The CEMP is a live document and includes but is not limited to the following control measures.

Table 5.2 Materials and Waste Management

Materials and waste issue	Control measure
Storage, handling and management of materials and waste	- Materials and waste to be stored in a commercial skip sited within the works compound before removal from site. - Potentially polluting substances will be stored on impermeable surfaces. - All temporary drainage and drainage arrangements intended to be used during the construction period will be fully detailed in the site surface water management plan will be confirmed during the design phase and will form a part of the CEMP. This will control drainage away from notable habitats, storm water sewers, watercourses and ditches, or adequate measures will be taken to protect against pollution; - Waste containers to be securely covered to ensure wastes cannot be blown or washed away. - Any oils, fuels and liquids used will be appropriately labelled and securely stored within the site compound (storage to include bunding and tamper proof and lockable valves, as appropriate). - All hazardous substances on site will be controlled in accordance with Control of Substances Hazardous to Health (COSHH) Regulations. The storage compound will be fenced off and locked when not in use to prevent theft and vandalism. - Refuelling of plant and machinery will take place with appropriate spillage controls. Vehicles will not be left unattended during refuelling. - Fuel storage tanks will be locked when not in use to prevent unauthorised access and reduce the risk of vandalism. - Spill kits to be located near to the works areas and within storage compounds, with personnel being trained in their use. - Any wheel washing will be undertaken in a designated area. Water from wheel washing facilities and wash down areas will be recycled or fully contained and disposed of via a tanker. - Daily walkover will be undertaken to collect other material.
Waste disposal strategy	- Domestic waste shall be taken off-site and disposed of daily. - Site foul drainage will be removed from site, in accordance with relevant permissions obtained from the sewerage or statutory authority. - Leaking or empty oil drums will be removed from site immediately and disposed of via an appropriately licensed waste disposal contractor. - Recyclable waste shall be taken for disposal at the available recycling facilities; any metalwork for example will seek to be recycled through the local scrapyard or reused.

Protective Fences, Exclusion Barriers and Warning Signs

Prior to commencement of development (inclusive of site clearance or de-vegetation works), temporary fencing will be erected around all protected and retained features, including waterbodies, dune habitats and grasslands (hereafter referred to as Biodiversity Protection Zones (BPZ), to delineate no go areas for workers and machinery. Areas beyond which works are not to take place are to be clearly marked out with exclusion barriers and warning signs.

Site Compound

The first stage of the works will be to establish the location of the site compound areas for the different phases of construction. The compounds will be located at least 50m¹⁶ outside BPZ on the existing roads and will be clearly signposted and fenced off. In compliance with industry standard practices for construction sites, the working area will be secure, and the general public will be separated from the works.

Zones for the stock piling of soil or storage of materials associated with the development will be clearly defined and on existing areas of hardstanding. Loose materials will be raised off the ground such as on pallets. Fuel, oil and other chemicals will be stored in appropriate containers that are impervious to the material being stored and will also be stored on areas of existing hardstanding with bunding. Leaking and empty containers will be removed from the site immediately.

Biosecurity

Good practice measures such as responsible sourcing of imported materials, regular washing of vehicles entering site and control of materials leaving site (following the waste management plan) will ensure that no invasive species are brought onto the site.

Several species listed on Schedule 9 species as per the Wildlife and Countryside Act 1981 (as amended) have been identified on site including Montbretia sp., Japanese knotweed (*Reynoutria japonica*), Cotoneaster sp. Including wall Cotoneaster (*Cotoneaster horizontalis*), small-leaved cotoneaster (*Cotoneaster microphyllus*), variegated yellow archangel (*Lamium galeobdolon*) and sea buckthorn (*Hippophae rhamnoides*). Whilst sea buckthorn is not an invasive species as per Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), it is considered to be an invasive species in the northwest of England. This was found across the site despite efforts from RSPB to eradicate. Additionally, the reserves manager confirmed the presence of New Zealand pigmyweed (*Crassula helmsii*) in ponds within the site during 2018-2020.

In accordance with the CEMP, Story Contracting will arrange a for a survey of the full works area to identify any existing / potential non-native invasive species which will be mapped following the survey. A toolbox talk will be provided to the contractors with which species to look out for and protocols to follow. Biosecurity protocols such as thorough wheel washes and invasive species Work Exclusion Zone (WEZ) enforced by fencing and signage (7m zones for all invasive species present on site except for Japanese Knotweed, which has 10m WEZ) to be followed to prevent non-native/invasive species from spreading.

In Combination Effects

There were no other developments within 200m of the Annex 1 Fixed coastal dunes with herbaceous vegetation ("grey dunes") and as such in combination effects are not predicted.

Conclusion

In light of the temporary and small-scale nature of the works and the use of appropriate mitigation measures secured within the CEMP, LSEs associated with non-recreational disturbance upon qualifying Annex 1 Fixed coastal dunes with herbaceous vegetation ("grey dunes") are highly unlikely.

5.2 BREEDING BIRDS (SPA AND RAMSAR)

Reduced Water Quality

Potential Effects

Research has shown that persistent organic pollutants have been shown to exhibit a wide range of toxic properties in terns' eggs¹⁷.

As per the Environment Agency's Pollution Prevention Guidelines Works and maintenance in or near water¹⁸ all works outside of 10m of the lagoon are considered to have no LSE.

The development of the hide overlooking Hodbarrow Lagoon and the maintenance of the BOAT along the new sea wall and refurbishment of the existing bird hide are immediately adjacent to the Hodbarrow Lagoon, where the purpose built limestone slag tern island and gull island are located. As such pollution events during construction of these features could toxify the water and impact breeding and overwintering bird populations.

Assessment

The works along the BOAT along the new sea wall will take place over approximately four weeks. The materials along the BOAT will remain the same and as such there is not expected to be a change in permeability. The works for each hide would take approximately eight weeks.

Considering the temporary nature and the relatively small scale of works proposed along the BOAT along the sea wall, it is considered unlikely that any contaminated runoff that may enter the lagoon during works would significantly impact the breeding bird assemblages. However, as we cannot predict surface water pollution levels in the event of a pollution event during construction, a precautionary approach has been applied.

Mitigation

The Air Quality, Dust and Emissions management detailed in Table 5.1 should be adhered to.

Materials and Waste

The Materials and Waste management detailed in Table 5.2 should be adhered to

In Combination Effects

There were no nearby developments identified are predicted to have cumulative effects in the form of reduced water quality extending to the qualifying breeding birds.

Conclusion

In light of the temporary and small-scale nature of the works and the use of appropriate mitigation measures secured within the CEMP, LSEs associated with reduced water quality upon qualifying breeding bird species is highly unlikely.

Reduced Air Quality

Potential Effects

There will be increased vehicle movements within 200m of the lagoon to and from site during construction which could impact air quality through pollution events such as increased dust deposition, and an increase in NO_x emissions from vehicle exhausts and machinery. The tern islands at its nearest point is approximately 54m away from the works (associated with the refurbishment of the hide) and gull island is at its nearest point to the works is approximately 145m away from the works (associated with the resurfacing of existing footpath).

This could impact the breeding bird assemblages as there is literature to suggest there is correlation between oxidative stress in some bird species and NO_x levels¹⁹.

Assessment

The Transport Assessment¹⁵ noted from site observations in 2022 suggested the BOAT was very lightly trafficked.

Contractors have estimated there will be approximately up to 26 two way trips per day for works along the BOAT. Contractors fleet is largely EV or Hybrids and where reasonably practicable, fixed items of construction plant will be electrically powered, in preference to diesel or petrol driven, which will reduce the levels of potential emissions from construction. The proposed works along the BOAT along the new sea wall which is expected to take approximately four weeks. Given the small scale and temporary nature of the works it is considered unlikely that any that pollution events on air quality would significantly impact the breeding bird assemblages. However, as this potential changes in air quality cannot be measured the below mitigation will be implemented.

Mitigation

Table 5.1 outlines the air quality requiring attention and identifies the control measures to be implemented.

In Combination Effects

There were no nearby developments identified are predicted to have cumulative effects in the form of reduced air quality extending to the qualifying breeding birds.

Conclusion

In light of the temporary and small-scale nature of the works and the use of appropriate mitigation measures secured with the CEMP, LSEs associated with reduced air quality upon qualifying breeding bird species are highly unlikely.

Non-recreational Disturbance

Potential Effects

Of the qualifying species, common tern, sandwich tern and little tern are known to have medium to high susceptibility to human disturbance within the breeding season²⁰ which can lead to colonies abandoning their nests, move and/or decrease breeding success.

Studies undertaken suggest changes in bird behaviour and flushing can begin to occur at chronic noise levels of 55-65dBA^{21,22,23}, with sudden irregular noise above 50dBA causing the most disturbance. The studies also showed that ambient construction noise levels should be restricted to below 70dBA as birds will habituate to regular noise below this level.

Assessment

Recommended BPZ distances for human disturbance during the breeding season is considered to range from 100-400m for tern species²⁰. There is limited research on the recommended BPZ for breeding colonies of Herring gulls and lesser black-backed gull's perhaps due to the fact they are known to nest in heavily urban environments.

As such, construction activities within the immediate vicinity of the Hodbarrow Lagoon, such as the maintenance along the BOAT along the new seawall, the restoration of the existing bird hide and the creation of the hide overlooking the lagoon, have the potential to indirectly disturb the qualifying species, breeding tern (the tern islands is at its nearest point approximately 54m away from the works) and gull colonies (the gull island is at its nearest point to the works is approximately 145m away from the works) in the form of increased noise, vibration and pollution events.

The exact machinery to be used during the works is yet to be determined however Storys Contracting Ltd have confirmed that the loudest piece of equipment is predicted to be a typical Bomag 120 sized vibrating roller which operates at 103.4dBA at source. Therefore, behavioural changes and flight abandonment of the site by all qualifying bird species present may be caused by the following site activities, depending on the location of the noise generation in relation to the birds:

- De-vegetation activities and any required clearance activities;
- Excavation, handling, removal and treatment of any arisings;
- Activities using plant or loud hand tools; and,
- Activities that cause sudden, loud noises.

Mitigation

Timing and BPZ

The scheme will avoid impacts through timing of works. Works within each receptor BPZ (see Figure 5.4) will avoid the breeding season (March to August, inclusive). In addition, all works outside of the BPZ will start furthest from the lagoon and work inwards to give opportunities for habituation to construction noise.

Figure 5.4 Biodiversity Protection Zone for breeding terns and gulls



Tern Colony

Recommended BPZ distances for human disturbance during the breeding season is considered to range from 100-400m for tern species²⁰.

As a precaution, the largest BPZ has been implemented for construction works and no works will take place within this BPZ between March to August.

Gull Colony

There is limited research on the recommended BPZ for breeding colonies of Herring gulls and lesser black-backed gull's perhaps due to the fact they are known to nest in heavily urban environments. As a precaution a BPZ of 150m will be established. The closest works taking place to the gull colonies are those associated with the resurfacing of existing footpath approximately 145m east which fall within the 150m BPZ. All other works fall outside the precautionary 150m BPZ.

Ahead of any construction works taking place during the breeding season, a breeding bird survey by an ornithologist ECoW should be undertaken within 48 hours prior to commencement. The surveyor will reconfirm the BPZ provided in Figure 5.4 above are appropriate and add any additional BPZ where required.

Lighting

It is understood that construction works will be undertaken during daylight hours. Should any artificial lighting be required this will follow the Bat Conservation Trust (BCT) and Institute of Lighting Professionals (ILP) guidelines²⁴. The lighting will be installed so as to not cause unnecessary light spill onto surrounding habitats. This will be achieved through directional lighting and the use of cowls/hoods. There will be no uncontrolled lighting and the lighting will be switched off when not in use.

In Combination Effects

The mitigation actions set out above will avoid/mitigate impacts on breeding bird species using the lagoon and as such there are no in combination effects predicted. Additionally, there were no nearby developments identified which are predicted to have cumulative effects in the form of non-recreational disturbance extending to the qualifying breeding birds.

Conclusion

Through avoiding works within the breeding season of the qualifying terns and gulls and their respective BPZ, this will avoid/mitigate impacts on breeding bird species using the lagoon, LSEs associated with non-recreational disturbance on qualifying breeding bird species are highly unlikely.

5.3 OVERWINTERING BIRDS (SPA AND RAMSAR)

Reduced Water Quality

Potential Effects

Research has shown that persistent organic pollutants have been shown to exhibit a wide range of toxic properties in birds²⁵.

As per the Environment Agency's Pollution Prevention Guidelines Works and maintenance in or near water²⁶ all works outside of 10m of the lagoon are considered to have no LSE.

The development of the hide overlooking Hodbarrow Lagoon and the maintenance of the BOAT along the new sea wall and refurbishment of the existing bird hide are immediately adjacent to the lagoon. The Hodbarrow Lagoon supports the qualifying overwintering bird assemblages. As such pollution events during construction of these features could toxify the water and impact overwintering bird populations.

Assessment

The works along the BOAT along the new sea wall will take place over approximately four weeks. The works for each of the hides would take approximately eight weeks. There is no predicted change in permeability to the BOAT and as such surface water runoff is not predicted to change.

Considering the temporary nature and the relatively small scale of works proposed along the BOAT along the new sea wall, it is considered unlikely that any contaminated runoff that may enter the lagoon during works would significantly impact the overwintering bird assemblages. However, as we cannot predict surface water pollution levels in the event of a pollution event during construction, a precautionary approach has been applied.

Mitigation

The air quality, dust and emissions management detailed in Table 5.1 and materials and waste management detailed in Table 5.2 will be adhered to.

In Combination Effects

There were no nearby developments identified are predicted to have cumulative effects in the form of reduced water quality extending to the qualifying overwintering birds.

Conclusion

In light of the temporary and small-scale nature of the works and the use of appropriate mitigation measures secured within the CEMP, LSEs associated with reduced water quality upon qualifying breeding bird species is highly unlikely.

Reduced Air Quality

Potential Effects

There will be increased vehicle movements within 200m of the lagoon to and from site during construction which could impact air quality through pollution events such as increased dust deposition, and an increase in NO_x emissions from vehicle exhausts and machinery.

