TTS

11.10.7.19 The following section provides the qualitative assessment of the impact of TTS-onset from site surveys (geophysical and geotechnical) on marine mammals. Further detail with regards to the TTS-onset thresholds used and the predicted impact ranges are presented in Seiche Ltd. (2022).

11.10.7.20 The Subsea Noise Assessment (Seiche Ltd., 2022) has concluded that for non-impulsive geophysical survey sound sources (MBES, SSS and SBP), cumulative TTS could occur up to 3,150 m from the sound source. For the MBES, the greatest predicted range for cumulative TTS is 33 m for harbour porpoise (VHF cetaceans). For the SSS, the greatest predicted range for cumulative TTS is 97 m, for harbour porpoise (Seiche Ltd., 2022). For the SBP, the greatest predicted range for cumulative TTS is 3,150 m for harbour porpoise (Seiche Ltd., 2022). USBL were not included in the Subsea Noise Assessment (Seiche Ltd., 2022) however, CSA Ocean Sciences Inc. (2020) estimated that the maximum distance to the Level B threshold (TTS[5]) is 50 m for all marine mammal hearing groups.

11.10.7.21 The Subsea Noise Assessment (Seiche Ltd., 2022) has concluded that for impulsive geophysical survey sound sources (seismic refraction and sparker), instantaneous TTS could occur up to 40 m from the source and cumulative TTS could occur up to 1,524 m from the sound source (Seiche Ltd., 2022). For the seismic refraction surveys, the greatest predicted impact range for instantaneous TTS is 40 m and for cumulative TTS is 1,524 m, for harbour porpoise (Seiche Ltd., 2022). For sparker surveys, the greatest predicted impact range for instantaneous TTS is 32 m and for cumulative TTS is 68 m, for harbour porpoise (Seiche Ltd., 2022).

11.10.7.22 The Subsea Noise Assessment (Seiche Ltd., 2022) has concluded that for geotechnical surveys (seismic CPT and vibrocore sampling), instantaneous TTS could occur up to 33 m from the sound source and cumulative TTS could occur up to 856 m from the sound source (Seiche Ltd., 2022). For the seismic CPT, the greatest predicted impact range for instantaneous TTS is 33 m and for cumulative TTS is 856 m for harbour porpoise (Seiche Ltd., 2022). For vibrocore sampling, the greatest predicted impact range for cumulative TTS is 607 m for harbour porpoise (Seiche Ltd., 2022).

11.10.7.23 It is important to note that the Factored In Measures (see Table 11.15) which will include the implementation of a project-specific mitigation protocol during the geophysical surveys, will reduce the risk of marine mammal experiencing TTS although the focus of this will be to minimise the risk of PTS. As a minimum it will adhere to international best practice, including DAHG (2014) guidance.

BEHAVIOURAL DISTUBANCE

11.10.7.24 The following section provides the assessment of the impact of behavioural disturbance from site surveys (geophysical and geotechnical) on marine mammals. For impulsive noise sources, the threshold for mild disturbance is 140 dB re 1 µPa (rms) and the threshold for strong disturbance is 160 dB re 1 µPa (rms). For continuous/non-impulsive noise the threshold for disturbance is 120 dB re 1 µPa (rms). Further detail with regard to the thresholds used and the predicted impact ranges are presented in Seiche Ltd. (2022).

11.10.7.25 The Subsea Noise Assessment (Seiche Ltd., 2022) concluded that for non-impulsive geophysical survey sound sources, disturbance could occur for all FHGs up to 4,950 m from the sound source. USBL were not included in the Subsea Noise Assessment (Seiche Ltd., 2022)

however, CSA Ocean Sciences Inc. (2020) estimated that the maximum distance to the Level B threshold (disturbance[9]) is 50 m for all marine mammal hearing groups.

11.10.7.26 For impulsive sound sources, disturbance could occur out to 700 m for a sparker and out to 1,324 m for seismic refraction for all FHGs (Seiche Ltd., 2022).

11.10.7.27 The Subsea Noise Assessment concluded that for geotechnical surveys, disturbance could occur for all FHGs out to 10 km for vibrocore surveys and 1.5 km for seismic CPT surveys for strong disturbance (Seiche Ltd., 2022).

11.10.7.28 Therefore, the impact of disturbance to all marine mammal species from site surveys is considered to result in a small proportion of the population affected, occur frequently throughout the construction phase, the effect is reasonably expected to occur, have intermittent and reversible consequences, and is very unlikely to affect the population trajectory. Therefore, the magnitude of impact is assessed Low adverse for all marine mammal species.

SIGNIFICANCE OF EFFECT

AUDITORY INJURY – PTS

11.10.7.29 For all marine mammal species, the impact of PTS-onset from underwater noise during site surveys has been assessed as **Negligible**, with the sensitivity of the receptor being **Low.** Therefore, the significance of effect from PTS-onset to all marine mammal species from underwater noise during site surveys is **Not Significant**, which is **not significant** in EIA terms.

BEHAVIOURAL DISTURBANCE

11.10.7.30 For all marine mammal species, the impact of behavioural disturbance from underwater noise during site surveys has been assessed as **Low adverse**, with the sensitivity of the receptor being **Low**. Therefore, the significance of effect from behavioural disturbance to all marine mammal species from underwater noise during site surveys is **Slight adverse**, which is **not significant** in EIA terms.

RESIDUAL EFFECT ASSESSMENT

11.10.7.31 The significance of effect from injury and/or disturbance to marine mammals from underwater noise during site surveys is not significant in EIA terms. Therefore, no additional mitigation to the Factored In Measures already identified in Table 11.15 are considered necessary. No ecologically significant adverse residual effects have been predicted in respect of marine mammals.

11.10.7.32 It is important to note that all cetaceans are an EPS and under EPS legislation it is an offence to injure a single individual (this includes PTS auditory injury). The Developer has conducted an Annex IV Species Risk Assessment (RPS, 2023) for species listed under Annex IV of the Habitats Directive and EPS to determine if the proposed surveys could have the potential risk of auditory injury or disturbance to these species and outlines proposed mitigation within the risk assessment report to further reduce the risk of injury and disturbance. Within this document, the Developer has committed to a project-specific mitigation protocol during the geophysical surveys that will minimise the risk of PTS, and as a minimum will adhere to international best practice, including DAHG (2014) guidance (see RPS, 2023).

[9] Level B harassment impacts include TTS and behavioural responses (CSA Ocean Science Inc, 2020)

Operations and Maintenance phase

11.10.7.33 Routine geophysical surveys will be undertaken of the inter-array cables, inter-connector cables, and export cables throughout the operations and maintenance phase. Surveys will occur every six months during the first two years and annually thereafter (Table 11.10).

11.10.7.34 The exact equipment to be deployed during the site surveys are yet to be confirmed, therefore an illustrative assessment has been conducted by assuming that equipment will be the same as that proposed in the FLA. The conclusions of this assessment should be interpreted with a high level of precaution given the lack of information regarding the equipment types that will be used.

MAGNITUDE OF IMPACT

AUDITORY INJURY – PTS

11.10.7.35 Based on the results of the Subsea Noise Assessment (Seiche Ltd., 2022) conducted for site surveys during the construction phase as part of the FLA, and CSA Ocean Sciences Inc. (2020), it is assumed that the magnitude of impact of PTS-onset from surveys during the operations and maintenance phase will be similar, assuming the same equipment is used.

11.10.7.36 Therefore, the impact of PTS-onset to all marine mammal species from site surveys is considered to result in a very small proportion of the population affected, although auditory injury (PTS) is expected to have a permanent change to the receptor. The impact is expected to occur relatively frequently throughout the construction phase, although the effect is unlikely to occur given implementation of Factored In Measures and is very unlikely to affect the population trajectory. Therefore, the magnitude of impact is assessed as Negligible adverse for all marine mammal species.

TTS

11.10.7.37 The impact ranges for TTS-onset from site surveys on marine mammals are expected to be similar to those presented in Seiche Ltd. (2022) and CSA Ocean Sciences Inc. (2020), assuming the same equipment is used in both the construction and operations and maintenance phases (see paragraphs 11.10.7.19 to 11.10.7.22).

11.10.7.38 It is important to note that the Factored In Measures (see Table 11.15) which will include the implementation of a project-specific mitigation protocol during the geophysical surveys, will reduce the risk of marine mammal experiencing TTS although the focus of this will be to minimise the risk of PTS. As a minimum it will adhere to international best practice, including DAHG (2014) guidance.

BEHAVIOURAL DISTURBANCE

11.10.7.39 Based on the results of the Subsea Noise Assessment (Seiche Ltd., 2022) conducted for site surveys during the construction phase as part of the FLA, and CSA Ocean Sciences Inc. (2020), it is assumed that the magnitude of impact of behavioural disturbance from surveys during the operations and maintenance phase will be similar, assuming the same equipment is used.

11.10.7.40 Therefore, the impact of disturbance to all marine mammal species from site surveys is considered to result in a small proportion of the population affected, occur frequently throughout the construction phase, the effect is reasonably expected to occur, have intermittent and reversible consequences, and is very unlikely to affect the population trajectory. Therefore, the magnitude of impact is assessed Low adverse for all marine mammal species.

SIGNIFICANCE OF EFFECT

AUDITORY INJURY – PTS

11.10.7.41 For all marine mammal species, the impact of PTS-onset from underwater noise during site surveys has been assessed as **Negligible**, with the sensitivity of the receptor being **Low.** Therefore, the significance of effect from PTS-onset to all marine mammal species from underwater noise during site surveys is **Not Significant**, which is **not significant** in EIA terms.

BEHAVIOURAL DISTURBANCE

11.10.7.42 For all marine mammal species, the impact of behavioural disturbance from underwater noise during site surveys has been assessed as **Low adverse**, with the sensitivity of the receptor being **Low**. Therefore, the significance of effect from behavioural disturbance to all marine mammal species from underwater noise during site surveys is **Slight adverse**, which is **not significant** in EIA terms.

RESIDUAL EFFECT ASSESSMENT

11.10.7.43 The significance of effect from injury and/or disturbance to marine mammals from underwater noise during site surveys is not significant in EIA terms. Therefore, no additional mitigation to the Factored In Measures already identified in Table 11.15 are considered necessary. No ecologically significant adverse residual effects have been predicted in respect of marine mammals.

11.10.8 Impact 8 – Injury and/or disturbance to marine mammals from dredging and trenching

11.10.8.1 As part of seabed preparation for construction, seabed lowering and feature clearance may be required by dredging. Additional dredging activities may be required during the operation and maintenance phase for scour protection repair and maintenance of WTG and OSP foundations, as well as maintenance of inter-array cables, interconnector cables and offshore export cables.

11.10.8.2 Trenching will be required during the offshore cable installation; it is expected that the majority of the cable route will be buried via the use of jet trenching.

11.10.8.3 The key parameters for assessment of this pathway for Project Design Option 2 are presented in Table 11.9. Activities of relevance are those that produce underwater non-impulsive noise such as backhoe dredging, grab or clamshell dredging, mass flow excavation, water injection dredging, suction hopper dredging, jet trenching, mechanical trenching and vertical injector tools.

11.10.8.4 Underwater noise has the potential to impact marine mammals if the frequency is within their hearing range (Table 11.18) and the sound levels are greater than the relevant thresholds for the FHG in which the species is categorised (Table 11.20; Southall *et al.*, 2019). The source levels for dredging and trenching are presented in Table 11.66. Full details of the underwater noise modelling methodology, assumptions, and resulting impact ranges for dredging (backhoe), dredging (suction) and trenching are detailed in Volume III, Appendix 11.1: Underwater Noise Assessment (Revised March 2026). Source levels for TSHD are presented in McQueen *et al.* (2019).

Table 11.66: Estimated source levels for dredging and trenching

Activity	SPL_{pk} (dB re 1µPa @ 1 m)
Dredging (backhoe)	165
Dredging (suction)	186
TSHD	186
Trenching	172

SENSITIVITY OF THE RECEPTOR

AUDITORY INJURY-PTS

11.10.8.5 Non-piling construction activities such as dredging and trenching produce a continuous and non-impulsive noise which is generally considered to be very unlikely to result in PTS in marine mammals (Todd *et al.*, 2015; Southall *et al.,* 2019). The main energy of non-piling construction activities such as dredging and trenching, is listed as being below 1 kHz (Todd *et al.*, 2015). This is within the estimated peak sensitivity range of minke whales (LF cetacean) but out of the peak hearing ranges of harbour porpoise (VHF cetaceans), dolphin (HF cetaceans) and seal species (PCW).

11.10.8.6 If PTS were to occur as a result of these construction activities, there would be little impact to vital rates in harbour porpoise (VHF cetaceans), dolphin (HF cetaceans) and seal species (PCW), as the hearing sensitivity of these receptors is relatively poor below 1 kHz (Southall *et al.*, 2019).

11.10.8.7 Cetaceans with a low frequency hearing range, such as minke whales (Southall *et al.*, 2019), are likely to be more sensitive to a PTS in this frequency range if it were to occur. Communication signals between minke whales have been found to be below 2 kHz (Edds-Walton, 2000; Mellinger *et al.*, 2000; Gedamke *et al.*, 2001; Risch *et al.*, 2013; 2014). While knowledge about the hearing ranges of baleen whales is not fully understood, it is assumed that the hearing frequency ranges of cetaceans are similar to the sounds they produce (White and Todd, 2024). Tubelli *et al.* (2012) estimated the hearing frequency range in minke whales to be approximately between 30 Hz and 7.5 kHz or between 100 Hz and 25 kHz depending on the stimulation location. As demonstrated by the above studies, the hearing ranges of these LF receptors are more likely to overlap with the non-impulsive noise produced during these construction activities.

11.10.8.8 Although PTS is a permanent auditory effect, exposure to noise levels capable of inducing TTS is more likely to elicit behavioural avoidance rather than injury (Southall *et al.,* 2007). Evidence from other studies demonstrates that harbour porpoises exposed to similar continuous noise sources typically move away from the source, thereby leaving the zone where PTS onset could occur (Hermannsen *et al.,* 2015). In addition, vessel presence itself is expected to act as a deterrent, further reducing the likelihood of animals remaining in the immediate vicinity at the onset of construction activities (Benhemma-Le Gall *et al.,* 2023).

11.10.8.9 Therefore, it is unlikely that PTS from trenching and dredging would significantly impact the survival of reproductive rates of marine mammal species. As a result, they are considered to be of high adaptability, reasonable tolerance, and are of high value, though recovery from PTS is not expected should it occur. Therefore, all marine mammal species are assessed as having a Low sensitivity to auditory injury from dredging and trenching.

BEHAVIOURAL DISTURBANCE

11.10.8.10 Limited information is currently available regarding the sensitivity of marine mammals to other construction activities such as dredging and trenching, though the few studies currently available primarily focus on the impact of disturbance from dredging. These studies have confirmed that underwater noise from dredging activities can cause displacement and disturbance to marine mammals (Culloch *et al.*, 2016; Pirotta *et al.*, 2013). However, it is difficult to determine the sensitivity specifically to disturbance from dredging activities in isolation from the disturbance from vessel presence required for the activity (Todd *et al.*, 2015).

11.10.8.11 Dredging activities have been shown to cause harbour porpoise displacement within a radius of 5 km around the dredging location (Verboom, 2014). Diederichs *et al.* (2010) noted there was short term avoidance (around 3 hours) at distances of up to 600 m from a trailing suction hopper dredger, but no significant long-term impacts. Modelling potential impacts of dredging of a port expansion predicted a disturbance range of 400 m, with a more conservative approach predicting avoidance of harbour porpoise up to 5 km (McQueen *et al.* 2020). The presence of vessels has been shown to deter and disturb harbour porpoise out of the area before any non-piling construction activities start (Brandt *et al.*, 2018). Therefore, it is highly unlikely that harbour porpoise will be present in the immediate vicinity at the start of any dredging or trenching activity.

11.10.8.12 A study analysing the impacts of dredging on bottlenose dolphins, observed a decrease in bottlenose dolphin presence in foraging areas of Aberdeen harbour with an increase in intensity of dredging activity, with bottlenose dolphins absent from the vicinity for five weeks during the initial dredge operations (Pirotta *et al.*, 2013). The presence of shipping activity in this area is high all year round, with dolphins in the region considered to be habituated to high levels of vessel presence as a result. Therefore, in this instance, it was concluded that displacement was a direct result of dredging. In western Australia, Marley *et al.* (2017a), reported varied responses to dredging between sites. No bottlenose dolphins were sighted during backhoe dredging activities at one site, while dolphins remained using the other site despite the same dredging activities occurring. This suggests that the response may be context specific. A study conducted in northwest Ireland, construction related activity (including dredging and trenching) did not result in any evidence of a negative impact to common dolphins (Culloch *et al.*, 2016).

11.10.8.13 The same study conducted by Culloch *et al.* (2016) found evidence that the fine-scale temporal occurrence of minke whales in northwest Ireland decreased on days when construction activity and associated vessel noise were present, indicating a short-term avoidance response to disturbance. Similar avoidance behaviour has been recorded elsewhere, controlled exposure experiments show that minke whales move rapidly and consistently away from elevated acoustic stimuli, demonstrating a capacity for displacement when exposed to anthropogenic noise sources (Boisseau *et al.,* 2021). However, minke whales are highly adapted to spatial movement. Tracking and habitat-use studies demonstrate that they routinely forage across broad spatial ranges, shifting their distribution in response to prey availability at both fine and regional scales (MacDougall and Robinson, 2025). Their foraging behaviour is adaptable, with individuals exploiting a variety of prey resources, including surface-associated and deeper-water prey patches, and adjust their feeding strategies seasonally to follow movements of prey (sandeels, sprat, and krill) (Friedlaender *et al.,* 2014; Cade *et al.,* 2023). Further, studies indicate that minke whales undertake broad-scale, seasonal movements across diverse habitats over the annual cycle (Eerkes-Medrano *et al.,* 2021).

11.10.8.14 Collectively, these studies show that minke whales possess a high degree of foraging flexibility and can access alternative prey patches across extensive spatial ranges. Given their large body size, substantial energetic reserves, and broad-scale movement capacity, minke whales are well equipped to tolerate temporary displacement from localised foraging areas. Consequently, they are expected to recover from any short-term disruption to foraging more

effectively than smaller species such as harbour porpoise, and temporary displacement is unlikely to result in measurable impacts on vital rates.

11.10.8.15 A study on the effects of dredging sound on aquatic life, demonstrated using acoustic modelling for pinnipeds that displacement could be caused to individuals up to 5 km from site (depending on equipment specification) (McQueen *et al.,* 2020).

11.10.8.16 Based on evidence available, all marine mammal species within this assessment are considered to be of high adaptability, reasonable tolerance, high recoverability, and of high value. Therefore, all marine mammal species are assessed as having a Low sensitivity to behavioural disturbance from dredging and trenching.

CONSTRUCTION PHASE

MAGNITUDE OF IMPACT

AUDITORY INJURY- PTS

11.10.8.17 The following section provides the assessment of the impact of PTS-onset from dredging and trenching on marine mammals. Further detail with regards to the PTS-onset thresholds used and the predicted impact ranges are presented in Volume III, Appendix 11.1: Underwater Noise Assessment (Revised March 2026).

11.10.8.18 Volume III, Appendix 11.1: Underwater Noise Assessment (Revised March 2026) concluded that for non-impulsive other construction activities (including dredging and trenching), injury in the form of cumulative PTS could occur up to 50 m from the sound source. For trenching, backhoe dredging and suction dredging the impact range for cumulative PTS for all marine mammal groups is <50 m (see Volume III, Appendix 11.1: Underwater Noise Assessment (Revised March 2026)). For TSHD the maximum impact range for cumulative PTS for all marine mammal groups is <50 m (SLR, 2024).

11.10.8.19 The impact of PTS-onset to all marine mammal species from site surveys is considered to result in a very small proportion of the population affected, although auditory injury (PTS) is expected to have a permanent change to the receptor. The impact is expected to occur relatively frequently throughout the construction phase, although the effect is unlikely to occur given the natural avoidance response of marine mammals to vessels (prior to commencing dredging or trenching), and any effect is very unlikely to affect the population trajectory. Therefore, the magnitude of impact is assessed as Negligible adverse for all marine mammal species.

TTS

11.10.8.20 Volume III, Appendix 11.1: Underwater Noise Assessment (Revised March 2026) concluded that for non-impulsive other construction activities (dredging and trenching) impacts in the form of cumulative TTS could occur up to 820 m from the sound source. For trenching and dredging the impact range for cumulative TTS for all marine mammal groups except VHF cetaceans (harbour porpoise) is <50 m (see Volume III, Appendix 11.1: Underwater Noise Assessment (Revised March 2026)). For harbour porpoise (VHF cetacean), whilst backhoe dredging has a maximum impact range for cumulative TTS of <50 m, suction dredging indicates a maximum impact range for cumulative TTS as 250 m, and for trenching the maximum impact range is 820 m. For TSHD the maximum impact range for cumulative TTS is <1 km (SLR, 2024). However, as outlined in paragraph 11.7.5.6, there is no assessment of the number of animals, magnitude, sensitivity, or significance of effect is given.

BEHAVIOURAL DISTURBANCE

11.10.8.21 The following section provides the assessment of the impact of behavioural disturbance from dredging and trenching on marine mammals. The main energy of noise from dredging and trenching is largely below 1 kHz, which is within the peak hearing range of minke whales but outside of the peak hearing sensitivity of porpoise, dolphin and seal species.

11.10.8.22 Should any disturbance occur it is expected that the disturbance from dredging would be limited to a maximum of 5 km impact radius and that any animals that are displaced would be expected to return once the dredging works had ceased (McQueen *et al.*, 2020). There are no known data available for the effect of trenching on marine mammals. Therefore, it has been assumed that deterrence ranges would be similar to those from dredging and, as such, would be within 5 km, and it is expected that any animals that are displaced would be expected to return once the works had ceased.

11.10.8.23 Therefore, the impact of disturbance to all marine mammal species from trenching and dredging is considered to result in highly localised effects, occur frequently throughout the construction phase, the effect is reasonably expected to occur, have intermittent and reversible consequences, and is very unlikely to affect the population trajectory. Therefore, the magnitude of impact is assessed Low adverse for all marine mammal species.

SIGNIFICANCE OF EFFECT

AUDITORY INJURY - PTS

11.10.8.24 For all marine mammal species, the magnitude of PTS-onset from underwater noise from dredging and trenching has been assessed as **Negligible**, with the sensitivity of the receptor being **Low**. Therefore, the significance of effect from PTS-onset to all marine mammal species from underwater noise from dredging and trenching is **Not Significant,** which is **not significant** in EIA terms

BEHAVIOURAL DISTURBANCE

11.10.8.25 For all marine mammal species, the impact of behavioural disturbance from underwater noise from dredging and trenching has been assessed as **Low adverse**, with the sensitivity of the receptor being **Low**. Therefore, the significance of effect from behavioural disturbance to all marine mammal species from underwater noise during site surveys is **Slight adverse**, which is **not significant** in EIA terms.

RESIDUAL EFFECT ASSESSMENT

11.10.8.26 The significance of effect from injury and/or disturbance to marine mammals from underwater noise during dredging and trenching is not significant in EIA terms. Therefore, no additional mitigation to the Factored In Measures already identified in Table 11.15 are considered necessary. No ecologically significant adverse residual effects have been predicted in respect of marine mammals.

Operations and Maintenance phase

11.10.8.27 Routine maintenance will take place on the inter-array cables, inter-connector cables and offshore export cables throughout the operations and maintenance phase. Scour protection repair, removal of excess sediment and reburial or exposed cables will take place once every five years.

MAGNITUDE OF IMPACT

AUDITORY INJURY-PTS

11.10.8.28 Based on the results of the Volume III, Appendix 11.1: Underwater Noise Assessment (Revised March 2026) and SLR (2024), it is assumed that the magnitude of impact of PTS-onset from dredging and trenching (including TSHD) during the operations and maintenance phase will be similar to the construction phase, assuming the same equipment is used.

11.10.8.29 Therefore, the impact of PTS-onset to all marine mammal species from dredging and trenching is considered to result in a very small proportion of the population affected, although auditory injury (PTS) is expected to have a permanent change to the receptor. The impact is expected to occur relatively infrequently throughout the operational phase, and the effect is very unlikely to unlikely to occur given natural avoidance behaviour of vessels by marine mammals and is very unlikely to affect the population trajectory. Therefore, the magnitude of impact is assessed as Negligible adverse for all marine mammal species.

TTS

11.10.8.30 The impact ranges for TTS-onset from site surveys on marine mammals are expected to be similar to those presented in Volume III, Appendix 11.1: Underwater Noise Assessment (Revised March 2026) and SLR (2024). It is assumed that the TTS-onset impact range from dredging and trenching during the operations and maintenance phase will be similar to construction phase, assuming the same equipment is used. And, as outlined in paragraph 11.7.5.6, there is no assessment of the number of animals, magnitude, sensitivity, or significance of effect is given.

BEHAVIOURAL DISTURBANCE

11.10.8.31 Based on the information within the literature, disturbance from dredging would be limited to a maximum of 5 km impact radius and any animals that are displaced would be expected to return once the dredging works had ceased (McQueen *et al.*, 2020) with the same deterrence range assumed for trenching due to the lack of data available.

11.10.8.32 Therefore, the impact of disturbance to all marine mammal species from trenching and dredging is considered to result in a small proportion of the population affected, occur infrequently throughout the operational phase, the effect is reasonably expected to occur, have intermittent and reversible consequences, and is very unlikely to affect the population trajectory. Therefore, the magnitude of impact is assessed Low adverse for all marine mammal species.

SIGNIFICANCE OF EFFECT

AUDITORY INJURY- PTS

11.10.8.33 For all marine mammal species, the magnitude of PTS-onset from underwater noise from dredging and trenching has been assessed as **Negligible**, with the sensitivity of the receptor being **Low**. Therefore, the significance of effect from PTS-onset to all marine mammal species from underwater noise from dredging and trenching is **Not Significant**, which is **not significant** in EIA terms

BEHAVIOURAL DISTURBANCE

11.10.8.34 For all marine mammal species, the impact of behavioural disturbance from underwater noise from dredging and trenching has been assessed as **Low** adverse, with the sensitivity of the receptor being **Low**. Therefore, the significance of effect from behavioural disturbance to all

marine mammal species from underwater noise during site surveys is **Slight adverse**, which is **not significant** in EIA terms.

RESIDUAL EFFECT ASSESSMENT

11.10.8.35 The significance of effect from injury and/or disturbance to marine mammals from underwater noise during dredging and trenching is not significant in EIA terms. Therefore, no additional mitigation to the Factored In Measures already identified in Table 11.15 are considered necessary. No ecologically significant adverse residual effects have been predicted in respect of marine mammals.

11.11 Cumulative impacts assessment methodology

11.11.1 Methodology

11.11.1.1 The Cumulative Impact Assessment (CIA) takes into account the impacts associated with the Proposed Development together with other proposed and reasonably foreseeable projects, plans and existing and permitted projects. The projects and plans selected as relevant to the CIA presented within this Chapter are based upon the results of a screening exercise (see Volume III, Appendix 3.2: Cumulative Impact Assessment Screening (Revised March 2026)). Each project and plan has been considered on a case-by-case basis for screening in or out of this Chapter's assessment based upon effect-receptor pathways and the spatial/temporal scales involved.

11.11.1.2 When assessing the potential cumulative impacts of the Proposed Development, it is essential to consider that some projects, particularly those labelled as ‘proposed’ or outlined in development plans, may not materialise or may not fully manifest as described in their worst-case scenarios. Therefore, it is imperative to incorporate a degree of certainty (or uncertainty) regarding the potential impacts from such proposals. For example, projects under construction are likely to contribute to cumulative impacts (assuming effects or spatial pathways exist), whereas proposals awaiting approval are less likely to contribute, as some may not attain approval or may not be realised due to various factors.

11.11.1.3 In light of this, all projects and plans considered alongside the Proposed Development have been categorised into ‘tiers’, reflecting their current stage within the planning and development process. This enables the CIA to present various future development scenarios, each carrying different potential for actualisation. This approach facilitates assigning appropriate weight to each scenario (tier) when evaluating potential cumulative impacts. The tiering methodology is provided in Volume III, Appendix 3.2: Cumulative Impact Assessment Screening (Revised March 2026).

11.11.1.4 In accordance with the UK guidance on cumulative effects assessment for Nationally Significant Infrastructure Projects (Planning Inspectorate, 2024), a reasonable precautionary approach has been adopted to address the future status of Arklow Bank Wind Park 1 (ABWP1), which is not yet confirmed. Where relevant, this includes the assumption of a potential temporal overlap of decommissioning activities of ABWP1 and construction of the Proposed Development.

11.11.1.5 Under this assumption, ABWP1 is considered to be undergoing decommissioning concurrently with construction of the Proposed Development. Although this may result in a degree of overlap or potential double counting of effects, this approach reflects uncertainty surrounding the timing of decommissioning activities and ensures that all reasonably foreseeable potential cumulative effects are appropriately considered.

