Hornsea Project Four

Kittiwake onshore artificial nesting structure site selection and evidence on nesting limitations update

Deadline: 6, Date: 27 July 2022
Document Reference: G6.3
Revision: 01

Prepared	NIRAS, July 2022
Checked	Dr Sarah May Randall Orsted, July 2022
Accepted	Francesca De Vita, Orsted, July 2022
Approved	Dr Julian Carolan, Orsted, July 2022

G6.3
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Revision Summary				
Rev	*Date*	*Prepared by*	*Checked by*	*Approved*
01	27/07/2022	NIRAS, July 2022	Dr Sarah May Randall, Orsted, July 2022	Dr Julian Carolan, Orsted, July 2022

Revision Change Log			
Rev	*Page*	*Section*	*Description*
01	-	-	Submitted at Deadline 6

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Glossary

Term	Definition
Compensation / Compensatory Measures	If an Adverse Effect on the Integrity of a designated site is determined during the Secretary of State's Appropriate Assessment, compensatory measures for the impacted site (and relevant features) will be required. The term compensatory measures is not defined in the Habitats Regulations. Compensatory measures are however, considered to comprise those measures which are independent of the project, including any associated mitigation measures, and are intended to offset the negative effects of the plan or project so that the overall ecological coherence of the national site network is maintained.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Hornsea Project Four Offshore Wind Farm	The proposed Hornsea Project Four Offshore Wind Farm project. The term covers all elements of the project (i.e., both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network. Hereafter referred to as Hornsea Four.
Offshore Ornithology Engagement Group (OOEG)	The Hornsea Four Offshore Ornithology Engagement Group means the group that will assist, through consultation the undertaker in relation to the delivery of each compensation measures as identified in the kittiwake compensation plan, the gannet compensation plan and the guillemot and razorbill compensation plan. Matters to be consulted upon to be determined by the Applicant and will include site selection, project/study design, methodology for implementing the measure, monitoring, and adaptive management options as set out in the kittiwake compensation plan, the gannet compensation plan and the guillemot and razorbill compensation plan.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Special Protection Area (SPA)	(SPA) Strictly protected sites designated pursuant to Article 4 of the Birds Directive (via the Habitats Regulations) for species listed on Annex I of the Directive and for regularly occurring migratory species.

Acronyms

Term	Definition
AEoI	Adverse Effect on Integrity
ANS	Artificial nesting structure
BRAG	Black, Red, Amber, Green
DCO	Development Consent Order
FFC SPA	Flamborough and Filey Coast Special Protection Area
HAT	Highest Astronomical tide
LAT	Lowest Astronomical Tide
OOEG	Offshore Ornithology Engagement Group
SNCB	Statutory Nature Conservation Body

1 Introduction

1.1 Hornsea Project Four Offshore Wind Farm and kittiwake artificial nesting structures

1.1.1.1 Orsted Hornsea Project Four Limited (hereafter the 'Applicant') is proposing to develop Hornsea Project Four Offshore Wind Farm (hereafter 'Hornsea Four'). Hornsea Four will be located approximately 69 km offshore the East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone. Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and connection to the electricity transmission network. Detailed information on the project design can be found in **A1.4: Project Description (REP4-003)**, with detailed information on the site selection process and consideration of alternatives described in **A1.3: Site Selection and Consideration of Alternatives (APP-009)**.

1.1.1.2 Following the Applicant's submission, the Applicant has revisited its conclusion of no potential for an adverse effect on integrity (AEoI) in respect of the kittiwake feature of the Flamborough and Filey Coast Special Protection Area (FFC SPA) from Hornsea Four in-combination with other plans and projects and concluded AEoI on the FFC SPA in combination with other plans and projects. The Applicant maintains its position of no AEoI alone or in combination for all other qualifying species of the FFC SPA and for all other European sites.

1.1.1.3 The provision of an artificial nesting structure (ANS) to increase the annual recruitment of black-legged kittiwake *Rissa tridactyla* (kittiwake) into the regional population of the Southern North Sea is considered a viable compensation measure for a potential Adverse Effect on Integrity (AEoI) at the Flamborough and Filey Coast Special Protection Area (FFC SPA). The two options Hornsea Four are considering comprise the provision of either an offshore or an onshore artificial nesting structure with a preference for an offshore repurposed artificial nesting structure.

1.2 Artificial nesting structure site selection process to date

1.2.1.1 The Applicant is working strategically to develop an onshore site selection process and has built upon extensive site selection work undertaken for Hornsea Project Three. Hornsea Four considered a number of potential opportunities across a broader search area than that used by Hornsea Three, these areas are: Cayton Bay to Newbiggin by the Sea; and East Suffolk. A site selection process was undertaken to establish specific sites on which an artificial nesting structure could be developed, however an offshore repurposed artificial nesting structure is the preferred approach for compensation of the potential impacts to the kittiwake feature of FFC SPA, if deemed necessary by the Secretary of State.

