THE OFFSHORE OIL AND GAS EXPLORATION, PRODUCTION, UNLOADING AND STORAGE (ENVIRONMENTAL IMPACT ASSESSMENT) REGULATIONS 2020

Applicant provision of Further Information in response to Notice under Regulation 12(1) sent to LB CCS Limited on 1st July 2024.

General Comments:

Question 12. The Habitat Regulations Assessment (HRA) has not been carried out with reference to the specific conservation objectives of qualifying features of SPAs. In order to inform the conclusion of no Adverse Effect on Site Integrity for the Liverpool Bay SPA alone or in-combination the following amendments are requested:

- A clear description of what works are happening, when the works are happening, and in what locations is needed.
- The assessments of pressures should be based on the spatial and temporal presence of receptors. For example, if works associated with cables are only occurring during the breeding season, there is no need to carry out an assessment of cable works on non-breeding features.
- Vessel transit movements need to be considered, at least to the point of a commitment to transiting via designated shipping lanes as much as possible to limit vessel disturbance.

Applicant response: The Applicant has provided details of the number and type of each vessel in relation to each of the assessed impacts in Table 8.16 in Chapter 8, **section 8.8.1**: Marine Ornithology. Vessels will be utilising the existing supply base at Heysham and other ports in Liverpool Bay where appropriate and will utilise the existing navigation routes through Liverpool Bay.

It is important to note that the MDS applied to each impact is specific and may also differ to the overall project description presented within Volume 1, Chapter 3: Proposed Development Description. This ensures that for each impact assessed under each topic the most appropriate scenario is assessed (i.e. the scenario with the potential for generating the maximum effect to the relevant receptors).

It should be noted that the levels of vessel activity in our project area, are already far more than our proposed project vessel movements. For example, while the Proposed Development will require over the whole construction period a total of around 240 construction vessels round tips (**Table 7.21, Chapter 7, section 7.9.1)**, there are on average each day 54 commercial vessels that pass through Eni's development area **(ES appendices and Technical Reports, Appendix L_NRA, section 9.2)**. This means the construction of the Proposed Development will add on average an additional two vessels to this daily baseline. Furthermore, except for cable laying, which would take 3-5 days per cable, the Applicant already carries out many of the Proposed Development activities on its existing assets.

Double click icon to open: **Volume 3: Appendix L Navigational Risk Assessment (NRA)**	ES-2022-009_LBA CCS Ltd_ES_Append

- To inform the HRA, impacts need to be assessed in relation to the conservation objectives of each site in question.

Applicant response: The conservation objectives were suggested in section 1.5.4 in the RIAA including European sites that states: "*For European sites which fall within both Welsh and English or English and Scottish territorial waters the two relevant governing Statutory Nature Conservation Bodies (SNCBs) can publish separate conservation objectives for the same European site. ...Where this is the case for European sites assessed within this HRA Stage 2 Appropriate Assessment, the most recently published conservation objectives have been used.*"

The Natural England Conservation Objectives used in Table 1.10 (and throughout the Section 1.6 of the RIAA were published in 2018 (Natural England, 2018), complying with this statement, as opposed to the Regulation 33 Advice Package, which was published in 2010 (Natural England and NRW, 2010).

- The red-throated diver qualifying feature of the Liverpool Bay SPA has an objective to restore the distribution of the feature and therefore the appropriate mitigation measures must be put in place for vessel activity during the wintering periods.

Applicant response: The Applicant notes that most works will take place within the period from the 20th March to 21st October and therefore the sensitive winter period will be avoided. The Applicant will continue to engage with NRW, and NE regarding common scoter and red-throated diver and will submit a vessel management plan to OPRED, NRW, and NE for approval prior to commencing any works.

Additionally, the existing levels of vessel activity in our project area should be noted, which are far more than our proposed project vessel movements. For example, the Proposed Development will require over the whole construction period a total of around 240 construction vessels round trips **(Table 7.21, Chapter 7, section 7.9.1)**, there are on average each day 54 commercial vessels that pass through Eni's development area **(ES appendices and Technical Reports, Appendix L_NRA, section 9.2).** This means the construction of the Proposed Development will add on average an additional two vessels to this daily baseline. Furthermore, except for cable laying, which would take 3-5 days per cable, the Applicant already carries out many of the Proposed Development activities on its existing assets, using for example jack-up vessels next to its platforms.

- An assessment of disturbance by vessels should use a relevant buffer around each vessel. For red-throated diver this buffer should be 2km from each vessel (creating an impacted area of at least 13km^2 per vessel). For common scoter this buffer should be 2.5km from each vessel (creating an impacted area of at least 20km^2 per vessel). Therefore, activities occurring outside the Liverpool Bay SPA may exert a pressure on features of the Liverpool Bay SPA, and hence these activities should be included in a vessel disturbance assessment.

Applicant response: For each of the species assessed (presented in **Table 8-9 in Chapter 8, section 8.7.4.1**, displacement impacts were quantified for the population derived within the area of physical works plus 2 km buffer, as recommended by SNCBs. However, a **4 km buffer was used for common scoter and red-throated diver** (**Table 8.9, Chapter 8, section 8.7.4.2)** due to being more sensitive to disturbance from noise, boat, and helicopter traffic, and can be affected up to this distance (*SNCBs (2022). Joint SNCB Interim Displacement Advice Note. Joint SNCB Interim Displacement Advice Note.*).

- For the purposes of the HRA, the seasons and reference populations used should be those relevant to the SPAs. The latest population estimates for the SPA should be used to assess the magnitude of impact. This is relevant where conservation objectives refer to population size. Where conservation objectives refer to the distribution of the feature,

the area impacted should be quantified. The size of the SPA should be used to assess the magnitude of impact.

- A clear in-combination assessment needs to be carried out, considering the presence of operational wind farms and vessel activity related to a range of activities.

Applicant response: Displacement common scoter: The applicant would like to clarify that the displacement assessment for common scoter is based upon the cable corridor plus 4km buffer (**Volume 3: Appendix K2 Offshore Ornithology Displacement Technical Report - section 1.5.1.3 - non-breeding season**). The applicant notes that the area of 12 vessels would be approx. half of the area assessed (based upon the overlap of 4km which is 458.08km2. **See Appendix K2 Displacement Technical Report, section 1.3**) and therefore the effects upon common scoter presented in the ES are very precautionary and any changes would only reduce the magnitude of impacts.

Displacement red-throated diver: The Applicant would like to clarify that the area of impact is based on the cable corridor plus 4km buffer (458.08km2) (**Volume 3: Appendix K2 Offshore Ornithology Displacement Technical Report - section 1.5.1.4 - non-breeding season (ES-2022-009_LBA CCS Ltd_ES_Appendix K2_OOD TR_OPRED_Reg 12.pdf)**). The area of impact as proposed by OPRED would be 109km2. The impact area assessed by the Applicant is larger and therefore the assessment presented in the ES is more precautionary. Change in impact area as proposed by JNCC would result in a lower magnitude of impacts.

Additionally, a technical note on displacement of red-throated diver and common scoter is included with this response (**Technical Note – Displacement – all sections respond to these questions**).

Double click icon to open: **Volume 3: Appendix K2 Offshore Ornithology Displacement Technical Report**	 ES-2022-009_LBACC SLtd_ES_Appendix K
Double click icon to open: **ES-2022-009_Technical Note_Displacement_CS and RTD**	 ES-2022-009_Techni cal Note_Displaceme

Question 15. Further information is required to agree with cumulative assessment of impacts of suspended sediment concentrations (SSC), sediment deposition and changes to seabed morphology. It is recommended that further evidence is required to support the assessment to impacts from SSC and associated deposition on benthic habitats, the Dee Estuary Cockle Beds and prey species of Breeding Terns and Red-Throated Diver.

Applicant response: The Marine Licence application and Environmental Statement (ES) presented two cable route options to negotiate the West Hoyle Spit.

The worst-case option presented within the ES, was a route that crossed the West Hoyle Spit following a parallel alignment to the existing Point of Ayr (PoA) to Douglas platform natural gas pipeline (PL1030), as shown in the ES at Figure 3.16 in Chapter 3, section 3.4.5.1 . This option would require the excavation of trench across the West Hoyle Spit to facilitate passage of the cable lay vessel. An alternative route further to the east, via a tidal channel through the spit, was also presented in the ES at Figure 3.17 in Chapter 3, section 3.4.5.1.

The Applicant can confirm that the worst-case route option, across the West Hoyle Spit, will no longer be pursued. The alternative option to the east is now the preferred option and will be taken forward to detailed design by our EPC contractor. The preferred option avoids the excavation of the trench across the spit, and therefore the impact on the benthic habitat at the West Hoyle Spit that provides prey species for breeding Tern and Red-Throated Diver. This also means that the worst-case suspended sediment concentrations and

subsequent sedimentation associated with the trench excavation, are not predicted to occur within the Dee Estuary SAC/SPA/SSSI and the associated Cockle Beds.

Notwithstanding, the worst-case assessment presented in the ES in Chapter 6, section 6.11.1.1, predicted that suspended sediment could be deposited as far as 8 km into the designated sites but at negligible depths. The SSC rapidly decrease with distance from the West Hoyle Spit excavation, and within the Dee Estuary drop to a concentration below 3 mg/l falling, which is within the mean annual average background levels of ~30mg/l and corresponding sedimentation values in the estuary are predicted to be <3 mm. Additionally, the mudflats and sandflats within the designated sites would remain stable and continue to support hydrodynamic processes, as well as the communities which utilise these habitats.

Therefore, average SSC values within the Dee Estuary from the cable installation along the Preferred Route are greatly reduced from those that would have arisen from the worst-case route across the West Hoyle Spit, falling in the region of background concentrations (<3 mg/l). The sites mudflats and sandflats would remain stable and continue to support hydrodynamic processes, as well as the communities which utilise these habitats.

The scientific literature also illustrates that many shellfish species have a high tolerance to increases in SSC and are reported to be insensitive to increases in turbidity (Wilber and Clarke, 2001). This includes shellfish IEFs, such as brown crab which has been assessed in the MarESA as being tolerant to increase in SSCs, smothering, and increase in turbidity, with very low, low, and no sensitivity to each of these impacts, respectively (Neal and Wilson, 2008). This is due to their mobility, allowing brown crab to escape from sediment deposition and avoid areas of increased SSCs, as they rely on good visibility to forage (Neal and Wilson, 2008).

Furthermore, non-mobile shellfish IEFs, such as common cockle, have also been assessed in the MarESA as being tolerant and not sensitive to increased SSCs and turbidity (Tyler-Walters, 2007). This is because this species naturally inhabits sedimentary and turbid environments and is therefore considered to be tolerant to these impacts (Navarro and Widdows, 1997; Tyler-Walters, 2007). The common cockle also has intermediate tolerance to smothering of up to 5 cm of deposited sediment, with a high recovery rate, and an overall low sensitivity to smothering (Tyler-Walters, 2007). For example, in laboratory and field conditions, individuals have been observed to burrow quickly to the surface if smothered by 2 to 5 cm of sediment (Jackson and James, 1979; Richardson et al., 1993). Historic common cockle beds are present within the Dee Estuary, which have been subject to previous closures and are not managed under the Dee Estuary Cockle Fishery Order (2008) Management Plan (NRW, 2024). Given the low sensitivities of common cockle to increased SSCs, turbidity, and smothering (Tyler-Walters, 2007), if this impact had occurred, it would have been unlikely that it would have affected the cockle beds of the Dee Estuary.

Marine Biodiversity: **SSC** has been assessed in relation to the Dee Estuary Cockle Beds the accompanying **Technical Note-Fish and Shellfish MBTN02 at Sections 1.4, 1.4.1, 1.4.2, and 1.4.3** and the **Technical Note-RIAA MBTN04 at Section 1.3.3.**

Double click icon to open: **Technical Note-Fish and Shellfish MBTN02**	ES-2022-009_Techni cal Note-Fish and Sh
Double click icon to open: **Technical Note-RIAA MBTN04**	ES-2022-009_Techni cal Note_RIAA_MBTN

Question 20. General comments on ornithology relating to the development.

- It is noted that the route of the proposed development appears to go through the very limited foraging range of Little Terns associated with the Dee Estuary SPA and the

Gronant Dunes and Talacre Warren SSSI. Please clarify if the intent is to follow the recommendations of the Little Tern Foraging Distribution Technical Report that work in the nearshore waters could be carried out outside of the Little Tern breeding season (mid-April to mid-July).

Applicant response: The Applicant agrees with OPRED that the timing of the work is crucial. The Applicant will continue to engage with NRW to define a seasonal period to avoid impacts upon the little terns.

Since publication of the ES and submitting the OPRED application, the Applicant has been in negotiations with contractors for the supply and installation of the offshore electrical cables. The outcome of these negotiations is that the cables will not be installed across the West Hoyle Spit and will follow the preferred option to the east. The Applicant can confirm that the worst-case route option, across the West Hoyle Spit, will therefore no longer be pursued. The alternative option to the east is now the preferred option and will be taken forward to detailed design by our EPC contractor, and will involve a single cable, instead of the two previously proposed. The preferred option therefore avoids the excavation of the trench across the West Hoyle Spit. This means that there will be a much reduced project footprint within the important little tern foraging area, being confined to the approximately 15m wide footprint of the plough or cable trencher on the seabed. Additionally, the route for the cable laying will be through Foraging Sectors E-3, and E-4 where there is a low percentage of foraging (see Figure 1.3 :Distribution of foraging little tern split by count sectors and distance bands in **Offshore ES The Eni HyNet EIA Little Tern Foraging Distribution Technical Report** (**ES-2022-009_LBA CCS Ltd_ES_Appendix K4_LT FTR_OPRED-Reg 12.pdf**).

This also means that there will be a simultaneous lay and burial of the electrical cable requiring only one passage of the cable lay vessel between Point of Ayr and the New Douglas platform, instead of the four that would have been needed. The 'worst-case' assessed in the ES will therefore not occur and the West Hoyle Spit will be undisturbed. As a result, the worst-case environmental effects will be avoided and are not predicted to occur.

We are however, continuing to work with our cable installation contractor to avoid as much of the little tern season as possible. The key activity for the project is the laying of the cable from PoA to the New Douglas platform, which needs to be carried out in good weather conditions to prevent damage to the cable during installation. The cable pulling operation would take around 4-5 days, and the laying of the cable away from the shore and around the eastern end of West Hoyle Spit would take a further 24-48 hours. These works are currently scheduled to be carried out during July and August.

Additionally, the current schedule is for the onshore prep-works for cable installation to be carried out during April, and would take approximately 19 days as shown in Offshore ES Chapter 3, Section 3.4.5.2, Figure 3.20. This activity could possibly be started a little earlier, potentially avoiding the start of the little tern breeding season. However, this is not definite, but is something that we are continuing to explore our cable installation contractors during the development of detailed method statements and work schedules.

Double click icon to open: **Volume 3: Appendix K4 Little Tern Foraging Distribution Technical Report**	ES-2022-009_LBACC SLtd_ES_Appendix K

- Impacts on Little Terns as a result of effects on fish populations (e.g., due to high suspended sediment concentrations (SSC)) need to be considered. Further clarity is needed on the worst-case scenario for fish mortality, as well as clarity on the timings of the works. Work should be planned so that both SSCs are reduced, and prey availability is restored before breeding Terns arrive at the colony in April.

Applicant response: Sediment plumes associated with the PoA Terminal to Douglas OP cable will result in increased SSC within the Dee Estuary SAC/SPA/SSSI. Peak SSC values within the Dee Estuary arising from cable installation are greatly reduced from those along the cable route, with values of up to 30 mg/l for

short periods, whilst average values are expected to be within the range of background concentrations at <3 mg/l. The site's mudflats and sandflats would remain stable and continue to support hydrodynamic processes, as well as the communities which utilise them. This is because maximum sedimentation is expected to be <0.5 mm and occur only at the mouth of the estuary.

- Impacts on Red-Throated Diver as a result of effects on fish populations (e.g. due to high SSCs) also need to be considered.

Applicant response: In relation to OPRED Item 16 above regarding red-throated diver, the SSC modelling undertaken as part of the physical processes chapter (Vol. Chapter 6. section 6.11.1.1) concludes that, although SSCs may be more than 1,000mg/l, these levels will only be located within the immediate dredge path. The fish chapter (Chapter 7. section 7.12.12) has also concluded a minor impact upon fish (minor to moderate on herring) due to increased SSCs in the wider area. As red-throated diver are able to exploit a much larger area and a wider range of prey items than breeding little tern, the localised minor impact on fish will not impact red-throated diver in the same way as it will little tern which are tied to a small foraging range. Furthermore, reduced prey abundance of little terns are known to lead to colony-level effects (Perrow et al., 2011). Therefore, the Applicant is confident that the assessment presented for red-throated diver under impacts to prey availability in the Environmental Statement is still valid.

- To avoid disturbance and displacement of Red Throated-Diver and Common Scoter, both of which are designated features of Liverpool Bay SPA a vessel traffic management plan is advised which should consider measures such as, but not limited to, restricting vessel movements to existing navigation routes.

Applicant response: The Applicant notes that most works will take place within the period from the 20th March to 21st October and therefore the sensitive winter period will be avoided. The Applicant will continue to engage with NRW, and NE regarding common scoter and red-throated diver and will submit a vessel management plan to OPRED, NRW, and NE for approval prior to commencing any works.

Additionally, the existing levels of vessel activity in our project area should be noted, which are far more than our proposed project vessel movements. For example, the Proposed Development will require over the whole construction period a total of around 240 construction vessels round trips (Table 7.21, Chapter 7, section 7.9.1), there are on average each day 54 commercial vessels (ES Appendices and Technical Reports, Appendix L_NRA, section 9.2 (**ES-2022-009_LBA CCS Ltd_ES_Appendix L_NRA_OPRED_Reg 12.pdf**)) that pass through Eni's development area. This means the construction of the Proposed Development will add on average an additional two vessels to this daily baseline. Furthermore, except for cable laying, which would take 3-5 days per cable, the Applicant already carries out many of the Proposed Development activities on its existing assets, using for example jack-up vessels next to its platforms.

- To avoid disturbance and displacement of Red-Throated Diver and Common Scoter, seasonal restrictions on offshore construction activity within Liverpool Bay SPA within the winter period (1st November to 31st March inclusive), noting that there can also be large numbers of birds present in October and April should be considered.

Applicant response: Overall, the Applicant has a 'weather window' that we are trying to avoid from around 21st October to 20th March each year, as the sea-state can make it dangerous to carry out heavy lifts, drilling, and cable laying with vessels alongside the platforms during this period. This means nearly all works will be carried out from the end of March to mid-October. It is therefore highly likely that all our works will be completed outside of the winter period. The Applicant will continue to engage with NRW, and NE regarding common scoter and red-throated diver and will submit a vessel management plan to OPRED, NRW, and NE for approval prior to commencing any works.

The SNCB advice is restricted to OWF infrastructure and has no best practice protocol for vessel movements in regard to red-throated diver. The applicant's indicative summary schedule shows that works are scheduled to take place outside the Nov - Mar period with only landfall preparation and cable wet storage due to take place during the winter months, therefore there will be no impacts during the core wintering period.

- Due to the potential for disturbance to both breeding and overwintering receptors, a clear timetable for the proposed works should be supplied.

Applicant response: Since publication of the ES and submitting the OPRED application, the Applicant has been in negotiations with contractors for the supply and installation of the offshore electrical cables. The outcome of these negotiations is that the cables will not be installed across the West Hoyle Spit and will follow the preferred option to the east. The Applicant can confirm that the worst-case route option, across the West Hoyle Spit, will therefore no longer be pursued. The alternative option to the east is now the preferred option and will be taken forward to detailed design by our EPC contractor, and will involve a single cable, instead of the two previously proposed. The preferred option therefore avoids the excavation of the trench across the West Hoyle Spit.

We are however, continuing to work with our cable installation contractor to avoid as much of the little tern season as possible. The key activity for the project is the laying of the cable from PoA to the New Douglas platform, which needs to be carried out in good weather conditions to prevent damage to the cable during installation. The cable pulling operation would take around 4-5 days, and the laying of the cable away from the shore and around the eastern end of West Hoyle Spit would take a further 24-48 hours. These works are currently scheduled to be carried out during July and August.

Additionally, the current schedule is for the onshore prep-works for cable installation to be carried out during April and would take approximately 19 days as shown in **Offshore ES Chapter 3 Figure 3.20, section 3.4.5.2**. This activity could possibly be started a little earlier, potentially avoiding the start of the little tern breeding season. However, this is not definite, but is something that we are continuing to explore with our cable installation contractors during the development of detailed method statements and work schedules.

The chart below provides the provisional indicative dates for the laying of the cable from PoA to the New Douglas Platform. The first two items A3440 (waiting on weather 7 days), and A1650 (shore pull in 3.07 days), correspond to the 'Cable Pulling Operations' items in the chart above. The remaining items in the chart below then relate to the laying of the cable from PoA to New Douglas platform.

PoA-Douglas CCS		28.82d	0.00	24-Jun-2026	22-Jul-2026
A3440	CLV - Waiting on Weather Window	7.00d		24-Jun-2026	01-Jul-2026
A1650	CLV - Shore pull-in PoA (*)	3.07d		01-Jul-2026	04-Jul-2026
A1660	CLV - Simultaneous lay and burial from PoA - Douglas CCS	11.17d		04-Jul-2026	15-Jul-2026
A1670	CLV - Freelay PoA - Douglas CCS	2.73d		15-Jul-2026	17-Jul-2026
A3310	CLV - Wetstore 2nd end Douglas CCS	1.67d		17-Jul-2026	19-Jul-2026
A2190	CLV - Transit to Port	0.50d		19-Jul-2026	20-Jul-2026
A1680	CLV - Re-arrange deck (offload HD3)	1.00d		20-Jul-2026	21-Jul-2026
A2200	CLV - Transit to Site	0.50d		21-Jul-2026	21-Jul-2026
A1690	CLV - 2nd end pull-in Douglas CCS	1.18d		21-Jul-2026	22-Jul-2026

The following charts show the cable laying operations from the New Douglas platform to the three satellites. Each taking just a few days each during July and August.

Douglas - Hamilton Main CCS		3.16d	0.00	22-Jul-2026	25-Jul-2026
A1700	CLV - 1st pull-in Douglas CCS	0.82d		22-Jul-2026	23-Jul-2026
A1710	CLV - Freelay Douglas - Hamilton Main CCS	1.10d		23-Jul-2026	24-Jul-2026
A1720	CLV - 2nd end pull-in Hamilton Main CCS	1.18d		24-Jul-2026	25-Jul-2026
A1730	CLV - Infield transit	0.06d		25-Jul-2026	25-Jul-2026
Douglas - Hamilton North CCS		2.97d	0.00	25-Jul-2026	28-Jul-2026
A1740	CLV - 1st pull-in Douglas CCS	0.82d		25-Jul-2026	26-Jul-2026
A1750	CLV - Freelay Douglas - Hamilton North CCS	1.61d		26-Jul-2026	28-Jul-2026
A1760	CLV - Wetstore 2nd end Hamilton North CCS	0.49d		28-Jul-2026	28-Jul-2026
A1770	CLV - Infield transit	0.05d		28-Jul-2026	28-Jul-2026
Douglas - Lennox CCS		5.22d	0.00	28-Jul-2026	03-Aug-2026
A1780	CLV - 1st pull-in Douglas CCS	0.82d		28-Jul-2026	29-Jul-2026
A1790	CLV - Freelay Douglas - Lennox CCS	3.38d		29-Jul-2026	02-Aug-2026
A1800	CLV - Wetstore 2nd end Lennox CCS	0.52d		02-Aug-2026	02-Aug-2026
A2230	CLV - Transit to port	0.50d		02-Aug-2026	03-Aug-2026

The indicative summary construction schedules presented in Chapter 3: Description of the Proposed Development show the 'bad weather window' from later September to mid-April. During this time the poor weather and likely sea state make it unsafe to operate offshore vessels for our installation works, which require stable conditions when carrying out heavy lifts, and installing fragile electrical cables. Marine works are very unlikely during this 'bad weather window' thereby avoiding disturbance to over-wintering birds.

The following bullet list gives a summary of the current indicative main programme dates for the works at the new Douglas OP and the three satellites NUIs:

- New Douglas platform installation (Jacket/piles/topsides) = 13 Aug 2026 - 24 Sep 2026
- New pipeline spools at New Douglas platform = 26 Jun 2026 - 4 Oct 2026

- Hamilton Main drilling (P&A, side-tracking, and completions) with drilling rig alongside platform = 27 Mar 2025 - 20 Dec 2025
- Hamilton Main removal of existing topsides = 25 Sep 2026 - 10 Oct 2026
- Hamilton Main installation of new topsides = 11 Oct 2026 - 15 Oct 2026
- Hamilton Main well perforations with jack-up rig alongside platform = 1 Jan 2027 - 4 Mar 2027

- Hamilton North drilling (P&A, side-tracking, and completions) with drilling rig alongside platform = 21 Dec 2025 - 18 Jul 2026
- Hamilton North removal of existing topsides = 4 Apr 2027 - 19 Apr 2027
- Hamilton North installation of new topsides = 20 Apr 2027 - 27 Apr 2027
- Hamilton North well perforations with jack-up rig alongside platform = 13 Jul 2027 - 9 Sep 2027

- Lennox drilling (P&A, side-tracking, and completions) with drilling rig alongside platform = 18 Jun 2026 - 1 Apr 2027
- Lennox removal of existing topsides = 1 May 2027 - 11 May 2027
- Lennox installation of new topsides = 16 May 2027 - 24 May 2027
- Lennox well perforations with jack-up rig alongside platform = 10 Nov 2027 - 20 Dec 2027

Question 21. Marine Mammals. Please address the following:

- The proposal to use a harbour porpoise density of 0.086 per km2 is considered to be lower than the more up to date densities supplied from the latest edition of the Marine Mammal Atlas (Evans & Waggit, 2023), therefore either the most precautionary or the most scientifically robust values should be taken forward to the assessment. For harbour porpoise use of densities taken from the Marine Mammal Atlas (Evans & Waggit, 2023) is recommended given their greater robustness, and that the results within the ES are revised.

Applicant response: Please see the **Technical Note-Marine Mammals MBTN03 in Table 1.1, and Section 1.3.12, Table 1.8**, and the **Technical Note-RIAA MBTN04 in Table 1.1, and Section 1.5.1, Table 1.6,** for a comparison between the densities used in the assessment and those from Evans and Waggit (2023). For all marine mammal IEFs, the Evans & Waggit densities were lower than those used for the assessment. Therefore no updates were made, as the greatest densities have been retained to apply a precautionary approach.

Double click icon to open: **Technical Note-Marine Mammals MBTN03**	ES-2022-009_Technical Note-Marine Ma

- There is insufficient justification and insufficient quantification of the effects of vessel noise and geophysical / seismic surveys to be able to agree with an overall magnitude of low.

Applicant response: For vessels and geophysical surveys, please refer to the **Technical Note-Marine Mammals MBTN03 in Table 1.1, and Section 1.3.14, Injury, Disturbance, and Displacement from Vessel Activity and other Noise Producing Activities -** further text has been provided on quantifying the impact of Injury, Disturbance, and Displacement from Vessel Activity and other Noise Producing Activities, and the **Technical Note-RIAA MBTN04 in Table 1.1, and Section 1.4.3 Underwater Noise Impacts during the Operation and Maintenance Phase**.

- The adopted screening distance of 20 km for vessel noise, 13 km for geophysical and seismic surveys, and the Liverpool Bay area for vessel collision for the purposes of the cumulative assessment is not considered to be appropriate.

Applicant response: For screening distances, please refer to the **Technical Note-Marine Mammals MBTN03 in Table 1.1** and the **Technical Note-RIAA MBTN04 in Table 1.1**.

- There is inadequate justification for the conclusion that the effects on marine mammal receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase or when considered in conjunction with other topics addressed in the ES.

Applicant response: For inter-related effects, please see Volume 2, Chapter 14 of the ES for the Interrelated Effects assessment.

Question 26. General Comments relating to Climate Change. Please address the following:

- Section 13 Volume 2 presents Greenhouse gas emissions (tCO_2e) from associated construction, operation, and decommissioning, but does not include consumption data or the emission factors. The assessment methodology provides a high-level information source of data. Please provide more granular information in the emissions data.

Applicant response: Additional detail regarding the calculation of emissions associated with the construction, operation and decommissioning phases are included within **ES Volume 3: Appendix O Greenhouse Gases**. This appendix includes more granular information, including emissions factors. Emission factors were sourced from the current guidance on this topic.

Double click icon to open: **Volume 3: Appendix O Greenhouse Gases**	ES-2022-009_LBACC SLtd_ES_Appendix C

- Pollutants have not been assessed. Volume 3 Air Quality Technical Report attempts to justify why no pollution data or AQ assessment is provided however, on the basis of this there is not considered to be sufficient information or evidence to substantiate that the impact during construction is negligible and data or an AQ assessment needs to be provided to substantiate the ambient air quality effect is not considered significant.

Applicant response: In line with the relevant guidance, the climate change chapter considers the impact of the proposed development on climate, and as such considers the 'Kyoto basket' of global warming gases expressed as their CO2 equivalent. Other pollutants are not considered to lie within the scope of this assessment.

- In Section 13.11.2 the proposed development GHG impacts (tCO_2e) are stated for the UK carbon Budget periods, but there is no information as to how the net emissions have been calculated at each stage? Please clarify. It is also noted that UK budget allocations are incorrect for 2028-2032 and 2033- 2037.

Applicant response: ES Chapter 13 in its section 13.1.1 summarises the activities and the **ES Volume 3 Appendix O GHG Technical Report** (**ES-2022-009_LBA CCS Ltd_ES_Appendix O_GHG_OPRED-Reg 12 .pdf**) embedded above is including all the details of the calculation. The assessment has identified each emissions source and broken the assessment down into the construction (i.e. installation), operation (injection) and decommissioning (post closure and decommissioning) phases. This is consistent with whole life carbon guidance which breaks the lifetime of a project down into A1-A5 emissions associated with construction, B1-B7 associated with operation, and C1-C4 associated with decommissioning. All emissions arising from the Proposed Development have been assessed against the context of the receptor for the assessment being the global atmospheric mass of GHGs, treated with high sensitivity.

However, a calculation against the UK budget and the Wales budget to estimate the benefit of the project have been performed (NSTA. (2021) Net Zero Stewardship Expectation 11) in comparison to the injected CO_2 as per the estimated emissions so far. We are conscious that this calculation can be modified in the near future with more accuracy of data, but we would suggest it as an overview of the estimation of avoided emissions in relation to the developed project.

The below tables illustrate the percentage of the avoided emissions with the carbon budget for both the UK and Wales based on an evaluation of planned reinjected CO_2 emissions compared to project-generated emissions.

It should be noted that the project's computation in the GHG-Net Zero table indicates that reinjected emissions will continue through 2052, with a lifetime maximum of 110.25 Mt CO2.

Parameter	UK Carbon Budget			
	Third: 2018-2022	Fourth: 2023-2027	Fifth: 2028-2032	Sixth: 2033-2037
UK Carbon Budget ($MtCO_{2eq}$)	2,544	1,950	1,725	965
GHG project-Construction ($MtCO_{2eq}$) (Scope1&2) - 4.5 MTPA profile	0	0.00034355+ 0.0048968 =0.00524	0.002778+ 0.19850 =0.201278	0.003391+ 0.326825745 =0.330214
CO_2 reinjected (from Emitters)-4.5 MTPA profile ($MtCO_2$)	0	1.05	19.13	22.52
Avoided Emissions ($MtCO_{2eq}$)	-	1.04476	18.0987	22.1697
Avoided CO_2 emissions against Budget (%)	-	0.054 %	1.05 %	2.3 %

The cumulative reinjected CO2 emissions over the UK Carbon Budget period 2027-2037, are 41.3 Mt CO2eq. at a rate of 4.5 MTPA. These total avoided emissions represent 0.93% of the UK Carbon Budget of 4,640 Mt CO2eq over the same period.

Parameter	Wales Carbon Budget	
	2021-2025	2026-2030
Wales Carbon Budget ($MtCO_{2eq}$)	43.12	35.28
GHG project Construction ($MtCO_{2eq}$) (Scope1&2)	0	0.0019221+0.107698=0.1096201
CO_2 reinjected (from Emitters)-4.5 MTPA profile ($MtCO_2$)	0	11.18
Avoided Emissions ($MtCO_{2eq}$)	-	10.07
Reinjected CO_2 emissions against Budget (%)	-	28.54%

The cumulative reinjected CO_2 emissions, over the Wales Carbon Budget period 2027-2030, are 11.18 Mt CO_2.at a rate of 4.5 MTPA. These total avoided emissions represent 28.54% of the Wales Carbon Budget of 35.28 Mt CO_{2eq}, over the same period.

Question 31. Section 1.3.2.

It is stated that existing topsides will be removed and new purposed built topsides with CO_2 injection capabilities will be installed. This is contradictory to other parts of the ES where it is stated that the existing topsides will be repurposed for the project. Please clarify:

Applicant response: Eni can confirm that it is just the existing satellite jackets that will be repurposed for CO_2 service. The existing topsides will be removed and replaced with new. Text has been updated in the NTS.

Eni has checked through Chapter 3 Proposed Development Description and has found two instances where typographical errors in the text has made the meaning a little ambiguous. These instances are as follows:

- **Chapter 3 Proposed Development Description.** Within the bullet list under Section 3.2 describing the development location and the three existing satellites, it would have been better to remove the words "*…to be repurposed for CO_2 service*" as they are superfluous to what is being described here.
- **Chapter 3 Proposed Development Description.** Section 3.4.7 Vessel utilisation states "*It is intended to continue to use the ISP during the construction phase, to accommodate any major maintenance requirement for repurposing the Offshore OPs to CO_2 service*". The is should say "*…maintenance requirement at the Offshore OPs for CO_2 service*".

We have also checked through the individual topic assessment chapters and found the following three instances where typographical errors in the text have made the meaning a little ambiguous:

- **Chapter 9: Shipping and Navigation** Section 9.11.2.1 Construction phase. This section is referring to the construction traffic during the construction phase and it would have been more accurate to say "*replacement*" and "*replace*" instead of "*repurposing*" and "*repurpose*" in these instances. Although, the jackets of each of the satellites is being repurposed, so it is not entirely incorrect. Notwithstanding, the description of the Maximum Design Scenario in Section 9.8.1 of this assessment chapter is clear that the MDS have been selected from the details provided in Chapter 3 of the of the Offshore ES. The information presented notably in the list of infrastructure under Section 3.3.1, and the descriptions of the offshore platforms in Section 3.3.5, confirm that the existing topsides will not be repurposed.
- **Chapter 11: Marine Archaeology** Section 11.8.1.2 Areas of Work "*Existing platforms to be repurposed also fall within this area. While the installation of new infrastructure and the conversion of existing platform infrastructure will fall within this zone, associated impacts including from jack up barges and anchoring of vessels may occur within the wider Eni Development Area*". Notwithstanding, the description of the Maximum Design Scenario in Section 11.8.1 of this assessment chapter is clear that the satellites will have new topsides installed and jackets re-used, and we can confirm that is what has been assessed.

- **Chapter 13: Climate Change** Section 13.11.1.4 the word "*repurposed*" should be deleted from the sentence. Notwithstanding, the description of the Maximum Design Scenario in Section 13.8.1 of this assessment chapter is clear that the satellites will have new topsides installed and jackets re-used, and that we can confirm that is what has been assessed.

a) Will the existing topsides be repurposed?

Applicant response: No. None of the existing topsides will be repurposed. There will be a new Douglas jacket and topsides, and each of the three satellite platforms at Hamilton, Hamilton North, and Lennox will have their topsides replaced and their existing jackets repurposed.

ai) If so, will this be carried out on site, or will they be taken onshore to carry out the work?

Applicant response: The new satellite topsides, and new Douglas topsides and jacket will be fabricated in the Netherlands and shipped to site by barge and lifted into place by a heavy lift vessel (HLV).

aii) How long will each of the jackets sit without topside? (Lennox, Hamilton Main and Hamilton North)

Applicant response:

- The existing Hamilton Main topside will be removed in the period of 25 Sept 2026-10 Oct 2026 – the jacket will be without the topside for less than 24 hrs as the installation will be in the period of 11 Oct 2026- 15 Oct 2026
- The existing Hamilton North topside will be removed in the period of 4 Apr 2027- 19 Apr 2027 – the jacket will be without the topside for less than 48 hrs as the installation will be in the period of 20 Apr 2027- 27 Apr 2027
- The existing Lennox topside will be removed in the period of 1 May 2027-11 May 2027– the jacket will be without the topside for less than 7 days as the installation will be in the period 16 May 2027 -24 May 2027.

b) If new topsides are to be installed

Applicant response: There will be a new Douglas jacket and topsides, and each of the three satellite platforms at Hamilton, Hamilton North, and Lennox will have their topsides replaced and their existing jackets repurposed. And in addition to the response above aii) New Douglas platform installation (Jacket/piles/topsides) = 13 Aug 2026 - 24 Sep 2026.

bi) When will the existing topsides be removed from each installation?

Applicant response: please see the answer aii) above

- The existing Hamilton Main topside will be removed in the period of 25 Sept 2026-10 Oct 2026 – the jacket will be without the topside for less than 24 hrs as the installation will be in the period of 11 Oct 2026- 15 Oct 2026
- The existing Hamilton North topside will be removed in the period of 4 Apr 2027- 19 Apr 2027 – the jacket will be without the topside for less than 48 hrs as the installation will be in the period of 20 Apr 2027- 27 Apr 2027
- The existing Lennox topside will be removed in the period of 1 May 2027-11 May 2027– the jacket will be without the topside for less than 7 days as the installation will be in the period 16 May 2027 -24 May 2027.

bii) When will the new topside be installed for each installation (Lennox, Hamilton Main and Hamilton North)

Applicant response: Please see our answers on aii) and b) above

c) Will the Douglas CCS Platform be installed when the existing Douglas Process platform is still in situ

Applicant response: Yes. The existing Douglas structures will remain in place until CO_2 injection commences in late 2027. The existing Doulgas complex structures are then scheduled for removal in 2028.

ci) If so, for how long will all four platforms be in site (3 existing Douglas & 1 new)

Applicant response: All four structures could be in place for up to 12 months. The 4 platforms will be there before the Douglas complex is removed from Oct 2026 until 2028.

cii) If not, what is the planned commencement of removing existing topsides and when will the work start and complete for the new platform?

Applicant response: Please see all the details of the schedule as part of the answers aii), b)

Question 39. Section 2.2.2.3.

Please provide a copy of the noise modelling and assessment.

Applicant response: Noise modelling is provided within the Application in **Volume 3: Underwater Noise Technical Report (ES-2022-009_LBA CCS Ltd_ES_UWN TR_OPRED_Reg 12.pdf)**. A full assessment of the impacts from underwater noise on fish and shellfish ecology receptors and marine mammal receptors is presented within Volume 2, Chapter 7: Marine Biodiversity, sections 7.12.11, 7.12.13, 7.12.14, 7.12.15, 7.12.16, 7.12.17, 7.12.18 and 7.12.19.

Double click icon to open: **Volume 3 Appendix J Underwater Noise Technical Report**	ES-2022-009_LBACC SLtd_ES_Appendix J_

Question 40. Section 2.3.1.

It is stated that the displacement results were evaluated for different project phases, including the construction phase and the operations of the Douglas platform. It is not clear which phases were evaluated and if the Lennox, Hamilton Main and Hamilton North were considered? Please clarify.

Applicant response: The Applicant would like to clarify that works surrounding the platforms have already been assessed in the ES under displacement from construction as the bird densities were produced for the export cable corridor plus 2km and 4km. The platforms and associated works are included within this (please see Volume 3: Offshore Ornithology displacement report for further details in **ES Volume 3, Appendix K2_OOD, sections 1.5.2, 1.5.3** (**ES-2022-009_LBA CCS Ltd_ES_Appendix K2_OOD TR_OPRED_Reg 12.pdf**)). The applicant notes that displacement from the new Douglas was undertaken on a precautionary basis, however if OPRED do not see it as an impact then the applicant would be equally happy for OPRED to not consider it.

Question 46. Section 2.8.1.

It is noted that there is limited reference to the North Sea Transition Deal Targets. Please reference specific offshore oil and gas commitments to reduce emissions through the North Sea Transition Deal and Energy White Paper. Please discuss the commitment to these targets.

Applicant response: The electrical power will be sourced from the UK National Grid via Scottish Power Energy Networks (SPEN), which will be supplied via new electrical cables from Point of Ayr terminal to the new Douglas platform, and onwards to the satellite platforms via three new cables. The Proposed Development does not include any secondary fuel sources on the offshore platforms in the case of a power outage.

Key items outlined within the Energy White Paper of relevance to the Proposed Development and Climate Change are:

- The North Sea Transition Deal is outlined within the Energy White Paper, with key deliverables relevant to the Proposed Development including support of CCUS and the development of hydrogen production. Further detail is provided below (items 2 and 3).

- Key commitments include making the UK continental shelf a net zero basin by 2050. This commitment is supported by the extent of carbon reinjected by the Proposed Development (further detail provided below, item 2). Additionally, the Paper supports the repurposing of existing infrastructure in support of clean energy technologies. The Proposed Development is re-purposing existing infrastructure for the re-injection and storage of CO2, thereby ensuring reduced emissions associated with the construction of such a project through the avoidance of 100% new infrastructure and associated construction emissions.

Key items outlined within the North Sea Transition Deal of relevance to the Proposed Development and Climate Change are:

- Item 1. Supply chain decarbonisation: The Proposed Development is seeking to reduce operational emissions through the refurbishment and electrification of OPs, which will enable the Proposed Development to benefit from grid decarbonisation and remove the need to utilise open cycle gas turbines (OCGT) for power generation.

- Item 2. Carbon Capture Usage & Storage: the Proposed Development supports key action highlighted to achieve Transport and Storage Infrastructure for at least 10 Mt/year of carbon capture by 2030. The Proposed Development alone has the potential to capture approximately 4.5 Mt CO_2/year when fully operational. Reaching a total of between 110,250,000 tCO_2 and 116,050,000 tCO2 reinjected over the Proposed Development's lifetime.

- Item 3. Hydrogen: The Proposed Development is being developed in parallel with and as a key part of the HyNet Northwest full-chain hydrogen and CCS industrial decarbonisation project (the HyNet Project), which is designed to transform a region of the UK into the world's first low carbon industrial cluster by 2030. The wider project will enable the provision of low carbon hydrogen to power industry, transport, and to heat homes and businesses.

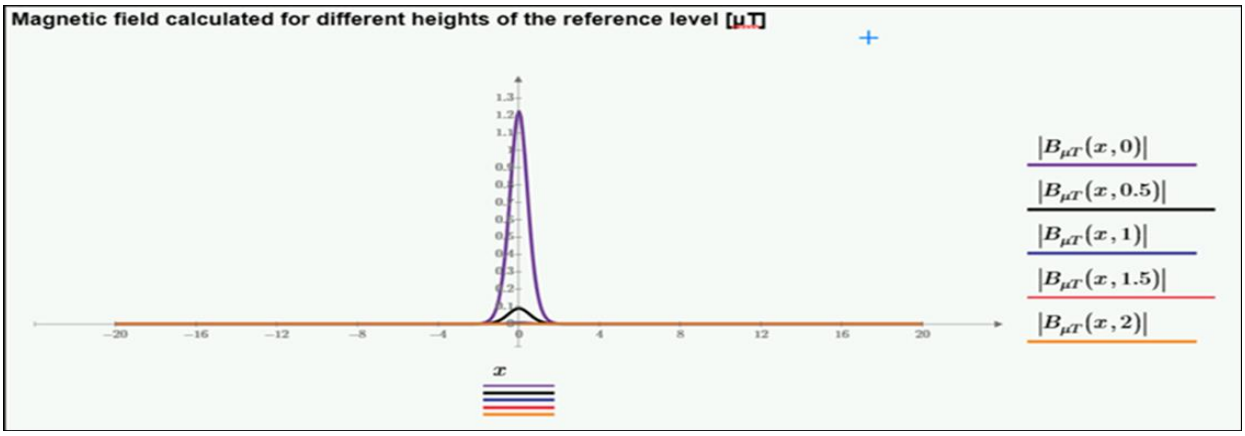
Additionally, during the construction and operational phases vessel fuel consumption will be minimised by optimising vessel scheduling, with consideration given to the co-ordination of activities and material delivery. Activities will be limited on the speed of vessels, and fuel used will have a low sulphur component (0.1%). Vessels older than 20 years will not be used.

Question 117. Section 7.9.2 - Table 7.24.

Impacts to benthic invertebrates due to EMF should not be scope out and should be included within the assessment and placed in the worst-case scenarios as a conservative approach.

Applicant response: It was the understanding of the latest scientific research and our knowledge of EMF sources that provided the evidence to scope out EMF from the EIA. Principally, there has to be a source that generates an EMF of a magnitude that is capable of affecting marine life. Our cable will not generate such a source.

The figure to the right is from one of our vendors for a cable similar to ours (33kV, three core x 630 sqmm cable with a current rating of 750A (although ours will be an even lower amperage)), with grounded metallic sheath, and buried at 1m below surface (our cable will be buried 2-3m below). As they are DC cables, there will be no detectible electric fields external to the metallic sheath. However, the cable will generate static magnetic fields, which will not be screened by the metallic sheath. Curves in the graph represent the anticipated magnetic field at 0m (purple), and 0.5 m (black) distance from the seabed. Values are in microtesla. At the seabed the magnetic field will be ~0.1uT, and at 0.5m above ~1.2uT.



These are extremely low values and are much lower than any of those cited from the published literature on the matter where effects may occur on marine life. EMF generated by the cables is likely to be ~0.1µT calculated at the seabed for a cable buried at 1m deep, which is below the levels which have been observed to have impacts upon marine life, including fish and marine invertebrates. In addition, the cables will be buried 2-3m below the surface through the subtidal and intertidal zones, which will mean that the EMF at the surface will be even less than the ~0.1µT shown in the graph.

Furthermore, the habitats present along the subtidal and intertidal section of the cable route are not optimal for species such as the crawfish/spiny lobster, which has a habitat preference of rocky exposed coasts with depths of 5-400m. In addition to this, the desk study and field surveys did not identify any other benthic invertebrates that are sensitive to EMF. Therefore, given the EMF source is so low (~0.02-0.04% the value in studies), the potential effects are likely to be negligible.

There are limited findings on the electro sensitivity of benthic organisms and on the associated impact of EMFs on the surrounding benthic invertebrates. The Applicant has reviewed the findings of the four research papers shared by NE, and can conclude the following:

Scott, K, et. al., found that EMF strengths of up to 250µT were found to have limited physiological and behavioural impacts on edible crab. Their study found that it was not until there was exposure to 500µT and 1000µT where effects were observed. The power cable for the Proposed Development will generate <0.1µT at the seabed, which equates to just 0.04% of the EMF in the study.

Taormina, B, et. al., showed that juvenile lobsters did not exhibit any change of behaviour when submitted to an artificial magnetic field gradient (maximum intensity of 200µT) compared to non-exposed lobsters in the ambient magnetic field. Additionally, no influence was noted on either the lobsters' ability to find shelter or modified their exploratory behaviour after one week of exposure to anthropogenic magnetic fields (225 ± 5µT) which remained similar to those observed in control individuals. The study concluded that static and time-varying anthropogenic magnetic fields, at these intensities, do not significantly impact the behaviour of juvenile European lobsters in daylight conditions. The power cable for the Proposed Development will generate <0.1µT at the seabed, which equates to just 0.04% of the EMF in the study.

Chapman, E.C., et. al., this study simulated an EMF of 500µT, as modelled for an export cable over a rocky shore, where the industry standard cable burial would not be possible. It found no significant differences in either behavioural or physiological responses in edible sea urchins, periwinkles, common starfish, and velvet crabs. The power cable for the Proposed Development will generate <0.1µT at the seabed, which equates to just 0.02% of the EMF in the study.

Jakubowska, M., et. al., this study simulated EMF at 1,000µT, and no avoidance or attraction behaviour to EMF was shown. The power cable for the Proposed Development will generate <0.1µT at the seabed, which equates to just 0.01% of the EMF in the study.

The shared studies present similar findings to those used in our Offshore EIA. Bochert and Zettler (2006) studied the effects of EMF on the survival and physiology of various crustaceans, marine worms, and echinoderms in the context of cables associated with OWFs in the Baltic Sea. The authors demonstrated no significant effects for any species after three months of exposure. Furthermore, Wilhelmsson et al. (2010) demonstrated that there were no differences between benthic community assemblages observed in visual surveys of OWF subsea cables and their peripheral areas. Finally, the presence of diverse and seemingly healthy benthic communities on existing offshore infrastructure indicates that EMF is unlikely to cause a long-term significant effect upon benthic receptors (Linley et al., 2007; Walker et al., 2009).

Embedded mitigation for this impact includes cable burial and/or protection when not available (such as at cable crossings). The target cable burial depth of 2 to 3 m is sufficient to eliminate the potential for impacts from EMF on benthic invertebrates. Based on this, and the findings of the literature provided above, the evidence supports scoping this impact out of the assessment on benthic subtidal and intertidal ecology.

Question 148. Section 7.12.14.1.

The assigned magnitude of impact of low is not considered to be appropriate for PTS, as it is irreversible injury. Please revise the assigned magnitude score for auditory injury. This should also be applied to the cumulative assessment stage.

Applicant response: Please see the **Marine Mammal Technical Note (MBTN03), section 1.3.6**, for updated text with justification of magnitude of impacts as low for both harbour porpoise and minke whale. This will apply to both the Project alone and cumulatively with other plans and projects.

Question 150. Section 7.12.14.1 & Table 7.32 & Volume 3 Section 1.8.2.1

The ADD duration for the UXO clearance should be revised as 30 minutes is not considered sufficient for a maximum injury range of 16km. A likely range of UXO sizes should be presented, and clearance methods each with their specific injury range. The ADD duration should be calculated based on the time it would take an animal to flee that injury range using standard speed. It should further consider the use of bubble curtain. The underwater noise modelling should not include the ADD as it should be based on a true worst-case scenario.

Applicant response: The MDS for the impact of "Injury and disturbance from underwater noise generated from UXO detonation" within Volume 2, Chapter 7: Marine Biodiversity assumes clearance of a maximum UXO size of 907 kg by either low order or high order techniques. However, it is also assumed that clearance of 130 kg UXOs is considered more likely, as presented in Volume 2, Chapter 7: Marine Biodiversity. Modelled ranges for both the maximum and most likely UXO sizes are presented, and associated assessments have been undertaken.

A more detailed assessment of mitigation will be undertaken post-consent as further information becomes available, to inform the Final MMMP, which will be developed in line with latest guidance. This will include more detailed information on any requirement for (and specifications of) the use of Acoustic Deterrent Devices (ADDs). As such, no further information is provided.

Please see the **Technical Note-Marine Mammals MBTN03 section 1.3.2 - Updated Mitigation Measures** – updates to the embedded mitigation/tertiary mitigation measures have been presented, which includes measures related to piling and UXO clearance activities. A more detailed assessment of mitigation, including the duration of ADD use, will be undertaken post-consent as further information becomes available, to inform the Final MMMP, which will be developed in line with latest guidance decision.

Underwater noise modelling has presented impact ranges both with and without 30 minutes of ADD. The use of ADDs is incorporated into the underwater noise modelling and assessment, in line with the implementation of current guidance on marine mammal mitigation measures for piling (Joint Nature Conservation Committee (JNCC), 2010a)). The application of 30 minutes ADD are embedded/designed-in mitigation and are therefore considered part of the design basis for assessment. Given that ADDs are considered a designed-in measure, noise modelling without the inclusion of ADDs would not be considered proportionate and would give rise to impact ranges beyond those which could be reasonably predicted to occur. As such, no further information is provided.

Question 153. Section 7.12.15.1.

The magnitude of TTS resulting from a high order detonation (UXO clearance) has been concluded as negligible for all IEFs. This score is considered to be too low. A more precautionary approach is advised for this impact pathway. Please revised the magnitude scores for UXO injury. This should also be applied to the cumulative assessment stage.

Applicant response: Please see the **Marine Mammal Technical Note (MBTN03), section 1.3.7**, Temporary Threshold Shift (TTS) Resulting from a High Order Detonation (UXO clearance) for both the Project Alone and Cumulatively with other Plans and Projects; an update to the magnitude of impact has been presented.

Question 158. Section 7.13 & 7.13.15 & Table 7.94.

It is thought unrealistic to assess injury and disturbance from geophysical and seismic site investigation use by “presenting a sum of the impact ranges of all vessels”. No alternative method has been proposed as an alternative to quantify the impact. Please assess this impact pathway adequately and given the extent of the cumulative increase in the number of vessel trips within the relevant management units over the lifetime of the project either justify a cumulative magnitude of low or update this assessment.

Applicant response: Please see updated assessment in the **Marine Mammal Technical Note MBTN03 Section 1.3.14:** Injury, Disturbance, and Displacement from Vessel Activity and other Noise Producing Activities, and **Section 1.3.15**: Cumulative Injury, Disturbance, and Displacement from Vessel Activity and other Noise Producing Activities, which address this.

Question 193. Section 8.11.

Please include:

- any seasonal impact to birds in relation to the work to be carried out
- information regarding how the significance of effect has been determined as this appears to be inconsistent within the ES.

Applicant response: Regarding the potential for significant numbers of the designated species to be present at the site in the between October and April, the indicative summary construction schedules presented in Chapter 3: Description of the Proposed Development show the 'bad weather window' from later September to mid-April. During this time the poor weather and likely sea state make it unsafe to operate offshore vessels for our installation works, which require stable conditions when carrying out heavy lifts, and installing fragile electrical cables. Marine works are very unlikely during this 'bad weather window' thereby avoiding disturbance to over-wintering birds. The applicant would also note that bird groups have been assessed seasonally being split as either breeding or non-breeding.

The Applicant is however, continuing to work with its cable installation contractor to avoid as much of the little tern season as possible. The laying and burial of the electrical cables from PoA to the New Douglas platform, and onwards to the satellite platforms, needs to be carried out in good weather conditions to prevent damage to the cable during installation. The cable shore pulling operation would take around 4-5 days, and the laying of the cable away from the shore and around the eastern end of West Hoyle Spit would take a further 24-48 hours. Between 3-5 days would then be required to lay each cable offshore. These works are currently scheduled to be carried out during July and August.

Additionally, the current schedule is for the onshore prep-works for cable installation to be carried out during April, and would take approximately 19 days, as shown in Offshore ES Chapter 3 Figure 3.20, section 3.4.5.2. This activity could possibly be started a little earlier, potentially avoiding the start of the little tern breeding season. However, this is not definite, but is something that we are continuing to explore our cable installation contractors during the development of detailed method statements and work schedules.

The matrix used for the assessment of significance is provided within table 8-22. Definitions used for the sensitivity of receptor and magnitude of impact used to generate the significance are provided in table 8-21 and table 8-18 respectively. The definitions and assessment are based on guidance and legislative frameworks as detailed within section 8.9.1.

Question 208. Section 1.5.1.4.

It is stated that red-throated divers are displaced by vessel traffic at distances from 250m to 1,700m, therefore the area of impact is from 0.6km2 to 1.7km2. However, this is not the case. The area of impact would be 9km2 per vessel.

Therefore 12 vessels would result in an impacted area of 109km2 (assuming areas of impact do not overlap). A 2.0km buffer around each vessel is advised for the assessment of 100% displacement of red-throated diver (Burt et al., 2022, Burger et al., 2019). Therefore, one vessel may have an area of impact of 12.6km2; multiplied by the 12 vessels this results in an overall area impacted of 150.8km2 (assuming areas of impact do not overlap). Please revise the assessment and amend as necessary.

Please so clarify that the displacement assessment is based on the cable corridor plus relevant buffer. It is not clear what area is being considered when calculating the number of birds displaced and number of mortalities: the cable corridor plus buffer, or a buffer around 12 vessels.

Applicant response: The Applicant would like to clarify that the area of impact is based on the cable corridor plus 4km buffer (458.08km2) (**Volume 3: Offshore Ornithology Displacement Technical Report - section 1.5.1.4 - non-breeding season**). The area of impact as proposed by OPRED would be 109km2. The impact area assessed by the Applicant is larger and therefore the assessment presented in the ES is more precautionary. Change in impact area as proposed by JNCC would result in a lower magnitude of impacts. However, a technical note updating the displacement of red-throated diver and common scoter has been produced (**Technical Note – Displacement**).

Question 213. Section 13.4.1 - Table 13.1.

Please assess the climate change and emissions impacts of this development against UK, North West Region and Welsh targets.

The below tables illustrate the percentage of the avoided emissions with the carbon budget for both the UK and Wales based on an evaluation of planned reinjected CO2 emissions compared to project-generated emissions.

Applicant response: A calculation against the UK budget and the Wales budget to estimate the benefit of the project have been performed (NSTA. (2021) Net Zero Stewardship Expectation 11) in comparison to the injected CO_2 as per the estimated emissions so far. We are conscious that this calculation can be modified in the near future with more accuracy of data, but we would suggest it as an overview of the estimation of avoided emissions in relation to the developed project.

The below tables illustrate the percentage of the avoided emissions with the carbon budget for both the UK and Wales based on an evaluation of planned reinjected CO2 emissions compared to project-generated emissions.

It should be noted that the project's computation in the GHG-Net Zero table indicates that reinjected emissions will continue through 2052, with a lifetime maximum of 110.25 Mt CO2.

Parameter	UK Carbon Budget			
	Third: 2018-2022	Fourth: 2023-2027	Fifth: 2028-2032	Sixth: 2033-2037
UK Carbon Budget ($MtCO_{2eq}$)	2,544	1,950	1,725	965
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Avoided Emissions ($MtCO_{2eq}$)	-	1.04476	18.0987	22.1697
Avoided CO_2 emissions against Budget (%)	-	0.054 %	1.05 %	2.3 %

The cumulative reinjected CO2 emissions over the UK Carbon Budget period 2027-2037, are 41.3 Mt CO2eq. at a rate of 4.5 MTPA. These total avoided emissions represent 0.93% of the UK Carbon Budget of 4,640 Mt CO2eq over the same period.

Parameter	Wales Carbon Budget	
	2021-2025	2026-2030
Wales Carbon Budget ($MtCO_{2eq}$)	43.12	35.28
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CO_2 reinjected (from Emitters)-4.5 MTPA profile ($MtCO_2$)	0	11.18
Avoided Emissions ($MtCO_{2eq}$)	-	10.07
Reinjected CO_2 emissions against Budget (%)	-	28.54%

The cumulative reinjected CO_2 emissions, over the Wales Carbon Budget period 2027-2030, are 11.18 Mt CO_2.at a rate of 4.5 MTPA. These total avoided emissions represent 28.54% of the Wales Carbon Budget of 35.28 Mt CO_{2eq}, over the same period. The Tyndall Centre for Climate Change Research has recommended district-specific carbon budgets up to 2100 that, in its research, are considered to be compatible with a 1.5°C aligned trajectory for the UK. The Proposed Development's GHG impacts have been considered in terms of the North West's Tyndall Centre-derived carbon budget.

- Project emissions comprise -8.085% of the fourth carbon budget (2023-2027) (81.7 MtCO2e).

- Project emissions comprise -55.797% of the fifth carbon budget (2028-2032) (40.3 MtCO2e).

- Project emissions comprise -113.006% the sixth carbon budget (2033-2037) (19.9 MtCO2e).

Question 214. Section 13.4.1 - Table 13.1.

Please clarify what the impact of the GWP CO_2e are for each stage of the lifecycle phase of the development (pre installation, installation, injection, post closure and decommissioning) as these emissions will go straight to atmosphere.

Applicant response: The GWP CO_2e for each stage of the lifecycle phase of the development (pre installation, installation, injection, post-closure and decommissioning) are set out in the following tables:

- **Table 13.9 for Construction stage** (pre installation, installation) = **137,772 tCO_2e**. This table presents the embodied carbon emissions associated with the consumption of materials and fuel required to construct the Proposed Development.
- **Table 13.10 for Operation and Maintenance stage** (injection) = **51,275 tCO_2e**. This table presents the embodied carbon emissions associated with the consumption of materials and fuel required to facilitate the operation and maintenance of the Proposed Development.
- **Table 13.11 for fuel use (grid electricity) during Operation and Maintenance stage** (injection) = **30,386 tCO_2e**. This table presents the GHG emissions associated with the consumption grid electricity.
- **Table 13.12 for fuel use during Decommissioning stage** (decommissioning) = **2,833 tCO_2e**. This table presents the GHG emissions associated with the plant, fuel, and vessel use required to remove infrastructure.
- **Table 13.13 for emissions associated with CO_2 transportation and geological storage** (post-closure) = **-110,247,682 tCO_2e**. This table presents the overall net benefit arising from the main purpose of the Proposed Development for the permanent geological storage of CO_2.

The assessment has identified each emissions source and broken the assessment down into the construction (i.e. installation), operation (injection) and decommissioning (post closure and decommissioning) phases. This is consistent with whole life carbon guidance which breaks the lifetime of a project down into A1-A5 emissions associated with construction, B1-B7 associated with operation, and C1-C4 associated with decommissioning. All emissions arising from the Proposed Development have been assessed against the context of the receptor for the assessment being the global atmospheric mass of GHGs, treated with high sensitivity.

Question 217. Chapter 13 Section 13.10.

Please include what steps are being taken to reduce emissions from this project.

Applicant response: The Proposed Development will be transporting and permanently storing more than 110 million tonnes of CO_2 emissions from difficult to decarbonise industrial emitters in the NW of England and North Wales. In addition to this primary objective, the emission reduction measures for the Proposed Development are set out in Section 13.10 in Table 13.8 and summarised below.

As part of the carbon storage project design process, several mitigation measures have been proposed to reduce the potential for impacts on climate change. As there is a commitment to implementing these measures, they are considered inherently part of the design of the carbon storage project and have therefore been considered in the environmental and net zero assessments.

During the construction and operation phases, vessels older than 20 years will not be used. Regarding rig selection, a request has been made to make a firm commitment to taking all feasible steps to reduce the fuel consumption and related GHG emissions of the proposed drilling unit, as well as to provide information and certification pertinent to the sustainability aspects of the proposed drilling unit.

To balance operating risk and fuel efficiency, GHG emissions from rig activities will be measured in real-time to facilitate continuous improvement, considering engine and power plant optimisation.

As a basic environmental standard for UK operations, ISO 14001 certification will be maintained; however, an energy management policy and ISO 50001-compliance documentation will need to be created as part of the management system.

The rig to be employed will be subject to the carbon storage project vessel management measures. These will include minimisation of vessel fuel consumption by providing an efficient and optimised vessel schedule to reduce the number of journeys, and co-ordinating activities and material delivery. Activities will be limited on the speed of vessels, and fuel used will have a low sulphur component (0.1%).

Energy demand associated with the offshore platforms during the operational phase, will be reduced through a variety of energy efficiency measures. These include: the use of efficient, low loss transformers; variable frequency drives (VFDs) on CO_2 compressors; LED light bulbs; low voltage electrical installations; compressor efficiency specification and optimisation; efficient air coolers; energy monitoring systems (to comply with ISO 50001 certification); and Real Time Monitoring and Advanced Process Control (a computer-based algorithm that automatically optimises the process parameters and promotes a reduction in energy consumption from approximately 3% to 7%). The implementation of these energy efficiency opportunities will result in reduced energy consumption during operation, thereby reducing emissions of GHGs to the atmosphere associated with such energy consumption.

Fugitive emissions may take place during the operational phase These emissions will be monitored through a Leak Detection and Repair (LDAR) programme, which forms part of the preventative maintenance activities, designed to avoid and minimise fugitive emissions to as low as reasonably practicable.

At the end of the Proposed Development's lifetime, materials removed during decommissioning will be recycled where practicable. The recycling of materials at the end of the Proposed Development's lifetime not only prevents materials from being sent to landfills, but also reduces the need for the extraction of primary materials, thereby reducing emissions associated with such processes.

Question 218. Sections 13.11.1.3 & 13.11.1.4 - Tables 13.11 & 13.12.

Please clarify how the total emission figures have been calculated.

Applicant response: Section 13.9 presents details of our assessment methodology. However, in summary, GHG emissions have been estimated by applying published emissions factors to activities required for the Proposed Development. The emissions factors relate to a given level of activity, or amount of fuel, energy or materials used, to the mass of GHGs released as a consequence. The GHGs considered in this

assessment are those in the 'Kyoto basket' of global warming gases expressed as their CO_2-equivalent (CO_2e) global warming potential (GWP). This is denoted by CO_2e units in emissions factors and calculation results. GWPs used are typically the 100-year factors in the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (IPCC, 2013) or as otherwise defined for national reporting under the United Nations Framework Convention on Climate Change (UNFCCC).

Climate Change: Volume 3, Appendix O GHG Greenhouse gas assessment provides methodologies regarding the calculation of emissions associated with the Proposed Development.

Question 219. Section 13.11.

Please include or confirm:

- the anticipated number of surveys that have been included within the Monitoring Plan

Applicant response: The number of the surveys that have been anticipated as part of the **Monitoring Plan** is split between the pre-injection, injection, and the post injection period (**Sections 5, 6, 7, 8, and 9, and Tables 8, and 9, and Figure 20**). As for the pre-injection period the environmental baseline surveys will be undertaken around June 2025. For the period of injection routine Environmental surveys /monitoring are planned coinciding with 3D/4D seismic surveys (every 5-6 years) and Drop-Down Video (DDV) are undertaken on an annual basis part of the asset integrity management system that will also collect environmental data for monitoring. These surveys will be performed along other technical survey for the monitoring of the stores in terms of Well Intervention. As for the post injection period, the environmental monitoring will be predominant and will be assessing modification to the surrounding seabed of the stores.

All the details are part of the Monitoring Plan (MP) for Hamilton, Hamilton North and Lennox, dated 25th July 2024.

- It is noted that venting has been considered in the context of CO_2 and is mentioned through maintenance activities, please confirm if any venting or flaring will be carried out over the lifecycle of the project.

Applicant response: There is no planned venting of CO_2.The Proposed Development is a CO_2 storage project and there are no substances that would be flared. There will be no continuous CO_2 venting. CO_2 venting would be associated with maintenance activities and for final decommissioning of CO_2 facilities.

- will there be any requirement for well intervention operations during the lifecycle of the project? If so, has this been scoped into the assessment

Applicant response: All the wells intervention are part of well integrity intervention described in the **Monitoring Plan** at **Section 5.1,** where Well intervention assessment is required for E-line logging (2 7/8" tool strings), coil tubing perforation (4 1/2" tool string) and installation of downhole chokes. These chokes will be installed either in the 5.75" nipple profile or on a full bore retrievable packer. As the completion is designed as a monobore completion, there are no assess requirements. Some of the wellbores could have inclinations (>60°) where E-Line tractors may be required.

Regular E-line logging will be performed to monitor CO_2 movement within the reservoir as well as wellbore integrity. The intervals for such logging is defined in **Tables 8, and 9, and Figure 20** of the Monitoring Plans for Hamilton, Hamilton North, and Lennox, dated July 2024.

We assume that Well Intervention will be regulated similarly to the oil and gas sector and therefore the below legislation may be applied when relevant:

- Marine and Coastal Access Act 2009 (legislation.gov.uk) – for seabed disturbance.
- The Offshore Chemicals Regulations 2002 (legislation.gov.uk) – for chemical use and discharge.
- Energy Act 2008 (legislation.gov.uk) – for consent to locate vessels or rigs completing the project.

- The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (legislation.gov.uk) – possibly for oil discharge (could be needed for rig drainage, machine fluids etc).
- The Conservation of Offshore Marine Habitats and Species Regulations 2017 (legislation.gov.uk) – Covers survey work.

- The emissions stated throughout this chapter do not include consumption data. Please include. Please also state what Emission Factors have been used

Applicant response: Regarding venting emissions, this information was provided by Eni in response to an email sent on 13/06/2023. The response was as follows: Venting of CO_2 is based on (1) pigging operations (VL) (2) inspection of static equipment (VSL) (3) inspection and replacement of filter cartridges once per year (VSL) (4) blowdown of compression trains for periodic maintenance (plant vent) and the estimated figures for the lifespan of the project operational term (2025-2050) is 2,318 ton/yr, with an average of 89.15 ton/yr. These values were used within the assessment. The 26 years has arisen from the operational term 2025-2050 inclusive of 2025.

- Why is there no consideration to pollutant emissions during the construction, operational and decommissioning phases? As above point if the fuels and fuel consumption are provided an assessment can be made of the combustion pollutant emissions

Applicant response: In line with the relevant guidance, the climate change chapter considers the impact of the proposed development on climate, and as such considers the 'Kyoto basket' of global warming gases expressed as their CO_2 equivalent. Other pollutants are not considered to lie within the scope of this assessment.

- Within Section 13.11.1.5 indicative venting emissions have been provided, quoted as the total an average of 89.15 tCO_2 per year, or 2,318 tCO_2e over the Proposed Development's operational lifetime. The development over a 25- year lifetime period would provide an average of 92.7tCO_2 not 89.15tCO_2 which suggests a 26-year lifetime? Please clarify

Applicant response: The 26 years has arisen from the operational term 2025-2050 inclusive of 2025.

- In Table 13.15 the proposed development GHG impacts (tCO_2e) are stated for the UK carbon Budget periods below, but there is no information as to how the net emissions at each stage have been calculated. Please clarify UK budget allocations are incorrect 2028-2032 and 2033-2037: UK Carbon Budget Order 2016 - 1,725,000,000 UK Carbon Budget Order 2021- 965,000,000?

Applicant response: - Net emissions have been calculated for each carbon budget period by summing the relevant construction and / or operational emissions associated with each period. For example, emissions associated with the fourth carbon budget period (2023-2037) include the total construction-stage emissions, alongside 3 years of emissions associated with operational energy demand (as the development is modelled as operational from 2025, informed by annual energy demand values provided by the client, scaled by the relevant emissions factors as described within Volume 3 Appendix O), 3 years of emissions associated with operational vessel and helicopter movements (total emissions associated with such movements scaled to reach only 3 years' worth of emissions), and finally the CO2 storage predicted to be injected over the period (also provided by the client - approximately 2.25 Mt in 2026 and 4.5 Mt in 2027). This method has been applied to each carbon budget period.

Emissions associated with the UK budget has been provided in questions 26 and 213 as an overview.

Question 248. Sections 1.72 & 1.7.3 - Tables 1.20 - 1.22.

Please include the impact from UXO detonation into the underwater sound assessment for fish. This should include mortality, TTS and behavioural changes.

Applicant response: Please see the **Technical Note-RIAA MBTN04 Section 1.4.2: Unexploded Ordnance (UXO) Clearance, Table 1.5,** which presents a full table of all the PTS results for UXO clearance on fish. Regarding mortality and behavioural changes, these were not modelled in the subsea noise modelling used to inform the assessment and are not included as a result (**Volume 3, Appendix J: Underwater Noise Technical Report, Sections 1.5, and 1.6**).

Question 259. Section 1.9.2 - Table 1.135

- It is noted in this section that all wells that the developer is planning to carry out work at have been scoped into the assessment, however, these have been omitted from other sections of the ES. Please confirm that these have been considered in all relevant sections.
- Please confirm the plans for the decommissioning of pipelines.
- Disturbance and Displacement from airborne sound and presence of vessels and infrastructure. Please confirm that the figures are consistent with similar figures on vessels within other sections of the ES.
- No information is provided of the potential numbers of birds (red-throated diver and common scoter) that may be displaced when work is carried out on the offshore platforms within the Liverpool Bay SPA, particularly if any work is planned to be carried out during the overwintering period (1st November to 31st March inclusive). Please confirm.
- Creation of roosting and nesting habitats among project infrastructure. It is unclear whether this is a benefit or otherwise. Please clarify.

Applicant response: The applicant notes that a separate decommissioning Environmental Appraisal has been submitted for decommissioning activities.

The applicant can confirm, to the best of our knowledge disturbance and displacement has been assessed equally across all parts of the ES. If there is a particular section which OPRED feels has not been, we would be happy to address that following clarification on what needs addressing.

An updated displacement assessment has been produced for red-throated diver and common scoter in the **Technical Note – Displacement** that accompanies this submission.

Creation of roosting/nesting platforms was assessed as being of minor positive effects on birds such as kittiwake and cormorant in the ES. However, for HRA terms this does not impact upon any conservation objectives for any sites. Therefore, this makes no difference to the appropriate assessment.

Question 260. Section 1.9.3.1.

The area of impact from 12 vessels is stated as the area of displacement impact, but then the displacement assessment (in the Offshore Ornithology Displacement Technical Report) appears to be based on the cable corridor plus relevant buffer. It not clear what area is being considered when calculating the number of birds displaced and number of mortalities: the cable corridor plus buffer, or a buffer around 12 vessels. Given the variability in density of red-throated diver and common scoter across the Liverpool Bay SPA, it is recommended to calculate densities in specific locations of vessel activity, rather than using a mean density across a large area. Please amend.

Applicant response: The Applicant confirms that the displacement area for common scoter and red-throated diver is based on the cable corridor plus a 4 km buffer overlapping with the Liverpool bay SPA.

Furthermore, the displacement of red-throated diver and common scoter is calculated based on the cable corridor plus 4km, and hence vessel activity within this region. However, according to section 3.4.5.2, cable laying is scheduled to take place from April 2026 for 3 months, and cable pull in from May 2027 for 2 months. Therefore, the only vessel activity along the cable corridor is outside the wintering period for red-throated diver and common scoter. However, vessel activity associated with all four platforms is scheduled to occur during the wintering period. It is recommended to base a vessel disturbance assessment on these locations for red-throated diver and common scoter plus any transit routes if these are outside of existing shipping routes. This includes works associated with the installation of the new Douglas platform, removal of the existing Douglas platform, and installation of pipelines to connect the new Douglas platform, should these overlap with the wintering period (1st November to 31st March inclusive). The schedule of removal of the existing Douglas platform and installation of pipelines to connect the new Douglas platform are not given in the ES. Please amend as necessary.

Applicant response: The Applicant can confirm that the platforms are included in the 4km buffering the cable corridor and overlaying with the Liverpool Bay SPA. The displacement impacts on red-throated diver and common scoter from work associated with the installation of the new Douglas platform, removal of the existing Douglas platform, and installation of pipelines to connect the new Douglas platform are therefore assessed in ES.

However, for clarity, the Applicant has produced a technical note **(Technical Note – Displacement)** presenting separately the displacement impacts on red-throated diver and common scoter from work associated with the platforms. This is based on the methodology used for assessing cable laying temporary displacement impacts (using a 2km and 2.5km buffer as requested by JNCC buffer).

The Applicant can confirm that abundance of red-throated diver and common scoter have been calculated using local bird densities from HiDef Aerial Surveying Limited (2023).

The Applicant with continue to engage with SNCBs regarding timing of the work and mitigation measures to reduce the temporary impact on birds.