11.11.1.6 Due to the commitments made by the Developer in respect of the Foreshore Licences FS007339 and FS007555 (Table 11.15), FS007339 and FS007555 have been screened out of the CIA.

Other Phase One offshore wind projects

11.11.1.7 All East Coast Phase One projects (Codling Wind Park, Dublin Array, North Irish Sea Array (NISA), and Oriel) have been awarded a MAC and have formally submitted applications for planning consent. While planning consent has not yet been granted, the potential for overlapping development timelines presents a risk of cumulative effects. Accordingly, the Phase One projects have been screened in as Tier 1 projects for the purposes of the CIA. This approach aligns with a request from ACP that Phase One projects collaborate and share project information where appropriate. Assessment of these projects is therefore based on information shared between the Phase One developers and supplemented by publicly available information, and is considered accurate at the time of preparation of this EIAR.

11.11.1.8 Indicative construction programme information for the Phase One projects were informed by the latest available planning application documentation in the public domain, reviewed in response to the ACP RFIs. The indicative construction periods applied within the CIA are:

- Proposed Development: 2027 – 2030;
- Codling Wind Park: 2026 – 2029;
- Dublin Array: 2029 – 2032;
- NISA: 2027 –2030; and
- Oriel: 2028 – 2030.

11.11.1.9 These construction periods represent overall construction windows and may include foundation installation, cable installation and other associated works. Given the uncertainty in final construction schedules, a precautionary approach has been applied whereby construction, operation and maintenance, and decommissioning activities associated with the Phase One projects are assumed to temporally overlap with those of the Proposed Development. As all Phase One projects comprise of broadly similar activities, the resulting impacts are expected to be similar in nature to those associated with the Proposed Development, with cumulative effects primarily driven by spatial proximity and temporal overlap.

Cumulative iPCoD modelling

11.11.1.10 Given the proximity of the Phase One offshore wind projects to each other, and the associated risk of cumulative effects resulting from disturbance of marine mammals by underwater noise, the iPCoD framework (Harwood *et al.,* 2014; King *et al.,* 2015) was used to predict the potential population consequences of the predicted impacts of disturbance resulting from piling to harbour porpoise, bottlenose dolphin, grey seal, and harbour seal. This approach uses the predicted impacts of disturbance for each of the projects in isolation, and considers their impact cumulatively.

11.11.1.11 iPCoD modelling was conducted using two different indicative piling scenarios to account for Phase One projects that were still considering monopile and pin pile foundations at the time of submission. The scenarios are presented in Table 11.67 below.

11.11.1.12 The methodology, input parameters used, and assumptions made are fully described in Volume III, Appendix 11.3: Phase 1 Irish Offshore Windfarms: Cumulative iPCoD Modelling. However, it is important to note that the precautions built into the iPCoD model mean that the results are considered to be highly precautionary. Despite these limitations and uncertainties, this assessment has been carried out according to best practice and using the best available scientific information. Therefore, the information provided is considered to be sufficient to carry out an adequate assessment, although precaution should be applied when interpreting the results and subsequently in making conclusions.

11.11.1.13 In February 2026, NISA confirmed to the Proposed Development that they had undertaken a design refinement for foundation installation. Jacket foundations will be installed with suction buckets. There will be no piling required for the NISA development.

Table 11.67: Proposed piling scenarios used in iPCoD modelling for the East Coast Phase One offshore wind projects

Scenario 1	Scenario 2
• Monopiles at all five Phase One projects; and • Piling January 2027 to December 2029, inclusive.	• Monopiles at the Proposed Development, Oriel, Codling Wind Park; • Pin pile jackets at NISA and Dublin Array; and • Piling January 2027 to December 2029, inclusive.

Screening projects

11.11.1.14 The selection of projects and plans pertinent to the assessment of impacts to marine mammals is based on an initial screening exercise conducted on a long list. The CIA methodology and long list used in the CIA are detailed in Volume III, Appendix 3.2: Cumulative Impact Assessment Screening (Revised March 2026).

11.11.1.15 To compile the CIA long list, a range has been applied to identify relevant offshore projects to screen in. For marine mammals, with respect to offshore windfarm projects, the range is defined as the species-specific MUs, encompassing the Celtic and Irish Sea MU for harbour porpoise, the Irish Sea MU for bottlenose dolphins, the Celtic and Greater North Seas MU for common dolphins, Risso's dolphins, and minke whales, and the East RoI MU for both harbour and grey seals. For all other planned offshore projects, the International Council for the Exploration of the Sea (ICES) 7a Celtic Sea region was used for screening due to the smaller scale that these projects have in nature in comparison to commercial offshore windfarms. Each project, plan, or activity has then been evaluated and screened in or out based on effect-receptor pathways, data reliability, and the temporal and spatial scales involved.

11.11.1.16 The temporal scope considered in the CIA for marine mammals spans from 2021 to 2034 inclusive. This timeframe facilitates a quantitative assessment of impacts to the MUs both prior to the construction of the Proposed Development (since the baseline data were compiled), and during the potential construction window for the Proposed Development. The anticipated construction timeline for the Proposed Development is from 2027 to 2030, with piling activities occurring in 2028 and assuming that UXO clearance will occur the year beforehand (i.e. 2027). It is therefore important to note that while the assessment of magnitude considers the full temporal scope of 2021 to 2034, importance is placed on the proportion of the population that will be potentially impacted by high-noise construction activities (including piling and UXO clearance) at the Proposed Development cumulatively with Tier 1 and 2 projects during the construction period (2027 to 2030).

11.11.1.17 As a result, the following offshore project types were screened out of the CIA short list:

- All projects located outside of the relevant species MU boundary;
- All projects that are already operational (prior to 2021) (given that they are considered to have existing impacts included within the baseline);
- All projects where there is no expected temporal overlap with the construction window of the Proposed Development; and
- All projects where the construction timeframe is unknown.

Projects screened in

11.11.1.18 The specific projects screened into this CIA, and the tiers into which they have been allocated are presented in Table 11.68. Timeline information is sourced from Environmental

Statement (ES) and Preliminary Environmental Impact Report (PEIR) Chapters that are publicly available.

11.11.1.19 Numerous other projects are situated within the Irish Sea and the relevant species MUs; however, the majority of these projects are in the conceptual or early planning stages, and there is no publicly available information regarding the construction timeline for these projects.

Table 11.68: List of other projects and plans considered within the CIA

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
Tier 1							
Codling Wind Park	Application submitted	10.3	9.4	'Relevant Project'. Application submitted under the Maritime Area Planning (MAP) Act 2021.	2026 – 2029	2029 onwards	Potential for temporal overlap with Proposed Development construction phase.
Dublin Array	Application submitted	25.8	24.9	'Relevant Project'. Application submitted under the MAP Act 2021.	2029 – 2032	2032 onwards	Potential for temporal overlap with Proposed Development construction phase.
North Irish Sea Array (NISA)	Application submitted	65.1	64.1	'Relevant Project'. Application submitted under the MAP Act 2021.	2027 – 2030	2030 onwards	Potential for temporal overlap with Proposed Development construction phase.
Oriel	Application submitted	108.1	107.2	'Relevant Project'. Application submitted under the MAP Act 2021.	2028 – 2030	2030 onwards	Potential for temporal overlap with Proposed Development construction phase.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
Greenlink Interconnector	Under construction	79.6	79.0	Power cable.	2024 – 2026	From 2027	Potential cumulative impact exists.
Erebus Floating Wind Demo	Consented	133.3	132.7	Consented for up to 7 turbines.	2023 – 2026	From 2027	Potential cumulative impact exists.
Awel y Môr	Consented	148.5	147.6	Consented for up to 50 turbines.	2023 – 2027	From 2028	Potential for temporal overlap with Proposed Development construction phase.
Morgan	Pre-planning application	165.3	164.3	English Round 4 project with up to 96 turbines.	2025 – 2028	From 2029	Potential for temporal overlap with Proposed Development construction phase.
North Hoyle	Operational	170.9	170.1	Decommissioning of 60 MW offshore windfarm comprising of 30 turbines.	2031 – 2034	Pre 2021-2030	Potential cumulative impact exists.
White Cross	Planning application submitted	174.7	174.0	A 100 MW floating offshore wind demonstration	2025 – 2027	From 2028	Potential for temporal overlap with Proposed Development

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
				project with up to 8 turbines.			construction phase.
Burbo Bank	Operational	189.9	189.0	Decommissioning of original 90 MW site comprising of 25 turbines.	2031 – 2034	Pre 2021-2030	Potential cumulative impact exists.
Walney 1	Operational	199.1	198.1	Decommissioning of 184 MW offshore windfarm comprising of 51 monopiles.	2031 – 2034	Pre 2021-2030	Potential cumulative impact exists.
TwinHub	Operational	256.2	255.6	Floating wind demonstration site with up to 4 turbines.	2024 – 2026	From 2027	Potential cumulative impact exists.
Nearte Na Goithe	Operational	435.4	434.4	A 450 MW offshore windfarm with up to 54 turbines.	2023 – 2026	From 2027	Potential cumulative impact exists.
Rampion 2	Consented	450.7	450.0	An extension of Rampion offshore windfarm with 90 turbines.	2025 – 2028	From 2029	Potential for temporal overlap with Proposed Development construction phase.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
Inch Cape	Under construction	456.4	455.4	A 1.1 Gigawatt (GW) Scottish offshore windfarm with up to 72 turbines.	2025 – 2026	From 2027	Potential cumulative impact exists.
Seagreen Phase 1	Operational	474.6	473.6	An operational offshore windfarm with 114 turbines and a total generating capacity of 1,075 MW.	2020 – 2022	From 2023	Potential cumulative impact exists.
Dudgeon Extension	Consented	475.2	474.5	An extension of Dudgeon offshore windfarm.	2024 – 2026	From 2027	Potential cumulative impact exists.
Saint-Brieuc	Under construction	480.6	479.9	A 496 MW offshore windfarm with 62 turbines.	2021 – 2025	From 2026	Potential cumulative impact exists.
Kentish Flats	Operational	499.3	498.7	Decommissioning of 90 MW operational offshore windfarm comprising of 30 turbines.	2031 – 2034	Pre 2021-2030	Potential cumulative impact exists.
Hornsea Project Two	Operational	499.3	498.5	A 1.32 GW English Round 3 offshore windfarm with 165	2020 – 2021	From 2022	Potential cumulative impact exists.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
				turbines. Fully operational.			
Courseulles-sur-mer	Under construction	515.1	514.4	A 450 MW offshore windfarm. Under construction.	2023 – 2026	From 2027	Potential cumulative impact exists.
Scroby Sands	Operational	518.0	517.4	Decommissioning of 60 MW operational offshore windfarm comprising of 30 turbines	2031 – 2034	Pre 2021-2030	Potential cumulative impact exists.
Fécamp	Under construction	527.1	526.5	A 497 MW offshore windfarm with 71 turbines. Under construction.	2023 – 2026	From 2027	Potential cumulative impact exists.
Dogger Bank – Creyke Beck B	Operational	530.9	530.0	A 1.2 GW English Round 3 offshore windfarm. Under construction.	2020 – 2023	From 2024	Potential cumulative impact exists.
Dogger Bank – Creyke Beck A	Under construction	535.5	534.6	A 1.2 GW English Round 3 offshore windfarm. Under construction.	2022 – 2025	From 2026	Potential cumulative impact exists.
Dieppe Le Tréport	Under construction	561.4	560.7	A 496 MW French offshore windfarm with 62 turbines.	2022 – 2027	From 2028	Potential for temporal overlap with Proposed Development

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
							construction phase.
Dogger Bank-Teesside B (Sofia)	Under construction	565.3	564.3	A 1.4 GW English Round 3 offshore windfarm with 100 turbines.	2022 – 2027	From 2028	Potential for temporal overlap with Proposed Development construction phase.
East Anglia Three	Under construction	583.4	582.7	A 1.4 GW English Round 3 offshore windfarm with up to 100 turbines.	2023 – 2027	From 2028	Potential for temporal overlap with Proposed Development construction phase.
Dunkerque	Operational	590.0	589.5	A 600 MW French offshore windfarm.	2021 – 2022	From 2023	Potential cumulative impact exists.
Moray West	Under construction	591.3	590.3	An 882 MW Scottish offshore windfarm with 60 turbines.	2023 – 2026	From 2027	Potential cumulative impact exists.
Groix et Belle-Île	Operational	600.2	599.6	A 25 MW French floating offshore wind demonstration project with 3 turbines.	2021	From 2022	Potential cumulative impact exists.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
Dogger Bank C – Teesside A	Under construction	600.8	599.9	A 1.2 GW English Round 3 offshore windfarm.	2021 – 2028	From 2029	Potential for temporal overlap with Proposed Development construction phase.
Winderergiegebied Borssele zuidzijde	Operational	603.8	603.3	Offshore wind energy area within the southern part of Dutch Borssele Windfarm Zone.	2021 – 2028	From 2029	Potential for temporal overlap with Proposed Development construction phase.
Borssele	Operational	604.8	604.3	Large offshore windfarm zone in Dutch waters comprising multiple phased developments.	2028 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
OWF Borssele IV	Operational	604.8	604.3	Decommissioning of one of the Dutch operational offshore windfarm sites within Borssele Windfarm Zone.	2031 – 2034	Pre-2021-2030	Potential cumulative impact exists.
SeaStar	Operational	611.7	611.2	Decommissioning of Belgian operational	2031 – 2034	Pre-2021-2030	Potential cumulative impact exists.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
				offshore windfarm within the wider SeaMade project.			
Borssele Kavel III	Production	614.7	614.2	A Dutch offshore windfarm.	2023 – 2026	From 2027	Potential cumulative impact exists.
Northwind	Operational	615.1	614.6	A Dutch offshore windfarm.	2028 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
OWF Borssele I	Operational	618.3	617.8	A Dutch offshore windfarm forming part of the Borssele Windfarm Zone.	2027 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
Hollandse Kust F	Under construction	623.5	622.9	A Dutch offshore windfarm, part of the Hollandse Kust offshore wind programme.	2021 – 2024	From 2025	Potential for temporal overlap with Proposed Development construction phase.
Borssele Kavel II	Operational	624.6	624.1	A Dutch offshore windfarm within the	2025 – 2027	From 2028	Potential for temporal overlap with Proposed Development

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
				Borssele Windfarm Zonne.			construction phase.
OWF Borssele II	Operational	624.7	624.1	A Dutch offshore windfarm.	2027 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
Hollandse Kust	Operational	642.3	641.6	A offshore windfarm zone in Dutch waters comprising multiple windfarms developed under the Hollandse Kust programme.	Pre-2021 – 2022	From 2023	Potential cumulative impact exists.
Saint-Nazaire	Operational	652.1	651.4	A 480 MW French offshore windfarm.	Pre-2021 – 2021	From 2022	Potential for temporal overlap with Proposed Development construction phase.
HKZ Kavel II	Under construction	668.0	667.4	A offshore windfarm site within the Hollandse Kust Zuid offshore wind area in Dutch waters.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
HKZ Kavel I-IV	Operational	676.4	675.8	Offshore windfarm sites within the Hollandse Kust Zuid offshore wind area in Dutch waters.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
Hollandse Kust	Operational	677.3	676.7	A offshore windfarm zone comprising multiple operational developments under the Hollandse Kust programme in Dutch waters.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
OWF Luchterduinen	Operational	680.4	679.8	A 129 MW Dutch offshore windfarm.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
OWF Prinses Amalia	Operational	681.5	680.9	A 120 MW Dutch offshore windfarm.	2023 – 2026	From 2027	Potential cumulative impact exists.
Iles d'Yeu et de Noirmoutier	Consented	682.7	682.0	A 500 MW offshore windfarm.	2024 – 2025	From 2026	Potential cumulative impact exists.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
OWF Egmond aan Zee	Operational	692.1	691.4	A 108 MW Dutch offshore windfarm.	2025 – 2026	From 2027	Potential cumulative impact exists.
ZeeEnergie / Gemini II	Operational	787.3	786.5	A 600 MW Dutch offshore windfarm, forming part of the wider Gemini Offshore Windfarm development.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
Veja Mate	Operational	790.5	789.7	A 402 MW German offshore windfarm.	2029 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
EnBW He Dreiht	Consented	811.0	810.2	A 960 MW German offshore windfarm.	2027 – 2028	From 2029	Potential for temporal overlap with Proposed Development construction phase.
Riffgat	Operational	826.4	825.7	A 113 MW German offshore windfarm.	2027	From 2028	Potential for temporal overlap with Proposed Development construction phase.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
Borkum Riffgrund 2	Operational	826.7	803.9	A 913 MW German offshore windfarm.	2024 – 2025	From 2026	Potential cumulative impact exists.
Trianel Windpark Borkum Phase 1	Operational	826.9	826.1	A 200 MW German offshore windfarm.	2025 – 2026	From 2027	Potential cumulative impact exists.
Merkur Offshore (MEG Offshore I)	Operational	832.3	831.5	A 396 MW German offshore windfarm.	2024 – 2025	From 2026	Potential cumulative impact exists.
Gode Wind 01	Operational	860.9	860.1	A 330 MW German offshore windfarm.	2023 – 2024	From 2025	Potential cumulative impact exists.
Tier 2							
Holyhead Deep	Consented	84.0	83.1	Tidal.	2026 – 2027	From 2028	Potential for temporal overlap with Proposed Development construction phase.
West Anglesey Demonstration Zone	Consented	85.0	84.1	Tidal.	2022 – 2026	From 2027	Potential cumulative impact exists.
Mona	Consented	146.7	145.7	English Round 4 project with up to 107 turbines.	2025 – 2028	From 2029	Potential for temporal overlap with Proposed

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
							Development construction phase.
Celtic Interconnector	Under construction	151.9	151.3	Power cable.	2024 – 2027	From 2028	Potential for temporal overlap with Proposed Development construction phase.
Forthwind	Consented	405.9	404.9	A Scottish floating offshore wind demonstration project.	2025 – 2027	From 2028	Potential for temporal overlap with Proposed Development construction phase.
Berwick Bank	Consented	446.4	445.4	A 4.1 GW Scottish offshore windfarm.	2025 – 2029	From 2030	Potential for temporal overlap with Proposed Development construction phase.
Parc éolien posé au large de la Normandie (AO4)	Pre-planning application	464.8	464.1	Proposed fixed-bottom French offshore windfarm.	2026 – 2027	From 2028	Potential for temporal overlap with Proposed Development construction phase.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
Seagreen Phase 1A	Consented	476.0	475.0	Extension to wider Seagreen Offshore Windfarm development.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
East Anglia Two	Consented	548.4	547.8	A 900 MW English Round 3 offshore windfarm with up to 75 turbines.	2024 – 2028	From 2029	Potential for temporal overlap with Proposed Development construction phase.
Hornsea Project Three	Consented	550.6	549.7	A 2.9 GW English Round 3 offshore windfarm.	2024 – 2028	From 2029	Potential for temporal overlap with Proposed Development construction phase.
Norfolk Vanguard West	Consented	551.6	550.9	A 1.4 GW offshore windfarm in the Norfolk zone.	2024 – 2028	From 2029	Potential for temporal overlap with Proposed Development construction phase.
East Anglia One North	Consented	556.0	555.4	An 800 MW English Round 3 offshore windfarm with up to 67 turbines.	2024 – 2028	From 2029	Potential for temporal overlap with Proposed Development

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
							construction phase.
Norfolk Boreas	Consented	581.3	580.6	A 1.4 GW offshore windfarm in the Norfolk zone.	2021 – 2025	From 2026	Potential cumulative impact exists.
Norfolk Vanguard East	Consented	582.4	581.7	A 1.4 GW offshore windfarm in the Norfolk zone.	2024 – 2027	From 2028	Potential for temporal overlap with Proposed Development construction phase.
Salamander	Consented	598.4	597.4	A 100 MW floating offshore windfarm with up to 7 turbines.	2025 – 2027	From 2028	Potential for temporal overlap with Proposed Development construction phase.
Borssele Kavel V	Consented	620.6	620.1	A offshore windfarm located within the Borssele Windfarm Zone in Dutch waters.	2025 – 2026	From 2027	Potential cumulative impact exists.
Pentland Floating	Consented	649.3	648.5	A 100 MW Scottish floating offshore windfarm.	2024 – 2026	From 2027	Potential cumulative impact exists.
Tier 3							

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
Decommissioning of Arklow Bank Wind Park 1 (ABWP1)	Pre-application consultation	0.0	0.0	Proposed decommissioning of the seven existing offshore wind turbines at ABWP1 is assessed under a precautionary scenario, assuming decommissioning activities overlap temporally with construction of the Proposed Development. Decommissioning methods are assumed to be similar to those set out in the Proposed Development Rehabilitation Schedule.	Not defined – assumed to overlap with Proposed Development construction phase for assessment purposes.		Potential for temporal overlap with Proposed Development construction phase.
Mares Connect	Proposed	37.5	36.6	Power cable.	2026 – 2028	From 2029	Potential for temporal overlap with Proposed Development construction phase.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
Rosslare Euro Port	Planning application submitted	52.2	51.6	Proposed development of Rosslare Offshore Renewable Energy (ORE) Hub for offshore wind energy.	2027 – 2028	From 2029	Potential for temporal overlap with Proposed Development construction phase.
Port of Waterford ORE Capable Terminal (Belview)	Planning application submitted	88.8	88.2	Proposed development of Port of Waterford ORE for offshore wind energy.	2027 – 2028	From 2029	Potential for temporal overlap with Proposed Development construction phase.
Erebus / Valorous proposed cable route	Proposed	123.7	123.0	Power cable.	2025 – 2026	From 2027	Potential for temporal overlap with Proposed Development construction phase.
Gwynt Glas	Concept / Early Planning	139.8	139.1	Proposed floating offshore windfarm in the Celtic Sea.	2032 – 2034	From 2035	Potential cumulative impact exists.
Pembrokeshire Demonstration Zone	Pre-planning application	144.3	143.7	Proposed marine energy demonstration zone off the Pembrokeshire coast.	2025 – 2026	From 2027	Potential cumulative impact exists.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
Llyr 1	Pre-planning application	148.0	147.3	A 200 MW test and demonstration site for floating offshore wind with up to 10 turbines.	2027 – 2029	From 2030	Potential for temporal overlap with Proposed Development construction phase.
Llyr 2	Pre-planning application	151.9	151.2	A 200 MW test and demonstration site for floating offshore wind with up to 10 turbines.	2027 – 2029	From 2030	Potential for temporal overlap with Proposed Development construction phase.
Morecambe	Planning application submitted	174.2	173.3	English Round 4 project with up to 40 turbines.	2027 – 2030	From 2031	Potential for temporal overlap with Proposed Development construction phase.
Isle of Man (Mooir Vannin)	Planning application submitted	179.2	178.2	A 1.4 GW offshore windfarm with up to 100 turbines.	2028 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
North Channel Wind 2	Pre-planning application	204.0	203.1	A 420 MW offshore windfarm in Northern Ireland.	2028 – 2031	From 2032	Potential for temporal overlap with Proposed Development

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
							construction phase.
LirIC	Proposed	204.6	203.7	Power cable.	2026 – 2029	From 2030	Potential for temporal overlap with Proposed Development construction phase.
North Channel Wind 1	Pre-planning application	227.9	227.0	A 1 GW offshore windfarm in Northern Ireland.	2028 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
Outer Dowsing	Planning application submitted	465.5	464.7	A 1.5 GW English Round 4 offshore windfarm.	2027 – 2030	From 2031	Potential for temporal overlap with Proposed Development construction phase.
Centre-Manche 1	Pre-planning application	468.9	468.2	A 1 GW French offshore windfarm.	2027 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
Centre-Manche 2	Pre-planning application	476.8	476.1	A 1.4 GW French offshore windfarm.	2028 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
Dogger Bank South (West)	Pre-planning application	504.9	504.0	An English Round 4 offshore windfarm with a combined capacity (with Dogger Bank South (East)) of 3 GW.	2027 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
Morven	Pre-planning application	514.6	513.6	A 291 MW Scottish offshore windfarm. Concept/Early Planning.	2028 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
Bowdun	Pre-planning application	528.0	527.0	A 1,008 MW Scottish offshore windfarm. Concept/Early Planning.	2028 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
Dogger Bank South (East)	Pre-planning application	530.3	529.4	An English Round 4 offshore windfarm with a combined capacity (with	2027 – 2031	From 2032	Potential for temporal overlap with Proposed Development

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
				Dogger Bank South (West)) of 3 GW.			construction phase.
Ossian	Planning application submitted	533.7	532.7	Proposed Scottish floating offshore windfarm with up to 3.6 GW.	2027 – 2030	From 2031	Potential for temporal overlap with Proposed Development construction phase.
North Falls	Planning application submitted	536.8	536.3	An extension of Greater Gabbard offshore windfarm with a generating capacity of 504 MW.	2027 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
Five Estuaries	Planning application submitted	553.3	552.8	An extension of Galloper offshore windfarm with a generating capacity of 353. Development Consent Order (DCO) submitted in March 2024.	2027 – 2030	From 2031	Potential for temporal overlap with Proposed Development construction phase.
Bellrock	Pre-planning application	565.9	564.9	A 1.2 GW Scottish floating offshore windfarm.	2028 – 2032	From 2033	Potential for temporal overlap with Proposed Development

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
							construction phase.
Muir Mhòr	Planning application submitted	597.7	596.7	A 798 MW Scottish floating offshore windfarm. Concept/Early Planning.	2028 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
Spiorad na Mara	Pre-planning application	605.0	604.1	A 900 MW offshore windfarm with up to 66 turbines.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
Caledonia	Planning application submitted	606.6	605.7	A 2 GW offshore windfarm.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
Sud de la Bretagne Extension	Planned	608.3	607.6	A French offshore windfarm. In planning.	2027 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
Aspen	Planning application submitted	633.6	632.7	A Scottish floating offshore windfarm up to 3 GW.	2029 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
Green Volt	Planning application submitted	635.0	634.0	A floating offshore windfarm that will electrify an oil and gas platform.	2029 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
Hollandse Kust D	Pre-planning application	636.8	636.1	Proposed offshore windfarm within the Hollandse Kust programme in Dutch waters.	2029 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
Hollandse Kust West Zuidelijk Deel (HK-w-z)	Pre-planning application	638.6	638.0	Proposed offshore windfarm within the southern part of Hollandse Kust West, in Dutch waters.	2029 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
Gebied 2 Noord (2-n)	Planned	639.5	638.8	Proposed offshore wind energy area in Dutch North Sea.	2029 – 2031	From 2032	Potential for temporal overlap with Proposed Development

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
							construction phase.
Cenos	Planning application submitted	649.6	648.6	A Scottish offshore floating windfarm of up to 1400 MW.	2027 – 2030	From 2031	Potential for temporal overlap with Proposed Development construction phase.
Marram	Pre-planning application	652.4	651.4	A Scottish floating offshore windfarm of up to 3 GW.	2029 – post-2034	From 2042	Potential for temporal overlap with Proposed Development construction phase.
Havbredey	Pre-planning application	653.3	652.4	A Scottish floating offshore windfarm of up to 1500 MW.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
Stromar	Pre-planning application	653.9	652.9	A Scottish floating offshore windfarm of up to 1 GW.	2029 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
West of Orkney	Pre-planning application	659.0	658.1	A 2 GW Scottish offshore windfarm.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
Buchan	Pre-planning application	661.1	660.1	A Scottish floating offshore windfarm of up to 1 GW.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
Hollandse Kust E	Pre-planning application	666.7	666.1	Proposed offshore windfarm within the Hollandse Kust programme in Dutch waters.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
Les deux oles	Approved	682.8	682.1	A floating offshore windfarm pilot project in French waters.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development construction phase.
Culzean	Pre-planning application	686.6	685.6	Proposed Scottish offshore windfarm.	2029 – 2032	From 2033	Potential for temporal overlap with Proposed Development

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
							construction phase.
Ayre	Pre-planning application	690.5	689.5	A 1 GW Scottish floating offshore windfarm.	2029 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
Ten Noorden van de Wadden	Pre-planning application	748.6	747.8	A 700 MW offshore windfarm in the Netherlands.	2029 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
N-9.1	Pre-planning application	778.4	777.6	A 2 GW German offshore windfarm.	2029 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
N-9.4	Pre-planning application	782.9	782.1	A 1 GW German offshore windfarm.	2029 – 2031	From 2032	Potential for temporal overlap with Proposed Development construction phase.
EN6	Planned	783.5	782.6	Proposed offshore windfarm	2029 – 2031	From 2032	Potential for temporal overlap

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
				development area in German North Sea.			with Proposed Development construction phase.
N-9.2	Pre-planning application	791.8	791.0	A 2 GW German offshore windfarm.	2025 – 2026	From 2027	Potential cumulative impact exists.
EN7	Planned	809.1	808.3	Proposed offshore windfarm development area in German North Sea.	2025 – 2027	From 2028	Potential for temporal overlap with Proposed Development construction phase.
Borkum Riffgrund West II	Planned	813.1	812.3	Proposed offshore windfarm development area in German North Sea, adjacent to existing Borkum Rigguard projects.	2021 – 2022	From 2023	Potential cumulative impact exists.
EN8	Planned	816.6	815.7	Proposed offshore windfarm development area in German North Sea.	2024 – 2025	From 2026	Potential cumulative impact exists.

