

**Affidavit**

No VID 647 of 2023

Federal Court of Australia  
District Registry: Victoria  
Division: General

**Raelene Cooper**

Applicant

**National Offshore Petroleum Safety and Environmental Management Authority and others named in the schedule**

Respondents

*This document is in a form that may be uploaded to the online file*

Affidavit of: [REDACTED]  
Address: c/o 11 Mount Street, Perth WA 6000  
Occupation: [REDACTED]  
Date: 10 September 2023

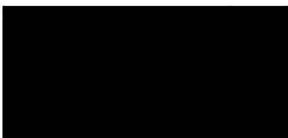
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Filed on behalf of: Woodside Energy Scarborough Pty Ltd and Woodside Energy (Australia) Pty Ltd, the Second and Third Respondent

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I, [REDACTED] of c/o 11 Mount Street, Perth WA 6000, [REDACTED]

[REDACTED] affirm:

1. I am authorised to affirm this affidavit on behalf of Woodside Energy Scarborough Pty Ltd and Woodside Energy (Australia) Pty Ltd (**Woodside**) in response to the Applicant's application for an interlocutory injunction dated 7 September 2023.
2. The matters contained in this affidavit are based on:
  - (a) my own knowledge, save as otherwise stated;
  - (b) information derived from the electronic records of Woodside, to which I have access and which I believe to be true and correct; and
  - (c) information provided to me by others in the Seismic and Survey Operations team or the Engineering team at Woodside, who I identify below, and I believe that information is true and correct.

### Background

3. I hold the following formal qualifications:
  - (a) Bachelor of Surveying: Curtin University, 1989;
  - (b) Graduate Diploma in Computing: Curtin University, 1996; and
  - (c) Master of Business Administration: Curtin University, 2001.
4. I joined Woodside in 2008 and have worked in the role of [REDACTED] [REDACTED] since July 2022.
5. My previous roles at Woodside include, ordered from most to least recent:

[REDACTED]

[REDACTED]

[REDACTED]

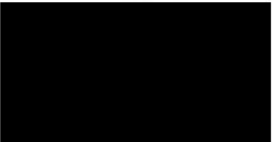
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

6. As [REDACTED], I am responsible for:
- (a) managing those who project manage geophysical, geotechnical, construction, positioning and seismic acquisition survey activities;
  - (b) liaising with the business in relation to geophysical, geotechnical, construction, positioning and seismic acquisition survey operations capabilities, resources and scheduling; and
  - (c) managing and responding to issues that arise in relation to geophysical, geotechnical, construction, positioning and seismic acquisition survey activities.
7. I have four full-time employees reporting to me in this role. In addition, the Seismic and Survey Operations team engages long-term contractors to manage fluctuating business demands. Currently there is a high business demand as a result of activities in relation to the Scarborough Project, and I have between eight to ten contractors reporting to me.
8. The employees and contractors who report to me are a mix of hydrographic surveyors, geographic information systems analysts, geotechnical engineers and geophysicists.
9. My team works with the Procurement team to engage contractors in respect of geophysical, geotechnical, construction, positioning and seismic acquisition survey works. [REDACTED] who reports to me, works with a representative of the Procurement team [REDACTED] to produce a contract and scope of works for seismic acquisition surveys. The reason for this is that while the Procurement team has contracts expertise, they do not have expertise in relation to the seismic acquisition surveys that my team has.



10. The Procurement team are the contract process owners, but I am the contract owner and responsible for managing the contractor. As such, my team conducts negotiations with contractors.
11. As part of my role, I manage contractors engaged to complete works under the Scarborough 4D B1 Marine Seismic Survey Environment Plan (**Seismic Survey EP**). I was not responsible for the drafting of the Seismic Survey EP but had input into this document.
12. In terms of the lifecycle of a gas field, my role and responsibilities cover the acquisition and processing of data.
13. Over my career, I have been involved in approximately four seismic survey campaigns proximate to the Scarborough field (but not over the Scarborough field), over four years.
14. I have been involved in seismic survey campaigns in the Northern Territory, Korea and Senegal. I have been involved in nine total seismic survey campaigns in my career over five years.
15. The most recent major seismic survey campaign that I have been involved in was in the Northern Territory in 2022.