If construction does occur during winter period, the following questions must be addressed:

- What density of red throated diver (RTD) and common scoter (CS) will be present in the disturbed area and thus used in the disturbance calculations?
- Where has this bird density data been obtained from? This should be obtained from Liverpool Bay specific data sources, Lawson et al (2015) is recommended
- Please include a map in the RIAA of the area wherein RTD and CS are assessed as being disturbed from for the construction and the operational phase. What % of birds are likely to be disturbed from this area
- How long will the disturbing activity last for in the construction phase?

- The RIAA needs to describe the proportion of the SPA population that is likely to be disturbed

- What proportion of the available foraging habitat in the SPA will be excluded to RTD and CS as result of the disturbance? What are the implications of this exclusions, considering the conservation objective targets for 'bird distribution' and 'distribution of supporting habitats' are defined as 'restore' in the SNCB conservation advice due to the presence of infrastructure causing an ongoing impact, meaning further deterioration should be avoided.

Disturbance and displacement from airborne sound and presence of vessels and infrastructure is assessed in relation to mortalities impacting the qualifying populations of the SPA and the conservation objective regarding population size. However, no reference is made to how the loss of habitat due to vessel disturbance impacts the conservation objective regarding distribution of the feature(s).

The assessment has not been carried out with reference to the specific conservation objectives of qualifying features. Of note is one of the conservation objectives for red-throated diver, which is to restore the distribution of the feature. Due to this objective, it is recommended that all vessel activity within and 2km around the Liverpool Bay SPA is undertaken outside of the wintering period (1st November to 31st March inclusive). It is recommended that, as a minimum, mitigation measures are put in place for vessel activity during the wintering period, namely using established shipping routes to transit through the SPA, slow vessel speeds, and avoiding over-revving of engines.

Using all the above information and recommendations, please provide further reasoning as to why the conclusion of a negligible adverse effect upon the integrity of the Liverpool Bay SPA alone has been reached.

Applicant response: Regarding the potential for significant numbers of the designated species to be present at the site in the between October and April, the indicative summary construction schedules presented in Chapter 3: Description of the Proposed Development show the ‘bad weather window’ from later September to mid-April. During this time the poor weather and likely sea state make it unsafe to operate offshore vessels for our installation works, which require stable conditions when carrying out heavy lifts, and installing fragile electrical cables. Marine works are very unlikely during this ‘bad weather window’ thereby avoiding disturbance to over-wintering birds. The applicant would also note that bird groups have been assessed seasonally being split as either breeding or non-breeding.

The Applicant is however, continuing to work with its cable installation contractor to avoid as much of the little tern season as possible. The laying and burial of the electrical cables from PoA to the New Douglas platform, and onwards to the satellite platforms, needs to be carried out in good weather conditions to prevent damage to the cable during installation. The cable shore pulling operation would take around 4-5 days, and the laying of the cable away from the shore and around the eastern end of West Hoyle Spit would take a further 24-48 hours. Between 3-5 days would then be required to lay each cable offshore. These works are currently scheduled to be carried out during July and August.

Additionally, the current schedule is for the onshore prep-works for cable installation to be carried out during April, and would take approximately 19 days, as shown in Offshore ES Chapter 3 Figure 3.20. This activity could possibly be started a little earlier, potentially avoiding the start of the little tern breeding season. However, this is not definite, but is something that we are continuing to explore our cable installation contractors during the development of detailed method statements and work schedules.

Therefore, no AEOI are predicted.

Question 263. Section 1.9.3 - Table 1.137.

The excess mortality caused by displacement (%) is the same as that calculated in the Offshore Ornithology Displacement Technical Report, however this used BDMPS seasonal definitions and regional population sizes. For the purposes of HRA, the non-breeding season should be used for red-throated diver and common scoter (1st November to 31st March inclusive).) as presented in the sites Conservation Advice package to calculate the number of individuals potentially displaced, along with population estimates of the Liverpool Bay SPA, to calculate excess mortality.

The methodology used to calculate the figures provided within the ES is likely to underestimate impact on the SPA conversation objectives and further clarity is required to assess the level of impact to the red-throated diver feature of the Liverpool Bay SPA. Please amend as necessary.

- What is the implication of the excess mortality of RTD and CS described within the table to the conservation objectives of the SPA, what affect does this have on SPA population?
- How has the likelihood of mortality from disturbance been calculated i.e. what is the relationship between disturbance and mortality that is being assumed?
- What mitigation will be built into the operating procedures to minimise impacts, for example a Vessel Management Plan to limit the spatial area wherein vessels are operating and minimise the footprint of disturbance during construction. Furthermore, during operation would vessels be directed into defined routes/stand by areas.

Applicant response: An updated technical note assessing red-throated diver and common scoter against the SPA population and non-breeding season has been produced (**Technical Note – Displacement, all sections**).

THE OFFSHORE OIL AND GAS EXPLORATION, PRODUCTION, UNLOADING AND STORAGE (ENVIRONMENTAL IMPACT ASSESSMENT) REGULATIONS 2020

Applicant provision of Further Information in response to Notice under Regulation 12(1) sent to LBCCS Limited on 18th September 2024.

General Comments:

QUESTION 2: Reg 12(1) letter dated 1 July 2024 – comment 2

OPRED's previous comments in Regulation 12(1) letter dated 1 July 2024, requested a clear delineation of the boundaries of the project. Whilst it is recognised that Figure 2.1 provides detail on the development area in relation to the Marine Plan region, there is no indication/detail of the Welsh/English territorial boundary. Figure 2.1 provides details for existing infrastructure. Please revise to include the location of proposed new infrastructure, including pipelines and cables and their proximity to the Welsh/English boundary. In addition, please provide a clear map of the project with respect to all the relevant Marine Protected Areas (MPAs) and the Welsh/English boundary.

Eni Response: Table 2.1 presents the distances of the Proposed Development Offshore NUIs to the nearest Designated Sites. All the NUIs are sited outside of the Designated Sites, except for the Lennox NUI, which sits within the Liverpool Bay SPA. However, the New Douglas, Hamilton Main, and Hamilton North NUIs are all within 2.5km of the Liverpool Bay SPA boundary.

Table 2.1: Distances in kilometres from existing and proposed platforms to Designated Site

Designated Site	Hamilton Main	Hamilton North	Douglas	Lennox	New Douglas
Dee Estuary SAC	23.48	31.35	23.86	20.97	24.1
River Dee and Bala Lake SAC	45.17	53.56	47.97	45.09	48.23
Shell Flat and Lune Deep SAC	30.86	23.35	37.2	20.97	37.11
Menai Strait and Conwy Bay SAC	30.53	36.57	22.79	49.28	22.85
North Anglesey Marine SAC	52.39	54.05	43.63	72.09	43.51
Ribble Estuary MCZ	34.88	33.71	43.69	15.14	43.77
Fylde MCZ	12.62	9.66	20.76	2.47	20.78
Ribble Estuary SSSI	27.2	27.01	36.01	7.45	36.11
Little Ormes Head SSSI	33.95	40.49	26.65	52.1	26.75
Great Ormes Head SSSI	35.68	41.59	27.86	54.39	27.9
Liverpool Bay SPA	**0.59**	**2.25**	**0.16**	**Within**	**0.33**

Figure 2.1 shows the boundary between English and Welsh territorial waters, which is also the boundary between the England and Wales Marine Plan Areas. The Hamilton Main, Hamilton North, and Lennox storage sites, wells, and NUIs are located within English Territorial Waters. The injection, monitoring, and sentinel wells will be drilled from within the template of the existing platform wells at each of the Hamilton Main, Hamilton North, and Lennox NUIs, which are all within English Territorial Waters.

Figure 2.1 shows that the New Douglas Platform, and new electrical cable from Point of Ayr to the New Douglas Platform are located within Welsh Territorial waters. The new pipeline spools to connect the existing gas pipelines to the New Doulgas NUI are located within Welsh Waters at the coordinates presented in **Table 3.5** in response to **Question 3** below.

Figure 2.2 shows that the New Douglas, Hamilton Main, and Hamilton North, wells, and NUIs are located outside, but close to the boundary of the Liverpool Bay SPA. The Lennox wells and NUI are located within the Liverpool Bay SPA. **Table 6.1**, presented in response to **Question 6**, shows the distances from each platform to the closest designated sites for benthic ecology, fish and shellfish, and marine mammals.

The whole Proposed Development, including all the storage sites, NUIs, wells, cables, and pipelines, is located within the UK 12 nautical mile limit. The distance from each platform to the nearest median line, and UK coastline is presented in **Table 3.1**, **Table 3.2**, **Table 3.3**, and **Table 3.4** in response to **Question 3** below.

The new electrical cables, and repurposed natural gas pipelines from the New Douglas NUI to each of the three satellite NUIs, originate in Welsh territorial waters, but cross into English territorial waters. The approximate coordinates for the start and end points of the existing repurposed pipelines, and electrical cables, and the points at which they each cross the median line between England and Wales, are presented in **Table 3.5**, and **Table 3.7**, in response to **Question 3** below.

The New Douglas NUI, new electrical cable from PoA, and associated external cable protection at crossings, PL1030 repurposed gas line, as shown in **Figure 2.1**, are in Welsh waters. The approximate coordinates for the third-party cable crossings are given in **Table 3.8** in response to **Question 3** below.

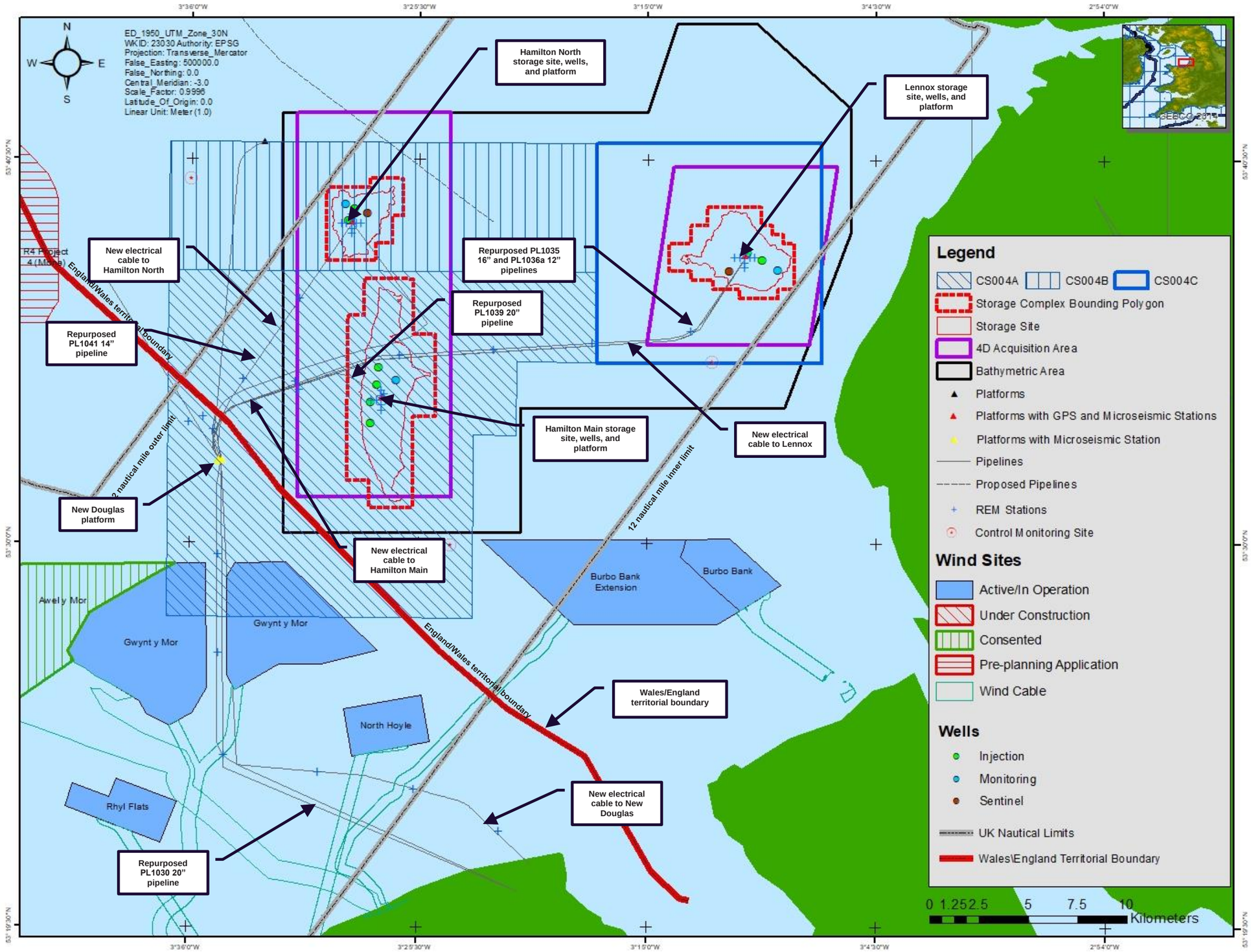


Figure 2.1: Location of Proposed Development components and the Wales/England territorial boundary and existing infrastructure

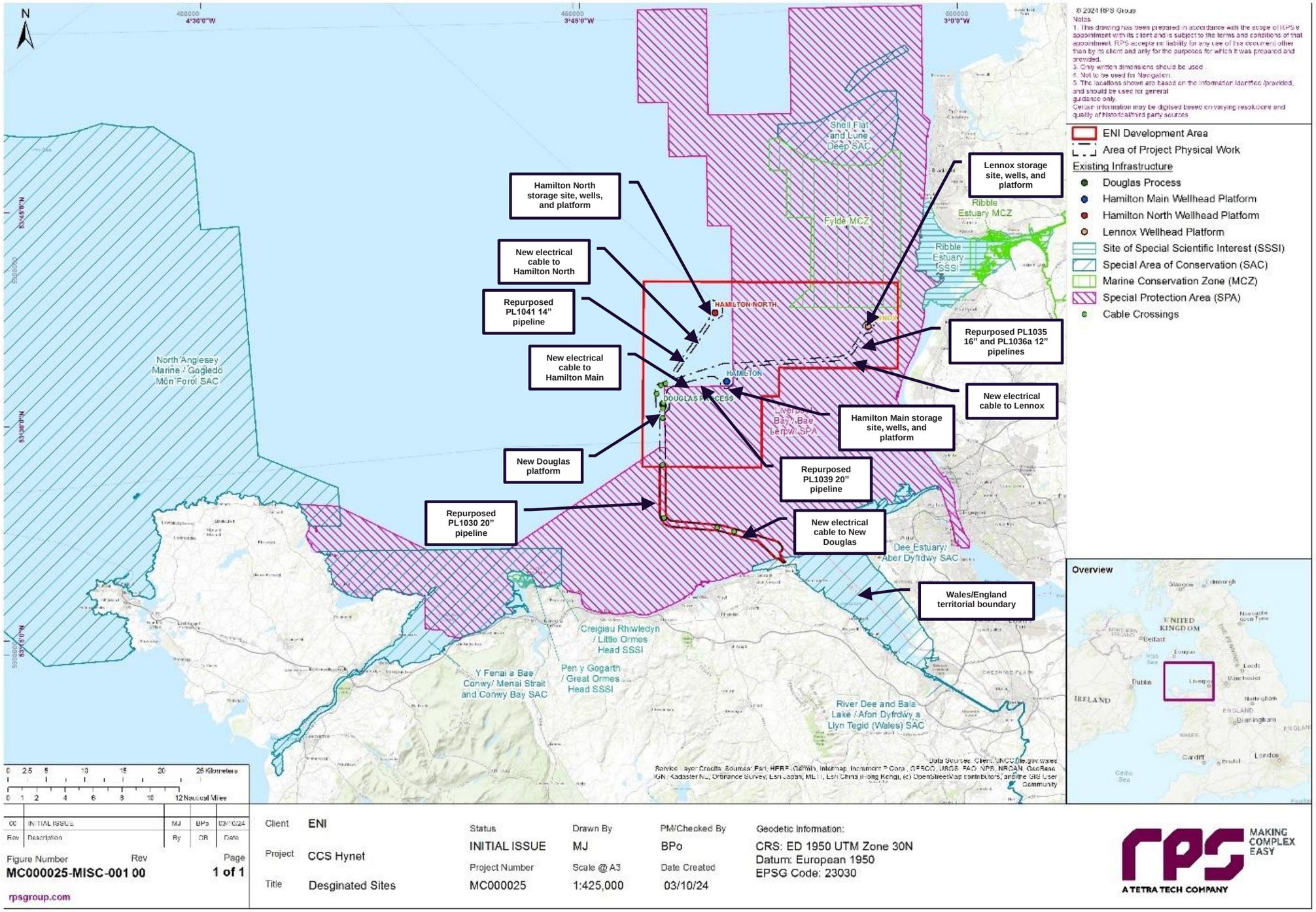


Figure 2.2: Location of Proposed Development components and the Designated Sites

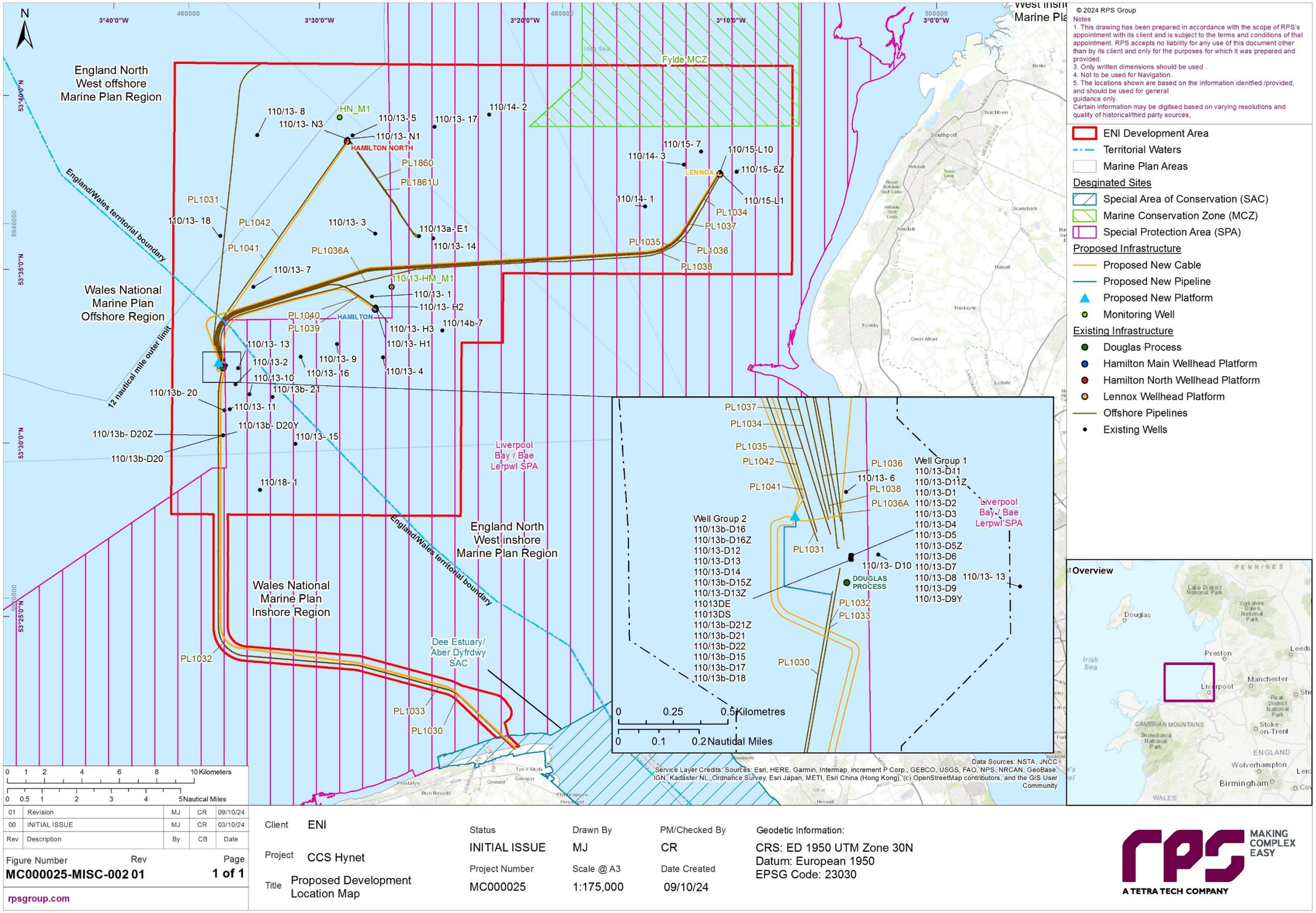


Figure 2.3: Location of Proposed Development components and the Wales/England territorial boundary and existing infrastructure

Figure 2.3 s provided for context. It shows the existing Eni oil and gas infrastructure in Liverpool Bay in relation to the Liverpool Bay SPA. The existing Douglas, Hamilton Main, and Hamilton North NUIs, and wells are located outside, but close to the boundary of the Liverpool Bay SPA. The Lennox wells and NUI are located within the Liverpool Bay SPA.

Figure 2.3 shows the boundary between English and Welsh territorial waters, which is also the boundary between the England and Wales Marine Plan Areas. The existing Hamilton Main, Hamilton North, and Lennox NUIs, and wells are located within English Territorial Waters.

Figure 2.1 shows that the existing Douglas Complex, and existing PL1030 pipeline to Point of Ayr are located within Welsh Territorial waters.

All the existing Eni oil and gas infrastructure in Liverpool Bay, including the NUIs, wells, electrical cables, and pipelines, is located within the UK 12 nautical mile limit. The distance from each platform to the nearest median line, and UK coastline is presented in **Table 3.1**, **Table 3.2**, **Table 3.3**, and **Table 3.4** in response to **Question 3** below.

The new electrical cables, and repurposed natural gas pipelines from the New Douglas NUI to each of the three satellite NUIs, originate in Welsh territorial waters, but cross into English territorial waters. The approximate coordinates for the start and end points of the pipelines and electrical cables, and the points at which they each cross the median line between England and Wales, are presented in **Table 3.5**, and **Table 3.7**, in response to **Question 3** below.

The insert within **Figure 2.3** shows the location of the New Douglas NUI, and alignment of the new electrical cable from PoA, and PL1030 repurposed gas line, and that they are in Welsh waters, but outside of the Liverpool Bay SPA.

QUESTION 3: Reg 12(1) letter dated 1 July 2024 – comment 3

OPRED acknowledges reference to the multiple figures which are useful when providing a broad overview of the location of the development in relation to the MPA's. To carry out an effective assessment, a more detailed illustration of the proximity of activities to relevant MPA's is required rather than in relation to the development as a whole. For example, the removal/replacement of topsides and the installation of a new Platform at Douglas in relation to the MPA's protected areas. Individual activities should clearly be identified and assessed against each relevant protected site. Please provide details on the following:

- The ES should clearly contain information about what activities will be undertaken and where.

Eni Response: The activities that will be undertaken in the Proposed Development will include:

1- installation of a new Douglas CCS platform to replace the existing Douglas Process platform to receive CO_2 from the onshore PoA Terminal and distribute CO_2 to the Hamilton Main, Hamilton North, and Lennox wellhead platforms and when necessary, provide heating. Installation of the new Douglas CCS platform will include up to eight driven piles; The existing Douglas complex will be decommissioned after the completion of first injection planned in Q4 2027.

2- installation of new topsides on the Hamilton Main, Hamilton North, and Lennox wellhead platforms to receive and inject CO_2 into the depleted hydrocarbon reservoirs; Only the topsides of the satellite platforms Hamilton, Hamilton North and Lennox will be replaced, the respective jackets will be reused.

Further details on New Douglas, Hamilton, Hamilton North and Lennox platforms are provided respectively in **Tables 3.1**, **3.2**, **3.3**, and **3.4** below.

New Douglas

A New Douglas platform will be installed within the established 500m zone, approximately 190m to the north of the existing Douglas accommodation platform, just beyond the blow-out/H_2S dispersion radius of the existing facilities at approximate coordinates E461607 N5932596. The new Douglas CCS platform will be a Normally Unmanned Installation (NUI), acting as a hub for the CCS operations. It will provide overnight emergency shelter in a purpose-built module for six persons

The topsides, will comprise cellar, mezzanine, and weather decks, and have overall dimensions of approximately 33 m in length, 30 m in width, and 35.5 m in height to the weather deck/helideck.

The Douglas CCS jacket shown in **Question 41** below will be a four-legged steel structure measuring approximately 20 m x 20 m at the lower level and 17.5 m x 17.5 m at the upper level. The jacket will support several equipment items listed below:

- 8 risers, of which 3 are provision for future dense phase gas;
- 5 J-tubes, of which one is provision for a possible future cable from PoA;
- 4 caissons for riser support;
- caisson for J-tubes support;
- cathodic protection monitoring J-tube; and
- Zodiac landing platform.

Details of the jacket are provided in response to **Question 41**, which includes **Figure 41.1**.

Table 3.1: New Topsides Module for NEW Douglas NUI

Estimated Dimensions & weight	Water Depth (m)	Distance median Line (km)	Distance UK Coastline (km)	Equipment Accommodated
L: 33m W: 30m H: 35.5m ~2,200 tonnes top sides	29.2m	1.56 km	29.3 km	**Cellar Deck equipment:** • pig launchers and pig receivers. • Emergency Shutdown (ESD) valving and riser pipework. • emergency overnight shelter. • survival craft. • davit crane(s). • submarine cable transition box. • J-tube head **Mezzanine Deck equipment** • electrical local equipment room. • battery room. • piping manifold area. • CO2 gas heaters. • deck stair access to either cellar or weather decks. • helideck fire/foam fighting skid. • Heating, Ventilation, and Air Conditioning (HVAC) unit for instrumentation and electrical equipment room.

Hamilton

A new deck will be installed on the satellite platform of Hamilton after removal of the existing topside. The components will be delivered to the NUI completely fabricated and ready for integration onto the jacket. The main fabricated components are summarised in **Table 3.2**.

Table 3.2: New Topsides Module for Hamilton NUI

Estimated Dimensions & weight	Water Depth (m)	Distance Medina Line (km)	Distance UK Coastline (km)	Equipment Accommodated
L: 23m W: 26m H: 12m ~1,100 tonnes	23m	6.90 km	22.88	Helideck Electrical heaters and controls Battery room UPS system Instrument room (telecoms)

Hamilton North

A new deck will be installed on Hamilton North after removal of the existing topside. The components will be delivered to the NUI completely fabricated and ready for integration onto the jacket. The main fabricated components are summarised in **Table 3.3**.

Table 3.3: New Topsides Module for Hamilton North NUI

Estimated Dimensions	Water Depth (m)	Distance Median Line (km)	Distance UK coastline (km)	Equipment Accommodated
L: 23 m W: 26 m H: 12 m ~950 tonnes	24m	11.82 km	26.20 km	Helideck Electrical heaters and controls Battery room UPS system Instrument room (telecoms)

Lennox

A new deck will be installed on each of the satellite platform of Lennox after removal of the existing topside. The components will be delivered to the NUI completely fabricated and ready for integration onto their respective jackets. The main fabricated components are summarised in **Table 3.4**.

Table 3.4: New Topsides Module for Lennox NUI

Estimated Dimensions	Water Depth (m)	Distance median line (km)	Distance UK coastline (km)	Equipment Accommodated
L: 24 m W: 30.5 m H: 12 m ~1,400 tonnes	7.8m	25.30	7.30	Helideck Electrical heaters and controls Battery room UPS system Instrument room (telecoms)

3- repurposing of the existing subsea natural gas pipelines for their change of use from hydrocarbon to CO_2 service; namely:

- PL 1030 20” from PoA to New Douglas.
- PL 1039 20” from New Douglas to Hamilton.
- PL 1041 14” from New Douglas to Hamilton North.
- PL 1035 16” from New Douglas to Lennox.
- Pl 1036a 12” from New Douglas to Lennox.

4- installation of new additional pipeline spools to connect the new Douglas CCS platform, the satellite platforms Hamilton, Hamilton North, and Lennox to the existing subsea natural gas pipelines as per the detail in **Table 3.5** below.

Table 3.5: Design details for additional pipeline spool connections

Pipeline ID	Steel pipe spool length (m)	Spool Start	Spool End	Existing contents	Median line crossed
PL1030 20”	608	E:461775.81 N:5932229.40	E:461477.79 N:5932596.10	Existing **natural gas** to Point of Ayr	Pipeline spool in Welsh waters. No median line crossed by pipeline spool
PL1039 20”	309	E:461783.90 N:5932629.23	E:461477.79 N:5932596.10	Existing **natural gas** from Hamilton Main	Pipeline spool in Welsh waters. No median line crossed by pipeline spool
PL1041 14”	205	E:461679.84 N:5932613.32	E:461477.79 N:5932596.10	Existing **natural gas** from Hamilton North	Pipeline spool in Welsh waters. No median line crossed by pipeline spool
PL1035 16”	263	E:461735.58 N:5932625.51	E:461477.79 N:5932596.10	Existing **natural gas** from Lennox	Pipeline spool in Welsh waters. No median line crossed by pipeline spool
PL1036a 12”	329	E:461805.80 N:5932620.55	E:461477.79 N:5932596.10	Existing **natural gas** injection to Lennox	Pipeline spool in Welsh waters. No median line crossed by pipeline spool

In addition to laying these pipeline lengths on the seabed, PL1030 may also require some external protection in the form of concrete mattresses over approximately 400 m of its length. The 200 m of this pipeline closest to the new Douglas CCS platform will not be provided with any external protection. No external protection will be provided for the other pipeline connections, as these lengths are all within 200 m of the new Douglas CCS platform. Material quantities for the protection of pipeline connections are given in **Table 3.6**.

Table 3.6: Design Envelope: material quantities for mattress protection of pipeline connections

Pipeline ID	Steel pipe (m)	No. concrete mattresses	Dimensions of each concrete mattress (m)	Weight of each mattress (kg)	Total weight of concrete mattresses (kg)
PL1030 20”	608	110	6 x 3 x 0.3	9,800	1,078,000
PL1039 20”	309	70	6 x 3 x 0.3	9,800	686,000
PL1041 14”	205	50	6 x 3 x 0.3	9,800	490,000
PL1035 16”	263	60	6 x 3 x 0.3	9,800	588,000
PL1036a 12”	329	70	6 x 3 x 0.3	9,800	686,000

5- installation, including cable burial of one submarine 33 kV armoured cables, with integrated FO cable connections from PoA to new Douglas CCS platform (35km) and connecting the new Douglas CCS platform with the Hamilton Main (12 km; 33 kV), Hamilton North (15 km; 33 kV) and Lennox (35 km; 33 kV) platforms. The power cable connecting PoA to new Douglas is including the intertidal /foreshore area up to the MHWS within Welsh water only. The connection of the power cable from the new Douglas to the satellite platforms (Hamilton, Hamilton North and Lennox) will start from the Welch waters and will end in the English waters. Details of the power cable is provided in **Table 3.7** below.

Table 3.7: Design details for combined new electrical and fibre-optic cables

Cable	Cable length (m)	Cable Start	Cable End	Median line crossed
PoA to new Douglas	34,359	E:477493.43 N:5911991.50	E:461477.79 N:5932596.10	Cable entirely in Welsh waters. No median line crossed by cable
New Douglas to Hamilton Main	11,033	E:469999.75 N:5935548.30	E:461477.79 N:5932596.10	Cable starts at New Douglas in Welsh waters and terminates at Hamilton Main in English Waters. Crosses median line at **E:462168.43, N:5934528.81**
New Douglas to Hamilton North	14,864	E:468497.20 N:5944503.30	E:461477.79 N:5932596.10	Cable starts at New Douglas in Welsh waters and terminates at Hamilton Main in English Waters. Crosses median line at **E:461513.71, N:5935114.23**
New Douglas to Lennox	32,312	E:488424.64 N:5942739.60	E:461477.79 N:5932596.10	Cable starts at New Douglas in Welsh waters and terminates at Hamilton Main in English Waters. Crosses median line at **E:461539.65, N:5935090.97**

6- installation of concrete mattresses and external cable protection at crossings of existing cables, and in areas where cable burial is not deemed feasible, or as a remedial secondary protection measure if the target cable depth of lowering cannot be achieved.

Details of third party cable crossings is provided in **Table 3.8** below. Please also see **Figure 44.1**, and **Figure 44.2** in response to **Question 44**.

Table 3.8: Design Envelope: Third Party Cable Crossings

Crossing ID	Third-party owner	UTM Easting (m)	UTM Northing (m)	Water depth (m)	Water above berm (m)	Berm height (m
PoAX-1	Ørsted Burbo Bank wind farm	470974.84	5916002.39	**5**	4.2	0.8
PoAX-2	Greencoat UK Wind North Hoyle wind farm	468795.03	5916535.10	**7**	6.2	0.8
PoAX-3		*468776.17*	*5916536.68*	*7*	*6.2*	*0.8*
PoAX-4	Gwynt y Môr OFTO, Gwynt y Môr wind farm	461904.20	5917763.30	**12**	11.2	0.8
PoAX-5		*461875.07*	*5917817.57*	*12*	*11.2*	*0.8*
PoAX-6		461713.35	5924702.50	20	19.2	0.8
PoAX-7	National Grid/Scottish Power, Western Link HVDC cable	461713.35	5930787.10	30	29.2	0.8
PoAX-8		461713.35	5930818.38	30	29.2	0.8

7- development of the Hamilton, Hamilton North, and Lennox reservoirs for the injection of around 109 Mt of CO_2 over a 25-year period for permanent geological storage. The storage would be divided between the three reservoirs, as follows: Hamilton, 53 Mt; Hamilton North, 18 Mt; and Lennox 38 Mt. This will be done through up to 8 injection wells created by side tracking of existing production wells, drilling of 3 monitoring wells (2 out of the 3 are new wells), and 2 sentinel wells via recompletion. All of which will be within the existing footprint (template) of the corresponding platform, and no subsea tieback is required. Details of wells are provided in **Table 3.9** below. **Figures 3.2, 3.3, and 3.4** show the Hamilton, Hamilton North, and Lennox storage sites.

The monitoring and sentinel wells will be used for the programme of the Monitoring, Measurement and Verification plan (now called the **Monitoring Plan**) using technologies of screening that are detailed in the **Monitoring Plan** submitted with the Carbon Storage permit.

Table 3.9: Overview Of Wells

Purpose	Well type	Field/ Platform	Well name	Easting	Northing	Proposed kick-off point m MD	Measured Depth (MD) m	True Vertical Depth (TVD) m
Injector	Sidetrack	Hamilton	C110/13a-HA (ex.110/13-H1 ST1)	469685	5936706.2	863	1498	932
			C110/13a-HB (ex.110/13-H2 ST1)	470200.5	5937333.5	1686	2380	932
			110/13a-HC (ex.110/13-H3 ST1)	470200.5	5935501.56	893	1366	932
			C110/13a-HD (ex.110/13-H4 ST1)	470200.5	5934462.3	1579	2219	933
		Hamilton North	C110/13a-NA (ex.110/13-N1 ST1)-	468323	5945412.5	783	1403	971
			C110/13a-NB (ex.110/13-N3 ST1)	468323	5944406.4	713	1043	1010
		Lennox	C110/15a-LB (ex.110/15-L05ST1)	489487.6	5942334.3	678	1668	865
			C110/15a-LC (ex. 110/15-L13 ST2)	489487.6	5942938.2	625	1947	1124
Monitor	New well	Hamilton	C110/13a-HE (ex.110/13-H5)	470848.6	5936608.7	N/A	1894	960
		Hamilton North	C110/13a-NC (ex. 110/13-N4)	468084.6	5945670.8	N/A	1781	1043
	Sidetrack	Lennox	C110/15a-LA (ex. 110/15-L01Z ST2)	490155.3	5941955.3	625	2466	1114
Sentinel	Recompletion	Hamilton North	110/15-N02	469272	5944899	N/A	N/A	N/A
		Lennox	110/15-L04	487637	5941932	N/A	N/A	N/A

8- The entire Proposed Development is within the Liverpool Bay SPA except for the New Douglas platform and the Hamilton North platform as shown on the **Figure 3.1. Table 2.1** presented in response to **Question 2**, presents the distances of the Proposed Development to the different MPA sites.

9- The entire Proposed Development is within 12 nm limit of both Welsh and English territorial waters as shown below in **Figure 3.1**.

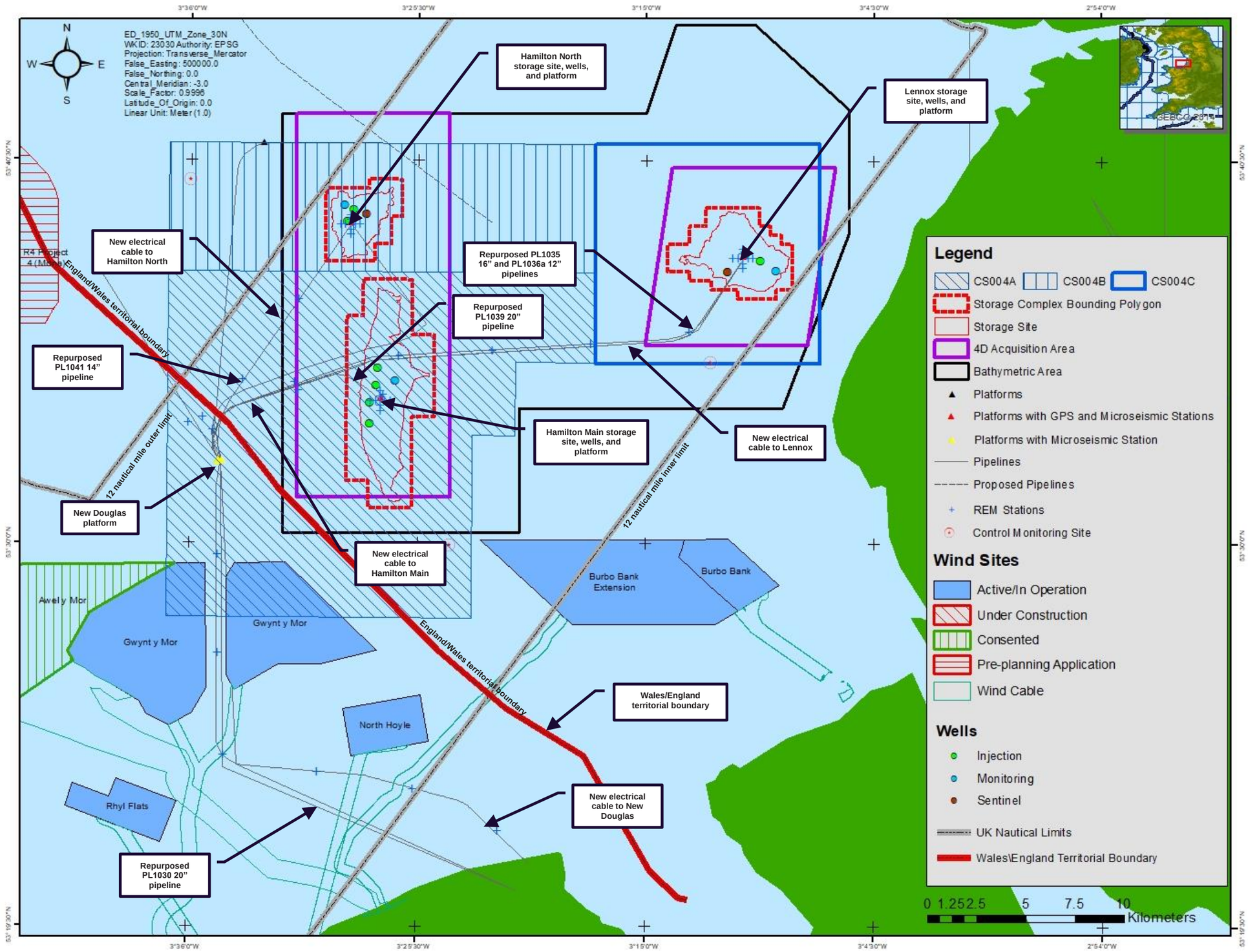


Figure 3.1: Location of Proposed Development components and the Wales/England territorial boundary and existing infrastructure

- Each existing installation should further detail if it is located within or the distance to the MPAs, the distance to coastline, the distance to closest median line and water depth at site.

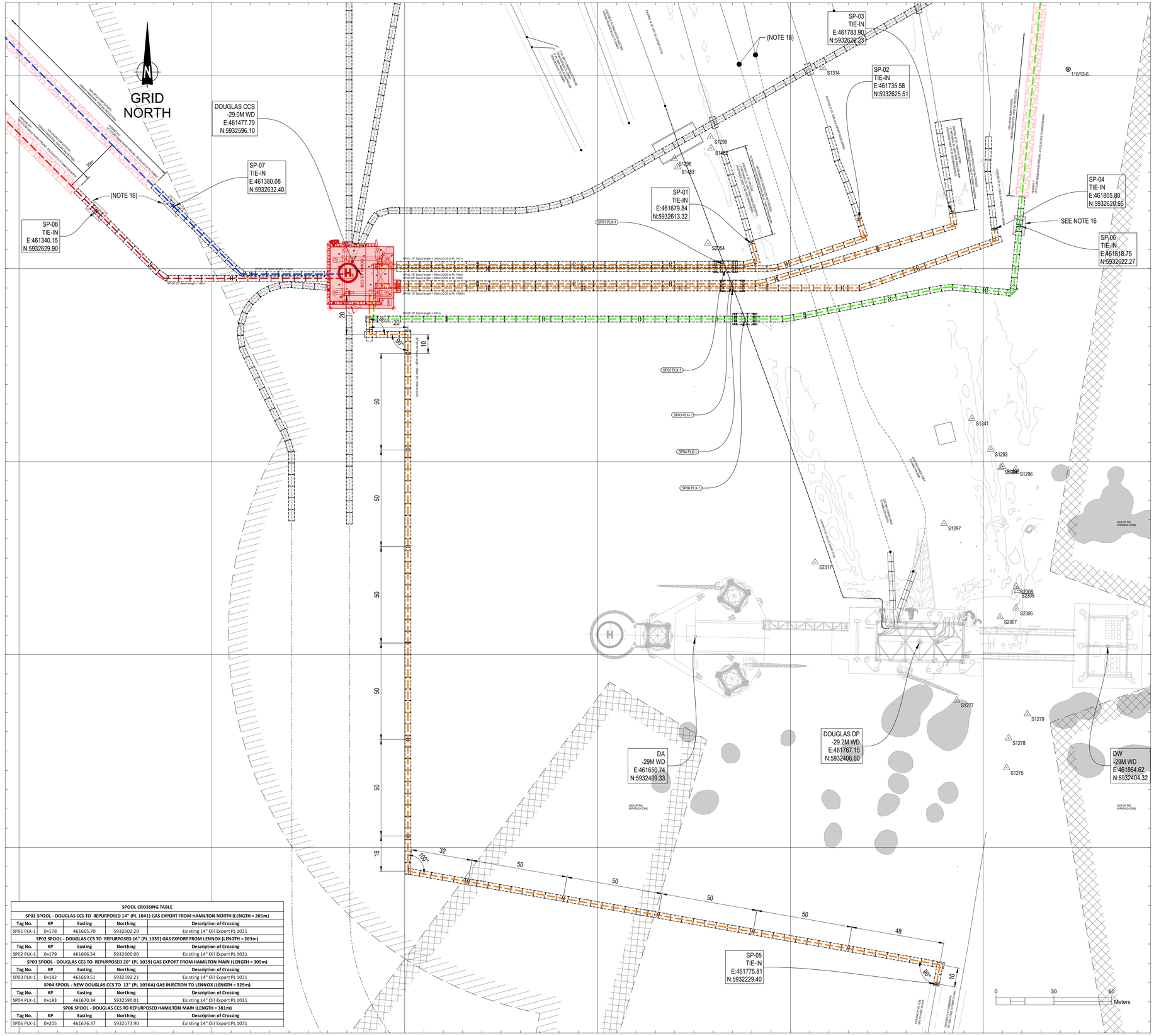
  Eni Response: The Applicant can confirm the distances for all platforms, from MPA, median Line, and UK coastline are provided in the response to **Question 2** in **Table 2.1**, and in response to this question in **Table 3.1**, **Table 3.2**, **Table 3.3**, and **Table 3.4**.

- New installations should have the same details as above, along with any known information about how it will be installed. Any details unknown at this stage in the process, should state that the information will be provided within the relevant site-specific application.

  Eni Response: The Applicant can confirm the distances for all platforms, from MPA, median Line, and UK coastline are provided in the response to **Question 2** in **Table 2.1**, and in response to this question in **Table 3.1**, **Table 3.2**, **Table 3.3**, and **Table 3.4**.

- All pipelines should be identified (PL number given), state the start and end of the and in question 5 pipeline, the length of the pipeline, pipeline contents and if it crosses any median lines or conservation sites.

  Eni Response: The Applicant can confirm that CO2 will be transported from PoA to Douglas via the existing 20" natural gas **PL1030** pipeline, approximately 600 m of which will be rerouted to the new Douglas CCS platform. Four existing natural gas pipelines will then convey CO2 from the new Douglas CCS Platform to the satellites (**PL1039**, **PL1041**, **PL1035**, and **PL1036a**). Whilst much of the existing natural gas pipeline infrastructure will be repurposed to transport CO2, the end sections of each pipeline at Douglas would be rerouted to the new Douglas CCS platform. The following lengths of new pipeline will be required to connect to the new Douglas CCS platform, as shown in the figure below titled: **OFFSHORE PIPELINES APPROACH DRAWING - DOUGLAS CCS PLATFORM**. Please see **Table 3.5** above.



SPOOL CROSSING TABLE				
SP01 SPOOL - DOUGLAS CCS TO REPURPOSED 14" (PL 1041) GAS EXPORT FROM HAMILTON NORTH (LENGTH = 205m)				
Tag No.	**KP**	**Easting**	**Northing**	**Description of Crossing**
SP01 PLX-1	0+178	461665.70	5932602.20	Existing 14" Oil Export PL 1031
SP02 SPOOL - DOUGLAS CCS TO REPURPOSED 16" (PL 1035) GAS EXPORT FROM LENNOX (LENGTH = 263m)				
Tag No.	**KP**	**Easting**	**Northing**	**Description of Crossing**
SP02 PLX-1	0+179	461666.54	5932600.00	Existing 14" Oil Export PL 1031
SP03 SPOOL - DOUGLAS CCS TO REPURPOSED 20" (PL 1039) GAS EXPORT FROM HAMILTON MAIN (LENGTH = 309m)				
Tag No.	**KP**	**Easting**	**Northing**	**Description of Crossing**
SP03 PLX-1	0+182	461669.51	5932592.21	Existing 14" Oil Export PL 1031
SP04 SPOOL - NEW DOUGLAS CCS TO 12" (PL 1036A) GAS INJECTION TO LENNOX (LENGTH = 329m)				
Tag No.	**KP**	**Easting**	**Northing**	**Description of Crossing**
SP04 PLX-1	0+183	461670.34	5932590.01	Existing 14" Oil Export PL 1031
SP06 SPOOL - DOUGLAS CCS TO REPURPOSED HAMILTON MAIN (LENGTH = 381m)				
Tag No.	**KP**	**Easting**	**Northing**	**Description of Crossing**
SP06 PLX-1	0+205	461676.37	5932573.90	Existing 14" Oil Export PL 1031

REFERENCE DOCUMENTS

NUMBER	TITLE
1025H0BSDN84002	OVERALL FACILITY SCHEMATIC
1025H0BGRV09422	PIPELINE/CABLE ROUTE ENGINEERING GEOLOGICAL GROUND MODEL
1025H0BGRV09420	PHASE 2C NEARSHORE ENGINEERING GEOLOGICAL GROUND MODEL

KEY PLAN

GENERAL NOTES

1. ALL DIMENSIONS AND COORDINATES ARE IN METRES UNLESS NOTED OTHERWISE.
2. GLOBAL COORDINATE REFERENCE SYSTEM: European Datum 1950 UTM Zone 30N (EPSG: 23030)

PROJECTED COORDINATE SYSTEM	European Datum 1950 UTM Zone 30N
PROJECTION	TRANSVERSE MERCATOR
LINEAR UNIT	METERS (1.0)
FALSE EASTING	500000.0
FALSE NORTHING	0.0
CENTRAL MERIDIAN	-3.0
SCALE FACTOR	0.9996
LATITUDE OF ORIGIN	0.0
GEOGRAPHIC COORDINATE SYSTEM	European Datum 1950
ANGULAR UNIT	DEGREE (0.0174532925199433)
PRIME MERIDIAN	GREENWICH (0.0)
DATUM	European 1950
SPHEROID	International 1924
SEMIMAJOR AXIS	6378388.0
SEMIMINOR AXIS	6356911.946127946
INVERSE FLATTENING	297

3. PIPELINE ROUTING IS PRELIMINARY AND SUBJECT TO CHANGE BASED ON SURVEY INFORMATION.
4. WATER DEPTHS GIVEN FOR INFORMATION ONLY.
5. LAYOUT IS COMPILED FROM VARIOUS SOURCES AND THEREFORE IS SUBJECT TO CONFIRMATION.
6. PRELIMINARY ROUTING BASED ON EXISTING SEABED ARCHITECTURE AROUND EACH PLATFORM.
7. DOUGLAS ACCOMMODATION AND WELLHEAD PLATFORMS TO BE IN-PLACE AT THE TIME OF THE INSTALLATION OF NEW PIPELINES AT THE DOUGLAS CCS PLATFORM.
8. PIPELINE APPROACH TO EACH PLATFORM AND SPOOL DETAILS TO BE CONFIRMED.
9. FIELD LAYOUT BASED ON THE PRELIMINARY LOCATION OF NEW RISERS AT EXISTING PLATFORMS (HAMILTON MAIN, HAMILTON NORTH, LENNOX AND DOUGLAS CCS PLATFORM).
10. FINAL LOCATION OF RISERS AT EACH PLATFORM TO BE CONFIRMED.
11. DRILLING JACK-UP CORRIDOR AND FOOTPRINT AROUND PLATFORMS TO BE CONFIRMED.
12. FIELD LAYOUT TO BE REVIEWED AGAINST THE DECOMMISSIONING SCOPE FOR THE PROJECT.
13. FOR OFFSHORE NEW PIPELINES FIELD LAYOUT, SEE DRAWING No. 1023DSBSDN84003.
14. FOR OFFSHORE POWER CABLES & FIBRE OPTIC FIELD LAYOUT, SEE DRAWING No. 1025H0BSDG84104.
15. NUMBER AND TYPE OF PROTECTION AT TIE-IN LOCATION FOR REPURPOSED PIPELINES (SP01 TO SP05) TO BE CONFIRMED.
16. SIZE OF TARGET BOX SHOWN IN DRAWING IS INDICATIVE ONLY, ACTUAL SIZE IS 6 x 3m REFER TO DOC. No. 23025.ENG.PLI.PRG DESIGN OF OFFSHORE PIPELINES.
17. CONCRETE SLEEPER SUPPORTS TO BE COATED WITH NEOPRENE.
18. THE CONTRACTOR NEEDS TO VERIFY THAT THE EXISTING CABLES TO HAMILTON NORTH AND HAMILTON MAIN FROM DOUGLAS PLATFORM WILL BE DECOMMISSIONED AND REMOVED PRIOR TO INSTALLING THE NEW SUBSEA CABLE. TO BE REVIEWED AGAINST THE DECOMMISSIONING SCOPE.

LEGEND

- FUTURE DENSE PHASE PIPELINE - DOUGLAS CCS to HAMILTON NORTH.
- FUTURE DENSE PHASE PIPELINE - DOUGLAS CCS to LENNOX.
- FUTURE DENSE PHASE PIPELINE - DOUGLAS CCS to HAMILTON MAIN.
- NEW POWER CABLES.
- EXISTING PIPELINES / UMBILICALS / POWER CABLES.
- TIE-IN SPOOL TO RE-PURPOSED PIPELINE.
- CONCRETE MATTRESS PROTECTION (6 x 3 x 0.3m) U.N.O.
- JACK-UP RIG EXCLUSION ZONE.
- PROHIBITED ANCHORING EXCLUSION ZONE 200m RADII.
- ROCK DUMP EXTENTS OVER NEW PIPELINES (100m EXTENT), OVER REPURPOSED PIPELINE TIE-INS (50m EXTENT).

S.Gandini

CD-FE	03	07.09.2023	RE-ISSUED FINAL	N.Z	M.R	S.G
CD-FE	02	18.08.2023	RE-ISSUED FOR COMMENT	N.Z	M.R	S.G
CD-FE	01	07.07.2023	ISSUED FINAL	N.Z	M.R	S.G
CD-FE	00	13.06.2023	ISSUED FOR COMMENT	N.Z	M.R	S.G
Validity Status	Rev. Number	Date	Revision index	Prepared	Checked	Approved / Approved Eni UK

Company logo and business name: eni uk / eni progetti

Company Document ID: 105600BSDN84152
Job. N. JA0614

Facility and Sub Facility Name: DOUGLAS SUBSEA
Project Name: LBA CCS Transport and Storage
Scale: 1:1000 @A1
Sheet of Sheets: 1 / 3

Document Title: **OFFSHORE PIPELINES APPROACH DRAWING - DOUGLAS CCS PLATFORM**

Superseded N.
Superseded by N.
Plant Area: N/A
Plant Unit: N/A

Software:AutoCad

Filename.105600BSDN84152_CDFE03_01 to 03.DWG

A1 (841 x 594)

- Any cables should be provided with the same details as pipelines (as above).

  Eni Response: The Applicant can confirm that the combined electrical and fibre-optic cables to be installed are named as shown in **Table 3.5**, which also includes start and end co-ordinates, and confirmation of within which jurisdiction they lie.

- Existing wells that are proposed to be used for the project should be clearly identified, including current status, and what they previously produced.

  Eni Response: Table 3.10 below contains details of the existing wells that will be used for the Proposed Development. The location of all wells in Liverpool Bay for the Proposed Development, and from the historical oil and gas production are shown on **Figure 2.3**. The location of the existing wells that will be used for the Proposed Development are shown on **Figures 3.2**, **Figure 3.3**, and **Figure 3.4** in relation to the Hamilton, Hamilton North, and Lennox Storage Sites.

Table 3.10: Details of existing wells that will be used for the Proposed Development

Well type LBCC	Reservoir	Easting	Northing	Well Bore Status	Original well intent
C110/13a-HA (ex.110/13-H1 ST1)-injection Sidetrack	Hamilton	469685	5936706.2	Closed-Future P&A	Gas producer
C110/13a-HB (ex.110/13-H2 ST1)-Injection Sidetrack	Hamilton	470200.5	5937333.5	Closed- Future P&A	Gas producer
110/13a-HC (ex.110/13-H3 ST1) -injection Sidetrack	Hamilton	470200.5	5935501.56	Closed- Future P&A	Gas producer
C110/13a-HD (ex.110/13-H4 ST1)-injection Sidetrack	Hamilton	470200.5	5934462.3	Closed- Future P&A	Gas producer
C110/13a-HE (ex.110/13-H5)-Monitoring new well	Hamilton	470848.6	5936608.7	New well. Does not exist currently	Gas producer
C110/13a-NA (ex.110/13-N1 ST1)-injection Sidetrack	Hamilton North	468323	5945412.5	Closed- Future P&A	Gas producer
C110/13a-NB (ex.110/13-N3 ST1)-injection Sidetrack	Hamilton North	468323	5944406.4	Closed-Future PA&	Gas producer
C110/13a-NC (ex. 110/13-N4)-Monitoring new well	Hamilton North	468084.6	5945670.8	New well. Does not exist currently	Gas producer
110/15-N02- Sentinel Recompletion	Hamilton North	469272	5944899	Closed- Future P&A	Gas producer
C110/15a-LB (ex.110/15-L05ST1)-injection Side track	Lennox	489487.6	5942334.3	Producing	Oil Producer converted to Gas producer
C110/15a-LC (ex. 110/15-L13 ST2)-injection Sidetrack	Lennox	489487.6	5942938.2	Producing	Oil Producer converted to Gas producer
C110/15a-LA (ex. 110/15-L01Z ST2)-Monitoring Sidetrack	Lennox	490155.3	5941955.3	Producing	Gas injector converted to Gas producer
110/15-L04- Sentinel Recompletion	Lennox	487637	5941932	Closed- Future P&A	Oil and gas

- Proposed new wells should be clearly identified, including whether they will be platform wells or subsea tie backs. Their identifier (well number for example) if known should be detailed. Please provide their location and whether they are to be drilled within or in close proximity to an MPA.

  Eni Response: Table 3.9 above presents an overview of the thirteen proposed CCS wells including their surface location coordinates, estimated Measured Depth (MD) and estimated True Vertical Depth (TVD).

  No subsea tieback is planned; all the wells listed in **Table 3.9** above are drilled from the corresponding platforms. The proximity to the MPAs is detailed in **Figure 2.1**, *"Location of Proposed Development components and the Wales/England territorial boundary and existing infrastructure*," and Table 2.1, *"Distances in kilometres from existing and proposed platforms to Designated Site"*, which was previously included in the response to **Question 2** above.

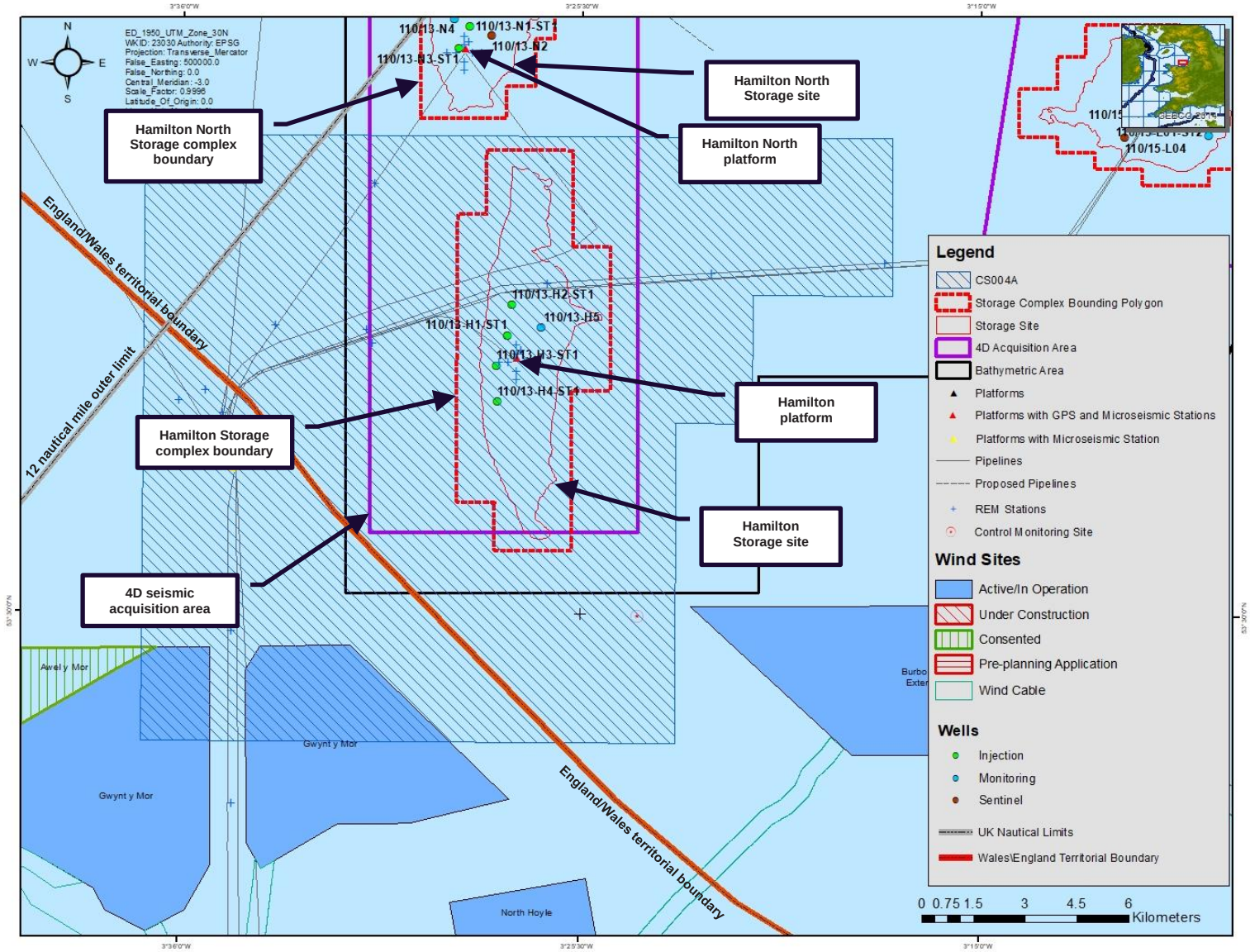


Figure 3.2: Location of Hamilton Storage Site and wells, and relationship to the Wales/England territorial boundary and existing infrastructure

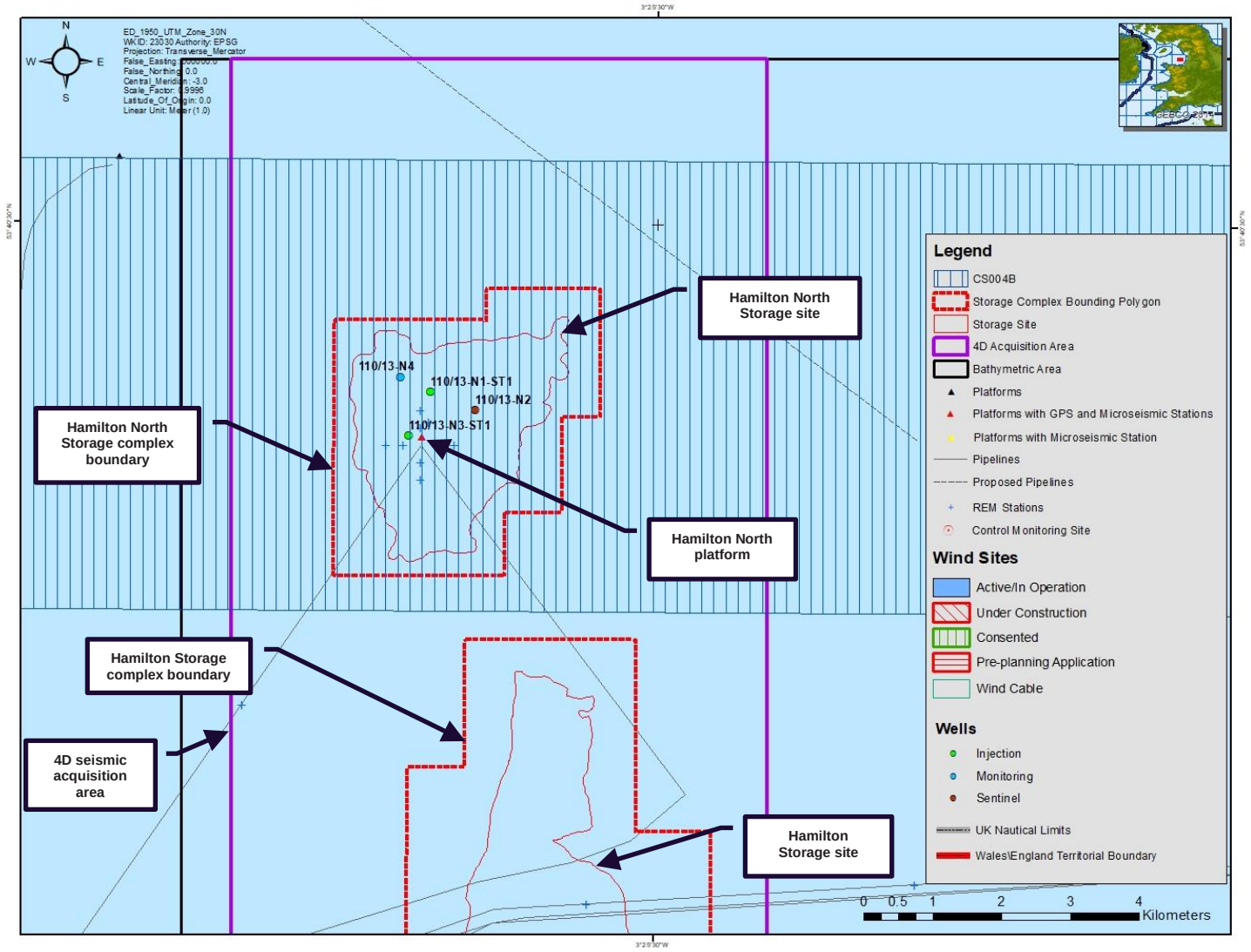


Figure 3.3: Location of Hamilton North Storage Site and well, and relationship to the Wales/England territorial boundary and existing infrastructure

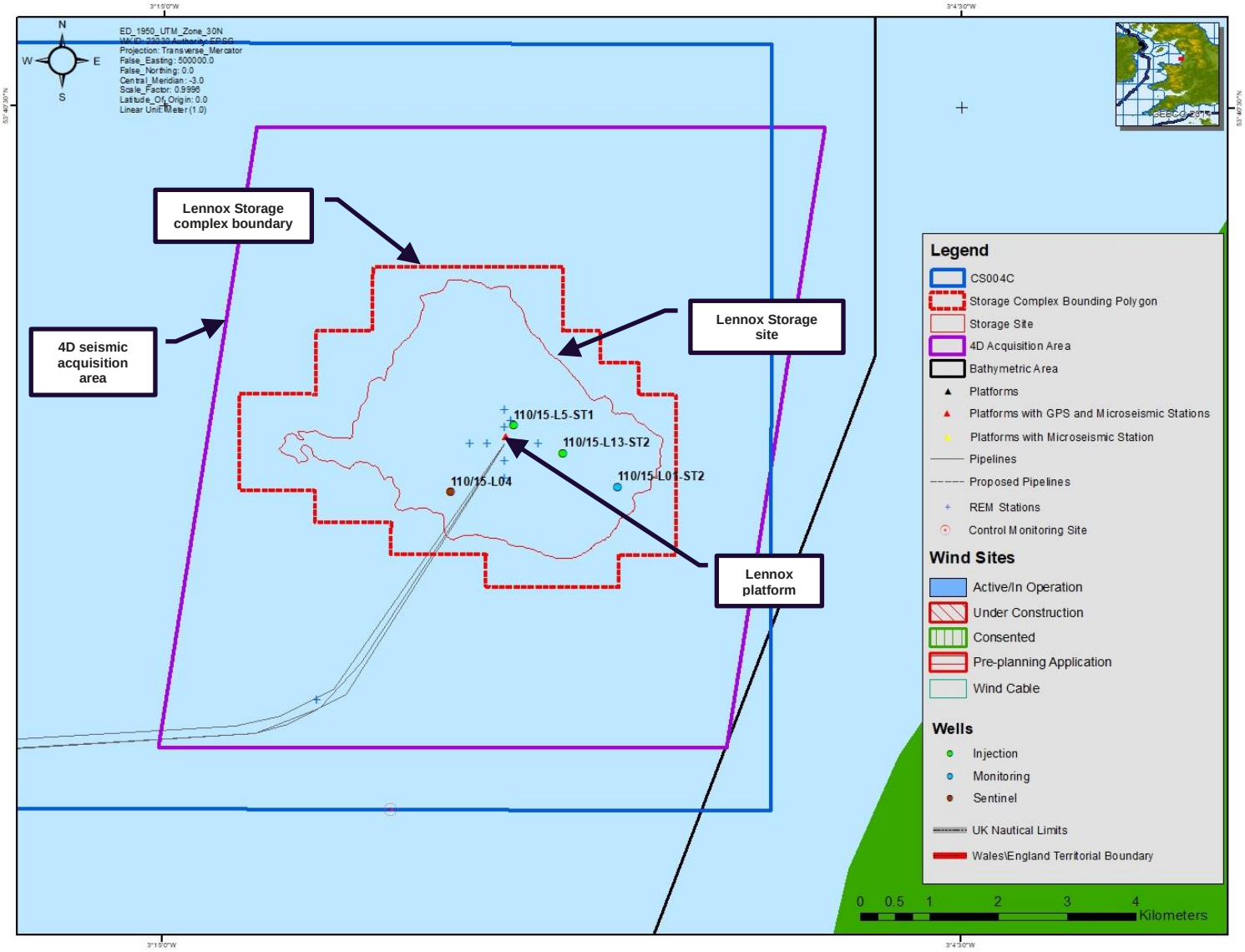


Figure 3.4: Location of Lennox Storage Site and wells, and relationship to the Wales/England territorial boundary and existing infrastructure

- Please include a figure illustrating where infrastructure (new and existing) is in relation to the different zones (intertidal/subtidal) (which have been used in Chapter 7), so that this can be put into context for the whole project.

Eni Response: Figure 3.5 presents and extract from a satellite image to illustrate the location of the boundary between subtidal and intertidal zones and the proposed electrical cable route. The subtidal zone is defined by the whole seabed, seaward of mean low water springs (MLWS). The intertidal zone is defined by the area between MLWS and mean high water springs (MHWS). Also shown is the alignment of the existing **PL1030** natural gas pipeline from the Douglas Complex to the Point of Ayr terminal. For context, **Figure 3.6** presents an extract from the relevant Admiralty Chart information, also illustrating the location of the boundary between subtidal and intertidal zones, and the alignment of the existing **PL1030** natural gas pipeline from the Douglas Complex to the Point of Ayr terminal.

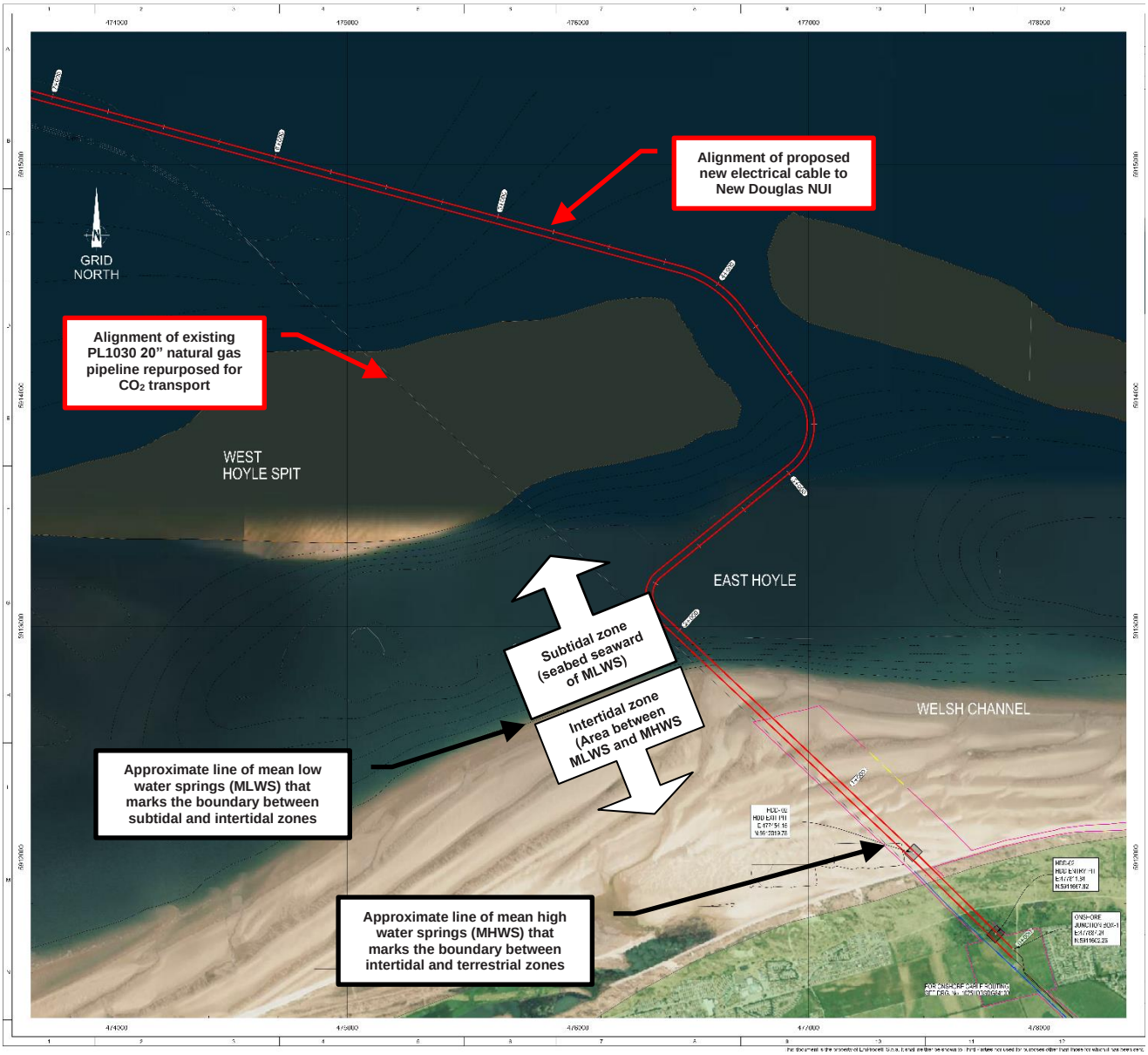


Figure 3.5: Extract from satellite image illustrating location of boundary between subtidal and intertidal zones and proposed electrical cable route

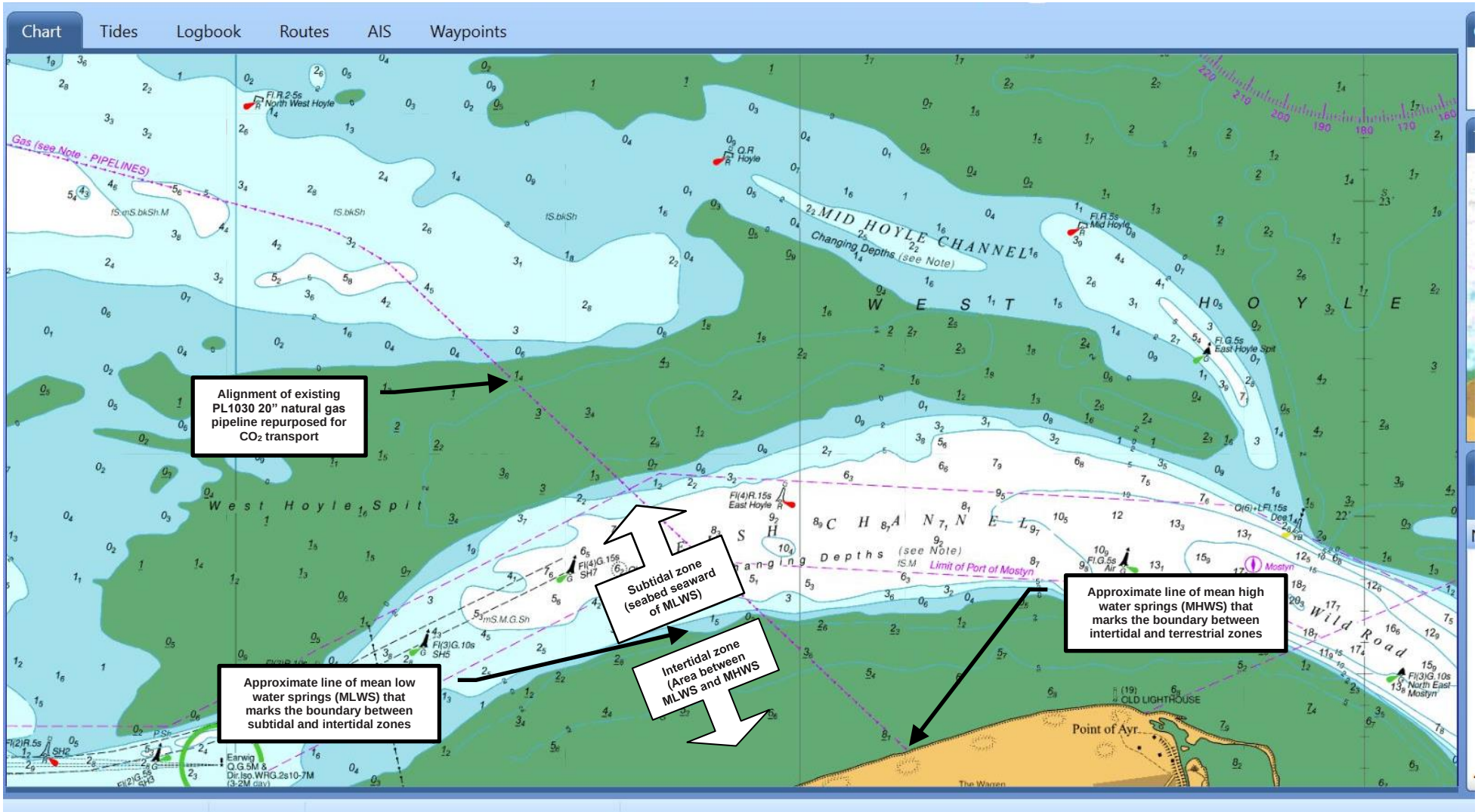


Figure 3.6: Extract from Admiralty Chart illustrating location of boundary between subtidal and intertidal zones

QUESTION 4: Reg 12(1) letter dated 1 July 2024 – comment 4

OPRED welcomes the additional drawings provided.