Project/Plan	Status	Distance from Array Area (km)	Distance from Cable Corridor and Working Area (km)	Description of Project / Plan	Dates of Construction / Decommissioning	Dates of Operation	Justification for screening in
EN13	Planned	829.5	828.6	Proposed offshore windfarm development area in German North Sea.	2024 – 2025	From 2026	Potential cumulative impact exists.
Nordsøen II vest	Pre-planning application	829.8	828.9	A 2 GW Danish offshore windfarm.	2025 – 2026	From 2027	Potential for temporal overlap with Proposed Development construction phase.
EN15	Planned	870.0	869.1	Proposed offshore windfarm development area in German North Sea.	2022 – 2025	From 2026	Potential cumulative impact exists.
V317	Planned	1236.0	1235.0	Proposed offshore wind development zone in the Danish North Sea.	2026 – 2027	From 2028	Potential for temporal overlap with Proposed Development construction phase.

Screening impact pathways

11.11.1.20 Certain impacts assessed solely for the Proposed Development are not factored into the marine mammal CIA due to several factors:

- The impacts are highly localised in nature;
- Existing management and mitigation measures implemented at the Proposed Development and other projects will effectively diminish the likelihood of these impacts; and
- The potential significance of the impact from the Proposed Development alone has been evaluated as either Not Significant (due to Negligible conclusion for magnitude of impact) or Imperceptible (due to Negligible conclusion for sensitivity of the receptor).

11.11.1.21 The impacts excluded from the marine mammal CIA for these reasons encompass:

- *Auditory injury (PTS):* Activities such as pile driving, UXO clearance and site surveys may lead to PTS. However, robust mitigation and best practice noise management measures, including the MMMP for the Proposed Development, will be implemented to minimise injury risk to marine mammals to imperceptible levels. A review of other projects' EIARs confirms that similar mitigation measures will be implemented to manage underwater noise arising from those developments;
- *Injury from vessel activities*: It is anticipated that all offshore energy projects will adopt a VMP or adhere to guidelines to further reduce the already minimal risk of vessel collisions with marine mammals;
- *Disturbance from vessel activities*: Similar to collision risk, it is expected that all offshore energy projects will implement a VMP or adhere to best practice recommendations to mitigate the potential of disturbance to marine mammals;
- *Changes in fish and shellfish community affecting prey resources*: Changes in prey availability are highly localised and Not Significant, which is not significant in EIA terms;
- *Accidental pollution*: It is anticipated that all offshore energy projects will implement an EMP to ensure that the potential release from pollutants is minimised and strictly controlled;
- *Changes in EMF from subsea cabling:* Changes are of Imperceptible significance, which is not significant in EIA terms;
- *Injury from dredging and trenching*: This impact is highly localised, which is not significant in EIA terms; and
- *Disturbance from dredging and trenching*: This impact is highly localised and Slight adverse, which is not significant in EIA terms. Furthermore, no EDR is given for this activity (JNCC, 2025), reflecting the negligible likelihood of this activity contributing to cumulative disturbance.

11.11.1.22 Consequently, the impacts considered within the marine mammal CIA are primarily focused on the potential for disturbance arising from underwater noise during the construction phase of offshore developments (where data are available). Table 11.69 presents the potential impacts, development phase, and the list of projects / plans with which the two Project Design Options have been cumulatively assessed.

Table 11.69: Potential cumulative impacts, phases, scenarios, and projects to be considered cumulatively

Potential cumulative impact	Phase			Projects considered cumulatively	Justification for projects considered cumulatively
	C	O	D		
Disturbance to marine mammals from underwater noise	✓	×	×	Project parameters associated with Project Design Option 1 or 2 plus the projects listed in Table 11.9 and Table 11.10Table 11.68.	Outcome of the CIA will be highest when the greatest number of schemes are undertaking activities that generate underwater noise concurrently.

Assessment methodology for disturbance to marine mammals from underwater noise

11.11.1.23 For the Proposed Development, an indicative number of animals disturbed per day has been taken as the maximum number calculated within the alone assessments (Section 11.9.1), which is based on the ramp-up mitigation scenario and the highest robust species-specific density estimates (Table 11.7). As the maximum hammer energy (3,500 kJ) is the same for both the ramp-up mitigation and extended ramp-up mitigation scenarios, the predicted behavioural effects are unchanged between scenarios; therefore, the same indicative number of animals disturbed per day are applicable to both scenarios.

11.11.1.24 This approach ensures that the maximum number of animals potentially disturbed is carried forward into the cumulative assessment, leading to a precautionary assessment and outcome that ensures the conclusions remain robust under uncertainty. As a result, the predicted numbers are likely to represent an overestimate of actual disturbance on any given day.

11.11.1.25 For all other offshore projects, an indicative number of animals disturbed per day has been calculated using species-specific densities within the corresponding SCANS-IV survey blocks for each cetacean species (Gilles *et al.,* 2023), and average modelled at-sea density estimates for both pinniped species (Carter *et al.*, 2020), alongside a fixed EDR approach. For projects that are situated outside of the SCANS-IV survey boundaries, cetacean densities were derived from the corresponding ObSERVE survey strata (Rogan *et al.,* 2018a). However, it is important to note that this approach is highly precautionary, given the high level of uncertainty and assumptions within this assessment, as described in further detail below.

11.11.1.26 The EDR threshold parameters used to assess the number of animals potentially disturbed from offshore projects are based on the updated JNCC (2025) guidance. Under this guidance, the EDR applied to unabated pile driving and high order UXO detonation is the same. As a result, disturbance arising from these activities is assessed collectively as high-noise construction activities, without disaggregating effects by activity type. This reflects current best available guidance and avoids artificial separation of impacts where the spatial extent of disturbance is identical.

11.11.1.27 The EDRs and corresponding impact areas applied within the CIA are:

- A 20 km EDR for piling of all offshore windfarm projects (fixed and floating) in UK and Irish waters, based on guidance from JNCC (2025) for unabated pile driving of a monopile, resulting in an impact area of 1,256.64 km^2;
- A 20 km EDR for UXO clearance based on the high order detonation of UXOs without noise abatement only (JNCC, 2025), resulting in an impact area of 1,256.64 km^2;
- A 11 km EDR for piling of EU offshore windfarm projects, based on the current noise abatement expectations for those countries, resulting in an impact area of 380.13 km^2;
- A 10 km EDR for seismic surveys based on guidance from JNCC (2025), and an impact area of 314.16 km^2;
- A 5 km EDR for tidal and wave projects (assuming that low-level activities such as sheet or conductor piling may occur), resulting in an impact area of 78.5 km^2; and
- A 5 km EDR for subsea cabling, based on guidance from JNCC (2025) (assuming that only geophysical surveys will be undertaken) resulting in an impact area of 78.5 km^2.

11.11.1.28 Seismic surveys have been considered as Tier 3 projects as the potential number of seismic surveys that could be undertaken is unknown. Based on the size of the MU and its location, it has been assumed that there could be:

- One seismic survey occurring on any given day in the Irish Sea included within the CIA for bottlenose dolphin;
- Two seismic surveys occurring on any given day in the Celtic and Irish Seas within the CIA for harbour porpoise; and
- Four seismic surveys occurring on any given day in North Sea and one seismic survey occurring on any given day in the Celtic and Irish Seas within the CIA for Risso's dolphin, common dolphin, and minke whale.

11.11.1.29 Given that the East region of RoI MU for grey seal and harbour seal are coastal and have a relatively small spatial extent, no seismic surveys are anticipated to take place within these areas. As such, no cumulative impacts from seismic surveys on seals are considered within this assessment.

11.11.1.30 To estimate the number of cetaceans predicted to be disturbed from seismic surveys, the average density across the seas in which they are assumed to occur was calculated using the abundance of the corresponding SCANS-IV survey blocks and is presented in Table 11.70, below.

Table 11.70: A summary of parameters used to predict the number of cetaceans to be disturbed from seismic surveys

Species	Assumed location of seismic surveys	Abundance	Area (km^2)	Density (animals/km^2)
Harbour porpoise	Celtic and Irish Seas	55,888	346,007	0.162
Bottlenose dolphin	Irish Sea	16,125	46,007	0.350
Risso's dolphin	North Sea; Celtic and Irish Seas	4,589 (North Sea); 6,931 (Celtic and Irish Seas)	575,000 (North Sea); 346,007 (Celtic and Irish Seas)	0.008 (North Sea); 0.020 (Celtic and Irish Seas)
Common dolphin	North Sea; Celtic and Irish Seas	1,814 (North Sea); 162,716 (Celtic and Irish Seas)	575,000 (North Sea); 346,007 (Celtic and Irish Seas)	0.003 (North Sea); 0.470 (Celtic and Irish Seas)
Minke whale	North Sea; Celtic and Irish Seas	7,856 (North Sea); 4,094 (Celtic and Irish Seas)	575,000 (North Sea); 346,007 (Celtic and Irish Seas)	0.014 (North Sea); 0.012 (Celtic and Irish Seas)

Assumptions and precaution within the CIA

11.11.1.31 There are many assumptions that need to be made when undertaking a CIA, particularly on such large spatial scales; consequently, significant levels of precaution / conservatism within this CIA will result in the estimated effects being unrealistic. The main areas of precaution / conservatism in the assessment are:

- Assumption that all UXO detonations will use high order methodologies due to lack of information regarding preferences for low order methodologies per project (which would have a 5 km EDR);
- Assumption that floating offshore wind projects will involve piling, given a lack of information on anchoring systems that will be used;

- Number of developments assumed to be active at one time is unrealistic given availability of vessels worldwide;
- Inclusion of lower tier developments (Tier 3) with a lack of publicly available information (EIAR/ES/PEIR). By including projects that have either no consent, no ES/EIAR, no PEIR or no submitted information, then the worst-case scenarios have to be assumed in the absence of other information;
- Assumption that pile driving and UXO clearance could happen at any time during the construction period as exact timings are unknown. This creates an assumption that noisy activities will occur over consecutive years where in reality for most projects, it will be a year for each, this results in disturbance levels far greater than would ever occur in reality;
- Assumption that there is no spatial overlap in impact footprints between individual activities when summing across concurrent activities. This is highly unrealistic considering the proximity of some of the offshore windfarm projects to each other;
- Assumption that all offshore windfarm projects will install monopiles (or pin piles), without noise abatement, as a worst-case scenario is highly precautionary. The assessment does not account for potential reductions in underwater noise arising from non-piled foundation choice and/or the application of noise abatement measures during installation. Consequently, the resulting disturbance estimates may be lower than assumed and remains conservative;
- The duration and timelines presented in PEIR and Environmental Statement (ES) Chapters are worst-case scenarios and the true period of piling activity will likely be shorter for each project;
- Assumption that the EDRs can be applied across all species. The EDRs were developed for harbour porpoise and there is no advice available for other marine mammal species. This is considered conservative because the species in this assessment typically show less of a disturbance response compared to harbour porpoise;
- EDRs are based on published ranges where the bulk of the effect had been detected. Therefore, they are not equivalent to 100% deterrence or disturbance ranges from the area, nor are they seen to represent the limit range at which effects have been detected. For example, pile driving at the first seven large-scale offshore windfarms in the German Bight (including monopiles and piling without noise abatement) found declines in porpoise out to only 17 km (Brandt *et al.,* 2018). Furthermore, acoustic monitoring during piling at Gemini offshore windfarm in the Netherlands (7.5 m monopiles) showed that the avoidance distance of harbour porpoises was in the range of 10-20 km (Geelhoed *et al.,* 2018). There is also evidence of impact ranges decreasing over the period of pile installation at offshore windfarm sites. For example, in the Moray Firth, Graham *et al*. (2019) reported a 50% probability of harbour porpoises to respond within 7.4 km from the location of the first pile driven, which decreased to 1.3 km from the location of the last pile driven. This suggests individuals may, to some degree, habituate to piling activities over time;
- In the absence of site-specific underwater noise modelling outputs for all the projects included in the cumulative assessment, using the 20 km EDR has been identified as the best approach. However, caution should be applied when making direct comparisons across projects where numbers of disturbed animals have been derived from underwater noise modelling, as compared to the EDR approach, as these are not directly comparable; and
- In the absence of a recommended methodology to quantitatively assess the impact from seismic surveys, a highly precautionary approach has been taken. This has resulted in an unrealistic scenario because it assumes that seismic airguns would be continuously firing within the survey day when they are required to be turned off at the end of each survey line when the vessel turns (turns can take 2-3 hours and several can occur in a single day). This is exemplified by a review of seismic surveys undertaken within UK waters during 2018, which showed that airguns only operated for 52% of the time during potential survey days (BEIS, 2020).

11.12 Cumulative impact assessment

11.12.1.1 A description of the significance of cumulative effects upon marine mammals arising from each identified impact is given below.

11.12.2 Project Design Option 1 and 2 Impact 1 – Disturbance to marine mammals from underwater noise

SENSITIVITY OF THE RECEPTOR

11.12.2.1 During the project alone assessment, all marine mammal species were assessed as having a Low sensitivity to behavioural disturbance from underwater noise during pile driving, UXO clearance, and site surveys. The exception to this was grey seal which has a Negligible sensitivity to behavioural disturbance from underwater noise during pile driving but a Low sensitivity for UXO clearance and site surveys. Therefore, for the purpose of the CIA, all marine mammal species are assessed as having a Low sensitivity overall to underwater noise from pile driving, UXO clearance, and site surveys.

Construction phase

11.12.2.2 For pile driving (Impact 1; Sections 11.9.1 and 11.10.1), the Proposed Development alone was predicted to have a Slight adverse impact on harbour porpoise, bottlenose dolphin, Risso's dolphin, common dolphin, and harbour seal based on both Project Design Options due to disturbance to marine mammals from underwater noise. For grey seal, the Proposed Development alone was predicted to have an Imperceptible impact on disturbance from underwater noise as a result of pile driving. Given the temporary and intermittent consequences on individuals which are unlikely to affect the population trajectory, the magnitude of impact for pile driving was considered to be Low to Medium adverse for both Project Design Options.

11.12.2.3 For UXO clearance (Impact 6; Sections 11.9.6 and 11.10.6), the Proposed Development alone was predicted to have a Slight adverse impact on all marine mammal species based on both Project Design Options due to disturbance to marine mammals from underwater noise. Given the temporary and intermittent consequences on individuals which are unlikely to affect the population trajectory, the magnitude of impact for UXO clearance was considered to be Low adverse for both Project Design Options.

11.12.2.4 For site surveys (Impact 7; Sections 11.9.7 and 11.10.7), the Proposed Development alone was predicted to have a Slight adverse impact on all marine mammal species based on both Project Design Options due to disturbance to marine mammals from underwater noise. Given the temporary and intermittent consequences on individuals which are unlikely to affect the population trajectory, the magnitude of impact for pile driving is considered to be Low adverse for both Project Design Options.

TIER 1

MAGNITUDE OF IMPACT

11.12.2.5 Underwater noise associated with Tier 1 projects will occur predominantly during the construction phase, arising from a range of activities including impact piling for WTGs and OSPs, as well as associated construction activities (including UXO clearance). Construction phase therefore represents the primary period during which cumulative underwater noise effects may occur. Where decommissioning of Tier 1 projects has the potential to temporally overlap with construction of the Proposed Development, this has been included in the assessment. Decommissioning noise is expected to be no greater than that produced during construction, therefore the assessment has used published construction activity impact ranges for these projects. The Tier 1 projects' operational phase have scoped out of the assessment because the noise produced during the operational phase of offshore windfarms is negligible (as has been determined for the Proposed Development; see rationale in Table 11.11), and therefore will not contribute to a cumulative effect.

11.12.2.6 The magnitude of cumulative underwater noise impacts is principally driven by the duration and timing of construction activities across Tier 1 projects, rather than by any single activity in isolation. Where construction windows overlap between the Proposed Development and other Tier 1 projects, underwater noise may be generated over an extended period and across a broader spatial area than would occur for the Proposed Development alone, increasing the magnitude of impact.

11.12.2.7 Based on currently available programme information, construction of the Phase One offshore wind projects is anticipated between 2026 and 2032 (see Section 11.11.1.8). This programme indicates a clear potential for temporal overlap between construction activities at multiple Tier 1 offshore wind projects and the Proposed Development, and therefore the potential for increased cumulative underwater noise magnitude during the construction phase.

HARBOUR PORPOISE

11.12.2.8 The highest number of harbour porpoises predicted to be disturbed across Tier 1 projects between 2021 and 2034 is in 2027, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of harbour porpoise predicted to be disturbed in 2027 is estimated as 3,930 animals (6.29% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.71:). The number of harbour porpoise predicted to be impacted by the Proposed Development represents 48.55% of the total, with the remaining predicted cumulative disturbance attributable to other concurrent activities and projects within the MU.

11.12.2.9 iPCoD modelling was used to assess the cumulative impact of the Phase One projects (ABWP2, Codling Wind Park, Dublin Array, NISA, and Oriel; see Volume III, Appendix 11.3: Phase 1 Irish Offshore Windfarms: Cumulative iPCoD Modelling). For both piling scenarios, the iPCoD results for harbour porpoise show that the predicted level of disturbance is insufficient to result in any changes at the population level. The impacted population is predicted to continue to a stable trajectory at 99.6-99.7% of the size of the un-impacted population.

11.12.2.10 As a result, the magnitude of impact is considered to be equal to that of the alone assessment and is assessed as Low adverse for harbour porpoises.

BOTTLENOSE DOLPHIN

11.12.2.11 The highest number of bottlenose dolphins predicted to be disturbed across Tier 1 projects between 2021 and 2034 is in 2029, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of bottlenose dolphins predicted to be disturbed in 2029 is estimated as 2,365 animals (807.17% of MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.72). The number of bottlenose dolphins predicted to be impacted by the Proposed Development represents 49.94% of the total, with the remaining predicted cumulative disturbance attributable to other concurrent activities and projects within the MU.

11.12.2.12 As discussed previously within the alone assessment, the number of animals available in the area that could be disturbed are being over-predicted as it exceeds the MU population size of 293 animals. However, this population size does not take into account the connectivity of the MU population with other areas. Studies have shown large scale movement of bottlenose dolphins around Ireland and indicated connectivity with the population on the west coast of the RoI (O'Brien *et al.*, 2010). Long distance movements from the Atlantic to the North Sea between populations in the UK and Ireland have also been reported by Robinson *et al.* (2012). Therefore, the size of the reference population used from the Irish Sea MU is likely to be an under-

representation of the number of bottlenose dolphins that may be present in the MU Study Area. Equally, the most recent abundance estimates from the semi-resident population at Cardigan Bay in West Wales (which is within the Irish Sea MU) alone were 147 individuals (95% CI: 127 to 194; NRW, 2018). The design of broad scale surveys, such as SCANS, used to derive MU population estimates are not designed to capture localised, coastal populations such as that of the semi-resident population in Cardigan Bay, providing further evidence to suggest that the reference population size has been under-estimated.

11.12.2.13 Furthermore, it is important to highlight the significant difference between the SCANS-III and SCANS-IV abundance estimates of bottlenose dolphins in the Irish Sea. The SCANS-IV abundance estimate for the Irish Sea (blocks CS-D and CS-E) is 8,326 animals (Gilles *et al.,* 2023) whereas the MU population is derived from the lower SCANS-III abundance estimates, resulting in a population size of 293 (IAMMWG, 2023). As a result, the number of animals predicted to be disturbed using the density estimate from SCANS-IV is not comparable with the MU population size, given the much higher abundance estimates for the most recent SCANS surveys. Consequently, this disparity results in a highly unrealistic proportion of the MU population estimated as impacted given that the population size is under-estimated. If the population size is taken to be 8,326 animals, the percentage of the population predicted to be disturbed in 2029 reduces to 28.40% (Table 11.72).

11.12.2.14 A key source of precaution in this assessment is that the harbour porpoise EDRs have been used for bottlenose dolphins, as there is no equivalent for this species. Harbour porpoise have a higher hearing sensitivity than bottlenose dolphins (Southall *et al.,* 2019) and are considered to be particularly responsive to anthropogenic disturbance, with multiple studies showing that porpoises respond (avoidance and reduced vocalisation) to a variety of anthropogenic noise sources to distances of multiple kilometres (Brandt *et al.,* 2013; Thompson *et al.,* 2013; Tougaard *et al.,* 2013; Brandt *et al.,* 2018; Sarnocinska *et al.*, 2020; Thompson *et al.,* 2020; Benhemma-Le Gall *et al.,* 2021; Benhemma-Le Gall *et al.,* 2023).

11.12.2.15 Studies have shown that dolphin species show comparatively less of a disturbance response from underwater noise compared to harbour porpoise (Kastelein *et al.*, 2006; Stone *et al.*, 2017). For example, bottlenose dolphins in the Moray Firth have been shown to remain in the impacted area during both seismic activities and pile installation activities (Fernandez-Betelu *et al.,* 2021), which demonstrates a reduced behavioural response (i.e. displacement) as compared to harbour porpoise. Considering the above, it can be concluded that using EDRs derived from studies on harbour porpoise as a proxy for bottlenose dolphins is likely to result in an over-estimate of the number of bottlenose dolphins predicted to experience disturbance.

11.12.2.16 iPCoD modelling was used to assess the cumulative impact of the Phase One projects (Volume III, Appendix 11.3: Phase 1 Irish Offshore Windfarms: Cumulative iPCoD Modelling). When using the dose-response function, the results of the iPCoD modelling for bottlenose dolphin show a clear deviation from the baseline resulting from disturbance caused by pile driving across the five Phase One projects. The mean impacted population size initially decreases very slightly from the mean un-impacted population size in response to piling, after which it continues on the same, stable trajectory at 95-96% of the mean un-impacted population size. As the iPCoD model does not currently allow for a density-dependent response, there is no possibility for the impacted population to increase in size after the piling disturbance. The impacted population does, however, continue on a stable trajectory in the long-term.

11.12.2.17 Similarly, when using the level B harassment thresholds for bottlenose dolphin, the results of the iPCoD modelling show a clear deviation from the baseline resulting from disturbance caused by pile driving disturbance across the five Phase One projects (see Volume III, Appendix 11.3: Phase 1 Irish Offshore Windfarms: Cumulative iPCoD Modelling). The mean impacted population size initially decreases very slightly from the mean un-impacted population size in response to piling, after which it continues on the same, stable trajectory at 98% of the mean un-

impacted population size. As the iPCoD model does not currently allow for a density-dependent response, there is no possibility for the impacted population to increase in size after the piling disturbance. The impacted population does, however, continue on a stable trajectory in the long-term.

11.12.2.18 As a result, the magnitude of impact is considered to be equal to that of the alone assessment and is assessed as Medium adverse for bottlenose dolphins, which is considered to be precautionary due to the caveats and assumptions discussed above.

RISSO'S DOLPHIN

11.12.2.19 The highest number of Risso's dolphins predicted to be disturbed across Tier 1 projects between 2021 and 2034 is in 2027, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of Risso's dolphins predicted to be disturbed in 2027 is estimated as 210 animals (1.71% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.73). The number of Risso's dolphins predicted to be impacted by the Proposed Development represents 74.29% of the total, indicating that the majority of the predicted cumulative disturbance is from the Proposed Development, with a smaller contribution from other concurrent activities and projects within the MU.

11.12.2.20 As a result, the magnitude of impact is considered to be equal to that of the alone assessment and is assessed as Low adverse for Risso's dolphins.

COMMON DOLPHIN

11.12.2.21 The highest number of common dolphins predicted to be disturbed across Tier 1 projects between 2021 and 2034 is in 2025, which is before the expected construction period of the Proposed Development. The maximum cumulative number of common dolphins predicted to be disturbed in 2025 is estimated as 3,792 animals (3.69% of the MU population) (Table 11.74). Therefore, the highest number of common dolphins is predicted to occur in the absence of the Proposed Development.

11.12.2.22 When the Proposed Development is expected to be undergoing construction (2027 – 2030), the maximum number of individuals disturbed is 1,454 animals in 2027 (1.42% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.74). The number of common dolphins predicted to be impacted by the Proposed Development represents 20.43% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the MU.

11.12.2.23 As a result, the magnitude of impact is considered to be equal to that of the alone assessment and is assessed as Low adverse for common dolphins.

MINKE WHALE

11.12.2.24 The highest number of minke whales predicted to be disturbed across Tier 1 projects between 2021 and 2034 is in 2025, which is before the expected construction period of the Proposed Development. The maximum cumulative number of minke whales predicted to be disturbed in 2025 is estimated as 2,871 animals (14.27% of the MU population) (Table 11.75). Therefore, the highest number of minke whales is predicted to occur in the absence of the Proposed Development.

11.12.2.25 When the Proposed Development is expected to be undergoing construction (2027 – 2030), the maximum number of individuals disturbed is 2,144 animals in 2027 (10.66% of the MU population), assuming all other potential high-noise construction activities, including piling and

UXO clearance, occur on the same day as the Proposed Development (Table 11.75). The number of minke whales predicted to be impacted by the Proposed Development represents 10.54% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the MU.

11.12.2.26 As a result, the magnitude of impact is considered to be equal to that of the alone assessment and is assessed as Low adverse for minke whales.

GREY SEAL

11.12.2.27 The highest number of grey seals predicted to be disturbed across Tier 1 projects between 2021 and 2034 is in 2029, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of grey seal predicted to be disturbed in 2029 is estimated as 1,524 animals (91.70% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.76). The number of grey seals predicted to be impacted by the Proposed Development represents 8.66% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the East RoI region.

11.12.2.28 Considering the typical foraging distances of grey seals (Carter *et al.,* 2022), it is possible that seals from the East and South-east survey regions of the RoI presented in Morris and Duck (2019), and from the Wales and Northern Ireland MUs (SCOS, 2022), could also be disturbed by construction activities at projects screened into this assessment, including the Proposed Development. Therefore, for the purposes of the CIA it is more appropriate to consider the population of the East and South-east RoI, Wales MU, and Northern Ireland MU for grey seal as 9,936 animals. If the population size is taken to be 9,936 animals, the percentage of the population predicted to be disturbed in 2029 reduces to 15.34% (Table 11.76).

11.12.2.29 iPCoD modelling results show that the level of disturbance predicted under both piling schedules is not sufficient to result in any changes at the population level, since the impacted population is predicted to continue at an increasing trajectory at the same size as the un-impacted population (Volume III, Appendix 11.3: Phase 1 Irish Offshore Windfarms: Cumulative iPCoD Modelling).

11.12.2.30 As a result, the magnitude of impact is assessed as Low adverse for grey seals.

HARBOUR SEAL

11.12.2.31 The highest number of harbour seals predicted to be disturbed across Tier 1 projects between 2021 and 2034 is in 2029, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of harbour seal predicted to be disturbed in 2029 is estimated as 157 animals (86.26% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.77). The number of harbour seals predicted to be impacted by the Proposed Development represents 0.64% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the East RoI region.

11.12.2.32 Considering the typical foraging distances of harbour seals (Carter *et al.,* 2022), it is possible that seals from the East and South-east survey regions of the RoI presented in Morris and Duck (2019), and from the Wales and Northern Ireland MUs (SCOS, 2022), could also be disturbed by construction activities at projects screened into this assessment, including the Proposed Development. Therefore, for the purposes of the CIA it is more appropriate to consider the population of the East and South-east RoI, Wales MU, and Northern Ireland MU for harbour

seal as 1,378 animals. If the population size is assumed to be 1,378 animals, the percentage of the population predicted to be disturbed in 2029 reduces to 11.39% (Table 11.77).

11.12.2.33 iPCoD modelling results show that the level of disturbance predicted under both piling schedules is not sufficient to result in any changes at the population level, since the impacted population is predicted to continue at a stable trajectory at the same size as the un-impacted population (Volume III, Appendix 11.3: Phase 1 Irish Offshore Windfarms: Cumulative iPCoD Modelling).

11.12.2.34 As a result, the magnitude of impact is assessed as Low adverse for harbour seals.

TIER 1 + TIER 2

MAGNITUDE OF IMPACT

HARBOUR PORPOISE

11.12.2.35 The assessment of Tier 1 and 2 projects is considered to be the most realistic as this includes projects that are permitted. This means that full environmental impact assessments are available and there is reasonable confidence in the timelines of project construction.

11.12.2.36 The highest number of harbour porpoises predicted to be disturbed across Tier 1 and 2 projects between 2021 and 2034 is in 2027, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of harbour porpoise predicted to be disturbed in 2027 is estimated as 4,602 animals (7.36% of MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.71:). The number of harbour porpoises predicted to be impacted by the Proposed Development represents 41.46% of the total, with the remaining predicted cumulative disturbance attributable to other concurrent activities and projects within the MU.