### **Marine Seismic Survey**

16. The marine seismic survey authorised under the Seismic Survey EP (the **Seismic Survey**) will be conducted by a vessel towing three seismic 'triple sources' behind it, each seismic source comprises of two seismic arrays. The vessel is also towing twelve 'streamers', which are placed at 112.5m intervals with a total length of 7,644m. At the port and starboard side of the array are paravanes which are used to keep the streamers in place and equidistant and are outboard of the streamer arrangement. The total towing spread (including paravanes, seismic sources and streamers) is 1,460m wide from paravane to paravane. A diagram of the planned operational towing arrangement appears at slide 7 of a slide deck prepared by [REDACTED] titled 'Scarborough 4D B1 MSS Information Pack' (**Seismic Survey Information Pack**). A copy of this slide deck is annexed and marked [REDACTED]-1.
17. The seismic towing arrangement geometry determines the resolution or 'bin' size of the survey data. The smaller the bin size the greater the resolution of the resulting seismic image.
18. The vessel moves constantly at a speed of about 4-5 knots, moving in a straight trackline up and down the operational area under the Seismic Survey EP in what I call

a 'lawnmower' pattern. A diagram of the operational area under the Seismic Survey EP appears at slide 5 of the Seismic Survey Information Pack at [REDACTED] 1.

19. At the end of each trackline, the vessel conducts a 180 degree turn to complete the next line. Because of the length of the array, the turn is approximately 5,200m and takes approximately 4.5 hours to complete. Turning time takes up approximately 20% of the survey duration.
20. Each seismic source array releases compressed air at around 2000 pounds per square inch (*PSI*) at intervals of 12.5 metres. This release of compressed air sends a wave outward in all directions into the earth below. The wave 'reflects' off changes in the earth's geology caused by changes in density and velocity. These reflections are recorded by receivers in the streamers. Multiple reflections will be recorded at each receiver and allocated to a bin. The seismic vessel will travel across the operational area filling the spaced bins in a grid pattern, with reflection data. This method results in a 3D data image.
21. After the data is collected, it will be processed through various geophysical algorithms to produce a 3D image of the earth under the operational area. This process takes approximately 6 months to complete.

#### **Purpose of Seismic Survey**

22. The purpose of the Seismic Survey is to obtain an uplift in seismic imaging for the Scarborough and Jupiter fields within the operational area.

#### *Obtaining higher quality data*

23. I am informed by [REDACTED], and believe, that the last seismic survey conducted within the operational area in respect of the Scarborough field was conducted in 2004. This survey was not conducted by Woodside. Woodside has never conducted a seismic survey over the Scarborough field. I do not know who conducted the 2004 survey, but I am informed by [REDACTED], and believe, that Woodside acquired the data obtained from this survey when Woodside acquired the titles the subject of the survey.
24. I do not know when the last seismic survey over the Jupiter field was conducted or who conducted it. There has been a seismic survey over the Jupiter field at some point because the Jupiter reservoir has been identified.
25. Since 2004, technology has improved in relation to both the acquisition of data during a seismic survey, and the processing of that data.