This could impact the overwintering bird assemblages as there is literature to suggest there is correlation between oxidative stress in some bird species and NO_x levels²⁷.

Assessment

The Transport Assessment¹⁵ noted from site observations in 2022 suggested the BOAT was very lightly trafficked.

Contractors have estimated there will be approximately up to 26 two way trips per day for works along the BOAT and a precautionary estimation of between 57 and 72 two way trips for the works associated with the Visitor Centre and car park of which there is an approximate 125m stretch of access road that lies within 10m of the lagoon. Contractors fleet is largely EV or Hybrids and where reasonably practicable, fixed items of construction plant will be electrically powered in preference to diesel or petrol driven which will reduce the levels of potential emissions from construction.

The works along the BOAT along the new sea wall will take place over approximately four weeks. The works for each of the hides would take approximately eight weeks. Considering the temporary nature and the relatively small scale of works proposed along the sea wall/BOAT, it is considered unlikely that any that pollution events on air quality would significantly impact the overwintering bird assemblages. However, as this potential changes in air quality cannot be measured the below mitigation will be implemented.

Mitigation

Table 5.1 outlines the air quality requiring attention and identifies the control measures to be implemented.

In Combination Effects

There were no nearby developments identified are predicted to have cumulative effects in the form of reduced air quality extending to the qualifying overwintering bird assemblages.

Conclusion

In light of the temporary and small-scale nature of the works and the use of appropriate mitigation measures secured with the CEMP, LSEs associated with reduced air quality upon qualifying overwintering bird assemblages are highly unlikely.

Non-recreational Disturbance

Potential Effects

In the absence of mitigation, construction associated with the resurfacing of existing footpath on site and in particular, maintenance of the BOAT along the new seawall, restoration of the existing bird hide and construction of the hide adjacent to the old sea wall has potential to indirectly disturb the qualifying species through a range of pathways including noise, vibration and pollutant spillage.

Disturbance from long-term construction works are known to impact several of the overwintering bird species present²⁰. Disturbance can have negative physiological costs such as increased heart rate and stress hormones as well as negative energetic costs from the reduced foraging time or flying away from the site of disturbance.

Disturbance can have negative physiological costs such as increased heart rate and stress hormones as well as negative energetic costs from the reduced foraging time or flying away from the site of disturbance. As described in the non-recreational disturbance chapter of Section 5.2 chronic noise

levels of 55-65 dBA and sudden irregular noise above 50dBA causing the most disturbance can cause changes to bird behaviours. The studies also showed that ambient construction noise levels should be restricted to below 70dBA as birds will habituate to regular noise below this level.

Assessment

The exact machinery for the works is yet to be determined however Storys Contracting Ltd have confirmed that the loudest piece of equipment is predicted to be 103.4dBA at source. Therefore, behavioural changes and flight abandonment of the site by all qualifying bird species present may be caused by the following site activities, depending on the location of the noise generation in relation to the birds:

- De-vegetation activities and any required clearance activities;
- Excavation, handling, removal and treatment of any arisings;
- Activities using plant or loud hand tools; and
- Activities that cause sudden, loud noises.

Below is a table of the recommended buffer zones for the Qualifying and red list species at the site. The majority of the buffer zones described above have been taken from NatureScot's literature review²⁰ of disturbance distances of selected bird species and the 'human disturbance' covers activities such as pedestrian walking to a motorboats out at sea (which produce levels of up to 85 dBA).

Table 5.3 Recommended buffer zones for the Qualifying and red list species at the site

Species	Conservation Status	Overall sensitivity to disturbance	Recommended buffer zones in non-breeding season
Black-tailed Godwit (<i>Limosa limosa</i>)	Red LBAP Qualifying species for SPA designation	Medium	100-200m
Curlew (<i>Numenius arquata</i>)	Red LBAP Qualifying species for SPA designation	High	200-650m
Dunlin (<i>Calidris alpina alpina</i>)	Red Qualifying species for SPA designation	Medium	150-300m
Ringed plover	Red list Qualifying species for SPA designation	High	100-300m

Species	Conservation Status	Overall sensitivity to disturbance	Recommended buffer zones in non-breeding season
Goldeneye (<i>Bucephala clangula</i>)	Red	High	150-800m
Pochard (<i>Aythya ferina</i>)	Red	High	150-450m
Scaup (<i>Aythya marila</i>)	Red LBAP	High	150-450m
Slavonian Grebe (<i>Podiceps auritus</i>)	Red	Medium	150-350m
Bar-tailed Godwit (<i>Limosa lapponica</i>)	Amber Qualifying species for SPA designation	Medium	200-300m
Oystercatcher	Amber Qualifying species for SPA designation	Medium	150-300m
Grey Plover (<i>Pluvialis squatarola</i>)	Amber Qualifying species for SPA designation	Medium	150-300m
Knot (<i>Calidris canutus</i>)	Amber Qualifying species for SPA designation	Medium	100-300m
Mediterranean Gull (<i>Larus melancephalus</i>)	Amber Qualifying species for SPA designation	Low ²⁸	100m*
Redshank (<i>Tringa totanus</i>)	Amber Qualifying species for SPA designation	Medium	200-300m
Sanderling (<i>Calidris alba</i>)	Amber Qualifying species for SPA designation		69m ²⁹
Turnstone (<i>Arenaria interpres</i>)	Amber Qualifying species for SPA designation		72m ³⁰
Whooper Swan (<i>Cygnus cygnus</i>)	Amber Qualifying species for SPA designation	Medium	200-600m

Species	Conservation Status	Overall sensitivity to disturbance	Recommended buffer zones in non-breeding season
Black-throated Diver (<i>Gavia arctica</i>)	Amber LBAP	High	<1000m
Little Egret	Green Qualifying species for SPA designation		107m ³¹

*No buffer zones were identified during research, however gull's sensitivity to human disturbance is considered low and therefore the lower end of the buffer range for other species is considered acceptable for gulls.

Works to the BOAT along the new sea wall would fall within 15m of the lagoon which lies well below the lower threshold recommended for buffer zones.

The impact of disturbance on the populations of birds supported by habitats depends upon the availability of alternative habitat³². The lagoon forms a total of 50.24 ha and the width of the lagoon varies between approximately 850m-1,200m across and forms a part of the wider Duddon Estuary and therefore birds have ample space to avoid construction without leaving the lagoon. However, as there could be an increase in disturbance the mitigation set out below should be adhered to.

Mitigation

Avoidance

The buffer zones have informed the BPZ for the qualifying and red list species that have been identified as overwintering as detailed in the above varies between 69m (for Sanderling) and <1000 (Black-throated diver)²⁰. Given the number of different species at Hodbarrow Lagoon, there will be a variance in tolerance to disturbance. To minimise impacts on overwintering birds, a higher effort of works will take place along the BOAT along the new sea wall and the new hide adjacent to the old sea wall avoiding the sensitive period for overwintering periods 31st October – 31st March as much as possible.

Considering the nesting bird season constraints in the section above, this allows for a higher effort of if these works taking place between September and October.

Should these works be delayed or be anticipated to take longer, temporary acoustic screens will be installed to minimise disturbance onto the lagoon which can minimise noise disturbance by up to 30 dBA as well as screen movement of vehicles and workers from the birds. Any works that cannot keep ambient noise below 70dBA may have to cease until the following September/October.

Ecological Clerk of Works

An ECoW will be present during the works around the lagoon to identify the species using the lagoon and can make an assessment on the distance/sensitivity and advise each day on whether works can continue or should wait until the following window.

Best Practice

Best practicable means will be included to control construction noise in the form of low noise emission plant, as specified in BS5228-1. Best practicable means includes control at source, such as the selection of quiet and low vibration equipment, a review of the construction programme and methodology to consider quieter methods, and the use of less intrusive alarms such as reversing warnings.

Table 5.4 outlines noise and vibration issues requiring attention and identifies the control measures to be implemented.

Table 5.4 Noise and vibration management

Noise and Vibration	Control Measure
Site set-up and operating hours	Normal working hours will be 8.00am - 6.00pm Monday to Friday, and 9.00am - 1.00pm Saturday.
Construction traffic (delivery vehicles, site personnel etc.)	All goods, equipment, plant and materials will be transported by existing roads. Deliveries times will be planned to minimise potential disturbance to birds using the lagoon, the delivery location will be out of view of the lagoon.
Construction plant and equipment	- Site compounds to be sited on existing areas of hardstanding and at least 30m away from sensitive areas, with fencing / barriers to prevent encroachment on the 30m BPZ. Any static plant is to be sited within the fenced off compound. - Site compounds will be chosen to be as far from the lagoon as reasonably possible. - Plant and equipment to be switched off when not in use. - Plant and equipment to be maintained and operated in accordance with operators instruction and to ensure that excessive noise levels are not generated - Regular integrity checks of noise mitigation measures fitted to items of plant - Acoustics screens or enclosures for stationary or semi-stationary plant (e.g. generators) will be considered by the contractors - Best practicable means will be included to control construction noise in the form of low noise emission plant, as specified in BS5228-1. - Timing of works to avoid sensitive periods in order to reduce impacts on wildlife.

Lighting

It is understood that construction works will be undertaken during daylight hours. Should any artificial lighting be required this will follow the BCT and ILP guidelines²⁴. The lighting will be installed so as to

not cause unnecessary light spill onto surrounding habitats. This will be achieved through directional lighting and the use of cowls/hoods. There will be no uncontrolled lighting and the lighting will be switched off when not in use.

In Combination Assessment

There were no nearby developments identified are predicted to have cumulative effects in the form of non-recreational disturbance extending to the qualifying overwintering birds.

Conclusion

These mitigation actions will avoid/mitigate impacts on the overwintering species using the lagoon, LSEs associated with non-recreational disturbance on qualifying overwintering bird species are highly unlikely.

5.4 NATTERJACK TOADS (RAMSAR)

Reduced Water Quality

Potential Effects

There has been natterjack toad habitat creation which includes scrapes and pools on site however surveys so far have confirmed likely absence of natterjacks on site.

Research suggests that natterjack toads populations on heathland were found to avoid acidic pools³³ and as such in the absence of mitigation, pollution events during construction could alter the pH of these pools and reduce suitability for natterjack toad populations.

As per the Environment Alliance's Pollution Prevention Guidelines Works¹⁸ and maintenance in or near water all works outside of 10m of the pools are considered to have no LSE.

Assessment

Some of the resurfacing of existing footpath and the maintenance to the BOAT will be undertaken within approximately 10m of some of the existing and newly created natterjack toad ponds habitat. It is estimated that the works within these BPZ will take approximately one week.

Figure 5.5 10m Biodiversity Protection Zones from Natterjack toad habitat



Considering the temporary nature and the relatively small scale of works proposed along the existing footpath and the BOAT, it is considered unlikely that any contaminated runoff that may enter the pools during works would significantly impact the likelihood of natterjack toads potentially using these pools. However, as we cannot predict surface water pollution levels in the event of a pollution event during construction, a precautionary approach has been applied.

Mitigation

The air quality, dust and emissions management detailed in Table 5.1 and materials and waste management detailed in Table 5.2 will be adhered to.

In Combination Effects

There were no nearby developments identified are predicted to have cumulative effects in the form of reduced water quality extending to the qualifying natterjack toads.

Conclusion

The natterjack toads have the 2021/2022 and 2024 surveys been confirmed likely absent on site. However, as a precaution the assessment has been considered that in light of the temporary and small-scale nature of the works and the use of appropriate mitigation measures secured within the CEMP⁷, LSEs associated with reduced water quality upon qualifying natterjack toads is highly unlikely.

Reduced Air Quality

Potential Effects

As discussed above there are several scrapes/ponds adjacent to the existing footpath and the BOAT. There will be increased vehicle movements to and from site during construction which could result in an increase in NO_x emissions from vehicle exhausts. This can lead to greater rates of nitrogen deposition to the scrapes/pools, which can have a serious negative effect on the quality, alter the pH and reduce suitability for natterjack toads.

Assessment

The same assessment applies to that set out in the section above.

Mitigation

Table 5.1 outlines the air quality requiring attention and identifies the control measures to be implemented.

In Combination Effects

There were no nearby developments identified are predicted to have cumulative effects in the form of reduced air quality extending to the qualifying natterjack toads.

Conclusion

In light of the temporary and small-scale nature of the works and the use of appropriate mitigation measures secured with the CEMP, LSEs associated with reduced air quality upon qualifying natterjack toads are highly unlikely.

Non-recreational Disturbance

Potential Effects

Non-recreational disturbance (noise, visual, light activity, etc.) in/nearby the newly created natterjack toad habitat causing a barrier, displacement and preventing passage. Additionally, during construction site clearance has the potential to result in the killing and injury of natterjack toads.

Assessment

Works taking place near newly created natterjack toad habitat includes the resurfacing of the existing footpath and maintenance of the BOAT and so will be concentrated onto road/path habitat which is unsuitable for natterjacks. However, these works will be within the immediate vicinity to the scrapes/pools and are due to take approximately one week.

Dense scrub will also be removed as part of the development however this is also deemed unsuitable for natterjack toads³³. Some areas of scrub have been made less dense due to Site Investigation works and as such clearance has the potential to result in the killing and injury of natterjack toads. As such the mitigation set out below will be adhered to.

Mitigation

Best practice

Detailed mitigation measures relating to construction and includes best practice measures such as the following:

- A toolbox talk will be given by the ECoW to all operatives prior to the commencement of site activities;
- To compensate for the loss of scrub, refugia and hibernacula will be created to increase the carrying capacity on re-naturalised habitat;
- Precautionary staged clearance when air temperatures are between 9°C and 20°C and night time temperatures no lower than 5°C ideally take place during September and mid October (to avoid the nesting and overwintering bird seasons too);
- Firstly, the vegetation should be cut to no lower than 150mm directionally towards neighbouring suitable habitat and left for at least 24 hours. Secondly, the works area will be subject to fingertip search or raked by hand, under inspection by the ECoW and once the works area is deemed free of animals, it should be cleared to ground level and kept clear of vegetation to remain unsuitable for reptiles and amphibians; and,
- Materials where possible will be stored in a raised manner such as on pallets and on areas of existing hardstanding. All material should be compressed and sealed with the back of a bucket, making the spoil heaps solid to reduce likelihood of amphibians and reptiles burrowing into them.

