Information to Inform the Habitats Regulations Appraisal (HRA) for the proposed St Margaret's Hope Pier Extension

Version 2

Report to St Margaret's Hope Pier Trustees

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Version	Date	Details
V1	18 March 2026	Final report issued.
V2	31 March 2026	Clarification to project description (Work No. 4 will replace a temporary wave attenuator currently in situ).

Members of:

OREF Orkney Renewable Energy Forum
Scottish Hydrogen & Fuel Cell Association
CMC Cluster Marítimo de Canarias
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Australian Ocean Energy Group
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1 INFORMATION TO INFORM HRA

1.1 INTRODUCTION

A Habitats Regulations Appraisal (HRA) has been undertaken for St Margaret's Hope Pier Trustees (SMHPT)'s proposed extension of St Margaret's Hope Pier (the 'Project') to determine whether the proposal has the potential to affect any European sites (i.e., Special Protection Areas (SPAs) or Special Areas of Conservation (SACs)) within the UK-wide network of protected sites (UK site network).

An HRA was previously undertaken and submitted to inform the marine licence application (MS-00009939) for a pier extension at St Margaret's Hope pier. The marine licence for that proposal was awarded in November 2023. This Project concerns a new proposed pier extension for St Margaret's Hope pier which is similar in many aspects to that licenced in MS-00009939. The HRA report was therefore re-submitted as part of the Screening request for this Project however, as there are some changes to the proposed design and construction methodology compared to the previous proposal, the HRA report has since been revised and updated to fully assess the effects of the current proposal (the Project), as requested by NatureScot (see Section 1.4).

1.2 REGULATORY BACKGROUND

The requirements of the Habitats Directive and the Wild Birds Directive are transposed into domestic law in Scotland by The Conservation (Natural Habitats, &c.) Regulations 1994 as amended (the 'Habitats Regulations'). These Regulations apply on land in Scotland, and in Scottish inshore waters (the area of sea adjacent to Scotland from 0 to 12 nautical miles). The UK's exit from the European Union has resulted in some changes in terminology regarding the Habitats Regulations. European sites are no longer part of the European Union's Natura 2000 network. Instead, they form a UK-wide network of protected sites. The UK site network is made up of SPAs and SACs. It is Scottish Government policy to afford the same protection to proposed SPAs (pSPA) and candidate SACs (cSAC) as fully classified sites.

1.3 OVERVIEW OF HRA PROCESS

Under the Habitats Regulations, a competent authority must consider whether a plan or project could affect a European site, firstly by considering whether it will have a Likely Significant Effect (LSE) on a European site, and if so, they must carry out an appropriate assessment. This process is known as HRA. HRA applies to any plan or project which has the potential to affect the qualifying features of a European site, even when those interests may be at some distance from that site.

A competent authority must not authorise a project unless it can be shown beyond reasonable scientific doubt – through an appropriate assessment, that the project will not adversely affect the integrity of a European site. The competent authority, in this instance Marine Directorate will decide whether an appropriate assessment is necessary and carry it out (with advice provided by NatureScot) if required. It is the applicant, in this instance SMHPT, who is usually required to provide the information to inform the appropriate assessment.

NatureScot guidance[1] sets out nine stages to HRA, these are:

- Stage 1: What is the plan or project?

[1]Available at: https://www.nature.scot/professional-advice/planning-and-development/environmental-assessment/habitats-regulations-appraisal-hra

- Stage 2: Is the plan or project directly connected with or necessary to site management for nature conservation?
- Stage 3: Is the plan or project (either alone or in combination with other projects) likely to have a significant effect on a European site?
- Stage 4: Undertake an appropriate assessment of the implications for the site in view of its conservation objectives.
- Stage 5: Can it be ascertained that the proposal will not adversely affect the integrity of the site?
- Stage 6: Are there alternative solutions?
- Stage 7: Would a priority habitat or species be affected adversely?
- Stages 8 and 9: Are there imperative reasons of overriding public interest?

This report considers stages 1 to 5. Stages 6 to 9 are only considered in exceptional circumstances where it cannot be ascertained that the plan or project will not adversely affect the integrity of a European site.

1.4 CONSULTATION RESPONSES

Consultation feedback specific to the HRA was received in response to the request for Screening. Details of each of the comments received and how these have been incorporated into the assessment to allow completion of the HRA is presented in Table 1-1.

Table 1-1 Consultation responses relevant to the HRA

Comment/Information request	Response and relevant section/document
NatureScot, Screening response, 23 June 2025	
Scapa Flow SPA The proposal is within Scapa Flow, a SPA protected for its breeding red-throated diver and non-breeding black-throated diver, eider, great northern diver, long-tailed duck, shag, Slavonian grebe and red-breasted merganser. Given the works proposed and the location within this protected area there is potential for significant effects on all features of the SPA. Impacts on SPA birds associated with the construction phase should be re-assessed, taking into account the changes to the proposed development design and methodology. An updated schedule of works for the construction phase of this proposal is also required to determine which of the SPA qualifying features are likely to be present and impacted by the work.	The qualifying features of Scapa Flow SPA have been considered in this HRA (see Section 2). The proposed schedule of works for the construction phase is provided in Section 1.5.2. This has been used to inform the determination of likely significant effects for each of the qualifying features (see Section 2.2.5).
Impacts of piling noise The construction methodology now includes sheet piling (Work no.1-3) and potentially piling work to secure the floating wave barrier (Work no.4). There is a risk that piling could cause disturbance and audial injury of SPA birds in the vicinity of the works, and this impact pathway should be considered and assessed in the HRA.	The impacts of piling noise are assessed for each of the relevant qualifying features of Scapa Flow SPA in Section 2.3.1.
Impacts of wave barrier (Work No. 4) The proposed floating wave barrier (Work no.4) is located within the SPA, so there are potentially impacts associated with disturbance and displacement of SPA birds from the development site which should be assessed.	The potential impacts of disturbance and displacement of Scapa Flow SPA qualifying features arising due to the construction of the floating wave barrier are assessed in Section 2.3.1.

Comment/Information request	Response and relevant section/document
Habitat loss Updated information should be provided on the area of the SPA habitat lost to development, and its significance in the context of the conservation objectives of the SPA.	The impacts of any permanent loss of SPA habitat on Scapa Flow SPA qualifying features that could arise as a result of the development are considered in Section 2.2.5.
Vessel activity Any updates to the vessel routes and the number of vessel movements required for the construction phase should be included in the updated assessment to determine impacts associated with disturbance and displacement both within the vicinity of the development and elsewhere in Scapa Flow. The timings and frequency of vessel routes are also required to determine which species may be impacted. Any changes in operational activities, including details on new vessel movements, numbers and sizes predicted, should also be included.	The updated project description includes full details of the vessel routes, numbers and timings of vessel movements required during the construction phase (see Section 1.5.2). The potential impacts of disturbance and displacement of Scapa Flow SPA qualifying features arising due to vessel activities during construction activities are assessed in Section 2.3.2. Potential disturbance and displacement of SPA birds associated with any proposed changes to operational activities, including vessel movements are considered in Section 2.2.5.
The key impact pathways, and associated conservation objectives (CO), which should be assessed in an updated HRA should include: Construction Phase • Disturbance (visual and audial) associated with the proposed construction work on SPA birds (CO 2b) • Displacement of SPA birds from the development area (CO 2b) Operation Phase • Disturbance and displacement of SPA birds associated with any proposed changes to operational activities, including vessel movements (CO 2b) • Any permanent loss of SPA habitat which will arise as a result of the development (CO 2c)	All of these impacts have been considered in the assessment (see Section 2.2.5). For those qualifying features where LSE has been concluded, an appropriate assessment has been undertaken considering the potential impacts and the relevant conservation objectives (see Section 2.3).
Baseline data The previous application and associated HRA conducted a desk-based assessment based on the Scapa Flow Site Selection document and survey results from Jackson (2018). This survey data is now outwith our recommended 5-year period for survey data, and we advise that up-to-date data is required to inform the assessment. The applicant will therefore need to collate or collect more recent data, through existing datasets (e.g. WeBs data, HiDEF Inshore wintering waterfowl surveys 2021/22 and 2022/2023), and if required they may need to carry out their own surveys of the area. NatureScot is able to advise further on available datasets, and suitable methodologies if it is deemed that survey work is required. We advise that data should cover an entire year since there are breeding and non-breeding qualifying features.	A desk-based assessment has been undertaken using available up-to-date data including the sources identified by NatureScot (see Section 2.2.2). The available data is considered sufficient to inform the assessment.

Comment/Information request	Response and relevant section/document
Sanday SAC There is connectivity to the harbour seal of Sanday SAC. In our view, due to the nature of the development and updated construction methodology, there is the potential for significant effects on this qualifying feature. We advise the HRA is updated taking into account the changes in construction methodology and proposal design. The potential impacts on the harbour seal of Sanday SAC should be fully assessed for this project alone or in-combination with other plans or projects. The potential impact pathways which should be assessed in an updated HRA should include: • Disturbance from increased vessel noise (all phases) • Increased risk of collision with vessels (all phases) • Potential for auditory injury and disturbance from an increase in underwater noise (construction/decommissioning) • Indirect impacts via prey species (construction) • Increased suspended sediment (construction)	The potential impacts of the Project, as listed by NatureScot, have been considered in the HRA in relation to harbour seals from Sanday SAC (see Sections 3.2.4 and 3.3).
Loch of Stenness SAC The Loch of Stenness SAC is designated for its coastal lagoon feature. There is connectivity between the proposal and the SAC, due to the potential that invasive non-native species could be introduced during construction or operation. Therefore, in our view, there is the potential for significant effects on this protected area.	The impact of invasive non-native species on Loch of Stenness SAC is considered in Section 3.2.4
No dredging work has been proposed. We advise if this is to form part of the proposed works, this should also be included and assessed.	No dredging work is proposed.
HRA The HRA submitted as part of this screening request is based on a previous proposal. We acknowledge that some of this information associated with the proposal design and construction methods remains unchanged, however we advise that the HRA should be updated which assesses all impacts associated with the current proposal on the European sites listed above.	The HRA report has been revised and updated to assess all impacts relevant to the current proposal.
Cumulative and in-combination assessment An updated in-combination assessment is also required as part of the HRA for this proposal. The in-combination assessment should take into account any new plans or projects which could cumulatively impact the same qualifying features of the above European sites. The list of projects scoped in for assessment was compiled in June 2022 as part of the applicant's previous application, so we advise that this list is revised and an assessment carried out as part of the HRA. As a minimum, we advise that the assessment should include the proposed Orkney Harbour developments, any marine cable proposals and any new aquaculture proposals, including site expansions and relocations.	Cumulative and in-combination effects have been considered for relevant SPAs and SACs (see Section 2.2.6 and 3.2.1).

1.5 STAGE 1: WHAT IS THE PROJECT?

1.5.1 Project location

The HRA was undertaken for the Project using the boundary shown in Figure 1.1.

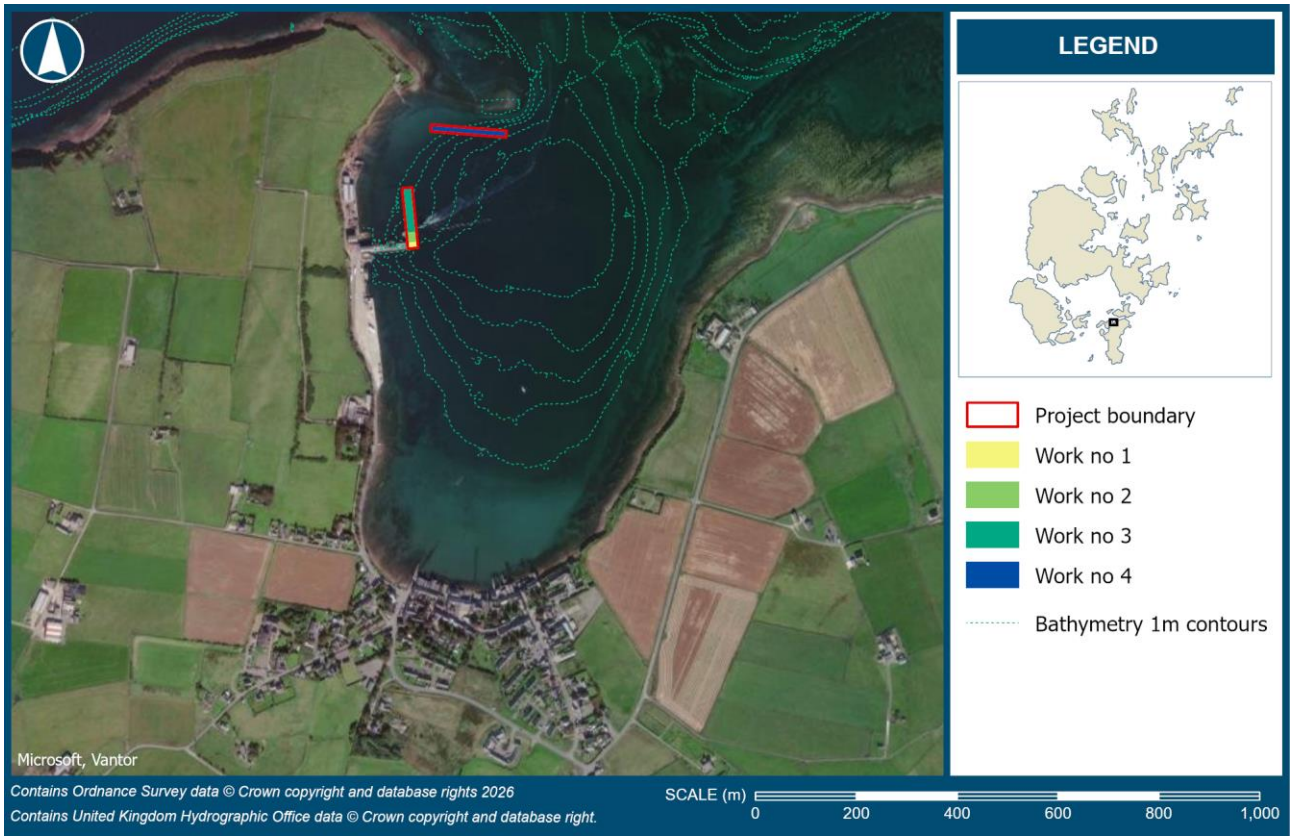

Figure 1.1 Location of the Project

1.5.2 Project description

There are four key components to the proposed development which are described below.

Work No. 1 – A solid pier faced with sheet piling attached to the existing pier and extending 20 metres in length and 12 metres in width following the same berthing line as the existing pier. The Work will have a surface area of 240 square metres and will be capped with a solid concrete surface. On the seaward facing sides the surface will contain ducting to provide necessary utilities and lighting for port operations. This Work will form a pier extension to the existing Ro-Ro berth to enable larger capacity ferries to berth on the south side of the pier and provide additional berths for workboats on the north side of the pier.

Work No. 2 - A solid pier faced with sheet piling attached to Work No. 1 and extending 20 metres in length and 20 metres in width following the line of the end of Work No. 1. The Work will have a surface area of 400 square metres and will be capped with a solid concrete surface. On the seaward facing sides the surface will contain ducting to provide necessary utilities and lighting for port operations. This Work will form an extension running at right angles to the line of the existing pier and provide additional berthing space and lay down area for workboats and fishing boats.

Work No. 3 - A solid pier faced with sheet piling attached to Work No. 2 and extending 88 metres in length and 20 metres in width following the berthing line formed by the east end of Work No. 1 and Work No. 2. The Work will have a surface area of 1,760 square metres and will be capped with a solid concrete surface. On the seaward facing sides the surface will contain ducting to provide necessary utilities and lighting for port operations. This Work will form a further extension running at right angles to the line of the existing pier and provide additional berthing space for large vessels, workboats, and fishing boats and lay down area for equipment and cargo.

Work No. 4 - The construction of a floating barrier for the purpose of providing protection from waves impacting on the berth face on the north side of the existing pier. The barrier will consist of floating pontoons or a similar structure, fixed in position by driven steel tubular piles or moorings and anchors. The Work will be approximately up to 153 metres in length with a width of approximately 13 metres. The Work will have a surface area of approximately 1,989 square metres square metres and will contain solar, or wave induced power systems for the provision of navigation lighting and operation of the barriers functions.

The proposed Work No. 4 will replace a temporary wave attenuator that is currently in situ adjacent to the existing pier. The temporary wave attenuator comprises 3 x 10.75 m and 2 x 10.69 m lengths of redundant and cleaned oil cargo transfer hoses (diameter approximately 0.6 m) bolted together at the flanges and secured on temporary moorings. The co-ordinates of the pipe ends are:

A - 502307E, 6521414N
B- 502229E, 6521466N

Proposed schedule of works

The proposed schedule of works is shown in Table 1-2.