26. In terms of acquisition of data, technology concerning source array design, increases in the number of towed streamers and length (increasing the receiver number), receiver sensitivity, towed arrangement (streamer and source) positioning, computer processing and data storage has significantly improved. The resulting increase in the recorded data volume and quality will produce a clearer 3D image of the field than the data collected using the methods in 2004.
27. In terms of the processing of data, computing power has increased significantly since 2004 to allow more powerful and complete algorithms to be run using the complete data set with reduced use of assumptions, which will result in a clearer processed 3D image.
28. The data obtained from the 2004 seismic survey has been reprocessed twice. At slide 9 of the Seismic Survey Information Pack (■■■■-1) is an image of a cross-section of the Scarborough field as originally obtained in 2004, and as reprocessed in 2010 and 2018. This is a cross-section of the 3D data image that is obtained through seismic surveying. In these images the wavy lines are noise, representing uncertainties in the data. The wavy like nature of these lines is not real and does not represent the true shape of these reflectors. The reduction in the wavy lines in the images labelled 2010 and 2018 are indicative of increased clarity through the reprocessing of the data.
29. Geophysicists can interpret these images in order to calculate the thickness, location and characteristics of the reservoir. To maximise the amount of gas to be obtained from a well and design the well in a manner that minimises the design footprint, Woodside needs to have the clearest image of the reservoir possible. Examples of ways in which the initial well design can be amended to minimise design footprint having regard to seismic imaging include (but are not limited to) by choosing where to drill wells, how many wells to drill, and the depth to drill to.
30. Because of the age of the data, the 2004 data is unable to be reprocessed any further to reduce the amount of noise in the images due to limitation of the seismic acquisition method at that time.

*Obtaining data over areas for which Woodside has no data*

31. In addition to age of the data, Woodside does not have one continuous survey over the Scarborough field. The survey that was conducted in 2004 covered approximately three quarters of the Seismic Survey EP operational area. The incomplete acquisition is shown in the diagram at slide 8 of the Seismic Survey Information Pack at ■■■■-1. As such, another purpose of the Seismic Survey is to obtain data in relation to the whole operational area. A complete whole field high quality 3D image provides the

basis for reservoir engineers to model how the field reservoirs will behave across its lifetime.

#### **Use and benefits of data**

32. Having regard to the improvements in technology discussed at paragraph 25 above, I anticipate that the data collected, and the images produced, from the Seismic Survey, will include significantly less noise. As such, the data from the Seismic Survey will inform the optimal field development design and reservoir management practices, to obtain maximum gas for minimum cost.
33. In addition to informing optimal field development design, in my experience, seismic data allows a titleholder to produce a firmer estimate of the amount of gas in the field and therefore the value of the field. For example, when Woodside reprocessed the 2004 data in 2018 or 2019, Woodside was able to produce a clearer image of the Scarborough field and revised its estimate of the volume of gas in the Scarborough field to be approximately 50% higher than previously estimated, and therefore significantly more valuable.
34. Conducting the Seismic Survey before Woodside commences extracting gas will provide Woodside with a baseline survey against which to conduct 4D seismic survey monitoring over the life of the field. This is the same as a 3D seismic survey, except that the fourth dimension is time. By conducting a seismic survey at approximately two year intervals over the life of the gas field, Woodside is able to compare the images of the reservoirs. Changes in the images represent the movement of gas.
35. A reservoir is comprised of liquids and gas. As gas is extracted, water and gas can move within the reservoir. When gas is being extracted, the extractor aims to extract gas, not water.
36. Monitoring the changes in the reservoir and in particular the movement of gas and water allows Woodside to better understand the geology of the field and the behaviour of the reservoir which allows Woodside to maximise the efficiency of extraction. 4D monitoring surveys are also used to confirm the accuracy of reservoir models.
37. Changes identified by Woodside will inform the action Woodside takes in relation to wells. For example, if Woodside identifies through 4D monitoring that a well is close to extracting water instead of gas, Woodside may choose to shut that well in ahead of schedule and drill a new production. 4D monitoring therefore allows for more effective planning.

38. Without a baseline obtained through a seismic survey reservoir management will become more reliant on reservoir modelling, and less able to identify any divergence between this modelling and the real world changes to the reservoir.
39. Woodside is unable to use the 2004 data as a baseline for 4D monitoring, because of the quality of the data and the incomplete reservoir coverage. This data was not collected for the purpose of 4D monitoring, which was not yet invented in 2004.
40. Finally, seismic imaging and 4D monitoring using seismic imaging reduces the risk of geohazards while drilling. This is because the seismic imaging allows Woodside to better avoid shallow gas and over-pressurised areas, avoiding 'kicks' in gas pressure while drilling.

