



FIVE ESTUARIES OFFSHORE WIND FARM

VOLUME 5, REPORT 5.7 KITTIWAKE IMPLEMENTATION AND MONITORING PLAN – REVISION D (CLEAN)

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DEFINITION OF ACRONYMS

Term	Definition
AEoI	Adverse Effect on Integrity
ANS	Artificial Nesting Structure
DBS	Dogger Bank South
DEFRA	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
DCO	Development Consent Order
ES	Environmental Statement
FFC	Flamborough and Filey Coast
HRA	Habitats Regulations Assessment
IROPI	Imperative Reasons of Overriding Public Interest
KIMP	Kittiwake Implementation and Monitoring Plan
MCZ	Marine Conservation Zone
MMF	Mean-Max Foraging Range
NE	Natural England
OWF	Offshore Wind Farm
RAG	Red, Amber, Green
RIAA	Report to Inform Appropriate Assessment
RSPB	Royal Society for the Protection of Birds
SAC	Special Areas of Conservation
SD	Standard Deviation
SMP	Seabird Monitoring Programme
SNCB	Statutory Nature Conservation Bodies
SPA	Special Protection Area
VE	Five Estuaries Offshore Wind Farm
VE OWFL	Five Estuaries Offshore Wind Farm Limited



GLOSSARY OF TERMS

Term	Definition
Development Consent Order	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP) from the Secretary of State (SoS) for the Department for Energy Security and Net Zero (DESNZ).
Environmental Statement	Environmental Statement (the documents that collate the processes and results of the EIA).
Export Cable Corridor (ECC)	The area(s) where the export cables will be located.
Habitats Regulation Assessment (HRA)	The assessment of the impacts of implementing a plan or policy on a European Site (as required by the Conservation of Habitats and Species Regulations 2017 (as amended) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended)), the purpose being to consider the impacts of a project against conservation objectives of the site and to ascertain whether it will adversely affect the integrity of the site
Mitigation	Mitigation measures, or commitments, are commitments made by the project to reduce and/or eliminate the potential for significant effects to arise as a result of the project.
NSIP	Nationally Significant Infrastructure Projects are major infrastructure developments in England and Wales which are consented by DCO under the Planning Act 2008. These include proposals for offshore wind farms with an installed capacity over 100MW.
Order Limits	The extent of development including all works, access routes, TCCs, visibility splays and discharge points. (Not Red Line Boundary (RLB))
The Applicant	Five Estuaries Offshore Wind Farm Limited (The Applicant).
Special Area of Conservation (SAC)	A protected site under the Conservation of Habitats and Species Regulations (2017).
Special Protection Area (SPA)	Sites designated under EU Regulations (79/409/EEC) to protect habitats of migratory birds and certain threatened birds under the Birds Directive Regulations.



1 INTRODUCTION

- 1.1.1 This document outlines the kittiwake implementation and monitoring plan (KIMP) that will contribute to the delivery of the strategic compensation measures that have been developed for Five Estuaries Offshore Wind Farm (VE). VE is a proposed extension to the operational Galloper Offshore Wind Farm. VE will be situated approximately 37 km off the coast of Suffolk, England (at its closest point). The KIMP has been developed in consultation with Natural England and the RSPB through the Expert Topic Groups (ETGs) and specific meetings with both Natural England and the RSPB.
- 1.1.2 The Applicant is applying for a Development Consent Order (DCO) supported by a range of plans and documents, including an Environmental Statement (ES) which will set out the results of the Environmental Impact Assessment (EIA). The Applicant is also submitting a Report to Inform Appropriate Assessment (RIAA), which sets out the information necessary for the competent authority, in this case the Secretary of State (SoS), to undertake a Habitats Regulations Assessment (HRA) to determine if there is any Adverse Effect on Integrity (AEol) on the national site network.
- 1.1.3 The KIMP is part of the Habitat Regulation Assessment (HRA) Derogation Case and is a follow on document from the kittiwake roadmap (VEOWFL 2023, 5.5.4 Kittiwake – Evidence, Site Selection and Roadmap – Revision C and sets out how the final compensation scheme would be developed, implemented and monitored. This process is described in more detail below.

1.2 DEROGATION PROCESS

- 1.2.1 As part of the DCO application, Five Estuaries Offshore Windfarm Ltd (VE OWFL) is required to produce a Report to Inform Appropriate Assessment (RIAA) to provide the information required by the Competent Authority in order to undertake its HRA and Appropriate Assessment. If the HRA process deems that AEol cannot be excluded, a derogations process is followed. In the event that no alternative solutions can be found, and if there are imperative reasons of overriding public interest (IROPI), the final stage of the derogations process is to develop measures to compensate for adverse effects on a site.
- 1.2.2 It should be noted that this does not prejudice the outcome of the ongoing HRA process. The ongoing HRA process will ultimately determine the compensation requirements for VE OWFL.
- 1.2.3 A without prejudice dDCO schedule for kittiwake compensation measures has been provided at Deadline 5 which includes the potential to use either the proposed project-led measure or a strategic measure delivered through the marine recovery fund.