1.2.1.2 The constraints and requirements established as a part of the site selection process have been led by the evidence-based approach, as described in the Ecological Evidence reports (**B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence (APP-187)** and **B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence (APP-189)**).

1.2.1.3 An account of the ecological criteria for the site selection process undertaken to date is provided in Section 3 of **B2.7.5 Compensation measures for FFC SPA: Artificial Nesting: Site Selection and Design (APP-191)**, and an update on the site selection process is provided in

the Applicant's latest revision of **B2.7.4 Compensation Measures for FFC SPA: Kittiwake Onshore Artificial Nesting Roadmap (REP5-020)**. The purpose of site selection has been to identify an area which could host an onshore artificial nesting structure that, if deemed necessary by the Secretary of State, could provide additional nesting opportunities for kittiwake in the English Southern North Sea. The artificial nesting structure will provide nesting spaces for prospective first-time breeders, allowing those kittiwake to recruit into the breeding population and contribute to an increase of in the wider biogeographic population. The preferred zone for installing onshore ANS is located within the onshore to nearshore environment (up to 5km from the coast) and the principles influencing this initial site selection work comprise:

- Locations which kittiwake are likely to find (for example, either locations where there are existing populations of kittiwake, or where there are factors which attract kittiwake);
- Locations where there is evidence of nearby colonies with stable/increasing productivity and evidence of an expanding population (as a proxy for favourable prey resource);
- Locations where there is a lack of or limited existing natural suitable nesting habitat (locations where kittiwake are attempting to nest in atypical situations or are subject to intentional direct disturbance, such as ground nesting, or in urban environments); and
- Waterfront location away from urban housing which minimise human interaction and where purpose built onshore artificial nests are ideally adjacent to water, to mimic the natural nesting conditions of the target species as far as possible.

1.3 Purpose of report

1.3.1.1 This report provides the background and steps taken by the Applicant for selecting sites upon which to locate kittiwake artificial nesting structures. The report details progress made on the key steps to ANS land acquisition presented in **B2.7 FFC SPA: Kittiwake Compensation Plan (REP5-016)**, advancing the process from 'Scope search zones' under Phase One through to 'Final site selection based on required outcomes' under Phase Two (**Figure 1**).

Figure 1: Phase One and Phase Two of developing a shortlist of sites for an artificial nesting structure.

2 Method

2.1 Scoping search zones and site selection criteria

2.1.1.1 The Onshore Site Selection and Pathway to Securement (Niras, 2020) report undertaken for Hornsea Three and analysis undertaken for Hornsea Three was used building upon the extensive site selection work to identify potential opportunities for Hornsea Four. This analysis resulted in the identification of two preferred search zones to locate onshore kittiwake ANS for Hornsea Four, which expands upon the Hornsea Three search areas, defined as: 1) Cayton Bay to Newbiggin by the Sea (**Figure 2**); and 2) East Suffolk (**Figure 3**). The Area of Search identification process is detailed for each compensation measure in **Volume A4, Annex 6.1: Compensation Project Description (APP-057)**. Information on the consultation undertaken as part of the process to date is presented within **Volume B2, Annex 9 Record of Consultation (APP-021)**.

2.1.1.2 The area of search was initially limited to the coastline of the English Southern North Sea based on the preference for compensation to be located close to the source of impact where possible. For the Hornsea Three project, the SoS stated in paragraph 7.47 of his "Minded to Approve" letter that the coherence of the network of kittiwake Natura 2000 sites can be maintained if a compensatory measure benefits the wider North Sea population of kittiwake generally. Therefore, the search area for Hornsea Four ANS sites has been extended to include additional sites along the north-east coast of England not initially considered as part of Hornsea Three derogation measures. To scope in potential sites for ANS within the search zones the Applicant revisited the sites initially identified by Hornsea Three (Niras, 2020), and added additional sites based on a desk-based analysis of the expanded Hornsea Four search areas, new data and expert knowledge, as laid out in **B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence (APP-**

189) and **B2.7.5 Compensation measures for FFC SPA: Artificial Nesting: Site Selection and Design (APP-191)**.

