Unit Name NORTHERN ENDEAVOUR LR Number 9182916

Annual/Intermediate survey endorsements

1st Annual Survey endorsement

Signed:
Place of Survey
Date

2nd Annual Survey endorsement

Signed:
Place of Survey
Date

3rd Annual Survey endorsement

Signed:
Place of Survey
Date

4th Annual Survey endorsement

Signed:
Place of Survey
Date

** Delete as appropriate*

Unit Name NORTHERN ENDEAVOUR LR Number 9182916

Extension of special survey completion date

In accordance with the Rules and Regulations for the Classification of Offshore Units this certificate is extended until (see note 2) .

Signed: _____

Place of survey

Date

Special survey completion

This Special Survey having been completed, this certificate is extended until .

Signed: _____

Place of survey

Date

Notes

1 In accordance with the Rules and Regulations for the Classification of Offshore Units, class will be automatically suspended and this certificate becomes invalid if not endorsed annually within three months of the due date of the Annual or Intermediate Surveys.

2 This certificate expires on the due date of the Special Survey. Consideration can be given at the discretion of the Committee to any exceptional circumstances justifying an extension to the Special Survey completion date for a maximum period of three months beyond the validity of this certificate.

3 Prior to the endorsement of this certificate all overdue hull and machinery surveys should be dealt with or postponed by agreement.

4 In normal circumstances the Annual or Intermediate Survey is to be held in conjunction with the Periodical Load Line Inspection and the Safety Construction Annual Survey.

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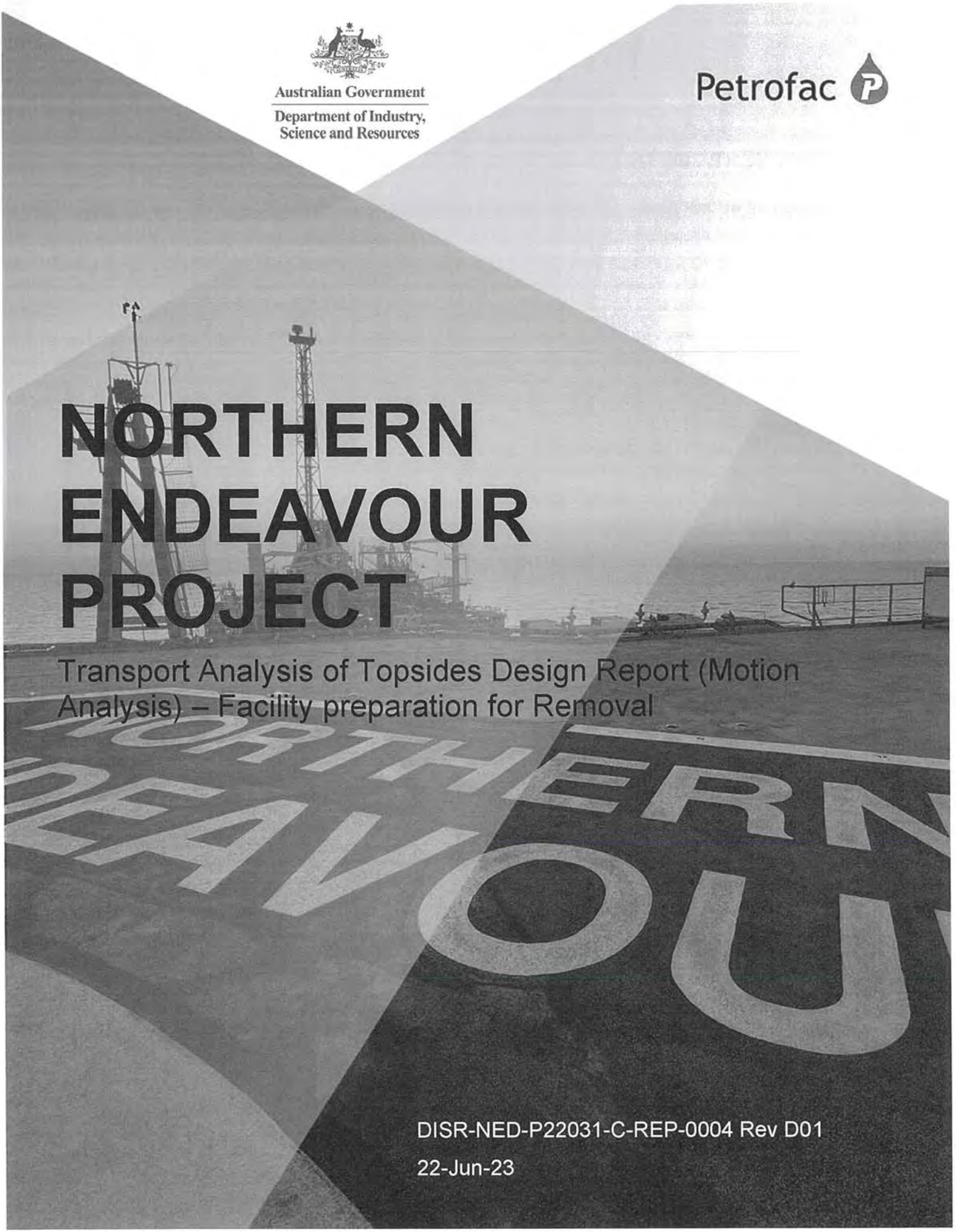
NORTHERN ENDEAVOUR PROJECT

Transport Analysis of Topsides Design Report (Motion Analysis) – Facility preparation for Removal



DISR-NED-P22031-C-REP-0004 Rev D01

22-Jun-23

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TABLE OF CONTENTS

Page 3 of 45

TABLES

s22

s22

FIGURES

s22

EXECUTIVE SUMMARY

This report details the motion response analysis of Northern Endeavour FPSO performed by Linch-Pin Offshore Management and Services Ltd. The purpose of this report is to determine the motions of the FPSO in designed tow condition and to calculate the acceleration of topside modules of interest.

The preferred route for this tow is the route from Laminaria-Corallina to Labuan via Lombok Strait and the Java Sea on western side of Borneo. But as it is yet to be confirmed, for the purpose of this analysis, three tow routes to Labuan have been considered and the most onerous metocean conditions of the three routes and Laminaria-Corallina site has been applied. In terms of significant wave height, metocean criteria of Laminaria-Corallina site is found to be the most onerous compared to other tow routes. Non-cyclonic metocean data of three optional tow routes have been obtained from RPS Energy and the relevant metocean criteria for towing can be found in Appendix-C.

The viscous roll damping for tow condition has been obtained by calibrating with roll motion amplitudes calculated for ballast condition in the historical motion analysis reports made by Kvaerner-SBM Consortium in 1998 and Orwell in 2013. For FPSO's motion response analysis, the 10 years RP non-cyclonic metocean criteria of Lamanaria-Corallina site has been considered because it is more severe than the cyclonic criteria. The range of peak period for unrestricted marine operation has been derived according to DNV-ST-N001, Marine operations and Marine Warranty, Ref. [6] and the longest period has been chosen for this analysis. The maximum roll and pitch response to non-cyclonic criteria is found to be 4.73 and 3.06 degrees respectively.

The maximum translational and rotational acceleration of topside modules of particular interest during tow (flare tower at this stage) has been calculated in this report.