Should any natterjacks be found on site during the surveys or within the proximity of the works or spoil storage area at any point during site preparation or construction works, the natterjack toad will be left in-situ and all works in that area are to be halted immediately.

ECoW who will provide advice and recommendations for either further survey work or will contact Natural England to start the licencing procedure. No further works would be able to be undertaken until a Natural England development licence for the site is granted, this may involve further surveys which are seasonal in nature.

Lighting

It is understood that construction works will be undertaken during daylight hours. Should any artificial lighting be required this will follow the BCT and ILP guidelines²⁴. The lighting will be installed so as to not cause unnecessary light spill onto surrounding habitats. This will be achieved through directional lighting and the use of cowls/hoods. There will be no uncontrolled lighting and the lighting will be switched off when not in use.

In Combination Effects

There were no nearby developments identified are predicted to have cumulative effects in the form of non-recreational disturbance on extending to the qualifying natterjack toads.

Conclusion

The natterjack toads have the 2021/2022 and 2024 surveys been confirmed likely absent on site. However, as a precaution the assessment has been considered that, in light of the temporary and small-scale nature of the works and the use of appropriate mitigation measures secured with the CEMP, LSEs associated with non-recreational disturbance on qualifying natterjack toads are highly unlikely.

6.0 APPROPRIATE ASSESSMENT OPERATIONAL PHASE

6.1 HABITATS (SAC)

Recreational Pressure and Disturbance

Potential Effects

There has been only one Annex I habitat identified on the site which is Fixed coastal dunes with herbaceous vegetation ("grey dunes"). The European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) supporting documentation for the conservation status assessment for Fixed coastal dunes with herbaceous vegetation ("grey dunes") has highlighted sports, tourism and leisure activities are considered a high ranking pressure/threat. An increase in recreational pressure could result in habitat degradation through trampling from footfall, introduction of invasive species and increase in eutrophication through dog faeces and leaching of flea treatments.

Assessment

The aspirations of the scheme will be that there will be a reduction of cars using the BOAT and parking in the unofficial parking spot immediately adjacent to the cited Annex I H2130 Fixed coastal dunes with herbaceous vegetation (grey dunes) habitat. As such this should reduce antisocial activity associated with off-roading across the adjacent grasslands and dune habitats on the site, reduce fly tipping as well as reduce airborne nitrogen oxides (NO_x) levels associated with vehicles. Additionally, the proposals will bring long-term management to the site for a period of at least 30 years.

The aspirations for the scheme are that visitor numbers will increase from 40,000 to between 80,000 and 90,000 annually. Increased footfall can lead to habitat degradation through dune fragmentation, instability and eventually coastal erosion³⁴ as well as increase in likelihood of introduction of invasive species. Additionally, an increase in dogwalkers can lead to an increase in eutrophication through dog faeces.

Mitigation

Signage

Research suggest that signage is an effective way of reducing disturbance caused by visitors at unmanaged wildlife sites³⁵ and can be used to raise awareness of the importance of the site and what species they may see.

Detailed interpretation boards will be installed around the site. The signs will include instructions to keep dogs on leads and also educational messaging about the importance of maintaining distance from sensitive habitats like the Annex I habitat identified on the site which is Fixed coastal dunes with herbaceous vegetation ("grey dunes"). Signage will inform site visitors during the removal of desire lines to explain the reasons behind the decisions and highlights alternative routes.

Signs will promote the conservation of qualifying and notable habitats and species. Graphics will also play a key role in communicating facts and encouraging further interest. It is recommended that modern graphics are opted for so as to engage a wider audience. These boards will help to raise public awareness and improve the understanding and appreciation of the different species found at site. The signage will remind visitors to pick up dog waste, litter keep them on leads.

Plate 6.1 Signage example taken from Swanage.co.uk



Reconfiguration of the paths

Paths will be formalised through use of natural and permeable materials on existing routes to increase the site accessibility for all and encourage site visitors to use official paths.

Having more formalised paths will reduce trespass onto sensitive habitats such as the Annex I habitat identified on the site which is Fixed coastal dunes with herbaceous vegetation ("grey dunes"). Signage will also be used to raise awareness about the sensitive habitats and dissuade people from crossing the open grasslands. This is an effective practice often used in ancient woodlands during bluebell season and on other existing RSPB reserves.

Where additional access discouragement is required, a natural barrier in the form of thorny scrub will be in place such as around the new carpark and the as well as cordoning off in areas near around the Annex I fixed coastal dunes with herbaceous vegetation ("grey dunes") habitat. Fencing will guide visitors to remain on the paths which will prevent degradation of habitats through trampling and the spread of invasive species.

Provision of bins

It is understood that there is none or very limited existing bins across the site. The scheme will provide a total of 11 litter and dog waste bins around the reserve at regular intervals along paths and concentrated at areas with benches, viewpoints and hides, cross sections of paths and parking. The operational management team will be responsible for emptying the bins and will increase frequency of emptying during the busiest times of the year.

Removal of the picnic bench

The Annex I 'Fixed coastal dunes with herbaceous vegetation ("grey dunes") habitat' is currently subject to heavily trampling (see Plate 6.2). The picnic bench within this area will be moved to allow the habitats to recover.

Plate 6.2 'Fixed coastal dunes with herbaceous vegetation (grey dunes) habitat' subject to existing trampling (photo taken in February 2023)



Remedial actions

Should the monitoring identify that the Annex I 'Fixed coastal dunes with herbaceous vegetation (grey dunes) habitat' is threatened by the increase in site visitors trampling over the habitat. The following actions would be considered:

- Installing fencing around the habitat; and
- Increased signage detailing the importance of the habitats.

In Combination Effects

The application for Port Haverigg Holiday Village (ref: 4/10/2387/Of1) in Haverigg (approximately 100m south-east of the site) is to increase the holiday village by 100 no. Static caravan pitches, 20 no. Motor home pitches, 30 no. Touring caravan pitches, camping area for up to 20 no. Tents.

This was granted planning in 2010 with commencement to have taken place within three years. It is unknown whether this development has been completed however an application (ref: 4/22/2402/OB1) for variation of the Condition 2 of the planning permission was submitted in 2022 and as such it was considered that the development may still be underway. As such this has been considered within this assessment.

The Port Haverigg Holiday Village will likely increase the number of visitors to the nature reserve, perhaps more so than the Visitor Centre and carpark. Greengage have not had access to the documents associated with this planning application however the PEA Update to the 2010 assessment for Port Haverigg Holiday Village states³⁶ that "the wintering bird surveys undertaken for the 2010 report indicate that the area is avoided by wintering waders, gulls and wildfowl" and concluded that "it is considered unlikely that there will be any cumulative effects from extending the site in this area – but some mitigation to encourage responsible behaviour by visiting tourists should be put in place" for the application for the variation of the Condition 2 states: *"It is considered unlikely that there will be any cumulative effects from extending the site in this area – but some mitigation to encourage responsible behaviour by visiting tourists should be put in place."* And recommended the following *"measures they can take to minimise impacts. This can be in the form of information on noticeboards or in welcome packs/ emails. Simple messages are all that is needed:*

- *Keep dogs under control (preferably on a lead) on the upper shore of the beach and around sand dunes to protect ground nesting birds and high-tide roosts;*
- *If a bird is agitated, then it is likely that you are close to its nest. Many ground nesting waders have well camouflaged eggs, so head lower down the beach (below the high tide mark) or follow clear footpaths;*
- *Keep to paths and open areas to avoid trampling sensitive vegetation;*
- *No fires or BBQs near to sand dunes, grassland or scrub habitats".*

Additionally, a review of the landscaping plan produced by Landscape Architecture Arboriculture on the 19th January 2022 reveals that the proposals include additional areas for recreation away from the nature reserve.

Nonetheless, the mitigation proposed to be embedded within the Iron line development will also act as mitigation for an increase in visitor numbers as a result of the Port Haverigg Holiday Village development. As such, no LSEs are predicted to arise as a result of this development, therefore it will not contribute to cumulative impacts.

Conclusion

In light of the appropriate operational mitigation measures which can be secured within a LEMP, LSEs associated with recreational disturbance on Annex I 'Fixed coastal dunes with herbaceous vegetation (grey dunes) habitat are highly unlikely.

6.2 BREEDING BIRDS (SPA AND RAMSAR)

Recreational Pressure and Disturbance

Potential Effects

The increase in visitors has potential to increase the frequency of human disturbance to breeding terns and gulls. The 0.5 ha tern island was created within 100m of the existing BOAT, which lies closer than the recommended human disturbance BPZ for tern species (ranging from 200-400m)²⁰. This can affect the breeding success of birds in a variety of ways including reduced intake of food, increased energy expenditure, physiological impacts such as increased stress and direct impact through predation by domestic dogs. As such this impact, should be taken to the Appropriate Assessment stage of the HRA as required under the Habitats Regulations, and mitigation secured to ensure a conclusion of no adverse effect on integrity.

Assessment

Proposals estimate peaks of between 20 – 50 visitors per hour over the course of a day during peak periods (school holidays, warm weather). Whilst the scheme will increase the number of visitors, given the size of the site, the numbers of visitors will still be spread out and it unlikely that there will not be a sudden increase in large crowds gathering that could disturb the qualifying breeding bird assemblages.

The proposals seek to restrict of vehicular access along the BOAT to emergency and maintenance vehicles only which should decrease the opportunities from disturbance from anti-social driving of vehicles along the BOAT.

The tern and gull nest have existing mitigation as they are on islands which are surrounded by anti-predation fencing which gives them an additional level of protection against dog disturbance (and mammal) predation. The site is an RSPB reserve and there will be an existing level of understanding about the sites importance for birds

The continued presence of a tern warden during the breeding season who will be involved in the ecological management, visitor infrastructure upkeep and monitoring³⁷.

Mitigation

Strengthening the bund

The existing bund provides an effective visual screen between the people on the BOAT along the new sea wall and the breeding tern colony. This bund has deteriorated over the years and has gaps in places. The scheme will fortify and extend the existing bund to have a maximum height of 1500mm along the BOAT along the new sea wall as well restrict access to vehicles along the BOAT. Despite an increase in visitors the bund will ensure that this increase will be visibly unnoticeable to the terns.

Scrub creation

The proposed scrub planting will enforce the bund and deter humans and dogs from wandering into the terns field of vision.

Tern Warden

RPSB provide a tern warden within the tern hide during the nesting season. The tern wardens will continue to monitor the tern populations, engage with the public and monitor disturbance and predation. As described above, the increase in visitors will be unnoticeable to the terns following the strengthening of the bund. The role of the tern warden will be to continue monitoring terns and raising awareness of the importance of the tern colony to the public. If the wardens notice any sustained changes in behaviour on days when recreational pressure is high such as increased vigilance towards the perceived 'threat', increase in defensive calls or fleeing. This will be reported and remedial actions set out below will be explored and those set out within the VAMP⁶.

Sign Posting

The scheme will increase signage and education boards to raise awareness of the international importance of the tern colonies on site. This will aid behaviour change and increase the level of respect and understanding of site visitors and is an effective way of reducing disturbance caused by visitors at unmanaged wildlife sites³⁵.

Remedial Actions

It is predicted that there should be no impact to the tern colony with the mitigation measures proposed. However, should the tern wardens report sustained or frequent changes in tern behaviour or reduction in colony due to increased disturbance from recreation, the following remedial actions will be considered to mitigate long-term changes. The following actions would be considered:

- Assess where the peak points of disturbance are coming from and restrict access or strengthen the bund during the breeding season;
- Introducing a parking charge during peak times on weekends, bank holidays and school holidays as per the VAMP.³⁸

The above mitigation measures should be secured within a Landscape and Ecological Management Plan (LEMP) for the proposals.

In Combination Effects

The in combination effects for the Port Haverigg Holiday Village (ref: 4/10/2387/Of1) application assessed for the qualifying feature above are also relevant to breeding birds. Greengage have not had access to the documents associated with this planning application however the PEA Update to the 2010 assessment for Port Haverigg Holiday Village states that *"the wintering bird surveys undertaken for the 2010 report indicate that the area is avoided by wintering waders, gulls and wildfowl – and this pattern is repeated for the breeding bird survey"* and concluded that *"it is considered unlikely that there will be any cumulative effects from extending the site in this area – but some mitigation to encourage responsible behaviour by visiting tourists should be put in place."* And recommended the following measures to minimise impacts of relevance to breeding birds. *"This can be in the form of information on noticeboards or in welcome packs/ emails. Simple messages are all that is needed:*

- *Keep dogs under control (preferably on a lead) on the upper shore of the beach and around sand dunes to protect ground nesting birds and high-tide roosts;*
- *If a bird is agitated, then it is likely that you are close to its nest. Many ground nesting waders have well camouflaged eggs, so head lower down the beach (below the high tide mark) or follow clear footpaths."*

Additionally, a review of the landscaping plan produced by Landscape Architecture Arboriculture on the 19th January 2022 reveals that the proposals include additional areas for recreation away from the nature reserve.

Nonetheless, the mitigation proposed to be embedded within the Iron line development will also be mitigation for an increase in visitor numbers as a result of the Port Haverigg Holiday Village development. As such, no LSEs are predicted to arise as a result of this development, therefore it will not contribute to cumulative impacts.

Conclusion

In light of the appropriate operational mitigation measures which can be secured within a LEMP, LSEs associated with recreational disturbance on breeding birds are highly unlikely.

6.3 OVERWINTERING BIRDS (SPA AND RAMSAR)

Reduced Air Quality

Potential Effects

There will be an increase in vehicles along the access road to the Visitor Centre which does fall within 200m of the lagoon. There is a stretch of this access road within 10m of the lagoon, separated by some scrub planting however this is not considered significant barrier. This could impact air quality through increased dust deposition, and an increase in NO_x emissions from vehicle exhausts. This could impact the wintering bird assemblages as there is literature to suggest there is correlation between oxidative stress in some bird species and NO_x levels¹⁹.