2.1.1.3 The Onshore Site Selection and Pathway to Securement report (Niras 2020) undertaken for Hornsea Three used a Black, Red, Amber, Green (BRAG) scoring system to rank potential sites on ecological merit for kittiwake ANS within the search zones. During consultation with the Hornsea Three offshore ornithology engagement group (OOEG) this BRAG system was upgraded to a quantitative scoring system with input from Natural England. This scoring system has been used by the Applicant for site selection[1] and takes account off the following ecological considerations:

- Proximity to open coast – preference for sites that directly front onto tidal waters.
- Proximity to existing, small kittiwake colonies – preference given to sites closer to expanding existing colonies.
- Proximity of residential / busy tourist areas and roadside sites – preference to minimise disturbance and human conflicts on ANS.
- Proximity to existing nearshore offshore wind farms – preference to avoid collision risk when transiting between ANS and the sea.
- Environment suitability – preference to blend in an ANS with an environment that kittiwakes naturally occupy (e.g. tall cliffs, quay-sides, seafront buildings) over atypical environment (e.g. woodland, mud flats, sand dunes).
- Conflict with other protected site species designations – preference given to ANS locations without potential for conflict (e.g. a tall structure could overshadow protected wader roosting/feeding sites).
- Coastal erosion – preference given to ANS sited away from receding coastlines, given the required longevity of project.
- Local nest space availability – limited nesting space on natural cliffs or existing manmade structures promotes likelihood of ANS success.
- Likelihood of exchange with FFC SPA population – ANS near to, but not in competition with, FFC SPA are more likely to succeed.

[1] Specific detail on the site selection scoring system is commercially sensitive and therefore has not been detailed in this report.

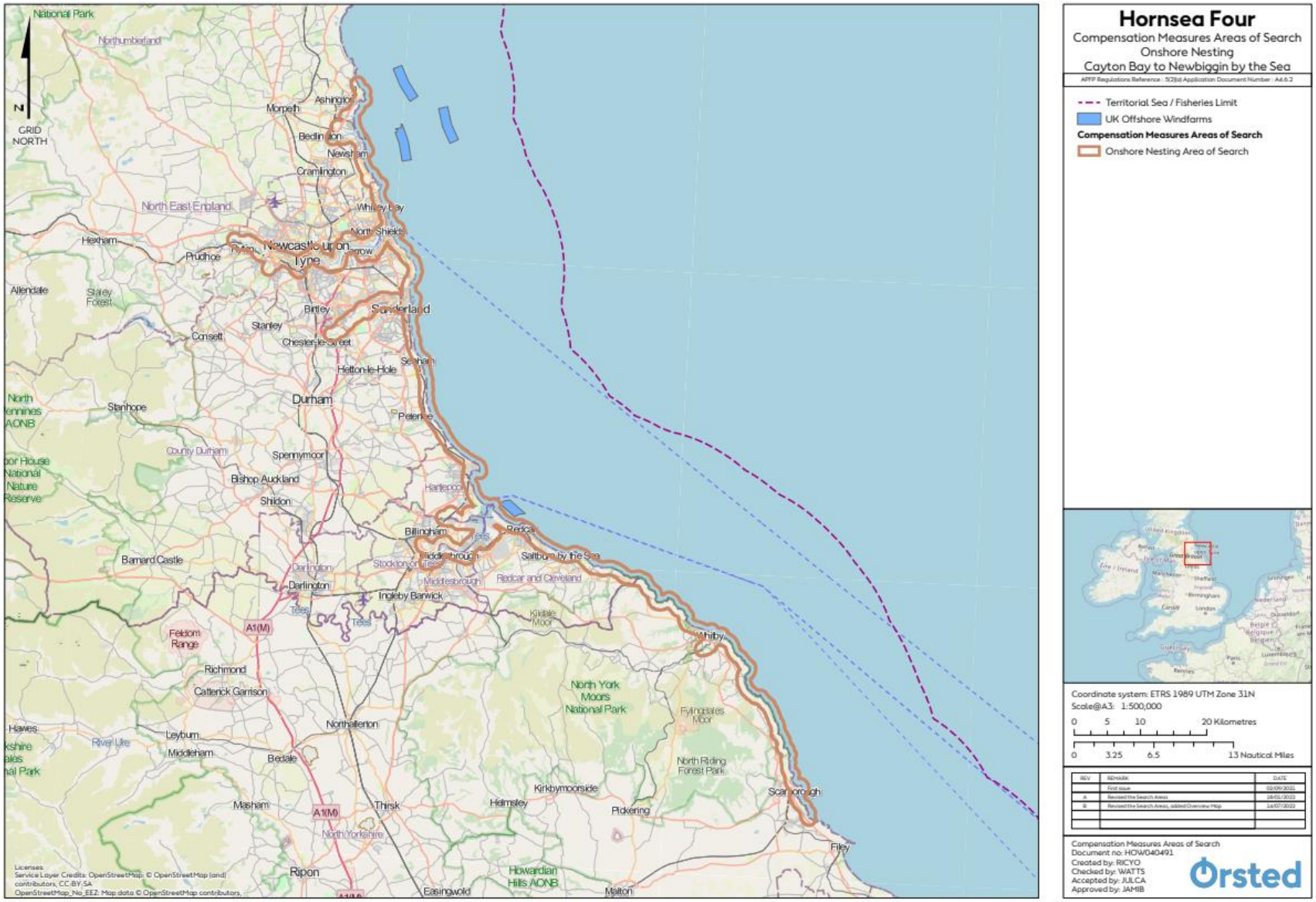

Figure 2: Onshore artificial nesting structure search zone - Cayton to Newbiggin by the Sea.