1.3 PREDICTED IMPACTS

- 1.3.1 One of the species of potential derogation risk for VE is kittiwake at Flamborough and Filey Coast (FFC) Special Protection Area (SPA). FFC SPA is 275.5 km away from VE, outwith the mean-max foraging (MMF) range for kittiwake (156.1 km; Woodward *et al.*, 2019); therefore, there is low potential for connectivity between FFC SPA and VE during the breeding season. Following a review of tracking data and agreement from Natural England it was decided that kittiwake should only be considered for the non-breeding connectivity.
- 1.3.2 Recent decisions on other offshore wind projects (e.g. Hornsea Three, Hornsea Four, East Anglia One North, East Anglia Two, Norfolk Vanguard and Norfolk Boreas) concluded that AEol could not be ruled out for kittiwake at FFC SPA when considered in-combination with other projects. As a precedent for concern around AEol has been established on other projects, the species is thus of in-principle derogation concern for VE.

1.4 COMPENSATION OPTIONS

- 1.4.1 This document outlines the implementation and monitoring plan for the kittiwake compensatory measures options. The compensation option of using artificial nesting structures (ANS) onshore is justified and presented along with any previous stakeholder input or consultation. An ANS that has already been constructed at Gateshead has been identified as a suitable site, after consultation with NE. This document also outlines the other stakeholders that will be involved in this compensation process, including any landowners and partner OWF developers. This document also presents a timeline for the implementation of the ANS compensation measure. The ongoing maintenance, monitoring, and adaptive management programs are also described.
- 1.4.2 The Secretary of State recently approved measures for the DEFRA strategic compensation/ Marine Recovery Fund (MRF) including offshore ANS for kittiwake in English Waters. The Applicant proposes that either involvement in the Dogger Bank South (DBS) ANS or participating in the DEFRA strategic compensation via the MRF are feasible, deliverable compensation options.



2 PROPOSED COMPENSATION MEASURES

2.1.1 Following the compensation measure longlisting ('Five Estuaries Offshore Wind Farm: Potential compensation measures longlist report' (VE OWFL, 2022a)) and shortlisting process ('Five Estuaries Offshore Wind Farm: Compensation measures shortlist technical note' (VE OWFL, 2022b)), and following consultation with Natural England and the RSPB at the ETG in August 2023 and subsequent monthly meetings the following measures have been selected for compensation for kittiwake:

- > Onshore DBS kittiwake tower at Gateshead
- > Participating in the DEFRA strategic compensation via the MRF.



3 STAKEHOLDER ENGAGEMENT

- 3.1.1 VE OWFL presented potential compensation measures to Natural England during the ETG in September 2023 and it was agreed that the kittiwake tower constructed by Dogger Bank South (DBS) OWF at Gateshead would be the most suitable option given the low level of impact on kittiwake by the Project (VE OWFL, 2024).
- 3.1.2 Consultation with relevant stakeholders, such as Natural England, regarding the compensation measures have been ongoing before the DCO application submission. Consultation on compensation plans to date has consisted of Natural England feedback on the shortlist and longlist of compensation measures (VE OWFL, 2022a; VE OWFL, 2022b), relevant ETG meeting with Natural England and the RSPB as well as monthly meetings with Natural England.
- 3.1.3 Engagement with Natural England continued throughout the examination period, during which refinements were made to this IMP. Following the examination, additional updates were incorporated in response to a request from the Secretary of State.
- 3.1.4 Further stakeholder engagement will be required throughout the development of the artificial nesting scheme – should this be via the RWE/DBS tower or the DEFRA strategic compensation.
- 3.1.5 Following consent of the project, should the RWE/DBS option be taken forward, ongoing consultation will continue, and will assist in the delivery of any implementation and maintenance of the compensation measures, monitoring, reporting, and other relevant matters as determined by VE OWFL. It is envisaged that stakeholders involved in the consultation will be the relevant Statutory Nature Conservation Bodies (SNCBs), such as Natural England, as well as the RSPB, the local planning authority and owners and/or managers of the sites at which the artificial nesting program is planned to be implemented, if required.