With regards to OPRED's previous comment in Regulation 12(1) letter dated 1 July 2024 regarding National Policy Statement, the use of the overarching NPS for Energy (NPS EN-1), NPS for Renewable Energy Infrastructure and (NPS EN- 3) NPS of Electricity Networks Infrastructure (NPS EN-5) and how these relate to the content of the information presented within the ES is unclear.

Eni Response: The overarching NPS for Energy (NPS EN-1) is referenced because it sets-out, at Chapter 4, the "Assessment Principles", including those for "Environmental Effects/Considerations" that should be applied to "Carbon Capture and Storage (CCS)". The applicant considers that these are relevant to the Proposed Development, in particular the re-purposing of the existing natural gas pipelines for CO_2 transportation, and the use of the depleted hydrocarbon reservoirs for CO_2 storage. The assessment principles and environmental effects/considerations described in NPS EN-1 have been applied and helped to define the scope of the EIA carried out by the Applicant for the Proposed Development.

NPS EN-1 also provides general assessment and technology specific information that has been applied in the assessment and recognises that offshore electrical and fibre-optic cables are common to all forms of energy infrastructure, including CCS.

The NPS for Renewable Energy Infrastructure and (NPS EN-3) is relevant as it provides technology specific information regarding the assessment of offshore electrical and fibre-optic cables, which are key components of the Proposed Development. NPS EN-3 also provides information relevant to the assessment of the Proposed Development regarding the respective policies of England and Wales. These policies influence site selection and design, and the appraisal of sustainability and Habitats Regulations Assessment.

The NPS for Electricity Networks Infrastructure (NPS EN-5), is referenced because it sets-out, at Section 2.12, "Special assessment principles for offshore-onshore transmission". This includes matters considered in the Applicant's assessment and provides specific mitigation measures for offshore electrical and fibre-optic cables, which form part of the Proposed Development in both English and Welsh territorial waters.

Similarly, the references to Guidance, much of which is applicable to offshore renewables developments and cable laying appears to have negated the requirement to provide the necessary information on the elements of the project that relate to the development and reconfiguration of existing offshore oil and gas infrastructure for the HyNet CCUS project.

The Applicant is aware of and has paid heed to the key legislation and guidance relevant to the assessment of the proposed CCS project. The key piece of environmental legislation for the Proposed Development is The Offshore Oil and Gas Exploration, Production, Unloading and Storage (Environmental Impact Assessment) Regulations 2020, with associated guidance (*The Offshore Oil and Gas Exploration, Production, Unloading and Storage (Environmental Impact Assessment) Regulations 2020 – A Guide*). These regulations mandate the undertaking of an EIA and the production of an ES for certain types of offshore developments, including activities related to the geological storage of CO_2, as per the Energy Act 2008. The ES is the means whereby the Secretary of State (SoS) can assess that the environmental implications of the proposed Development have been properly considered and, subject to all other requirements being satisfied, the SoS can agree that consent for the Development can be granted by the NSTA via a Storage Permit. Three Storage Permits are being sought for the Proposed Development; one each for the Hamilton, Hamilton North, and Lennox stores.

The Energy Act 2008 provides for a licensing regime that governs the offshore storage of CO_2. It forms part of the transposition into UK law of European Nature Information System (EU) Directive 2009/31/EC on the geological storage of CO_2. The Carbon Dioxide (Licensing etc.) Regulations 2010 (SI 2010/2221) transposes many other requirements of the directive. The Energy Act 2008 (Consequential Modifications) (Offshore

Environmental Protection) Order 2010 applies the provisions of the following regulations to offshore CCS activities:

- The Offshore Petroleum Activities (Conservation of Habitat) Regulations 2001;
- The Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007;
- The Offshore Chemicals Regulations 2002;
- The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005;
- The Greenhouse Gas Emissions Trading Scheme Regulations 2005;
- The Offshore Installations (Emergency Pollution Control) Regulations 2002; and
- The REACH Enforcement Regulations 2008.

The Applicant is aware that several key environmental approvals will be required during the detailed design phase for the Proposed Development, prior to operation, which include (but are not limited to):

- Oil Pollution Emergency Plans (OPEP) (drilling);
- Permits for chemical use and discharge (drilling and pipeline);
- Pipeline Works Authorisation (PWA) and associated environmental screening directions (PLA MAT);
- Deposit of Materials Consent (DepCon);
- Consent to Locate (CtL); and
- Other operational permits including Well Operations Notification System (WONS) consents and environmental screening directions for drilling activities.

Furthermore, the Applicant recognises its obligations under several other key regulatory drivers applicable to the Proposed Development, which include (but are not limited to):

- The Marine Strategy Regulations 2010;
- The Marine and Coastal Access Act (MCAA) 2009;
- The Energy Act 2008, Part 4A;
- The Merchant Shipping (Prevention of Pollution by Garbage from Ships) Regulations 2020;
- The Merchant Shipping (Prevention of Pollution by Sewage from Ships) Regulations 2020;
- The Merchant Shipping (Control and Management of Ships' Ballast Water and Sediments) Regulations 2022;
- The Merchant Shipping (Prevention of Air Pollution from Ships) Regulations 2008 (as amended); and
- The Merchant Shipping (Oil Pollution Preparedness, Response & Co-operation Convention) Regulations 1998 (as amended).

Wells will be plugged in line with NSTA requirements and industry guidance, following cessation of injection. The Applicant understands the current guidance is the OEUK Well Decommissioning for CO2 Storage Guidelines, Issue 1, Nov 2022 (BEIS (2018). Guidance Notes: Decommissioning of Offshore Oil and Gas Installations and Pipelines. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/760560/Decom_Guidance_Notes_November_2018.pdf).

Please clarify what assessment is being made for the nearshore infrastructure (which is the domain of NRW) and what relates to the offshore element (pipelines and oil and gas installations).

Eni Response: The Proposed Development requires consent under the two primary consenting regimes, which each have their respective Environmental Impact Assessment (EIA) Regulations, as follows:

- in respect of a **carbon storage permit**: The Offshore Oil and Gas Exploration, Production, Unloading and Storage (Environmental Impact Assessment) Regulations 2020; and
- in respect of a **marine licence application**: The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) ;

The Applicant reached a clear conclusion that it would be proper to bring together the components of the Proposed Development requiring a Carbon Storage Permit, and Marine Licence together as a single project for the purposes of EIA and to inform AA.

Table 4.1 describes the Proposed Development components and identifies the respective licencing regime.

Table 4.1: Proposed Development components and main development consent regime

Proposed Development Component			Storage Permit - OPRED ES approval	Marine Licence – NRW ES approval
Installation of a new Douglas CCS jacket and topsides, including up to eight driven piles.			✓	X
Installation of new topsides on the Hamilton Main, Hamilton North, and Lennox wellhead platforms with re-use of existing jackets.			✓	X
Repurposing of the existing subsea natural gas pipelines for their change of use from hydrocarbon to CO2 service.	PoA to New Douglas PL 1030 20”		X	✓
	New Douglas to Hamilton PL 1039 20”		✓	X
	New Douglas to Hamilton North PL 1041 14”		✓	X
	New Douglas to Lennox PL 1035 16”		✓	X
	New Douglas to Lennox Pl 1036a 12”		✓	X
installation of new sections of pipeline to connect the new Douglas CCS platform to the existing subsea natural gas pipelines, including concrete mattresses, and grout bags for support and external protection.	PoA to New Douglas Spools PL 1030 20”		X	✓
	New Douglas to Hamilton North spools PL 1041 14”		X	✓
	New Douglas to Lennox spools PL 1035 16”		X	✓
	New Douglas to Lennox spools Pl 1036a 12”		X	✓
development of the Hamilton Main, Hamilton North, and Lennox reservoirs for the injection and storage of CO2 This will be done through up to eight injection wells created by side tracking of existing production wells. This includes drilling and recompletion operations, all of which will be within the existing footprint (template) of each platform.	Hamilton - sidetrack well	C110/13a-HA (ex.110/13-H1 ST1)	✓	X
		C110/13a-HB (ex.110/13-H2 ST1)	✓	X
		110/13a-HC (ex.110/13-H3 ST1)	✓	X
		C110/13a-HD (ex.110/13-H4 ST1)	✓	X
	Hamilton North-sidetrack well	C110/13a-NA (ex.110/13-N1 ST1)	✓	X
		C110/13a-NB (ex.110/13-N3 ST1)	✓	X
	Lennox-sidetrack well	C110/15a-LB (ex.110/15-L05ST1)	✓	X
		C110/15a-LC (ex. 110/15-L13 ST2)	✓	X
implementation of a programme of Monitoring, Measurement and Verification (MMV) activities.	Pre-injection phase		✓	✓
	Injection phase		✓	✓
	Post-injection and closure phase		✓	✓

Proposed Development Component			Storage Permit - OPRED ES approval	Marine Licence – NRW ES approval
Drilling of two new monitoring wells, one at Hamilton North and one at Hamilton Main. Additional monitoring wells will be created from the recompletion of existing wells within the existing footprint (template) of each platform: one monitoring well created by side-tracking an existing well in Lennox; and two sentinel wells, one in Hamilton North and one in Lennox.	Hamilton Monitoring - New well	C110/13a-HE (ex.110/13-H5)	✓	X
	Hamilton North-Monitoring New well	C110/13a-NC (ex. 110/13-N4)	✓	X
	Hamilton North-Recompletion sentinel well	110/15-N02	✓	X
	Lennox Monitoring - Sidetrack	C110/15a-LA (ex. 110/15-L01Z ST2)	✓	X
	Lennox Monitoring – Recompletion sentinel well	110/15-L04	✓	X
installation, including cable burial of submarine 33 kV armoured cables, with integrated FO cable connections (35 km from PoA Terminal onshore to the new Douglas CCS platform, including within the intertidal/foreshore area up to MHWS, within Welsh waters only).			✓	✓
installation, including cable burial, of new power cables with integrated FO connecting the new Douglas CCS platform with the Hamilton Main (12 km; 33 kV), Hamilton North (15 km; 33 kV) and Lennox (35 km; 33 kV) platforms.			✓	X
installation of concrete mattresses and external cable protection at crossings of existing cables, and in areas where cable burial is not deemed feasible, or as a remedial secondary protection measure if the target cable depth of lowering cannot be achieved.			✓	X

The EIA Regulations require that the EIA consider the likely significant impacts of a project on the environment. The potential impacts that have been considered in the EIA were selected following environmental issues identification (ENVID) and consultation with several stakeholders. Following this, the decision process related to defining whether the Proposed Development may potentially significantly impact on the environment. The EIA Regulations themselves do not provide a specific definition of significance, but they indicate that the methods used for identifying and assessing potential impacts should be transparent and verifiable. Despite this being inherently a subjective process, a defined methodology was developed to make the assessment as objective as possible.

Distinct from, but closely related to the EIA Regulations, is the requirement to consider the potential impacts on the integrity of protected habitats. Before determining whether a project will have an adverse effect on the conservation objectives and integrity of a European Site, it is important to consider the whole Proposed Development.

Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are protected areas in the UK and form part of the UK's national site network. The sites are designated under the Conservation of Habitats and Species Regulations 2017 (as amended) within 12 nautical miles (NM) and under the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) outside 12 NM. OPRED is the Competent Authority for the Habitats Regulations Assessment (HRA) process regarding the Storage Permit application, and NRW for the Marine Licence, with the advice of relevant Statutory Nature Conservation Agencies.

All necessary information to support the HRA process was provided within the assessment chapters sections of the ES, and the supporting RIAA, such that the Competent Authority will have sufficient information to undertake an Appropriate Assessment (AA). Whilst HRA focuses on SACs, SPAs and Ramsar sites, information was also presented within the ES, and accompanying RIAA, to assess the potential for impact on all other relevant marine protected areas (MPAs) (for example, Marine Conservation Zones (MCZs)).

Please provide details of the marine plan objectives and how these align with the proposed development activities outlined in the ES.

Eni Response: The Applicant can confirm that the Proposed Development activities align with the relevant Marine Plan objectives in England and Wales. The evidence to support this position is presented in the following section and in **Table 4.1** and **Table 4.2**.

Compliance with the North West Marine Plan (England): The North West Inshore and North West Offshore Marine Plan was published in June 2021 (HM Government, 2021) and introduces a strategic approach to marine planning within the marine plan area. It is intended to inform decision-making by marine users and regulators on where, when or how activities may take place within the marine plan area. The North West Inshore and North West Offshore Marine Plan contains 13 objectives which are delivered through 57 policies. The policies cover a wide range of topics including activities and uses, economic, social and environmental considerations, and cross-cutting issues such as integration of decision-making on land and at sea. The key policies relevant to the Proposed Development and how the policy objectives have been addressed are presented in **Table 4.1** below.

Compliance with the Welsh National Marine Plan (Wales): The Welsh National Marine Plan (WNMP) was published in November 2019 (Welsh Government, 2019) and introduces a framework to support sustainable decision-making for the marine environment. The Welsh National Marine Plan contains 13 objectives which are delivered through 52 policies. The policies cover a wide range of topics including activities and uses, economic, social and environmental considerations and cross-cutting issues such as the joining up between decision-making on land and at sea and opportunities for coexistence. The key policies relevant to the Proposed Development and how the policy objectives have been addressed are presented in **Table 4.2** below.

Table 4.1: Compliance with the North West Marine Plan (England)

Policy Code	NWMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
NW-INF-1	**Infrastructure**: Proposals for appropriate marine infrastructure which facilitates land-based activities, or land-based infrastructure which facilitates marine activities (including the diversification or regeneration of sustainable marine industries), should be supported.	Yes	The Proposed Development will form part of the wider HyNet Carbon Dioxide Transportation and Storage Project ('the Project'). The Project will include infrastructure to produce and distribute low carbon hydrogen. The hydrogen is produced using natural gas, with the resultant CO_2 emissions captured and stored. See the Proposed Development Description (volume 1, chapter 3) for full details.
NW-INF-2	**Infrastructure**: *(1) Proposals for alternative development at existing safeguarded landing facilities will not be supported.* *(2) Proposals adjacent and opposite existing safeguarded landing facilities must demonstrate that they avoid significant adverse impacts on existing safeguarded landing facilities.* *(3) Proposals for alternative development at existing landing facilities (excluding safeguarded sites) should not be supported unless that facility is no longer viable or capable of being made viable for waterborne transport.* (4) Proposals adjacent and opposite existing landing facilities (excluding safeguarded sites) that may have significant adverse impacts on the landing facilities should demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant.	No	The Proposed Development does not involve any proposals that would affect existing safeguarded landing facilities.
NW-CO-1	**Co-existence***:* Proposals that optimise the use of space and incorporate opportunities for co-existence	Yes	The new marine infrastructure will be installed close to the Applicant's existing assets, and in similar construction techniques. The routing and location of

Policy Code	NWMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
	and co-operation with existing activities will be supported. Proposals that may have significant adverse impacts on, or displace, existing activities must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant. *If it is not possible to mitigate significant adverse impacts, proposals must state the case for proceeding.*		the new infrastructure has also accounted for the existing and future users of Liverpool Bay. The Applicant therefore considers that the Proposed Development will be able to coexist with other compatible sectors to optimise the value and use of the marine area, and marine natural resources. See the Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.
NW-AGG-1	***Aggregates**: Proposals in areas where a licence for extraction of aggregates has been granted or formally applied for should not be authorised, unless it is demonstrated that the proposal is compatible with aggregate extraction.*	Yes	Measures adopted as part of the Proposed Development (with relevance to Infrastructure and Other Sea Users) are contained in volume 2, section 12.10, and an assessment of impacts is contained in volume 2, section 12.11.
NW-AGG-2	***Aggregates**: Proposals within an area subject to an Exploration and Option Agreement with The Crown Estate should not be supported unless it is demonstrated that the proposal is compatible with aggregate extraction.*	Yes	Measures adopted as part of the Proposed Development (with relevance to Infrastructure and Other Sea Users) are contained in volume 2, section 12.10, and an assessment of impacts is contained in section 12.11.
NW-AGG-3	***Aggregates**: Proposals in areas of high potential aggregate resource that may have significant adverse impacts on future aggregate extraction should demonstrate that they will, in order of preference:* *a) avoid* *b) minimise* *c) mitigate* *- significant adverse impacts on future aggregate extraction so they are no longer significant.* If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.	Yes	Measures adopted as part of the Proposed Development (with relevance to Infrastructure and Other Sea Users) are contained in volume 2, section 12.10, and an assessment of impacts is contained in section 12.11.
NW-AQ-1	***Aquaculture**: Proposals within existing or potential strategic areas of sustainable aquaculture* *production must demonstrate consideration of and compatibility with sustainable aquaculture production. Where compatibility is not possible, proposals that may have significant adverse impacts on sustainable aquaculture production must demonstrate that they will, in order of preference:* a) avoid b) minimise c) mitigate *- adverse impacts on sustainable aquaculture production so they are no longer significant.* If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.	No	The Proposed Development infrastructure does not overlap Strategic Areas of Sustainable Aquaculture Production. The Proposed Development does not overlap shellfish classified waters, or areas identified for mussel, pacific and native oyster production. See the Commercial Fisheries chapter (volume 2, chapter 10) for full details.
NW-AQ-2	***Aquaculture**: Proposals enabling the provision of infrastructure for sustainable aquaculture and related industries will be supported.*	No	The Proposed Development does not involve any aquaculture development.
NW-CAB-1	***Cables**: Preference should be given to proposals for cable installation where the method of protection is burial.* Where burial is not achievable, decisions should take account of protection measures for the cable that may be proposed by the applicant. Where burial or protection measures are not appropriate, proposals	Yes	*The new offshore power and fibre optic (FO) cables of the Proposed Development will be protected through cable burial. Concrete mattresses and external cable protection will be installed, at crossings of existing cables and where cable burial is not deemed feasible, or as a remedial secondary protection measure if the target cable depth of lowering cannot be achieved. See the Proposed*

Policy Code	NWMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
	should state the case for proceeding without those measures.		*Development Description (volume 1 chapter 3) for full details.*
NW-CAB-2	***Cables**:* Proposals demonstrating compatibility with existing landfall sites and incorporating measures to enable development of future landfall opportunities should be supported. Where this is not possible proposals will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts on existing and potential future landfall sites so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.	Yes	The Proposed Development does not affect future landfall opportunities.
NW-CAB-3	***Cables**:* Where seeking to locate close to existing subsea cables, proposals should demonstrate compatibility with ongoing function, maintenance and decommissioning activities relating to the cable.	Yes	Cable crossing and proximity agreements are measures adopted as part of the Proposed Development listed in volume 2, section 12.10. Impacts on existing cables are discussed in volume 2, section 12.11.4.
NW-DD-1	***Dredging and disposal**:* In areas of authorised dredging activity, including those subject to navigational dredging, proposals for other activities will not be supported unless they are compatible with the dredging activity.	No	The Proposed Development does not involve any proposals that would affect navigable channels and open at-sea disposal sites.
NW-DD-2	***Dredging and disposal**:* Proposals that cause significant adverse impacts on licensed disposal sites should not be supported. Proposals that may have significant adverse impacts on licensed disposal sites must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant. If it is not possible to mitigate the significant adverse impacts, proposals must state the case for proceeding.	No	The Proposed Development does not involve any proposals that would affect navigable channels and open at-sea disposal sites.
NW-DD-3	***Dredging and disposal**:* Proposals for the disposal of dredged material must demonstrate that they have been assessed against the waste hierarchy. Where there is the need to identify new dredge disposal sites, including alternative use sites, proposals should be supported if they conform to best practice and guidance.	No	The Proposed Development does not involve any proposals for the disposal of dredged material.
NW-OG-1	***Oil and gas**:* Proposals in areas where a licence for oil and gas has been granted or formally applied for should not be authorised unless it is demonstrated that the other development or activity is compatible with the oil and gas activity.	Yes	The purpose of the Proposed Development is to transport up to 4.5 million tonnes per annum (MTPA) of carbon dioxide (CO_2) from a number of industrial emitters in the North West of England and Wales for permanent geological storage in depleted offshore oil and gas reservoirs. Consultation with oil and gas operators and other energy infrastructure operators are measures adopted as part of the Proposed Development listed in volume 2, section 12.10. Impacts upon oil and gas licence blocks are considered within volume 2, section 12.11.6.
NW-OG-2	***Oil and gas**:* Proposals within areas of geological oil and gas extraction potential demonstrating compatibility with future extraction activity will be supported.	Yes	The purpose of the Proposed Development is to transport up to 4.5 MTPA of CO_2 from a number of industrial emitters in the North West of England and Wales for permanent geological storage in depleted

Policy Code	NWMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
			offshore oil and gas reservoirs. Consultation with oil and gas operators are measures adopted as part of the Proposed Development listed in volume 2, section 12.10. Impacts upon oil and gas licence blocks are considered within volume 2, section 12.11.6.
NW-PS-1	***Ports, harbours and shipping**:* In line with the National Policy Statement for Ports, sustainable port and harbour development should be supported. Only proposals demonstrating compatibility with current port and harbour activities will be supported. Proposals within statutory harbour authority areas or their approaches that detrimentally and materially affect safety of navigation, or the compliance by statutory harbour authorities with the Open Port Duty or the Port Marine Safety Code, will not be authorised unless there are exceptional circumstances. Proposals that may have a significant adverse impact upon future opportunity for sustainable expansion of port and harbour activities, must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.	No	The Proposed Development does not involve proposals for ports, harbours and shipping activities, and nor will it prevent the support and enhancement of ports, harbours, and shipping activities. See the Shipping and Navigation chapter (volume 2, chapter 9) for full details.
NW-PS-2	***Ports, harbours and shipping**:* Proposals that require static sea surface infrastructure or that significantly reduce under-keel clearance must not be authorised within or encroaching upon International Maritime Organization routeing systems unless there are exceptional circumstances.	No	The Proposed Development does not involve proposals for ports, harbours and shipping activities, and nor will it prevent the support and enhancement of ports, harbours, and shipping activities. See the Shipping and Navigation chapter (volume 2, chapter 9) for full details.
NW-PS-3	***Ports, harbours and shipping**:* Proposals that require static sea surface infrastructure or that significantly reduce under-keel clearance which encroaches upon high density navigation routes, strategically important navigation routes, or that pose a risk to the viability of passenger services, must not be authorised unless there are exceptional circumstances.	No	The Proposed Development does not involve proposals for ports, harbours and shipping activities, and nor will it prevent the support and enhancement of ports, harbours, and shipping activities. See the Shipping and Navigation chapter (volume 2, chapter 9) for full details.
NW-PS-4	***Ports, harbours and shipping**:* Proposals promoting or facilitating sustainable coastal and/or short sea shipping as an alternative to road, rail or air transport will be supported where appropriate.	No	The Proposed Development does not involve proposals for ports, harbours and shipping activities, and nor will it prevent the support and enhancement of ports, harbours, and shipping activities. See the Shipping and Navigation chapter (volume 2, chapter 9) for full details.
NW-REN-1	***Renewables**: Proposals that enable the provision of renewable energy technologies and associated supply chains, will be supported.*	No	The purpose of the Proposed Development is to transport up to 4.5 MTPA of CO_2 from a number of industrial emitters in the North West of England and Wales for permanent geological storage in depleted offshore oil and gas reservoirs. The Proposed Development is being developed in parallel with and as a key part of the HyNet Northwest full-chain hydrogen and Carbon Capture and Storage (CCS) industrial decarbonisation project (the HyNet Project), which is designed to transform a region of the UK into the world's first low carbon industrial cluster by 2030.
NW-REN-2	***Renewables**: Proposals for new activity within areas held under a lease or an agreement for lease for renewable energy generation should not be authorised, unless it is demonstrated that*	No	The purpose of the Proposed Development is to transport up to 4.5 MTPA of CO_2 from a number of industrial emitters in the North West of England and Wales for permanent geological storage in depleted offshore oil and gas reservoirs. Consultation with energy infrastructure operators are measures

Policy Code	NWMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
	the proposed development or activity will not reduce the ability to construct, operate or decommission the existing or planned energy generation project.		adopted as part of the Proposed Development listed in volume 2, section 12.10.
NW-REN-3	***Renewables**:* Proposals for the installation of infrastructure to generate offshore renewable energy, inside areas of identified potential and subject to relevant assessments, will be supported.	No	The Proposed Development does not involve proposals for the installation of infrastructure to generate offshore renewable energy
NW-HER-1	***Heritage assets**:* Proposals that demonstrate they will conserve and enhance the significance of heritage assets will be supported. Where proposals may cause harm to the significance of heritage assets, proponents must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - any harm to the significance of heritage assets. If it is not possible to mitigate, then public benefits for proceeding with the proposal must outweigh the harm to the significance of heritage assets.	Yes	A specialist archaeological contractor (MSDS) was commissioned to undertake a Marine Archaeological Technical Report (volume 3, appendix N). This has been used to inform the Marine Archaeology chapter (volume 2, chapter 11). The potential for harm to the significance of marine heritage assets by the Proposed Development has been assessed in volume 2, section 11.11, which includes the assessment of designated and non-designated marine heritage assets identified within the Marine Archaeology Study Area (MASA). Mitigation measures have been adopted as part of the Proposed Development to protect the known archaeological assets and make provisions for those assets that are discovered during the Proposed Development in the form of the production of an outline Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) (Volume 4, appendix U) which accompany this ES.
NW-SCP-1	***Seascape and landscape**:* Proposals should ensure they are compatible with their surroundings and should not have a significant adverse impact on the character and visual resource of the seascape and landscape of the area. The location, scale and design of proposals should take account of the character, quality and distinctiveness of the seascape and landscape. Proposals that may have a significant adverse impact on the seascape and landscape of the area should demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant. If it is not possible to mitigate, the public benefits for proceeding with the proposal must outweigh significant adverse impacts to the seascape and landscape of the area. *Proposals within or relatively close to nationally designated areas should have regard to the specific statutory purposes of the designated area. Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks and Areas of Outstanding Natural Beauty.*	Yes	A Seascape, Landscape and Visual Impact Assessment (SLVIA) has been completed for the Proposed Development using methods derived from best practice guidance. (volume 3, appendix C2). The conclusion reached in the SLVIA is that in seascape, landscape, and visual terms, it is considered that the Proposed Development can be accommodated without significant effects on seascape, landscape character, and visual amenity.
NW-FISH-1	**Fisheries**: Proposals that support a sustainable fishing industry, including the industry's diversification, should be supported.	No	The Proposed Development does not involve proposals that support a sustainable fishing industry.
NW-FISH-2	**Fisheries**: Proposals that enhance access for fishing activities should be supported. Proposals that may have significant adverse impacts on access for fishing activities must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate	Yes	Impacts on commercial fisheries have been assessed in volume 2, chapter 10. The Proposed Development will have a Fisheries Liaison Officer (FLO) in place. See the Commercial Fisheries chapter (volume 2, chapter 10) for full details.

Policy Code	NWMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
	- adverse impacts so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.		
NW-FISH-3	**Fisheries**: Proposals that enhance essential fish habitat, including spawning, nursery and feeding grounds, and migratory routes, should be supported. Proposals that may have significant adverse impacts on essential fish habitat, including spawning, nursery and feeding grounds, and migratory routes, must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant.	Yes	The areas of essential fish habitat potentially impacted have been identified in the Marine Biodiversity Technical Report (volume 3, appendix I) and summarised in the Marine Biodiversity baseline (volume 2, section 7.8.2). The impacts as a result of the Proposed Development are assessed in detail in volume 2, sections 7.12 and 7.13. The Environmental Impact Assessment (EIA) and Cumulative Effects Assessment (CEA) concluded that there are no significant adverse impacts on essential fish habitat.
NW-EMP-1	***Employment**:* Proposals that result in a net increase in marine-related employment will be supported, particularly where they meet one or more of the following: 1) are aligned with local skills strategies and support the skills available 2) create a diversity of opportunities 3) create employment in locations identified as the most deprived 4) implement new technologies - in, and adjacent to, the north west marine plan areas.	Yes	The Proposed Development, as part of the wider HyNet North West Project, will create new roles whilst safeguarding existing jobs which may have otherwise been lost through the rising costs of carbon emissions. Developing a low carbon cluster across the North West of England and North East Wales will create learning, training and upskilling opportunities, supporting the levelling up of the region to thrive into a low carbon future.
NW-CC-1	***Climate change**:* Proposals that conserve, restore or enhance habitats that provide flood defence or carbon sequestration will be supported. Proposals that may have significant adverse impacts on habitats that provide a flood defence or carbon sequestration ecosystem service must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant d) compensate for significant adverse impacts that cannot be mitigated.	Yes	The Proposed Development will help to reduce CO_2 emissions and meet climate policy targets in the long-term by allowing CO_2 transport and storage. The Proposed Development will have a beneficial net effect arising from the CO_2 transportation and long-term storage by the Proposed Development, enabled by the onshore transportation and pressurisation of CO_2 undertaken by the onshore elements of the wider CCS project. See the Climate Change chapter (volume 2, chapter 13) for full details.
NW-CC-2	***Climate change**:* Proposals in the north west marine plan areas should demonstrate for the lifetime of the project that they are resilient to the impacts of climate change and coastal change.	Yes	The assessment of climate risk to the Proposed Development has been scoped out as effects are anticipated to be not significant. Studies conducted from Liverpool Bay have shown that extreme wind and wave climates are not expected to change significantly from those that are currently exhibited. Additionally, long-term analyses have illustrated that although there was a slight increase in the severity of most extreme events, there was little change in the extreme wave climate predicted for Liverpool Bay. The Proposed Development will be re-using and refurbishing existing offshore infrastructure, and introducing a new offshore platform that have been designed for resilience to storms in Liverpool Bay and have been proven operationally. The design of construction and refurbishment works to the sea-surface infrastructure will be to appropriate engineering and safety standards taking into account metocean data for this location. The pipeline and gas injection well are all undersea (and indeed under the seabed in the case of the sequestration volume) with minimal vulnerability to storm events.

Policy Code	NWMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
NW-CC-3	***Climate change***: Proposals in the north west marine plan areas, and adjacent marine plan areas, that are likely to have significant adverse impact on coastal change, or on climate change adaptation measures inside and outside of the proposed project areas, should only be supported if they can demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant.	No	The Proposed Development is not likely to have a significant adverse impact on coastal change or on climate change adaptation.
NW-CCUS-1	**Carbon capture usage and storage**: Decommissioning programmes for oil and gas facilities should demonstrate that they have considered the potential for re-use of infrastructure.	Yes	The Proposed Development is a CCUS project that make use of existing oil and gas infrastructure wherever possible, including pipelines and offshore platforms (OPs). See the Proposed Development Description (volume 1, chapter 3) and Site Selection and Consideration of Alternatives (volume 1, chapter 4) for full details.
NW-CCUS-2	**Carbon capture usage and storage**: Carbon capture, usage and storage proposals incorporating the re-use of existing oil and gas infrastructure will be supported.	Yes	The Proposed Development is a CCUS project that make use of existing oil and gas infrastructure wherever possible, including pipelines and offshore platforms (OPs). See the Proposed Development Description (volume 1, chapter 3) and Site Selection and Consideration of Alternatives (volume 1, chapter 4) for full details.
NW-CCUS-3	**Carbon capture usage and storage**: *Proposals associated with the deployment of low carbon infrastructure for industrial clusters should be supported.*	Yes	The Proposed Development will form part of the wider HyNet Carbon Dioxide Transportation and Storage Project ('the Project'). The Project will include infrastructure to produce and distribute low carbon hydrogen. The hydrogen is produced using natural gas, with the resultant CO_2 emissions captured and stored. The aim of the Project is to reduce CO_2 emissions from industry, homes, and transport and support economic growth in the North West of England and North Wales.
NW-AIR-1	***Air quality and emissions***: *Proposals must assess their direct and indirect impacts upon local air quality and emissions of greenhouse gases.* *Proposals that are likely to result in increased air pollution or increased emissions of greenhouse gases must demonstrate that they will, in order of preference:* *a) avoid* *b) minimise* *c) mitigate* *- air pollution and/or greenhouse gas emissions in line with current national and local air quality objectives and legal requirements.*	Yes	Emissions of greenhouse gases associated with the Proposed Development are assessed within the Climate Change chapter (volume 2, chapter 13). Air quality effects during construction, operation, maintenance and decommissioning of the Proposed Development are not considered significant. See volume 3, appendix C.1.
NW-ML-1	***Marine litter***: Public authorities must make adequate provision for the prevention, re-use, recycling and disposal of waste to reduce and prevent marine litter. Public authorities should aspire to undertake measures to remove marine litter within their jurisdiction.	No	Not applicable
NW-ML-2	***Marine litter***: *Proposals that facilitate waste re-use or recycling to reduce or remove marine litter will be supported.* *Proposals that could potentially increase the amount of marine litter in the marine plan areas must include measures to, in order of preference:* *a) avoid* *b) minimise* *c) mitigate*	Yes	The Mitigation measures captured within the ES would avoid the deliberate introduction of litter into the marine plan area; and minimise the risk of accidental release of litter. The Waste Management Plan will adhere to the highest tiers of the Waste Hierarchy, all relevant legislation and the Applicant's waste management procedures. Waste storage areas will be incorporated into the Detailed Design. Waste segregation measures will be

Policy Code	NWMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
	- waste entering the marine environment.		put in place by the Construction Contractor as implemented in the detailed CEMP and WMP. Waste management measures are captured in the Environmental Management Plan (EMP) (volume 4, Appendix R).
NW-WQ-1	***Water quality**:* Proposals that protect, enhance and restore water quality will be supported. Proposals that cause deterioration of water quality must demonstrate that they will, in order of preference: *a) avoid* *b) minimise* *c) mitigate* - deterioration of water quality in the marine environment.	Yes	Potential impacts from the Proposed Development on water quality have been assessed in the Physical Processes chapter (volume 2, chapter 6). The EIA and CEA concluded that there are no significant adverse impacts on water quality.
NW-ACC-1	***Access**:* Proposals demonstrating appropriate enhanced and inclusive public access to and within the marine area, including the provision of services for tourism and recreation activities, will be supported. Proposals that may have significant adverse impacts on public access should demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant.	No	The Proposed Development will not enhance access to and within the marine area, nor will it prevent public access. See the Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.
NW-TR-1	***Tourism and recreation**:* Proposals that promote or facilitate sustainable tourism and recreation activities, or that create appropriate opportunities to expand or diversify the current use of facilities, should be supported. Proposals that may have significant adverse impacts on tourism and recreation activities must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant.	No	The Proposed Development will not facilitate tourism and recreation activities, nor will it have significant adverse impacts on tourism and recreation. See the Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.
NW-SOC-1	***Social benefits**: Those bringing forward proposals should consider and demonstrate how their development shall enhance public knowledge, understanding, appreciation and enjoyment of the marine environment as part of (the design of) the proposal.*	No	Not applicable
NW-DEF-1	**Defence**: Proposals in or affecting Ministry of Defence areas should only be authorised with agreement from the Ministry of Defence.	No	The Proposed Development will not affect Ministry of Defence areas. See the Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.
NW-MPA-1	***Marine protected areas**:* Proposals that support the objectives of marine protected areas and the ecological coherence of the marine protected area network will be supported. Proposals that may have adverse impacts on the objectives of marine protected areas must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts, with due regard given to statutory advice on an ecologically coherent network.	Yes	Designated sites and features of importance within the physical processes and marine biodiversity study areas and have been identified in volume 2, chapter 6 and 7 respectively. In both chapters, the EIA and CEA concluded that there are no significant adverse impacts on the objectives of marine protected areas.
NW-MPA-2	***Marine protected areas**:* Proposals that enhance a marine protected area's ability to adapt to climate	No	The Proposed Development will not enhance nor adversely impact on a marine protected area's ability to adapt to climate change.

Policy Code	NWMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
	change, enhancing the resilience of the marine protected area network, will be supported. Proposals that may have adverse impacts on an individual marine protected area's ability to adapt to the effects of climate change, and so reduce the resilience of the marine protected area network, must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts.		
NW-MPA-3	***Marine protected areas**:* Where statutory advice states that a marine protected area site condition is deteriorating or that features are moving or changing due to climate change, a suitable boundary change to ensure continued protection of the site and coherence of the overall network should be considered.	No	Not applicable
NW-MPA-4	***Marine protected areas**:* Proposals that may have significant adverse impacts on designated geodiversity must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant.	Yes	Designated sites and sites of interest due to geological importance within the physical processes study area have been identified in volume 2, section 6.7.12. Potential impacts have also been identified and the significance of the effects on physical processes receptors has been assessed in volume 2, section 6.11.
NW-BIO-1	**Biodiversity**: Proposals that enhance the distribution of priority habitats and priority species will be supported. Proposals that may have significant adverse impacts on the distribution of priority habitats and priority species must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant d) compensate for significant adverse impacts that cannot be mitigated.	Yes	The Proposed Development will aim to conserve habitat through a number of embedded mitigation measures adopted to reduce the impacts of the Proposed Development (volume 2, section 7.11).
NW-BIO-2	**Biodiversity**: Proposals that enhance or facilitate native species or habitat adaptation or connectivity, or native species migration, will be supported. Proposals that may cause significant adverse impacts on native species or habitat adaptation or connectivity, or native species migration, must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant d) compensate for significant adverse impacts that cannot be mitigated.	Yes	Embedded mitigation measures have been outlined in section 7.11, and tertiary mitigation is considered where the significance of an impact is moderate or major to reduce the significance of the impact to negligible or minor (volume 2, sections 7.12 and 7.13).
NW-BIO-3	**Biodiversity**: Proposals that conserve, restore or enhance coastal habitats, where important in their own right and/or for ecosystem functioning and provision of ecosystem services, will be supported. Proposals must take account of the space required for coastal habitats, where important in their own right and/or for ecosystem functioning and provision of ecosystem services, and demonstrate that they will, in order of preference: a) avoid b) minimise	Yes	Volume 2, section 7.12 considers the magnitude, sensitivity and significance of the impacts associated with the Proposed Development on benthic habitats. Embedded mitigation measures have been outlined in volume 2, section 7.11, and each impact has been comprehensively assessed in volume 2, section 7.12 and where required, tertiary mitigation has been suggested. As a result, the Proposed Development seeks to conserve the function and services provided by coastal habitats.

Policy Code	NWMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
	c) mitigate d) compensate for - net habitat loss.		
NW-INNS-1	**Invasive non-native species**: Proposals that reduce the risk of introduction and/or spread of non-native invasive species should be supported. Proposals must put in place appropriate measures to avoid or minimise significant adverse impacts that would arise through the introduction and transport of invasive non-native species, particularly when: 1) moving equipment, boats or livestock (for example fish or shellfish) from one water body to another 2) introducing structures suitable for settlement of invasive non-native species, or the spread of invasive non-native species known to exist in the area.	Yes	The implementation of an EMP (volume 4, Appendix R) as part of the embedded measures adopted by the Proposed Development (volume 2, section 7.11) will manage and reduce the risk of introduction or spread of INNS. The INNS Management Plan is presented in volume 4, appendix T.
NW-INNS-2	**Invasive non-native species**: Public authorities with functions to manage activities that could potentially introduce, transport or spread invasive non-native species should implement adequate biosecurity measures to avoid or minimise the risk of introducing, transporting or spreading invasive non-native species.	No	Not applicable
NW-DIST-1	**Disturbance**: Proposals that may have significant adverse impacts on highly mobile species through disturbance or displacement must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant.	Yes	Potential impacts on marine biodiversity receptors (including underwater noise) from Proposed Development have been identified in the key parameters for assessment in section 7.9 and further assessed in sections 7.12 and cumulatively with other projects in section 7.13. Embedded mitigation measures have been outlined in section 7.11, and each impact has been comprehensively assessed in section 7.12.
NW-UWN-1	**Underwater noise**: Proposals that result in the generation of impulsive sound must contribute data to the UK Marine Noise Registry as per any currently agreed requirements. Public authorities must take account of any currently agreed targets under the Marine Strategy Part One Descriptor 11.	Yes	The Applicant will comply with the requirements, and this has been adopted in the Enhancement, Mitigation and Monitoring Commitments (volume 3, appendix E).
NW-UWN-2	**Underwater noise**: Proposals that result in the generation of impulsive or non-impulsive noise must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts on highly mobile species so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals must state the case for proceeding.	Yes	Noise modelling has been undertaken (volume 3, appendix J). The potential impacts of underwater noise resulting from the construction, operations and maintenance, and decommissioning phases of the Proposed Development have been considered in the assessment of impacts in the Marine Biodiversity chapter (volume 2, chapter 7), and appropriate mitigation measures have been proposed.
NW-CE-1	**Cumulative effects**: Proposals which may have adverse cumulative effects with other existing, authorised, or reasonably foreseeable proposals must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse cumulative and/or in-combination effects so they are no longer significant.	Yes	The cumulative effects of the Proposed Development have been assessed in volume 3, appendix F and are summarised in the relevant topic chapters (volume 2, chapters 6 to 13).
NW-CBC-1	**Cross-border co-operation**: Proposals must consider cross-border impacts throughout the lifetime of the proposed activity. Proposals that impact upon one or more marine plan areas or terrestrial environments must show evidence of the relevant public authorities (including other countries) being consulted and responses considered.	Yes	The Transboundary Impacts Screening (volume 3, appendix G) identified the potential for transboundary impacts associated with the Proposed Development for the following topics: • Climate Change; • Fish and Shellfish Ecology; • Marine Mammals;

Policy Code	NWMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
			• Offshore Ornithology; • Shipping and Navigation; and • Commercial Fisheries. These topics are further considered for transboundary impacts within the respective topic chapters contained in volume 2 of the ES.

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Table 4.2: Compliance with the Welsh National Marine Plan (Wales)

WNMP Policy No.	WNMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
GEN_01	**Planning policy:** There is a presumption in favour of the sustainable development of the plan area in order to contribute to Wales' well-being goals.	Yes	The Proposed Development supports sustainable development and Planning Policy Wales (February 2021), which considers the Well-being of Future Generations Act.
GEN_02	**Planning policy:** Relevant public authorities should take a proportionate, risk-based approach to application of relevant marine planning policies in decision making.	Yes	The Marine Licence application for the new marine infrastructure, the Carbon Storage Permit application for the permanent geological storage of CO_2, and the supporting Environmental Statement (ES), will be subject to public consultation, and consideration of the EIA by Natural Resources Wales (NRW) and the Offshore Petroleum Regulator (OPRED), and associated decision on the licences/permit. In that regard, the Applicant understands that the relevant public authorities will take a proportionate, risk-based approach to the application of relevant marine planning policies in their decision making.
ECON_01	**Sustainable economic growth**: Proposals for economically sustainable activities are encouraged, particularly where they contribute to: • the sustainable management of natural resources thereby supporting ecosystem resilience; • a more resilient economy; • employment opportunities particularly for coastal communities; • protecting and creating employment at all skill levels; • maintaining communities with a high-density of Welsh speakers; and/or • tackling poverty by supporting deprived coastal communities.	Yes	The Proposed Development, as part of the wider HyNet North West Project, will create new roles whilst safeguarding existing jobs which may have otherwise been lost through the rising costs of carbon emissions. Developing a low carbon cluster across the North West of England and North East Wales will create learning, training and upskilling opportunities, supporting the levelling up of the region to thrive into a low carbon future.
ECON_02	**Coexistence**: Proposals should demonstrate how they have considered opportunities for coexistence with other compatible sectors in order to optimise the value and use of the marine area and marine natural resources.	Yes	The new marine infrastructure will be installed close to the Applicant's existing assets, and in similar construction techniques. The routing and location of the new infrastructure has also accounted for the existing and future users of Liverpool Bay. The Applicant therefore considers that the Proposed Development will be able to coexist with other compatible sectors in order to optimise the value

WNMP Policy No.	WNMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
			and use of the marine area, and marine natural resources. See the Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.
SOC_01	**Access to the marine environment:** Proposals that maintain or enhance access to the marine environment are encouraged.	No	The Proposed Development will not enhance access to the marine environment, nor will it prevent public access. See the Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.
SOC_02	**Well-being of coastal communities:** Proposals that contribute to the well-being of coastal communities are encouraged.	Yes	The Applicant considers that the Proposed Development complies with Planning Policy Wales (February 2021) which considers the Well-being of Future Generations Act.
SOC_03	**Marine pollution incidents:** Proposals should demonstrate how they minimise their risk of causing or contributing to marine pollution incidents.	Yes	All project vessels will have control measures and shipboard oil pollution emergency plans (SOPEP) in place and will adhere to MARPOL Annex I requirements. See the EMP (volume 4, appendix R) for full details.
SOC_04	**Welsh language and culture:** Proposals that contribute to the promotion and facilitation of the use of the Welsh language and culture are encouraged.	No	Not applicable
SOC_05	**Historic assets:** Proposals should demonstrate how potential impacts on historic assets and their settings have been taken into consideration and should, in order of preference: a) avoid adverse impacts on historic assets and their settings; and/or b) minimise impacts where they cannot be avoided; and/or c) mitigate impacts where they cannot be minimised. If significant adverse impacts cannot be avoided, minimised or mitigated, proposals must present a clear and convincing case for proceeding. Opportunities to enhance historic assets are encouraged.	Yes	A specialist archaeological contractor (MSDS) was commissioned to undertake a Marine Archaeological Technical Report (volume 3, appendix N). This has been used to inform the Marine Archaeology chapter (volume 2, chapter 11). The potential for harm to the significance of marine heritage assets by the Proposed Development has been assessed in volume 2, section 11.11, which includes the assessment of designated and non-designated marine heritage assets identified within the MASA. Mitigation measures have been adopted as part of the Proposed Development to protect the known archaeological assets and make provisions for those assets that are discovered during the Proposed Development in the form of the production of an outline WSI and PAD (volume 4, appendix U) which accompany this ES.
SOC_06	**Designated landscapes:** Proposals should demonstrate how potential impacts on the purposes and special qualities for which National Parks or Areas of Outstanding Natural Beauty have been designated have been taken into consideration and should, in order of preference: a) avoid adverse impacts on designated landscapes; and/or b) minimise impacts where they cannot be avoided; and/or c) mitigate impacts where they cannot be minimised. If significant adverse impacts cannot be avoided, minimised or mitigated, proposals must present a clear and convincing case for proceeding. Opportunities to enhance designated landscapes are encouraged.	Yes	A Seascape, Landscape and Visual Impact Assessment has been completed for the Proposed Development using methods derived from best practice guidance (volume 3, appendix C2). Designated landscapes within the SLVIA Study area were identified and none of them are predicted to experience significant indirect effects, as areas predicted to experience effects because of the Proposed Development are shown to experience indirect effects associated with the current offshore infrastructure.
SOC_07	**Seascapes:** Proposals should demonstrate how potential impacts on seascapes have been taken into consideration and should, in order of preference: a) avoid adverse impacts on seascapes; and/or b) minimise impacts where they cannot be avoided; and/or c) mitigate impacts where they cannot be minimised. If significant adverse impacts cannot be avoided, minimised or mitigated, proposals must present a clear and convincing case for proceeding. Opportunities to enhance seascapes are encouraged.	Yes	A Seascape, Landscape and Visual Impact Assessment has been completed for the Proposed Development using methods derived from best practice guidance (volume 3, appendix C2). The conclusion reached in the SLVIA is that in seascape, landscape, and visual terms, it is considered that the Proposed Development can be accommodated without significant effects on seascape, landscape character, and visual amenity.
SOC_08	**Resilience to coastal change and flooding:** Proposals should demonstrate how they are resilient to coastal change and flooding over their lifetime.	Yes	Cable burial depth will be sufficient to ensure cables remain buried during coastal changes. See the

WNMP Policy No.	WNMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
			Proposed Development Description (volume 1, chapter 3) for full details.
SOC_09	**Effects on coastal change and flooding:** Proposals should demonstrate how they: avoid significant adverse impacts upon coastal processes; and minimise the risk of coastal change and flooding; Proposals that align with the relevant Shoreline Management Plan(s) and its policies are encouraged.	Yes	An assessment of how the Proposed Development will affect coastal processes and the Shoreline Management Plan is provided in the Physical processes chapter (volume 2, chapter 6). The buried nature of the Proposed Development under the Talacre dune system, and Talacre Beach, will avoid potential impacts on coastal change and flooding.
SOC_10	**Minimising climate change:** Proposals should demonstrate how they, in order of preference: a) avoid the emission of greenhouse gases; and/or b) minimise them where they cannot be avoided; and/or c) mitigate them where they cannot be minimised. Where significant emission of greenhouse gases cannot be avoided, minimised or mitigated, proposals for regulated activities must present a clear and convincing case for proceeding.	Yes	The purpose of the Proposed Development is to transport up to 4.5 MTPA of CO_2 from a number of industrial emitters in the North West of England and Wales for permanent geological storage in depleted offshore oil and gas reservoirs.
SOC_11	**Resilience to climate change:** Proposals should demonstrate that they have considered the impacts of climate change and have incorporated appropriate adaptation measures, taking into account Climate Change Risk Assessments for Wales. Proposals that contribute to climate change adaptation and/or mitigation are encouraged.	Yes	The purpose of the Proposed Development is to transport up to 4.5 MTPA of CO_2 from a number of industrial emitters in the North West of England and Wales for permanent geological storage in depleted offshore oil and gas reservoirs. The Proposed Development has considered the impacts of climate change and incorporated appropriate adaptation measures, taking account Climate Risk Change Assessments for Wales.
ENV_01	**Resilient marine ecosystems:** Proposals should demonstrate how potential impacts on marine ecosystems have been taken into consideration and should, in order of preference: a) avoid adverse impacts; and/or b) minimise impacts where they cannot be avoided; and/or c) mitigate impacts where they cannot be minimised. If significant adverse impacts cannot be avoided, minimised or mitigated, proposals must present a clear and convincing case for proceeding. Proposals that contribute to the protection, restoration and/or enhancement of marine ecosystems are encouraged.	Yes	Potential impacts on marine ecosystems have been considered in the Marine Biodiversity chapter (volume 2, chapter 7) and the Inter-Related Effects chapter (volume 2, chapter 14). The Environmental Impact Assessment (EIA) and Cumulative Effects Assessment (CEA) concluded that there are no significant adverse impacts on the marine biodiversity receptors.
ENV_02	**Marine Protected Areas:** Proposals should demonstrate how they: avoid adverse impacts on individual Marine Protected Areas (MPAs) and the coherence of the network as a whole; have regard to the measures to manage MPAs; and avoid adverse impacts on designated sites that are not part of the MPA network.	Yes	Designated sites and features of importance within the physical processes and marine biodiversity study areas and have been identified in volume 2, chapter 6 and 7 respectively. In both chapters, the EIA and CEA concluded that there are no significant adverse impacts on the objectives of marine protected areas.
ENV_03	**Invasive non-native species:** Proposals should demonstrate how they avoid or minimise the risk of introducing and spreading invasive non-native species. Where appropriate, proposals should include biosecurity measures to reduce the risk of introducing and spreading of invasive non-native species.	Yes	The implementation of an EMP (volume 4, Appendix R) as part of the embedded measures adopted by the Proposed Development (volume 2, section 7.11) will manage and reduce the risk of introduction or spread of INNS. The INNS Management Plan is presented in volume 4, appendix T. A Biosecurity Method Statement will be implemented throughout the construction of the Proposed Development. The Biosecurity Method Statement will detail the locations and extent of any INNS identified, alongside appropriate measures to control and prevent spread or propagation of INNS. High-level recommendations for the treatment and removal of INNS will be identified.

WNMP Policy No.	WNMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
			Appropriate good hygiene measures (e.g. Check, Clean, Dry methods) will be detailed. Workers should be equipped with the necessary equipment, Personal Protective Equipment (PPE) and substances to implement biosecurity control measures, including effective hygiene and sanitation practices.
ENV_04	**Marine litter:** Proposals should demonstrate how they: avoid the deliberate introduction of litter into the marine plan area; and minimise the risk of accidental release of litter.	Yes	The Mitigation measures captured within the ES would avoid the deliberate introduction of litter into the marine plan area; and minimise the risk of accidental release of litter. The Waste Management Plan will adhere to the highest tiers of the Waste Hierarchy, all relevant legislation and the Applicant's waste management procedures. Waste storage areas will be incorporated into the Detailed Design. Waste segregation measures will be put in place by the Construction Contractor as implemented in the detailed CEMP and WMP. Waste management measures are captured in the EMP (volume 4, appendix R).
ENV_05	**Underwater noise:** Proposals should demonstrate that they have considered man-made noise impacts on the marine environment and, in order of preference: a) avoid adverse impacts; and/or b) minimise impacts where they cannot be avoided; and/or c) mitigate impacts where they cannot be minimised. If significant adverse impacts cannot be avoided, minimised or mitigated, proposals must present a clear and convincing case for proceeding.	Yes	Noise modelling has been undertaken (volume 3, appendix J). The potential impacts of underwater noise resulting from the construction, operations and maintenance, and decommissioning phases of the Proposed Development have been considered in the assessment of impacts in the Marine Biodiversity chapter (volume 2, chapter 7), and appropriate mitigation measures have been proposed.
ENV_06	**Air and water quality:** Proposals should demonstrate that they have considered their potential air and water quality impacts and should, in order of preference: a) avoid adverse impacts; and/or b) minimise adverse impacts where they cannot be avoided; and/or c) mitigate adverse impacts where they cannot be minimised. If significant adverse impacts cannot be avoided, minimised or mitigated, proposals must present a clear and convincing case for proceeding.	Yes	**Air quality**: Emissions of greenhouse gases associated with the Proposed Development are assessed within the Climate Change chapter (volume 2, chapter 14). Air quality effects during construction, operation, maintenance and decommissioning of the Proposed Development are not considered significant. See volume 3, appendix C.1. **Water quality**: Potential impacts from the Proposed Development on water quality have been assessed in the Physical Processes chapter (volume 2, chapter 6). The EIA and CEA concluded that there are no significant adverse impacts on water quality.
ENV_07	**Fish species and habitats:** Proposals potentially affecting important feeding, breeding (including spawning & nursery) and migration areas or habitats for key fish and shellfish species of commercial or ecological importance should demonstrate how they, in order of preference: a) avoid adverse impacts on those areas; and/or b) minimise adverse impacts where they cannot be avoided; and/or c) mitigate adverse impacts where they cannot be minimised; If significant adverse impacts cannot be avoided, minimised or mitigated, proposals must present a clear and convincing case for proceeding.	Yes	Potential impacts on fish and shellfish ecology receptors (including underwater noise and effects on important feeding, breeding (including spawning and nursery) and migration areas) from the Proposed Development have been identified in the key parameters for assessment in volume 2, section 7.9 and further assessed in volume 2, section 7.12 and cumulatively with other projects in volume 2, section 7.13. Embedded mitigation measures have been outlined in volume 2, section 7.11, and each impact has been comprehensively assessed in volume 2, section 7.12.
GOV_01	**Cumulative effects:** Proposals should demonstrate that they have assessed potential cumulative effects and should, in order of preference: a) avoid adverse effects; and/or b) minimise effects where they cannot be avoided; and/or c) mitigate effects where they cannot be minimised. If significant adverse effects cannot be avoided, minimised or mitigated, proposals must present a clear and convincing case for proceeding. Proposals that contribute to positive cumulative effects are encouraged.	Yes	The cumulative effects of the Proposed Development have been assessed in volume 3, appendix F and are summarised in the relevant topic chapters (volume 2, chapters 6 to 13).

WNMP Policy No.	WNMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
GOV_02	**Cross-border and plan compatibility:** Relevant public authorities, in making their decisions, should have regard to: any applicable policy in a relevant marine plan; any applicable policy in relevant terrestrial development plans or related documents; the Natural Resources Policy; any relevant local well-being plan(s) (including the local well-being assessment); and evidence in any relevant Area Statement(s) produced by Natural Resources Wales (NRW).	Yes	The Marine Licence application for the new marine infrastructure, the Carbon Storage Permit application for the permanent geological storage of CO_2, and the supporting ES, will be subject to public consultation, and consideration of the EIA by NRW and OPRED, and associated decision on the licences/permit. In that regard, the Applicant understands that the relevant public authorities will take account of cross-border and plan compatibility in their decision making.
SCI_01	**Using sound science responsibly:** Relevant public authorities should make decisions using sound evidence and a risk-based, proportionate approach. Where appropriate they should apply the precautionary principle and consider opportunities to apply adaptive management.	Yes	The Marine Licence application for the new marine infrastructure, the Carbon Storage Permit application for the permanent geological storage of CO_2, and the supporting ES, will be subject to public consultation, and consideration of the EIA by NRW and OPRED, and associated decision on the licences/permit. In that regard, the Applicant understands that the relevant public authorities will make their decisions using sound evidence and a risk-based approach, and where appropriate they will apply the precautionary principle and consider opportunities to apply adaptive management.
AGG_01a	**Aggregates (supporting):** Proposals for new aggregate extraction will be supported, within any tonnage limits, where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.	No	The Proposed Development does not involve any aggregate extraction.
AGG_01b	**Aggregates (supporting):** Relevant public authorities and the sector are encouraged, in liaison with other interested parties, to collaborate to understand opportunities: for the sustainable use of wider marine aggregate natural resources; to define and, once in place, further develop and refine Strategic Resource Areas for aggregates in order to support the sustainable development of the aggregate sector through marine planning.	No	The Proposed Development does not involve any aggregate extraction.
AQU_01a	**Aquaculture (supporting):** Proposals for new aquaculture developments will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.	No	The Proposed Development does not involve any aquaculture development.
AQU_01b	**Aquaculture (supporting):** Relevant public authorities and the sector are encouraged, in liaison with other interested parties, to collaborate to understand opportunities for the sustainable use of aquaculture resources including the identification of: natural resources that provide aquaculture potential opportunities to define and, once in place, further develop and refine Strategic Resource Areas for aquaculture in order to support the sustainable development of the aquaculture sector through marine planning.	No	The Proposed Development does not involve any aquaculture development.
D&D_01	**Dredging and disposal (supporting):** Proposals that maintain navigable channels and long term access to open at-sea disposal sites for appropriate material will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.	No	The Proposed Development does not involve any proposals that would affect navigable channels and open at-sea disposal sites. See the Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.
ELC_01a	**Low carbon energy (supporting) wind:** Proposals for offshore wind energy generation will be supported where they contribute to the objectives of	No	The Proposed Development will not prevent the development of offshore wind energy generation.

WNMP Policy No.	WNMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
	this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations. Proposals for wind >350MW will be considered by UK Government in accordance with relevant national policy. In determining an NSIP for a wind proposal, the decision maker will have regard to this plan. Any determination in relation to energy developments of any scale will be taken in accordance with this plan alongside any other relevant considerations.		
ELC_01b	**Low carbon energy (supporting) wind:** In order to understand future opportunities for offshore wind development, including floating technologies, this plan supports strategic planning for the sector. Relevant public authorities and the sector are encouraged, in liaison with other interested parties, to collaborate to understand opportunities for the sustainable use of wind energy resources including identification of: • natural resources that provide potential opportunity for future use; • evidence to de-risk consenting for the sector; and • opportunities to define and, once in place, further develop and refine Strategic Resource Areas for offshore wind energy resource safeguarding; in order to support the sustainable development of the sector through marine planning. Relevant public authorities should make appropriate evidence available to support planning and decision making in order to support the sustainable development of the sector through marine planning, where it is appropriate to do so.	No	The Proposed Development will not prevent the development of offshore wind energy generation.
ELC_02a	**Low carbon energy (supporting) wave:** Proposals for wave energy generation will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.	No	The Proposed Development will not prevent the development of wave energy generation.
ELC_02b	**Low carbon energy (supporting) wave:** In order to understand future opportunities for wave energy development, relevant public authorities and the sector are encouraged, in liaison with other interested parties, to collaborate to understand opportunities for the sustainable use of wave energy resources including identification of: • natural resources that provide potential opportunity for future use; • evidence to de-risk consenting for the sector; and • opportunities to define and, once in place, further develop and refine Strategic Resource Areas for wave energy resource safeguarding; in order to support the sustainable development of the sector through marine planning. Relevant public authorities should make appropriate evidence available to support planning and decision making in order to support the sustainable development of the sector through marine planning, where it is appropriate to do so.	No	The Proposed Development will not prevent the development of wave energy generation.
ELC_03a	**Low carbon energy (supporting) tidal stream:** Proposals for tidal stream energy generation will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.	No	The Proposed Development will not prevent the development of tidal stream energy generation.
ELC_03b	**Low carbon energy (supporting) tidal stream:** In order to understand future opportunities for tidal stream energy development, relevant public authorities and the sector are encouraged, in liaison with other interested parties, to collaborate to	No	The Proposed Development will not prevent the development of tidal stream energy generation.

WNMP Policy No.	WNMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
	understand opportunities for the sustainable use of tidal stream energy resources including identification of: • natural resources that provide potential opportunity for future use; • evidence to de-risk consenting for the sector; and • opportunities to define and, once in place, further develop and refine Strategic Resource Areas for tidal stream energy resource safeguarding; in order to support the sustainable development of the sector through marine planning. Relevant public authorities should make appropriate evidence available to support planning and decision making in order to support the sustainable development of the sector through marine planning, where it is appropriate to do so.		
ELC_04	**Low carbon energy (supporting) tidal range:** In order to understand future opportunities for tidal range development, strategic planning for the sector is encouraged. Relevant public authorities and the sector are encouraged, in liaison with other interested parties, to collaborate to: • collect evidence to support understanding of environmental constraints and opportunities for the sustainable use of the tidal range resource; • support understanding of the optimal siting of tidal lagoon developments across Wales as part of a wider, UK perspective; and • identify opportunities to define and, once in place, further develop and refine Strategic Resource Areas for tidal lagoon safeguarding purposes. Relevant public authorities should make appropriate evidence available to support planning and decision making in order to support the sustainable development of the sector through marine planning, where it is appropriate to do so.	No	The Proposed Development will not prevent the development of tidal range energy generation.
O&G_01a	**Oil and gas (supporting):** Proposals that maximise the economic recovery of oil and gas sustainably will be supported where they comply with the objectives of this plan, and fully meet the environmental safeguards contained within the statutory processes of awarding production licences and subsequent activity-specific approvals. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.	No	The purpose of the Proposed Development is to transport up to 4.5 MTPA of CO_2 from a number of industrial emitters in the North West of England and Wales for permanent geological storage in depleted offshore oil and gas reservoirs.
O&G_01b	**Oil and gas (supporting):** Welsh Government policy is to avoid the continued extraction of fossil fuels in intertidal areas and estuaries and coastal inlet waters that fall within the Welsh onshore licence area. Applications for new petroleum licenses in these areas should not be supported, unless required for mine safety or scientific purposes. Proposals for the development and extraction of oil and gas in these areas with land based elements must provide robust and credible evidence to demonstrate how they conform to the Planning Policy Wales Energy Hierarchy for Planning, including how they make a necessary contribution towards decarbonising the energy system.	No	The purpose of the Proposed Development is to transport up to 4.5 MTPA of CO_2 from a number of industrial emitters in the North West of England and Wales for permanent geological storage in depleted offshore oil and gas reservoirs.
O&G_02	**Oil and gas (supporting):** Proposals that support the long-term development of carbon capture and storage technology will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.	Yes	The Proposed Development is a carbon capture and storage project. The purpose of the Proposed Development is to transport up to 4.5 MTPA of CO_2 from a number of industrial emitters in the North West of England and Wales for permanent geological storage in depleted offshore oil and gas reservoirs. The Proposed Development complies with all the relevant general policies and sector safeguarding policies.

WNMP Policy No.	WNMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
FIS_01a	**Fisheries (supporting):** Proposals that support and enhance sustainable fishing activities will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.	Yes	Impacts on commercial fisheries have been assessed in volume 2, chapter 10. The Proposed Development will have a FLO in place. See the Commercial Fisheries chapter (volume 2, chapter 10) for full details.
FIS_01b	**Fisheries (supporting):** Relevant public authorities and the sector are encouraged, in liaison with other interested parties, to collaborate to understand opportunities to develop a strategic evidence base to improve understanding of opportunities for the sustainable development of fisheries in order to support the sustainable development of the fisheries sector through marine planning.	No	The Proposed Development will not prevent the support and enhancement of sustainable fishing activities. See the Commercial Fisheries chapter (volume 2, chapter 10) for full details.
P&S_01a	**Ports and shipping (supporting):** Proposals for ports, harbours and shipping activities will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.	No	The Proposed Development does not involve proposals for ports, harbours and shipping activities, and nor will it prevent the support and enhancement of ports, harbours, and shipping activities. See the Shipping and Navigation chapter (volume 2, chapter 9) for full details.
P&S_01b	**Ports and shipping (supporting):** Relevant public authorities and the sector are encouraged, in liaison with other interested parties, to collaborate to understand opportunities to support the sustainable development of the ports and shipping sector through marine planning.	No	The Proposed Development does not involve proposals for ports, harbours and shipping activities, and nor will it prevent the support and enhancement of ports, harbours, and shipping activities. See the Shipping and Navigation chapter (volume 2, chapter 9) for full details.
P&S_02	**Ports and shipping (supporting):** Proposals that provide for the maintenance, repair, development and diversification of port and harbour facilities will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.	No	The Proposed Development does not involve proposals for ports, harbours and shipping activities, and nor will it prevent the support and enhancement of ports, harbours, and shipping activities. See the Shipping and Navigation chapter (volume 2, chapter 9) for full details.
CAB_01	**Subsea cabling (supporting):** Proposals that facilitate the growth of digital communications networks and/or the optimal distribution of electricity will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.	No	The Proposed Development will not prevent the growth of digital communications networks and/or the optimal distribution of electricity. See the Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.
T&R_01a	**Tourism and recreation (supporting):** Proposals that demonstrate a positive contribution to tourism and recreation opportunities and policy objectives (for the sector) around the Welsh coast will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.	No	The Proposed Development will not prevent the delivery of the policies to support tourism and recreation. See the Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.
T&R_01b	**Tourism and recreation (supporting):** Relevant public authorities and the sector are encouraged, in liaison with other interested parties, to collaborate to understand opportunities for sustainable tourism and recreation around the Welsh coast, including: a) developing a strategic evidence base to improve understanding of current and potential tourism and recreation activities, including eco-tourism and other low impact activities; and b) opportunities to define areas of future opportunity for tourism and recreation; in order to support the sustainable development of the tourism and recreation sector through marine planning.	No	The Proposed Development will not prevent the delivery of the policies to support tourism and recreation. See the Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.
SAF_01	**Safeguarding strategic resources:** a: Proposals likely to have significant adverse impacts upon an established activity covered by a formal application	No	The Proposed Development is compatible with existing activities in the marine environment, and the Welsh National Marine Plan. See the

WNMP Policy No.	WNMP Policy	Does the project have the potential to impact the Policy?	How Does the Proposed Project Comply with the Policy?
	or authorisation must demonstrate how they will address compatibility issues with that activity. Proposals unable to demonstrate adequate compatibility must present a clear and convincing case for the proposal to progress under exceptional circumstances. b: Proposals likely to have significant adverse impacts upon an established activity not subject to a formal authorisation must demonstrate how they will address compatibility issues with that activity. Proposals unable to demonstrate adequate compatibility must present a clear and convincing case for proceeding. Under SAF 01 a and b, compatibility should be demonstrated through, in order of preference: a. Avoiding significant adverse impacts on those activities, and/or b. Minimising significant adverse impacts where these cannot be avoided; and/or c. Mitigating significant adverse impacts where they cannot be minimised.		Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.
SAF_02	**Safeguarding strategic resources:** Proposals which may have significant adverse impacts upon the prospects of any sector covered by this plan to engage in sustainable future strategic resource use (of resources identified by an SRA) must demonstrate how they will address compatibility issues with that potential resource use. Proposals unable to demonstrate adequate compatibility must present a clear and convincing case for proceeding. Compatibility should be demonstrated through, in order of preference: a. Avoiding significant adverse impacts on this potential strategic resource use, and/or b. Minimising significant adverse impacts where these cannot be avoided; and/or c. Mitigating significant adverse impacts where they cannot be minimised.	No	The Proposed Development is compatible with existing activities in the marine environment, and the Welsh National Marine Plan. See the Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.
DEF_01	**Defence (safeguarding):** Proposals that: • potentially affect Ministry of Defence (MOD) Danger Areas, Exercise Areas or strategic defence interests; and/or • potentially interfere with communication, surveillance and navigation facilities necessary for defence and national security; should only be authorised with the agreement of MOD.	No	The Proposed Development is compatible with the safeguarded defence activities. See the Infrastructure and Other Sea Users chapter (volume 2, chapter 12) for full details.

QUESTION 5: Reg 12(1) letter dated 1 July 2024 – comment 5

Details provided in response to OPRED, regarding the description of the proposed development plans as outlined in ES Chapter 3 are acknowledged. Please provide further details on each individual location i.e. Lennox, Hamilton, Hamilton North, new Douglas and the location wells to be drilled if these are not drilled from the location of the NUIs (or a MODU located next to NUI). The impact of drilling any planned wells should be included, with details of the drilling rig to be used, and any stabilisation material required. Any of the wells that are to be repurposed will also need to be assessed, along with an assessment of new topsides that are required for the NUIs.

Eni Response: The following sections provide information to clarify the location of the injection, monitoring, and sentinel wells for the Proposed Development.

Further clarification is also provided on from where drilling activities will be performed and the details of the proposed MODU.

New Douglas

A New Douglas platform will be installed within the established 500m zone, approximately 190m to the north of the existing Douglas accommodation platform, just beyond the blow-out/H_2S dispersion radius of the existing facilities at approximate coordinates E461607 N5932596. The new Douglas CCS platform will be a Normally Unmanned Installation (NUI), acting as a hub for the CCS operations. It will provide overnight emergency shelter in a purpose-built module for six persons

The topsides will comprise cellar, mezzanine, and weather decks, and have overall dimensions of approximately 33 m in length, 30 m in width, and 35.5 m in height to the weather deck/helideck. The main dimensions, and fabricated components accommodated on the New Douglas topsides are presented in **Table 3.1** in response to **Question 3**.

The Douglas CCS jacket shown in **Question 41**, will be a four-legged steel structure measuring approximately 20 m x 20 m at the lower level and 17.5 m x 17.5 m at the upper level. The jacket will support several equipment items including:

- 8 risers, of which 3 are provision for future dense phase gas;
- 5 J-tubes, of which one is provision for a possible future cable from PoA;
- 4 caissons for riser support;
- caisson for J-tubes support;
- cathodic protection monitoring J-tube; and
- Zodiac landing platform.

As a worst-case, it was estimated that the footprints of jack-up vessels for heavy lifting would result in up to 736 m^2 of disturbance during the installation of the new Douglas NUI jacket, and topsides. However, these footprints would be similar in size to those that already exist from the current, and historical operations around the existing Douglas Complex. These spudcan footprints would represent approximately 0.3% of the up to 1.91 km^2 of temporary subtidal habitat loss and/or disturbance during the construction phase of the whole Proposed Development. This 1.91 km^2 would represent just 0.08% of the overall area of the Liverpool Bay SPA. This would have a negligible effect on benthic habitats, and hence prey availability within the Liverpool Bay SPA. The effect will, therefore, be of **minor** adverse significance, which is **not significant** in EIA terms.

Hamilton Main

A new deck will be installed on the satellite platform of Hamilton after removal of the existing topside. The components will be delivered to the NUI completely fabricated and ready for integration onto the jacket. The main dimensions, and fabricated components on the new Hamilton Main topsides are presented in **Table 3.2** in response to **Question 3**.

The carbon storage development plan requires a total of four injector wells located on Hamilton Main.

Each of the injection wells will be side-tracked from existing wells to enable the installation of CO_2 resistant tubulars and cement. They are planned to be drilled as close to existing production wells as possible.

A monitoring well will also be drilled to the flanks of Hamilton carbon store for long-term pressure, saturation, and plume movement monitoring. This well will be a new well drilled from an existing spare slot to a location remote from the planned injection wells, on the flanks of the reservoir, in an area previously not drilled. This work will mobilise a sediment plume which extends 8 km to the east and west, with peak SSC values of c. 360 mg/l constrained to the site itself, and average suspended sediment concentrations (SSC) of less than a tenth of this peak value at <3 mg/l across most of the plume. Corresponding deposition relates to approximately 50 mm at the site itself and average sedimentation of approximately 0.03 mm across most of the plume. The magnitude of the impact will therefore be low due to being within background levels and of a temporary nature. The sensitivity of the receptors is considered low due to the recoverable nature of the seabed within the Designated Sites. The effect will, therefore, be of **minor** adverse significance, which is **not significant** in EIA terms. Further details are contained in the Offshore ES, Chapter 6, Section 6.11.1.