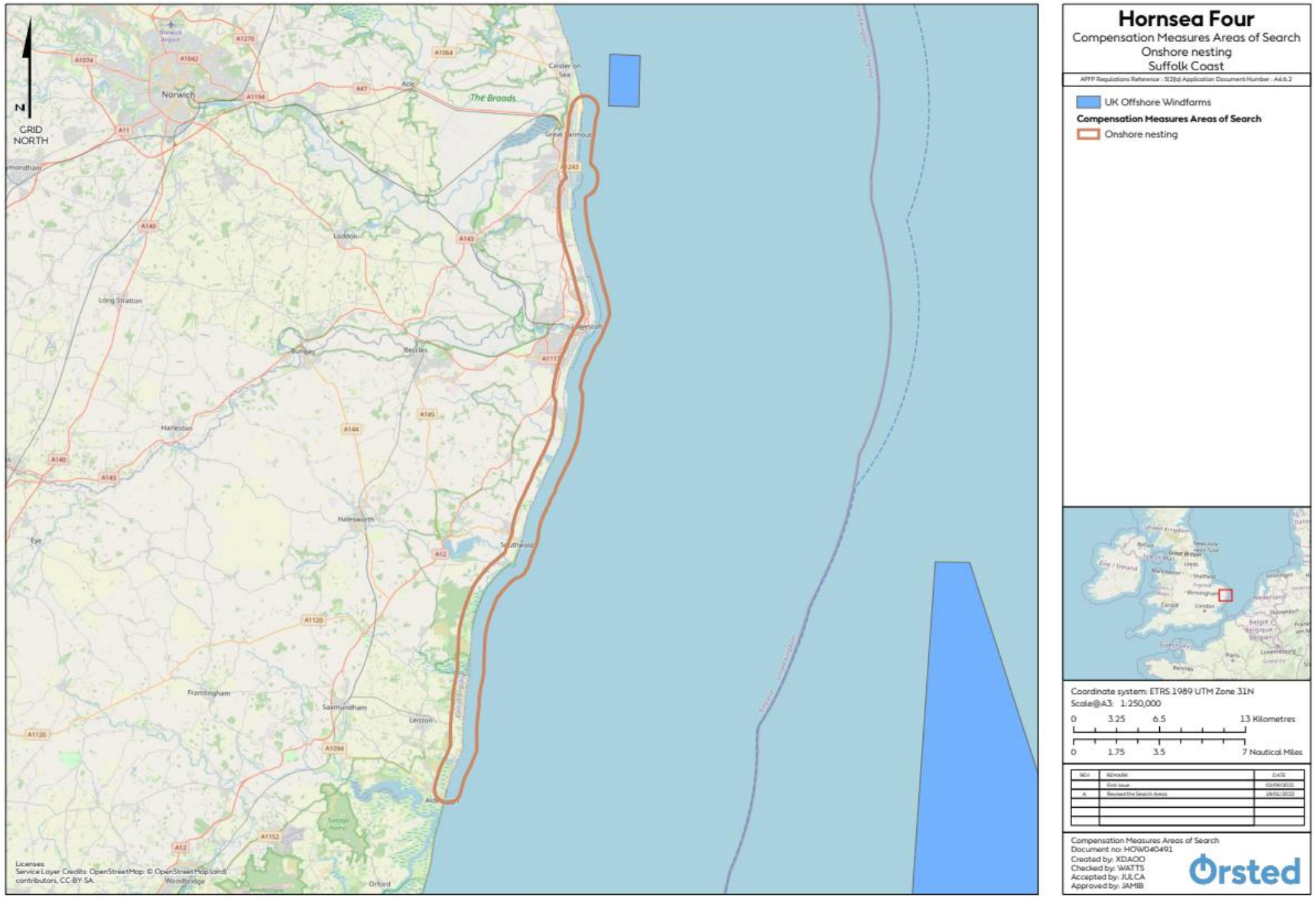

Figure 3: Onshore artificial nesting structure search zone – East Suffolk.

2.2 Shortlisting sites, land parcel acquisition and site visits

2.2.1.1 Sites scored highest by site selection criteria[2], that were not ruled out for another reason (e.g. being used by Hornsea Three or other developers), were investigated to identify any parcels of land available for acquisition. The Applicant first cross-referenced selected sites suitable for an artificial nesting structure with Land Registry data to identify suitable land parcels in the areas of each site and then engaged with landowners to determine if land was available for acquisition. For any candidate sites that had land parcels available for acquisition but had considerable uncertainty surrounding their site selection score based on the desk-based analyses (e.g. confirmation of whether existing small kittiwake colonies exist, and at what distance from the land parcel), a site visit was arranged. Site visits surveyed the coastal length of land parcels during kittiwake nesting in June 2022, photographing and documenting information to update site scoring criteria (Section 2.1) from clifftop and beach vantage points.