11.12.2.37 The predicted extent of the cumulative disturbance is to a small proportion of the MU population, with short-term behavioural changes expected from each disturbance event that an individual is exposed to and is unlikely to affect the population trajectory. Therefore, the magnitude of impact is assessed as Low adverse for harbour porpoises.

BOTTLENOSE DOLPHIN

11.12.2.38 The highest number of bottlenose dolphins predicted to be disturbed across Tier 1 and 2 projects between 2021 and 2034 is in 2029, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of bottlenose dolphins predicted to be disturbed in 2029 is estimated as 2,365 animals (807.17% of MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.72).

11.12.2.39 If the population size is assumed to be 8,326 animals, the percentage of the population predicted to be disturbed in 2029 reduces to 28.40% (Table 11.72). The number of bottlenose dolphins predicted to be impacted by the Proposed Development represents 49.94% of the total, with the remaining predicted cumulative disturbance attributable to other concurrent activities and projects within the MU.

11.12.2.40 As a result, the magnitude of impact is assessed as Medium adverse for bottlenose dolphins, which is considered to be precautionary due to the caveats and assumptions discussed above in paragraphs 11.12.2.12 to 11.12.2.15.

RISSO'S DOLPHIN

11.12.2.41 The highest number of Risso's dolphins predicted to be disturbed across Tier 1 and 2 projects between 2021 and 2034 is in 2027, which coincides with the expected construction period of the Proposed Development. The maximum number of Risso's dolphins predicted to be disturbed in 2027 is estimated as 212 animals (1.73% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.73). The number of Risso's dolphins predicted to be impacted by the Proposed Development represents 73.58% of the total, indicating that the majority of the predicted cumulative disturbance is from the Proposed Development, with a smaller contribution from other concurrent activities and projects within the MU.

11.12.2.42 As a result, the magnitude of impact is considered to be equal to that of the alone assessment and is assessed as Low adverse for Risso's dolphins.

COMMON DOLPHIN

11.12.2.43 The highest number of common dolphins predicted to be disturbed across Tier 1 and 2 projects between 2021 and 2034 is in 2025, which is before the expected construction period of the Proposed Development. The maximum cumulative number of common dolphins predicted to be disturbed in 2025 is estimated as 3,823 animals (3.72% of the MU population) (Table 11.74). Therefore, the highest number of dolphins is predicted to occur in the absence of the Proposed Development.

11.12.2.44 When the Proposed Development is expected to be undergoing construction (2027 – 2030), the maximum cumulative number of common dolphins predicted to be disturbed is estimated as 1,486 animals in 2027 (1.45% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.74). The number of common dolphins predicted to be impacted by the Proposed Development represents 19.99% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the MU.

11.12.2.45 The predicted extent of the cumulative disturbance from Tier 1 and 2 projects is to a small proportion of the MU population, with short-term behavioural changes expected from each disturbance event an individual is exposed to which are unlikely to affect the population trajectory. Therefore, the magnitude of impact is assessed as Low adverse for common dolphins.

MINKE WHALE

11.12.2.46 The highest number of minke whales predicted to be disturbed across Tier 1 and 2 projects between 2021 and 2034 is in 2026, which is before the expected construction period of the Proposed Development. The maximum cumulative number of minke whales predicted to be disturbed in 2026 is estimated as 3,510 animals (17.45% of the MU population) (Table 11.75). Therefore, the highest number of minke whales is predicted to occur in the absence of the Proposed Development.

11.12.2.47 When the Proposed Development is expected to be undergoing construction (2027 – 2030), the maximum cumulative number of minke whales predicted to be disturbed is estimated in 2027 is estimated as 2,771 animals (13.77% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.75). The number of minke whales predicted to be impacted by the Proposed Development represents 8.16% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the MU.

11.12.2.48 The predicted extent of the cumulative disturbance from Tier 1 and 2 projects is to a small proportion of the MU population, with short-term behavioural changes expected from each disturbance event an individual is exposed to which are unlikely to affect the population trajectory. Therefore, the magnitude of impact is assessed as Low adverse for minke whales.

GREY SEAL

11.12.2.49 Across Tier 1 and 2 projects, the predicted level of cumulative grey seals disturbance remains unchanged from the Tier 1 assessment. This reflects that there are no Tier 2 projects located within the East region of RoI for grey seals. Therefore, the maximum cumulative number of grey seals predicted to be disturbed in 2029 is estimated as 1,524 animals (91.70% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.76).

11.12.2.50 If the population size is taken to be 9,936 animals, the percentage of the population predicted to be disturbed in 2029 reduces to 15.34% (Table 11.76). The number of grey seals predicted to be impacted by the Proposed Development represents 8.66% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the MU.

11.12.2.51 As there are no additional Tier 2 projects included within the assessment; as a result, the number of animals and proportion of the population predicted to impacted does not materially differ to the assessment of Tier 1 projects only. The results of the iPCoD modelling for the Tier 1 (i.e. Phase One) projects are considered applicable to the assessment of Tier 1 and 2 projects i.e. there is no predicted population-level impacts to seals.

11.12.2.52 Therefore, the magnitude of impact is assessed as Low adverse for grey seals.

HARBOUR SEAL

11.12.2.53 Across, Tier 1 and Tier 2 projects, the predicted level of cumulative harbour seals disturbance remains unchanged from the Tier 1 assessment. This reflects that there are no Tier 2 projects located within the East region of RoI for harbour seals. Therefore, the maximum cumulative number of harbour seals predicted to be disturbed in 2029 is estimated as 157 animals (86.26% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.77).

11.12.2.54 If the population size is assumed to be 1,378 animals, the percentage of the population predicted to be disturbed in 2029 reduces to 11.39% (Table 11.77). The number of harbour seals predicted to be impacted by the Proposed Development represents 0.64% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the MU.

11.12.2.55 As there are no additional Tier 2 projects included within the assessment; as a result, the number of animals and proportion of the population predicted to impacted does not materially differ to the assessment of Tier 1 projects only. The results of the iPCoD modelling for the Tier 1 (i.e. Phase One) projects are considered applicable to the assessment of Tier 1 and 2 projects i.e. there is no predicted population-level impacts to seals.

11.12.2.56 Therefore, the magnitude of impact is assessed as Low adverse for harbour seals.

TIER 1 + TIER 2 + TIER 3

MAGNITUDE OF IMPACT

11.12.2.57 The assessment of Tier 3 projects is very uncertain because these projects are not yet consented. It is important to note that the Tier 3 projects are less likely to contribute to a cumulative impact due to the uncertainty that they will go ahead, therefore there is little confidence in the results of this assessment.

HARBOUR PORPOISE

11.12.2.58 The highest number of harbour porpoises predicted to be disturbed across Tier 1, 2, and 3 projects between 2021 and 2034 is in 2028, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of harbour porpoise predicted to be disturbed in 2028 is estimated as 6,539 animals (10.46% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.71:). The number of harbour porpoises predicted to be impacted by the Proposed Development represents 29.18% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the MU.

11.12.2.59 Considering only projects with higher data confidence (Tier 1 and 2), predicted cumulative disturbance of harbour porpoise remains low throughout the assessment period (2021 – 2034). The highest predicted levels of disturbance for Tier 1 and Tier 2 projects occur between 2025 and 2034, peaking in 2027 at approximately 7.36% of the MU population (Table 11.71:). Outside this peak construction window, predicted levels of disturbance are lower with the average proportion of the population potentially disturbed by Tier 1 and 2 projects between all years considered in this CIA (2021 to 2034) is 3.37% of the MU population.

11.12.2.60 However, it is important to recognise that the likelihood of all Tier 1, 2, and 3 projects undertaking high-noise construction related activities at the same time is extremely unlikely. The highest predicted impact occurs in 2028 when 11 offshore windfarms are assumed to be undergoing construction, one offshore windfarm is undergoing decommissioning, two power cable projects are constructing, and two seismic surveys occur, as well as piling at the Proposed Development (Table 11.71:). Logistically, this is improbable due to the number of vessels, particularly for piling, that are currently available for such works. As such, the predicted peak levels of disturbance should be regarded as conservative upper bounds rather than realistic expectations.

11.12.2.61 There is also precaution surrounding the estimated number of harbour porpoise predicted to experience behavioural disturbance from seismic surveys. Large 2D and 3D seismic surveys used in oil and gas exploration can produce large impact ranges (10 km EDR for harbour porpoise; JNCC, 2025). However, Thompson *et al.* (2013) show that the disturbance impact is short-lived as harbour porpoise have been shown to return to the impacted area within 19 hours following the cessation of survey activity. This change in behaviour is therefore considered to be short-term and recoverable, making the magnitude of impact from seismic surveys more likely to be negligible, and not expected to result in long-term displacement or population-level effects.

11.12.2.62 The cumulative iPCoD model provides a population-level assessment of the impact of disturbance for the Phase One projects. However, it was not undertaken across all projects due to the uncertainty around their activity schedules and/or early planning stages. However, previous theoretical modelling can help inform understanding of potential population-level effects across a greater range of projects. For example, Nabe-Nielsen *et al.* (2018) used the Disturbance Effects of Noise on the Harbour Porpoise Population in the North Sea (DEPONS) model to predict the potential cumulative population-level effects from construction of 60 offshore windfarms in the

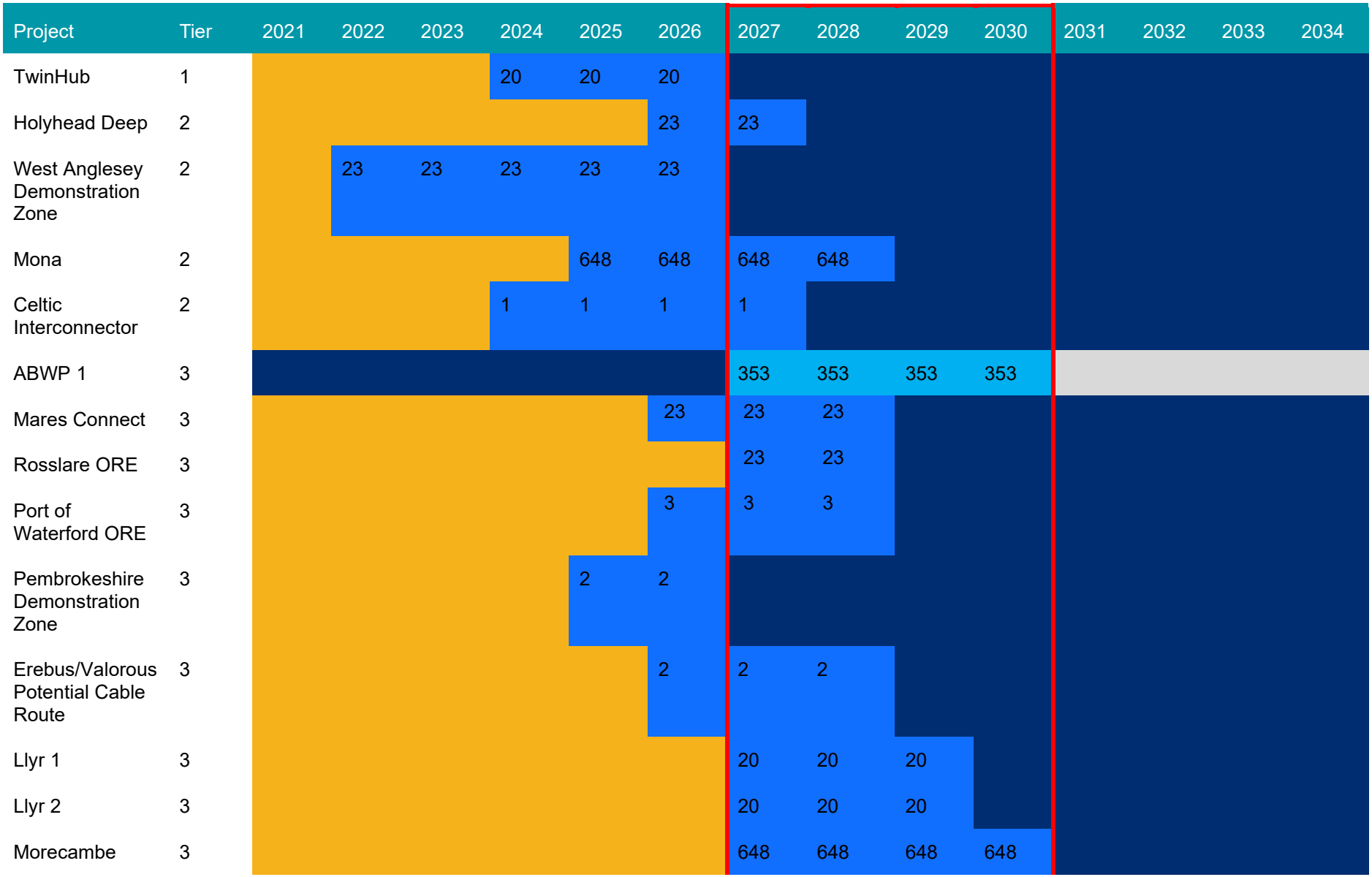
North Sea between 2011 and 2020. The model indicated that the population was unlikely to be significantly impacted, with recovery to baseline population within six to seven years, despite short-term declines of up to 20% in population size, a scenario far exceeding the levels predicted in this CIA. Therefore, any population level-effects from the Proposed Development and other Tier 1, 2 and 3 projects are expected to be smaller, with a faster recovery to baseline.

11.12.2.63 Overall, the predicted extent of the cumulative disturbance is to a small proportion of the MU population, with short-term behavioural changes expected from each disturbance event that an individual is exposed to. However, as the overall disturbance effect is predicted to occur across multiple projects over several years, the temporary changes in behaviour and/or distribution of individuals could result in potential reductions in reproductive rates of some individuals, although is unlikely to affect the population trajectory. Therefore, the magnitude of impact is assessed using a precautionary approach as Low adverse for harbour porpoise.

Table 11.71: Number of harbour porpoise disturbed by underwater noise in the CIA.

The Proposed Development construction window is indicated by red bars. Orange = Not yet/no longer operational; Grey = Abandoned/not in use; Blue = Construction; Pale blue = Decommissioning; Navy = Operation and maintenance

Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Proposed Development	1							1,908	1,908	1,908	1,908				
Codling Wind Park	1						353	353	353	353					
Dublin Array	1									353	353	353	353		
North Irish Sea Array (NISA)	1							353	353	353	353				
Oriel	1								353	353	353				
Greenlink Interconnector	1				2	2	2								
Erebus Floating Wind Demo	1			20	20	20	20								
Awel y Môr	1			648	648	648	648	648							
Morgan	1					648	648	648	648						
North Hoyle	1											648	648	648	648
White Cross	1					20	20	20							
Burbo Bank	1											648	648	648	648
Walney 1	1											648	648	648	648


Project
Tier
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
TwinHub
1
20
20
20
Holyhead Deep
2
23
23
West Anglesey Demonstration Zone
2
23
23
23
23
23
Mona
2
648
648
648
648
Celtic Interconnector
2
1
1
1
1
ABWP 1
3
353
353
353
353
Mares Connect
3
23
23
23
Rosslare ORE
3
23
23
Port of Waterford ORE
3
3
3
3
Pembrokeshire Demonstration Zone
3
2
2
Erebus/Valorous Potential Cable Route
3
2
2
2
Llyr 1
3
20
20
20
Llyr 2
3
20
20
20
Morecambe
3
648
648
648
648

Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mooir Vannin	3								353	353	353	353			
North Channel Wind 2	3								353	353	353	353			
LirIC	3						23	23	23	23					
North Channel Wind 1	3								353	353	353	353			
Seismic survey 1	3	51	51	51	51	51	51	51	51	51	51	51	51	51	51
Seismic survey 2	3	51	51	51	51	51	51	51	51	51	51	51	51	51	51
Tier 1		0	0	668	690	1,358	1,711	3,930	3,615	3,320	2,967	2,297	2,297	1,944	1,944
% MU		0.00 %	0.00 %	1.07 %	1.10 %	2.17 %	2.74 %	6.29 %	5.78%	5.31 %	4.75 %	3.67 %	3.67 %	3.11 %	3.11 %
Tier 1 and 2		0	23	691	714	2,030	2,406	4,602	4,263	3,320	2,967	2,297	2,297	1,944	1,944
% MU		0.00 %	0.04 %	1.11 %	1.14 %	3.25 %	3.85 %	7.36 %	6.82%	5.31 %	4.75 %	3.67 %	3.67 %	3.11 %	3.11 %
Tier 1, 2 and 3		102	125	793	816	2,134	2,561	5,819	6,539	5,545	5,129	3,458	2,399	2,046	2,046
% MU		0.16 %	0.20 %	1.27 %	1.31 %	3.41 %	4.10 %	9.31 %	10.46 %	8.87 %	8.20 %	5.53 %	3.84 %	3.27 %	3.27 %

BOTTLENOSE DOLPHIN

11.12.2.64 The highest number of bottlenose dolphins predicted to be disturbed across Tier 1, 2, and 3 projects between 2021 and 2034 is in 2029, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of bottlenose dolphins predicted to be disturbed in 2029 is estimated as 3,674 animals (1,253.92% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.72).

11.12.2.65 If the population size is assumed to be 8,326 animals, the percentage of the population predicted to be disturbed in 2029 reduces to 44.13% (Table 11.72). The number of bottlenose dolphins predicted to be impacted by the Proposed Development represents 32.14% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the MU.

11.12.2.66 For projects with higher data confidence (Tier 1 and 2), the predicted cumulative number of bottlenose dolphins remains limited to a relatively small proportion of the larger population size (8,326 individuals) across the assessment period (2021-2034). The highest predicted levels of disturbance occur between 2027 and 2030, peaking in 2029 at approximately 28.40% of the larger population size (Table 11.72). Outside of this peak construction window, predicted levels of disturbance are substantially lower with the average proportion of the population potentially disturbed by Tier 1 and 2 projects between all years considered in this CIA (2021 to 2034) is 8.36% of the larger population size.

11.12.2.67 Overall, the predicted extent of the cumulative disturbance is to a relatively small proportion of the larger population size (from the most recent abundance estimates for this area using the SCANS IV surveys), with short-term behavioural changes expected from each disturbance event that an individual is exposed to. The overall disturbance effect is predicted to occur across multiple projects and over several years, the temporary changes in behaviour and/or distribution of individuals could result in potential reductions in reproductive rates of some individuals. However, the cumulative disturbance is not considered enough to affect the long-term viability of the population. Whilst it is unlikely that all Tier 3 projects will progress to construction, the magnitude of impact is assessed using a precautionary approach as Medium adverse for bottlenose dolphins.

Table 11.72: Number of bottlenose dolphins disturbed by underwater noise in the CIA.

The Proposed Development construction window is indicated by red bars. Orange = Not yet/no longer operational; Grey = Abandoned/not in use; Blue = Construction; Pale blue = Decommissioning; Navy = Operation and maintenance

Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Proposed Development	1							1,181	1,181	1,181	1,181				
Codling Wind Park	1						296	296	296	296					
Dublin Array	1									296	296	296	296		
NISA	1							296	296	296	296				
Oriel	1								296	296	296				
Greenlink Interconnector	1				33	33	33								
Burbo Bank	1											14	14	14	14
Walney 1	1											14	14	14	14
Awel y Môr	1			14	14	14	14	14							
Morgan	1					14	14	14	14						
North Hoyle	1											14	14	14	14
Holyhead Deep	2						19	19							
Mona	2					14	14	14	14						

Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
West Anglesey Demonstration Zone	2		19	19	19	19	19								
ABWP 1	3							296	296	296	296				
Mares Connect	3						19	19	19						
Rosslare ORE	3							19	19						
Port of Waterford ORE	3						0	0	0						
Morecambe	3							14	14	14	14				
Mooir Vannin	3								296	296	296	296			
North Channel Wind 2	3								296	296	296	296			
North Channel Wind 1	3								296	296	296	296			
Seismic survey 1	3	111	111	111	111	111	111	111	111	111	111	111	111	111	111
Tier 1		0	0	14	47	61	357	1,801	2,083	2,365	2,069	338	338	42	42
% MU (alone)		0.00%	0.00%	4.78%	16.04%	20.82%	121.84%	614.68%	710.92%	807.17%	706.14%	115.36%	115.36%	14.33%	14.33%
% MU (combined)		0.00%	0.00%	0.17%	0.56%	0.73%	4.29%	21.63%	25.02%	28.40%	24.85%	4.06%	4.06%	0.50%	0.50%
Tier 1 and 2		0	19	33	66	94	409	1,834	2,097	2,365	2,069	338	338	42	42

Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
% MU (alone)		0.00 %	6.48 %	11.26%	22.53%	32.08%	139.59%	625.94%	715.70%	807.17%	706.14%	115.36%	115.36%	14.33%	14.33%
% MU (combined)		0.00 %	0.23 %	0.40 %	0.79 %	1.13 %	4.91 %	22.03%	25.19%	28.40%	24.85%	4.06 %	4.06 %	0.50 %	0.50 %
Tier 1, 2 and 3		111	130	144	177	205	539	2,293	3,444	3,674	3,378	1,337	449	153	153
% MU (alone)		37.88%	44.37%	49.15%	60.41%	76.45%	183.96%	782.59%	1168.94%	1253.92%	1152.90%	456.31%	153.24%	52.22%	52.22%
% MU (combined)		1.33 %	1.56 %	1.73 %	2.13 %	2.46 %	6.47 %	27.54%	41.36%	44.13%	40.57%	16.06%	5.39 %	1.84 %	1.84 %

RISSO'S DOLPHIN

11.12.2.68 The highest number of Risso's dolphins predicted to be disturbed across Tier 1, 2, and 3 projects between 2021 and 2034 is in 2029, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of Risso's dolphins predicted to be disturbed in 2029 is estimated as 563 animals (4.59% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.73). The number of Risso's dolphins predicted to be impacted by the Proposed Development represents 27.71% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the MU.

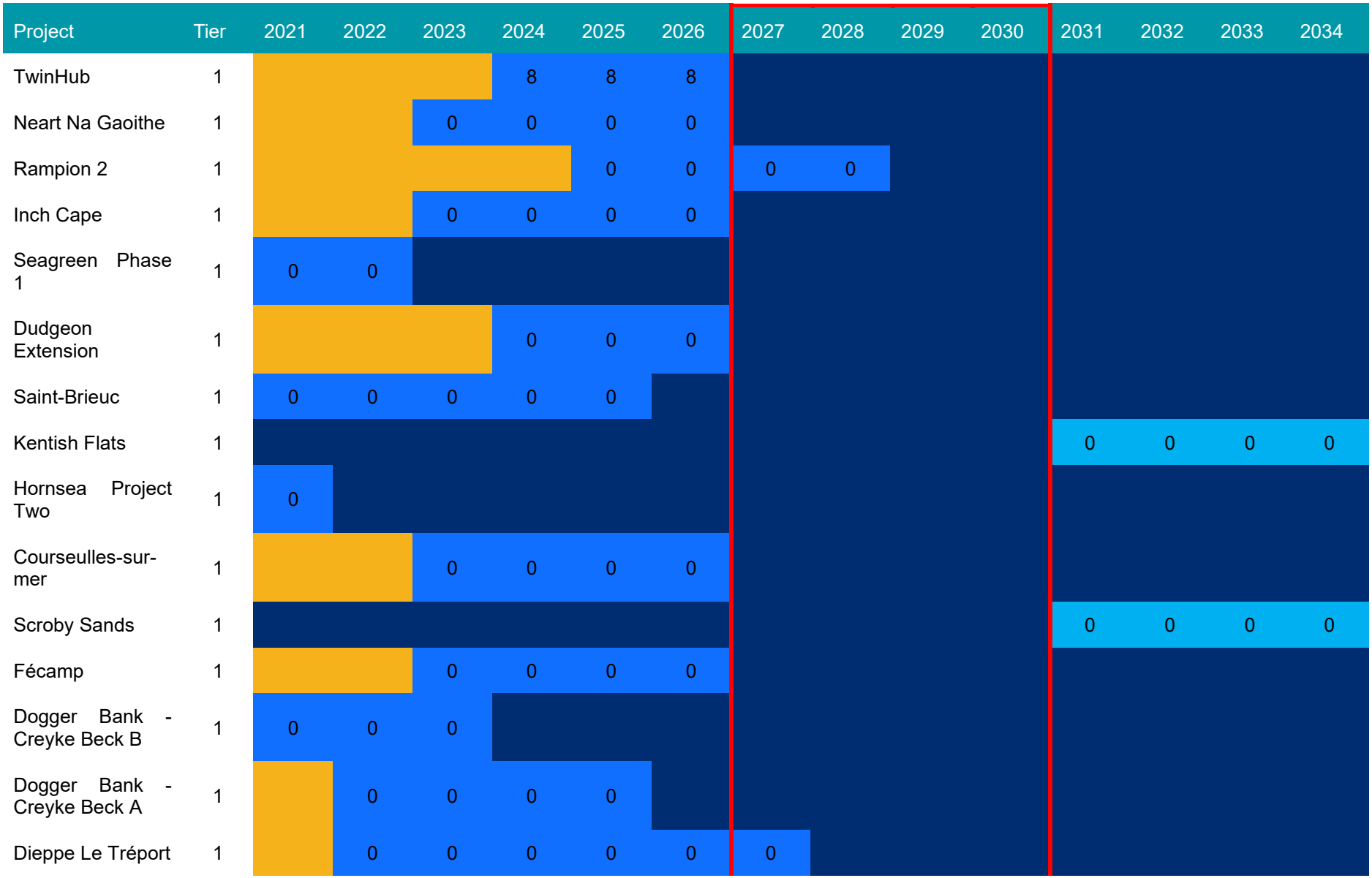
11.12.2.69 Considering only projects with higher data confidence (Tier 1 and 2), the predicted cumulative disturbance of Risso's dolphins remains low throughout the assessment period (2021 – 2034). The highest levels of disturbance for Tier 1 and Tier 2 projects occur between 2024 and 2030, peaking in 2027 at approximately 1.73% of the MU population) (Table 11.73). Outside of this construction window, predicted levels of disturbance are lower with the average proportion of the population potentially disturbed by Tier 1 and 2 projects between all years considered in this CIA (2021 to 2034) is 0.76% of the MU population.

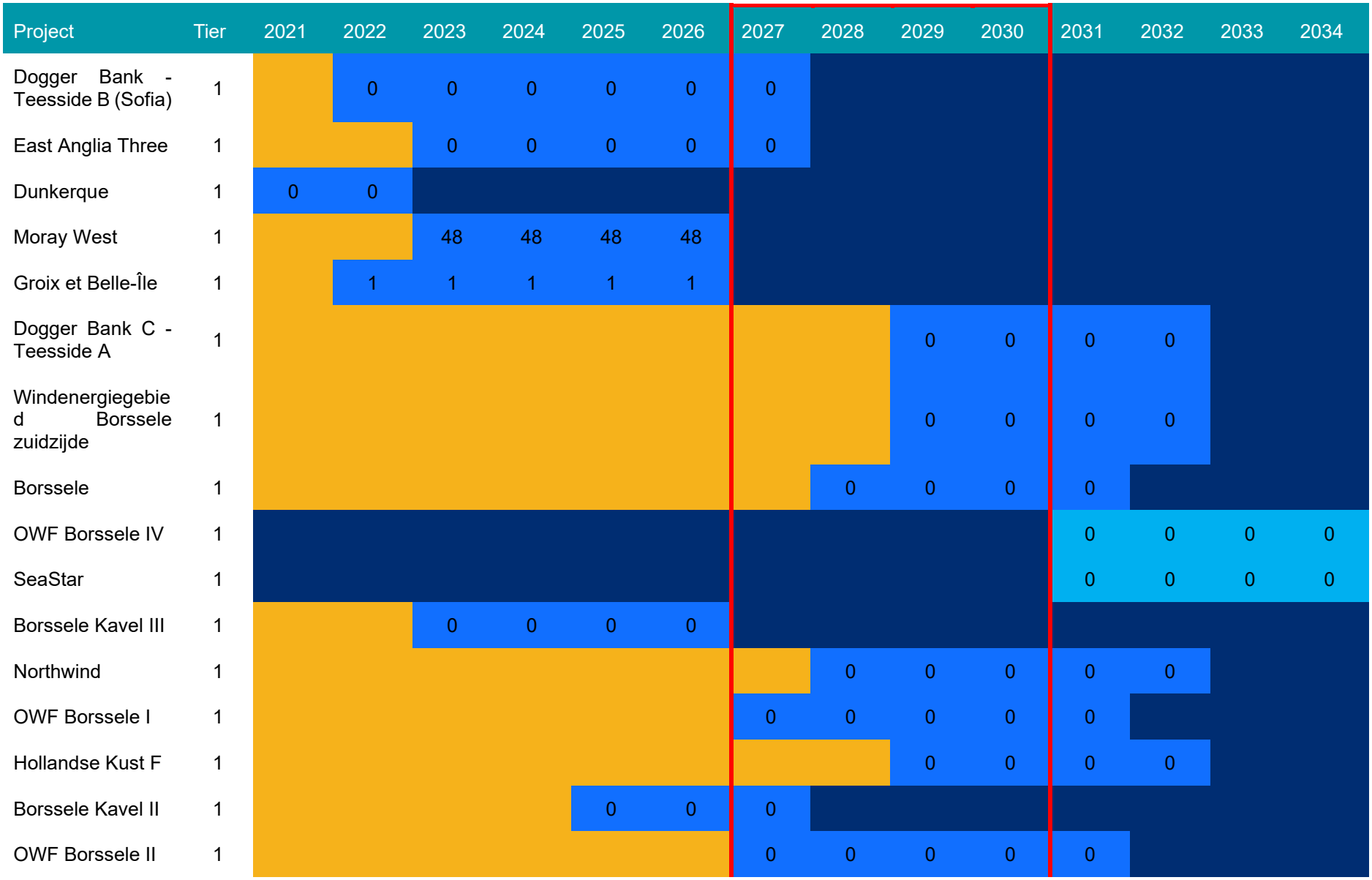
11.12.2.70 Overall, the predicted extent of the cumulative disturbance is to a small proportion of the MU population, with short-term behavioural changes expected from each disturbance event that an individual is exposed to. However, as the overall disturbance effect is predicted to occur across multiple projects and over several years, the temporary changes in behaviour and/or distribution of individuals could result in potential reductions in reproductive rates of some individuals. Considering the small proportion of the population affected and the extensive area of the respective MU, the cumulative impacts are unlikely to affect the population trajectory. The magnitude of impact is assessed using a precautionary approach as Low adverse for Risso's dolphins.

