

Outer Dowsing Offshore Wind

Environmental Statement

Chapter 15 Shipping and Navigation

Volume 3 Appendices

Appendix 15.2

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Outer Dowsing Offshore Wind Farm Assessment of Impact on Offshore Oil and Gas Installations (Vessel/Rig Access and Allision)

Prepared by Anatec Limited
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Abbreviations Table

Abbreviation	Definition
GT R4 Ltd	The Applicant. The special project vehicle created in partnership between Corio Generation (a wholly owned Green Investment Group portfolio company), Gulf Energy Development and TotalEnergies
AIS	Automatic Identification System
DCO	Development Consent Order
ERRV	Emergency Response and Rescue Vessel
ES	Environmental Statement
FSA	Formal Safety Assessment
GOMO	Guidelines for Offshore Marine Operations
HLV	Heavy Lift Vessel
IMO	International Maritime Organization
km	Kilometres
km²	Kilometres squared
LAPS	Lancelot Area Pipeline System
m	Metres
MCA	Maritime and Coastguard Agency
MDS	Maximum Design Scenario
MGN	Marine Guidance Note
MMO	Marine Management Organisation
MRP	Mean Route Position
nm	Nautical miles
NRA	Navigational Risk Assessment
NtM	Notice to Mariners
NUI	Normally Unmanned Installation
O&G	Oil and Gas
O&M	Operation and Maintenance
ODOW	Outer Dowsing Offshore Wind
ORCP	Offshore Reactive Compensation Platforms
SimOps	Simultaneous Operations

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Abbreviation	Definition
WTGs	Wind Turbine Generators

Reference Documentation

Document Number	Title
6.1.18	Marine Infrastructure and Other Users
6.3.15.1	Navigational Risk Assessment
6.2.18.1	Helicopter Access Report

1 Introduction

GT R4 Ltd (the Applicant) is planning to develop the Outer Dowsing Offshore Windfarm (hereafter the 'Project'). The construction and operation of the Project may impact on Oil and Gas (O&G) assets in the vicinity of the array area. These impacts have been assessed in full as part of the Environmental Statement (ES) which will be submitted to the Planning Inspectorate as part of the Development Consent Order (DCO) application.

Anatec Ltd have been commissioned to undertake a dedicated vessel / rig assessment focusing on the impact on allision and access to existing O&G assets as a result of the Project. This assessment will inform Volume 1, Chapter 18: Marine Infrastructure and Other Users (document reference 6.1.18).

On this basis, the output of this assessment is a significance ranking for each O&G asset assessed in terms of allision risk, routine access deviations and spacing / proximity concerns. Significance has been determined via the International Maritime Organization (IMO) Formal Safety Assessment (FSA) approach, (IMO, 2018), in line with the approach undertaken within Volume 3, Appendix 15.1 Navigational Risk Assessment (NRA) (document reference 6.3.15.1).

The NRA (document reference 6.3.15.1) provides assessment of impacts to shipping and navigation users that may be affected by the presence of the Project and the associated works, and is therefore of relevance to this study. In particular, vessel traffic data collected as required under the Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 654 as part of the NRA process and 12 months of Automatic Identification System (AIS) data is utilised as a primary input into this assessment. Full assessment and background of the survey data and long term vessel traffic data utilised can be found within the NRA (document reference 6.3.15.1).

2 Consultation

A summary of key points arising from consultation to date deemed of relevance to the assessment of marine access to O&G assets is detailed in Table 2.1, noting this includes reference to where each point raised is addressed within this report. This includes consultation direct with the key O&G operators of relevance (Shell and Perenco), and additional shipping and navigation consultation undertaken as part of the NRA process (document reference 6.3.15.1).

Table 2.1 Consultation Summary

Consultation Type	Summary
NRA Regular Operator Outreach, September 2022	Email outreach to regular vessel operators of the area, as identified via assessment of long term vessel traffic data. This included Boston Putford who operate the majority of O&G vessels at local fields. They provided no substantive feedback.
NRA Hazard Workshop 10 th November 2022	Perenco and Shell both in attendance. Agreed that further consultation would be undertaken to discuss platform access for both helicopters and vessels.
Meeting with Perenco 1 st November 2023	General discussions on the Malory platform, noting focus was helicopter access. Discussions are ongoing.
Meeting with Shell 7 th December 2023 and 15 th February 2024	General discussions on the Barque PB platform noting focus was helicopter access. Discussions are ongoing.
NRA Hazard Workshop 23 rd November 2023	Boston Putford in attendance and confirmed limited concern in terms of impacts to their vessels in terms of vessel transit.

3 Project Description

3.1 Overview

An overview of the array area is presented in Figure 3.1. The array area is located approximately 54 kilometres (km) from the Lincolnshire coast at its closest point to land, covering an area of approximately 436 kilometres square (km²) in the southern North Sea.

For the purposes of this assessment, a study area comprising a minimum¹ radius of 10 nautical miles (nm) from the array area has been utilised, as shown in Figure 3.1. This is the same study area used in the NRA (document reference 6.3.15.1), and is a standard value for similar shipping and navigation assessments, given it ensures relevant routeing is captured whilst still remaining site specific to the Project.

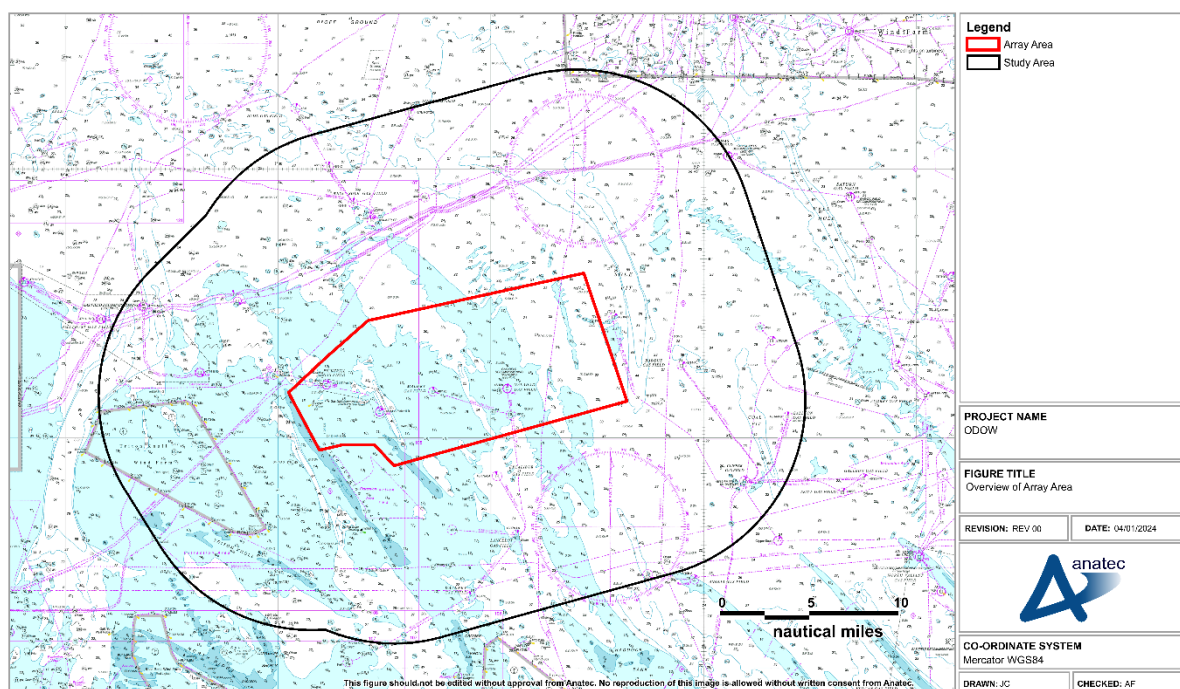


Figure 3.1 Overview of Array Area

3.2 Layout

A final layout will be approved via the Marine Management Organisation (MMO) post-consent in liaison with the MCA and Trinity House. Therefore, for the purposes of this assessment and in line with the NRA (document reference 6.3.15.1) approach to deviations and displacement, the full array area will be applied to ensure a worst case is assessed.

¹ Radius of 10nm measured from PEIR array area boundary, and therefore is greater than 10nm in certain areas given the array area was reduced post PEIR.