2.2.1.2 The Applicant did not wish to limit the search for potential ANS sites to urban areas, which have previously been sought as desirable locations for kittiwake ANS sites by other projects (e.g. Hornsea Three, Norfolk Vanguard). Using an urban site for ANS has the benefit of more simple assessment of whether existing kittiwake colonies are limited by available space to nest than a natural cliff site (urban structures, such as buildings or piers, have clear limits/ledges/windows etc., whereas limits of suitable nesting areas within natural cliff faces are more ambiguous to the human eye). However, natural cliff face colonies can also be limited by suitable nesting space due to factors such as unstable or unsuitable (e.g. smooth) rock, resident predators or vegetation. For selected non-urban sites with available land parcels, site visits also undertook an assessment of whether kittiwake colonies (if found) were limited by available nesting space within natural cliff habitat using photographs of the colony and cliff face 2 km either side.

3 Results

3.1 Site selection

3.1.1.1 The scoping exercise found 28 potential sites for kittiwake ANS[3].

3.1.1.2 The Applicant selected seven sites to progress to land acquisition stage using the BRAG scoring system as described in Section 2.1 to rank potential sites on ecological merit for kittiwake ANS within the search zones. These seven sites fell under two categories:

1) There were four sites that were only considered by Hornsea Three in initial stages of site selection (Niras 2020), which hold potential ecological merit (further assisted newly available data and information) and were progressed by the Applicant. These sites include **Great Yarmouth**, **Sunderland, Seaham harbour** and **Scarborough**.

2) The Applicant identified three new sites. **Whitby** was previously overlooked by Hornsea Three as it was included in a broad region, between Staithes and Grimsby, which was

[2] Specific detail on the site selection scoring system is commercially sensitive and therefore has not been detailed in this report.
[3] Specific detail on the site selection scoring system is commercially sensitive and therefore has not been detailed in this report.

deemed as too close to FFC SPA on the grounds that kittiwake from ANS could potentially compete with kittiwake from FFC SPA for food resources (Niras 2020). The Applicant has identified using kittiwake tracking data from FFC SPA that, at approximately 50 km from FFC SPA, an ANS at Whitby would likely present minimal competition for resources as the sea areas offshore of Whitby are not highly used by FFC SPA kittiwake (between 95%-75% kernel utilization distribution; Cleasby et al. 2020). Furthermore, Seabird Monitoring Programme[4] data shows that kittiwake colonies around Whitby are either stable or have increased between 1999/2002-2019/21. **Blyth** and **Walberswick** were identified as potentially suitable harbours for kittiwake ANS, which at the far north and south of the search areas respectively were worth pursuing further.

3.2 Land parcel availability

3.2.1.1 152 coastal land parcels within the seven selected sites were identified and owners contacted for acquisition. Land parcels at Seaham harbour, Great Yarmouth, Scarborough, Blyth and Walberswick were not available for acquisition, ruling out these sites. Four suitable land parcels were identified at the two remaining sites: Whitby (**Figure 4**) (two sites, Lythe to the north and Hawsker to the south of the town); and Sunderland (**Figure 5**) (two sites north of the city, Marsden and Whitburn). The suitable land parcels are also mapped in relation to the compensation consultation search area (**Figure 6**).

[4] Seabird Monitoring Programme ([redacted] on 10/06/2022).

Figure 4: Onshore artificial nesting suitable land parcels – Whitby.