As a worst-case, it was estimated that the footprints of jack-up vessels (e.g. Valaris Norway, and ISP for drilling) would result in up to 736 m^2 of disturbance during drilling, and the installation of the new Hamilton Main NUI topsides. These spudcan footprints would represent approximately 0.3% of the up to 1.91 km^2 of temporary subtidal habitat loss and/or disturbance during the construction phase of the whole Proposed

Development. This 1.91 km² would represent just 0.08% of the overall area of the Liverpool Bay SPA. However, these footprints already exist from the current, and historical operations around the platform, as shown in **Figure 5.1**. This would have a negligible effect on benthic habitats, and hence prey availability within the Liverpool Bay SPA. The effect will, therefore, be of **minor** adverse significance, which is **not significant** in EIA terms.

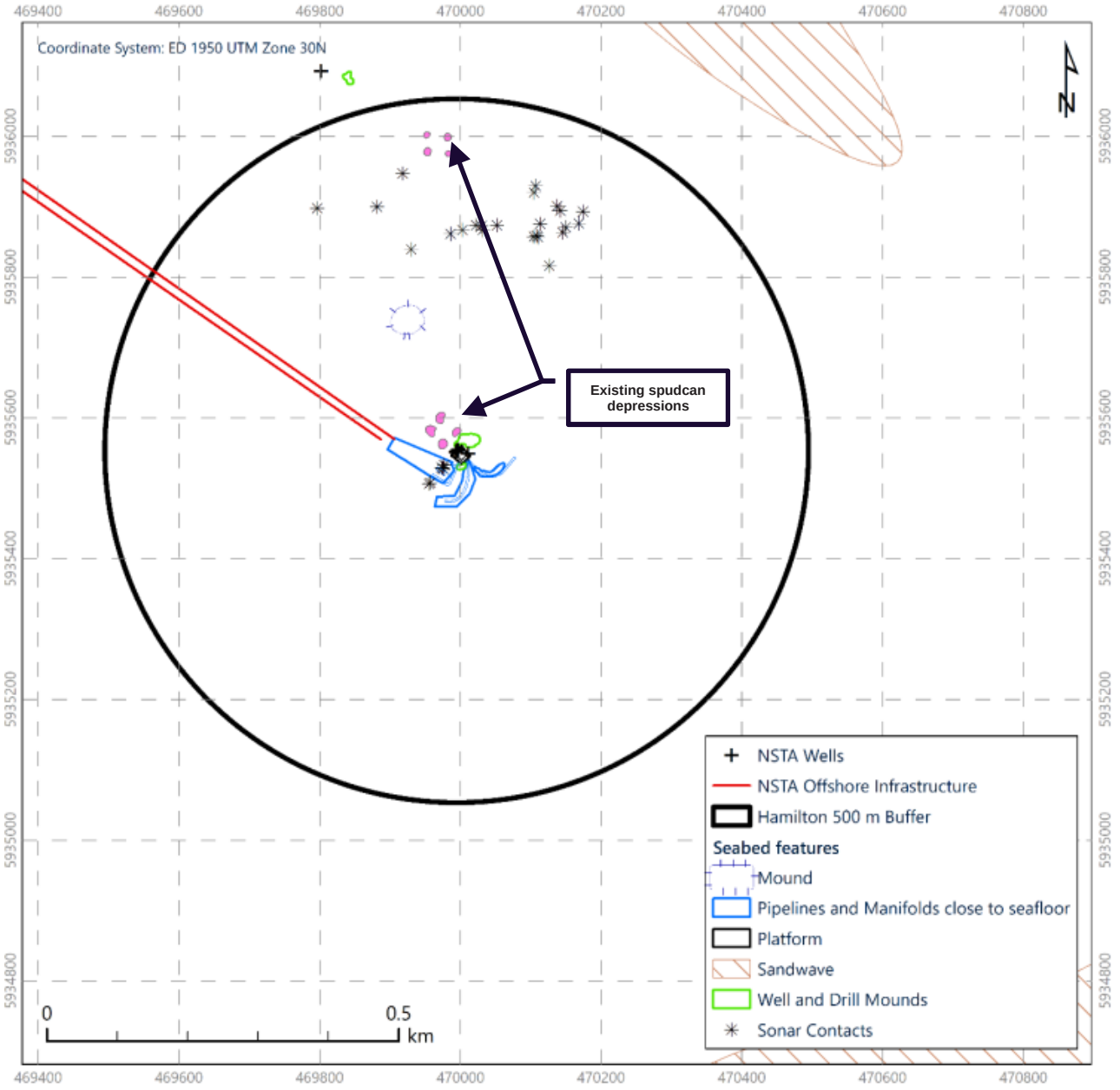


Figure 5.1: Location of existing spudcan depressions around Hamilton Main NUI

Further works will occur in the form of a top-side replacement, to convert the facility for CO_2 treatment and injection. These works will, however, occur above the sea surface and not mobilise any sediment into the marine environment.

Table 5.1 presents an overview of the proposed CCS wells including their surface location coordinates, well identifier, estimated Measured Depth (MD) and estimated True Vertical Depth (TVD).

Table 5.1: Overview of Wells at Hamilton Main

Purpose	Well type	Well name	Easting	Northing	Proposed kick-off point m MD	Measured Depth (MD) m	True Vertical Depth (TVD) m
Injector	Sidetrack	C110/13a-HA (ex.110/13-H1 ST1)	469685	5936706.2	863	1498	932
		C110/13a-HB (ex.110/13-H2 ST1)	470200.5	5937333.5	1686	2380	932
		110/13a-HC (ex.110/13-H3 ST1)	470200.5	5935501.56	893	1366	932
		C110/13a-HD (ex.110/13-H4 ST1)	470200.5	5934462.3	1579	2219	933
Monitor	New well	C110/13a-HE (ex.110/13-H5)	470848.6	5936608.7	N/A	1894	960

Hamilton North

A new deck will be installed on Hamilton North after removal of the existing topside. The components will be delivered to the NUI completely fabricated and ready for integration onto the jacket. The main dimensions, and fabricated components on the new Hamilton North topsides are presented in **Table 3.3** in response to **Question 3**.

The carbon storage development plan requires a total of two injector wells located on Hamilton North.

Each of the injection wells will be side-tracked from existing wells to enable the installation of CO_2 resistant tubulars and cement. They are planned to be drilled as close to existing production wells as possible.

A monitoring well will also be drilled to the flanks of Hamilton North carbon store for long-term pressure, saturation, and plume movement monitoring. This well will be a new well drilled from an existing spare slot within the existing platform template to a location on the flanks of the reservoir, in an area previously not drilled. This work will mobilise a sediment plume which extends 8 km to the east and west, with peak SSC values of c. 440 mg/l constrained to the site itself, and average SSCs of less than 3 mg/l across most of the plume. Corresponding deposition relates to approximately 60 mm at the site itself and average sedimentation of approximately 0.10 mm across most of the plume. The magnitude of the impact will therefore be low due to being within background levels and of a temporary nature. The sensitivity of the receptors is considered low due to the recoverable nature of the seabed within the Designated Sites. The effect will, therefore, be of **minor** adverse significance, which is **not significant** in EIA terms. Further details are contained in the Offshore ES, Chapter 6, Section 6.11.1.

Therefore, the effect of temporary habitat loss and/or disturbance will be of **minor** adverse significance, which is **not significant** in EIA terms.

It is worth noting that, both SSC and deposition related to the drill cutting releases were less than the seabed preparation and cable installation activities both spatially and in magnitude. With sedimentation from drilling restrained to negligible levels across the drill site and along the tidal ellipse.

As a worst-case, it was estimated that the footprints of jack-up vessels (e.g. Valaris Norway, and ISP for drilling) would result in up to 736 m^2 of disturbance during drilling, and the installation of the new Hamilton North NUI topsides. These spudcan footprints would represent approximately 0.3% of the up to 1.91 km^2 of temporary subtidal habitat loss and/or disturbance during the construction phase of the whole Proposed Development. This 1.91 km^2 would represent just 0.08% of the overall area of the Liverpool Bay SPA. However, these footprints already exist from the current, and historical operations around the platform, as shown in **Figure 5.2**. This would have a negligible effect on benthic habitats, and hence prey availability within the Liverpool Bay SPA. The effect will, therefore, be of **minor** adverse significance, which is **not significant** in EIA terms.

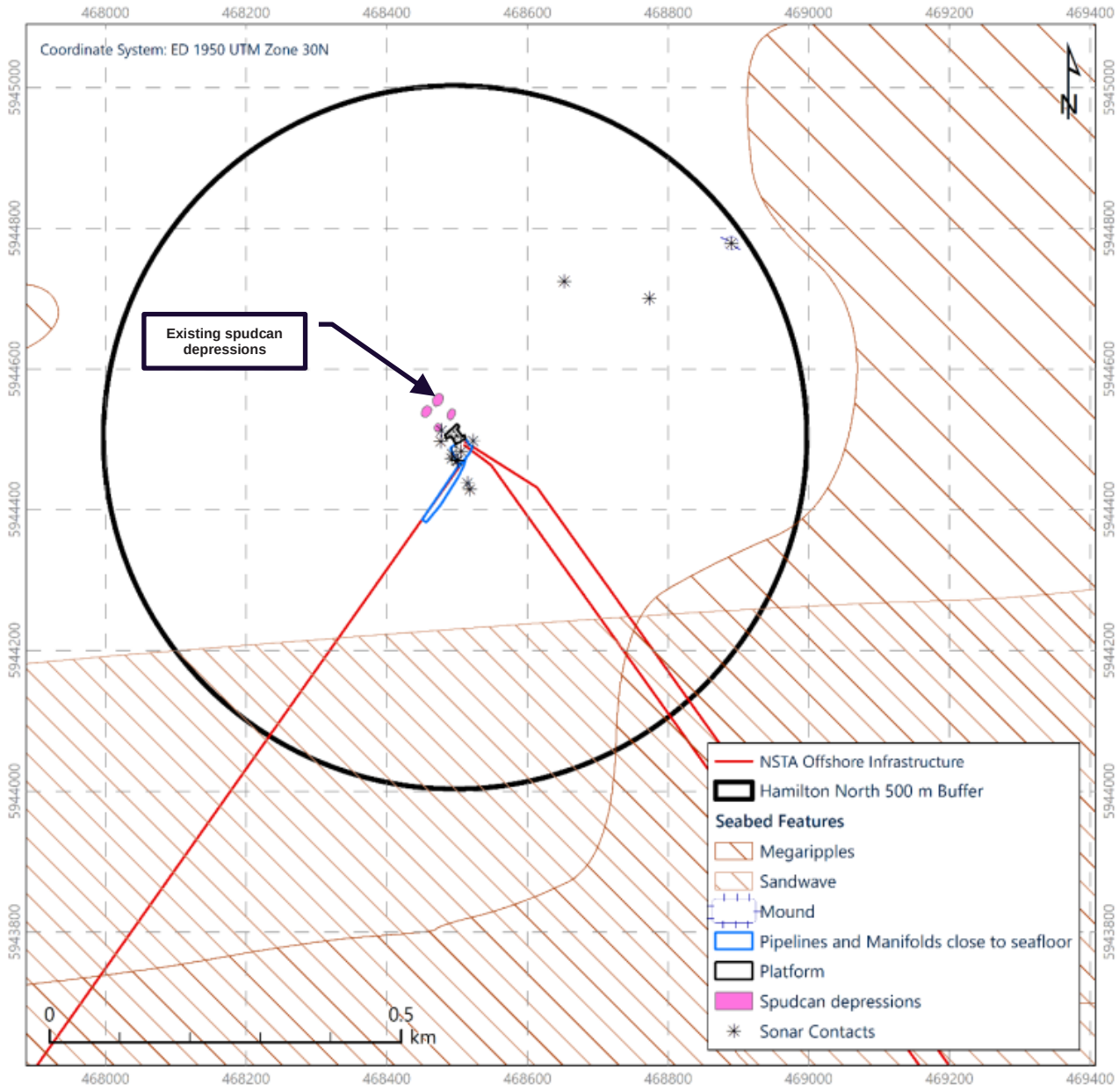


Figure 5.2: Location of existing spudcan depressions around Hamilton North NUI

Further works will occur in the form of a top-side replacement, to convert the facility for CO2 treatment and injection. These works will, however, occur above the sea surface and not mobilise any sediment into the marine environment.

The planned sentinel well is an existing well, which will be worked over to provide an additional monitoring point early in the injection period, and therefore not require any drilling activity. It was not constructed to a specification considered to be suitable for CO_2 exposure and will be plugged & abandoned after several years of injection, once the CO_2 plume reaches it.

Table 5.2 presents an overview of the proposed CCS wells including their surface location coordinates, well identifier, estimated Measured Depth (MD) and estimated True Vertical Depth (TVD).

Table 5.2: Overview of Wells at Hamilton North

Purpose	Well type	Well name	Easting	Northing	Proposed kick-off point m MD	Measured Depth (MD) m	True Vertical Depth (TVD) m
Injector	Sidetrack	C110/13a-NA (ex.110/13-N1 ST1)	468323	5945412.5	783	1403	971
		C110/13a-NB (ex.110/13-N3 ST1)	468323	5944406.4	713	1043	1010
Monitor	New well	C110/13a-NC (ex. 110/13-N4)	468084.6	5945670.8	N/A	1781	1043
Sentinel	Recompletion	110/15-N02	469272	5944899	N/A	N/A	N/A

Lennox

A new deck will be installed on each of the satellite platform of Lennox after removal of the existing topside. The components will be delivered to the NUI completely fabricated and ready for integration onto their respective jackets. The main dimensions, and fabricated components on the new Lennox topsides are presented in **Table 3.3** in response to **Question 3**.

The project carbon storage development plan requires a total of 2 injector wells located on Lennox CS.

Both injection wells will be side-tracked from existing wells to enable the installation of CO_2 resistant tubulars and cement. They are planned to be drilled as close to existing production wells as possible.

A monitoring well will also be drilled to the flanks of Lennox carbon store for long-term pressure, saturation, and plume movement monitoring. This well will be a new well drilled from an existing spare slot to a location remote from the planned injection wells. This well will be side-tracked from an existing well because there are no remaining slots on the Lennox NUI.

The planned sentinel well is existing well, which will be worked over to provide additional monitoring point early in the injection period. It is not constructed to a specification considered to be suitable for CO_2 exposure and will be plugged & abandoned after several years once the CO_2 plume reaches it.

At the Lennox NUI, the drilling methodology will result in the recovery of the drill cuttings for disposal onshore and that none would be left on the seabed. Therefore, the sediment generated by the installation of the new electrical cable represented the worst-case scenario for the creation of suspended sediment from the construction works at the Lennox NUI. This work will result in average concentrations are <1,000 mg/l and are greatest in the direct vicinity of the cable path, and <10 mg/l at the extent of the physical processes study area. Average sedimentation is limited to <100 mm with peak values of c.70 mm, however outside the area of project physical work deposition is limited to negligible levels of <3 mm. Sedimentation one day after the cessation of trenching shows that fine sands and resuspended sediment settle during slack water. The magnitude of the impact will therefore be low due to being within background levels and of a temporary nature. The sensitivity of the receptors is considered low due to the recoverable nature of the seabed within the Designated Sites. The effect will, therefore, be of **minor** adverse significance, which is **not significant** in EIA terms.

As a worst-case, it was estimated that the footprints of jack-up vessels (e.g. Valaris Norway, and ISP for drilling) would result in up to 736 m^2 of disturbance during drilling, and the installation of the new Lennox NUI topsides. These spudcan footprints would represent approximately 0.3% of the up to 1.91 km^2 of temporary subtidal habitat loss and/or disturbance during the construction phase of the whole Proposed Development. This 1.91 km^2 would represent just 0.08% of the overall area of the Liverpool Bay SPA. However, these footprints already exist from the current, and historical operations around the platform, as shown in **Figure 5.3**. This would have a negligible effect on benthic habitats, and hence prey availability within the Liverpool Bay SPA. The effect will, therefore, be of **minor** adverse significance, which is **not significant** in EIA terms.

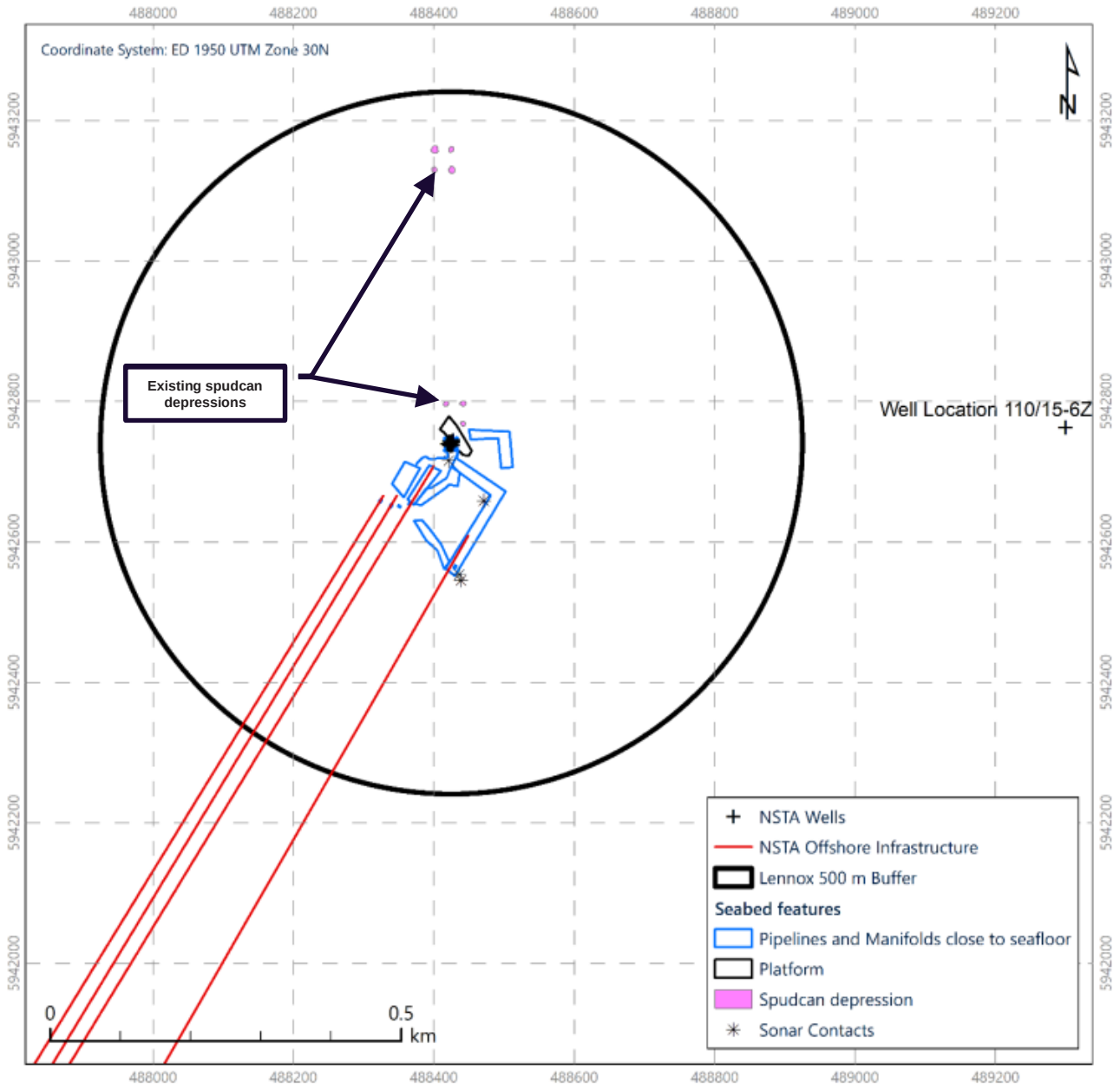


Figure 5.3: Location of existing spudcan depressions around Lennox NUI

Table 5.3 presents an overview of the proposed CCS wells including their surface location coordinates, well identifier, estimated Measured Depth (MD) and estimated True Vertical Depth (TVD).

Table 5.3: Overview of Wells at Lennox

Purpose	Well type	Well name	Easting	Northing	Proposed kick-off point m MD	Measured Depth (MD) m	True Vertical Depth (TVD) m
Injector	Sidetrack	C110/15a-LB (ex.110/15-L05ST1)	489487.6	5942334.3	678	1668	865
		C110/15a-LC (ex. 110/15-L13 ST2)	489487.6	5942938.2	625	1947	1124
Monitor	Sidetrack	C110/15a-LA (ex. 110/15-L01Z ST2)	490155.3	5941955.3	625	2466	1114
Sentinel	Recompletion	110/15-L04	487637	5941932	N/A	N/A	N/A

All CO2 injection wells will be drilled from the existing platform well slots as side-track, while the sentinel wells will be only recompleted and therefore not require any drilling activity. Waste streams from drilling activities via existing producer wells will be collected on vessel and disposed of onshore, without releasing material into the marine environment. Therefore, this infrastructure/activity was scoped out of the assessment as a pathway does not exist to affect physical processes receptors.

The Proposed Development does however require the drilling of two monitoring wells at Hamilton North and Hamilton Main, as such they have been considered through numerical modelling and subsequent assessment. Therefore, this infrastructure/activity was scoped into the assessment. Additional monitoring wells will be created via the recompletion of existing wells, with all sediment collected and disposed of onshore, without releasing material into the marine environment.

Therefore, in summary, there are three types of activity:

- CO2 injection wells drilled from the producer well slots as side-track – drill cuttings collected
- Sentinel wells recompleted - no drilling activity
- Monitoring wells (Hamilton North and Hamilton Main) – drill cutting release to the marine environment

Those drilling activities with a pathway to impact upon physical processes relate to the Hamilton North and Hamilton Main monitoring wells alone and have been included in the assessment.

QUESTION 6: Reg 12(1) letter dated 1 July 2024 – comment 6

OPRED acknowledges the provision of additional information to support the response to the request to improve the resolution of figures within the ES. Please address OPRED's remaining concerns that Liverpool Bay CCS Limited have chosen not to consider the Liverpool Bay SPA in the study on the basis that there are no designated benthic fish or marine mammals within this site. OPRED would highlight the requirement of the Conservation Objectives to consider the attributes relating the to the supporting habitats and processes associated with the designated feature(s) of the site.

Eni Response: The Applicant can confirm that within the Marine Biodiversity ES chapter, Ornithology ES chapter, and the RIAA, all relevant designated sites have been considered across different ecological receptors (i.e. benthic ecology, fish and shellfish, marine mammals, ornithology). The conservation objectives of all relevant Designated Sites (including the Liverpool Bay SPA in the ornithology section of the RIAA) have been assessed.

The Applicant recognises that the conservation objectives of the Liverpool Bay SPA consider supporting habitats and processes associated with the designated ornithological features of the site. However, the way our assessments have been carried out is to consider the impacts on the supporting habitats and processes in terms of the way that they affect the ornithological receptor. Therefore, the significance of the effects from changes to prey availability for ornithological receptors has been assessed for all relevant qualifying features is assessed in the **Offshore ES, Chapter 8: Offshore Ornithology**, and the **RIAA**, including for cumulative effects with other projects. Within the RIAA, the section where the Liverpool Bay SPA is assessed are Section 1.9.1.1: Liverpool Bay SPA, which identifies at Table 1.126 all the Conservation Attributes and Targets for the Qualifying Features and assesses the potential for adverse effects against each objective and qualifying feature in Section 1.9.1, including Table 1.138, which is reproduced below as **Table 8.3**.

That Applicant can confirm, therefore, that within the Marine Biodiversity ES chapter, Ornithology ES chapter, and the RIAA, all relevant designated sites have been considered across different ecological receptors (i.e. benthic ecology, fish and shellfish, marine mammals, ornithology). The conservation objectives of all relevant Designated Sites (including the Liverpool Bay SPA in the ornithology section of the RIAA) have been assessed.

Please see **Figure 2.2**, and **Table 6.1**, which show the distances from each platform to the closest designated sites for benthic ecology, fish and shellfish, and marine mammals.

The Liverpool Bay SPA is also included (despite it not being relevant to benthic, fish, or mammals) to show the location of the different platforms associated with the Project.

As illustrated by the figure and distances provided, the platforms are a considerable distance from all designated sites with benthic, fish and shellfish, and marine mammal features, except for the Liverpool Bay SPA (which is not relevant for assessment against these features).

Although some platforms overlap or come within 1km of the Liverpool Bay SPA, there were no significant effects of the entire project upon benthic or fish and shellfish receptors. Therefore, it can be concluded that there would be no significant effect on the habitats and supporting processes of the ornithological features of the Liverpool Bay SPA due to the result of the project as a whole, or by individual platforms.

Table 6.1: Distance to Designated Sites from the Proposed Development NUIs

Designated Site Name	Distance to platform (km)				
	Hamilton Main	Hamilton North	Douglas	Lennox	New Douglas
Dee Estuary SAC	23.48	31.35	23.86	20.97	24.1
River Dee and Bala Lake SAC	45.17	53.56	47.97	45.09	48.23
Shell Flat and Lune Deep SAC	30.86	23.35	37.2	20.97	37.11
Menai Strait and Conway Bay SAC	30.53	36.57	22.79	49.28	22.85
North Anglesey Marine SAC	52.39	54.05	43.63	72.09	43.51
Ribble Estuary MCZ	34.88	33.71	43.69	15.14	43.77
Fylde MCZ	12.62	9.66	20.76	2.47	20.78
Ribble Estuary SSSI	27.2	27.01	36.01	7.45	36.11
Little Ormes Head SSSI	33.95	40.49	26.65	52.1	26.75
Great Ormes Head SSSI	35.68	41.59	27.86	54.39	27.9
Liverpool Bay SPA	0.59	2.25	0.16	Within	0.33

QUESTION 7: Reg12(1) letter dated 1 July 2024 – comment 11

It is stated in the Regulation 12(1) response letter 2nd August 2024 (in relation to the Regulation 12(1) letter dated 1 July 2024, that "Marine works are very unlikely during this bad weather window, thereby avoiding disturbance to over-wintering birds." On reviewing the schedule, it is indicated that work on the Lennox, Hamilton North and Hamilton Main Platform wells will take place during the overwintering period. Efforts should still be made as a matter of best practice to minimise and mitigate disturbance to the receptor species, and Liverpool Bay CCS Limited are advised that disturbance should be minimised through the implementation of a Vessel Management Plan (VMP) and secured as a condition in any marine licence or permission granted as appropriate. Please clarify when this VMP will be delivered. There is also no information regarding whether any geophysical surveys will be undertaken during the overwintering period. Please provide this information as appropriate. In addition, where are the construction and maintenance vessels likely to sail from?

Eni Response: In response to **Question 17**, the Applicant has included five mini programmes (**Figure 17.4 to Figure 17.8**) to provide an overview of the timetable of activities for the platform works at the New Douglas, Hamilton Main, Hamilton North, and Lennox. These programmes show that the main vessel movements will take place from April to October each year, thereby avoiding the bad weather window, and the overwintering period. While the programmes show some 'Well' related activities, these will be carried out by vessels that will have moved into location, alongside the platform, prior to the start of the over-wintering period.

The Applicant has anticipated that a **VMP** is likely to be required through the Storage Permit, and Marine Licence, as consent conditions. Therefore, the Applicant has made it a requirement of the EPC contractors that will implement the Proposed Development to prepare a **VMP** for the works. The **VMP** will be prepared following consent, and submitted to the relevant regulatory bodies for approval, prior to the commencement of development.

The **VMP** will provide details of the vessel management and navigational safety measures that will be implemented, in accordance with relevant guidance, during the construction, and operation and maintenance phases of the Proposed Development.

The end-of-life decommissioning of the Proposed Development will be subject to a separate Decommissioning Plan. The **VMP** detailing the navigational safety and vessel management arrangements for those decommissioning works, will be developed at the appropriate time in advance of those activities commencing. The **VMP** will contain details of the following:

- Navigational safety measures during construction.
- Navigational safety measures during operation and maintenance.
- Promulgation of information e.g., local notices to mariners, Admiralty notices to mariners, hydrographic charts, Kingfisher Bulletins, radio navigational warnings.
- Location of working ports.
- Types and specification of vessels.
- Numbers and movements of vessels.
- Indicative transit route corridors.
- Anchoring.
- Environmental sensitivities relevant to vessel management.
- Compliance with Marine Guidance Notes.
- Compliance with Storage Permit, and Marine Licence conditions.

Drilling activity at Hamilton North will take approximately five months commencing in September 2024. Perforation of the wells is then scheduled later during November/December 2027. The works at Hamilton Main are scheduled to commence in February 2025 and take approximately seven months. Perforation of the wells is then scheduled later during August/September 2027. The works at the Lennox platform are planned to take around 12 months commencing in October 2025. Perforation of the wells is then scheduled later during April/May 2028. Drilling activities shown in the mini programs in Figures 17.4, 17.5, and 17.6 respectively Hamilton, Hamilton Main and Lennox are scheduled from November 2026 to January 2027 for Hamilton, From July to August 2027 for Hamilton Main and from August to October 2027 for Lennox.

However, to minimise and mitigate for the potential disturbance resulting from these activities, all rig movement will occur during the summer season. This will prevent displacement from the presence of associated vessels occurring during the winter months, however there is still the potential for displacement from the impact of sound from the drilling works. Although both common scoter and red-throated diver are highly susceptible to disturbance, often flushing from large distances and relocating even further away from the source of disturbance (Goodship & Furness, 2022), the impact of displacement from disturbance has been fully assessed as presenting less than the 1% threshold for excess mortality and is therefore deemed negligible. The overall significance of the impact of disturbance from airborne sound (and the presence of vessels and infrastructure) is minor for this species group.

The applicant has not prepared a VMP or outline VMP but has committed to the preparation, and submission for prior approval of a VMP prior to the commencement of the works.

The Applicant can confirm that no geophysical surveys are scheduled to take place during the overwintering period. Geophysical survey vessels will be in operation between May 2025 and June 2025.

The heavy lift vessels will sail from the Netherlands, the cable lay vessel will sail from Aberdeen and crew change and food supply vessels will sail from Liverpool.

QUESTION 8: Reg 12(1) letter dated 1 July 2024 – comment 12

It is acknowledged that within the response provided to OPRED on 2nd August 2024 that there is reference to the conservation objectives. Please provide further details of how the impacts have been addressed in relation to the conservation objectives of each MPA. Please note the latest advice was published in 2023 https://publications.naturalengland.org.uk/publication/3236717. Please note that the Appropriate Assessment will be assessed against the conservation objectives and targets outlined within the advice package of each relevant MPA.

Eni Response: The applicant notes that as per the CAP document 'the sites conservation objectives will be met when all attributes meet their targets'. The site objectives for the Liverpool Bay SPA can be found here: https://publications.naturalengland.org.uk/publication/5089733892898816.

An assessment against each site objective (as set out below) is provided and it is noted that these site conservation objectives have been read in conjunction with the latest Conservation Advice Package (Natural England, 2022) as per the guidance contained within the site conservation objectives (Natural England, 2019).

- The extent and distribution of the habitats of the qualifying features
- The structure and function of the habitats of the qualifying features
- The supporting processes on which the habitats of the qualifying features rely
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site.

Assessment of adverse effects alone

Liverpool Bay SPA

The objective of the Liverpool Bay SPA is to ensure that the integrity of the site is maintained or restored as appropriate, and to ensure that the site contributes to achieving the aims of the Birds Directive subject to natural change. In the context of the natural change, this may be achieved by ensuring that conservation objectives as set out in the RIAA at section 1.9.1.1.4 are endorsed.

The assessment in this section will focus on each of the designated ornithological features of the SPA and impacts associated with the Proposed Development with respect to the overarching conservation objectives established for this site (Natural England, 2019):

- Conservation objective 1 – The extent and distribution of the habitats of the qualifying features.
- Conservation objective 2 – The structure and function of the habitats of the qualifying features.
- Conservation objective 3 – The supporting processes on which the habitats of the qualifying features rely.
- Conservation objective 4 – The population of each of the qualifying features.
- Conservation objective 5 – The distribution of the qualifying features within the site.

Not all conservation objectives are relative to each impact, therefore **Table 8.1** below presents potential impacts resulting from the activities at the Proposed Development that may affect conservation objectives of the Liverpool Bay SPA.

Table 8.1: Impacts Considered For Each Conservation Objective – Liverpool Bay SPA

The ✓ indicates that there is a potential for impact to affect the conservation objective and × indicates that there is no pathway through which the impact could undermine conservation objective.

Impact	Conservation Objective 1	Conservation Objective 2	Conservation Objective 3	Conservation Objective 4	Conservation Objective 5
Temporary habitat loss leading to displacement/disturbance of birds	✓	✓	✓	✓	✓
Disturbance and displacement from airborne sound and presence of vessels and infrastructure	×	×	×	✓	✓
Indirect impacts from changes in prey availability	×	×	×	✓	✓
Accidental pollution in the surrounding area	×	×	×	✓	✓

Temporary habitat loss leading to displacement/disturbance of birds

A total of 37.02 km^2 of the physical works area sits within the Liverpool Bay SPA which itself is 2521.77 km^2 in extent. Assuming that all of the SPA represents foraging for its various features, this equates to 1.47% of the Liverpool Bay SPA that will be temporarily affected by proposed works. It can be presumed that the area of the physical works would be lost to all qualifying species. However, once construction has finalised the habitat will be returned to its previous state.

As both common tern and little tern have restricted foraging ranges during the breeding season, 18 km and 5 km respectively (mean max from Woodward *et. al*., 2019), impacts upon these species will be greater. Assuming that prey is affected within the area of physical works this equates to a temporary loss of 8.6% of foraging for little tern from the north Wales coast colonies (Point of Ayr and Gronant Dunes). However, the common tern colonies are greater than 18 km away from the proposed area of physical works, therefore, common tern will not be impacted and is not included within the summary table below. There is a lack of recent empirical data on the usage and foraging range of little tern from the north Wales coast colonies and therefore a survey was commissioned in 2023 to better understand usage of this area.

Disturbance and displacement from airborne sound and presence of vessels and infrastructure

Displacement modelling has been undertaken for all species where data was available (see Appendix K2: Offshore Ornithology Displacement Technical Report) utilising a mixture of the HiDef Aerial Surveying Limited (2023); Waggit, *et. al*. (2020) and Bradbury, *et. al*. (2016) data, the results of this are summarised in Table below. The number presented within the table represent a 100% displacement around the 12 construction vessels and a 1% mortality rate. This is deemed the worst case scenario. Density data was not available for little tern within Liverpool Bay SPA so instead the amount of available foraging habitat that will be subject to disturbance from visual and audial sources at any one time has been calculated. A precautionary disturbance distance of 50 m is used for little tern, see **Annex A** for further information.

Table 8.22: Showing The Maximum Excess Mortality Caused Through Displacement As Calculated For The Liverpool Bay Features

Feature	Season	Excess mortality caused by displacement (%)	Amount of foraging habitat subject to disturbance (%)
Red-throated diver	Non-breeding	0.89	N/A
Little gull	Non-breeding	0.040	N/A
Common scoter	Non-breeding	0.98	N/A
Little tern	Breeding	0.04	0.8

Displacement will be highest during the construction phase, but this can be considered a temporary impact, and as all excess mortality is below 1% displacement does not significantly impact the long-term viability of the populations. As the increase in excess mortality (or reduction in available habitat) is short term and reversible and is not sufficient to significantly impact population viability there would be no adverse effects to the integrity of the Liverpool Bay SPA.

Research has shown that disturbance to birds from vessel movements generally occurs within 50 to 100 m, with vessels approaching at faster speeds eliciting higher disturbance (Rodgers and Schwikert, 2002; Burger, 1998; Schwemmer et al., 2011). The cable lay vessel (CLV) is a slow moving vessel that will manoeuvre on anchors within the nearshore area. Once beyond the foraging range of little tern to the north of the West Hoyle Spit, the CLV will manoeuvre via its own propulsion and dynamic positioning system.

There is limited data available regarding noise and vibration during dredging (i.e. cable burial), although underwater noise levels are generally comparable to other types of commercial marine traffic. Research suggests that gulls can be highly tolerant to disturbance stimuli with generally only very intensive, prolonged disturbance causing avoidance of foraging or breeding areas (Calladine et al., 2006). When foraging at sea, tern species are also reported to be relatively insensitive to disturbance by shipping activities (Natural England and JNCC, 2019).

Rather than dispersing the area completely, birds would be expected to temporarily redistribute within the local area. In addition, it should be noted that there are high levels of existing vessel and maintenance dredging activities within the area. Daily there over a dozen return trips by offshore wind farm maintenance vessels from Port of Mostyn via the Welsh Channel. Seabirds and other diving birds foraging in the footprint of the proposed works would therefore be expected to be reasonably habituated to vessels, with more sensitive species already likely to be avoiding this area.

Overall, utilisation of the Proposed Development footprint by these bird interest features for foraging is considered limited, particularly given that it is a busy shipping area. The Proposed Development and cable laying will not cause a change to the overall extent of habitat available for seabirds and other diving birds with the foraging ranges of these species encompassing an extensive, area which will not be spatially restricted to the Proposed Development or cable laying footprints. Any changes in foraging habitat and prey resources will, therefore, represent only a small proportion of habitat available for these species (**Table 8.2**). Furthermore, the potential for disturbance from this potential foraging area during the Proposed Development and cable lay activities is short-term and comparable to existing vessel movements via, and maintenance dredging of the Welsh Channel.

In terms of the key prey items for bird interest features of the SPAs. Terns mainly feed on fish, but also shrimps and other crustaceans, small squid and marine worms. The ability of these species to catch prey items is not considered to be impaired given the scale of their foraging ranges, as shown in Figure 1.3 in the Offshore ES Volume 3, Appendix K4: Little Tern Foraging Technical Report, reproduced below.

In the context of the site's conservation objectives, the population size and habitat extent will be maintained. In other words, there is no potential for a discernible change to occur to the overall populations of these bird interest features or supporting habitat and availability of prey. Overall, there is considered no potential for an AEOI on the interest features of the Dee Estuary SPA/Ramsar site and Liverpool Bay / Bae Lerpwl SPA in advance of any mitigation. However, the applicant would like to note that a precautionary approach has been taken to the potential effects upon site integrity for little tern, which is based upon the assumption that works are to take place over the breeding season. On this basis:

- The impacts of works during the breeding season would likely be moderate, primarily due to effects on prey availability and associated habitat loss.
- Conversely, it was determined that conducting works during the non-breeding season would result in negligible to no change in impacts.

The Applicant is committed to working with its cable installation contractors, and the relevant stakeholders and regulators to develop a method of working to enable works within the area sensitive to breeding little tern, to result in as little disturbance as practicable.

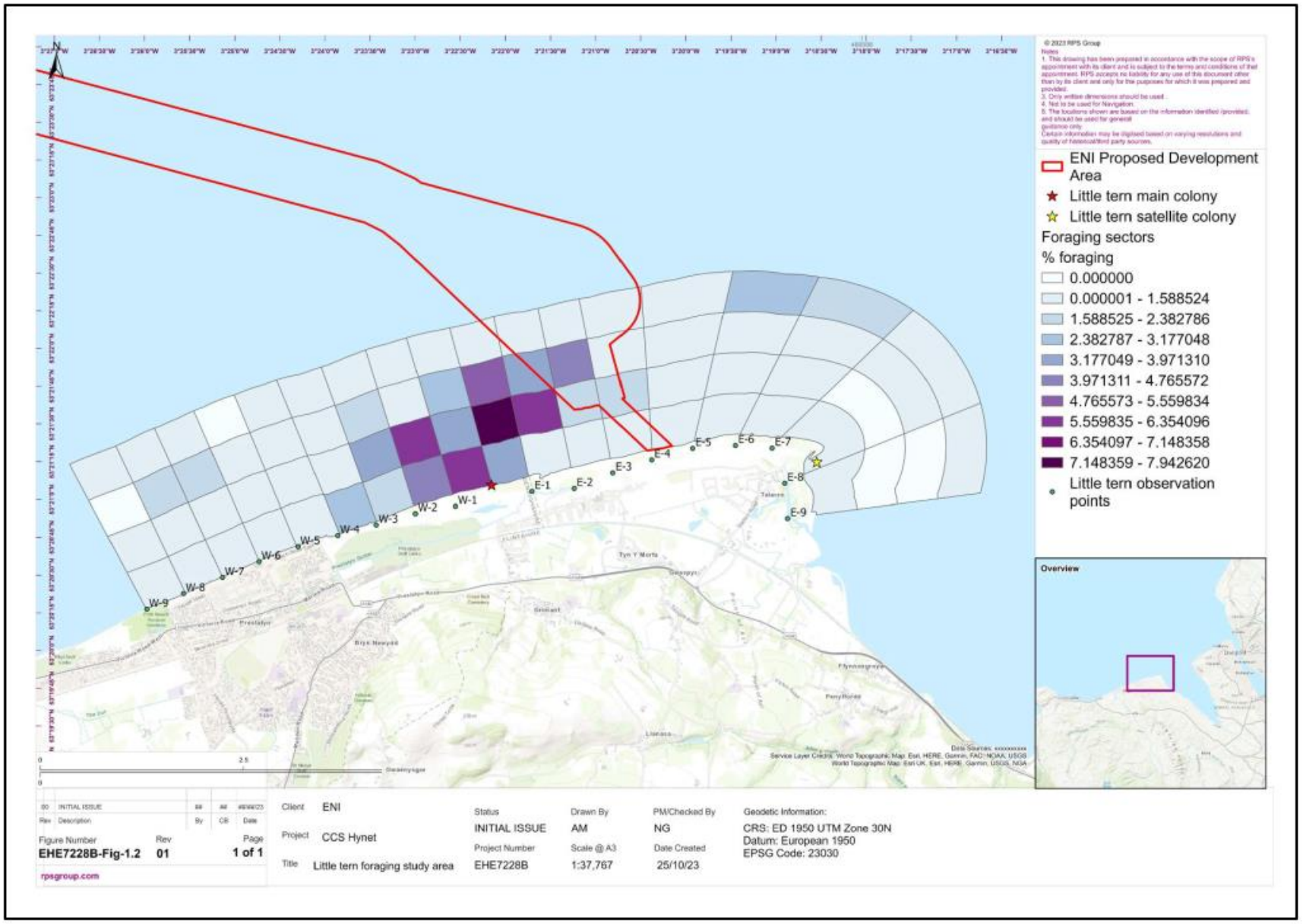


Figure 1.3: Distribution Of Foraging Little Tern Split By Count Sectors And Distance Bands

Indirect impacts from changes in prey availability

Indirect effects to prey availability are predicted to be short term and reversible (Chapter 7: Marine Biodiversity) lasting only for the duration of construction. Any impacts can therefore be assumed to apply only to the construction and decommissioning phases. Within the assessment of fish within the ES Chapter 7 and the diadromous fish section of this RIAA, it was concluded that there would be no significant impact on fish. Therefore, the fish are likely to move away from construction and operational areas in a similar manner as the birds and therefore the impacts from changes in prey availability will be of the same, if not of less significance that the temporary habitat loss.

Accidental pollution in the surrounding area

There is a risk of pollution being accidentally released during the construction, operation and maintenance as well as decommissioning phases from sources including vessels/vehicles and equipment/machinery. The likelihood of an accidental release of pollutants is extremely low. However, should an event occur, effects would be limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be managed by the implementation of measures set out in standard industry guidance documents such as ERP, OPEPs and SOPEPs. Birds that spend a lot of time in the water such as common scoter and red-throated diver would be more susceptible to any risks, however as the risks of spillage are low, any spills will be limited in extent, and any effects will be reversible, so there would be no adverse effects to the integrity of the Liverpool Bay SPA in any phase caused by the risk of accidental pollution in the surrounding area.

Summary

Table 8.3 below contains the summary assessment of each conservation objective (RIAA section 1.9.1.1.4) for each feature of the Liverpool Bay SPA against each impact pathway. Only impact pathways which have potential to affect the conservation objects are presented, see RIAA Table 1.70 for breakdown.

For little tern for the construction and decommissioning phases and for the impacts of temporary habitat loss due to disturbance/displacement and indirect impacts upon prey availability there will be a **moderate adverse effect upon the integrity of the Liverpool Bay SPA for all conservation objectives.**

For all other features during all phases and for all impacts of temporary habitat loss due to disturbance/displacement, indirect impacts upon prey availability, and accidental pollution in the surrounding area there will be a **negligible adverse effect upon the integrity of the Liverpool Bay SPA.**

Dee Estuary SAC

The assessment of adverse effects on integrity (AEOI) for the Dee Estuary SAC is set out in the RIAA at section 1.6.3.1. This assessment concludes that In line with findings presented in the RIAA at Table 1.10, adverse effects which undermine the conservation objectives set for the relevant Annex I qualifying features as well as habitats of qualifying species of the Dee Estuary SAC, will not occur as a result of activities associated with the Proposed Development either alone, or in combination with other plans or projects.

Therefore, with respect to relevant Annex I qualifying features and habitats of qualifying species, it can be concluded that there is no risk of an adverse effect on the integrity of the Dee Estuary SAC as a result of activities associated with the Proposed Development either alone, or in combination with other plans or projects.

References

Burger, J. and Gochfeld, M. (1998). Effects of ecotourists on bird behaviour at Loxahatchee National Wildlife Refuge, Florida. Environmental Conservation, 25, 13-21.

Calladine J.R., Park, K.J, Thompson, K. and Wernham, C.V. (2006) Review of Urban Gulls and their Management in Scotland. A report to the Scottish Executive.

Natural England (2019) European Site Conservation Objectives for Liverpool Bay / Bae Lerpwl Special Protection Area Site Code: UK9020294. Available at: http://publications.naturalengland.org.uk/publication/5089733892898816 (accessed 22/10/2024).

Natural England and JNCC (2019) Natural England and JNCC Conservation Advice for Marine Protected Areas. Outer Thames Estuary SPA.

Rodgers, J.A., and Schwikert, S.T., (2002). Buffer-Zone Distances to Protect Foraging and Loafing Waterbirds from Disturbance by Personal Watercraft and Outboard-Powered Boats. Conservation Biology, 16(1), 216-224.

Schwemmer, P., Mendel, B., Sonntag, N., Dierschke, V., and Garthe, S. (2011) Effects of ship traffic on seabirds in offshore waters: implications for marine conservation and spatial planning. Ecological Applications, 21(5), 1851-1860

Table 8.3: A Summary Of The Liverpool Bay Spa Assessment

Impact relative to the conservation objective	Relevant project phase C	O	D	Feature	Assessment	Conclusion
1. Objective 1: To maintain or restore the extent and distribution of the habitats of the qualifying feature						
Temporary habitat loss leading to displacement/disturbance of birds	✓	×	✓	Red-throated diver	37.02 km^2 of the proposed works is within the Liverpool Bay SPA, this equates to 1.47% of available habitats that will be temporarily unavailable. However, this is short term and reversible and works will not be taking place within the entire 1.47% of affected habitats at any one time.	Negligible adverse effects upon the extent and distribution of habitats and therefore no adverse effect on site integrity.
	✓	×	✓	Little gull		
	✓	×	✓	Common scoter		
	✓	×	✓	Waterbird assemblage		
	✓	×	✓	Little tern	8.6% of little tern's foraging range may be temporarily lost. In the absence of recent empirical data on which areas of the Liverpool Bay SPA the little tern use for foraging a precautionary moderate adverse effect is predicated upon this feature for temporary habitat loss.	Moderate adverse effects upon the extent and distribution of habitats and therefore moderate adverse effects on site integrity.
2. Objective 2 – To maintain and restore the structure and function of the habitats of the qualifying features						
Temporary habitat loss leading to displacement/disturbance of birds	✓	×	✓	Red-throated diver	37.02 km^2 of the proposed works sits within the Liverpool Bay SPA, this equates to 1.47% of available habitats that will be temporarily unavailable. However, this is short term and reversible and works will not be taking place within the entire 1.47% of affected habitats at any one time.	Negligible adverse effects upon the structure and function of the habitats and therefore no adverse effect on site integrity.
	✓	×	✓	Little gull		
	✓	×	✓	Common scoter		
	✓	×	✓	Waterbird assemblage		
	✓	×	✓	Little tern	8.6% of little tern's foraging range may be affected. In the absence of recent empirical data on which areas of the Liverpool Bay SPA the little tern use for foraging a precautionary moderate adverse effect is predicated upon this feature for temporary habitat loss	Moderate adverse effects upon the structure and distribution of habitats and therefore moderate adverse effects on site integrity.
3. Objective 3 – To maintain or restore the supporting processes on which the habitats of the qualifying features rely						
Temporary habitat loss leading to displacement/disturbance of birds	✓	×	✓	Red-throated diver	37.02 km^2 of the proposed works sits within the Liverpool Bay SPA, this equates to 1.47% of available habitats that will be temporarily unavailable. However, this is short term and reversible and works will not be taking place within the entire 1.47% of affected habitats at any one time.	Negligible adverse effects upon the supporting processes of habitats and therefore no adverse effect on site integrity.
	✓	×	✓	Little gull		
	✓	×	✓	Common scoter		

Impact relative to the conservation objective	Relevant project phase			Feature	Assessment	Conclusion
	C	O	D			
	✓	×	✓	Waterbird assemblage		
	✓	×	✓	Little tern	8.6% of little tern's foraging range may be affected. In the absence of recent empirical data on which areas of the Liverpool Bay SPA the little tern use for foraging a precautionary moderate adverse effect is predicated upon this feature for temporary habitat loss	Moderate adverse effects upon the supporting process of habitats and therefore moderate adverse effects on site integrity.
4. Objective 4 – To maintain or restore the population of each of the qualifying feature						
Temporary habitat loss leading to displacement/disturbance of birds	✓	×	✓	Red-throated diver	37.02 km^2 of the proposed works sits within the Liverpool Bay SPA, this equates to 1.47% of available habitats that will be temporarily unavailable. However, this is short term and reversible and works will not be taking place within the entire 1.47% of affected habitats at any one time. This temporary loss is not expected to impact the population with features able to relocate to non-impacted areas.	No adverse effects on the population and therefore no adverse effect on. site integrity
	✓	×	✓	Little gull		
	✓	×	✓	Common scoter		
	✓	×	✓	Waterbird assemblage		
	✓	×	✓	Little tern	8.6% of little tern's foraging range may be affected during construction. In the absence of recent empirical data on which areas of the Liverpool Bay SPA the little tern use for foraging a precautionary moderate adverse effect is predicated upon this feature for temporary habitat loss.	The reduction of foraging area might lead to a moderate adverse effects on the population and therefore a moderate adverse effect on site integrity
Disturbance and displacement from airborne sound and presence of vessels and infrastructure	✓	×	✓	Red-throated diver	Disturbance will be mostly temporary and reversible and excess mortality caused by disturbance was calculated at 0.89%.	No adverse effects on the population and therefore no adverse effect on site integrity.
	✓	×	✓	Little gull	Disturbance will be mostly temporary and reversible and excess mortality caused by disturbance was calculated at 0.040%.	
	✓	×	✓	Common scoter	Disturbance will be mostly temporary and reversible and excess mortality caused by disturbance was calculated at 0.98%.	
	✓	✓	✓	Little tern	Disturbance will be mostly temporary and reversible, and excess mortality was calculated at 0.04% of the available foraging range.	
	✓	×	✓	Waterbird assemblage	The small scale of displacement around the vessels is not likely to impact any of the assemblage features to a greater extent than the highly sensitive common scoter and red-throated diver and therefore the conclusion for these features is relevant to the assemblage also.	No adverse effects on the population and therefore no adverse effect on site integrity.
	✓	✓	✓	Red-throated diver	Impacts to prey species would occur at the same scale as the temporary habitat loss and displacement to birds. The fish are likely	

Impact relative to the conservation objective	Relevant project phase			Feature	Assessment	Conclusion
	C	O	D			
Indirect impacts from changes in prey availability	✓	✓	✓	Little gull	to temporarily move during constriction to a similar extent as the birds, therefore there should be no impact on the population of features. Wintering species, which are less spatially restricted than breeding species are less sensitive to this impact.	No adverse effects on the population and therefore no adverse effect on site integrity.
	✓	✓	✓	Common scoter		
	✓	✓	✓	Waterbird assemblage		
	✓	✓	✓	Little tern	8.6% of little tern's foraging range may be affected and therefore the prey species for which the little tern feeds would also be displaced over the same spatial extent.	The reduction of foraging area might lead to a moderate adverse effects on the population and therefore a moderate adverse effect on site integrity.
Accidental pollution in the surrounding area	✓	✓	✓	Red-throated diver	Any effects would be limited both temporally and spatially with necessary action plans already in place. Therefore, for all receptors with the omission of common tern, any effects to population would be negligible	No adverse effects on the population and therefore no adverse effect on site integrity.
	✓	✓	✓	Little gull		
	✓	✓	✓	Common scoter		
	✓	✓	✓	Little tern		
	✓	✓	✓	Waterbird assemblage		
5. Objective 5: To maintain or restore the distribution of the qualifying features within the site						
Temporary habitat loss leading to displacement/disturbance of birds	✓	×	✓	Red-throated diver	37.02 km^2 of the proposed works sits within the Liverpool Bay SPA, this equates to 1.47% of available habitats that will be temporarily unavailable. However, this is short term and reversible and works will not be taking place within the entire 1.47% of affected habitats at any one time. This temporary loss is expected to impact the distribution with features able to relocate to non-impacted areas.	Negligible adverse effects on the distribution and therefore no adverse effect on. site integrity.
	✓	×	✓	Little gull		
	✓	×	✓	Common scoter		
	✓	×	✓	Waterbird assemblage		
	✓	×	✓	Little tern	8.6% of little tern's foraging range may be affected during construction. In the absence of recent empirical data on which areas of the Liverpool Bay SPA the little tern use for foraging a precautionary moderate adverse effect is predicated upon this feature for temporary habitat loss.	The reduction of foraging area might lead to a moderate adverse effects on the population and therefore a moderate adverse effect on site integrity
Disturbance and displacement from airborne	✓	×	✓	Red-throated diver	37.02 km^2 of the proposed works sits within the Liverpool Bay SPA, this equates to 1.47% of available habitats that will be temporarily	

Impact relative to the conservation objective	Relevant project phase			Feature	Assessment	Conclusion
	C	O	D			
sound and presence of vessels and infrastructure	✓	×	✓	Little gull	unavailable. However, this is short term and reversible and works will not be taking place within the entire 1.47% of affected habitats at any one time. This temporary loss is expected to impact the distribution with features able to relocate to non-impacted areas.	Negligible adverse effects on the distribution and therefore no adverse effect on. site integrity.
	✓	×	✓	Common scoter		
	✓	✓	✓	Little tern	Disturbance will be mostly temporary and reversible, and the area affected is calculated at 0.8% of the available foraging range.	
	✓	×	✓	Waterbird assemblage	The small scale of displacement around the vessels is not likely to impact any of the assemblage features to a greater extent than the highly sensitive common scoter and red-throated diver and therefore the conclusion for these features is relevant to the assemblage also.	Negligible adverse effects on the distribution and therefore no adverse effect on site integrity.
Indirect impacts from changes in prey availability	✓	✓	✓	Red-throated diver	Impacts to prey species would occur at the same scale as the temporary habitat loss and displacement to birds. The fish are likely to temporarily move during constriction to a similar extent as the birds, therefore there the distribution of features will be impacted. However the area impacted is small, and of a temporary nature.	Negligible adverse effects on the distribution and therefore no adverse effect on site integrity.
	✓	✓	✓	Little gull		
	✓	✓	✓	Common scoter		
	✓	✓	✓	Waterbird assemblage		
	✓	✓	✓	Little tern	8.6% of little tern's foraging range may be affected and therefore the prey species for which the little tern feeds would also be displaced over the same spatial extent.	The reduction of foraging area might lead to a moderate adverse effects on the distribution and therefore a moderate adverse effect on site integrity.
Accidental pollution in the surrounding area	✓	✓	✓	Red-throated diver	Any effects would be limited both temporally and spatially with necessary action plans already in place. If an event were to occur, the distributional impacts would be short term and reversible.	Negligible adverse effects on the distribution and therefore no adverse effect on site integrity.
	✓	✓	✓	Little gull		
	✓	✓	✓	Common scoter		
	✓	✓	✓	Little tern		
	✓	✓	✓	Waterbird assemblage		

It has also been outlined that most of the works will take place from 20th March to 21st October. This only appears to apply to works being carried out for cable laying, installation of the new Douglas Platform and topsides work. Other activities including drilling of wells will take place within the overwinter period and any mitigation measures for the work to be undertaken should therefore be provided. Please advise how far in advance of the work commencing would Liverpool Bay CCS plan to engage and submit a Vessel Management Plan and which works will this cover?

Eni Response: In response to **Question 17**, the Applicant has included five mini programmes (**Figure 17.4 to Figure 17.8**) to provide an overview of the timetable of activities for the platform works at the New Douglas, Hamilton Main, Hamilton North, and Lennox. These programmes show that the main vessel movements will take place from April to October each year, thereby avoiding the bad weather window, and the overwintering period. While the programmes show some 'Well' related activities, these will be carried out by vessels that will have moved into location, alongside the platform, prior to the start of the over-wintering period.

The Applicant has anticipated that a **VMP** is likely to be required through the Storage Permit, and Marine Licence, as consent conditions. Therefore, the Applicant has made it a requirement of the EPC contractors that will implement the Proposed Development to prepare a VMP for the works. The **VMP** will be prepared following consent, and submitted to the relevant regulatory bodies for approval, prior to the commencement of development.

For details on the **VMP**, please see the response to **Question 7**, above.

The drilling of the wells, although taking place over the winter period, will be drilled as side tracks or work overs from existing wells within the footprint of the existing platforms. Therefore, as birds are already displaced from existing offshore infrastructure, there will be no additional disturbance impacts. In addition, to minimise and mitigate for the potential disturbance resulting from these activities, all rig movement will occur during the summer season. This will prevent displacement from the presence of associated vessels occurring during the winter months.

OPRED acknowledge that reference to the species and the buffer used for the assessment (Table 8.9). An illustration of the displacement impacts would be beneficial.

Eni Response: Please see the **Figures 8.1** and **8.2** below to illustrate the used buffer of 2 and 4km for displacement

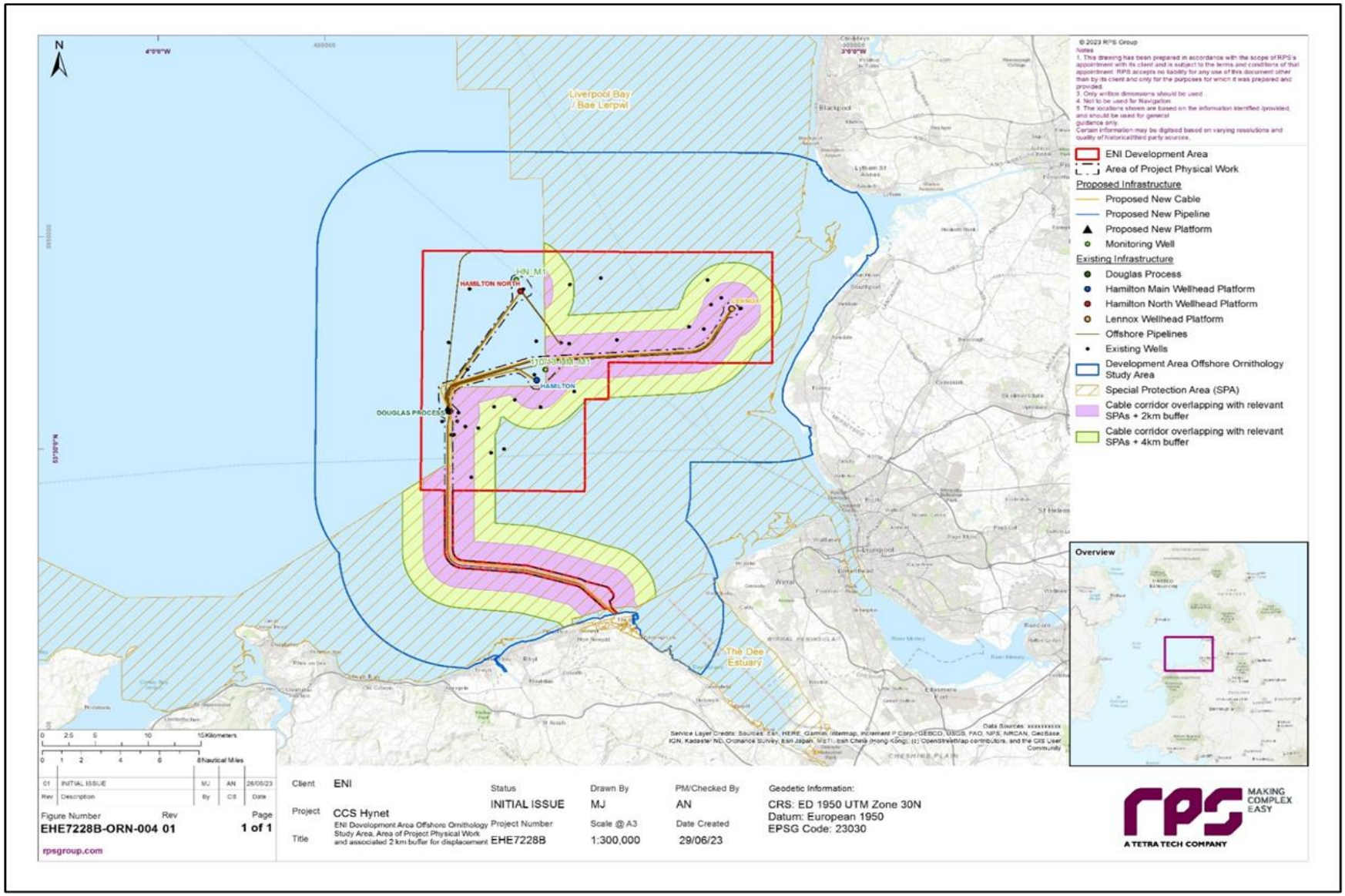


Figure 8.1: Proposed Development Area, Offshore Ornithology Study Area, Area Of Project Physical Work And Associated 2 Km And 4 km Buffers For Displacement With Overlap With Liverpool Bay/Bae Lerpwl SPA

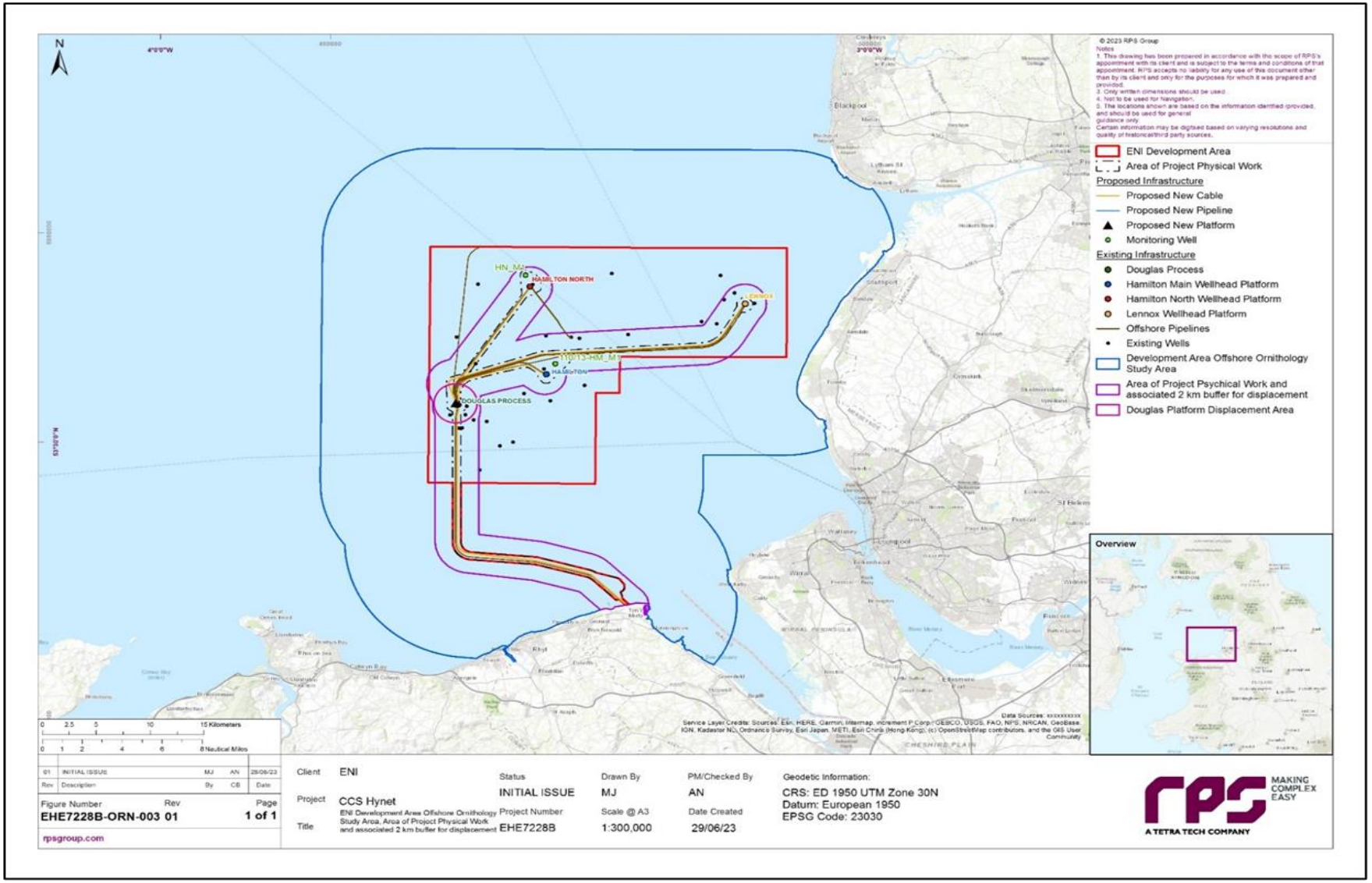


Figure 8.2: Proposed Development Area, Offshore Ornithology Study Area, Area Of Project Physical Work And Associated 2 Km Buffer For Displacement

QUESTION 9: Reg 12(1) letter dated 1 July 2024 – comment 13

It is noted that the applicant has described how many of the embedded mitigation measures sit at the top of the Mitigation Hierarchy, are designed to 'avoid' or 'reduce' environmental effects and are directly incorporated into the design of the Proposed Development. However, in many instances it is unclear on how the measure will help to mitigate the potential issue. For example, in Table 13.8 it is implied that fugitive emissions will be monitored through a Leak Detection and Repair Programme, however, it is unclear how this programme will stop the potential for fugitive emissions to occur. Similarly, it is unclear how the recycling of materials where practicable during decommissioning could a mitigation measure. Please expand on the measures outlined and their appropriateness when assessing the environmental impact.

Eni Response: With regards to climate change, justification is provided for each mitigation measure within Table 13.8 of Offshore ES Chapter 13 Climate Change, outlining how each measure reduces lifetime emissions associated with the Proposed Development. Additional context for each mitigation measure is provided below for the mitigation measures listed in Chapter 13.

Further information regarding how each mitigation measure is considered in the assessment of significance is also included below (detailed within Offshore ES Chapter 13 Climate Change), in line with IEMA 2022 guidance on the assessment of GHG emissions. It should be noted that the assessment of significance is a matter of professional judgement.

- A major adverse effect is where the project's GHG impacts are "*not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type*".
- A moderate adverse effect is where the project's GHG impacts are "*partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonization in line with local and national policy goals for projects of this type*".
- A minor adverse effect is where the project's GHG impacts are "*fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type".*
- A negligible effect is where the project's GHG impacts are "*reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050".*
- A beneficial effect is where the project's GHG impacts are "*below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline*".

1. *During construction and operational phases vessel fuel consumption will be minimised by optimising vessel scheduling, with consideration given to the co-ordination of activities and material delivery. Activities will be limited on the speed of vessels, and fuel used will have a low sulphur component (0.1%). Vessels older than 20 years will not be used.*

This acts to reduce the magnitude of emissions associated with vessel movements during the construction and operation of the Proposed Development and is accounted for within the relevant assessments of significance. This is not judged to be sufficient to enable the relevant impacts assessed during the construction/operation of the Proposed Development to be consistent with good practice methods aligned with the UK's net zero trajectory, as such the effect of GHG emissions associated with the relevant impacts has been assessed to be of moderate adverse significance, which is significant in EIA terms.

2. *During the operational phase, energy demand associated with the OPs will be reduced through energy efficiency opportunities. These include the use of efficient low loss transformers, variable frequency drives (VFDs) on CO_2 compressors, LED light bulbs, low voltage electrical installations, compressor efficiency specification and optimisation, efficient air coolers, energy monitoring systems (to comply with ISO 50001 certification), and Real Time Monitoring and Advanced Process Control (a computer-based algorithm that automatically optimises the process parameters and promotes a reduction in energy consumption from approximately 3% to 7%).*

The implementation of energy efficiency opportunities on the OPs results in the reduced consumption of energy during the operation of the Proposed Development, thereby reducing the magnitude of emissions to the atmosphere associated with such energy consumption. This is judged to align with good practice methods aligned with net zero, as such the effect of GHG emissions associated with energy and fuel use during the operation phase has been assessed to be of minor adverse significance, which is not significant in EIA terms.

3. *During the operational phase fugitive emissions will be monitored thorough a LDAR programme as part of the preventative maintenance activities, to avoid or minimise their presence as low as reasonably practicable.*

The Leak Detection and Repair (LDAR) programme is described as one of the implemented technologies within the project. This comprises Vibroacoustic Pipeline Monitoring System (e-VPMS®) which is a patented technology developed through an Eni R&D project started in 2009. It provides novel real-time monitoring of pipeline integrity in different scenarios (both onshore and offshore). The technology is mature in the oil and gas industry, currently surveying over 1,400 km of pipelines worldwide. Test applications on CO2 has been performed on pilot scale facilities and a demonstrative application on pilot project is planned for 2024. Real-time leak detection (LD) and third-party interference (TPI) monitoring is fundamental for a rapid response to any potential threat. The e-VPMS works through collection from a few remote stations installed across the pipeline route. Real-time monitoring data is sent to a cloud-based server and is continuously analysed. The leak location accuracy that can be achieved is better than 25 m. Additionally, gas detectors and flame detectors will be implemented in the whole project as part of safety measures.

The above preventative maintenance measures will ensure any fugitive emissions are identified as early as possible, to enable the fast prevention of further emissions release.

This mitigation measure is considered in the context of total CO2 transportation and long term storage, and is considered to align with operational good practice, contributing to the assessment of a significant beneficial effect.

4. *At the end of the Proposed Development's lifetime, materials removed during decommissioning will be recycled where possible.*

This prevents materials from being sent to landfill, and also reduces the need for the extraction of primary materials in the future, thereby reducing emissions associated with such processes. This is considered to align with good practice and the UK's net zero trajectory, and therefore the associated effect arising from decommissioning is assessed to be of minor adverse significance, which is not significant in EIA terms.

QUESTION 11: Reg12(1) letter dated 1 July 2024 – comment 20

Please provide clarity on the following comments regarding ornithology relating to the development:

- Liverpool Bay CCS Limited's commitment to carrying out the works within the period from 20th March to 21st October is welcomed. It is not clear from the response whether the applicant is referring to work related to the new Douglas Platform and the cable installation and whether this includes operations due to be carried out at the Lennox, Hamilton and Hamilton North Platforms and further clarification is therefore requested.

Eni Response: The Applicant can confirm LBCCS Limited's commitment to carrying out the works within the period from 20th March to 21st October applies to the new Douglas Platform, cable installation, Lennox, Hamilton and Hamilton North Platforms, and the additional pipeline spool connections to the New Douglas.

In response to **Question 17**, the Applicant has included five mini programmes (**Figure 17.4 to Figure 17.8**) to provide an overview of the timetable of activities for the platform works at the New Douglas, Hamilton Main, Hamilton North, and Lennox. These programmes show that the main vessel movements will take place

from April to October each year, thereby avoiding the bad weather window, and the overwintering period. While the programmes show some 'Well' related activities during the overwintering period, these will be carried out by vessels that will have moved into location, alongside the platform, prior to the start of the over-wintering period.

- It is noted that JNCC have been omitted from list of consultees regarding the vessel management plan.

Eni Response: The Applicant can confirm that the VMP described in response to **Question 7**, will be prepared following consent, and submitted to the relevant regulatory bodies for approval, and anticipates that JNCC will be one of the Consultees on the document.

- Some further information provided appears to be incorrect, notably where the applicant states that "*The SNCB advice is restricted to OWF infrastructure and has no best practice protocol for vessel movements in regard to Red- Throated Diver*". Please clarify the best practice protocol advised for OWF infrastructure.

Eni Response: The Applicant acknowledges that the previously provided information was incorrect. The Applicant can confirm that the assessments carried out within the Offshore ES utilised the Joint SNCB Interim Displacement Advice Note, and its accompanying annex with the specific advice on the treatment of displacement of red-throated diver (Joint SNCB Interim Displacement Advice Note | JNCC Resource Hub).

- It is noted that the applicant is planning to carry out work on offshore platforms throughout the winter period. How will potential disturbance and displacement of the Red-Throated Diver and Common Scoter be reduced during the sensitive winter period?

Eni Response: Potential disturbance and displacement of the Red-Throated Diver and Common Scoter will be reduced by **avoiding, and minimising** work during the sensitive winter period.

In response to **Question 17**, the Applicant has included five mini programmes (**Figure 17.4 to Figure 17.8**) to provide an overview of the timetable of activities for the platform works at the New Douglas, Hamilton Main, Hamilton North, Lennox, and cable Installation.

These programmes show that the main vessel movements will take place from April to October each year, thereby avoiding the bad weather window, and the overwintering period. While the programmes show some 'Well' related activities during the overwintering period, these will be carried out by vessels that will have moved into location, alongside the platform, prior to the start of the over-wintering period.

- The vessel management plan (VMP) should holistically/strategically consider vessel movements across the different parts of the project i.e. during the construction phases of the HYNET development area. This should also include an estimation of any ongoing maintenance and support work.

Eni Response: The Applicant has anticipated that a **VMP** is likely to be required through the Storage Permit, and Marine Licence, as consent conditions. Therefore, the Applicant has made it a requirement of the EPC contractors that will implement the Proposed Development to prepare a **VMP** for the works. The **VMP** will be prepared following consent, and submitted to the relevant regulatory bodies for approval, prior to the commencement of development.

The **VMP** will provide details of the vessel management and navigational safety measures that will be implemented, in accordance with relevant guidance, during the construction, and operation and maintenance

phases of the Proposed Development. The **VMP** will show that the main vessel movements will take place from April to October each year, thereby avoiding the bad weather window, and the overwintering period. While some 'Well' related activities occur during the bad weather window, these will be carried out by vessels that will have moved into location, alongside the platform, prior to the start of the over-wintering period. Please see also response to **Question 17**.