ABBREVIATIONS

Abbreviation	Description
AP	Aft Perpendicular
B	Breadth
D	Depth
FP	Forward Perpendicular
FPSO	Floating, Production, Storage and Offloading
GM	Transverse Metacentric Height
LCG	Longitudinal Centre of Gravity
LOA	Length overall
LBP	Length between perpendiculars
NE	Northern Endeavour
NEDCOM	Northern Endeavour Decommissioning Project
RAO	Response Amplitude Operator
RP	Return Period
T	Draft
VCG	Vertical Centre of Gravity

HOLDS

Section	Hold
1.1	Shipyard Name

Page 7 of 45

1.0 INTRODUCTION

The Department of Industry, Science, Energy and Resources (DISER) requires the disconnection and removal of the Floating, Production, Storage and Offload (FPSO) Northern Endeavour (NE) from the Laminaria-Corallina fields.

The Northern Endeavour Decommissioning project (NEDCOM) will cover the physical decommissioning of the Laminaria-Corallina facilities and will be conducted in three principal phases, as follows:

1. Phase One: Disconnection of the FPSO and unmanned tow, including well isolations.

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1.1. Background

In Phase one of NEDCOM project, the mooring lines, and risers of the FPSO will be disconnected and then the FPSO will be towed from the site to the Shipyard in Southeast Asia. The exact shipyard (HOLD) is not decided yet, but it will be either in Singapore or in Labuan.

1.2. Scope and Objectives

The scope and objectives of this report are following:

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- Generate RAO's for tow load condition.
- Calculate the acceleration of topside modules of interest during tow.

2.0 METHODOLOGY

s22

Page 9 of 45

3.0 GENERAL

3.1. Northern Endeavour FPSO Particulars

s22

s22

APPENDIX C: TOW ROUTE METCOCEAN CRITERIA

Route-1 : Lamanaria to Singapore through Java Sea, NW Monsoon (Nov-Mar)

Non-Cyclonic Conditions
Independent Omnidirectional Parameters
J3776 - Java Sea
NW Monsoon

Parameter	Symbol	Units	Return Period 10
Wind [3]			**At Time of Peak Wind Speed**
Gust (3 second)	U_s	$m\,s^{-1}$	18.29
Mean (1 minute)	U_1	$m\,s^{-1}$	16.59
Mean (10 minute)	U_{10}	$m\,s^{-1}$	15.29
Mean (1 hour)	U_{3600}	$m\,s^{-1}$	14.27
Waves			**At Time of Peak Wave Height**
Significant Wave Height	H_s	m	3.46
Spectral Peak Period [4]	T_p	s	7.54
Spectral Mean Period [5]	T_{m01}	s	6.15
Zero Crossing Period [6]	T_z	s	5.71
Maximum Single Wave Height	EH_{max}	m	6.44
Period of Maximum Single Wave	TH_{max}	s	7.08
Steepness of Maximum Single Wave	L/EH_{max}		12.13
JONSWAP Parameters [7]			**At Time of Peak Wave Height**
Phillips Parameter	α		0.0142
Peakedness Parameter	γ		2.29
Sigma A	σ_A		0.078
Sigma B	σ_B		0.093
Water Levels			**At Time of Peak Wave Height**
Chart Depth (LAT)	h	m	60.12
Tidal MSL (above LAT)	h_{msl}	m	0.92
Tidal MHWS (above LAT)	h_{mhws}	m	1.67
Sea Level Rise	h_{slr}	m	0.47
Minimum Still Water Level (ASB)	h_{min}	m	60.62
Maximum Still Water Level (ASB)	h_{max}	m	61.93
Wave Crest Elevation [8]	h_c	m	3.86
Minimum Instantaneous Water Level (ASB)	$h_{inst,min}$	m	58.05
Maximum Instantaneous Water Level (ASB) [9]	$h_{inst,max}$	m	65.79
Independent Water Levels [10]			**At Time of Peak Wave Height**
Most Probable Maximum Single Wave Height	H_{mp}	m	6.83
Wave Crest Elevation [8]	h_{crest}	m	4.21
Maximum Instantaneous Water Level (ASB) [9]	$h_{inst,max,ind}$	m	66.14
Total Steady Currents			**At Time of Peak Current Speed at 2mBMSL**
Current Speed @ +2m BMSL	V_{+2}	$m\,s^{-1}$	0.73

Route-1 : Lamanaria to Singapore through Java Sea, Northernly Monsoon (Nov-Apr)

Non-Cyclonic Conditions
Independent Omnidirectional Parameters
J3776 - Offshore Singapore
Northerly Monsoon

Parameter	Symbol	Units	Return Period 10
Wind [3]			**At Time of Peak Wind Speed**
Gust (3 second)	U_g	$m\,s^{-1}$	16.70
Mean (1 minute)	U_1	$m\,s^{-1}$	15.19
Mean (10 minute)	U_{10}	$m\,s^{-1}$	14.02
Mean (1 hour)	U_{1hr}	$m\,s^{-1}$	13.12
Waves			**At Time of Peak Wave Height**
Significant Wave Height	H_s	m	2.85
Spectral Peak Period [4]	T_p	s	7.25
Spectral Mean Period [5]	T_m	s	5.84
Zero Crossing Period [6]	T_z	s	5.41
Maximum Single Wave Height	EH_{max}	m	5.31
Period of Maximum Single Wave	TH_{max}	s	6.72
Steepness of Maximum Single Wave	L/EH_{max}		13.27
JONSWAP Parameters [7]			**At Time of Peak Wave Height**
Phillips Parameter	α		0.0121
Peakedness Parameter	γ		1.87
Sigma A	σ_a		0.084
Sigma B	σ_b		0.097
Water Levels			**At Time of Peak Wave Height**
Chart Depth (LAT)	h	m	45.10
Tidal MSL (above LAT)	h_{msl}	m	1.10
Tidal MHWS (above LAT)	h_{mhws}	m	1.50
Sea Level Rise	h_{slr}	m	0.47
Minimum Still Water Level (ASB)	$h_{swl\,min}$	m	46.10
Maximum Still Water Level (ASB)	$h_{swl\,max}$	m	46.77
Wave Crest Elevation [8]	h_c	m	3.18
Minimum Instantaneous Water Level (ASB)	$h_{inst\,min}$	m	43.98
Maximum Instantaneous Water Level (ASB) [9]	$h_{inst\,max}$	m	49.95
Independent Water Levels [10]			**At Time of Peak Wave Height**
Most Probable Maximum Single Wave Height	H_{mp}	m	5.65
Wave Crest Elevation [8]	$h_{c\,ind}$	m	3.45
Maximum Instantaneous Water Level (ASB) [9]	$h_{inst\,max\,ind}$	m	50.22
Total Steady Currents			**At Time of Peak Current Speed at 4mBMSL**
Current Speed @ +4m BMSL	V_{+4}	$m\,s^{-1}$	0.79

Route-2 : Lamanaria to Labuan (Banda-Molucca-Celebes-Sulu sea), NE Monsoon (Nov-Apr)

Non-Cyclonic Conditions
Independent Omnidirectional Parameters
J3776 - Sulu Sea
NE Monsoon