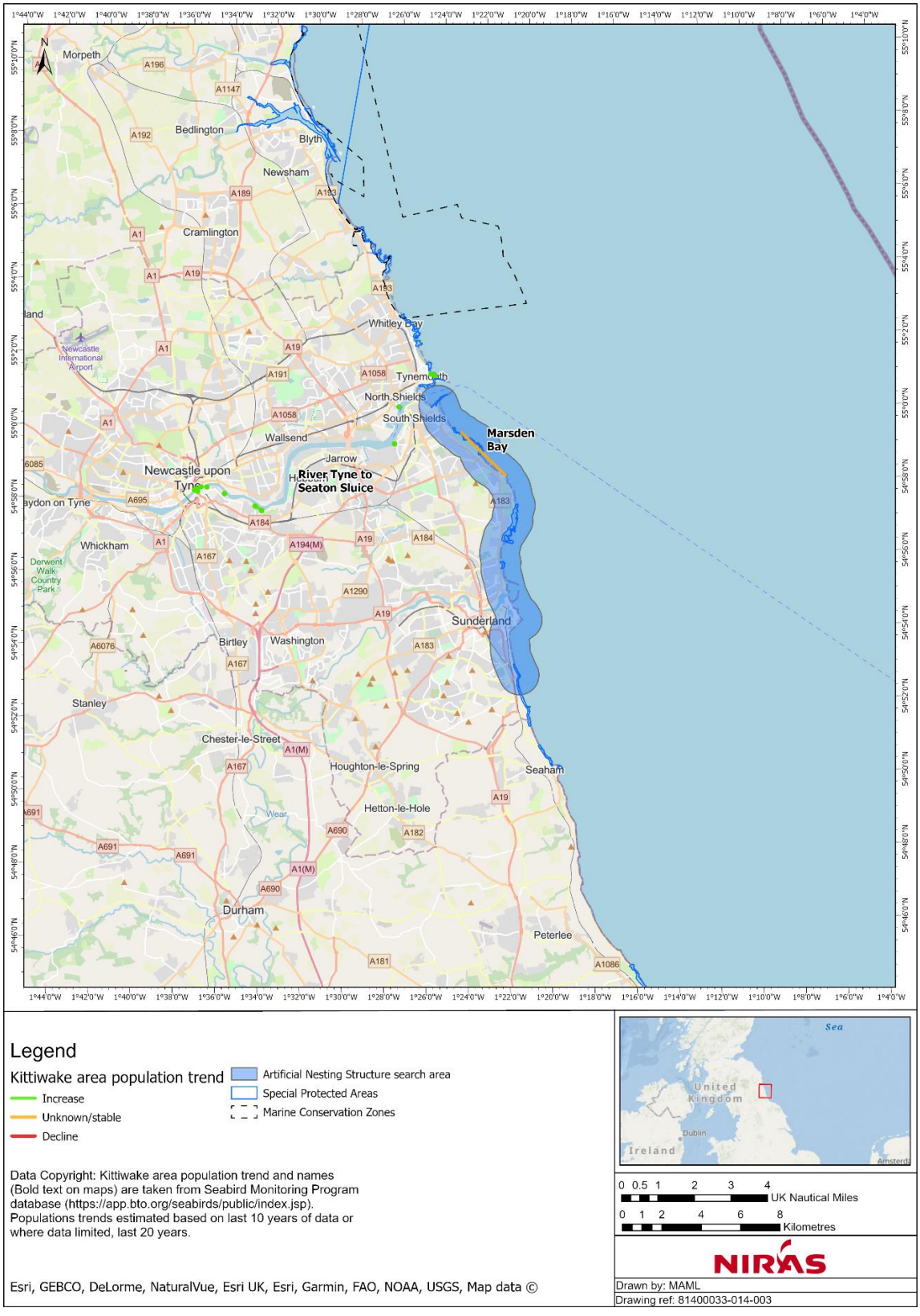

Figure 5: Onshore artificial nesting suitable land parcels – Sunderland.