Table 1-2 Proposed schedule of works

Phase of work	Timing of works	Anticipated duration
Work No. 4 Option 1- Chains and anchors	Q4 2026	4 days
Work No. 4 Option 2 – Tubular piles	Q4 2026	3 days
Work No.1 and barge removal	Q2-Q3 2027	4 - 8 weeks (mobilisation to demobilisation), piling over 2 weeks
Work No. 2	Q2-Q3 2028	4 - 8 weeks (mobilisation to demobilisation), piling over 3 weeks
Work No. 3	Q2-Q3 2029	12 - 16 weeks (mobilisation to demobilisation), piling over 6 weeks

Vessel routes for construction works

Vessels will travel to the site using one of two routes: vessels from Stromness will take a route through Scapa Flow and vessels from elsewhere in Orkney or from ports outwith Orkney will travel to the Project site from a southerly approach via the Pentland Firth pilotage station at the southern entrance to Scapa Flow (Figure 1.2).

The piling pontoon (Works 1- 4) and the concrete pontoons (Work No 4) will be towed to the Project site from ports outwith Orkney. All other vessels will be locally based.

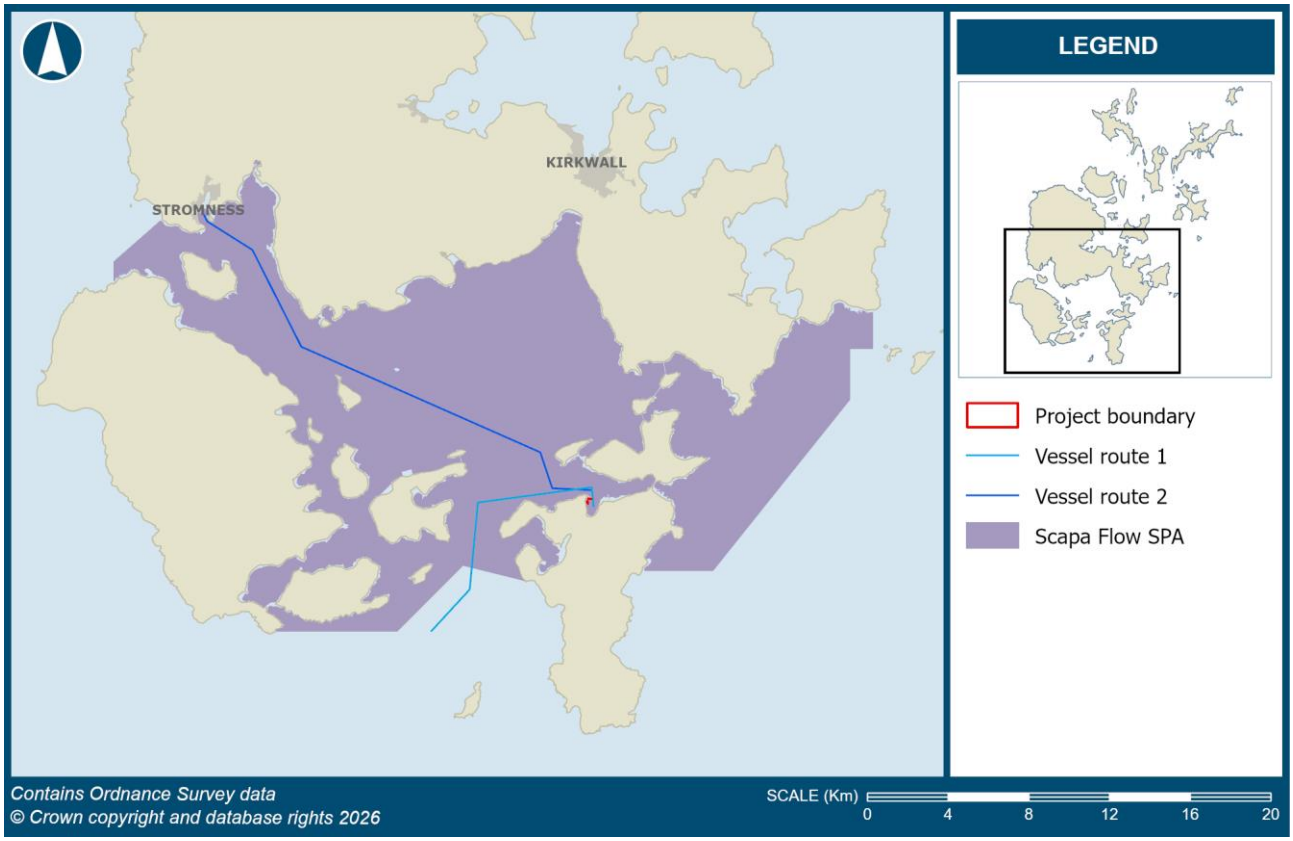

Figure 1.2 Project location and installation vessel routes in relation to Scapa Flow SPA

The anticipated vessel movements for construction works are shown in Table 1-3.

Table 1-3 Anticipated vessel movements for construction works

Phase of work	Timing of vessel movements	Sub-task	Vessel type	No. of vessel movements in/out of St Margaret's Hope	Total No. of vessel movements in/out of St Margaret's Hope
Work No. 4	Q4 2026 (3-4 days mobilisation to demobilisation)	Wave barrier – transportation of concrete pontoons	Small tug or workboat/multi-cat	8 (4 round trips from a port outside of Orkney)	10
		Wave barrier Option 1- Installation of mooring chains and anchors	1 x multi-cat	2 (one trip in and out)	
		Wave barrier Option 2 - Installation of tubular piles	1 multi-cat + Pontoon fitted with pile driver (towed)	2 (one trip in and out)	

Phase of work	Timing of vessel movements	Sub-task	Vessel type	No. of vessel movements in/out of St Margaret's Hope	Total No. of vessel movements in/out of St Margaret's Hope
		Option 1 – Installation of moorings and attachment of concrete pontoons	1 x multi-cat	4 days in the port installing	N/A. Local movements only between the SMH pier and the wave barrier area.
		Wave barrier Option 2 - Installation of tubular piles and attachment of concrete pontoons	1 multi-cat + Pontoon fitted with pile driver (towed)	3 days in the port installing	N/A. Local movements only between the SMH pier and the wave barrier area.
Work No. 1	Q2-Q3 2027 (4-8 weeks mobilisation to demobilisation)	Installation of pier extension (20m x 12m)	1 multi-cat + Pontoon fitted with pile driver (towed)	2 (one trip in and out)	11
			1 x multi-cat	4 (2 trips in and out)	
			1 x small workboat/safety boat	2 (one trip in and out)	
		Removal of existing barge	1 x tug or multi-cat	1 trip out to remove barge	
		Recovery of moorings of existing barge	1 x multi-cat	2 (1 trip in and out) for recovery of moorings	
Work No. 2	Q2-Q3 2028 (4-8 weeks mobilisation to demobilisation)	Installation of pier extension (20m x 20m)	1 multi-cat + Pontoon fitted with pile driver (towed)	2 (one trip in and out)	8
			1 x multi-cat	4 (2 trips in and out)	
			1 x small workboat/safety boat	2 (one trip in and out)	
Work No. 3	Q2-Q3 2029 (12-16 weeks mobilisation to demobilisation)	Installation of pier extension (88m x 20m)	1 multi-cat + Pontoon fitted with pile driver (towed)	2 (one trip in and out)	10
			1 x multi-cat	6 (3 trips in and out)	
			1 x small workboat/safety boat	2 (one trip in and out)	

2 SPAS

2.1 STAGE 2: IS THE PROJECT DIRECTLY CONNECTED WITH OR NECESSARY TO SITE MANAGEMENT FOR NATURE CONSERVATION?

No, the proposal is not directly connected with or necessary to site management for the conservation of any SPAs, and therefore, consideration of Stage 3 is required.

2.2 STAGE 3: IS THE PROJECT (EITHER ALONE OR IN COMBINATION WITH OTHER PROJECTS) LIKELY TO HAVE A SIGNIFICANT EFFECT ON THE SITE?

2.2.1 Identification of relevant European sites

Scapa Flow SPA

The Project is located within the boundary of Scapa Flow SPA (see Figure 1.2). There is the potential for likely significant effects on all features of the SPA, as advised by NatureScot in their screening response (see Table 1-1). Scapa Flow SPA is an extensive site comprising an area of 318.2 km^2, designated to provide protection for seven species of wintering marine birds; breeding red-throated diver *Gavia stellata*; and their supporting habitats. The qualifying features of Scapa Flow SPA are listed in Table 2-1.

Table 2-1 Scapa Flow qualifying features

Qualifying feature	Breeding / non-breeding season interest	Population size in Scapa Flow (NatureScot, 2022) (individuals)
Red-throated diver *Gavia stellata*	Breeding	76 (pairs)
Black-throated diver *Gavia arctica*	Non-breeding	57
Great northern diver *Gavia immer*	Non-breeding	510
European shag *Phalacrocorax aristotelis*	Non-breeding	3,000
Common eider *Somateria mollissima*	Non-breeding	2,000
Long-tailed duck *Clangula hyemalis*	Non-breeding	1,400
Red-breasted merganser *Mergus serrator*	Non-breeding	540
Slavonian grebe *Podiceps auritus*	Non-breeding	140

Other SPAs

No other SPAs were identified by NatureScot in their screening response as requiring consideration in an updated HRA. The Project area is within foraging range of several species of birds that are qualifying features of SPAs designated to protect breeding seabird populations in the wider area. During the breeding season, many seabird species regularly fly considerable distances on foraging trips from nest sites; therefore, SPAs at considerable distances from the Project could have potential connectivity for particular qualifying features. However, given the Project is to remove and replace an existing temporary pier structure and install a floating wave barrier within a busy working pier area, in a wider industrial harbour, the Project will not affect any seabird foraging areas and it is not anticipated to result in any likely significant effects to foraging seabirds therefore all other SPAs have been scoped out of the assessment.

2.2.2 Scapa Flow SPA baseline characterisation

A desk-based assessment was undertaken to inform the baseline characterisation for each of the qualifying features of Scapa Flow SPA. The following information sources have been used to inform the assessment:

- Wetland Bird Survey (WeBS) data[2];
- HiDEF Scapa Flow SPA inshore wintering waterfowl surveys 2021/22 and 2022/23 (Peters-Grundy et al, 2026); and,
- Scapa Flow proposed SPA inshore wintering waterfowl survey 2017/18 (Jackson, 2018).

An overview of each of the datasets is provided below and the data used to compile individual summaries of the distribution and abundance for each of the Scapa Flow SPA qualifying features in relation to the Project site and wider Scapa Flow area.

Wetland Bird Survey (WeBS) data

A search was made for available Wetland Bird Survey (WeBS) data for the Project site and surrounding area. Data for each of the Scapa Flow SPA qualifying features was obtained from the WeBS Report Online[3]. WeBS data was obtained for the WeBS survey site to the east of the Project (Scapa Flow Water Sound (Inner)) (see Figure 2.1), with the most recent data covering the five-year period from season 2012/20 to 2023/24 (Table 2-2). It should be noted that the WeBS count area for Water Sound (Inner) includes an area to the east of Churchill Barrier No. 4 which is unlikely to be affected by the Project. No up-to-date WeBS data was available for any other WeBS survey site within the wider Scapa Flow area.

[2] Available [online] at: https://app.bto.org/webs-reporting/numbers.jsp

[3] Available [online] at: https://app.bto.org/webs-reporting/numbers.jsp

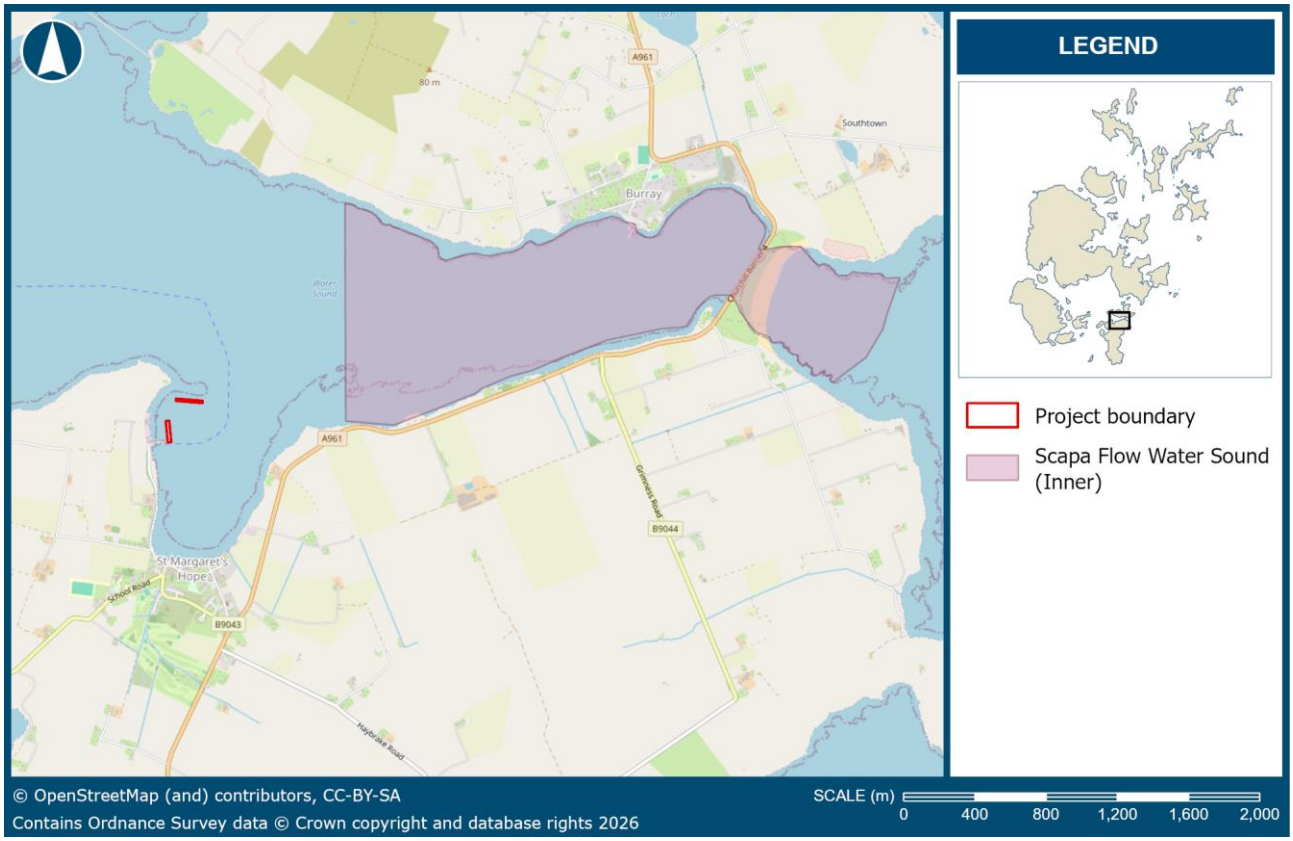

Figure 2.1 Project location in relation to WeBS Scapa Flow Water Sound (Inner)count area

Table 2-2 WeBS data for Scapa Flow Water Sound (Inner) (Calbrade et al., 2025[4])[5]

SPA qualifying feature	Annual peak counts					5-year average
	19/20	20/21	21/22	22/23	23/24	
Red-throated diver	8	3	8	5	**9**	7
Great northern diver	**5**	4	3	4	2	4
Black-throated diver	0	**1**	0	0	0	0
Slavonian grebe	2	3	0	0	**6**	2
European shag	**34**	5	15	27	5	17

[4] Contains Wetland Bird Survey (WeBS) data and Goose & Swan Monitoring Programme (GSMP) data from Waterbirds in the UK 2023/24 © copyright and database right 2025. WeBS is a partnership jointly funded by the BTO, RSPB and JNCC, with fieldwork conducted by volunteers. GSMP is a partnership jointly funded by the BTO, JNCC and NatureScot with fieldwork conducted by both volunteers and professional surveyors.

[5] Peak values are shown in bold.

SPA qualifying feature	Annual peak counts					5-year average
	19/20	20/21	21/22	22/23	23/24	
Common eider	34	31	**62**	27	61	43
Long-tailed duck	**56**	32	36	27	28	36
Red-breasted merganser	48	**58**	51	46	39	48

Digital aerial surveys (DAS) inshore wintering waterfowl surveys 2021/22 and 2022/23

Digital aerial surveys of Scapa Flow SPA were conducted in the 2021/22 and 2022/23 winter seasons (Peters-Grundy et al, 2026). A single survey was completed during each winter season, one in February 2022 and one in January 2023[6].