4 Methodology

4.1 Impacts Assessed

This assessment has focused on impacts associated with allision and vessel access to O&G assets identified during consultation and as part of Volume 1, Chapter 18: Marine Infrastructure and Other Users (document reference 6.1.18).

A separate study has been undertaken with respect to the impact on helicopter operations, and is provided in Volume 3, Appendix 18.1: Helicopter Access Report (document reference 6.3.18.1).

On this basis, impacts considered within this assessment are as follows:

- Wind turbines and associated works may result in deviations to routine support vessel routing to O&G platforms;
- Proximity of wind turbines and associated works may restrict / hamper access to O&G platforms and subsurface infrastructure during certain periods (e.g., allowable weather); and
- Potential allision risk to O&G platforms due to vessels being deviated from existing routes due to the presence of the windfarm infrastructure within the array area.

4.2 Assessment Methodology

As standard for marine risk assessment and in line with the NRA (document reference 6.3.15.1), this assessment utilises the FSA (IMO, 2018) approach. The FSA approach within the NRA uses probability (frequency) and consequence to determine the significance of each impact as being either broadly acceptable, tolerable, or unacceptable for each asset assessed. Impacts that are determined to be unacceptable must be reduced to within broadly acceptable or tolerable parameters via additional mitigation over those that are considered embedded.

It should be considered that the output of this assessment considers impacts associated with allision and access only, and as such will inform but not supersede the assessment in Volume 1, Chapter 18: Marine Infrastructure and Other Users (document reference 6.1.18).

On this basis, methodologies for assessing the significance of allision and access impacts are provided in Sections 4.2.1 and 4.2.2.

4.2.1 Allision

It should be considered that proximity between offshore installations and passing traffic is a primary factor affecting allision risk. On this basis, the assessment of allision risk undertaken within this assessment has focused on changes to traffic patterns passing within 2nm of the relevant assets as a result of the Project. This has been based on the pre- and post-windfarm routes as identified within the NRA (document reference 6.3.15.1).

The significance of allision risk has then been assessed on a qualitative basis as per the criteria given in Table 4.1. It is noted that the definitions of these rankings must be considered in conjunction with the assumptions detailed in Section 4.4.

Table 4.1 Allision Assessment Significance Criteria

Significance	Description	Criteria
Broadly Acceptable	Beneficial (potential decrease in allision risk)	Decrease in vessel numbers in proximity to asset
	No impact	No or negligible change in vessel numbers in proximity to asset
	Adverse – low (potential for low or possible increase in allision frequency)	Low change in vessel numbers in proximity to asset
Tolerable with Mitigation	Adverse – moderate (potential for possible or high increase in allision frequency)	Moderate to high change in vessel numbers in proximity to asset but available searoom for transit
Unacceptable	Adverse – High (potential for high or very high increase in allision frequency)	High change in vessel numbers with limited searoom for transit

4.2.2 Vessel / Rig Access

Impacts associated with access have been separated into two categories as follows:

- Deviations required for routine offshore support vessel visits (e.g., supply and standby) to assets as a result of the Project, i.e., impact on surface navigation only; and
- Wind farm structures or works restricting or hampering the ability to carry out O&G operations at assets within the array area, or nearby, e.g., rig work.

Deviations have been assessed by identifying typical baseline vessel activity to screened in assets via the use of vessel traffic data (see Section 6) and Anatec’s internal routeing database (Anatec, 2023). It has then been determined whether safe alternate routeing exists should vessels choose to deviate around the array area.

Impacts associated with the potential for operations at O&G assets to be restricted or hampered have been assessed based on the proximity of the assets to the structures within the array area. The available space (i.e., distance between the asset and array area) has been assessed against existing cases of relevant operations occurring in the vicinity of or within constructing or operational windfarms, with consultation undertaken for array area with the relevant operators in regards to spacing needs (see Section 2) also taken into consideration.

Significance is then assessed on a qualitative basis according to the criteria detailed in Table 4.2. It is noted that the definitions of these rankings must be considered in conjunction with the assumptions detailed in Section 4.4.

Table 4.2 Access Assessment Significance Criteria

Significance	Description	Assessment Criteria	
		Deviations	Restriction / Hampering of O&G Operations
Broadly Acceptable	No impact	Route to asset unaffected by windfarm structures	No impact on operations
	Adverse – low	Minimal deviation required with limited impact on transit distance / time	Limited impact on O&G operations
Tolerable with Mitigation	Adverse – moderate	Moderate deviation required with potential for notable impact on transit distance / time	Potential for moderate restriction / hampering of O&G operations
Unacceptable	Adverse - High	Deviation not possible without unacceptable impacts on vessel safety	Wind farm structures prevent practicable access to asset by a rig / vessel required to undertake an operation at that asset

4.3 Maximum Design Scenario

The Maximum Design Scenario (MDS) within which impacts have been assessed is summarised as follows, noting that further details are provided within the NRA (document reference 6.3.15.1) which holds the same MDS for the array area:

- Maximum extent of buoyed construction / decommissioning area during the construction and decommissioning phases, and maximum extent of the array area within the operational phase (maximum deviations, and minimum proximity to O&G assets); and
- Maximum number of structures - 100 wind turbines, four offshore substations, and one accommodation platform.

As per Section 3.2, the final layout for the Project is not yet defined and will be agreed with the MCA and Trinity House post-consent as per the relevant deemed Marine Licence conditions, with an indicative layout (deemed to be worst case from a shipping and navigation perspective) utilised in the NRA (document reference 6.3.15.1).

It is noted that the project envelope includes the potential for up to two Offshore Reactive Compensation Platforms (ORCP). There are no platforms within the ORCP study area assessed within the NRA (document reference 6.3.15.1) i.e., within 10nm. As such there are no associated O&G access issues.

4.4 Assumptions

4.4.1 Assessment Approach

Given that Anatec is not privy to individual O&G operator’s Safety Cases, it is not possible to determine whether impacts to the relevant assets are “tolerable” within the context of those Safety Cases. It should therefore be considered that the assessment output is based on whether the impacts assessed as part of the scope of this particular assessment (i.e., marine

access and allision risk) are considered to be tolerable considering the known mitigations assumed to be in place (see Section 4.4.2). On this basis, cumulative tolerability of all impacts has not been considered, with the focus of the assessment remaining on marine access and allision risk to third party vessels.

4.4.2 Mitigation

Impacts have been assessed on the assumption that known embedded mitigations will be in place, both on the part of the Applicant and the relevant O&G operators. On this basis, where an impact has been assessed as being within tolerable parameters, key measures assumed to be in place include the following:

- The Applicant will consider local O&G assets and associated operational requirements, where appropriate (i.e., assets which may be affected in terms of access), within their final site design process, and continue to consult and liaise with relevant operators in this regard;
- O&G operators will continue to provide suitable Collision Risk Management measures for their assets (e.g., Emergency Response and Rescue Vessel (ERRV), etc.) taking into account fluctuations in local passing traffic levels over time;
- Promulgation of information including to regular commercial vessel operators in the area to ensure they are aware of the Project, ensuring they can passage plan taking into account both the windfarm structures and the existing O&G assets;
- The Applicant will promulgate information as required to relevant O&G vessel operators (including on a targeted basis), who will utilise this information to passage plan for the minimisation of deviations to routes to local assets;
- Industry standard Simultaneous Operations (SimOps) agreements between the Applicant and relevant O&G operators to ensure any access issues are minimised, this should include the sharing of information between parties to ensure both The Applicant and the relevant O&G operators are aware of each other's operations in advance; and
- Consultation with Trinity House to determine appropriate lighting and marking taking into consideration the existing O&G assets.

5 Oil & Gas Asset Screening

A screening process has been undertaken to determine which O&G assets in proximity to the windfarm site require assessment within this report, screening methodology listed in Table 5.1.

Table 5.1 Asset Screening Methodology

Criteria	Assessment Approach	Tier
Pre-existing asset within array area.	Impacts associated with allision and access assessed, including access impacts to associated subsea infrastructure. Installations which are currently undergoing decommissioning excluded.	1
Surface asset outside of array area but within 10nm ¹	Impacts associated with allision and access assessed.	2

¹This is based on 10nm around the current array area. Of note is Galleon, which sites inside the study area but further than 10nm from the current array area.

