XLINKS' MOROCCO-UK POWER PROJECT

Environmental Statement

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Abbreviations Table

Abbreviation	Definition
AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
ALB	All-Weather Lifeboat
AtoN	Aid to Navigation
CBRA	Cable Burial Risk Assessment
CD	Chart Datum
CEMP	Construction Environmental Management Plan
CLV	Cable Lay Vessel
COLREGS	Convention on the International Regulations for Preventing Collisions at Sea
DCO	Development Consent Order
DfT	Department for Transport
DWT	Deadweight Tonnage
EEZ	European Economic Zone
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
ES	Environmental Statement
EU	European Union
FLO	Fisheries Liaison Officer
FOC	Fibre Optic Cable
FSA	Formal Safety Assessment
GT	Gross Tonnage
HDD	Horizontal Directional Drilling
HMCG	His Majesty's Coastguard
HVDC	High Voltage Direct Current
ILB	Inshore Lifeboat
IMO	International Maritime Organization
ITZ	Inshore Traffic Zone
JRCC	Joint Rescue Coordination Centre

Abbreviation	Definition
LOA	Length Overall
MAIB	Marine Accident Investigation Branch
MARPOL	International Convention for the Prevention of Pollution from Ships
MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
MoD	Ministry of Defence
MPCP	Marine Pollution Contingency Plan
MRCC	Maritime Rescue Coordination Centre
NAVTEX	Navigational Telex
NRA	Navigational Risk Assessment
NtM	Notice to Mariners
NTZ	No Take Zone
OWF	Offshore Wind Farm
PEIR	Preliminary Environmental Information Report
PEXA	Practice Exercise Area
PLL	Potential Loss of Life
RAM	Restricted in Ability to Manoeuvre
RIB	Rigid Inflatable Boat
RNLI	Royal National Lifeboat Institution
ROV	Remotely Operated Vehicle
RYA	Royal Yachting Association
SAR	Search and Rescue
SOLAS	International Convention for the Safety of Life at Sea
TCE	The Crown Estate
TEU	Twenty Foot Equivalent Units
TSS	Traffic Separation Scheme
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office

Abbreviation	Definition
UNCLOS	United Nations Convention on the Law of Sea
VHF	Very High Frequency
VMS	Vessel Monitoring System

Units

Abbreviation	Definition
DWT	Deadweight Tonnage
km	Kilometre(s)
kV	Kilovolt(s)
m	Metre(s)
mG	Milligauss
mm	Millimetre(s)
nm	Nautical Mile(s)
µT	Microtesla

9 Baseline Shipping Analysis

9.1 Introduction

This section presents analysis of the AIS shipping data within the study area including assessments of the vessel numbers, types, sizes, and densities. An AIS data set covering 12 months from September 2022 to August 2023 was used to provide up-to-date coverage of the study area and cover seasonal variations in vessel traffic.

It is noted that a number of tracks of vessels were considered to be temporary or non-routine and have been removed to ensure the analysis is not skewed and gives a fair representation of normal vessel traffic movements in the area. These included vessels undertaking surveys along the Offshore Cable Corridor and throughout the study area. The tracks of vessels entirely within the Taw Torridge Estuary were also excluded from the analysis, as these are not considered to be relevant to the Offshore Cable Corridor.

9.2 Vessel Numbers

Figure 9.1 presents the average daily vessel count per month, based on the number of unique vessels per day[5] over the month, recorded within the study area and intersecting the Offshore Cable Corridor.

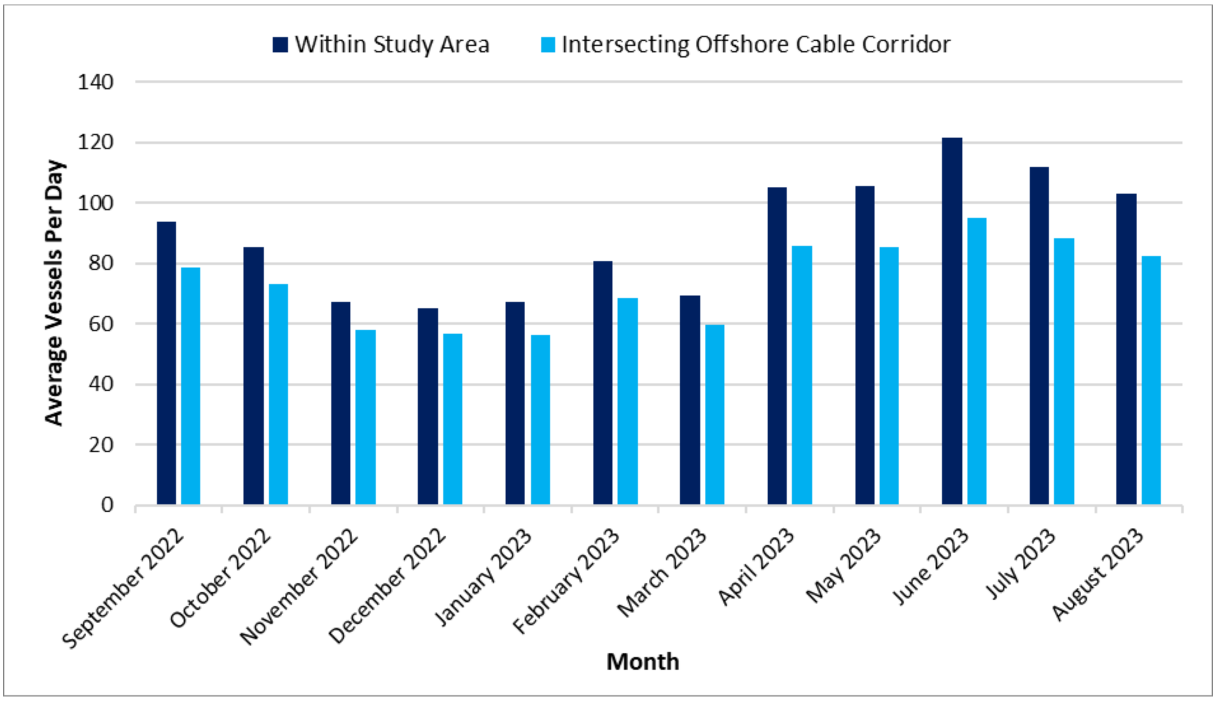


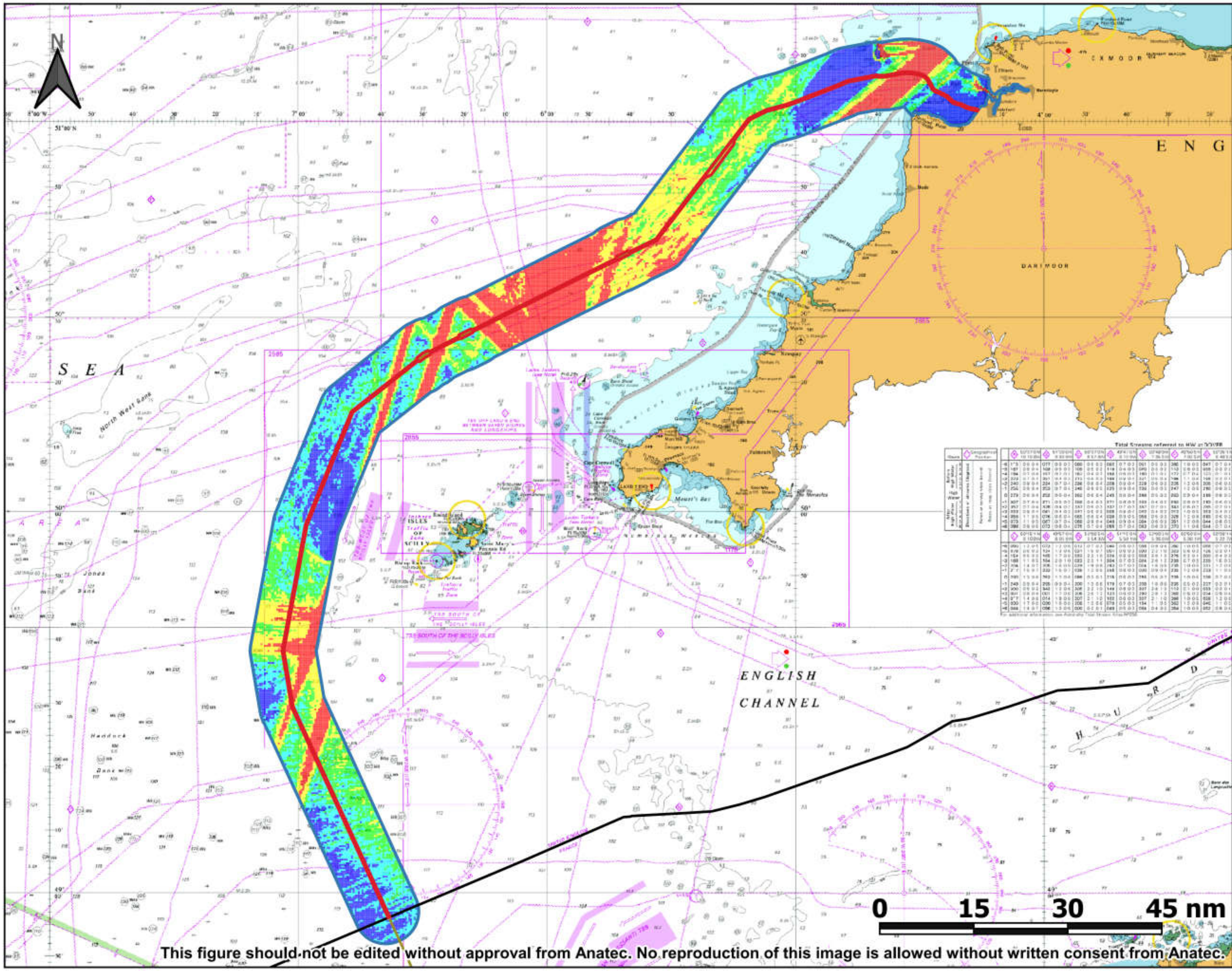
Figure 9.1 Average Daily Vessel Count per Month

[5] i.e., each vessel is counted only once per day within the Study Area to avoid over-counting if the vessel leaves and re-enters.

There was an average of 90 vessels per day recorded within the study area, with 74 per day intersecting the Offshore Cable Corridor. Vessel numbers were typically higher in summer months, which can be attributed to a greater volume of recreational, fishing and passenger vessels present during these months than in winter. This is underlined by June 2023 being the busiest month, with an average of 122 vessels per day within the study area compared with the quietest month, December 2022, seeing an average of 65 vessels per day.

9.3 Vessel Density

Figure 9.2 presents the vessel density within the study area, based on the number of tracks intersecting the cells of a 500m x 500m grid covering the study area.



Legend

- Xlinks UK Offshore Cable Corridor
- Indicative Cable Centreline
- Study Area
- UK Exclusive Economic Zone (EEZ)

AIS Vessel Density

- Lowest
- Highest

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Figure Title:
Figure 9.2: AIS Vessel Density (September 2022 - August 2023)

Date: 14/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator

Key routes can be seen crossing the Offshore Cable Corridor corresponding to vessels using the TSS lanes around the Isles of Scilly, as well as traffic to/from ports in the Bristol Channel such as Bristol and Newport. High density routes between Lundy, Ilfracombe and Bideford are also visible in the north of the study area, close to the landfall.

9.4 Vessel Type

This section presents analysis of the vessel types recorded within the study area, as well as anchoring and fishing activity. It is noted that vessel type is broadcast in the AIS data, however this information is not always provided/correct, as this information is required to be input correctly by vessel crew. As a result, research was carried out to update missing or incorrect vessel types. Where information was not available, vessels have been categorised as unspecified, which amounted to less than 1% of all vessel traffic.

Figure 9.3 presents the tracks of vessels recorded on AIS within the study area, colour-coded by vessel type.

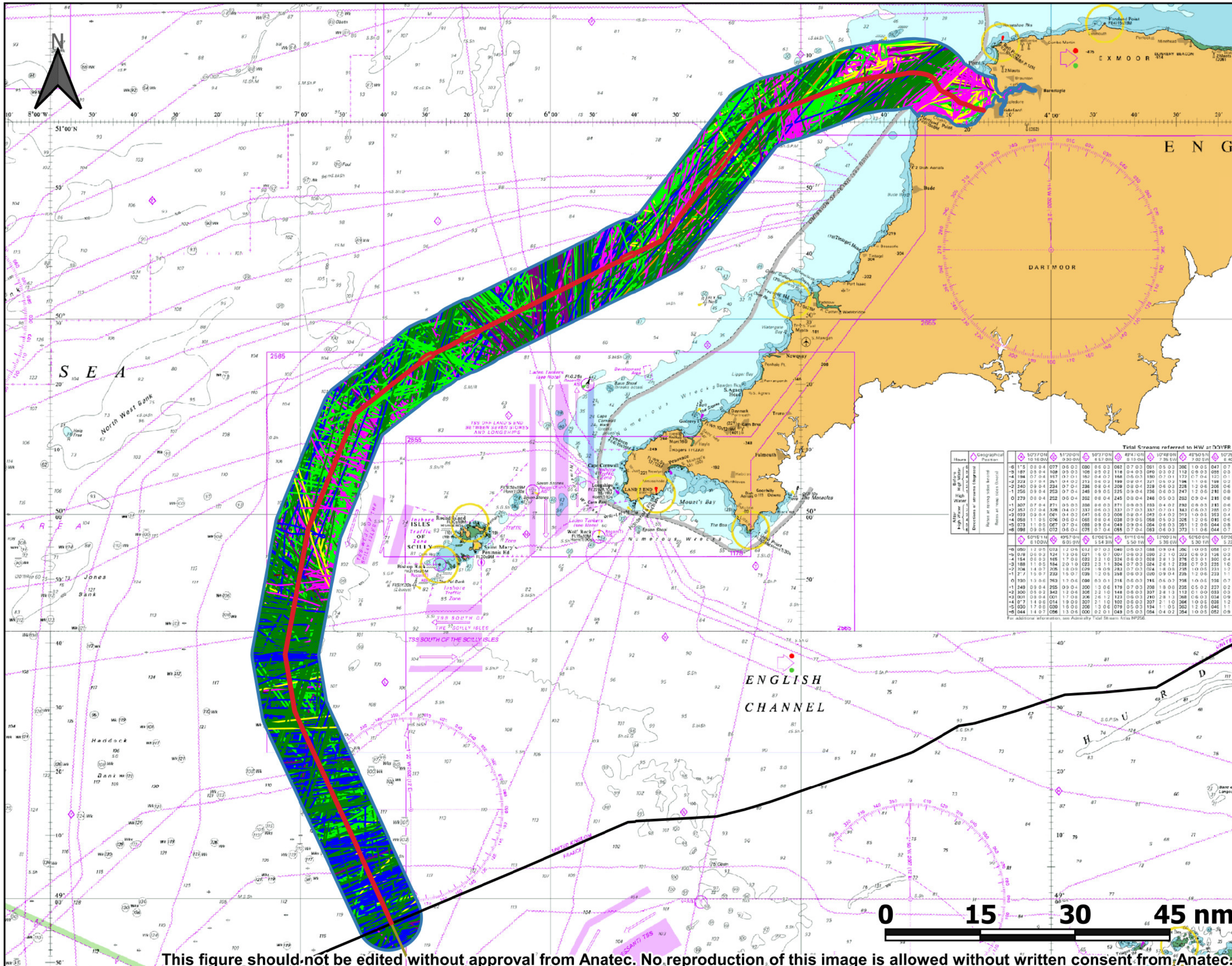

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Figure Title:
Figure 9.3: AIS Vessel Tracks by Vessel Type (September 2022 - August 2023)

Date: 13/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator

Vessel traffic was recorded throughout the study area, with particular dense regions of traffic associated with cargo vessels and tankers using the TSS lanes around the Isles of Scilly. Recreational activity was also recorded throughout the study area, particularly in coastal areas near the landfall in Bideford Bay, while fishing activity was typically recorded off the west coast to the north of the Isles of Scilly. These vessel types are presented in further detail in the following sections.

Figure 9.4 presents the distribution of vessel types recorded within the study area.

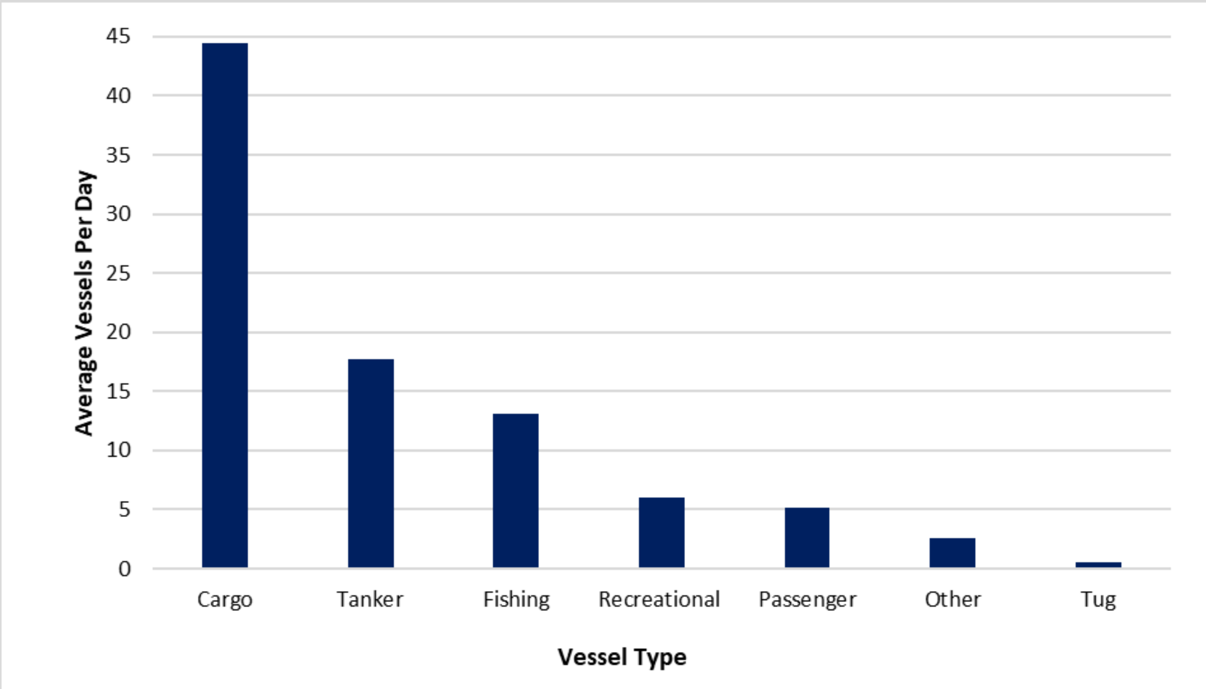
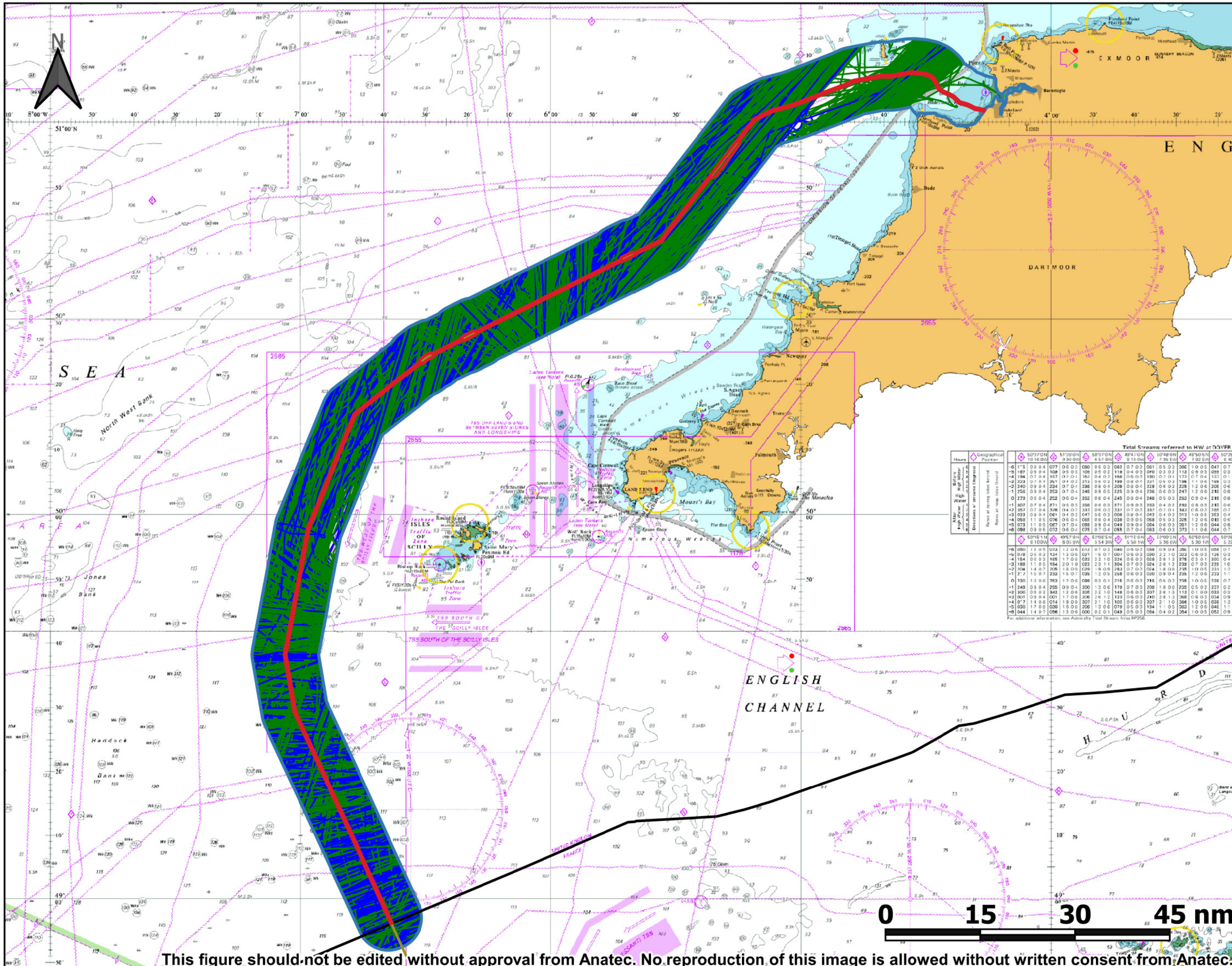


Figure 9.4 Distribution of Vessel Type

The most common vessel type was cargo vessels, accounting for 50% of vessels within the study area with an average of 44 vessels per day. Tankers (20%), fishing vessels (15%) and recreational vessels (7%) also accounted for a large proportion of vessel traffic. Passenger vessels (6%) were recorded frequently, including both cruise ships and regular ferries. Vessels in the "other" category included RNLI lifeboats, guard and survey vessels on passage and dive support vessels.

9.4.1 Cargo Vessels and Tankers

Figure 9.5 presents the tracks of cargo vessels and tankers recorded within the study area.



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Vessel Type

- Cargo
- Tanker

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Figure Title:
Figure 9.5: Cargo Vessel and Tanker Tracks (September 2022 - August 2023)

Date: 13/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator

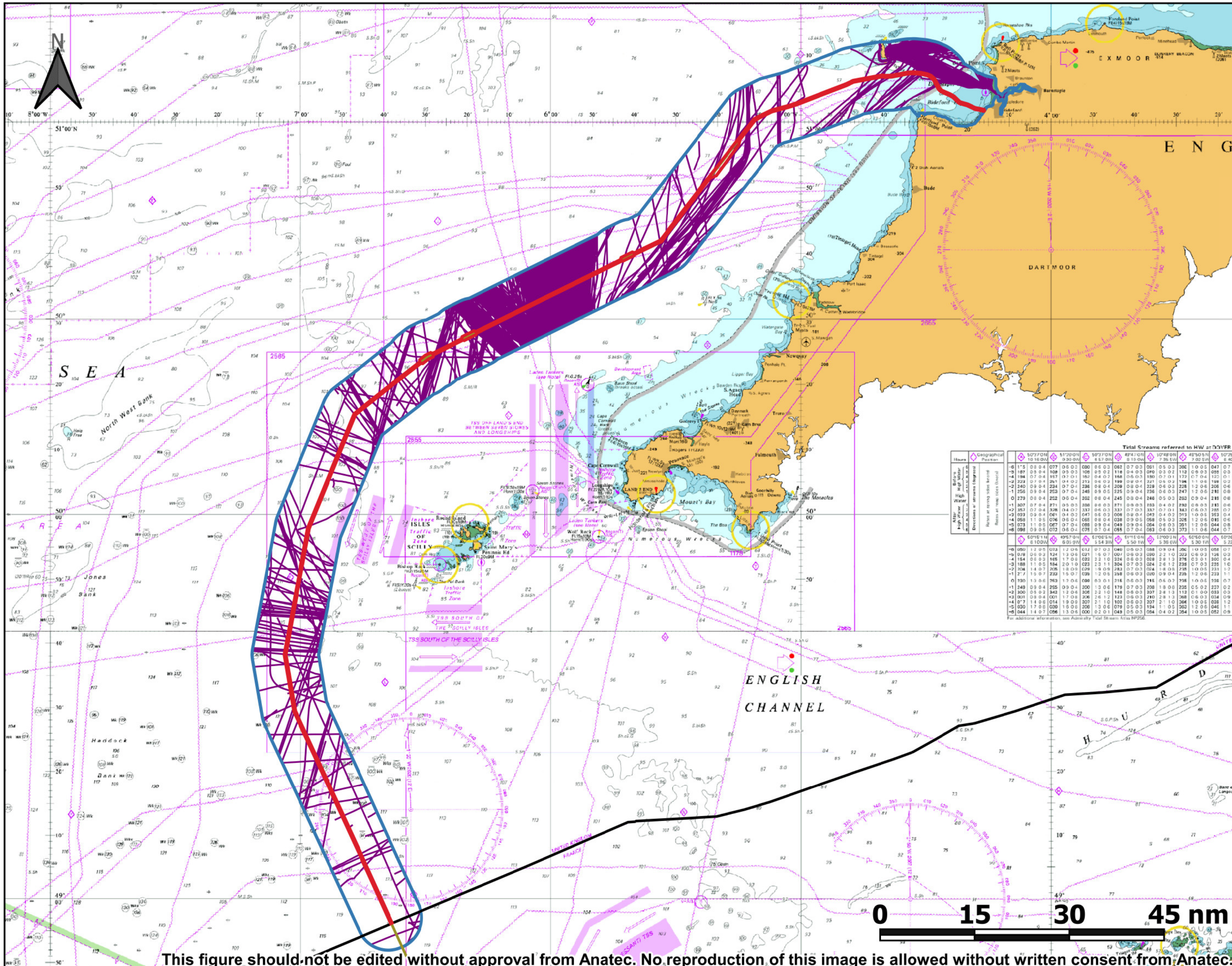
On average there were 44 cargo vessels and 18 tankers per day within the study area. Common destinations for these vessel types included major European ports such as Rotterdam, Antwerp, Zeebrugge and Cherbourg, reflecting the volume of traffic using the English Channel and crossing the southern extents of the Offshore Cable Corridor. Popular UK ports included Southampton, Liverpool and Belfast, with Irish ports such as Dublin, Cork and Rosslare also being very common destinations. Commercial vessel destinations were reflective of the English Channel being a major thoroughfare for international shipping, with vessels frequently recorded transiting between the European and UK ports above, as well as ports in the USA and Canada, such as New York, Halifax, Charleston and Baltimore.