The end-of-life decommissioning of the Proposed Development will be subject to a separate Decommissioning Plan. The **VMP** detailing the navigational safety and vessel management arrangements for those end-of-life decommissioning works, will be developed at the appropriate time in advance of those activities commencing. The **VMP** will contain details of the following:

- Navigational safety measures during construction.
- Navigational safety measures during operation and maintenance.
- Promulgation of information e.g., local notices to mariners, Admiralty notices to mariners, hydrographic charts, Kingfisher Bulletins, radio navigational warnings.
- Location of working ports.
- Types and specification of vessels.
- Numbers and movements of vessels.
- Indicative transit route corridors.
- Anchoring.
- Environmental sensitivities relevant to vessel management.
- Compliance with Marine Guidance Notes.
- Compliance with Storage Permit, and Marine Licence conditions.

- Movements in regard to Red-Throated Diver. Please provided further clarity on the best practice protocol advised for OWF infrastructure. It is noted that the applicant is planning to carry out work on offshore platforms throughout the winter period and further reassurance requested on how any potential disturbance and displacement of the Red-Throated Diver and Common Scoter will be reduced during the sensitive winter period.

Eni Response: Potential disturbance and displacement of the Red-Throated Diver and Common Scoter will be reduced by **avoiding, and minimising** work during the sensitive winter period. The Applicant can confirm that the assessments carried out within the Offshore ES utilised the Joint SNCB Interim Displacement Advice Note, and its accompanying annex with the specific advice on the treatment of displacement of red-throated diver (Joint SNCB Interim Displacement Advice Note | JNCC Resource Hub).

The five mini programmes at **Figure 17.4 to Figure 17.8**, presented in response to **Question 17**, provide an overview of the timetable of activities for the platform works at the New Douglas, Hamilton Main, Hamilton North, and Lennox. These programmes show that the main vessel movements will take place from April to October each year, thereby avoiding the bad weather window, and the overwintering period. While the programmes show some 'Well' related activities during the overwintering period, these will be carried out by vessels that will have moved into location, alongside the platform, prior to the start of the over-wintering period.

This means that there will be minimal vessel movements, related only to crew changeover, during the over-wintering period.

- It is noted that that the information in the response provided by Liverpool Bay CCS Limited on 2nd August 2024 contradicts what is stated in the previous response which states "*Overall, the Applicant has a 'weather window' that*

we are trying to avoid from around 21st October to 20th March each year, as the sea-state can make it dangerous to carry out heavy lifts, drilling, and cable laying with vessels alongside the platforms during this period. This means nearly all works will be carried out from the end of March to mid-October. It is therefore highly likely that all our works will be completed outside of the winter period." The schedule provided indicates that work will be carried out on the offshore platforms during the sensitive winter period. Please provided further information on how any potential disturbance and displacement of the Red- Throated Diver Common Scoter will be reduced during the sensitive winter period.

Eni Response: The Applicant can confirm that the main vessel movements will take place from April to October each year, thereby avoiding the bad weather window, and the overwintering period. While the programmes at **Figure 17.4 to Figure 17.7**, presented in response to **Question 17**, show some 'Well' related activities during the overwintering period, these will be carried out by vessels that will have moved into location, alongside the platform, prior to the start of the over-wintering period.

This means that there will be minimal vessel movements, related only to crew changeover, during the over-wintering period.

- Please clarify that it is work outside of the established 500m zones that will be restricted to non-winter months i.e. heavy lifts and cable laying.

Eni Response: Except for the cable laying, all the other project related activities will be carried out within the established 500m zones. All the heavy lifts, and the drilling activities at the three satellite platforms are carried out within the established 500m zones. The installation of the New Douglas platform, and the new pipeline spool connections will be carried out within the established 500m zone of the existing Douglas platform complex. This is because the New Douglas platform will be installed within the established 500m zone, approximately 190m to the north of the existing Douglas accommodation platform.

The five mini programmes at **Figure 17.4 to Figure 17.8**, presented in response to **Question 17**, provide an overview of the timetable of activities for the platform works at the New Douglas, Hamilton Main, Hamilton North, Lennox, and cable installation. These programmes show that the main vessel movements will take place from April to October each year, thereby avoiding the bad weather window, and the overwintering period. While the programmes show some 'Well' related activities during the overwintering period, these will be carried out by vessels that will have moved into location, alongside the platform, prior to the start of the over-wintering period.

This means that there will be minimal vessel movements, related only to crew changeover, during the over-wintering period.

Non-Technical Summary Comments

QUESTION 17: Section 1.3.2. Reg 12(1) letter dated 1 July 2024 – comment 31

Further information regarding the timing of the topsides replacement and removal has been provided. OPRED understand that the Hamilton Main and Hamilton North jacket will be without a topside for less than 24 or 48 hours. Please provide detail on the logistics of these operations regarding the requirement for specialist Heavy Lift Vessels and support vessels.

Eni Response: A dedicated HLV with revolving derrick crane, with sufficient crane capacity and required installation equipment, shall be utilised for Douglas CCS Platform installation, Hamilton North and Hamilton Main topside replacement. For Lennox, due to platform very shallow water depth condition, a heavy lift vessel

with fixed stern crane (shear leg) and shallow draft capability is envisaged. Vessel requirements are dynamic positioning. However, an anchor pattern might be utilised for additional stability due to dynamic nature of the tides and currents in the area.

For preparatory works on platforms, jack up vessel with sufficient cranage is to be utilized based on current and ongoing Liverpool Bay Asset operational experience for well intervention and repairs. Topsides are transported from fabrication yard by means of 400ft flat deck cargo barges supported by tugs operations. Handling of barges in field is performed with 2+1 tugs (meaning stand-by tug is present for contingency at all time). Any over the top works shall be accompanied by ERRV (Emergency Response and Rescue Vessel) present in the field of operations. Mobilisations of vessel are performed at Contractor's premises, while supporting spread is supplied locally in UK. Transfer of personnel is envisaged by crew boats or helicopters as required, depending on length of crew changes frequency.

Figure 17.1 shows the potential arrangement of vessels engaged in the lifting of the existing topsides from the respective platforms and placing them onto the transportation barge for onward disposal. **Figure 17.2** presents a potential arrangement of how the new topsides will be transported and lifted into place. **Figure 17.3** shows the operation of the shear legs crane in shallow water and to onward transportation of the removed topsides for onward transportation to the disposal yard in Norway.

The following mini programmes (**Figure 17.4 to Figure 17.8**) have been prepared to provide an overview of the timetable of activities for the platform works at the New Douglas, Hamilton Main, Hamilton North, Lennox, and cable Installation. Also shown is which jack up rig, heavy lift vessel, and drill rig are in use.

Figure 17.4 shows that the "platform removal & new installation works" for the Hamilton Main platform are currently scheduled to take place during 29th July 2028 to 2nd August 2026. This period of works includes around one day for the lifting of the existing topsides off its jacket and onto the transportation barge. Another day will be required to prepare the new risers and J-tubes to receive the new topsides, which will then take another day to be lifted into place from the transportation barge. This means that the existing jacket will be without a topside for as short a period as possible through carrying out a smooth, sequential lifting operation. **Figure 17.5**, and **Figure 17.7**, show a similar period, and will involve similar activities, for Hamilton North, and New Douglas platforms. Albeit, for the New Douglas platform, instead of lifting an existing topside, a new jacket will be lifted into place, and then new topsides added. At Lennox, the removal of the existing and installation of the new topside will take a little long, as it will involve a different lifting vessel. **Figure 17.8** includes geophysical and geotechnical surveys from May to June 2025, the cable lay operation planned with a Cable Lay Vessel(CLV) is planned to mobilise from June to August 2026 from POA to new Douglas and from new Douglas to the satellite platforms including all the preparatory works (e.g. rollers installation), mobilisation of the CLV and pulling out the cable. All cable protection and mattresses installation are scheduled in 2026 and 2027 avoiding the winter bad weather.

Tug/Anchor Handlers and Cargo Barges will be active when Installation Vessels (HLV or SLV) are at the individual locations. CTVs and Helicopters will be required for transiting personnel when the Construction Support Vessels (JUR and/or ISP) are alongside of the respective platforms.

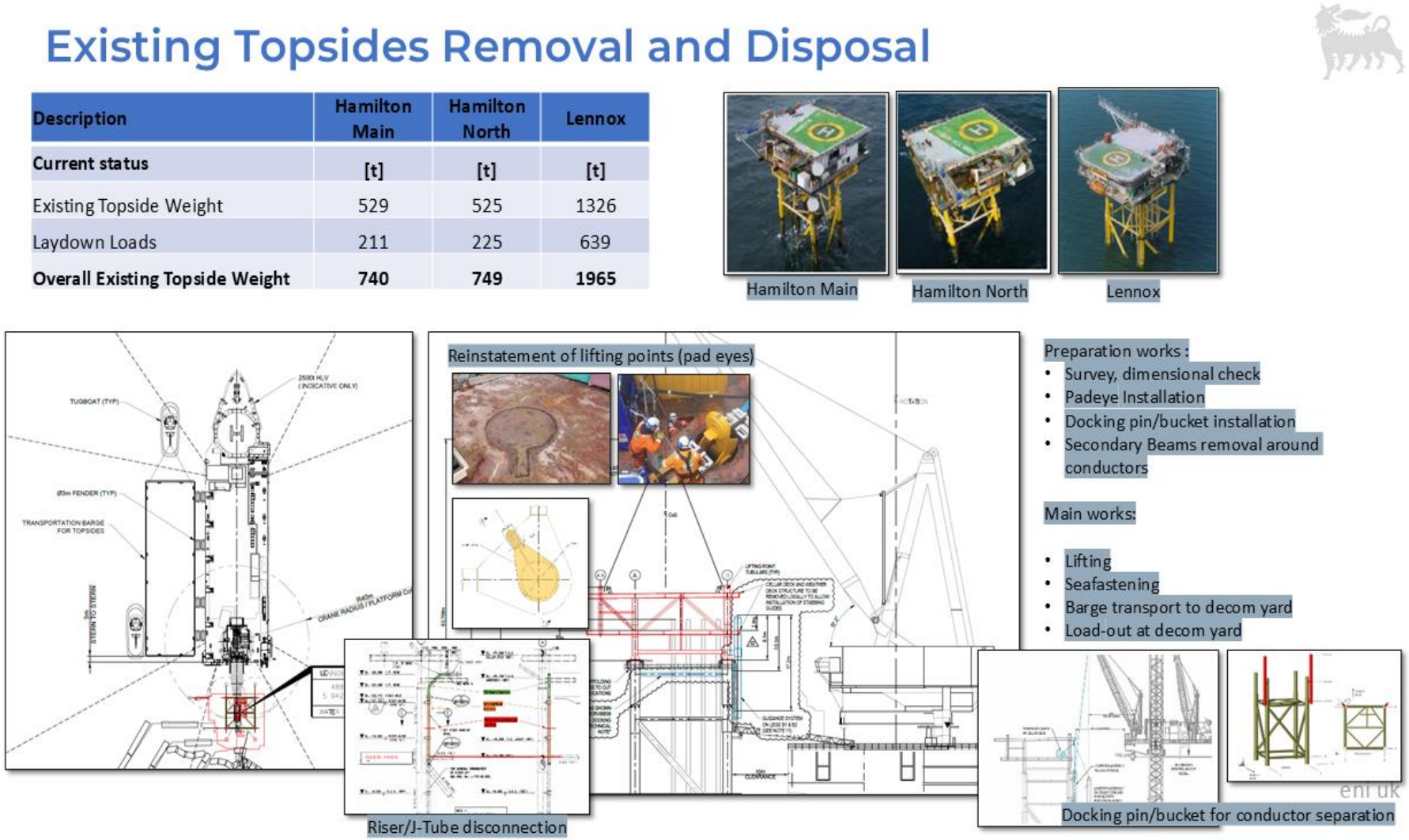


Figure 17.1: Existing topsides removal

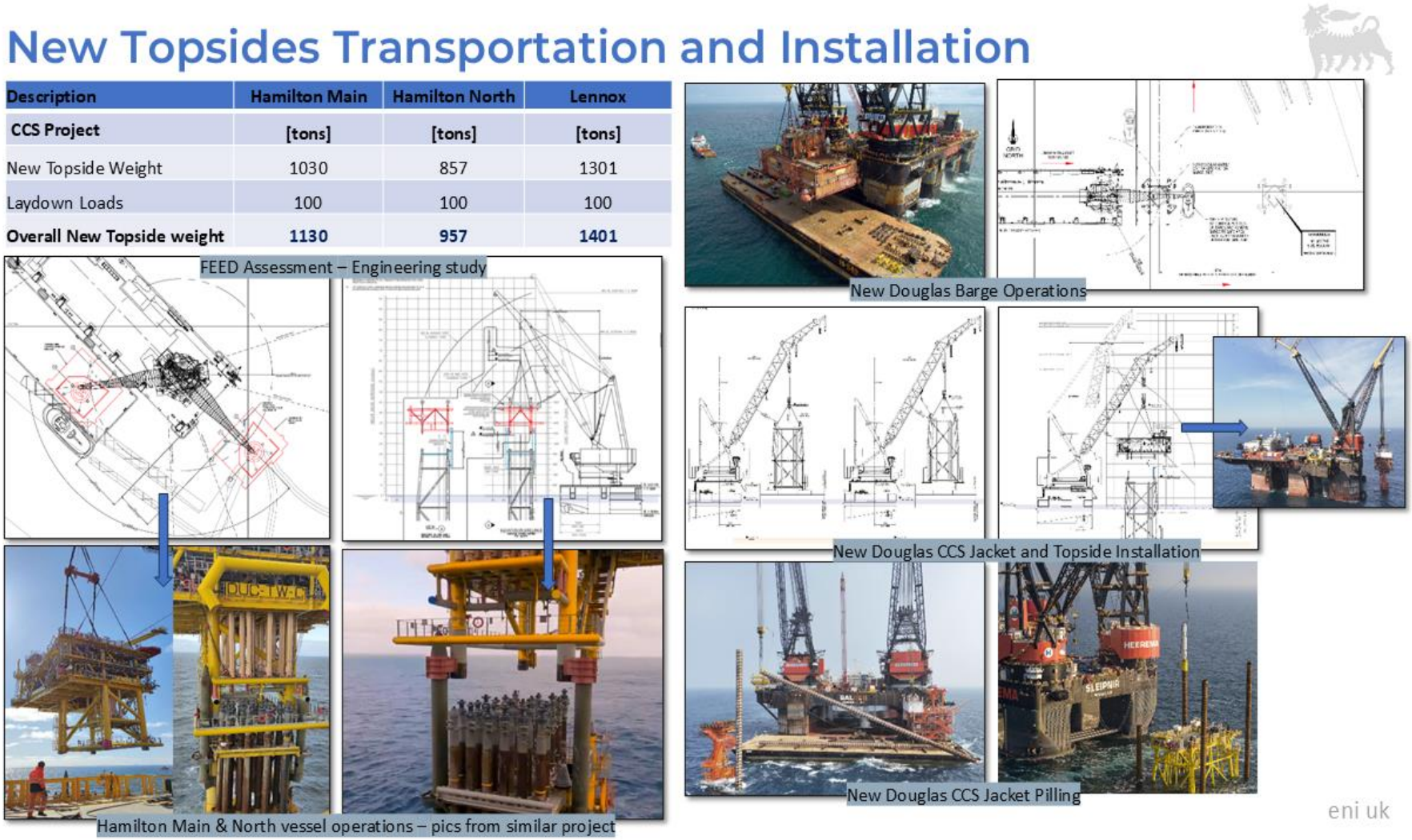


Figure 17.2: New topsides transportation and installation

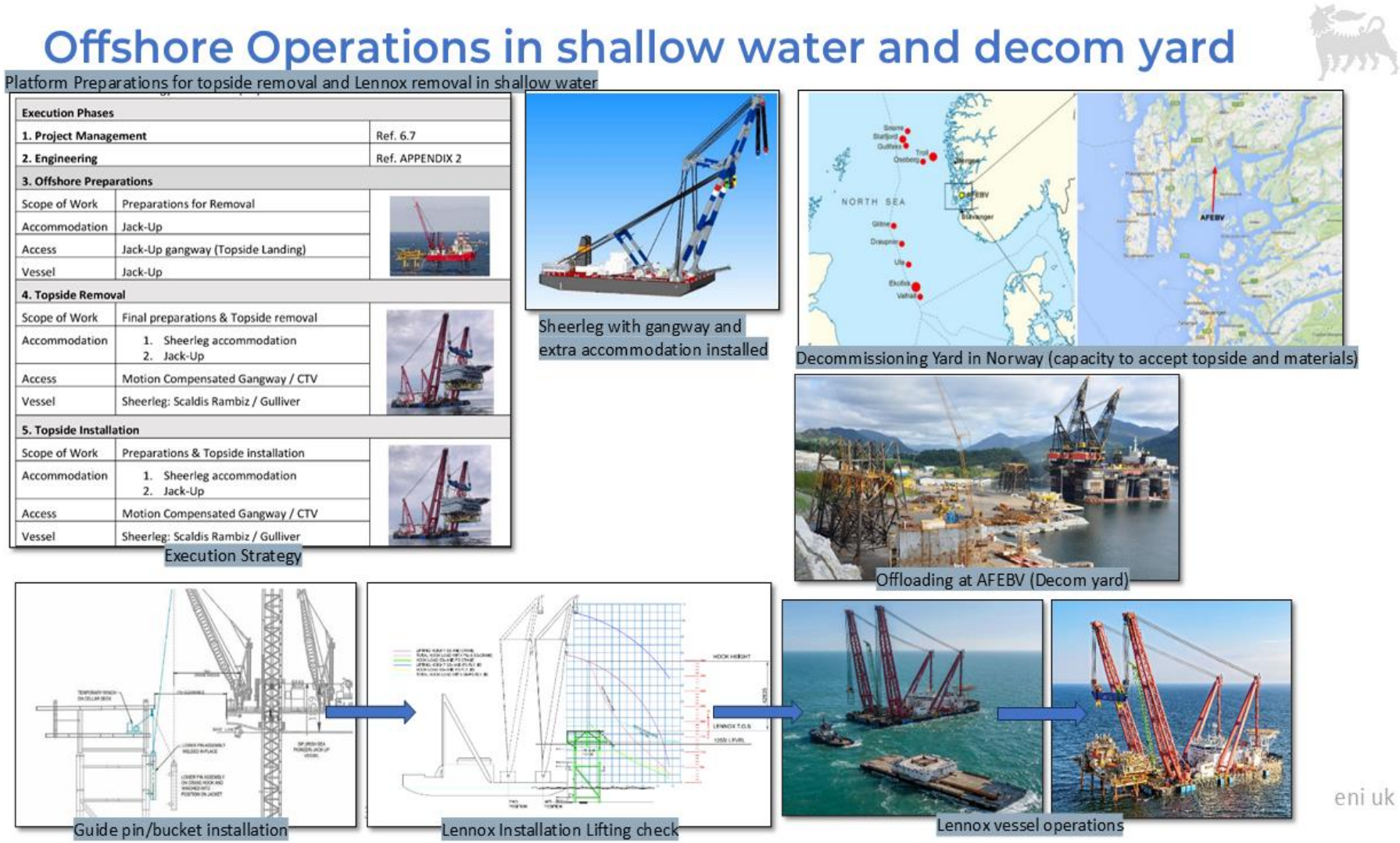


Figure 17.3: Offshore Operations in Shallow water

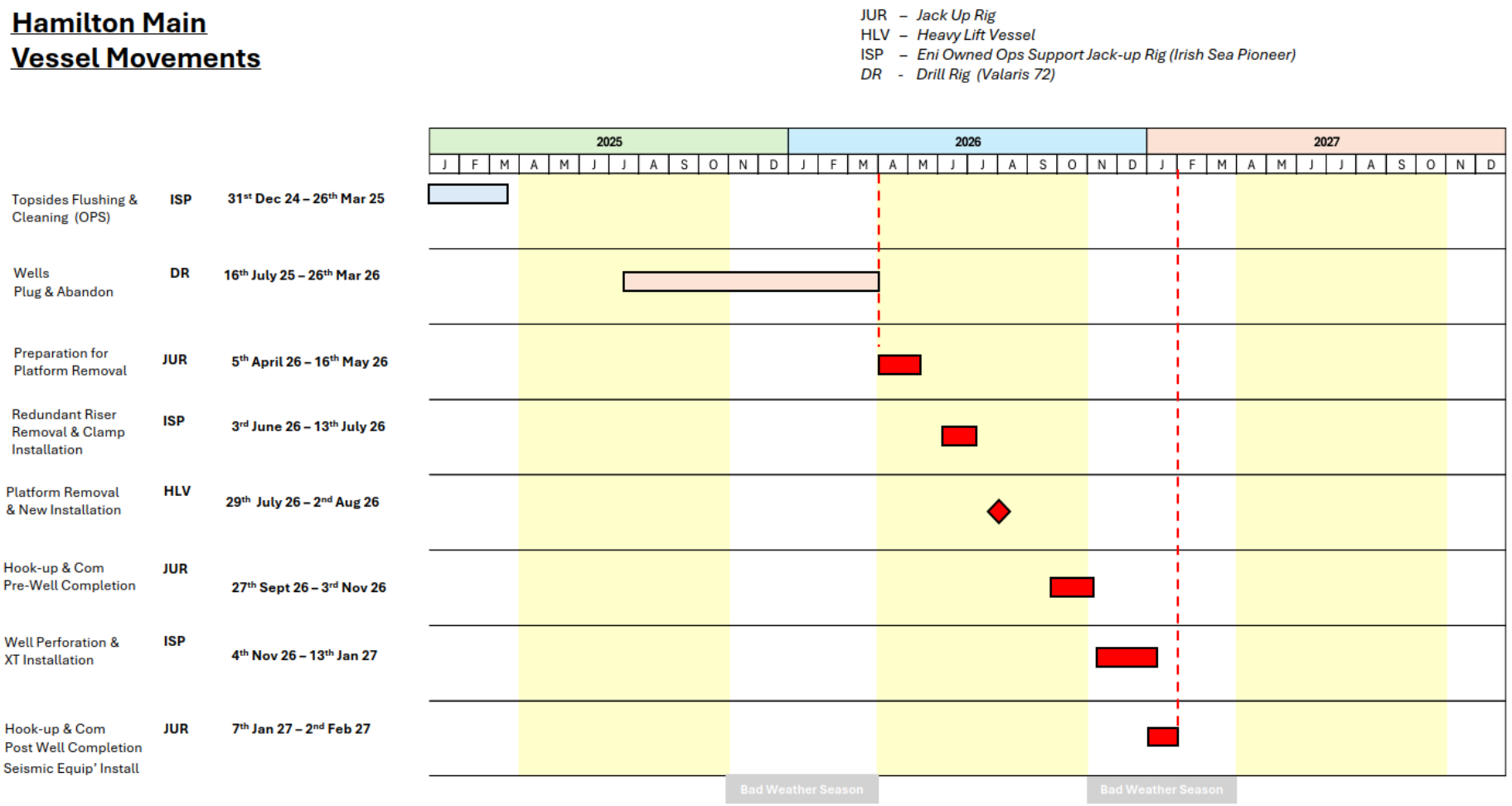


Figure 17.4: Currently anticipated programme for vessel movements and platform works at Hamilton Main

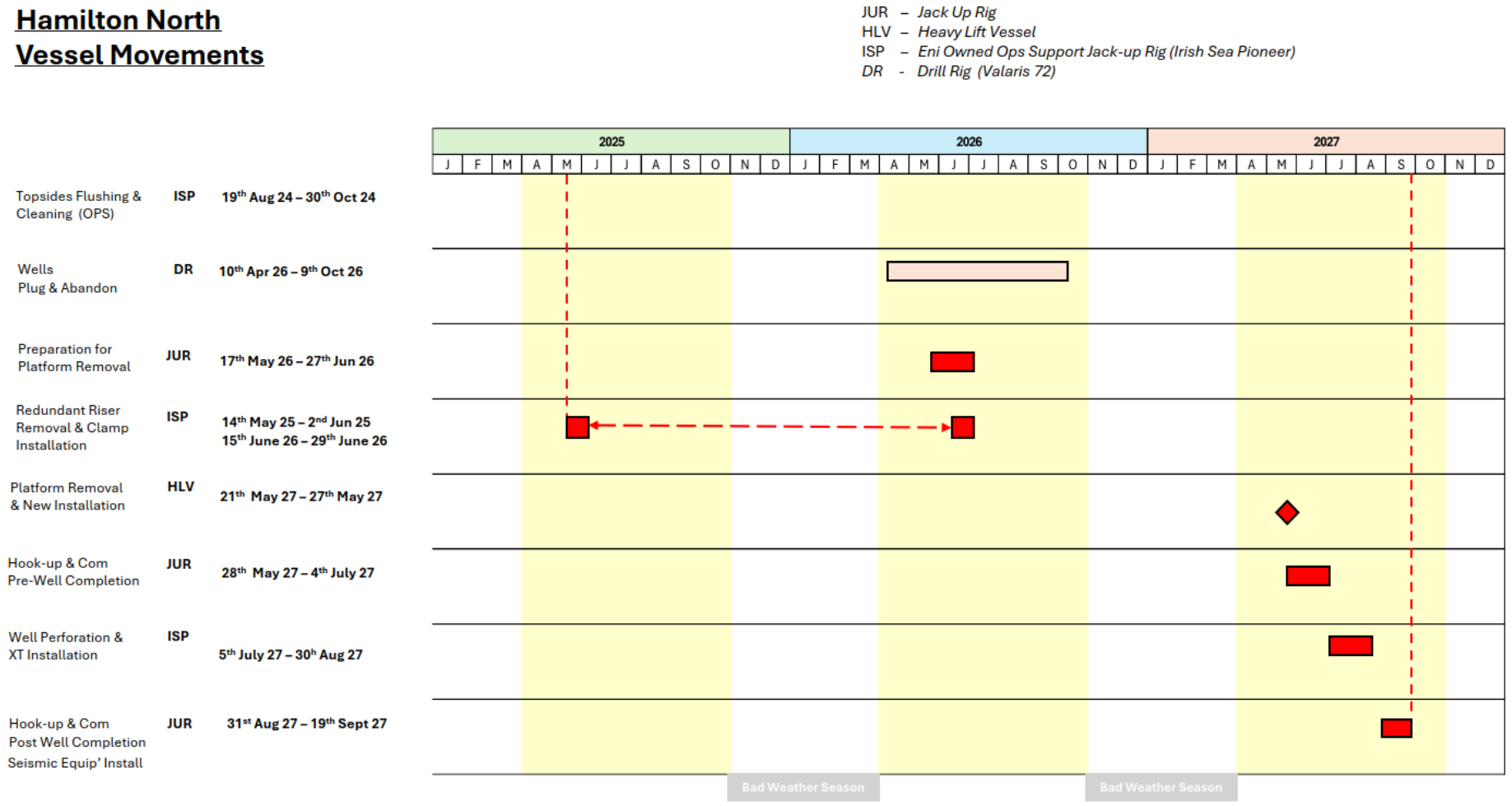


Figure 17.5: Currently anticipated programme for vessel movements and platform works at Hamilton North

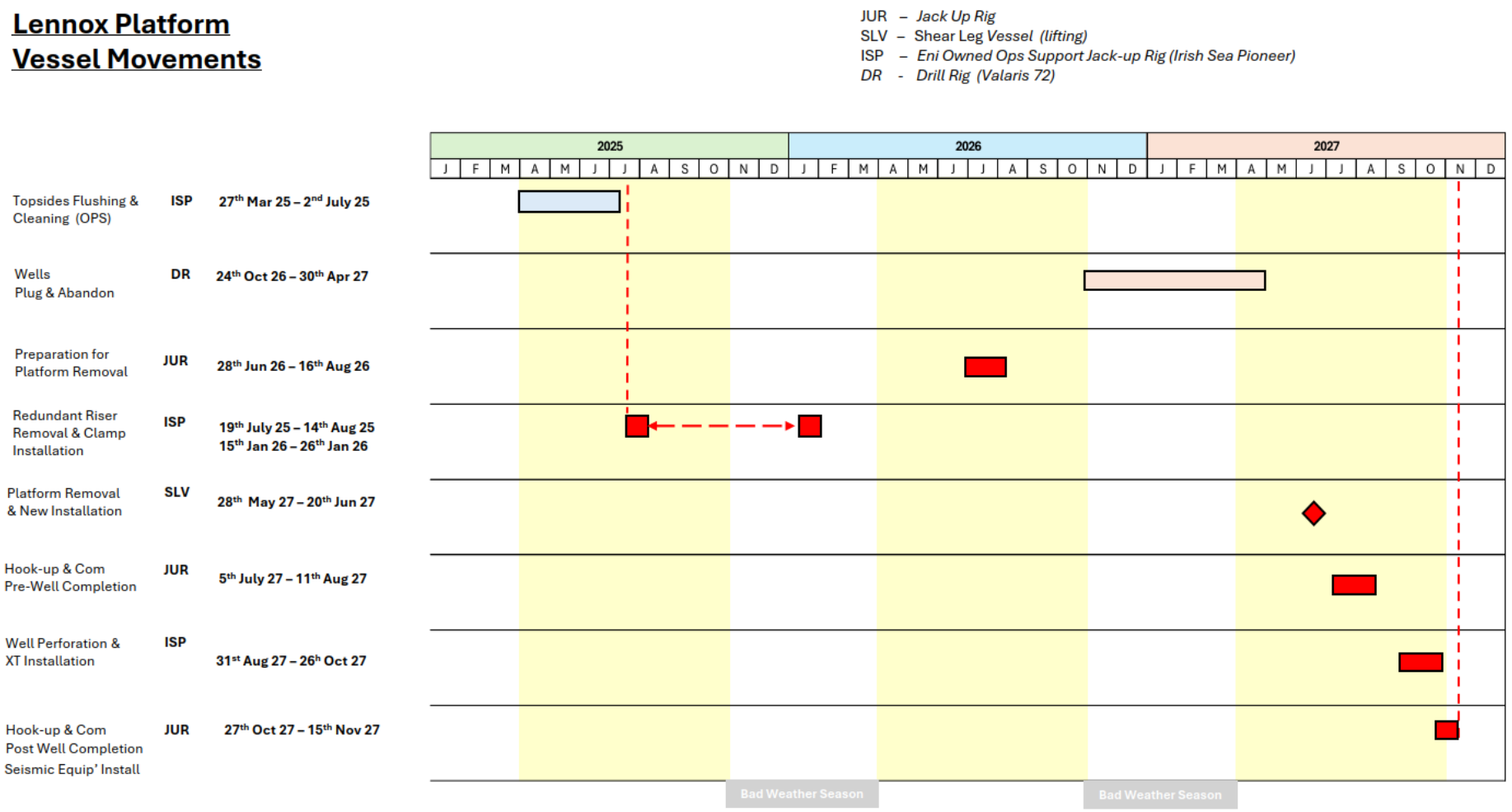


Figure 17.6: Currently anticipated programme for vessel movements and platform works at Lennox

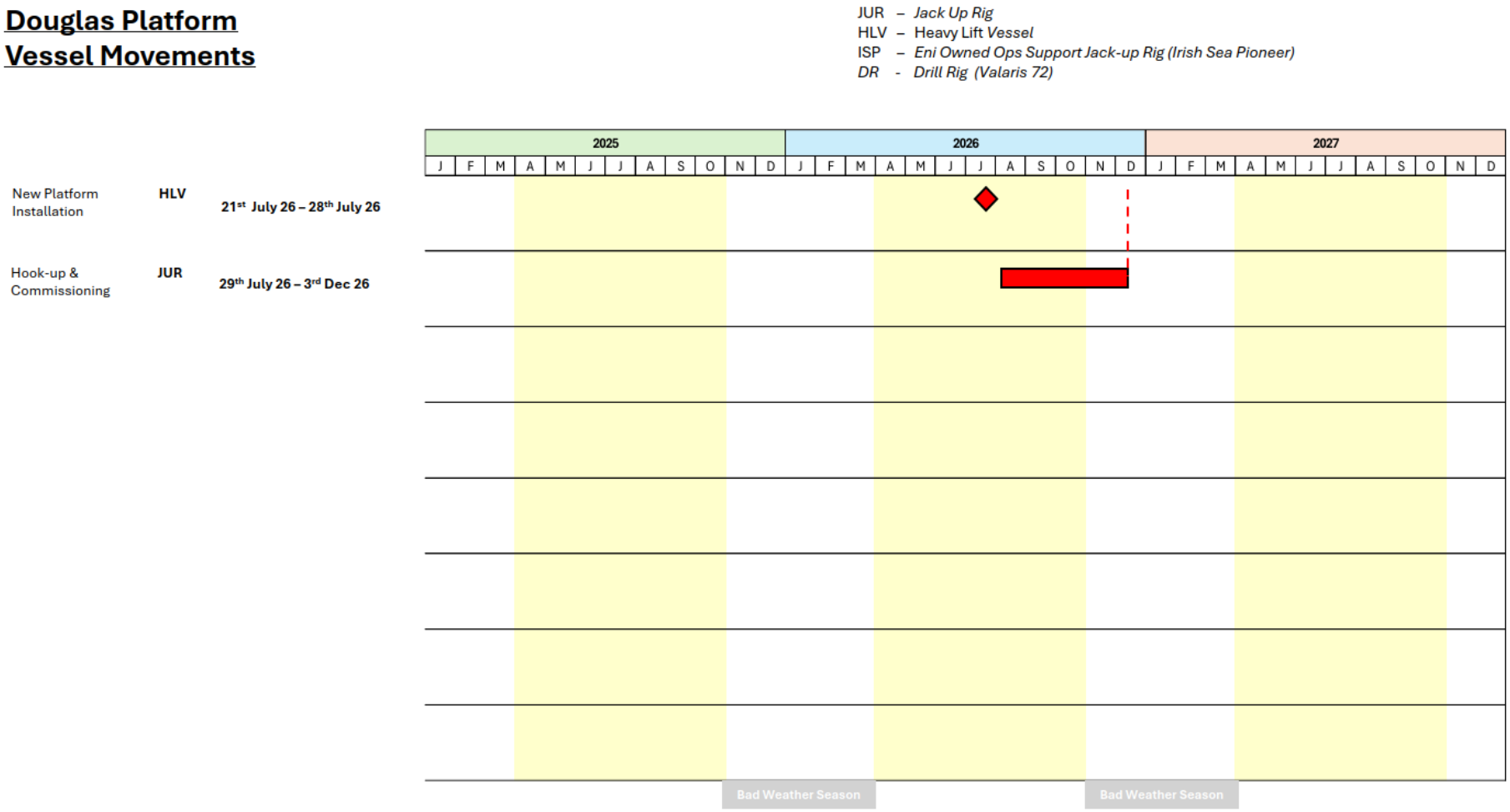
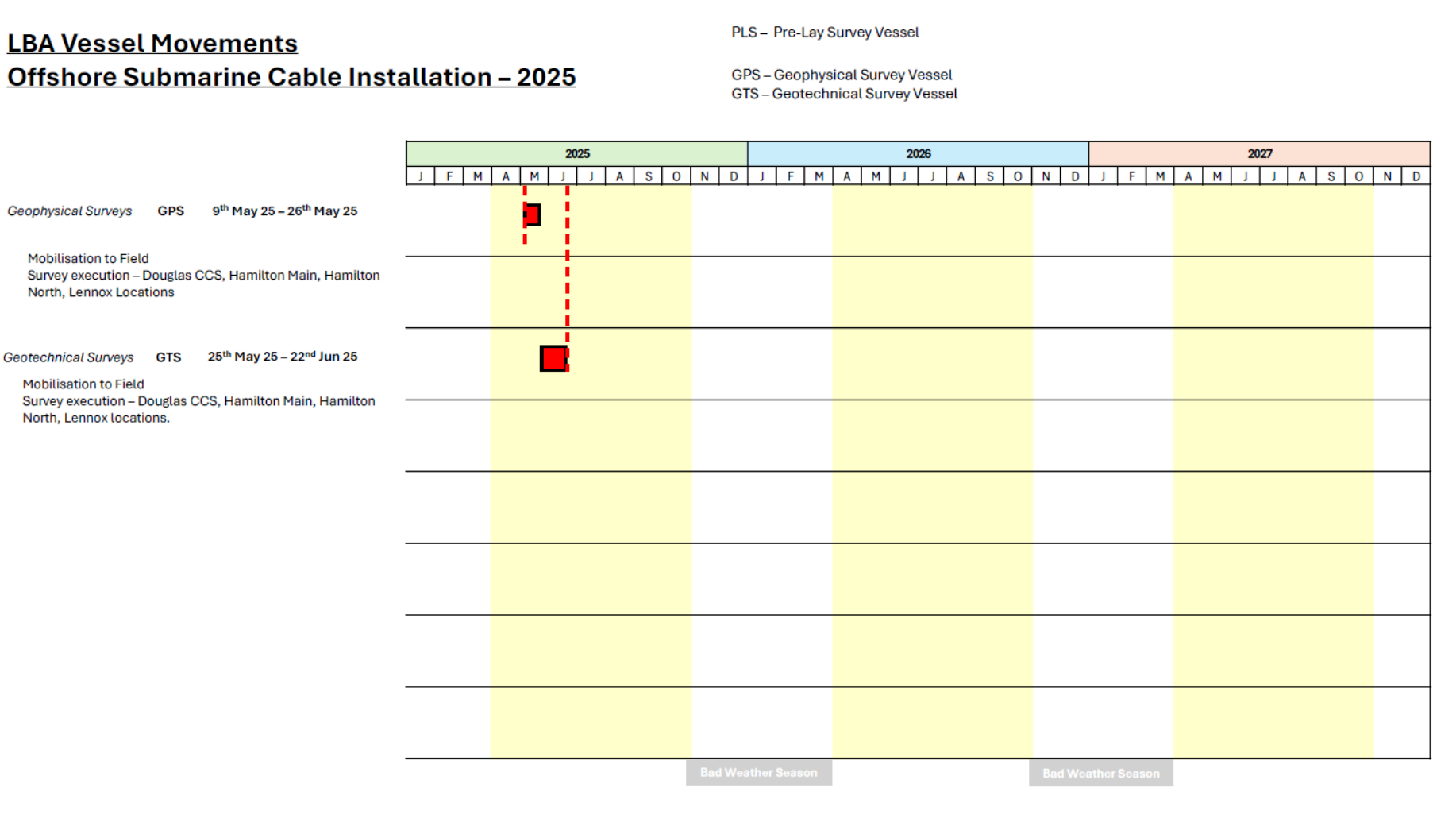


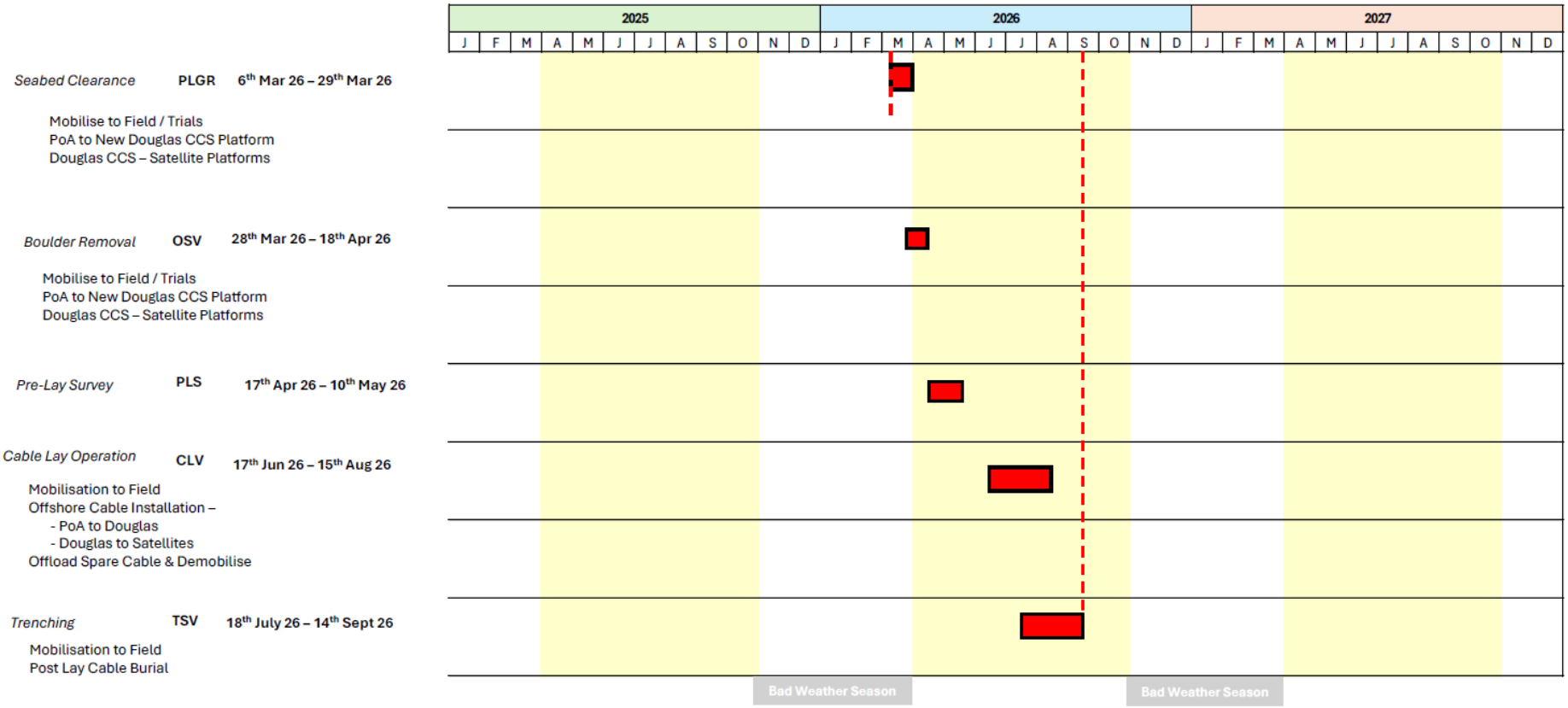
Figure 17.7: Currently anticipated programme for vessel movements and platform works at New Douglas

Figure 17.8: Currently anticipated programme for vessel movements and cable Installation 2025, 2026, and 2026/2027



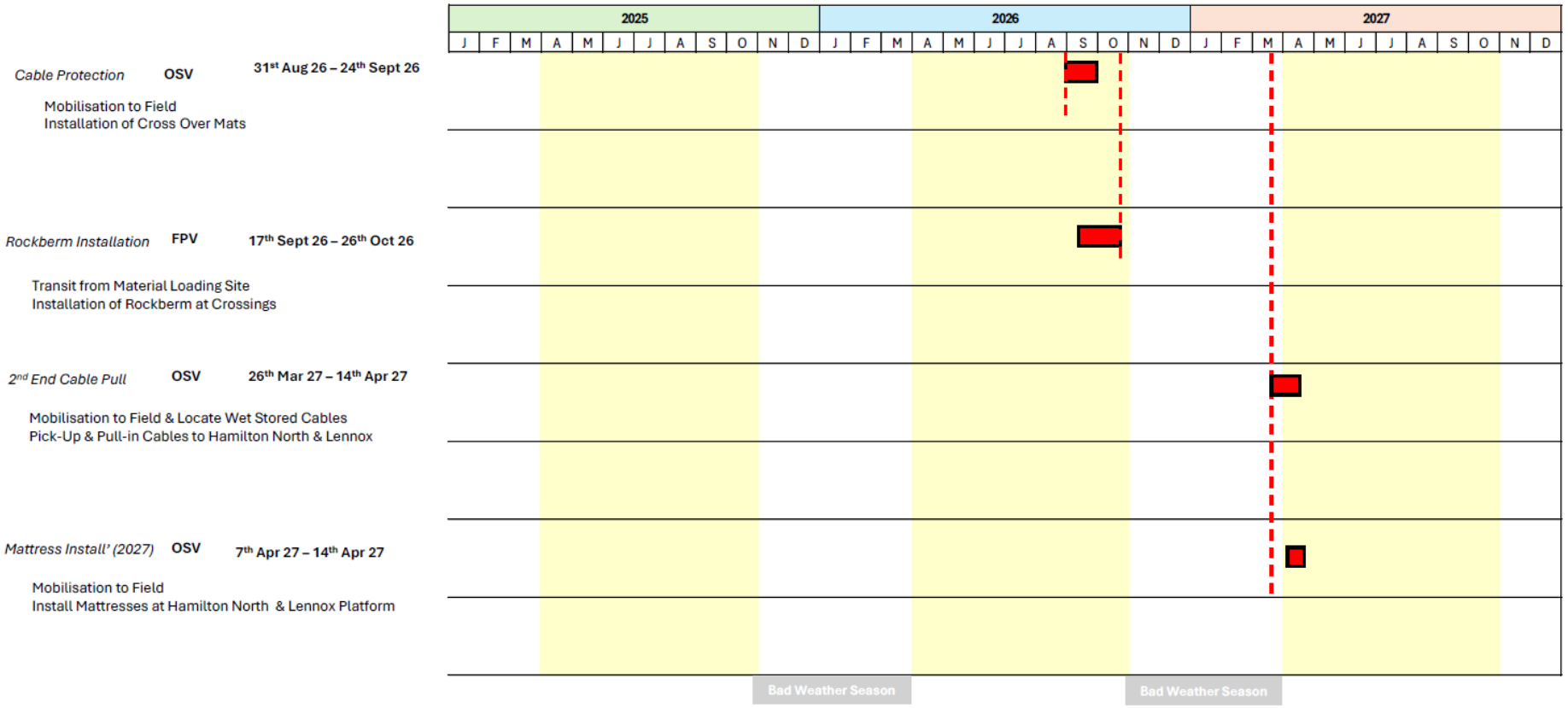
LBA Vessel Movements
Offshore Submarine Cable Installation – 2026

PLS – Pre-Lay Survey Vessel
PLGR – Pre-Lay Grapnel Run Vessel
CLV – Cable Lay Vessel
TSV – Trench Support Vessel
OSV – Offshore Support Vessel



LBA Vessel Movements
Offshore Submarine Cable Installation – 2026/2027

OSV – Offshore Support Vessel
FPV - Rockberm Installation Vessel



QUESTION 22: Section 2.3.1. Reg 12(1) letter dated 1 July 2024 – comment 41

OPRED acknowledge the use of 315km as the mean maximum foraging range for gannet. It is noted however, that Volume 1, Chapter 3 does not detail the seasonal impacts to birds in relation to the proposed activities, and the cumulative impact to birds throughout the year. Please provide further details.

Table 8.34 provides a summary of the available data for the Cumulative Effects Assessment (CEA). Please include distances from the development. It is noted that no oil and gas activities have been included within this table as they have been scoped out, however, it is noted that oil and gas activities and gas storage licence area fall within the same distance range as some of the projects that have been included within this table. Please clarify why oil and gas activities have not been included within the assessment.

Eni Response: The applicant has chosen the receptors based upon the species guild and season by which they are potential receptors. The groups assessed were:

- non-breeding waterbirds (wildfowl, waders, etc) - The internationally important concentrations of wildfowl and waders of the Dee Estuary SPA, Ribble and Alt Estuaries SPA, etc are not present as breeding birds with many of them breeding on tundra and moorland further north and returning for the non-breeding season (for which they are assessed).
- Non-breeding seaducks - These, e.g., red-throated diver and common scoter are present in large concentrations during the non-breeding season only and breed further north, eg., Scotland, Iceland, Norway, etc. These were assessed during the non-breeding season.
- Breeding true seabirds - Assessed during the breeding season these are not tied to a restricted foraging range during the non-breeding season with many species also being migratory (e.g., Manx shearwater winter off the coast of South America).
- Breeding terns These birds are present and tied to restricted foraging ranges during the breeding season only. Outside of the breeding season they do not have restricted foraging ranges. Terns have accordingly been assessed during the breeding season.

These birds are all either migratory or not tied to foraging ranges associated with nest sites throughout the seasons and therefore there will not be any cumulative impacts throughout the year due to either, the birds not being present, or, the birds not being impacted by displacement as they have access to vast areas of the ocean outside of specific seasons.

The impacts have been identified to the relevant groups within either the breeding or non-breeding periods as set out above. A summary of the resulting significance of effect from these assessments are provided below and are also set out within Volume 2, Chapter 8: Offshore Ornithology.

<u>The impact of temporary habitat loss leading to displacement/disturbance of birds.</u>

- **Non-breeding waterbirds**: Minor for both the construction and end-of-life decommissioning phase.
- **Non-breeding seaducks**: Minor for both the construction and end-of-life decommissioning phase.
- **Breeding seabirds**: Negligible for both the construction and end-of-life decommissioning phase.
- **Breeding terns**: Minor for both the construction and end-of-life decommissioning phase.

<u>Disturbance and displacement from airborne sound and presence of vessels and infrastructure.</u>

- **Non-breeding waterbirds**: Minor for the construction phase and end-of-life decommissioning phase. No chance for the operation and maintenance phase.
- **Non-breeding seaducks**: Minor for the construction phase and end-of-life decommissioning phase. No chance for the operation and maintenance phase.
- **Breeding seabirds**: Negligible for the construction phase and end-of-life decommissioning phase. No chance for the operation and maintenance phase.
- **Breeding terns**: Negligible for the construction phase and end-of-life decommissioning phase. No chance for the operation and maintenance phase.

Collision with static offshore infrastructure.

- **All receptors**: No change across all phases and seasons.

Indirect impacts to birds from changes in prey availability.

- **Non-breeding seaducks**: Negligible for the construction phase and end-of-life decommissioning phase. No chance for the operation and maintenance phase.
- **Breeding seabirds**: Negligible for the construction phase and end-of-life decommissioning phase. No chance for the operation and maintenance phase.
- **Breeding terns**: Moderate for the construction phase and end-of-life decommissioning phase. No chance for the operation and maintenance phase.

Accidental pollution in the surrounding area.

- **All receptors**: Negligible across all phases and seasons.

Creation of roosting and nesting habitats among project infrastructure.

- **Breeding seabirds**: A minor positive effect during the operation and maintenance phase.

Distances to Projects

The distance between the Project and all projects assessed within the CEA are presented within table 8.30 of Volume 2, Chapter 8: Offshore Ornithology and are also listed below.

Tier 1 projects:

- Gwynt y Môr - 0km
- North Hoyle offshore wind farm - 0km
- MaresConnect Interconnector - 0km
- Rhyl Flats wind farm - 31.05km
- Morlais renewable energy - 72km
- Dublin Array offshore wind farm - 160km
- North Irish Sea Array wind farm - 160km
- GE wind farm - 165km
- GE wind farm - 165km
- Bray offshore wind farm - 165km
- Kish offshore wind farm - 165km
- Oriel offshore wind farm - 165km
- Arklow offshore wind farm - 165km
- Codling offshore wind farm - 165km
- Marine renewable tidal array - 170km
- Ballyhenry Bay Strangford Lough tidal test - 170km
- Awel y Môr - 1.1km

Tier 2 projects:

- Morgan and Morecambe offshore wind farms transmission assets - 3km
- Morgan offshore wind farm generation assets - 7.53km
- Morecambe offshore wind farm generation assets - 30km
- Mona offshore wind farm - No data

- Fair Head tidal energy park - 205km

Other offshore oil and gas projects were considered in the CEA Long List, but none were brought forward to the assessment based on lack of available data to undertake a meaningful assessment, and lack of receptor pathways.

We have also assessed the impact of the Proposed Development on the potential reduction or restriction of oil and gas exploration activities, including surveys, drilling and the placement of infrastructure.

Infrastructure, safety zones and activities associated with the Proposed Development may restrict access to the existing cables mentioned above, in addition to the planned MaresConnect cable. Cable crossing and proximity agreements as per the ICPC Recommendation 3-10C 'Telecommunications Cable and Oil Pipeline/Power Cables Crossing Criteria' are being established with relevant cable operators and will include the ability of a cable operator to access their infrastructure during the construction of the Proposed Development. All the cables crossed by the Proposed Development already cross existing Eni infrastructure through similar agreements.

Eni Response: The Applicant can confirm that all projects with available data that allowed for a meaningful cumulative assessment have been included within the CEA. A Carbon Dioxide Appraisal and Storage Licence has been granted (Licence reference: CS010) to Spirit Energy Production UK Limited, however no details relating to the extent and works activities for the associated proposed project (Morecambe Net Zero Cluster) are available. Therefore, this proposed development would be classified as a Tier 3 project. Tier 3 projects therefore at this time have not been included in the cumulative assessment.

Comments on Volumes and Chapters

Volume 1 Chapters 1-5: Introductory Chapters

Volume 1 – Chapter 1: Introduction

QUESTION 25: Section 1.3.3. Reg 12(1) letter dated 1 July 2024 – comment 50

Further information regarding the major accidents and disasters arising from a CO2 release which have been scoped out of the assessment is required. Similar information was also requested within Comment 79 and Comment 116 from the 1st July 2024 Reg12(1) letter:

- Currently only oil spill modelling results are included in the assessment. Under the EIA 2020 Regulations the environmental impact from of a worst-case diesel release should be included.

Eni Response: The oil spill technical note response from the original Reg(12)1 letter Dated 1 July 2024 Comment 50. Section 1.3.3 is replaced by the applicant's response below about loss of diesel inventory from a drilling rig. Answers to the **Questions 38-b)**, **51 -1st bullet** and **79 - i)** and **ii)** are similar to this question.

The recent Well Abandonment Temporary Operations Oil Pollution Emergency Plan (TOOPEP) dated March 2024 includes stochastic modelling that was conducted using the SINTEF Oil Spill Contingency and Response (OSCAR) modelling package for the worst-case scenarios associated with an instantaneous loss of diesel of a jack-up rig at Lennox. The current jack up and Valaris Contractor will be used during LBCCS execution phase.

The Applicant will develop an adapted TOOPEP during the execution and the operation of the LBCCS to comply with the requirements of the Merchant Shipping (Oil Pollution Preparedness, Response and Co-Operation Convention) Regulations 1998 as amended and the Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015.

The modelling is based upon unmitigated conditions, allowing **a full worst-case scenario** to be presented with a total release of 1,097.5 m^3 (**Table 25.1**) However, as presented in the TOOPEP, a wide range of standard mitigation measures will be in place, as per standard legislative requirements (e.g. MARPOL).

A potential diesel spill associated with the Lennox platform is considered to fall within the impact of 'accidental pollution' for benthic subtidal and intertidal receptors, as presented within the Marine Biodiversity Chapter of the Environmental Statement.

The original Maximum Design Scenario (MDS) for this impact considered a range of different vessel movements and activities in all phases, wherein accidental pollution could occur. The magnitude of impact presented in Volume 2, Chapter 7: Marine Biodiversity, was considered negligible for all project phases, taking into account the embedded mitigation measures that would apply to manage this risk. The sensitivity of all benthic subtidal and intertidal Important Ecological Features (IEFs) was considered to be high. Thus, a minor adverse significance of effect was concluded, which is not significant in EIA terms.

Table 25.1 – Modelled Oil

Modelled Oil						
Oil name	Marine Diesel					
Name	**ITOPF Group**	**SG**	**Viscosity**	**Pour Point (°C)**	**Wax Content (%)**	**Asphaltene Content (%)**
Marine diesel	II	0.843	3.9 (13°C)	-36	0.05	0.05
Inventory Loss Parameters						
Release source	VALARIS NORWAY Diesel Inventory		Release volume	1,097.5 m^3		
Justification for predicted worst case volume	Maximum worst case diesel/marine gas oil inventory predicted within a non-production installation in-field					
Metocean Parameters						
Air temperature	Variable		Sea temperature	Variable		
Wind data (years covered)	2008 - 2014		Wind data reference	European Centre for Medium-Range Weather Forecasts (ECMWF)		
Current data (years covered)	2008 - 2014		Current data reference	MetOffice 3 years' seasonal Shelf-hourly current data		
Modelled Release Parameters						
Latitude	053° 37' 56.66" N		Longitude	003° 09' 42.49" W		
UKCS Block	110/15		Type of release	Surface		
Release duration	1 hour		Release duration assumed to be over a one hour time period.			
Release volume	1,097.5 m^3					
Total simulation time	10 days		Release period	Multi-year statistic		
Number of simulations	40 per year		Total number of simulations per season	120		
Oil Spill Modelling Software Used	OSCAR (Marine Environmental Modelling Workbench v14.1)					

Figure 25.1 Probability of Surface oiling (≥1%) Meeting or Exceeding 0.3 µm

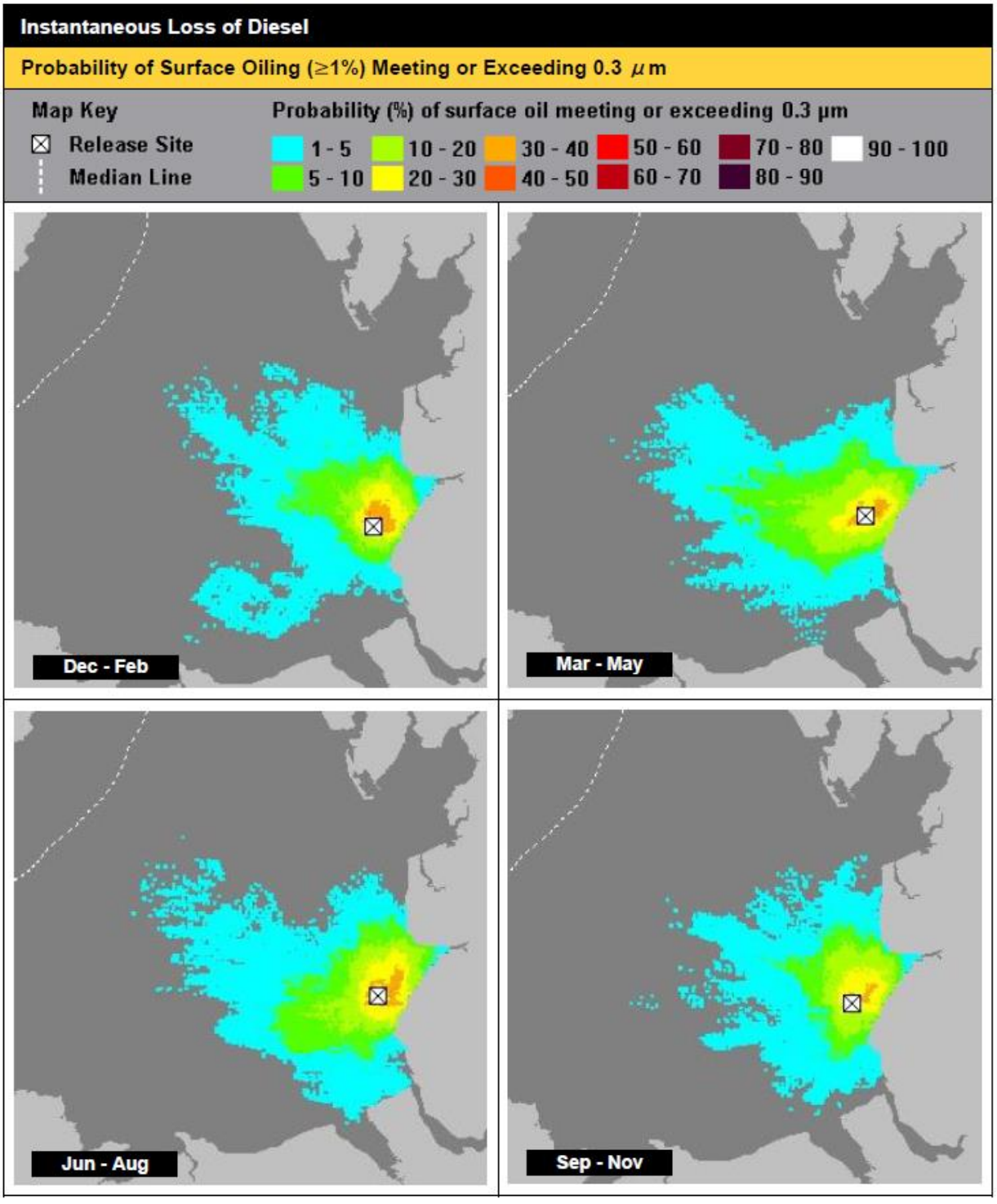


Figure 25.2 Arrival Time of Surface Oil

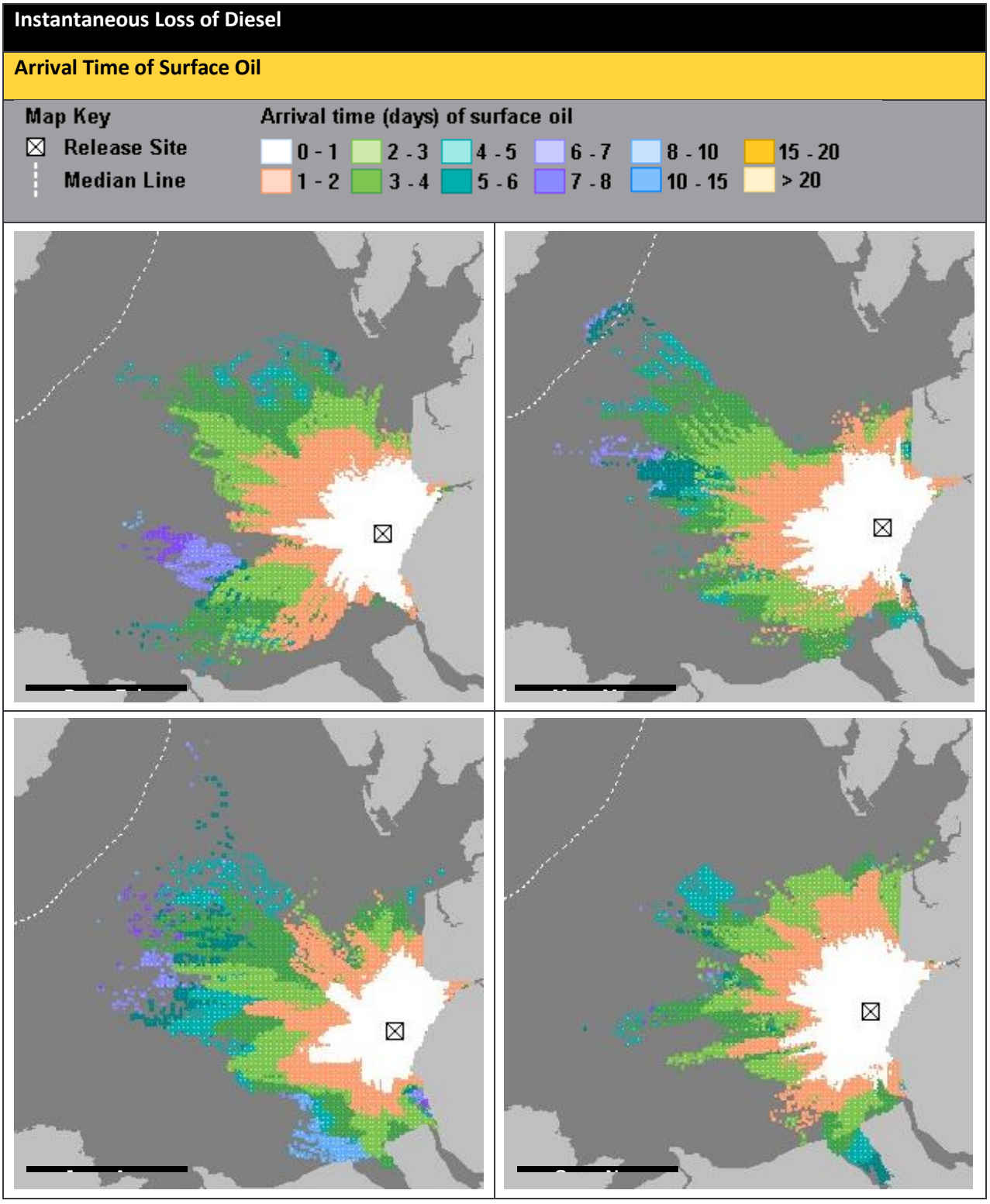


Table 25.2 – Instantaneous Loss of Diesel scenario results

Instantaneous Loss of Diesel				
Probability (≥1%) and shortest time of surface oil crossing median line				
Coastal States	**Dec – Feb**	**Mar – May**	**Jun – Aug**	**Sep – Nov**
Model does not predict a ≥1% probability of surface oil with a thickness of ≥0.3µm crossing the Isle of Man or Irish median line within 10 days				
Probability (≥1%) and shortest time for shoreline oiling				
Shoreline	**Dec – Feb**	**Mar – May**	**Jun – Aug**	**Sep – Nov**
England				
Cumbria	1 – 5%	-	-	-
	9 days	-	-	-
Lancashire	**40 – 50%**	20 – 30%	20 – 30%	40 – 50%
	12 hrs	21 hrs	16 hrs	12 hrs
Merseyside	**40 – 50%**	**40 – 50%**	30 – 40%	**40 – 50%**
	3 hrs	5 hrs	**3 hrs**	4 hrs
Halton	1 – 5%	1 – 5%	1 – 5%	1 - 5%
	33 hrs	42 hrs	2 days	32 hrs
Wales				
Flintshire	-	1 – 5%	-	1 - 5%
	-	2 days	-	39 hrs
Denbighshire	-	1 – 5%	-	1 - 5%
	-	2 days	-	2 days
Conwy	-	1 – 5%	-	-
	-	4 days	-	-
Anglesey	-	-	-	1 - 5%
	-	-	-	9 days
Maximum accumulations onshore				
After 10 days[1]	718 m^3	772 m^3	791 m^3	741 m^3

The OSCAR modelling presented in the TOOPEP indicates that the worst-case scenario of a diesel spill at Lennox (assuming the loss of the entire rig diesel inventory) has a 40-50% chance of beaching in Merseyside within three hours of release. There is also the potential for the diesel to impact Cumbria, Lancashire, Halton, and some areas of

[1] This is the maximum mass accumulated onshore across all beaching locations from one of the 100+ simulations.

Wales. The maximum mass of oil accumulations onshore (across all areas) ranges by season from 718 m^3 to 791m^3 **(Table 25.2)**, which puts these results into the context of Liverpool Bay.

Therefore, in this worst-case scenario, the following designated sites shown in the following figure could potentially be impacted:

- Fylde MCZ (surface waters)
- Ribble Estuary SSSI (waters and coastline)
- Liverpool Bay SPA (waters and coastline)
- Dee Estuary SAC (waters and coastline)

As this comment is in relation to offshore ornithology, there is therefore potential for the ornithological features of the Liverpool Bay SPA to be impacted. In addition, the benthic subtidal and intertidal habitat features of the other designated sites (and also those supporting features not listed within the Liverpool Bay SPA) could potentially also be impacted, affecting prey availability for ornithological features.

It is important to note that this worst-case scenario modelling represents a completely unmitigated scenario of a diesel release at the Lennox platform. In reality, an unmitigated mass diesel release would not occur, with extensive embedded mitigation measures in place associated with activities at the Lennox platform (and other rig/jack-ups) to manage the risk of occurrence and prevent excessive spread of pollutants. These include the use of rapidly deployed booms and detergents, and other removal strategies, along with mandatory response training. In addition, natural degradation within the water column due to natural turbulence and mixing would be expected to occur, supporting breakdown of pollutants.

When considering the embedded mitigation measures which would apply in the event of a mass diesel release, the magnitude of impact for 'accidental pollution' is not considered to materially change compared to the negligible magnitude determined within Volume 2, Chapter 7: Marine Biodiversity. Therefore, the significance of effects on benthic subtidal and intertidal IEFs would remain as **minor adverse**, which is not significant in EIA terms.

With no change to the assessment outcomes indicated for benthic subtidal and intertidal ecology IEFs, no material change is predicted for offshore ornithology IEFs in the context of changes in prey availability.

- Only 4 tonnes of CO_2 could be released from a legacy well. Please justify why the release can only be 4 tonnes. Chapter 13 Page 17/34 states *'Any material amount of CO_2 leakage is therefore considered to be possible in an accident or disaster scenario. However, such an event is considered highly unlikely (given the above designed-in protection).*' Please confirm the estimated volume of an unconstrained leak prior to any mitigation. What is the environmental impact of such an accident? Section 3 of the Monitoring Plan lists leak paths, please provide the probability and impact assessment of these paths.

Eni Response: The 4 tonnes of CO2 which could be released relates to the most likely leaked mass, not the maximum possible leaked mass. The probability of such an event occurring is estimated to be in the order of 1.1 per 125 years. The maximum release rate from a legacy well has been estimated to be 5000 tonnes per day (steady state release rate) for a major, unmitigated failure. This could result in 1.8 million tonnes of released CO2, should it take up to 1 year to contain the leak. The probability of this occurring is estimated to be 2.5E-05 per 125 years.

The maximum, unmitigated mass released is estimated to be 3.7 million tonnes from an abandoned, surplus or legacy well which has a release duration of 100 years. This assumes the release occurs after completion of the injection period. The probability of such an event occurring is estimated to be less than 2.4E-03 per 125 years.

- Please confirm whether the leakage rate of 4,000 te of CO_2 for well abandonment is per well or for all wells (including sentinel and monitoring wells).

Eni Response: The leak rate of 4,000 tonnes (or more specifically, 3,650 tonnes) relates to the most likely leaked mass from any well that has been abandoned (including injection, sentinel and monitoring wells). It does not represent the per well volume (i.e it takes into account the total number of wells).

A summary of all the scenarios considered and assessed is presented in the following **Table 25.3.**

Table 25.3 – QRA results

Scenario ID	Scenario	Leak Category	Likelihood of Occurrence (over 125y)	Leak rate (t/d)	Leak Duration	Mass Released (Site)	Mass Released (Complex)	Risked Mass (Complex)	Signif-icant?
1	Diffusion	Seep	0.00E+00	0.00	100	0	0	0	N
2	Capillary flow through intact caprock	Seep	0.00E+00	0.00	100	0	0	0	N
3	Lateral variability in seal quality	Minor	0.00E+00	43.00	100	1,569,500	792,598	0	N
4	Major active fault zone	Major/Minor	0.00E+00	27.40	100	1,000,100	505,051	0	N
5	Large block bounding fault zone	Minor	1.00E-04	2.74	100	100,010	50,505	5	N
6a	Map-scale faults	Seep	7.80E-03	0.27	100	10,001	5,051	39	N
6b	Map-scale faults	Minor	1.95E-03	1.00	100	36,500	18,433	36	N
7a	Sub-seismic faults and fracture networks	Seep	6.00E-04	0.40	100	14,600	7,373	4	N
7b	Sub-seismic faults and fracture networks	Minor	1.50E-04	1.50	100	54,750	27,649	4	N
8a	Reactivation of pre-existing faults	Seep	7.50E-04	1.00	100	36,500	18,433	14	N
8b	Reactivation of pre-existing faults	Minor	2.50E-04	27.40	100	1,000,100	505,051	126	N
9a	Initiation of new faults/fractures	Seep	7.50E-04	1.00	100	36,500	18,433	14	N
9b	Initiation of new faults/fractures	Minor	2.50E-04	27.40	100	1,000,100	505,051	126	N
10a	Gas chimneys/pipes	Seep	2.66E-04	0.10	100	3,650	1,843	0	N
10b	Gas chimneys/pipes	Minor	1.00E-04	1.00	100	36,500	18,433	2	N
11a	Lateral Migration	Seep	1.60E-03	1.00	100	36,500	18,433	29	N
11b	Lateral Migration	Minor	4.00E-04	27.40	100	1,000,100	505,051	202	N
AWsS	Active Well seep short	Seep	1.13E+00	0.1	0.1	4	4	4	N
AWsL	Active Well seep long	Seep	1.25E-01	0.1	0.25	9	9	1	N
AWmiD	Active Well minor DHSV	Minor	1.19E-02	25	0.003	27	27	0	N
AWmiS	Active Well minor short	Minor	6.19E-04	25	0.33	3,011	3,011	2	N
AWmiL	Active Well minor long	Minor	6.25E-06	25	0.75	6,844	6,844	0	N
AWmdD	Active Well moderate DHSV	Moderate	5.94E-03	500	0.003	548	548	3	N
AWmdS	Active Well moderate short	Moderate	3.09E-04	500	0.33	60,225	60,225	19	N
AWmdL	Active Well moderate long	Moderate	3.13E-06	500	0.75	136,875	136,875	0	N
AWmjD	Active Well major DHSV	Major	5.94E-04	7344	0.003	8,042	8,042	5	N
AWmjS	Active Well major short	Major	2.81E-05	7344	0.33	884,585	884,585	25	N
AWmjL	Active Well major long	Major	3.13E-06	7344	0.75	2,010,420	2,010,420	6	N
WkvS	Active Well workover short	Major	2.08E-03	7344	0.33	884,585	884,585	1,841	N
WkvL	Active Well workover long	Major	2.31E-04	7344	0.75	2,010,420	2,010,420	465	N
AbnS	Active Well Abandonment short	Major	1.80E-03	7344	0.33	884,585	884,585	1,592	N
AbnL	Active Well Abandonment long	Major	2.00E-04	7344	0.75	2,010,420	2,010,420	402	N
WireS	Active Well wireline short	Major	8.39E-04	734.4	0.33	88,458	88,458	74	N
WireL	Active Well wireline long	Major	9.32E-05	734.4	0.75	201,042	201,042	19	N
AAWsS	Abandoned Active Well seep short	Seep	1.31E-01	0.1	100	3,650	3,650	477	N
AAWsL	Abandoned Active Well seep long	Seep	1.31E-01	0.1	100	3,650	3,650	477	N
AAWmiS	Abandoned Active Well minor short	Minor	2.38E-02	10	5	18,250	18,250	433	N
AAWmiL	Abandoned Active Well minor long	Minor	2.38E-02	10	100	365,000	365,000	8,669	N
AAWmdS	Abandoned Active Well moderate short	Moderate	2.38E-03	100	5	182,500	182,500	433	N
AAWmdL	Abandoned Active Well moderate long	Moderate	2.38E-03	100	100	3,650,000	3,650,000	8,669	N
AAWmjS	Abandoned Active Well major short	Major	4.28E-04	3000	0.5	547,500	547,500	234	N
AAWmjL	Abandoned Active Well major long	Major	4.75E-05	3000	1	1,095,000	1,095,000	52	N
SWsS	Surplus well seep short	Seep	3.44E-02	0.1	100	3,650	3,650	125	N
SWsL	Surplus well seep long	Seep	3.44E-02	0.1	100	3,650	3,650	125	N
SWmiS	Surplus well minor short	Minor	6.25E-03	10	5	18,250	18,250	114	N
SWmiL	Surplus well minor long	Minor	6.25E-03	10	100	365,000	365,000	2,281	N
SWmdS	Surplus well moderate short	Moderate	6.25E-04	100	5	182,500	182,500	114	N
SWmdL	Surplus well moderate long	Moderate	6.25E-04	100	100	3,650,000	3,650,000	2,281	N
SWmjS	Surplus well major short	Major	1.13E-04	3000	0.5	547,500	547,500	62	N
SWmjL	Surplus well major long	Major	1.25E-05	3000	1	1,095,000	1,095,000	14	N
LWsS	Legacy well seep short	Seep	1.25E-01	0.1	100.00	3,650	3,650	456	N
LWsL	Legacy well seep long	Seep	1.25E-01	0.1	100.00	3,650	3,650	456	N
LWmiS	Legacy well minor short	Minor	6.88E-02	10	5.00	18,250	18,250	1255	N
LWmiL	Legacy well minor long	Minor	6.88E-02	10	100.00	365,000	365,000	25,094	N
LWmdS	Legacy well moderate short	Moderate	6.25E-03	100	5.00	182,500	182,500	1141	N
LWmdL	Legacy well moderate long	Moderate	6.25E-03	100	100.00	3,650,000	3,650,000	22,813	N
LWmjS	Legacy well major short	Major	2.25E-04	5000	0.50	912,500	912,500	205	N
LWmjL	Legacy well major long	Major	2.50E-05	5000	1.00	1,825,000	1,825,000	46	N
EQ-S	Earthquake small		1.00E-03	1	50	18,250	1,825	2	N
EQ-M	Earthquake medium		1.88E-04	100	12	438,000	43,800	8	N
EQ-L	Earthquake large		6.25E-05	1000	4	1,460,000	146,000	9	N

Note: Active well = injection well; Legacy well = wells which have already been abandoned; Surplus well = suspended E&A wells and ex-production wells that are not yet abandoned, but will be abandoned before the start of injection.