Population estimates for six of the SPA qualifying features were derived from the DAS however there was insufficient records to derive a population estimate for black-throated diver. A comparison of the DAS population estimates with those from the previous survey of the Scapa Flow proposed SPA in 2017/18 is presented in Appendix table A-1.

The predicted mean densities of each of the seven non-breeding season interests of Scapa Flow SPA for the Project site and surrounding area in Water Sound are shown in Table 2-3.

Table 2-3 Predicted mean densities of non-breeding season SPA qualifying features for Project site and wider Water Sound area (Peters-Grundy et al, 2026)

Scapa Flow SPA qualifying feature	Predicted mean density (birds/km²)[7]	
	DAS February 2022	DAS January 2023
Great northern diver	Project site (and wider Water Sound area) - 0.5 - 0.99 birds/km²	Project site (and inner Water Sound area) – **1 - 1.99 birds/km²** Outer Water Sound area - 2 – 4.99 birds/km²
Black-throated diver	0	0
Slavonian grebe	Project site (and outer Water Sound area) - 0.1 - 0.19 birds/km² Inner Water Sound area – 0.2 – 0.49 birds/km²	Project site (and outer Water Sound area) - **0.2 - 0.49 birds/km²** Inner Water Sound area – 0.5 – 0.99 birds/km²
European shag	Project site (and wider Water Sound area) - 0.5 - 0.99 birds/km²	Project site (and wider Water Sound area) - **1 - 4.99 birds/km²**

[6] Shore-based surveys were also carried out in both winter seasons however the area surveyed is in the northeast of Scapa Flow (off the coast of East Mainland), so is not of direct relevance to the Project.

[7] The highest of the two values for the Project site is presented in bold.

Scapa Flow SPA qualifying feature	Predicted mean density (birds/km²)[7]	
	DAS February 2022	DAS January 2023
Common eider	Project site (and wider Water Sound area - **20 - 49.9 birds/km²**	Project site (and wider Water Sound area - **20 - 49.9 birds/km²**
Long-tailed duck	Project site (and wider Water Sound area) - **10 - 19.9 birds/km²**	Project site (and wider Water Sound area) - **10 - 19.9 birds/km²**
Red-breasted merganser	Project site (and wider Water Sound area) - 2 - 4.99 birds/km²	Project site (and wider Water Sound area) - **10 - 19.99 birds/km²**

Scapa Flow proposed SPA inshore wintering waterfowl survey 2017/18

A survey of the abundance and distribution of the seven wintering Scapa Flow SPA qualifying features within the larger Scapa Flow proposed SPA was undertaken in the winter of 2017/18 (Jackson, 2018). This data provides population estimates for each of the wintering species within the pSPA area as a whole and peak counts within individual count sectors. The Project location is within count sector 17 (see Figure 2.2). An overview of the survey findings for Sector 17, the area within which the Project site is located, is shown in Table 2-4.

Table 2-4 Sector 17 count totals and peak and mean percentages for wintering SPA qualifying features (Jackson, 2018)

Scapa Flow SPA qualifying feature	Sector 17 count totals				Peak %	Mean %
	Nov	Jan	Feb	Mar		
Great northern diver	3	8	2	2	0.79%	0.44%
Black-throated diver	0	0	0	0	0%	0%
Slavonian grebe	1	2	0	7	10.4%	4.3%
European shag	13	10	6	9	1.55%	0.8%
Common eider	32	71	43	31	4.1%	2.34%
Long-tailed duck	19	17	36	63	2.6%	1.83%
Red-breasted merganser	33	48	23	22	18.0%	12.0%

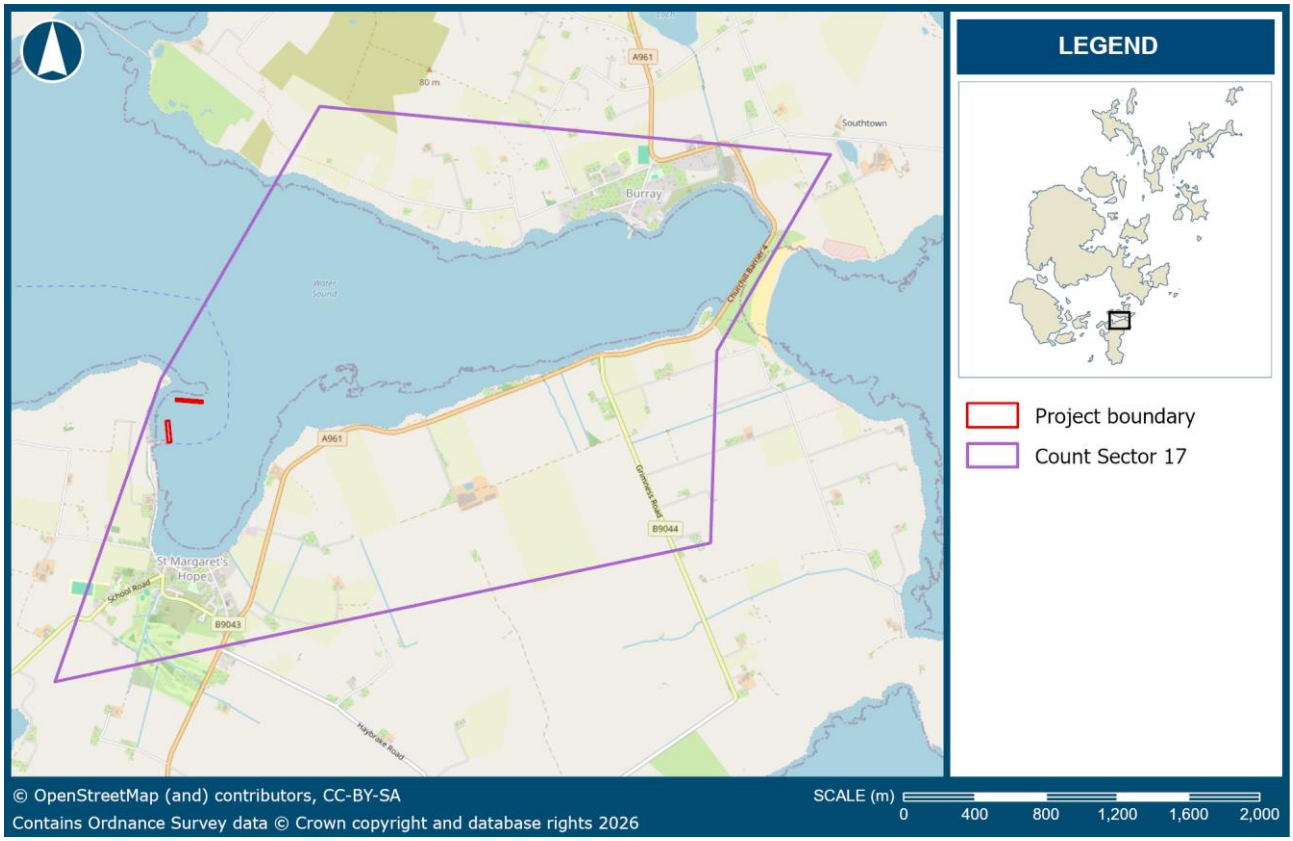

Figure 2.2 Project location in relation to shore count sector 17 used in the Scapa Flow pSPA inshore wintering waterfowl survey 2017/18

Species summaries

Great northern diver (non-breeding)

Great northern divers migrate from their northern breeding grounds and are present in Scapa Flow SPA during the non-breeding season between October and mid-May. This species is widely distributed throughout the SPA. Great northern divers undergo a pre-breeding flightless moult period sometime between February and mid-April, during which time they may be particularly sensitive to disturbance (NatureScot, 2022).

The population estimate[8] of great northern divers within Scapa Flow SPA was 262 birds in February 2022 and 1,072 birds in January 2023 (Peters-Grundy et al, 2026). This upper estimate is similar to the upper count from the 2017/18 surveys, that recorded a peak count of 1,016 individuals within the survey area during the January count (Appendix table A-1). The highest densities were found in the west of the SPA (between the islands of Cava and Fara) in February 2022 and in the central Scapa Flow area in January 2023. In 2017/18, the central 'offshore' sub-area in Scapa Flow held a mean of 55% of all great northern divers recorded during the surveys.

Great northern divers were recorded within the Water Sound area in both DAS with a predicted mean density of 0.5 - 0.99 birds/km^2 in February 2022. In January 2023, there was a predicted mean density of 1- 1.99 birds/km^2 at the Project site and inner Water Sound area, with a higher predicted mean density of 2 – 4.99 birds/km^2 in the outer Water Sound area (Table 2-3).

[8] Derived using Bayesian point processing.

In 2017/18, sector 17 (within which the Project is located) held a mean of 0.4% of the count total with a peak count of eight birds in the January count which represents 0.8% of the count total (see Table 2-4). The number of birds predicted to occur within Sector 17 (with an area of 3.4 km^2) based on the predicted mean density from the January 2023 DAS (1- 1.99 birds/km^2) is 3.4 to 6.76 birds, therefore rounded up to seven birds, at the higher end of the scale. This suggests that the findings of the recent DAS are consistent with those of Jackson 2018 for the Project site and wider Water Sound area.

In the wider Water Sound area in 2017/18, the inshore E2[9] sub-area held a peak of 21 birds in the January count (mean value 15 birds) and a mean of 1.8% of the total count. The number recorded during the first count in November/early December was substantially lower than recorded later in the season which suggests that birds were continuing to arrive through November and into December (Jackson, 2018).

The WeBS data for the inner Water Sound area shows that great northern divers have been consistently recorded every season over the 2019/20 to 2023/24 period, with an annual peak count (five-year average) of four birds present.

All of the available data indicates that great northern divers are found in the Water Sound area during the non-breeding season, at a relatively low density. The peak of eight birds recorded in the area in 2017/18 surveys represents 3% of the SPA citation population however the findings of subsequent surveys indicate that the population has thought to have increased (peak 1,016 birds, mean 826 (Jackson, 2018) so the peak of eight birds represents 0.96% of the mean estimate of the current population.

Black-throated diver (non-breeding)

Black-throated divers wintering in Scapa Flow are present from early August until late April and birds undergo a pre-breeding flightless moult between February and mid-April. This species is widely distributed in the nearshore waters around Scapa Flow however the available data indicates that this species is rarely recorded within the Water Sound area.

Few black-throated divers were recorded during the DAS, with a SPA population estimate of 13 birds in February 2022 and 30 birds in February 2023 (Peters-Grundy et al, 2026). The 2017/18 surveys recorded a peak count of 39 birds within the survey area during the February count (Jackson, 2018) so the population estimates of the DAS are broadly consistent with the findings of Jackson (2018). No black-throated divers were recorded in the Water Sound area during either of the DAS in 2022 or 2023 nor in any of the 'inshore E2[9]' sub-area counts in 2017/18. The available WeBS data for the inner Water Sound area shows that black-throated diver was recorded only once in the 2019/20 to 2023/24 period (see Table 2-2), with an annual peak count of one bird in 2020/21 (five-year average of zero birds present).

Overall, the available data indicates that no black-throated divers have been recorded within the Project area and that the Project area and wider Water Sound area is not an area of importance for black-throated divers within the Scapa Flow SPA.

Slavonian grebe (non-breeding)

Slavonian grebes migrate from their breeding grounds and are present in Scapa Flow from mid-September until late April. This species is widely distributed in the nearshore waters around Scapa Flow, occurring in sheltered inshore areas with sandy substrates (NatureScot, 2022).

[9] The inshore E2 sub-area includes sectors 16, 17 and 18 which together fully cover the Water Sound area from Churchill Barrier 4 to Hunda (east).

The SPA population was estimated[8] at 73 birds in February 2022 and 100 birds January 2023 (Peters-Grundy et al, 2026) however the population estimate was higher in the 2017/18 surveys, with a peak count of 161 birds recorded during the February count (Jackson, 2018) (Appendix table A-1). It is possible that the DAS method may not fully capture Slavonian grebes due to their small size and preference for nearshore areas therefore the shore-based method may provide more reliable counts for this species.

The predicted mean density of Slavonian grebes within the Project site and outer Water Sound area, based on the February 2022 data, is 0.1 - 0.19 birds/km^2 with a slightly higher predicted mean density of 0.2 – 0.49 birds/km^2 in the inner Water Sound area. In 2023, the predicted mean densities were higher in both areas than in 2022, with the Project site and outer Water Sound area holding 0.2 - 0.49 birds/km^2 and the inner Water Sound area holding 0.5 – 0.99 birds/km^2. In 2017/18, sector 17 (within which the Project is located) held a mean of 4.3% of the count total with a peak count of seven birds in the March count which represents 10.4% of the count total (see Table 2-4). The proportion of the count total present within the Water Sound area during the March count is relatively high however the total count of Slavonian grebes within Scapa Flow in March was the lowest out of all of the counts with 65 birds present as most of the birds had already departed to breeding areas by this time.

The number of birds predicted to occur within Sector 17 (with an area of 3.4 km^2) based on the predicted mean density from the January 2023 DAS (0.2- 0.49 birds/km^2) is 0.68 to 1.66 birds, therefore rounded up to two birds, at the higher end of the scale. This is consistent with the findings of Jackson (2018) for the January count which also recorded two birds in Sector 17 in the January count in the 2017/18 survey (see Table 2-4).

In the wider Water Sound area in 2017/18, the 'inshore E2[9]' sub-area held a peak count of 14 birds during the February count and a mean of 8.7% of the total count.

The WeBS data for the inner Water Sound area recorded Slavonian grebes in three out of five seasons within the 2019/20 to 2023/24 period, with an annual peak count (five-year average) of two birds present (see Table 2-2).

Overall, the available data indicates that Slavonian grebes are likely to be present in the Project area and wider Water Sound area with a peak of seven birds present. This represents 5% of the SPA citation population. The findings of subsequent surveys indicate the population has remained stable at the site (Jackson, 2018).

Common eider (non-breeding)

Common eiders are resident in Scapa Flow and can be found year-round. The non-breeding season period for eiders is from September to mid-April. During this time, they are found widely distributed in the nearshore waters around Scapa Flow. They undergo a flightless moult period between July and mid-September (NatureScot, 2022).

The DAS population estimates[8] for common eider differed greatly between surveys, with an estimate of 676 birds in February 2022 and a much higher estimate of 1,504 birds in January 2023 (Peters-Grundy et al, 2026) (Appendix table A-1). The 2017/18 surveys recorded a considerably higher count of common eiders with a peak of 2,324 birds within the survey area during the November count with numbers remaining relatively consistent throughout the winter months (Jackson, 2018).

The predicted mean density of common eiders at the Project site and wider Water Sound area was 2 – 49.9 birds/km^2 in both DAS (Table 2-4). In 2017/18, sector 17 (within which the Project is located) held a mean of 2.34% of the count total with a peak count of 71 birds in the January count which represents 4.1% of the count total (see Table 2-4).

The number of birds predicted to occur within Sector 17 (with an area of 3.4 km^2) based on the predicted mean density from the January 2023 DAS (2 – 49.9 birds/km^2) is 68 to 170 birds. The lower of these estimates is consistent with the findings of Jackson (2018), that recorded 71 birds present in Sector 17 in the January count (Table 2-4).

In the wider Water Sound area in 2017/18, the 'inshore E2[9]' sub-area held a peak count of 190 birds during the February count with a mean percentage of 7% of the count. In comparison, the 'inshore west' sub-area along the east coast of Hoy that held a mean of 57% of the total count.

The WeBS data for the inner Water Sound area shows that common eiders have been consistently recorded every season over the 2019/20 to 2023/24 period, with an annual peak count (five-year average) of 43 birds present.

Overall, the available data indicates that common eiders are likely to be present in the Project area and wider Water Sound area with a peak of 71 birds recorded in the 2017/18 surveys. This represents 3.5% of the SPA citation population. The findings of subsequent surveys indicate the population has remained stable at the site (Jackson, 2018).

Long-tailed duck (non-breeding)

Long-tailed ducks migrate to Scapa Flow SPA from their northern breeding grounds and are present during the non-breeding season from mid-September until late April. This species is widely distributed across the SPA with highest concentrations recorded in the sheltered inshore waters north-west of Hoy and the waters around Burray within which the Project is located (NatureScot, 2022).