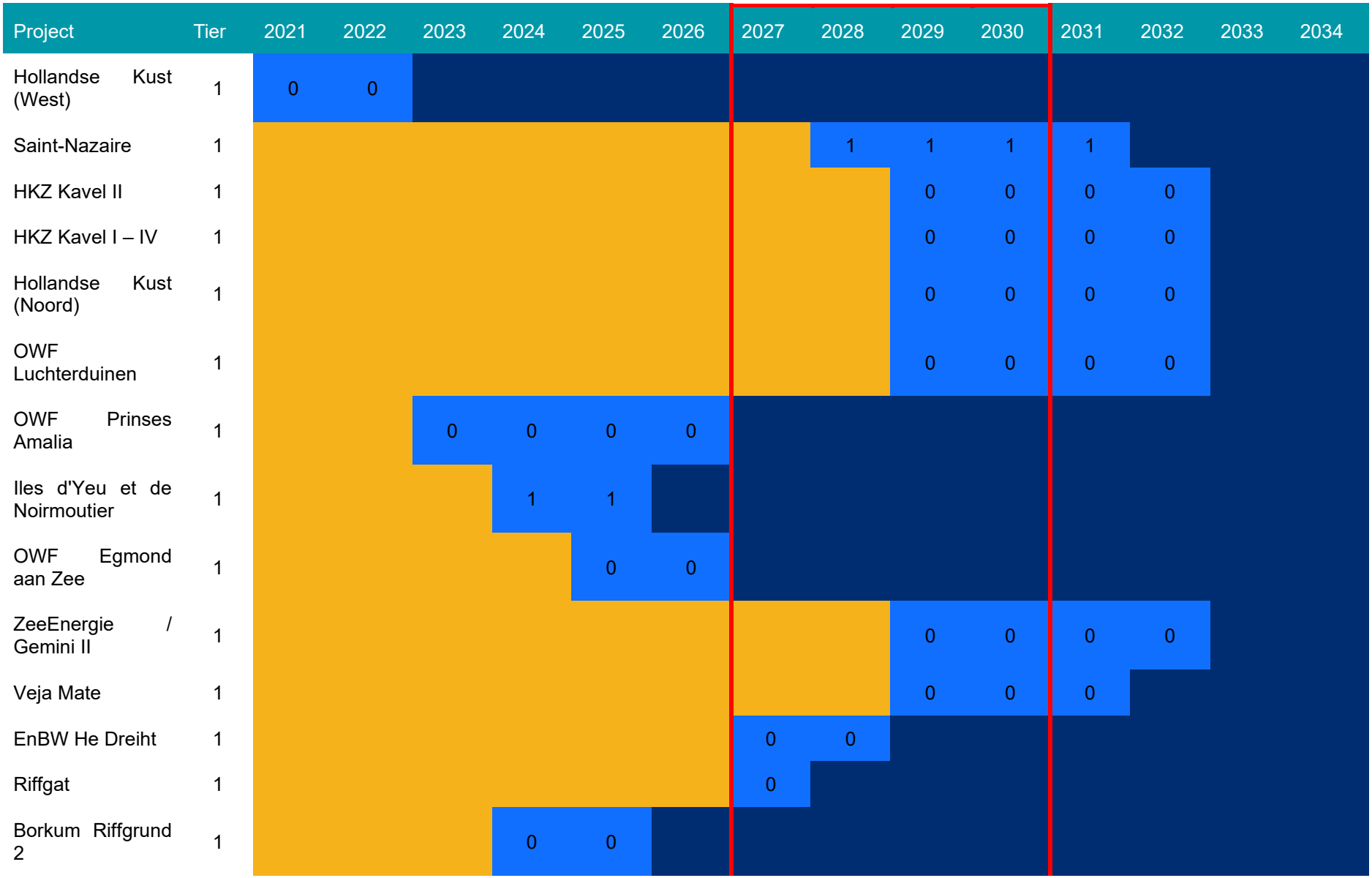
Table 11.73: Number of Risso's dolphin disturbed by underwater noise in the CIA.

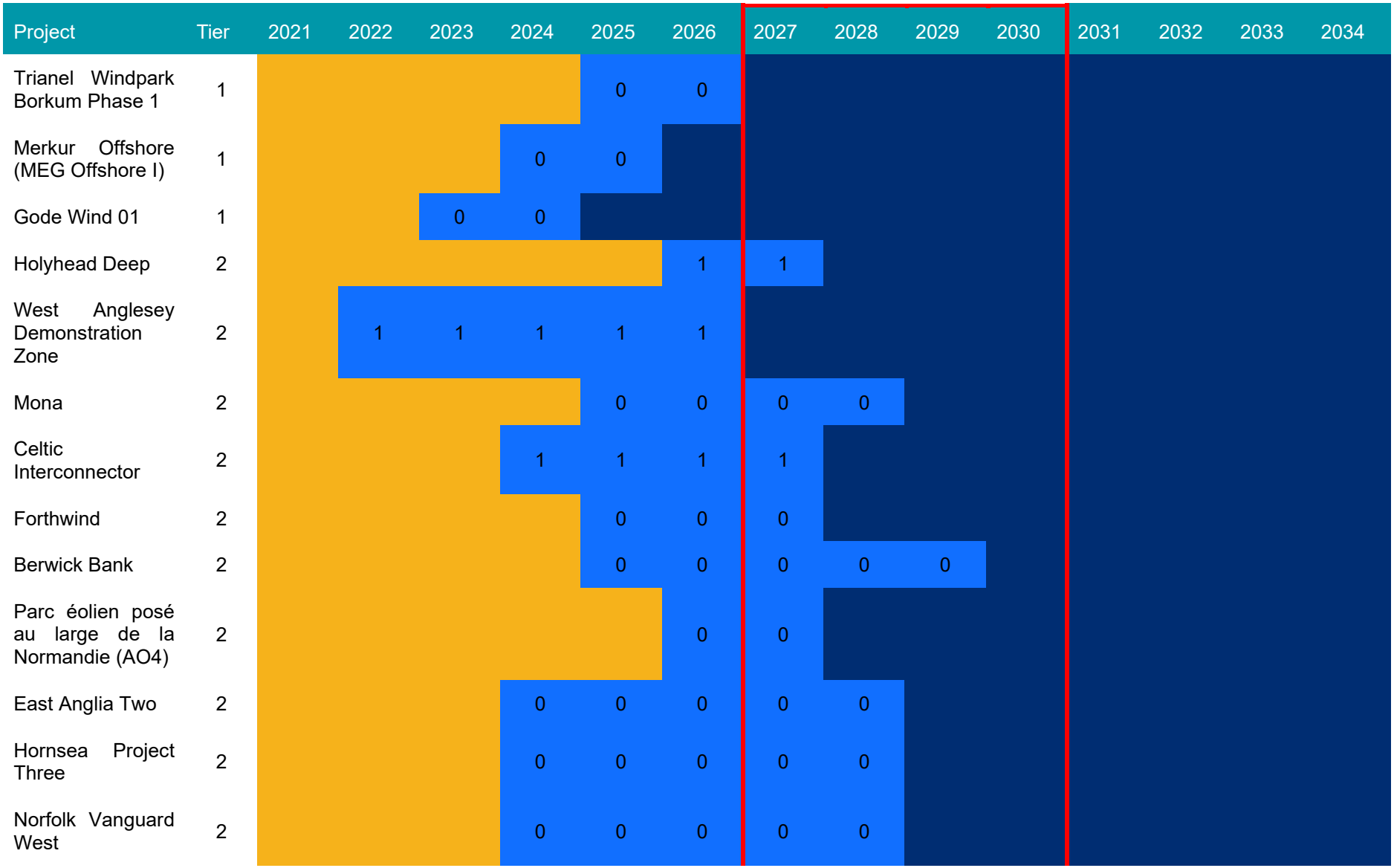
The Proposed Development construction window is indicated by red bars. Orange = Not yet/no longer operational; Grey = Abandoned/not in use; Blue = Construction; Pale blue = Decommissioning; Navy = Operation and maintenance

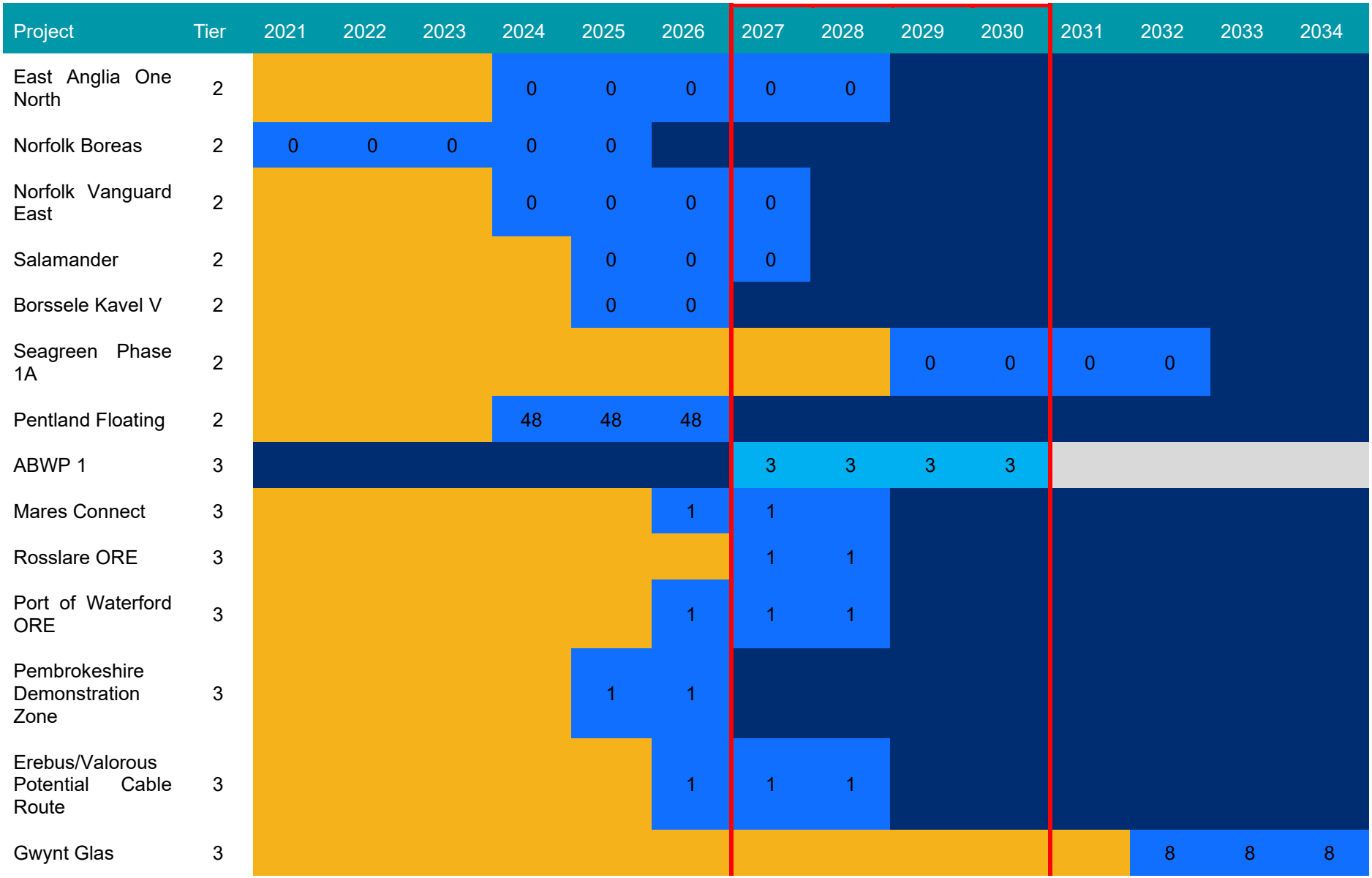
Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Proposed Development	1							156	156	156	156				
Codling Wind Park	1						3	3	3	3					
Dublin Array	1									3	3	3	3		
NISA	1							3	3	3	3				
Oriel	1								3	3	3				
Greenlink Interconnector	1				1	1	1								
Erebus Floating Wind Demo	1			8	8	8	8								
Awel y Môr	1			40	40	40	40	40							
Morgan	1					0	0	0	0						
North Hoyle	1											0	0	0	0
White Cross	1					8	8	8							
Burbo Bank	1											0	0	0	0
Walney 1	1											0	0	0	0

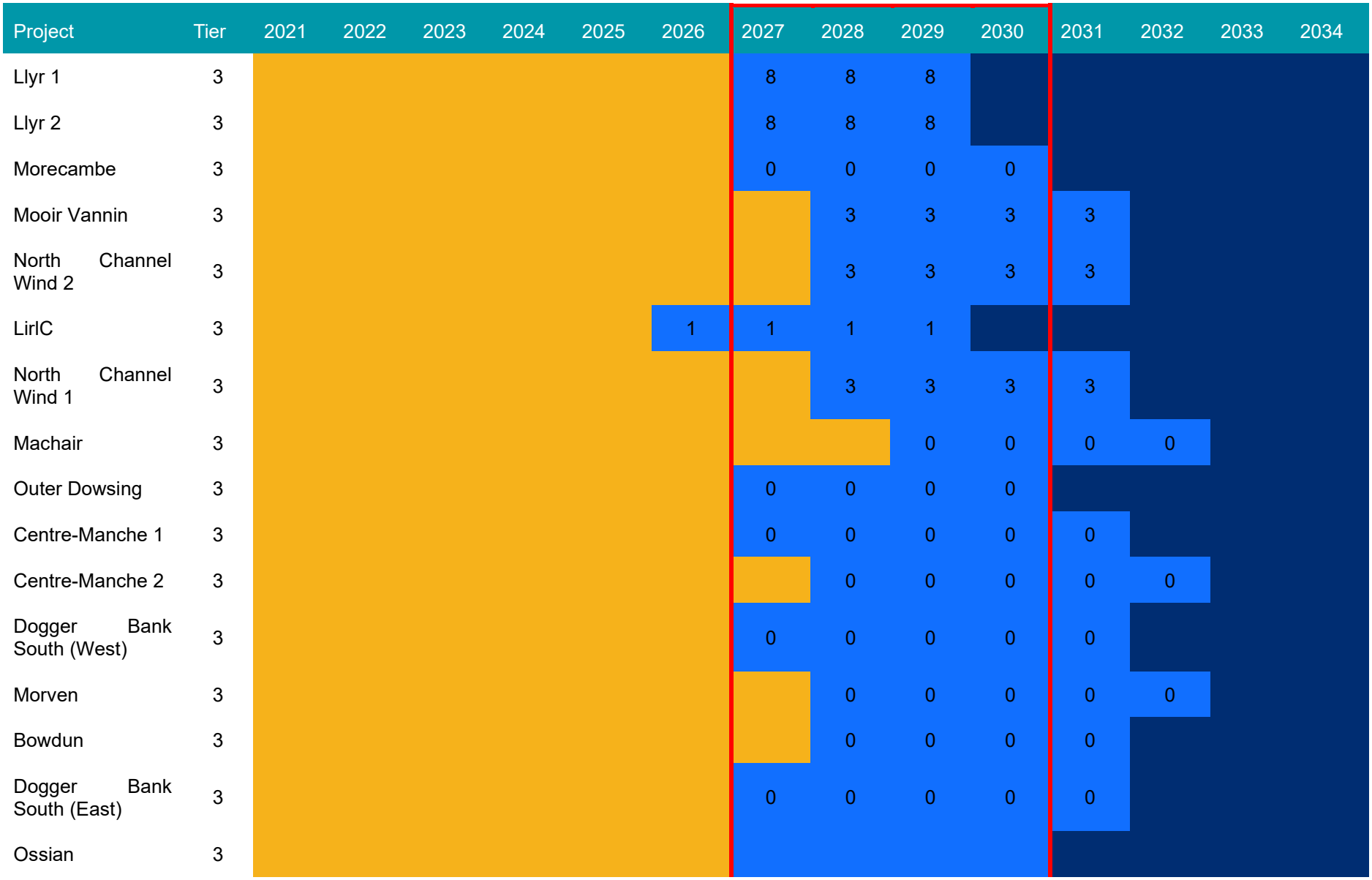

Project
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2034
TwinHub
1
8
8
8
Neart Na Gaoithe
1
0
0
0
0
Rampion 2
1
0
0
0
0
Inch Cape
1
0
0
0
0
Seagreen Phase 1
1
0
0
Dudgeon Extension
1
0
0
0
Saint-Brieuc
1
0
0
0
0
0
Kentish Flats
1
0
0
0
0
Hornsea Project Two
1
0
Courseulles-sur-mer
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0
0
0
0
Scroby Sands
1
0
0
0
0
Fécamp
1
0
0
0
0
Dogger Bank - Creyke Beck B
1
0
0
0
Dogger Bank - Creyke Beck A
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Dieppe Le Tréport
1
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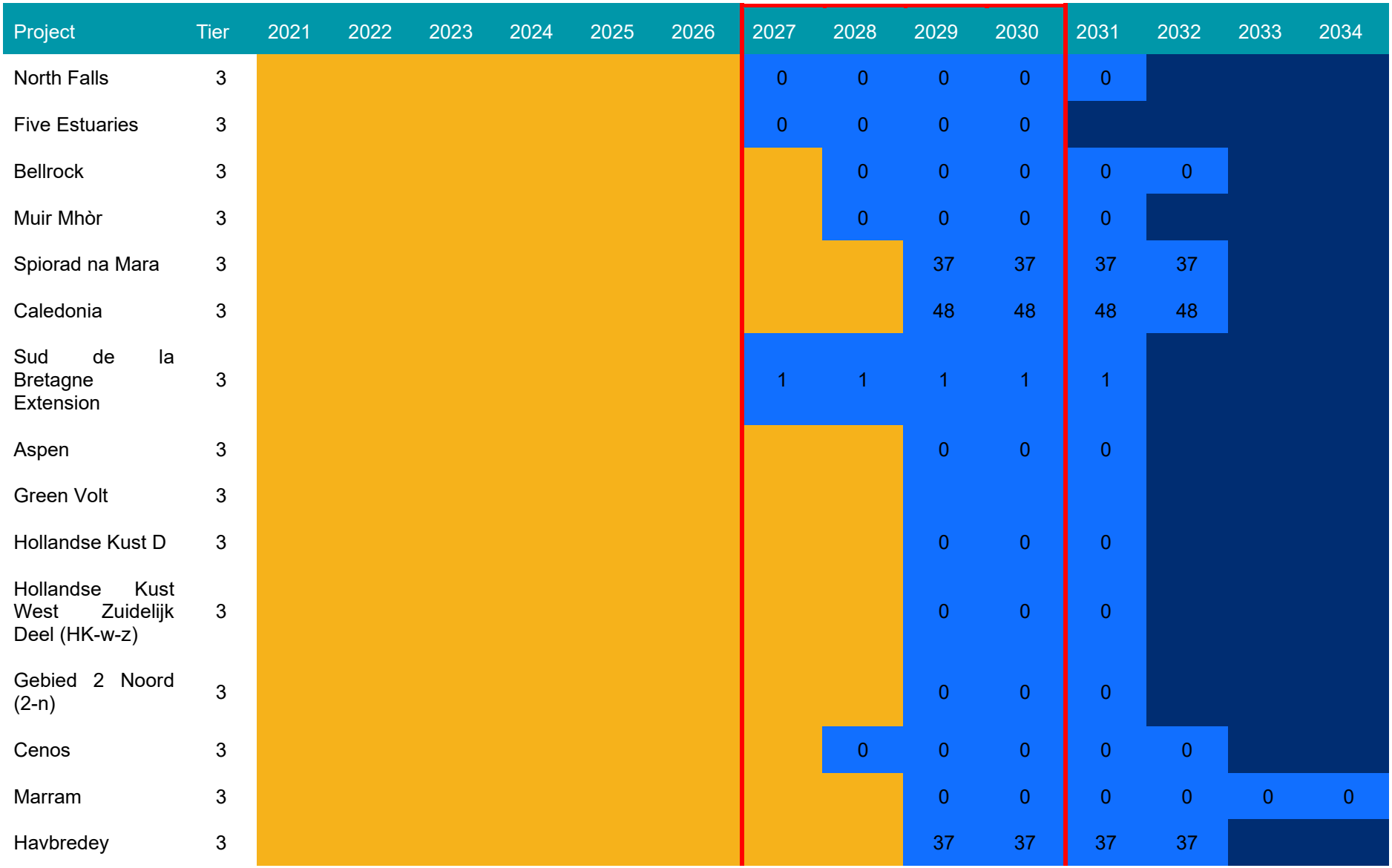

Project
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2034
Dogger Bank - Teesside B (Sofia)
1
0 0 0 0 0 0
East Anglia Three
1
0 0 0 0 0
Dunkerque
1
0 0
Moray West
1
48 48 48 48
Groix et Belle-Île
1
1 1 1 1 1
Dogger Bank C - Teesside A
1
0 0 0 0
Windenergiegebied Borssele zuidzijde
1
0 0 0 0
Borssele
1
0 0 0 0
OWF Borssele IV
1
0 0 0 0
SeaStar
1
0 0 0 0
Borssele Kavel III
1
0 0 0 0
Northwind
1
0 0 0 0 0
OWF Borssele I
1
0 0 0 0 0
Hollandse Kust F
1
0 0 0 0
Borssele Kavel II
1
0 0 0
OWF Borssele II
1
0 0 0 0 0

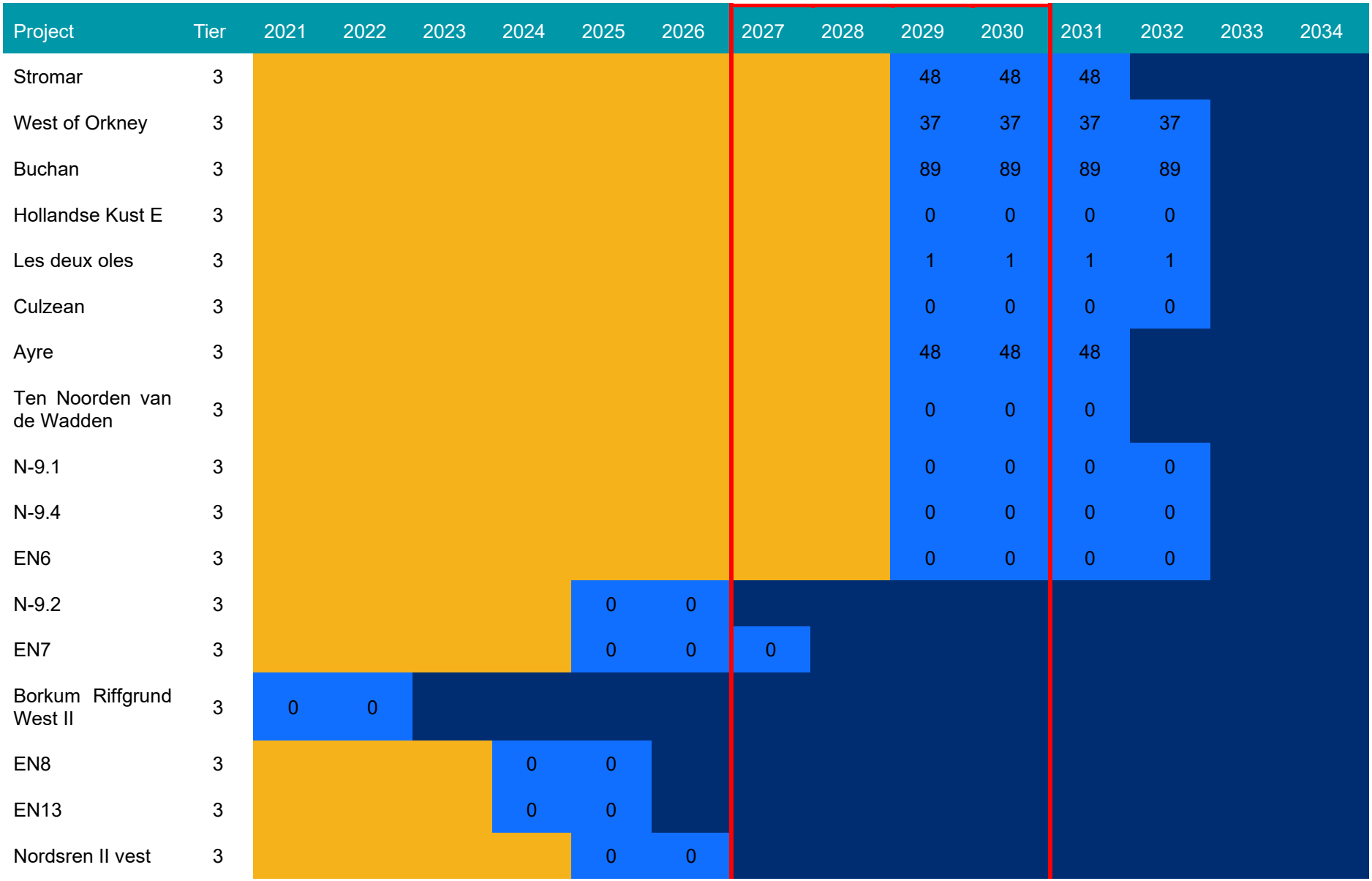

Project
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2034
Hollandse Kust (West) 1
0 0
Saint-Nazaire 1
1 1 1 1
HKZ Kavel II 1
0 0 0 0
HKZ Kavel I – IV 1
0 0 0 0
Hollandse Kust (Noord) 1
0 0 0 0
OWF Luchterduinen 1
0 0 0 0
OWF Prinses Amalia 1
0 0 0 0
Iles d'Yeu et de Noirmoutier 1
1 1
OWF Egmond aan Zee 1
0 0
ZeeEnergie / Gemini II 1
0 0 0 0
Veja Mate 1
0 0 0
EnBW He Dreiht 1
0 0
Riffgat 1
0
Borkum Riffgrund 2 1
0 0


Project
Tier
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2034
Trianel Windpark Borkum Phase 1
1
0
0
Merkur Offshore (MEG Offshore I)
1
0
0
Gode Wind 01
1
0
0
Holyhead Deep
2
1
1
West Anglesey Demonstration Zone
2
1
1
1
1
1
Mona
2
0
0
0
0
Celtic Interconnector
2
1
1
1
1
Forthwind
2
0
0
0
Berwick Bank
2
0
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0
0
0
Parc éolien posé au large de la Normandie (AO4)
2
0
0
East Anglia Two
2
0
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Hornsea Project Three
2
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Norfolk Vanguard West
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Project
Tier
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East Anglia One North
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Norfolk Boreas
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Norfolk Vanguard East
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Salamander
2
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Borssele Kavel V
2
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Seagreen Phase 1A
2
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0
Pentland Floating
2
48
48
48
ABWP 1
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Mares Connect
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1
Rosslare ORE
3
1
1
Port of Waterford ORE
3
1
1
1
Pembrokeshire Demonstration Zone
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1
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Erebus/Valorous Potential Cable Route
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1
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Gwynt Glas
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8


Project
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Llyr 2
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8
Morecambe
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Mooir Vannin
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3
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North Channel Wind 2
3
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LirlC
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1
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1
1
North Channel Wind 1
3
3
3
3
3
Machair
3
0
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0
0
Outer Dowsing
3
0
0
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0
Centre-Manche 1
3
0
0
0
0
0
Centre-Manche 2
3
0
0
0
0
0
Dogger Bank South (West)
3
0
0
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0
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Morven
3
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0
0
0
0
Bowdun
3
0
0
0
0
Dogger Bank South (East)
3
0
0
0
0
0
Ossian
3


Project
Tier
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2033
2034
North Falls 3 0 0 0 0 0
Five Estuaries 3 0 0 0 0
Bellrock 3 0 0 0 0 0
Muir Mhòr 3 0 0 0 0
Spiorad na Mara 3 37 37 37 37
Caledonia 3 48 48 48 48
Sud de la Bretagne Extension 3 1 1 1 1 1
Aspen 3 0 0 0
Green Volt 3
Hollandse Kust D 3 0 0 0
Hollandse Kust West Zuidelijk Deel (HK-w-z) 3 0 0 0
Gebied 2 Noord (2-n) 3 0 0 0
Cenos 3 0 0 0 0 0
Marram 3 0 0 0 0 0 0
Havbredey 3 37 37 37 37


Project
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Stromar 3 48 48 48
West of Orkney 3 37 37 37 37
Buchan 3 89 89 89 89
Hollandse Kust E 3 0 0 0 0
Les deux oles 3 1 1 1 1
Culzean 3 0 0 0 0
Ayre 3 48 48 48
Ten Noorden van de Wadden 3 0 0 0
N-9.1 3 0 0 0 0
N-9.4 3 0 0 0 0
EN6 3 0 0 0 0
N-9.2 3 0 0
EN7 3 0 0 0
Borkum Riffgrund West II 3 0 0
EN8 3 0 0
EN13 3 0 0
Nordsren II vest 3 0 0

Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
EN5	3		0	0	0	0									
V317	3						0	0							
Seismic survey 1	3	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Seismic survey 2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Seismic survey 3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Seismic survey 4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Seismic survey 5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Tier 1		0	1	97	107	115	117	210	166	169	166	4	3	0	0
% MU		0.00 %	0.01 %	0.79 %	0.87 %	0.94 %	0.95 %	1.71 %	1.35 %	1.38 %	1.35 %	0.03 %	0.02 %	0.00 %	0.00 %
Tier 1 and 2		0	2	98	157	165	168	212	166	169	166	4	3	0	0
% MU		0.00 %	0.02 %	0.80 %	1.28 %	1.35 %	1.37 %	1.73 %	1.35 %	1.38 %	1.35 %	0.03 %	0.02 %	0.00 %	0.00 %
Tier 1, 2 and 3		19	21	117	176	185	192	256	219	563	543	378	279	27	27
% MU		0.15 %	0.17 %	0.95 %	1.44 %	1.51 %	1.57 %	2.09 %	1.79 %	4.59 %	4.43 %	3.08 %	2.28 %	0.22 %	0.22 %

COMMON DOLPHIN

11.12.2.71 The highest number of common dolphins predicted to be disturbed across Tier 1, 2, and 3 projects between 2021 and 2034 is in 2027, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of common dolphins predicted to be disturbed in 2027 is estimated as 4,077 animals (3.97% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.74). The number of common dolphins predicted to be impacted by the Proposed Development represents 7.28% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the MU.