Parameter	Symbol	Units	Return Period 10
Wind [3]			**At Time of Peak Wind Speed**
Gust (3 second)	U_3	$m\,s^{-1}$	17.73
Mean (1 minute)	U_1	$m\,s^{-1}$	16.10
Mean (10 minute)	U_{10}	$m\,s^{-1}$	14.85
Mean (1 hour)	U_{hr}	$m\,s^{-1}$	13.87
Waves			**At Time of Peak Wave Height**
Significant Wave Height	H_s	m	3.55
Spectral Peak Period [4]	T_p	s	8.83
Spectral Mean Period [5]	T_m	s	6.97
Zero Crossing Period [6]	T_z	s	6.43
Maximum Single Wave Height	EH_{max}	m	6.61
Period of Maximum Single Wave	TH_{max}	s	8.02
Steepness of Maximum Single Wave	L/EH_{max}		15.18
JONSWAP Parameters [7]			**At Time of Peak Wave Height**
Phillips Parameter	α		0.0095
Peakedness Parameter	γ		1.37
Sigma A	σ_a		0.094
Sigma B	σ_b		0.103
Water Levels			**At Time of Peak Wave Height**
Chart Depth (LAT)	h	m	384.38
Tidal MSL (above LAT)	h_{msl}	m	1.05
Tidal MHWS (above LAT)	h_{mhws}	m	1.80
Minimum Still Water Level (ASB)	h_{min}	m	385.04
Maximum Still Water Level (ASB)	h_{max}	m	385.82
Wave Crest Elevation [8]	h_c	m	3.97
Minimum Instantaneous Water Level (ASB)	$h_{inst,min}$	m	382.40
Maximum Instantaneous Water Level (ASB) [9]	$h_{inst,max}$	m	389.79
Independent Water Levels [10]			**At Time of Peak Wave Height**
Most Probable Maximum Single Wave Height	H_{mp}	m	7.11
Wave Crest Elevation [8]	$h_{c,ind}$	m	4.29
Maximum Instantaneous Water Level (ASB) [9]	$h_{inst,max,ind}$	m	390.11
Total Steady Currents			**At Time of Peak Current Speed at 4mBMSL**
Current Speed @ +4m BMSL	V_{+4}	$m\,s^{-1}$	0.71

Route-3 : Singapore to Labuan, NE Monsoon (Nov -Apr)

Non-Cyclonic Conditions
Independent Omnidirectional Parameters
J3776 - Labuan Southern Approach
NE Monsoon

Parameter	Symbol	Units	Return Period 10
Wind [3]			**At Time of Peak Wind Speed**
Gust (3 second)	U_g	$m\ s^{-1}$	15.03
Mean (1 minute)	U_1	$m\ s^{-1}$	13.71
Mean (10 minute)	U_{10}	$m\ s^{-1}$	12.69
Mean (1 hour)	U_{60}	$m\ s^{-1}$	11.90
Waves			**At Time of Peak Wave Height**
Significant Wave Height	H_s	m	3.73
Spectral Peak Period [4]	T_p	s	11.81
Spectral Mean Period [5]	T_{m}	s	8.64
Zero Crossing Period [6]	T_z	s	7.93
Maximum Single Wave Height	EH_{max}	m	6.94
Period of Maximum Single Wave	TH_{max}	s	9.94
Steepness of Maximum Single Wave	L/EH_{max}		21.81
JONSWAP Parameters [7]			**At Time of Peak Wave Height**
Phillips Parameter	α		0.0046
Peakedness Parameter	γ		0.53
Sigma A	σ_a		0.134
Sigma B	σ_b		0.122
Water Levels			**At Time of Peak Wave Height**
Chart Depth (LAT)	h	m	55.15
Tidal MSL (above LAT)	h_{msl}	m	1.15
Tidal MHWS (above LAT)	h_{mhws}	m	1.85
Minimum Still Water Level (ASB)	h_{min}	m	55.97
Maximum Still Water Level (ASB)	h_{max}	m	56.63
Wave Crest Elevation [8]	h_c	m	4.16
Minimum Instantaneous Water Level (ASB)	$h_{inst,min}$	m	53.19
Maximum Instantaneous Water Level (ASB) [9]	$h_{inst,max}$	m	60.79
Independent Water Levels [10]			**At Time of Peak Wave Height**
Most Probable Maximum Single Wave Height	H_{mp}	m	7.35
Wave Crest Elevation [8]	$h_{c,ind}$	m	4.34
Maximum Instantaneous Water Level (ASB) [9]	$h_{inst,max,ind}$	m	60.97
Total Steady Currents			**At Time of Peak Current Speed at 4mBMSL**
Current Speed @ +4m BMSL	V_{+4}	$m\ s^{-1}$	0.88

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Route-3 : Singapore to Labuan, Northerly Monsoon(Nov-Apr)

Non-Cyclonic Conditions
Independent Omnidirectional Parameters
J3776 - Offshore Singapore
Northerly Monsoon

Parameter	Symbol	Units	Return Period 10
Wind [3]			**At Time of Peak Wind Speed**
Gust (3 second)	U_g	$m\,s^{-1}$	16.70
Mean (1 minute)	U_1	$m\,s^{-1}$	15.19
Mean (10 minute)	U_{10}	$m\,s^{-1}$	14.02
Mean (1 hour)	U_{3600}	$m\,s^{-1}$	13.12
Waves			**At Time of Peak Wave Height**
Significant Wave Height	H_s	m	2.85
Spectral Peak Period [4]	T_p	s	7.25
Spectral Mean Period [5]	T_m	s	5.84
Zero Crossing Period [6]	T_z	s	5.41
Maximum Single Wave Height	EH_{max}	m	5.31
Period of Maximum Single Wave	TH_{max}	s	6.72
Steepness of Maximum Single Wave	L/EH_{max}		13.27
JONSWAP Parameters [7]			**At Time of Peak Wave Height**
Phillips Parameter	α		0.0121
Peakedness Parameter	γ		1.87
Sigma A	σ_A		0.084
Sigma B	σ_B		0.097
Water Levels			**At Time of Peak Wave Height**
Chart Depth (LAT)	h	m	45.10
Tidal MSL (above LAT)	h_{msl}	m	1.10
Tidal MHWS (above LAT)	h_{mhws}	m	1.50
Sea Level Rise	h_{slr}	m	0.47
Minimum Still Water Level (ASB)	h_{min}	m	46.10
Maximum Still Water Level (ASB)	h_{max}	m	46.77
Wave Crest Elevation [8]	h_c	m	3.18
Minimum Instantaneous Water Level (ASB)	$h_{inst,min}$	m	43.98
Maximum Instantaneous Water Level (ASB) [9]	$h_{inst,max}$	m	49.95
Independent Water Levels [10]			**At Time of Peak Wave Height**
Most Probable Maximum Single Wave Height	H_{mp}	m	5.65
Wave Crest Elevation [8]	$h_{c,ind}$	m	3.45
Maximum Instantaneous Water Level (ASB) [9]	$h_{inst,max,ind}$	m	50.22
Total Steady Currents			**At Time of Peak Current Speed at 4mBMSL**
Current Speed @ +4m BMSL	V_{+4}	$m\,s^{-1}$	0.79

Lamanaria -Corallina Site Summer (Nov-Apr)

Laminaria Non-Cyclonic Design Criteria - Summer (Nov-Apr)

Summer winds and waves predominantly from the west-southwest.