Assets currently undergoing decommissioning were screened out, these include the Galahad platform, Pickerill platforms and Amethyst platforms.

Table 5.2 provides a summary of the outputs of the screening.

Table 5.2 Asset Screening Summary

Project	Operator	Status	Distance (nm)	Tier
Malory	Perenco	Operational	0	1
Galahad Subsea Tee	Perenco	Operational	0	1
Barque PB	Shell	Operational	0.8	2
Excalibur	Perenco	Operational (decommissioning planned)	2.1	2
Barque PL	Shell	Operational	3.6	2
West Sole A	Perenco	Operational	5.4	2
Lancelot	Perenco	Operational (decommissioning planned)	5.6	2
West Sole B	Perenco	Operational	6.6	2

Project	Operator	Status	Distance (nm)	Tier
Clipper	Shell	Operational	8.0	2
Waveney	Perenco	Operational	8.2	2
Ensign	Spirit Energy	Pending decommissioning	8.8	2
West Sole C	Perenco	Operational	9.0	2
Hoton	Shell	Operational	9.0	2

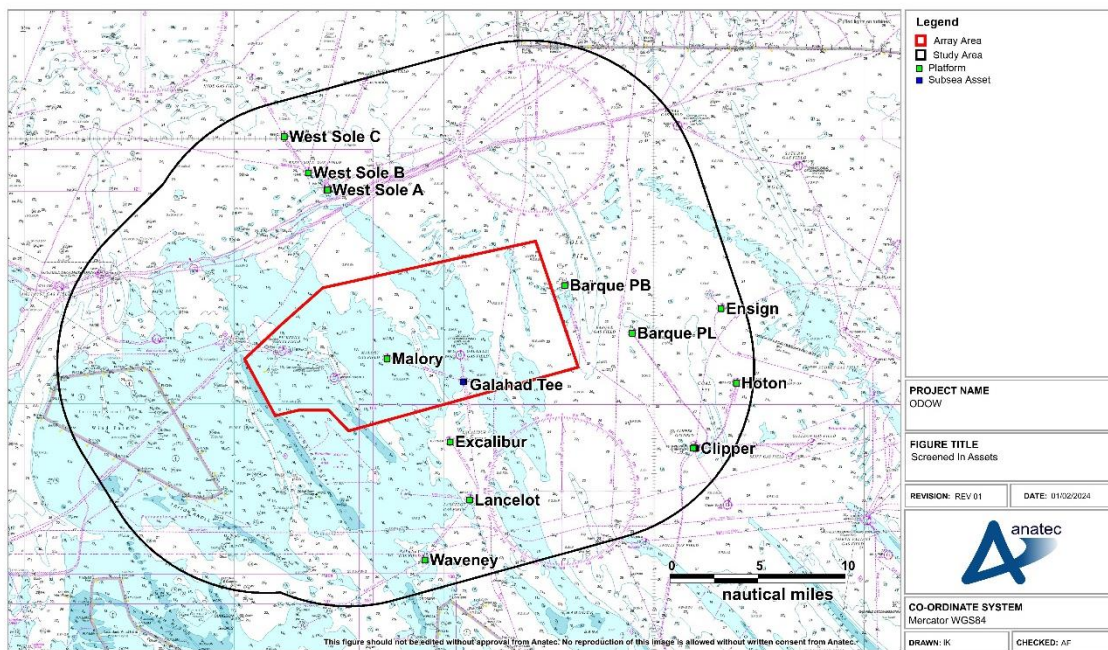


Figure 5.1 Screened In O&G Assets

6 Vessel Traffic Assessment

6.1 Survey Methodology

As part of the NRA (document reference 6.3.15.1) process, AIS data was collected for the 12-month period 1st April 2021 to 31st March 2022. This data was used to assess vessel routing within the study area, noting that the long-term nature of this dataset ensured seasonal variation, low use routes, and adverse weather routing were captured. On this basis the 12-month dataset has also been used to assess O&G vessel activity within this report given it allows for longer term assessment and the capture of infrequent routing. The full assessment of this data (including analysis of all vessel types) is provided in Annex D of the NRA (document reference 6.3.15.1).

6.2 Data Overview

The 12-months of AIS data is presented in Figure 6.1 relative to the array area and the screened in O&G assets (see Section 5).

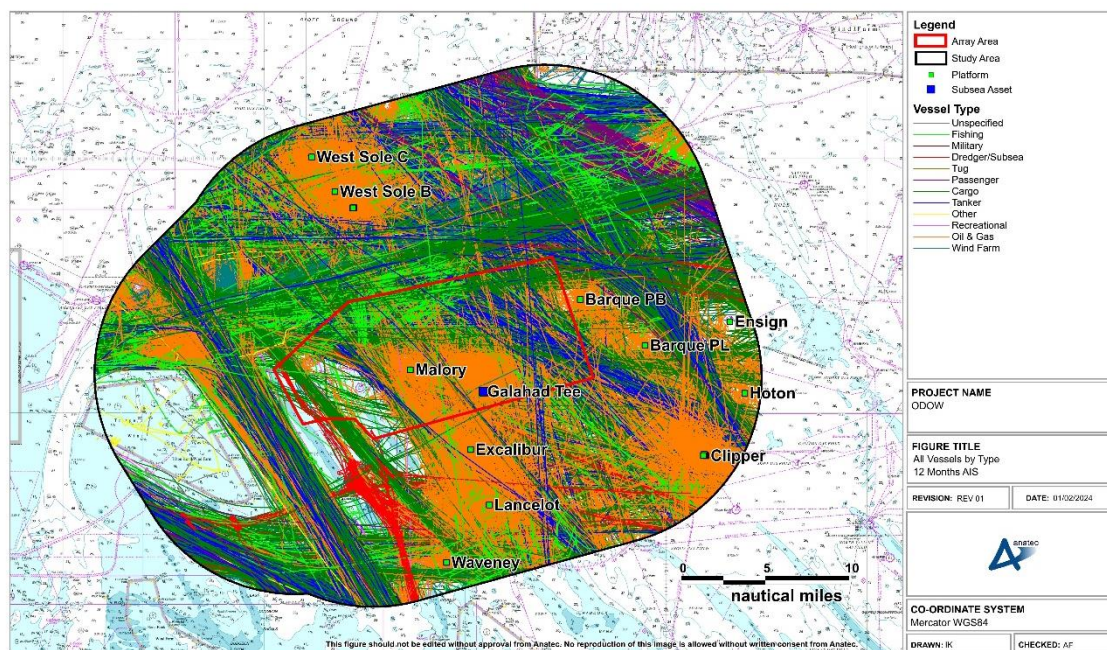


Figure 6.1 Vessel Traffic Survey Data 12-Months

An average of 58 unique vessels per day were recorded within the study area over the 28 days of marine traffic data studied, with the most commonly recorded vessels being commercial vessels (cargo and tankers) which accounted for approximately 71% of traffic. O&G support traffic levels were also notable, accounting for approximately 15% of all vessels recorded.

6.3 Commercial Vessels

An average of approximately four commercial vessels were recorded per day transiting through the array area.

The vessel traffic data (see Section 6.2) was used to identify the main routes within the study area using the principles set out in MGN 654 (MCA, 2021). A total of 13 main routes were identified on this basis. The identified routes are shown relative to the array area and the screened in assets (as per Section 5) in Figure 6.2. In line with MGN 654, 90th percentiles for the sections of routes within the study area were produced as part of the NRA process. These are included in Figure 6.2.