Long-tailed duck was the most abundant of the SPA qualifying features recorded during both DAS in Scapa Flow. The population estimate[8] of long-tailed ducks within Scapa Flow SPA was 1,502 birds in February 2022 and 3,678 birds in January 2023 (Peters-Grundy et al, 2026) (Appendix table A-1). The predicted mean density of long-tailed ducks at the Project site and wider Water Sound area was 10 - 19.9 birds/km^{2}in both digital aerial surveys (Table 2-3).

In the 2017/18 surveys, a peak count of 1,996 birds was recorded during the March count (Jackson, 2018). In 2017/18, sector 17 (within which the Project is located) held a mean of 1.83% of the count total with a peak count of 63 birds in the March count which represents 2.6% of the count total (see Table 2-4). The highest count in March, late in the winter season, may indicate an influx of birds from more southerly wintering sites as birds start to head back north to their Arctic breeding grounds (Jackson, 2018).

The number of birds predicted to occur within Sector 17 (with an area of 3.4 km^2) based on the predicted mean density from the January and February DAS (10 – 19.9 birds/km^2) is 34 to 67.6 birds. These estimates for the Project site and wider Water sound area are consistent with the findings of Jackson (2018) where 36 birds were recorded in the February count and 63 birds in the March count (Table 2-4).

In the wider Water Sound area in 2017/18, the 'inshore E2[9]' sub-area held a maximum count of 119 birds and a mean percentage of 6.6% of the count. This species was widely distributed within the wider Water Sound area during all counts (Jackson, 2018). The highest density of long-tailed ducks was recorded in the 'inshore west' sub-area along the east coast of Hoy that held a mean of 39.5% of the count.

The WeBS data for the inner Water Sound area shows that long-tailed ducks have been consistently recorded every season over the 2019/20 to 2023/24 period, with an annual peak count (five-year average) of 36 birds present.

Overall, the available data indicates that long-tailed ducks are likely to be present in the Project area and wider Water Sound area with a peak count of 63 birds recorded in the area in the 2017/18 surveys. This represents 4.5% of the SPA

citation population. The findings of subsequent surveys indicate the population has remained stable at the site (Jackson, 2018).

Red-breasted merganser (non-breeding)

Red-breasted mergansers are present year-round in Scapa Flow. The non-breeding season is mid-August to late March. This species is widely distributed in the sheltered nearshore waters around Scapa Flow including in the waters around Burray in which the Project is located (NatureScot, 2022). This species undergoes a post-breeding flightless moult period in August to September (NatureScot, 2022).

The population estimate[8] of red-breasted mergansers differed considerably between the two DAS, with an estimate of 102 birds in February 2022 and a considerably higher estimate of 338 birds in January 2023 (Peters-Grundy et al, 2026) (Appendix table A-1). The higher DAS count was similar to the peak count of 370 birds recorded in the 2017/18 winter surveys when the peak count was in November with numbers decreasing steadily throughout the winter months (Jackson, 2018). The predicted mean density of red-breasted mergansers at the Project site and wider Water Sound area was 2 - 4.99 birds/km^2 in February 2022 and 10 - 19.9 birds/km^2 in January 2023 (Table 2-3).

In 2017/18, sector 17 (within which the Project is located) held a mean of 12% of the count total with a peak count of 48 birds in the January count which represents 18% of the count total (see Table 2-4). The number of birds predicted to occur within Sector 17 (with an area of 3.4 km^2) based on the predicted mean density from the January 2023 DAS (10 – 19.9 birds/km^2) is 34 to 67.6 birds. These estimates are therefore consistent with the findings of Jackson (2018) where 48 birds were recorded in the January count (Table 2-4).

In the wider Water Sound area in 2017/18, the 'inshore E2[9]' sub-area held a maximum count of 55 birds and a mean percentage of 15.4% of the count.

The WeBS data for the inner Water Sound area shows that red-breasted mergansers have been consistently recorded every season over the 2019/20 to 2023/24 period, with an annual peak count (five-year average) of 48 birds present.

Overall, the available data indicates that red-breasted mergansers are likely to be present in the Project and wider Water Sound area. A peak count of 48 birds was recorded in the area in the 2017/18 surveys. This represents 8.9% of the SPA citation population however the findings of subsequent surveys indicate that numbers have potentially decreased at the site (Jackson, 2018).

European shag (non-breeding)

European shags are present year-round in Scapa Flow. Their non-breeding period is from late September to early February, and their main breeding period is from March to September (NatureScot, 2022). During the non-breeding season, they are distributed widely around the coastlines of Scapa Flow.

The population estimate[8] of European shag was 134 birds in February 2022 with a much higher estimate of 872 birds in January 2023 (Peters-Grundy et al, 2026) (Appendix table A-1). Despite the higher value in January 2023, this was still considerably lower than the peak count recorded in the 2017/18 surveys where a peak of 3,726 birds was recorded in the November count (Jackson, 2018). The count total for the November survey in 2017 was nearly three times higher than those for the December/January and January/February counts highlighting the importance of Scapa Flow for this species in the early part of the winter season. The counts totals in mid-winter were relatively constant however the number recorded in the March count was down by approximately half which is likely to reflect birds departing from Scapa Flow to return to their breeding colonies.

The predicted mean density of European shags at the Project site and wider Water Sound area was 0.5 - 0.99 birds/km^2 in February 2022 and 1 - 4.99 birds/km^2 in January 2023 (Table 2-3).

In 2017/18, sector 17 (within which the Project is located) held a mean of 0.8% of the count total with a peak count of 13 birds in the November count which represents 1.55% of the count total (see Table 2-4). The number of birds predicted to occur within Sector 17 (with an area of 3.4 km^2) based on the predicted mean density from the January 2023 DAS (1 - 4.99 birds/km^2) is 3.4 to 16.96 birds. These estimates are therefore consistent with the findings of Jackson (2018) where 10 birds were recorded in the January count (Table 2-4).

In the wider Water Sound area in 2017/18, the 'inshore E2[9]' sub-area held a peak count of 89 birds in the November count with a mean percentage of 3.2% of the count with highest numbers recorded in the 'inshore northwest' sub-area between Stromness and Houton Head which held a mean of 20.8% of the birds recorded.

The WeBS data for the inner Water Sound area shows that European shags have been consistently recorded every season over the 2019/20 to 2023/24 period, with an annual peak count (five-year average) of 17 birds present.

Overall, the available data indicates that European shags are likely to be present in the Project area and wider Water Sound area with a peak count of 13 birds present in the 2017/18 surveys. This represents 0.4% of the SPA citation population. The findings of subsequent surveys indicate the population has remained stable at the site (Jackson, 2018).

Red-throated diver (breeding)

During the breeding season (April to September) red-throated divers habitually forage in inshore coastal waters within 10 km of inland breeding sites (Black et al, 2014). The Project site and wider vicinity of St Margaret's Hope Bay are not predicted to hold foraging areas for red-throated diver (NatureScot WMS[10]). The main concentrations of red-throated divers in Scapa Flow are predicted to occur in the bays off the east coast of Hoy around the islands of Cava and Fara; around the northeast coast of Hoy and Graemsay; and along the northern coast of Scapa Flow from Bay of Houton to Scapa Bay. These areas are most intensively used during the chick-rearing period (June-August) and during the post-fledging period (August) when juvenile red-throated divers are initially brought to the same inshore areas previously used for foraging by their parents (Okill and Wanless, 1990), where they continue to be fed by their parents before leaving for their wintering grounds (Okill, 2002). Lowest densities of red-throated divers are predicted to occur in the eastern side of Scapa Flow, and around the coasts of Burray.

As red-throated diver is a breeding season interest of Scapa Flow SPA, this species was not a target species in any of the wintering inshore surveys. No red-throated divers were recorded within the Project area or wider Water Sound area during either of the DAS. Only three red-throated divers and three unidentified diver species were recorded within the entire SPA area in February 2022 and in January 2023, only two red-throated divers and seven unidentified diver species were recorded within the SPA boundary. In the 2017/18 surveys, only two records of red-throated diver were recorded in the Water Sound area, both records were within sector 17 with two birds recorded in the November count and one bird present in the February count. The WeBS data for the inner Water Sound area (including the area to the east of Barrier 4) shows that red-throated divers have been consistently recorded every season over the 2019/20 to 2023/24 period, with an annual peak count (five-year average) of seven birds present (Table 2-2).

[10] Available on Marine Scotland's National Marine Plan Interactive (NMPi). Available [online] at: https://marinescotland.atkinsgeospatial.com/nmpi/

Overall, the available data indicates that red-throated divers are unlikely to be present in the Project area and wider Water Sound area during the breeding season. The Project location and vessel transit routes are outwith areas predicted to hold foraging red-throated divers during the breeding season. There are very few records of red-throated diver within the vicinity of the Project location during the winter period with a peak of two birds present in the wider Water Sound area. This represents 1.3% of the SPA citation breeding population however numbers of red-throated divers present in Scapa Flow during the winter season are unknown.

2.2.3 Conservation objectives

The conservation objectives of Scapa Flow SPA are:

1. To ensure that the qualifying features of the Scapa Flow SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status.
2. To ensure that the integrity of the Scapa Flow SPA is maintained in the context of environmental changes by meeting objectives 2a, 2b and 2c for each qualifying feature:

   2a. The populations of qualifying features are viable components of the site.

   2b. The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species.

   2c. The supporting habitats and processes relevant to qualifying features and their prey/food resources are maintained.

2.2.4 Impacts associated with the Project

The following potential impacts associated with the Project have been considered in the HRA:

Construction phase

- Potential disturbance (visual and audial) and displacement of SPA qualifying features due to in-water construction activities; and,
- Potential disturbance of SPA qualifying features through vessel movements required for construction activities.

Operational phase

- Potential disturbance and displacement of SPA qualifying features associated with any proposed changes to operational activities, including vessel movements; and,
- Any permanent loss or damage to prey-supporting habitats which will arise as a result of the Project.

Decommissioning phase

Impacts during the decommissioning phase are likely to be similar to or less than those during the construction phase.

Cumulative and in-combination effects are assessed in Section 2.2.6.

2.2.5 Determination of potential for LSE

Based on the project description details (see Section 1.5.2), an assessment has been made to determine whether the Project is likely to have a significant effect on any of the qualifying features of Scapa Flow SPA (Table 2-5). Following

NatureScot advice[11], where there is connectivity and the potential exists for LSE, then it has been concluded 'LSE'. Where there is no potential for connectivity, or it is obvious that the Project will not undermine the conservation objectives despite there being connectivity, it has been concluded 'no LSE'. Where LSE has been concluded, consideration of Stage 4 is required (see Section 2.3).

Construction phase

Potential disturbance (visual and audial) and displacement of SPA qualifying features due to in-water construction activities

The available data indicates that the Project site and wider Water Sound area are not areas of importance for black-throated diver or red-throated diver therefore there is no potential for likely significant effects for either species as a result of this impact. The other six wintering SPA qualifying features have been recorded within the vicinity of the Project or wider Water Sound area therefore likely significant effects are concluded for these species (Table 2-5).

Potential disturbance of SPA qualifying features through vessel movements required for construction activities

There is potential connectivity for all eight qualifying features of the Scapa Flow SPA in relation to disturbance due to vessel movements during construction therefore LSE is concluded for all eight species (Table 2-5).

Operational phase

Potential disturbance and displacement of SPA qualifying features associated with any proposed changes to operational activities, including vessel movements

The existing vessel activities currently operating out of St Margaret's Hope pier include:

- Three return trips every day by Pentland Ferries' passenger/Ro-Ro ferry operating from St Margaret's Hope to Gill's Bay, Caithness.
- Scottish Sea Farms (SSF) has three work boats based at St Margaret's Hope pier, each one servicing one of three fish farms in Scapa Flow (SMH Lober, Hunda and Westerbister). On average, each workboat will carry out one return trip per day from St Margaret's Hope pier.
- On average, two fishing boats operate from St Margaret's Hope pier, each with one return trip per day.

The ferry service will continue to berth against the existing pier and solid pier extension. The new pier will improve berthing safety and provide substantially more berthing space and available working apron and provide vehicular access for the existing inshore fishery and aquaculture operations however at this time it is not anticipated that the Project will result in any significant changes in the number, type or frequency of vessel movements during the operational phase of the Project. The maximum size of vessels using the pier will be up to 100 m (length overall) and 2,000 gross tonnage.

Any changes in the number, type or frequency of vessel movements during the operational phase of the Project are not anticipated to be at levels that would result in disturbance or displacement that would result in any likely significant effects for any of the qualifying features of Scapa Flow SPA therefore it has been concluded '**no LSE**'.

[11] https://www.nature.scot/professional-advice/planning-and development/environmental-assessment/habitats-regulations-appraisal-hra

Any permanent loss or damage to prey-supporting habitats which will arise as a result of the Project

The proposed pier extension is located adjacent to the location of the existing temporary barge therefore although the permanent extension covers a larger footprint (2,400 m^2) compared to the existing temporary barge (900 m^2), this area is not anticipated to provide important prey-supporting habitats for any of the SPA qualifying features given its proximity to the existing temporary barge and its location within the working St Margaret's Hope harbour area. The location of the proposed floating wave barrier is also within the St Margaret's Hope harbour area, at a distance of approximately 200 m from the existing temporary barge. The footprint of the wave barrier area (including moorings and anchors) is 1,989 m^2.

The total footprint of the Project would result in the permanent loss of an area of 0.0044 km^2. This is equivalent to 0.0014% of the total area of the SPA (318.2 km^2). The permanent loss of a relatively small area of habitat within the extent of the SPA due to the footprint of the Project, is negligible and not anticipated to result in any likely significant effects. Given its small size and its location adjacent to the existing pier which is already subject to disturbance associated with the working pier, this area is unlikely to provide critical habitat for any of the Scapa Flow SPA qualifying features, therefore it has been concluded '**no LSE**'.

Table 2-5 Determination of potential for LSE for qualifying features of Scapa Flow SPA

Qualifying feature	Potential for LSE?			
	Construction		Operation	
	Disturbance and displacement	Disturbance (vessel activities)	Disturbance and displacement	Habitat loss
Red-throated diver	No	Yes	No	No
Black-throated diver	No	Yes	No	No
Great northern diver	Yes	Yes	No	No
European shag	Yes	Yes	No	No
Common eider	Yes	Yes	No	No
Long-tailed duck	Yes	Yes	No	No
Red-breasted merganser	Yes	Yes	No	No
Slavonian grebe	Yes	Yes	No	No

2.2.6 Cumulative and in-combination effects

The potential effects of the Project must be considered cumulatively and in-combination with other projects that are planned, proposed or that exist in the surrounding area.

Scapa Flow SPA was formally designated in February 2022 therefore all existing developments operating at the time of designation are considered part of the baseline conditions for the SPA. A search for other proposed or approved (and yet to be built) developments with potential for likely significant effects on the qualifying features of Scapa Flow SPA that may require consideration in a cumulative and in-combination assessment was undertaken using Orkney Islands

Council's planning portal and Marine Directorate's list of marine licence applications[12]. Those developments requiring consideration in an assessment of cumulative and in-combination effects of the Project are identified in Table 2-6.

None of the developments propose any noisy construction works in the marine environment (such as blasting, piling or drilling) therefore there is no scope for any cumulative and in-combination effects in relation to potential disturbance (visual and audial) and displacement of SPA qualifying features due to in-water construction activities as a result of the Project.

The Scapa Deep Water Quay (SDWQ) proposal (23/289/NATEIA) is the only proposal of relevance to the assessment of cumulative and in-combination effects in relation to potential disturbance through vessel movements required for the construction activities of the Project however the SDWQ proposal is currently on hold. From the information currently available on the OIC's planning portal regarding the SDWQ, NatureScot has determined that the applicant's information and impact assessment on the construction phase vessel movements is incomplete. It is therefore not possible to carry out an assessment of the cumulative and in-combination effects in relation to this impact based on the available information.