Non-cyclonic Storm Return Period Criteria (Independent) - Summer (Nov-Apr)							
	Note	Parameter		Units	1-Year	10-Year	100-Year
Winds (10m ASL) Excluding squalls	1	Gust speed (3 sec)	U_g	m/s	15.7	19.2	21.9
	1	Mean Speed (1 min)	U_1	m/s	14.1	17.2	19.6
	1	Mean Speed (10 min)	U_{10}	m/s	12.8	15.6	17.8
	1	Mean Speed (60 min)	U_{60}	m/s	11.8	14.4	16.4
Waves	4	Significant Wave Height	H_s	m	4.2	5.2	5.9
	5	Spectral Peak Period	T_p	s	10.7	11.9	12.7
	5	Spectral Mean Period	T_m	s	8.3	9.2	9.8
	5	Zero Crossing Period	T_z	s	7.7	8.6	9.2
	5	Maximum Single Wave	EH_{max}	m	7.8	9.7	11.0
	6	Period of Maximum Wave	TH_{max}	s	9.5	10.6	11.3
	7	Significant wave steepness	$1:S_s$		22.3	22.3	22.3
	8	Steepness of EHmax	1:S		18.1	18.1	18.1
		JONSWAP Phillips parameter	a		0.0143	0.0143	0.0143
		JONSWAP peakedness parameter	?		2.3155	2.3151	2.3148
		JONSWAP Sigma a parameter	s_a		0.0774	0.0774	0.0774
		JONSWAP Sigma b parameter	s_b		0.0931	0.0931	0.0931
Currents (Total Steady)	2	348m above bed	W_{+348}	m/s	0.72	0.82	0.89
	2	340m above bed	W_{+340}	m/s	0.67	0.76	0.82
	2	300m above bed	W_{+300}	m/s	0.54	0.59	0.62
	2	260m above bed	W_{+260}	m/s	0.69	0.75	0.79
	2	220m above bed	W_{+220}	m/s	0.66	0.71	0.75
	2	180m above bed	W_{+180}	m/s	0.80	0.89	0.95
	2	100m above bed	W_{+100}	m/s	0.61	0.65	0.68
	2	10m above bed	W_{+10}	m/s	0.62	0.67	0.71

BE&R CONSULTING

Northern Endeavour End-of-Life Options Analysis

Summary Report

Prepared for:

Department of Industry, Science and Resources

Document no.	DIS-01-REP-001-0

Revision	Date	Description	Prepared by	Checked by	Approved by
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CONTENTS

s22

s22

s22

s22

s22

s22

s22

Tables

s22

s22

s22

s22

Figures

s22

s22

Appendices

s22

s22

1 EXECUTIVE SUMMARY

1.1 Purpose

The purpose of this report is to identify and assess options for the s22 or recycling of the Northern Endeavour FPSO. The report provides the high-level information relevant to assessing the viability of these options. More detailed information, including costing and regulatory requirements, will be required to enable the Commonwealth to make informed decisions on the best pathway forward for FPSO disposal.

1.2 Background

The Department of Industry Science and Resources – Northern Endeavour Branch (DISR) has engaged BE&R to assess the end-of-life options available to the Northern Endeavour, define a pathway to proceed with the disposal of the FPSO, and describe the risks involved with the disposal options for the vessel.

Incorporated within this document, BE&R describes an overview of the disposal options, the relevant regulations, the costs, schedule, risks and processes associated with the execution of the vessel disposal.

The following activities were conducted to support this guidance:

- Establishment of key drivers and criteria for option selection

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- Recycling market and recycling regulations review
- Vessel lay-up and towing options

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- A high-level risk assessment for the disposal
- Comparative review of options against key drivers

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1.3 End-of-life disposal options

Four potential opportunities were identified as available to the Northern Endeavour:

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2. Green Recycling in Europe (Denmark or Norway) (EU-SRR compliant yard)
3. Green Recycling in Türkiye (EU-SRR compliant yard)
4. Green Recycling in Australia (EU-SRR compliant)

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1.5 Regulations

The Hong Kong Convention (HKC) aims to ensure safe and eco-friendly ship recycling by enforcing design, operation, and dismantling standards. The HKC, which enters into force on 26th June 2025, has been ratified by 22 states, covering 45.81% of world shipping. The EU Ship Recycling Regulation (EU-SRR), which applies to the ships flagged in EU member states, aligns with the HKC, with additional safety and environmental requirements for ships of 500GT and above, including leakage control, hazardous material handling, and waste management. The EU-SRR is the most stringent level of regulation for the ship recycling industry.

Australia has not ratified either the HKC or EU-SRR.

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1.7 Green Recycling in Europe (EU-SRR compliant yard)

Responses to the market survey were received from yards in Norway (AF Offshore Decom) and Denmark (Modern American Recycling Services – MARS). Both yards have extensive experience in the recycling of large FPSOs and indicated that they have yard availability in 2024-2025.s22

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The lowest risk method of transporting the FPSO to Europe is via a Heavy Lift Vessel (HLV). Given the increased permitting risk and the requirement to remove or shorten the flare tower if the Suez Canal route is used, the Cape of Good Hope route has been identified as the lower risk option. The transportation schedule would need to be developed to avoid the worst winter weather months. Only two HLVs are large enough to transport the Northern Endeavour, so it will be critical to secure a contract with one of the vessels in a timely manner.

Given the indicated availability of the yards, it is anticipated that the Northern Endeavour will not be required to be laid up prior to departure.

The study has shown that the Europe option is most aligned with the Commonwealth's agreed key drivers: minimising health & safety risk, environmental risk and reputation risk.

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1.8 Green Recycling in Türkiye (EU-SRR compliant yards)

Responses were received from two entities in Türkiye, Dido Shipping and Ege Celik San. Ve Tic. A.S. Dido operates three yards in Türkiye. Dido has experience recycling FPSO, whereas Ege Celik San has only recycled large tankers. Both entities have indicated that they have yard availability in 2024-2025. Türkiye has regulations limiting the importation of different types of contamination, such as NORM. s22 s22

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As per the Europe option, the FPSO would be transported to Türkiye on a HLV via the Cape of Good Hope.

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The study has shown that the Türkiye option is more aligned with the Commonwealth's agreed key drivers than the Australian option but less than the Europe option.

1.9 Green Recycling in Australia (EU-SRR compliant)

Three entities in Australia expressed their interest in the opportunity to recycle the Northern Endeavour:

- United Salvage (Whyalla, SA)
- McMahon Services (Whyalla, SA)
- Birdon (Henderson, WA)

All three indicated that they had yard availability in 2024-2025.

None of the companies have experience recycling FPSOs or vessels as large as the Northern Endeavour. Birdon (WA based) and McMahon (SA based) have recycled large Australian navy vessels, and Birdon has recycled various oil and gas structures. Both companies are undertaking feasibility studies for an oil and gas entity regarding recycling an Australian-based FPSO.

United Salvage (SA based) has no direct experience recycling large vessels.

The Australian vendors have indicated that they will be able to comply with the EU-SRR but are not certified.

The risk associated with the Australian companies having insufficient experience or confirmed infrastructure to recycle vessels of the size of the Northern Endeavour and the demands of satisfying the requirements of the EU-SRR is considered to be high.

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The FPSO could be wet towed to the Australian yards. However, the structural integrity of the Northern Endeavour hull will be required to be verified.