However, this increase in traffic here will be balanced out by a reduction of traffic along the BOAT which will be limited to emergency vehicles only.

Assessment

A review of the APIS interactive map³⁹ has identified the area with this habitat has a 3-year average for 2021 (which is the latest dataset available) of 11.1 Nitrogen Deposition Kg N ha⁻¹ yr and a 3-year average of NO_x concentrations of 3.4 ug/m³.

As set out in the government's Environment Improvement Plan⁴⁰, air quality in the UK has improved significantly in recent decades with a decrease of 44% in NO_x. Greengage have RSPB overwintering bird data for the site since 2010. As such, historic levels for the quadrat with the access road to the visitor centre have been reviewed since 2010 to see if the highest levels of N Disposition observed a reduction in qualifying species.

The highest N Disposition levels were recorded in 2012 (three year average between 2011-2013) which were measured at 13.7 KgN/ha/yr.

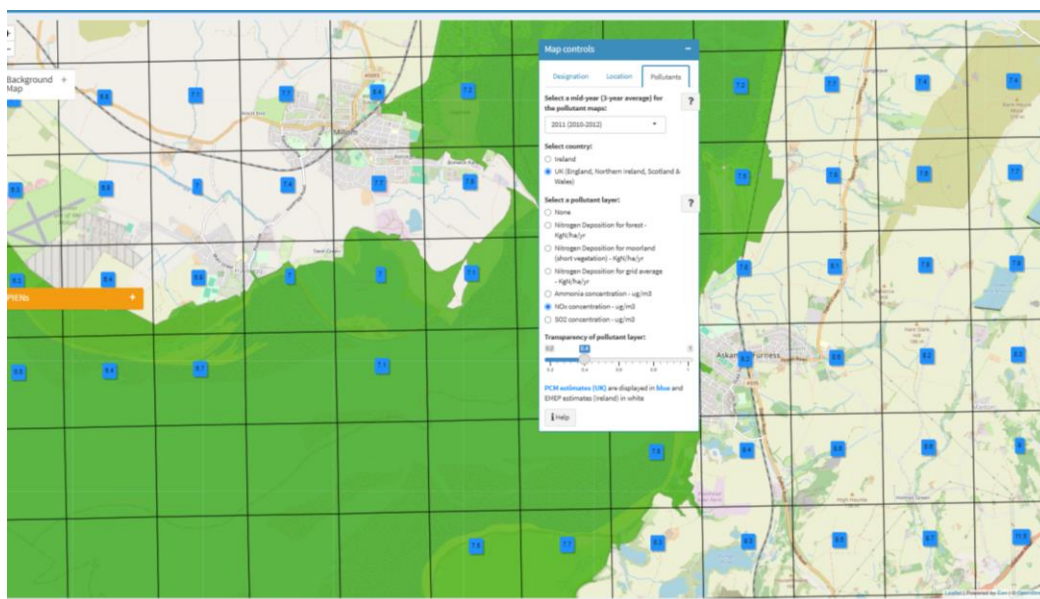
Figure 6.1 Highest level of N disposition since 2010



During these years there were three qualifying species (bar tailed godwit, grey plover and sanderling) which were not observed on site however these are not recorded in most of the years since 2010 (which RSPB have provided data for) and as such are not an indicator of N Disposition having an effect. The more likely reason is that these particular qualifying species are waders and Hodbarrow Lagoon is not a stronghold as their habitat preferences are typically sandy and muddy estuaries. The remaining species outlined in Table 5.3 were observed during the years of highest N deposition suggesting that increases to average KgN/ha/yr are not going to significantly impact these species.

Additionally, historic levels for the quadrat with the access road to the visitor centre have been reviewed since 2010 to see if the highest levels of NO_x observed a reduction in qualifying species. The highest levels were recorded in 2011 (three year average between 2010-2012) which were measured at 7ug/m³.

Figure 6.2 The highest level of three year average NO_x ug/m³ since 2010



Two qualifying species of those listed in Table 5.3 bar tailed godwit and sanderling were not observed during 2010-2012. However, as above, these are not recorded in most of the years since 2010 (which RSPB have provided data for) and as such are not an indicator of NO_x having an effect. The remaining species outlined in Table 5.3 were observed during the years of highest NO_x suggesting that increases to average ug/m³ are not going to significantly impact these species.

Greengage have reviewed the Transport Assessment⁴¹ which identified in October 2018, Mainsgate Road as having as having a 7 day average of 908 two way trips for all vehicles. Reviewing the 2018 levels ensures that any reduction in N Deposition and NO_x levels as a result of Covid is not captured as this was a period where vehicle use changed from the typical routines. In 2018, this quadrat had a level of 11.8 N Deposition Kg N /ha/-1 yr (see Figure 6.3) and a 3-year average of NO_x concentrations ranging of 6 ug/m³ in 2018 (see Figure 6.4). The 2018 average has an average of 11.8 Nitrogen Deposition Kg N ha⁻¹ yr and a 3-year average of NO_x concentrations of 6 ug/m³.

Figure 6.3 2018 N deposition levels

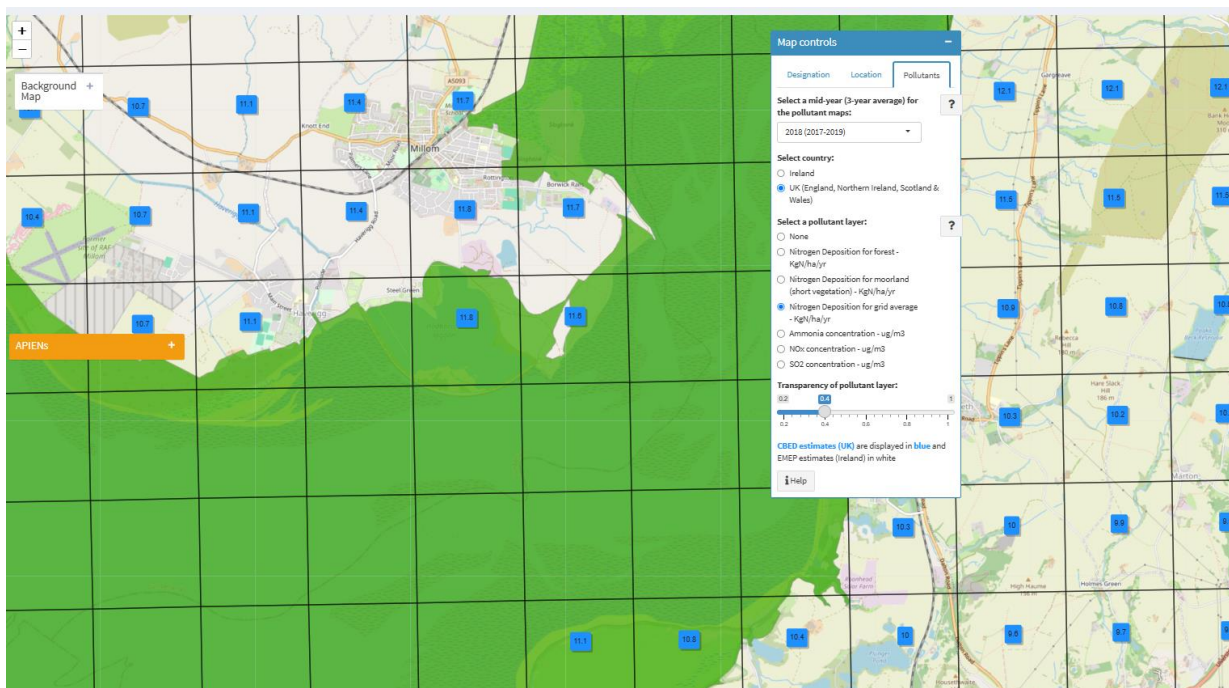
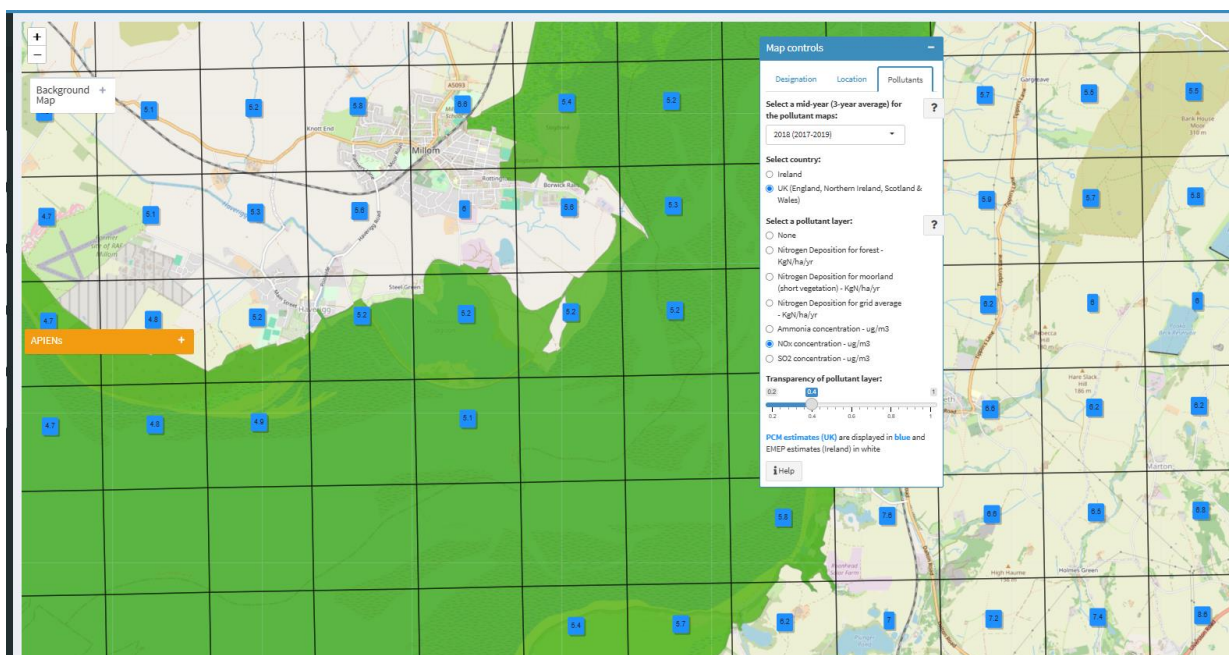


Figure 6.4 2018 level of three year average NOx ug/m3



The Transport Assessment predicts that trips will be an increase from 111 (on a Saturday) 337 (on a Saturday) which is less than half of the 908 trips per day along Mainsgate Roads. Therefore, N deposition and NOx along this access road is not expected to exceed 2018 levels of N Deposition and NOx along Mainsgate Road. Overall, the increase in numbers along the access road via the lagoon is unlikely to exceed historical levels of N Deposition and NOx which did not appear to have an effect on overwintering birds.

Mitigation

As described above, any increases to the N and NO_x deposition from additional vehicles driving along the access road are not predicted to have significant effects on the overwintering bird species. However, should levels of N and NO_x deposition increase to higher than previously recorded at the site then remedial actions such as additional scrub buffer planting should be considered.

In Combination Effects

Whilst the adjacent Port Haverigg Holiday Village (ref: 4/10/2387/0f1) application will likely increase visitor numbers to the site, this development is close enough to the site that visitors will likely walk to the site.

There are two existing roads available to reach the Port Haverigg Holiday Village both of which do have small stretches within 200m of the lagoon. A review of the landscaping plan dated 19th January 2022 reveals that the plans include an additional access road which will also fall within 200m from the lagoon at approximately 150m. The speed limit within the holiday village is likely to be low and as such have lower emissions⁴². This new road will encourage less cars along the road along the lagoon edge and there will be additional planting between this new road and the lagoon which should filter some of the pollutants.

However, with the mitigation proposed to be embedded within the Iron line development no LSEs are predicted to arise as a result of this development, therefore it will not contribute to cumulative impacts.

Conclusion

In light of the assessment above, LSEs associated with reduced air quality on qualifying overwintering bird species are considered highly unlikely. Remedial actions such as additional scrub buffer planting should be secured through a LEMP if N deposition and NO_x rise past historic levels.

Recreational Pressure and Disturbance

Potential Effects

The increase in visitors has potential to increase the frequency of human disturbance which can impact birds variety of ways including reduced intake of food, increased energy expenditure, physiological impacts such as increased stress and direct impact through predation by domestic dogs.

Assessment

Whilst the scheme will increase the number of visitors, this is likely to be more noticeable during the other seasons. Furthermore, given the size of the site, the numbers of visitors will still be spread out and it unlikely that there will not be a sudden increase in large crowds gathering that could disturb the qualifying overwintering bird assemblages.

The proposals seek to restrict of vehicular access along the BOAT to emergency vehicles only which should decrease the opportunities from disturbance from antisocial activity such as off-roading and racing along the BOAT.

There will be an increase in vehicle traffic to the Visitor centre and car park site which at its closest point passes the lagoon at 10m. This road is already subject to vehicle traffic consisting of those visiting site and to the Household Waste Recycling Centre off-site to the north. The BPZ for human disturbance for the non-breeding bird species range from 200m to 1km (see Table 5.3). The lagoon forms a total of 50.24ha and is approximately 850m-1,300m across. Therefore, there would be ample area of the lagoon available to all species if they were seeking to avoid disturbance from vehicles. Nonetheless, the below mitigation measures will be provided as part of the scheme.

Mitigation

Many of the mitigation actions for operational impacts provided in the breeding bird section above apply to the overwintering birds too. The fortification and extension of the bund will protect the birds from visual disturbance by shielding site visitors. The restriction of vehicles along the BOAT and the reduction in lagoon access points will reduce the behaviours such as anti-social driving of cars/mopeds/motorbikes and kayaking that have high disturbance potential.

Notably, proposals also seek to include interpretation and education boards to raise awareness of the international importance of the overwintering bird assemblages and increase the respect and promote behavioural change.