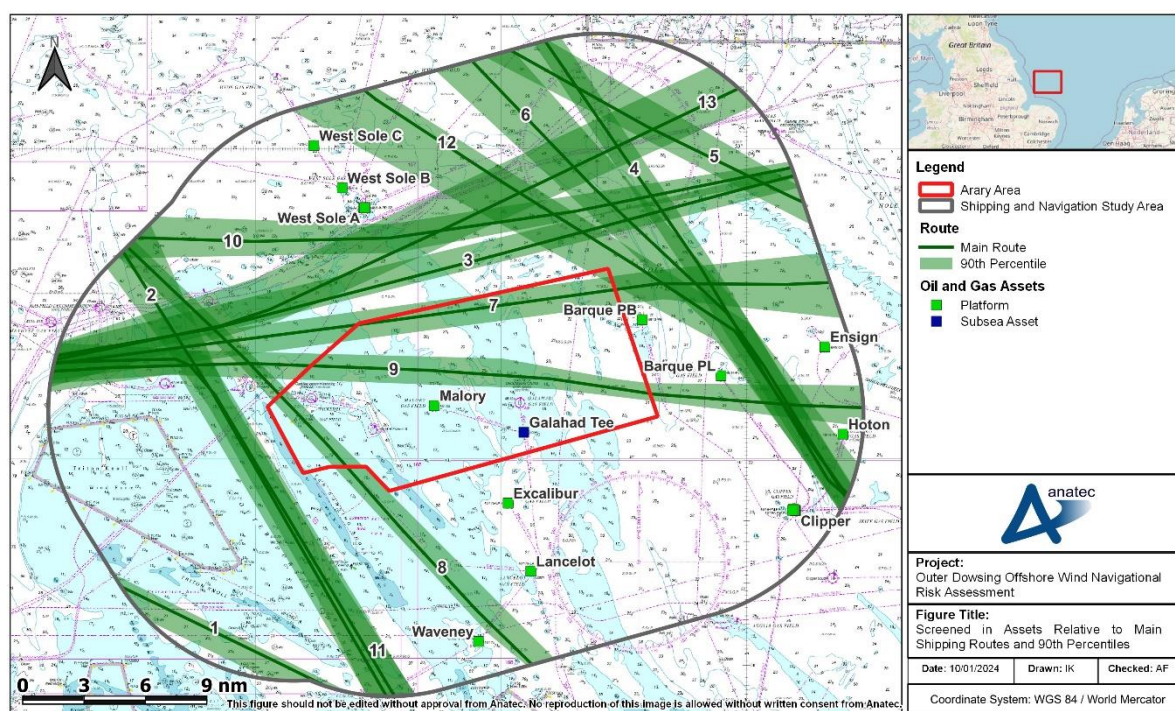


Figure 6.2 Main Commercial Routes

Further details of the routes in terms of vessel numbers and origin / terminus ports are provided in Table 6.1. It should be considered that the origin / terminus ports have been identified via common destinations transmitted by vessels recorded on any given route. As such, vessels on a route within the study area will not necessarily be associated with the ports listed.

Table 6.1 Summary of Main Route Details

Route No.	Average Vessels per Day	Description
1	16	Humber Ports – Rotterdam (The Netherlands). Primarily cargo vessels (59%) and tankers (29%). Includes P&O Ferries and Stena Line commercial ferry routes.
2	12	Tees – Rotterdam (The Netherlands). Primarily cargo vessels (53%) and tankers (34%). Used by DFDS Seaways commercial ferry operator (on the Newcastle-Amsterdam route) as an adverse weather route.
3	4	Humber Ports – Cuxhaven (Germany). Primarily cargo vessels (88%). Used by DFDS Seaways commercial ferry operator (on Immingham-Cuxhaven route).
4	2	Tees Port – Rotterdam (The Netherlands). Primarily cargo vessels (68%).
5	2	Newcastle – Amsterdam (The Netherlands). Primarily passenger vessels (79%). Used by DFDS Seaways commercial ferry operator (on the Newcastle-Amsterdam and Newcastle / North Shields-IJmuiden routes).
6	2	Tees – Rotterdam (The Netherlands). Primarily cargo vessels (49%) and tankers (41%).
7	1	Humber Ports – Cuxhaven (Germany). Primarily cargo vessels (88%).
8	1	Tees – Rotterdam (The Netherlands). Primarily cargo vessels (90%).
9	<1	Humber Ports – Bremerhaven/Hamburg (Germany). Primarily cargo vessels (90%).
10	<1	Humber Ports – Cuxhaven (Germany). Primarily cargo vessels (81%).
11	<1	Humber Ports – Rotterdam (The Netherlands). Primarily tankers (81%).
12	<1	Tees – Amsterdam (The Netherlands). Cargo vessels (35%), tankers (25%), passenger vessels (19%), and O&G vessels (19%). Used by DFDS Seaways commercial ferry operator (the Newcastle-Amsterdam route) as an adverse weather route.

Route No.	Average Vessels per Day	Description
13	<1	Humber Ports – Hornsea OWFs. Route used by construction, operation and maintenance (O&M) vessels to the Hornsea offshore wind projects from the Humber.

6.4 O&G Support Vessels

The O&G support vessels recorded during the 12-month period are presented in Figure 6.3. The associated O&G assets are also shown for context. High level behavioural analysis has been undertaken to provide an indication of whether each vessel was likely to have been in transit at the time, or on station at an asset. This has been shown via colour coding in Figure 6.3.

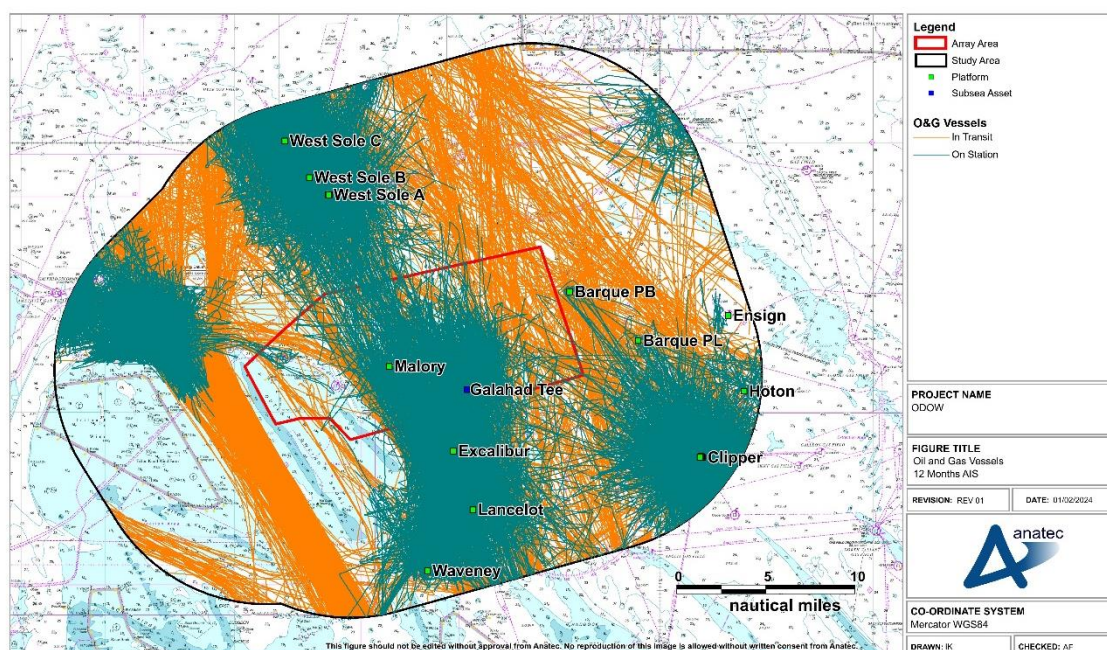


Figure 6.3 O&G Support Vessels within the Array Area Study Area

There was an average of nine O&G support vessels per day recorded during the study period within the study area, with a total of 28% of all O&G vessels recorded intersecting the array area.

In terms of O&G vessels in transit, routing was observed to occur to the west of the array area through the Outer Dowsing Channel (see Route 2 in Section 6.3), and to the east of the array area (Routes 4, 6 and 12). Lower use O&G routing was also observed through the array area itself, though not in sufficient volumes to be defined as a main route.

O&G vessels in transit accounted for approximately 41% of all O&G vessels, with those vessels likely to be engaged in activity at a platform or in O&M activity equated to 58%

The majority of O&G support vessels engaged in activity were observed to be associated with the West Sole and Clipper assets, noting that vessels were also recorded at each of the other screened in assets.

6.4.1 Routine Support Visits

The closest (and therefore most relevant) surface assets are Malory and Barque PB. Based on the 12 months of data there were on average two visits per month to Malory from the south, with the information broadcast via AIS indicating that these vessels were mobilising from Great Yarmouth. The analysis indicated similar results for Barque PB, with an estimated 2-3 visits per month and Great Yarmouth again the key origin port. Anatec’s ShipRoutes Database (Anatec, 2023) also indicates that O&G routes in this area tend to mobilise from Great Yarmouth. It is noted that transits between Malory and the West Sole field, and Barque and Clipper were also recorded. It was estimated that 1-2 transits to Malory per month occurred from the north over the 12 months of data, with the majority of these transits originating from the West Sole field.

