Introduction

RPS Consulting Engineers Limited (RPS) were appointed by the Foreshore Unit of the Department of Housing, Local Government and Heritage (DHLGH) to review the North Irish Sea Array Windfarm Limited (NISA) Foreshore Licence Application (FLA) for Site Investigation Work for Export Cable Route (FS007358) and undertake an Annex IV Risk Assessment and Stage 2 Appropriate Assessment (AA) Technical review., FLA FS007358 was initially submitted by NISA Ltd. (a wholly owned subsidiary of Statkraft Ireland) in March 2021 and was accepted by the Department in August 2021,

Having regard to the relevant EU and national legislation and the documents submitted by NISA Ltd, RPS have determined that further information is required to enable them to complete their Technical Review, and therefore have requested that NISA Ltd provides the following further information:

1. Survey details

In the Schedule of Works document, the applicant states that site investigation activities will be commenced and completed as soon as possible following award of a foreshore licence. Further clarity on the timings and duration of the site investigations would be helpful. For example, how long will each survey type take, and are there any seasonal considerations for different elements of the work?

The applicant should also provide the total number of survey vessels that may be operating at any one time within the application area. It is acknowledged that this may be difficult to assess with certainty at this time, therefore a 'worst-case scenario' estimate is recommended.

Response:

Subject to the award of a Foreshore licence, as well as favourable weather conditions, Statkraft propose a survey works schedule that will be phased over a total of 5 years. To minimise the risk associated with poor winter weather conditions, Statkraft would seek to carry out most of the proposed site investigation works between March and October within the five years following award of a Foreshore Licence.

Given the current Covid-19 global pandemic and the uncertainty still associated with its evolution, as well as the uncertainty associated with the timing for obtaining a Foreshore Licence, it is not possible at the time of writing to provide exact details on the proposed survey schedule. However, the intention is to begin survey activities as soon as feasible following award of the Foreshore Licence, preferably in spring of 2022 with a staged programme of investigations over the subsequent four years (2023, 2024, 2025, 2026), capitalising on suitable weather windows over the total period of five years.

This phased approach will progress the overall development towards detailed design stage. Procurement of survey contractors will be undertaken to ensure that suitable weather windows can

be utilised as soon as possible following licence award. The exact survey mobilisation dates will be known at that point in the process.

It is expected that a maximum of 2 vessels would be operating at any one time within the application area.

Typical time periods for the proposed site investigation activities are described in Table 1-1 below.

Table 1-1: Typical Time Required for Individual Site Investigation Activities

Activity	Typical Time Period Required for Activity	Total Number of SI Locations	Total Time for Site Investigations	Footprint Affected per SI	Footprint Affected per SI (km^2)	Total Footprint per SI (km^2)	Area Directly Affected as % of Total Foreshore Licence Application Area
Hydrographical and Geophysical	8-10 weeks (weather dependent)	N/A	8-10 weeks. The survey area and in particular the potential cable routes will be refined prior to undertaking the geophysical survey to minimise the time on site.	N/A	N/A	N/A	N/A
Borehole	24 - 36 hours in any one location	18	Up to 27 days in total hours for actual boreholes across all campaigns. Boreholes will be split between campaigns with a preliminary campaign typically taking up to 6 weeks and an interim campaign typically taking up to 12 weeks.	$8m^2$	0.000008	0.000144	0.000135593%
CPT	30 minutes - 3 hours in any one location	88	Maximum 11 days of actual SI time over all campaigns but is part of same campaign as Boreholes so approximately 8 weeks for a preliminary campaign and 16 weeks for an interim campaign. Some locations will be co-located with borehole locations.	$8m^2$	0.000008	0.000704	0.000662900%
Gravity Corer/Vibrocorer	45 minutes - 2 hours in any one location	70	Maximum 6 days of actual SI time but is part of same campaign as Boreholes so approximately 8 weeks for preliminary campaign and 16 weeks for the interim campaign	$1m^2$	0.000001	0.000070	0.0000659134%
Benthic Grab Sampling	Up to 3 hours in any one location	130	Maximum 16 days in actual SI hours however 3 to 4 weeks for the campaign to allow for SI Prep (drop down camera or ROV) and transit between locations. Surveys between May to September.	$1m^2$	0.000001	0.000130	0.000122410%

2. Disturbance to breeding birds at nesting sites

In the Chapter 5 Appropriate Assessment Stage 1 Screening, the applicant states in Table 5-1 *"However, tern species including the Roseate Tern are considered of low or very low sensitivity to disturbance/displacement for most human based marine activities including dredging (comparable if not louder above water noise levels than the activities proposed under this FLA) and traffic and transport (faster moving vessels than those involved in the activities under this FLA)."* Can the applicant please provide a reference or evidence for this information?