4 LOCATION FOR IMPLEMENTATION

- 4.1.1 As outlined in Section 2 Proposed compensation measures, the delivery of artificial nesting for kittiwake may be undertaken using the below option:
- > Use of an existing structure at Gateshead built by RWE.
- 4.1.2 The Applicant is currently in discussions with DBS OWF to secure a formal agreement to contribute towards a defined share of the kittiwake tower RWE constructed at Gateshead. This is based on the positive feedback from Natural England at the ETG meeting in September 2023. A letter of intent from DBS confirming willingness to allocate nesting platforms to VE, in the event that the compensation measure is required, is provided at Appendix B within 9.5.4: Kittiwake: Evidence, Site Selection and Roadmap – Revision C.
- 4.1.3 VE OWFL believe that the onshore ANS built at Gateshead is an appropriate site as there is evidence of man-made structures already being utilised in the area (Turner, 2010), and the population using man-made structures is, in some cases, increasing. The east coast of England kittiwake population is mainly found on the stretch of coast between Humberside and Northumberland, so the location of the site has great connectivity with existing colonies and feeding areas. The structure is built to allow for reconfiguration until the required breeding success is achieved (FLI Structures, 2023). The design of the structure is aimed to enable the kittiwake to maintain the ideal nesting microclimate by mitigating against solar heat or wind related cold stress (FLI Structures, 2023), thus providing the perfect nesting location for the compensation measure.
- 4.1.4 The location of the ANS at Gateshead is thought to be at the optimal location as it has connectivity with existing kittiwake colonies, including being adjacent to an existing nesting tower at Saltmeadows. This will help with faster recruitment to the ANS, with the Saltmeadows ANS holding over 120 pairs in 2023.
- 4.1.5 With the FFC SPA being the only SPA designated for kittiwake in English waters, and consequently having almost all impacts from OWFs apportioned to it, the compensation measure would deliver breeding birds back into the biogeographical region within the North Sea. The Gateshead ANS is approximately 140 km from FFC SPA, well within the foraging range of kittiwakes. The structure is approximately 415 km from the VE array area.
- 4.1.6 The location of the ANS can be found in Figure 4.1.



4.2 COMPENSATION REQUIREMENTS

- 4.2.1 The estimated compensation quantum for the predicted mortality of 0.82 birds was calculated in 5.5.3 Kittiwake Evidence, Site Selection and Roadmap – Revision C document . The roadmap presents a range of compensation requirements, from a ratio of 1:1 up to 3:1, following the methods used in Hornsea Four and both stage one and stage two methods used in Hornsea Three¹.

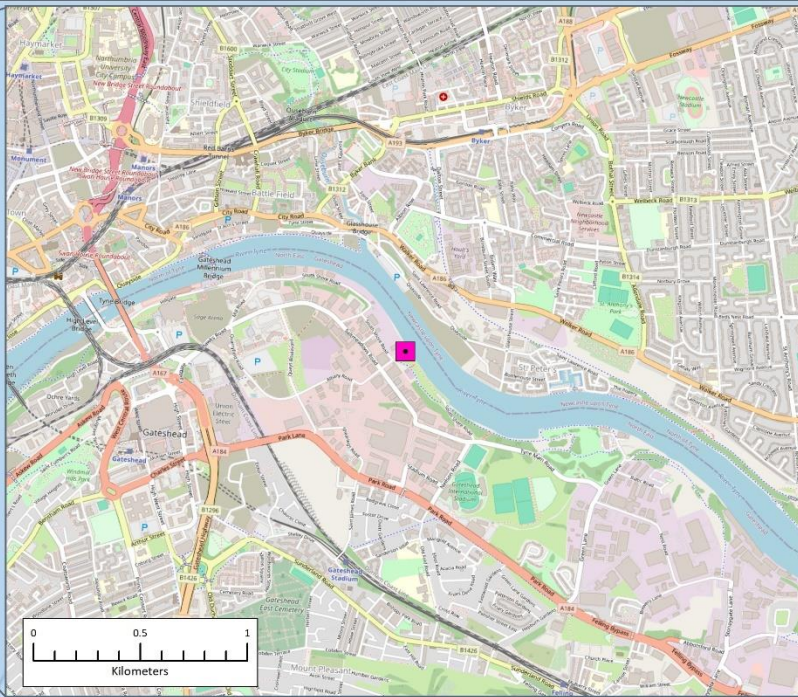
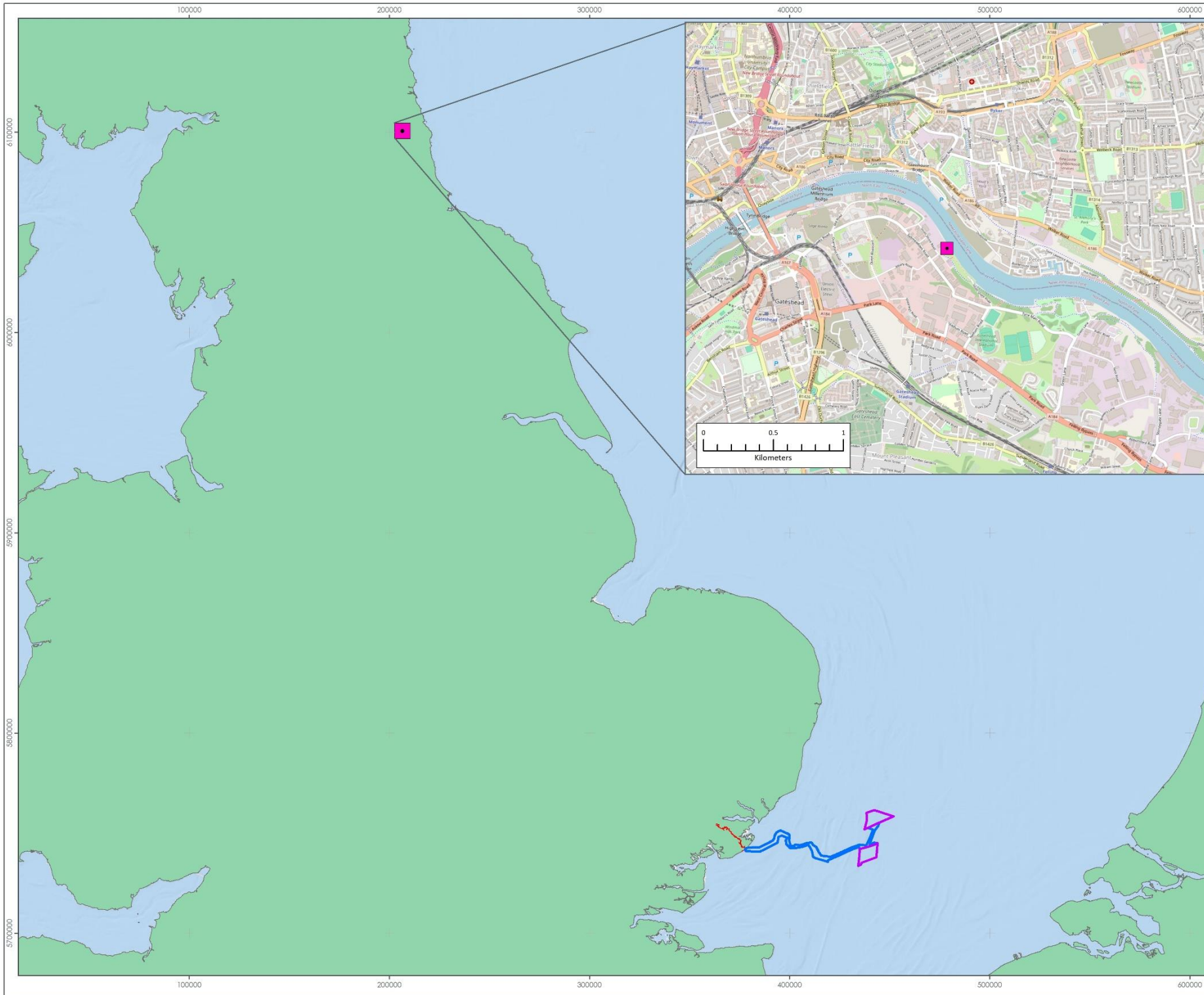
NATURAL ENGLAND'S PREFERRED APPROACH