### **Marine Seismic Survey Schedule**

#### *Status of works*

41. From a contractual and operational perspective, works under the Seismic Survey EP are ready to commence on short notice.
42. On 14 August 2023, Woodside obtained the grant of petroleum access authority WA-106-AA by the National Offshore Petroleum Titles Administrator (**NOPTA**). This access authority relates to the petroleum titles within the operational area which are not held by Woodside. Annexed and marked [REDACTED]-2 is a copy of petroleum access authority WA-106-AA. Annexed and marked [REDACTED]-3 is a copy of a letter from NOPTA to Woodside dated 14 August 2023 enclosing petroleum access authority WA-106-AA.
43. Shearwater GeoServices (**Shearwater**) is contracted to complete the survey. I understand that Shearwater then subcontracts support vessels.
44. The vessels which will conduct the Seismic Survey are currently on standby located near to, but outside of, the operational area. The streamers have been deployed, and the vessel is moving to maintain streamer positioning.
45. The activity comprises four vessels. As at Sunday 10 September 2023, there were a total of approximately 81 crew on those vessels:
  - (a) Geo Coral (survey): 57 People on Board (**POB**);
  - (b) Mariska-G (support): 13 POB;
  - (c) Empress (guard): 4 POB; and
  - (d) Limitless (spotter): 7 POB.



46. [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] Based on my experience in this industry, I am aware that there are only about three or four global providers of seismic survey services. Shearwater is one of these service providers.

47. If Shearwater terminated their engagement, the negotiation of a new contract with another service provider would take months and, based on my experience, I do not expect that another vessel could be available to perform the works prior to 31 December 2023.

*Duration of Seismic Survey*

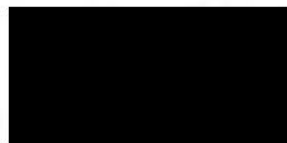
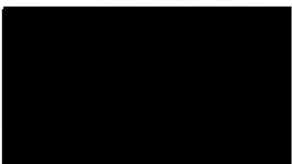
48. The Seismic Survey, as originally planned, was estimated to take approximately two months to complete. Due to scheduling constraints, Woodside has amended its plans in order to reduce the time taken to complete the works to an estimate of 40 days. In particular, Woodside has increased the width of the array so that it needs to conduct less turns in order to cover the operational area. Woodside made this decision around the end of July 2023.

49. As a result, the bin size has increased, resulting in a lower resolution of seismic imaging that will be obtained. The resolution that will be obtained using the configuration described at paragraph 16 above is the lowest resolution that will still meet Woodside's requirements.

50. 40 days is a theoretical estimate only. It does not include time for breakdowns, weather and environmental standby due to shutdowns. If these contingencies are factored in, the time to complete the works could increase to approximately 55 days.

51. Woodside has considered whether there are any other amendments it can make to the Seismic Survey to reduce the time taken to complete the survey, and has formed the view that the time to complete the survey cannot be reduced any further. In particular, in Woodside's view, it would not be commercially worthwhile to reduce the area of the survey any further.

52. In relation to the Scarborough field, any reduction in the survey area over Scarborough would result in Woodside not obtaining seismic imaging over the whole of the Scarborough reservoir.