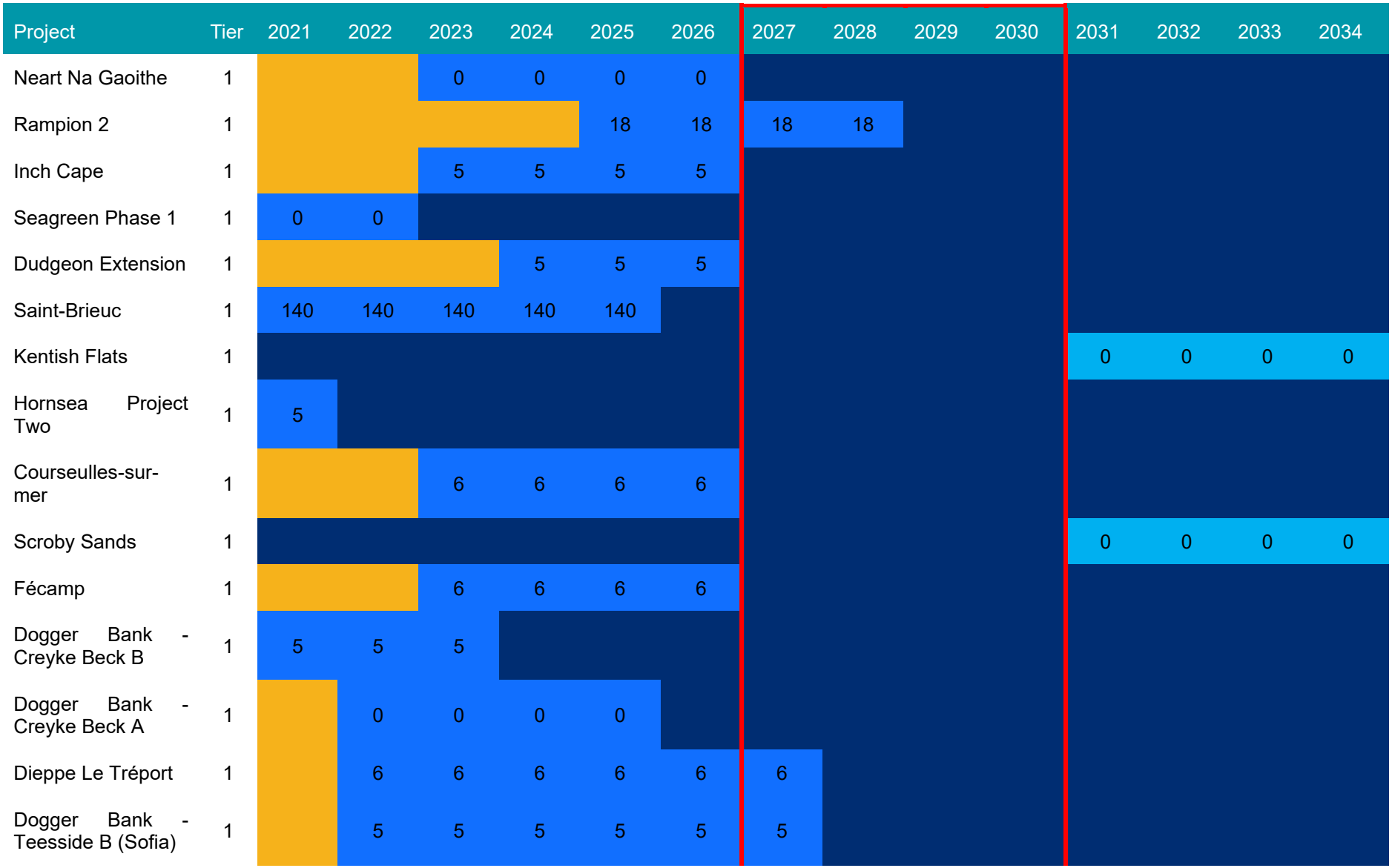
11.12.2.72 Considering only projects with higher data confidence (Tier 1 and 2), the predicted cumulative number of common dolphins predicted to be disturbed remains low throughout the assessment period (2021 – 2034). The highest predicted level of disturbance for Tier 1 and Tier 2 projects occur between 2023 and 2027, peaking in 2025 (3.72% of the MU population) (Table 11.74). The average proportion of the population potentially disturbed by Tier 1 and 2 projects between all years considered in this CIA (2021 to 2034) is 1.08% of the MU population.

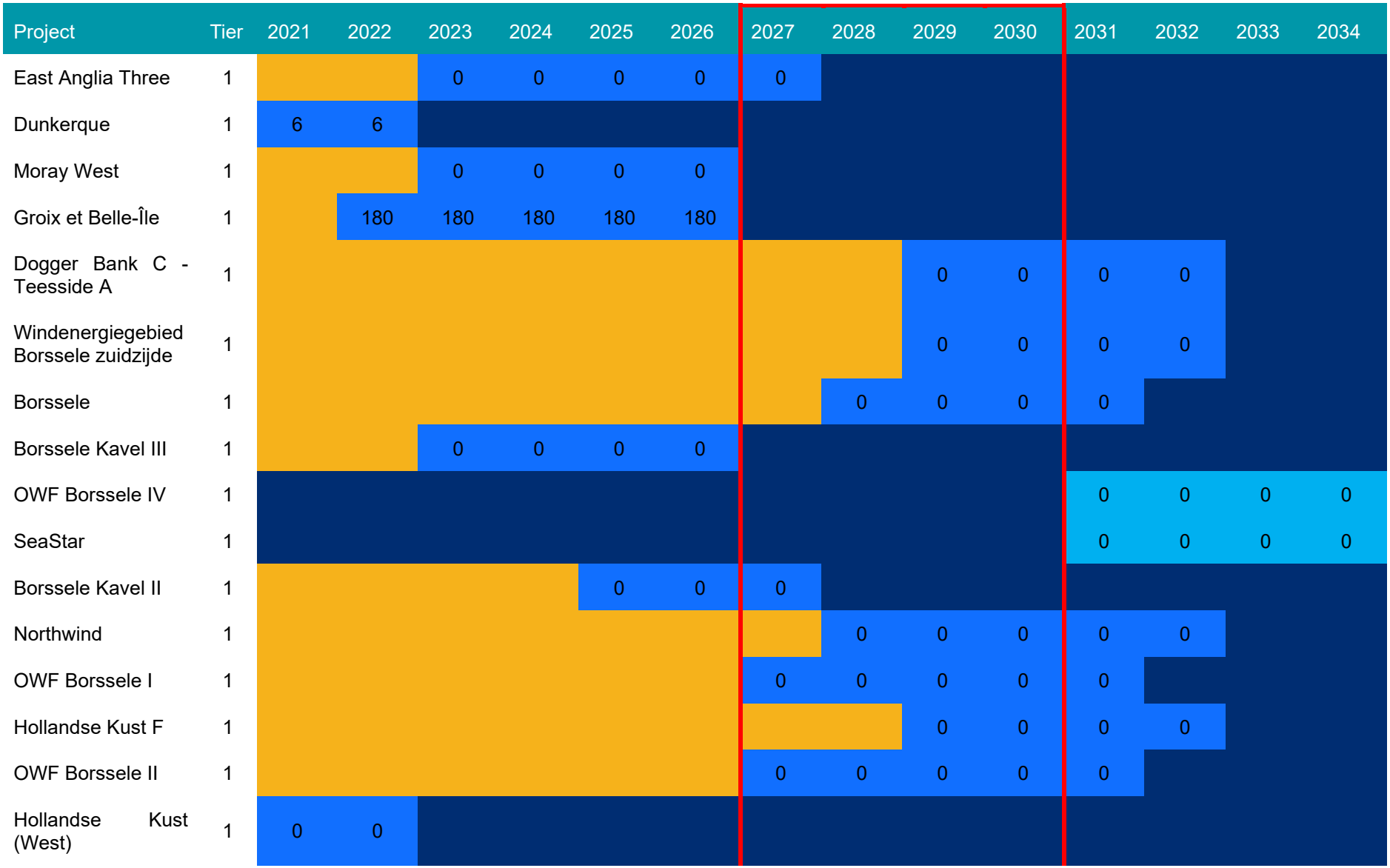
11.12.2.73 The predicted extent of the cumulative disturbance is to a small proportion of the MU population, with short-term behavioural changes expected from each disturbance event that an individual is exposed to. However, as the overall disturbance effect is predicted to occur across multiple projects and over several years, the temporary changes in behaviour and/or distribution of individuals could result in potential reductions in reproductive rates of some individuals. Considering the small proportion of the population affected and the extensive area of the respective MU, the cumulative impacts are unlikely to affect the population trajectory. The magnitude of impact is assessed using a precautionary approach as Low adverse for common dolphins.

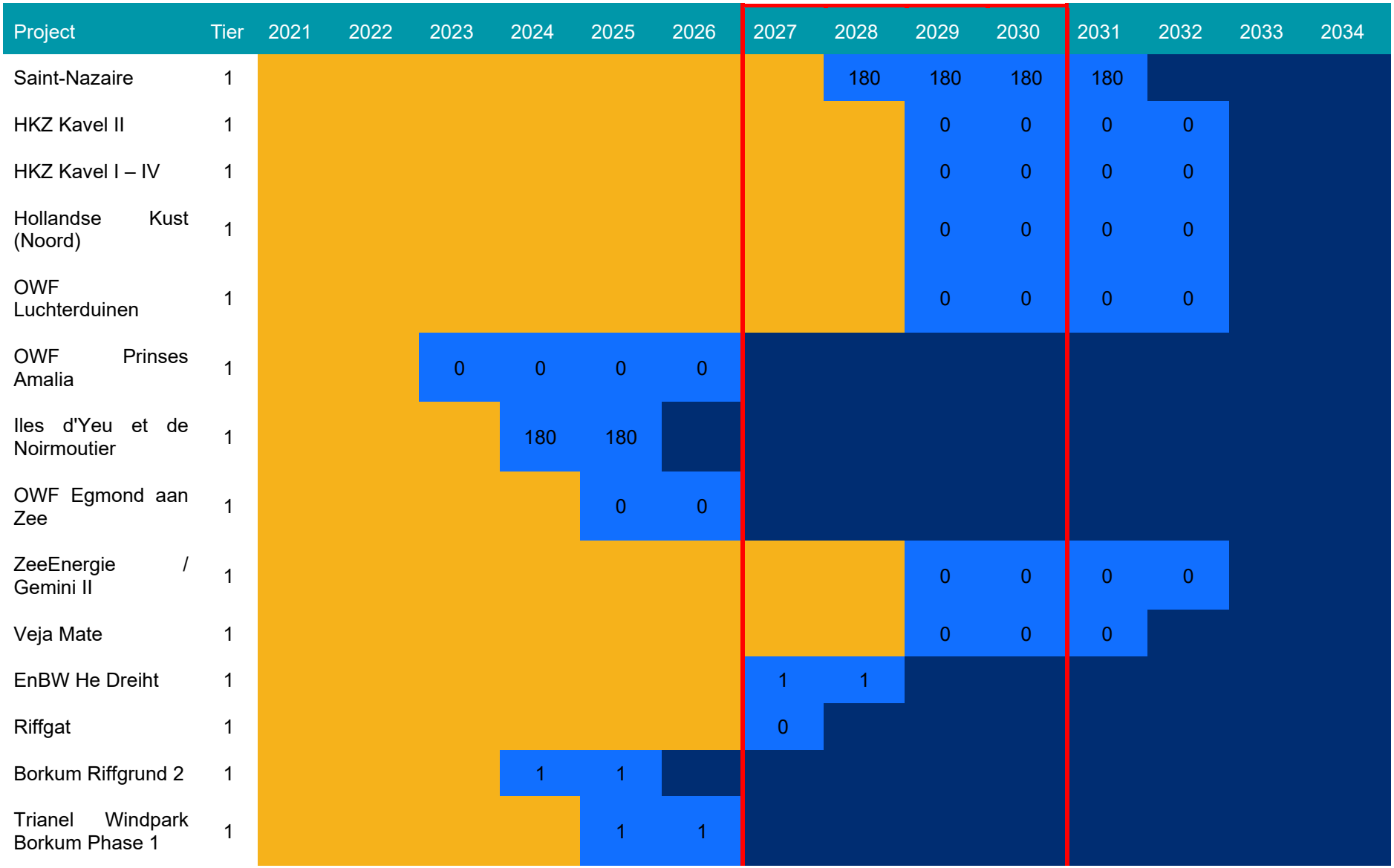
Table 11.74: Number of common dolphin disturbed by underwater noise in the CIA.

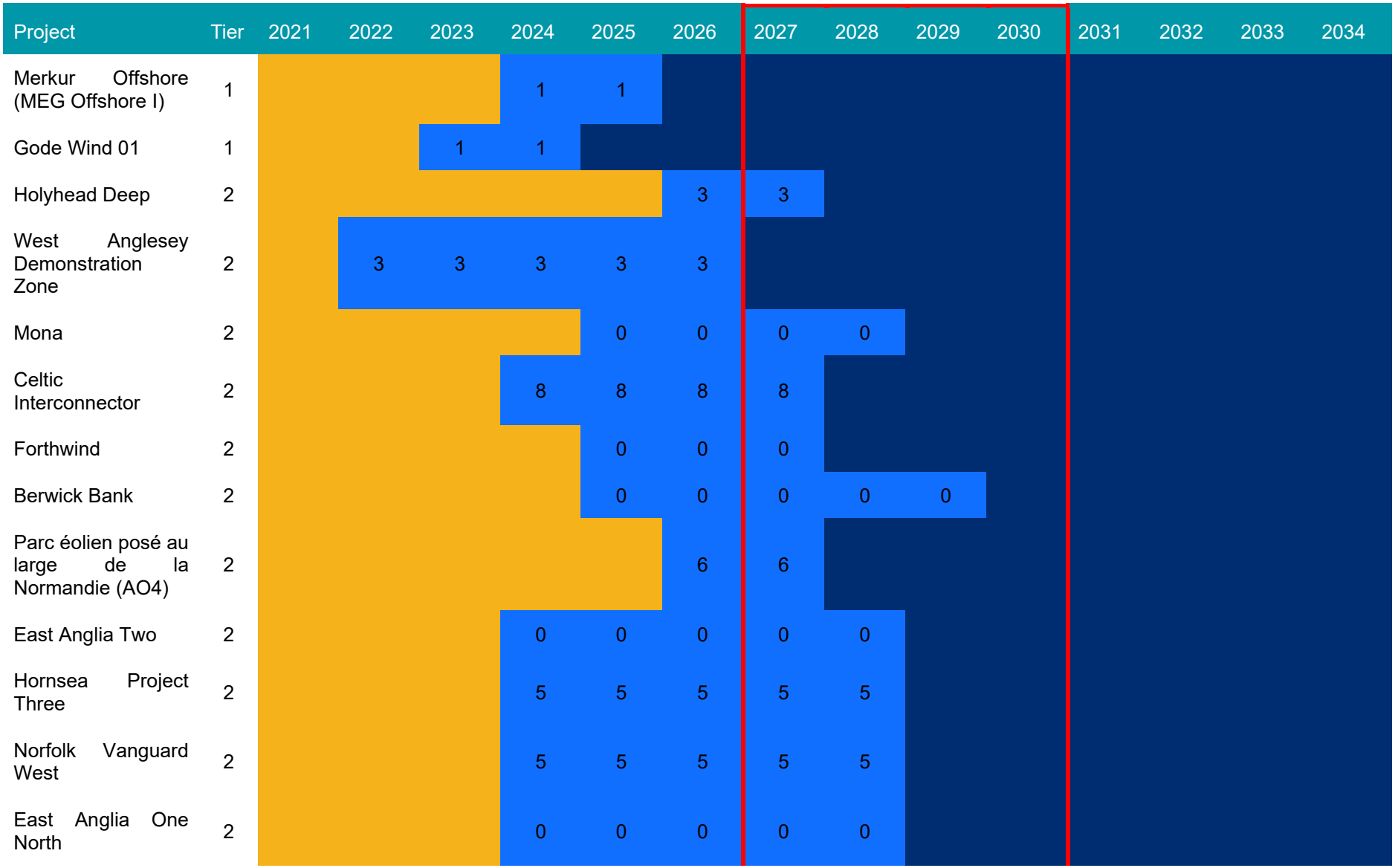
The Proposed Development construction window is indicated by red bars. Orange = Not yet/no longer operational; Grey = Abandoned/not in use; Blue = Construction; Pale blue = Decommissioning; Navy = Operation and maintenance

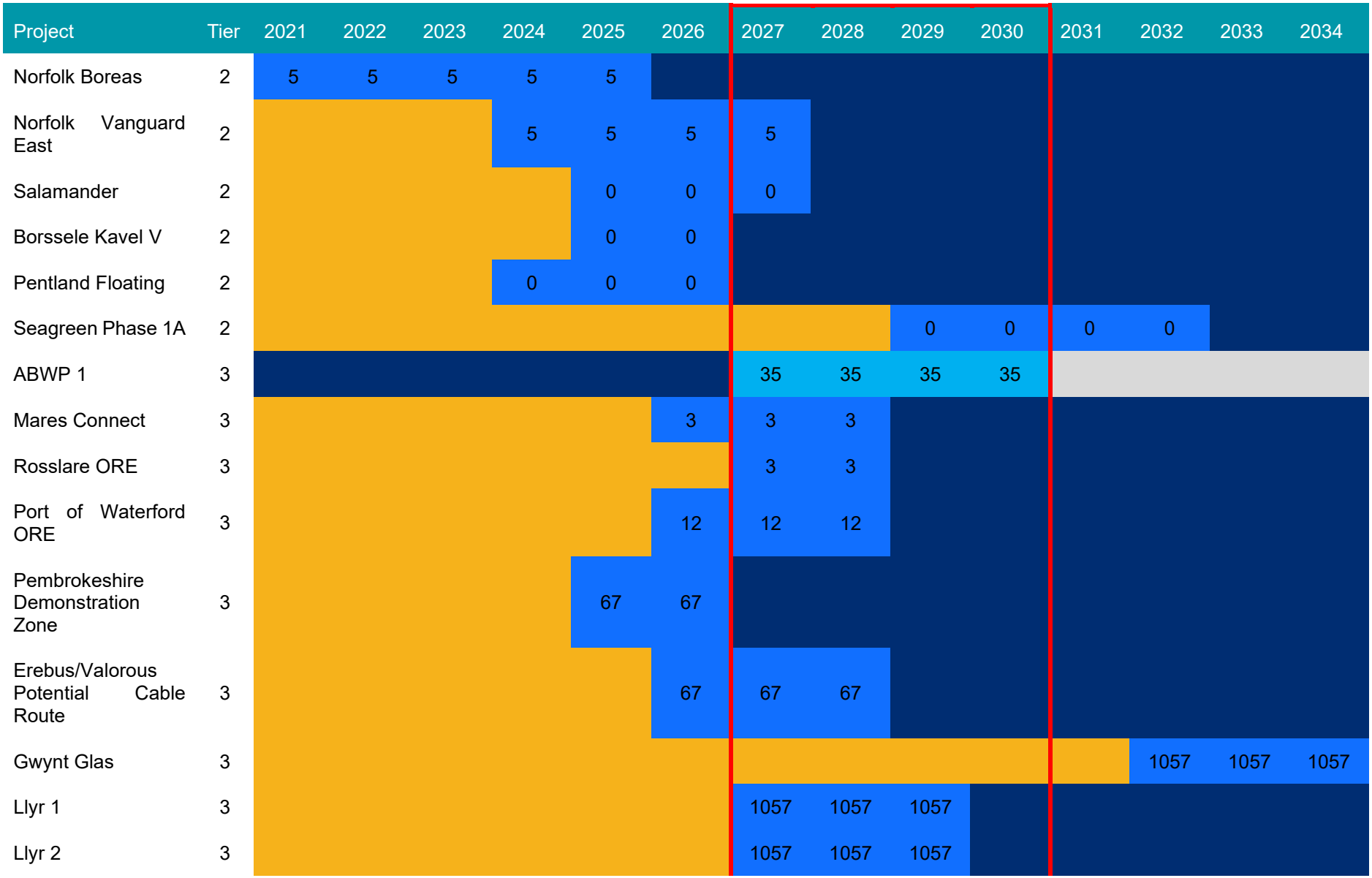
Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Proposed Development	1							297	297	297	297				
Codling Wind Park	1						35	35	35	35					
Dublin Array	1									35	35	35	35		
NISA	1							35	35	35	35				
Oriel	1								35	35	35				
Greenlink Interconnector	1				67	67	67								
Erebus Floating Wind Demo	1			1057	1057	1057	1057								
Awel y Môr	1			0	0	0	0	0							
Morgan	1					0	0	0	0						
North Hoyle	1											0	0	0	0
White Cross	1					1057	1057	1057							
Burbo Bank	1											0	0	0	0
Walney 1	1											0	0	0	0
TwinHub	1				1057	1057	1057								

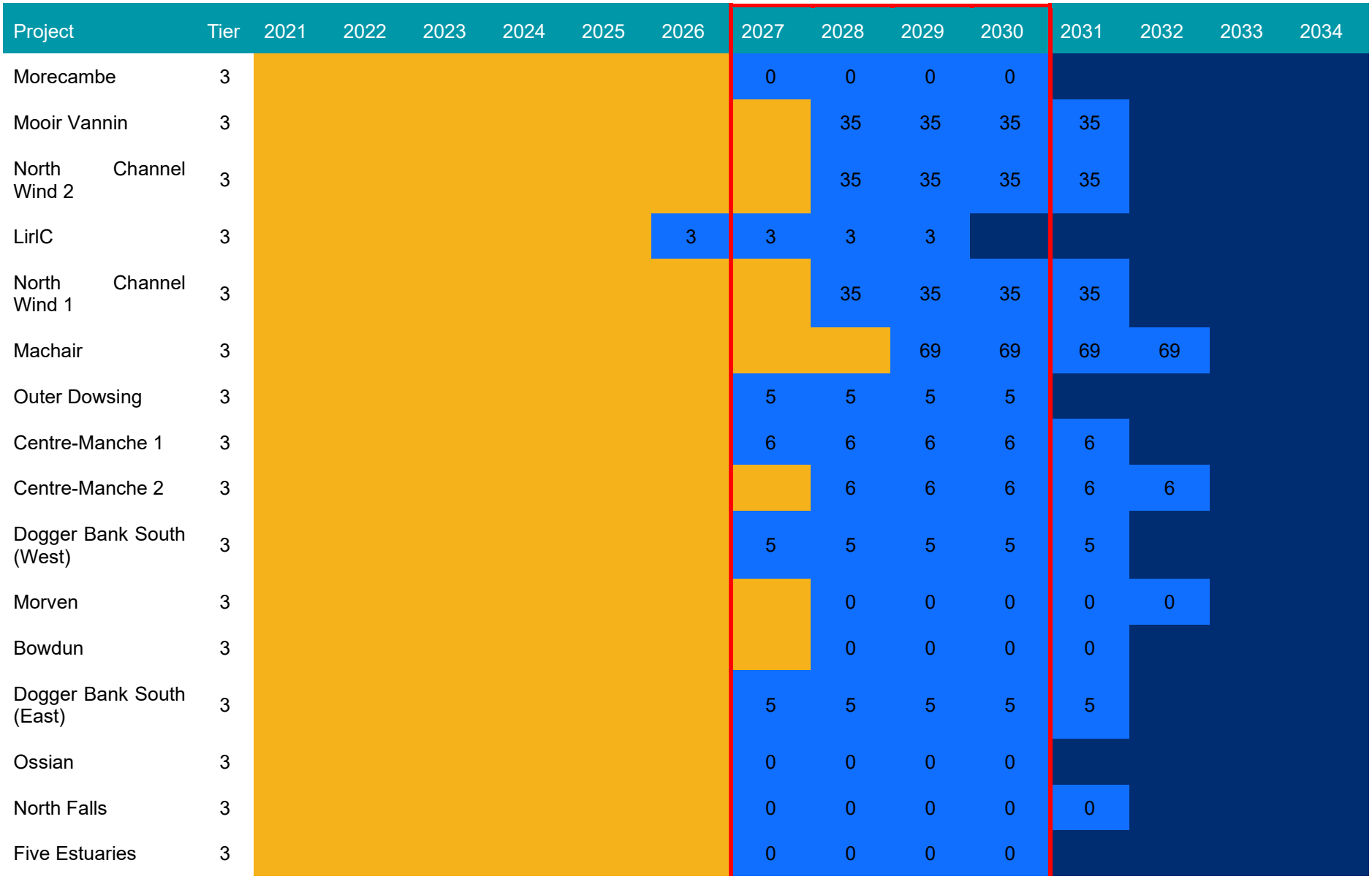

Project
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Neart Na Gaoithe 1 0 0 0 0
Rampion 2 1 18 18 18 18
Inch Cape 1 5 5 5 5
Seagreen Phase 1 1 0 0
Dudgeon Extension 1 5 5 5
Saint-Brieuc 1 140 140 140 140 140
Kentish Flats 1 0 0 0 0
Hornsea Project Two 1 5
Courseulles-sur-mer 1 6 6 6 6
Scroby Sands 1 0 0 0 0
Fécamp 1 6 6 6 6
Dogger Bank - Creyke Beck B 1 5 5 5
Dogger Bank - Creyke Beck A 1 0 0 0 0
Dieppe Le Tréport 1 6 6 6 6 6 6
Dogger Bank - Teesside B (Sofia) 1 5 5 5 5 5 5