- 4.2.2 Following the more precautionary Hornsea Three stage two method and using the UCI impacts, preferred by Natural England, the minimum number of breeding pairs required (with a 1:1 ratio) is 15 (15.2) and the maximum number of pairs required (with a 3:1 ratio) is 46 (45.7).

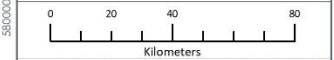
APPLICANTS PREFERRED APPROACH

- 4.2.3 The Applicant believes that the Hornsea Four method for calculating the compensation requirement of kittiwake is the most appropriate, with a precautionary 3:1 ratio applied to the mean impact numbers. The compensation quantum using these parameters would be 7 pairs, the equivalent to using the UCI at a 1:1 ratio when using the Hornsea Four methodology.

¹ [EN010080-003246-HOW03-30Sep Appendix 2 Kittiwake Compensation Plan \(06543754 A\).pdf](#)
(planninginspectorate.gov.uk)



- LEGEND**
- Array Areas
 - Offshore Export Cable Corridor
 - Onshore Order Limits
 - Kittiwake Compensation Site



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Sat. Imagery: Google, IGN, NOAA, and other contributors

PROJECT TITLE:
FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
**Kittiwake Compensation Site
in relation to Project Boundaries**

VER	DATE	REMARKS	Drawn	Checked
1	15/02/2024	For Issue	BPHB	MB

DRAWING NUMBER: 4.1



4.3 LANDOWNER AGREEMENT

- 4.3.1 The kittiwake tower (ANS) at Gateshead was constructed on land owned by H Nichol and Sons, South Shore Road, Gateshead in 2023. The land the tower has been built on has been leased for 60 years, in line with the expected life of DBS. VE OWFL are seeking to coordinate a formal agreement with DBS OWF for a defined share of the ANS that will cover the required compensation quantum. The 60 year time frame will adequately cover VEs requirement for the lifetime of the project.