Response:

The Marine Management Organisation (MMO) published a report (MMO, 2018)[1] in March 2018 providing a high-level overview of current knowledge of potential for displacement, attraction and non-avoidance impacts associated with marine activities upon seabird species and subsequent habituation to such activities. It included a literature review of monitoring/survey information and reports available regarding disturbance to seabirds and other species that use the marine area such as seaducks.

From the range of marine activities considered in the MMO report (2018), 'Traffic and Transport' and dredging were considered as conservative comparators to the activities proposed under the application from a point of view of potential to cause disturbance to the species considered in the report provided in support of the application.

By conservative we mean that the vessels used for the site investigations will generally be moving at much slower speeds that those that formed part of the MMO report under the Traffic and Transport which included consideration of high-speed ferry routes. With regards to dredging the level of seabed disturbance from the site investigations will be at levels significantly lower than that expected in dredging with above water noise that could cause disturbance expected to be similar.

Regarding traffic and transport, the MMO report (2018) reviewed a large amount of data relating to the displacement impacts of traffic and transport activities on seabirds, and overall, there is a strong support for low displacement impacts of traffic and transport on tern. This can be seen in **Error! Reference source not found.** below.

Table 2-1: Traffic and transport displacement index - Species vs Sub-activity (MMO, 2018)

Species group	Species	Traffic and transport	
Tern	Little tern	0.73	0.80
	Sandwich tern		0.80
	Common tern		0.67
	Roseate tern		1.00
	Arctic tern		0.67

Impact level:	No data (ND)	V. low	Low	Moderate	High	V. high

[1] 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. Available online from https://www.gov.uk/government/publications/displacement-and-habituation-of-seabirds-in-response-to-marine-activities-mmo-1139

As previously stated, normal traffic and transport vessels (i.e those included in the 2018 MMO Report) will move faster than the survey vessels involved in the activities under this FLA. Therefore, the information presented above constitutes a conservative view when compared to the activities proposed under the licence application where the sensitivity to displacement is likely to be lower.

The MMO report did not have any specific information on dredging however included reference to Cook and Burton (2010)[2], which also estimate sensitivities of species to displacement by dredging which may act at different spatial and temporal scales. Namely short-term direct displacement consequences associated with avoidance of activities, and longer-term indirect displacement consequences associated with trophic changes. The estimated importance of each aspect for each Tern species considered is shown in Table 2-1, which shows the Roseate tern has a low sensitivity to direct disturbance associated with dredging activities, but a very high sensitivity to indirect impacts on their prey fish and benthic communities, such as increased sedimentation and turbidity (Cook and Burton, 2010).

Table 2-1: Species sensitivities of two components of potential displacement impacts associated with aggregate extraction activities (Cook and Burton, 2010)

Species	Sensitivity to displacement impact	
	Direct disturbance associated with dredging activities	Indirect impacts on fish and benthic communities
Little tern	Low	High
Sandwich tern	Low	Very high
Common tern	Low	High
Roseate tern	Low	Very high
Arctic tern	Low	Very high

In accordance with the sources above, it was determined in the AA Stage 1 Screening that increased activity within the Rockabill SPA (004014) area and disturbance to the SPA sediment may affect the Roseate terns' preferred prey species sandeel during the site investigations. Sandeel may burrow in disturbed waters so the access to food for chicks may be limited. This may worsen chick growing conditions. Should geotechnical or benthic survey work occur within the SPA during the breeding season (end April to August) likely significant effects on the conservation objectives of the SPA as a result of effects on prey biomass availability of the Roseate tern could not be ruled out in the absence of mitigation measures. Therefore, the site proceeded to Stage 2 Appropriate Assessment for the qualifying interest Roseate Tern.

At Stage 2 Appropriate Assessment (Natura Impact Statement), it was determined that there may be a direct effect on conservation objective 4 (Prey biomass available – no significant decline in kilogrammes available) as a result of disturbance to the seabed, which can result in burrowing of the Roseate tern's preferred prey species, sandeel, and a consequent reduction in access to prey for the Roseate tern. This may affect the ability of the Roseate tern to successfully raise their young and therefore may have an indirect effect on conservation objective number 2 (Productivity rate: fledged young per breeding pair – no significant decline in mean number).