In Combination Effects

The in combination effects for the Port Haverigg Holiday Village (ref: 4/10/2387/Of1) application assessed for the recreational disturbance qualifying features above are also relevant to overwintering birds. The PEA Update to the 2010 assessment for Port Haverigg Holiday Village states that *"the wintering bird surveys undertaken for the 2010 report indicate that the area is avoided by wintering waders, gulls and wildfowl"*. And concluded that *"it is considered unlikely that there will be any cumulative effects from extending the site in this area – but some mitigation to encourage responsible behaviour by visiting tourists should be put in place."* And recommended including information on noticeboards and welcome packs/emails and messages advising that dogs are kept on leads and clear footpaths should be followed.

Additionally, a review of the landscaping plan produced by Landscape Architecture Arboriculture on the 19th January 2022 reveals that the proposals include additional areas for recreation away from the nature reserve.

Nonetheless, the mitigation proposed to be embedded within the Iron line development will also be mitigation for an increase in visitor numbers as a result of the Port Haverigg Holiday Village development. As such, no LSEs are predicted to arise as a result of this development, therefore it will not contribute to cumulative impacts.

Conclusion

In light of the assessment above and the mitigation measures imbedded into the scheme, LSEs associated with recreational disturbance on qualifying overwintering bird species are considered highly unlikely.

6.4 NATTERJACK TOADS (RAMSAR)

Reduced Water Quality

Potential Effects

There has been natterjack toad habitat creation which includes scrapes and pools on site however surveys so far have confirmed likely absence of natterjacks on site. Dogs entering the pools in particular can alter the turbidity, siltation and leach chemicals from flea treatments on their fur. This can cause an increase in toxicity. Research suggests that natterjack toads populations on heathland were found to avoid acidic pools⁴³ and as such disturbance from dogs entering water could alter the pH of these pools and reduce suitability for natterjack toad populations.

Assessment

No natterjack toads have been identified so far on surveys to date (as of 9th April 2025). However, suitable habitat exists on site and nearby populations exist with calling males heard from a waterbody off-site approximately 65m east from nature reserve.

The increase in visitors has potential to increase the frequency of human and dog disturbance to the scrapes/pools. It is understood from RSPB's activities and outputs data they have shared that there was plans in January/February 2025 to erect 265m post and rail fencing around the natterjack toad pools on the reserve. It is understood from a meeting with RSPB on the 23/05/2025 that at least one of the pools has fencing. This should reduce the opportunities for reduced water quality from human and dog disturbance despite the increase in visitor numbers.

Mitigation

It is predicted that there should be no impact to the potential natterjack toad ponds with the new fencing installed.

Fencing

Installing fencing around the remaining natterjack toad ponds. This should include enough space between the fence and the pool for habitat management to continue.

Monitoring

The fences will be monitored monthly during the natterjack toad breeding season and any remedial measures such as repairs should be undertaken to ensure. This could be secured within an updated LEMP. Should reports of the ponds still being through humans or dogs entering the pond the fence height should be increased.

Signage

The scheme will increase signage and education boards to raise awareness of the international importance of the natterjack toads on site. This will aid behaviour change and increase the level of respect and understanding of site visitors and is an effective way of reducing disturbance caused by visitors at unmanaged wildlife sites³³.

In Combination Effects

There were no nearby developments identified are predicted to have cumulative effects in the form of reduced water quality extending to the qualifying natterjack toads.

Conclusion

In light of the assessment above and the remedial mitigation measures imbedded into the scheme, LSEs associated with reduced water quality on qualifying natterjack toad species are considered highly unlikely.

Recreational Pressure and Disturbance

Potential Effects

The natterjack pools are located immediately adjacent to well-used paths and in the absence of mitigation could be subject to regular disturbance by dogs off their leash.

Assessment

No natterjack toads have been identified so far on surveys to date (as of 9th April 2025). However, suitable habitat exists on site and nearby populations exist with calling males heard from a waterbody off-site approximately 65m east from nature reserve.

The 265m post and rail fencing installed on around pools on the reserve in January and February 2025 should reduce the opportunities for human and dog disturbance despite the increase in visitor numbers.

The aspirations of the scheme will be that there will be a reduction of vehicles using the BOAT and reduce antisocial activity associated with off-roading which would reduce the chance of natterjack toads being run-over by vehicles using the site.

The Visitor centre and car park site will be closed during the night and so no change in visitor numbers across the nature reserve are predicted when natterjacks are dispersing or foraging.

Mitigation

The mitigation measures described in the section above are relevant for this potential impact pathway too.

In Combination Effects

The application 4/10/2387/0f1 Port Haverigg Holiday Village, Haverigg (Approximately 100m south-east of the site) was identified as having potential LSE on the natterjack toad populations that have been identified on an ornamental pool on that site. Natterjack toads are known to disperse up to 3-4km⁴⁴ so cumulative effects from recreational disturbance would likely have effects on the same populations of natterjack toads. However, with the mitigation proposed to be embedded within the Iron line development no LSEs are predicted to arise as a result of this development, therefore it will not contribute to cumulative impacts.

Conclusion

In light of the assessment above and the remedial mitigation measures imbedded into the scheme, LSEs associated with recreational disturbance on qualifying natterjack toad species are considered highly unlikely.

Non-recreational Disturbance

Potential Effects

No additional lighting is proposed for the nature reserve. It is understood that there will be some waymarking lighting around the visitor centre and carpark for public safety reasons during the months where the operational hours close after sunset. Natterjack toads are nocturnal and as such the additional light could disturb natterjack toads as they are dispersing/migrating.

Assessment

The operating hours of the Visitor Centre are yet to be confirmed but is likely between 9:00 and 17:00. There will be lighting required between the hours of 8:00 to 18:00 when operating hours which fall before sunrise or after sunset (i.e for a few hours each day during the winter, and at no other time).

Natterjack toads are nocturnal and adults emerge from hibernation during March/April⁴⁵ when night time temperatures consistently stay above 7°C⁴⁶. As such the natterjack toads will be hibernating and unlikely to be disturbed by additional lighting. However, up until the 5th March sunset is before 18:00 and as such the lighting has potential to disturb natterjack toads during milder nights if adults begin to emerge early in the season.

Sunrise is already before 8:00 in March when natterjack toads may be emerging and as such there will be no lighting impact associated with the mornings in the spring.

Additionally, natterjack toads begin to hibernate when temperatures regularly drop below freezing. The time of hibernation varies across Britain, but it is usually latest at coastal sites, where it may not occur until November⁴⁷. From the 22nd October, sunset is before 18:00 and as such as such the lighting has potential to disturb natterjack toads before they enter hibernation.

Sunrise is after 8:00 from the 25th November. It is likely that natterjacks have already begun hibernating in late November the lighting has potential to disturb natterjack toads if milder nights result in a delay in hibernating.

However, the areas proposed for lighting are associated with the visitor centre and carpark and will be directed over hardstanding which is unsuitable habitat for natterjack toads.

Mitigation

External Lighting Strategy Statement⁴⁸ states there will be no additional lighting that is not specifically essential for public safety. The lighting has been designed in accordance with the Bat Conservation Trust (BCT) and Institute of Lighting Professionals Guidance Note 8 (Bats and Artificial Lighting)⁴⁹

and as such has been designed in a way that is sensitive to all wildlife. This includes the following measures:

- Provision of external lighting will be minimised wherever possible. No lighting is proposed to the access roads or to the car parks not associated with the visitor centre;
- Light distribution will be highly controlled, highly directional, and use light spill control systems, such as honeycomb louvres and the like, to ensure light spill beyond the task area is negligible;
- Uplighting shall not be used anywhere externally;
- Approach to the internal lighting will be well considered and take due cognisance of external spill out of the building and will minimise where possible;
- There will not be a dawn-til-dusk lighting strategy employed. Lighting shall not automatically operate overnight. The lighting shall only operate for a brief period at dawn and dusk when these times coincide around the normal operational hours of the Visitor Centre. The exact hours of operation are still to be determined;
- All lighting shall switch on when the daylight starts to fade and switch off automatically when there is enough daylight, but only when these times sit within the agreed operational hours; and,
- The restriction of vehicles along the BOAT to emergency and maintenance vehicles only reduces the likelihood of recreational vehicle disturbance from headlights.

In Combination Effects

The application 4/10/2387/0f1 Port Haverigg Holiday Village, Haverigg (Approximately 100m south-east of the site) was identified as having potential LSE on the natterjack toad populations that have been identified on an ornamental pool on that site. Natterjack toads are known to disperse up to 3-4km⁵⁰ so cumulative effects from lighting disturbance would likely have effects on the same populations of natterjack toads. However, with the mitigation proposed to be embedded within the Iron line development no LSEs are predicted to arise as a result of this development, therefore it will not contribute to cumulative impacts.

Conclusion

In light of the assessment above and the lighting design measures embedded into the scheme, LSEs associated with non-recreational disturbance on qualifying natterjack toad species are considered highly unlikely.

7.0 SUMMARY

In response to proposed development the Iron Line in Cumbria, a sAA has been conducted to assess the potential for LSEs upon the Morecambe Bay and Duddon Estuary site, SAC, SPA and Ramsar.

The sHRA screening process identified potential LSEs arising from the following impact pathways:

- Construction Phase
 - Habitats (SAC)
 - reduced air quality and non-recreational pressure
 - Breeding birds (SPA and Ramsar)
 - reduced water quality, reduced air quality, non-recreational disturbance
 - Overwintering birds (SPA and Ramsar)
 - reduced water quality, reduced air quality, non-recreational disturbance
 - Natterjack toads (Ramsar)
 - reduced water quality, reduced air quality, non-recreational disturbance
- Operational Phase
 - Habitats (SAC)
 - recreational pressure and disturbance
 - Breeding birds (SPA and Ramsar)
 - recreational pressure and disturbance
 - Overwintering birds (SPA and Ramsar)
 - reduced air quality, recreational pressure and disturbance
 - Natterjack toads (Ramsar)
 - recreational pressure and disturbance and non-recreational disturbance

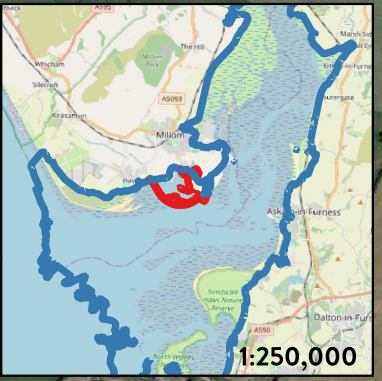
The sAA concludes that mitigation inherent to the scheme (site location, geographical barriers) and additional mitigation actions, such as best practice measures within the CEMP and management and remedial actions secured within the LEMP update remove the likelihood of LSEs occurring.

APPENDIX A PLANNING APPLICATION BOUNDARY AND ECOLOGICAL RECEPTORS

Figure A.1 Planning Application Boundary

IRON LINE

-  Planning application boundary
-  Visitor Centre and car park site.



Title: Figure A1

Drawn by: LT
Date: 09/04/2025

Reviewed by: HB
Date: 09/04/2025

Project number: 553023
Sources: Google Satellite, OpenStreetMap

Figure A.2 the SPA, SAC, Ramsar and SSSI Boundary

Figure A.3 *Ecological receptors and BPZs*

IRON LINE

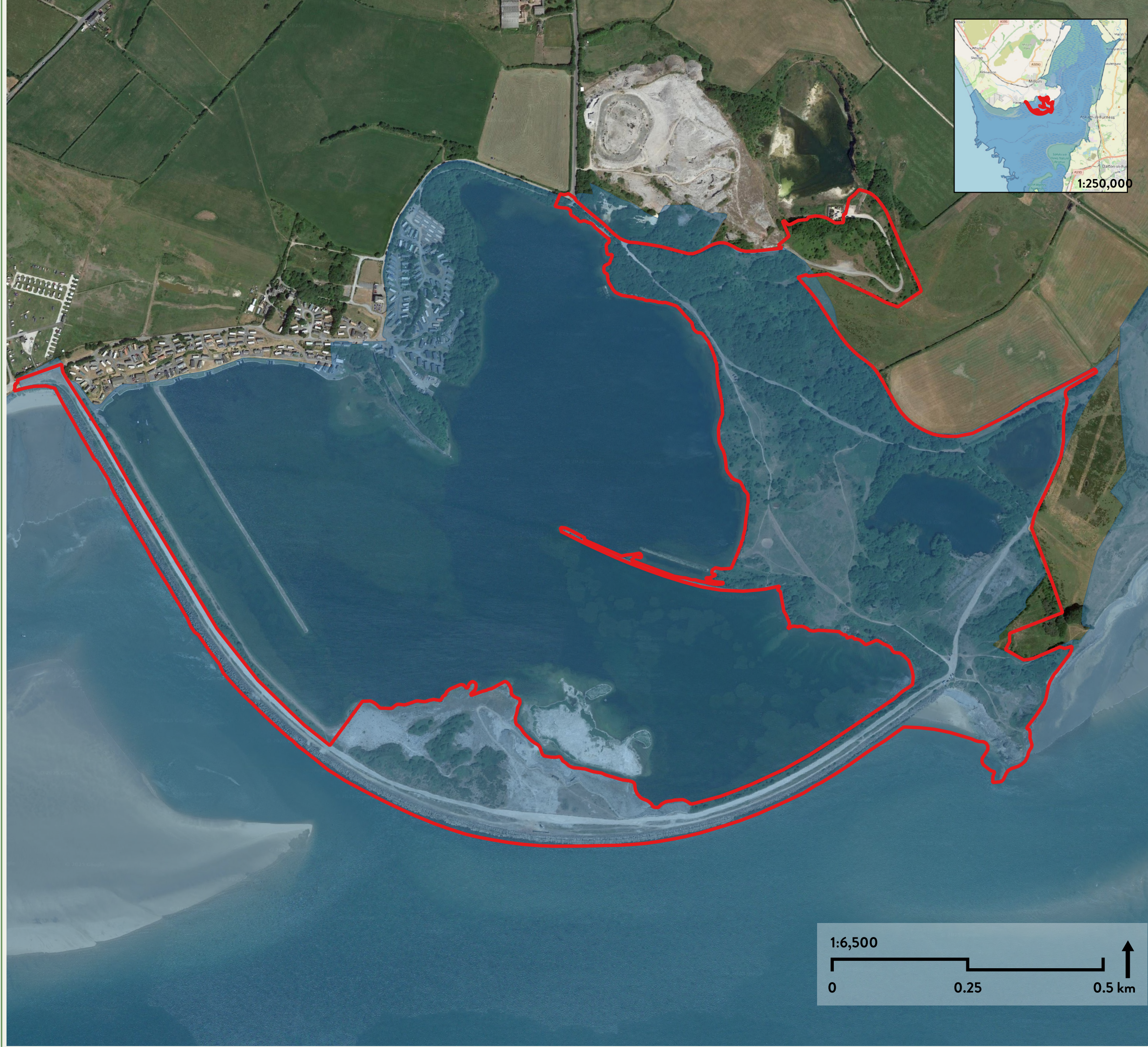
-  Red Line Boundary
-  Designated site boundary (SPA, SAC, Ramsar and SSSI)