- Assuming the pipeline will be shut-in what is the maximum pipeline release volume?

Eni Response: Table 25.4 shows the total CO_2 mass inventory contained within each of the Offshore CO_2 transportation pipelines that will be used for the Proposed Development. For a pipeline release, the modelling and assessments have been based on a full-bore release from the PL1030 20" pipeline from PoA to New Douglas CCS platform. This would represent the maximum pipeline release volume of **4,643 tonnes** across the Proposed Development. The assumptions for the worst-case assessment are that pipeline releases are detected by

instrumentation, and the mass of CO_2 released would equal the whole pipeline inventory. If undetected immediately by instrumentation, the mass released would be the whole pipeline inventory, plus one hour of discharge via the pipeline breach.

Table 25.4: Offshore Pipelines Total CO_2 Mass Inventory

Pipeline ID	Kg/km	t/km	Length (km)	Total Mass (t)
PL1030 20" to New Douglas	132,650	133	35	**4,643**
PL1039 20" to Hamilton Main	132,650	133	12	**1,596**
PL1041 14" to Hamilton North	65,000	65	15	**975**
PL1035 16" to Lennox	83,779	84	32	**2,688**
PL1036a 12" to Lennox	46,087	46	32	**1,472**

- What are the environmental consequences of a pipeline release?

Eni Response: Please see the Eni Response to **Question 38d**, which answers the same question about the environmental consequences of a pipeline release.

- Please clearly detail the mitigation measures. For example, it is not clear if the pipeline can be shut in in the reverse direction.

Eni Response: The Applicant can confirm that pipeline emergency shutdown (ESD) valves will be located onshore at Point of Ayr (PoA), and on the New Douglas CCS platform to enable the shut-in of PL1030 20" pipeline. For the PL1039 20", PL1041 14", PL1035 16", and PL1036a 12" pipelines, ESDs will be located on the New Douglas CCS platform, and at each of the three satellite platforms. This means each pipeline can be individually shut-in.

Additionally, surface controlled, subsea safety valves (SCSSVs) will be installed within the Hamilton, Hamilton North, and Lennox carbon store (CS) wells to automatically shut-in the flow of a well in the event either surface controls fail, or surface equipment becomes damaged. These valves will be qualified to survival temperatures of -78.5°C.

QUESTION 34: Section 3.4. Reg 12(1) letter dated 1 July 2024 – comment 69

References to the environmental effects of wells to be drilled are acknowledged from the response dated 2nd August 2024 to OPRED. However, please provide further information on the following:

- Chemical management CCS:

  Please provide details of the different types of chemical groups to be used and discharged over the life of this development including from; drilling of wells (injection, monitoring and sentinel wells), pipelines (commissioning the pipelines for CO_2 transport), commissioning new topsides. Please confirm that Liverpool Bay CCS Limited has considered the chemical management relating to the switch from the extraction of oil and gas to the storage of CO_2 and asset integrity and has chemical management in place for issues such as hydrates, scales, and other chemical precipitates in wells preventing injection. Please detail how corrosion and erosion will be managed and confirm that any chemicals used and discharged will be low risk to the environment.

Eni Response: The use of chemicals is critical in a variety of applications during the drilling of sidetracks for CO2 re-injection and cleaning and flushing of pipelines to be re-used for the future CCS operations. The chemicals to be used to maintain pipelines and pipeline integrity will be reviewed, and the specific chemicals (e.g. corrosion inhibitors, scale inhibitors) will be established in due time.

The project will review all chemicals requirements and will be working with the chemical suppliers to ensure the use of PLONOR chemicals (Pose Little or No Risk to the Environment), where practicable and acceptable.

If any discharge occurs to the marine environment, it will be reviewed and assessed accordingly. A chemical risk assessment for each product will be provided accordingly as required by the Offshore Chemical Regulations 2002 (As Amended 2011), and OPRED OCR Guide.

Time-limited uses and discharges during offshore activities for CCS project, including but not limited to the drilling or maintenance of wells, the commissioning, maintenance and re-purposing of pipelines, will be covered by 'Term Permits' according to the Offshore Chemical Regulations 2002 (As Amended 2011).

- Legacy Wells:

  Please provide potential impact and risks from platform legacy wells. Whilst these may pose a medium risk to the environment from potential leaks, please provide further details on what sort of risk may occur, over what period of time the risk has been assessed for and what impact there may be on the environment and specific sensitivities, noting that the Lennox field is only 2 miles from the NW coast of England. There is the requirement to abandon a significant number of wells across the project area. Please confirm that all wells will be abandoned to the correct standards prior to any work that will be carried out as part of the CCS development and that there will be no immediate risk to the environment from the P&A wells.

Eni Response: The risk associated with the failure of a legacy well have been assessed and categorised in terms of the potential release volume. The categorisation has considered seeps, and minor, moderate and major leaks, either over a short or long period. Probabilities of each type of leak occurring have been determined over a range of periods, in particular, 125 years (a period believed to adequately represent the lifecycle of the injection and storage cycle). Over that period (125 years) the probability of a major, long term leak occurring, was estimated to be less than 2.50E-05.

It is confirmed that wells will be plugged and abandoned in line with NSTA requirements and industry guidance, following cessation of injection. The Applicant understands the current guidance is the OEUK Well Decommissioning for CO2 Storage Guidelines, Issue 1, Nov 2022 (BEIS (2018). Guidance Notes: Decommissioning of Offshore Oil and Gas Installations and Pipelines. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/760560/Decom_Guidance_Notes_November_2018.pdf).

Further details are provided in the responses to **Questions 50** and **79**)

- Atmospheric Emissions:

  Please provided details of potential atmospheric emissions associated with the drilling of the wells.

Eni Response: The current base case for the environmental assessment of the Proposed Development included a total of 13 wells. Eight will be CO_2 injector wells (four at Hamilton Main, two at Hamilton North, and two at Lennox). These will be drilled as side-tracks from existing producer wells. Each side-tracked wellbore will comprise around 15 days for drilling, and 20 days for completion. Two new dedicated monitoring wells, one each at Hamilton North, and Lennox, will also be drilled. This will require 25 days for drilling and 20 days for completion. One additional monitoring well will be a side-track from an existing producer well (at Lennox) and two will be sentinel wells (one at Hamilton North, and one at Lennox). These sentinel wells will be existing wells that will be recompleted for additional reservoir monitoring. The drilling rig required during drilling and recompletion of the wells will be powered by diesel and the combustion of diesel is a source of local air quality pollutants.

In the context of air quality effects, sensitive receptors are locations where members of the public might be regularly exposed and include building façades of residential properties, schools, hospitals, care homes. The nearest drilling location (at Lennox) is approximately 11 km from the nearest coastline. There are no distances

given in air quality guidance beyond which air quality effects from plant are not considered to have an effect. However, Defra's Industrial Emissions Screening Tool referred to in Defra's "*Local Air Quality Management Technical Guidance: LAQM.TG22*" (Defra, 2022) only considers receptors up to 2 km. This provides a useful guide to the maximum distance at which impacts can be expected. Using professional judgment, at 11 km, emissions from the plant used during construction are highly unlikely to affect local air quality onshore.

In relation to emissions from ships, LAQM.TG22 advises local authorities that there is a risk of exceedance of the short-term objectives for NO_2, PM_{10} and SO_2 where there are 5,000 or more large ship movements per year. In this case, the construction works will generate substantially fewer ship movements, indicating that the risk of an exceedance is very low. Using professional judgment, emissions from ships used during construction are highly unlikely to affect local air quality onshore. Overall, the risk of impact during construction is negligible and the ambient air quality effect is not considered significant.

During the operation phase of the Proposed Development, fugitive and venting emissions may take place but every effort will be made to minimise emissions. Fugitive emissions are unintentional leakages of gases or vapours from pressure-containing equipment or facilities and typically would occur at flanges, valves, and other equipment interfaces. During the operation phase, fugitive emissions will be monitored through a Leak Detection and Repair (LDAR) programme as part of the preventive maintenance activities, to avoid or minimise their presence as low as reasonably practicable. Carbon dioxide (CO_2) is not a local air quality pollutant and there are no ambient air quality limit values, standards or objectives set for the protection of human-health. There are no known emissions of ambient air pollutants during operation and maintenance. This is because there are no permanent emission sources, and emissions will be restricted to the occasional visits by maintenance vessels. On that basis, the risk of impact during operation and maintenance is negligible and the ambient air quality effect is not considered significant.

The Applicant can confirm that the climate change chapter (Chapter 13) and associated Greenhouse gas assessment (appendix O) considers emissions arising from both the drilling of the wells and the materials required for the completion stage of each well. The assessment details the following:

- Emissions from the construction of injection wells can be broken into two main stages, fuel consumed during the drilling of wellbores, and emissions associated with the materials associated with well completion (predominantly steel and cement).
- In relation to GHG emissions associated with the drilling of wells, a conservative assumption for the typical daily diesel fuel consumption for an offshore drilling rig has been utilised (IPIECA, 2013). This has been scaled by the number of drilling days required for each well and the emissions factor for fuel oil (DESNZ and DEFRA, 2023). This results in emissions associated with the fuel required to drill wells amounting to 27,286 tCO_2e.
- In relation to the completion stage of well construction, GHG emissions arise from embodied carbon from the quantities of steel and cement used to complete the wellbores. Material quantities provided by the Applicant's design team have been scaled by the relevant emissions factors for steel piping and cement (Jones and Hammond, 2019), totalling 10,932 tCO_2e.
- Total GHG emissions associated with the construction of wells is 38,218 tCO_2e.

The above is detailed in section 13.11.1.1 of chapter 13, and sections 1.6.5.1 and 1.6.5.2 of Appendix O.

This quantity of emissions is considered as part of the assessment of GHG emissions associated with construction/refurbishment activities, including materials, transport and use of plant/offshore marine vehicles. The significance of effect was determined to be moderate adverse, which is significant in EIA terms.

- Environmental Footprint:

  Please provide the potential volume of material to be used, and its footprint, that may be required for any rig stabilisation (including contingency) associated with the placement of rigs that will carry out the works. Further details of approximate anchor patterns and footprint must also be confirmed.

Eni Response: A worst-case area and volume of seabed disturbance footprint was estimated assuming the utilisation of the Valaris Norway jack-up vessel. **Table 34.1** presents the calculations used to derive this worst-case.

Table 34.1 Seabed disturbance from Valaris Norway

Aspect	Quantity	Dimensions	Disturbance Area (m^2)	Volume (m^3)
Spud cans	3	20.12m (Diameter) 4.5m (Depth)	318 x 3 = 954	1,431 x 3 = 4,293
Anchors[1]	4	1m x 6.7m x 6m	40.2 x 4 = 160.8	4 x 1 x 40.2 = 160.8
Anchor chains and wires[2]	4	1000m x 44mm Wire and 50m x 76mm Chain 4m worst case scar at 0.5m depth	1,050 x 4 = 4,200 x 4 = 16,800	16,800 x 0.5 = 8,400
Stabilisation material for Scour (rock)[3]	3	20.12m diameter of each spud cans	318m^2 x 3 = 954[4]	1,800
Total			17,914.8	14,653.8

[1] Four Bruce anchors (6 tonnes) will be deployed. Penetration depth is assumed to be 1m.
[2] Disturbance area is based on a worst-case assumption that the entire length of each of the four anchor chains (50m) and wires (1000m) will be laid on the seabed and subject to a lateral movement. Penetration depth is assumed to be 0.5m.
[3] Disturbance area assumes that rock will be deposited within the same area of each spud can.
[4] Since disturbance area of contingency rock pads is the same as the area affected by the spud cans this has not been considered within the footprint.

Four anchors will be deployed to assist in the final positioning of the rig. Once the rig is in place, the anchors (including the wires and chains) will be recovered for the duration of the drilling activity. The anchor deployment disturbance is estimated to be 40.2m2 per anchor with each chain and wire having a worst-case footprint of 4,200m^2 resulting in a total footprint from anchors and chains of 16,960.8m^2.

Each spud can will have a footprint of 318m^2 resulting in a total footprint of 954m^2. Although unlikely, there is also the potential requirement for the deposit of rock stabilisation material around the spud cans, if scour occurs. As detailed in **Table 34.1**, up to 14,653.8m^3 of sediments may be disturbed during deployment of the Valaris Norway.

Potential impact

Seabed communities

Permanent physical disturbance of the seabed by the rock which may be used for contingent scour mitigation can result in impacts to benthic communities within an area of 954m2. Furthermore, the anchors used to position the Valaris Norway, and the movement of the anchor chains and wires across the seabed will also result in impacts to benthic communities within an area of 16,800m2.

Physical disturbance of the seabed from anchoring can cause displacement or mortality of benthic species, such as sessile organisms, that are unable to move out of the impacted area. However, anchoring of the Valaris Norway is a transient operation and, as such, it is expected that recovery of affected areas of seabed will be relatively quick once the Valaris Norway is in place over the platform and the anchors, chains and wires are retrieved. Any rock deposited will result in soft sediment habitats being replaced by hard/coarse substratum habitat. As a result, there will be changes in seabed substrata and subsequent localised changes in benthic communities from those that favour soft sandy sediments, to epifaunal species that can colonise hard substrata. Taxa likely to colonise such a hard substratum could include tunicates, sponges, sessile tube dwelling polychaetes (S. spinulosa) and encrusting organisms such as bryozoans. This effect will remain for as long as the material is in place, but any impacts will be in a relatively small area in comparison to the soft sediment habitat available in the wider Irish Sea.

Re-colonisation of the affected areas is anticipated to take place in several ways, including mobile species moving in from the edges of the area, juvenile recruitment from plankton or from burrowing species digging back to the surface. There are no identified reefs of Sabellaria spinulosa identified stations near the work area, however in the event the anchor chains and wires cross an unidentified area of S. spinulosa reef, recruitment rates are high, and recovery could be short term as this species is often one of the first to settle on newly exposed surfaces (OSPAR, 2010). Furthermore, in the unlikely event that S. spinulosa reef is discovered in

the area during the operation, anchor chain placement will be carefully planned, and anchor chain and wire lengths will be kept to a minimum. Impacts to ocean quahog (Arctica islandica) may result from direct sediment penetration by anchor and chains/wires. However, as the pressure footprint is relatively small and the presence of ocean quahog within the operational areas unlikely, this species will not be affected at a population level. The impact to seabed communities because of physical damage from the footprint of the rig is therefore considered to be Acceptable.

The proposed operations may also lead to an increase in turbidity through sediment resuspension resulting in smothering of some sensitive benthic species. This could also remobilise potentially contaminated sediment. Echinodermata species were found abundantly throughout the area during the 2022 survey; however, these species are considered not sensitive to changes in suspended solids and have medium sensitivity to smothering and siltation rate changes (RPS, 2023). Where sedimentation does impact negatively on benthic species, consequences are likely to be short-lived as most of the smaller sedentary species (such as polychaete worms) have short lifecycles and recruitment of new individuals from outside of the disturbed area will be rapid (Tillin and Tyler-Walters, 2013). S. spinulosa is unlikely to be significantly impacted as it relies on a supply of suspended solids and organic matter to filter feed and build protective tubes and therefore it is often found in areas with high levels of turbidity (Gibb et al., 2014). Ocean Quahog are not sensitive to light siltation expected with increased turbidity, they are however sensitive to heavy siltation (Tillin and Tyler-Walters, 2013), however this is only expected in the immediate vicinity of operations, as dense aggregations of Ocean Quahog are not expected in this area the impact to this species is not expected to be significant. The impact to seabed communities from increased turbidity caused by the deployment of the Valaris Norway and the casing and conductor cutting and lifting operations, if required, is therefore considered to be Acceptable.

Fish spawning and nursery grounds and commercial fisheries

Demersal fish could be temporarily displaced from a very small area (ca. 954m2 for all three spud cans) whilst the Valaris Norway is on location at the worksite, with an additional area of ca. 16,960.8m2 disturbed during the deployment of the anchors.

Commercially and ecologically important fish species such as nephrops and sand eels, both of which have spawning and/or nursery grounds in the vicinity of the operation, lay their eggs only in clean sandy and gravelly sediments. The deposit of rock on the seabed will result in the long-term loss of soft sediment habitat; however, the spatial extent of effects on species with substrata specific requirements would be limited (within an area of up to 954m2). Egg development and hatching success for bottom spawning species such as rays is also vulnerable to the effects of smothering. Several studies have been conducted on the effects of sedimentation on fish egg development of commercially valuable fish species. Results are variable with some demonstrating mortality of fish eggs when smothered by even a thin veneer of sediment (DOER, 2000) and many studies showing no significant effects on fish egg and larval development and mortality (Auld and Schubel, 1978; Kiørboe et al., 1981). Once the anchors have been retrieved and the casing and conductors have been cut and removed, if required, the seabed sediments are likely to re-settle and be subject to the natural tidal influences on sediment transport in the area. Given the mobile nature of demersal fish species, any displaced fish are likely to find suitable spawning areas in adjacent locations. The spawning grounds for benthic spawning species in the vicinity of the worksite are likely part of wider spawning grounds for these species in the Liverpool Bay Area and the area is not considered to be critical spawning habitat for these species.

The remaining fish species (both demersal and pelagic) spawn in the water column and have planktonic eggs and larvae. As a result, they are only indirectly sensitive to sediment disturbance through increased turbidity and water contamination resulting from sediment resuspension. While this may temporarily displace fish species from their spawning and nursery areas and reduce the visual acuity of fish potentially affecting foraging behaviour, any such disturbance is highly localised and of as short a duration as practicable. Thus mobile species would be expected to return shortly after cessation of the operations. Disturbed sediment resulting from this operation is expected to resettle rapidly and as such is not anticipated to impact protected shellfish water in the region.

Given the above, the impact to fish spawning and nursey grounds from physical disturbance, increased turbidity and smothering is therefore considered to be Tolerable and **not significant**.

Up to 954 m^2 of disturbance during drilling, and the installation at each of the different satellite platforms Hamilton, Hamilton North and Lennox NUI topsides. These spudcan footprints would represent approximately 0.14% of the up to 1.91 km^2 of temporary subtidal habitat loss and/or disturbance during the construction phase of the whole Proposed Development. This 1.91 km^2 would represent just 0.08% of the overall area of the Liverpool Bay SPA. However, these footprints already exist from the current, and historical operations around the platform, as shown in **Figure 5.3 presented above in response to Question 5**. This would have a negligible effect on benthic habitats, and hence prey availability within the Liverpool Bay SPA. The effect will, therefore, be of **minor** adverse significance, which is **not significant** in EIA terms.

QUESTION 36: Section 3.5.1.3. Reg 12(1) letter dated 1 July 2024 – comment 76

Please confirm if any other potential leak points will be monitored at offshore assets other than those that have been considered to be high risk at the Lennox Platform.

Eni Response: The coverage area of the monitoring plan of the 3 stores is reported in figure 36-1 below highlighting wells, areal, facilities and environmental monitoring coverage area.

Further clarity on the identification and monitoring for potential leaks is required:

- With reference to the monitoring plan, please confirm how leaks at high-risk locations such as fault and fracture and other hight risk locations will be identified. The current monitoring plan only covers EIA baseline survey locations and assets where the drilling of new wells will take place.

Eni Response: The following prevention/mitigation measures have been identified in the Containment Risk Assessment as required features of the monitoring strategy to reduce the associated risk:

- Subsurface monitoring (e.g., seismic, ground deformation, micro seismic)
- Pressure and Temperature at bottomhole, wellhead, annulus, and pipeline.
- Injection rate
- Downhole wellbore monitoring (e.g., PLT/SNL, PNL, calliper…)
- Environmental monitoring
- CO2 quality at collection points
- Platform CO2 detection system

The **Table 36.1** provides a map of surveillance actions divided by risk categories as reported in the Containment Risk Assessment. Risk scenarios identification numbers are reported in the square brackets.

A conceptual sketch is presented in the **Figure 36.1**, providing an overview of the different leakage paths related to well and geological scenarios.

All detailed risks, mitigations measures, monitoring activities and corrective actions are included in the Risk Register of the Containment Risk Assessment Annex A, (Example at Figure 50-4 below) to which the Monitoring Plan, Corrective Measures Plan and Provisional Post Closure Plan are strictly related and connected.

Table 36.1: Monitoring and surveillance activities for the identified risk scenarios

Risk Categories	Geological	Well	Injectivity/Capacity Issues	Other
Risk Scenarios	Flow through primary seal [#1.1-1.9] Flow up/across faults and associated with overfilling [#2.1-2.7]	Leak through wells (injection, monitoring and legacy) [#5.1-5.13]	Injectivity/Capacity Issues [#6.1-6.11]	External Activities / Events/ Impacts [#7.1-7.3 and 7.20] Other [#8.1-8.3, #8.11, 8.13-8.14] *T&S system*
Surveillance Actions	Seismic P/T and injection rate Downhole wellbore monitoring Ground Deformation Microseismic Environmental Monitoring	P/T and injection rate Downhole wellbore monitoring Seismic Environmental Monitoring Platform CO_2 detection system	P/T and injection rate CO_2 quality at collection points	Microseismic Ground Deformation Environmental Monitoring CO_2 quality at collection points

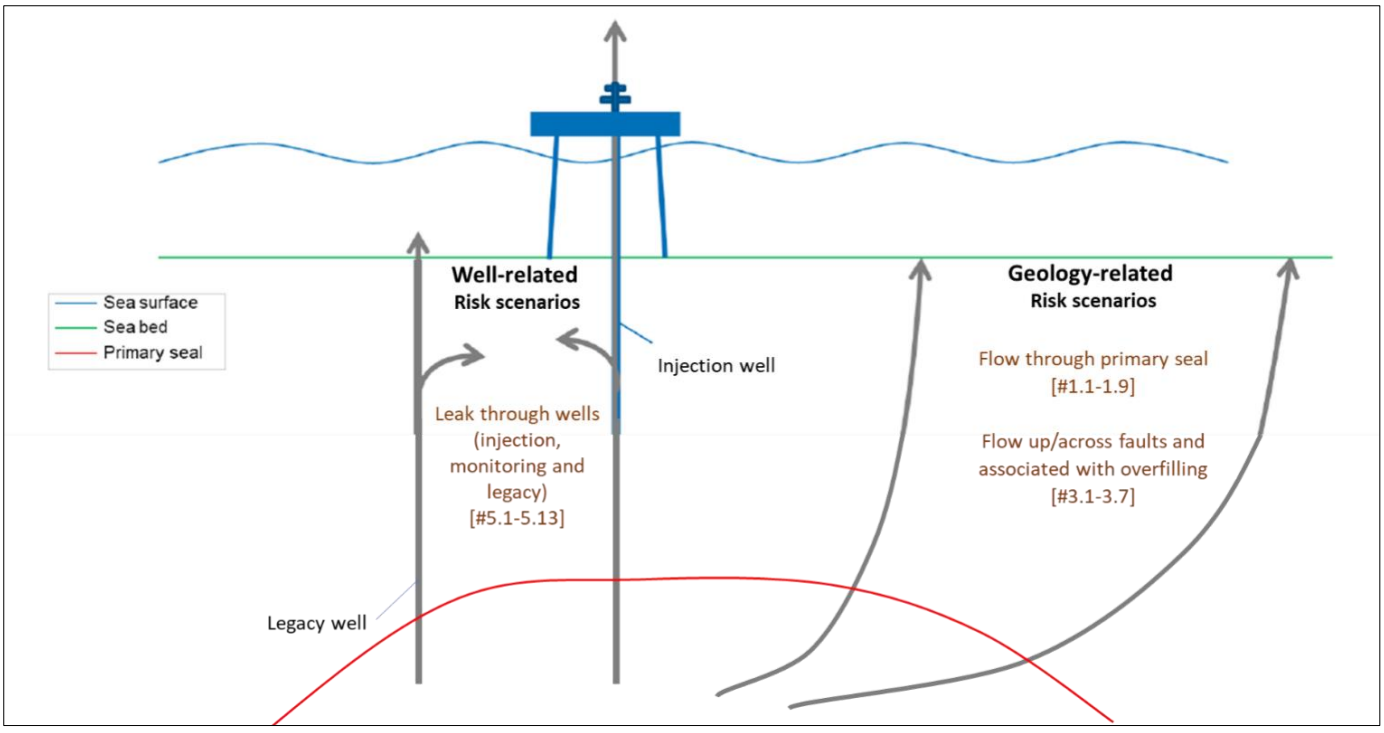


Figure 36.1: Conceptual sketch showing potential risk paths related to well and geological scenarios

- What type of legacy well is being selected to detect leaks in terms of highest risk from the list of risks identified in section 3 of the Monitoring Plan.

Eni Response: The Applicant can confirm the injection, monitoring and sentinel wells will be monitored with the following technologies:

- Fiber optic DAS/DTS. Distributed Temperature Sensing (DTS) and Distributed Acoustic Sensing (DAS) will be installed for both injection, monitoring and sentinel wells. This will allow to conduct distributed temperature surveys, distributed acoustic surveys and Vertical Seismic Profiling (VSP) acquisition. The fibre optic cable will be clamped to production tubing of the wells and extended up to the completion packer, which is positioned at a different depth for each well. DTS/DAS will investigate well portion above the production packer, with particular focus in the overburden.
- Downhole pressure-temperature gauges P/T will be installed for both injections, monitoring and sentinel wells. This real-time technology will provide information near the perforation depth. Additionally, these gauges will be used to acquire well testing data during fall-off periods. When combined with wellhead P/T sensors, this dataset will provide useful information on dynamic gradient and will enable data driven monitoring techniques like Virtual Metering.
- Flow meter on injection wells to measure injection rates.
- Cased-hole logs – also called E- Line logging applicable on injection, monitoring, and sentinel wells. These are a time lapse series of wireline logs, run both during and post-injection, can be used to monitor the behaviour of the injected CO2 and verify borehole integrity (CO2 containment) across the caprock interval. They will provide insight for the detection of any significant irregularities, any migration of CO2 and detection of leakage. Cased-hole specific tools include through-casing resistivity, pulsed neutron capture (PNC/PNL) and Production Logging (PLTs/SNL) tools. Interpreted singly or in combination, all these logs provide high-resolution information on the properties of the borehole walls, their fluids, and conditions in the borehole itself, such as pressure and temperature. E- Line logging for well integrity will include multi-finger calipers, ultrasonic tools, electromagnetic tools and magnetic flux leakage tools. These logs will involve the full well portion.
- Fluid sampling on monitoring and sentinel wells to collect bottom-hole fluid samples that is representative of the fluid saturating the formation at the monitoring/sentinel wells.
- Well Testing Interpretation (WTI), performed mainly on injection well has the objective of investigating the near wellbore areas in terms of dynamic effects on well performance, estimating key information like well damage and interpolated reservoir pressure.
- The Containment Risk Assessment summarised the monitoring activities based on the classification of the wells coming from the screening:
- Wells Screened Out, No Need for Detailed Analysis because wells are off complex, reservoir interval is present at location, but reservoir is not pressure connected and wells are outside area of CO2/pressure migration.
- Wells analysed in more detail because wells are on complex, reservoir interval is present at location, reservoir is pressure connected; and wells are inside area of CO2/pressure migration.
- Wells analysed in more detail because wells are off complex; but reservoir interval is present at location; reservoir is pressure connected; and wells are inside area of CO2/pressure leakage.

In summary the following monitoring activities are planned for the legacy E&A (Exploration & Appraisal) and suspended wells:

- On-Complex legacy wells that have already been abandoned. These wells will be subject to annual surveying for asset integrity purposes once CO2 injection starts. Additional environmental monitoring may be carried out if triggered by an event.
- Off-Complex legacy wells that have already been abandoned. These wells are subject only to additional environmental monitoring if triggered by an event.

Volume 1 – Chapter 5: Environmental Impact Assessment Legislation and Guidance

QUESTION 38: Section 5.8. Reg 12(1) letter dated 1 July 2024 – comment 79

OPRED request further information regarding a number of topics that have been scoped out of the assessment:

a) It is noted that the assessment for major accidents and disasters arising from a CO2 release has been undertaken using mitigation. An assessment of the environmental impact of a major CO2 release also needs to be carried out without any mitigation in place. Mitigation measures which will then be in place should then be outlined with the residual risk assessed as per the EIA requirements to assess accidents and disasters. Examples of assessments include 'Assessment of Subsea Ecosystem Impacts - Technical Study Report No. 2008/8 March 2009, International Energy Agency GHG R&D Programme paper, Carbon Dioxide Major Accident Hazard Awareness June 2023, AIChE, Deep Trouble, The Risks of Offshore Carbon Capture and Storage, November 2023, Centre for International Environmental Law. Please amend this assessment.

Eni Response: The Applicant has carried out an assessment of the environmental impact of a major CO_2 release from a well blow out without mitigation in the following sections. It should be noted that the 'mitigation' that prevents well blow-out is an integral, and fully embedded part of the project, i.e. it would not be possible to construct a well that did not include the blow out prevention measures within its design.

An assessment of the potential effects of a pipeline release is presented in response to **Question 38 d)**:

CO_2 Leakage from Wells

Potential Impacts

Wells are conduits for controlled flow through otherwise impenetrable rocks. While wells may therefore be the most probable route of a leak, multiple engineered barriers prevent uncontrolled flow.

Once CO2 injection is initiated, the reservoir(s) will pressurise over time. Theoretically, surface blowout at the injection wells could occur if a well experiences loss of containment. This could only occur if both the primary containment (the well envelope) and the downhole safety valve failed, i.e. a blowout is very unlikely. However, in the unlikely event of the failure of both barriers, CO2 may find its way to the surface via the wells by means of:

- Wells designed, drilled and used to inject CO2 (injection wells) or to monitor the Store (monitoring well), where CO2 could potentially flow up tubing, in the annulus or up casing; and
- Wells which have previously been drilled in the vicinity of the Stores, but which are no longer operational (legacy wells).

Eight injection wells will be created by side tracking of existing production wells, drilling of three monitoring wells (two out of the three are new wells) and two sentinel wells via recompletion, all of which will be within the existing footprint (template) of the corresponding platform, and no subsea tieback is required. The QRA carried out for the Proposed Development identified that leaks from these wells could be "major", between 2,765 to 7,344 t/day (see **Table 38.1**), but the chance of such an occurrence is extremely remote (see **Table 38.2**).

Table 38.1: Blow-out Rates Identified from QRA

Storage Site	Active Wells	Instantaneous release rate (t/d)	Steady state release rate (t/d)
Hamilton Main	4 injection, 1 monitoring	60,566	7,344
Hamilton North	2 injection, 1 monitoring, 1 sentinel	55,469	2,765
Lennox	2 injection, 1 monitoring, 1 sentinel	60,307	4,493

Table 38.2: Deep Geological Storage Report(1) Active Well Probability of Leak Estimates

Leak Category	Leak Rate (t/d)	Probability of occurrence/well/annum	Duration (months)	Comment
Seep (continuous)	<1	0.1 to 1E-3	Continuous	Assumed unlikely to remediate if detected
Minor	1-50	1E-3 to 1E-5	Up to 6	Non-expedited relief well
Moderate	50-1,000	1E-4 to 1E-5	Up to 4	Expedited relief well
Major	>1,000	1E-5 to 1E-6	Up to 4	Expedited relief well

(1) WSP, Crondall Energy, GeoEnergy Durham. Deep Geological Storage of CO2 on the UK Continental Shelf – Containment Certainty Issue V1, 23 January 2023

Once injection ceases (i.e. post-injection), one or more of the eight injection wells may provide a leak path.

Mitigation Measures to Prevent Leakage

Table 38.3: Key barriers to preventing leakage of CO2 via well pathways.

Potential Failure Mechanism	Mitigation Measures (Barriers)
CO2 flows up tubing	• Downhole Safety Valve prevents CO2 flow up tubing • Wellhead tree prevents leak of CO2 outside of well
CO2 in annulus	• Annulus packer prevents CO2 flow in annulus • Annulus monitoring to detect any CO2 in the annulus • Wellhead tree prevents leak of CO2 outside of well
CO2 flows up casing	• Casing material specified as corrosion resistant alloy maintain integrity • Cement plug, and rock to rock combination plug. • Verification of integrity of cementing

To reduce the risk of leakage of reservoir fluids along the outside of wells, cement is put in place to bond steel casing to the surrounding rock formation. In principle, corrosive, CO2-rich fluids could degrade cement, allowing leakage of CO2 along the outside of the well. However, the probability of CO2 being leaked undetected to the surface in this way is considered extremely remote because:

- It is unlikely that the flow required to corrode a leakage pathway could be sustained long enough or far enough to reach the surface; and
- Migrating flow would very likely be diverted into a porous formation and not reach the surface.

While CO2 can chemically modify Portland cement, based on reaction rate, it has been documented that cement degradation is expected to take tens of thousands of years. If reaction with CO2 does take place resulting in carbonate precipitation, this may lead to seals being improved as cement porosity is then “plugged” by carbonation, which prevents further leakage of CO2.

Well integrity and leak monitoring techniques for injection and legacy wells are presented in full in the Monitoring Plan, which will fulfil the requirements of Article 13 of the CCS Directive, and which was submitted with the Storage Permit application. Post-closure monitoring, documented in the Post Closure Plan, and informed by monitoring data acquired during operations, will be utilised to mitigate any risk of post-injection leaks.

Marine Ecosystems

Marine ecosystems are particularly tolerant to fluctuations in CO2 concentrations and subsequent short-term variations in seawater acidity. Typically, shelf seas will experience variations of an annual range of 0.2- 0.4 pH units, with a mean between 8.0 and 8.1 pH units (Thomas et al., 2005; Artioli et al., 2012). Long-term reductions in pH approaching or exceeding 1.0 unit can be considered as significantly harmful, while reductions in the order of 0.2–0.5 pH units are considered potentially harmful, and reductions of < 0.1 pH units are considered unlikely to have an impact (Widdicombe et al.,2013). Short-term (hours to a few days) reductions in pH will be much less deleterious to marine biota (Phelps et al., 2015).

All CO2 leakage events which reach the water column will produce a gradient of pH and other chemical changes between the leak location and the periphery of the affected area, with the potential to impact ecosystems in the vicinity of the leak. The length of the gradient will depend primarily on the leakage rate but will also be influenced by other factors associated with the form of leak and hydrodynamic mixing (Jones et al., 2015). A small seep (< 1 t/day) will only have a spatial impact of a few tens of meters radius. A very large leak (> 100 t/day), but which is very unlikely to occur, would have a kilometre scale footprint (Phelps et al., 2015). Both scenarios will have decreasing concentrations away from the point of release.

The organisms most vulnerable to the effects of acidification are those that rely on a calcified shell such as crustaceans. As well as permanent members of the zooplankton such as Calanus species, the plankton includes larval forms of many benthic mollusc and crustacean species. While effects of acidification may not be lethal, physiological effects may result due to trade-offs between respiration, growth, and reproduction (Jones et al., 2015). Analysis of a long-term natural volcanic CO2 vent system at ambient seawater temperature, and without toxic sulphur compounds, demonstrated significant alteration in marine community structure. However, this change was constrained to a region with a measurable pH change within approximately 100 m of the vent (Hall-Spencer et al., 2008) and required a long duration, rather than short-term exposure to display a change in organisms.

Recent studies on fish have focussed on responses to ocean acidification where a wide range of behavioural effects have been identified (Clements and Hunt, 2015). However, due to the localised nature of the impacts in comparison to the large feeding areas and the mobile nature of fish species in the Liverpool Bay environment, fish are unlikely to be significantly impacted by temporarily elevated CO2 levels.

Marine mammal species are also mobile in nature and feed over large areas. If a CO2 leak were to cause significant impacts on the marine mammal food chain, potential effects could result on marine mammals. However, as shown above, CO2 is estimated to disperse and therefore any impacts are likely to be minor.

The most recent study[2] into the risks associated with geological storage of CO_2 proposed four release categories from wells (Seep (<1t/d), Minor (1-50t/d), Moderate (50-1000t/d), and Major (>1,000t/d)) and these categories have been adopted by this analysis, using the highest value of the range. The 2023 Containment Certainty Study[1] also estimated the likely extent of environmental impact (acidification of seawater) for the different leak rate categories. These extents are derived from modelling[1] that identified the distance beyond which the seawater would return to its baseline pH of 8.1. The estimated extents are presented in **Table 38.5** and on **Figure 38.1**.

Additionally, for 'Major' releases, project-specific blowout modelling has been performed[3,4], which has derived specific CO_2 release rates for each storage site during the injection phase, which varies from ~2,750 to ~7,500 tonnes per day (t/d). The mass of CO_2 released will also be affected by the duration of the well release. **Table 38.5** summarises the worst-case leak rates and durations adopted from these studies for this analysis.

Table 38.5: Worst-case CO_2 leak rates and durations

Worst-case leak durations					
Magnitude	**Years**	**t/d**	**Extent (sq.miles)**	**Extent (km²)**	**Radius (m)***
Seep	100	1	0.0002	0.0005	25
Minor	100	50	0.02	0.05	250
Moderate	25	1,000	19.41	50.265	4,000
Major	25	5,000	78	201.06	16,000
*** source:** Table 4 Likely extent of environmental impact for different leak rate categories. (Deep Geological Storage of CO_2 on the UK Continental Shelf: Containment Certainty)					

[2] WSP, Crondall Energy, GeoEnergy Durham. Deep Geological Storage of CO2 on the UK Continental Shelf – Containment Certainty Issue V1, 23 January 2023

[3] ENI. CO2 Blowout Modelling TQ-005, 30 September 2022

[4] ENI. Revised Blowout Modelling email C Yen-Ni (ENI), 4 January 2023

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1134212/ukcs-co2-containment-certainty-report.pdf

Table 38.5 shows that in the extremely unlikely event that a major well release of 5,000 t/d occurred, the anticipated distance from the release that pH levels would have returned to the background 8.1 pH unit is 16 km. For context, assuming this unlikely major release occurred from a CO2 injection well at the Lennox NUI, then this could potentially affect the pH of the seawater for a 16 km radius around the platform. This radius has been plotted onto **Figure 38.1**, which also shows the ICES fisheries rectangles in which the LBCCS project is located. This impacted area would correspond to 201 km^2, or just 0.46%, of the total 44,181 km^2 area of ICES rectangles 36E5, and 36E6, in which the landings are dominated by shellfish species namely whelk, queen scallop, king scallop, lobster, and crab.

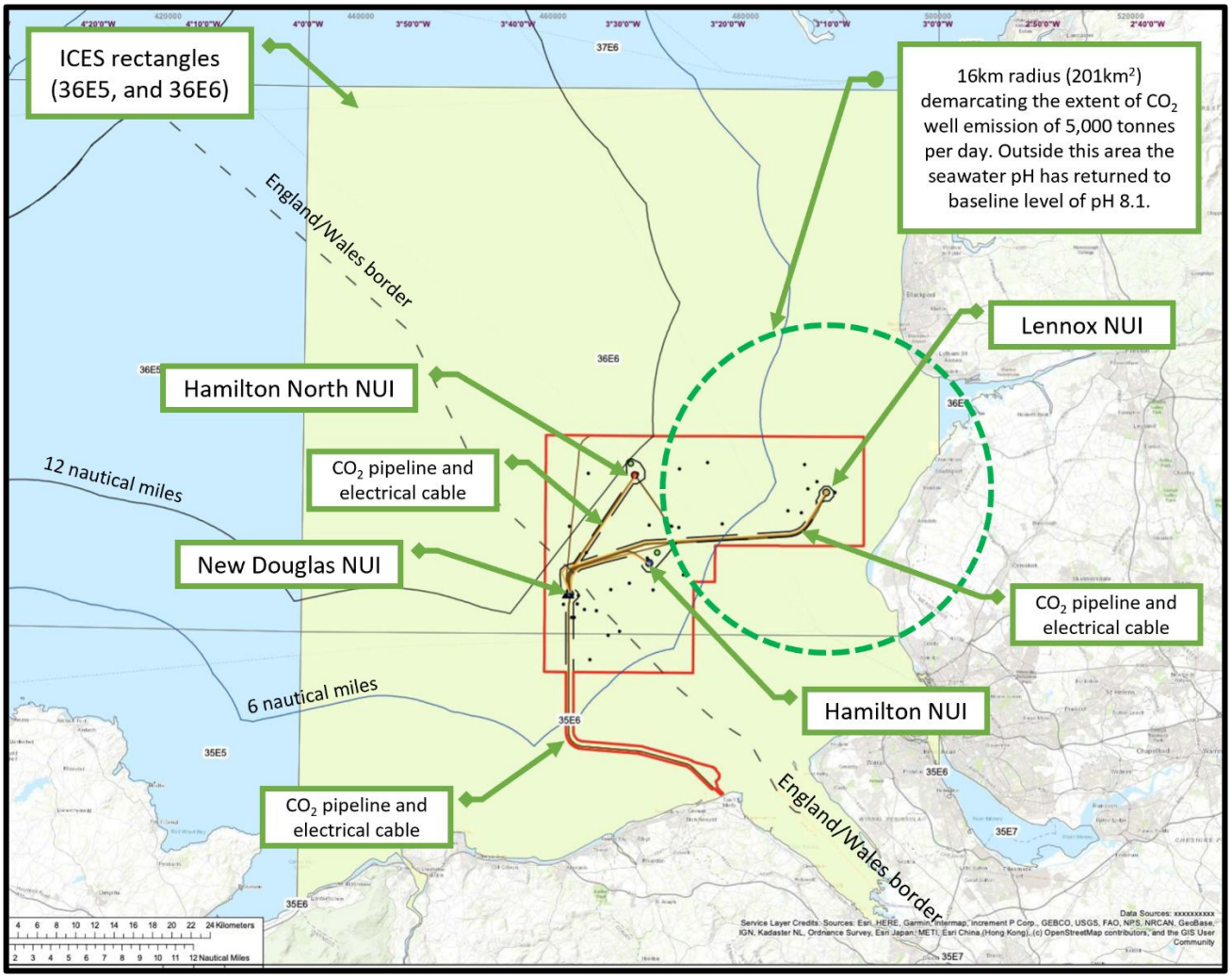


Figure 38.1: Map showing the location of the ICES rectangles (36E5, and 36E6) in green and a 16km radius extent of environmental impact centred on Lennox

The organisms most vulnerable to the effects of acidification are those that rely on a calcified shell such as crustaceans and molluscs, which may experience sublethal effects as discussed above for water column impacts.

Studies such as the QICS experiment have investigated the response of a range of benthic and bottom dwelling species to temporarily elevated concentrations of CO2. Whilst evidence of disturbance to bivalves and megafauna was absent (Pratt et al., 2015; Kita et al., 2015) impacts were seen in microbial communities (Tait et al., 2015) and microbenthic community structure (Widdicombe et al., 2015; Blackford et al., 2014). The experiment demonstrated that biological systems recovered within a few weeks of exposure.

A CO2 leak from the wells or subsurface may reach the seabed sediment where the majority will dissolve in the sediment pore water and reduce the pH, precipitate in the mineral phase, or accumulate as gas pockets within the sediment. Some may emerge into the water column and dissolve (Taylor et al., 2015).

Elevated CO2 levels in sediment have the potential to alter both the composition and function of benthic microbial communities, with implications for the turnover of organic matter and the benthic supply of nutrients to fuel pelagic primary production (Tait et al., 2015).

Benthic organisms are likely to be at risk, with the primary mechanism for harm being a decrease in pH (increase in acidity). The potential impacts are dependent on the leak rates and leak areas; currents and water mixing, leading to dilution and dispersion; the individual species and lifecycle stage; the duration of exposure; and other environmental factors.

Small short-term CO2 leaks are therefore likely to cause highly localised and short-term impacts on macro faunal communities. It is expected that changes to the pore waters would return to background levels within a few weeks of the leak ceasing due to advection away from the point of the leak and tidal mixing. There is the potential for rapid recovery to occur, depending on the characteristics of the communities and habitats impacted.

Residual Effects and Mitigation

There is some risk that stored CO2 could be leaked via wells, through the rock column, or that CO2 could be leaked during pipeline transportation. Multiple types of barriers exist to reduce this risk including barriers that are natural/passive, engineered, operational strategy, monitoring/detection, modelling and corrective action. Examples barriers are illustrated in **Figure 38.2**.

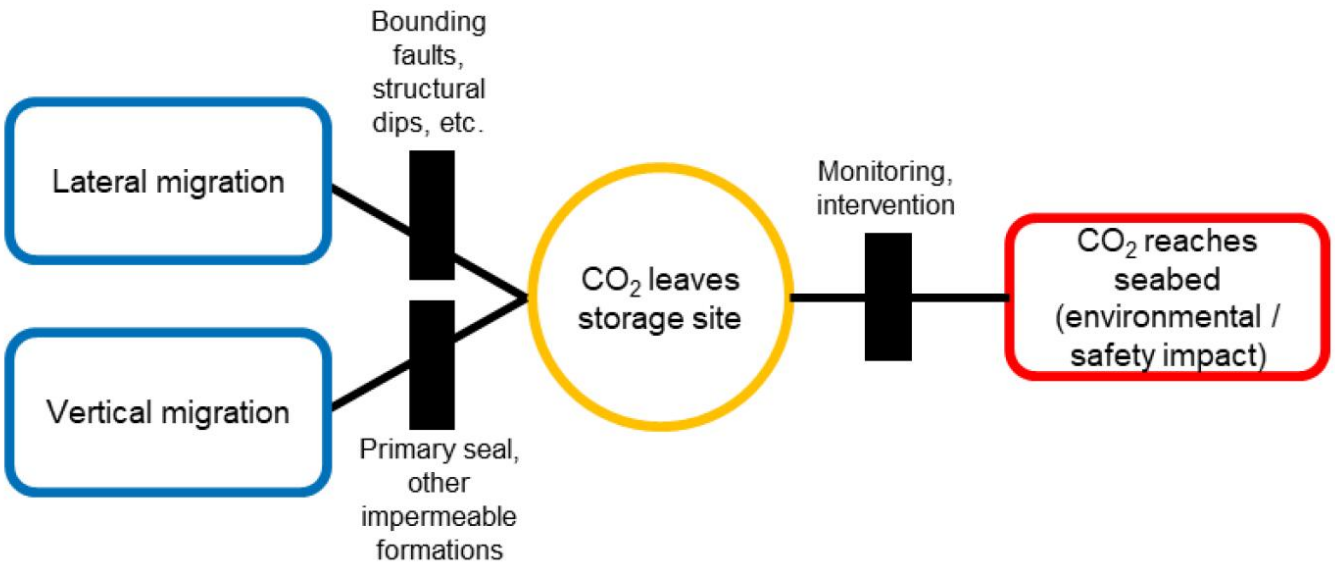


Figure 38.2: High Level Summary of Geological Leak Paths

In addition to the design mitigations, monitoring the migration of the CO2 will be utilised to confirm conformance with predictions and/or checking for the presence of CO2, in accordance with the **Monitoring Plan**, and intervening if reasonably practical (i.e. carry out Corrective Measures). Monitoring and corrective action also prevents leakage by identifying non-conformances in the migration of CO2 before leakage out of the site occurs, enabling amendment of injection pattern or rates if required.

The CO2-specific well design combined with the downhole and surface monitoring and corrective measures in place reduces the likelihood of a sustained leak to the environment to extremely remote, with a corresponding low level of risk. Instrumentation will be incorporated into the completion of each well to provide early warning should a leak occur. Standard oil field techniques would then be used to repair the well.

The Monitoring Plan includes targeted monitoring at key locations such as legacy well bores to identify signs of CO2 leaks and this supplements the planned seismic monitoring to detect the presence of CO2 within the

formations. In the unlikely event that CO2 is found to be present outside of the expected locations, injection patterns and volumes will be adjusted.

The **Monitoring Plan** describes the Regular Environmental Monitoring (REM) that will be carried out during the pre-injection, injection, and post-closure phases, to the frequencies detailed in the Monitoring Schedule reported in the **Monitoring Plan** at Table 8 and Table 9. The Monitoring Schedule shows that the pre-injection REM will be repeated on a frequency to coincide with the 3D/4D seismic acquisition. The REM will be carried out at locations to repeat the EIA baseline survey, which are around, and above the storage project assets using the methods and analysis set out in the **Monitoring Plan** at Table 6. The REM will collect environmental data from the seabed and the water column and will include images from DDV and photographic stills. The REM will, at times, coincide with the annual asset integrity monitoring, in accordance with the Asset Integrity Management System (AIMS) as part of the Safety Case, and Pipeline Safety Regulations requirements.

The **Corrective Measures Plan** submitted with the Storage Permit application details any measures that would be taken to prevent or stop the leakage of CO2 from the storage complex. Based on the identified risks, the measures include:

- Altering injection pattern or rates;
- Stopping injection;
- Well repair; or
- Well permanent closure.

Due to the Store selection process and the proposed monitoring and management strategies, the incremental risk of a CO2 leak in the regional and global context is considered negligible. When considering the probability of the scenarios involving loss of CO2 containment, all the residual likelihood assignments are assessed as extremely remote once the Proposed Development specific prevention and mitigation measures are considered.

b) The environmental impact of a diesel release including the accident/ disaster assessment under EIA (Regulations 2020) must be assessed. It is noted that only spill modelling results have been included.

Eni Response: The oil spill technical note response from the original Reg(12)1 letter dated 1 July 2024 Comment 50. Section 1.3.3 is replaced by the applicant's response about loss of diesel inventory from a drilling rig. Answers to the **Question 25-1st bullet)**, the **Question 51 -1st bullet)** and **Question 79 - i)** and **ii)** are similar to the current question.

c) Please explain why only 4 tonnes of CO2 would be released from a legacy well and why this is restricted to this volume? It is noted that Chapter 13 Page 17/34 states 'Any material amount of CO2 leakage is therefore considered to be possible in an accident or disaster scenario. However, such an event is considered highly unlikely (given the above designed-in protection).' What is the volume of an unconstrained leak prior to any mitigation and what is the environmental impact of such an accident? Section 3 of the Monitoring Plan has listed the most likely leak paths. Please confirm, the probability of a leak occurring from any of these locations and the environmental impact that may result.

Eni Response: With regards to the Climate Change Chapter, it is considered that any material amount of CO2 leakage is considered to be possible in an accident or disaster scenario. However, such an event is considered highly unlikely (given the above designed-in protection). The risk assessment carried out by the Applicant for the project identified that there is no significant risk of CO2 leakage from the storage complexes, or of harm to the environment or human health. The risk assessment identified and evaluated the leak paths via which CO2 can leave the subsurface storage complexes, and included a register itemising

each foreseeable leak scenario, its associated risk levels and prevention and mitigation control measures. Of all the scenarios considered, loss of containment due to an in-field legacy well providing a leak path was judged the highest risk, but even so was judged "unlikely" once the project-specific prevention and mitigation measures are taken into account. All other scenarios were considered less likely, being ranked either "rare" or "practically non-credible". The risk assessment took account of the Measurement, Monitoring and Verification plan (MMV) that will be implemented during operation. If such leakage was to be considered within the assessment, the worst case leakage rate of 4,000 tCO2 (resulting from un-mitigated release from one well during abandonment), detailed within the Containment Risk Assessment, would not affect the assessments of significance undertaken within the Climate Change Chapter. This is because such release forms a negligible proportion of whole life emissions arising from the Proposed Development (less than -0.01%), and as such does not affect the conclusions of the chapter.

d) What is the maximum pipeline release volume prior to it being shut in, and what are the potential environmental consequences should a pipeline release occur?

Eni Response: Table 38.1 shows the total CO_2 mass inventory contained within each of the Offshore CO_2 transportation pipelines that will be used for the Proposed Development. For a pipeline release, the modelling and assessments have been based on a full bore release from the PL1030 20" pipeline from PoA to New Douglas CCS platform. This would represent the maximum pipeline release volume of **4,643 tonnes** across the Proposed Development. The assumptions for the worst-case assessment are that pipeline releases are detected by instrumentation, and the mass of CO_2 released would equal the whole pipeline inventory. If undetected immediately by instrumentation, the mass released would be the whole pipeline inventory, plus one hour of discharge via the pipeline breach.

Table 38.1: Offshore Pipelines Total CO_2 Mass Inventory

Pipeline ID	Kg/km	t/km	Length (km)	Total Mass (t)
PL1030 20" to New Douglas	132,650	133	35	**4,643**
PL1039 20" to Hamilton Main	132,650	133	12	**1,596**
PL1041 14" to Hamilton North	65,000	65	15	**975**
PL1035 16" to Lennox	83,779	84	32	**2,688**
PL1036a 12" to Lennox	46,087	46	32	**1,472**

Pipeline leakage scenarios

While considered low probability, the accidental leakage of CO2 from pipelines could potentially impact the environment. The potential impact of a leak has been assessed in our QRAs against the following points and the pipeline release frequencies shown in **Table 38.2**.

- The probability of occurrence of the leak and the effectiveness of the planned control measures in place which will mitigate the likelihood of such an event and interventions that will be used to prevent or reduce the impacts of any leaks;
- The potential for any leaks to impact the environment;
- The residual risks remaining after consideration of the preventive measures, mitigations, and interventions; and
- The cumulative risks of leaks in and around the Proposed Development.

Table 38.2: Offshore pipeline release frequency per km/year (from Open sea, IOGP, 2019; Onshore, Vitali *et al*., 2022)

Pipeline	Small	Medium	Large	Rupture	Total
Offshore >16"	4.51E-05	5.30E-06	1.06E-06	1.59E-06	**5.30E-05**
Offshore 12"	4.08E-04	4.80E-05	9.60E-06	1.44E-05	**4.80E-04**

Significant experience in relation to CO2 pipelines has been accrued onshore US, where CO2 pipelines number more than 50 and transport approximately 68 Mt per annum of CO2. Incorporation of key considerations including pipeline design and route selection minimise risk resulting in no greater risks of leaks of CO2 relative to natural gas transport (GCCSI, 2015).

The maximum volume of CO2 leaked from the pipelines at any time would be the inventory contained within the pipelines at the time of the leak. For the PoA to New Douglas Pipeline route that figure is approximately 4,640 t. A more credible scenario is a smaller leak over several days. This could occur because of corrosion or localised impact e.g. anchor dragging.

Given the limited number of hydrocarbon containing pipeline incidents that have taken place offshore in the UKCS238, and the relatively lower number of CO2 pipelines in comparison to hydrocarbon pipelines, even fewer incidents have occurred involving CO2 pipelines. Consequently, there are significant uncertainties in the failure frequencies quoted. The level of uncertainty increases for large hole sizes and equipment sizes/types where few leaks have been recorded. The International Association of Oil and Gas Producers (IOGP) collated UKCS offshore hydrocarbon pipeline failure data, as shown in **Table 38.2**, concluding that steel pipelines of a diameter greater than 16” in offshore waters have a failure frequency of 5.3 x 10-5 per km-year (IOGP, 2019).

Application of the above frequency to the Proposed Development Pipelines is shown in **Table 38.3**. Vitali et al. (2022) report on analysis of incident data relating to onshore CO2 pipelines in the U.S from the Pipeline and Hazardous Materials Safety Administration (PHMSA) database of the U.S. Department of Transportation between 1986 and 2021. It was concluded that the estimated values for failure rates for CO2 pipelines are in the same range as those reported for hydrocarbon pipelines (Vitali et al., 2022).

Table 38.3: Offshore Pipelines Isolatable Section Release Frequency (per year)

Pipeline ID	Small	Medium	Large	Rupture	Total
PL1030 20” to New Douglas (35km)	2.67E-03	3.79E-04	8.97E-05	1.45E-04	**3.28E-03**
PL1039 20” to Hamilton Main (12km)	2.60E-03	4.37E-04	1.17E-04	1.95E-04	**3.35E-03**
PL1041 14” to Hamilton North (15)	8.18E-03	1.09E-03	2.48E-04	3.92E-04	**9.91E-03**
PL1035 16” to Lennox (32km)	-	-	-	-	**-**
PL1036a 12” to Lennox (32km)	1.51E-02	1.91E-03	4.11E-04	6.37E-04	**1.81E-02**

In the remote event of an incident, a leak would be detected via onshore pressure monitoring instrumentation and CO2 pumping from onshore would cease. Leakage of the full inventory of the pipelines is unlikely, and significant leakage is estimated to be a short-term event of the order of a day. The pressure drop from a small hole is not sufficient to be detectable by the planned leak detection system, due to technology limitations. Detection of small holes would occur via planned periodic visual inspections as identified through the annual asset integrity surveys, which include drop down video (DDV), described in the **Monitoring Plan**, submitted with the Storage Permit application.

There will be no significant routine venting of CO2 from the offshore pipelines and infrastructure. Any small volumes of CO2 vented as part of isolations required on the infrastructure during operational activity (e.g. from pig traps and launchers during pipeline inspection) are considered to form de minimis amounts. These are therefore excluded from further assessment here but have been included in the GHG calculations for the Proposed Development. Any measurable venting of CO2 would be carried out at PoA via the existing vent stack but would only occur because of an unplanned event.

Impact Assessment

Context

If CO2 was to leak into the marine environment, the initial fate of the leak would depend on the size and duration of the leak and its nature, including the rate of the leakage, and the water depth at which the leak occurred. The CO2 dissolution rate depends partly on bubble size, which in turn depends on the geometry of the leak opening and on the plume dynamics just above the leak location. The fraction of gas reaching the sea surface will also depend on the leak rate.

Ultimately, any CO_2 that is leaked will enter the global carbon cycle and has the potential to contribute to climate change. In context, 110 Mt CO_2 is forecast to be injected by the end of injection in 2052, equivalent to 29% of the net annual UK emissions in 2023 (384 Mt of CO_2 equivalent) (ONS, 2024).

Potential impacts on the environment described within this section are worst case impacts on the water column and seabed sediment, given that understanding to date is largely drawn from laboratory studies and a small number of release experiments. Actual impacts from the predicted rates of leak from the Proposed Development (in the unlikely event of accidental leakage) are therefore expected to be significantly lower and probably undetectable against background variation.

Recent studies that investigated the impacts of CO2 leaks are highlighted in **Table 38.4**.

Table 38.4: Key studies investigating the effects of CO_2 leaks

Project	Summary	References	Relevant conclusions
Quantifying and monitoring potential ecosystem impacts of geological carbon storage (QICS)	2012; Ardmucknish Bay, West of Scotland. Novel injection of CO2 into marine sediments to mimic, as realistically as possible, leakage at the sea floor	Watanabe et al., 2015; Tait et al., 2015; Widdicombe et al., 2015; Pratt et al., 2015; Kita et al., 2015; Phelps et al., 2015.	Environmental impacts from small-scale leaks will be minimal and not ecologically significant. In the unlikely event of larger leaks, impact could be locally more significant but limited to a few kilometres of the leak.
Strategies for Environmental Monitoring of Marine Carbon Capture and Storage (STEMM-CCS)	2017; Goldeneye site, North Sea Controlled release of CO2 beneath surface sediments at seabed at 120 m water depth.	de Beer et al., 2021; Falcon-Suarez et al., 2021; Lichtschlag et al., 2021;	Small operational leaks of CO2 have very limited, localised impact on the benthic environment and the water column.

CO2 leaks into the water column

On release into the marine environment, CO2 is less dense than the surrounding water so will rise towards the surface, dissolving as they rise (IPCC, 2015). Larger bubbles, moving rapidly and dissolving more slowly, such as those associated with medium-large rapid leaks from a pipeline or well rupture, may reach the water surface and be released into the atmosphere (Sellami et al., 2015). Smaller bubbles from small, continuous leaks associated with small sized pipeline holes would dissolve completely before reaching the surface and are unlikely to penetrate more than a few metres from the seabed (Jones et al., 2015).

The behaviour of CO2 in seawater is complex and dependent on several factors including water depth, temperature, and background saturation levels of CO2. When CO2 dissolves into water, it forms carbonic acid, which is relatively unstable and dissociates to form bicarbonate and carbonate ions. As the level of bicarbonate ions increases, associated with a release of hydrogen ions, the pH of water reduces. The effects of increased CO2 levels in seawater may therefore include a decrease in pH (i.e. increase in acidity) and a decrease in the availability of carbonate ions (due to their reaction with hydrogen ions). However, because seawater is a complex buffering solution, ocean chemistry can be resistant to change (Middelburg et al., 2020).

CFD modelling of 20” pipeline rupture.

Computational fluid dynamics (CFD) modelling was carried out to evaluate the loss of containment from the CO2 pipelines with the following main objectives:

- To conduct subsea discharge and dispersion modelling of accidental releases of gas phase CO2 from the offshore pipelines; and
- To conduct atmospheric dispersion modelling of CO2 accidental releases using the subsea discharge results on the sea surface and assess the potential impact on environmental receptors.

The CFD modelling results shown that 90% of the CO2 would reach the sea surface from a full bore rupture of the 35km PoA to New Douglas 20” pipeline. This assumes that releases are detected by instrumentation and that the mass released is equal to whole pipeline inventory.

On reaching the surface, the atmospheric dispersion modelling has demonstrated that the maximum distance reached by the 5% CO2 (50,000 ppm) cloud is approximately 2,700 m at 1 m elevation and was observed for a FBR (20'') release under higher wind speed conditions.

Marine Ecosystems

Marine ecosystems are particularly tolerant to fluctuations in CO2 concentrations and subsequent short-term variations in seawater acidity. Typically, shelf seas will experience variations of an annual range of 0.2- 0.4 pH units, with a mean between 8.0 and 8.1 pH units (Thomas et al., 2005; Artioli et al., 2012). Long-term reductions in pH approaching or exceeding 1.0 unit can be considered as significantly harmful, while reductions in the order of 0.2–0.5 pH units are considered potentially harmful, and reductions of < 0.1 pH units are considered unlikely to have an impact (Widdicombe et al.,2013). Short-term (hours to a few days) reductions in pH will be much less deleterious to marine biota (Phelps et al., 2015).

All CO2 leakage events which reach the water column will produce a gradient of pH and other chemical changes between the leak location and the periphery of the affected area, with the potential to impact ecosystems in the vicinity of the leak. The length of the gradient will depend primarily on the leakage rate but will also be influenced by other factors associated with the form of leak and hydrodynamic mixing (Jones et al., 2015). A small seep (< 1 t/day) will only have a spatial impact of a few tens of meters radius. A very large leak (> 100 t/day), but which is very unlikely to occur, would have a kilometre scale footprint (Phelps et al., 2015). Both scenarios will have decreasing concentrations away from the point of release.

The organisms most vulnerable to the effects of acidification are those that rely on a calcified shell such as crustaceans. As well as permanent members of the zooplankton such as Calanus species, the plankton includes larval forms of many benthic mollusc and crustacean species. While effects of acidification may not be lethal, physiological effects may result due to trade-offs between respiration, growth and reproduction (Jones et al., 2015). Analysis of a long-term natural volcanic CO2 vent system at ambient seawater temperature and without toxic sulphur compounds demonstrated significant alteration in marine community structure. However, this change was constrained to a region with a measurable pH change within approximately 100 m of the vent (Hall-Spencer et al., 2008) and required a long duration, rather than short-term exposure to display a change in organisms.

Recent studies on fish have focussed on responses to ocean acidification where a wide range of behavioural effects have been identified (Clements and Hunt, 2015). However, due to the localised nature of the impacts in comparison to the large feeding areas and the mobile nature of fish species in the Liverpool Bay environment, fish are unlikely to be significantly impacted by temporarily elevated CO2 levels.

Marine mammal species are also mobile in nature and feed over large areas. If a CO2 leak were to cause significant impacts on the marine mammal food chain, potential effects could result on marine mammals. However, as shown above, CO2 is estimated to disperse and therefore any impacts are likely to be minor.

e) Please clearly detail any mitigation measures, for example, it is unclear if the pipeline can be shut in, in the reverse direction.

Eni Response: The Applicant can confirm that pipeline emergency shutdown (ESD) valves will be located onshore at Point of Ayr (PoA), and on the New Douglas CCS platform to enable the shut-in of PL1030 20" pipeline. For the PL1039 20", PL1041 14", PL1035 16", and PL1036a 12" pipelines, ESDs will be located on the New Douglas CCS platform, and at each of the three satellite platforms. This means each pipeline can be individually shut-in.

Additionally, surface controlled, subsea safety valves (SCSSVs) will be installed within the Hamilton, Hamilton North, and Lennox carbon store (CS) wells to automatically shut-in the flow of a well in the event either surface controls fail, or surface equipment becomes damaged. These valves will be qualified to survival temperatures of -78.5°C.

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QUESTION 40: Section 6.7.12. Table 6.8. Reg 12(1) letter dated 1 July 2024 – comment 86

Whilst it is recognised that the Liverpool Bay SPA is designated for birds, any impacts due to Suspended Sediment Concentration (SSC) plumes and associated sediment deposition during cable laying, sediment disturbance from rig placement or sediment deposits related to drilling activities, may have an impact on birds by impacting prey availability. Please provide an assessment on these potential affects. The Liverpool Bay SPA must be recognised and referred to within section 6.7.12 and included within Table 6.8. OPRED would refer the applicant to the requirements of the Conservation Objectives to consider the attributes relating to the supporting habitats and processes associated with the designated feature(s) of the site.

Eni Response: The Applicant can confirm that within the Marine Biodiversity ES chapter, Ornithology ES chapter, and the RIAA, all relevant designated sites have been considered across different ecological receptors (i.e. benthic ecology, fish and shellfish, marine mammals, ornithology). The conservation objectives of all relevant Designated Sites (including the Liverpool Bay SPA in the ornithology section of the RIAA) have been assessed.

The Applicant recognises that the conservation objectives of the Liverpool Bay SPA consider supporting habitats and processes associated with the designated ornithological features of the site. However, the way our assessments have been carried out is to consider the impacts on the supporting habitats and processes in terms of the way that they affect the ornithological receptor. Therefore, the significance of the effects from changes to prey availability for ornithological receptors has been assessed for all relevant qualifying features is assessed in the **Offshore ES, Chapter 8: Offshore Ornithology**, and the **RIAA**, including for cumulative effects with other projects. Within the RIAA, the section where the Liverpool Bay SPA is assessed is Section 1.9.1.1: Liverpool Bay SPA, which identifies at Table 1.126 all the Conservation Attributes and Targets for the Qualifying Features and assesses the potential for adverse effects against each objective and qualifying feature in Section 1.9.1, including Table 1.138, which is reproduced in response to Question **8**, as **Table 8.3**.

That Applicant can confirm, therefore, that within the Marine Biodiversity ES chapter, Ornithology ES chapter, and the RIAA, all relevant designated sites have been considered across different ecological receptors (i.e. benthic ecology, fish and shellfish, marine mammals, ornithology). The conservation objectives of all relevant Designated Sites (including the Liverpool Bay SPA in the ornithology section of the RIAA) have been assessed.

In relation to the Liverpool Bay SPA included in **Table 40.1** below, Volume 3 Appendix P: Habitats Regulations Assessment Stage 2 Report to Inform Appropriate Assessment (RIAA) considered the attributes relating to the supporting habitats and processes associated with the designated features in line with the conservation objectives. Section 1.10.4.1 concluded that the conservation objectives of this site could be undermined for little tern as a result of indirect impacts upon prey availability. These impacts were concluded to result in a moderate adverse effect upon the integrity of the Liverpool Bay/Bae Lerpwl SPA for little tern conservation objective 4 and 5 as a result of activities associated with the Proposed Development. The assessment concluded that the conservation objectives of this site could not be undermined for little tern as a result of the other impacts (disturbance and displacement from airborne sound and presence of vessels and infrastructure and accidental pollution in the surrounding area). The addition of mitigation limiting construction activities during the sensitive egg laying and chick rearing period would reduce these adverse effects to negligible and therefore no adverse Effect upon the integrity of the Liverpool Bay/Bae Lerpwl SPA.

For all other features, the assessment concluded that the conservation objectives of this site would not be undermined resulting from any impacts. Therefore, it can be concluded that there is no risk of an adverse effect on the integrity of the Liverpool Bay/Bae Lerpwl SPA resulting from activities associated with the Proposed Development.

For completeness, the following assessment describes the potential impacts on SSC and deposition resulting from activities associated with the Proposed Development which informed the RIAA.

Table 40.1: Designated Sites and Relevant Qualifying Interests

Designated Site	Closest Distance to the Area of Project Physical Work (km)	Relevant Qualifying Interest
1.	Marine Conservation Zones (MCZs)	
Fylde MCZ	1.80	Qualifying Features: • Subtidal sands and subtidal muds that are highly productive and evidenced to support an abundance of animals such as crustacean, starfish, and bivalve species including: nut-shell *Nucula nitidosa*, razor shell *Pharus legumen* and the white furrow shell *Abra alba*. Flatfish, including sole *Solea solea* and plaice *Pleuronectes platessa*, in addition to whiting *Merlangius merlangus* are also supported by the habitat within the site.
2.	Special Areas of Conservation (SACs), Ramsar Sites and Special Protection Areas (SPAs)	
Liverpool Bay/Bae Lerpwl SPA (UK9020294A)	0.0	Qualifying Features: • Red-throated diver Gavia stellata (non-breeding) • Little gull Hydrocoloeus minutus (non-breeding) • Common scoter Melanitta nigra (non-breeding) • Little tern Sternula albifrons (breeding) • Common tern Sterna hirundo (breeding)
Ribble and Alt Estuaries SPA and Ramsar Site	6.10	Qualifying Features: 1. The site consists of extensive areas of sandflats and mudflats, as well as large areas of saltmarsh, particularly in the Ribble. There are also areas of coastal grazing marsh. 2. The site supports breeding ruff *Philomachus pugnax*, common tern *Sterna hirundo* and lesser black-backed gull *Larus fuscus graellsii*. The site also supports wintering Bewick's swan *Cygnus columbianus bewickii*, whooper swan *Cygnus cygnus*, golden plover *Pluvialis apricaria*, bar-tailed godwit *Limosa lapponica*, pink-footed goose *Anser brachyrhynchus*, shelduck *Tadorna tadorna*, wigeon *Anas penelope*, teal *Anas crecca*, pintail *Anas acuta*, oystercatcher *Haematopus ostralegus*, grey plover *Pluvialis squatarola*, knot *Calidris canutus islandica*, sanderling *Calidris alba*, dunlin *Calidris alpina alpine*, black-tailed godwit *Limosa limosa islandica*, redshank *Tringa tetanus*. The Ribble and Alt Estuaries SPA also supports passage populations of ringed plover *Charadrius hiaticula*, sanderling *Calidris alba*, and redshank *Tringa tetanus*.
Mersey Narrows and North Wirral Foreshore SPA and Ramsar Site	9.0	Qualifying Features: 3. The site comprises of intertidal habitats, man-made lagoons, and extensive intertidal flats. 4. The site supports non-breeding bar-tailed godwit, little gull *Hydrocoloeus minutus*, and knot. The site also supports breeding common tern and an internationally important waterbird assemblage.
The Dee Estuary SAC, Ramsar	0.0	Qualifying Features: 5. Mudflats and sandflats not covered by seawater at low tide; Salicornia and other animals colonizing mud and sand; Atlantic Sea meadows *Glauco-Puccinellietalia maritimae*, embryonic shifting dunes, shifting dunes along the shoreline, fixed dunes with

Designated Site	Closest Distance to the Area of Project Physical Work (km)	Relevant Qualifying Interest
Site and SPA		herbaceous vegetation and humid dune slacks, and estuaries. 6. Internationally important populations include oystercatcher, knot, curlew *Numenius arquata*, redshank, bar-tailed godwit, black-tailed godwit, grey plover and dunlin.
3.	Sites of Scientific Interest (SSSI) (DEFRA, 2023)	
Dee Estuary SSSI	5.0	Qualifying Features: 7. The Dee Estuary is of special interest for its populations of internationally important wintering waterfowl *Anseriformes sp.*, term species, intertidal mud and sandflats, saltmarsh and transitional habitats. 8. Internationally important populations include oystercatcher, knot, curlew, redshank, bar-tailed godwit, black-tailed godwit, grey plover and dunlin.
North Wirral Foreshore SSSI	8.80	Qualifying Features: 9. Intertidal sand and mudflats and embryonic saltmarsh of considerable importance.
Ribble Estuary SSSI	6.80	Qualifying Features: 10. Extensive intertidal sand-mud flats and areas of reclaimed saltmarsh, supporting internationally important populations of wildfowl.
Sefton Coast SSSI	6.20	Qualifying Features: 11. Intertidal mud, sandflats, embryonic shifting dunes, mobile dunes, dunes creeping with willow *Salix arenaria*, humid dune slacks, fixed dunes, dune grasslands and dune heath. 12. Assemblages of vascular and non-vascular plants, in particular the nationally rare grey hair grass *Corynephorus canescens*, nationally scarce liverwort *Pentalophyllum ralfsii* and nationally rare moss *Bryum neodamense*.
4.	Bathing Water Locations	5. Bathing Water Quality Classification
Rhyl	2.10	Sufficient
Ainsdale	6.0	Good
West Kirby	7.60	Excellent
Southport	6.40	Good

Seabed Preparation

Prior to cable installation, seabed preparation activities are required, in the form of a small sandwave clearance operation, south of the new Douglas CCS Platform. This operation required the clearance via mass flow excavator (MFE) of two stretches of sandwaves, totalling a 115 m in length, 10 m in width, and depth of 3 m, mobilising 3,450 m3 over the course of three days. During the operation average suspended sediment levels of approximately 100 mg/l are observed, however, concentrations fall rapidly to < 5 mg/l a short distance from the discharge site, with only the finer sediments being more widely dispersed. Deposition is highly limited with peak values extending into the SPA having values of around 1 mm. Some of the finer material associated with the excavation process is resuspended during successive tides, so that sediment may still be suspended a day after cessation of excavation activities.

Cable Installation

During the construction phase impacts in relation to increased SSC and subsequent deposition will be experienced to a degree within the Liverpool Bay SPA. During the installation of both lengths of the PoA to Douglas OP export cabling, the SPA will be directly affected with sediments being mobilised and deposited within the receptor. SSC concentrations are raised by as much as 1,000 mg/l in the vicinity of West Hoyle Spit, however, reduce rapidly to background levels a short distance from the cable path. The resultant SSC plume has the capacity to extend approximately 15 km to the east and west. Deposition can be up to c. 160 mm in depth along the trench route itself, but as with SSC rapidly decreases with distance from the source of disturbance.