Cargo vessels and tankers were recorded throughout the study area, with particularly dense regions of traffic associated with vessels using the TSS lanes around the Isles of Scilly, and passing Bideford Bay on passage to or from the Bristol Channel. The largest of cargo vessels and tankers were typically recorded crossing the southern extent of the Offshore Cable Corridor using the English Channel.

A single 88 m cargo vessel was recorded entering the Port of Bideford over the data period.

9.4.2 Passenger Vessels

Figure 9.6 presents the tracks of passenger vessels recorded within the study area.



Legend

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- Study Area
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Vessel Type

- Passenger

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Figure Title:
Figure 9.6: Passenger Vessel Tracks (September 2022 - August 2023)

Date: 13/11/2024	**Drawn:** LD	**Checked:** LC

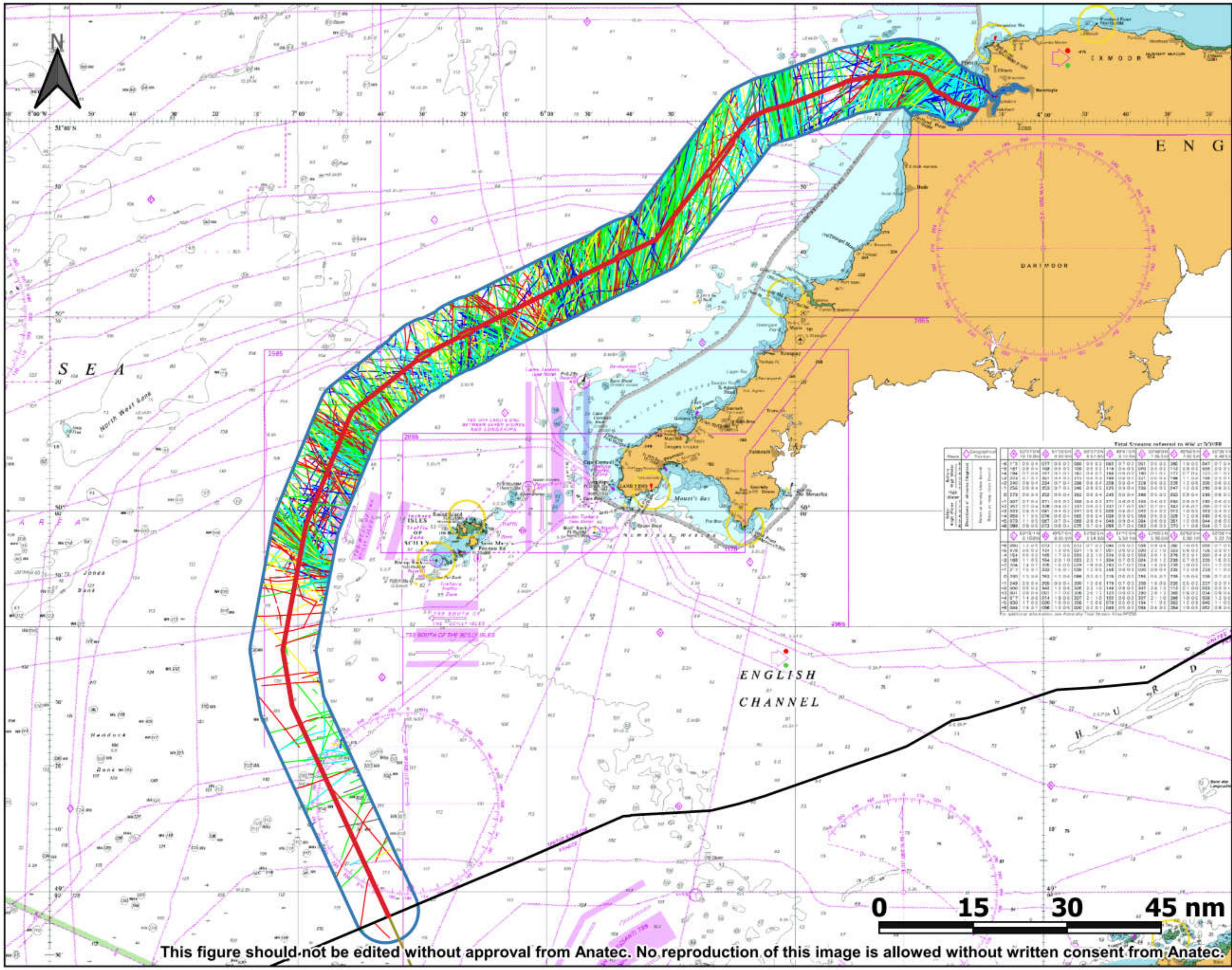
Coordinate System: WGS 84 / World Mercator

There was an average of five passenger vessels recorded within the study area per day, including both regular ferries and large cruise ships. Regular ferry routes in the study area included a 38 m vessel passing regularly between Bideford, Lundy and Ilfracombe in the vicinity of the Offshore Cable Landfall. It was noted during consultation with the Lundy Company Ltd that there are 100-120 sailings from Ilfracombe and Bideford to Lundy per year, with most of these coming from Ilfracombe due to the challenging tidal nature of Bideford's entrance.

Other ferries were recorded crossing the Offshore Cable Corridor while using the TSS east of the Isles of Scilly on passage between Dunkirk, Roscoff and Cherbourg in France, Bilbao in Spain, and Rosslare, Cork and Dublin in Ireland. The largest passenger vessel recorded within the study area was a 345 m cruise ship which was recorded making several trips between New York and Southampton over the year, crossing the Offshore Cable Corridor while using the TSS south of the Isles of Scilly.

9.4.3 Recreational Vessels

Figure 9.7 presents the tracks of recreational vessels recorded on AIS within the study area, colour-coded by vessel length. Following this, **Figure 9.8** presents the density of recreational vessel tracks, based on a grid of 500 m x 500 m cells. It is noted that recreational vessels are not required to broadcast on AIS, and will therefore be under-represented.



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Vessel Length (m)

- Unspecified
- < 10
- 10 -12
- 12 - 14
- 14 - 16
- 16 - 24

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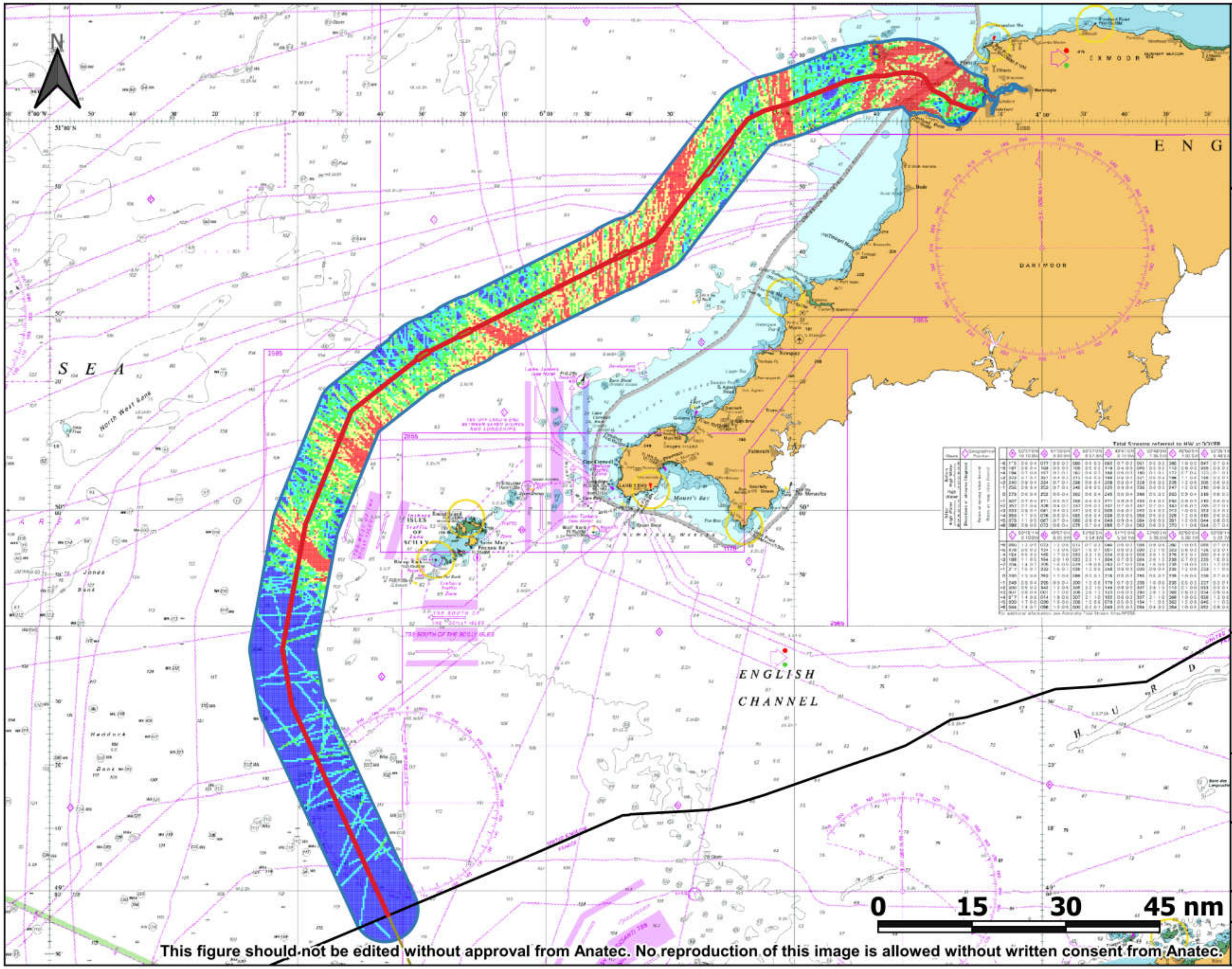
Figure Title:
Figure 9.7: Recreational Vessel Tracks (September 2022 - August 2023)

Date: 13/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator



Legend

- Xlinks UK Offshore Cable Corridor
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- Study Area
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Recreational Vessel Density

- Lowest
-
-
-
- Highest

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Figure Title:
Figure 9.8: AIS Recreational Vessel Density (September 2022 - August 2023)

Date: 14/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator

Over the course of the 12-month data period, there was an average of six recreational vessels per day within the study area. Recreational vessels were recorded throughout the study area, with particularly dense areas of activity recorded in Bideford Bay. During consultation, the harbour master at the Port of Bideford suggested that non-AIS recreational vessels would typically include Rigid Inflatable Boats (RIBs) and indicated that these would typically remain within the Taw Torridge Estuary, rather than passing beyond the Bideford Bar. Recreational activity was less common in the south of the study area within the English Channel.

In addition to AIS data, the RYA Coastal Atlas of Recreational Boating has been considered to inform on recreational vessel activity. **Figure 9.9** presents the AIS intensity of recreational vessel activity in proximity to the Offshore Cable Corridor.

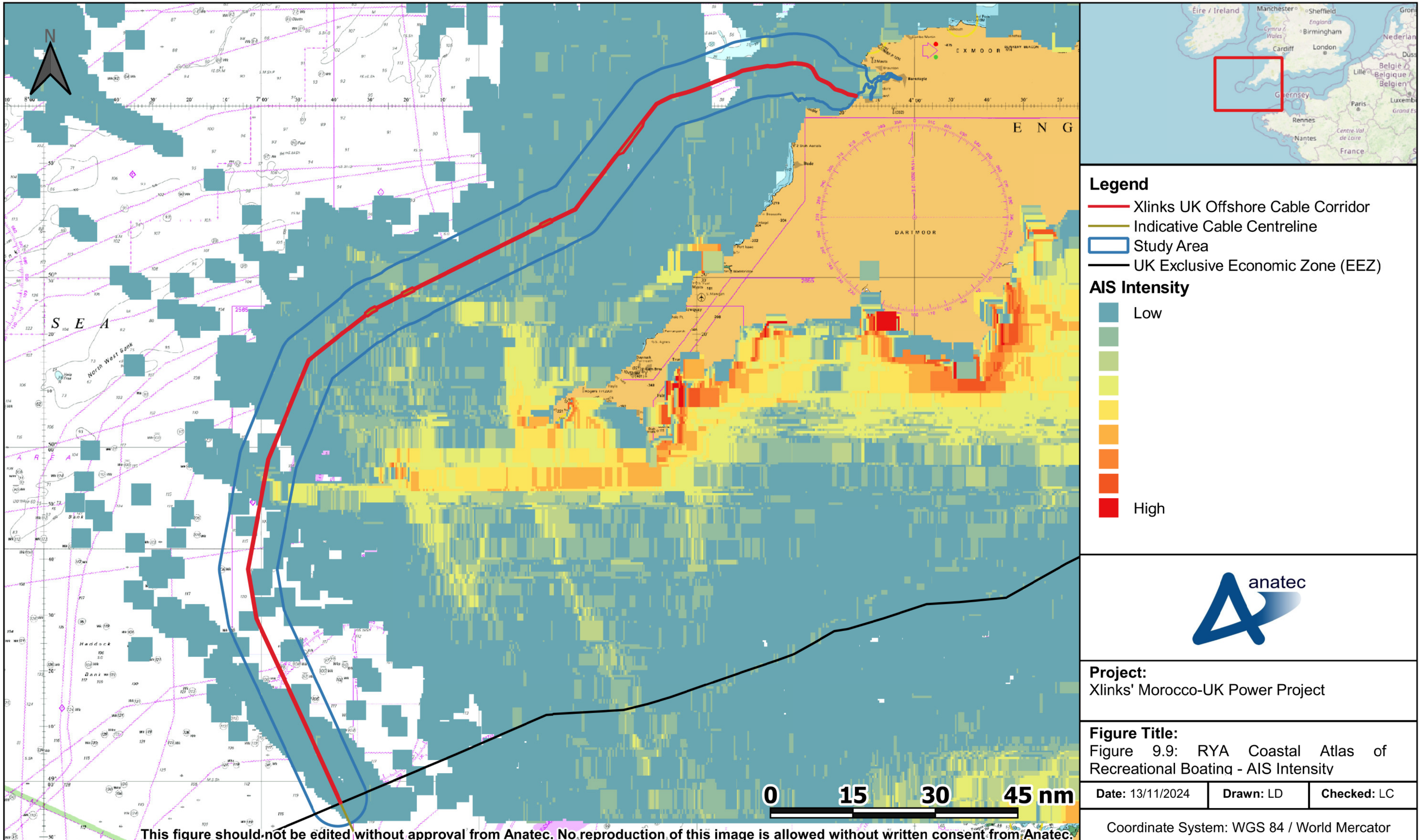

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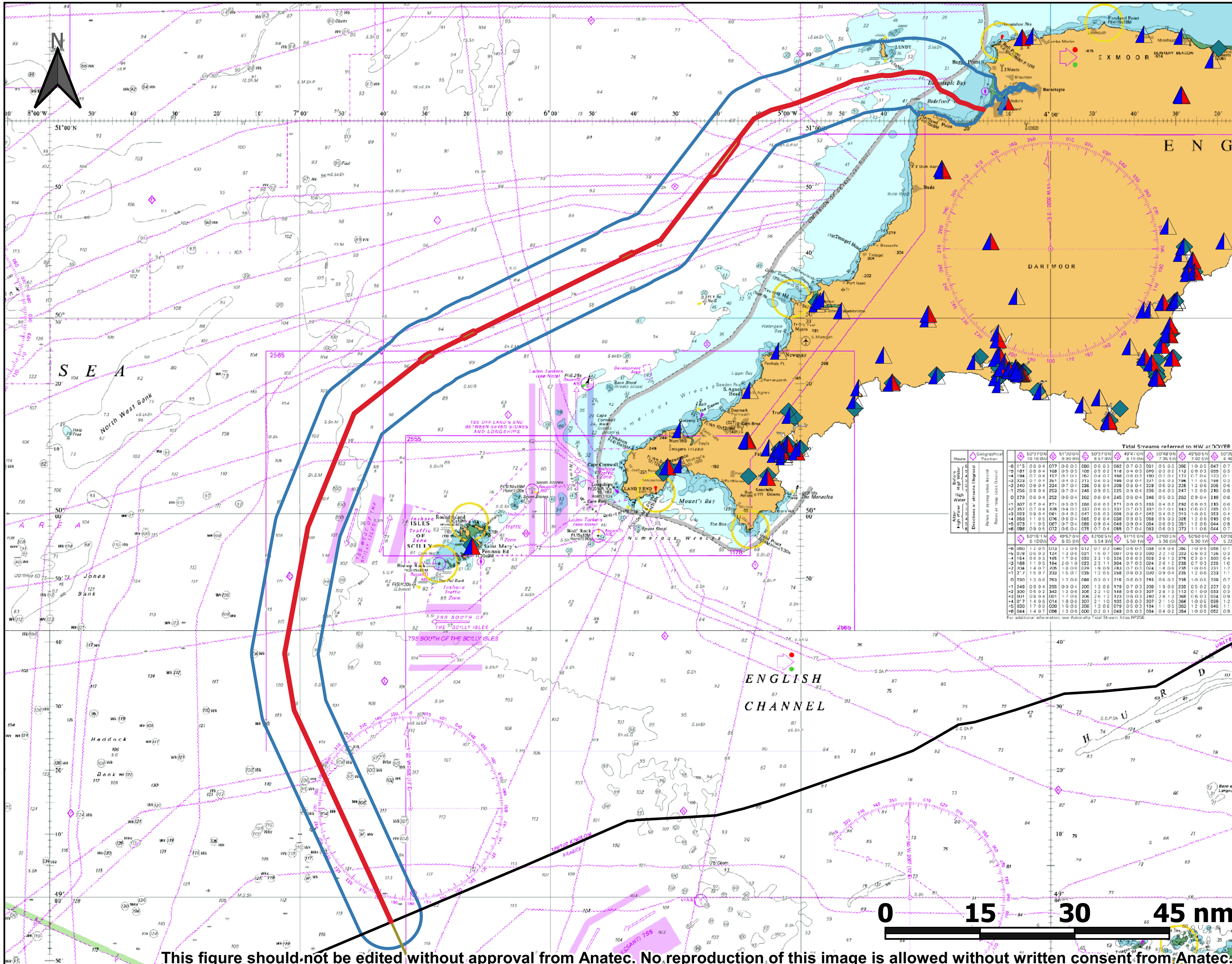
Figure Title:
Figure 9.9: RYA Coastal Atlas of Recreational Boating - AIS Intensity

Date: 13/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator

It can be seen that recreational activity is much more common along the south coast of England, as well as around the Isles of Scilly, inshore of the Offshore Cable Corridor. AIS intensity of recreational activity throughout the Offshore Cable Corridor is relatively low. This is in agreement with observations made by both the RYA and the Cruising Association during consultation.

Figure 9.10 presents the locations of recreational facilities presented in the RYA Coastal Atlas.



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- Study Area
- UK Exclusive Economic Zone (EEZ)

Recreational Facilities

- RYA Club
- RYA Training Centre
- Marina

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Figure Title:
Figure 9.10: RYA Coastal Atlas of Recreational Boating - Recreational Facilities

Date: 13/11/2024	Drawn: LD	Checked: LC

Coordinate System: WGS 84 / World Mercator

Again, it can be seen that the majority of recreational activity is focused on the south coast of England, with a large number of RYA clubs and training centres in this area. Along the south-west coast, there are a number of RYA clubs, with a training centre, the North Devon Yacht Club, also located within the Taw Torridge Estuary, north of the Offshore Cable Corridor landfall. There is also an RYA club and training centre, the Scillonian Sailing Club, based on the Isles of Scilly.

The RYA Coastal Atlas also notices the presence of Marinas at Padstow, Penzance, Newlyn and the Isles of Scilly.

9.4.4 Fishing Vessels

Figure 9.11 presents the average daily count of fishing vessels each month.

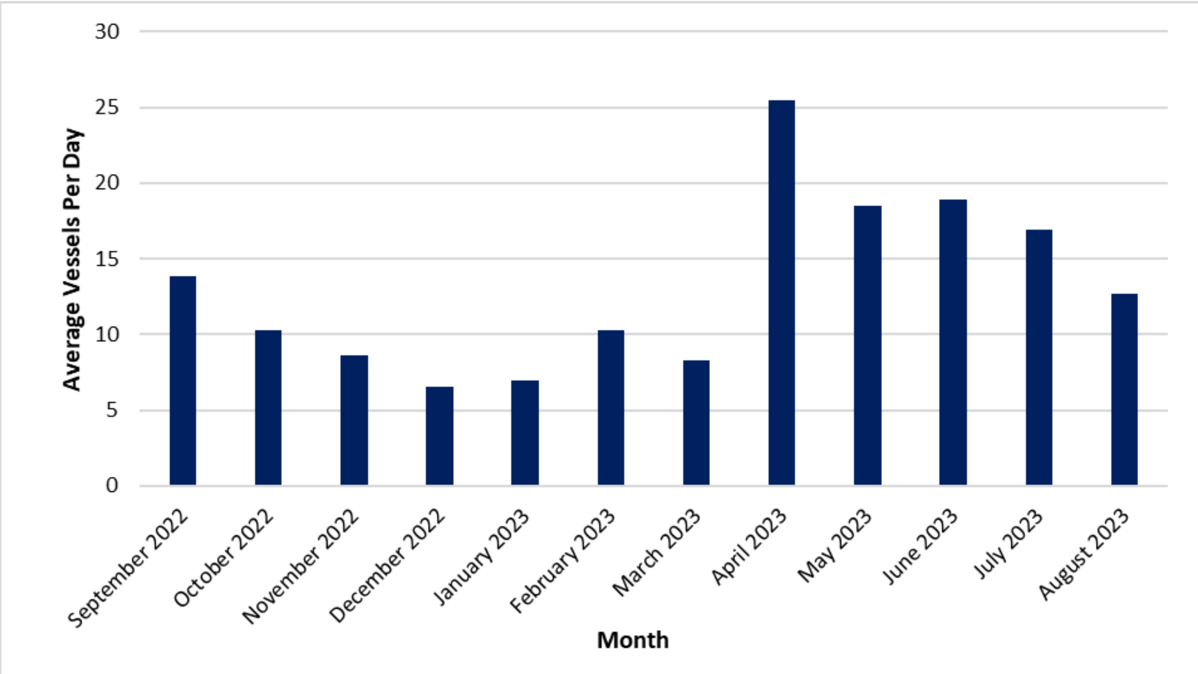
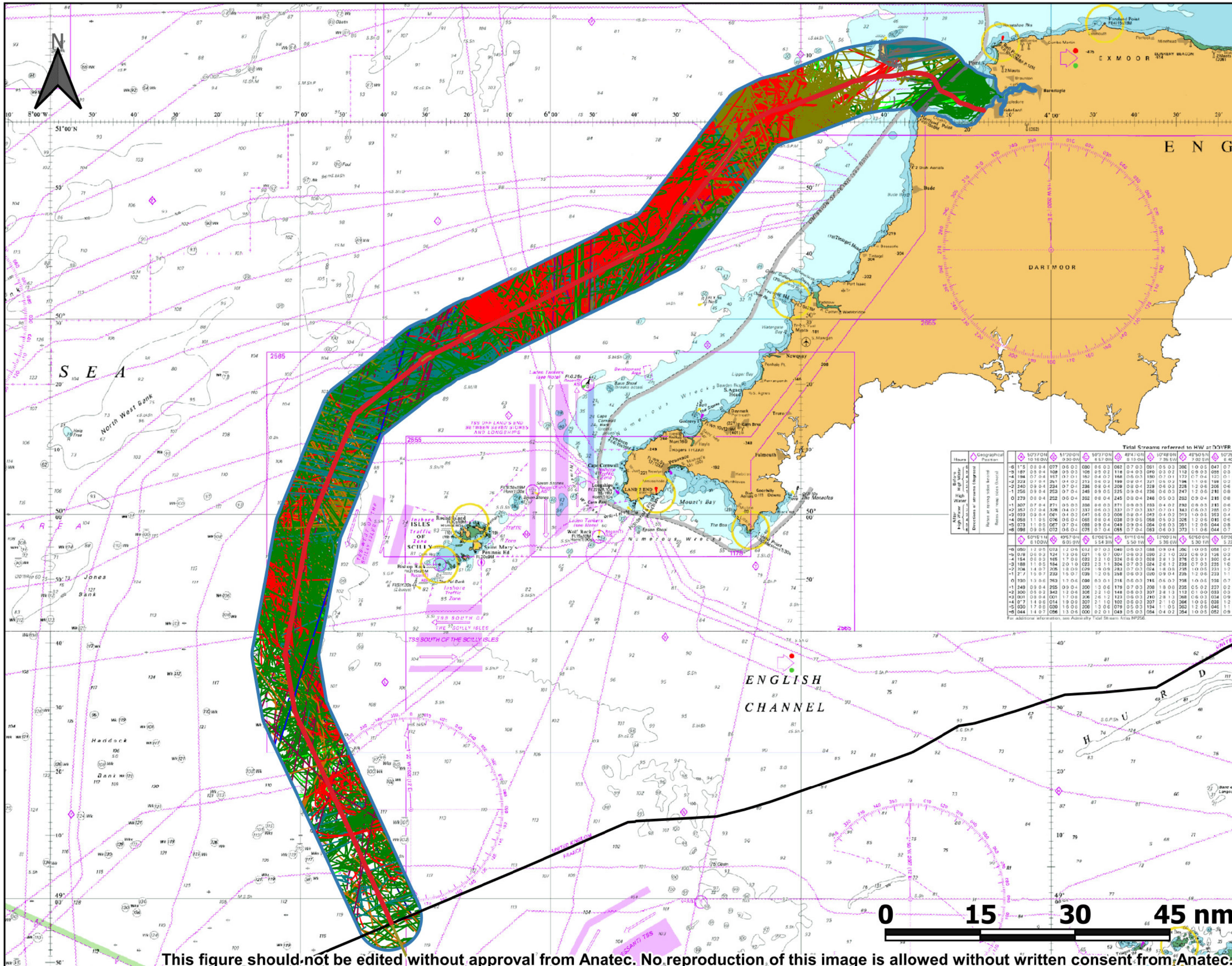


Figure 9.11 Average Daily Fishing Vessel Count per Month

During the 12-month data period, there was an average of 13 fishing vessels per day recorded within the study area, with significant seasonal variation observed over the course of the year. April was the busiest month for fishing, with an average of 25 vessels per day recorded within the study area. Generally the autumn and winter months were quieter in terms of fishing vessel activity compared to late spring and summer months, with December and January being the quietest with 6 to 7 vessels per day.