To illustrate routine vessel approaches, examples of vessels approaching and then departing the Malory and Barque PB platforms are shown in Figure 6.4 and Figure 6.5 respectively. The vessel outlines shown are based on the information transmitted via AIS, and both examples were taken from the 12 months of AIS data.

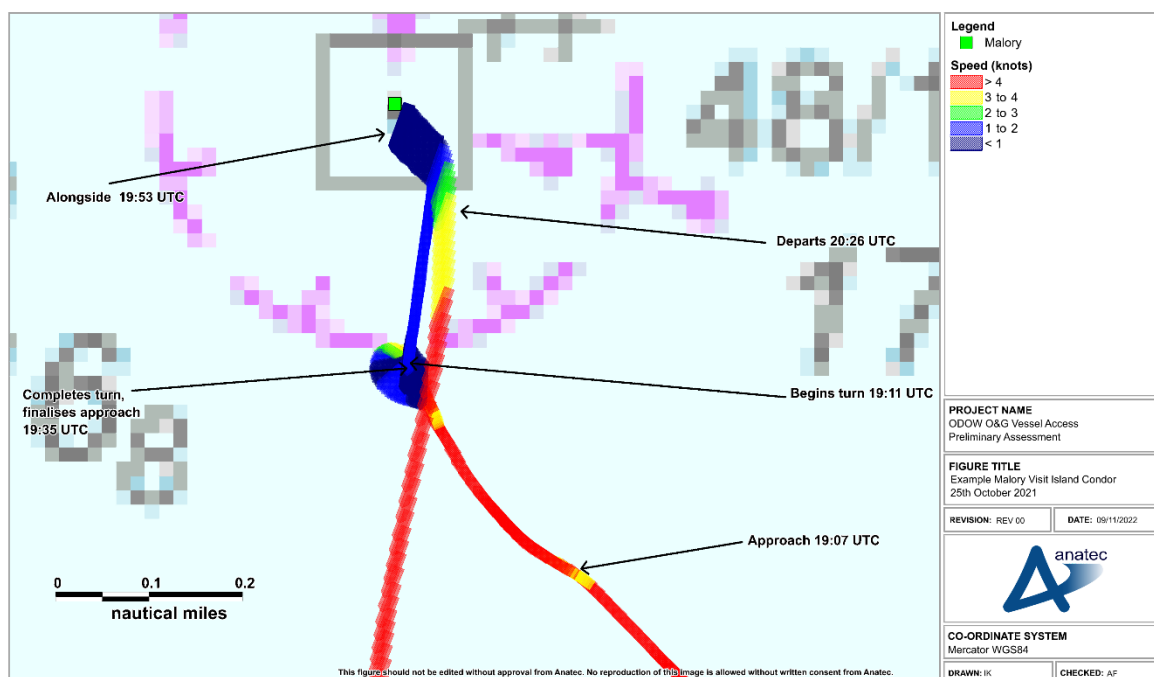


Figure 6.4 Example visit to Malory – Island Condor 25th October 2021

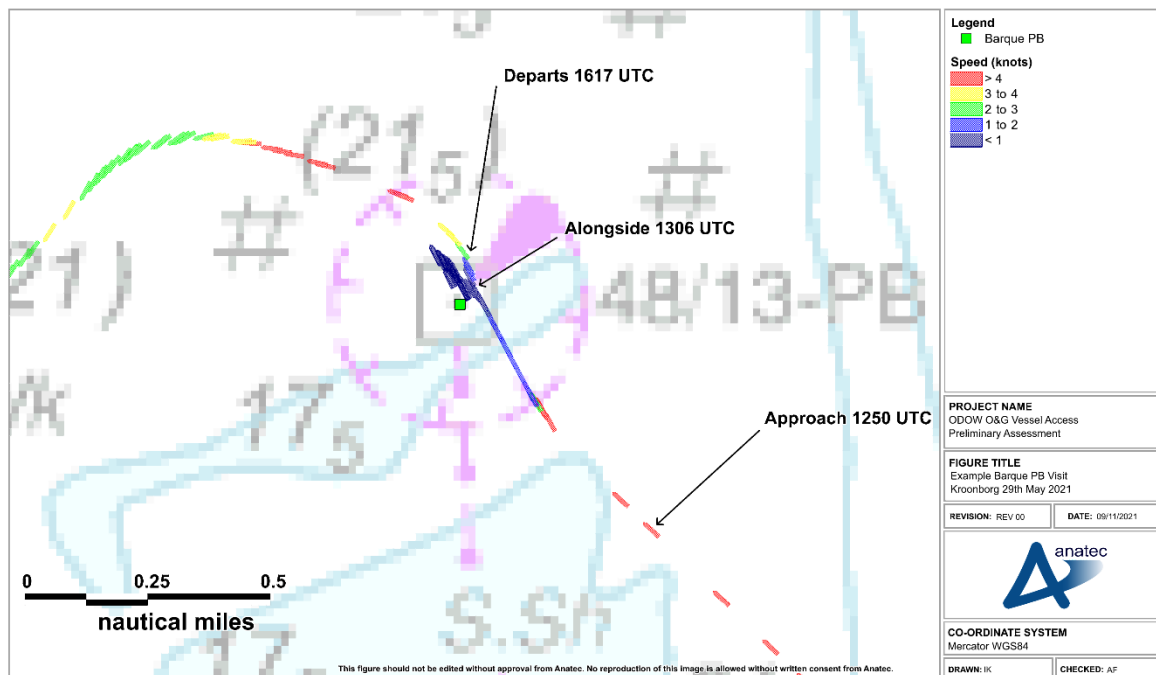


Figure 6.5 Example visit to Barque PB – Kroonborg 29th May 2021

It should be considered that crew transfer via Walk to Work systems is becoming more common within the southern North Sea. It is likely that any such vessels servicing the O&G platforms would utilise similar routeing patterns to those observed for current routine supply / support visits (i.e., including approaches from the south, and servicing of other platforms to the north).

6.4.2 Rig Moves

No rig moves were recorded to either Barque PB or Malory, however a total of four rigs were recorded within the study area over the 12 months. Review of the destination information transmitted via AIS by these rigs showed multiple ports associated with the movements including Dundee, the Humber, Southwark and Vlissingen.

Of particular note is the jack up Haeva, which was towed to the Galahad field (i.e., within the order limits) in June 2021 and remained stationed there until September 2021. The jack up was towed from the Amethyst field to Galahad on the 23rd June 2021, by a total of three tugs supporting the operation. It is noted that the ERRV Putford Protector was recorded following behind the operation and was therefore likely supporting in an ERRV capacity. To illustrate the spatial area required for this and similar operations, Figure 6.6 provides a detailed plot showing the estimated outlines of the jack up and towing tugs based on the transmitted AIS information during the approach to Galahad (the ERRV has been excluded to ensure the focus is on the towage). As shown, the “width” of the operation (i.e., distance between the support tugs) during approach from the northwest was approximately 250m, with the width increasing to approximately 400m upon final approach from the west.