Title: Figure A2

Drawn by: LT
Date: 09/04/2025

Reviewed by: HB
Date: 09/04/2025

Project number: 553023
Sources: Google Satellite and OpenStreetMap



IRON LINE

- Planning Application Boundary
- Tern islands
- 400m tern island buffer
- Gull island
- Approximate area of Annex I habitat
Fixed coastal dunes with herbaceous vegetation ("grey dunes")
- 200m Annex I habitat buffer
- Suitable natterjack toad habitat
- 10m suitable natterjack toad habitat buffer
- Visitor Centre and carpark footprint
- Approximate location of new hides and existing hide



Title: Figure A3

Drawn by: LT
Date: 04/04/2025

Reviewed by: JC
Date: 07/04/2025

Project number: 553023
Sources: Google Satellite and OpenStreetMap

APPENDIX B RELEVANT LEGISLATION AND POLICY

B.1 LEGISLATION

Current key legislation relating to ecology includes the Environment Act 2021⁵¹, Wildlife and Countryside Act 1981 (as amended)⁵²; The Conservation of Habitats and Species Regulations 2019 ('Habitats & Species Regulations')⁵³, The Countryside and Rights of Way Act 2000 (CRoW Act)⁵⁴, and The Natural Environment and Rural Communities Act, 2006⁵⁵.

The Environment Act, 2021

Under the Environment Act⁵⁶, 2021, as of 12th February 2024 and 2nd April 2024, it is mandatory in England for new developments (with a small number of exceptions) to deliver a minimum 10% biodiversity net gain (BNG), as measured by the Statutory Biodiversity Metric or Small Sites Metric (SSM) respectively, secured through planning condition as standard (as per schedule 14 of the Act). Approach to the delivery of BNG must follow the mitigation hierarchy, with avoidance of impact and on-site compensation/gains prioritised, ahead of the use of off-site compensation, or the purchase of statutory credits.

The Act introduces the condition that no development may begin unless a Biodiversity Gain Plan (BGP) has been submitted and approved by the LPA.

The Act also amends requirements of the NERC Act, 2006, adding the need to not just conserve, but enhance biodiversity through planning projects. Furthermore, it introduces the need for the LPA to have regard to relevant local nature recovery strategies and relevant species/protected site conservation strategies, when making their decision.

Under the Act, the enhancements must be maintained for at least 30 years.

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

The Conservation of Habitats & Species Regulations replace The Conservation (Natural Habitats, etc.) Regulations 1994 (as amended)⁵⁷, and transpose Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora ('EU Habitats Directive')⁵⁸, and Council Directive 79/409/EEC on the Conservation of Wild Birds ('Birds Directive')⁵⁹ into UK law (in conjunction with the Wildlife and Countryside Act).

Regulation 43 and 47 respectively of the Conservation of Habitats & Species Regulations makes it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2 (European protected species of animals), or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 5 (European protected species of plant). Development that would contravene the protection afforded to European protected species requires a derogation (in the form of a licence) from the provisions of the Habitats Directive.

Regulation 63 (1) states: 'A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which –

(a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects); and

(b) is not directly connected with or necessary to the management of that site;

must make an appropriate assessment of the implications for that site in view of that site's conservation objectives.'

Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981 (as amended) is the principal mechanism for the legislative protection of wildlife in Great Britain. This legislation is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats⁶⁰ (the 'Bern Convention') and the Birds Directive and EU Habitats Directive are implemented in Great Britain.

The Countryside and Rights of Way Act 2000

The Wildlife and Countryside Act has been updated by the CROW Act. The CROW Act amends the law relating to nature conservation and protection of wildlife. In relation to threatened species it strengthens the legal protection and adds the word 'reckless' to the offences of damaging, disturbing, or obstructing access to any structure or place a protected species uses for shelter or protection, and disturbing any protected species whilst it is occupying a structure or place it uses for shelter or protection.

The Natural Environment and Rural Communities Act 2006

The Natural Environment and Rural Communities Act 2006 states that every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity. Biodiversity Action Plans provide a framework for prioritising conservation actions for biodiversity.

Section 41 of the Natural Environment and Rural Communities Act requires the Secretary of State to publish a list of species of flora and fauna and habitats considered to be of principal importance for the purpose of conserving biodiversity. The list, a result of the most comprehensive analysis ever undertaken in the UK, currently contains 1,149 species, including for example, hedgehog (*Erinaceus europaeus*), and 65 habitats that were listed as priorities for conservation action under the now defunct UK Biodiversity Action Plan⁶¹ (UK BAP). Despite the devolution of the UK BAP and succession of the UK Post-2010 Biodiversity Framework⁶² (and Biodiversity 2020 strategy⁶³ in England), as a response to the Convention on Biological Diversity's (CBD's) Strategic Plan for Biodiversity 2011-2020 and EU Biodiversity Strategy (EUBS)⁶⁴, this list (now referred to as the list of Species and Habitats of Principal Importance in England) will be used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 41 of the Natural Environment and Rural

Communities Act 2006 'to have regard' to the conservation of biodiversity in England, when carrying out their normal functions.

Biodiversity Action Plans

Non-statutory Biodiversity Action Plans (BAPs) have been prepared on a local and regional scale throughout the UK over the past 15 years. Such plans provide a mechanism for implementing the government's broad strategy for conserving and enhancing the most endangered ('priority') habitats and species in the UK for the next 20 years. As described above the UK BAP was succeeded in England by Biodiversity 2020 although the list of priority habitats and species remains valid as the list of Species of Principal Importance for Nature Conservation.

Regional and local BAPs are still valid however and continue to be updated and produced.

Detail on the relevant BAPs for this site are provided in the main text of this report.

Legislation Relating to NSN Sites and Habitats Directive Annex I/II Species

European Commission Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora ('EU Habitats Directive'), and Council Directive 79/409/EEC on the Conservation of Wild Birds ('Birds Directive') form the cornerstones of nature conservation legislation across EU member states. Priority species requiring protection across Europe are listed in the Annexes of these Directives. Regulation 63(1) of the Conservation of Habitats and Species Regulations 2019 and Offshore Marine Conservation Regulations, 2007 (as amended) transpose these directives into UK law and set the basis for the designations of protected sites (known as NSN sites; Special Areas of Conservation under the Habitat Directive and Special Areas of Protection under the Birds Directive) that are of importance for habitats, species or assemblages listed on the directive Annexes. In the UK Ramsar sites are also offered the same level of protection as SPAs and SACs however the qualifying species for the designation may differ; Ramsar sites being designated specifically as important wetland habitats.

Under article 6(3) of the Habitats Directive, where projects stand to have likely significant effect (in accordance with the European Court of Justice ruling of C-127/02 Waddenzee cockle fishing) upon the integrity of conservation objectives (i.e. conservation status of the qualifying species or habitats) within the designated sites then the Competent Authority must undertake an Appropriate Assessment.

Natterjack Toads

Natterjack Toads are a European Protected Species (EPS) listed under Schedule 2 of the Conservation of Habitats and Species Regulations 2019 (EU Exit) (as amended), and Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), as well as recognised as a species of national conservation importance under section 41 (S.41) of the Natural Environment Rural Communities Act 2006 (NERC Act) - England.

Specifically, the existing legal framework makes it illegal to:

- Intentionally or deliberately capture, injure or kill a Natterjack Toad,
- Damage or destroy a breeding or resting place of a Natterjack Toad, or intentionally or recklessly damage or destroy any structure or place used for shelter or protection,
- Intentionally or recklessly disturb a Natterjack Toad in a place used for shelter or protection, or deliberately disturb Natterjack Toad in such a way as to be likely significant to affect (i) the ability of any significant group to survive, breed, rear or nurture their young, or (ii) the local distribution or abundance,
- Intentionally or recklessly obstruct access to a place used for shelter or protection,
- Possess a Natterjack Toad (alive or dead), or any part of a Natterjack Toad.

Legislation Relating to Birds (Nesting)

Nesting birds, with certain exceptions, are protected from intentional killing, destruction of nests and destruction/taking of eggs under the Wildlife and Countryside Act 1981 (as amended) and the CROW Act. Any clearance of dense vegetation should therefore be undertaken outside of the nesting bird season, taken to run conservatively from March to August (inclusive), unless an ecologist confirms the absence of active nests prior to clearance.

Legislation Relating to Invasive Non-native Species

Section 14 of the Wildlife and Countryside Act 1981 (as amended) prevents the release into the wild of certain plants and animals which may cause ecological, environmental or socio-economic harm. It prohibits the introduction into the wild of any animal of a kind which is not ordinarily resident in, and is not a regular visitor to, Great Britain in a wild state, or any species of animal or plant listed on Schedule 9 of the Act. In the main, Schedule 9 lists non-native species that are already established in the wild, but which continue to pose a conservation threat to native biodiversity and habitats, such that further releases should be regulated. The Schedule also includes some native species (for example barn owl) in order to provide a level of control to ensure that releases, in particular reintroduction programs, are carried out in an appropriate manner and biodiversity is properly safeguarded.

B.2 PLANNING POLICY

National

National Planning Policy Framework

The National Planning Policy Framework (NPPF) 2024⁶⁵ sets out the Government's planning policies for England, including how plans and decisions are expected to apply a presumption in favour of sustainable development. Chapter 15 of the NPPF focuses on conservation and enhancement of the natural environment, stating plans should 'identify and pursue opportunities for securing measurable net gains for biodiversity'.

It goes on to state: ‘if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused’. Alongside this, it acknowledges that planning should be refused where irreplaceable habitats such as ancient woodland are lost.

Local

Copeland Local Plan

Policy DS7: Sustainable Drainage

New development must incorporate Sustainable Drainage Systems unless it can be demonstrated that this not appropriate. Drainage systems should be well designed with consideration given to the additional benefits they can provide as spaces for landscape, biodiversity and recreation.

Development on greenfield sites should seek to achieve pre-development or better levels of surface water run-off and on previously developed sites, a reduction in surface water discharge should be sought. In demonstrating a reduction clear evidence of existing connections from the site and associated rates of discharge calculations should be provided. In both cases, measures should be put in place to prevent pollution entering watercourses with surface water managed at source. Where identified on the local validation list applicants should submit a Drainage Strategy that shows how foul and surface water will be effectively managed and maintained. Where SuDS are being incorporated details of their long-term management should be provided. This will be secured through the use of s106 agreements. Surface water should be discharged in the following order of priority:

1. To a suitable soakaway or some other form of infiltration system
2. An attenuated discharge to a surface water body such as a watercourse giving full consideration to the catchment and sub-catchments
3. An attenuated discharge to a public surface water sewer, highway drain or another discharge system where there is clear evidence, to the satisfaction of the Council, that alternative preferred options are not available
4. An attenuated discharge to a public combined sewer where there is clear evidence, to the satisfaction of the Council, that alternative preferred options are not available

Strategic Policy T1: Tourism Development

The Local Plan will support the creation, enhancement and expansion of tourist attractions, new build visitor accommodation and infrastructure in locations consistent with the settlement hierarchy. All tourism development must be of an appropriate scale, located where the environment and infrastructure can accommodate the visitor impact, and where it does not result in unacceptable harm to environmental assets (including landscapes, heritage assets and biodiversity) or the character of the area. Proposals for tourism development outside of defined settlements will be supported where:

- The proposal is for a specific activity or function that requires such a location; or
- The proposal enhances Copeland’s existing place bound assets; or

- The proposal is for the change of use, or diversification of an existing building, to provide overnight or longer stay visitor accommodation; or
- The proposal is for a farm diversification scheme in a rural area that will provide or enhance tourist provision.

Policy T2: Tourism Development along the Developed Coast

Opportunities for tourist development in close proximity to the coastline (with the exception of areas designated as undeveloped coast) of an appropriate type and scale will be supported in principle where the proposal:

- a) Provides improved accessibility to the coastal walkways and cycle routes; or
- b) Improves the quality and range of holiday accommodation including overnight tourist provision; or
- c) Creates or enhances gateways and/or hubs; or
- d) Enhances the offer for both onshore and offshore visitors at Whitehaven Harbour including provision for the docking of cruise ships; or
- e) Provides opportunities to enhance the tourism offer in South Copeland.

In all circumstances development should be of an appropriate scale located where the environment and infrastructure can accommodate the visitor impact, and where it does not result in unacceptable harm to environmental assets including landscapes, heritage assets, and biodiversity. All development should ensure local landscape character is maintained and avoid detrimental impacts on setting of Heritage Coast.

Strategic Policy N1: Conserving and Enhancing Biodiversity and Geodiversity

The Council is committed to conserving Copeland's biodiversity and geodiversity including protected species and habitats.

Potential harmful impacts of any development upon biodiversity and geodiversity must be identified and considered at the earliest stage

Proposals must demonstrate, to the satisfaction of the Council, that the following mitigation hierarchy must have been undertaken:

Avoidance – Biodiversity and geodiversity must be considered when drafting up proposals and any potential harmful effects on biodiversity and geodiversity must be identified along with appropriate measures that will be taken to avoid these effects.