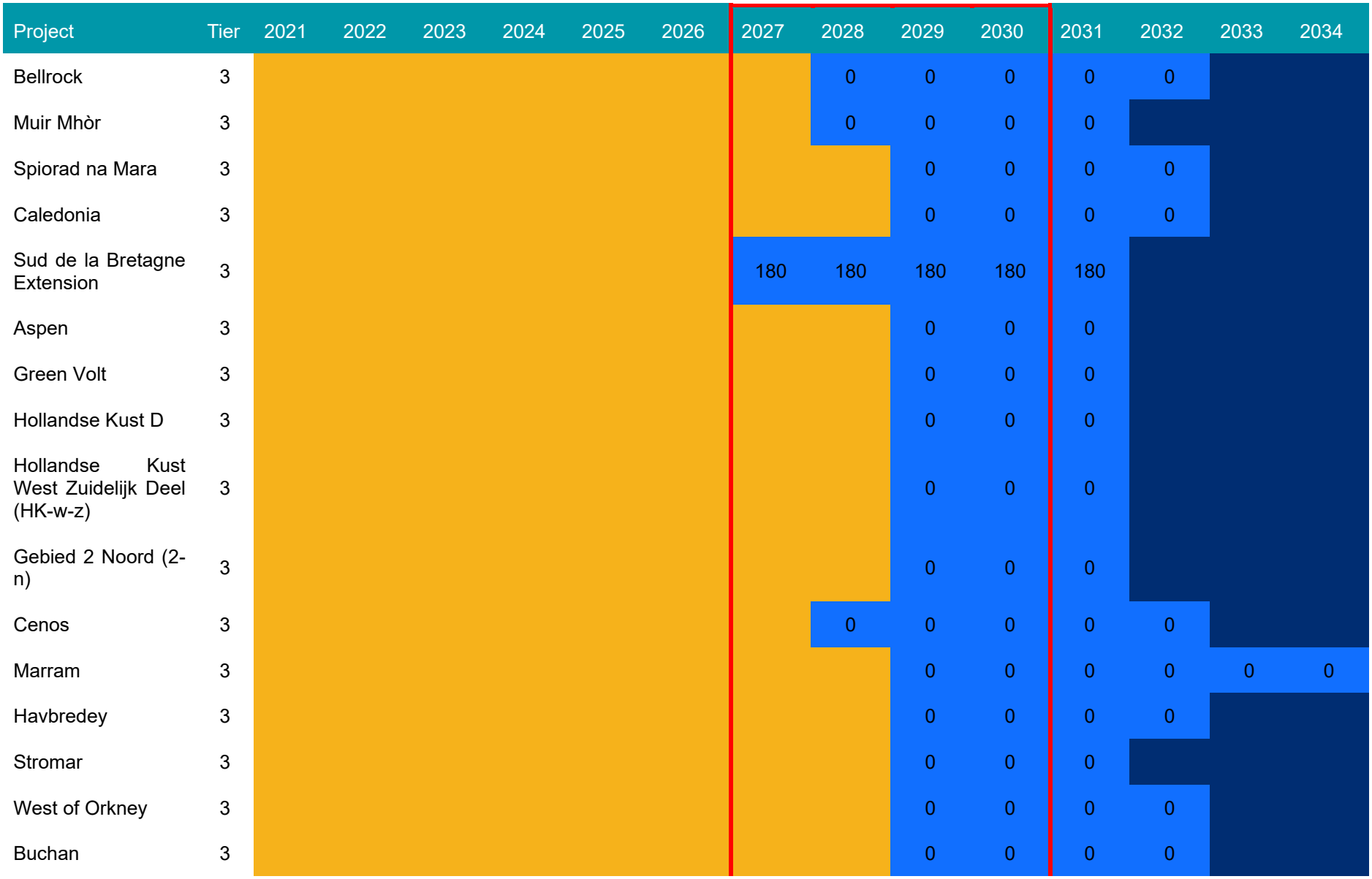

Project
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East Anglia Three 1 0 0 0 0 0
Dunkerque 1 6 6
Moray West 1 0 0 0 0
Groix et Belle-Île 1 180 180 180 180 180
Dogger Bank C - Teesside A 1 0 0 0 0
Windenergiegebied Borssele zuidzijde 1 0 0 0 0
Borssele 1 0 0 0 0
Borssele Kavel III 1 0 0 0 0
OWF Borssele IV 1 0 0 0 0
SeaStar 1 0 0 0 0
Borssele Kavel II 1 0 0 0
Northwind 1 0 0 0 0 0
OWF Borssele I 1 0 0 0 0 0
Hollandse Kust F 1 0 0 0 0
OWF Borssele II 1 0 0 0 0 0
Hollandse Kust (West) 1 0 0

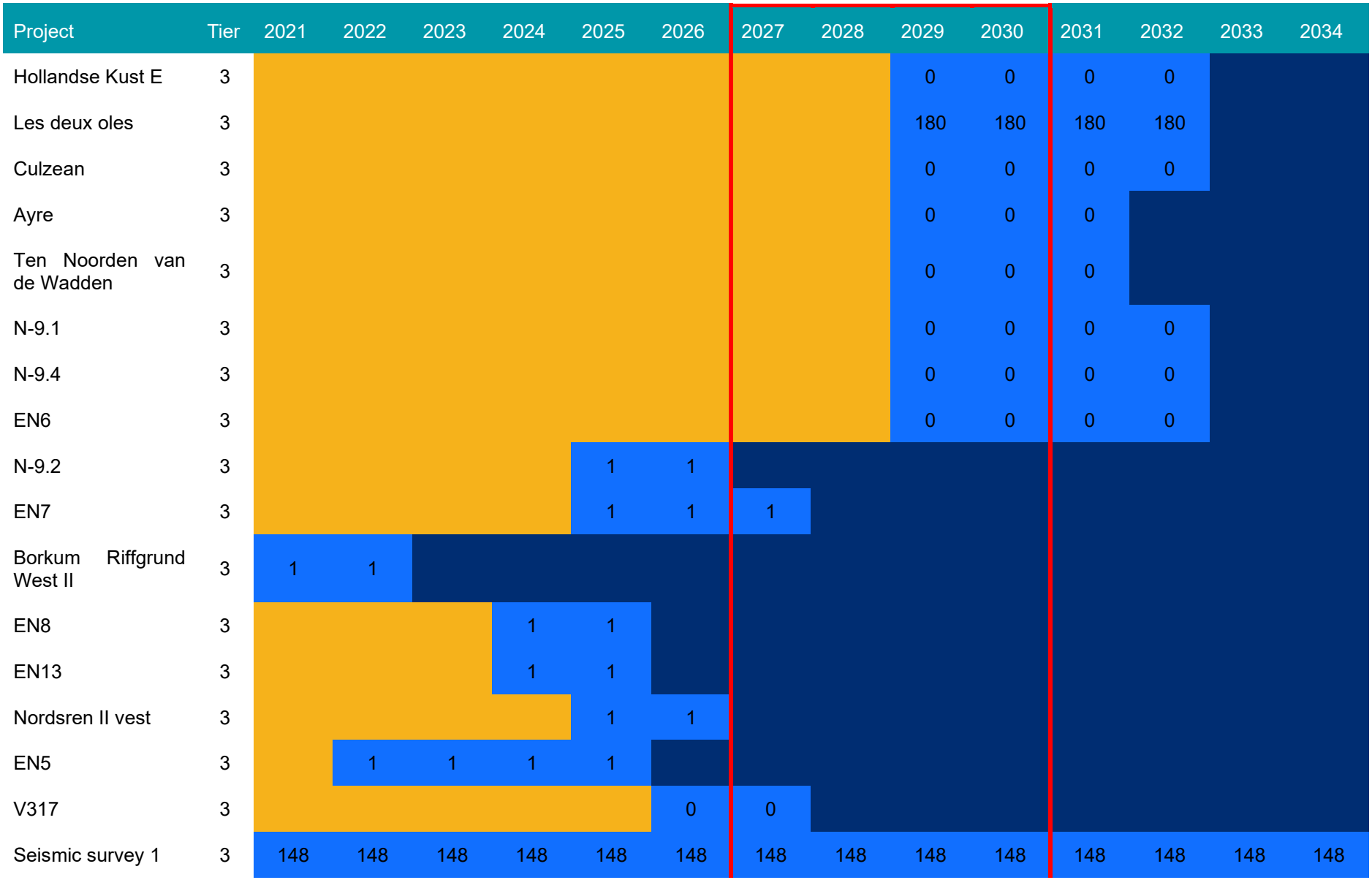

Project
Tier
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2034
Saint-Nazaire
1
180
180
180
180
HKZ Kavel II
1
0
0
0
0
HKZ Kavel I – IV
1
0
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0
0
Hollandse Kust (Noord)
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0
OWF Luchterduinen
1
0
0
0
0
OWF Prinses Amalia
1
0
0
0
0
Iles d'Yeu et de Noirmoutier
1
180
180
OWF Egmond aan Zee
1
0
0
ZeeEnergie / Gemini II
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Veja Mate
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EnBW He Dreiht
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Riffgat
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Borkum Riffgrund 2
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Trianel Windpark Borkum Phase 1
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Project
Tier
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2030
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2032
2033
2034
Merkur Offshore (MEG Offshore I)
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Gode Wind 01
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1
Holyhead Deep
2
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3
West Anglesey Demonstration Zone
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3
3
3
3
3
Mona
2
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0
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Celtic Interconnector
2
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Forthwind
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Berwick Bank
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Hornsea Project Three
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Mares Connect
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Rosslare ORE
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Port of Waterford ORE
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Pembrokeshire Demonstration Zone
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Erebus/Valorous Potential Cable Route
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Gwynt Glas
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North Channel Wind 1 3 35 35 35 35
Machair 3 69 69 69 69
Outer Dowsing 3 5 5 5 5
Centre-Manche 1 3 6 6 6 6 6
Centre-Manche 2 3 6 6 6 6 6
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Morven 3 0 0 0 0 0
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Five Estuaries 3 0 0 0 0


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Spiorad na Mara 3 0 0 0 0
Caledonia 3 0 0 0 0
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Aspen 3 0 0 0
Green Volt 3 0 0 0
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Hollandse Kust West Zuidelijk Deel (HK-w-z) 3 0 0 0
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Ayre 3 0 0 0
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N-9.4 3 0 0 0 0
EN6 3 0 0 0 0
N-9.2 3 1 1
EN7 3 1 1 1
Borkum Riffgrund West II 3 1 1
EN8 3 1 1
EN13 3 1 1
Nordsren II vest 3 1 1
EN5 3 1 1 1 1
V317 3 0 0
Seismic survey 1 3 148 148 148 148 148 148 148 148 148 148 148 148 148 148

Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Seismic survey 2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Seismic survey 3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Seismic survey 4	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Seismic survey 5	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Tier 1		156	342	1,411	2,717	3,792	3,505	1,454	601	617	582	215	35	0	0
% MU		0.15 %	0.33 %	1.37 %	2.65 %	3.69 %	3.41 %	1.42 %	0.59 %	0.60 %	0.57 %	0.21 %	0.03 %	0.00 %	0.00 %
Tier 1 and 2		161	350	1,419	2,748	3,823	3,540	1,486	611	617	582	215	35	0	0
% MU		0.16 %	0.34 %	1.38 %	2.68 %	3.72 %	3.45 %	1.45 %	0.60 %	0.60 %	0.57 %	0.21 %	0.03 %	0.00 %	0.00 %
Tier 1, 2 and 3		314	504	1,572	2,903	4,048	3,847	4,077	3,312	3,482	1,330	923	1,499	1,209	1,209
% MU		0.31 %	0.49 %	1.53 %	2.83 %	3.94 %	3.75 %	3.97 %	3.23 %	3.39 %	1.30 %	0.90 %	1.46 %	1.18 %	1.18 %

MINKE WHALE

11.12.2.74 The highest number of minke whales predicted to be disturbed across Tier 1, 2, and 3 projects between 2021 and 2034 is in 2026, which is before the expected construction period of the Proposed Development. The maximum cumulative number of minke whales predicted to be disturbed in 2026 is estimated as 3,542 animals (17.61% of the MU population) (Table 11.75). Therefore, the highest number of minke whales to be disturbed is predicted to occur in the absence of the Proposed Development.

11.12.2.75 When the Proposed Development is expected to be undergoing construction (2027 – 2030), the maximum cumulative number of minke whales predicted to be disturbed is estimated in 2027 as 3,361 animals (16.71% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.75). The number of minke whales predicted to be impacted by the Proposed Development represents 6.72% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the MU.

11.12.2.76 Considering only projects with higher data confidence (Tier 1 and 2), the predicted cumulative number of minke whales remains limited throughout the assessment period (2021 – 2034). The highest levels of disturbance for Tier 1 and Tier 2 projects occur between 2022 and 2028, peaking in 2026 at approximately 17.45% of the MU population (Table 11.75).Outside this peak construction window, predicted levels of disturbance are lower with the average proportion of the population potentially disturbed by Tier 1 and 2 projects between all years considered in this CIA (2021 to 2034) being 5.97% of the MU population.

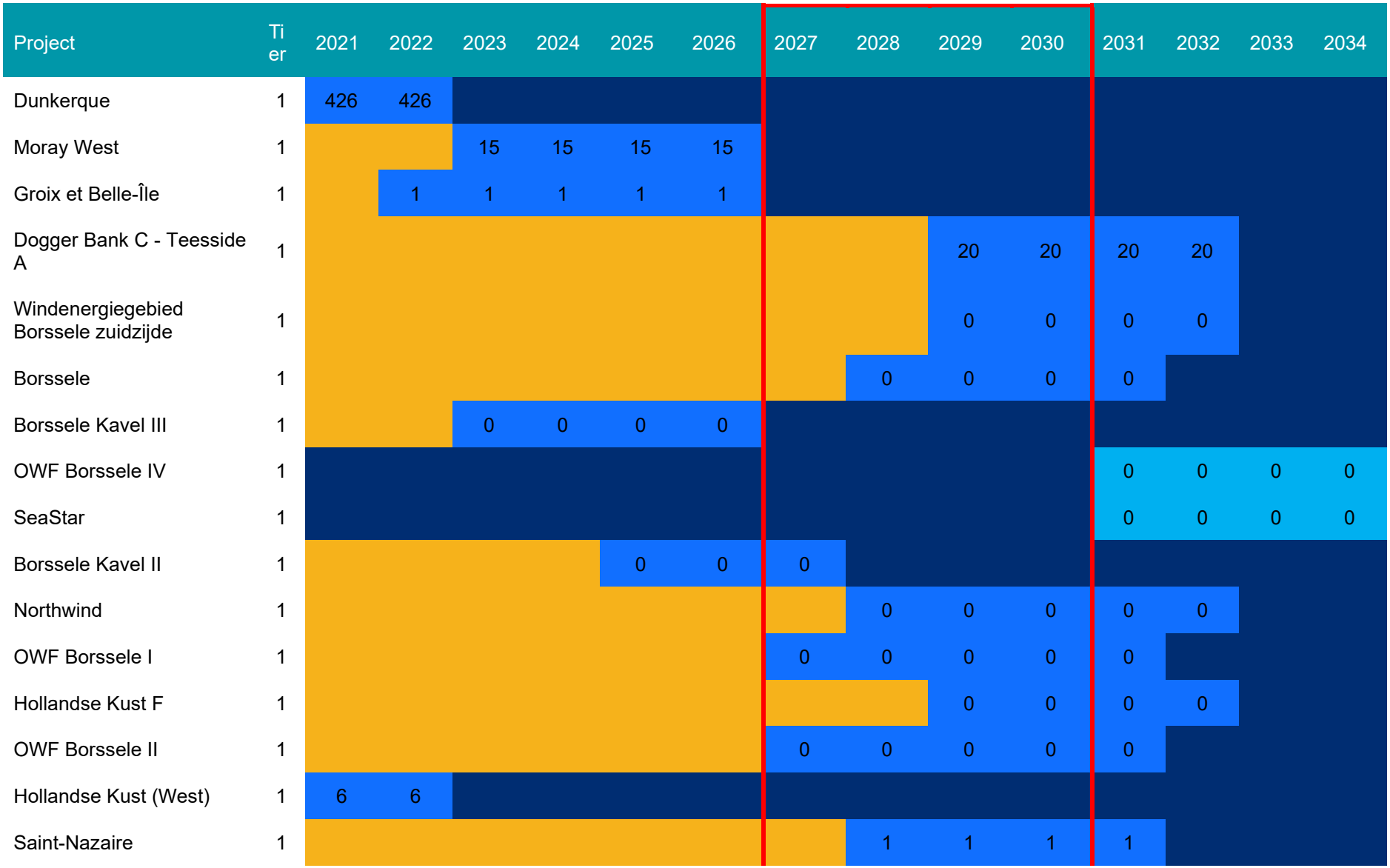
11.12.2.77 Overall, the predicted extent of the cumulative disturbance is to a small proportion of the MU population, with short-term behavioural changes expected from each disturbance event that an individual is exposed to. However, as the overall disturbance effect is predicted to occur across multiple projects and over several years, the temporary changes in behaviour and/or distribution of individuals could result in potential reductions in reproductive rates of some individuals. Considering small proportion of the population affected and the extensive area of the respective MU, the cumulative impacts are unlikely to affect the population trajectory. Whilst it is unlikely that all Tier 3 projects will progress to construction, the magnitude of impact is assessed using a precautionary approach as Medium adverse for minke whales.

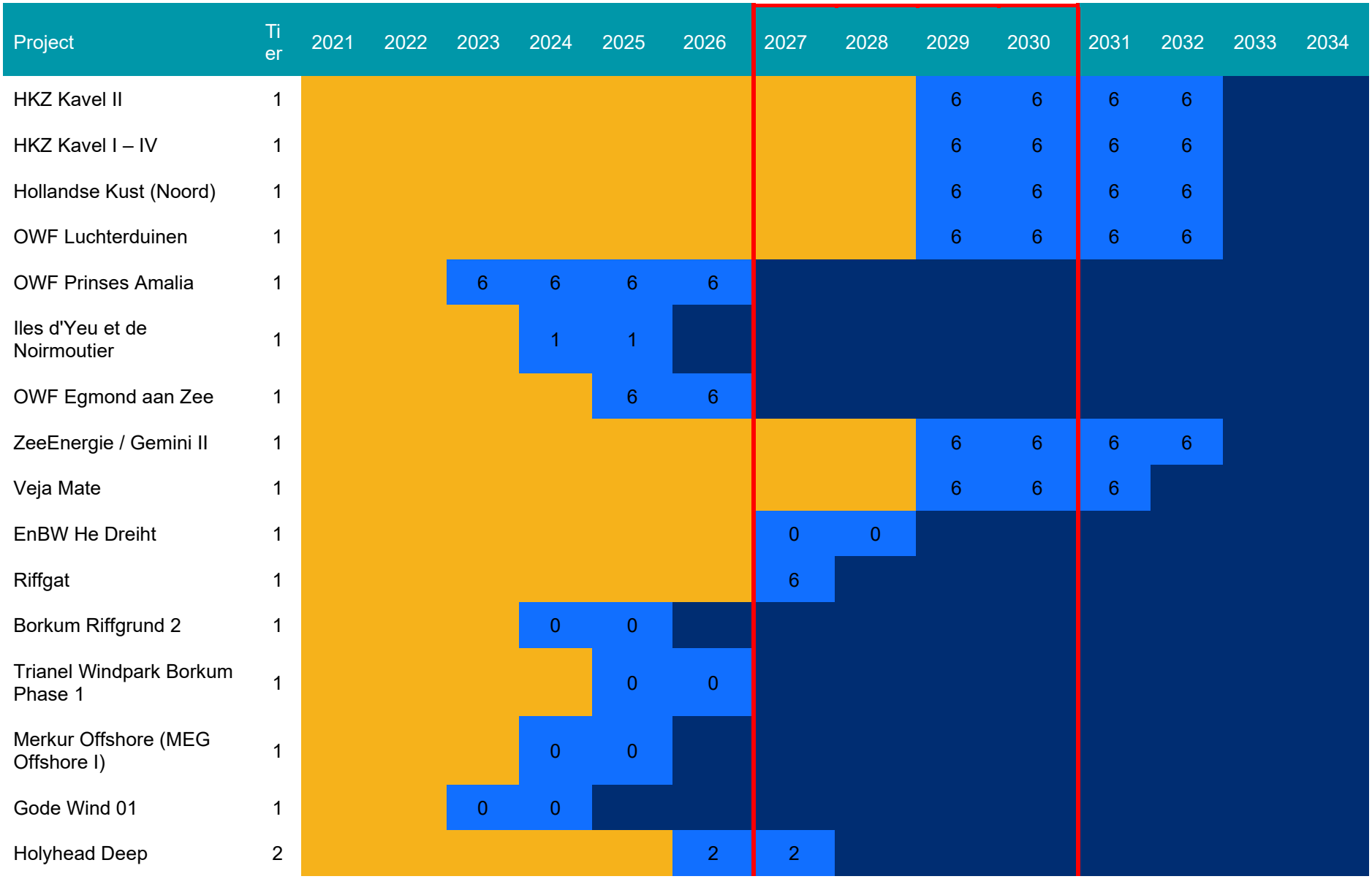
Table 11.75: Number of minke whale disturbed by underwater noise in the CIA.

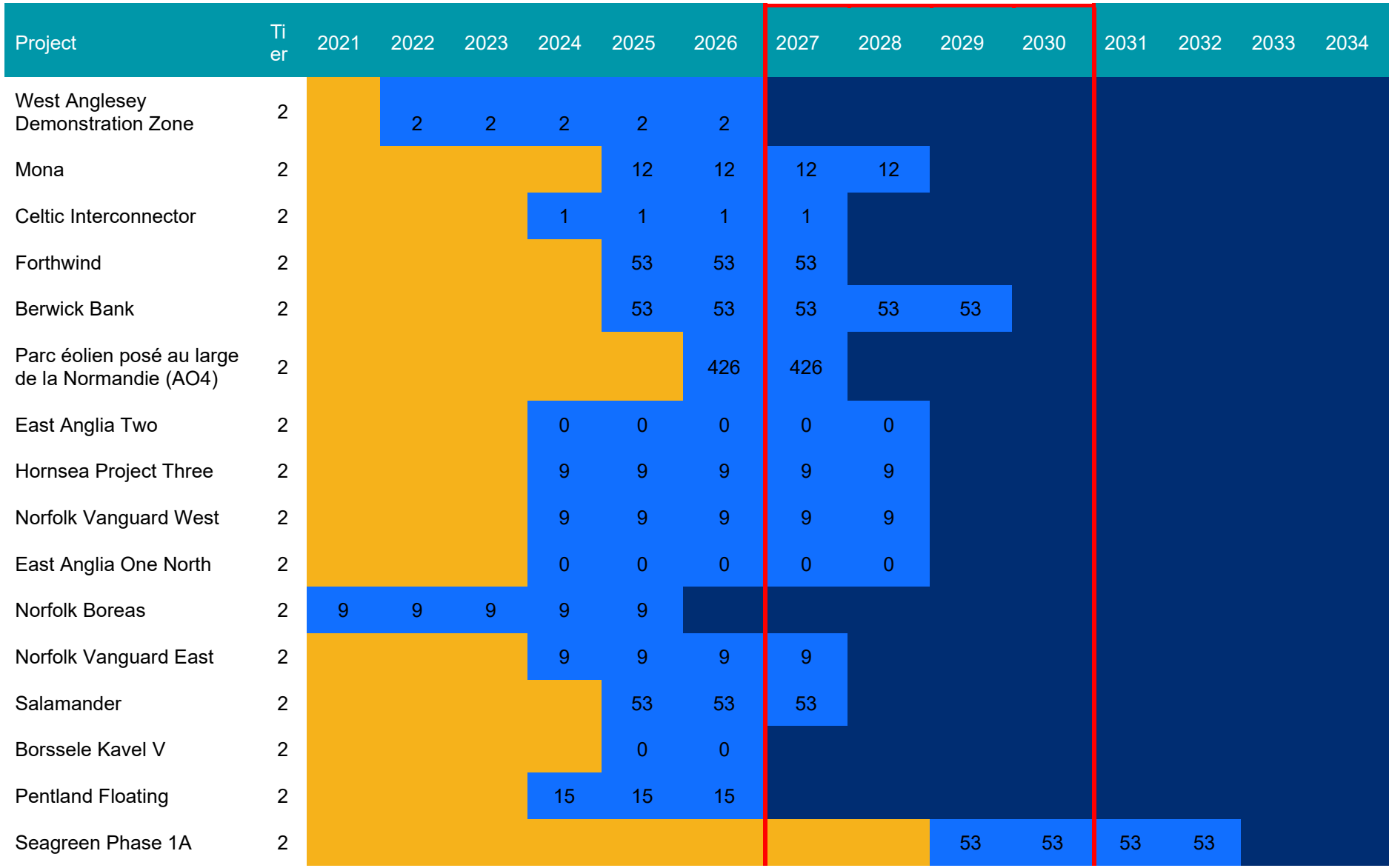
The Proposed Development construction window is indicated by red bars. Orange = Not yet/no longer operational; Grey = Abandoned/not in use; Blue = Construction; Pale blue = Decommissioning; Navy = Operation and maintenance

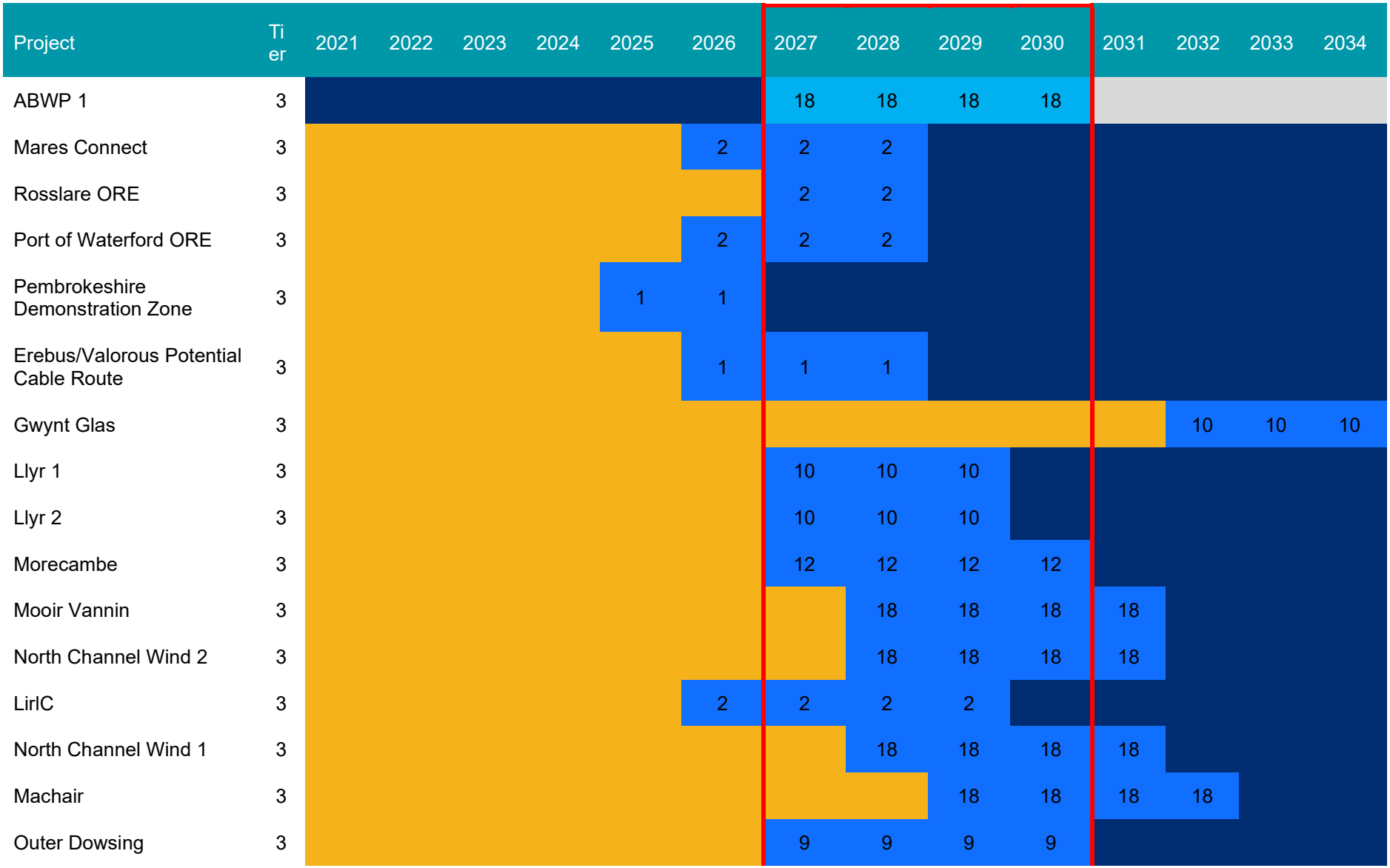
Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Proposed Development	1							226	226	226	226				
Codling Wind Park	1						18	18	18	18					
Dublin Array	1									18	18	18	18		
NISA	1							18	18	18	18				
Oriel	1								18	18	18				
Greenlink Interconnector	1				1	1	1								
Erebus Floating Wind Demo	1			10	10	10	10								
Awel y Môr	1			12	12	12	12	12							
Morgan	1					12	12	12	12						
North Hoyle	1											12	12	12	12
White Cross	1					10	10	10							
Burbo Bank	1											12	12	12	12
Walney 1	1											12	12	12	12
TwinHub	1				10	10	10								