[2] Cook, A.S.C.P. & Burton, N.H.K. 2010. A review of the potential impacts of marine aggregate extraction on seabirds. Marine Environment Protection Fund (MEPF) Project 09/P130. Available online from https://www.bto.org/sites/default/files/shared_documents/publications/research-reports/2010/rr563.pdf

As a result of this, the following mitigation measure was proposed: No geotechnical or benthic site investigation activities will be undertaken within the SPA during the nesting season. The implementation of this mitigation measure with respect to the breeding tern colonies in the Rockabill SPA will ensure that the conservation objectives of the SPA are not adversely impacted, and the integrity of the site will be maintained.

3. Underwater noise assessment

A comprehensive underwater noise assessment is required to fully assess injury and disturbance effects to marine mammals.

- The applicant makes use of functional marine mammal hearing groups as outlined in Southall *et al.* (2007). It is noted that these groupings have been revised in Southall *et al.* (2019), which updates the 2007 groupings and noise exposure criteria in light of scientific findings. The DAHG (2014) marine mammal mitigation guidelines refer to the 2007 paper and it is assumed that the applicant may therefore have relied upon these older groupings and criteria as a result. The applicant should provide a robust assessment using the best available scientific evidence, including the re-evaluated marine mammal groupings from 2019.

- It is further noted that the applicant has provided only linear (unweighted) peak sound pressure levels (SPL) and not marine mammal hearing-weighted sound exposure levels (SEL), as set out in Southall et al. (2019). The hearing-weighted function is designed to represent the bandwidth for each group within which acoustic exposures can have auditory effects. SEL is recommended for assessing the impacts of non-impulsive (continuous) noise, while a dual approach using SEL and SPL is recommended for impulsive noise (Southall et al. 2019). In Section 4.2 of the NIS document, the applicant provides injury criteria for permanent threshold shift (PTS) and temporary threshold shift (TTS) for groupings of marine mammals from Southall et al. (2007), and states that these apply to individual animals exposed to single, multiple and non-pulsed sources, however, as explained above, SPL refers only to the peak sound exposure, which is useful for impulsive sound sources, but less useful for continuous, or non-impulsive sources. SEL is a measure of total sound energy of an event or a number of events (e.g., over the course of a day) normalised to one second. This allows the total acoustic energy contained in events lasting a different amount of time to be compared on a like-for-like basis. Using SEL for continuous sounds allows exposure duration and the effect of exposure to multiple events over a 24-hour period to be taken into account. Although the DAHG (2014) guidance refers to Southall et al. (2007), it should be noted that the 2019 onset thresholds for PTS and TTS are lower than those outlined in 2007, and therefore more precautionary. The applicant should provide a robust assessment of injury and disturbance, based on a dual criteria approach, as set out in the more recent Southall et al. (2019).

- It is noted that indicative sound levels have not been provided for vibro-coring activities. The applicant states in Section 4.2 of the NIS document that CPT and vibrocoring are undertaken with mechanical devices which do not emit significant noise. While this may be true of CPT, vibrocoring is expected to emit underwater noise, likely to be low frequency. The applicant should provide indicative sound levels for vibrocoring and include this impact in the underwater noise assessment.

- The applicant has not provided an assessment of the likely zone of injury or disturbance for marine mammals for each sound source. With increasing distance from the sound source, where it is audible to the animal, the effect is expected to diminish through identifiable stages (i.e. PTS or TTS in hearing, avoidance, masking, reduced vocalisation) to a point where no significant response occurs. The applicant should, as part of the underwater noise assessment calculate estimated zones of injury for each functional hearing group, in order to conclude whether proposed mitigation measures are appropriate.

Response:

To address the comments above, a standalone Annex IV Risk Assessment has been provided as part of this response, as well as a noise propagation modelling exercise carried out for the NISA Offshore Wind Farm (OWF) site. The SW modelling location used in the OWF site is close to the NISA Cable Assessment Area (CAA), which also has similar shallower depths. For this reason, the SW location was used in the report submitted with this response to characterise the underwater noise and perceived sound levels during the proposed geophysical and geotechnical surveys on the NISA CAA.