A larger plume again is seen from the trenching of the Douglas to Lennox Inter-OP cable, which again would overlap with the Liverpool Bay SPA, with much of the cable path from c. Hamilton Main to Lennox OP going directly through the receptor. Average concentrations can be in excess of 1,000 mg/l in the direct vicinity of the cable path, and 10 mg/l at the extent of the plume. Average SSC is limited to <100 mg/l, with peak sedimentation values of c. 70 mm, this rapidly drops to c. 3 mm outside of the area of project physical work.

The Douglas to Hamilton-Main Inter-OP cable plume can be largely characterised by the Douglas to Lennox Inter-OP results, with similar quantities of SSC and deposition. The impact on the Liverpool Bay SPA would be reduced from that of the PoA to Douglas OP and Douglas to Lennox Inter-OP cables which share more of their trench paths with the Liverpool Bay SPA.

The Douglas to Hamilton North Inter-OP cable plume will differ slightly spatially, extending further to the north and reaching the extents of the physical processes study area, in some cases potentially leaving the boundary by small distances. Similar average SSC values can be expected, with the greatest again occurring along the cable route itself. Again, similar sedimentation values will be very similar to those experienced for the modelled cable routes. Again, increased SSC and deposition will occur within Liverpool Bay SPA as a result of the operation.

In all cases, the impact will be intermittent, of short-term duration and highly reversible. The magnitude of the impact will therefore be low due to being within background levels and of a temporary nature. The sensitivity of the receptors is considered low due to the recoverable nature of the seabed within the Designated Sites. The effect will, therefore, be of **minor** adverse significance, which is **not significant** in EIA terms. Further details are contained in the Offshore ES, Chapter 6, Section 6.11.1.

Proposed Douglas CCS Platform

The construction of the Douglas CCS Platform will have a negligible impact with regards to increases in SSCs or subsequent deposition due to the method of installation being that of driven piles. The action of driving piles compresses sediment and pushes it down or to the side of the driven pile within the seabed. Therefore, a negligible quantity of sediment is mobilised into the water column.

Hamilton Main

The Hamilton Main hydrocarbon reservoir is to be repurposed into an appropriate CCS facility via the creation of two injection wells, the creation of one new monitoring well and one sentinel well. In the case of the injection wells, infrastructure will be repurposed via the side-tracking of existing producer wells within the existing site of the platform, whereas sentinel wells will be recompleted for additional monitoring. In both cases, no material will be mobilised within the marine environment. In the case of the Hamilton Main monitoring well, new infrastructure is required, involving the drilling of a new well to the hydrocarbon field on the flanks of the reservoir, in an area previously not drilled. This work will mobilise a plume which extends 8 km to the east and west, with peak SSC values of c. 360 mg/l constrained to the site itself, and average SSCs of less than a tenth of a millimetre across the majority of the plume. Corresponding deposition relates to approximately 50 mm at the site itself and average sedimentation of approximately 0.03 mm across the majority of the plume. The magnitude of the impact will therefore be low due to being within background levels and of a temporary nature. The sensitivity of the receptors is considered low due to the recoverable nature of the seabed within the Designated Sites. The effect will, therefore, be of **minor** adverse significance, which is **not significant** in EIA terms. Further details are contained in the Offshore ES, Chapter 6, Section 6.11.1.

Further works will occur in the form of a top-side replacement, in order to convert the facility for CO2 treatment and injection, said works will, however, occur above the sea surface and not mobilise any sediment into the marine environment.

Hamilton North

The Hamilton North hydrocarbon reservoir is to be repurposed into an appropriate CCS facility via the creation of two injection wells, the creation of one new monitoring well and one sentinel well. In the case of the injection wells, infrastructure will be repurposed via the side-tracking of existing producer wells within the existing site of the platform, whereas sentinel wells will be recompleted for additional monitoring. In both cases no material will be mobilised within the marine environment. In the case of the Hamilton North monitoring well, new infrastructure is required, involving the drilling of a new well to the hydrocarbon field on the flanks of the reservoir, in an area previously not drilled. This work will mobilise a plume which extends 8 km to the east and west, with peak SSC values of c. 440 mg/l constrained to the site itself, and average SSCs of less than 0.30 mm across the majority of the plume. Corresponding deposition relates to approximately 60 mm at the site itself and average sedimentation of approximately 0.10 mm across the majority of the plume. The magnitude of the impact will therefore be low due to being within background levels and of a temporary nature. The sensitivity of the receptors is considered low due to the recoverable nature of the seabed within the Designated Sites. The effect will, therefore, be of **minor** adverse significance, which is **not significant** in EIA terms. Further details are contained in the Offshore ES, Chapter 6, Section 6.11.1.

Further works will occur in the form of a top-side replacement, in order to convert the facility for CO2 treatment and injection, said works will, however, occur above the sea surface and not mobilise any sediment into the marine environment.

Lennox

The depleted Lennox hydrocarbon reservoir will be repurposed for use in CCS via the creation of two injector wells, one sentinel well, and one monitoring well. In the case of Lennox all the aforementioned wells will be completed by repurposing existing infrastructure i.e., recompleting the well, or drilled from the existing platform well slots as side-track, in both cases material would be collected and disposed of onshore, therefore not being released into the marine environment.

Therefore, the sediment generated by the installation of the new electrical cable represented the worst-case scenario for the creation of suspended sediment from the construction works at the Lennox NUI. This work will result in average concentrations are <1,000 mg/l and are greatest in the direct vicinity of the cable path, and <10 mg/l at the extent of the physical processes study area. Average sedimentation is limited to <100 mm with peak values of c.70 mm, however outside the area of project physical work deposition is limited to negligible levels of <3 mm. Sedimentation one day after the cessation of trenching shows that fine sands and resuspended sediment settle during slack water. The magnitude of the impact will therefore be low due to being within background levels and of a temporary nature. The sensitivity of the receptors is considered low due to the recoverable nature of the seabed within the Designated Sites. The effect will, therefore, be of **minor** adverse significance, which is **not significant** in EIA terms.

Additionally, the Lennox Offshore Platform will be redeveloped with an updated topside including facilities for CO2 treatment and injection, however, all works will take place above the sea surface with no impact upon suspended sediments or subsequent deposition.

QUESTION 41: Section 6.9. Reg 12(1) letter dated 1 July 2024 – comment 87

Technical Note Physical Processes Section 1.4 states that "*The proposed platform at Douglas consists of four legs c. 2 m in diameter at a spacing of 17 m. Given the diminutive nature of this structure compared to neighbouring wind turbine structures for which published information is available, the impacts on physical processes would be negligible. Installation will be undertaken by pile driving with limited potential to mobilise seabed sediments and increase SSC.*" OPRED requires an assessment of the impacts of the project outlined within the ES. Impacts from activities such as the installation of the new Douglas installation on the offshore physical processes must be considered in more detail.

Eni Response:

Proposed Douglas CCS Platform

As provided for in the Proposed Development, the existing Douglas Offshore Platform is to be decommissioned and replaced via the installation of a new Douglas CCS platform, which will receive CO2 from the POA Terminal and distribute to the Hamilton Main, Hamilton North, and Lennox wellheads. The Douglas CCS Platform will be supported by a four-legged jacket foundation, each leg having a 2 m diameter and spaced approximately 17.5 m x 17.5 m at the upper level and 20 m x 20 m at its lower level. These four legs will be secured to the seabed by up to eight driven piles, with two at each leg. Each pile will be approximately 1.5 m in diameter, 40.25 m in length, and penetrate the seafloor by around 22 m. The dimensions and form of the new Douglas CCS Platform Jacket are displayed in **Figure 41.1**.

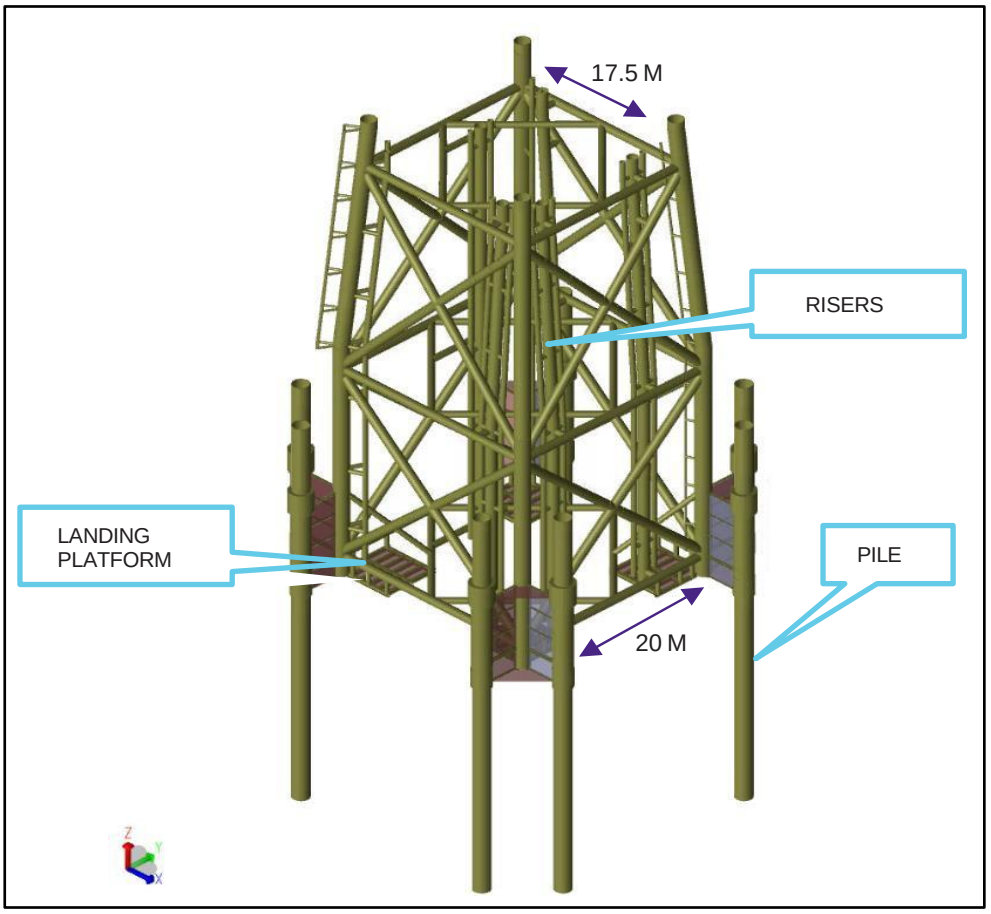

Figure 41.1: Proposed Douglas CCS Platform Jacket Structure

The construction of the Douglas CCS Platform will have a negligible impact with regards to increases in SSCs or subsequent deposition due to the method of installation being that of driven piles. The action of driving piles

compresses sediment and pushes it down or to the side of the driven pile within the seabed. Therefore, a negligible quantity of sediment is mobilised into the water column.

During the construction phase there is the potential for impacts to arise due to anchors patterns formed by construction rigs. Footprint depressions would occur in sandy/loose material as the equipment is installed. On removal the depression would be partially infilled by gravity and then, over time, be infilled by the mobile seabed sediments which are present in the area. The extent of temporary depressions, following completion of operations, would be limited to the immediate area therefore, short term changes to bathymetry would have negligible impacts on tidal currents and sediment transport regimes. Monitoring at the Barrow offshore wind farm showed depressions were almost entirely infilled 12 months after construction (BOWind, 2008). Although the monitoring study was undertaken during the first year of operation of Barrow Offshore Wind Farm (post construction monitoring initiated July 2006) it included oceanography, seabed morphology (scour etc.) and bathymetry. The wind farm is located in the east Irish Sea near Barrow-in Furness and therefore provides relevant, applicable datasets in compliance with regulatory standards. This further supported by seabed surveys undertaken in the vicinity of the existing Douglas platform complex, where seabed feature mapping identified 40 circular depressions interpreted to be spudcan footprints. Of the 40 features more than 50% are less than 0.6 m maximum depth, with only one c. 3 m indicating infilling by underlying sediment transport regimes. Given the short timescale of recovery, and the fact that impacts to bathymetry and subsequently physical processes such as waves, tides and sediment transport are negligible there would not be significant impacts on physical process receptors.

Given the structure will exist in the water column throughout the project lifespan, acting as an obstacle to the flow of water, the structure has the potential to impact upon physical processes such as tides, waves and sediment transport. This is, however, mitigated by the diminutive scale of the structure itself, with changes to physical processes being of a negligible nature, resulting in no significant effects on physical process receptors within the study area.

This conclusion is supported by previous numerical modelling assessments undertaken within Liverpool Bay, namely for the Mona Offshore Wind Project development (Mona Offshore Wind, 2024), which considered the impacts associated with the installation of a variety of considerably larger structures, i.e., posing c. 2.5 to >10 times as large an obstacle in the water column than the new Douglas CCS Platform. The closest foundation in scale to the new Douglas CCS Platform modelled within the Mona Offshore Wind Project ES was that of a four-legged suction bucket foundation with the following parameters:

- Four jacket legs with a diameter of 5 m, spaced 48 m apart
- Suction bucket foundations with a diameter of 16 m
- Scour protection to a height of 2.5 m extending 20 m from the bucket

The resulting outputs of the numerical modelling demonstrated the scale of impacts with regards to tidal flows and wave climate as a result of the foundation installation. It was found that post-installation one such foundation would be expected to alter tidal flows during peak flood by up to c. 2 cm/s (constituting a change of less than 2%) within the direct vicinity (50 m) of the structure. This would reduce rapidly with distance from the foundation itself, falling a change of 1 cm/s 100 m from the structure. An example of the change in tidal flows incurred by the presence of the four-legged suction bucket foundation is presented for the flood tide in **Figure 41.2**.

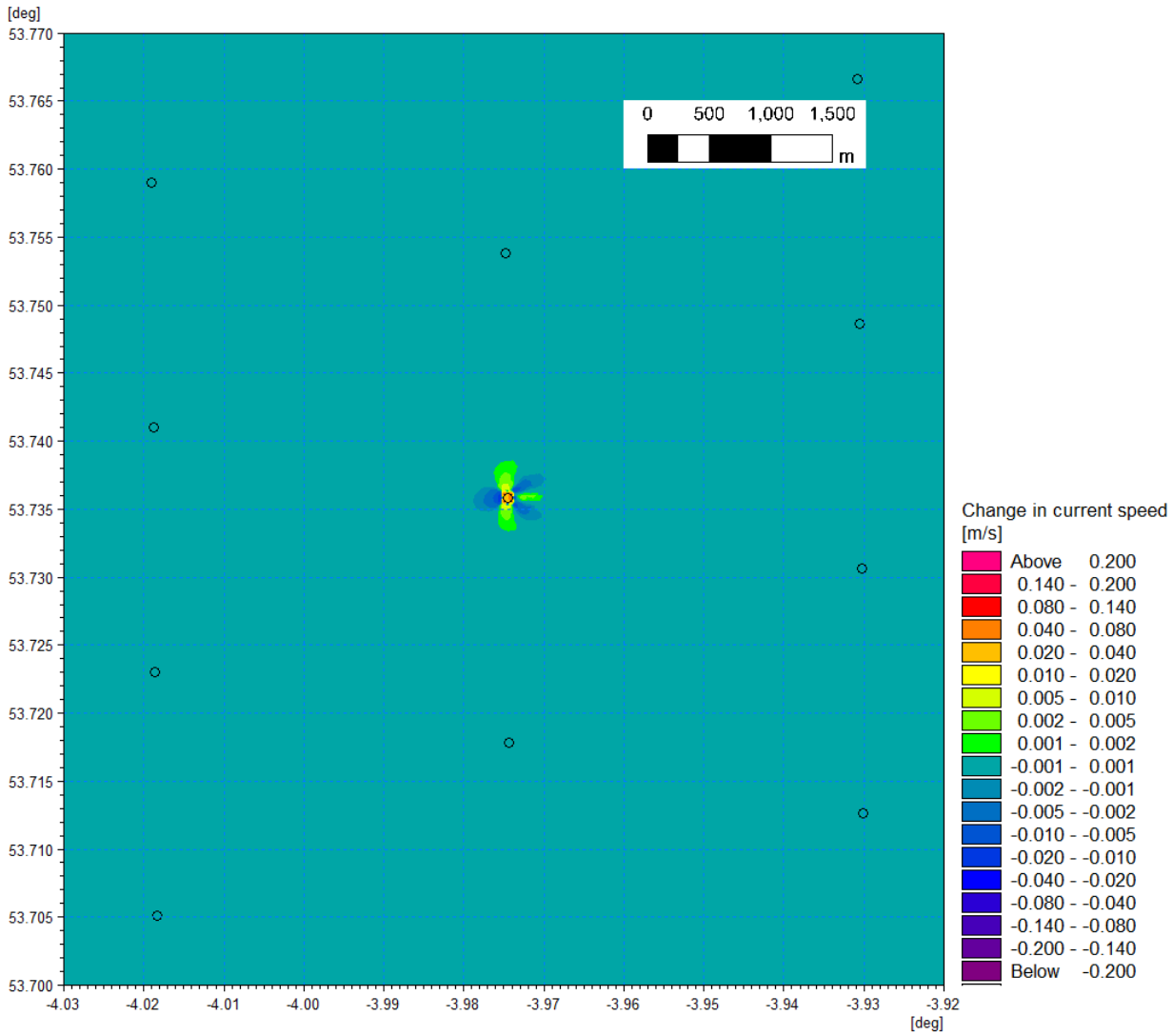

Figure 41.2: Change in tidal flow (post-construction minus baseline) suction bucket foundation – flood tide

Likewise changes to the wave climate post-construction were analysed, in this case for various 30° directional sectors and return period storm events. The largest observable change in wave height occurred with waves originating from the 090° sector, with a magnitude of change of c. 2% of the baseline wave height, within the direct vicinity of the structure (50 m) rapidly falling to around half this value 100 m from the foundation.

In summary, based on the evidence presented within the Mona Offshore Wind Project ES, it can be concluded that no significant changes to the tidal regime or wave climate would occur throughout the lifespan of the new Douglas CCS Platform. This is in line with the conclusion of the Mona Offshore Wind Project ES which presented that much larger foundations would have a negligible impact on physical processes which would be highly limited to the direct vicinity of the structures themselves.

References

- BOWind (2008) Barrow Offshore Wind Farm Post Construction Monitoring Report. First annual report. 15 January 2008, 60pp.
- Mona Offshore Wind Limited (2024) Mona Offshore Wind Project. Environmental Statement Volume 6, Annex 1.1: Physical processes technical report. Available: https://www.morganandmona.com/en/.

QUESTION 42: Section 6.11. Reg 12(1) letter dated 1 July 2024 – comment 89

It is noted that within Volume 3: Chapter 6 Physical Processes Section 6.11.1 and Technical Note Physical Processes Section 1.4, that details relating to the release of drill cuttings has been included, however, this infrastructure/activity has been scoped out of the assessment. It is noted that the plume extends 8 km to the east and west and that the average deposition at the drill site can be up to c.30 mm. Please expand on the justification on why this has not been included within the assessment.

Eni Response: All CO_2 injection wells will be drilled from the existing platform well slots as side-track, while the sentinel wells will be only recompleted and therefore not require any drilling activity. Waste streams from drilling activities via existing producer wells will be collected on vessel and disposed of onshore, without releasing material into the marine environment. Therefore, this infrastructure/activity was scoped out of the assessment as a pathway does not exist to affect physical processes receptors.

The Proposed Development does however require the drilling of two monitoring wells at Hamilton North and Hamilton Main, as such they have been considered through numerical modelling and subsequent assessment. Therefore, this infrastructure/activity was scoped into the assessment. Additional monitoring wells will be created via the recompletion of existing wells, with all sediment collected and disposed of onshore, without releasing material into the marine environment.

Therefore, in summary, there are three types of activity:

- CO_2 injection wells drilled from the producer well slots as side-track – drill cuttings collected.
- Sentinel wells recompleted - no drilling activity.
- Monitoring wells (Hamilton North and Hamilton Main) – drill cutting release to the marine environment.

Those drilling activities with a pathway to impact upon physical processes relate to the Hamilton North and Hamilton Main monitoring wells alone and have been included in the assessment.

QUESTION 43: Section 6.11. Reg 12(1) letter dated 1 July 2024 – comment 90

Technical Note Physical Processes Section 1.4 – Table 1-2 Scope of Activities and Physical Processes Assessment. It is noted that this table scopes out a number of development activities, including the installation of a new Douglas CCS platform and repurposing and installation of new sections of pipelines. Given the nature and status of the project, OPRED would not consider the installation of a new platform or the installation of new pipeline sections to be insignificant enough to be scoped out of the assessment. The ES does not provide enough detail on how pipelines will be repurposed and whether this will require any physical intervention, it is therefore unclear if this can be scoped out of the assessment. Please provide further information of the impacts from activities such as the installation of the new Douglas installation on the offshore physical processes.

Eni Response:

Drilling of wells

Those drilling activities with a pathway to impact upon physical processes relate to the Hamilton North and Hamilton Main monitoring wells alone and have been included in the assessment.

To summarise there are three types of activity:

- CO2 injection wells drilled from the producer well slots as side-track – drill cuttings collected
- Sentinel wells recompleted - no drilling activity
- Monitoring wells (Hamilton North and Hamilton Main) – drill cutting release to the marine environment

Further information is provided in response to **Question 3**, and **Question 42** above.

Installation of new Douglas Platform

The potential impacts arising from the installation of the new Douglas installation are detailed in the response to **Question 41**. This includes both construction phase and post-construction impacts.

Repurposing and installation of new sections of pipeline

Repurposing of the consists of several activities including installation of new topsides, installation of sections of pipeline to connect the new Douglas CCS platform, connection of injection, sentinel and monitoring wells (discussed above) and finally commissioning of the existing subsea natural gas pipelines for their change of use from hydrocarbon to CO2 service. In terms of activities which may impact on physical processes, existing pipelines to be re-utilized for gas phase have been assessed to suit the CO2 injection. There are no additional modifications needed for the purpose of transporting CO2 other than rerouting the short pipeline sections to tie-in to the new Douglas CCS platform.

Much of the existing pipeline infrastructure will be repurposed to transport CO2, the end sections of each pipeline at Douglas would be rerouted to the new Douglas CCS platform which is located at a water depth of 26.5 m CD. The largest diameter pipe to be rerouted is 20" (i.e. maximum of c. 2% water depth) and if external protection is required this would comprise concrete mattressing with a height of 0.3 m. The total maximum obstruction within the water column is c. 3%. The presence of infrastructure would therefore not lead to notable changes in the local tidal regime, wave climate or sediment transport regime. New sections of pipeline will be laid on the seabed and there will not be mobilisation of seabed sediment by trenching activities or the sediment plumes and increases in SSC associated with this activity.

Topside installation does not affect physical processes as works are located above MHWS outside the physical processes study area with no pathway to affects. Repurposing existing buried infrastructure does not affect physical processes as it will occur within the pipeline and will not require any physical intervention.

Microseismic and Ground Deformation Monitoring

As part of the Proposed Development a Measurement, Monitoring and Verification Programme (MMV) will be undertaken. The MMV programme will be applied for the 25-year life cycle of the Proposed Development, and throughout the post-closure phase, which is currently anticipated for a further 20 years. Regular environmental monitoring will include collecting environmental data from the seabed, the water column, and the atmosphere. Seabed surveys will include Microseismic and Ground Deformation Monitoring using a hydrophone mounted in a frame on the seabed in the vicinity of each of the four platforms with telemetry collected topside.

Four monitoring stations will be installed on the seabed c. 15 m from the corresponding platform and will remain in place for the duration on the MMV. Each station is c. 3 m by 2.5 m in plan, < 1 m in height and powered with a 12 mm cable connected to the adjacent platform.

In terms of impacts on physical processes, during installation there is anticipated to be small increase in SSC due to seabed preparation and placement of the unit. However, due to the diminutive size of the unit this has very limited potential for impacts on physical processes. Similarly, due to the limited height with respect to the water depth, where Lennox being the shallowest platform is located in an average of over 10 m of water, this would not give rise to impacts on wave climate or tidal flows.

The construction works are of very limited nature both in duration and extent and as such, if in the unlikely event they were to occur at the same time as releases from the drilling of Hamilton North and Hamilton Main monitoring wells the cumulative impacts would be negligible.

QUESTION 44: Section 6.11.2. Reg12(1) letter dated 1 July 2024 – comment 94

The provision of information regarding an assessment that supports the statement that the seabed will accommodate cable burial to the required depth is welcomed, however, limited information on the overall impact of cable protection has been provided. It is recognised that details of the anticipated volumes of protection are provided in Chapter 3, however, the assessment of these in Chapter 6 appears to be limited. Please provide details of the extent of the impacts which should also be put into context with any protected sites.

Eni Response: The Applicant can confirm that It is provided for in the Proposed Development that cable protection be implemented where necessary, namely on the final approaches between cable routes and the new Douglas CCS Platform, and at the crossings of existing pipelines and cables. The material quantities for the cable protection are given in **Table 44.1** below.

Table 44.1: Design Envelope: material quantities for protection of electrical cables

Cable/Crossing ID	Protection Type	Number	Dimensions (m)	Weight (kg)	Total Weight (kg)
POA to New Douglas Cable 1	Concrete Mattress	35	6 x 3 x 0.3	9,800	343,000
POA to New Douglas Cable 2	Concrete Mattress	35	6 x 3 x 0.3	9,800	343,000
New Douglas to Hamilton North	Concrete Mattress	50	6 x 3 x 0.3	9,800	490,000
	Rock	-	1,000	12,000 – 16,000 per linear metre	12,000,000 – 16,000,000
New Douglas to Hamilton Main	Concrete Mattress	100	6 x 3 x 0.3	9,800	980,000
New Douglas to Lennox	Concrete Mattress	60	6 x 3 x 0.3	9,800	588,000
	Rock	-		12,000 – 16,000 per linear metre	12,000,000 – 16,000,000
POA to New Douglas Cable 1, 10x crossings	Concrete Mattress	64	6 x 3 x 0.3	9,800	686,000
	Rock	-	1,000	12,000 – 16,000 per linear metre	12,000,000 – 16,000,000
POA to New Douglas Cable 2, 10x crossings	Concrete Mattress	64	6 x 3 x 0.3	9,800	686,000
	Rock	-	1,000	12,000 – 16,000 per linear metre	12,000,000 – 16,000,000

In the case of cable crossings, **Table** (see also **Table 3.8**) outlines all the cable crossings that are along the Point of Ayr to Douglas platform cable. The cable crossings for the inter-platform cables to the three satellite platforms are either within the 500 m clearance zone of the New Douglas platform, and/or cross Eni infrastructure. All are in water depth in excess of 25 m. **Table** gives the water depths, and water depths above berm height. This shows that for crossings PoAX 1 (Burbo Bank OWF), PoAX 2 & 3 (North Hoyle OWF), and PoAX 4 & 5 (Gwynt y Môr OWF) there will be a reduction in clearance above the berm 0.8 m in height, as the water in these locations is very shallow; 5 m, 7 m, and 12 m respectively. The revised project description has determined that only one cable will now be installed, so only three export cable crossings (PoAX 1, 2, & 4) will be required within limited water depths where the restriction of 5% water depth reduction to cable protection height cannot be met throughout the tidal cycle.

Table 44.2: Design Envelope: Third party cable crossings

Crossing ID	Third-party owner	UTM Easting (m)	UTM Northing (m)	Water depth (m)	Water above berm (m)	Berm height (m
PoAX-1	Ørsted Burbo Bank wind farm	470974.84	5916002.39	**5**	4.2	0.8
PoAX-2	Greencoat UK Wind North Hoyle wind farm	468795.03	5916535.10	**7**	6.2	0.8
PoAX-3		*468776.17*	*5916536.68*	*7*	*6.2*	*0.8*
PoAX-4	Gwynt y Môr OFTO, Gwynt y Môr wind farm	461904.20	5917763.30	**12**	11.2	0.8
PoAX-5		*461875.07*	*5917817.57*	*12*	*11.2*	*0.8*
PoAX-6		461713.35	5924702.50	20	19.2	0.8
PoAX-7	National Grid/Scottish Power, Western Link HVDC cable	461713.35	5930787.10	30	29.2	0.8
PoAX-8		461713.35	5930818.38	30	29.2	0.8

In such cases the design of the cable crossing reduces the potential impacts of physical processes by the use of layered protection which gradually changes in height, as illustrated in **Figure** and **Figure** . Each layer of the modular post lay concrete mattress is 0.3 m in height. At the approach to the crossing, there will be a single layer of mattressing which then overlays the cable as it emerges from the bed and is surface laid. The cable will then be laid over a single layer of mattressing placed on the bed at the crossing point. This is then covered with either a single layer of mattressing, or rock.

For crossings PoAX-1, and PoAX-2 the concrete mattress protection as shown in **Figure** , the distance of the touchdown points either side of the crossing is circa 5 m. Therefore the 0.8 m berm height occurs for a limited distance <10 m and for most of the crossing the obstruction on the bed is between 0.3 m and 0.5 m in height (i.e. a small proportion of each shallow water crossing exceeds 5% of the water depth). The rock protection for PoAX-4 shown in **Figure** the 0.8 m berm height will occur over its full length of up to 200 m. Therefore, only crossings PoAX-1, PoAX-2, and PoAX-4 will be within very shallow water and will form a gradual reduction in water depth, lowering the potential impacts of physical processes.

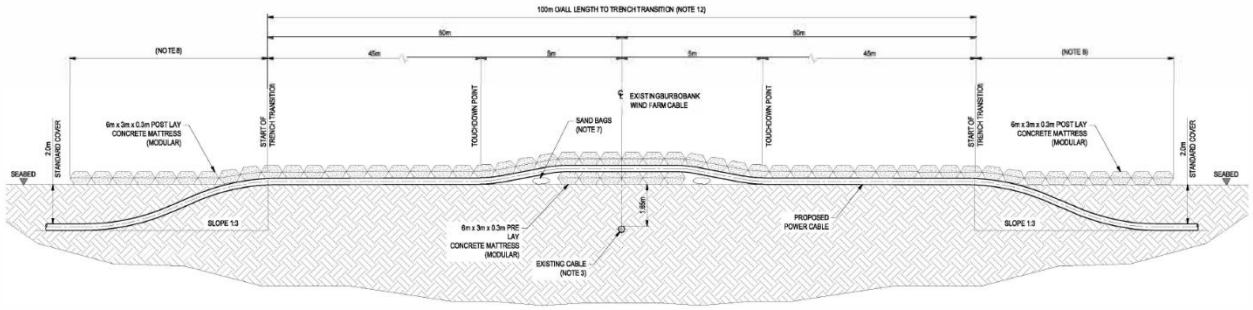

Figure 44.1: Typical Schematic Layout of Concrete Mattress Protection at Cable Crossing

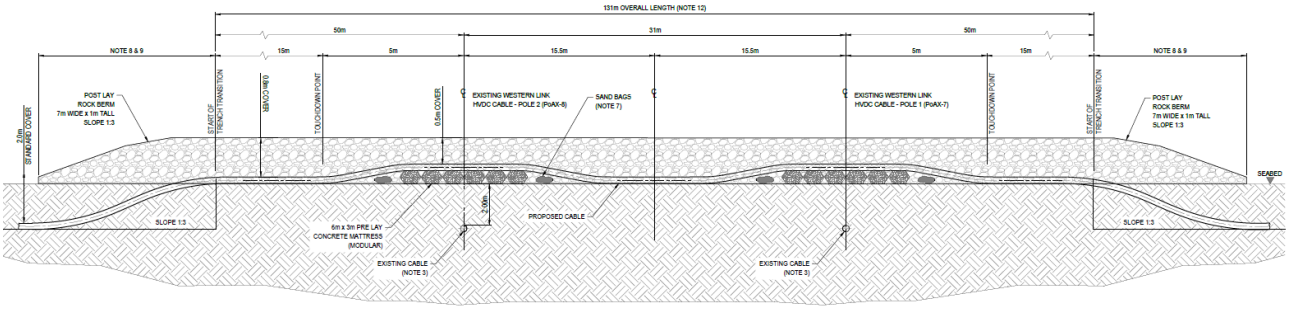

Figure 44.2: Typical Schematic Layout of Rock Berm Protection at Cable Crossing

It should also be noted that where an impact does arise from the presence of cable protection it will be highly localised, as can be supported through the modelling undertaken by Mona Offshore Wind Project, (Mona Offshore Wind Limited, 2024). The results of which showed that where cable protection was employed, impacts to the wave climate were only observed where the protection height equated to 15% or more of the water depth, when this criterion was exceeded, then changes to wave climate were still limited to 0.5 to 1%. Impacts to tidal currents were shown to occur when cable protection was perpendicular to the orientation of tidal flow, however, changes were highly localised, with increases in current speed of 1% around the structure itself, these impacts were only present within 500 m of the structures.

In the case of the ENI project, some small change may be observed in wave climate due to the presence of the cable crossing with PoAX-1 with the Burbo Bank OWF, located at a depth of 5 m (16% of the water depth) however it should be understood that as a majority of the cable protection itself is generally below the 0.8 m berm height, instead between 0.3 m and 0.5 m, the impacts is likely to be further minimised. Furthermore, this crossing is located at too great a distance from any designated receptors to impact upon the physical processes within them. No other crossings will impact designated sites, as evidenced by the fact they are both in deeper water and situated further away from the receptors.

References

- Mona Offshore Wind Limited (2024) Mona Offshore Wind Project. Environmental Statement Volume 6, Annex 1.1: Physical processes technical report. Available: https://www.morganandmona.com/en/.

QUESTION 45: Section 6.11.2.2. Reg12(1) letter dated 1 July 2024 – comment 96

Please confirm if Liverpool Bay CCS Limited has any plans for contingency deposits should any cables become exposed during the operation and maintenance phase.

Eni Response: In the ES Project Description in Chapter 3, at 3.5.1.4 it states: "From experience of existing operations, reburial of up to 500 m of cable in one event every 5-10 years is anticipated. It is anticipated that the external cable protection at existing cable crossings is unlikely to require maintenance, as the rock and concrete mattresses are expected to remain in place. Maintenance or repairs are only anticipated should the cable protection be impacted by either fishing activity, or anchor snagging. Any movement of the rock and mattresses from these external interventions would be identified through the annual asset integrity surveys, and the necessary repairs carried out accordingly. These repairs would be carried out within the maximum design envelope described for the cable crossings external protection in Table 3.7."

For the Physical processes assessment, the MDS for the Operation and Maintenance Phase has assessed:

- PoA Terminal to Douglas OP: The repair/ replacement and/or reburial of damaged or exposed cable sections/whole cable will may be required over the proposed development lifetime, to occur as required from inspection.
- Inter-OP cables: The repair/ replacement and/or reburial of damaged or exposed cable sections/ whole cable will may be required over the proposed development lifetime, to occur as required from inspection.

The assessment has even included the cumulative effects with the Burbo Bank wind farm cable reburial.

The Marine Biodiversity assessment has also included within the MDS for the Operation and Maintenance Phase:

- "The MDS for this impact includes the use of jack-up vessels for maintenance of offshore infrastructure and cable repair and reburial. Reburial of up to 500 m of cable every 5 to 10 years in anticipated (assuming 15 m width of seabed disturbance)".

The assessment of the cable reburial during the Operation and Maintenance Phase was based on the following:

Up to 72,000 m2 of subtidal habitat loss due to:

- Footprints of jack-up vessels for routine maintenance works. Up to 15 events per year over the 25-year lifecycle of the Proposed Development, resulting in a total value of 34,500 m2 over the lifecycle.
- Up to 37,500 m2 due to the reburial of up to 500 m of cable every 5 to 10 years, over the 25-year lifecycle. Only a smaller portion of this (7,500 m2 will occur at any one time).

QUESTION 46: Section 6.12.1. - Table 6.16. Reg 12(1) letter dated 1 July 2024 – comment 100

Table 6.10 and Impacts Scoped Out of the Assessment for Physical Processes and Technical Note Physical Processes Section 1.4 – Table 1-2 Scope of Activities and Physical Processes Assessment.

The effect of each operation at each installation and for each pipeline must be assessed; only a general assessment for the complete work has been included. The sensitivity at each site varies and therefore the activities will have different impacts.

Eni Response: Information relating to drilling activities is provided in response to **Question 42** whilst repurposing and installation of new sections of pipeline are discussed in response to **Question 43**.

It is also noted that the tables scope out a number of development activities, including the installation of a new Douglas CCS platform and repurposing and installation of new sections of pipelines. Given the nature and status of the project, OPRED would not consider the installation of a new platform or installation of new pipeline sections to be insignificant enough to be scoped out of the assessment. The ES does not provide adequate detail on how pipelines will be repurposed and whether this will require any physical intervention. It is therefore unclear if this can be scoped out of the assessment. As has been requested in Comment 90 please provide further information of the impacts from activities such as the installation of the new Douglas installation on the offshore physical processes.

Eni Response: Further information relating to the impacts of the different phases of the project to each site is provided in response to **Question 40** with regard to activities at each site and **Question 41** which provides information relating to potential impacts arising from installation of the new Douglas installation.

Please provide further details of where the relevant information is held in Appendix F: Cumulative Effects Assessment relating to the screening exercise.

Eni Response:

CEA Screening Exercise

Once the CEA long list was collated, all the included projects, plans and activities were then individually screened with specific references to each topic. This screening was carried out based on the level of detail available (tier) and data confidence, as well as the potential for interactions with the Proposed Development on a conceptual, physical and temporal basis. Those that were screened in were then carried forward into the CEA undertaken in the relevant topic chapters of the Environmental Statement.

The screening criteria used to scope in or out additional projects/developments with relevance to physical processes is displayed in **Table 46.1**, the results of the screening process are displayed in **Table 46.2** below.

Please confirm if all the activities associated with infrastructure and geological surveys have been included within the assessment.

Eni Response:

Survey Impact

As part of the Proposed Development a Measurement, Monitoring and Verification Programme (MMV) will be undertaken. The MMV programme will be applied for the 25-year life cycle of the Proposed Development, and throughout the post-closure phase, which is currently anticipated for a further 20 years. Regular environmental monitoring will include collecting environmental data from the seabed, the water column, and the atmosphere.

Seabed surveys will include Microseismic and Ground Deformation Monitoring using a hydrophone mounted in a frame on the seabed in the vicinity of each of the four platforms with telemetry collected topside. Further information is provided in the response to **Question 43**. Once these monitoring stations are installed the nature of geophysical surveys to be carried out is not invasive, with no pathway to mobilise sediments within the marine environment, lead to deposition, or affect seabed morphology and coastal processes.

All infrastructure and activities associated with the Proposed Development which are likely to impact the physical processes receptors have been considered within the assessment presented in the ES Chapter 6: Physical Processes. The nature of geophysical surveys to be carried out is not invasive, with no pathway to mobilise sediments within the marine environment, lead to deposition, or affect seabed morphology and coastal processes.

All infrastructure and activities associated with the Proposed Development which are likely to impact the physical processes receptors have been considered within the assessment presented in the ES Chapter 6: Physical Processes.

Table 46.1: Screening Criteria

	Included as part of the topic baseline and hence not considered within the cumulative impact assessment.
	Part of the baseline but has an ongoing impact and is therefore considered relevant to the cumulative impact assessment: **Screened into assessment.**
	Potential cumulative impact exists: **Screened into assessment.**
	No conceptual or physical effect-receptor pathway: **Screened out of assessment.**
	Low data confidence: **Screened out of assessment.**
	No temporal overlap: **Screened out of assessment.**
	Project has been withdrawn from development or operation

Table 46.2: Screening outcomes

Type	Reference	Developer	Project Title	Distance from ENI Hynet Development Area (km)	Spatial/temporal overlap with ENI Hynet			Status of Project/Plan	Licensable Period		Details	Data Confidence	Tier	Screening Outcome	Justification
					Spatial	Temporal (overlap with construction)	Temporal (overlap with operation)		Start date	Licence Expiration Date					
Wales	Offshore Renewables	ORML2233C	Awel y Mor Offshore Windfarm Ltd	Awel y MÃ´r Offshore Wind Farm River Clwyd Crossing	7	×	✓	✓	Planning	15/11/2023	Unknown	Public register - Customer Portal (naturalresources.wales)	High	1		Trenchless, entry and exit point landward of MHWS, no Impact to physical processes
Wales	Offshore Renewables	ORML2233L	Awel y Mor Offshore Windfarm Ltd	Awel y MÃ´r Offshore Wind Farm Interlink with Gwynt y Mor windfarm	0	✓	✓	✓	Planning	15/11/2023	Unknown	Public register - Customer Portal (naturalresources.wales)	Moderate	1		
Wales	Offshore Renewables and Deposit	ORML2233T	Awel y Mor Offshore Windfarm Ltd	Awel y MÃ´r Offshore Wind Farm Transmission Assets	1	✓	✓	✓	Planning	15/11/2023	Unknown	Public register - Customer Portal (naturalresources.wales)	High	1		
Wales	Offshore Renewables and Deposit	ORML2233G	Awel y Mor Offshore Windfarm Ltd	Awel y MÃ´r Offshore Wind Farm Generation Assets	1	✓	✓	✓	Planning	15/11/2023	Unknown	Public register - Customer Portal (naturalresources.wales)	High	1		
Wales	Construction	CML2283	The Port of Mostyn Ltd	Mostyn Energy Park Extension (MEPE) Project	4	✓	✓	✓	Application submitted	01/09/2023	01/08/2030		High	1		
Wales	Construction	CML2329	Cemex Raynes Quarry	Jetty repairs at Cemex Raynes Quarry	13	×	✓	✓	License Expired	17/07/2023	31/12/2023		High	1		No pathway to affect physical processes, relates to jetty deck repairs
Wales	Construction	CML2318	Denbighshire County Council	Pont Foryd waterproofing and resurfacing works	7	×	✓	✓	Consented/Licensed	01/09/2023	31/08/2024		High	1		No pathway to affect physical processes, relates to bridge resurfacing
Wales	Construction and Deposit	CML2315	Mona Offshore Wind Limited	Suction Bucket foundation trials	5	✓	✓	✓	Consented/Licensed	13/07/2023	11/07/2024		High	1		
Wales	Disposal Site	IS103	Mostyn Breakwater	Irish Sea	6	×	✓	✓	Open	Unknown				1		
England	Disposal Site	IS135	Burbo Bank Extension OWF	Irish Sea	0.5	×	✓	✓	Open	Unknown				1		
Wales	Dredge and/or Disposal	DML1542	Port of Mostyn Ltd	Maintenance dredge, POM	4	×	✓	×	Unknown	01/05/2019	30/04/2025			1		

	Type	Reference	Developer	Project Title	Distance from ENI Hynet Development Area (km)	Spatial/temporal overlap with ENI Hynet			Status of Project/Plan	Licensable Period		Details	Data Confidence	Tier	Screening Outcome	Justification
						Spatial	Temporal (overlap with construction)	Temporal (overlap with operation)		Start date	Licence Expiration Date					
Wales	Dredge and/or Disposal	DML2001	Port of Mostyn	PoM maintenance dredge	4	×	✓	×	Unknown	12/10/2020	31/03/2026			1		
Wales	Marine Minerals	MM004/10/NSB	Mersey Sand Suppliers Ltd	Hilbre Swash Area 393	0	✓	✓	✓	Unknown	01/01/2014	01/01/2030		High	1		
England	Renewables		Gwynt y Mor	Capacity of 576 MW, 90 km² area	0	✓	✓	✓	Active/In Operation	03/12/2008	03/12/2033		High	1		
England	Renewables		North Hoyle Wind Farm Limited	North Hoyle Offshore Wind Farm	0	✓	✓	×	Operational	01/01/2003	01/01/2028		High	1		
England	Renewables		bp/EnBW/Cobra/Floatation	Morgan and Morecambe Offshore Windfarm Transmission Assets	3	×	✓	✓	Pre-application	Unknown	Unknown	Scoping	High	1		
England	Renewables		Morgan Offshore Wind Limited	Morgan Offshore Wind Project Generation Assets	>20	×	✓	✓	Pre-application	Unknown	Unknown	PEIR	High	2		The Morgan Offshore Wind Project is located 7 km to the North of the ENI Hynet Development Area and does not have a spatial overlap with the CEA Study Area.
Wales	Renewables		RWE	Awel y Mor	1	✓	✓	✓	Submitted	01/01/2030	01/01/2055		High	1		
England	Renewables		Mona Offshore Wind Limited	Mona Offshore Wind Farm	5	✓	✓	✓	Pre-application	01/01/2028	31/12/2065			2		
Wales	Construction	CML1721	Burbo Extension Ltd	Cable Repair and Remediation	0	✓	✓	×	Consented/Licensed	20/07/2017	01/09/2027	Reburial	High	1		
Wales	Construction	CML2149	Conwy County Council	Colwyn Bay CRMP	12	×	✓	✓	Consented/Licensed	18/04/2019	18/04/2029	Beach recharge	High	1		
Wales	Construction	CML2149	Conwy County Council	Colwyn Bay CRMP	12	×	✓	×	Consented/Licensed	05/07/2019	04/07/2023	Beach recharge	High	1		
Wales	Construction	CML2140	Denbighshire County Council	Prestatyn Coastal Defence	2	×	✓	×	Consented/Licensed	31/07/2021	31/05/2025	Raised embankment	High	1		The raised embankment option under this license is set back from front line defences and would have no pathway to affect physical processes.
Wales	Construction	CML2272	Conwy County Council	Kinmel Bay Coastal Defence Works	8	×	✓	✓	Consented/Licensed	07/07/2022	06/07/2029	Improved rock armour defences & raising seawalls	High	1		The works at Kinmel Bay consist of raising a seawall and raising and widening of the existing rock armour defence, there is therefore a highly limited potential for increased SSCs during construction and no pathway to impact upon physical processes.

Type	Reference	Developer	Project Title	Distance from ENI Hynet Development Area (km)	Spatial/temporal overlap with ENI Hynet			Status of Project/Plan	Licensable Period		Details	Data Confidence	Tier	Screening Outcome	Justification
					Spatial	Temporal (overlap with construction)	Temporal (overlap with operation)		Start date	Licence Expiration Date					
Wales	Construction	CML2272	Conwy County Council	Kinmel Bay Coastal Defence Works	8	×	✓	×	Consented/Licensed	01/03/2021	30/03/2024	Improved rock armour defences & raising seawalls	High	1		The works at Kinmel Bay consist of raising a seawall and raising and widening of the existing rock armour defence, there is therefore a highly limited potential for increased SSCs during construction and no pathway to impact upon physical processes.
Wales	Construction	CML2272	Conwy County Council	Kinmel Bay Coastal Defence Works	8	×	✓	×	Consented/Licensed	01/03/2022	30/03/2024	Improved rock armour defences & raising seawalls	High	1		The works at Kinmel Bay consist of raising a seawall and raising and widening of the existing rock armour defence, there is therefore a highly limited potential for increased SSCs during construction and no pathway to impact upon physical processes.
Wales	Construction, Deposit, Removal	CML2152	Central Rhyl Coastal Defence Scheme	Central Rhyl Coastal Defence Scheme	4	×	✓	×	Consented/Licensed	31/03/2023	30/03/2024	Rock scour protection & new stepped revetment with wave wall	High	1		The works at Central Rhyl consist of the construction of rock scour protection at the base of existing defences along with repair works to existing defences, and new stepped revetment with accompanying seawall, there is therefore a highly limited potential for increased SSCs during construction and no pathway to impact upon physical processes.
Wales	Removal	RML2109	Gwynt y Mor Offshore Wind Farm	Removal of met mast at GyM	0	✓	✓	×	Variation Granted	21/11/2022	30/11/2027	Topside lattice structure removal, monopile removal, scour protection and a seabed survey	High	1		
Wales	Cable		Mares Connect Limited	Mares Connect Interconnector	0	✓	?	✓	Permitted	Unknown	Unknown			1		

QUESTION 50: Section 7.9.1 – Table 7.23. Reg12(1) letter dated 1 July 2024 – comment 115

Three Monitoring Plans (MP's) have been included, however please confirm that all the MPs reflect similar information relating to the monitoring of wells. Please provide the following information:

Eni Response: The wells monitoring strategy and technologies are the same for all the three storage sites. The three documents differ only in the name of the wells which are obviously different for each store.

Please clarify if the monitoring plan will identify leaks at high-risk locations as listed in Section 3, such as fault and fracture locations and how will a leak from this high-risk location be identified?

Eni Response: A surveillance plan has been prepared and described targeting different areas (i.e., **Geological, wells, injectivity/capacity and other**) with multiple technologies to guarantee the redundancy required in the regulations (**Figure 50-1)**. Results of the monitoring campaign will be evaluated to highlight possible model conformance issues and to detect significant irregularities, as reported in **Figure 19-1** above.

The following prevention/mitigation measures have been identified in the Containment Risk Assessment as required features of the monitoring strategy to detect and reduce all the associated risk including the fault and fracture locations:

- Subsurface monitoring (e.g., seismic, ground deformation, microseismic).
- Pressure and Temperature at bottomhole, wellhead, annulus and pipeline.
- Injection rate.
- Downhole wellbore monitoring (e.g., PLT/SNL, PNL, calliper…).
- Environmental monitoring.
- CO2 quality at collection points.
- Platform CO2 detection system.

An example of the risk register included in the Containment Risk Assessment (CRA) on fault -fracture is provided in **Figure 50-3**

An example of the risk register included in the Containment Risk Assessment (CRA) on fault -fracture is provided in **Figure 50-3**.

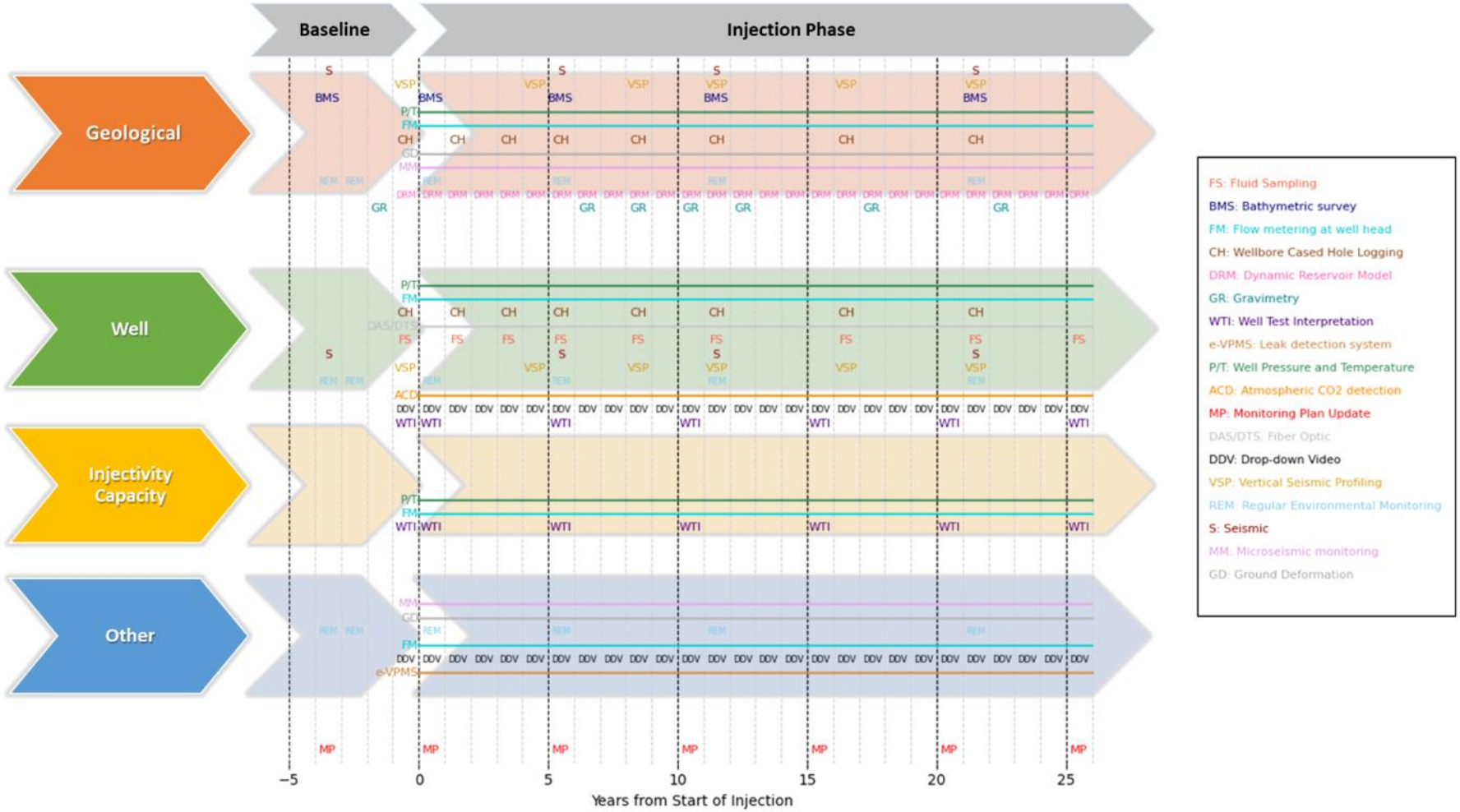

Figure 50-1 Range of different technologies for regular monitoring. Frequencies will be regularly updated, based on new information from store monitoring results and upon formal approval from relevant authorities. Full line represents continuous acquisition.

Figure 50-2 below provides a map of surveillance actions divided by risk categories as reported in the Containment Risk Assessment. Risk scenarios identification numbers are reported in the square brackets and are all included in "Annex A" in the containment Risk Assessment.

Risk Categories	Geological	Well	Injectivity/Capacity Issues	Other
Risk Scenarios	Flow through primary seal [#1.1-1.9] Flow up/across faults and associated with overfilling [#2.1-2.7]	Leak through wells (injection, monitoring and legacy) [#5.1-5.13]	Injectivity/Capacity Issues [#6.1-6.11]	External Activities / Events/ Impacts [#7.1-7.3 and 7.20] Other [#8.1-8.3, #8.11, 8.13-8.14] *T&S system*
Surveillance Actions	Seismic P/T and injection rate Downhole wellbore monitoring Ground Deformation Microseismic Environmental Monitoring	P/T and injection rate Downhole wellbore monitoring Seismic Environmental Monitoring Platform CO_2 detection system	P/T and injection rate CO_2 quality at collection points	Microseismic Ground Deformation Environmental Monitoring CO_2 quality at collection points

Figure 50-2 Surveillance Actions as highlighted in the Containment Risk Assessment document.

Leak Path Note 1		Risk scenario	Consequence	Unmitigated Risk Note 2				Risk Controls (Prevention & Mitigation)	Monitoring Activities Note 3	Corrective Actions Note 4	Data, Modelling, Analyses	Residual Risk Note 5				Certainty	Actions / Notes
				P	E	R	A					P	E	R	A	RC/PC/U	
Part 2. Geological – up / across faults and associated with overfilling																	
2.1	Faults / fractures Faults bound the field to the east and west (dip closure to the north and south)	Vertical CO_2 migration up existing fault(s) crossing primary seal (bounding faults and internal faults penetrate the primary seal)	CO_2 release to seabed - small leak rate, prolonged duration – minor environmental effect	-	02	03	01	See Bowtie G2 • Rock-fault system can be considered sealed after trapping hydrocarbons over geological times • Once pressure is re-equilibrated any vertical migration of CO_2 up the fault will stop (although lateral migration can continue – see below)	See Bowtie G2 • 3D high resolution seismic • Bathymetric survey	See Bowtie G2 • Stopping or reducing injection • Adjusting injection pattern	• Primary Seal Drainage Capillary Pressure Analysis • Geochemical Studies • Basin Geology Study • Fault Seal Analysis	-	02	03	01	Reasonably Certain	Scenario is very similar to CO_2 diffusion through primary seal (scenario 1.2). Fault reactivation is considered below (scenario 2.2). Available data indicates faults are effectively sealing from top of reservoir to original GWC. Latest seismic survey data has reduced uncertainty around how faults terminate in the shallow overburden and confirmed non continuity of fault planes up to seabed. With the currently available data about fault materials there is no indication of impact on the basic lithology of the area. Long term trapping mechanisms have been assessed. Field is filled to spill; no losses over geological timescales. A literature review has been completed to provide further information on the most critical parameters impacting Fault Seal Analysis application for a CCS project. Negligible risk to people, as for 1.1 above.

Figure 50-3; example extract of risk register - Faults / fractures Faults bound the field to the east and west (dip closure to the north and south)

An outline is reported below to directly link the monitoring actions to the specific threat: the main item is the threat (top events of the bowtie analysis) while second-level items report different controls (i.e.,surveillance actions). These risk and monitoring actions are identified in the Containment Risk Assessment:

- Vertical Flow through Primary Seal
  - Geophysical monitoring during injection to verify that CO2 plume size is under control.
  - Downhole monitoring of pressure, temperature, acoustics and seismicity
  - Environmental monitoring
- CO2 leaves storage site vertically – via fault
  - Geophysical monitoring during injection to verify that CO2 plume size is under control
  - Downhole monitoring of pressure, temperature, acoustics and seismicity
  - Environmental monitoring
- Lateral Migration of CO2
  - Geophysical monitoring during injection to verify that CO2 plume size is under control and
  - the extent of CO2 migration
  - Downhole monitoring of pressure, temperature, acoustics and seismicity
- CO2 leaves storage site via injection Wells
  - Downhole and surface pressure/temperature gauges in Annulus
  - Downhole pressure monitoring: release through plug would enter casing and be detected.
  - by pressure monitoring
  - Differential annulus pressure monitoring will identify release from injection tubing
  - Downhole distributed temperature sensors throughout the wellbore will detect
  - temperature drop, which may indicate hydrate formation.
  - Pressure monitoring of annulus may identify geomechanical effects on wellbore.
  - 4D seismic monitoring indicates geomechanical changes during injection.
  - Environmental monitoring
- P&A wells and legacy wells:
  - Environmental monitoring

A conceptual sketch is presented in the **Figure 50-4** below, providing an overview of the different leakage paths related to well and geological scenarios.

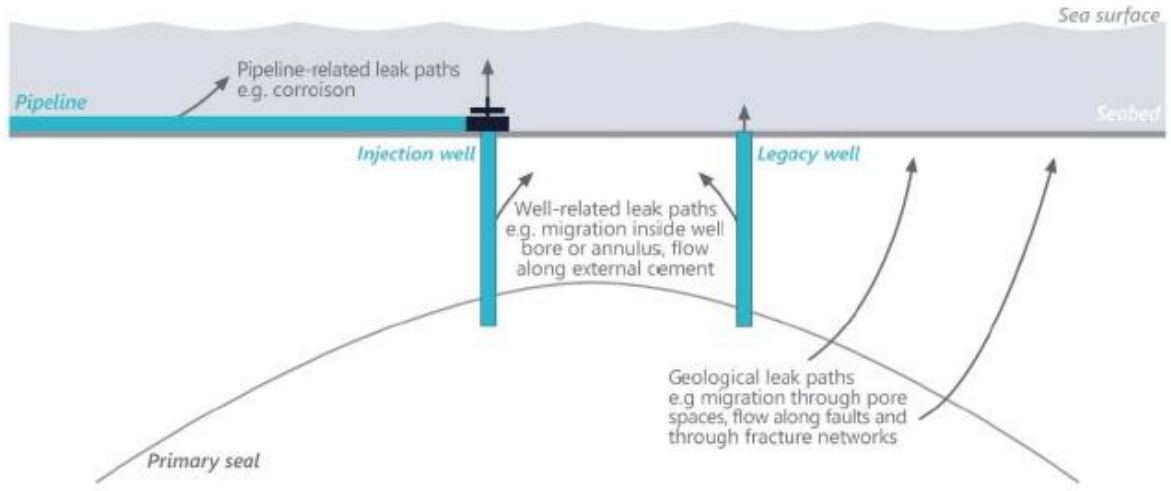

Figure 50-4 Conceptual sketch showing potential risk paths related to well and geological scenarios

All detailed risks, mitigations measures, monitoring activities and corrective actions are included in the Risk Register of the Containment Risk Assessment to which the Monitoring Plan, Corrective Measures Plan and Provisional Post Closure Plan are strictly related and connected.

The current monitoring plan only covers EIA baseline survey locations and assets including wells. Ref - S5.4.3 Environmental Monitoring Sampling Details. What type of legacy well(s) will be selected to detect leaks in terms of highest risk from the list of risks identified in Section 3 of the MP?

Eni Response: The Containment Risk Assessment summarised the monitoring activities based on the classification of the wells coming from the screening:

- Wells Screened Out, No Need for Detailed Analysis for wells that are off complex, reservoir interval is present at location but reservoir is not pressure connected and wells are outside area of CO2 pressure migration.
- Wells analysed in more detail because wells are on complex, reservoir interval is present at location, reservoir is pressure connected; and wells are inside area of CO2/pressure migration.
- Wells analysed in more detail because wells are off complex; but reservoir interval is present at location; reservoir is pressure connected; and wells are inside area of CO2/pressure leakage.

In summary the following monitoring activities are planned for the legacy E&A (Exploration & Appraisal) and suspended wells:

- On-Complex legacy wells that have already been abandoned. These wells will be subject to annual surveying for asset integrity purposes once CO2 injection starts. Additional environmental monitoring may be carried out if triggered by an event.
- Off-Complex legacy wells that have already been abandoned. These wells are subject only to additional environmental monitoring if triggered by an event.

In Table 7: Additional techniques for Triggered Environmental Monitoring. Please demonstrate that a 5 yearly interval is sufficient to identify potential leak risks during early injection.

Eni Response: The pre-injection, injection, and post-closure phases will all involve routine environmental monitoring (REM), conducted at the intervals specified in the Monitoring Schedule found in **Tables 50-5 and 50-6**. The 2025 REM will replicate the 2022 environmental survey data, which will focus on species assemblage and community structure, habitat classification, sediment contamination and particle size analysis, and the presence of species and habitats of conservation importance.

According to the Monitoring Schedule, during the injection phase, the pre-injection REM will be repeated at a frequency that corresponds with the 3D/4D seismic acquisition. This is to monitor long-term changes in the marine environment.

However the annual Asset Integrity Monitoring (AIM) will, at times, coincide with the REM using the Drop Down Video and photographic stills (DDV), to detect any bubbles and sample the water column. Should any anomalies detected during AIM, REM, or any other monitoring, an ROV will be deployed with multiple sensors/probes at well injection sites, or potential leak sites, to measure: Pressure, Temperature, Conductivity/salinity, pH, Depth, Dissolved oxygen, nitrate, phosphate; water current; and acoustic data, which will be compared to the baseline data for analysis and work on any remedial action that needs to be implemented.

Annual AIM inspections do, in fact, include environmental surveys, and the REM will assist us in verifying and identifying any changes to the baseline environment from the data that has been obtained.

			Baseline				
Item	Acronyms	Monitoring Technique	Pre '24	2024	2025	2026	2027
Injection well (H1-ST1, H2-ST1,H3-ST1,H4-ST1)	CH	CH logs for well integrity					✓
	P/T	Wellhead and Downhole pressure/temperature					✓
	FM	Well mass flow metering					✓
	CH	CH logs for surveillance(2)					✓
	WTI	Well Testing Interpretation(1)					✓
	DAS/DTS	Well integrity with fibre optic monitoring					✓
Monitoring well (110/13-H5)	CH	CH logs for well integrity					✓
	P/T	Wellhead and Downhole pressure/temperature					✓
	DAS/DTS	Well integrity with fibre optic monitoring					✓
	CH	CH logs for surveillance(2)					✓
	FS	Fluid Sampling					✓
Legacy E&A wells "on structure"(110/13-1, 110/13-3) and "suspended" well (110/13-4)	DDV	Annual drop down video survey as part of asset integrity monitoring through Asset Integrity Management System (AIMS)					✓
Areal	S	Surface Seismic(2)	✓				
	VSP	Borehole seismic(2)					✓
	GD	Ground Deformation monitoring					✓
	MM	Microseismic monitoring					✓
	BMS	Bathymetric survey(2)	✓				
	REM	Benthic grab samples and water column samples at platforms, and selected legacy wells	✓		✓		
	DRM	Dynamic Reservoir Model	✓				✓
	GR	Gravimetry(2)				✓	
PoA, Hamilton platform	FM	Field mass flow monitoring					
	FM	Composition monitoring					✓
	ACD	Atmospheric CO_2 detection					✓
Pipeline	DDV	Annual drop down video survey as part of asset integrity monitoring through Asset Integrity Management System (AIMS)					✓
	e-vpms	Leak detection system (e-vpms)					✓
N.A.		MP, CMP and PPCP		✓			

(1) Fall-off pressure will be acquired during any injector shut-down, planned and un-planned. If the fall-off data is adequate, it will be interpreted. The frequency reported in the table is aligned with planned PoA shut-down

(2) The scheduled time frame will be revised based on the estimation of the most updated reservoir model and on the results of previous monitoring activities.

✓: Scheduled activity

Figure 50-5- Summary schedule for the baseline acquisition

Item	Acronyms	Monitoring Technique	Injection Phase																								
			2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053
Injection well (H1-ST1, H2-ST1,H3-ST1,H4-ST1)	CH	CH logs for well integrity		✓		✓		✓			✓			✓					✓					✓				
	P/T	Wellhead and Downhole pressure/temperature	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====
	FM	Well mass flow metering	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====
	CH	CH logs for surveillance[2]		✓		✓		✓			✓			✓					✓					✓				
	WTI	Well Testing Interpretation[1]	✓					✓					✓					✓					✓					✓
	DAS/DTS	Well integrity with fibre optic monitoring	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====
Monitoring well (110/13-H5)	CH	CH logs for well integrity		✓		✓		✓			✓			✓					✓					✓				
	P/T	Wellhead and Downhole pressure/temperature	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====
	DAS/DTS	Well integrity with fibre optic monitoring	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====
	CH	CH logs for surveillance[2]		✓		✓		✓			✓			✓					✓					✓				
	FS	Fluid Sampling		✓		✓		✓			✓			✓					✓					✓				✓
Legacy E&A wells "on structure"(110/13-1, 110/13-3) and "suspended" well (110/13-4)	DDV	Annual drop down video survey as part of asset integrity monitoring through Asset Integrity Management System (AIMS)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Areal	S	Surface Seismic[2]						✓						✓										✓				
	VSP	Borehole seismic[2]					✓				✓			✓					✓					✓				
	GD	Ground Deformation monitoring	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====
	MM	Microseismic monitoring	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====
	BMS	Bathymetric survey[2]	✓					✓						✓										✓				
	REM	Benthic grab samples and water column samples at platforms, and selected legacy wells	✓					✓						✓										✓				
	DRM	Dynamic Reservoir Model	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	GR	Gravimetry[2]							✓		✓		✓		✓					✓					✓			
PoA, Hamilton platform	FM	Field mass flow monitoring	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====
	FM	Composition monitoring	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====
	ACD	Atmospheric CO_2 detection	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====
Pipeline	DDV	Annual drop down video survey as part of asset integrity monitoring through Asset Integrity Management System (AIMS)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	e-vpms	Leak detection system (e-vpms)	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====	====
N.A.		MP, CMP and PPCP	✓					✓					✓					✓					✓					✓

(1): Fall-off pressure will be acquired during any injector shut-down, planned and un-planned. If the fall-off data is adequate, it will be interpreted. The frequency reported in the table is aligned with planned PoA shut-down

(2): The scheduled time frame will be revised based on the estimation of the most updated reservoir model and on the results of previous monitoring activities.

✓: Scheduled activity

==== Continuous measurement

Figure 50-6- Summary schedule for monitoring acquisition in the Injection Phase

- It is noted that only platform and well locations have been identified for environmental monitoring which does not align with other potential risk locations. Please clarify why leaks from locations such as fracture zones are not part of the monitoring plan.

Eni Response: The coverage area of the monitoring plan of the 3 stores is reported in Figure 2-1 above highlighting wells, areal, facilities and Regular Environmental Monitoring (ERM) coverage area.

- Please clarify how any bubbles detected will be classified as being a potential leak.

Eni Response: It depends on "bubbling" source, e.g well, natural gas seepage paired with geomorphology that could indicate vertical pathways – pockmarks and fault lines, however, the Corrective Measure Plan identifies and describes 20 scenarios as possible outcomes of regular monitoring including 7 leakage scenarios and 13 significant irregularities scenarios with the objective to provide information regarding the management of these situations. As example, please refer to scenario L-4 below.

Scenario #	L-4
Objective / Key Barrier	Well Integrity – Mechanical issue
Results from standard surveillance	Well monitoring results (Well integrity logs, PNL, PLT, SNL, VSP, environmental surveys) show CO_2 outside the complex through well, for injection wells N1-ST1 and N3-ST3, monitoring 110/13-N4 and sentinel 110/13-N2
Threat	CO_2 leaves the storage complex via wells
CRA Risk Register	1.8, 5.2, 5.3, 5.4, 5.5, 5.9 and 5.10
Expected Leak rate	Seep -Minor – Moderate - Major
Corrective Strategy	a) (O5) Shut-in the well (for CO_2 injectors) b) (T6) Estimate severity of CO_2 leakage in well c) (M2) Evaluate if contingent well monitoring is required d) (T4) Design remedial job e) (O6) Implement remedial job f) (O9) Relief well g) (O11) well abandonment h) (O10) new injection well
Corrective Action Type	Mitigation
Monitoring Methods to verify Corrective Actions Success	Well integrity Test

- Please clarify that proposals outlined in the monitoring table are inclusive of ROV surveys and legacy well buoys. It is also unclear what proposed monitoring would inform a change in well injection and management of well integrity. please clarify.

Eni Response: Annual drop-down video survey as part of asset integrity monitoring through Asset Integrity Management System (AIMS) will be performed on the legacy wells (no buoys are expected or mentioned in the monitoring plan or CRA). All the corrective measures are described and included in the Corrective Measure Plan. Please refer to scenario L-6 below as an example.

Scenario #	L-6
Objective / Key Barrier	Storage Complex Integrity – Geological issue or mechanical issue for legacy wells
Results from standard surveillance	Induced CO2 Leakage and/or anomalous results from legacy wells (110/13-5) surveillance, REM
Threat	CO_2 leaves the storage complex
CRA Risk Register	5.6, 5.7, 5.8 and 5.13
Expected Leak rate	Seep - Minor
Corrective Strategy	a) (O2) Modification of operational strategy / injection pattern or rates to mitigate consequences b) (T7) Estimate severity of CO_2 leakage in reservoir c) (M3) and (M4) evaluate if additional dedicated monitoring is required d) (T4) Design remedial job e) (O6) Implement remedial job f) (O9) Relief well g) (T8) If job fails, identify and develop a mitigation plan to account for major project changes
Corrective Action Type	Mitigation
Monitoring Methods to verify Corrective Actions Success	Optimized Geophysical monitoring + ROV

- In Table 2 Surveillance Actions (as highlighted in the Containment Risk Assessment Document T&S system risk in the MP), please clarify what is planned post closure of the wells. Furthermore, please clarify why monitoring and sentinel wells are not considered as a leak risk.

Eni Response: All the post closure activities are included in Provisional Post Closure Plan. In general, the wells not selected for post-closure monitoring will be abandoned in the first months of the post-closure period. The final abandonment procedure of all wells will be developed in discussion with OPRED and NSTA.

The table 2 confirms that leaks through wells (injection, monitoring, sentinel and legacy) are considered as risks, please see the 3rd column, "Risk categories WELLS".

QUESTION 51: Section 7.9.2. Reg 12(1) letter dated 1 July 2024 – comment 116

It is acknowledged that accidental pollution has been scoped in for benthic ecology and has been scoped out for other receptors on the basis of the approach taken for other offshore projects such as wind farms. The construction and maintenance phase of the project includes the drilling of new wells, side- tracking existing oil and gas wells, repurposing of oil and gas pipelines, removal and replacement of installations topsides all of which are considered to present a potential pollution risk. Whilst it is understood that the risks from vessels may be comparable to those of wind farm developments which regard to other activities presented within the ES, it is not deemed to be acceptable to compare the two industries. Liverpool Bay CCS Limited are requested to scope in Fish and Shellfish and marine mammals as a minimum and provide further information on the following which has also been requested as part of Comment 50 and Comment 79 from the 1st July 2024 Reg12(1) letter:

- the environmental impact of a diesel release i.e. accident/ disaster assessment under EIA. Currently only has spill modelling results.

  Eni Response: The oil spill technical note response from the original Reg(12)1 letter dated 1 July 2024 Comment 50. Section 1.3.3 is replaced by the applicant's response about loss of diesel inventory from a drilling rig. Answers to the question above 25-1st bullet), the question 38-b) and 79 - i) and ii) are similar to the current question

- why only 4 tonnes of CO_2 would be released from a legacy well - what restricts it to the that volume exactly? It is noted that Chapter 13 Page 17/34 states 'Any material amount of CO_2 leakage is therefore considered to be possible in an accident or disaster scenario. However, such an event is considered highly unlikely (given the above designed-in protection).' We need to know the volume of an unconstrained leak prior to any mitigation. What is the environmental impact of such an accident? S3 of the Monitoring Plan lists leak paths but there is no probability or impact assessment from one of these paths.

  Eni Response: Answers are provided in **Question 25 comment 50 (2nd and 3rd bullets) and Questions 38-a) and 38-d)** above.

- Please confirm what the leakage rate of 4,000 tonnes of CO_2 for well abandonment is referring to. Is this per well or for all wells (including sentinel and monitoring wells).

  Eni Response: Answers are provided in **Question 25 comment 50 (2nd and 3rd bullets) and Questions 38-a) and 38-d)** above.

  what is the maximum pipeline release volume prior to it being shut in? It is assumed that this would be shut in?

  Eni Response: Table 51.1 shows the total CO_2 mass inventory contained within each of the Offshore CO_2 transportation pipelines that will be used for the Proposed Development. For a pipeline release, the modelling and assessments have been based on a full bore release from the PL1030 20" pipeline from PoA to New Douglas CCS platform. This would represent the maximum pipeline release volume of **4,643 tonnes** across the Proposed Development. The assumptions for the worst-case assessment are that pipeline releases are detected by instrumentation, and the mass of CO_2 released would equal the whole pipeline inventory. If undetected immediately by instrumentation, the mass released would be the whole pipeline inventory, plus one hour of discharge via the pipeline breach.

  Table 51.1: Offshore Pipelines Total CO_2 Mass Inventory

Pipeline ID	Kg/km	t/km	Length (km)	Total Mass (t)
PL1030 20" to New Douglas	132,650	133	35	**4,643**
PL1039 20" to Hamilton Main	132,650	133	12	**1,596**
PL1041 14" to Hamilton North	65,000	65	15	**975**
PL1035 16" to Lennox	83,779	84	32	**2,688**
PL1036a 12" to Lennox	46,087	46	32	**1,472**

- and what are the environmental consequences of a pipeline release?