The study has shown that the Australian options are the least aligned with the Commonwealth's agreed key drivers. This is driven by the higher relative risk around practical execution experience, schedule and financial value, even though these drivers have the lowest weighting in regard to the level of importance to the Commonwealth.

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- The cost of the wet tow or dry tow to the recycling yard. For the Europe and Türkiye options a dry tow has been assumed

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1.11 Recommendations

The following recommendations were developed as a result of the disposal options review:

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- For the Europe and Türkiye recycling options, use the dry tow method to transport the Northern Endeavour and sail via the Cape of Good Hope

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2 INTRODUCTION

2.1 Background

The Department of Industry Science and Resources – Northern Endeavour Branch has engaged BE&R to assess the end-of-life options available to the Northern Endeavour, define a pathway to proceed with the disposal of the FPSO, and describe the risks involved with the disposal options of the FPSO.

2.2 Scope of Work

The scope of work included the following two phases:

Phase 1: Identify

s22

2.3 Northern Endeavour FPSO – General Description

Table 2-1 List Northern Endeavour FPSO Vessel Particulars

Particular	Quantity	Unit
Topsides		
Oil	170 000	bpd
Produced Water	174 000	bpd
Total Liquids	241 000	bpd
Gas Compression	80	mmscfd
Water Injection	NA	bwpd
Gas Injection	19	mmscfd
Total Gas Processing	60	mmscfd
Lift Gas	60	mmscfd
Power Gen	Approx 9	MW
Hull		
Flag State	Australia	
Build	New	

Particular	Quantity	Unit
Size	Suezmax	
Config	Double Sided	
Design life	60 years for hull	Years
Length Overall	274.7	m
Beam	50	m
Depth	28	m
Design draught	18.76	m
Deadweight	179,300	Tonnes
Gross Tonnage	108,406	Tonnes
Built	1999	Year
Storage	1,400,000	bbls
Offtake Volume		bbls
Mooring	Int. Turret	
Accommodation	64 (94)	PoB

2.4 Abbreviations and Definitions

A list of the abbreviations and definitions used in this report are noted below.

Table 2-2 List of Abbreviations and Definitions

Abbreviation	Description
bbls	barrel of crude oil
bpd	Barrels per day
bwpd	Barrels of water per day
CAPEX	Capital Expenditure
CCMA	Castleton Commodities Merchant Asia
CODA	Centre of Decommissioning Australia
COT	Cargo Oil Tanks
DAFF	Department of Agriculture, Fisheries and Forestry
DISR	Department of Industry, Science and Research
EU-SRR	European Union Ship Recycling Regulation
FLNG	Floating LNG Production
FMECA	Failure modes, effects, and criticality analysis
FPSO	Floating Production Storage Offloading
FPS	Floating Production System
FSO	Floating Storage Offloading
FSRU	Floating Storage Regassification Unit
GA	General Arrangement
HKC	Hong Kong Convention
IHM	Inventory of Hazardous Materials
HM	Hazardous Materials
LDT	Light Displacement Tonnage
m	Metres
mmscfd	Million standard cubic feet per day
MOPU	Mobile Offshore Production Unit
MW	Megawatts
NE	Northern Endeavour
POB	Persons on Board
Pratique	Permission granted to a ship to have dealings with a port, given after quarantine or on showing a clean bill of health.
RLE	Repair and Life Extension
ROI	Return on Investment
ppm	Parts per million
SA	South Australia
SIMOPS	Simultaneous Operations
TECOP	Technical, Economic, Commercial, Operational, Political
WA	Western Australia

3 OPPORTUNITY ASSESSMENT

As part of the Identify Phase, a high-level overview was developed of the potential opportunities available to the Northern Endeavour:

s22

2. Green Recycling in Europe (Denmark or Norway) (EU-SRR compliant yard)
3. Green Recycling in Türkiye (EU-SRR compliant yard)
4. Green Recycling in Australia (EU-SRR compliant)

These opportunities have several permutations, as illustrated in Table 3-1. These permutations impact the cost schedule and risk associated with each opportunity.

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Table 3-1 Key Permutations of the Opportunities

s22

	Recycling in Europe (EU-SRR compliant yard)	Recycling in Türkiye (EU-SRR compliant)	Recycling in Australia (EU-SRR compliant)	Notes
Location				
West Africa	■			
Malaysia				
Timor Sea				
Europe	■			
Türkiye		■		
Whyalla, SA			■	
Henderson WA			■	
Departure / Loadi				
Northern Endeavour Site	■	■	■	
Sheltered Location	■	■		To load HLV
Lay-up locations				
Labuan, Malaysia	■	■		Decontamination required
Batam, Indonesia	■	■		
Australia	■	■	■	(location TBC)
Tow type				
Wet	■	■	■	
Dry	■	■		
Route				
Via Suez	■	■		
Via COGH	■	■		
Direct			■	

s22

4.4.2 Bringing the Northern Endeavour into an Australian Port

The Northern Endeavour is considered a non-SOLAS vessel (non-propelled) under the Navigation Act. If the loading of the Northern Endeavour onto a Heavy Lift Vessel (HLV) takes place at least 12NM away from the Australian coastal boundary, there is no requirement to comply with any of the Australian regulations related to Biosecurity/Invasive marine species. Thus, there will be no requirement to clean the hull.

However, if the intent is to load the vessel within the 12NM limit, the vessel will be subject to pre-arrival reporting, pratique, assessment and inspection at the first point of entry on arrival.

However, given the unique situation and location of the Northern Endeavour, it is strongly recommended that all relevant stakeholders be actively engaged to discuss options for variation of the application of the regulations. This has been done recently for pipe-laying vessels coming into Australian Commonwealth waters, where a low-risk ruling was obtained as required by the Department of Agriculture, Fisheries and Forestry (DAFF).

Under the Antifouling Performance Standards for The Maritime Industry: Development of A Framework for Assessment, Approval and Relevance of Effective Products [7], the responsibility for managing the risks of translocating marine pests for all vessels travelling between Australian ports lies with the States and the Northern Territory. The Australian Government manages the risk of the introduction of marine pests internationally.

The National Biofouling Management Guidelines for The Petroleum Production and Exploration Industry, 2009, provides recommendations for the management of biofouling hazards by the petroleum industry in the Australian Territory [8].

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10 TOWING OPTIONS

10.1 Dry Tow to Europe/Türkiye

Dry tow options have been investigated for the transportation of the Northern Endeavour FPSO to the recycling yards in Europe/Türkiye. There are two semi-submersible heavy lift vessels (HLV) capable of transporting the Northern Endeavour FPSO, the Boka Vanguard owned by Boskalis as shown in [48], and the Hua Rui long owned by the Chinese Ministry of Transport [49]. Table 10-2 outlines the indicative rates and transit times for the Hua Rui Long and the Boka Vanguard vessels.

10.2 Tow to sheltered location for HLV loading

A relatively sheltered location will be required to load the Northern Endeavour onto the HLV. The vendors have supplied the following preliminary limiting conditions.

Table 10-1 HLV Loading Limiting Criteria

Criteria	Limitation
Period of operation:	Daylight
Minimum Visibility:	500m
Maximum wind speed:	15knots
Maximum wave height:	0.50 meter/period 5s
Maximum swell:	0.30 meter/ period 7s
Maximum surface current:	1.0 knot.