4.4 COORDINATION WITH OTHER OFFSHORE WIND FARM DEVELOPMENTS

- 4.4.1 Section 4.2 highlighted that the estimated compensation requirement is low, with 0.8 kittiwake mortalities per annum. Therefore, as mentioned above, VE OWFL are seeking to coordinate a formal agreement from DBS OWF. Other RWE projects, including Rampion 2, are also seeking to utilise space on the ANS and will provide a strategic approach to the compensation for kittiwakes. This collaboration with another OWF developer is key to the success of these compensation measures, which would not be feasible for each individual project given the low levels of impact.
- 4.4.2 Although Natural England do not typically support the use of onshore artificial nesting structures for kittiwake where there are a large number of birds impacted, they are in support of this measure for VE and consider it proportionate to an impact of less than one breeding adult. The collaborative approach described has also been supported and encouraged by Natural England and DEFRA during consultation. The full consultation table can be found in the RIAA (VE OWFL, 2024).



5 RWE KITTIWAKE TOWER AT GATESHEAD

5.1 AIM

- 5.1.1 This section outlines the implementation plan for the ANS at Gateshead, including the design and layout of the ANS infrastructure and the timeline and monitoring and reporting of the compensation programme.

5.2 DESIGN

- 5.2.1 The kittiwake ANS was designed, built and installed by FLI Structures in partnership with Shoney Wind for RWE. The tower is tailored to the location and allows reconfiguration until the desired breeding success is achieved. The structure mitigates against solar heat and wind related cold stress due to climate change, enabling kittiwake to maintain the ideal nest microclimate required to successfully incubate eggs and protect young chicks (RWE, 2022).
- 5.2.2 To achieve the best results and respond to changes in performance or required performance or the surrounding environment; the tower has a layout of the nest ledges that can be altered, and additional nesting cabins can be added. The tower can be raised, lowered, realigned or extended (RWE, 2022).

5.3 SITE DESIGN AND LAYOUT

- 5.3.1 In terms of compensation for offshore wind related mortality, a site with more 'predictable' productivity is critical to quantifying the likely success of compensation measures. Thus, coastal locations were not considered because SWL's analysis of historical productivity, historical overnight air temperatures and historical wind data, showed that coastal colonies have widely differing productivities from year to year which correlated with weather conditions.
- 5.3.2 The chosen site was selected because it is adjacent to the existing Saltmeadows ANS colony, where there is long term historical data. It also offers an opportunity to undertake scientific study and comparisons to the existing tower and other urban inland sites on the Tyne (RWE, 2022).
- 5.3.3 A further reason for selection of the H Nichol site, was because two sides of the kittiwake ANS are oriented such that one side will experience sunrise and the other sunset, enabling comparison with each other. According to the 'time limited sun compass theory' (Guilford *et al.* 2014; Padget *et al.* 2018; Togunove *et al.* 2021) nests facing sunrise or sunset may improve the accuracy of geolocation, which in turn may improve foraging efficiency (RWE, 2022).

5.4 DESIGN OF ACCOMPANYING INFRASTRUCTURE

- 5.4.1 The ANS comprises of a support structure and a kittiwake module topside up to 15 m in height and accommodates up to 200 nests. The topsides nesting components are a combination of ledges and boxes. The nesting components have inward swinging doors to help with monitoring. The key benefits to the structures design are:
- > Accessible topside to ornithologists (safe design with no need for ropes);
 - > Design includes feeding holes for supplemental feeding if required;
 - > Accessible hatches and one-way glass to help monitoring;



- > Designs are modular, such that breeding space can be increased by increasing tower height or cladding the support structure with further nesting ledges.
- > The ANS is relocatable, recyclable, and installable with screw piles (subject to ground conditions).

5.4.2 The design of the ANS can be found in Figure 5.1.

5.5 IMPLEMENTATION TIMETABLE

5.5.1 The DBS kittiwake tower has already been constructed therefore the compensatory measures could be deemed to begin from the 2024 breeding season, 6 years before the proposed operational phase of VE. Therefore, this site will potentially receive a net benefit from these compensation measures by the time VE becomes operational.

5.6 MAINTENANCE

5.6.1 Regular structural and certification inspections will be completed. These inspections will ensure that the structure is safe for personnel to internally access the tower via the internal stair well.