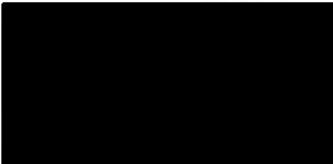
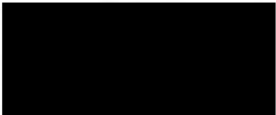


53. Woodside considered whether to remove the Jupiter field from the survey area and only complete the survey over the Scarborough field. The 'base case' for the Seismic Survey is to survey the Scarborough field, because the Jupiter field is not yet being developed by Woodside.
54. As noted above at paragraph 19, a significant duration of the survey is spent turning at the end of each trackline. As such, removing Jupiter from the survey plan would not significantly reduce the total length of the survey, because the majority of the Jupiter field is on the same 'tracks' as the Scarborough field in any event.
55. Woodside calculated that removing the Jupiter field from the operational area would only reduce the time taken to complete the survey by about 6 days. Annexed and marked [REDACTED]-4 is a copy of a document titled 'Scarborough & Jupiter vs Scarborough Only Time Difference Calculation' showing this.
56. As such, Woodside determined that it would not be commercially worthwhile to remove the Jupiter field from the survey area. This is because the cost to conduct this survey separately would far exceed the cost of conducting including the Jupiter field in the Seismic Survey.
57. In addition, conducting the Seismic Survey over both the Scarborough and Jupiter fields will result in less environmental impacts or risks than conducting two separate seismic survey campaigns.
58. Finally, it is beneficial for Woodside to have one continuous survey over both the Scarborough and Jupiter fields, as it will determine whether the two fields, currently mapped as separate fields, are actually connected.

#### *Window to conduct Seismic Survey*

59. The following factors mean that works under the Seismic Survey EP must be performed as soon as possible:
- (a) the end date and terms of the Seismic Survey EP;
  - (b) the schedule for drilling activities; and
  - (c) the schedule for the arrival of the floating production storage and offloading vessel (*FPSO*) in the operational area.

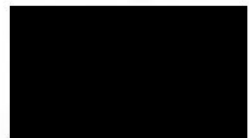
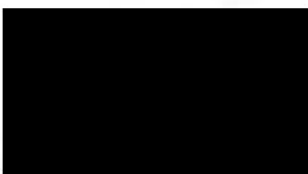
#### *The terms of the Seismic Survey EP*

60. In relation to 58(a), the Seismic Survey EP requires all activities to be completed by 31 December 2023. That is, no works can be completed under the Seismic Survey EP after this date. After this date, if Woodside wishes to complete seismic activities, it may need to obtain acceptance by NOPSEMA of a new or revised environment plan.
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- 61. In relation to 58(b), I understand that the Seismic Survey EP contains a commitment by Woodside that activities under the Seismic Survey EP will not be conducted at the same time as drilling activities.
- 62. In any event, the quality of seismic data obtained is reduced if there is noise in the area when the survey is conducted.

***The Schedule for drilling activity***

- 63. The timeframe for drilling to commence depends on:
  - (a) regulatory approval of the Scarborough Drilling and Completions Environment Plan (***Drilling EP***); and
  - (b) the availability of the drilling rig.
- 64. As to the first matter, at the time of affirming this affidavit, the Drilling EP is currently before NOPSEMA for assessment. It is hoped that NOPSEMA will accept the Drilling EP in the coming weeks or months.
- 65. As to the second matter, the drilling rig which has been contracted for works under the Drilling EP is currently completing works in respect of Woodside's Enfield Plug and Abandonment EP in respect of the Enfield wells, near Exmouth, Western Australia, and that it is expected that the drilling rig contracted to perform the works under the Drilling EP will be available in late October. There is a strong driver to complete the seismic work as soon as possible given that the seismic survey and drilling works cannot be conducted at the same time.
- 66. [REDACTED]
- 67. Having regard to the schedule for the Scarborough Project and the time taken to process the data obtained during the Seismic Survey, it is already too late for Woodside to use the data that will be obtained from the Seismic Survey in this drilling campaign (called the 'Phase 1' wells). However, the data will still be valuable for future drilling campaigns and reservoir assessment.