Figure 9.12 presents the tracks of fishing vessels recorded within the study area, colour-coded by fishing gear type.



Legend

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- UK Exclusive Economic Zone (EEZ)

Gear Type

- Beam Trawler
- Demersal Trawler
- Pelagic Trawler
- Pair Trawler (Demersal)
- Pair Trawler (Pelagic)
- Twin Trawler
- Trawler (Unspecified)
- Dredger
- Purse Seine
- Gill Netter
- Long Liner/Drift Netter
- Potter/Whelker
- Other/Unspecified
- Scottish/Danish Seine

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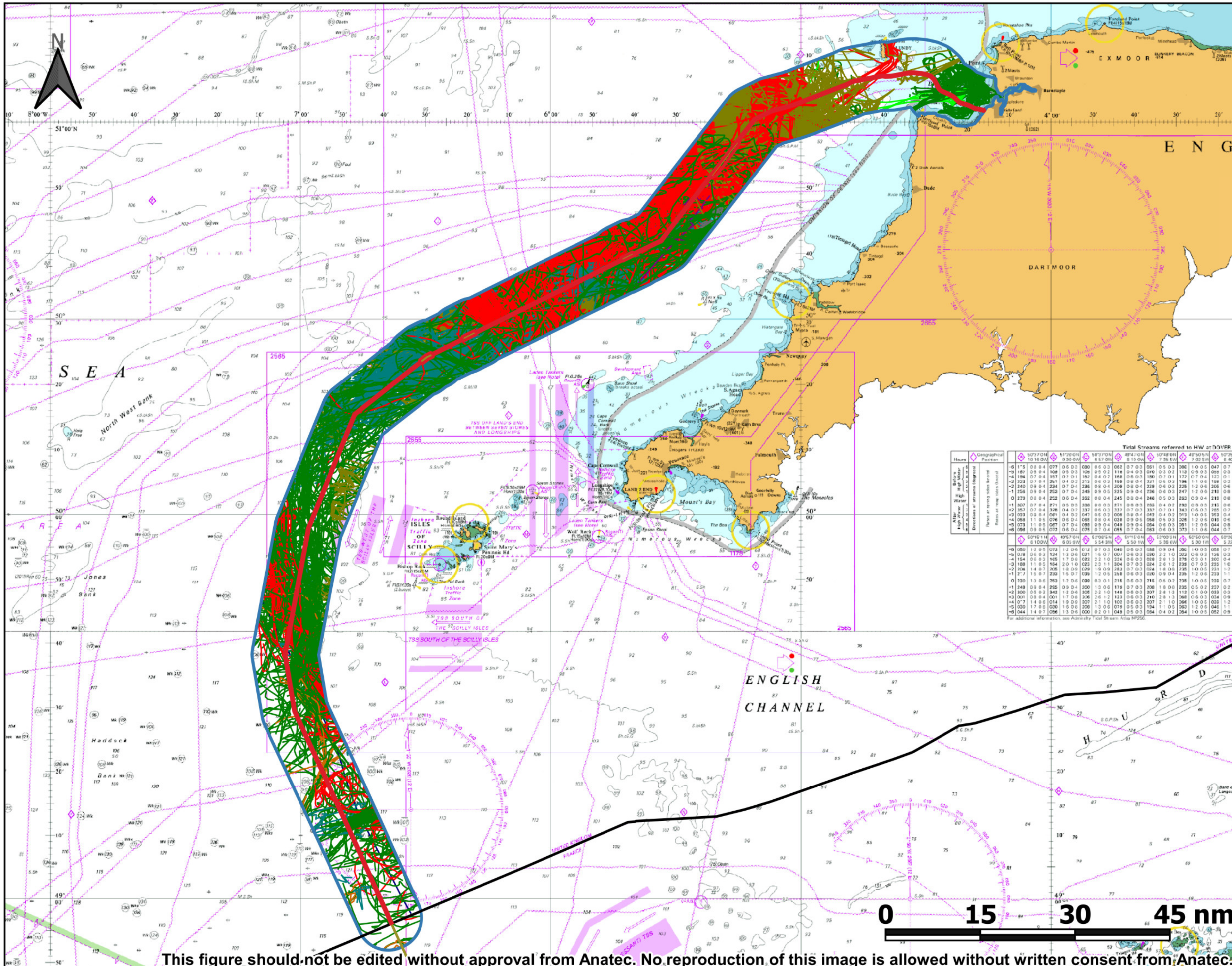
Figure Title:
Figure 9.12: AIS Fishing Vessels by Gear Type (September 2022 - August 2023)

Date: 13/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator

Fishing vessels were recorded throughout the study area, noting that this includes the tracks of transiting fishing vessels as well as those actively engaged in fishing. A wide variety of fishing gear types were recorded within the study area, with demersal and beam trawlers being the most prominent throughout, with beam trawlers most commonly recorded along the southwest coast of the UK mainland. Potters/whelkers were notably recorded in the north of the study area to the west of Bideford Bay and south of Lundy, while gill netters were also frequently present in the area to the north of the Isles of Scilly. The average speed of fishing vessels within the study area was 5.0 knots, indicative that many vessels were likely to be actively engaged in fishing.

Figure 9.13 presents the tracks of fishing vessels deemed to be actively engaged in fishing, colour-coded by fishing gear type. Approximately 63% of fishing vessels recorded within the study area were considered to be actively engaged in fishing.



Legend

- Xlinks UK Offshore Cable Corridor
- Indicative Cable Centreline
- Study Area
- UK Exclusive Economic Zone (EEZ)

Gear Type

- Beam Trawler
- Demersal Trawler
- Pelagic Trawler
- Pair Trawler (Pelagic)
- Twin Trawler
- Dredger
- Gill Netter
- Potter/Whelker
- Other/Unspecified
- Scottish/Danish Seine

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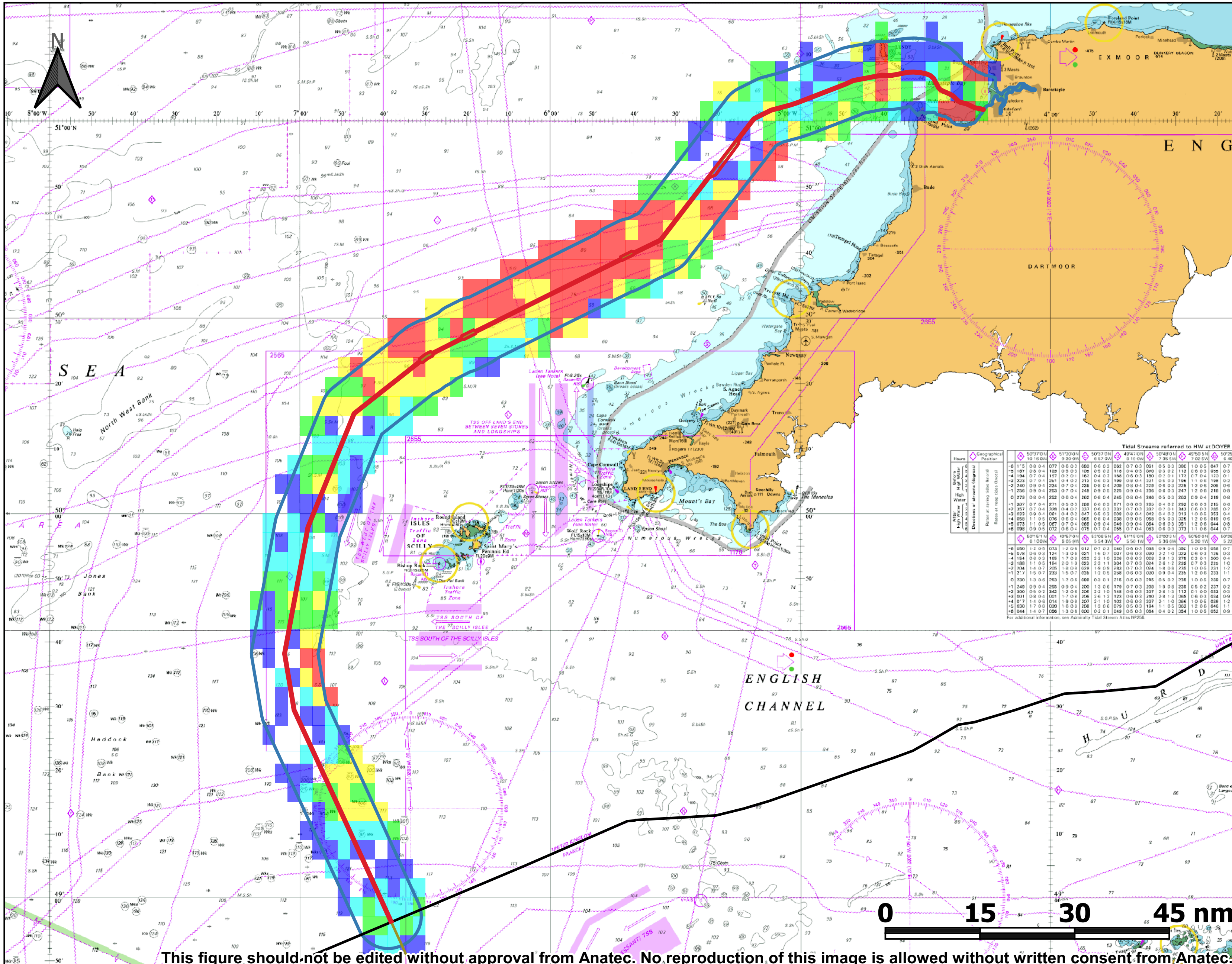
Figure Title:
Figure 9.13: AIS Active Fishing Vessels by Gear Type (September 2022 - August 2023)

Date: 13/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator

It can be seen that the most active area of fishing within the study area is the central region, parallel to the coast of the UK mainland, where demersal trawlers, beam trawlers, gill netters and potters/whelkers were all recorded actively fishing in significant numbers.

In addition to AIS, VMS satellite data for 2020 was reviewed to inform on fishing vessel movements. **Figure 9.14** presents the intensity of fishing vessel activity within the study area.



Legend

- Xlinks UK Offshore Cable Corridor
- Indicative Cable Centreline
- Study Area
- UK Exclusive Economic Zone (EEZ)

MMO Fishing Intensity (2020)

- Lowest
- Highest

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Figure Title:
Figure 9.14: MMO VMS Fishing Intensity (2020)

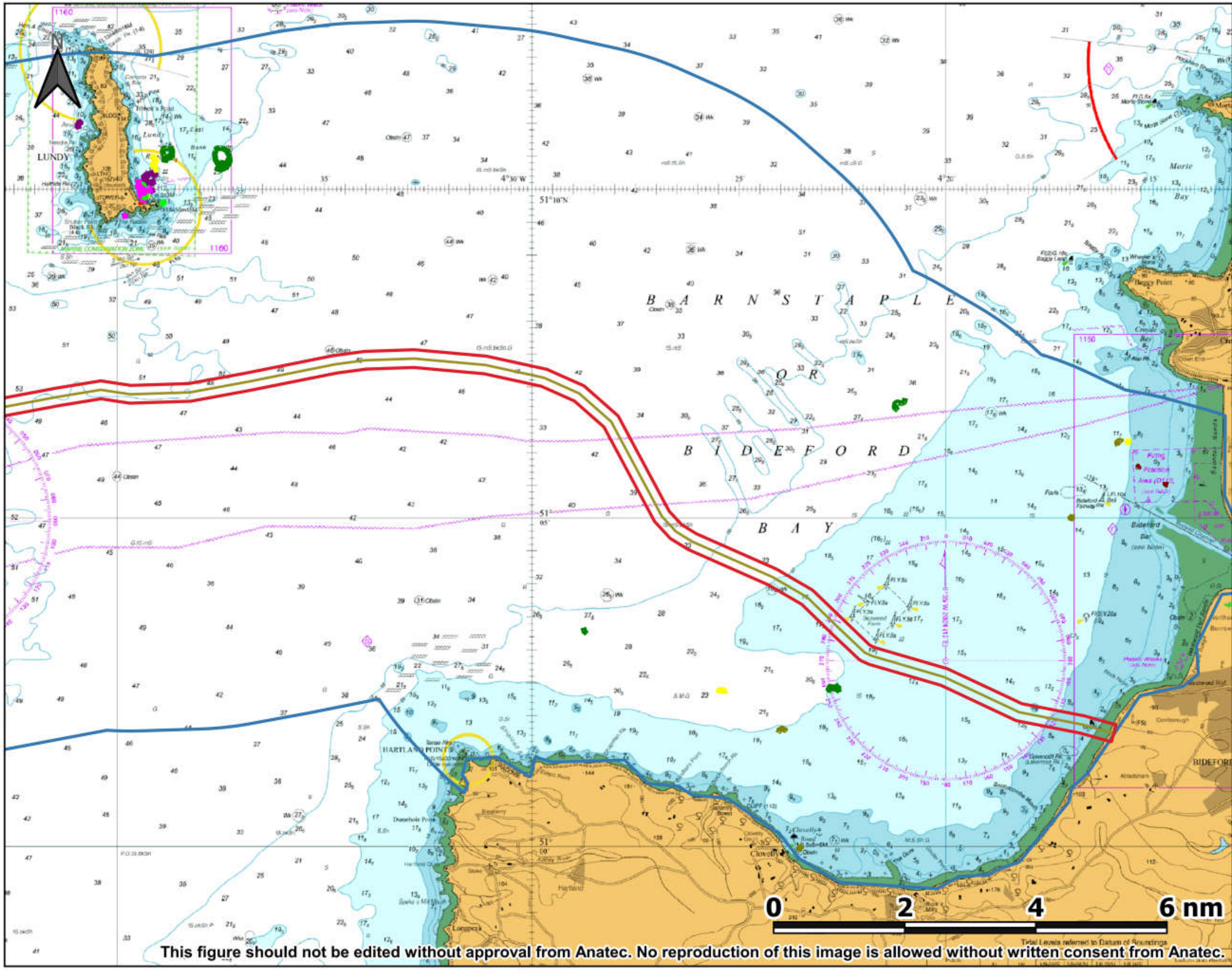
Date: 13/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator

Fishing density as reported by the MMO showed a good correlation with the baseline as established using AIS data, with the region of highest activity being the centre of the study area, off the UK mainland and north of the Isles of Scilly.

9.4.5 Anchored Vessels

Figure 9.15 presents the tracks of vessels at anchor within the study area, colour-coded by vessel type. These were identified using the navigation status transmitted via AIS and an analysis based on vessel speed and duration. Any vessels determined by Anatec to wrongly broadcast their status as "At Anchor", based on the behaviour of the vessel, were filtered out of the analysis. In addition, AIS tracks from vessels which transmitted a navigation status other than 'At Anchor' were used as input to Anatec's Speed Analysis model. The program detects any tracks of vessels that were travelling at speeds less than one knot for a minimum of 30 minutes. This output is then manually checked, and any tracks that can be confirmed as coming from an anchored vessel are added to the tracks from the first step.



Legend

- Xlinks UK Offshore Cable Corridor
- Indicative Cable Centreline
- Study Area

Vessel Type

- Fishing
- Military
- Tug
- Passenger
- Cargo
- Other
- Recreational

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Figure Title:
Figure 9.15: AIS Anchored Vessel Tracks by Vessel Type (September 2022 - August 2023)

Date: 13/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator

Anchoring activity was limited in the study area, with vessels only recorded within Bideford Bay and off the east coast of Lundy, and a low level of anchoring recorded in these locations. There was an average of approximately one unique anchored vessel recorded within the study area every three days during the 12 months. No anchoring was recorded within the Offshore Cable Corridor, with the closest vessel being an 83 m cargo vessel recorded 0.5 nm to the south within Bideford Bay.

Figure 9.16 presents the distribution of the types of anchored vessels recorded within the study area.

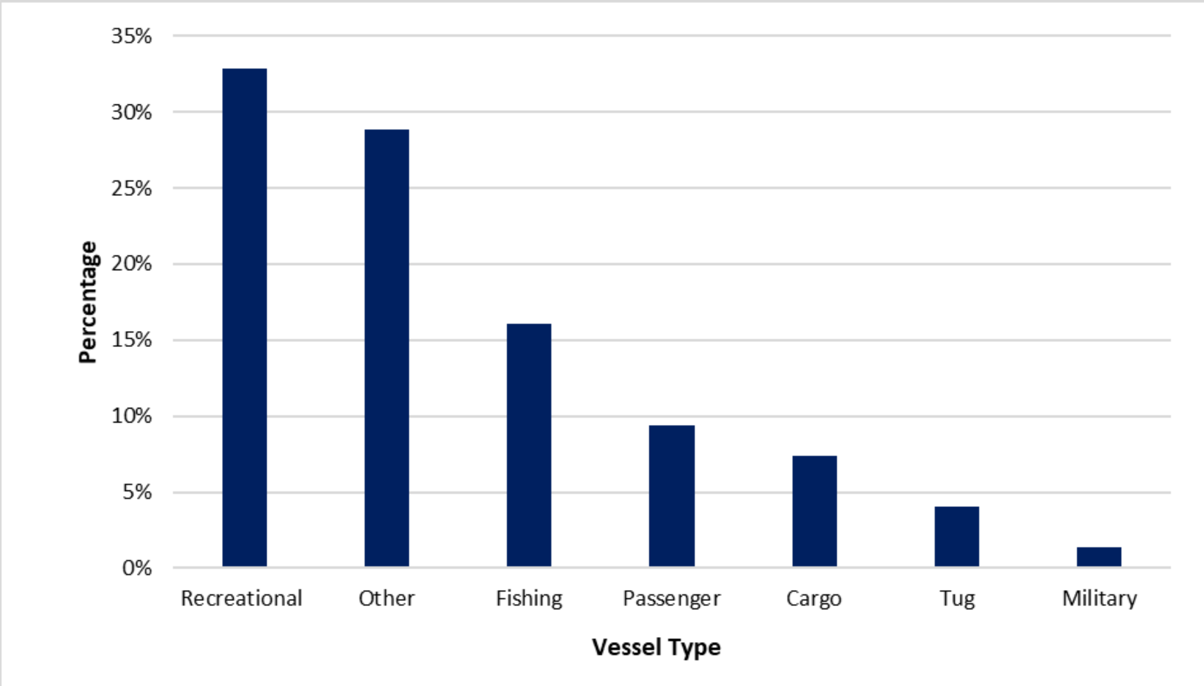


Figure 9.16 Anchored Vessel Type Distribution

The most common types of anchored vessels were recreational vessels (33%) and fishing vessels (16%). "Other" vessels accounted for 29% of anchored vessels, and typically consisted of dive vessels off Lundy.

9.5 Vessel Length

Figure 9.17 presents the AIS vessel tracks recorded in the study area, colour-coded by vessel length. Vessel length information was available for 99% of vessels.

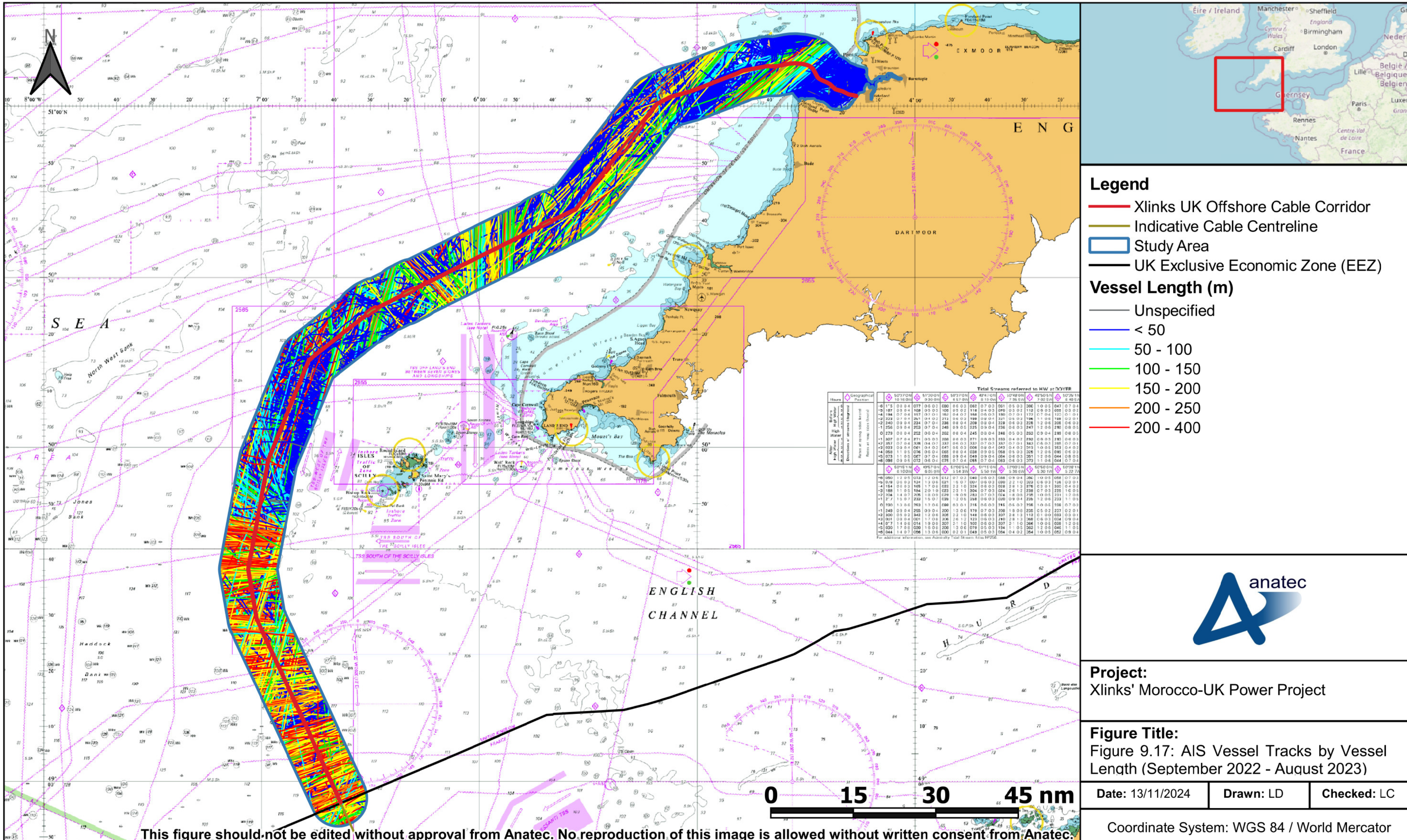


Figure Title:
Figure 9.17: AIS Vessel Tracks by Vessel Length (September 2022 - August 2023)

Large vessels of greater than 300 m in length were most commonly recorded crossing the southern extents of the study area, while on passage to/from the English Channel. Small vessels (less than 20 m in length) were more typically recorded in greater numbers in the Celtic Sea to the north and west of the Isles of Scilly, and were primarily recreational and fishing vessels, as well as some other vessels including RNLI lifeboats.

Figure 9.18 presents the distribution of vessel lengths recorded within the study area, excluding the 1% of vessels for which length information was not available.