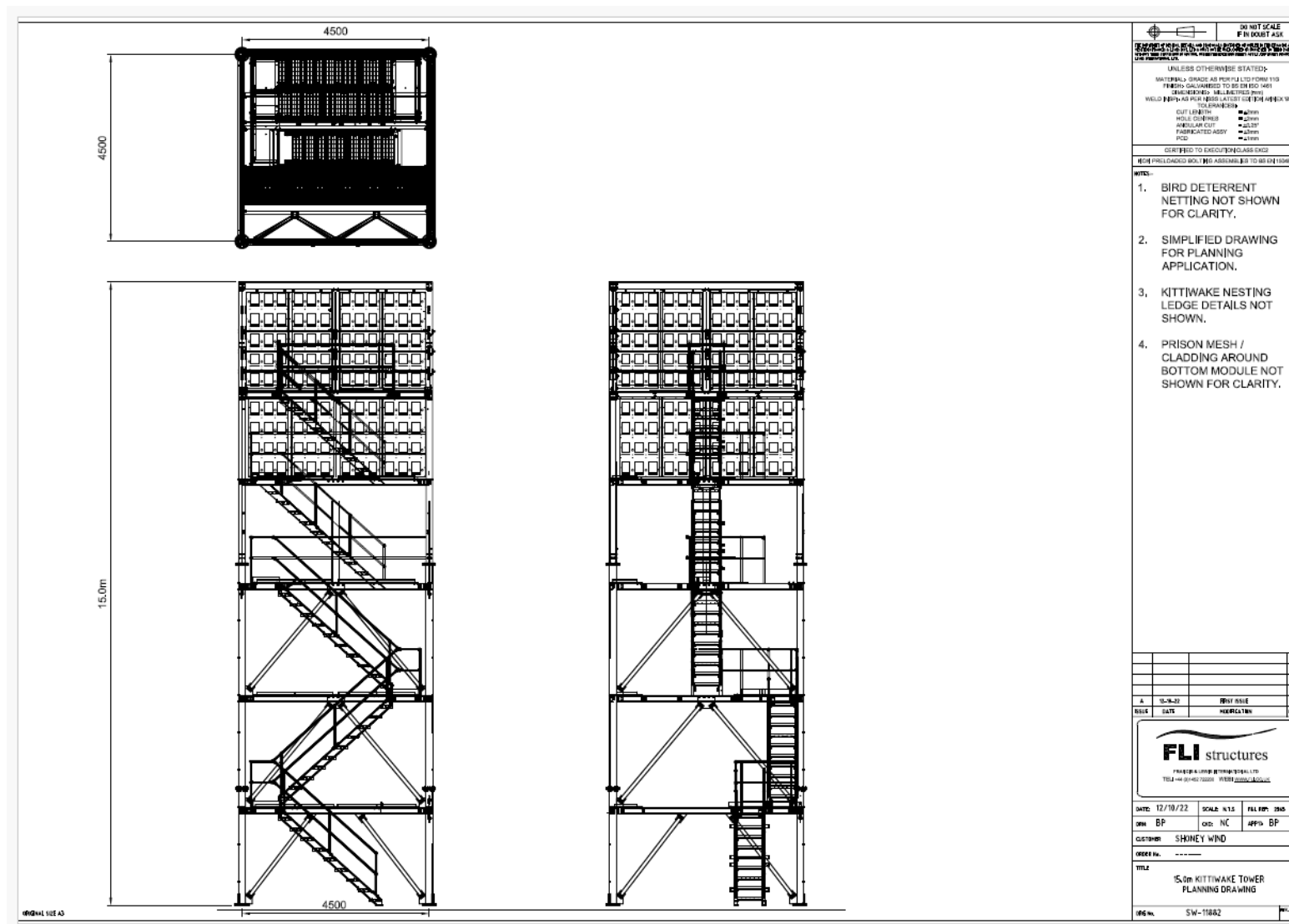


Figure 5.1 The design plans of the kittiwake ANS at Gateshead



5.7 MONITORING AND REPORTING

MONITORING PLAN

- 5.7.1 Monitoring will be required for all stages of the proposed artificial nesting program. The details of monitoring proposals will be discussed with Natural England, with key details to be agreed upon including the frequency, duration, and nature of monitoring methodology, as well as data analysis and reporting requirements. However, this document will present an initial monitoring methodology upon which the final monitoring plan can be decided. Monitoring and reporting will be agreed between the parties and will be undertaken by DBS on behalf of all parties or as otherwise agreed.
- 5.7.2 Firstly, monitoring has taken place on the DBS tower during the 2023 breeding season and monitoring of existing colonies with connectivity to the structure to determine the impact of the new structure on the colonies will be carried forward as part of the VE compensation measure.
- 5.7.3 When monitoring, the same environmental variables will be recorded on each visit to ensure that clear comparisons can be made to baseline conditions and between visits. Following colonisation, additional data, such as productivity and diet, may be collected to make further comparisons between birds nesting on the artificial structure and natural colonies. A monitoring programme will be discussed and developed with Natural England and other relevant stakeholders, but it is expected that monitoring will be undertaken throughout the operational lifetime of VE. After the compensation plan has been implemented, additional monitoring will take place to determine the success of these compensatory measures. Its success will be based on its ability to attain an additional 5.31 breeding pairs of kittiwake (at a 1:1 ratio). Therefore, productivity of the site will be monitored, along with natal dispersal and colony interchange with FFC SPA. These factors will be measured against the pre-implementation monitoring that serves as a baseline.
- 5.7.4 Monitoring of the ANS recruitment started during the first breeding season following implementation in 2023. The frequency of observations throughout the operational period will be decided after discussion with the involved stakeholders. Both a nearby cliff colony, nearby urban colonies and the ANS site will be monitored after implementation, and their monitoring will continue throughout the operation of VE OWF. Site productivity will also be monitored during each breeding season following the installation of VE OWF.
- 5.7.5 This monitoring will be carried out by trained observers, and they will undertake monitoring using the methods outlined in JNCC's Seabird Monitoring Programme (Walsh *et al.*, 1995). The particular method of data collection and observation, including binoculars, telescopes, land-based or sea-based surveys, and drones, will depend on the location. The ANS is designed to allow entry for ornithologists to monitor the breeding kittiwakes from close quarters with minimal disturbance. The ANS will be checked for any occupancy prior to entering the structure by binoculars or telescope from a nearby vantage point. The surveys at FFC SPA will be carried out using telescopes from vantage points along the cliff tops. The final methods will be decided after discussion with various stakeholders.