  Eni Response: Answers are provided in **Question 38-d)** above.

- The mitigation measures need to be clearly set out we are not clear for example if the pipeline can be shut in in the reverse direction. Information is presented but it does not answer the question.

Eni Response: The Applicant can confirm that pipeline emergency shutdown (ESD) valves will be located onshore at Point of Ayr (PoA), and on the New Douglas CCS platform to enable the shut-in of PL1030 20" pipeline. For the PL1039 20", PL1041 14", PL1035 16", and PL1036a 12" pipelines, ESDs will be located on the New Douglas CCS platform, and at each of the three satellite platforms. This means each pipeline can be individually shut-in.

Additionally, surface controlled, subsea safety valves (SCSSVs) will be installed within the Hamilton, Hamilton North, and Lennox carbon store (CS) wells to automatically shut-in the flow of a well in the event either surface controls fail, or surface equipment becomes damaged. These valves will be qualified to survival temperatures of -78.5°C.

QUESTION 59: Section 7.12.14.1. Reg12(1) letter dated 1 July 2024 – comment 148

The justification should be based on the impact without the use of ADDs and therefore the magnitude should therefore be reconsidered on this basis.

Eni Response: Noise modelling has been undertaken to determine the range of potential effects on marine mammals, fish, and sea turtles due to noise from piling activities associated with construction of the Proposed Development. The results are summarised in **Table 59.1** below, which has been reproduced from Table 1.36 in the Offshore ES Appendix J, Underwater Noise Technical Report. Table 59.1 shows the maximum injury range for each group of mammals, fish, and sea turtles, for the consecutive piling case (the worst-case scenario of cumulative SEL or peak), **with** and **without** the use of ADD. The PTS impact range is typically dominated by peak, which means that, except for except for Low Frequency cetaceans, these ranges do not change when including the use of an ADD prior to piling.

Table 59.1: Summary of Maximum PTS Injury Ranges for Marine Mammals, and Mortality for Fish, and Turtles due to Impact Piling Based on Highest Range of Peak Pressure or SEL (N/E = Threshold Not Exceeded)

Species Group	Range: Without ADD (m)	Range: With ADD (m)
Low frequency cetacean	**1,905**	108
High frequency cetacean	41	41
Very high frequency cetacean	490	490
Phocid carnivores	118	118
Other carnivores	34	34
Group 1 Fish: no swim bladder	184	184
Group 2 Fish: where swim bladder is not involved in hearing	314	314
Group 3 to 4 Fish: where swim bladder is involved in hearing	314	314
Sea turtles	314	314
Eggs and larvae	314	314

The use of an ADD prior to piling means that no SEL PTS injury thresholds are exceeded for marine mammals, and the ranges based on the peak thresholds are all within the 500 m standard mitigation zone.

Notwithstanding the modelling results for the use of ADD prior to piling, ADDs will be utilised by the Applicant for the Proposed Development. This is because ADDs are commonly used to mitigate harm to marine

mammals from offshore developments and are recommended by the JNCC guidance for piling, particularly in periods of low visibility. Therefore, the results for the modelled ADD have been used to quantify the magnitude of impact as per this standard approach utilised for the underwater noise assessments for other marine infrastructure projects.

There are a range of ADDs with different sound source characteristics available, therefore, the choice of a suitable device will be consulted upon and agreed with the relevant nature conservation bodies, including JNCC, prior to the commencement of development. The selected device will be deployed from the piling vessel and activated for a determined duration to allow individuals sufficient time to flee from the source, whilst also minimising the additional sound introduced into the environment. Furthermore, following the deployment of the ADD, the PTS injury ranges based on the SPLpk thresholds are all within 500 m. As per the JNCC guidance, a standard 500 m mitigation zone will be applied as part of the MMMP. Both the MMMP and the ADD are embedded mitigation measures that will be utilised by the Applicant and will be consulted upon and agreed with the relevant nature conservation bodies, including JNCC, prior to the commencement of development.

QUESTION 65: Section 7.15. Reg 12(1) letter dated 1 July 2024 – comment 169

Please provide the criteria and method used to arrive at the conclusion that the effects on marine mammal receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessment presented for each individual phase or when considered in conjunction with other topics.

Eni Response: Please see Volume 2, Chapter 14 (Inter-related effects) for the assessment methodology behind the conclusions presented in Volume 2, Chapter 7.

Assessment methodology

The inter-related impact assessment has followed the methodology set out in volume 1, chapter 5. The following definition of inter-related effects has been applied throughout this chapter:

“Multiple effects upon the same receptor arising from the Hynet Carbon Dioxide Transportation and Storage Project. These occur either where a single effect acts upon a receptor over time to produce a potential additive effect or where a number of separate effects, such as underwater noise from impact piling and an increase in suspended sediments from laying cable, can affect a single receptor, for example fish and shellfish ecology”.

Guidance

Specific to the inter-related impact assessment, the Planning Inspectorate Advice Note 9 (The Planning Inspectorate, 2018) has been considered, with specific regard to the following text (paragraph 4.13):

“ensure that interactions (interactions between aspect assessments includes where a number of separate impacts, e.g. noise and air quality, affect a single receptor such as fauna) between aspect (the Planning Inspectorate refers to ‘aspects’ as meaning the relevant descriptions of the environment identified in accordance with the Environmental Impact Assessment (EIA) Regulations) assessments are taken into account relevant to the worst case scenario(s) established and that careful consideration is given to how these are assessed.”

The approach also serves to accommodate Planning Inspectorate Advice Note 9 regarding the need to consider the assessment as a whole and not as a series of unconnected specialist reports.

Approach to assessment

The approach to assessing inter-related effects within this chapter has followed a four-stage process, as summarised in Table 14.2 and reproduced below. Further details on the approach summarised above and used to develop this chapter are presented in volume 1, chapter 5.

Table 14.2: Summary Of Staged Approach To The Inter-Related Effects Assessment For The Proposed Development

Stage	Description
1	Assessment of effects undertaken for individual ES topic areas within chapters 6 to 12.
2	Review of assessments undertaken within chapters 6 to 12 to identify 'receptor groups' requiring assessment.
3	Identification of potential inter-related (offshore) effects on receptor groups through review of the topic-specific assessments in the ES chapters.
4	Assessment undertaken on how individual effects may combine to create inter-related effects on each receptor group for: • 'Project lifetime effects' (i.e. during construction, operations and maintenance and decommissioning phases). • 'Receptor-led effects' (i.e. multiple effects on a single receptor).

Topic-specific assessments

The first stage of the assessment of inter-related effects is presented in each of the individual ES topic chapters and comprises the individual assessments of effects on receptors across the construction, operations and maintenance and decommissioning phases of the Proposed Development.

Identification of receptor groups

Stage 2 involved a review of the assessments undertaken in the topic-specific chapters to identify 'receptor groups' requiring assessment within the inter-related effects assessment. The term 'receptor group' is used to highlight that the approach taken for the inter-related effects assessment will not assess every individual receptor assessed at the Environmental Statement stage, but rather potentially sensitive groups of receptors. The receptor groups assessed can be broadly categorised as those relating to the physical environment, the biological environment, and the human environment, as follows:

Physical environment:

- Physical processes.

Biological environment:

- Marine biodiversity (including benthic subtidal and intertidal ecology, fish and shellfish, and marine mammals); and
- Ornithology.

Human environment:

- Shipping and navigation;
- Commercial fisheries;
- Marine archaeology; and

Infrastructure and other sea users.

It is important to note that the significance of effects on different receptors in the same receptor group (i.e. different species of birds in 'ornithology') may vary according to the sensitivity of receptors. Therefore, where a number of species have been considered within the assessments in this chapter, a range is provided for significance of effect.

For some other individual topic chapters, an assessment of potential inter-related effects is inherent within the chapter itself and as such, is not covered in this inter-related effects assessment. The topics where this applies are shown below in **Table 65.1**.

Table 65.1: Topics Not Included In The Inter-Related Effects Assessment

Topic	Definition
Marine Nature Conservation Sites*	The assessment of inter-related effects is central to the assessment of potential effects on the integrity of designated sites and has therefore already been assessed within the individual chapters of the ES, and within the Report to Inform the Appropriate Assessment. No additional levels of inter-related or receptor led effects are therefore considered to occur at the site level beyond those identified in the topic specific chapters of the ES and the Report to Inform the Appropriate Assessment.

*Items listed in the topic column do not necessarily correspond to a specific ES chapter. The Topic name presented refers to individual topics of receptors within a chapter.

Identification of potential inter-related effects on receptor groups

Following the identification of receptor groups, the potential inter-related effects on these receptor groups were identified via review of the impact assessment sections for each topic chapter. The judgement as to which impacts may result in inter-related effects upon receptors associated with the Proposed Development was based on the professional judgement and experience of the project team.

Linked receptor groups

It is important to recognise potential linkages between the topic-specific chapters within this ES, whereby effects assessed in each chapter have the potential for secondary effects on any number of other receptors.

Where such linked relationships arise, these have been fully assessed within the individual topic chapters. This chapter on inter-related effects (offshore) therefore summarises the consideration of these inter-related effects on linked receptors already set out in the preceding, topic-specific chapters.

It should be noted that it is considered that there are unlikely to be any receptor led effects from combined onshore and offshore activities, and as a result this has not been considered further in this inter-related effects chapter or the onshore inter-related effects chapter (chapter 19).

Assessment of inter-related effects on each receptor group

Individual effects on each of the key receptors were identified across the three Proposed Development phases (i.e. project lifetime effects) as well as the interaction of multiple effects on a receptor (i.e. receptor-led effects), as defined in **Table 65.2** . This information has been presented within the assessment tables in the Offshore ES section 14.6 Receptor based inter-related effects assessment.

Table 65.2: Definitions Of Project Lifetime And Receptor-Led Inter-Related Effects

Effect type	Definition
Project lifetime effects	Assessment of the scope for effects that occur throughout more than one phase of the Proposed Development, (construction, operations and maintenance and decommissioning) to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three key project stages (e.g. underwater noise effects from construction, disturbance from maintenance work, vessels, and decommissioning).
Receptor-led effects	Assessment of the scope for multiple effects to interact to create inter-related effects on a receptor. As an example, multiple effects on a given receptor such as benthic habitats (e.g. direct habitat loss or disturbance, sediment plumes, scour, jack-up vessel use etc.) may interact to produce a different or greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

The significance of the individual effects is presented in the summary of impacts, mitigation measures and monitoring tables for each receptor group within the topic-specific chapters (all conclusions for significance of effect for impacts defined in the topic chapters assume successful implementation of mitigation measures where appropriate (i.e. the residual effect has been used)). A descriptive assessment of the scope for these individual effects to interact to create a different or greater effect is then undertaken. This assessment incorporates qualitative and, where reasonably possible, quantitative assessments. The assignment of significance of effect to any such inter-related effect is not undertaken, rather, any inter-related effects that

may be of greater significance than the individual effects acting in isolation on a given receptor are identified and discussed within this chapter.

The inter-related effects assessment presents and utilises the maximum significant adverse effects for the Proposed Development (i.e. the maximum design scenarios including successful implementation of measures adopted as part of the Proposed Development where appropriate), noting that individual effects may not be significant at the topic-specific level but could become significant when their inter-related effect is assessed.

Effects of negligible significance or greater (minor, moderate, major) may occur in only one phase of the project life cycle (e.g. during the construction phase but not the operations and maintenance or decommissioning phases). Where this is the case, it has been made clear that, as a result, there will be no inter-related effects across the Proposed Development phases. Effects of negligible significance identified in the individual topic assessments have been included since there is the potential for inter-related effects to increase the level (significance) of effect when considered with other sources.

QUESTION 66: Section 7.16 - Table 7.107. Reg12(1) letter dated 1 July 2024 – comment 170

The duration of any use of ADDs will be approved post Environmental Statement process hence a 30 min ADD is not appropriate. Please amend the noise assessment to not include 30 min ADD to amend the significance of effect section with this information. This should further be applied to the cumulative assessment stage.

Eni Response: Please see the response to **Question 59** above.

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QUESTION 68: Section 8.7. and Section 8.7.3.2. Reg 12(1) letter dated 1 July 2024 – Comment 173 and 181

Please provide the Offshore Ornithology Baseline Technical Report referred to referred to (in Volume 3) of the Reg 12 (1) response letter dated 2 August 2024.

Eni Response: The Offshore Ornithology Baseline Report has been provided in **Annex A**.

QUESTION 73: Section 8.7.3.2. Reg 12(1) letter dated 1 July 2024 – comment 180

Please provide the Offshore Ornithology Baseline Report in order for OPRED to provide any further comments.

Eni Response: The Offshore Ornithology Baseline Report has been provided in **Annex A**.

QUESTION 74: Section 8.7.3.2. Reg 12(1) letter dated 1 July 2024 – comment 181

Please provide the Offshore Ornithology Baseline Technical Report referred to referred to (in Volume 3) of the Reg 12 (1) response letter dated 2 August 2024.

Eni Response: The Offshore Ornithology Baseline Report has been provided in **Annex A**.

QUESTION 79: Section 8.8.1 Table 8.16. Reg 12(1) letter dated 1 July 2024 – Comment 189

- In your response to the Reg12(1) letter dated 1 July 2024 it is stated that the number of vessels for construction, operation and maintenance and decommissioning stages are detailed in table 8.16. The number within this table is not location specific so please clarify the number of vessels required at each location.

Eni Response: Those vessels required at each of the platform locations are set out below.

For the NUIs:

- A maximum of three installation and support vessels will be present at each platform location (one each of jack up rig, heavy lift vessel and Eni owned Ops support jack up rig).
- A maximum of four tug/anchor handler vessels will be present at the new Douglas platform, with a maximum of three tug/anchor handler vessels present at each of Hamilton Main, Hamilton North and Lennox.
- A maximum of three cargo barges will be present at the new Douglas platform, with a maximum of two cargo barges vessels present at each of Hamilton Main, Hamilton North and Lennox.
- A maximum total of two support vessels servicing all locations for equipment transportation will be present.
- A maximum total of two pre-commissioning vessels will be present on site. One of these vessels will service the new Douglas platform and Hamilton Main, while the other will service Hamilton North and Lennox.
- A maximum total of two seabed preparation vessels will be present on site. One of these vessels will service the new Douglas platform and Hamilton Main, while the other will service Hamilton North and Lennox.
- A maximum total of two crew transfer vessels will be present on site. One of these vessels will service the new Douglas platform, while the other will service Hamilton North and Hamilton Main, and Lennox.

For cable lay:

- A maximum of one installation and support vessels will be present.
- A maximum of one jack up will be present.
- A maximum of two multicats will be present.
- A maximum of three working boats will be present.
- A maximum total of one support vessel for trenching will be present.
- A maximum total of one DSV/LCV for the cable pull in will be present.
- A maximum total of one survey vessel will be present.
- A maximum of one seabed preperation vessel will be present.
- A maximum total of one crew transfer vessels will be present.
- A maximum of two cable protection vessels will be present.
- A maximum of one cable burial installation vessel will be present.

Although locations of these vessels have not been provided this is the maximum number of vessels that will be present on site at any one time and these vessels will move throughout the area of physical works as cable is laid. In total there is approximately 107km of cable to be laid at an approximate rate of 3km per day.

For subsea pipelines:

- A maximum of three diving support vessels will be present.
- A maximum of one construction support vessel will be present.
- A maximum of one seabed preperation vessel will be present.
- A maximum of one crew transfer vessel will be present (this will most likely be done via helicopter, see response 2).

Although locations of these vessels have not been provided this is the maximum number of vessels that will be present on site at any one time and these vessels will move throughout the area of physical works as pipelines are refurbished.

- Please clarify that helicopters will not be used during the commissioning and decommissioning phase. If this is not the case, please add the number of helicopters required.

Eni Response: A maximum of one helicopter will be required on site at any one time during the cable lay. A maximum of one helicopter will be required on site at any one time during the subsea pipeline installation. A maximum of one helicopter will be required on site at any one time during the installation of each new platform.

- Please provide a comparison of the available roosting habitats between what is currently available and what will be available during the CCUS Operational phase of the project.

Eni Response: The Applicant recognises that there will be an overall reduction in nesting opportunities for kittiwake, it is assumed that there will be sufficient space throughout the refurbed and new topsides to support the same, or greater numbers of nesting kittiwake (not all platforms were at full capacity). In addition, the applicant has followed OPRED guidance and as part of the decommissioning Environmental Appraisal is already excluding nesting kittiwake from platforms as per the nesting bird strategy. As this plan has been approved this is therefore the existing baseline. There is no guarantee that the same birds will survive/return following years of deterrence, and it is therefore assumed that there will be a positive effect in supplying new nesting structures and ceasing deterrence.

Considering that not all platforms are used by nesting kittiwake, currently 632 pairs (RSK Biocensus, 2022) utilise 5829.8m^2, this is an average of 0.11 nests per m^2. During the operational phase there will be a reduction in available platform area of 990m^2 leading to an operational available platform area of 4839.8m^2. For kittiwake to colonise the refurbed and new platforms in similar numbers they will need to be present at a density of 0.13 nests per m^2. Whilst it is acknowledged that the full area of the platform will not be available it is clear from the 2022 report that the platforms are currently not at full nesting capacity and that therefore there will be room for additional nesting kittiwake.

- In the response to the Reg12(1) letter dated 1 July 2024, reference is made to the Technical note - Pollution Modelling. Please address the following comments:
  i. Section 1.2.8 of the Technical Note states "Accidental leakage of diesel due to the drilling jack up rig has the potential to low -moderate impact ecosystems in the vicinity of the release as per the results of the table above...In the unlikely event of a Diesel release leak, minor localised influence on the marine environment may occur. The Development thus poses small risks of accidental diesel leak considering mitigation measures with the residual magnitude ranked as low." The table references the modelling outputs that shows in the worst case, the loss of the entire rig diesel inventory has a 40-50% chance of beaching in Merseyside in 3hrs with the diesel potentially also impacting Cumbria, Lancashire, Halton and some areas of Wales. The maximum mass of oil accumulations onshore (across all areas) ranges by season from 718m3 to

791m3. There is no evidence presented in the Technical Note to support why the worst-case pollution potential incident (presumably both on/offshore impacts) has the 'low-moderate', 'minor localised' and 'low' residual risks in terms on environmental impact as described. Please provide this evidence.

ii. Section 1.2.9 of the Technical Note states that a SIMA has been undertaken. The outputs / results from the SIMA are not discussed in the Technical Note report but these should be considered and included when the OPEP / Shoreline Response Plan(s) are developed. It is noted that the Technical Note states that SIMA was undertaken "according to The Oil Spill Response Effectiveness in UK Waters Guidelines" - These OGUK (OEUK) guidelines do not discuss or reference the SIMA process so this reference should be explained further. The Technical Note also includes the text: "Refer to Section 6.2 The Oil Spill Response Effectiveness in UK Waters Guidelines" - There is no section 6.2 in this document. Please amend this and provide further detail as requested above.

Eni Response: The oil spill technical note response from the original Reg(12)1 letter dated 1 July 2024 Comment 50. Section 1.3.3 is replaced by the applicant's response about loss of diesel inventory from a drilling rig. Answers to the questions above 25-1st bullet), the question 38-b) and 51-1st bullet) are similar to the current 79-i) and ii).

QUESTION 82: Section 8.11. Reg 12(1) letter dated 1 July 2024 – comment 193

The drilling and side-tracking of injection wells at Hamilton Main and Lennox, and the removal of topsides of Hamilton Main and Hamilton North will all occur during the overwintering period in 25/26. The drilling and side-tracking of wells at Lennox will occur during the overwintering season 26/27 and the commissioning of infrastructure will occur during the overwintering season 27/28 (according to Volume 1 chapter 3 Figure 3.11). All of the above work will require vessel movements. Therefore, the seasonal impact to birds in relation to the work to be carried out is required to be assessed. This should be location specific i.e. the Impacts at Lennox may be different from the Impacts of Hamilton Main. Any cumulative impacts should further be assessed. Please include this in this section.

Eni Response: Drilling activity at Hamilton North will take approximately five months commencing in September 2024. Perforation of the wells is then scheduled later during November/December 2027. The works at Hamilton Main are scheduled to commence in February 2025 and take approximately seven months. Perforation of the wells is then scheduled later during August/September 2027. The works at the Lennox platform are planned to take around 12 months commencing in October 2025. Perforation of the wells is then scheduled later during April/May 2028.

To minimise and mitigate for the potential disturbance resulting from these activities, all rig movement will occur during the summer season. This will prevent displacement from the presence of associated vessels occurring during the winter months, however there is still the potential for displacement from the impact of sound from the drilling works. Although both common scoter and red-throated diver are highly susceptible to disturbance, often flushing from large distances and relocating even further away from the source of disturbance (Goodship & Furness, 2022), the impact of displacement from disturbance has been fully assessed as presenting less than the 1% threshold for excess mortality and is therefore deemed negligible.

The overall significance of the impact of disturbance from airborne sound (and the presence of vessels and infrastructure) is **minor** for this species group.

An assessment of potential displacement from works at each location is presented below.

Common scoter

- Liverpool Bay SPA common scoter population - 141,801

- Average baseline mortality rate - 0.238
- Therefore the expected annual mortality is 141,801 x 0.238 = 33,748.64
- Considering the disturbance distance of 2.5 km, the potential area of disturbance for each platform differs due to the varying area that each platform overlaps with the SPA.
- The maximum area of disturbance for Hamilton is 10.95km2, for Lennox is 19.64km2, for Hamilton North is 0.28km2, and for Douglas Process is 9.32km2.
- Using the mean population density of 83.53 birds/km (HiDef, 2023) the number of birds that could be displaced is as follows:
- **Hamilton** - 914.75, using a mortality rate of 0.5 to 1% this gives an additional mortality range of 4.57 to 9.15 birds.
- **Lennox** - 1,640.06, using a mortality rate of 0.5 to 1% this gives an additional mortality range of 8.20 to 16.40 birds.
- **Hamilton North** - 23.65, using a mortality rate of 0.5 to 1% this gives an additional mortality range of 0.12 to 0.24 birds.
- **New Douglas** - 778.13, using a mortality rate of 0.5 to 1% this gives an additional mortality range of 3.89 to 7.78 birds.
- **Cumulative total across all platforms** - 3,356.5, using a mortality rate of 0.5 to 1% this gives an additional mortality range of 16.78 to 33.57 birds.

Red-throated diver

- Liverpool Bay SPA common scoter population - 1,800
- Average baseline mortality rate - 0.233
- Therefore the expected annual mortality is 1,800 x 0.233 = 419.40
- Considering the disturbance distance of 2 km, the potential area of disturbance for each platform differs due to the varying area that each platform overlaps with the SPA.
- The maximum area of disturbance for Hamilton is 6.35km2, for Lennox is 12.57km2, for Hamilton North is 0km2, and for Douglas Process is 5.88km2.
- Using the mean population density of 1.06 birds/km (HiDef, 2023) the number of birds that could be displaced is as follows:
- **Hamilton** - 6.73, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.01 to 0.02%.
- **Lennox** - 13.32, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.02 to 0.03%.
- **Hamilton North** - 0.00, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.00 to 0.00%.
- **New Douglas** - 6.23, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.01 to 0.01%.
- **Cumulative total across all platforms** - 26.28, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.03 to 0.06%.

QUESTION 83: Section 8.11.7. Reg 12(1) letter dated 1 July 2024 – comment 194

Please include an assessment of anticipated vessel movement and any seasonal restrictions that may be required. Any potential vessel movement between 1st November and 31st of March will need to be assessed if passing through Liverpool Bay SPA. This should be done on an individual basis and as cumulative effect and be location specific.

Eni Response: The applicant would like to note that the vessels are not fixed but move throughout the sea, therefore it is impossible to provide exact locations for all vessels. However, the vessel numbers for the proposed operations in Liverpool Bay for the Proposed Development, are presented in **Table 83.1**.

Table 83.3: Vessel numbers and movements for topside and cable installation

Topside installation				Cable and pipe installation		
Vessels	Maximum number on site at any one time	Vessel movements (return trips)		Vessels	Maximum number on site at any one time	Vessel movements (return trips) across the construction period
		Year #1 Douglas and Hamilton Main	Year #2 Hamilton North and Lennox			
Main Installation and Support Vessels	6	6	6	Cable Lay Installation & Support Vessels	1	4
Tug/Anchor Handlers	7	7	6	Jack-Up	1	1
Cargo Barges	5	5	4	Multicat	2	1
Support vessels	2	42	38 [1]	Working boat	3	1
Survey Vessels	1	8 [2]	0	Support vessel (for trenching)	1	1
Pre-comm Vessel [3]	1	1	1	DSV/LCV (for cable pull-in)	4	29
Seabed preparation vessels for boulder removal, grapnel, pre-sweep/levelling	1	One way trip	One way trip	Survey Vessels	1	2
Crew Transfer Vessels	2	40	36	Seabed preparation vessels for boulder removal, grapnel, pre-sweep/levelling	2	6
				Construction support vessel	1	6

Topside installation				Cable and pipe installation		
Vessels	Maximum number on site at any one time	Vessel movements (return trips)		Vessels	Maximum number on site at any one time	Vessel movements (return trips) across the construction period
		Year #1 Douglas and Hamilton Main	Year #2 Hamilton North and Lennox			
				Crew Transfer Vessels	2	34
				Cable Protection Installation Vessels	2	4
				Cable burial installation Vessels	1	2
Helicopter	1	60	60	Helicopter	2	124

[1] Year #2 includes all platforms. [2] All platforms visited in year #1. [3] Plus one more trip dedicated to Lennox in either year.

Assuming a disturbance distance of 2.5km (as per JNCC guidance) excess mortality (expressed as % above the baseline) caused by displacement from vessels was calculated as:

- 0.01 to 0.03% per vessel for common scoter
- 0.01 to 0.02% per vessel for red-throated diver

To surpass the 1% threshold for common scoter there would need to be 33 vessels active at any one time within the Liverpool Bay SPA, and 50 vessels for red-throated diver. As has already been highlighted elsewhere cable laying will take place outside of the winter months, as will most vessel movements associated with the NUIs

QUESTION 97: Section 13.5 and Table 13.3. Reg 12(1) dated 1 July 2024 – comment 215

Please include assessment of impact against the air receptor and include a breakdown of pollutant species prior to converting them to a global warming potential (GWP) and an assessment of impact on the climate.

Eni Response: The Applicant can confirm that the main sources of air pollution during the construction phase are from the combustion of diesel used in the drilling rig required during drilling and recompletion of the wells. As outlined in section 1.4.1 of the Air Quality Technical Report "In the context of air quality effects, sensitive receptors are locations where members of the public might be regularly exposed and include building façades of residential properties, schools, hospitals, care homes.

The nearest drilling location (at Lennox) is approximately 11 km from the nearest coastline. There are no distances given in air quality guidance beyond which air quality effects from plant are not considered to have an effect. However, Defra's Industrial Emissions Screening Tool referred to in Defra's "Local Air Quality Management Technical Guidance: LAQM.TG22" (Defra, 2022) only considers receptors up to 2 km. This provides a useful guide to the maximum distance at which impacts can be expected. Using professional judgment, at 11 km, emissions from the plant used during construction are highly unlikely to affect local air quality onshore.

In relation to emissions from ships, LAQM.TG22 advises local authorities that there is a risk of exceedance of the short-term objectives for NO2, PM10 and SO2 where there are 5,000 or more large ship movements per year. In this case, the construction works will generate substantially fewer ship movements, indicating that the

risk of an exceedance is very low. Using professional judgment, emissions from ships used during construction are highly unlikely to affect local air quality onshore.

Overall, the risk of impact during construction is negligible and the ambient air quality effect is not considered significant.

Section 1.4.2 and 1.4.3 of the Air Quality Technical Report outlines that there are no sources of emissions to air except for the potential fugitive and venting emissions of carbon dioxide. However, CO2 is not a local air quality pollutant and there are no ambient air quality limit values, standards or objectives set for the protection of human-health.

On that basis, and as outlined in the Air Quality Technical Report, the air quality effects during construction, operation, maintenance and decommissioning of the Proposed Development are not considered significant.

More transparency is required on the environmental impact to conclude no likely significant impact of pollutant emissions on humans and the environment or indeed why they should be scoped out prior to this stage of the EIA. Please provide further evidence on why impact of pollutant emissions to air has been scoped out including consideration of offshore receptors, vessel and activity scheduling for this project and others in its vicinity, distance to receptors and the behaviour of air pollutants in this area with regard to likely significant effect.

Eni Response: In line with IEMA guidance on the assessment of GHG emissions and evaluating their significance, the receptor for GHG emissions is the global atmosphere. The Offshore ES Climate Change Chapter 13 has assessed GHG emissions arising from the Proposed Development, considering the 'Kyoto basket' of global warming gases (i.e. carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride) expressed as their CO2-equivalent global warming potential (GWP). A breakdown against each of these global warming gases has not been provided as it is their collective GWP on the global atmosphere that is relevant for the assessment, enabling an assessment of the impact of the Proposed Development on climate change. The individual release of each GHG to the atmosphere is therefore not considered.

As stated above, in line with IEMA guidance on the assessment of GHG emissions and evaluating their significance, the receptor for GHG emissions is the global atmosphere. As such, the Offshore ES Climate Change Chapter 13 has not considered the impact of any pollutant emissions on human health or specific environmental receptors that are not the global atmosphere.

QUESTION 99: Chapter 13 Section 13.10. Reg 12(1) dated 1 July 2024 – comment 217

Please include what steps are being taken to reduce emissions from this project.

Eni Response: The Applicant can confirm that the Proposed Development will be transporting and permanently storing more than 110 million tonnes of CO_2 emissions from difficult to decarbonise industrial emitters in the NW of England and North Wales. In addition to this primary objective, the emission reduction measures for the Proposed Development are set out in Section 13.10 in Table 13.8 and summarised below.

As part of the carbon storage project design process, several mitigation measures have been proposed to reduce the potential for impacts on climate change. As there is a commitment to implementing these measures, they are considered inherently part of the design of the carbon storage project and have therefore been considered in the environmental and net zero assessments.

During the construction and operation phases, vessels older than 20 years are not planned to be used. Regarding rig selection, a request has been made to make a firm commitment to taking all feasible steps to

reduce the fuel consumption and related GHG emissions of the proposed drilling unit, as well as to provide information and certification pertinent to the sustainability aspects of the proposed drilling unit.

To balance operating risk and fuel efficiency, GHG emissions from rig activities will be measured in real-time to facilitate continuous improvement, considering engine and power plant optimisation.

As a basic environmental standard for UK operations, ISO 14001 certification will be maintained; however, an energy management policy and ISO 50001-compliance documentation will need to be created as part of the management system.

The rig to be employed will be subject to the carbon storage project vessel management measures. These will include minimisation of vessel fuel consumption by providing an efficient and optimised vessel schedule to reduce the number of journeys, and co-ordinating activities and material delivery. Activities will be limited on the speed of vessels, and fuel used will have a low sulphur component (0.1%).

Energy demand associated with the offshore platforms during the operational phase, will be reduced through a variety of energy efficiency measures. These include: the use of efficient, low loss transformers; variable frequency drives (VFDs) on CO_2 compressors; LED light bulbs; low voltage electrical installations; compressor efficiency specification and optimisation; efficient air coolers; energy monitoring systems (to comply with ISO 50001 certification); and Real Time Monitoring and Advanced Process Control (a computer-based algorithm that automatically optimises the process parameters and promotes a reduction in energy consumption from approximately 3% to 7%). The implementation of these energy efficiency opportunities will result in reduced energy consumption during operation, thereby reducing emissions of GHGs to the atmosphere associated with such energy consumption.

Fugitive emissions may take place during the operational phase. The Leak Detection and Repair (LDAR) programme is described as one of the implemented technologies within the project. This comprises Vibroacoustic Pipeline Monitoring System (e-VPMS®) which is a patented technology developed through an Eni R&D project started in 2009. It provides novel real-time monitoring of pipeline integrity in different scenarios (both onshore and offshore). The technology is mature in the oil and gas industry, currently surveying over 1,400 km of pipelines worldwide. Test applications on CO2 has been performed on pilot scale facilities and a demonstrative application on pilot project is planned for 2024. Real-time leak detection (LD) and third-party interference (TPI) monitoring is fundamental for a rapid response to any potential threat. The e-VPMS works through collection from a few remote stations installed across the pipeline route. Real-time monitoring data is sent to a cloud-based server and is continuously analysed. The leak location accuracy that can be achieved is better than 25 m. Additionally, gas detectors and flame detectors will be implemented in the whole project as part of safety measures.

Good design, along with the above preventative maintenance measures, will ensure any fugitive emissions are identified as early as possible, to enable the fast prevention of further emissions release.

At the end of the Proposed Development's lifetime, materials removed during decommissioning will be recycled where practicable. The recycling of materials at the end of the Proposed Development's lifetime not only prevents materials from being sent to landfills, but also reduces the need for the extraction of primary materials, thereby reducing emissions associated with such processes.

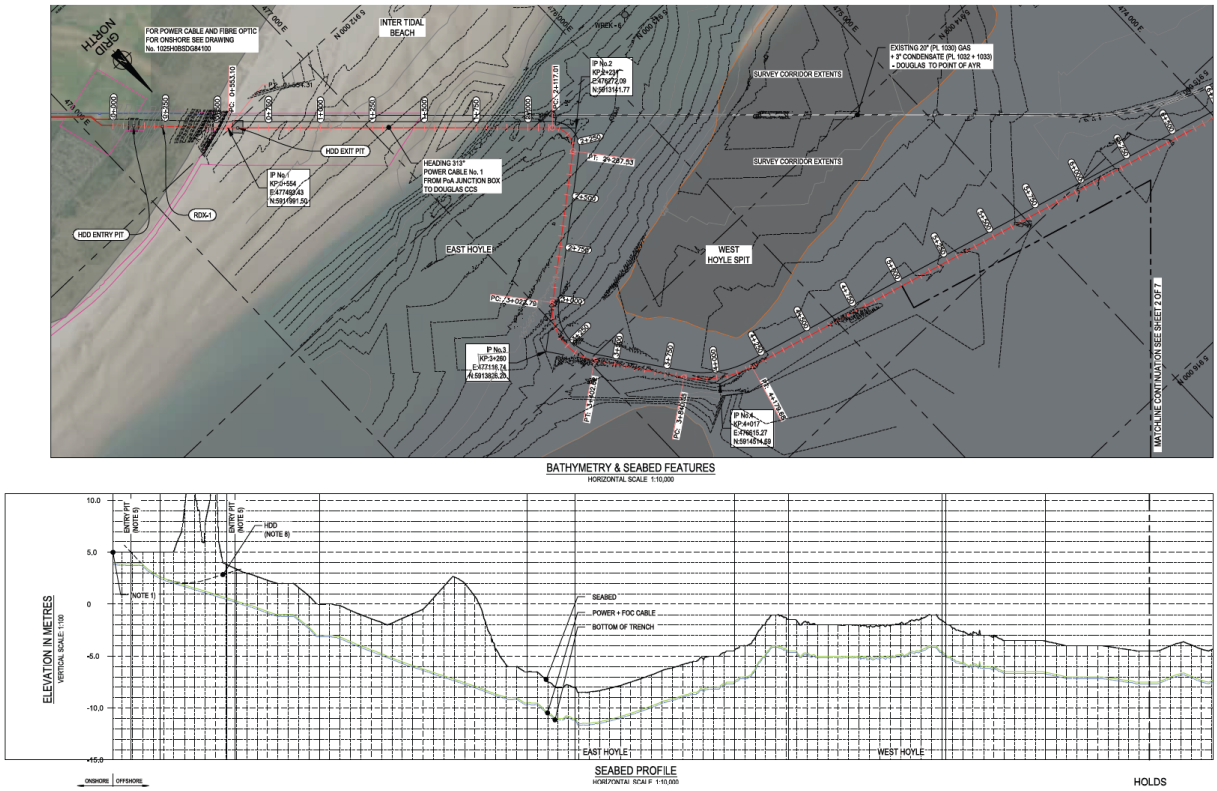
QUESTION 105: Section 1.6.4 – Page 67. Reg 12(1) letter dated 1 July 2024 – comment 242

The conclusion that there is no adverse effect on the integrity of the Dee Estuary SAC as a result of activities associated with the Proposed Development on page 67 is queried. Please provide additional information/evidence and clarity on how the assessment was derived in the absence of applicable sediment contamination data for the intertidal zone area and areas of sand wave clearance within the vicinity of the SAC.

Eni Response: Seabed disturbances due to construction and decommissioning activities could potentially lead to the remobilisation of previously sediment bound contaminants which could impact the surrounding benthic communities in the SAC. However, the assessment in the EIA, based on the site specific physical processes modelling, suggested that the nature of the construction activities is not likely to result in any remobilisation of previously sediment bound contaminants due to the already turbid and dynamic nature of the intertidal zone. This formed the basis for the conclusion presented in Table 1.10 of the RIAA for the Dee Estuary SAC.

The Applicant evaluated the sediment contamination data for the intertidal zone area and areas of sand wave clearance within the vicinity of the SAC based on the activities that will be undertaken in the area and can have a potential release of contaminated sediments resulting from the cable installation operation in the intertidal zone during construction; and a potential for release of contaminants through the HDD drilling process during construction (**Figure 105-1**)

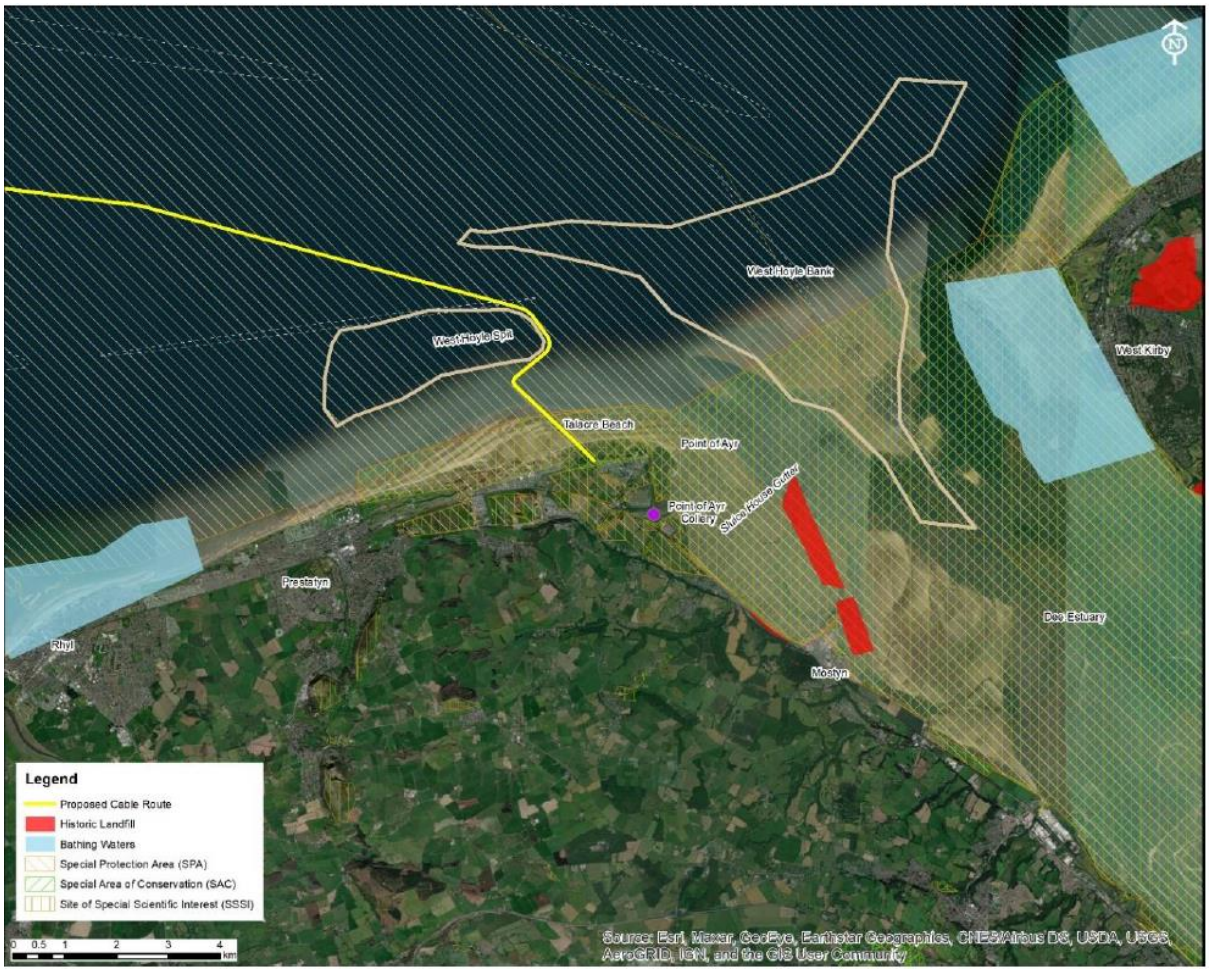
Figure 105-1 Offshore Power Cable No.1 -PoA to Douglas CCS Alignment Sheet KP 0+000-KP5+000 (Document reference 1025H0BSDG84110)



Talacre beach at the Point of Ayr is located on the North Wales coast on the western shore of the mouth of the Dee Estuary (**Figure 105-2**). The frontage is largely undefended with sand dunes and sandy beach foreshore. The intertidal zone at Point of Ayr is about 700 m wide and with a complex system of offshore banks and channels.

The coast is important for nature conservation with designations including the local Gronant Dunes and Talacre Warren Site of Special Scientific Interest (SSSI). The foreshore is also part of the Dee Estuary Special Area of Conservation (SAC), area of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar site as well as being part of the larger Liverpool Bay SPA1. The Point of Ayr is also an RSPB nature reserve.

Figure 105-2. Location, designations, and potential sources of contamination



Three possible sources of contamination were found during the sediment contamination evaluation, and they are as follows:

- The underlying geology;
- The historic Point of Ayr colliery to the south of the Point of Ayr spit in the Dee Estuary; and
- Historic coastal landfill sites.

Baseline understanding of physical processes within the study area have been developed through consideration of a range of project-specific and existing data sources including:

- The Shoreline Management Plan (Halcrow, 2011);
- A coastal and nearshore geomorphological study of the area (ABPmer 2018);
- The project Environmental Statement which includes numerical modelling of hydrodynamic and sediment transport processes; and
- Project nearshore engineering geological ground model (Fugro, 2022)

The superficial geology of the intertidal foreshore at the landfall is illustrated in **Figure 105-3 and Figure 105-4** which shows the Holocene beach deposits to be made of sand and the old storm beach deposits (above high tide) to be made of gravel and cobbles. In the Dee Estuary behind the spit and storm beach there are alluvial deposits of sand, silt and clay.

Boreholes acquired on the West Hoyle Spit (Alluvial Mining, 1992) that were sampled and tested showed subglacial traction till underlies the West Hoyle Spit at between 9.3 m and 10.5 m below chart datum where it comprises extremely high strength reddish brown clay with gravel.

Figure 105-3. Superficial geology modified from BGS Geological Survey Maps

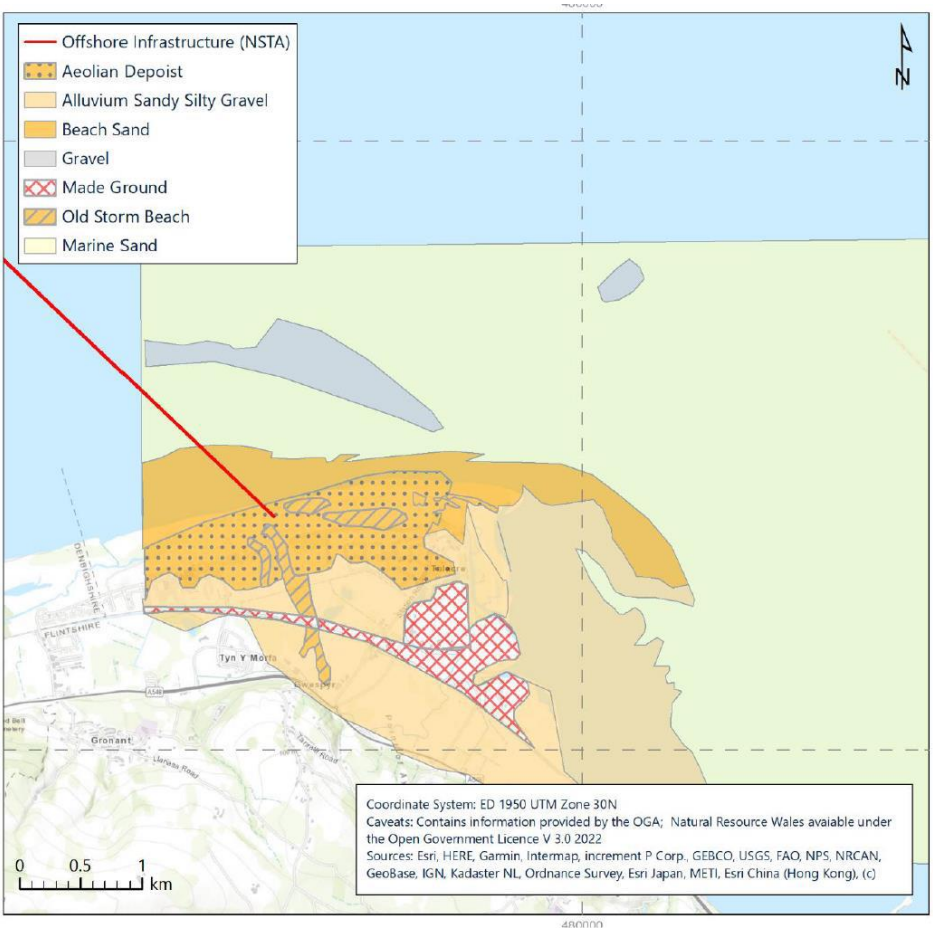
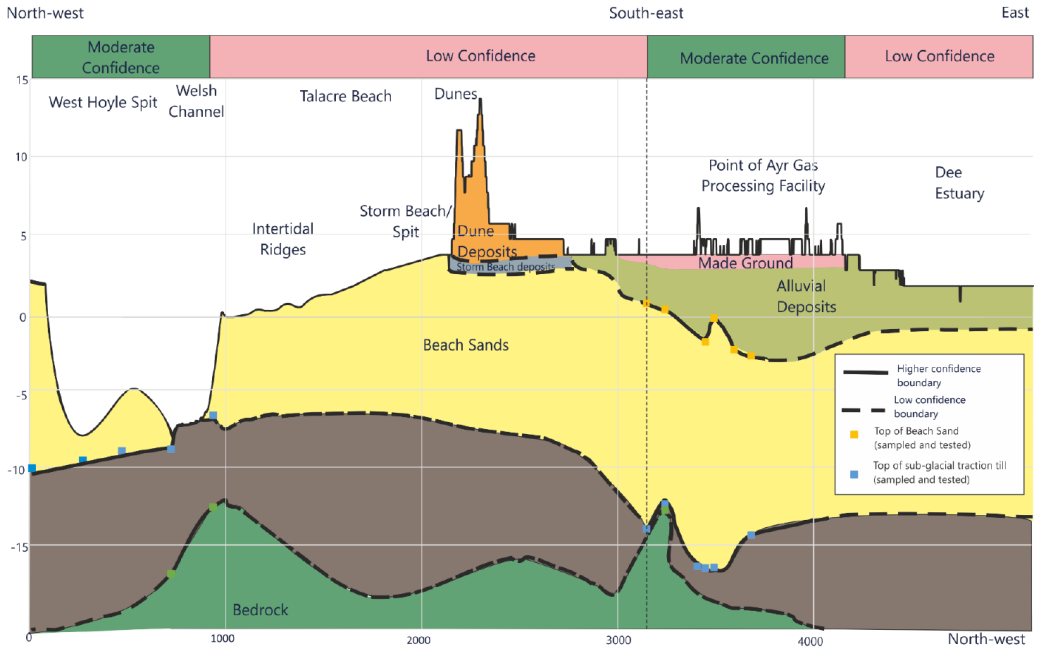


Figure 105-4. Cross section through nearshore section of the landfall (depths relative to CD) -Fugro 2022 source

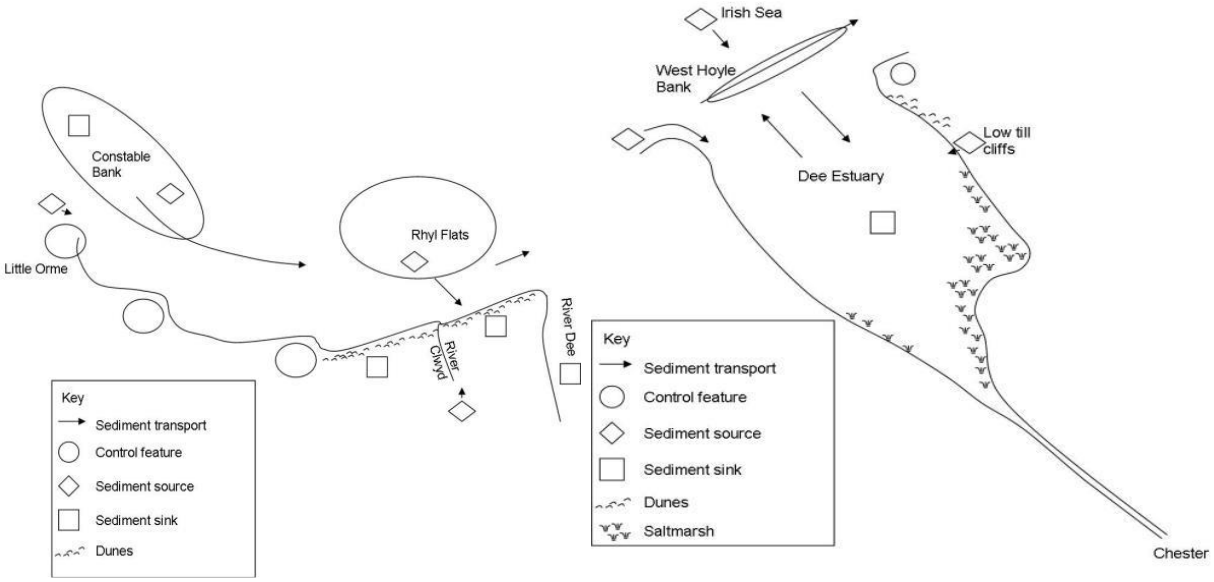


The Point of Ayr is characterised by a dune system (up to 12 m high) fronted by barrier beaches comprising of sand and shingle. The high tide level of the beach extends to the sand dunes at the back of the beach at the location of the landfall (Fugro, 2022).

There are several nearshore banks including the adjacent Mid Hoyle Spit and channels. The whole frontage is highly mobile. The cable has been routed through the channel avoiding the Mid Hoyle Spit (**Figure105-1**)

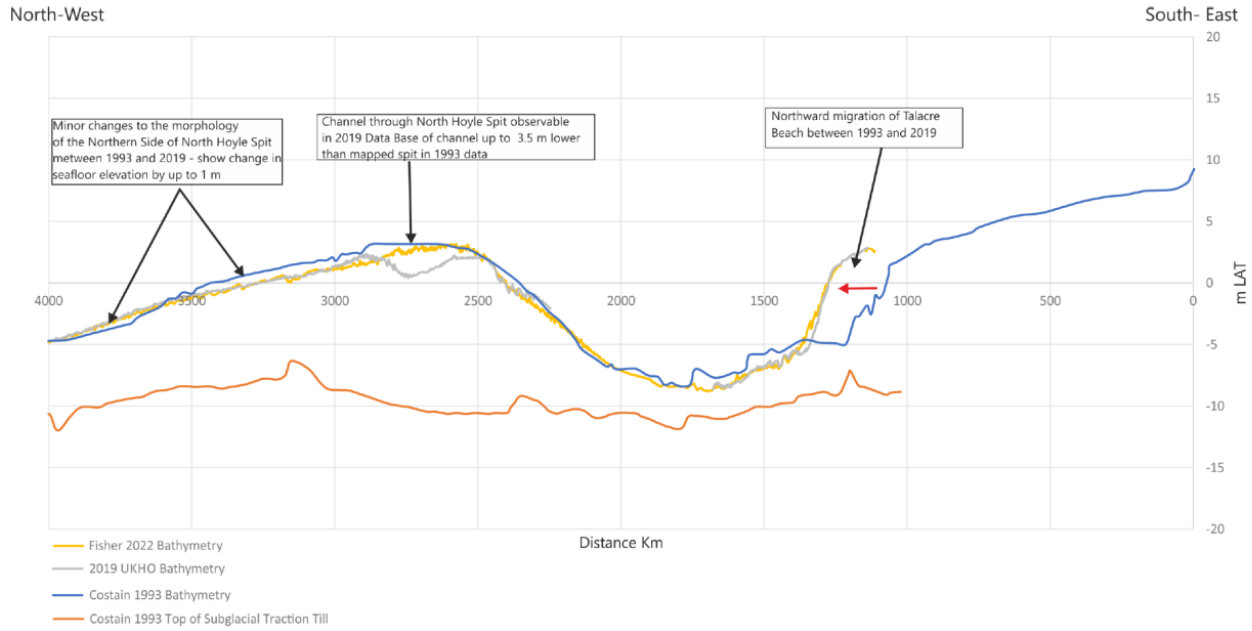
Sediment transport is west to east which is partially interrupted by the presence of groynes and other sea defences along the north Wales coast. The historical feed of sediment from offshore, and alongshore from west to east has helped maintain the beaches along the frontage with the continual growth of Point of Ayr spit only limited by strong tidal flows associated with the Dee Estuary (Halcrow, 2011). The Dee estuary is a is a major sink for sediment, with predominately sands and fines being both moved into the estuary and stored in the banks at the mouth (Halcrow, 2011). The sediment transport regime of the frontage and Dee Estuary is illustrated in **Figure 105-5**, below.

Figure 105-5. Sediment transport regime of the frontage and Dee Estuary



The overall result was a widening of the beach along the coastline as illustrated in **Figure 105-6**. Furthermore, the presence of the groynes has moved the west-to-east pathway of sand further offshore, towards the outer intertidal, which forces material to take a wider route towards the Point of Ayr. This widening of the coastal frontage has caused a slight constriction of the Welsh Channel and a re-orientation of flows in the area. Comparison of the available bathymetry datasets does show erosion on the North Hoyle Spit and the development of a channel up to 3.5 m deep in the 2019 bathymetry data compared to the 1993 bathymetry profile. This channel has subsequently been infilled and is not observable in the 2022 dataset (Fugro, 2022). Further detail of the ongoing evolution of the spit and bank system is provided in ABPmer, 2018.

Figure 105-6 Comparative cross-section through the North Hoyle Spit showing differences between the available bathymetry datasets



The highly mobile intertidal ridge features are approximately 1 m high are aligned parallel with the main current direction and are exposed during low tide. In between the intertidal ridges are a series of linear troughs and drainage pathways which empty during a falling tide.

Sediments and Contamination

Three sources of potential contamination have been identified, these are:

- The underlying geology which is discussed above;
- The historic Point of Ayr colliery to the south of the Point of Ayr spit in the Dee Estuary; and
- Historic coastal landfill sites.

There is a historic coal mining site, Point of Ayr Colliery, situated on the west back of the Dee Estuary which was opened in 1874 and closed in 19965 (**Figure 105-2**). Coal mining has the potential to generate large amounts of coal mine spoils and waste rocks that are often naturally contaminated with inorganic contaminants such as arsenic and selenium. During operations water was pumped from the mines and discharged through the Gutter Fawr into the Dee Estuary and mine waste was used to secure the land between the river and the colliery (Northern Mine Research Society, 2024).

There are also several historic landfill sites in the Dee Estuary and one adjacent to the River Clwyd, circa 13 km west of the landfall. (The latter could potentially release contaminated material into the river, if subject to erosion. An area south of Sluice House Gutter is reclaimed land which was filled with colliery waste (Halcrow, 2011).

Assessment

1- Potential release of contaminated sediment from HDD exit pit excavation operations

Whilst beach material will be disturbed to a depth of circa 3 m during HDD exit pit excavation, it is considered highly unlikely that these activities will release contaminated sediment into the marine environment. There are four key reasons for this, discussed in more detail below:

- Low potential for contaminant retention in beach sediments;
- No pathway from historical sources of anthropogenic contamination;
- Low potential for local disturbance of naturally present contaminants; and

- Small absolute and relative volumes of material disturbed.

These reasons apply individually and in combination, leading to a low overall potential for measurable effect.

1-1 Low potential for contaminant retention in beach sediments

The location of the landfall is presently and historically characterised as a relatively dynamic setting, consisting of sandy material to a depth of circa 10 mLAT. Coarse grain sediments such as sand and gravel have relatively limited ability to trap contaminants, especially in a high energy and morphologically dynamic environment such as that encountered at the Point of Ayr. (In contrast, fine particles (i.e. muds and silts) have a much higher ability to carry contamination due to a higher specific surface area, and due to the presence of clay minerals, organic matter, and iron, manganese and aluminium oxides associated with fine-sized aggregates.) Accordingly, the level of contamination in the beach material of the working area is expected to be low.

1-2 No pathway from historical sources of anthropogenic contamination

Whilst anthropogenic contaminant sources have been identified relatively nearby to the landfall, it is considered very unlikely that the prevailing sediment transport pathways and depositional processes would either transport contaminants to the landfall, or therefore, allow contaminated material to accumulate in significant concentrations.

The long-term alongshore sediment transport direction is from west to east (away from the landfall relative from the potential sources of contamination), and the Dee Estuary is known to be a sink for offshore sediment. Therefore, any historic contaminated fluid or material from the Point of Ayr colliery is likely to have been transported further into, and likely still remain, within the Dee Estuary.

Sediment transport modelling undertaken to inform the SMP indicates that there may potentially be some (sub-tidal) transport of material out of the estuary (Halcrow, 2011). However, even if some contaminated material were to have been transported out into the Irish Sea, this is likely to have been subject to widespread resuspension and dispersion, reducing the concentration of any specific contamination. The dynamic nature of the sand spit in the area of the landfall means any contaminated material reaching it would have been regularly re-worked.

1-3 Low potential for local disturbance of naturally present contaminants

The risk of the underlying (coal) geology being disturbed, thereby releasing naturally present material containing contaminants into coastal receiving waters is considered to be extremely low. This is because the maximum depth of disturbance of the cable installation operations is shallower than the highest recorded depths of the coal seams in this area. The boreholes and ground model demonstrate that the coal seams are located below the glacial till (depth greater than circa -12m CD (**Figure 105-4**), whereas the cable installation operations will only disturb material to a depth of circa 3 m below the beach/bed level (**Figure 105-1**).

1-4 Small absolute and relative volumes of material disturbed

The volume of material that is being disturbed is small in absolute terms (assumed low thousands of cubic metres) and it is expected that the majority of excavated material will be returned to the trench/ exit pit as backfill. Whilst it is theoretically possible that some of the excavated material could be re-worked (via storms/ ongoing beach processes) whilst the exit pit and trench remain open, such processes would only serve to further reduce the concentration of any contaminants present.

2- Potential release of drilling fluid during HDD drilling

The HDD borehole will be at a shallower depth than the coal seams that are present in this region. Accordingly, any drilling arisings are expected to comprise beach and underlying Quaternary material as well as drilling fluid, rather than coal.

The release of drilling fluid (typically a suspension of natural bentonite clay (or similar) in water) into the coastal waters at the punch-out location may cause a sediment plume in the nearshore area. The drilling fluid typically consists of a low concentration bentonite – water mixture. Depending on the formation to be drilled through, the concentration is typically between 13 litres (30 kg) and 35 litres (80 kg) of dry bentonite clay per m^3 of water (30,000 to 80,000 mg/l).

The use of bentonite has several benefits:

- It is a natural material;
- It is recyclable; and
- It is on the PLONOR list, so its discharge is not a danger to the environment.

The bentonite in the drilling fluid is expected to remain in suspension for at least hours or days and will be widely dispersed to very low concentrations before settling. There will be no risk to nearby receptors – notably bathing waters located circa 7 km away (at Prestatyn and West Kirby).

This assessment concludes that the nature of the construction activities is not likely to result in any remobilisation of previously sediment bound contaminants due to the nature of the intertidal zone and therefore **no significant effects will occur**.

References

ABPmer Data Explorer – SEASTATES. Available at: https://www.seastates.net/explore-data/ (Accessed 14 October 2024).

ABPmer (2018). Pipeline PL1030: Assessment of management options. ABP Marine Environmental Research Ltd., Report No. R.3050.

Admiralty Total Tide data (2024). UK Hydrographic Office Admiralty Tide Tables, 2024.

DataMapWales (2024). Shoreline Management Plan Policies. Available at: https://datamap.gov.wales/maps/new?layer=geonode:nrw_shoreline_management_plan_policies#/ (Accessed 14 October 2024).

EniProgetti S.p.a. (n.d.). Offshore Power Cable No. 1 – PoA To Douglas CCS Alignment Sheet KP 0+000 – KP 5+000, Document ID: 1025H0BSDG84110.

Environment Agency (n.d.). Barkby Beach to Point of Ayr 11A4.4: Actions for this unit. Available at: https://environment.data.gov.uk/shoreline-planning/unit/SMP22/11A4.4#actionplan (Accessed 14 October 2024).

Fugro (2022). Phase 2c Nearshore Engineering Geological Ground Model Consultancy Report - HyNet Development Liverpool Bay Offshore United Kingdom, Document ID. 1025H0BGRV09420 (Prepared for Eni UK and Boskalis Subsea Services, 10 February 2022).

Halcrow (2011). North West England and North Wales Shoreline Management Plan SMP2: Appendix C - Baseline Processes. Section C4 – B - Little Orme to Point of Ayr.

Natural Resources Wales (2024). Protected areas of land and seas. Available at: https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/find-protected-areas-of-land-and-sea/?lang=en# (Accessed 14 October 2024).

Northern Mine Research Society (n.d.). Point of Ayr Colliery. Available at: https://nmrs.org.uk/mines-map/coal-mining-in-the-british-isles/denbighshire/point-of-ayr-colliery/ (Accessed 14 October 2024).

RPS (2024). Hynet Carbon Dioxide transportation and Storage project – offshore - Environmental Statement, February 2024 (Project reference number: ES/2022/009).

Wood (2022). HyNet North West Hydrogen Pipeline EIA Scoping Report. Document number 8 07733-WOOD-IA-SC-RP-M5-20942.

QUESTION 113: Section 1.9.3.1. Reg 12(1) letter dated 1 July 2024 - comment 260

a) Given the variability in densities of red throated diver and common scooter across the Liverpool Bay SPA please calculate densities at specific locations of vessel activity rather than mean density across a large area.

Eni Response: The applicant notes that generally vessels, by their very nature, move. Therefore, as it will be impossible to predict all variations in the location of multiple vessels and a mean density is therefore considered appropriate.

b) It is acknowledged that the displacement assessment covers Douglas platform however please carry out a vessel disturbance assessment for the NUI's within Liverpool Bay SPA for red-throated diver and common scoter plus any transit routes if these are outside of the shipping routes. Furthermore, please make it clear of the schedule of removal of the existing Douglas platform and installation of pipelines to connect to the new Douglas platform.

Eni Response: An assessment of potential displacement from works at each location is presented below.

Common scoter

- Liverpool Bay SPA common scoter population - 141,801
- Average baseline mortality rate - 0.238
- Therefore the expected annual mortality is 141,801 x 0.238 = 33,748.64
- Considering the disturbance distance of 2.5 km, the potential area of disturbance for each platform differs due to the varying distance of each platform from the SPA boundary.
- The maximum area of distrubance for Hamilton is 10.95km2, for Lennox is 19.64km2, for Hamilton North is 0.28km2, and for Douglas Process is 9.32km2.
- Using the mean population density of 83.53 birds/km (HiDef, 2023) the number of birds that could be displaced is as follows:
- Hamilton - 914.75, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.01 to 0.03%.
- Lennox - 1,640.06, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.02 to 0.05%.
- Hamilton North - 23.56, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.00 to 0.00%.
- Douglas Process - 778.13, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.01 to 0.02%.
- Cumulative total across all platforms - 3,356.5, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.05 to 0.10%.

Red-throated diver

- Liverpool Bay SPA common scoter population - 1,800
- Average baseline mortality rate - 0.233
- Therefore the expected annual mortality is 1,800 x 0.233 = 419.40
- Considering the disturbance distance of 2 km, the potential area of disturbance for each platform differs due to the varying distance of each platform from the SPA boundary.
- The maximum area of disturbance for Hamilton is 6.35km2, for Lennox is 12.57km2, for Hamilton North is 0km2, and for Douglas Process is 5.88km2.
- Using the mean population density of 1.06 birds/km (HiDef, 2023) the number of birds that could be displaced is as follows:

- Hamilton - 6.73, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.01 to 0.02%.
- Lennox - 13.32, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.02 to 0.03%.
- Hamilton North - 0.00, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.00 to 0.00%.
- Douglas Process - 6.23, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.01 to 0.01%.
- Cumulative total across all platforms - 26.28, using a mortality rate of 0.5 to 1% this gives an additional mortality range within the Liverpool Bay SPA of 0.03 to 0.06%.

c) Please clarify the schedule of work for the NUI's and any other work required to connect the NUI's with New Douglas platform including installation of new cables/pipelines/ new topsides etc. If any of this work could slip into wintering period, the following information need to be presented:

i. What density of red throated diver (RTD) and common scoter (CS) will be present in the disturbed area and thus used in the disturbance calculations?

ii. Where has this bird density data been obtained from? This should be obtained from Liverpool Bay specific data sources, Lawson et al (2015) is recommended.

iii. Please include a map in the RIAA of the area wherein RTD and CS are assessed as being disturbed from for the construction and the operational phase. What % of birds are likely to be disturbed from this area

iv. How long will the disturbing activity last for in the construction phase?

v. The RIAA needs to describe the proportion of the SPA population that is likely to be disturbed

vi. What proportion of the available foraging habitat in the SPA will be excluded to RTD and CS as result of the disturbance? What are the implications of this exclusions, considering the conservation objective targets for 'bird distribution' and 'distribution of supporting habitats' are defined as 'restore' in the SNCB conservation advice due to the presence of infrastructure causing an ongoing impact, meaning further deterioration should be avoided.

Disturbance and displacement from airborne sound and presence of vessels and infrastructure is assessed in relation to mortalities impacting the qualifying populations of the SPA and the conservation objective regarding population size. However, no reference is made to how the loss of habitat due to vessel disturbance impacts the conservation objective regarding distribution of the feature(s).

The assessment has not been carried out with reference to the specific conservation objectives of qualifying features. Of note is one of the conservation objectives for red-throated diver, which is to restore the distribution of the feature. Due to this objective, it is recommended that all vessel activity within and 2km around the Liverpool Bay SPA is undertaken outside of the wintering period (1. November to 31. March inclusive). It is recommended that, as a minimum, mitigation measures are put in place for vessel activity during the wintering period, namely using established shipping routes to transit through the SPA, slow vessel speeds, and avoiding over-revving of engines.

Using all the above information and recommendations, please provide further reasoning as to why the conclusion of a negligible adverse effect upon the integrity of the Liverpool Bay SPA alone has been reached.

Eni Response:

Response to c).

The schedule and durations of the main installation and support vessels associated with the works at the NUI's is as follows:

Hamilton Main

- Topsides - flushing and cleaning - 31st December 2024 to 26th March 2025
- Wells - Plug and abandon - 16th July 2025 to 26th March 2026
- Preparation for platform removal - 5th April 2026 to 16th May 2026
- Redundant riser removal and clamp installation - 3rd June 2026 to 13th July 2026
- Platform removal and new installation - 29th July 2026 to 2nd August 2026
- Hook-up and commissioning, pre-well completion - 27th September 2026 to 3rd November 2026
- Well perforation and XT installation - 4th November 2026 to 13th January 2027
- Hook-up and commissioning, post-well completion and seismic equipment install - 7th January 2027 to 2nd February 2027

Hamilton North

- Topsides - flushing and cleaning - 19th August 2024 to 30th October 2024
- Wells - Plug and abandon - 10th April 2026 to 9th October 2026
- Preparation for platform removal - 17th May 2026 to 27th June 2026
- Redundant riser removal and clamp installation - 14th May 2025 to 2nd June 2025 and 15th June 2026 to 29th June 2026
- Platform removal and new installation - 21st May 2027 to 27th May 2027
- Hook-up and commissioning, pre-well completion - 27th September 2026 to 3rd November 2026
- Well perforation and XT installation - 4th November 2026 to 13th January 2027
- Hook-up and commissioning, post-well completion and seismic equipment install - 7th January 2027 to 2nd February 2027

Lennox

- Topsides - flushing and cleaning - 27th March 2025 to 2nd July 2025
- Wells - Plug and abandon - 24th October 2026 to 30th April 2027
- Preparation for platform removal - 28th June 2026 to 16th August 2026
- Redundant riser removal and clamp installation - 19th July 2025 to 14th August 2025 and 15th January 2026 to 26th January 2026
- Platform removal and new installation - 28th May 2027 to 20th June 2027
- Hook-up and commissioning, pre-well completion - 5th July 2027 to 11th August 2027
- Well perforation and XT installation - 31st August 2027 to 26th October 2027

- Hook-up and commissioning, post-well completion and seismic equipment install - 27th October 2027 to 15th November 2027

Douglas

- New platform installation - 21st July 2026 to 28th July 2026
- Hook up and commissioning - 29th July 2026 to 3rd December 2026

The movement of tug/anchor vessels and cargo barges will take place only when installation vessels are at the individual locations, minimising vessel traffic, and associated potential disturbance, through the SPA.

QUESTION 116: Section 1.9.3.11 - Table 1.156. Reg 12(1) letter dated 1 July 2024 – comment 267

Pages 466 – 468 of the RIAA. It is stated that there will be no adverse effect to red-throated diver, little gull, common scoter and waterbird assemblage within Liverpool Bay SPA. Please clarify how this conclusion has been made. Please also clarify if the conclusion would be different depending on what season the work is undertaken.

Eni Response:

Temporary habitat loss leading to displacement/disturbance of birds

A total of 37.02 km2 of the physical works area sits within the Liverpool Bay SPA which itself is 2521.77 km2 in extent. Assuming that all of the SPA represents foraging for its various features, this equates to 1.47% of the Liverpool Bay SPA that will be temporarily affected by proposed works. It can be presumed that the area of the physical works would be lost to all qualifying species. However, once construction has finalised the habitat will be returned to its previous state. For little tern that only use a very limited area within the Liverpool Bay, the areas of loss within their respective foraging range have been calculated. This equates to 0.167% of the little tern foraging range.

Disturbance and displacement from airborne sound and presence of vessels and infrastructure

Displacement modelling has been undertaken for all species where data was available utilising a mixture of the HiDef Aerial Surveying Limited (2023); Waggit, et. al. (2020) and Bradbury, et. al. (2016) data, the results of this are summarised in Table 1.137. The number presented within the table represent a 100% displacement around the 12 construction vessels and a 1% mortality rate. This is deemed the worst case scenario. Density data was not available for little tern within Liverpool Bay SPA so instead the amount of available foraging habitat that will be subject to disturbance from visual and audial sources at any one time has been calculated. A precautionary disturbance distance of 50 m is used for little tern.

Displacement will be highest during the construction phase, but this can be considered a temporary impact, and as all excess mortality is below 1% displacement does not significantly impact the long term viability of the populations. As the increase in excess mortality (or reduction in available habitat) is short term and reversible and is not sufficient to significantly impact population viability there would be no adverse effects to the integrity of the Liverpool Bay SPA.

Indirect impacts from changes in prey availability

Indirect effects to prey availability are predicted to be short term and reversible, lasting only for the duration of construction. Any impacts can therefore be assumed to apply only to the construction and decommissioning phases. For mobile species during the non-breeding season, the assessment of fish within volume 2, chapter 7: marine biodiversity, and the diadromous fish section of the RIAA concluded that there would be no significant impact on fish. Therefore, the fish are likely to move away from construction and operational areas in a similar manner as the birds and therefore the impacts from changes in prey availability will be of the same, if not of less significance that the temporary habitat loss.

For breeding species that are concentrated within a small foraging range such as little tern, displacement of prey due to underwater noise created by cable laying activities has been quantified as affecting between 2.4% and 2.9% of the little tern foraging range. Common tern have a larger foraging range (18 km from Woodward et al., 2014) and the area affected will be approx. 0.01%, which is negligible. Displacement caused by sedimentation is harder to quantify due a lack of numerical data in the literature, however dredging works for the West Hoyle Bank will be approx. 1 km across, 60 m in width and 7 m in depth, these will take approx. two to three weeks to complete and may result in average Suspended Sediment Concentration (SSC) values of over 3000 mg/l in shallower waters. In addition, the cable plough itself may result in SSCs of over 1000 g/l in the shallower nearshore waters where the little tern forage. This is over the 1 g/l that may be harmful to adult fish (Engell, Sørensen and Skyt, 2001), and it would be reasonable to assume that some displacement of fish may occur, although it is not possible to quantify this. Additionally, fish eggs may be smothered and killed which will further reduce the amount of small prey items available for the little tern. Assuming works were to take place during the breeding season (which for little tern is between April and July), then although the impacts caused by construction may be high in any one year, the impacts will be reversible causing no long-term effects to the biogeographic populations of little tern and common tern. Taking that into consideration the magnitude of impact during construction is taken as a precautionary 'low'. Although work is still needed to define the sensitive egg laying and chick rearing period for the Gronant Dunes

colony, measures to limit works during the sensitive egg laying and chick rearing period when little tern are concentrated within a small foraging range are to be discussed further with NRW. Works carried out after chick fledging when the little tern are not confined to a small foraging range would have a negligible impact. Therefore, for these receptors the magnitude of impact for construction is presented for both work during the breeding period and for works outside of the breeding period.

Accidental pollution in the surrounding area

There is a risk of pollution being accidentally released during the construction, operation and maintenance as well as decommissioning phases from sources including vessels/vehicles and equipment/machinery. The likelihood of an accidental release of pollutants is extremely low. However, should an event occur, effects would be limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be managed by the implementation of measures set out in standard industry guidance documents such as ERP, OPEPs and SOPEPs. Birds that spend a lot of time in the water such as common scoter and red-throated diver would be more susceptible to any risks, however as the risks of spillage are low, any spills will be limited in extent, and any effects will be reversible, so there would be no adverse effects to the integrity of the Liverpool Bay SPA in any phase caused by the risk of accidental pollution in the surrounding area.

Therefore, for all features except little tern, during all phases and for all potential impacts, there will be a negligible adverse effect upon the integrity of the Liverpool Bay SPA.

Annex A: Offshore ES - Volume 3, Appendix K1: Offshore Ornithology Baseline Technical Report

Double click icon to open: **ES Volume 3, Appendix K1: Offshore Ornithology Baseline Technical Report**	ES-2022-009_LBACC SLtd_ES_Appendix K