Mitigation – Where harmful effects cannot be avoided, they must be appropriately mitigated in order to overcome or reduce negative impacts.

Compensation – Where mitigation is not possible or viable or in cases where residual harm would remain following mitigation, harmful effects should be compensated for. Where this is in the form of compensatory habitat an area of equivalent or greater biodiversity value should be provided.

Compensation is a last resort and will only be accepted in exceptional circumstances.

Where harm remains to a National Site Network, Ramsar site, or functionally linked land, or Site of Special Scientific Interest, development will only be approved where it can be demonstrated that there are imperative reasons of overriding public interest. In such cases, compensatory measures must ensure the overall coherence of the network of European or National Sites as a whole is protected.

Planning permission will be refused for any development if significant harm cannot be avoided, mitigated or compensated for.

A Construction Environmental Management Plan should be submitted where appropriate and sustainable construction methods must be used where possible.

Development proposals where the principal objective is to conserve or enhance biodiversity and geodiversity interests will be supported in principle.

Strategic Policy N2: Local Nature Recovery Networks

The Council will support the identification, implementation, protection and enhancement of Local Nature Recovery Networks that provide important linkages for wildlife within Copeland and beyond. Development which protects or enhances Local Nature Recovery Networks will be supported in principle.

Strategic Policy N3: Biodiversity Net Gain

All development, with the exception of that listed in the Environment Act 2021 and any documents which may supersede it must provide at least 10% biodiversity net gain over and above existing site levels, following the application of the mitigation hierarchy set out in Policy N1 above. This is in addition to any compensatory habitat provided under Policy N1.

Net gain should be delivered on site where possible. Where on-site provision cannot be achieved in full, the remaining provision must be made elsewhere. This should be provided in order of the following preference:

1. Off site in an area identified as a Local Nature Recovery Network in the Plan area;
2. Off site on an alternative suitable site within Cumberland ;
3. Off-site on an alternative suitable site;
4. Through the purchase of off-site biodiversity units on the market;
5. Through the purchase of an appropriate amount of national biodiversity credits.

Sites where net gain is provided (on or off site) must be managed and monitored by the landowner for a minimum period of 30 years. Where appropriate applicants should supply a Habitat Creation Plan and a Habitat Management and Monitoring Plan (HMMP). Monitoring reports detailing the site's condition post-enhancement must be submitted to the Council each year over this period.

Where there is evidence of deliberate neglect or damage to any of the habitats on development sites in order to reduce its biodiversity value the biodiversity predevelopment value of the onsite habitat will be calculated as the biodiversity value of the habitat on the date immediately before the degradation took place.

Strategic Policy N8: The Undeveloped Coast

The Council will ensure that the landscape character of the undeveloped coast is maintained by conserving the intrinsic qualities, natural beauty and open character of the undeveloped coast from inappropriate development. Inappropriate development includes that which affects views within or towards/from the St Bees and Whitehaven Heritage Coast. The following types of development will however be supported:

- Development which supports the management of the undeveloped coast for biodiversity;
- Development which provides or improves safe access to and interpretation of the undeveloped coast for residents and visitors such as appropriate fencing, signage and interpretation boards;
- Energy generating developments that require a coastal location along the undeveloped coast, provided that the potential impacts on biodiversity, landscape and heritage assets are carefully assessed against the benefits. Where negative impacts are likely these must be mitigated against and compensated for.

APPENDIX C DESIGNATED SITES CITATIONS

7.2 DESCRIPTIONS OF DESIGNATED SITES

The nature reserve lies within the Morecambe Bay and Duddon Estuary SPA, Morecambe Bay SAC, and Duddon Estuary Ramsar and SSSI. The Visitor Centre and car park site lies just outside the boundary of these designations.

Morecambe Bay is a large estuary situated on the northwest English coast in Cumbria and Lancashire. The Bay includes the Duddon Estuary which is formed by the River Duddon and the smaller Kirkby Pool as they open into the Irish Sea at the south-west corner of the Lake District. Morecambe Bay contains a mosaic of coastal habitats covering approximately 62 ha and supports breeding and overwintering bird assemblages of international importance as well as nationally important numbers of natterjack toads (*Epidalea calamita*) and a rich assemblage of wetland plants and invertebrates.

Morecambe Bay and Duddon Estuary SPA66

Qualifying Species

The Morecambe Bay and Duddon Estuary SPA qualifies under Article 4.1 of the Directive (2009/147/EC) as it is used regularly by 1% or more of the Great Britain (GB) populations of the following species listed in Annex I in any season:

Table 7.1 Qualifying species at Morecambe Bay and Duddon Estuary SPA

Species	Season	% of population
Whooper swan (<i>Cygnus Cygnus</i>)	Non-breeding	1.0% of GB population
Little egret (<i>Egretta garzetta</i>)	Non-breeding	3.0% of GB population
European golden plover (<i>Pluvialis apricaria</i>)	Non-breeding	1.0% of GB population (1991)
Bar-tailed Godwit (<i>Limosa lapponica</i>)	Non-breeding	8.0% of GB population
Ruff (<i>Calidris pugnax</i>)	Non-breeding	1.0% of GB population
Mediterranean gull (<i>Larus melancephalus</i>)	Non-breeding	1.0% of GB population
Little tern (<i>Sternula albifrons</i>)	Breeding	2.2% of GB population
Sandwich tern (<i>Sterna sandvicensis</i>)	Breeding	5.7% of GB population (1992)
Common tern (<i>Sterna hirundo</i>)	Breeding	2.0% of GB population (1991)

The Morecambe Bay and Duddon Estuary SPA qualifies under Article 4.2 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed in Annex I) in any season:

Table 7.2 Annex 2 Migratory species at Morecambe Bay and Duddon Estuary SPA

Species	Season	% of population
Pink-footed goose (<i>Anser brachyrhynchus</i>)	Non-breeding	4.5% of biogeographic population
Common shelduck (<i>Tadorna tadorna</i>)	Non-breeding	2.0% of biogeographic population
Northern pintail (<i>Anas acuta</i>)	Non-breeding	4.2% of biogeographic population
Eurasian oystercatcher (<i>Haematopus ostralegus</i>)	Non-breeding	6.8% of biogeographic population
Grey plover (<i>Pluvialis squatarola</i>)	Non-breeding	1.0% of biogeographic population (1991)
Common ringed plover (<i>Charadrius hiaticula</i>)	Non-breeding	1.4% of biogeographic population
Eurasian curlew (<i>Numenius arquata</i>)	Non-breeding	1.5% of biogeographic population
Black-tailed godwit (<i>Limosa limosa</i>)	Non-breeding	4.0% of biogeographic population
Ruddy turnstone (<i>Arenaria interpres</i>)	Non-breeding	1.0% of biogeographic population
Red knot (<i>Calidris canutus</i>)	Non-breeding	7.3% of biogeographic population
Sanderling (<i>Calidris alba</i>)	Non-breeding	3.0% of biogeographic population (1991)
Dunlin (<i>Calidris alpina alpina</i>)	Non-breeding	2.0% of biogeographic population
Common redshank (<i>Tringa totanus</i>)	Non-breeding	4.6% of biogeographic population
Lesser black-backed gull (<i>Larus fuscus</i>)	Non-breeding	1.7% of biogeographic population
Lesser black-backed gull	Breeding	2.7% of biogeographic population
European herring gull (<i>Larus argentatus argenteus</i>)	Breeding	1.0% of biogeographic population (1991)

Assemblage qualification

The Morecambe Bay and Duddon Estuary SPA qualifies under Article 4.2 of the Directive (2009/147/EC) as it used regularly by over 20,000 seabirds in any season.

At time of the 1997 citation of Morecambe Bay and Duddon Estuary SPA, the area supported 40,672 individual seabirds including: herring gulls, lesser black-backed gulls, Sandwich terns, common terns and little terns.

The site qualifies under Article 4.2 of the Directive (2009/147/EC) as it used regularly by over 20,000 waterbirds in any season. During the period 2009/10 – 2013/14, the site held a five year peak

mean value of 266,751 individual birds. The main components of the assemblage include all of the qualifying features listed above, as well as an additional 19 species present in numbers exceeding 1% of the GB total and / or exceeding 2,000 individuals: great white egret (*Ardea alba*), Eurasian spoonbill (*Platalea leucorodia*), light-bellied brent goose (*Nearctic origin*), Eurasian wigeon (*Mareca penelope*), Eurasian teal (*Anas crecca*), green-winged teal (*Anas carolinensis*), mallard (*Anas platyrhynchos*), ring-necked duck (*Aythya collaris*), common eider (*Somateria mollissima*), common goldeneye, red-breasted merganser (*Mergus serrator*), great cormorant (*Phalacrocorax carbo*), northern lapwing (*Vanellus vanellus*), little stint (*Calidris minuta*), spotted redshank (*Tringa erythropus*), common greenshank (*Tringa nebularia*), black-headed gull (*Chroicocephalus ridibundus*), common (mew) gull (*Larus canus*) and European herring gull (*Larus argentatus*).

In accordance with the Standard Data Form for sites within the 'UK national site network of European sites' the following threats, pressures and activities have impacts on the site:

Table 7.3 Negative impacts and activities on the Morecambe Bay and Duddon Estuary SPA

Negative impact	Rank	Inside/Outside
G01 Outdoor sports and leisure activities, recreational activities	High (H)	Inside
H04 Air pollution, air-borne pollutants	Medium (M)	Inside
F02 Fishing and harvesting aquatic resources	H	Inside
H03 Marine water pollution	H	Both
M02 Changes in biotic conditions	H	Both
M01 Changes in abiotic conditions	M	Both
D04 Airports, flightpaths	M	Inside
K03 Interspecific faunal relations	M	Inside

Table 7.4 Positive impacts and activities on the Morecambe Bay and Duddon Estuary SPA

Positive impact	Rank	Inside/Outside
A06 Annual and perennial non-timber crops	M	Both
D05 Improved access to site	M	Inside
A04 Grazing	M	Inside
A02 Modification of cultivation practices	M	Inside
G05 Other human intrusions and disturbances	M	Inside
G03 Interpretative centres	M	Inside

Morecambe Bay SAC67

The Morecambe Bay SAC qualifies under Article 6 of the habitats directive (92/43/EEC). The primary reason for its international designation includes the following Annex I habitats and Annex II species:

- Annex I Habitats:
 - Estuaries;
 - Mudflats and sandflats not covered by seawater at low tide;
 - Large shallow inlets and bays;
 - Perennial vegetation of stony banks;
 - Salicornia and other annuals colonizing mud and sand;
 - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*);
 - Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes");
 - "Fixed coastal dunes with herbaceous vegetation ("grey dunes")" *Priority feature; and,
 - Humid dune slacks.

* Priority natural habitats or species for which UK SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Habitats Regulations. They must be considered when a competent authority is required to make a HRA, including an AA, under the relevant parts of the Habitats Regulations.

- Annex II Species:
 - Great crested newt (*Triturus cristatus*) (GCN);
- The Annex I habitats also present but are not a primary reason for selection of the site include:
 - Sandbanks which are slightly covered by sea water all the time;
 - Coastal lagoons *Priority feature;
 - Reefs;
 - Embryonic shifting dunes;
 - Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) * Priority feature; and,
 - Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*).

There has been only one Annex I habitat identified within the planning application boundary which is "Fixed coastal dunes with herbaceous vegetation ("grey dunes")". European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) supporting documentation for the conservation status assessment for this habitat has identified the following pressures and threats:

Table 7.5 Characterisation of pressures/threats for the Annex I habitat Fixed coastal dunes with herbaceous vegetation ("grey dunes")

Characterisation of pressures/threat	Pressure Ranking	Threat Ranking
L02 Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices)	H	H
J03 Mixed source air pollution, air-borne pollutants	H	H
F02 Construction or modification (e.g. of housing and settlements) in existing urban or recreational areas	H	H
A06 Abandonment of grassland management (e.g. cessation of grazing or mowing)	H	H
F07 Sports, tourism and leisure activities (F07)	H	H
F08 Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defences or coastal protection works and infrastructures)	H	H
N03 Increases or changes in precipitation due to climate change	H	H
B03 Replanting with or introducing non-native or non-typical species (including new species and GMOs)	M	M
A02 Conversion from one type of agricultural land use to another (excluding drainage and burning)	M	M
L01 Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization)	M	H
I02 Other invasive alien species (other than species of Union concern)	M	M

Duddon Estuary Ramsar⁶⁸

The Duddon Estuary Ramsar is designated under the Convention on the Wetlands of International Importance especially as Waterfowl Habitat 1971 – the Ramsar Convention. Qualification for Ramsar criteria:

- Supports nationally important numbers of the rare natterjack toad, near the north- western edge of its range (an estimated 18-24% of the British population). Supports a rich assemblage of wetland plants and invertebrates- at least one nationally scarce plant including *Epipactis dunensis*, *Limonium humile*, *Centaureum littorale*, *Pyrola rotundifolia*, *Equisetum variegatum*, *Corallorhiza trifida*, *Coincya*

monensis ssp. monensis. and at least two British Red Data Book invertebrates *Colletes cunicularius*, *Psen littoralis*, *Hypocaccus rugiceps*;

- Supports nationally important numbers of waterfowl during spring and autumn passage;
- Internationally important waterfowl assemblage (greater than 20,000 birds); and,
- Over winter the site regularly supports internationally important populations of Knot (*Calidris canutus*) Pintail (*Anas acuta*), Redshank (*Tringa totanus*).

Adverse factors affecting the ecological character of the Duddon Estuary Ramsar site include small scale factors such as overgrazing by domestic livestock as well as erosion. Larger scale factors include recreational/tourism disturbance.

The Ramsar Information Sheet includes the following statement relating to the site's vulnerability and management:

"The Duddon Estuary is a diverse estuarine system dependent on the physical processes that dominate the natural system: consequently the vulnerability of habitats is linked to the physical environment. The intertidal zone is being threatened by coastal squeeze as a result of land claim and coastal defence works as well as sea level rise and storm surges"... "waterfowl wintering on estuaries are vulnerable to loss of feeding areas through disturbance, land claim and development. The Duddon Estuary partnership are addressing some of the threats arising from recreational pressure and bait digging"... "There are various developments of housing, amenity and industry adjacent to the site, however to date there has been no significant effect on the nature conservation interest of the estuary"

Duddon Estuary SSSI⁶⁹

The citation includes information expanding on what has been described in relation to the NSN designation. Extracts below have been selected from the SSSI citation to provide a broader picture.