- 5.7.6 Monitoring of natal dispersal will differ from the quantitative methodology used for monitoring site productivity. Current practice and stakeholders within the OWF industry have found that, using current technologies, it is not possible to quantitatively measure natal dispersal (Ørsted, 2022). Many of the current methods, including satellite, radio, and archival tags, are not feasible due to their size and weight (Ørsted, 2022). However, other OWF developments have chosen to use other methods, including chick ringing with identifying colours, to help determine the colony of origin of kittiwake chicks when they later choose a nesting site upon maturity (Ørsted, 2022). The benefits of the ANS in regard to colour-ringing birds is that a larger percentage of the colony can be ringed due to the easy access to the nest ledges, resulting in fuller and longer term datasets about where they disperse too.
- 5.7.7 In addition to the monitoring of site productivity, natal dispersal, and colony interchange, this plan may also include monitoring of adult survival rates and diet. This monitoring plan will be reviewed annually to reassess its accuracy and efficiency in light of up-to-date survey methods.

5.8 REPORTING PLAN

- 5.8.1 Following the breeding season an annual report will be produced and provided to the relevant stakeholders by the end of the year.
- 5.8.2 A stakeholder meeting will be organised following each years' monitoring to present any findings and will discuss any reporting issues or any adaptive management measures that may be required.
- 5.8.3 The planned timelines for the annual reporting will follow the stages below:
- > Monitoring data collected from the season received by the end of August;
 - > Findings from the data presented to stakeholders by end of September;
 - > Draft report circulated by end of October;
 - > Finalised report submitted to relevant stakeholders by start of December;
 - > Approval/final comments by January the following year;
 - > Adaptive management begins where required prior to the breeding season.

5.9 DATA SHARING

- 5.9.1 All data collected from the monitoring of the ANS and nearby control sites will be shared with the Marine Data Exchange (The Crown Estate), the relevant Local Environmental Records Centre and the Seabird Monitoring Programme (SMP) database.



6 COMPENSATION PERFORMANCE MONITORING AND ADAPTIVE MANAGEMENT

- 6.1.1 Should post-implementation monitoring reveal that the artificial nesting program is unsuccessful, or less successful than anticipated, an assessment will be undertaken to determine the reasons underlying the lack of success, and to inform the next steps. Notably, the next steps will consist of identifying potential improvements (or extensions) to the implemented measure, based on potential issues discovered during the assessment. The design of the ANS provides several adaptive management options, including adding nesting ledges/boxes, increasing in height etc. Should the assessment determine that the measure cannot be improved or extended sufficiently, then alternatives, such as contribution to the MRF (or equivalent), will be considered in consultation with stakeholders. The Applicant will not commit to adaptive measure if the evidence suggests that the reason for lack of success are out of the Projects control e.g. climate change, prey availability.



7 REFERENCES

- Bogdanova, M.I., Daunt, F., Newell, M., Phillips, R.A., Harris, M.P., and Wanless, S. (2011), 'Seasonal interactions in the black-legged kittiwake, *Rissa tridactyla*: links between breeding performance and winter distribution', *Proc. R. Soc. B*.278: 2412–2418.
- Bradbury, G., Trinder, M., Furness, B., Banks, A.N., Caldow, R.W.G., Hume, D. (2014), 'Mapping Seabird Sensitivity to Offshore Wind Farms,' *PLOS ONE*, 9: 1-17.
- Bull, J., Wanless, S., Elston, D. A., Daunt, F., Lewis, S. and Harris, M. P. (2004), 'Local-scale variability in the diet of black-legged kittiwakes *Rissa tridactyla*', *Ardea*, 92: 43–52.
- Chivers, L. S., Lundy, M. G., Colhoun, K., Newton, S. F., Houghton, J. D. and Reid, N. (2012), 'Foraging trip time-activity budgets and reproductive success in the black-legged kittiwake', *Marine Ecology Progress Series*, 456: 269-277.
- Christensen-Dalsgaard, S., Langset, M. and Anker-Nilssen, T. (2020), 'Offshore oil rigs—a breeding refuge for Norwegian Black-legged Kittiwakes *Rissa tridactyla*?', *Seabird*, 32: 20-32.
- Coulson, J. (2011), 'The kittiwake', (A&C Black).
- Coulson, J. C. (2019), 'Black-legged Kittiwake', in *Gulls* (p. 843), (London: Collins New Naturalist).
- Defra. (2021), Best practice guidance for developing compensatory measures in relation to Marine Protected Areas
- del Hoyo, J., Elliott, A. and Sargatal, J. (1996), 'Handbook of the Birds of the World', Volume 3. Hoatzin to Auks, (Barcelona: Lynx Edicions).
- FLI Structures, 2023 Kittiwake Nesting Tower <https://gaga2023.galvanizing.org.uk/fli-structures>
- Frederiksen, M., Moe, B., Daunt, F., Phillips, R. A., Barrett, R. T., Bogdanova, M. I., Boulinier, T., Chardine, J. W., Chastel, O., Chivers, L. S. and Christensen-Dalsgaard, S. (2012), 'Multicolony tracking reveals the winter distribution of a pelagic seabird on an ocean basin scale', *Diversity and distributions*, 18(6): 530-542.
- Furness, R. W. (2015), 'Non-breeding season populations of seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS)', *Natural England Commissioned Reports*, Number 164.
- Guilford, Tim & Taylor, Graham. (2014). The sun compass revisited. *Animal Behaviour*. 97. 135–143. 10.1016/j.anbehav.2014.09.005.