It is anticipated that a suitable sheltered location will be available between the Northern Endeavour site and the Australian coast, as there is a range of atolls in the region that may provide some protection. To determine the tow cost and duration, it has been assumed that the location is within 300km (Refer Figure 10-1). It is also noted that it is preferable to be located outside the 12nm coastal limit to avoid potential biosecurity issues.

Based on the data provided by the wet tow vendors, it is estimated that this tow will cost US$1.0-1.5mill (excluding any costs associated with disconnection).

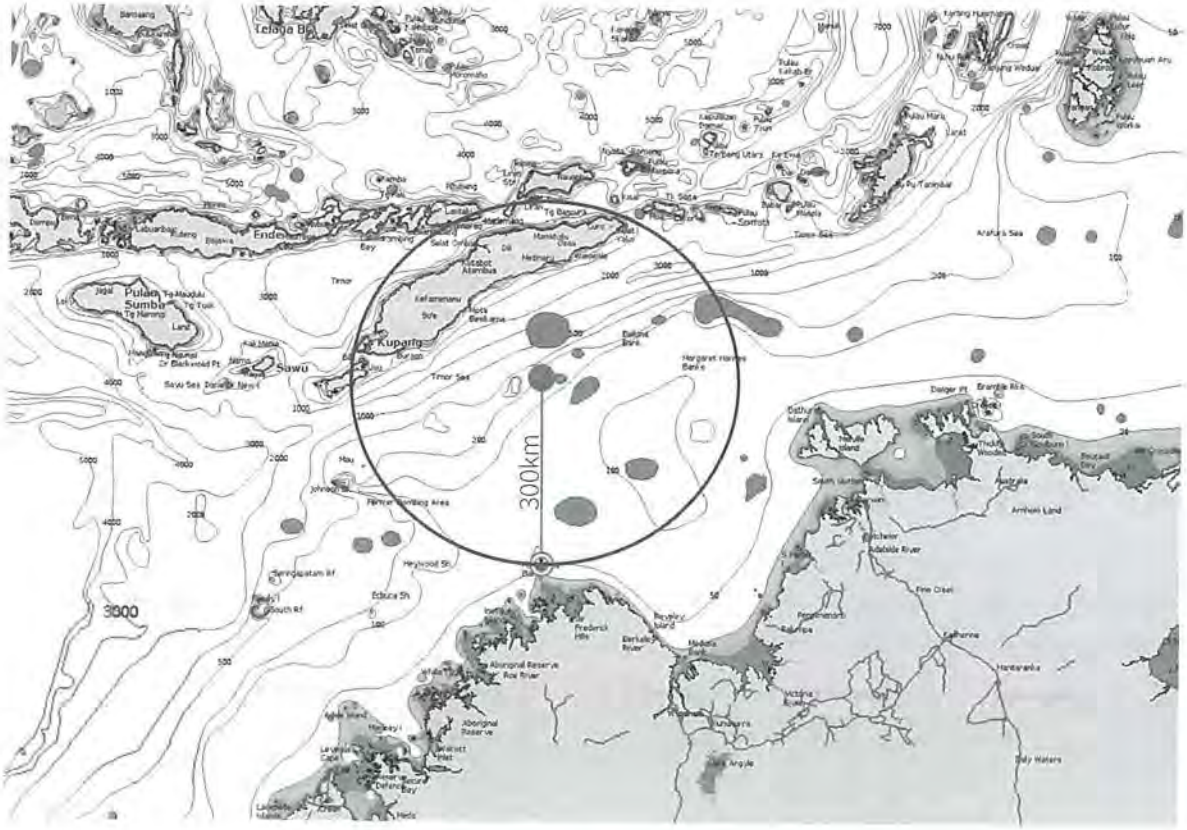

Figure 10-1 Estimated tow to the sheltered location

10.3 Wet Tow

Two vendors were approached for the wet tow of the Northern Endeavour FPSO. The following vessels were proposed:

- ALP Keeper – 302MT Bollard Pull
- Posh Eagle – 200MT Bollard Pull

It has been assumed that a reserve tug will be required to always be present during the tow. The structural integrity of the Northern Endeavour hull will be required to be verified for the wet tow scenario.

Indicative rates and transit times for the tow to the recycling yards in Europe/Türkiye are provided in Table 10-2.

The data for the wet tow vessels has been interpolated to determine equivalent costs and transit times for the wet tow to the Australian options.

10.4 Route to Europe/Türkiye

There are two main routes that the FPSO tow can take to reach Europe/Türkiye from the Timor Sea, via the Suez Canal or Cape of Good Hope. The vessel vendors have indicated that either route is potentially viable for the wet tow or dry tow.

10.4.1 Weather Delays

Weather-related delays are a possibility.

The route via the Suez Canal can be impacted by the southwest monsoon season, typically occurring from June to September in the western parts of the Indian Ocean, such as the Arabian Sea. The eastern parts of the Indian Ocean, including the waters around northern Australia, can also experience adverse wave conditions during the southeast monsoon season, typically occurring from December to March.

The Cape of Good Hope route is known for its challenging maritime conditions. The worst wave conditions are typically encountered during the Southern Hemisphere's winter months, particularly from May to September. Adverse conditions are more likely to occur on this route than the route via the Suez Canal.

Adverse weather is more likely to impact the wet tow than the dry tow, as the FPSO will be travelling slower and will be restricted by the capacity of the tow vessel to maintain the tow in rough weather.

Indication of the likelihood of weather delays or their potential cost impact cannot be estimated at this point.

10.4.2 Suez Canal

The Suez Canal charges for transport through the Canal. However, that route provides a commercial advantage by shortening the tow duration.

It is noted that the Suez Canal Authorities will oversee the passage. The Suez Canal Authorities may decide to use their towing vessels for the transit, which is common. Also, on some occasions, the passage through the Suez has been prevented by restrictions made under the export clearance documentation. This is noted to have been incurred when transporting the FSO Dampier Spirit.

The vendors have not indicated that there are length/breadth/draft restrictions that would impact the tow via the Suez Canal. However, it is understood that there is a height restriction of about 68m.

The height restriction would likely have implications for the flare tower on the FPSO. Further studies would be required to assess whether and where the flare tower can be removed prior to the tow.

10.4.3 Cape of Good Hope

Although there are potential weather delays associated with this route, these can be managed by timing the tow to avoid the worst winter months. There are no dimensional tow restrictions or additional permit requirements for passage past the Cape of Good Hope.

10.5 Notice Period prior to Tow

Availability of the transport vessel cannot be guaranteed until a contract has been signed. The dry tow vendors have advised the following notification schedule. A similar schedule would apply to the wet tow vessels:

- 3-month window on the signing of an agreement
- 120 days prior to the first day of the window, the window narrowed to 60 days
- 90 days prior to the first date of the new window, the window narrowed to 45 days
- 60 days prior to the first date of the new window, the window narrowed to 30 days
- 45 days prior to the new window, the window narrowed to 15 days
- 30 days prior to the new window, the window narrowed to 7 days
- 15 days prior to the new window, the window narrowed to a firm date

10.6 Towing Cost and Schedule Comparison

Table 10-2 summarises the estimated costs and schedule for the various tow options considered. The data is based on information provided by the tow vendors and factored to suit the various tow options. Costs for mobilisation and demobilisation are included in the estimate. A contingency of 30% has been added. The data accuracy is considered to be +40%/-30%.