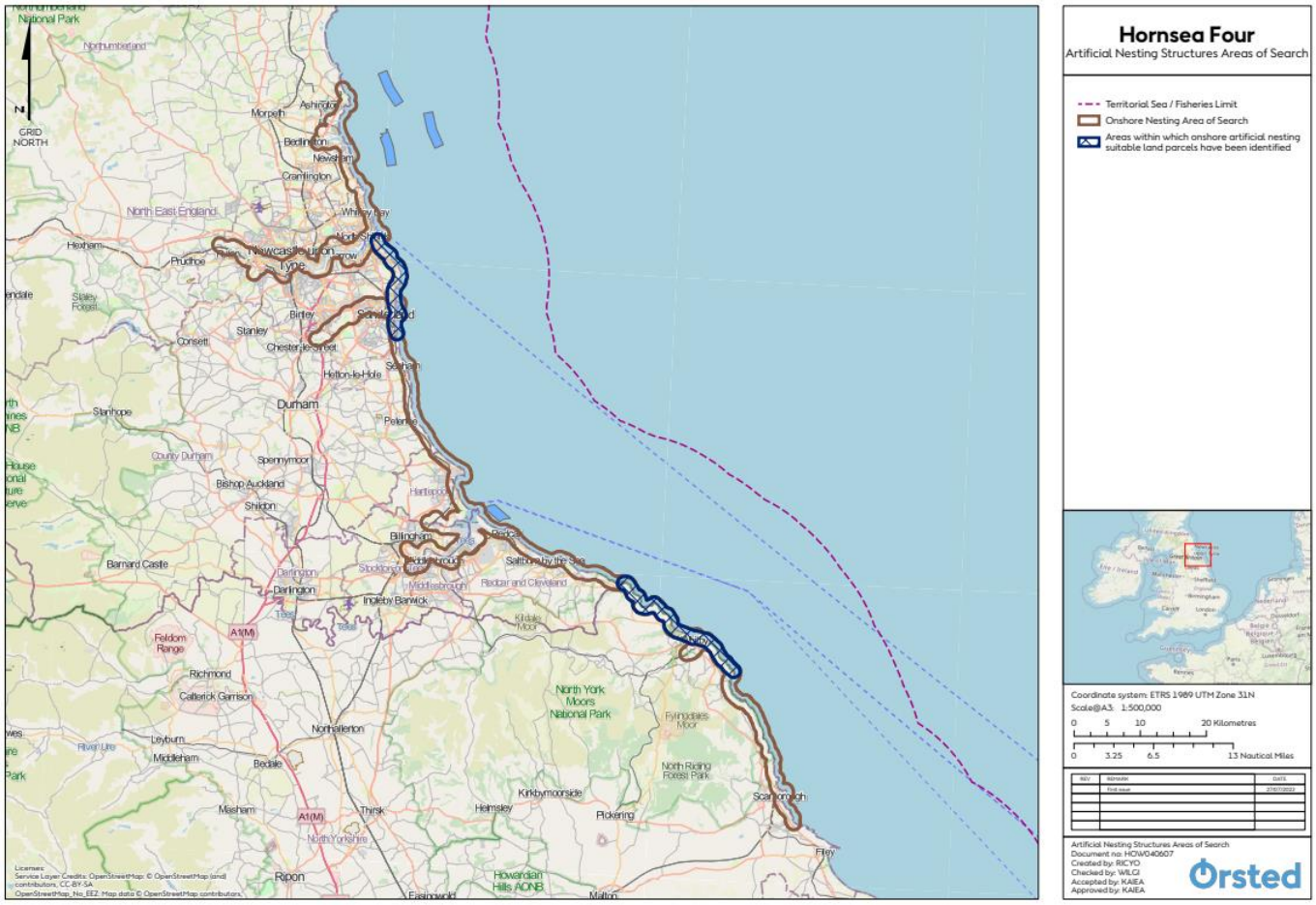

Figure 6: Onshore artificial nesting suitable land parcels mapped in relation to wider compensation consultation search area (Cayton Bay to Newbiggin by the Sea).

3.3 Site visits and ecological appraisal of available land parcels

3.3.1.1 Site visits were undertaken at four land parcels to verify their ecological site scores (based on Section 2.1) and make a more thorough ecological appraisal of suitability for ANS (Section 2.2). Visits were made to Lythe and Hawsker near Whitby and two sites at Whitburn, Sunderland.

3.3.2 Lythe (north of Whitby)

3.3.2.1 **Nearby kittiwake colonies:** Between Runswick Bay and Sandsend (Figure 7), a single established kittiwake colony (approximately 288 nests (including Apparently Occupied Nests and Trace nests as defined in Walsh et al. 1995); Figure 8) and several smaller sub-colonies (approximate number of nests at each sub-colony: 68; 50; 17; 7; and 200 individuals roosting on the beach in front) within 500 m of the established colony were found (Figure 9).

3.3.2.2 **Assessment of kittiwake colony nest space limitation:** The single established colony appears to have used almost all suitable nesting space within the colony area, with the only areas absent of nests located in vertical sections of smooth rock (Figure 8). There do not appear to be additional suitable cliffs for nesting in the vicinity (Figure 7), and the aforementioned smaller sub-colonies are located on unstable and less preferable shale cliffs (Figure 9). The presence of these small sub colonies nesting on unstable shale cliffs suggests they could be overspill from the established colony, strengthening the case for nesting space limitation. In this case, provision of an ANS would provide a more suitable nesting area than naturally available, proving additionality.

3.3.2.3 **Suggested ANS:** The cliff face that hosts the established colony appears to have used all available nesting space, but has some large areas of smooth cliff face (Figure 8). A possible ANS solution would be to install artificial ledges on these smooth areas of cliff face to boost colony capacity, as has been successfully piloted at Coquet Island[5] (physical process and technical considerations would need to be investigated). Alternatively, an ANS could be situated at the top of the cliff.

3.3.2.4 **Overall site suitability for ANS:** The existing established kittiwake colony presents a good case for nesting space limitation (as detailed above) and is contained within the land parcel.

[redacted]

The potentially simple solution of adding artificial ledges to this colony makes a strong case for this site. **Site rank: 1/4.**

Figure 7: Typical coastline at Lythe (north of Whitby).

Figure 8: Established kittiwake colony at Lythe (North of Whitby).

Figure 9: Small kittiwake sub-colonies on unstable shale cliffs at Lythe (North of Whitby).

3.3.3 Hawsker (south of Whitby)

3.3.3.1 **Nearby kittiwake colonies:** Between Whitby and High Hawsker, a single, established kittiwake colony (approximately 236 nests) was found on a cliff (Figure 10).