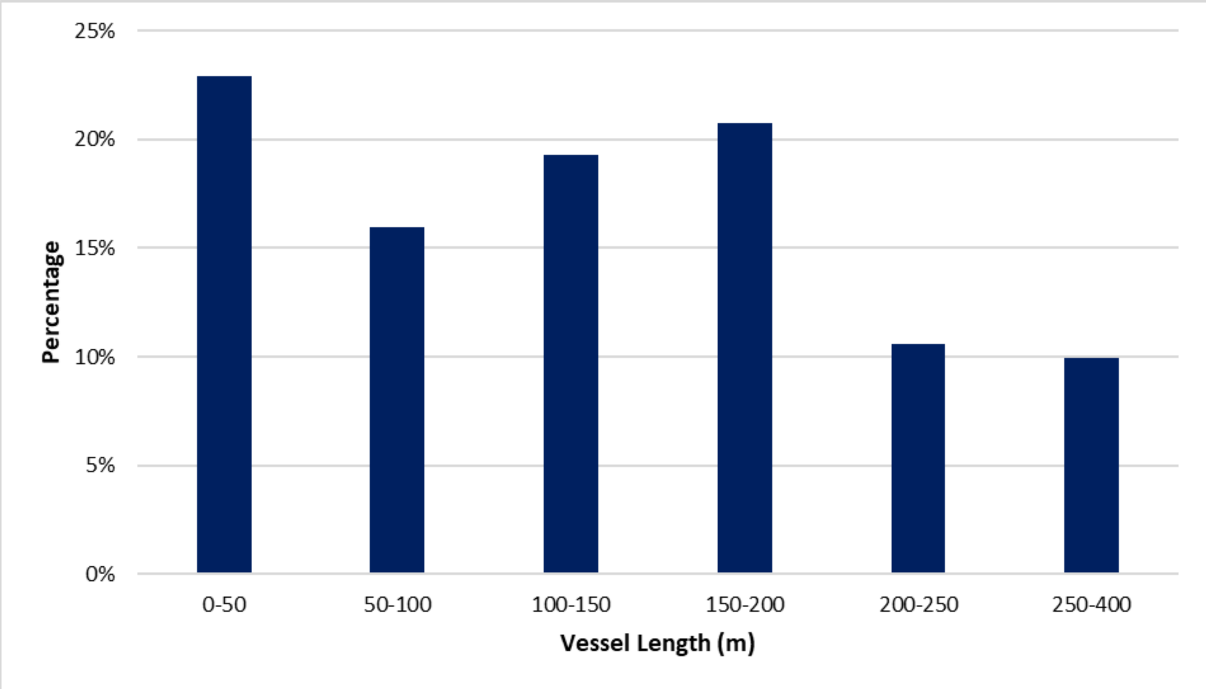
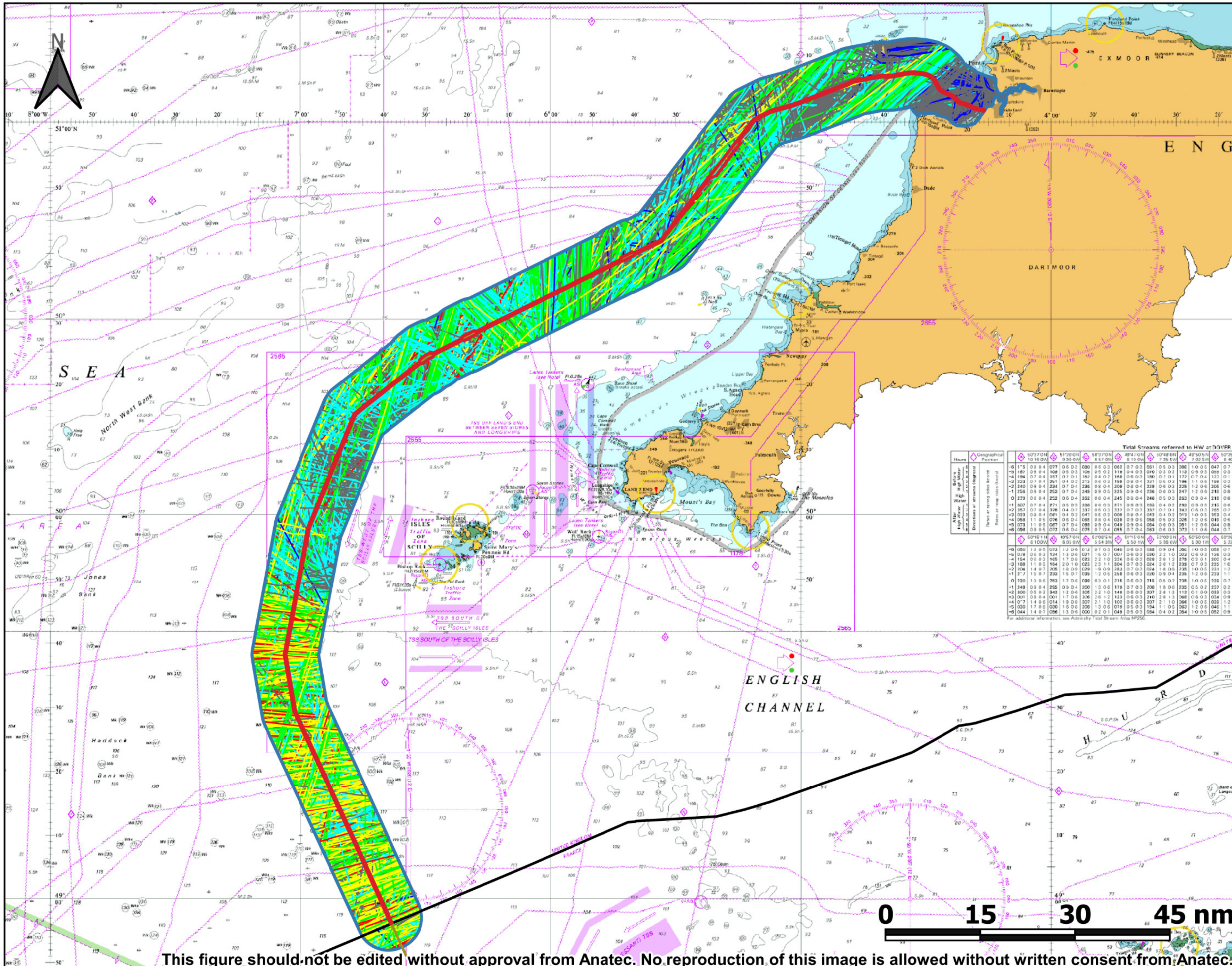


Figure 9.18 Vessel Length Distribution

The average length of vessels recorded within the study area was 134 m, with the largest vessel being a 400 m container ship recorded crossing the Offshore Cable Corridor while on passage to Tanger-Med in Morrocco. The largest vessels (250 – 400 m in length) were typical cargo vessels and tankers, and made up 10% of vessel traffic. Vessels in the smallest size category (0 – 50 m) were of various types, with recreational vessels and fishing vessels particularly prominent. Other vessels within this category included the 38 m passenger vessel operating between Ilfracombe, Lundy and Bideford, which was frequently recorded in the north of the study area.

9.6 Vessel Draught

Figure 9.19 presents the tracks of vessels recorded within the study area, colour-coded by vessel draught.



Legend

- Xlinks UK Offshore Cable Corridor
- Indicative Cable Centreline
- Study Area
- UK Exclusive Economic Zone (EEZ)

Vessel Draught (m)

- Unspecified
- < 3
- 3 - 6
- 6 - 9
- 9 -12
- >= 12

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Figure Title:
Figure 9.19: AIS Vessel Tracks by Vessel Draught (September 2022 - August 2023)

Date: 13/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator

Deeper draught vessels typically included cargo vessels and tankers, and were recorded mostly in the southern extent of the study area, crossing the Offshore Cable Corridor on passage to or from the English Channel. Shallower draught vessels were mostly recreational and fishing vessels, as well as RNLI lifeboats and the passenger ferry on the route between Ilfracombe, Bideford and Lundy. Vessels without available draught information were predominantly fishing and recreational vessels, which would typically be expected to have relatively shallow draughts.

Rotterdam was a commonly reported destination for the deepest draught vessels, while other deep draught vessels reported destinations including Port Talbot and Falmouth in the UK, IJmuiden and Vlissingen in the Netherlands, as well as further afield destinations such as Egypt, China and India.

Figure 9.20 presents the distribution of vessel draughts recorded within the study area, excluding 18% of vessels which had unspecified draughts.

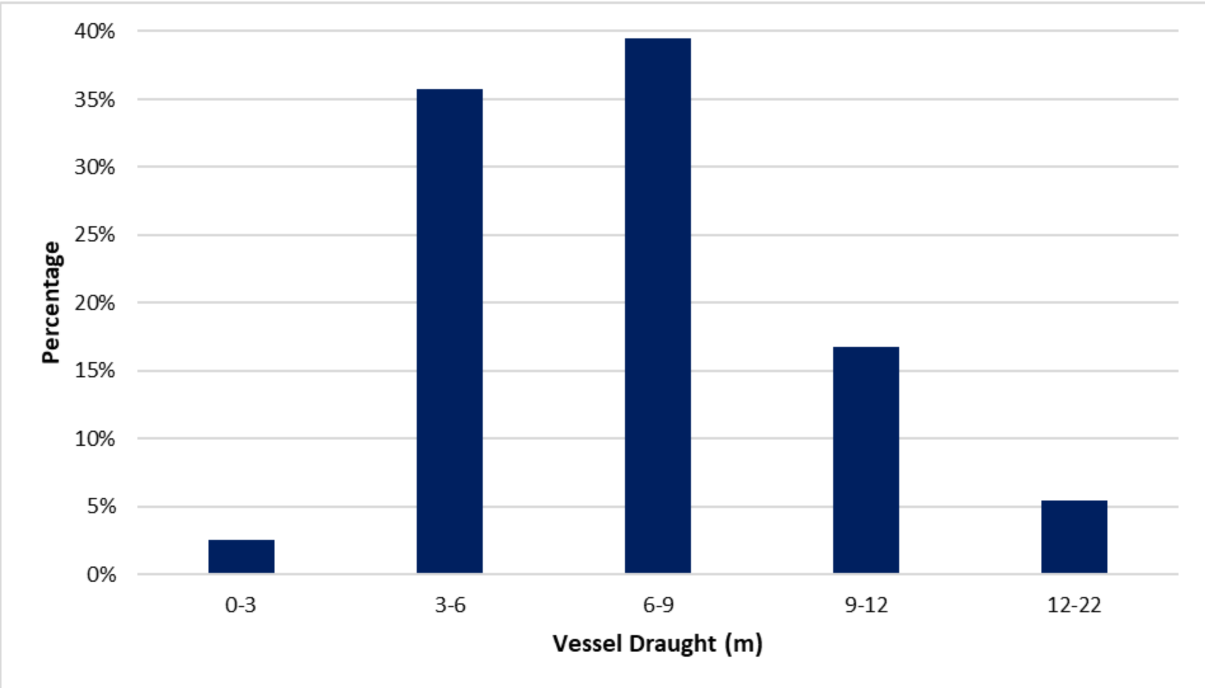

Figure 9.20 Vessel Draught Distribution

The average vessel draught recorded within the study area was 7.4 m, with the deepest draught vessel being a crude oil tanker heading to Rotterdam with a draught of 21.6 m. The majority of vessels broadcast a draught between 3 m and 9 m, with 39% between 6 m and 9 m, and a further 36% between 3 m and 6 m. Vessels with a draught deeper than 12 m made up approximately 5% of vessels within the study area.

9.7 Vessel DWT

Figure 9.21 presents the tracks of vessels recorded on AIS within the study area, colour-coded by deadweight tonnage (DWT).

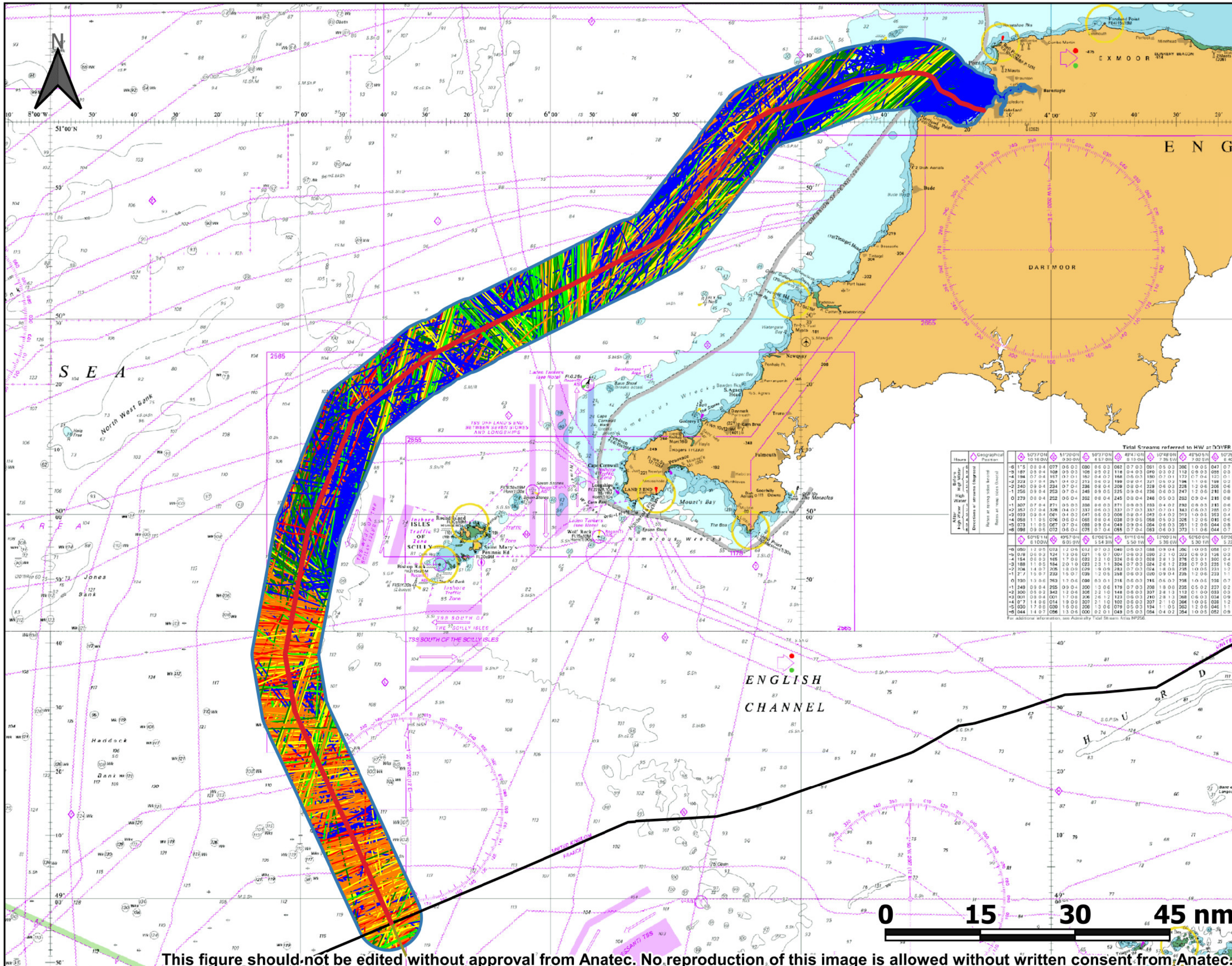

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Figure Title:
Figure 9.21: AIS Vessel Tracks by Vessel DWT (September 2022 - August 2023)

Date: 13/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator

DWT traffic patterns were similar to length and draught, with the largest vessels typically recorded in the southern extent of the study area close to where the Offshore Cable Corridor passes into French waters. These large vessels were mostly cargo vessels and tankers crossing the Offshore Cable Corridor on passage through the English Channel between European ports such as Rotterdam and Bremerhaven and ports in the US and Canada. Large vessels were also recorded heading north-south across the Offshore Cable Corridor heading to the Bristol Channel and St George's Channel, typically associated with ports in Ireland or the west of the UK such as Port Talbot, Liverpool or Pembroke and destinations in Spain, Gibraltar and Egypt.

Figure 9.22 presents the distribution of vessel DWT recorded within the study area.

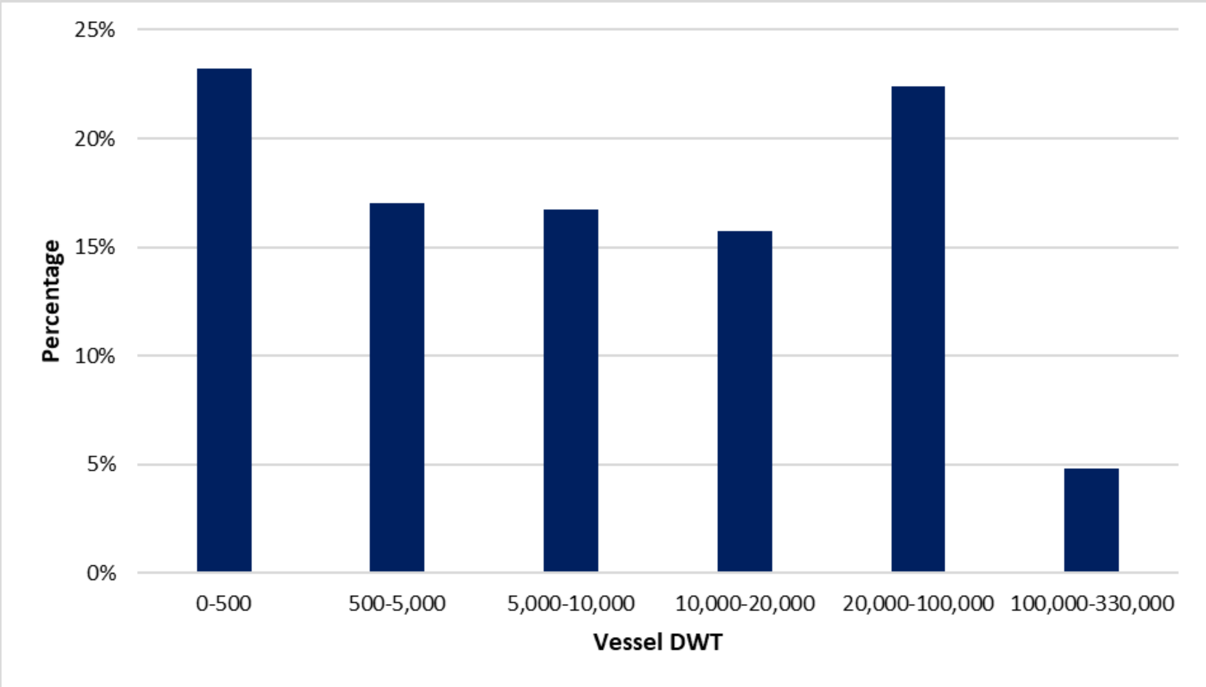
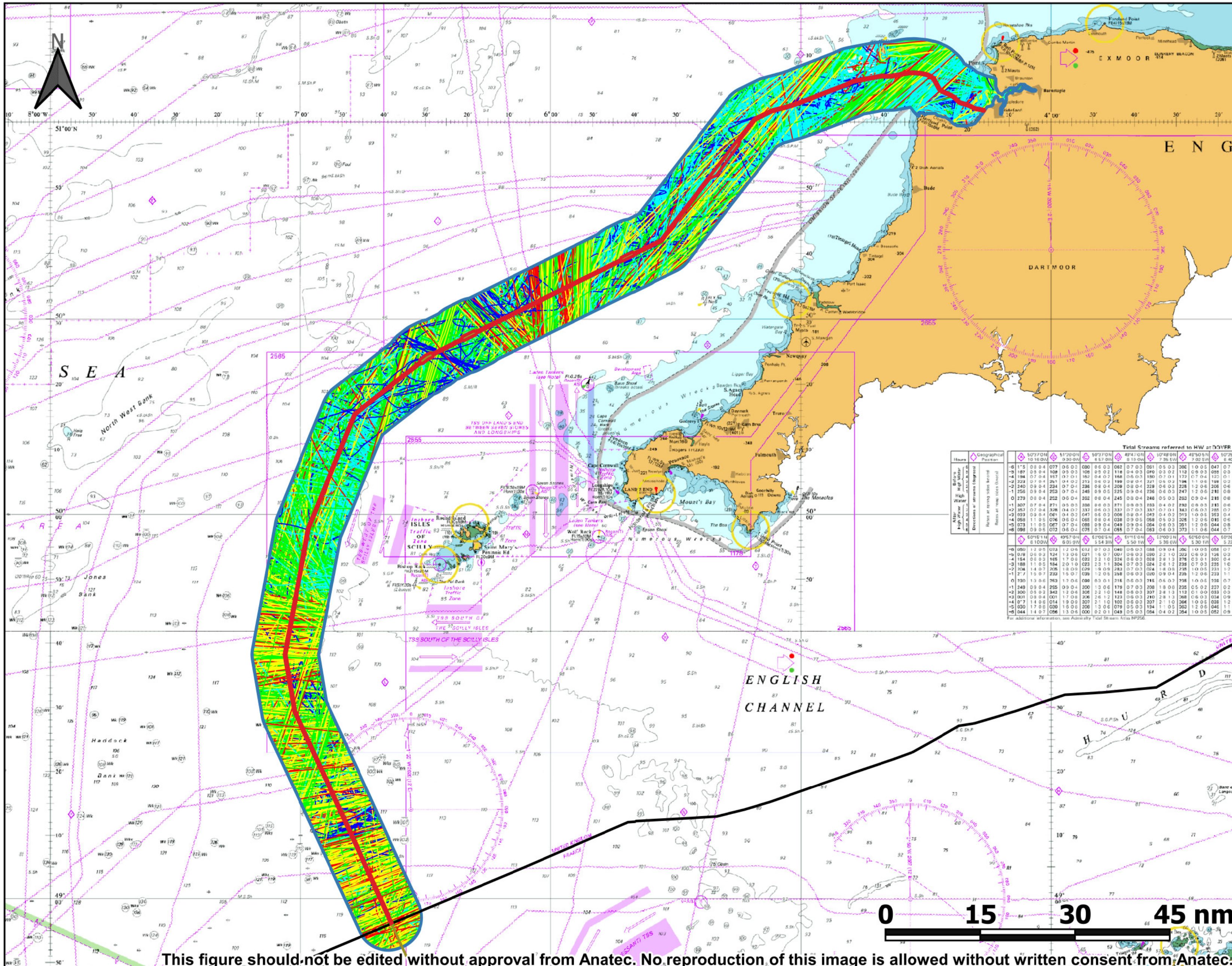


Figure 9.22 Vessel DWT Distribution

The average DWT recorded was 23,971, with the largest being a 333 m crude oil tanker, with a DWT of 321,225, heading to Mexico. The largest DWTs (greater than 100,000 DWT) made up less than 5% of vessels, and were typically recorded by similar crude oil tankers, passing between Rotterdam and the US. Smaller vessels (less than 500 DWT) were typically fishing vessels, recreational vessels, and passenger vessels such as the regular ferry between Bideford, Ilfracombe and Lundy, and were recorded throughout the study area.

9.8 Vessel Speed

Figure 9.23 presents the tracks of vessels recorded within the study area, colour-coded by vessel speed.



Legend

- Xlinks UK Offshore Cable Corridor
- Indicative Cable Centreline
- Study Area
- UK Exclusive Economic Zone (EEZ)

Vessel Speed (knots)

- Unspecified
- < 4
- 4 - 8
- 8 - 12
- 12 - 16
- >= 16

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Figure Title:
Figure 9.23: AIS Vessel Tracks by Vessel Speed (September 2022 - August 2023)

Date: 13/11/2024	Drawn: LD	Checked: LC

Coordinate System: WGS 84 / World Mercator

Vessel speeds varied throughout the study area, with fasters vessels tending to be those on main routes, such as those crossing the Offshore Cable Corridor to the south entering/exiting the English Channel, associated with the TSS lanes around the Isles of Scilly, or vessels crossing the Offshore Cable Corridor close to Bideford Bay associated with the Bristol Channel.

Figure 9.24 presents the distribution of vessel speeds recorded within the study area.

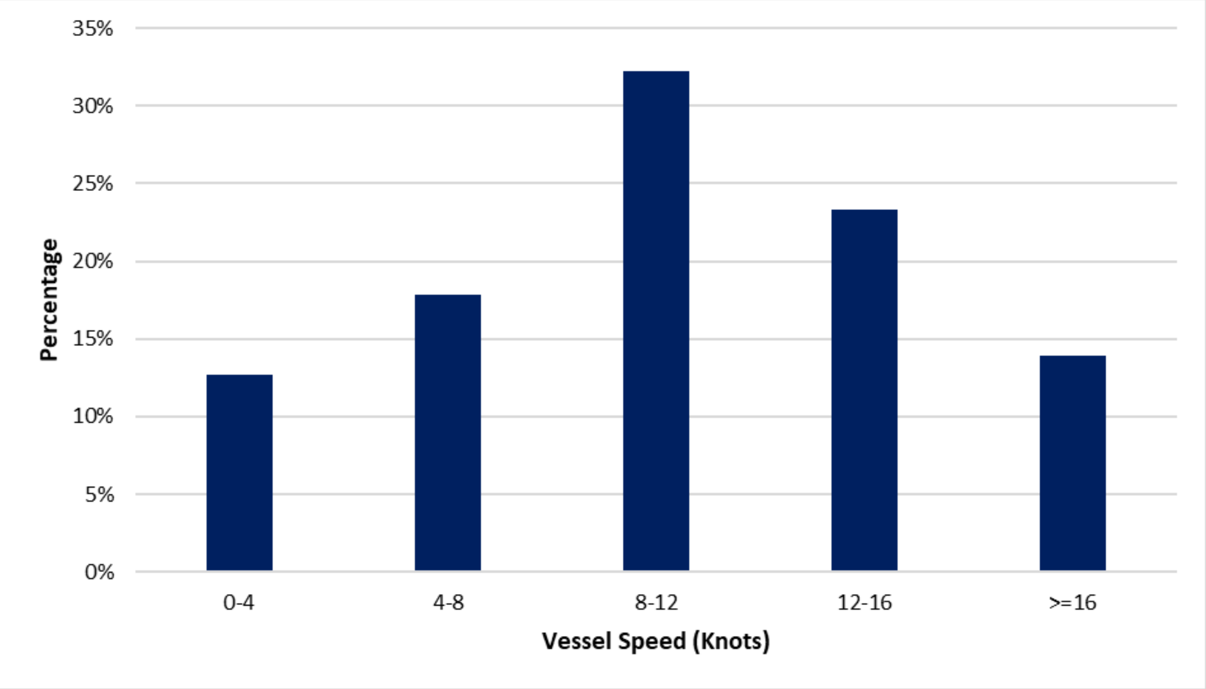


Figure 9.24 Vessel Speed Distribution

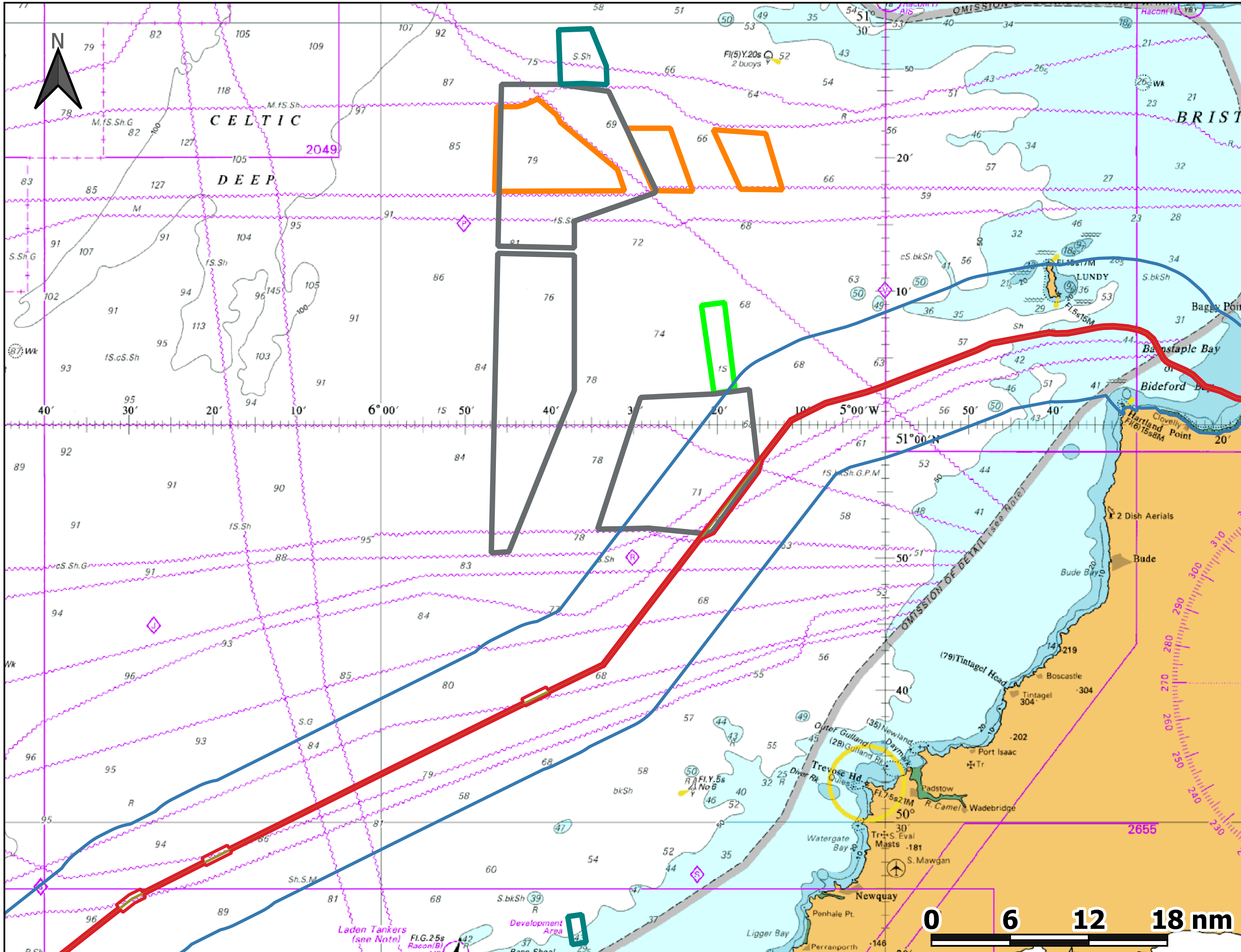
The average speed of vessels recorded on AIS within the study area was 10.4 knots, with the maximum speeds recorded being in excess of 30 knots. The fastest vessels typically consisted of wind farm crew transfer vessels, passenger vessels, recreational vessels and RNLI lifeboats. Vessels travelling at greater than 16 knots made up 14% of traffic, with lower speeds much more common.