Project
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Inch Cape 1 9 9 9 9
Seagreen Phase 1 1 53 53
Dudgeon Extension 1 9 9 9
Saint-Brieuc 1 2 2 2 2 2
Kentish Flats 1 0 0 0 0
Hornsea Project Two 1 9
Courseulles-sur-mer 1 426 426 426 426
Scroby Sands 1 0 0 0 0
Fécamp 1 426 426 426 426
Dogger Bank - Creyke Beck B 1 9 9 9
Dogger Bank - Creyke Beck A 1 20 20 20 20
Dieppe Le Tréport 1 426 426 426 426 426 426
Dogger Bank - Teesside B (Sofia) 1 9 9 9 9 9 9
East Anglia Three 1 0 0 0 0 0


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Moray West 1 15 15 15 15
Groix et Belle-Île 1 1 1 1 1 1
Dogger Bank C - Teesside A 1 20 20 20 20
Windenergiegebied Borssele zuidzijde 1 0 0 0 0
Borssele 1 0 0 0 0
Borssele Kavel III 1 0 0 0 0
OWF Borssele IV 1 0 0 0 0
SeaStar 1 0 0 0 0
Borssele Kavel II 1 0 0 0
Northwind 1 0 0 0 0 0
OWF Borssele I 1 0 0 0 0 0
Hollandse Kust F 1 0 0 0 0
OWF Borssele II 1 0 0 0 0 0
Hollandse Kust (West) 1 6 6
Saint-Nazaire 1 1 1 1 1


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HKZ Kavel I – IV 1 6 6 6 6
Hollandse Kust (Noord) 1 6 6 6 6
OWF Luchterduinen 1 6 6 6 6
OWF Prinses Amalia 1 6 6 6 6
Iles d'Yeu et de Noirmoutier 1 1 1
OWF Egmond aan Zee 1 6 6
ZeeEnergie / Gemini II 1 6 6 6 6
Veja Mate 1 6 6 6
EnBW He Dreiht 1 0 0
Riffgat 1 6
Borkum Riffgrund 2 1 0 0
Trianel Windpark Borkum Phase 1 1 0 0
Merkur Offshore (MEG Offshore I) 1 0 0
Gode Wind 01 1 0 0
Holyhead Deep 2 2 2


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Celtic Interconnector 2 1 1 1 1
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Berwick Bank 2 53 53 53 53 53
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Hornsea Project Three 2 9 9 9 9 9
Norfolk Vanguard West 2 9 9 9 9 9
East Anglia One North 2 0 0 0 0 0
Norfolk Boreas 2 9 9 9 9 9
Norfolk Vanguard East 2 9 9 9 9
Salamander 2 53 53 53
Borssele Kavel V 2 0 0
Pentland Floating 2 15 15 15
Seagreen Phase 1A 2 53 53 53 53


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Mares Connect 3 2 2 2
Rosslare ORE 3 2 2
Port of Waterford ORE 3 2 2 2
Pembrokeshire Demonstration Zone 3 1 1
Erebus/Valorous Potential Cable Route 3 1 1 1
Gwynt Glas 3 10 10 10
Llyr 1 3 10 10 10
Llyr 2 3 10 10 10
Morecambe 3 12 12 12 12
Mooir Vannin 3 18 18 18 18
North Channel Wind 2 3 18 18 18 18
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North Channel Wind 1 3 18 18 18 18
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Outer Dowsing 3 9 9 9 9


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Centre-Manche 1 3 426 426 426 426 426
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Dogger Bank South (West) 3 9 9 9 9 9
Morven 3 53 53 53 53 53
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North Falls 3 0 0 0 0 0
Five Estuaries 3 0 0 0 0
Bellrock 3 53 53 53 53 53
Muir Mhòr 3 53 53 53 53
Spiorad na Mara 3 28 28 28 28
Caledonia 3 15 15 15 15
Sud de la Bretagne Extension 3 1 1 1 1 1
Aspen 3 53 53 53 53
Green Volt 3 16 16 16


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Hollandse Kust D 3 6 6 6
Hollandse Kust West Zuidelijk Deel (HK-w-z) 3 6 6 6
Gebied 2 Noord (2-n) 3 6 6 6
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Marram 3 53 53 53 53 53 53
Havbredey 3 28 28 28 28
Stromar 3 15 15 15
West of Orkney 3 28 28 28 28
Buchan 3 16 16 16 16
Hollandse Kust E 3 6 6 6 6
Les deux oles 3 1 1 1 1
Culzean 3 13 13 13 13
Ayre 3 15 15 15
Ten Noorden van de Wadden 3 6 6 6
N-9.1 3 6 6 6 6
N-9.4 3 6 6 6 6

Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
EN6	3									6	6	6	6		
N-9.2	3					0	0								
EN7	3					0	0	0							
Borkum Riffgrund West II	3	0	0												
EN8	3				0	0									
EN13	3				0	0									
Nordsren II vest	3					0	0								
EN5	3		0	0	0	0									
V317	3						0	0							
Seismic survey 1	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Seismic survey 2	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Seismic survey 3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Seismic survey 4	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Seismic survey 5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Tier 1		505	952	1,424	1,436	2,871	2,866	2,144	1,700	355	337	111	104	36	36
% MU		2.51 %	4.73 %	7.08 %	7.14 %	14.27 %	14.25 %	10.66 %	8.45 %	1.76 %	1.68 %	0.55 %	0.52 %	0.18 %	0.18 %

Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Tier 1 and 2		514	963	1,435	1,490	3,096	3,510	2,771	1,783	461	390	164	157	36	36
% MU		2.55 %	4.79 %	7.13 %	7.41 %	15.39 %	17.45 %	13.77 %	8.86 %	2.29 %	1.94 %	0.82 %	0.78 %	0.18 %	0.18 %
Tier 1, 2 and 3		538	987	1,459	1,514	3,121	3,542	3,361	3,118	2,136	2,043	1,725	1,000	123	123
% MU		2.67 %	4.91 %	7.25 %	7.53 %	15.51 %	17.61 %	16.71 %	15.50 %	10.62 %	10.16 %	8.57 %	4.97 %	0.61 %	0.61 %

GREY SEAL

11.12.2.78 The highest number of grey seals predicted to be disturbed across Tier 1, 2, and 3 projects between 2021 and 2034 is in 2029, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of grey seals predicted to be disturbed in 2029 is estimated as 1,872 animals (112.64% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.76).

11.12.2.79 If the population size is taken to be 9,936 animals, the percentage of the population predicted to be disturbed in 2029 reduces to 18.84% (Table 11.76). The number of grey seals predicted to be impacted by the Proposed Development represents 7.05% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the wider region.

11.12.2.80 Considering only projects with higher data confidence (Tier 1 and 2), the predicted cumulative disturbance of grey seals remains limited to a relatively small proportion of the MU population across the assessment period (2021 – 2034). The highest predicted levels of disturbance occur during the Phase One offshore windfarm construction window between 2026 and 2032, peaking in 2029 at approximately 15.34% of the MU population when assuming the larger population size of 9,936 animals (Table 11.76). Outside this peak construction window, predicted levels of disturbance are substantially lower with the average proportion of the population potentially disturbed by Tier 1 and 2 projects between all years considered in this CIA (2021 to 2034) is 24.70% of the MU population and 4.13% of the population when assuming the larger population size of 9,936 animals.

11.12.2.81 Overall, the predicted extent of the cumulative disturbance from Tier 1, 2, and 3 projects is to a relatively small proportion of the population (assuming the population includes the East and South-east regions of RoI, Wales, and Northern Ireland), with short-term behavioural changes expected from each disturbance event an individual is exposed to. However, as the overall disturbance effect is predicted to occur across multiple projects and over several years, the temporary changes in behaviour and/or distribution of individuals could result in potential reductions in reproductive rates of some individuals, although is unlikely to affect the population trajectory. Whilst it is unlikely that all Tier 3 projects will progress to construction, the magnitude of impact is assessed using a precautionary approach as Medium adverse for grey seals.

Table 11.76: Number of grey seal disturbed by underwater noise in the CIA.

The Proposed Development construction window is indicated by red bars. Orange = Not yet/no longer operational; Grey = Abandoned/not in use; Blue = Construction; Pale blue = Decommissioning; Navy = Operation and maintenance

Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Proposed Development	1							132	132	132	132				
Codling Wind Park	1						348	348	348	348					
Dublin Array	1									348	348	348	348		
NISA	1							348	348	348	348				
Oriel	1								348	348	348				
Mares Connect	3						22	22	22						
ABWP 1	3							348	348	348	348				
Tier 1		0	0	0	0	0	348	828	1,176	1,524	1,176	348	348	0	0
% MU (alone)		0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	20.94 %	49.82 %	70.76 %	91.70 %	70.76 %	20.94 %	20.94 %	0.00 %	0.00 %
% MU (combined)		0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	3.50 %	8.33 %	11.84 %	15.34 %	11.84 %	3.50 %	3.50 %	0.00 %	0.00 %
Tier 1 and 2		0	0	0	0	0	348	828	1,176	1,524	1,176	348	348	0	0
% MU (alone)		0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	20.94 %	49.82 %	70.76 %	91.70 %	70.76 %	20.94 %	20.94 %	0.00 %	0.00 %
% MU (combined)		0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	3.50 %	8.33 %	11.84 %	15.34 %	11.84 %	3.50 %	3.50 %	0.00 %	0.00 %

Project Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Tier 1, 2 and 3	0	0	0	0	0	370	1,198	1,546	1,872	1,524	348	348	0	0
% MU (alone)	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	22.26 %	72.08 %	93.02 %	112.64 %	91.70 %	20.94 %	20.94 %	0.00 %	0.00 %
% MU (combined)	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	3.72 %	12.06 %	15.56 %	18.84 %	15.34 %	3.50 %	3.50 %	0.00 %	0.00 %

HARBOUR SEAL

11.12.2.82 The highest number of harbour seals predicted to be disturbed across Tier 1, 2, and 3 projects between 2021 and 2034 is in 2029, which coincides with the expected construction period of the Proposed Development. The maximum cumulative number of harbour seals predicted to be disturbed in 2029 is estimated as 196 animals (107.69% of the MU population), assuming all other potential high-noise construction activities, including piling and UXO clearance, occur on the same day as the Proposed Development (Table 11.77).

11.12.2.83 If the population size is assumed to be 1,378 animals, the percentage of the population predicted to be disturbed in 2029 reduces to 14.22% (Table 11.77). The number of harbour seals predicted to be impacted by the Proposed Development represents 0.51% of the total, indicating that the majority of predicted cumulative disturbance arises from other concurrent activities and projects within the wider region.

11.12.2.84 Considering only projects with higher data confidence (Tier 1 and 2), the predicted cumulative disturbance of harbour seals remains limited throughout the assessment period (2021 – 2034). The highest levels of disturbance occur during the Phase One offshore windfarm construction window between 2026 and 2032, peaking in 2029 at approximately 11.39% of the larger population size of 1,378 animals is assumed (Table 11.77). Outside this peak construction window, predicted levels of disturbance are lower with the average proportion of the population potentially disturbed by Tier 1 and 2 projects between all years considered in this CIA (2021 to 2034) is 23.12% of the MU population and 3.05% of the larger population size.

11.12.2.85 Overall, the predicted extent of the cumulative disturbance from Tier 1, 2, and 3 projects is to a relatively small proportion of the MU population (assuming the population includes the East and South-east regions of RoI, Wales, and Northern Ireland), with short-term behavioural changes expected from each disturbance event an individual is exposed to. However, as the overall disturbance effect is predicted to occur across multiple projects and over several years, the temporary changes in behaviour and/or distribution of individuals could result in potential reductions in reproductive rates of some individuals, although is unlikely to affect the population trajectory. The magnitude of impact is assessed using a precautionary approach as Low adverse for harbour seals.

Table 11.77: Number of harbour seal disturbed by underwater noise in the CIA.

The Proposed Development construction window is indicated by red bars. Orange = Not yet/no longer operational; Grey = Abandoned/not in use; Blue = Construction; Pale blue = Decommissioning; Navy = Operation and maintenance

Project	Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Proposed Development	1							1	1	1	1				
Codling Wind Park	1						39	39	39	39					
Dublin Array	1									39	39	39	39		
NISA	1							39	39	39	39				
Oriel	1								39	39	39				
Mares Connect	3						3	3	3						
ABWP 1	3							39	39	39	39				
Tier 1		0	0	0	0	0	39	79	118	157	118	39	39	0	0
% MU (alone)		0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	21.43 %	43.41 %	64.84 %	86.26 %	64.84 %	21.43 %	21.43 %	0.00 %	0.00 %
% MU (combined)		0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	2.83%	5.73 %	8.56 %	11.39 %	8.56 %	2.83 %	2.83 %	0.00 %	0.00 %
Tier 1 and 2		0	0	0	0	0	39	79	118	157	118	39	39	0	0
% MU (alone)		0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	21.43 %	43.41 %	64.84 %	86.26 %	64.84 %	21.43 %	21.43 %	0.00 %	0.00 %
% MU (combined)		0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	2.83%	5.73 %	8.56 %	11.39 %	8.56 %	2.83 %	2.83 %	0.00 %	0.00 %

Project Tier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Tier 1, 2 and 3	0	0	0	0	0	42	121	160	196	157	39	39	0	0
% MU (alone)	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	23.08 %	66.48 %	87.91 %	107.69 %	86.26 %	21.43 %	21.43 %	0.00 %	0.00 %
% MU (combined)	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	3.05%	8.78 %	11.61 %	14.22 %	11.39 %	2.83 %	2.83 %	0.00 %	0.00 %

SIGNIFICANCE OF EFFECT

11.12.2.86 The magnitude of the cumulative impact of disturbance from underwater noise has been assessed as **Low** for harbour porpoise, Risso's dolphin, common dolphin, and harbour seal. The sensitivity of all marine mammal receptors is assessed as being **Low**. Therefore, the significance of effect from disturbance to all marine mammal species from underwater noise is **Slight adverse,** which is **not significant** in EIA terms.

11.12.2.87 The magnitude of the cumulative impact of disturbance from underwater noise has been assessed as **Medium** for bottlenose dolphin, minke whale, and grey seal. The sensitivity of all marine mammal receptors is assessed as being **Low**. Therefore, the significance of effect from disturbance to all marine mammal species from underwater noise is **Slight adverse**, which is **not significant** in EIA terms.

11.13 Transboundary effects

11.13.1.1 A screening of transboundary impacts has been carried out and has identified that there was no potential for significant transboundary effects with regards to marine mammals from the Proposed Development upon the interests of other states.

11.13.1.2 The potential transboundary impacts are summarised below:

- Injury and/or disturbance to marine mammals from underwater noise and vibration during pile-driving. Overall, the effect of injury will be of **Not Significant** to **Slight adverse** significance, and disturbance will be of **Imperceptible** to **Slight adverse** significance, neither of which is significant in EIA terms;
- Injury and/or disturbance to marine mammals from vessel activities. Overall, the effect of injury will be **Not Significant**, and disturbance will be of **Slight adverse** significance, which is not significant in EIA terms.
- Changes in the fish and shellfish community affecting prey resources. Overall, the effect will be of **Imperceptible** to **Slight adverse** significance, which is not significant in EIA terms.
- Accidental pollution. Overall, the effect will be of **Slight adverse** significance, which is not significant in EIA terms;
- Changes in EMF from subsea electrical cabling. Overall, the effect will be of **Imperceptible** significance, which is not significant in EIA terms;
- Injury and/or disturbance to marine mammals from underwater noise during UXO clearance. Overall, the effect of injury will be of **Not Significant** to **Slight adverse** significance, and disturbance will be of **Slight adverse** significance, neither of which is significant in EIA terms;
- Injury and/or disturbance to marine mammals from underwater noise during site surveys. Overall, the effect of injury will be **Not Significant**, and disturbance will be of **Slight adverse** significance, which is not significant in EIA terms; and
- Injury and/or disturbance to marine mammals from underwater noise from dredging and trenching. Overall, the effect of injury will be **Not Significant**, and disturbance will be of **Slight adverse** significance, which is not significant in EIA terms.

11.14 Summary of effects

11.14.1.1 This Chapter has investigated the potential effects on marine mammals arising from the Proposed Development. The range of potential impacts and associated effects has been informed by the Scoping Opinion, consultation responses from stakeholders, and the RFI that has been received, alongside reference to existing legislation and guidance.

11.14.1.2 The impacts considered include direct impacts, for example, behavioural disturbance due to underwater noise during pile driving, as well as indirect impacts, such as changes in fish and shellfish communities affecting prey resource. This has included assessment of cumulative impacts, for example underwater noise from various offshore energy developments within the species-specific MUs.

11.14.1.3 Potential impacts considered in this Chapter, alongside any mitigation and residual effects are summarised in Table 11.78 and Table 11.79. Throughout the construction, operations and maintenance, and decommissioning phases of the Proposed Development, all impacts assessed were found to have either Imperceptible, Not Significant, or Slight adverse effects on all marine mammal receptors. As a result, no impact pathway was considered to be significant in terms of the EIA Regulations.

Table 11.78: Summary of potential environmental impacts, mitigation and monitoring for Project Design Option 1

Description of impact	Phase			Factored In Measures	Magnitude of impact	Sensitivity of Receptors	Significance of effect	Additional measures	Residual effect	Proposed monitoring
	C	O	D							
1. Injury and/or disturbance to marine mammals from underwater noise during pile driving	✓	×	×	A MMMP will be implemented (see Volume III, Appendix 25.2: Marine Mammal Mitigation Plan (Revised March 2026)). Full details of Factored In Measures can be found in section 11.7.3.	<u>Auditory injury (PTS)</u> C: Negligible to Low adverse <u>Behavioural disturbance</u> C: Low to medium adverse	<u>Auditory injury (PTS)</u> C: Low <u>Behavioural disturbance</u> C: Negligible to Low	<u>Auditory injury (PTS)</u> C: Not Significant to Slight adverse (not significant in EIA terms) <u>Behavioural disturbance</u> C: Imperceptible to Slight adverse (not significant in EIA terms)	Extended ramp-up mitigation scenario	<u>Auditory injury (PTS)</u> C: Not Significant (not significant in EIA terms) <u>Behavioural disturbance</u> C: Imperceptible to Slight adverse (not significant in EIA terms)	Monitoring has been proposed to understand the potential for behavioural disturbance to marine mammals during piling. Such monitoring will include both visual monitoring and the use of PAM. The details of this monitoring commitments are set out in Volume II, Chapter 4: Description of Development (Revised March 2026), Table 4.10.
2. Injury and/or disturbance to marine mammals from vessel activities	✓	✓	✓	An EVMP will be implemented (see Volume III, Appendix 25.10: Environmental Vessel Management Plan (Revised March 2026)). Full details of Factored In Measures can be found in section 11.7.3.	<u>Injury</u> C: Negligible O: Negligible D: Negligible <u>Behavioural disturbance</u> C: Low adverse O: Low adverse D: Low adverse	<u>Injury</u> C: High O: High D: High <u>Behavioural</u> disturbance C: Low O: Low D: Low	<u>Injury</u> C: Not Significant (not significant in EIA terms) O: Not Significant (not significant in EIA terms) D: Not Significant (not significant in EIA terms) <u>Behavioural disturbance</u> C: Slight adverse (not significant in EIA terms) O: Slight adverse (not significant in EIA terms) D: Slight adverse (not significant in EIA terms)	None	<u>Injury</u> C: Not Significant (not significant in EIA terms) O: Not Significant (not significant in EIA terms) D: Not Significant (not significant in EIA terms) <u>Behavioural disturbance</u> C: Slight adverse (not significant in EIA terms) O: Slight adverse (not significant in EIA terms) D: Slight adverse (not significant in EIA terms)	N/A
3. Changes in fish and shellfish community affecting prey resources	✓	✓	✓	N/A	C: Negligible O: Negligible D: Negligible	C: Low O: Low D: Low	C: Not Significant (not significant in EIA terms)	None	C: Not Significant (not significant in EIA terms) O: Not Significant (not significant in EIA terms)	N/A

Description of impact	Phase C	Phase O	Phase D	Factored In Measures	Magnitude of impact	Sensitivity of Receptors	Significance of effect	Additional measures	Residual effect	Proposed monitoring
							O: Not Significant (not significant in EIA terms) D: Not Significant (not significant in EIA terms)		D: Not Significant (not significant in EIA terms)	
4. Accidental pollution	✓	✓	✓	An EMP will be implemented (see Volume III, Appendix 25.1: Environmental Management Plan (Revised March 2026)). A Marine Pollution Contingency Plan will be implemented (Volume III, Appendix 25.1 EMP (Revised March 2026), Annex 2) Full details of Factored In Measures can be found in section 11.7.3.	C: Low adverse O: Low adverse D: Low adverse	C: Medium O: Medium D: Medium	C: Slight adverse (not significant in EIA terms) O: Slight adverse (not significant in EIA terms) D: Slight adverse (not significant in EIA terms)	None	C: Slight adverse (not significant in EIA terms) O: Slight adverse (not significant in EIA terms) D: Slight adverse (not significant in EIA terms)	N/A
5. Changes in EMF from subsea electrical cabling	×	✓	×	Commitment to the burial of cables where possible and protected where not possible, as set out in Volume II, Chapter 4: Description of Development (Revised March 2026)	O: Low adverse	O: Negligible	O: Imperceptible (not significant in EIA terms)	None	O: Imperceptible (not significant in EIA terms)	N/A
6. Injury and/or disturbance to marine mammals from underwater noise during UXO clearance	✓	×	×	A MMMP will be implemented. Full details of Factored In Measures can be found in section 11.7.3	Auditory injury (PTS) C: Negligible to Low adverse Behavioural disturbance C: Low adverse	Auditory injury (PTS) C: Low to Medium Behavioural disturbance C: Low	Auditory injury (PTS) C: Not Significant to Slight adverse (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms)	None	Auditory injury (PTS) C: Not Significant to Slight adverse (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms)	N/A
7. Injury and/or disturbance from underwater noise during site surveys	✓	×	×	A MMMP will be implemented. Full details of Factored In Measures can be found in section 11.7.3	Auditory injury (PTS) C: Negligible Behavioural disturbance C: Low adverse	Auditory injury (PTS) C: Low Behavioural disturbance C: Low	Auditory injury (PTS) C: Not Significant (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms)	None	Auditory injury (PTS) C: Not Significant (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms)	N/A

Description of impact	Phase			Factored In Measures	Magnitude of impact	Sensitivity of Receptors	Significance of effect	Additional measures	Residual effect	Proposed monitoring
	C	O	D							
8. Injury and/or disturbance to marine mammals from dredging and trenching	✓	✓	×	N/A	Auditory injury (PTS) C: Negligible O: Negligible Behavioural disturbance C: Low adverse O: Low adverse	Auditory injury (PTS) C: Low O: Low Behavioural disturbance C: Low O: Low	Auditory injury (PTS) C: Not Significant (not significant in EIA terms) O: Not Significant (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms) O: Slight adverse (not significant in EIA terms)	None	Auditory injury (PTS) C: Not Significant (not significant in EIA terms) O: Not Significant (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms) O: Slight adverse (not significant in EIA terms)	N/A

Table 11.79: Summary of potential environmental impacts, mitigation and monitoring for Project Design Option 2

Description of impact	Phase			Factored In Measures	Magnitude of impact	Sensitivity of Receptors	Significance of effect	Additional measures	Residual effect	Proposed monitoring
	C	O	D							
1. Injury and/or disturbance to marine mammals from underwater noise during pile driving	✓	×	×	A MMMP will be implemented (see Volume III, Appendix 25.2: Marine Mammal Mitigation Plan (Revised March 2026)). Full details of Factored In Measures can be found in section 11.7.3.	Auditory injury (PTS) C: Negligible to Low adverse Behavioural disturbance C: Low to medium adverse	Auditory injury (PTS) C: Low Behavioural disturbance C: Negligible to Low	Auditory injury (PTS) C: Not Significant to Slight adverse (not significant in EIA terms) Behavioural disturbance C: Imperceptible to Slight adverse (not significant in EIA terms)	Extended ramp-up mitigation scenario	Auditory injury (PTS) C: Not Significant (not significant in EIA terms) Behavioural disturbance C: Imperceptible to Slight adverse (not significant in EIA terms)	Monitoring has been proposed to understand the potential for behavioural disturbance to marine mammals during piling. Such monitoring will include both visual monitoring and the use of PAM. The details of this monitoring commitments are set out in Volume II, Chapter 4: Description of Development (Revised March 2026), Table 4.10.
2. Injury and/or disturbance to marine mammals from vessel activities	✓	✓	✓	An EVMP will be implemented (see Volume III, Appendix 25.10: Environmental Vessel Management Plan). Full details of Factored In Measures can be found in section 11.7.3.	Injury C: Negligible O: Negligible D: Negligible Behavioural disturbance C: Low adverse O: Low adverse D: Low adverse	Injury C: High O: High D: High Behavioural disturbance C: Low O: Low D: Low	Injury C: Not Significant (not significant in EIA terms) O: Not Significant (not significant in EIA terms) D: Not Significant (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms) O: Slight adverse (not significant in EIA terms) D: Slight adverse (not significant in EIA terms)	None	Injury C: Not Significant (not significant in EIA terms) O: Not Significant (not significant in EIA terms) D: Not Significant (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms) O: Slight adverse (not significant in EIA terms) D: Slight adverse (not significant in EIA terms)	N/A
3. Changes in fish and shellfish community affecting prey resources	✓	✓	✓	N/A	C: Negligible O: Negligible D: Negligible	C: Low O: Low D: Low	C: Not Significant (not significant in EIA terms) O: Not Significant (not significant in EIA terms)	None	C: Not Significant (not significant in EIA terms) O: Not Significant (not significant in EIA terms)	N/A

Description of impact	Phase			Factored In Measures	Magnitude of impact	Sensitivity of Receptors	Significance of effect	Additional measures	Residual effect	Proposed monitoring
	C	O	D							
							D: Not Significant (not significant in EIA terms)		D: Not Significant (not significant in EIA terms)	
4. Accidental pollution	✓	✓	✓	An EMP will be implemented (see Volume III, Appendix 25.1: Environmental Management Plan (Revised March 2026)). A Marine Pollution Contingency Plan will be implemented (Volume III, Appendix 25.1 EMP (Revised March 2026), Annex 2) Full details of Factored In Measures can be found in section 11.7.3.	C: Low adverse O: Low adverse D: Low adverse	C: Medium O: Medium D: Medium	C: Slight adverse (not significant in EIA terms) O: Slight adverse (not significant in EIA terms) D: Slight adverse (not significant in EIA terms)	None	C: Slight adverse (not significant in EIA terms) O: Slight adverse (not significant in EIA terms) D: Slight adverse (not significant in EIA terms)	N/A
5. Changes in EMF from subsea electrical cabling	×	✓	×	Commitment to the burial of cables where possible and protected where not possible, as set out in Volume II, Chapter 4: Description of Development (Revised March 2026).	O: Low adverse	O: Negligible	O: Imperceptible (not significant in EIA terms)	None	O: Imperceptible (not significant in EIA terms)	N/A
6. Injury and/or disturbance to marine mammals from underwater noise during UXO clearance	✓	×	×	A MMMP will be implemented. Full details of Factored In Measures can be found in section 11.7.3	Auditory injury (PTS) C: Negligible to Low adverse Behavioural disturbance C: Low adverse	Auditory injury (PTS) C: Low to Medium Behavioural disturbance C: Low	Auditory injury (PTS) C: Not Significant to Slight adverse (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms)	None	Auditory injury (PTS) C: Not Significant to Slight adverse (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms)	N/A
7. Injury and/or disturbance from	✓	×	×	A MMMP will be implemented.	Auditory injury (PTS) C: Negligible	Auditory injury (PTS) C: Low	Auditory injury (PTS)	None	Auditory injury (PTS)	N/A

Description of impact	Phase			Factored In Measures	Magnitude of impact	Sensitivity of Receptors	Significance of effect	Additional measures	Residual effect	Proposed monitoring
	C	O	D							
underwater noise during site surveys				Full details of Factored In Measures can be found in section 11.7.3	Behavioural disturbance C: Low adverse	Behavioural disturbance C: Low	C: Not Significant (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms)		C: Not Significant (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms)	
8. Injury and/or disturbance to marine mammals from dredging and trenching	✓	✓	×	N/A	Auditory injury (PTS) C: Negligible O: Negligible Behavioural disturbance C: Low O: Low	Auditory injury (PTS) C: Low O: Low Behavioural disturbance C: Low O: Low	Auditory injury (PTS) C: Not Significant (not significant in EIA terms) O: Not Significant (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms) O: Slight adverse (not significant in EIA terms)	None	Auditory injury (PTS) C: Not Significant (not significant in EIA terms) O: Not Significant (not significant in EIA terms) Behavioural disturbance C: Slight adverse (not significant in EIA terms) O: Slight adverse (not significant in EIA terms)	N/A

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