- Harris, M. P., and Wanless, S. (1997), 'Breeding success, diet, and brood neglect in the kittiwake (*Rissa tridactyla*) over an 11-year period', *ICES Journal of Marine Science*, 54(4): 615-623.
- JNCC (2021), 'Black-legged kittiwake (*Rissa tridactyla*)', <https://jncc.gov.uk/our-work/black-legged-kittiwake-rissa-tridactyla/#annual-abundance-and-productivity-by-geographical-area-england> [Accessed: February 2023].
- Ørsted (2020), 'Appendix 2 Kittiwake Compensation Plan' Document number: EN010080-003246. [https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-003246-HOW03-30Sep_Appendix%20%20Kittiwake%20Compensation%20Plan%20\(06543754_A\).pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-003246-HOW03-30Sep_Appendix%20%20Kittiwake%20Compensation%20Plan%20(06543754_A).pdf) [Accessed: January 2024].
- Ørsted (2022), 'Kittiwake Implementation and Monitoring Plan (KIMP),' Final iteration for submission to the Secretary of State of the Department for Business Energy and Industrial Strategy.
- Padget, O., Bond, S. L., Kavelaars, M. M., van Loon, E., Bolton, M., Fayet, A. L., et al. (2018). In situ clock shift reveals that the sun compass contributes to orientation in a pelagic seabird. *Curr. Biol.* 28, 275–279.
- Robinson, R. A. (2005), 'BirdFacts: profiles of birds occurring in Britain & Ireland' <http://www.bto.org/birdfacts> [Accessed: February 2023].
- RWE (2022), 'Installation of a Kittiwake Tower' Document reference: 004551509-01
- RWE (2024), 'Kittiwakery and Urban and Coastal Surveyed Sites Summary Paper' Document number: 005061589-02
- Swann, R. L., Harris, M. P., and Aiton, D. G. (2008), 'The diet of European Shag *Phalacrocorax aristotelis*, Black-legged Kittiwake *Rissa tridactyla* and Common Guillemot *Uria aalge* on Canna during the chick-rearing period 1981 – 2007', *Seabird*, 21: 44–54.
- Togunov, Ron & Derocher, Andrew & Lunn, Nicholas & Auger-Méthé, Marie. (2021). Characterising menotactic behaviours in movement data using hidden Markov models.
- Turner, D. M. (2010), 'Counts and breeding success of Black-legged Kittiwakes *Rissa tridactyla* nesting on man-made structures along the River Tyne, northeast England, 1994-2009', *Seabird*, 23: 111-126.
- Walsh, P.M., Halley, D.J., Harris, M.P., del Nevo, A., Sim, I.M.W., and Tasker, M.L. (1995), 'Seabird monitoring handbook for Britain and Ireland,' Peterborough: JNCC, RSPB, ITW, Seabird Group.



Woodward, I., Thaxter, C.B., Owen, E., and Cook, A.S.C.P. (2019), 'Desk-based revision of seabird foraging ranges used for HRA screening', BTO research report number 724.

VE OWFL (2022a), 'Five Estuaries Offshore Wind Farm: Potential compensation measures longlist report'.

VE OWFL (2022b), 'Five Estuaries Offshore Wind Farm: Compensation measures shortlist technical note'.

VE OWFL (2022c), 'Five Estuaries Offshore Wind Farm: Compensation measures ranking approach note'.

VE OWFL (2023), 'Volume 5, Report 5.4: Kittiwake Compensation – Ecological Evidence and Roadmap'.

VE OWFL (2024), 'Five Estuaries Offshore Wind Farm: Environmental Statement: Report to Inform Appropriate Assessment'.

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