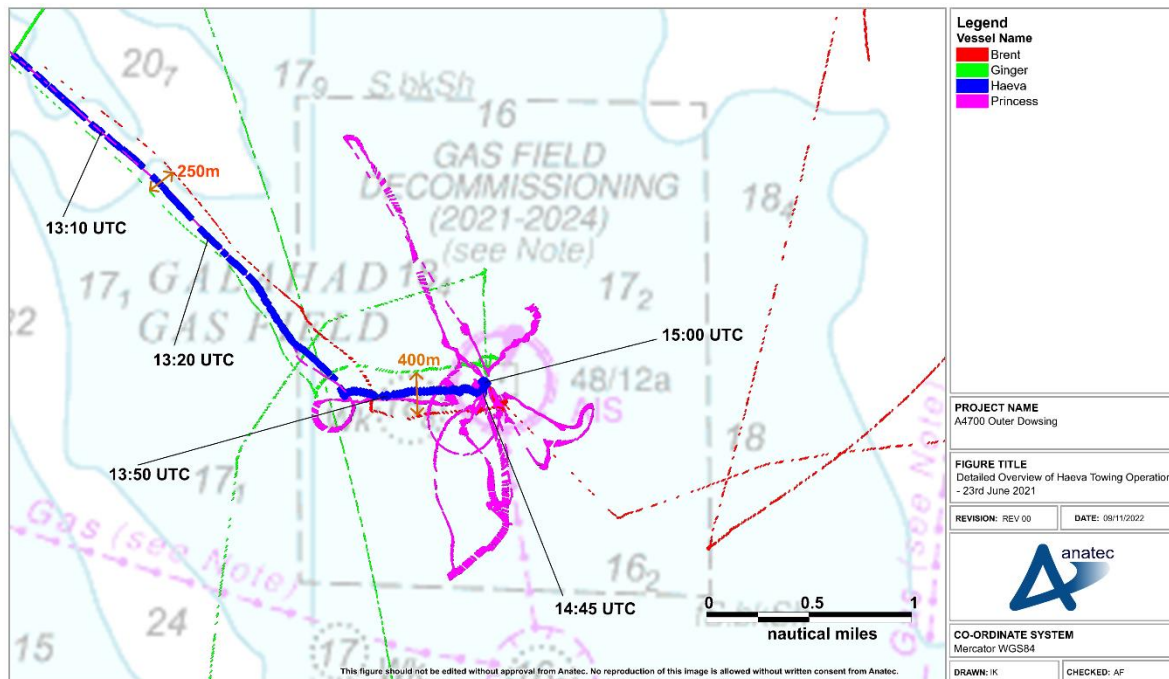


Figure 6.6 Detailed Overview of Haeva Towing Operation – 23rd June 2021

7 Impact on O&G Platform Allision Risk

7.1 Introduction

This section assesses potential impacts in relation to allision risk to O&G assets, that may arise as a result of the construction and operation of the Project. Assets in proximity have been screened in where appropriate as per Section 5, and changes between baseline vessel activity (see Section 6) and the predicted future case have then been used to assess the significance of the potential impacts.

7.2 Future Case Shipping

Changes in allision (collision risk also for Tier 1 assets) risk will primarily be based on changes in routeing that arise as a result of the construction and operation of the Project. Full details as to how post windfarm routeing has been defined are provided in the NRA (document reference 6.3.15.1). In summary, given that it is not possible to consider all potential alternative routeing options for commercial traffic, worst case alternatives have been considered.

Therefore, key assumptions for re-routeing include:

- All alternative Mean Route Position (MRP) maintain a minimum distance of 1nm from offshore installations and existing Wind Turbine Generators (WTGs) boundaries in line with the MGN 654 Shipping Route Template (MCA, 2021) – note that this approach assumes vessel transits are distributed around the MRP, and as such certain vessels will still pass closer than 1nm to assets; and
- All routes take into account local sandbanks and shallows, and known routeing preferences.

7.2.1 Tier 1

Post windfarm routeing as identified within the NRA (document reference 6.3.15.1.) is shown relative to the screened in assets in Figure 7.1. As shown, all main routes in the area are expected to deviate to avoid the array area altogether.

It is noted that the allision assessment has considered both main routes as shown in Figure 7.1 and low use routeing i.e., routes with insufficient vessel numbers to be classed as a main route.

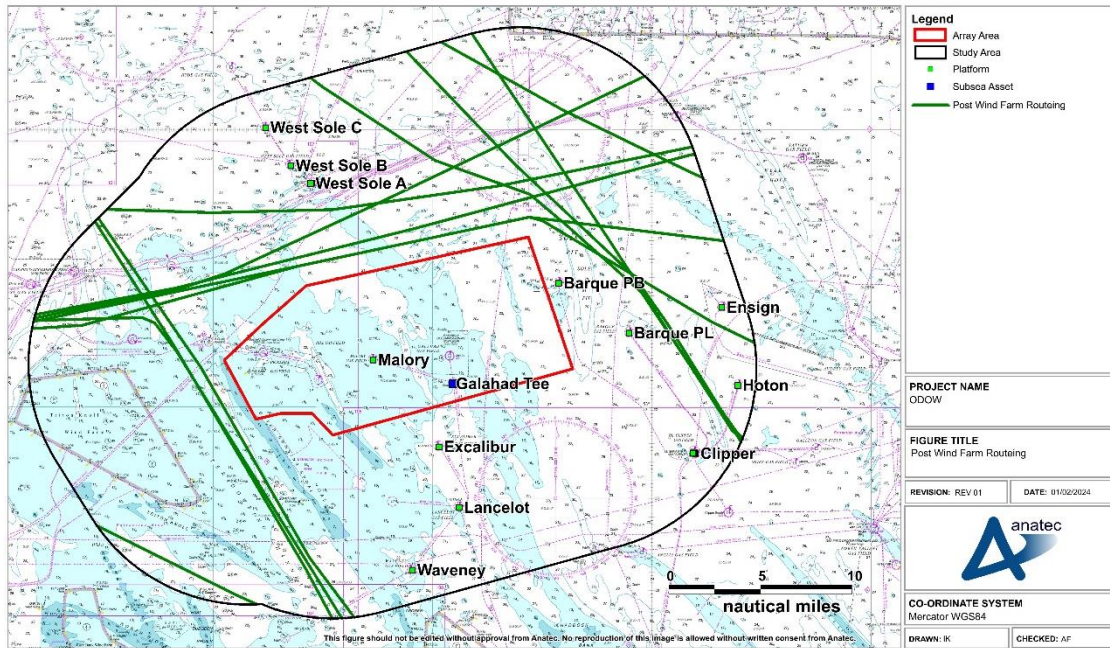


Figure 7.1 Post Wind Farm Routing

7.3 Proximity Assessment

As per Section 4.2.1, assessment of the potential change in traffic levels within 2nm of each screened in asset has been undertaken. The results of this assessment are provided in Table 7.1.

Table 7.1 Change in Vessel Numbers within 2nm of Assets

Asset	Change in Vessel Numbers per Day within 2nm
Tier 1	
Malory	-2
Galahad Subsea Tee	-1
Tier 2	
Barque PB	1
Barque PL	1
Excalibur	-1
West Sole A Complex	0
West Sole B	0
West Sole C	0
Lancelot	0

Asset	Change in Vessel Numbers per Day within 2nm
Clipper	0
Waveney	-1
Ensign	1
Hoton	0

7.4 Impact Assessment

7.4.1 Tier 1

As per the assessment undertaken in Section 7.3, vessel numbers passing within 2nm of the Malory platform and the Galahad Subsea Tee are expected to decrease (see Table 7.1), given that the commercial vessel routes that currently intersect the array area are expected to deviate to avoid the windfarm structures based on the findings of the NRA (document reference 6.3.15.1). Experience of other windfarm projects in the North Sea shows that the majority of commercial vessels will begin to deviate once the construction buoyage is in place, and as such allision risk to Malory from third party vessels is expected to decrease, as is collisions risk to any vessels stationed over the Galahad Subsea Tee.

The focus of this assessment is commercial vessels, however it should be considered that smaller vessels (e.g., fishing, recreation) may still choose to transit through the array area, and as such may still pose a risk to Malory and vessels at the Galahad Subsea Tee. However, it is unlikely that levels of these vessel types will increase over the pre-windfarm case, noting that neither were recorded in large numbers in the vessel traffic data studied in the NRA (document reference 6.3.15.1).

It should be noted that the windfarm support vessels within the array area during the construction and operational phases are also an allision risk to Malory, or collision risk to any vessels stationed at the Galahad Subsea Tee. However, such vessels will likely be aware of and familiar with Malory and the Galahad Subsea Tee, and it should be considered that they also provide additional response resources in the event of an emergency within or near the array area.

Details of the construction and maintenance of the Project will be promulgated to the relevant local O&G operators to ensure they are aware of the ongoing works and any periods/ locations where project vessel activity may be increased, and industry standard SimOps agreements will be in place between the Project and the operators to ensure associated risks are limited.

Given a reduction in traffic in proximity to the Malory platform and the Galahad Subsea Tee, it is considered that allision risk is **broadly acceptable** for Tier 1.