3.3.3.2 **Assessment of kittiwake colony nest space limitation:** The single colony appears to have used almost all suitable nesting space (all ledges occupied, leaving only vertical smooth or loose rock sections absent of nests) within the colony perimeter, which is limited to a small cove (Figure 10). However, there are some seemingly suitable natural cliffs for nesting within 500 m of the colony, which could theoretically be colonized if this colony had no further nesting space available, making additionality hard to prove.

3.3.3.3 **Suggested ANS:** An artificial cliff face (with ledges) either situated atop the exiting colony (to 'extend' the nesting area) or nearby would likely offer attractive colonization prospect to the cove colony. However, the cliff face that hosts the colony is very close (1-3 m) to the Cleveland Way coastal path so any ANS would need to be suitably designed and landscaped.

3.3.3.4 **Overall site suitability for ANS:** The existing kittiwake colony appears limited for space and borders the land parcel so presents a good opportunity, however some alternative suitable

cliffs for nesting and potential objection to siting an ANS atop the colony present challenges. **Site rank: 2/4**.

Figure 10: Established kittiwake colony at Hawsker (south of Whitby).

3.3.4 Marsden (north of Sunderland)

3.3.4.1 **Nearby kittiwake colonies:** Between Sandhaven Beach and Seaburn Beach sits the large and sprawling (over approximately 3 km of coastline) Marsden kittiwake colony (2,388 Apparently Occupied Nests in June 2016[6]), the land parcel is situated at the center of the colony (Figure 11).

3.3.4.2 **Assessment of kittiwake colony nest space limitation:** The Marsden kittiwake colony is split into several sub-colonies by natural bays along the coastline, the sub-colony at its' central point is probably the largest and most densely packed of the sub-colonies. However, there are still ledges that have apparent space for additional nests within this sub-colony (Figure 11), making it hard to justify that available nesting space is limiting growth of the Marsden colony (instead of prey resources for example), and therefore prove additionality.

3.3.4.3 **Suggested ANS:** There is some existing man-made cliff infrastructure to attach artificial ledges to, and birds would undoubtably use them for nesting. However, in the context of available nesting space on nearby natural cliff ledges the site is unlikely to be able to prove additionality and proceed to the ANS deployment stage.

3.3.4.4 **Overall site suitability for ANS:** The Marsden kittiwake colony does not appear to be limited by available nesting space. The higher densities of birds in the central sub-colony may help to make the case that this area is the most preferable for nesting birds; however, evidence of ledges with available space makes it hard to justify deploying ANS. **Site rank: 3/4.**

[6] Seabird Monitoring Programme ([redacted] on 26/07/2022).

Figure 11: Typical coastline at Marsden (north of Sunderland). The photo shows the profile of a sub-colony moving left-right with decreasing kittiwake nest density and increasingly available unoccupied nesting ledges.

3.3.5 Whitburn Beach (north of Sunderland)

3.3.5.1 **Nearby kittiwake colonies:** Whitburn Beach is a short distance to the south of large and sprawling Marsden kittiwake colony (2,388 Apparently Occupied Nests in June 2016[7]), with no sub-colonies in the vicinity.

3.3.5.2 **Assessment of kittiwake colony nest space limitation:** As above, the Marsden kittiwake colony does not appear limited by available nesting space. Furthermore, as Whitburn Beach nearby to the Marsden colony edge, potentially colonising birds would have to fly past more suitable nesting cliffs that are closer to the main colony in order to reach this site.

3.3.5.3 **Suggested ANS:** The coastline at this site is not suitable for kittiwake with sloping grassy banks and beaches and short cliffs (2-8m) and made of loose material (Figure 12).

Overall site suitability for ANS: The distance from the Marsden kittiwake colony and unsuitable natural nesting habitat make this site unsuitable for an ANS. **Site rank: 4/4.**

[7] Seabird Monitoring Programme [redacted] on 26/07/2022).

Figure 12: Typical coastline at Whitburn Beach (north of Sunderland).

4 Conclusion

4.1.1.1 The Applicant has demonstrated the steps taken and rationale for scoping and shortlisting of sites for an onshore ANS based on ecological criteria. For sites where land parcels were available for acquisition the Applicant has made visits to make a more detailed ecological

appraisal of site suitability, including, importantly, an assessment of whether colonies at sites are limited by available nesting space. The Applicant has found available land parcels at Lythe, north of Whitby and Hawsker, south of Whitby that offer strong ecological grounds for ANS success based on the nesting limitation described in this report and should be progressed to Statutory Nature Conservation Body (SNCB) consultation and ANS design phases. The Applicant is progressing land agreements with the two landowners of these land parcels. The Applicant has demonstrated clear, tangible progress on the delivery of onshore ANS compensation package for kittiwake; through the site selection process across the Cayton to Newbiggin by the Sea and East Suffolk search areas, through to the detailed onshore surveys providing evidence of nesting limitations at two locations in the north-east of England and including the extensive engagement with landowners and progression on land agreements.

5 References

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