Table 2-6 Developments considered in the assessment of cumulative and in-combination effects

Proposed development	Current status	LSE on qualifying features of Scapa Flow SPA?	Relevant impacts?	Cumulative and in-combination assessment required?
Scapa Deep Water Quay (23/289/NATEIA), Orkney Islands Council	Application currently on hold	LSE (all qualifying features)	*Disturbance and displacement (piling activities):* No marine blasting or piling or drilling is required. *Vessel disturbance*: The applicant's information and impact assessment on the construction phase vessel movements is incomplete.	No
Orkney Logistics Base (Hatston) 23/256/NATEIA, Orkney Islands Council	Application submitted 12 July 2023	There is currently insufficient information to determine whether this proposal is likely to have any LSE on great northern diver, Slavonian grebe and red-throated diver.		No

[12] Available [online] at: https://marine.gov.scot/marine-licence-applications

Proposed development	Current status	LSE on qualifying features of Scapa Flow SPA?	Relevant impacts?	Cumulative and in-combination assessment required?
EMEC Scapa Flow Test Site (24/279/WL)	Application submitted for continued operation. 7 August 2024, awaiting decision	No LSE	N/A	No. This development was already consented prior to the Scapa Flow SPA gaining policy protection therefore the test site forms part of the baseline conditions for the SPA.
Flotta Ultra Deep Water Quay (24/079/SCO), Repsol UK	Scoping Opinion issued 24 August 2024	LSE (all qualifying features)	The proposal is at an early stage therefore there is currently no details available to be considered in a cumulative and in-combination assessment.	No
Toyness Fish Farm (replacement of existing equipment) (21/410/MAR), Scottish Sea Farms	Approved 11 July 2022)	LSE (red-throated diver – disturbance due to construction and decommissioning vessel movements)	*Vessel disturbance*: Implementation of mitigation measures will ensure that disturbance of red-throated divers due to construction and decommissioning vessel activity will be avoided.	No
Bring Head Fish Farm, Hoy (replacement of existing equipment) (21/411/MAR). Scottish Sea Farms	Approved 18 July 2022	LSE (red-throated diver – disturbance due to construction and decommissioning vessel movements)	*Vessel disturbance*: Implementation of mitigation measures will ensure that disturbance of red-throated divers due to construction and decommissioning vessel activity will be avoided.	No

2.3 STAGE 4: UNDERTAKE AN APPROPRIATE ASSESSMENT OF THE IMPLICATIONS FOR THE SITE IN VIEW OF ITS CONSERVATION OBJECTIVES

2.3.1 Potential disturbance (visual and audial) and displacement of SPA qualifying features due to in-water construction activities

Visual and audial disturbance from in-water construction activities has the potential to cause disturbance to sensitive bird species that may be present in the nearby area. Disturbance from human activities may result in reduced energy intake as birds show alert responses rather than foraging, preening or resting behaviour (Livezey *et al*., 2016). Evasive behavioural responses such as flight, swim or dive activity may increase energy expenditure or reduce time available for foraging and if repeated disturbance occurs, this may also disrupt important behaviours or cause displacement of roosting or foraging birds to areas that are less energetically profitable and therefore result in increased energy demands on birds.

Percussive piling produces periodic impulsive noise of high intensity. Noise generated during piling activities will vary depending on several factors including the method of piling undertaken (impact driven or vibratory), the type of pile (sheet piles or tubular piles), the size and depth of the pile and the nature of the substrate into which the pile will be installed. Typical in-air noise levels for the proposed piling activities are shown in Table 2-7[13]. Very loud noises can potentially cause temporary or permanent damage to hearing. Hearing damage in birds from multiple impulse noise such as piling may occur at noise levels exceeding 125 dB(A) sound pressure level (Dooling and Popper, 2007). It is unlikely that birds would be present within 10 m of the works therefore hearing damage is unlikely to occur as a result of the Project.

All of the piling works will occur within close proximity (<200 m) to the existing pier at St Margaret's Hope therefore the area is already subject to some level of disturbance from human activities however, the high intensity impulsive noise generated during piling activities would be a novel source of noise that could potentially cause disturbance to birds across a wider area. The loudness of the noise reduces with distance from the noise source so there is potential for disturbance to birds present in the wider area due to the noise generated by the piling works. The sound pressure level (SPL) at a distance from the noise source can be calculated using the inverse square law[14]. The SPL for the various methods of piling at distances of 50 m, 100 m, 200m, 500 m and 1,000 m is shown in Table 2-7. A study of behavioural responses of roosting shorebirds to impulsive noise such as that generated by percussive piling found that noise levels of >65 dB (at the location of the bird) could cause a flight response, with noise levels >72 dB (at the location of the bird) likely to result in birds taking flight and abandoning the area entirely (Wright *et al*, 2010).

Based on the disturbance distances for shorebirds (as there is no available data for waterbirds), the noise generated by sheet piling activity for Works 1-3 exceeds 72 dB for the impact hammer driven method at 100 m from the piling location and at 50 m for the vibratory hammer method therefore there is the potential for birds to take flight and be displaced from these areas. If piling is required for Work No 4, the installation of the tubular piles would result in noise exceeding 72 dB at up to 200 m from the works therefore there is the potential for birds to take flight and be displaced from this area.

[13] The in-air noise levels presented in Table 2-7 are consistent with typical values reported for piling activities in BS 5228-1:2009+A1:2014 (Code of practice for noise and vibration control on construction and open sites – Part 1: Noise) (BSI, 2014). BS 5228 recognises that piling noise is highly variable and dependent on hammer type, pile size, ground conditions and method of installation.

[14] dL = 20log10 (R2/R1)

Table 2-7 Typical in-air noise levels and noise propagation in-air for the proposed piling operations

Pile type	Installation method	Activity equivalent continuous sound pressure level $L_{Aeq,1h}$ at 10m dB (A)[11]	Maximum Sound Level L_{AFmax} at 10m dB (A)[11]	SPL at 50 m dB(A)	SPL at 100 m dB(A)	SPL at 200 m dB(A)	SPL at 500 m dB(A)	SPL at 1,000 m dB(A)
Sheet piles (~15 m)	Impact hammer driven	85–95	100–115	**71-81**	**65-75**	59-69	50-60	45-55
Sheet piles (~15 m)	Vibratory hammer	80–90	90–100	**66-76**	60-70	54-64	46-56	40-50
Tubular piles (15 m × 400 mm Ø)	Impact hammer driven	90–100	115–125	**76-86**	**70-80**	**64-74**	56-66	50-60
Tubular piles (15 m × 400 mm Ø)	Vibratory hammer	85–95	95–105	**71-81**	**65-75**	59-69	50-60	45-55

The timing of the in-water construction works is scheduled to occur in four phases (see Table 1-2) and would affect three consecutive non-breeding seasons (2026/27, 2027/28 and 2028/29). The first phase (Work No.4) is scheduled to occur in Q4 2026. If piling is required, this will occur over a period of 3-4 days. All six of the wintering species may be present at the Project site and wider area during Work No 4 (see Table 2-8).

Piling operations for Works No 1-3 are anticipated to last up to two weeks, three weeks and six weeks respectively. The proposed construction schedule for Works No 1-3 overlaps with periods when all six wintering SPA qualifying features will be present in Scapa Flow (Table 2-8). However, only piling activity for Works No 1-3 occurring in April would have any potential to affect long-tailed duck or Slavonian grebe as these species are not present during the remainder of the construction period. Piling activity for Works No 1-3 occurring in April until mid-May could potentially affect any great northern divers present in the area however piling occurring at any other time during the anticipated schedule for Works No 1-3 would have no effect on this species. European shag, common eider and red-breasted merganser are resident in Scapa Flow, so could be present throughout the duration of Works No 1-3.

Conservation objective 2b seeks to ensure that the distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species. 'Significant disturbance' is disturbance that would lead to more than a transient effect on the distribution of the qualifying features within the site or disruption of important behaviours (NatureScot, 2022). The qualifying features of Scapa Flow SPA use the SPA for feeding, moulting, loafing, roosting, shelter and other maintenance activities. All qualifying features are protected throughout the whole site, throughout the year (NatureScot, 2022).

The six species are assessed as having medium to very high sensitivity to disturbance during the non-breeding season (Table 2-8). Red-breasted mergansers were assessed as having very high sensitivity to marine activity and were found to be more sensitive to sudden loud noise than other waterfowl with red-breasted mergansers observed to elicit flight responses to sudden loud noise (Jarrett et al, 2018).

A review of disturbance distances for a range of human disturbance found that great northern divers have a medium to high sensitivity to human disturbance during the non-breeding season with a minimum buffer of 100 – 350 m recommended to avoid disturbance to roosting or foraging great northern divers (Goodship & Furness, 2022). Slavonian grebe and common eider were assessed as having a medium sensitivity to human disturbance during the non-breeding season with recommended minimum buffer zones of 150 – 350 m and 200 – 500 m, respectively, to avoid disturbance to roosting or foraging birds (Goodship & Furness, 2022). Long-tailed duck was assessed as having high sensitivity to marine activity and common eider and European shag were found to have the lowest flight response rate to marine activity and were assessed as having medium sensitivity to marine activity (Jarrett et al, 2018). Species of medium sensitivity may tolerate some disturbance caused by human related activities, but the extent of disturbance caused to individual birds could depend on a wide range of factors including levels of habituation to disturbance and may vary due to numerous factors including species' sensitivity to disturbance, time of day, time of year, background noise levels, meteorological conditions, and the behavioural responses of birds to the noise.

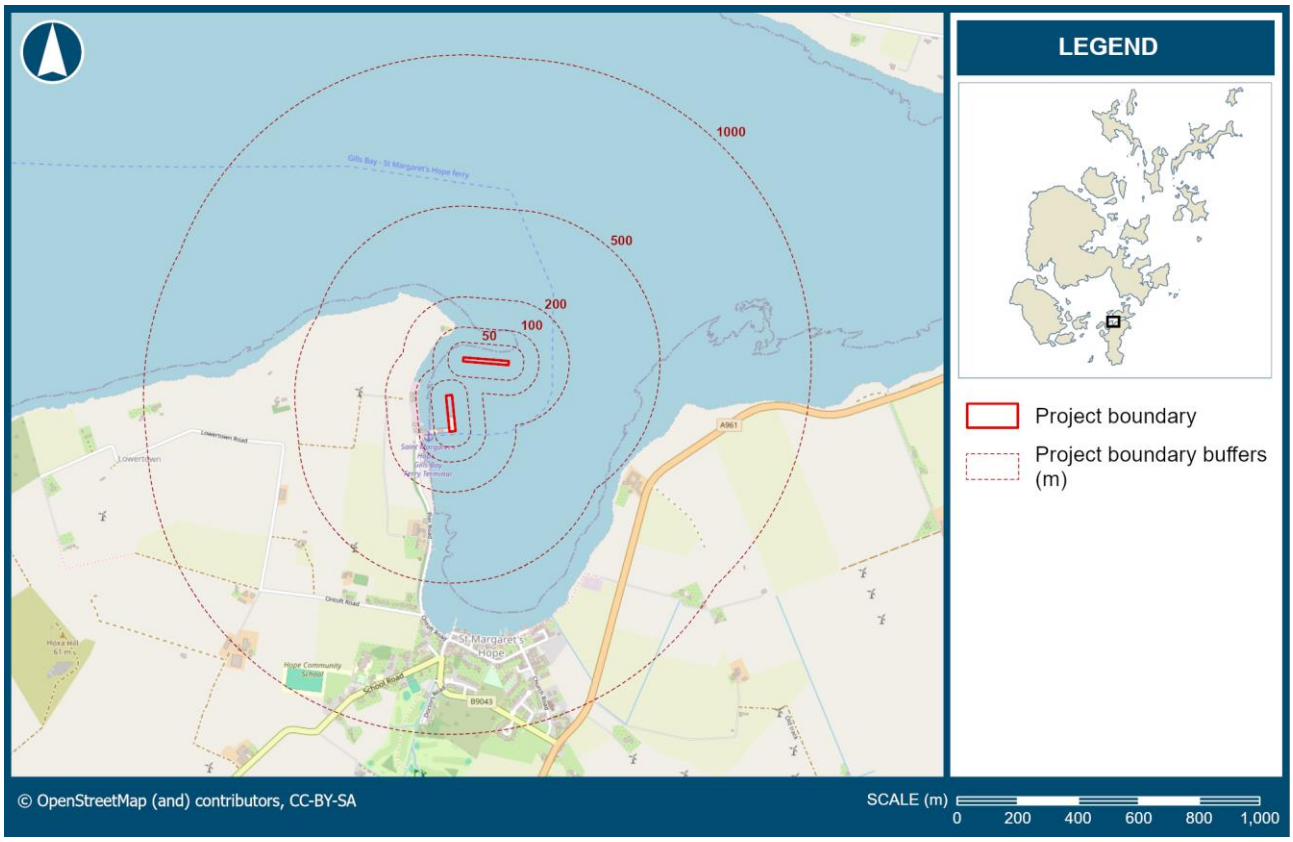

Figure 2.3 Project boundary with surrounding buffer distances from the piling activities

Disturbance and displacement effects due to the piling works are expected to occur within 200 m of Work No 4 and within 100 m of Works No 1-3. Lower levels of disturbance effects such as swim, dive or alert responses could occur over a wider area and based on the upper ranges of the disturbance distances available for the SPA qualifying features, this could extend to 350 m for great northern diver and Slavonian grebe and 500 m for common eider. The areas affected by disturbance effects are limited to the area within St Margaret's Hope Bay (see Figure 2.3) therefore, in areas already subject to other types of human disturbance related to the existing activities at the pier. Overall, this is a very small proportion of the available area within the SPA.

Work No 4 would be of very short duration, lasting 3-4 days only, therefore any effects would be temporary and transient with no significant effects anticipated. The timing of Works No 1-3 is spread across three non-breeding seasons however

the works would only partially overlap periods of occurrence for the three migratory species (great northern diver, long-tailed duck and Slavonian grebe). Although the resident species (common eider, European shag and red-breasted merganser) would be present throughout the duration of the works, the areas affected by the loudest noise is limited to within 100 - m of the existing pier therefore there is unlikely to be any disruption to important behaviours such as flightless moults as these are unlikely to occur within such close proximity to the existing pier. Any disturbance or displacement effects would be temporary, potentially lasting for the duration of the works however no permanent effects are anticipated. The SPA qualifying feature with the highest peak percentage of the SPA population recorded within Sector 17 (the wider Water Sound (inner) area) is red-breasted merganser (8.9%) however only a small proportion of these would be expected to occur within the area affected by the disturbance effects and the numbers present in the area during the period when Works No 1-3 are scheduled to occur (April-Sep) are likely to be lower as this is during the breeding season when birds would have already left the area to return to their breeding grounds.

Slavonian grebe and long-tailed ducks also have relatively high peak percentages of their SPA populations occurring in Sector 17 however the peak numbers of both species were recorded in March. Numbers would be expected to be lower in April (when the works could potentially commence) as birds will have left the area to migrate to their breeding grounds. Very low numbers of great northern divers and European shag were recorded in Sector 17 therefore no significant disturbance to either species is anticipated.

This appraisal has been used to ascertain whether the Project will not adversely affect the integrity of Scapa Flow SPA (see Stage 5 (Section 2.4.1)).

Table 2-8 Scapa Flow SPA qualifying features with potential for presence at the Project site (and wider Water Sound area) during the proposed piling activities

Qualifying feature	Sensitivity to disturbance	Potential overlap of species presence with the proposed piling works				Peak % of SPA population present in Sector 17
		Work No. 4 (wave barrier) Piling over 3-4 days in Q4 2026 (Oct-Dec)	Work No.1 and barge removal Piling over 2 weeks in Q2-Q3 2027 (Apr-Sep)	Work No. 2 Piling over 3 weeks in Q2-Q3 2028 (Apr-Sep)	Work No. 3 Piling over 6 weeks in Q2-Q3 2029 (Apr-Sep)	
Great northern diver (non-breeding)	**Medium – High** (Goodship & Furness, 2022); **High** (Jarrett et al, 2018)	Oct-Dec	April – mid-May only Flightless moult Feb – mid-April	April – mid-May only Flightless moult Feb – mid-April	April – mid-May only Flightless moult Feb – mid-April	1% (Jan)
European shag (non-breeding)	**Medium** (Jarrett et al, 2018)	Oct-Dec	Apr - Sep	Apr - Sep	Apr - Sep	0.4% (Nov)
Common eider (non-breeding)	**Medium** (Goodship & Furness, 2022; Jarrett et al, 2018)	Oct-Dec	Apr - Sep (flightless moult July to mid-Sept)	Apr - Sep (flightless moult July to mid-Sept)	Apr - Sep (flightless moult July to mid-Sept)	3.5% (Jan)

Qualifying feature	Sensitivity to disturbance	Potential overlap of species presence with the proposed piling works				Peak % of SPA population present in Sector 17
		Work No. 4 (wave barrier) Piling over 3-4 days in Q4 2026 (Oct-Dec)	Work No.1 and barge removal Piling over 2 weeks in Q2-Q3 2027 (Apr-Sep)	Work No. 2 Piling over 3 weeks in Q2-Q3 2028 (Apr-Sep)	Work No. 3 Piling over 6 weeks in Q2-Q3 2029 (Apr-Sep)	
Long-tailed duck (non-breeding)	**High** (Jarrett et al, 2018)	Oct-Dec	April only	April only	April only	4.5% (Mar)
Red-breasted merganser (non-breeding)	**Very high** (Jarrett et al, 2018)	Oct-Dec	Apr - Sep	Apr - Sep	Apr - Sep	8.9% (Jan)
Slavonian grebe (non-breeding)	**Very high** (Jarrett et al, 2018) **Medium** (Goodship & Furness, 2022);	Oct-Dec	April only	April only	April only	5% (Mar)

2.3.2 Potential disturbance of sensitive bird species through vessel movements required for construction activities

An increase in vessel movements in the marine environment has the potential to negatively impact breeding red-throated divers or wintering waterbird populations through increased disturbance. A passing vessel has the potential to cause temporary disturbance to foraging activities or may elicit an evasive behavioural response in birds present in the area such as flight, swim or dive activity. Evasive behavioural responses may increase energy expenditure or reduce time available for foraging and if repeated disturbance occurs, this may also disrupt important behaviours or cause birds to move to different areas that are less energetically profitable and therefore result in increased energy demands on birds. Breeding red-throated divers are most sensitive to disturbance during the chick-rearing period (June - July) and wintering birds are most sensitive to disturbance during flightless moult periods.