"The Duddon Estuary is of international and national importance for wintering wildfowl and waders and provides a vital link in the chain of west coast estuaries used by migrating birds, as well as being of particular importance as one of a series of estuaries on the north-west coast where the majority of the British population of natterjack toads occur."

"The mouth of the estuary forms an extensive flat sand plain, with the sands being very mobile. The mid and upper reaches of the estuary are flanked by saltmarsh and beyond high water are extensive sand dunes on both the north and south sides of the mouth of the estuary. These sand dune systems are particularly important for a diverse range of community types, supporting a number of rare and uncommon plants, as well as a variety of nationally rare and scarce invertebrate species. The past activities of the mining and iron-making industries have created a number of artificial habitats which have become areas of wildlife interest. These include the slag banks of Askham Pier and Borwick Rails, and the largest coastal lagoon in north-west England at Hodbarrow Lagoon."

Natterjack Toad

The natterjack toad is a nationally rare species in Britain and over 95% of the population is associated with five estuaries, the Alt, Ribble, Duddon, Esk and Solway. The Duddon Estuary itself is therefore one of the most important areas in Britain for this species and contains between 18–25% of the U.K population, which in turn is equivalent to 50% of the Cumbrian natterjack toad population. The toads breed in ephemeral pools associated with a range of habitats including dune slacks, marshy grassland, bare sand and slag banks, and hibernate and forage in the surrounding semi-natural vegetation, artificial habitats and semi-improved pastures. Particular concentrations occur at Millom Ironworks, Sandscale Haws and the stretch of coast between Sandside and Dunnerholme, but the species is evenly distributed over the whole estuary.

Invertebrates

"As a result of the range of habitats found at North Walney and Sandscale, these two sites are also important for their invertebrate populations, many typical of coastal habitats with a number of rare and nationally scarce species including the digger wasp (*Psen littoralis*), the solitary bee (*Colletes cunicularis*), water beetles associated with brackish waters (*Octhebius marinus*) and (*O. auriculatus*), and moths including the Shore Wainscot (*Mythimna litoralis*) and the Portland moth (*Ochropleura praecox*)."

REFERENCES

- ¹ The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (as amended)
<https://www.legislation.gov.uk/ukdsi/2019/9780111176573>
- ² CEC (Council of the European Communities), (1992); Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
- ³ DIRECTIVE 2009/147/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 30 November 2009 on the conservation of wild birds (codified version) (OJ L 20, 26.1.2010, p. 7)
- ⁴ Greengage Environmental Ltd (2025) Ecological Impact Assessment -Millom Iron Line (ref: 553023cp11Apr25FV02_EcIA_PEA)
- ⁵ Greengage Environmental Ltd (2025) shadow Habitats Regulations Assessment -Millom Iron Line (ref: 553023lt11Apr25FV01_sHRA)
- ⁶ Appletons (2022) Visitor and Action Management Plan (VAMP) ref: 2363
- ⁷ Story Contracting Ltd (2025) Construction Environmental Management Plan (CEMP) ref:
- ⁸ Story Contracting Ltd (2025) Construction Phase SHE Plan (CEMP) ref: CO00324
- ⁹ Cumberland Council (2024) Copeland, Local Plan 2021-2039
- ¹⁰ Copeland Borough Council (2022) Report to Inform a Habitats Regulations Assessment Publication Draft Local Plan
- ¹¹ The Conservation of Habitats and Species Regulations 2017(as amended)
<https://www.legislation.gov.uk/ukdsi/2017/1012/contents/made>
- ¹² Department for Transport (2024) TAG Unit A3- Environmental Impact Appraisal
<https://assets.publishing.service.gov.uk/media/66434490ae748c43d3793a87/tag-unit-a3-environmental-impact-appraisal.pdf>
- ¹³ German Environment Agency (2022)Review and revision of empirical critical loads of nitrogen for Europe
- ¹⁴ Air Pollution Information System (APIS) Nitrogen deposition :: Neutral Grassland <https://www.apis.ac.uk/node/981>
- ¹⁵ Curtains (2025) The Iron Line, Millom Transport Assessment (ref: Curtins Ref: 081617-CUR-XX-XX-T-TP-00001)
- ¹⁶ The Institute of Air Quality Management (IAQM) (2024)Guidance on the assessment of dust from demolition and construction
- ¹⁷ Andrew Power, Philip White, Brendan McHugh, Simon Berrow, Moira Schlingermann, Aaron McKeown, David Cabot, Marissa Tannian, Stephen Newton, Evin McGovern, Sinéad Murphy, Denis Crowley, Linda O'Hea, Brian Boyle, Ian O'Connor, Persistent pollutants in fresh and abandoned eggs of Common Tern (*Sterna hirundo*) and Arctic Tern (*Sterna paradisaea*) in Ireland, Marine Pollution Bulletin, Volume 168, 2021, 112400, ISSN 0025-326X, <https://doi.org/10.1016/j.marpolbul.2021.112400>.
(<https://www.sciencedirect.com/science/article/pii/S0025326X21004343>)
- ¹⁸ Environment Alliance - working together (2007) Pollution Prevention Guidelines Works and maintenance in or near water: PPG5
- ¹⁹ Salmón et al (2018) Oxidative stress in birds along a NO_x and urbanisation gradient: An interspecific approach
- ²⁰ Goodship, N.M. and Furness, R.W. (MacArthur Green) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.
- ²¹ Dooling, R. J., and Popper, A. N. (2007). "The effects of highway noise on birds," [http://www. dot. ca. gov/hq/env/bio/files/caltrans_birds_10-7-2007b. pdf](http://www.dot.ca.gov/hq/env/bio/files/caltrans_birds_10-7-2007b.pdf).
- ²² Wright, Mark & Goodman, Paul & Cameron, Tom. (2010). Exploring behavioural responses of shorebirds to impulsive noise. Wildfowl. 60. 150-167.
- ²³ N Cutts K Hemingway & J Spencer Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning & Construction Projects Version 3.2, March 2013 Copyright University of Hull
- ²⁴ Bat Conservation Trust and Institution of Lighting Professionals (2023) Guidance Note 08/23: Bats and artificial lighting in the UK. ILP, Rugby
- ²⁵ Andrew Power, Philip White, Brendan McHugh, Simon Berrow, Moira Schlingermann, Aaron McKeown, David Cabot, Marissa Tannian, Stephen Newton, Evin McGovern, Sinéad Murphy, Denis Crowley, Linda O'Hea, Brian Boyle, Ian O'Connor, Persistent pollutants in fresh and abandoned eggs of Common Tern (*Sterna hirundo*) and Arctic Tern (*Sterna paradisaea*) in Ireland, Marine Pollution Bulletin, Volume 168, 2021, 112400, ISSN 0025-326X, <https://doi.org/10.1016/j.marpolbul.2021.112400>.
(<https://www.sciencedirect.com/science/article/pii/S0025326X21004343>)

- ²⁶ Environment Alliance - working together (2007) Pollution Prevention Guidelines Works and maintenance in or near water: PPG5
- ²⁷ Salmón et al (2018) Oxidative stress in birds along a NO_x and urbanisation gradient: An interspecific approach
- ²⁸ MMO (2018). Displacement and habituation of seabirds in response to marine activities. A report produced for the Marine Management Organisation,. MMO Project No: 1139, May 2018, 69pp
- ²⁹ James A. Rodgers, Jr., and Henry T. Smith (1997) Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida
- ³⁰ James A. Rodgers, Jr., and Henry T. Smith (1997) Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida
- ³¹ James A. Rodgers, Jr., and Henry T. Smith (1997) Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida
- ³² Burton, Niall & Rehfish, Mark & Clark, Nigel. (2003). Impacts of Disturbance from Construction Work on the Densities and Feeding Behavior of Waterbirds Using the Intertidal Mudflats of Cardiff Bay, UK. Environmental management. 30. 865-71. 10.1007/s00267-002-2733-4.
- ³³ Trevor J. C. Beebee, JohnR. Griffin (1977) A preliminary investigation into Natterjack toad (*Bufo calamita*) breeding site characteristics in Britain
- ³⁴ Delgado-Fernandez, I., O'Keeffe, N. and Davidson-Arnott, R.G., 2019. Natural and human controls on dune vegetation cover and disturbance. Science of The Total Environment, 672, pp.643-656. <https://doi.org/10.1016/j.scitotenv.2019.03.494>
- ³⁵ Allbrook DL, Quinn JL. The effectiveness of regulatory signs in controlling human behaviour and Northern gannet (*Morus bassanus*) disturbance during breeding: an experimental test. J Nat Conserv. 2020 Dec;58:125915. doi: 10.1016/j.jnc.2020.125915. Epub 2020 Oct 9. PMID: 33071716; PMCID: PMC7546240
- ³⁶ South Lakes Ecology (2022) The PEA Update to the 2010 assessment for Port Haverigg Holiday Village (ref: Report 0822/3)
- ³⁷ RSPB (2023) Job advert for Assistant Warden - Cumbria Coast Reserves ref: JAN20233728)
- ³⁸ Appletons (2025) Visitor And Access Management Plan (ref: 2363)
- ³⁹ Air Pollution Information System (APIS) Nitrogen deposition :: Neutral Grassland <https://www.apis.ac.uk/node/981>
- ⁴⁰ HM Government (2023) Environmental Improvement Plan 2023
- ⁴¹ Curtains (2025) The Iron Line, Millom Transport Assessment (ref: Curtins Ref: 081617-CUR-XX-XX-T-TP-00001)
- ⁴² Transport for London (2018) Speed, emissions & health The impact of vehicle speed on emissions & health: an evidence summary
- ⁴³ Trevor J. C. Beebee, JohnR. Griffin (1977) A preliminary investigation into Natterjack toad (*Bufo calamita*) breeding site characteristics in Britain
- ⁴⁴ Sanuy D, Avriillier JN, Miaud C (2000) Terrestrial movements of the natterjack toad *Bufo calamita* (Amphibia, Anura) in a semi-arid, agricultural landscape. Amphib-Reptil 21:357-369
- ⁴⁵ Froglife Natterjack toad advice sheet froglife.org/info-advice/amphibians-and-reptiles/natterjack-toad/
- ⁴⁶ Back from the Brink (2020) Species Information Guide -Natterjack toads : <https://naturebftb.co.uk/wp-content/uploads/2020/05/Natterjack-Toad-species-survey-guide.pdf>
- ⁴⁷ Natural England 5. Amphibians and reptiles Saltfleetby - Theddlethorpe NNR (TF 470 910) <https://publications.naturalengland.org.uk/file76109#>
- ⁴⁸ Crookes Walker Consulting (2025) External Lighting Strategy Statement (ref: Ref: 3468-CWC-XX-XX-RP-E-0301)
- ⁴⁹ Bat Conservation Trust and Institution of Lighting Professionals (2023) Guidance Note 08/23: Bats and artificial lighting in the UK. ILP, Rugby
- ⁵⁰ Sanuy D, Avriillier JN, Miaud C (2000) Terrestrial movements of the natterjack toad *Bufo calamita* (Amphibia, Anura) in a semi-arid, agricultural landscape. Amphib-Reptil 21:357-369
- ⁵¹ GOV.UK., (2021). Habitats regulations assessments: protecting a European site Environment Act 2021. Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>
- ⁵² HM Government, (1981). Part I and Part II of Wildlife and Countryside Act (as amended). HMSO.
- ⁵³ HM Government, (2019). The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. Statutory Instrument 2019 no. 579.

-
- ⁵⁴ HM Government, (2000). *The Countryside and Rights of Way Act*. HMSO.
- ⁵⁵ HM Government, (2006). *Natural Environment and Rural Communities Act 2006*. HMSO.
- ⁵⁶ GOV.UK. (2021). *Environment Act 2021*. Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>
- ⁵⁷ HM Government, (1994). *The Conservation (Natural Habitats, &c.) Regulations*. HMSO.
- ⁵⁸ CEC (Council of the European Communities), (1992). *Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora*.
- ⁵⁹ The European Parliament And Of The Council, (2009). *Directive 2009/147/EC On The Conservation Of Wild Birds (Codified Version)*.
- ⁶⁰ CEC (Council of the European Communities), (1979). *Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 19.IX.1979)*. EC.
- ⁶¹ UK Biodiversity Action Plan, (2007). *UKBAP Priority Species and Habitats*. <https://jncc.gov.uk/our-work/uk-bap-priority-species/>
- ⁶² JNCC and Defra (on behalf of the Four Countries' Biodiversity Group), (2012). *UK Post-2010 Biodiversity Framework*. July 2012. Available from: <http://jncc.defra.gov.uk/page-6189>
- ⁶³ Defra, (2011). *Biodiversity 2020: A strategy for England's wildlife and ecosystem services*.
- ⁶⁴ European Commission, (2012). *Our life insurance, our natural capital: an EU biodiversity strategy to 2020* European Parliament resolution of 20 April 2012 on our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011/2307(INI)).
- ⁶⁵ GOV.UK., (2024). *National Planning Policy Framework*. [online] Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>
- ⁶⁶ Natural England (2014) *Morecambe Bay and Duddon Estuary Site Citation* EC Directive 79/409 on the Conservation of Wild Birds Special Protection Area (SPA)
- ⁶⁷ Joint Nature Conservation Committee JNCC <https://sac.jncc.gov.uk/site/UK0013027> [Last Accessed 01/03/2023]
- ⁶⁸ Produced by JNCC: Version 3.0 (13/06/2008) *Ramsar Information Sheet: UK11022*
- ⁶⁹ Natural England Designated Sites View Duddon Estuary SSSI <https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1000104&SiteName=Duddon%20Estuary&countyCode=&responsiblePerson=&unitId=&SeaArea=&IFCAAarea=> [Last Accessed 01/03/2023]
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