9.9 Future Baseline Environment

This section details potential changes to shipping over the lifetime of the Proposed Development.

There are currently nine proposed offshore wind farm sites in the vicinity of the Offshore Cable Corridor which have the potential to impact shipping in the area. This includes the White Cross wind farm, which has submitted a consent application, as well as several projects in early planning phases including Petroc, Gwynt Glas, Llywelyn and Llŷr sites. The Erebus Wind Farm received consent in March 2023 to install seven floating turbines, and is located approximately 30 nm to the north west of the Offshore Cable Corridor. Further south, off St

Ives, the TwinHub has consent to install four floating turbines, 16 nm to the southeast of the Offshore Cable Corridor. The proposed wind farms and areas of search for wind development in proximity to the Proposed Development are presented in **Figure 9.25**.



Legend

- Xlinks UK Offshore Cable Corridor
- Indicative Cable Centreline
- Study Area

Proposed Wind Farm

- Area of Search
- Consent Application Submitted
- Consented
- Pre-planning

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Project:
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Figure Title:
Figure 9.25: Proposed Offshore Wind Farms in Proximity to the Offshore Cable Corridor

Date: 13/11/2024	**Drawn:** LD	**Checked:** LC

Coordinate System: WGS 84 / World Mercator

Although mostly in early planning stages, these developments may lead to changes to the baseline shipping if they are granted consent and are constructed, including increased traffic volumes due to the presence of project vessels both during construction and throughout the lifetime of the wind farm, as well as the displacement of existing shipping routes. In line with industry experience to date, it is anticipated that commercial vessels would typically maintain a minimum mean distance from wind farm structures, though smaller vessels such as fishing vessels may opt to pass through wind farms.

Port statistics for some of the most common commercial destinations have been reviewed to understand how traffic patterns might be expected to change over the lifetime of the Proposed Development. **Figure 9.26** presents the most frequently reported destinations on AIS by commercial vessels.

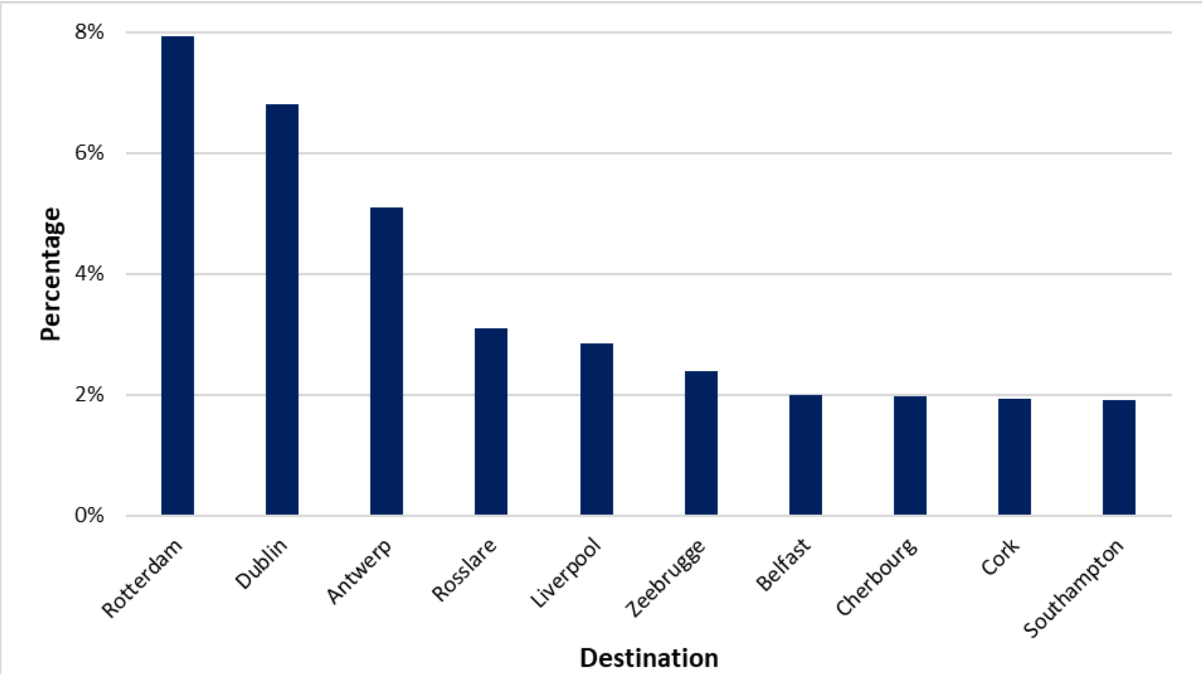

Figure 9.26 Most Common Commercial Destinations (September 2022 – August 2023)

Rotterdam was the most common destination reported by commercial vessels, accounting for approximately 8% of valid destinations broadcast by commercial vessels. Commercial throughput at Rotterdam has steadily increased since 2017, except for 2020, 2022, and 2023 which saw declines associated with the Covid-19 pandemic in 2020, as well as sanctions against Russia and the flattening of the Dutch economy in 2022. The slight decline in commercial throughput continued in 2023 and the first half of 2024 due to the disruptive effects of continuing geopolitical unrest and low economic growth on shipping.

Rotterdam is currently undergoing construction on new deep-sea and inland shipping quays in the Prinses Amaliahaven, which will facilitate increased throughput in the future. It is anticipated that this will be completed in 2024. Further plans are in place to expand the existing container terminal, expected to be completed in 2025.

The Irish ports of Dublin (7%) and Rosslare (3%) were also frequently broadcast destinations by commercial vessels. Overall port arrivals at Rosslare Port have increased by 23% in the last five years, whilst arrivals at Dublin Port during the same period decreased by roughly 6%. However, combined arrivals for the two ports remained generally consistent between years. The largest decrease at Dublin Port occurred between 2019 and 2021 which could reflect the effects of the Covid-19 pandemic. It is noted that arrivals at Dublin Port increased by roughly 3% between 2021 and 2022, suggesting numbers may continue to rise in the future. The yearly commercial vessel arrivals at Dublin and Rosslare between 2018 and 2022 are presented in **Figure 9.27**.

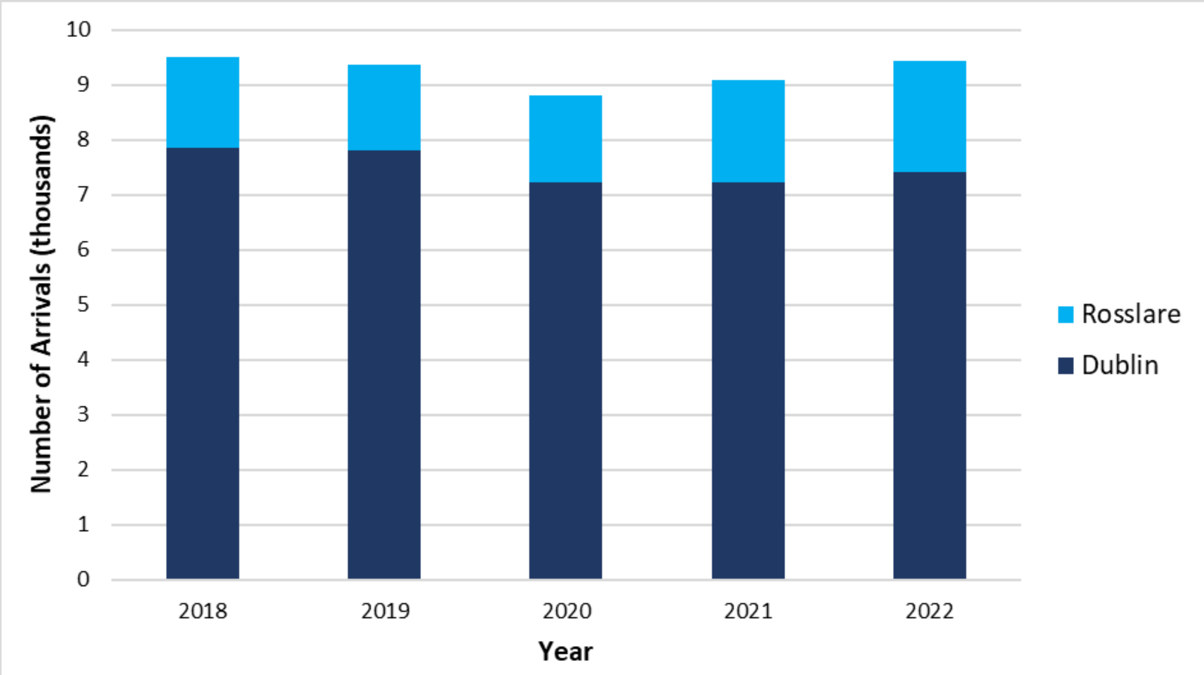

Figure 9.27 Commercial Vessel Arrivals at Dublin and Rosslare (2018 – 2022)

Antwerp (5%) was also a common destination broadcast on AIS. In October 2022, the Port of Antwerp-Bruges (Belgium) officially approved plans for the renewal of the quayside facilities and terminal at the Europa Terminal. This will include the deepening of the terminal by 2.5 m to accommodate larger vessels which will increase the terminal's capacity by over 700,000 Twenty Foot Equivalent Units (TEU) annually. Works commenced in 2022, and are anticipate to take up to nine years to complete. This development will allow the port to adapt to future shipping demands and accommodate larger container ships, which will increase the number of vessels able to berth there in the future.

The Port of Liverpool made up approximately 5% of commercial destinations, and is operated by Peel Ports, who have plans to invest £200m in sustainable port infrastructure projects by summer 2024 (Ref. xii). There are currently no detailed plans on expansion at Liverpool. Recent developments have included the completion of the Liverpool2 container terminal in

2016, which increased the port's ability to handle the largest container ships. Between 2017 and 2022, there has been an 11% decrease in vessel arrivals at Liverpool, with arrivals being relatively unchanged since 2020.

Fishing vessel made up approximately 15% of vessel traffic within the study area, however fishing trends are difficult to project accurately into the future, as these are dependent on numerous factors including fish stocks and quotas. Climate change may also play a significant role in future changes to fishing activity. Changes to legislation following Brexit may also impact the size and make-up of the fishing fleet in UK waters.

Recreational vessels made up approximately 7% of vessels within the study area, and activity can be similarly difficult to predict to that of fishing vessels, but is assumed to remain similar or slightly increase in future years. Similarly the make-up of recreational traffic may vary, with sail and electric-powered vessels expected to become more prominent in place of diesel-fuelled craft. The locations of recreational activity may also vary, while volume of activity may be dependent on other factors such as the weather, climate change and the economy.

10 Electromagnetic Interference

A compass, magnetic compass, or mariner's compass is a navigational instrument for determining direction relative to the earth's magnetic poles. It consists of a magnetised pointer (usually marked on the north end) free to align itself with the earth's magnetic field. A compass can be used to calculate heading, used with a sextant to calculate latitude, and with a marine chronometer to calculate longitude.

Like any magnetic device, compasses are affected by nearby ferrous materials as well as by local electromagnetic forces, such as magnetic fields emitted from power cables. As the compass still serves as an essential means of navigation in the event of power loss or as a secondary source, it is important that potential impacts from EMF should be minimised to ensure continued safe navigation. The vast majority of commercial traffic uses non-magnetic gyrocompasses as the primary means of navigation, which are unaffected by EMF. Therefore, it is considered highly unlikely that any interference from EMF as a result of the presence of the cables will have a significant impact on vessel navigation. However some smaller craft (fishing or leisure) may rely on them as their sole means of navigation.

The cables will be HVDC with an expected EMF of 79μT. The Moray Offshore Renewables Environmental Statement (Ref. xiii) notes that for both buried and protected DC cables the magnetic field will decrease exponentially with vertical distance from the seabed and with horizontal distance from the cables (within a few metres), irrespective of whether cables are buried or protected. It states that "*in all cases, where cables are buried to 1m depth, the predicted magnetic field is expected to be below the earth's magnetic field (assumed to be 50μT). Where DC cables cannot be buried and are instead protected, the magnetic field is expected to be below the earth's magnetic field within 5m from the seabed*".

The cables are planned to be bundled. Industry experience in cable installation shows that, for bundled cables or cables installed in close proximity to one another, the fields between the two cables will cancel each other out and therefore the external magnetic fields will be negligible (Ref. xiv).

The following are therefore considered to be important factors affecting the likelihood of EMF to affect compass deviation as a result of the presence of cables:

- spacing or separation of the cables;
- water depth;
- burial depth (or protection); and/or
- type of current (alternating or direct) running through the cables.

Within their response to the Xlinks Scoping Report the MCA stated that a compass deviation of three degrees will be accepted for 95% of the cable route and a five degree deviation accepted for the remaining 5%. **Table 10.1** details assumed EMF mitigation for the Proposed Development.

Table 10.1 EMF Mitigation

Mitigation	Reasoning	Percentage of Export Cable Applied to
Cables are installed in close proximity / bundled	Industry experiences in cable installation and offshore renewables shows that bundled cables or cables closely installed mitigate the effects of EMF.	100%
Water depth >10m	Increased water depth (vertical distance) mitigates the effects of the EMF.	Approximately 99.5% is within depths greater than 10 m CD.
Water depth >20m	Increased water depth (vertical distance) mitigates the effects of the EMF.	Approximately 97.1% is within depths greater than 20 m CD.
Cable burial	Burial depth also increases vertical distance. The cable will be buried to a target depth of 1.5m.	60% of the Offshore Cable will be buried. 40% of the Offshore Cable would be protected

Given that the cables will be bundled and 99.5% will be in water depths greater than 10m there are not anticipated to be any effects on compass deviation. Within shallow waters effects of EMF will be mitigated by the cables being HDD, with HDD exit points anticipated to be either 540 m offshore, at -6 m LAT, or 1,360 m, at a depth of -9 m LAT.

11 NRA Impact Assessment

This section provides a qualitative and quantitative risk assessment (using FSA) for the hazards identified associated with the Proposed Development, based on baseline data, expert opinion, stakeholder feedback and lessons learnt from existing offshore developments.

For each hazard, various subsections are provided as appropriate to consider each component of the hazard, both qualitative and quantitatively.

Within each component of an overarching hazard, embedded mitigation measures which have been identified as relevant to reducing risk are listed, with full descriptions provided in **section 11.2**. This is followed by statements defining the frequency of occurrence and severity of consequence for each component of the hazard in **bold** text, as defined in **section 4.2**.

At the end of the assessment of each hazard, these frequency of occurrence and severity of consequence rankings are summarised, with the resulting significance of risk given in **highlighted bold** text, as defined in **section 4.2**.

11.1 NRA Impacts Overview

The impacts identified during each phase of the Proposed Development are summarised and listed below, with reference to the relevant phase; Construction (C), Operational (Op), Operational during repairs (Op_{repair}), Decommissioning with the cables left in-situ ($D_{in\text{-}situ}$) and Decommissioning with the cables removed (D_{remove}):

- Collision of a third-party vessel with a vessel associated with cable installation, maintenance or decommissioning (C, Op_{repair}, D_{remove});
- Cable installation/decommissioning causing disruption to passing vessel routeing/timetables (C, D_{remove});
- Increase in the risk of a vessel-to-vessel collision due to construction/decommissioning vessel activity (C, D_{remove});
- Cable installation/decommissioning causing disruption to fishing and recreational activities (C, D_{remove});
- Cable installation/decommissioning causing disruption to third party marine activities (e.g., military, dredging) (C, D_{remove});
- Reduced access to local ports/harbours (C, Op_{repair}, D_{remove});
- Anchor interaction with the cable (C, Op, Op_{repair}, $D_{in\text{-}situ}$, D_{remove});
- A vessel engaged in fishing snags its gear on the cable (C, Op, Op_{repair}, $D_{in\text{-}situ}$, D_{remove});
- Reduction in under keel clearance resulting from laid cable and associated protection (C, Op, Op_{repair}, $D_{in\text{-}situ}$, D_{remove}); and
- Interference with marine navigational equipment (Op, Op_{repair}).

11.2 Embedded Mitigation Measures

As part of the design process for the Proposed Development, a number of embedded mitigation measures have been adopted to reduce the potential for risk to shipping and navigation. These measures have evolved over the project during preparation of the ES and in response to consultation.

These measures include those identified as typically good or standard industry practice, and those that would be required to meet existing legislation requirements. As the project is committed to implementing these measures, along with standard sectoral practices and procedures, they are considered to make up part of the design of the Proposed Development. The embedded mitigation measures considered are presented in **Table 11.1**.

Table 11.1 Embedded Mitigation Measures

Measure Adopted	How the Measure Will be Secured
Development of a Vessel Management Plan (as part of a Navigational Safety and Vessel Management Plan) which would set out pre-agreed vessel routes, speeds, safety measures, communication expectations etc.	An outline VMP is included within Volume 3, Appendix 5.2: Outline Navigational Safety and Vessel Management Plan of the ES. The final VMP will be updated through consultation with relevant stakeholders and the construction contractor when full details of the construction programme are finalised. The Navigational Safety and Vessel Management Plan is a requirement of the Outline Offshore Construction Environmental Management Plan (document ref. 7.9).
Suitable implementation and monitoring of cable protection as informed by Cable Burial Risk Assessment (CBRA), taking into account anchoring and fishing practices. Burial is preferred method of protection, with rock protection expected to be used at cable crossings and where target depth and burial with existing sediments is not possible.	Design parameters are taken forward into Offshore Construction Environmental Management Plan, which is a requirement of the Deemed Marine Licence (a draft is provided with the application for Development Consent Order (DCO)).
Compass deviation effects will be minimised through cable design and burial.	The cables will be bundled to minimise EMF effects. This is secured within the design parameters (Outline Offshore Construction Environmental Management Plan).
Relevant policy guidance on water depth reduction to be followed during the design and construction of the project. Following further survey and detailed engineering, if areas are identified where external protection is required and the MCA condition of no more than 5% reduction in water depth is not achievable, a location specific review of	Water depth reduction will be required to be in line with MCA requirements, which will be required to be met as part of the consent conditions (Deemed Marine Licence).

Measure Adopted	How the Measure Will be Secured
impacts to shipping and consultation with the MCA and Trinity House will be carried out and additional mitigations agreed as required.	
Promulgation of information via Notices to Mariners (NtM), Kingfisher bulletins, the Kingfisher Information Service – Offshore Renewable & Cable Awareness (KIS-ORCA) service, Radio Navigational Warnings on Very High Frequency (VHF) radio, Navigational Telex (NAVTEX), and/or broadcast warnings in advance of and during the offshore works. Details to be set out in the Vessel Management Plan. Regular operators including ferry operators, will be informed in advance of commencement of works.	Details of how information will be promulgated to be set out within Navigational Safety and Vessel Management Plan, which is a requirement of the Outline Offshore Construction Environmental Management Plan.
Compliance with international legislation, both for Project vessels and third-party vessels. This includes the COLREGs and SOLAS.	Legal requirement to comply with international legislation. Also will be a pre-requisite of the Offshore Construction Environmental Management Plan.
A Fisheries Liaison Officer (FLO) will be appointed to allow for the communication and liaison between the applicant and commercial fisheries during the construction phases.	An FLO has already been appointed to the project, and will continue to be engaged for the duration of the construction phase as a minimum. Listed requirement of the Deemed Marine Licence.
Cable installation vessels and support vessels will display appropriate lights and marks at all times, and broadcast their status on AIS. This will include indication of the nature of the work in progress and highlight their restricted manoeuvrability.	Via Navigational Safety and Vessel Management Plan which is a requirement of the Outline Offshore Construction Environmental Management Plan (application document ref. 7.9).
Guard vessel(s) will be employed to work alongside the installation vessel(s) during the construction period. These will alert third-party vessels to the presence of the installation activity and provide support in the event of an emergency.	Via Navigational Safety and Vessel Management Plan which is a requirement of the Outline Offshore Construction Environmental Management Plan (application document ref. 7.9).

Measure Adopted	How the Measure Will be Secured
Marine coordination and communication to manage Project vessel movements.	Via Navigational Safety and Vessel Management Plan which is a requirement of the Outline Offshore Construction Environmental Management Plan (application document ref. 7.9).
Passing vessels will be requested to maintain a "safe" distance from installation vessels restricted in manoeuvrability. This will be monitored by guard vessels.	Via Navigational Safety and Vessel Management Plan which is a requirement of the Outline Offshore Construction Environmental Management Plan (application document ref. 7.9).
The cable will be clearly marked on Admiralty Charts with associated note/warning about anchoring, trawling or seabed preparation.	Data sharing with UKHO provisioned on Deemed Marine Licence.
Liaison with pilotage service at Bideford to reduce impact on vessel access and disruption to activities.	Good practice, and via Notices to Mariners.
Liaison with the MOD to reduce disruption to military activities. Information on final design and post-installation surveys to be provided to the MOD if requested.	Good practice regarding communications. MOD (Defence Infrastructure Organisation) will be provided with details of as laid rock protection and post-installation survey data - as specified requirement of the Deemed Marine Licence.
A Marine Pollution Contingency Plan (MPCP) will be produced as part of the CEMP and will include measures to minimise the impact of any events as well as compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL).	Pre-requisite contractor requirement secured via final offshore CEMP (outline Offshore CEMP provided as application document 7.9).

11.3 NRA Assessment of Impacts

This section presents the analysis of the impacts that have been considered as part of the FSA process.

11.3.1 Assessment of Construction Effects

11.3.1.1 Collision of a Passing Third-Party Vessel with a Vessel Associated with Cable Installation

There is an increased risk of collision due to the presence of vessels associated with the installation of the Proposed Development. This includes vessels involved in HDD works, pre-lay surveys, preparation of the route, cable-lay and post-lay burial and protection works.

The nature of certain aspects of cable installation requires large, slow-moving vessels which will be Restricted in their Ability to Manoeuvre (RAM). Therefore, these vessels may have limited ability to take avoidance action to prevent a collision with a passing vessel. The risk is considered to be lower for smaller support vessels such as tugs and guard vessels due to their increased mobility.

Vessel collision risk will be higher in busier areas of shipping. The vessel traffic baseline identified busy areas of shipping associated with vessels utilising the TSS lanes around the Isles of Scilly, as well as crossing the Offshore Cable Corridor between Lundy and the landfall, associated with vessels entering the Bristol Channel.

At any given time, the spatial extent to which vessels are required to deviate is expected to be small. As the cable installation and protection works will be moving along the Offshore Cable Corridor throughout the construction period, it is also anticipated that the impact on any single area will be short-term. Cable lay will typically take place at speeds of 400-500 m per hour, while trenching/jetting and protection works are expected to progress at approximately 150 m per hour.

In addition to the main cable installation works, there will be project vessel movements associated with HDD works, pre-lay surveys, preparation of the route, pre-sweeping, and post-lay burial and protection works. HDD works are planned to be carried out ahead of the main cable installation and may involve the use of up to two jack-up vessels working in the nearshore area. Burial and protection activities would progress broadly in parallel with the expectation that cable lay and the start of burial would be just a few days apart (noting that burial and protection activities would take longer to complete than the cable lay).

Project vessels will be managed by marine coordination, will display suitable marks and lights, will broadcast on AIS (including relevant navigational status where appropriate) and will be compliant with relevant Flag State regulations including the COLREGs and SOLAS. Details of construction activities, including any advisory safe passing distances will be suitably promulgated via NtM, Kingfisher bulletins, Radio Navigational Warnings, NAVTEX and/or broadcast warnings to maximise awareness of ongoing construction activities. Communications with local ports and harbours, including pilot vessel operators at Bideford, about the construction activities and appointment of a FLO will also help to ensure local users are aware of works and minimise collision risk. Guard vessels will also be used where deemed necessary to raise awareness of construction work to passing vessels, and guide vessels around any areas of construction activities.

Severity of Consequence

The most likely consequences in the event of a collision incident between a project vessel and third-party vessel are minor contact between the vessels resulting in minor damage to property and minor reputational effects on business but no perceptible effect on people. The worst-case scenario could involve one of the vessels foundering resulting in Potential Loss of Life (PLL) and the environmental consequence of pollution. Such a scenario would be more likely if the third-party vessel involved was a small craft which may have weaker structural integrity than a commercial vessel. If pollution were to occur in proximity to the Proposed Development, or as a result of a collision involving a project vessel, then the MPCP would be implemented to minimise the impact on the environment.

Overall, the severity of consequence is considered to be **moderate**.

Frequency of Occurrence

With the mitigation measures noted above implemented, it is considered unlikely that a close encounter between a third-party vessel and a project vessel will occur. In the event that such an encounter does occur, collision avoidance action would be implemented by the vessels as per the COLREGs, including Rule 18 which governs responsibilities between vessels if one is RAM, thus ensuring that the likelihood of the encounter developing into a collision incident is very low.

The frequency of occurrence is therefore considered to be **remote**.

Tolerability of Effect

Overall, the severity of consequence is deemed to be moderate, and the frequency of occurrence is considered to be remote, giving an overall ranking of **tolerable**.

11.3.1.2 Cable Installation Causing Disruption to Passing Vessel Routeing/Timetables

Construction works may also cause disruption to vessel routeing/timetables. This will most likely affect busier areas of shipping where vessels are transiting on regular routes with a defined schedule. Within the study area, this is most likely to affect vessels making use of the TSS lanes around the Isles of Scilly, crossing the Offshore Cable Corridor entering or leaving the Bristol Channel, or regular vessels passing between Bideford and Lundy.

Additionally, cable installation will be a 24-hour operation to reduce the overall number of days required for the construction phase. At any given time, the spatial extent to which vessels are required to deviate is expected to be small. As the cable installation and protection works will be moving along the Offshore Cable Corridor throughout the construction period, it is also anticipated that the impact on any single area will be short-term. Cable lay will typically take place at speeds of 400-500 m per hour, while trenching/jetting and protection works are expected to progress at approximately 150 m per hour.