For a detailed list of Select Phase deliverables/activities please refer to the WBS in Appendix D.

Table 14-2 Activities / Contracts and Lead Times to Secure Slot

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Activity / Contracts	Lead time required to secure a slot
Wet tow from field to lay-up	1 month
Decontamination (inclusive of hull cleaning)	4 months
Lay-up/preservation	4 months
Tow to the recycling yard	3 months (dependent on location and method)
Recycling	4 months (dependent on vendor)

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a dry tow to Europe and an FPSO ready for disconnection in October 2024.

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	Tow to lay-up / sheltered loading location - award contract	Jul 2024	Jul 2024	Jul 2024	Contract not required if: wet tow, decontamination is not required or lay-up not required

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Execute	Tow to recycle yard - award contract	Jun 2024	Jun 2024	Jun 2024	Depends on the final location and selected option. May need to be issued earlier to secure a yard slot.
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	Disconnect and tow to lay-up / sheltered loading location	Oct 2024 (wet tow – 4 weeks)	Oct 2024 (4 weeks)	Oct 2024 (tow to dry tow loading location 1 week)	

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Phase	Milestone	Indicative Target completion Date			Additional comments
		Australian	Türkiye	Europe	
	Tow to the recycling location	N/A	Mar-Apr 2025	Nov-Dec 2024	40 - 45 day dry tow assumed

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- The cost of a tow to a sheltered location for the loading of the FPSO onto the HLV for transport to Europe. For the Türkiye option it has been assumed that the FPSO would be loaded onto the HLV at the decontaminant site
- The cost of the wet tow or dry tow to the recycling yard. For the Europe and Türkiye options a dry tow has been assumed

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Table 14-5 Execute Phase Cost Estimates

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Tow to a sheltered location	NA	NA	US1.0 -1.5mill	For loading the FPSO onto HLV
Dry Tow	NA	US$15.1-18.6mill	US$17.3-18.2mill	
Wet Tow	US$5.7-8.1mill	US$12.9-20.7mill	US$17.5-20.7mill	

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14.16 Contracting and Procuring Strategy and Responsibilities

A contracting and procurement strategy and responsibility matrix will be developed during the Select and Define Phase.

Key contracts will be as follows:

- Wet tow from field to lay-up location

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- Wet/dry tow from lay-up to recycling location.

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15.8 Towing Options

15.8.1 Dry Tow

Two semi-submersible heavy lift vessels (HLV) are capable of transporting the Northern Endeavour FPSO, the Boka Vanguard, owned by Boskalis and the Hua Rui Long, owned by the Chinese Ministry of Transport. A relatively sheltered location will be required to load the Northern Endeavour onto the HLV. Refer to Table 15-4 for a potential cost and transit duration summary.

Table 15-4 Dry Tow Options Summary

	Türkiye via Suez	North Sea via Suez	Türkiye via COGH	North Sea via COGH
Estimated Cost (USD)	$15.1mill	$17.3mill	$18.6mill	$18.2mill
Transit Time	28 – 30 days	37 - 39 days	44 - 45 days	44 days

15.8.2 Wet Tow

The structural integrity of the Northern Endeavour hull will be required to be verified for the wet tow scenario. It has been assumed that a reserve tug will be required to always be present during the tow.

Indicative rates and transit times for the tow to the recycling yards in Australia, Europe and Türkiye are provided in Table 15-5. The data for the wet tow vessels has been interpolated to determine equivalent costs and transit times for the wet tow to the Australian options.

Table 15-5 Wet Tow Options Summary

	Türkiye via Suez	North Sea Port via Suez	Türkiye via COGH	North Sea Port via COGH	Henderson WA	Whyalla SA
Estimated Cost (USD)	$12.9mill	$17.5mill	$20.7mill	$20.7mill	$5.7mill	$8.1mill
Transit Time	45- 62 days	63 - 90 days	73 -111 days	73 - 112 days	21 days	32 days

15.8.3 Tow recommendations

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Medium Risks – Europe / Türkiye

- Wet tow delayed/takes longer than expected due to issues such as weather, mechanical failure, piracy, failure to obtain permits or a safety incident
- Tow delayed due to issues in the Suez Canal, such as height restrictions, insufficient tugs available to manage the FPSO in the canal or the FPSO getting wedged in the canal
- HLVs not available due to failure to book early enough, HLV breakdown or HLV late arrival due to delay on other contracts

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Table 15-7 Key Milestones

Phase	Milestone	Indicative Target completion Date			Additional comments
		Australian	Türkiye	Europe	
s22					
	Tow to lay-up / sheltered loading location - award contract	Jul 2024	Jul 2024	Jul 2024	Contract not required if: wet tow, decontamination is not required or lay-up not required
s22					
	Tow to recycle yard - award contract	Jun 2024	Jun 2024	Jun 2024	Depends on the final location and selected option. May need to be issued earlier to secure a yard slot.
s22					
	Tow to the recycling location	N/A	Mar-Apr 2025	Nov-Dec 2024	40 - 45 day dry tow assumed
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- The cost of the wet tow or dry tow to the recycling yard. For the Europe and Türkiye options a dry tow has been assumed

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Table 15-9 Execute Phase Cost Estimates

Tow to a sheltered location	NA	NA	US1.0 -1.5mill	For loading the FPSO onto HLV
Dry Tow	NA	US$15.1–18.6mill	US$17.3–18.2mill	
Wet Tow	US$5.7-8.1mill	US$12.9-20.7mill	US$17.5-20.7mill	

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APPENDIX B SUMMARIES OF FPSO TOW VENDOR BUDGETS

Proposal on behalf of ALP for the Wet Tow Transport of FPSO Northern Endeavour

From	A safe and suitable handover location Timor Sea	
To	A safe and suitable handover location Aliaga/Yalova range	A safe and suitable handover location North Sea port
Vessel	1 x AHT of 24,400BHP ALP to reserve the right to use 2 of the vessels 4 engines for fuel management, to optimize the environmental footprint as well as the reach the most convenient next refuelling port with sufficient contingency. At two engines, the vessel has a BP of about 180MT.	
Tow	FPSO NORTHERN ENDEAVOR • Marine Growth not exceeding 5cm • Sheering/Yawing excluded • Suitably trimmed/ballasted • Unrestricted towage	
Lump Sum Price	Via Suez: USD 4,950,000 Via COGH: USD 7,450,000	Via Suez: USD 6,450,000 Via COGH: USD 7,450,000
Free Time	96 Hours for connection, disconnection, Bunkering and transit of Suez Canal/Dardanelles procedures	
Transit Time	Via Suez: 43 days / Via COGH: 73 days	Via Suez: 61 days / Via COGH: 73 days
	Transit times are weather permitting, no restrictions, agw, excluding time loss at Suez or Bunker location(s).	
Bunker stops	To Türkiye via Suez: no bunker stop is foreseen. To North Sea via Suez: a bunker stop is foreseen to be required at Suez/Malta range. To Türkiye/North Sea via COGH: a bunker stop is foreseen in the Cape Town/Walvis Bay range. In the past we have arranged a rendezvous with a bunker barge under tow, which would prevent the requirement for assistance vessels. We cannot guarantee that this is possible in the future. If not, then assistant tug to release the ALP towing vessel is to be arranged at the cost of Charterers.	
Commencement	In mutual agreement in 2024	
Demurrage	USD 35,000 per day, excluding consumables	
Carbon footprint	Via Suez: 7000ts Co2 Via COGH: 11,800ts Co2	Via Suez: 9900ts Co2 Via COGH: 11,800ts Co2
	Footprint is an "in-good-faith" estimate based on 3.11ts of Co2 in 1 MT of LSMGO	
Price exclusive of	Port expenses, harbour dues, pilotage, agency fees, taxes, dues, security costs, additional insurance, levies and all other expenses incl. cost related to bunker stops (if any) such as but not limited to assistance tugs. All cost for Suez Canal passage, delay and actual transit cost Additional insurance and protection for passing Gulf of Aden/Red Sea Escort/tug assistance in English Channel if needed. Steering tug red Sea if needed (in case of excessive sheering)	
Contract terms	Bimco Towcon 2021, suitably amended	
Bunker Price	Bunker escalation clause to apply based on USD 750 per MT average.	
Subject	Availability / Approved compliance / Board approval / reconfirmation of engineering calculations	