Conservation objective 2b seeks to ensure that the distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species. 'Significant disturbance' is disturbance that would lead to more than a transient effect on the distribution of the qualifying features within the site or disruption of important behaviours (NatureScot, 2022). The qualifying features of Scapa Flow SPA use the SPA for feeding, moulting, loafing, roosting, shelter and other maintenance activities. All qualifying features are protected throughout the whole site, throughout the year (NatureScot, 2022).

Red-throated diver (breeding)

Red-throated diver is assessed as having a high sensitivity to human disturbance (Goodship and Furness, 2022). Work No 4 is scheduled to occur in Q4 2026 which is outwith the breeding season period for red-throated divers. Only a few records of red-throated diver were recorded at the Project site or wider vicinity during the winter period so there is no potential for significant disturbance to this species from Work No 4.

Works No 1-3 coincides with the red-throated diver breeding season and works will affect three consecutive breeding seasons (2027, 2028 and 2029). The proposed vessel transit route from Stromness to the Project site passes near to an area predicted to hold foraging red-throated divers during the breeding season therefore only vessels transiting from Stromness have the potential to cause disturbance to foraging red-throated divers (Figure 2.4). However, this area is already subject to existing vessel activity such as passenger ferries, dive boats and fish farm vessel traffic. Disturbance from a passing vessel, should it occur, may result in a short-term, temporary disturbance to red-throated diver foraging activity if a bird were to initiate a swim, dive or flight response, however foraging activity is likely to resume a short time after a vessel has passed. The proposed level of vessel activity from Stromness to the Project site is relatively low (up to 8 to 11 vessel movements, per phase) with infrequent movements spread over a period of 4-8 weeks (works 1-2) and 12-16 weeks (work No 3). Any potential disturbance due to vessel traffic would be relatively infrequent, transient in nature and therefore unlikely to result in any long-term effects such as altering distribution of foraging red-throated divers within the site or disruption of important chick-rearing behaviours.

The Project location and vessel transit route from the southerly approach through Scapa Flow would not affect any areas predicted to hold foraging red-throated divers during the breeding season.

SPA qualifying features (non-breeding)

A study of short-term responses of wintering waterbirds to marine activity in Orkney found Slavonian grebe and red-breasted merganser to have very high sensitivity to vessel disturbance (Jarrett *et al.*, 2018). Great northern diver and long-tailed duck were found to have high sensitivity to vessel activity and European shag and common eider were both found to have medium sensitivity to vessel activity (Jarrett *et al.*, 2018).

Work No 4 will be completed within 3-4 days with up to ten vessel movements required, only two of which could pass through Scapa Flow between the Project site and Stromness, the other eight vessel movements would be via the southerly approach through Scapa Flow, required to transport the concrete pontoons for the floating wave barrier from a port outwith Orkney. All seven wintering qualifying features may be present in Scapa Flow SPA during Work No. 4 however black-throated diver was not recorded at the Project site or wider Water Sound area and only very low numbers of the other six wintering species were recorded at the Project site and wider area.

The proposed construction schedule for Works 1-3 overlaps with periods when some or all of the seven wintering SPA qualifying features will be present in Scapa Flow (Table 2-8). However, only vessel activity occurring in April would have any potential to affect long-tailed duck or Slavonian grebe as they are not present during the remainder of the construction period. Vessel activity in April until mid-May could potentially affect any great northern divers present in the area after which they would have left the area. European shag, common eider and red-breasted merganser are resident in Scapa Flow, so could be present throughout the duration of Works No 1-3.

All phases of the work require low levels of vessel activity (Work No 4 requires 10 vessel movements over a 3-4-day period; Works No 1 and 2 require 11 and 8 vessel movements respectively over 4-8-week periods and Work No 3 requires 10 vessel movements over a 12 - 16-week period). The low frequency of vessel movements and the type of vessels (one to two multicats, one small workboat/tug and a towed piling pontoon) required for each phase of the construction works is a relatively small increase in the volume of existing vessel traffic within the vicinity of St Margaret's Hope pier and the wider Scapa Flow area. Scapa Flow is part of Orkney Harbour Authority's harbour area and is regularly used by a variety of vessels including oil and gas industry vessels, oil tankers visiting the nearby Flotta Oil Terminal, inter-island ferry traffic, recreational dive boat traffic, aquaculture vessels, inshore fishing vessels and recreational sailing boats.

Six of the wintering SPA qualifying features are found to occur within the vicinity of the Project site and wider Water Sound area. Black-throated diver was not recorded at the Project site or wider Water Sound area. Passing vessels could potentially result in temporary disturbance of foraging birds present in the area however, the low number and frequency of vessel movements spread over the four phases of construction works, and the type of vessels (multicats and a small tug/workboat) required are not anticipated to result in levels of disturbance that would affect any of the qualifying features' distribution and use of the site, such that their ability to survive and/or breed would be compromised in the long-term. Any disturbance effects due to vessel activity during construction works are likely to be transient, with no lasting effects anticipated.

A vessel management plan (VMP) will be produced for the Project that will include the following measures to minimise or avoid disturbance to Scapa Flow SPA qualifying features due to vessel activity:

- All vessels will adhere to specified vessel transit routes;
- All vessels will adhere to the Scottish Marine Wildlife Watching Code (SMWWC)[15] (within practical feasibility) when manoeuvring around and within the vicinity of marine mammals and birds (Scapa Flow SPA qualifying features and in particular, red-throated divers during the chick-rearing period (June-July). This includes the following measures:
  - Avoid marine mammals/birds where possible;
  - Reduce speed to less than 6 knots if marine mammals/birds are within or near to vessel transit routes, where consistent with crew and navigational safety or unless there is an emergency and speed a prerequisite;
  - A steady speed and course will be maintained where possible if a marine mammal approaches a Project vessel;
  - Minimum approach distances (as stated in the SMWWC) for vessels on approach to marine mammals and birds, where it is safe to do so i.e., a distance of at least 50 m for birds and 300 m for marine mammals will be maintained;
  - Sudden unpredictable changes in speed, direction and engine noise will be avoided to minimise disturbance to any marine mammals or birds in the vicinity;
  - Rafts of birds will not be intentionally broken up or flushed.

This appraisal has been used to ascertain whether the Project will not adversely affect the integrity of Scapa Flow SPA (see Stage 5 (Section 2.4.2)).

[15]SMWWC available at: https://www.nature.scot/professional-advice/land-and-sea-management/managing-coasts-and-seas/scottish-marine-wildlife-watching-code

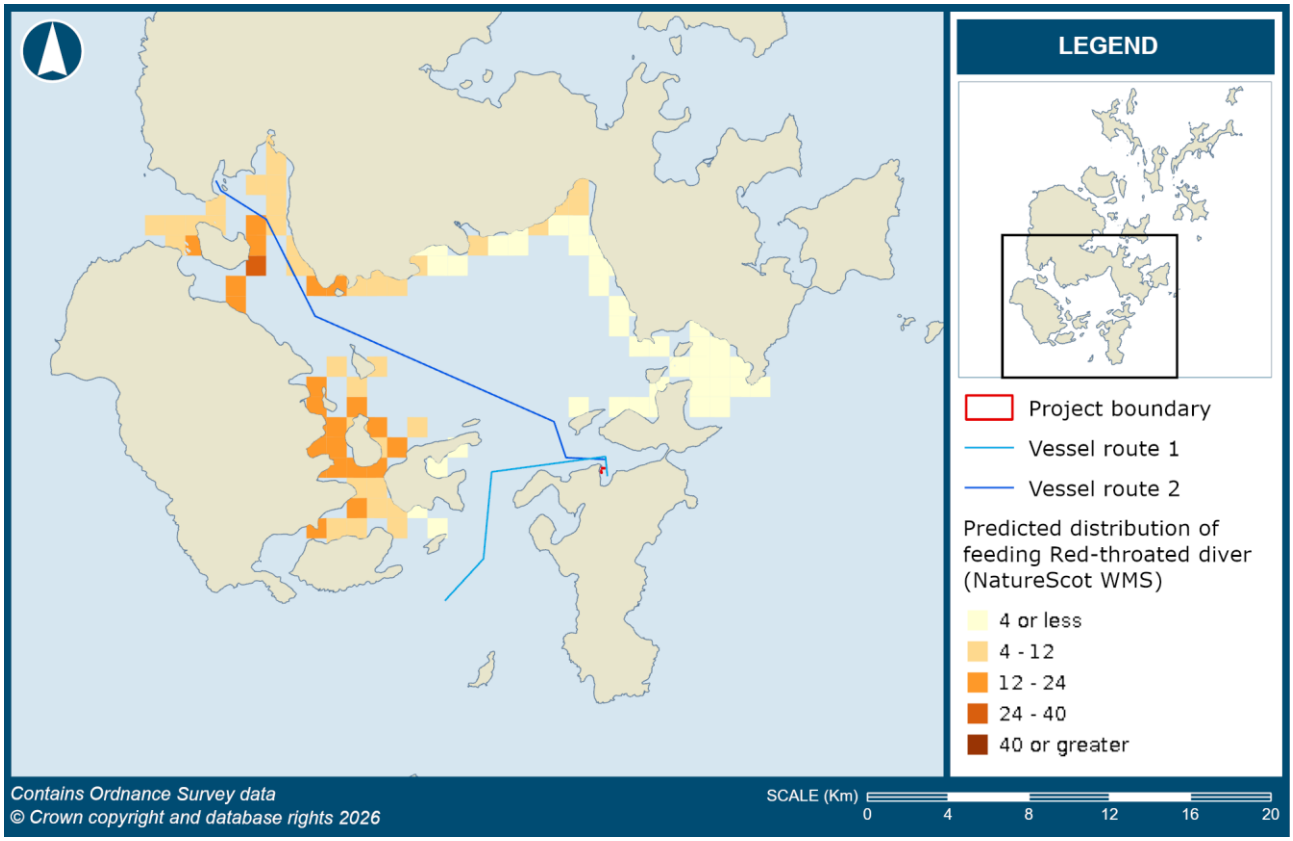

Figure 2.4 Project location and installation vessel routes in relation to predicted distribution of foraging red-throated divers in the breeding season

2.4 STAGE 5: CAN IT BE ASCERTAINED THAT THE PROPOSAL WILL NOT ADVERSELY AFFECT THE INTEGRITY OF THE SITE?

2.4.1 Potential disturbance (visual and audial) and displacement of SPA qualifying features due to in-water construction activities

Based on this appraisal, it is concluded that any disturbance or displacement of SPA qualifying features due to in-water construction activities is unlikely to be considered significant with no lasting effects on the distribution or behaviour of any of the six wintering qualifying features anticipated. When considered either alone or cumulatively, any resulting effects would not undermine any of the relevant conservation objectives (CO 2b) therefore it can be concluded that there will be no adverse effects on site integrity for Scapa Flow SPA for any of the qualifying features (Table 2-9).

Table 2-9 Conclusions of appropriate assessment relating to disturbance or displacement of relevant SPA qualifying features due to in-water construction activities

Qualifying feature	Relevant conservation objective	Conclusion of appropriate assessment
Great northern diver (non-breeding)	CO 2b: The distributions of the qualifying features throughout Scapa Flow SPA are maintained by avoiding significant disturbance of the species.	No adverse effects on site integrity
European shag (non-breeding)		
Common eider (non-breeding)		
Long-tailed duck (non-breeding)		
Red-breasted merganser (non-breeding)		
Slavonian grebe (non-breeding)		

2.4.2 Potential disturbance of sensitive bird species through vessel movements required for construction activities

Based on this appraisal, it is concluded that any disturbance of sensitive bird species through vessel movements required for construction activities is unlikely to be considered significant with no lasting effects on the distribution or behaviour of red-throated divers in the breeding season, or any of the wintering qualifying features anticipated.

Implementation of the measures in the VMP will minimise disturbance or displacement of SPA qualifying features due to vessel activity.

When considered either alone or cumulatively, any resulting effects would not undermine any of the relevant conservation objectives (CO 2b) therefore it can be concluded that there will be no adverse effects on site integrity for Scapa Flow SPA for any of the qualifying features (Table 2-10).

Table 2-10 Conclusions of appropriate assessment relating to disturbance of sensitive bird species through vessel movements required for construction activities

Qualifying feature	Relevant conservation objective	Conclusion of appropriate assessment
Red-throated diver (breeding)	CO 2b: The distributions of the qualifying features throughout Scapa Flow SPA are maintained by avoiding significant disturbance of the species.	No adverse effects on site integrity.
Great northern diver (non-breeding)		
European shag (non-breeding)		
Common eider (non-breeding)		
Long-tailed duck (non-breeding)		
Red-breasted merganser (non-breeding)		
Slavonian grebe (non-breeding)		
Black-throated diver (non-breeding)		

3 SACS

3.1 STAGE 2: IS THE PROJECT DIRECTLY CONNECTED WITH OR NECESSARY TO SITE MANAGEMENT FOR NATURE CONSERVATION?

No, the proposal is not directly connected with or necessary to site management for the conservation of any SACs and therefore consideration of Stage 3 is required.

3.2 STAGE 3: IS THE PROJECT (EITHER ALONE OR IN COMBINATION WITH OTHER PROJECTS) LIKELY TO HAVE A SIGNFICANT EFFECT ON THE SITE?

3.2.1 Identification of relevant European sites

In their screening response, NatureScot identified two SACs with potential for connectivity with the Project that require consideration in the HRA; Sanday SAC, specifically in relation to the harbour seal *Phoca vitulina* qualifying feature and Loch of Stenness SAC, designated for lagoons (Table 3-1). The locations of these SACs in relation to the Project are shown in Figure 3.1.

Table 3-1 SACs with potential for LSE identified by NatureScot in their screening response

SAC	Distance by-sea from Project (km)	Qualifying feature	Latest assessed condition (date assessed)[16]	Potential for connectivity?
Sanday SAC	84	Harbour seal	Unfavourable, declining (27 March 2024)	Yes, harbour seals from this SAC could potentially be present at the Project location. Therefore, there is potential for LSE (see Section 3.2.5).
		Reefs	N/A	No - no impact pathway; these qualifying features are not appraised further as there is no connectivity to the Project.
		Subtidal sandbanks	N/A	
		Intertidal mudflats and sandflats	N/A	
Loch of Stenness SAC	27	Lagoons	Favourable, maintained (21 March 2005)	Yes, there is connectivity between the Project and the SAC, due to the potential that invasive non-native species could be introduced during construction or operation. Therefore, further consideration of this impact is required (see Section 3.2.5).