In addition to the main cable installation works, there will be project vessel movements associated with HDD works, pre-lay surveys, preparation of the route and post-lay burial and protection works. HDD works are planned to be carried out ahead of the main cable installation and may involve the use of up to two jack-up vessels working in the nearshore area. Burial and protection activities would progress broadly in parallel with the expectation that cable lay and the start of burial would be just a few days apart (noting that burial and protection activities would take longer to complete than the cable lay).In nearshore areas, disruption may be caused to vessels on approach to ports and harbours in proximity to the Offshore Cable Corridor, particularly vessels within Bideford Bay near the landfall. During consultation with the harbour master and pilot at the Port of Bideford, it was noted that the landfall is sufficiently far from the pilot boarding location to avoid any impact from landfall works.

Through promulgation of information, the majority of vessels should be aware of ongoing construction activities, allowing passage planning to be carried out to minimise impact on schedules. During consultation, ferry operators suggested that no major re-routeing would be required due to construction activities, but asked to be kept informed on developments. It was also noted that ferries are familiar with navigating around vessels which are RAM, and that this would be unlikely to be a concern.

Severity of Consequence

The most likely consequences are minor reputational effects on business but no perceptible effect on people.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

The impact will be present throughout the construction phase, which will take place over several phases, beginning in 2027. The spatial extent around which vessels are required to deviate around vessels which are RAM is expected to be small at any given time. Cable installation will also be a 24-hour operation, which will reduce the overall length of the construction phase. Promulgation of information ensuring vessels are aware of works should also allow third-party vessels to passage plan if required to minimise disruption.

The frequency of occurrence is considered to be **reasonably probable**.

Tolerability of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be reasonably probable, giving an overall ranking of **tolerable**.

11.3.1.3 Increase in the Risk of Vessel-to-Vessel Collision due to Construction Activity

Construction activities may also cause displacement of third-party vessels, leading to an increased risk of collision between two third-party vessels. In particular, vessels may be required to deviate around large, slow-moving vessels such as CLVs which may be RAM.

The risk of vessel displacement leading to increased encounters between third-party vessels and therefore increased collision risk is likely to be greatest in high density shipping areas, such as routes associated with the TSS lanes around the Isles of Scilly and between Lundy and the landfall.

Additionally, cable installation will be a 24-hour operation to reduce the overall number of days required for the construction phase. At any given time, the spatial extent to which vessels are required to deviate is expected to be small. As the cable installation and protection works will be moving along the Offshore Cable Corridor throughout the construction period, it is also anticipated that the impact on any single area will be short-term. Cable lay will typically take place at speeds of 400-500 m per hour, while trenching/jetting and protection works are expected to progress at approximately 150 m per hour.

In addition to the main cable installation works, there will be project vessel movements associated with HDD works, pre-lay surveys, preparation of the route, and post-lay burial and protection works. HDD works are planned to be carried out ahead of the main cable installation and may involve the use of up to two jack-up vessels working in nearshore area. Burial and protections activities would progress broadly in parallel with the expectation that cable lay and the start of burial would be just a few days apart (noting that burial and protection activities would take longer to complete than the cable lay).

Ensuring third-party vessels are aware of construction activities through mitigation measures such as promulgation of information will allow vessels to review, and revise if necessary, their passage plans prior to departure. In addition, project vessels will be managed by marine coordination, will display suitable marks and lights, will broadcast on AIS where appropriate (including relevant navigational status for vessels which are RAM) and will comply with relevant Flag State regulations including both SOLAS and the COLREGs. Guard vessels will also be used to raise awareness and guide vessels around any areas of construction activity.

Severity of Consequence

In the event of a collision incident between third-party vessels, the most likely consequences are minor contact between the vessels resulting in minor property damage and minor reputational effects on business, but no perceptible effects on people. The maximum adverse scenario could involve the foundering of one or more vessels, resulting in PLL and the environmental consequence of pollution. Such a scenario would be more likely to occur if a collision incident involved a smaller craft, which may have weaker structural integrity than a commercial vessel. If pollution were to occur in proximity to the Proposed Development, then the MPCP would be implemented to minimise the impact on the environment.

Overall, the severity of consequence is considered to be **moderate**.

Frequency of Occurrence

The impact will be present throughout the construction phase, which will take place overall several phases, beginning in 2027. As previously noted, the spatial extent around which vessels are required to deviate around vessels which are RAM is expected to be small at any given time. Cable installation will also be a 24-hour operation, which will reduce the overall length of the construction phase. Promulgation of information ensuring vessels are aware of works should also allow third-party vessels to passage plan if required.

The frequency of occurrence is therefore considered to be **remote**.

Tolerability of Effect

Overall, the severity of consequence is deemed to be moderate, and the frequency of occurrence is considered to be remote, giving an overall ranking of **tolerable**.

11.3.1.4 Cable Installation Causing Disruption to Fishing and Recreational Activity

During the construction phase, there is a risk that construction works cause disruption to fishing and recreational vessels within the study area. From the baseline characterisation, it can be seen that there are fishing and recreational vessels recorded throughout the study area. This impact is likely to be greatest for recreational users in nearshore areas, such as close to the cable landfall within Bideford Bay, and for fishers throughout the study area. Fishing and recreational vessels may be displaced from these typical areas into busier areas, increasing the likelihood of encounters with larger commercial vessels. This impact will be present throughout the construction phase, including the main cable installation, as well as HDD works, pre-lay surveys, preparation of the route and post-lay burial and protection works.

Additionally, cable installation will be a 24-hour operation to reduce the overall number of days required for the construction phase. At any given time, the spatial extent to which vessels are required to deviate is expected to be small. As the cable installation and protection works will be moving along the Offshore Cable Corridor throughout the construction period, it is also anticipated that impact on any single area will be short-term. Cable lay will typically take place at speeds of 400-500 m per hour, while trenching/jetting and protection works are expected to progress at approximately 150 m per hour.

In addition to the main cable installation works, there will be project vessel movements associated with HDD works, pre-lay surveys, preparation of the route, pre-sweeping, and post-lay burial and protection works. HDD works are planned to be carried out ahead of the main cable installation and may involve the use of up to two jack-up vessels working in nearshore area. Burial and protection activities would progress broadly in parallel with the expectation that cable lay and the start of burial would be just a few days apart (noting that burial and protection activities would take longer to complete than the cable lay).Promulgation of information and the use of guard vessels where required are expected to ensure sea users are aware of construction works. However, recreational users may be less aware of construction works than commercial vessels. Liaison with local ports/harbours and distribution of local NtMs will help to inform recreational vessels of construction works. The use of promulgation methods including Kingfisher bulletins should also assist with increasing awareness among fishers and recreational users. The appointment of an FLO will help raise awareness among local fishers. All vessels will be expected to comply with international marine legislation, including the COLREGs and SOLAS.

During consultation, both the RYA and the Cruising Association noted that with typical mitigation measures in place, such as promulgation of information, project vessels displaying suitable marks and lights, and the use of both AIS and radar for watchkeeping, the impact on recreational users should be minor.

Severity of Consequence

The most likely consequences from fishing and recreational disruption are minor reputational effects on business, with no perceptible impact on people.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

The frequency of occurrence is therefore considered to be **reasonably probable**.

Tolerability of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be reasonably probable, giving an overall ranking of **tolerable**.

11.3.1.5 Cable Installation Causing Disruption to Third-Party Marine Activities

There is a potential for construction works to cause disruption to third-party marine activities, such as military exercises or dredging. As noted in the baseline environment characterisation, there are military exercise areas within the study area, with one of these being a navy exercise area overlapping the south of Offshore Cable Corridor. A further three exercise areas used for air activity are located overlapping the north of the Offshore Cable Corridor. It was noted during consultation that D064A is used by the Navy for air activity, and that the only surface presence may be aircraft carriers. Therefore, there is potential for military exercises to be disrupted by cable installation works. Military vessels were generally observed to be transiting through the study area, except for vessels in Bideford Bay and to the east of Lundy. It is noted that military vessels are not required to broadcast on AIS and therefore may be under-represented.

Additionally, cable installation will be a 24-hour operation to reduce the overall number of days required for the construction phase. At any given time, the spatial extent to which vessels are required to deviate is expected to be small. As the cable installation and protection works will be moving along the Offshore Cable Corridor throughout the construction period, it is also anticipated that impact on any single area will be short-term. Cable lay will typically take place at speeds of 400-500 m per hour, while trenching/jetting and protection works are expected to progress at approximately 150 m per hour.

In addition to the main cable installation works, there will be project vessel movements associated with HDD works, pre-lay surveys, preparation of the route, pre-sweeping, and post-lay burial and protection works. HDD works are planned to be carried out ahead of the main cable installation and may involve the use of up to two jack-up vessels working in nearshore area. Burial and protection activities would progress broadly in parallel with the expectation that cable lay and the start of burial would be just a few days apart (noting that burial and protection activities would take longer to complete than the cable lay).

Dredgers were recorded within the study area; however these were observed to be transiting rather than carrying out dredging.

Severity of Consequence

The most likely consequences from disruption to third-party marine activities are minor reputational effects on business but no perceptible effect on people.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

Given the low volumes of military vessels and dredgers recorded within the study area, and that the vast majority of these were recorded transiting rather than engaged in activities, it is anticipated that any disruption can be suitably managed by liaison with the MoD in advance of construction works. Consultation with the MOD was carried out to provide information on military activities in the area, and further liaison will be held as the development progresses. The MOD noted during consultation that they may request finalised design information, including the location and design of external protection.

The frequency of occurrence is therefore considered to be **remote**.

Tolerability of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be remote, giving an overall ranking of **broadly acceptable**.

11.3.1.6 Reduced Access to Local Ports/Harbours

There is potential for reduced access to local ports and harbours due to construction works, particularly for nearshore works in Bideford Bay close to the landfall. This is most likely to affect ports and harbours within the Taw Torridge Estuary, namely Bideford, Appledore and Yelland. The entrance to the rivers lies approximately 2.7 nm to the north of the landfall of the Offshore Cable Corridor, with entrance only recommended two hours either side of high water. Pilotage is operated by the Port of Bideford, with the pilot boarding station located 2.6 nm north of the cable landfall.

Vessel movements associated with construction activities may lead to temporary reduction of access or disruption to pilotage, particularly if project vessels are using one of the local harbours. HDD works in particular have potential to lead to disruption given these may involve large jack-up vessels which are RAM in nearshore areas.

Additionally, cable installation will be a 24-hour operation to reduce the overall number of days required for the construction phase. At any given time, the spatial extent to which vessels are required to deviate is expected to be small. As the cable installation and protection works will be moving along the Offshore Cable Corridor throughout the construction period, it is also anticipated that the impact on any single area will be short-term. Cable lay will typically take place at speeds of 400-500 m per hour, while trenching/jetting and protection works are expected to progress at approximately 150 m per hour.

In addition to the main cable installation works, there will be project vessel movements associated with HDD works, pre-lay surveys, preparation of the route and post-lay burial and protection works. HDD works are planned to be carried out ahead of the main cable installation and may involve the use of up to two jack-up vessels working in the nearshore area. Burial and protection activities would progress broadly in parallel with the expectation that cable lay and the start of burial would be just a few days apart (noting that burial and protection activities would take longer to complete than the cable lay).

Project vessels will be managed by marine coordination, will display suitable marks and lights, will broadcast on AIS (including relevant navigational status where appropriate) and will be compliant with relevant Flag State regulations including the COLREGs and SOLAS. Promulgation of information and liaison with local pilots, ports and harbours should also limit disruption to access.

Severity of Consequence

Vessels which are RAM used during both HDD works and the main cable installation, such as the CLV or jack-up vessels may lead to a temporary reduction in access to vessels using Bideford, Yelland or Appledore. The most likely consequences are minor reputational effects on business but no perceptible effect on people.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

The impact will be present during installation of the cable, particular during nearshore works at the landfall. Cable-lay is expected to take place over several stages, with works beginning in March 2028.

Based on the AIS data, less than one vessel per day was recorded entering the rivers. Vessel types using ports/harbours within the rivers were mainly fishing and recreational vessels, with a regular passenger route to Lundy and Ilfracombe also recorded. It is noted that small craft entering the area may be under-represented on AIS.

The frequency of occurrence is therefore considered to be **reasonably probable**.

Tolerability of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be reasonably probable, giving an overall ranking of **tolerable**.

11.3.1.7 Anchor Interaction with the Cable

There is a potential for risk of interaction from anchors with surface-laid cables prior to burial, during which time the cable will be exposed. Burial and protection activities would progress broadly in parallel, minimising the period during which the cable is exposed on the seabed, with the expectation that cable lay and the start of burial would be just a few days apart (noting that burial and protection activities would take longer to complete than the cable lay).

There is a risk that a nearby anchored vessel may lose its holding ground, and subsequently drag anchor over the cable. Vessels at anchor within the study area (baseline assessment) were mostly located within Bideford Bay or in proximity to Lundy. There was a low level of anchoring recorded across the majority of the study area.

There is also a risk that a vessel may suffer engine failure, and choose to drop anchor to avoid drifting into an emergency situation such as collision, allision or grounding. This is most likely to occur in areas of busy shipping, such as those associated with the TSS lanes around the Isles of Scilly or on passage to/from the Bristol Channel.

In open waters, where depths are deeper and anchoring not always feasible, it is more likely that a vessel attempts to fix the problem or awaits assistance.

Severity of Consequence

While the cable is exposed, any vessel anchor could interact with it. Should an anchor become snagged on the cable, there could be a risk of injury while trying to free it. If the anchor cannot be freed from the cable, the safest action is to the slip the anchor, rather than attempting to raise or cut the cable.

The most likely consequences are limited damage to property (anchoring vessel or subsea cable), with greater damage possible depending on the anchor size and the nature of the interaction.

The severity of consequence is therefore considered to be **moderate**.

Frequency of Occurrence

As noted, the majority of anchoring activity takes place within Bideford Bay, close to the cable landfall, or off Lundy. Anchoring activity within the study area is generally low, with less than a vessel every two days recorded at anchor.

Within the study area, the busiest areas of shipping are associated with vessels using the TSS lanes around the Isles of Scilly, and crossing the Offshore Cable Corridor in proximity to the landfall on passage to / from the Bristol Channel. A review of historical incident data from the RNLI revealed that machinery failures were among the most common incident type in the study area, with these having the potential to lead to an emergency anchoring situation.

Although there may be limited decision-making time in the event of a vessel drifting towards a hazard, charting of infrastructure including all subsea cables will inform any decision to anchor, as per Regulation 34 of SOLAS.

Mitigation measures will include promulgation of information, to ensure vessels are aware of the exposed cable, and the use of guard vessels where exposed areas of cable are considered to present a significant risk to navigation.

The frequency of occurrence is considered to be **extremely unlikely**.

Tolerability of Effect

Overall, the severity of consequence is deemed to be moderate, and the frequency of occurrence is considered to be extremely unlikely, giving an overall ranking of **broadly acceptable**.

11.3.1.8 Vessel Engaged in Fishing Snags its Gear on the Cable

5.8.95 Similar to impacts associated with vessel anchors, there is the potential for risk of interaction from fishing gear with surface-laid cables prior to burial or installation of external protection. As previously noted, this is expected to be a short period as cable lay and burial / protection are expected to be carried out in parallel.

Severity of Consequence

Although fishers are advised to follow the current maritime industry guidance (MGN 661, the Mariner's and all Admiralty charts) and avoid demersal trawling (and anchoring) in the immediate vicinity of the cables, it is acknowledged that fishing may still occur over the cables either inadvertently, or at the discretion of fishing vessel operators.

There is higher risk of snagging from demersal gear if the cable is exposed. The response from the crew includes reducing/reversing the propulsive force, attempting to unfasten the equipment, or releasing the gear and therefore in the majority of snagging incidents, it should be possible to recover the situation without any serious consequences (e.g. injury or fatality to crew members). However, accident data from the MAIB indicates that safe recovery from a snagging incident is not always the outcome. Consequences of snagging therefore range from damage to gear and the cable, loss of stability due to lines being put under strain and in the worst case, capsize of the vessel, men overboard and risk of injury or fatality. For example, a risk of capsize could occur if the vessel attempted to free its gear by raising the cable rather than releasing the gear.

The severity of consequence is therefore considered to be **serious**.

Frequency of Occurrence

Fishing vessels carrying demersal gear that interacts with the seabed when deployed present the greatest risk of snagging on subsea cables. Static gear types (e.g., potters/whelkers and gill netters) are not considered to present a safety risk from snagging, as they are able to select the position of their gear to avoid any subsea cables. Demersal trawlers made up 34% of all fishing vessels recorded in the study area. Demersal fishing was prevalent throughout the study area, with the exception of near Lundy and off the northwest of the Devon coast. It is noted that fishing vessels may be under-represented on AIS, particularly in coastal areas. However, vessels not on AIS are most likely to be using static gear, which is not considered a snagging risk.

It is expected that mitigation measures including the appointment of an FLO, promulgation of information via means including Kingfisher bulletins and local communications will help ensure fishers are aware of exposed cable and avoid fishing directly over it. Guard vessels will also be in place to raise awareness of exposed cable where a significant risk to navigation has been found.

The frequency of occurrence is therefore considered to be **remote**.

Tolerability of Effect

Overall, the severity of consequence is deemed to be serious, and the frequency of occurrence is considered to be remote, giving an overall ranking of **tolerable**.

11.3.1.9 Reduction in Under Keel Clearance from Laid Cable and Associated Protection or at the Landfall

There is a risk that external cable protection measures reduce under keel clearance leading to potential vessel grounding incidents. This could lead to subsequent capsize, injury, loss of life, oil spills, etc. In general, this risk is greatest in coastal areas where existing water depths are shallower. Burial and protection activities would progress broadly in parallel with the expectation that cable lay and the start of burial would be just a few days apart (noting that burial and protection activities would take longer to complete than the cable lay). This impact may be present during the construction phase as soon as the first section of cable requiring external protection has been laid.

It is planned to bury the cable to a target depth of 1.5 m. External protection up to an approx. maximum height of 1.4 m will be required at 20 live cable crossings, as well as up to 5 OOS cable crossings as a worst case. Where seabed characteristics do not allow full burial protection, rock protection may extend above seabed level, up to 1 m in height. The minimum water depth at the cable crossing locations is 42.5 m. The maximum height of external protection is 1.4 m therefore corresponding to a 3% reduction in water depth at cable crossings.

The Cable Burial Risk Assessment (CBRA) (an Outline CBRA is presented as Volume 1, Appendix 3.4 of the ES) has indicated a low risk to full target depth burial across Bideford Bay, where the seabed is dominated by sandy sediments. Thus the potential requirement for any rock placement in this area, where water depths are most shallow, is considered to be very low probability.

HDD will be utilised at the cable landfall, with ducts bringing the cable to between c. 500 m and c. 1,800 m offshore, with charted water depths in these areas being between c. 5 m and 10 m respectively. At the exit point offshore, the ducts may be sealed until ready to receive the cables. If there is a temporary reduction in under keel clearance associated with the HDD exit points, consultation with Trinity House will be undertaken to confirm if temporary marking is required.

Should external protection reduce water depth by more than 5% in any area, this will require consultation with the MCA and detailed assessment may be required following further surveys and detailed engineering to ensure navigational safety is not compromised.

Severity of Consequence

Should a vessel grounding occur, the most likely consequences are minor damage to property and minor reputational effects on business but no perceptible effect on people. The maximum adverse scenario may include the vessel foundering resulting in PLL and the environmental consequence of pollution. If pollution were to occur in proximity to the Proposed Development, then the MPCP would be implemented to minimise the impact on the environment.

Overall, the severity of consequence is considered to be **moderate**.

Frequency of Occurrence

The likelihood of a grounding is greater for larger vessels with deeper draughts noting that deep draught vessels within the study area were typically recorded passing further offshore in deeper water as opposed to coastal areas.

The maximum height of external protection will be c.1.4 m, which will be used at the 20 live cable crossings (and up to 5 OOS cable crossings). Elsewhere rock protection extending above the seabed level is considered to be the last resort in terms of preferred protection, with other burial techniques pursued in the first instance.

The average draught of vessels recorded within the study area was 7.0 m, while the maximum draught was 21.6 m. The maximum draught was recorded by a crude oil tanker visiting Rotterdam, crossing the Offshore Cable Corridor south of the Isles of Scilly in water depths in excess of 100 m. Draughts in the shallower areas around the landfall did not typically exceed 5 m in water depths below 20 m. If there is a reduction in water depth associated with the HDD exit point, this is most likely to have an effect on small vessels such as recreational and fishing vessels, due to the shallow water depths around the landfall.

Due to the temporary nature of this impact during the construction phase, the frequency of occurrence is considered to be **extremely unlikely**.

Tolerability of Effect

Overall, the severity of consequence is deemed to be moderate, and the frequency of occurrence is considered to be extremely unlikely, giving an overall ranking of **broadly acceptable**.

11.3.2 Assessment of Operational Effects

The impacts of the operation and maintenance phase of the Proposed Development have been assessed. A description of the potential effect on shipping and navigation caused by each identified impact is given below. Unless otherwise specified, each impact is relevant to both the operational and operational-repair phases.

11.3.2.1 Collision of a Passing Third-Party Vessel with a Vessel Associated with Cable Maintenance

Once the Proposed Development is operational, the risk of collision between third-party vessels and a project vessel remains only during periods of maintenance and repair work, or during inspection surveys. Surveys would be carried out by a single survey vessel.

Unplanned maintenance works (operational-repair) may require cable repairs involving the de-burial and recovery of the cable, before following a similar procedure to installation for repair, but at a smaller, local scale. Therefore vessels which are RAM may be required to carry out repairs. Project vessels will be managed by marine coordination, will display suitable marks and lights, will broadcast on AIS and be compliant with relevant Flag State regulations including SOLAS and the COLREGs.

As per the construction phase, other key mitigation measures will include promulgation of information via means such as NtM, Kingfisher bulletins, Radio Navigational Warnings, NAVTEX and/or broadcast warnings to maximise awareness of repair works.

Severity of Consequence

The most likely consequences in the event of a collision incident between a project vessel and third-party vessel are minor contact between the vessels resulting in minor damage to property and minor reputational effects on business but no perceptible effect on people. The worst-case scenario could involve one of the vessels foundering resulting in PLL and the environmental consequence of pollution. Such a scenario would be more likely if the third-party vessel involved was a small craft which may have weaker structural integrity than a commercial vessel. If pollution were to occur in proximity to the Proposed Development, or involving a project vessel, then the MPCP would be implemented to minimise the impact on the environment.

Overall, the severity of consequence is considered to be **moderate**.

Frequency of Occurrence

With the mitigation measures noted above implemented, it is considered unlikely that a close encounter between a third-party vessel and a project vessel will occur. In the event that such an encounter does occur, collision avoidance action would be implemented by the vessels as per the COLREGs, including Rule 18 which governs responsibilities between vessels if one is RAM, thus ensuring that the likelihood of the encounter developing into a collision incident is very low. Furthermore, although the risk will be present throughout the 50 year operational lifetime of the project, project vessel presence during the operational phase will be limited to single survey vessels during routine surveys (operational phase-normal), or vessels carrying out unplanned repair works (operational phase-repair).

The frequency of occurrence is therefore considered to be **extremely unlikely**.

Significance of the Effect

Overall, the severity of consequence is deemed to be moderate, and the frequency of occurrence is considered to be extremely unlikely, giving an overall ranking of **broadly acceptable**.

11.3.2.2 Reduced Access to Local Ports/Harbours

There is potential for reduced access to local ports and harbours due to repair works during the operational phase, particularly for nearshore works in Bideford Bay close to the landfall.

Unplanned maintenance works (operational-repair) may require cable repairs involving the de-burial and recovery of the cable, before following a similar procedure to installation for repair, but at a smaller, local scale. Therefore, vessels which are RAM may be required to carry out repairs.

Project vessels will be managed by marine coordination, will display suitable marks and lights, will broadcast on AIS (including relevant navigational status where appropriate) and will be compliant with relevant Flag State regulations including the COLREGs and SOLAS. Promulgation of information via NtM should also limit disruption to access.

During consultation with the harbour master and pilot at the Port of Bideford, it was noted that the landfall is sufficiently far from the pilot boarding location to avoid any impact from works there.

Severity of Consequence

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

Given the brief and localised nature of any repair works required during the operational phase, the probability of access to local ports and harbours being reduced is considered to be low.

The frequency of occurrence is therefore considered to be **extremely unlikely**.

Tolerability of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be extremely unlikely, giving an overall ranking of **broadly acceptable**.

11.3.2.3 Anchor Interaction with the Cable

As per the construction phase, there is a risk that a vessel drags anchor over the cable. Baseline characterisations found anchoring activity within the study area to be low, with anchored vessels recorded within Bideford Bay and off Lundy. It is noted that during repair works during the operational phase, there may be a requirement to de-bury the cable or remove external protection, thus exposing a section of the cable. During these times, it is anticipated that the presence of project vessels involved with the repair, and the effective promulgation of information would ensure that vessels do not drop anchor on or near the exposed cable section.

During the operational phase, the cable will be marked on UKHO Admiralty Charts, with associated warning regarding anchoring, trawling or seabed operations.

There is also the possibility that a vessel drops anchor over the cable in an emergency, leading to potential interaction between the anchor and the cable. As noted in the construction phase, a vessel suffering engine failure may drop anchor to prevent drifting, particularly to avoid an incident such as a collision, allision or grounding. The greatest areas of risk are those with high density shipping, such as where vessels utilising the TSS lanes cross the Offshore Cable Corridor, or those entering/exiting the Bristol Channel. RNLI incident data reviewed for 2013 to 2022 showed that machinery failures, which in some cases may lead to vessels drifting, were among the most common incident types within the study area.

As per the impact on anchor dragging, cable burial to a target depth of 1.5 m (based on the Outline CBRA (Volume 1, Appendix 3.4 of the ES)) will protect the cable from vessel anchors. The Outline CBRA (and supporting studies) have identified that up to 150 km of the route will present challenges to achieving a full target trenching depth (on account of hard rock substrate types etc) and which may require some or total protection with rock placement. The cable will also be charted on UKHO Admiralty Charts to help inform anchoring decisions, noting that decision-making time may be limited if a vessel is drifting towards a hazard.

Severity of Consequence

Once the cable is protected by either burial or external protection, larger vessel anchors pose a greater threat to the cable than those belonging to smaller vessels, as they are able to penetrate deeper into the seabed and cause greater damage. The target burial depth of 1.5 m, or external rock protection where this is not feasible, will mitigate the risk from vessel anchors.