Proposal on behalf of Posh for the Wet Tow Transport of FPSO Northern Endeavour

	Aliaga, Türkiye – via Suez	Lutelandet, Norway – via Suez	Aliaga, Türkiye – via COGH	Lutelandet, Norway – via COGH
Tug	1 x 200TBP AHT Posh Eagle or suitable substitute			
Schedule	Q2 2024			
Departure	South of Timor Leste (coordinates TBC)			
Destination	Aliaga, Türkiye – via Suez	Lutelandet, Norway (assumed) – via Suez	Aliaga, Türkiye – via COGH	Lutelandet, Norway (assumed) – via COGH
Freetime	6 days total for all purposes including 2 days for Suez Canal transit		4 days total for COGH	
Lumpsum	USD 5,000,000	USD 7,000,000	USD 8,500,000	USD 8,500,000
Demurrage	USD 25,000 per day in port USD 60,000 per day at sea			
Fuel escalation	Lumpsum is based on bunker costs USD 809/MT for LSMGO, bunker escalation clause to apply			
Payment	(a) 25% on signing CP, (b) 25% on departure of tug & tow, (c) 25% on passing Colombo or Port Louis, (d) 15% on passing Suez or Walvis Bay, (e) 10% due 5 days prior arrival			
Transit time	Approximately 60 days towing @ 5 knots, weather permitting via Suez	Approximately 88 days towing @ 5 knots, weather permitting via Suez	Approximately 112 days towing @ 5 knots, weather permitting via COGH	Approximately 111 days towing @5 knots, weather permitting via COGH
SOW	Towage of FPSO, always within the safe working capacities and capabilities of the tug and crew			
Contract	BIMCO TOWCON 2021 with mutually agreed amendments			
Validity	Offer is subject to tug availability and BOD approval at time of confirmation			
Remarks	- Offer excludes agencies, pilotage, assist tugs, harbour tugs, permits, licenses, all non-Singapore taxes, V.A.T, withholding taxes etc. - Offer is based on assumption towing draft not exceeding 9m and no towing speed restriction imposed by hirers. - Offer is inclusive of Suez transit cost, additional premium, armed guards, vessel hardening etc. for owners tug only for Suez route.			

Proposal on behalf of COSCO SHIPPING & Guangzhou Salvage for the Dry Tow Transport of FPSO Northern Endeavour using the Hua Rui Long

Transit Route	Suez Canal sailing WP WOG AGW	Cape of Good Hope sailing WP WOG AGW
Transit Time	33 days	51 days
Vessel	Owners' semi-submersible vessel HUA RUI LONG or substitute subject to vessel availability, in Owner's option with stern buoyancy casings remaining in their standard aft positions.	
Load port	Darwin, Australia 1 Good Safe Always Accessible Always Afloat Berth or Anchorage free from swell nominated by Charterers	
Discharge Port	Gulluk, Türkiye 1 Good Safe Always Accessible Always Afloat Berth or Anchorage free from swell nominated by Charterers	
Freight Indication	USD 11,000,000.00, Including 1-day free time for Suez Canal and costs up to a maximum of USD1,750,000.00. Exceeded time and cost to be for charterer 's account.	USD 14,110,000.00 Above Lump sum option basis FIO/FIO Terms
Schedule	Q4, 2024 to be mutual agreed. Subject Vessel Availability.	
Free time	Loading Port: 2 days FHINC/SHINC Discharge Port: 2 days FHINC/SHINC Free time fully reversible but not refundable	
Demurrage	USD 90,000 per day pro rata in port, offshore or deviation exclusive of bunker	
Bunkers	Included at USD 600 per mt VLSFO - escalation clause to apply	
Lashing	Owner's account and time basis	
Unlashing	Owner's account and time basis	
Deck preparation	Owner's account and time basis	
Deck cleaning	Owner's account and time basis	
Indication includes	Normal Port Charges Mobilization / Demobilization costs Transportation Manual including Preparation of stowage plans Stability/motion response Any and all taxes/dues on the vessel in Ballast condition. All fastening welds will be 100% visually inspected and MPI if required. Standard Material onboard for deck preparation (basis standard 300mm cribbing wood) and sea fastening	
Indication excludes	All taxes/dues/other costs on the cargo/freight and/or freight commissions levied by local Agents. Any preparation of the cargo for transport, such as internal strengthening Any tug and line handling boat assistance for loading, during lashing/unlashing (if required) and for discharge and/or shifting operations. Any tug and line handling boat assistance for loading, during lashing/unlashing (if required) and for discharge and/or shifting operations. Time used in excess to the granted free time at the load and/or discharge location. Cargo Insurance Compulsory stevedoring cost, if any. Any extra war risk premium for Vessel and crew. Marine Warranty Surveyors Cost for using sinkhole, quay/dock dues	

	Time and cost for non-standard sea fastening. Customized materials or any modification to standard material on board for the purpose of specific transport.
Payment Terms	10% of freight to be paid upon Contract Signed 55% of freight to be paid on Arrival of Loading Port 35% of freight to be paid three banking days prior to arrival of discharge port
Subject	- Owners to narrow window at mutually agreeable schedule - Vessel availability in the loading area at the time and mutually agreed Contract - Transport feasibility basis vessels capacity and capability - Review of final cargo drawings/stowage plans, stability calculations - Basis applicable sections of DNVGL-ST-N001 September 2018 edition, excluding sections 4.4, 5.6.5.4, 5.6.11, 11.3.5, 11.9.2.4, 11.9.5.9, 11.9.11 and 11.9.13.
Contract	Bimco Heavycon 2007 (suitably amended) subject details
Validity	14 days after issued

Proposal on behalf of Boskalis for the Dry Tow Transport of FPSO Northern Endeavour using the Boka Vanguard

Option	Suez Canal AA	Suez Canal BB	Cape of Good Hope	Cape of Good Hope
Point of Loading	Timor Leste	Timor Leste		
Via	Suez Canal	Suez Canal		
Point of Delivery	Yalova/ Türkiye	Rotterdam/The Netherlands		
Period	Q2 2024 in Owner's option	Q2 2024 in Owner's option		
Transit Time	Estimated at 28 days, weather permitting	Estimated at 37 days weather Permitting		
Vessel	MV "Boka Vanguard"	MV "Boka Vanguard"		
Freight	US $11,050,000.00 lump sum	US $12,350,000.00 lump sum		