[16] From NatureScot Sitelink Available at: https://sitelink.nature.scot/home

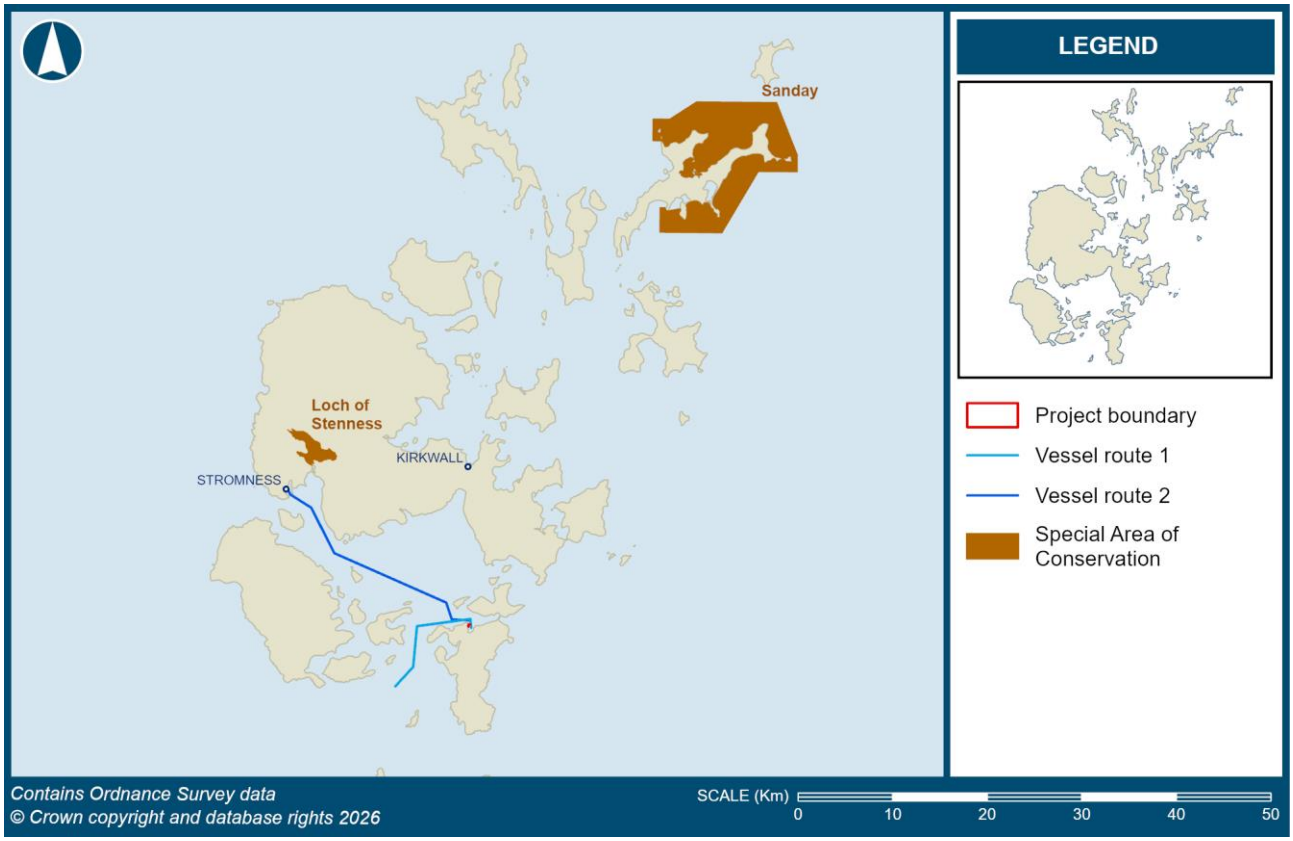

Figure 3.1 SACs with potential connectivity to the Project

3.2.2 Baseline characterisation

Sanday SAC - harbour seal

Sanday SAC is located approximately 84 km (by-sea) from the Project (see Figure 3.1). Harbour seals are highly mobile but foraging ranges vary substantially between individuals with some remaining within a few kilometres of haul-out sites and others foraging widely from 20-30 km to over 100 km from haul out sites (SCOS, 2024). There is a designated seal haul out at northwest Water Sound, located approximately 1.2 km from the Project boundary.

The harbour seal qualifying feature of Sanday SAC is considered to be in unfavourable condition (NatureScot, 2025). Harbour seal numbers counted at Sanday SAC have shown a severe decline compared to historic counts (SCOS, 2024). The most recent count data is from 2019, when 77 harbour seals were recorded in the SAC (SCOS, 2024). This is a reduction of -60% over the short-term (six-year) period and a reduction of -96% over the long-term period (since 1993) (SCOS, 2024). The current rate of decline is more severe (-14%) within the SAC than within the wider North Coast and Orkney seal management unit (SMU) (-8.6%) which is at a depleted level of abundance and still declining (SCOS, 2024).

The long-term viability of harbour seal in Sanday SAC is intrinsically linked to their ability to access and use habitat and prey resources both on site and in areas of functionally linked sea outwith the SAC (NatureScot, 2025). Sufficient availability of prey resources and access to these foraging areas is essential to the long-term health of the species in the SAC (NatureScot, 2025).

Harbour seals come ashore to breed at haul out sites in June and July and they then undergo an annual moult in August during which time they spend a higher proportion of time ashore than at other times of year. They are site-faithful,

returning to breed at the site where they were born. Harbour seals, unlike grey seals, do not breed in large colonies and pups can swim from birth.

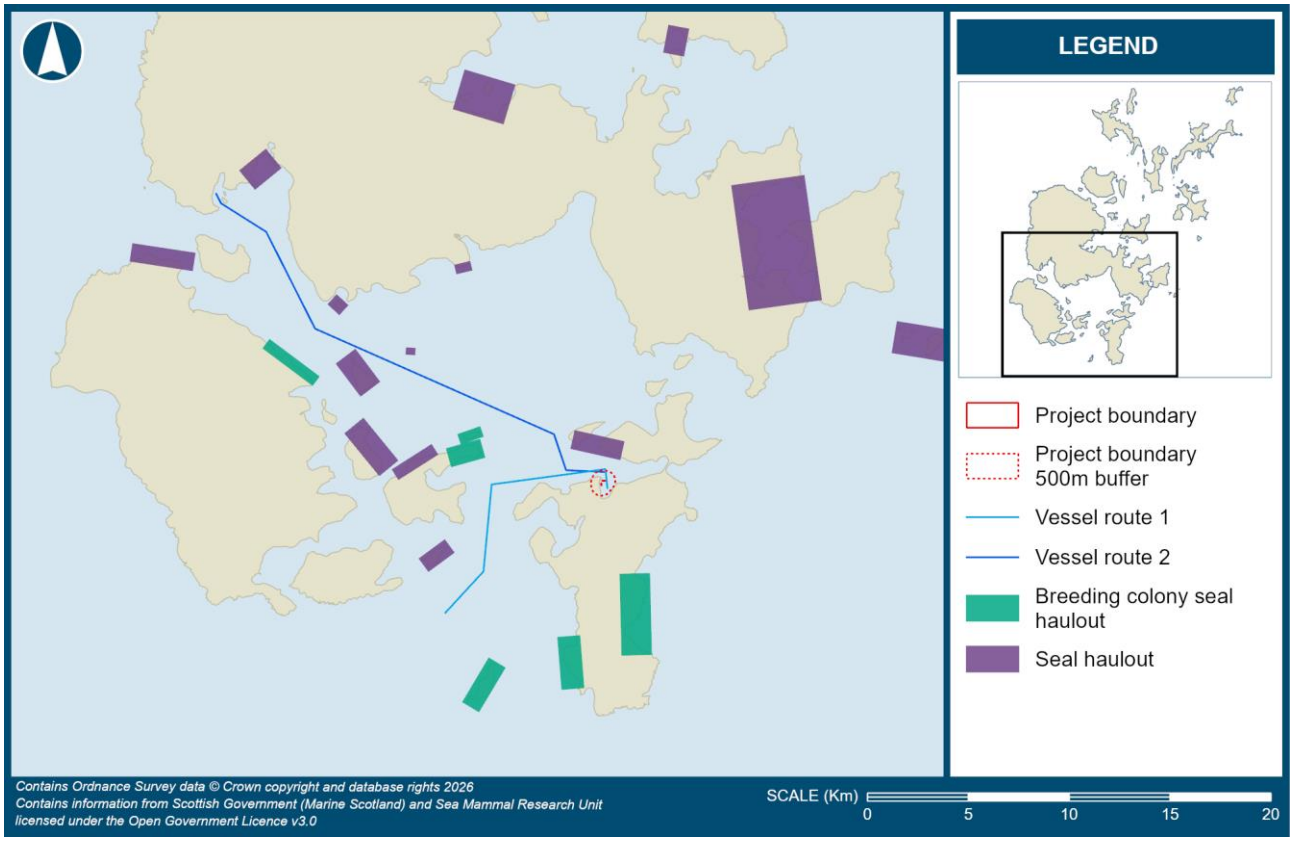

Figure 3.2 Project location in relation to designated seal haul outs

Loch of Stenness SAC - Lagoons

Loch of Stenness SAC is located 27 km from the Project boundary and approximately 5.4 km from the port of Stromness. The nearest distance between the VTR and the SAC is 4.2 km (Figure 3.1). Loch of Stenness is the largest brackish lagoon in the UK and contains a diverse range of lagoon species due to the varying salinities found across the large lagoon system. The lagoon habitat at the site is in favourable condition (NatureScot, 2025).

3.2.3 Conservation objectives

Sanday SAC

The conservation objectives of Sanday SAC for harbour seal are:

1. To ensure that the qualifying features of Sanday SAC are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status.
2. To ensure that the integrity of Sanday SAC is restored in the context of environmental changes by meeting objectives 2a, 2b and 2c for each qualifying feature:
   - 2a. Harbour seal are a viable component of the Sanday SAC.
   - 2b. The distribution of harbour seal throughout the site is maintained by avoiding significant disturbance.
   - 2c. The supporting habitats within the site relevant to harbour seal are maintained.

Loch of Stenness SAC

The conservation objectives of Loch of Stenness SAC are:

1. To ensure that the lagoons at Loch of Stenness SAC are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status.
2. To ensure that the integrity of Loch of Stenness SAC is maintained in the context of environmental changes by meeting objectives 2a, 2b and 2c for lagoons:
   2a. Extent and distribution of the habitat within the site.
   2b. Structure and function of the habitat and the supporting environment on which it relies.
   2c. Distribution and viability of typical species of the habitat.

3.2.4 Impacts associated with the Project

The following impacts have been identified that require consideration in the HRA:

Construction phase

- Potential for auditory injury and disturbance of harbour seals (Sanday SAC) from underwater noise during piling activities;
- Potential disturbance of harbour seals (Sanday SAC) from airborne noise during piling activities;
- Increased suspended sediment resulting in reduction of foraging success of harbour seals (Sanday SAC) during construction; and
- Indirect impacts via prey species of harbour seals (Sanday SAC) during construction.

All phases

- Potential disturbance of harbour seals (Sanday SAC) from increased vessel noise;
- Injury or mortality of harbour seals (Sanday SAC) from collision with vessels; and
- Introduction of non-native species (Loch of Stenness SAC).

3.2.5 Determination of potential for LSE

Based on the project description details (see Section 1.5.2), an assessment has been made to determine whether the Project is likely to have a significant effect on any of the qualifying features with potential connectivity with the Project (Table 3-2). Following NatureScot advice[17], where there is connectivity and the potential exists for LSE, then it has been concluded 'LSE'. Where there is no potential for connectivity, or it is obvious that the Project will not undermine the conservation objectives despite there being connectivity, it has been concluded '**no LSE**'.

Construction phase

Potential for auditory injury and disturbance of harbour seals (Sanday SAC) from underwater noise during piling activities

There is potential connectivity between the Project and harbour seals from Sanday SAC therefore it is concluded '**LSE**'.

[17] https://www.nature.scot/professional-advice/planning-and development/environmental-assessment/habitats-regulations-appraisal-hra

Potential disturbance of harbour seals (Sanday SAC) from airborne noise during piling activities

There is potential connectivity between the Project and harbour seals from Sanday SAC therefore it is concluded '**LSE**'.

Increased suspended sediment resulting in reduction of foraging success of harbour seals (Sanday SAC) during construction

Due to the distance between the Project and Sanday SAC (84 km), there is a low likelihood of harbour seals from the SAC using the Project area as a foraging site. Some harbour seals have extensive foraging ranges up to 100 km therefore it is possible that some seals from the SAC may have connectivity with the Project however most of the harbour seals from Sanday SAC are likely to forage nearer to the SAC. The construction works will occur within St Margaret's Hope Bay, within close proximity to the existing pier. Given the small size of the Project area, the distance from the SAC and its location within a busy harbour area, it is unlikely to provide important foraging habitat for harbour seals from Sanday SAC. The construction works are unlikely to have any effect on sedimentation as there is very little movement or deposition of sediment in St Margaret's Hope Bay. Any increased suspended sediment occurring as a result of the construction works is not anticipated to undermine any of the conservation objectives therefore it is concluded '**no LSE**'.

Indirect impacts via prey species of harbour seals (Sanday SAC) during construction

As outlined above, given the small size of the Project area, the distance from the SAC and its location within a busy harbour area, the Project footprint and surrounding area are unlikely to provide important foraging habitat for harbour seals from Sanday SAC. Therefore, any indirect impacts via prey species are not anticipated to undermine any of the conservation objectives therefore it is concluded '**no LSE**'.

All phases

Potential disturbance of harbour seals (Sanday SAC) from increased vessel noise

The construction works will require a relatively small number of vessel movements spread across four phases of construction, lasting between 3-4 days up to 16-weeks duration, with between 8 and 11 vessel movements required per phase (see Table 1-3). The types of vessels required during construction are multicats and a small tug/workboat. The low number and frequency of vessel movements and the type of vessels required for construction are not anticipated to result in levels of vessel noise that could result in disturbance to harbour seals that would lead to a permanent reduction in the harbour seal population of Sanday SAC. Any changes in the number, type or frequency of vessel movements during the operational phase of the Project are also not anticipated to result in noise levels that would result in disturbance of harbour seals that would lead to a permanent reduction in the harbour seal population of Sanday SAC. As there is no potential for any of the conservation objectives to be undermined, it is concluded '**no LSE**'.

Injury or mortality of harbour seals (Sanday SAC) from collision with vessels

A relatively small number of vessel movements will be required for the construction of the Project, with between 8 and 11 vessel movements required for each of the four phases of construction (Table 1-3). The low number and frequency of vessel movements and the type of vessels required for construction are not anticipated to result in levels of collision with harbour seals that would result in mortality or injury of harbour seals that would lead to a permanent reduction in the harbour seal population of Sanday SAC. As there is no potential for any of the conservation objectives to be undermined, it is concluded '**no LSE**'.

Introduction of non-native species (Loch of Stenness SAC)

The lagoon feature of Loch of Stenness SAC is sensitive to the introduction of invasive non-native species (INNS) that could potentially enter the lagoon system through release of ballast water or from fouling of vessels. Orkney Islands Council operates a stringent policy on Ballast Water Management (BWM) in Scapa Flow. All vessels required for the construction and operation of the Project will adhere to the OIC's BWM Policy however it is not anticipated that any

Project vessels will release ballast water. All vessels required for construction will adhere to the Project's Marine Non-Native Species Biosecurity Plan that includes measures to minimise the risk of spread of INNS. It is therefore concluded '**no LSE'**.

Where LSE has been concluded, consideration of Stage 4 is required.

Table 3-2 Determination of potential for LSE

SAC	Qualifying feature	Development phase	Potential impact requiring consideration in HRA	Potential for LSE?
Sanday SAC	Harbour seal	Construction	Potential for auditory injury and disturbance from underwater noise during piling activities (CO 2a)	Yes
		Construction	Potential disturbance from airborne noise during piling activities (CO 2a)	Yes
		Construction, Operation	Potential disturbance from increased vessel noise (CO 2a)	No
		Construction, Operation	Injury or mortality from collision with vessels (CO 2a)	No
		Construction	Indirect impacts via prey species (CO 2a)	No
		Construction	Increased suspended sediment resulting in reduction of foraging success of harbour seals (CO 2a)	No
Loch of Stenness SAC	Lagoon	Construction, Operation	Introduction of invasive non-native species (CO 2b)	No

3.2.1 Cumulative and in-combination effects

The potential effects of the Project must be considered cumulatively and in-combination with other projects that are planned, proposed or that exist in the surrounding area.

A search for other proposed or approved (and yet to be built) developments within the vicinity of the Project with potential for likely significant effects on the harbour seal qualifying feature of Sanday SAC that may require consideration in a cumulative and in-combination assessment in relation to underwater noise or airborne noise was undertaken using Orkney Islands Council's planning portal and Marine Directorate's list of marine licence applications[18]. The list of developments considered in the assessment of cumulative and in-combination effects is shown in Table 3-3.