The most likely consequences are limited damage to property (anchoring vessel or subsea cable), with greater damage possible depending on the anchor size and the nature of the interaction.

The severity of consequence is considered to be **minor**.

Frequency of Occurrence

Protection of the cable via burial or external protection will reduce the frequency of anchor interaction. As noted, decision-making time may be limited in a drifting scenario, however it is anticipated that charted infrastructure including subsea cables will inform any decision to anchor, as per Regulation 34 of SOLAS.

The frequency of occurrence is therefore considered to be **extremely unlikely**.

Significance of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be extremely unlikely. Therefore, the effect is of **broadly acceptable** adverse significance.

Overall, the severity of consequence is deemed to be moderate, and the frequency of occurrence is considered to be remote, giving an overall ranking of **tolerable**.

11.3.2.4 Vessel Engaged in Fishing Snags its Gear on the Cable

As per the construction phase, there is a risk of fishing gear interaction with the cable, as discussed in the same impact for the construction phase. Demersal fishing, using gear which interacts with the seabed, poses the greatest snagging risk, and has been recorded throughout the study area.

It is noted that during repair works during the operational phase, there may be a requirement to de-bury the cable or remove external protection, thus exposing a section of the cable. During these times, it is anticipated that the presence of project vessels involved with the repair, and the effective promulgation of information would ensure that vessels do not fish over or close to the exposed cable section.

During the operational phase, the cables will be marked on UKHO Admiralty Charts and KIS-ORCA, with associated note/warning regarding trawling, anchoring or seabed operations. This will inform decisions by the crew on choice of fishing grounds.

An Outline CBRA (Volume 1, Appendix 3.4 of the ES) has been undertaken to provide burial recommendations based on the risk to the cable from third party hazards, including fishing activities. It is anticipated that cables will be buried to a target depth of 1.5 m, with the Outline CBRA (and supporting studies) confirming an average minimum achievable depth of 0.8 m (as predicted from 42 assessment locations along the Offshore Cable Corridor). Where burial depth needs supplementing with external protection, rock placement (within trench or above seabed) will be deployed (max height 1 m). The 20 live crossings (and up to 5 OOS cable crossings) will also result in above seabed level structures designed according to best practice, and to an approximate maximum height of 1.4 m. Cable protection measures will be monitored by operational phase surveys to confirm their integrity.

All above ground cable protection will be designed according to industry standards, which although not to be promoted, deems them overtrawlable.

Severity of Consequence

The planned cable protection, including burial and the use of external protection such as rock berms at cable crossings and where burial is not feasible (or does not provide full protection), is assumed to provide effective mitigation from fishing gear snagging, reducing the risk of serious consequences such as snagging, capsize of the vessel and PLL.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

Once the cables are installed, the depiction of the cables on nautical and Kingfisher charts may discourage fishing in the vicinity of the cables, however evidence shows that this is not always the case with installed cables. The planned cable protection through burial and/or external protection is assumed to provide adequate protection against fishing gear interaction. It is the responsibility of fishers to dynamically risk assess whether it is safe to undertake fishing activities in proximity to the subsea cables and to make a decision as to whether or not to fish. Commercial issues regarding fishing activity are considered further in Volume 3, Chapter 3: Commercial Fisheries of the ES.

The frequency of occurrence is therefore considered to be **extremely unlikely**.

Significance of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be extremely unlikely. Therefore, the effect is of **broadly acceptable** adverse significance.

11.3.2.5 Reduction in Under Keel Clearance from Laid Cable and Associated Protection

There is a risk that external cable protection measures reduce under keel clearance leading to potential vessel grounding incidents. This could lead to subsequent capsize, injury, loss of life, oil spills, etc. In general, this risk is greatest in coastal areas where existing water depths are shallower.

It is planned to bury the cable to a target depth of 1.5 m. External protection up to an approx. maximum height of 1.4 m will be required at 20 cable crossings. Where seabed characteristics do not allow full burial protection, rock protection may extend above seabed level, up to 1 m in height. The minimum water depth at the cable crossing locations is 42.5 m. The maximum height of external protection is1.4 m therefore corresponding to a 3% reduction in water depth at cable crossings. Following the cable lay, cable inspection surveys will be carried out to ensure that protection measures remain in place.

The Outline CBRA (and supporting studies) have indicated a low risk to full target depth burial across Bideford Bay, where the seabed is dominated by sandy sediments. Thus the potential requirement for any rock placement in this area, where water depths are shallow, is considered to be very low probability.

Reductions in water depth greater than 5% are not anticipated. Should external protection reduce water depth by more than 5% in any area, this will require consultation with the MCA and Trinity House and detailed assessment may be required following further surveys and detailed engineering to ensure navigational safety is not compromised.

Severity of Consequence

Should a vessel grounding occur, the most likely consequences are minor damage to property and minor reputational effects on business but no perceptible effect on people. The maximum adverse scenario may include the vessel foundering resulting in PLL and the environmental consequence of pollution. If pollution were to occur in proximity to the Proposed Development, then the MPCP would be implemented to minimise the impact on the environment.

Overall, the severity of consequence is considered to be **moderate**.

Frequency of Occurrence

The likelihood of a grounding is greater for larger vessels with deeper draughts noting that deep draught vessels within the study area were typically recorded passing further offshore in deeper water as opposed to coastal areas.

The maximum height of external protection will be 1.4 m, which will be used at the 20 cable crossings. Elsewhere rock protection extending above the seabed level is considered to be the last resort in terms of preferred protection, with other burial techniques pursued in the first instance.

The average draught of vessels recorded within the study area was 7.0 m, while the maximum draught was 21.6 m. The maximum draught was recorded by a crude oil tanker visiting Rotterdam, crossing the Offshore Cable Corridor south of the Isles of Scilly in water depths in excess of 100 m. Draughts in the shallower areas around the landfall did not typically exceed 5 m in water depths below 20 m.

The frequency of occurrence is therefore considered to be **remote**.

Significance of Effect

Overall, the severity of consequence is deemed to be moderate, and the frequency of occurrence is considered to be remote. Therefore, the effect is of **tolerable** adverse significance.

11.3.2.6 Interference with Marine Navigational Equipment

A magnetic compass is a navigational instrument for determining direction relative to the earth's magnetic poles. It consists of a magnetised pointer (usually marked on the north end) free to align itself with the earth's magnetic field. Like any magnetic device, compasses are affected by nearby ferrous materials as well as by local electromagnetic forces, such as magnetic fields emitted from power cables. The majority of commercial vessels use a non-magnetic gyrocompass as the primary means of navigation, which is unaffected by the earth's magnetic field. However, as the magnetic compass still serves as an essential means of navigation in the event of power loss or as a secondary source, it must not be affected to the extent that safe navigation is threatened.

Within their response to the Xlinks Scoping Report the MCA stated that a compass deviation of three degrees will be accepted for 95% of the cable route and a five degree deviation accepted for the remaining 5%.

The important mitigating factors to reduce EMF effects on magnetic compasses are:

- Spacing or separation of the cables;
- Water depth;
- Burial depth (or protection); and/or
- Type of current (alternating or direct) running through the cables.

The proposed cables will consist of four 525 kV HVDC power cables buried in two bundled pairs, with a FOC included with each bundle. The HVDC cable may result in localised static EMF up to 79 µT (Amplitude Consultants, 2021), with the potential to affect magnetic compasses. Industry experience in cable installation shows that, for bundled cables or cables installed in close proximity to one another, the fields between the two cables will cancel each other out and therefore the external magnetic fields will be negligible. This agrees with advice provided by the MCA during consultation.

The magnetic field emitted by the cables will decrease exponentially with vertical distance from the seabed and with horizontal distance from the cables (within a few metres).

The cables will be bundled in two pairs and buried in trenches with target burial depth of 1.5 m where feasible, with external protection applied to the remainder. The vast majority of the Offshore Cable Corridor (99.5%) is located in water depths of greater than 10 m below Chart Datum (CD), and there is therefore significant vertical distance between the cables and surface vessels along the majority of the Offshore Cable Corridor.

Severity of Consequence

The majority of commercial vessel traffic uses non-magnetic gyrocompasses as the primary means of navigation, which are unaffected by EMF. Therefore, in general it is considered unlikely that any EMF interference created by the Proposed Development will have a significant impact on vessel navigation. However, as magnetic compasses can still serve as an essential means of navigation in the event of power loss, as a secondary source, or as some smaller craft (fishing or leisure) may rely on it as their sole means of navigation, it has been assessed within this impact assessment.

Vessels in shallower water should also be able to navigate visually using coastal features when conditions are suitable.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

Given that the cables will be bundled and 99.5% will be in water depths greater than 10 m there are not anticipated to be any effects on compass deviation. Within shallow waters effects of EMF will be mitigated by the cables being HDD (within up to 1,360 m of the LAT mark and also out to a minimum of -6 m LAT).

The frequency of consequence is therefore considered to be **negligible**.

Significance of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be negligible. Therefore, the effect is of **broadly acceptable** adverse significance.

11.3.3 Assessment of Decommissioning Effects

The impacts of the decommissioning phase of the Proposed Development have been assessed. A description of the potential effect on shipping and navigation caused by each identified impact is given below.

11.3.3.1 Collision of a Passing Third-Party Vessel with a Vessel Associated with Decommissioning

Similarly to the construction phase, there is a risk of collision between third-party vessels and projects vessels associated with decommissioning works.

Severity of Consequence

In the scenario where the cable is removed following its operational lifetime rather than left in-situ, the types and numbers of vessels expected to be used for decommissioning are expected to be similar (worst case) to those used in the construction phase.

The severity of consequence is therefore considered to be **moderate**.

Frequency of Occurrence

The frequency of occurrence is therefore considered to be **remote**.

Significance of Effect

Overall, the severity of consequence is deemed to be moderate, and the frequency of occurrence is considered to be remote. Therefore, the effect is of **tolerable** adverse significance.

11.3.3.2 Cable Decommissioning Causing Disruption to Passing Vessel Routeing/Timetables

As per the construction phase, there is a potential that decommissioning activities (decommissioning-removal) cause disruption to passing vessel routeing and timetables of vessels.

Severity of Consequence

In the scenario where the cable is removed following its operational lifetime rather than left in-situ, the types and numbers of vessels expected to be used for decommissioning are expected to be similar (worst case) to those used in the construction phase.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

The frequency of occurrence is therefore considered to be **reasonably probable**.

Significance of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be reasonably probable. Therefore, the effect is of **tolerable** adverse significance.

11.3.3.3 Increase in the Risk of a Vessel-to-Vessel Collision Due to Decommissioning Vessel Activity

As per the construction phase, vessel displacement due to the presence of project vessels during decommissioning works may lead to an increase in vessel-to-vessel collision risk between third-party vessels.

Severity of Consequence

In the scenario where the cable is removed following its operational lifetime rather than left in-situ, the types and numbers of vessels expected to be used for decommissioning are expected to be similar (worst case) to those used in the construction phase.

The severity of consequence is therefore considered to be **moderate**.

Frequency of Occurrence

The frequency of occurrence is therefore considered to be **remote**.

Significance of Effect

Overall, the severity of consequence is deemed to be moderate, and the frequency of occurrence is considered to be remote. Therefore, the effect is of **tolerable** adverse significance.

11.3.3.4 Cable Decommissioning Causing Disruption to Fishing and Recreational Activities

As per the construction phase, there is potential for decommissioning works to cause disruption to fishing and recreational activity.

Severity of Consequence

In the scenario where the cable is removed following its operational lifetime rather than left in-situ, the types and numbers of vessels expected to be used for decommissioning are expected to be similar (worst case) to those used in the construction phase.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

The frequency of occurrence is therefore considered to be **reasonably probable**.

Significance of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be reasonably probable. Therefore, the effect is of **tolerable** adverse significance.

11.3.3.5 Cable Decommissioning Causing Disruption to Third-Party Marine Activities

As per the construction phase, there is potential for decommissioning works to cause disruption to third-party marine activities such as military exercises or dredging.

Severity of Consequence

In the scenario where the cable is removed following its operational lifetime rather than left in-situ, the types and numbers of vessels expected to be used for decommissioning are expected to be similar to those used in the construction phase.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

The frequency of occurrence is therefore considered to be **remote**.

Significance of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be remote. Therefore, the effect is of **broadly acceptable** adverse significance.

11.3.3.6 Reduced Access to Local Ports/Harbours

Similar to the construction phase, the presence of project vessels carrying out decommissioning works may cause a reduction in access to local ports and harbours. This will be particularly prevalent during works in nearshore areas at the landfall in Bideford Bay.

Severity of Consequence

In the scenario where the cable is removed following its operational lifetime rather than left in-situ, the types and numbers of vessels expected to be used for decommissioning are expected to be similar (worst case) to those used in the construction phase, leading a similar reduction in access.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

The frequency of occurrence is therefore considered to be **reasonably probable**.

Significance of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be reasonably probable. Therefore, the effect is of **tolerable** adverse significance.

11.3.3.7 Anchor Interaction with the Cable

Should the cable be left in situ following decommissioning, there is a risk to the cable from anchor interaction. This impact is expected to be as per the operational phase, although it is noted that the cable may no longer be subject to monitoring. Decommissioning works are expected to be subject to a separate assessment based on the information available at the time, towards the end of the operational phase in advance of decommissioning (50+ years from the current time).

Should the cable be removed during the decommissioning phase, there would be a period where the cable is no longer operational, but remains entirely or partially laid, with the risk of anchor interaction remaining during this time.

Severity of Consequence

The most likely consequences are limited damage to property (anchoring vessel or subsea cable), with greater damage possible depending on the anchor size and the nature of the interaction.

The severity of consequence is considered to be **minor**.

Frequency of Occurrence

The frequency of occurrence is considered to be **extremely unlikely**.

Significance of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be extremely unlikely. Therefore, the effect is of **broadly acceptable** adverse significance.

11.3.3.8 Vessel Engaged in Fishing Snags its Gear on the Cable

Should the cable be left in situ following decommissioning, there is a risk to the cable from fishing gear snagging. This impact is expected to be as per the operational phase, although it is noted that the cable may no longer be subject to monitoring. Decommissioning works are expected to be subject to a separate assessment based on the information available at the time, towards the end of the operational phase in advance of decommissioning (50+ years from the current time).

Should the cable be removed during the decommissioning phase, there would be a period where the cable is no longer operational, but remains entirely or partially laid, with the risk of fishing gear interaction remaining during this time.

Severity of Consequence

The severity of consequence is considered to be **minor**.

Frequency of Occurrence

The frequency of occurrence is considered to be **extremely unlikely**.

Significance of Effect

Overall, the severity of consequence is deemed to be minor, and the frequency of occurrence is considered to be extremely unlikely. Therefore, the effect is of **broadly acceptable** adverse significance.

11.3.3.9 Reduction in Under Keel Clearance from Laid Cable and Associated Protection

Should the cable be left in situ following decommissioning, there is a risk that external cable protection measures reduce under keel clearance leading to potential vessel grounding incidents. This impact is expected to be as per the operational phase. Decommissioning works are expected to be subject to a separate assessment based on the information available at the time, towards the end of the operational phase in advance of decommissioning (50+ years from the current time).

Should the cable be removed during the decommissioning phase, there would be a period where the cable is no longer operational, but remains entirely or partially laid with cable protection also in place. Therefore under keel clearance may remain reduced in some areas of the Offshore Cable Corridor for part of the decommissioning phase. It is noted that by this time, the cable and associated protection would have been in place for 50 years meaning that mariners would be expected to be aware of the reduced under keel clearance.

Severity of Consequence

Should a vessel grounding occur, the most likely consequences are minor damage to property and minor reputational effects on business but no perceptible effect on people. The maximum adverse scenario may include the vessel foundering resulting in PLL and the environmental consequence of pollution. If pollution were to occur in proximity to the Proposed Development, then the MPCP would be implemented to minimise the impact on the environment.

Overall, the severity of consequence is considered to be **moderate**.

Frequency of Occurrence

The frequency of occurrence is considered to be **remote**.

Significance of Effect

Overall, the severity of consequence is deemed to be moderate, and the frequency of occurrence is considered to be remote. Therefore, the effect is of **tolerable** adverse significance.

11.4 Proposed Mitigation and Monitoring

11.4.1 Further Mitigation

The appraisal of the impact on shipping and navigation found that none of the impacts had a significance exceeding 'tolerable'. To ensure the risks are reduced to ALARP, embedded mitigations must be followed and potential additional mitigations are suggested as follows:

- It is recommended that the period between cable lay and burial/protection is minimised, in order to reduce the risk of fishing gear interaction with the unprotected cables.
- Should there be a temporary reduction in water depth associated with structures at the HDD exit point, consultation with Trinity House will be carried out and use of temporary AtoNs to warn local users of the water depth reduction may be required.

11.4.2 Future Monitoring

To ensure impacts remain in line with those assessed, the following monitoring is recommended to be implemented.

11.4.2.1 Cable Protection

Surveys of the Offshore Cable Corridor will be undertaken during the operational phase to ensure that burial and protection measures remain sufficient. Maintenance of the protection will be undertaken as necessary.

If exposed cables or ineffective protection measures are identified during post-construction monitoring, these would be promulgated to relevant sea users including via Notice to Mariners and Kingfisher Bulletins. Where immediate risk was observed, the Applicant would also employ additional temporary measures where appropriate (such as a guard vessel or temporary buoyage) until such time as the risk was permanently mitigated.

11.4.2.2 Compass Deviation

If there are any changes in the design, and it cannot be demonstrated that MCA requirements for compass deviation can be met, a post construction compass deviation survey of the 'as laid' Offshore Cable Corridor will be undertaken.

11.4.2.3 Decommissioning

Any future monitoring requirements for the decommissioning phase will be identified as part of a separate decommissioning programme.

11.5 Residual Effects

No impacts were assessed to be **Unacceptable**. With the proposed mitigation measures in place, impacts assessed as **Tolerable** are considered to be ALARP. The additional mitigation measure presented above is recommended to further reduce the impacts, however the overall rankings remain the same.

12 Cumulative Impacts

An assessment of cumulative impacts is presented in Volume 3, Chapter 5: Shipping and Navigation of the ES.

13 Summary

Using baseline data, expert opinion and the outputs of consultation, impacts relating to shipping and navigation have been identified for the Proposed Development for all phases of the development (construction, operation and decommissioning). This has been fed into the FSA undertaken in **section 11**.

13.1 Baseline Environment

13.1.1 Navigational Features

The Offshore Cable Corridor runs within UK waters from Cornborough Range, in Bideford Bay, to the border with the French EEZ. Key navigational features in the area include the TSSs around the Isles of Scilly, which are inshore of the Offshore Cable Corridor, and the ITZs inshore of the TSS lanes.

There are a number of ports and harbours in proximity to the Offshore Cable Corridor, with the closest being Bideford and Appledore, located close to the landfall. Pilotage is in place for vessels approaching these. There are two charted anchorages in the vicinity of the Offshore Cable Corridor; Lundy Road east of Lundy Island, and Clovelly Road 4.8 nm southwest of the cable landfall.

13.1.2 Emergency Response Resources

The RNLI operate several lifeboat stations throughout the west coast of the UK in proximity to the Offshore Cable Corridor. There was an average of 37 incidents within the study area per year between 2013 and 2022 responded to by the RNLI, with the majority of these recorded within Bideford Bay and nearshore areas. The most common incident types were person in danger incidents and machinery failures. Recreational vessels were the most commonly affected vessel type, accounting for 38% of incidents. Three incidents were located within the Offshore Cable Corridor, all of which were machinery failures. The majority of incidents were responded to by the Appledore lifeboat station, which is located at the mouth of the River Torridge.

Between 2012 and 2021, the MAIB recorded an average of three to four incidents per year within the study area. Fishing vessels were involved in 49% of incidents, with the most common incident type being machinery failure (46% of incidents). None of the incidents recorded by the MAIB were located within the Offshore Cable Corridor.

The nearest SAR station to the cable corridor is at Newquay, 25 nm to the east, which responded to almost all helicopter taskings within the Study Area Between April 2015 and March 2023. There were 89 helicopter taskings recorded within the study area, with the most frequent ones being rescue/recovery operations, search operations, and support operations. There were two taskings recorded within the Offshore Cable Corridor, with one being a rescue/recovery operation and the other a support operation.

The HMCG coordinates SAR operations through a network of 11 MRCC, including a JRCC based in Hampshire. All of the MCA's operations, including SAR, are divided into 18 geographical regions. The Proposed Development lies within Areas 11 and 12, "Cornwall including Isles of Scilly" and "North Devon including Severn Estuary". The closest MRCCs to the Proposed Development are at Falmouth, 38.5 nm to the southeast of the Offshore Cable Corridor in Cornwall, and Milford Haven, approximately 37.0 nm north of the Offshore Cable Corridor in Wales.

13.1.3 Vessel Traffic Movements

Based on the twelve months of AIS vessel traffic data, there was an average of 74 unique vessels per day recorded within the study area. The most common vessel types recorded were cargo vessels, tankers and fishing vessels. The highest vessel density was recorded in areas where vessels were associated with the TSSs around the Isles of Scilly, and where traffic heading to and from ports in the Bristol Channel crosses the proposed Offshore Cable Corridor.

The majority of the anchored vessel tracks were off Lundy, approximately 3.5 nm north of the Offshore Cable Corridor. Anchored vessels were also recorded within Bideford Bay. One anchored vessel was recorded within the study area approximately every three days.

Fishing vessels were recorded throughout the study area, with the most activity recorded in April 2023. The most common types of fishing vessels recorded were demersal trawlers and beam trawlers. The average speed of fishing vessels within the Study Area was 5.0 knots, indicative of high numbers of vessels actively fishing (63%). In addition to AIS, VMS satellite data for 2020 was reviewed to validate fishing vessel movements. Fishing density as reported by the MMO showed a good correlation between with the baseline as established using AIS data.

13.2 Future Case Vessel Traffic

There are a number of proposed OWFs in the vicinity of the Offshore Cable Corridor, which may alter the nature of shipping if they are consented and constructed. Two of these have been granted consent, being small scale floating demonstration projects in Erebus (30 nm northwest of the Offshore Cable Corridor) and TwinHub (16 nm southeast of the Offshore Cable Corridor). The White Cross OWF project has submitted a consent application and has been considered in the assessment of cumulative impacts. The majority of other projects are in early planning or site selection phases, however the construction of these may lead to increases in wind farm support traffic, as well as re-routeing of existing vessel traffic.

Common commercial destinations were considered to establish any trends in vessel arrivals, and to identify notable port developments which may lead to changes in vessel traffic in the future. Vessel arrivals typically showed a slight decrease across common destinations, noting that factors such as COVID-19 and recent sanctions against Russia may have played a role in this, among other factors. Significant developments at Rotterdam and Antwerp may lead to a long term increase in large vessel traffic crossing the south of the Offshore Cable Corridor.

Trends involving fishing and recreational vessels are difficult to predict as these depend on a number of factors. Fishing activity may vary depending on legislation changes post-Brexit, as well as fish stocks and quotas. Recreational activity may also vary, while volume of activity may be dependent on other factors such as the weather, climate change and the economy.

13.3 Risk Assessment

Using the baseline data, expert opinion, stakeholder concerns and lessons learnt from existing offshore developments, various shipping and navigation hazards have been risk assessed in line with the FSA approach.

The significance of risk has been determined as either **Broadly Acceptable** or **Tolerable** for all hazards assessed, assuming all embedded mitigation measures are implemented.