7.4.2 Tier 2

As can be seen from the proximity assessment in Section 7.3, it is predicted that vessel numbers within 2nm of Barque PB, Barque PL, and Ensign will increase by up to (approximately) one vessel per day. There are decreases or no changes predicted for the other Tier 2 assets. It is important to note that these are based on the worst-case deviations assessed within the NRA (document reference 6.3.15.1), and as such in reality vessels may choose alternate routes, including passing further from the assets given there is sea room available to do so.

Lighting and marking of the windfarm structures will be discussed and agreed with Trinity House post consent, and these discussions will include consideration of the local O&G assets, in particular Barque PB given its proximity to the array area. This will ensure that cumulative allision risk is managed.

Given the at most low increases in vessel numbers predicted within 2nm, significance in terms of allision for all Tier 2 platforms within 10nm of the array area is considered to be **broadly acceptable**.

7.5 Risk Ranking

Based on the assessment within this allision section, the significance of allision risk to each of the assets assessed is summarised in Table 7.2.

Table 7.2 Allision Impact Assessment Summary

Asset	Significance
Tier 1	
Malory	Broadly Acceptable
Galahad Subsea Tee	Broadly Acceptable
Tier 2	
Barque PB	Broadly Acceptable
Barque PL	Broadly Acceptable
Excalibur	Broadly Acceptable
West Sole A Complex	Broadly Acceptable
West Sole B	Broadly Acceptable
West Sole C	Broadly Acceptable
Lancelot	Broadly Acceptable
Clipper	Broadly Acceptable
Waveney	Broadly Acceptable

Asset	Significance
Ensign	Broadly Acceptable
Hoton	Broadly Acceptable

7.6 Risk Mitigation

Allision impacts to all surface assets are considered **broadly acceptable** along with vessel reduction in vicinity of the Galahad Subsea Tee. No additional mitigation measures are necessary above those considered embedded (see Section 4.4.2).

8 Impact on O&G Access (Rigs & Vessels)

8.1 Introduction

This section assesses potential impacts in relation to access to O&G assets that may arise as a result of the construction and operation of the Project. The assets within 10nm (see Section 5) have been considered to identify which may be affected in terms of access by the structures within the array area. As described in Section 4.2, both deviations to routine support vessel routing and spacing / proximity issues relative to the structures within the array area have been considered.

8.2 Identification of O&G Facilities Potentially Impacted

Assets assessed in terms of potential access issues are summarised in Table 8.1. This includes the manning status of the platforms (i.e., manned or 'normally unmanned installation' (NUI)) as well as the distance from the array area. Subsea infrastructure within the array area has been highlighted as such, noting that associated operations will still require surface access.

Based on a review of the destination information transmitted within the vessel traffic data studied (see Section 6) and Anatec's ShipRoutes database (Anatec, 2023), the majority of support vessels making routine visits to the surface assets assessed will originate from either Great Yarmouth or Lowestoft, or other O&G fields.

Minimum potential proximity to the array area has been included as this will inform the proximity / spacing assessment.

Table 8.1 Assets assessed in terms of Access Impacts

Asset Name	Status	Minimum Potential Distance from Array Area (nm)	Deviation Required for Routine Visits from Port
Tier 1			
Malory	Operational - NUI	0	Yes
Galahad Subsea Tee	Operational - Subsea	0	Yes
Tier 2			
Barque PB	Operational - NUI	0.8	No
Barque PL	Operational - NUI	3.6	No
Excalibur	Operational - NUI	2.1	No
West Sole A Complex	Operational - Manned	5.4	Yes
West Sole B	Operational - NUI	6.6	Yes
West Sole C	Operational - NUI	9.0	Yes

Asset Name	Status	Minimum Potential Distance from Array Area (nm)	Deviation Required for Routine Visits from Port
Lancelot	Operational - NUI	5.6	No
Clipper	Operational - Manned	8.0	No
Waveney	Operational - NUI	8.2	No
Ensign	Operational - NUI	8.8	No
Hoton	Operational - NUI	9.0	No

8.3 Impact Assessment

8.3.1 Tier 1

8.3.1.1 Deviations

Given that Malory and the Galahad Subsea Tee are within the array area, it will be necessary for associated vessels to enter into the array area, and on this basis, there will be no route deviation as such. However, the presence of the structures and windfarm vessels may impact upon O&G support vessels ability to access the areas needed to undertake any operations associated with Malory and the Galahad Subsea Tee.

As discussed in Section 6.4, based on the data studied it was estimated that an average of two visits occurred to Malory from the south per month, with an additional 1-2 visits per month from the North. This corresponds to approximately one visit per week.

There will be no formal prohibition of access through the array area to any vessels including O&G vessels, other than through any active safety zones (which would be temporary and regardless would not block access through, other than to areas immediately around the structure around which the safety zone was active). Any O&G vessels choosing to transit through the structures within the array area would therefore be free to access Malory and the Galahad Subsea Tee without deviation regardless of approach direction.

For vessels choosing not to transit directly through the structures, it is noted that defined buffers around infrastructure within the array area will be implemented. These buffers are 1nm around Malory and the Galahad Subsea Tee and 500 metres (m) around existing cables and pipelines. These defined buffers allow vessels a defined route of minimum 1km in width from the south along the pipeline to the Malory platform (which also connects the Galahad Subsea Tee) where there would be no turbines.

It is noted that Boston Putford (who operate the majority of O&G support vessels in the area) confirmed at the second NRA hazard workshop that they had limited concern with the Project (see Section 2).

No Project works would enter into the 500m safety zone around Malory or the Galahad Subsea Tee (except in an emergency situation).

While re-routing may be necessary, details of the Project would be promulgated in advance via the usual means (e.g., Notice to Mariners (NtM)), including directly to the relevant operators as identified within this assessment and consulted with to date. This will facilitate advanced passage planning, ensuring any deviations are minimal, and will allow the locations of completed or partially completed structures to be accounted for.

On this basis, the impact of deviation is assessed as being **tolerable with mitigation** for Tier 1 assets.

8.3.1.2 Proximity (Vessels / Rigs)

The Tier 1 assets will require suitable spacing from surrounding windfarm structures in the array area to accommodate various marine O&G operations requiring vessel / rig access, which may include inspections, maintenance interventions, and emergency repairs. Access will also be required to decommission the infrastructure and/or if further production or exploration is undertaken. The vessels associated with these operations (including any required supporting vessels) will require room to operate, and anchor spreads (where required) would also need to be accommodated, both in terms of access to the assets and also room to set the anchors. The spatial extent of these operations will depend on the nature of the activity, the vessels used, and whether anchor spreads are required.

This section assesses the potential impact of the windfarm structures in the array area and works within the array area on these types of marine operations. Of primary concern is that limited searoom caused by the windfarm structures within the array area may result in periods during which the O&G assets can be practicably accessed by the necessary vessels being restricted (e.g., more onerous restrictions on the operations due to adverse weather), and / or require vessels of a higher specification to be utilised over those that would be required in areas of open water.

This could have operational implications, noting that certain large scale operations will require additional searoom beyond the 500m threshold of the safety zones (for example where support tugs are required, or anchor spreads etc). Similarly, routing to the assets through the array area for operations involving larger vessels (such as a jack up rig) and any supporting tugs will need to be planned with respect to the available searoom, noting that limits on spacing in this regard may restrict the periods in which the assets can be practicably accessed for such operations (e.g., allowable weather), and / or restrict the types of vessels that can be used.

As described in Section 8.3.1.1, defined buffers around the infrastructure within the array area would allow for access to Malory and the Galahad Subsea Tee for operations requiring larger vessels or which extend beyond the 500m safety zone. These buffers are 500m around existing cables and pipelines providing an unobstructed route of minimum 1km in width to either Malory or the Galahad Subsea Tee, and 1nm around Malory and the Galahad Subsea

Tee allowing for vessels to operate outside the 500m safety zone if required. It is noted that as per Section 2, consultation is ongoing with Perenco in particular in terms of helicopter access. As such these buffers may change, though distances are unconfirmed.

It is also noted that the 500m buffer around the pipelines will allow access for any maintenance required for those pipelines.

Experience at other windfarms that have been constructed within close proximity to O&G assets shows that large rig operations can still occur within limited searoom. A relevant example is the Walney Extension Offshore Wind Farm located within the Irish Sea, where three wells (an exploration, appraisal, and development well) are present inside the order limits i.e., within the wind turbines. Despite intervention and subsequent decommissioning activities being required, to date there have been no reported issues.