[18] Available [online] at: https://marine.gov.scot/marine-licence-applications

Table 3-3 Developments considered in the assessment of cumulative and in-combination effects in relation to harbour seal from Sanday SAC

Proposed development	Current status	LSE on qualifying features of Sanday SAC?	Relevant impacts?	Cumulative and in-combination assessment required?
Scapa Deep Water Quay (23/289/NATEIA), Orkney Islands Council	Application currently on hold	No LSE (harbour seal)	*Potential for auditory injury and disturbance from underwater noise during piling activities.* *Potential disturbance from airborne noise during piling activities* No marine or intertidal blasting or piling or drilling is required.	No

Scapa Deep Water Quay is the only proposal that is located within the vicinity of the Project however there are no noisy construction works in the marine environment (such as blasting, piling or drilling) associated with that proposal therefore there is no scope for any cumulative and in-combination effects with the Project.

There are no developments within the vicinity of the Project that require consideration in an assessment of cumulative or in-combination effects for the Project in relation to auditory injury or disturbance of harbour seals from underwater noise due to piling activities or disturbance from airborne noise during piling activities required during construction of the Project.

3.3 STAGE 4: UNDERTAKE AN APPROPRIATE ASSESSMENT OF THE IMPLICATIONS FOR THE SITE IN VIEW OF ITS CONSERVATION OBJECTIVES

3.3.1 Potential for auditory injury and disturbance of harbour seals (Sanday SAC) from underwater noise during piling activities

Conservation objective 2a seeks to ensure harbour seals are a viable component of the Sanday SAC. When assessing the effects of a Project, consideration must also be given to whether impacts outwith the SAC could affect achievement of this CO. This CO is considered to be met if the conditions to support the essential behaviours of harbour seals are in place, this includes the avoidance of effects outwith the site that could lead to a permanent reduction in the harbour seal population through mortality, injury or impacts caused by disturbance, displacement, barrier effects or reduction in mobile prey resources (NatureScot, 2025).

The installation of driven piles in the marine environment without mitigation is likely to produce noise levels capable of causing injury and disturbance to marine mammals (JNCC, 2010). Typical in-water noise levels for the proposed piling activities are shown in Table 3-4.

Table 3-4 Typical in-water noise levels for the proposed piling operations

Pile type	Installation method	Noise criteria	At 10m (Jiménez-Arranz et al, 2020)	At 500m[19]	At 1000m[19]	At 1200m[19]
Sheet piles (~15 m)	Impact hammer driven	Sound Pressure Level SPL peak dB re 1 µPa	195–205	154.5-155.5	150-160	148.8-158.8
		Sound Pressure Level SPL rms dB re 1 µPa	145-155	-	-	-
		Sound Exposure Level (single strike) SEL_{ss} dB re 1 $\mu Pa^2 \cdot s$	165-175	-	-	-
Sheet piles (~15 m)	Vibratory hammer	Sound Pressure Level SPL rms dB re 1 µPa	170-180	129.5-139.5	125-135	123.8-133.8
Tubular piles (15 m × 400 mm Ø)	Impact hammer driven	Sound Pressure Level SPL peak dB re 1 µPa	200-210	159.5-169.5	155-165	153.8-163.8
		Sound Pressure Level SPL rms dB re 1 µPa	185-195	-	-	-
		Sound Exposure Level (single strike) SEL_{ss} dB re 1 $\mu Pa^2 \cdot s$	175-185	-	-	-
Tubular piles (15 m × 400 mm Ø)	Vibratory hammer	Sound Pressure Level SPL rms dB re 1 µPa	155-165	-	-	-

Marine mammal noise exposure criteria for temporary and permanent auditory effects as defined in Southall et al, 2019 are shown in Table 3-5. For impulsive noise, such as piling, dual exposure criteria are given including frequency-weighted sound exposure level and unweighted peak sound pressure level. Noise exposures exceeding the specified criteria levels are interpreted as indicating potential temporary threshold shift (TTS) or permanent threshold shift (PTS) onset in marine mammals. Exceedance of TTS and PTS onset thresholds can be considered as indicators of disturbance and injury respectively.

[19] Propagation in shallow coastal water is commonly approximated using SPL, dB at R metres = SPL - 15log10(R)

Table 3-5 TTS and PTS onset thresholds for seals (phocids) exposed to impulsive noise in water (from Southall et al, 2019)

	TTS onset: SEL (weighted) dB re 1 μPa²s	TTS onset: Peak SPL (unweighted) dB re 1 μPa	PTS onset: SEL (weighted) dB re 1 μPa²s	PTS onset: Peak SPL (unweighted) dB re 1 μPa
Phocids in water	170	**212**	185	**218**

Comparison of the noise levels of the proposed piling works with the criteria levels for TTS and PTS onset in seals indicates that the Peak SPL (at 10 m) would not exceed the noise thresholds for TTS or PTS onset for seals in water for any of the proposed piling installation methods. Noise levels decrease with distance from source, therefore only harbour seals at very close proximity (<10 m) to the piling activities could potentially be at risk from injury or disturbance from the in-water piling activities, in the absence of mitigation.

The timing of the in-water construction works is scheduled to occur in four phases (see Table 1-2). Piling activities will be required for Works No 1-3 and may be required for Work No. 4. The first phase (Work No.4) is scheduled to occur in Q4 2026 and if piling is required, this will occur over a period of 3-4 days. Piling operations for Works No 1-3 are anticipated to last up to two weeks, three weeks and six weeks respectively.

JNCC, along with statutory nature conservation agencies, have produced a protocol to protect marine mammals from injury and disturbance that is considered 'best practice' for piling operations (JNCC, 2010). JNCC's Standard Piling Protocol for minimising the risk of injury to marine mammals from piling noise (JNCC, 2010) will be followed to ensure that noise arising from the piling operations will not result in injury to any marine mammals (including harbour seals) in close proximity to the piling operations. The following measures from the protocol will be implemented:

- A Marine Mammal Protection Plan (MMMP) will be developed that includes key provisions of the JNCC protocol.
- The MMMP will include provisions for a dedicated Marine Mammal Observer (MMO) to monitor operations before commencing any noisy piling operations. If any harbour seals or other marine mammals are observed within the mitigation zone (500 m radius around the piling site), the MMMP set out in the CEMD will be implemented as agreed with Marine Directorate and NatureScot.
- The contractor will employ a "soft start" during piling activities to allow any harbour seals or other marine mammals adequate time to disperse from the area with minimal effect.
- The contractor will be required to follow JNCC guidance on piling procedures and to minimise the risk of disturbance and injury to marine mammals.

No requirements for any seasonal restrictions on piling operations have been identified.

This appraisal has been used to ascertain whether the Project will not adversely affect the integrity of Sanday SAC (see Stage 5 (Section 3.1.1).

3.3.2 Potential disturbance of harbour seals (Sanday SAC) from airborne noise during piling activities

Percussive piling produces periodic impulsive noise of high intensity. Noise generated during piling activities will vary depending on several factors however typical in-air noise levels for the proposed piling activities are shown in Table 3-6. Very loud noises can potentially cause temporary or permanent damage to hearing in seals. Hearing damage in seals from multiple impulse noise such as piling, may occur at noise levels exceeding 138 dB(A) sound pressure level (see

Table 3-7) therefore there is no potential for the airborne noise from piling activities to result in injury to harbour seals.

Table 3-6 Typical in-air noise levels and noise propagation in-air for the proposed piling operations

Pile type	Installation method	Activity equivalent continuous sound pressure level $L_{Aeq,1h}$ at 10m dB (A)[11]	Maximum Sound Level L_{AFmax} at 10m dB (A)[11]	SPL at 50 m dB(A)	SPL at 100 m dB(A)	SPL at 200 m dB(A)	SPL at 500 m dB(A)	SPL at 1,000 m dB(A)	SPL at 1,200 m dB(A)
Sheet piles (~15 m)	Impact hammer driven	85–95	100–115	71-81	65-75	59-69	50-60	45-55	43.5-53.5
Sheet piles (~15 m)	Vibratory hammer	80–90	90–100	66-76	60-70	54-64	46-56	40-50	38.5-48.5
Tubular piles (15 m × 400 mm Ø)	Impact hammer driven	90–100	115–125	76-86	70-80	64-74	56-66	50-60	48.8-58.5
Tubular piles (15 m × 400 mm Ø)	Vibratory hammer	85–95	95–105	71-81	65-75	59-69	50-60	45-55	43.5-53.5

Table 3-7 TTS and PTS onset thresholds for seals (phocids) exposed to impulsive noise in air (from Southall et al, 2019)

	TTS onset: SEL (weighted) dB re 1 μPa^2s	TTS onset: Peak SPL (unweighted) dB re 1 µPa	PTS onset: SEL (weighted) dB re 1 μPa^2s	PTS onset: Peak SPL (unweighted) dB re 1 µPa
Phocids in air	123	**138**	138	**144**

Harbour seals are sensitive to disturbance when they are hauled out. There is a designated seal haul-out[20] for harbour seals located 1.2 km to the north of the Project (see Figure 3.2). The responses of seals to human-induced disturbance at haul out sites is likely to be site and context specific and vary with the type of disturbance and time of year (SCOS, 2021). Harbour seals show strong site fidelity to haul outs even when subject to repeated disturbance (Paterson et al, 2019). Responses to disturbance may range from increased alertness to flushing of animals into the water.

The period of highest sensitivity to disturbance for harbour seals is during the pupping season (June – July) when repeated disturbance has the potential to affect the survival of pups. Disturbance that results in mother seals entering the water during suckling, reduces the time spent nursing pups and although pups can swim from birth, there is the potential for mothers and pups to become separated leading to pup abandonment and reduced pup survival. Seals are

[20] N00 021 North West Water Sound, West Burray

also sensitive to disturbance during the moulting period (August) when disruption to the skin and hair renewal processes could occur (SCOS, 2021).

Piling could potentially coincide with the breeding or moulting period for harbour seals during Works No 1-3 when piling is scheduled to occur in Q2-Q3 over a period of 2 weeks (Work No 1), three weeks (Work No. 2) and six weeks (Work No. 3).

The location of the nearest designated seal haul out is located 1.2 km to the north of the piling works. The airborne noise from piling activities would be a novel source of noise, however as the loudness of the noise reduces with distance from the noise source, the levels of noise audible at the designated seal haul-out would be between 38.5 and 58.5 dB (A) which is equivalent to the noise level of an ordinary spoken conversation[21]. These low levels of noise would not be anticipated to result in any disturbance effects to harbour seals present at the haul-out site.

This appraisal has been used to ascertain whether the Project will not adversely affect the integrity of Sanday SAC (see Stage 5 (Section 3.1.2).

3.1 STAGE 5: CAN IT BE ASCERTAINED THAT THE PROPOSAL WILL NOT ADVERSELY AFFECT THE INTEGRITY OF THE SITE?

3.1.1 Potential for auditory injury and disturbance of harbour seals (Sanday SAC) from underwater noise during piling activities

Based on this appraisal, it is concluded that only harbour seals within very close proximity (<10 m) to the piling activities could potentially be at risk from injury or disturbance from the in-water piling activities however implementation of the mitigation measures as detailed in the MMMP will help to ensure that no harbour seals are within the vicinity of the works, before piling commences.

When considered either alone or cumulatively, any resulting effects in relation to auditory injury or disturbance of harbour seals from underwater noise during piling activities would not result in a permanent reduction in the harbour seal population of Sanday SAC, therefore CO 2a would not be undermined. It can be concluded that there will be no adverse effects on site integrity for Sanday SAC for harbour seal (Table 3-8).

Table 3-8 Conclusions of appropriate assessment relating to potential for auditory injury and disturbance of harbour seals (Sanday SAC) from underwater noise during piling activities

Qualifying feature	Relevant conservation objective	Conclusion of appropriate assessment
Harbour seal	CO 2a Harbour seal are a viable component of the Sanday SAC	No adverse effects on site integrity.

3.1.2 Potential disturbance of harbour seals (Sanday SAC) from airborne noise during piling activities

Based on this appraisal, it is concluded that the airborne noise levels from piling activities are well below the thresholds for TTS or PTS onset for harbour seals. The reduction in noise with distance from the source means that at the nearest designated haul out, the audible noise from the piling works would be at levels comparable to a normal conversation therefore there is unlikely to be any disturbance effects at the haul out site as a result of piling activities.

[21] https://rnid.org.uk/

When considered either alone or cumulatively, any resulting effects in relation to disturbance of harbour seals (Sanday SAC) from airborne noise during piling activities would not result in a permanent reduction in the harbour seal population of Sanday SAC, therefore CO 2a would not be undermined. It can be concluded that there will be no adverse effects on site integrity for Sanday SAC for harbour seal (Table 3-9).

Table 3-9 Conclusions of appropriate assessment relating to disturbance of harbour seals (Sanday SAC) from airborne noise during piling activities

Qualifying feature	Relevant conservation objective	Conclusion of appropriate assessment
Harbour seal	CO 2a Harbour seal are a viable component of the Sanday SAC	No adverse effects on site integrity.

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5 APPENDICES

APPENDIX A COMPARISON OF POPULATION ESTIMATES OF INSHORE WINTERING WATERFOWL SURVEYS

A comparison of the DAS population estimates with those from the previous survey of the Scapa Flow proposed SPA in 2017/18 is presented in Appendix table A-1.

The DAS population estimates from the 2021/22 and 2022/23 surveys are lower for many of the SPA qualifying features than estimates from the previous count in 2017/18. This could be due to a number of factors:

- The 2017/18 count (Jackson, 2018) covered a larger survey area. In 2017/18, the survey area covered the larger proposed SPA (pSPA) boundary whereas the 2021/22 and 2022/23 DAS covered the final SPA boundary, so the population estimates are not directly comparable.
- The population estimates based on the 2017/18 counts are derived from multiple surveys within a single winter season rather than the single snapshot DAS so are not directly comparable.
- The 2017/18 counts included birds (such as common eider and shag) roosting on land above the high tide mark whereas the DAS covered only up to high-tide mark, so any roosting birds above the high-tide mark were not recorded.
- Weather and sea conditions during the DAS may have affected the detectability of birds (the weather was better in the January 2023 surveys compared to February 2022).
- There is natural variation in the distribution of birds between days and throughout the winter season so it is possible that the timings of the single snapshot DAS coincided with periods of naturally low bird abundance.

Appendix table A-1 Comparison of SPA population estimates derived from the HiDEF 2021/22 and 2022/23 DAS with counts from the 2017/18 survey

Scapa Flow SPA qualifying feature	DAS February 2022 (SPA boundary) (Peters-Grundy et al, 2026)	DAS January 2023 (SPA boundary) (Peters-Grundy et al, 2026)	2017/18 count (pSPA boundary) (Jackson, 2018)
Great northern diver	Design-based strip transect analysis 263 (95% CI 174 - 369) Bayesian analysis 262 (95% credible limits 197-343)	Design-based strip transect analysis 919 (95% CI 572 – 1,310) Bayesian analysis **1,072** (95% credible limits 884-1,232)	571 - 1,016
Black-throated diver	Design-based strip transect analysis 13 (95% CI 0 - 32) Bayesian analysis not undertaken (too few observations)	Design-based strip transect analysis 30 (95% CI 0 - 84) Bayesian analysis not undertaken (too few observations)	15 - 39

Scapa Flow SPA qualifying feature	DAS February 2022 (SPA boundary) (Peters-Grundy et al, 2026)	DAS January 2023 (SPA boundary) (Peters-Grundy et al, 2026)	2017/18 count (pSPA boundary) (Jackson, 2018)
Slavonian grebe	Design-based strip transect analysis 73 (95% CI 29 - 132) Bayesian analysis: 70 (95% credible limits 40-123)	Design-based strip transect analysis 100 (95% CI 50 – 159) Bayesian analysis: **114** (95% credible limits 69-175)	67 - 161
European shag	Design-based strip transect analysis 130 (95% CI 58 - 227) Bayesian analysis: 134 (95% credible limits 88-193)	Design-based strip transect analysis 764 (95% CI 253 – 1,416) **872** (95% credible limits 597-1,560)	582 - 3,726
Common eider	Design-based strip transect analysis 581 (95% CI 263 – 961) Bayesian analysis: 676 (95% credible limits 534-824)	Design-based strip transect analysis 1,456 (95% CI 454 – 2,938) **1,504** (95% credible limits 1,322-1,706)	1,696 - 2,324
Long-tailed duck	Design-based strip transect analysis 1,381 (95% CI 719 – 2,160) Bayesian analysis: 1,502 (95% credible limits 1,279-1,792)	Design-based strip transect analysis 3,149 (95% CI 625 – 7,559) **3,678** (95% credible limits 3,321-4,343)	893 - 1,996
Red-breasted merganser	Design-based strip transect analysis 79 (95% CI 25 - 157) Bayesian analysis: 102 (95% credible limits 56-200)	Design-based strip transect analysis 330 (95% CI 147 - 569) **338** (95% credible limits 255-435)	200 - 370