Appendix A Hazard Log

Table A.1 Hazard Log

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
Construction Phase	Collision of a third-party vessel with a vessel associated with cable installation, maintenance or decommissioning	Promulgation of information Development of a vessel management plan Compliance with international legislation Displaying of marks and lights Guard vessels deployed where required Management of project vessels via marine coordination and communication	Contact resulting in minor damage to vessels	Remote	Moderate	Tolerable	

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
		Passing vessels requested to maintain a safe passing distance from project vessels which are RAM					
		Preparation of an MPCP.					
	Cable installation/decommissioning causing disruption to passing vessel routeing/timetables	Promulgation of information	Increased journey time/distance but does not impact on schedules or compliance with COLREGs	Reasonably Probable	Minor	Tolerable	
		Development of a vessel management plan					
		Compliance with international legislation					
		Displaying of marks and lights					
		Management of project vessels via marine					

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
		coordination and communication					
	Increase in the risk of a vessel-to-vessel collision due to construction/decommissioning vessel activity	Promulgation of information Development of a vessel management plan Compliance with international legislation Displaying of marks and lights Management of project vessels via marine coordination and communication	Contact resulting in minor damage to vessels	Remote	Moderate	Tolerable	
	Cable installation/decommissioning causing disruption to fishing and recreational activities	Promulgation of information Development of a vessel management plan	Minor reputational effects on business but no perceptible effect on people	Reasonably Probable	Minor	Tolerable	

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
		Compliance with international legislation					
		Displaying of marks and lights					
		Management of project vessels via marine coordination and communication					
		Appointment of and FLO					
	Cable installation/decommissioning causing disruption to third party marine activities (e.g., military, dredging)	Promulgation of information	Minor reputational effects on business but no perceptible effect on people	Remote	Minor	Broadly Acceptable	
		Development of a vessel management plan					
		Compliance with international legislation					
		Displaying of marks and lights					

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
		Management of project vessels via marine coordination and communication					
	Reduced access to local ports/harbours	Promulgation of information	Minor reputational effects on business but no perceptible effect on people	Reasonably Probable	Minor	Tolerable	
		Development of a vessel management plan					
		Compliance with international legislation					
		Displaying of marks and lights					
		Management of project vessels via marine coordination and communication					
		Liaison with local pilotage					

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
	Anchor interaction with the cable	Marking on Admiralty charts Promulgation of information Implementation of cable protection informed by CBRA	Limited damage to property (vessel or cable)	Extremely Unlikely	Moderate	Broadly Acceptable	It is recommended to minimise the period between cable lay and burial/protection.
	A vessel engaged in fishing snags its gear on the cable	Marking on Admiralty charts Promulgation of information Implementation of cable protection informed by CBRA Appointment of an FLO	Minor damage to fishing gear or cable	Remote	Serious	Tolerable	It is recommended to minimise the period between cable lay and burial/protection.
	Reduction in under keel clearance resulting from laid cable and associated protection	Marking on Admiralty charts Promulgation of information	Minor damage to vessel, minor reputational effects on business and no	Extremely Unlikely	Moderate	Broadly Acceptable	Should there be a reduction in water depth associated with the HDD exit points

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
		Compliance with guidance on water depth reduction	perceptible impact on people				during the construction phase, there may be a requirement for temporary marking to be agreed with Trinity House.
Operation and Maintenance Phase	Collision of a third-party vessel with a vessel associated with cable installation, maintenance or decommissioning	Promulgation of information	Contact resulting in minor damage to vessels	Remote	Moderate	Tolerable	
		Development of a vessel management plan					
		Compliance with international legislation					
		Displaying of marks and lights					
		Guard vessels deployed where required					
	Reduced access to local ports/harbours	Promulgation of information		Extremely Unlikely	Minor	Broadly Acceptable	

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
		Development of a vessel management plan					
		Compliance with international legislation					
		Displaying of marks and lights					
		Management of project vessels via marine coordination and communication					
		Liaison with local pilotage					
	Anchor interaction with the cable	Marking on Admiralty charts	Limited damage to property (vessel or cable)	Extremely Unlikely	Minor	Broadly Acceptable	
		Promulgation of information					
		Implementation of cable protection informed by CBRA					

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
	A vessel engaged in fishing snags its gear on the cable	Marking on Admiralty charts Promulgation of information Implementation of cable protection informed by CBRA Appointment of an FLO	Minor damage to fishing gear or cable	Extremely Unlikely	Minor	Broadly Acceptable	
	Reduction in under keel clearance resulting from laid cable and associated protection	Marking on Admiralty charts Promulgation of information Compliance with guidance on water depth reduction	Minor damage to vessel, minor reputational effects on business and no perceptible impact on people	Remote	Moderate	Tolerable	
	Interference with marine navigational equipment	Compass deviation effects minimised via design and burial. Compass deviation	Cables have no effect upon the Radar, communication and position fixing	Extremely Unlikely	Negligible	Broadly Acceptable	

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
		assessment to be carried out	equipment on a vessel				
Decommissioning Phase	Collision of a third-party vessel with a vessel associated with cable installation, maintenance or decommissioning	Promulgation of information Development of a vessel management plan Compliance with international legislation Displaying of marks and lights Guard vessels deployed where required Management of project vessels via marine coordination and communication Passing vessels requested to	Contact resulting in minor damage to vessels	Remote	Moderate	Tolerable	

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
		maintain a safe passing distance from project vessels which are RAM					
		Preparation of an MPCP.					
	Cable installation/decommissioning causing disruption to passing vessel routeing/timetables	Promulgation of information	Increased journey time/distance but does not impact on schedules or compliance with COLREGs	Reasonably Probable	Minor	Tolerable	
		Development of a vessel management plan					
		Compliance with international legislation					
		Displaying of marks and lights					
		Management of project vessels via marine coordination and communication					

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
	Increase in the risk of a vessel-to-vessel collision due to construction/decommissioning vessel activity	Promulgation of information Development of a vessel management plan Compliance with international legislation Displaying of marks and lights Management of project vessels via marine coordination and communication	Contact resulting in minor damage to vessels	Remote	Moderate	Tolerable	
	Cable installation/decommissioning causing disruption to fishing and recreational activities	Promulgation of information Development of a vessel management plan	Minor reputational effects on business but no perceptible effect on people	Reasonably Probable	Minor	Tolerable	

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
		Compliance with international legislation					
		Displaying of marks and lights					
		Management of project vessels via marine coordination and communication					
		Appointment of and FLO					
	Cable installation/decommissioning causing disruption to third party marine activities (e.g., military, dredging)	Promulgation of information	Minor reputational effects on business but no perceptible effect on people	Remote	Minor	Broadly Acceptable	
		Development of a vessel management plan					
		Compliance with international legislation					
		Displaying of marks and lights					

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
		Management of project vessels via marine coordination and communication					
	Reduced access to local ports/harbours	Promulgation of information Development of a vessel management plan Compliance with international legislation Displaying of marks and lights Management of project vessels via marine coordination and communication Liaison with local pilotage	Minor reputational effects on business but no perceptible effect on people	Reasonably Probable	Minor	Tolerable	

Phase	Impact	Mitigation Measures	Most Likely Consequences	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Further Mitigation Required
	Anchor interaction with the cable	Marking on Admiralty charts Promulgation of information Implementation of cable protection informed by CBRA	Limited damage to property (vessel or cable)	Extremely Unlikely	Moderate	Broadly Acceptable	
	A vessel engaged in fishing snags its gear on the cable	Marking on Admiralty charts Promulgation of information Implementation of cable protection informed by CBRA Appointment of an FLO	Minor damage to fishing gear or cable	Remote	Serious	Tolerable	
	Reduction in under keel clearance resulting from laid cable and associated protection	Marking on Admiralty charts	Minor damage to vessel, minor reputational effects on business and no perceptible impact on people	Extremely Unlikely	Moderate	Broadly Acceptable	

Appendix B Marine Guidance Note 654 Checklist

The MGN 654 Checklist can be divided into two distinct checklists, one considering the main MGN 654 guidance document and one considering the Methodology for Assessing Marine Navigational Safety and Emergency Response Risks of OREIs which serves as Annex 1 to MGN 654 (Ref. i).

Due to the nature of the Proposed Development, which consists of an Offshore Cable Corridor only and no surface infrastructure, certain aspects of the checklists are not relevant.

The checklist for the main MGN 654 guidance document is presented in **Table B.1**. Following this, the checklist for the MCA's methodology annex is presented in **Table B.2**. For both checklists, references to where the relevant information and/or assessment is provided in the NRA is given.

Table B.1 MGN 654 Checklist for Main Document

Issue	Compliance	Comments
Site and Construction Coordinates. Developers are responsible for ensuring that formally agreed coordinates and subsequent variations of site perimeters and individual OREI structures are made available, on request, to interested parties at relevant project stages, including application for consent, development, array variation, operation and decommissioning. This should be supplied as authoritative Geographical Information System (GIS) data, preferably in Environmental Systems Research Institute (ESRI) format. Metadata should facilitate the identification of the data creator, its date and purpose, and the geodetic datum used. For mariners' use, appropriate data should also be provided with latitude and longitude coordinates in WGS84 (European Terrestrial Reference System 1989 (ETRS89)) datum.		
Traffic Survey. Includes:		
All vessel types.	✓	**Section 9: Baseline Shipping Analysis** All vessel types are considered, with specific breakdowns by vessel type. Additional data sources and consultation were used to supplement AIS data.
At least 28 days duration, within either 12 or 24 months prior to submission of the ES.	✓	**Section 5: Data Sources** A total of twelve months of AIS data has been used, covering September 2022 – August 2023.
Multiple data sources.	✓	**Section 5: Data Sources** Additional data sources such as VMS fishing data and the RYA Coastal Atlas have been used to supplement AIS data. Use of AIS as the primary source of data was agreed with key stakeholders during consultation, and non-AIS activity such as fishing and recreational activity discussed.
Seasonal variations.	✓	**Section 5: Data Sources** A full twelve months of AIS data has been reviewed, capturing seasonal variations within the analysis.

Issue	Compliance	Comments
MCA consultation.	✓	**Section 8: Consultation** The MCA has been consulted at multiple stages throughout the NRA process.
General Lighthouse Authority (GLA) consultation.	✓	**Section 8: Consultation** Trinity House has been consulted at multiple stages throughout the NRA process.
UK Chamber of Shipping consultation.	✓	**Section 8: Consultation** The UK Chamber of Shipping has been consulted during the NRA process.
Recreational and fishing vessel organisations consultation.	✓	**Section 8: Consultation** The RYA and Cruising Association have been consulted during the NRA process. Fishing organisations have been consulted as part of the commercial fisheries assessment, presented in Volume 3, Chapter 3: Commercial Fisheries of the ES.
Port and navigation authorities consultation, as appropriate.	✓	**Section 8: Consultation** The Port of Bideford has been consulted at during the NRA process. Lundy Company Ltd. has also been consulted.
Assessment of the cumulative and individual effects of (as appropriate):		
i. Proposed OREI site relative to areas used by any type of marine craft.	✓	**Section 9: Baseline Shipping Analysis** Vessel traffic data in proximity to the Offshore Cable Corridor has been analysed. **Section 11: NRA Impact Assessment** The impacts associated with the Proposed Development have been assessed for the construction, operation and maintenance and decommissioning phases. **Section 12: Cumulative Impacts** Cumulative impacts associated with the Proposed Development have been assessed.
ii. Numbers, types and sizes of vessels presently using such areas.	✓	**Section 9: Baseline Shipping Analysis** Vessel traffic data in proximity to the Offshore Cable Corridor has been analysed, including by number, type and size.
iii. Non-transit uses of the areas, e.g., fishing, day cruising of leisure craft, racing, aggregate dredging, personal watercraft, etc.	✓	**Section 6: Navigational Features** Navigational features in proximity to the Offshore Cable Corridor have been reviewed, including pilotage services and anchorages. **Section 9: Baseline Shipping Analysis** Vessel traffic data in proximity to the Offshore Cable Corridor has been analysed, including non-transit uses such as fishing, recreational, pilotage and anchoring activities.
iv. Whether these areas contain transit routes used by coastal or deep-draught vessels on passage.	✓	**Section 9: Baseline Shipping Analysis** Vessel traffic data in proximity to the Offshore Cable Corridor has been analysed, including the identification of main commercial routes passing through the area.

Issue	Compliance	Comments
v. Alignment and proximity of the site relative to adjacent shipping lanes.	✓	**Section 6: Navigational Features** Navigational features in proximity to the Offshore Cable Corridor have been reviewed, including identifying IMO routeing measures such as the TSSs around the Isles of Scilly.
vi. Whether the nearby area contains prescribed routeing schemes or precautionary areas.	✓	**Section 6: Navigational Features** Navigational features in proximity to the Offshore Cable Corridor have been reviewed, including identifying IMO routeing measures such as the TSSs. Military exercise areas and firing ranges were also identified.
vii. Proximity of the site to areas used for anchorage (charted or uncharted), safe haven, port approaches and pilot boarding or landing areas.	✓	**Section 6: Navigational Features** Navigational features in proximity to the Offshore Cable Corridor have been reviewed, including ports and harbours, pilotage services and anchorages.
viii. Whether the site lies within the jurisdiction of a port and/or navigation authority.	✓	**Section 6: Navigational Features** Navigational features in proximity to the Offshore Cable Corridor have been reviewed, including port and harbour limits. The Offshore Cable Corridor lies outside of the harbour limits of the Port of Bideford.
ix. Proximity of the site to existing fishing grounds, or to routes used by fishing vessels to such grounds.	✓	**Section 9: Baseline Shipping Analysis** Vessel traffic data in proximity to the Offshore Cable Corridor has been analysed, including the identification of fishing activity. Fishing activity is reviewed in further detail in Volume 3, Chapter 3: Commercial Fisheries of the ES.
x. Proximity of the site to offshore firing/bombing ranges and areas used for any marine military purposes.	✓	**Section 6: Navigational Features** Navigational features in proximity to the Offshore Cable Corridor have been reviewed, including identifying military exercise areas and firing ranges. **Section 8: Consultation** Consultation with the MOD DIO was carried out to provide further detail on military activities in proximity to the Offshore Cable Corridor.
xi. Proximity of the site to existing or proposed submarine cables or pipelines, offshore oil/gas platforms, marine aggregate dredging, marine archaeological sites or wrecks, Marine Protected Areas or other exploration/exploitation sites.	✓	**Section 6: Navigational Features** Navigational features in proximity to the Offshore Cable Corridor have been identified, including identifying existing cables and pipelines, wrecks and Marine Protected Areas. No existing oil/gas platforms or dredging areas were identified in proximity to the Proposed Development. **Section 12: Cumulative Impacts** Cumulative impacts associated with the Proposed Development have been assessed, considering proposed infrastructure.

Issue	Compliance	Comments
xii. Proximity of the site to existing or proposed OREI developments, in cooperation with other relevant developers, within each round of lease awards.	✓	**Section 6: Navigational Features** Navigational features in proximity to the Offshore Cable Corridor have been reviewed, with no existing offshore wind farms identified. **Section 12: Cumulative Impacts** Cumulative impacts associated with the Proposed Development have been assessed, considering proposed OREI developments.
xiii. Proximity of the site relative to any designated areas for the disposal of dredging spoil or other dumping ground.	✓	**Section 6: Navigational Features** Navigational features in proximity to the Offshore Cable Corridor have been reviewed, with no disposal or dumping grounds identified.
xiv. Proximity of the site to aids to navigation and/or VTS in or adjacent to the area and any impact thereon.	✓	**Section 6: Navigational Features** Navigational features in proximity to the Offshore Cable Corridor have been reviewed, including aids to navigation.
xv. Researched opinion using computer simulation techniques with respect to the displacement of traffic and, in particular, the creation of 'choke points' in areas of high traffic density and nearby or consented OREI sites not yet constructed.	✓	No permanent displacement of traffic and no choke points are anticipated.
xvi. With reference to xv. above, the number and type of incidents to vessels which have taken place in or near to the proposed site of the OREI to assess the likelihood of such events in the future and the potential impact of such a situation.	✓	**Section 7: Emergency Response Overview** Historical incident data including DfT SAR Helicopter Taskings and incident data from the MAIB and RNLI has been reviewed.
xvii. Proximity of the site to areas used for recreation which depend on specific features of the area.	✓	**Section 9: Baseline Shipping Analysis** Vessel traffic data in proximity to the Offshore Cable Corridor has been analysed, including recreational activities based on both AIS data and the RYA Coastal Atlas.
Predicted effect of OREI on traffic and interactive boundaries. Where appropriate, the following should be determined:		
a. The safe distance between a shipping route and OREI boundaries.	✓	Not applicable for subsea cables

Issue	Compliance	Comments
b. The width of a corridor between sites or OREIs to allow safe passage of shipping.	✓	Not applicable for subsea cables
OREI Structures. The following should be determined:		
a. Whether any feature of the OREI, including auxiliary platforms outside the main generator site, mooring and anchoring systems, inter-device and export cabling could pose any type of difficulty or danger to vessels underway, performing normal operations, including fishing, anchoring and emergency response.	✓	**Section 11: NRA Impact Assessment** The hazards due to the Proposed Development have been assessed for the construction, operation and maintenance and decommissioning phases, including consideration of users such as commercial vessels, recreational vessels and fishing vessels.
b. Clearances of fixed or floating WTG blades above the sea surface are not less than 22 m (above Mean High Water Springs (MHWS) for fixed). Floating turbines allow for degrees of motion.	✓	Not applicable for subsea cables
c. Underwater devices: i. Changes to charted depth; ii. Maximum height above seabed; and iii. Under keel clearance.	✓	**Section 2: Project Overview** The aspects of the Proposed Development relevant to shipping and navigation are detailed, including details on external protection which may lead to reduced under keel clearance. **Section 11: NRA Impact Assessment** The hazards due to the Proposed Development have been assessed for the construction, operation and maintenance and decommissioning phases, including consideration of reduction in under keel clearance.
d. Whether structures block or hinder the view of other vessels or other navigational features.	✓	Not applicable for subsea cables
The effect of tides, tidal streams and weather. It should be determined whether:		
a. Current maritime traffic flows and operations in the general area are affected by the depth of water in which the proposed construction is situated at various states of the tide, i.e. whether the construction could pose problems at high water which do not exist at low water conditions, and vice versa.	✓	**Section 9: Baseline Shipping Analysis** Vessel traffic data in proximity to the Offshore Cable Corridor has been analysed, including by vessel draught. **Section 11: NRA Impact Assessment** The hazards due to the Proposed Development have been assessed for the construction, operation and maintenance and decommissioning phases, including consideration of reduction in under keel clearance, which may be a greater impact during low water conditions.

Issue	Compliance	Comments
b. The set and rate of the tidal stream, at any state of the tide, has a significant effect on vessels in the area of the OREI site.	✓	Not applicable for subsea cables
c. The maximum rate tidal stream runs parallel to the major axis of the proposed site layout, and, if so, its effect.	✓	
d. The set is across the major axis of the layout at any time, and, if so, at what rate.	✓	
e. In general, whether engine failure or other circumstance could cause vessels to be set into danger by the tidal stream, including unpowered vessels and small, low speed craft.	✓	Not applicable for subsea cables
f. The structures themselves could cause changes in the set and rate of the tidal stream.	✓	Not applicable for subsea cables
g. The structures in the tidal stream could be such as to produce siltation, deposition of sediment or scouring, affecting navigable water depths in the wind farm area or adjacent to the area.	✓	**Section 11: NRA Impact Assessment** The hazards due to the Proposed Development have been assessed for the construction, operation and maintenance and decommissioning phases, including consideration of reduction in under keel clearance.
h. The site, in normal, bad weather, or restricted visibility conditions, could present difficulties or dangers to craft, including sailing vessels, which might pass in close proximity to it.	✓	Not applicable for subsea cables
i. The structures could create problems in the area for vessels under sail, such as wind masking, turbulence or sheer.	✓	Not applicable for subsea cables

Issue	Compliance	Comments
j. In general, taking into account the prevailing winds for the area, whether engine failure or other circumstances could cause vessels to drift into danger, particularly if in conjunction with a tidal set such as referred to above.	✓	Not applicable for subsea cables
Assessment of access to and navigation within, or close to, an OREI. To determine the extent to which navigation would be feasible within the OREI site itself by assessing whether:		
a. Navigation within or close to the site would be safe:		
i. For all vessels.	✓	No restriction to access associated with subsea cables
ii. For specified vessel types, operations and/or sizes.		
iii. In all directions or areas.		
iv. In specified directions or areas.		
v. In specified tidal, weather or other conditions.		
b. Navigation in and/or near the site should be prohibited or restricted:		
i. For specified vessel types, operations and/or sizes.	✓	No restriction to access associated with subsea cables
ii. In respect of specific activities.	✓	
iii. In all areas or directions.	✓	
iv. In specified areas or directions.	✓	
v. In specified tidal or weather conditions.	✓	

Issue	Compliance	Comments
c. Where it is not feasible for vessels to access or navigate through the site it could cause navigational, safety or routeing problems for vessels operating in the area, e.g., by preventing vessels from responding to calls for assistance from persons in distress.	✓	No restriction to access associated with subsea cables
d. Guidance on the calculation of safe distance of OREI boundaries from shipping routes has been considered.	✓	Not applicable for subsea cables
SAR, maritime assistance service, counter pollution and salvage incident response.		
The MCA, through HM Coastguard, is required to provide SAR and emergency response within the sea area occupied by all OREIs in UK waters. To ensure that such operations can be safely and effectively conducted, certain requirements must be met by developers and operators.		
a. An ERCoP will be developed for the construction, operation and decommissioning phases of the OREI.	✓	Not typically required for cable projects, however Emergency Response Procedures will be in place as per the CEMP.
b. The MCA's guidance document *Offshore Renewable Energy Installations: Requirements, Guidance and Operational Considerations for Search and Rescue and Emergency Response* (MCA, 2021) for the design, equipment and operation requirements will be followed.	✓	**Section 3: Guidance and Legislation** Outlines the guidance and legislation used within the NRA including Annex 5 of MGN 654.
c. A SAR checklist will be completed to record discussions regarding the requirements, recommendations and considerations outlined in Annex 5 (to be agreed with MCA).	✓	Not typically required for cable projects, however Emergency Response Procedures will be in place as per the CEMP.
6. Hydrography. In order to establish a baseline, confirm the safe navigable depth, monitor seabed mobility and to identify underwater hazards, detailed and accurate hydrographic surveys are included or acknowledged for the following stages and to MCA specifications:		
i. Pre-construction: The proposed generating assets area and proposed cable route.	✓	Section 2.2.3 notes that ongoing surveys will be carried out throughout the operation and maintenance phase to ensure burial and protection remains adequate.

Issue	Compliance	Comments
ii. On a pre-established periodicity during the life of the development.	✓	
iii. Post construction: Cable route(s).	✓	
iv. Post decommissioning of all or part of the development: the installed generating assets area and cable route.	✓	
Communications, Radar and positioning systems. To provide researched opinion of a generic and, where appropriate, site specific nature concerning whether:		
a. The structures could produce radio interference such as shadowing, reflections or phase changes, and emissions with respect to any frequencies used for marine positioning, navigation and timing (PNT) or communications, including GMDSS and AIS, whether ship borne, ashore or fitted to any of the proposed structures, to:		
i. Vessels operating at a safe navigational distance.	✓	Not applicable for subsea cables
ii. Vessels by the nature of their work necessarily operating at less than the safe navigational distance to the OREI, e.g., support vessels, survey vessels, SAR assets.	✓	
iii. Vessels by the nature of their work necessarily operating within the OREI.	✓	
b. The structures could produce Radar reflections, blind spots, shadow areas or other adverse effects:		
i. Vessel to vessel.	✓	Not applicable for subsea cables
ii. Vessel to shore.	✓	
iii. VTS Radar to vessel.	✓	
iv. Racon to/from vessel.	✓	
c. The structures and generators might produce SONAR interference affecting fishing, industrial or military systems used in the area.	✓	Not applicable for subsea cables.
d. The site might produce acoustic noise which could mask prescribed sound signals.	✓	Not applicable for subsea cables

Issue	Compliance	Comments
e. Generators and the seabed cabling within the site and onshore might produce EMFs affecting compasses and other navigation systems.	✓	**Section 10: Electromagnetic Interference** Demonstrates that electromagnetic interference as a result of the Proposed Development will be minimal. **Section 11: NRA Impact Assessment** Assesses the potential risks associated with the use of navigation, communication and position fixing equipment due to the Proposed Development in relation to electromagnetic interference.
Risk mitigation measures recommended for OREI during construction, operation and decommissioning.		
Mitigation and safety measures will be applied to the OREI development appropriate to the level and type of risk determined during the EIA. The specific measures to be employed will be selected in consultation with the MCA and will be listed in the developer's ES. These will be consistent with international standards contained in, for example, SOLAS Chapter V (IMO, 1974), and could include any or all of the following:		
i. Promulgation of information and warnings through notices to mariners and other appropriate MSI dissemination methods.	✓	**Section 11: NRA Impact Assessment** **Section 11.2** details embedded mitigation measures, including promulgation of information.
ii. Continuous watch by multi-channel VHF, including DSC.	✓	**Section 11: NRA Impact Assessment** **Section 11.2** details embedded mitigation measures, including marine coordination.
iii. Safety zones of appropriate configuration, extent and application to specified vessels[6].	✓	Not applicable for subsea cables
iv. Designation of the site as an Area to be Avoided (ATBA).	✓	Not applicable for subsea cables
v. Provision of aids to navigation as determined by the GLA.	✓	**Section 11: NRA Impact Assessment** **Section 11.2** details embedded mitigation measures. It is noted in **section 11.4.1** that temporary aids to navigation may be required to mark any prolonged water depth reductions associated with the HDD works.
vi. Implementation of routeing measures within or near to the development.	✓	There are no plans to implement any new routeing measures in proximity to the Offshore Cable Corridor.
vii. Monitoring by Radar, AIS, Closed Circuit Television (CCTV) or other agreed means.	✓	Not applicable for subsea cables

[6] As per SI 2007 No 1948 "The Electricity (Offshore Generating Stations) (Safety Zones) (Application Procedures and Control of Access) Regulations 2007.

Issue	Compliance	Comments
viii. Appropriate means for OREI operators to notify, and provide evidence of, the infringement of Safety Zones.	✓	Not applicable for subsea cables
ix. Creation of an ERCoP with the MCA's SAR Branch for the construction phase onwards.	✓	Not typically required for cable projects, however Emergency Response Procedures will be in place as per the final offshore CEMP.
x. Use of guard vessels, where appropriate.	✓	**Section 11: NRA Impact Assessment** **Section 11.2** details embedded mitigation measures, including deployment of guard vessels.
xi. Update NRAs every two years, e.g. at testing sites.	✓	Not applicable to the Proposed Development.
xii. Device-specific or array-specific NRAs.	✓	**Section 2: Project Overview** All offshore aspects of the Proposed Development relevant to shipping and navigation have been considered in this NRA.
xiii. Design of OREI structures to minimise risk to contacting vessels or craft.	✓	Not applicable for subsea cables
xiv. Any other measures and procedures considered appropriate in consultation with other stakeholders.	✓	**Section 11: NRA Impact Assessment** **Section 11.2** details embedded mitigation measures to be implemented to reduce the impact on shipping and navigation users.

Table B.2 MGN 654 Checklist Annex 1

Item	Compliance	Comments
A risk claim is included that is supported by a reasoned argument and evidence.	✓	**Section 11: NRA Impact Assessment** The impact assessment provides a risk claim for a range of hazards based on a number of inputs including (but not limited to) baseline data, expert opinion, stakeholder concerns and lessons learnt from existing offshore developments.
Description of the marine environment.	✓	**Section 6: Navigational Features** Navigational features in proximity to the Offshore Cable Corridor have been identified in order to describe the marine environment. A cumulative impact assessment has also been carried out, and is presented within Volume 3, Chapter 5: Shipping and Navigation of the ES.
SAR overview and assessment.	✓	**Section 7: Emergency Response Overview** Existing SAR resources in proximity to the Proposed Development are summarised including the UK SAR operations contract, RNLI stations and assets and HMCG stations.

Item	Compliance	Comments
Description of the OREI development and how it changes the marine environment.	✓	**Section 2: Project Overview** The offshore aspects of the Proposed Development relevant to shipping and navigation have been described to detail how the marine environment will be changed. No permanent re-routeing of vessel traffic is anticipated as part of the Proposed Development.
Analysis of the marine traffic, including base case and future traffic densities and types.	✓	**Section 9: Baseline Shipping Analysis** Vessel traffic data in proximity to the Offshore Cable Corridor has been analysed, including by analysis of the density and type of vessels recorded in the study area. Future case shipping is also discussed.
Status of the hazard log: ▪ Hazard identification; ▪ Risk assessment; ▪ Influences on level of risk; ▪ Tolerability of risk; and ▪ Risk matrix.	✓	**Appendix A: Hazard Log** A hazard log has been prepared detailing the result of the assessment.
NRA: ▪ Appropriate risk assessment; ▪ MCA acceptance for assessment techniques and tools; ▪ Demonstration of results; and ▪ Limitations.	✓	**Section 3: Guidance and Legislation** MGN 654 and the IMO's FSA guidelines are the primary guidance documents used for the assessment. **Section 11: NRA Impact Assessment** Provides qualitative and quantitative risk assessment (using FSA) for the hazards identified due to the Proposed Development, based on baseline data, expert opinion, stakeholder concerns and lessons learnt from existing offshore developments.
Risk control log	✓	**Appendix A: Hazard Log** The hazard log constitutes a risk control log.

14 References

i MCA (2021a). Marine Guidance Note 654 (Merchant and Fishing) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response. Southampton: MCA.

ii UNCLOS (1982). United Nations Convention on the Law of the Sea.

iii IMO (1972/77). Convention on the International Regulations for Preventing Collisions at Sea 1972 (COLREGS).

iv UK Government (2004). The Merchant Shipping (Vessel Traffic Monitoring and Reporting Requirements) Regulations 2004.

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