Similarly, Heavy Lift Vessel (HLV) activities associated with windfarm construction has occurred within arrays. An example would be the Stanislav Yudin HLV (with anchor spread) which has carried out operations in the Dudgeon and Beatrice Wind Farms, as well as O&G decommissioning operations where there are other platforms in proximity. The Blythe platform has also recently been installed within 1nm of the existing Dudgeon windfarm turbines.

These operations are able to be undertaken noting the available industry experience and guidance, such as the Guidelines for Offshore Marine Operations (GOMO) (2020). This guidance facilitates effective planning of these types of operations, taking into account restrictions, to help ensure safe and efficient operations even when searoom is limited.

Given a final layout is not yet defined, the full spacing available for any vessels / rigs cannot be confirmed at this stage. However, a 500m buffer will be maintained around the pipelines within the array area, and 1nm around Malory and the Galahad Subsea Tee. Further, the 500m safety zones would be avoided at all times by vessels associated with the Project (with the exception of an emergency situation),

Accounting for the above, proximity impacts to the Tier 1 assets are considered to be **tolerable with mitigation** on the basis that buffers are being maintained around the Tier 1 assets to facilitate marine access and operations.

8.3.2 Tier 2

8.3.2.1 Deviations

Based on the review of the available data, the majority of vessels visiting the Tier 2 assets within 10nm of the array area do so from Lowestoft / Great Yarmouth, or from other offshore fields.

On this basis, vessels associated with the West Sole assets will be most affected by the construction of the Project in terms of access, given that these assets are located north of the array area, and therefore in between the assets and the likely mobilisation ports. There would

be no restrictions on access through the array area (outside of active safety zones), and as such O&G vessels would be free to pass through the array area if they chose to. For any vessels with preference to deviate, they would likely choose to either:

- Pass west of the array area through the Outer Dowsing Channel, noting that this is a common passage taken by O&G vessels (see Figure 6.3); or
- Pass east of the array area.

There is searoom to accommodate either option, noting that vessels passing east would be required to include the presence of the Barque PB and Barque PL platforms in their passage planning, and vessels passing west may see increased encounters with other vessels. Allision risk to the Barque PB and PL platforms associated with deviated routes has been considered in Section 7, and the potential for increased encounters from deviations including in the Outer Dowsing Channel is considered in the NRA (document reference 6.3.15.1).

It should be considered that West Sole A is manned while West Sole B & C are NUI, and as such will be less frequently visited than the manned asset. Additionally, vessel movements to West Sole may occur from the north with vessels travelling south from the Cleeton and Ravenspurn Field.

Vessels operating at the Lancelot Area Pipeline System (LAPS) area (Excalibur, Lancelot and Waveney) may also operate at West Sole and vessels are recorded on passage through the array area when moving between these offshore areas. The vessels on these passages will have the same passage options as detailed above i.e., pass through the array area, pass west through the Outer Dowsing Channel, or pass to the east.

It is noted that Boston Putford (who operate the majority of O&G support vessels in the area) confirmed at the second NRA hazard workshop that they had limited concern with the Project (see Section 2). This aligns with the findings of this assessment i.e., there are safe available routeing options for the relevant supply vessels, albeit with the potential for increased transit distance depending on the routes chosen.

No notable deviations are likely for routine visits from port to the other Tier 2 assets within 10nm of the Array area. Vessels visiting Barque PL, Ensign, Hoton or the LAPS area from port would be approaching from the south, therefore the array area would have no impact on the vessels passage. Vessels visiting Barque PB may experience a minor deviation given its proximity to the eastern boundary of the array area, however there is safe sea room to accommodate such deviations east of the array area. Vessels visiting these assets from other fields north of the array would again have the same routeing options as detailed above i.e., pass through the array area, pass west through the Outer Dowsing Channel, or pass to the east.

Details of the Project would be promulgated in advance via the usual means (e.g., NtM), including directly to the relevant operators as identified within this assessment and consulted with to date. This will facilitate advanced passage planning, ensuring any deviations are

minimal, and will allow the locations of completed or partially completed structures to be accounted for.

Deviation impacts to West Sole are considered to be **tolerable with mitigation** given moderate deviations may be required for any vessel choosing not to transit through the array area. Other assets are considered to be **broadly acceptable**.

8.3.2.2 Proximity (Vessels / Rigs)

As per Table 8.1, the closest Tier 2 platform is the Barque PB, located approximately 0.8nm to the east of the array area, noting that a 1nm buffer around Barque PB will be kept clear of structures. As discussed in the corresponding assessment of Tier 1 assets, large scale operations associated with O&G assets are able to be undertaken in proximity to windfarm structures, including with less space than is available in this instance (see Section 8.3.1.2 for further details). Further, based on the vessel traffic data studied, the majority of O&G vessel activity associated with the Barque PB platform remained outside of the array area (see Figure 6.3). Regardless, ongoing liaison would be necessary to ensure cooperation particularly during the construction phase. Industry standard SimOps agreements will also be in place.

All other Tier 2 platforms are in excess of 2nm in proximity, which is considered sufficient space to accommodate marine operations.

It is noted that during the construction phase, details of the ongoing works of the Project would be promulgated in advance including to the relevant operators of O&G assets in the area. This would include details of specific operations being undertaken, and the vessel types involved.

Given proximity of the Barque PB, the significance for this asset is considered to be **tolerable with mitigation**. All other Tier 2 assets are considered to be of **broadly acceptable** significance in terms of proximity / spacing.

8.4 Risk Ranking

Based on the assessment within this access section, the significance of deviation and proximity impacts to each of the assets assessed is summarised in Table 8.2.

Table 8.2 Access Impact Assessment Summary

Asset	Significance – Deviations	Significance - Proximity
Tier 1		
Malory	Tolerable with Mitigation	Tolerable with Mitigation
Galahad Subsea Tee	Tolerable with Mitigation	Tolerable with Mitigation
Tier 2		
Barque PB	Broadly Acceptable	Tolerable with Mitigation
Barque PL	Broadly Acceptable	Broadly Acceptable
Excalibur	Broadly Acceptable	Broadly Acceptable
West Sole A Complex	Tolerable with Mitigation	Broadly Acceptable

Asset	Significance – Deviations	Significance - Proximity
West Sole B	Tolerable with Mitigation	Broadly Acceptable
West Sole C	Tolerable with Mitigation	Broadly Acceptable
Lancelot	Broadly Acceptable	Broadly Acceptable
Clipper	Broadly Acceptable	Broadly Acceptable
Waveney	Broadly Acceptable	Broadly Acceptable
Ensign	Broadly Acceptable	Broadly Acceptable
Hoton	Broadly Acceptable	Broadly Acceptable

8.5 Risk Mitigation

Noting that impacts associated with access are **tolerable with mitigation** for certain assets, the following additional mitigation measures should be considered for implementation in terms of reducing effects to within As Low As Reasonably Practicable parameters:

- Focused / targeted promulgation of information to relevant O&G operators.

9 Summary

This assessment has assessed potential allision risk and access issues that may arise to O&G assets as a result of the construction and operation of the Project. The assessment has primarily been informed via marine traffic data as part of the NRA (document reference 6.3.15.1) process, which has been used to identify the baseline (including in terms of O&G activity) and to assess changes that may arise following construction of the Project.

A summary of the findings of the assessment are provided in Table 9.1. These rankings are designed to inform Volume 1, Chapter 18: Marine Infrastructure and Other Users (document reference 6.1.18).

Table 9.1 Impact Assessment Summary

Asset	Allision	Deviations	Proximity
Tier 1			
Malory	Broadly Acceptable	Tolerable with Mitigation	Tolerable with Mitigation
Galahad Subsea Tee	Broadly Acceptable	Tolerable with Mitigation	Tolerable with Mitigation
Tier 2			
Barque PB	Broadly Acceptable	Broadly Acceptable	Tolerable with Mitigation
Barque PL	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable
Excalibur	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable
West Sole A Complex	Broadly Acceptable	Tolerable with Mitigation	Broadly Acceptable
West Sole B	Broadly Acceptable	Tolerable with Mitigation	Broadly Acceptable
West Sole C	Broadly Acceptable	Tolerable with Mitigation	Broadly Acceptable
Lancelot	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable
Clipper	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable
Waveney	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable
Ensign	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable
Hoton	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable

10 References

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