***The Schedule for the FPSO***

68. In relation to 58(c), once the FPSO arrives in the operational area, it will be connected to the subsea infrastructure, including pipelines. Any seismic survey will therefore need to go around the FPSO.
69. Performing the Seismic Survey around the FPSO, once the FPSO is in place, will be complex and will result in less data being obtained.
70. The FPSO will be around 100 metres by 100 metres in size. If seismic surveying is conducted with the FPSO in the operational area, the seismic array will need to keep a certain distance from the FPSO. I am unsure of the exact distance, but I expect it would be around 1km. The exact distance would depend on commitments made in the safety case relating to the FPSO, which I am not involved with but understand is not yet in force.
71. This means that if the Seismic Survey is conducted when the FPSO is within the operational area, there will effectively be a gap in the imaging of the reservoir for the area underneath the FPSO, and Woodside will be unable to obtain the benefit of seismic imaging of that area.
72. Planning in relation to the FPSO is not within my role, therefore I do not have an indication of the scheduling for arrival of the FPSO into the operational area. The FPSO must arrive into the operational area before the 'ready for start up' date as it is a necessary component to extract gas.

***The next available window for Seismic work in the area***

73. Having regard to the above factors, once drilling has commenced, the next available window to complete seismic activities within the operational area will be after drilling has been completed, but before the 'ready for start up' date. This will likely be in Q1 2025. This window is disadvantageous to Woodside, as compared to conducting works before drilling commences, because:
- (a) I am informed by [REDACTED] a reservoir engineer at Woodside, and believe, that data obtained before drilling would better inform the location for a potential ninth well in the Phase 1 drilling campaign;
- (b) it would require 'simultaneous operations', in that operational activities in respect of seismic surveying would be conducted while other vessels are in the operational area. Having multiple vessels in the operational area for different activities increases the risk of vessel collisions and associated environmental impacts; and

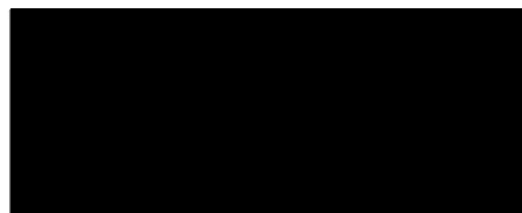
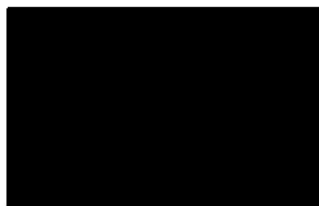
- (c) there may be a gap in the data obtained due to the presence of the FPSO in the operational area.
74. There is a risk that the seismic survey will not occur before the 'ready for start up' date. Without a baseline obtained through seismic, reservoir management will then be reliant on modelling rather than seismic data, which is less effective.
75. I am informed by [REDACTED], and believe that, undertaking a baseline survey after commencement of production will introduce additional uncertainty into the data, which will impact data quality and compromise Woodside's ability to understand and manage reservoir performance.
76. For these reasons, I consider that there is no safer or more convenient time in operational terms to conduct the Seismic Survey than the window set out in the Seismic Survey EP, before the commencement of drilling activities and the arrival of the FPSO to the operational area.

**No other available methods of acquiring data**

77. There is no other way for Woodside to obtain the data that it is seeking to obtain via the Seismic Survey.
78. Other than the data from the 2004 survey which Woodside owns, there is no other seismic survey data in existence in respect of the Scarborough field.
79. There are methods to obtain complementary data. For example, Woodside are planning to conduct a gravimetry survey. A gravimetry study involves putting down concrete platforms on which sensors are placed to measure gravity, which measures density and assists Woodside to determine water / gas contact and movement. Water / gas contact is the point of separation between water and gas.
80. However, a gravimetry survey is complimentary technology to seismic, it is not a substitute. It does not provide imagery of the geology reflectors as a seismic survey does.

81. There is research being undertaken globally around other methods of conducting seismic surveys, including in relation to using lower wavelength frequency. These options are still being tested and are not currently commercially available on this scale. In any event, having regard to the precautionary principle, I consider that Woodside would not use these methods until Woodside is comfortable that they have been appropriately tested and environmental impacts understood.

**AFFIRMED** at Perth, Western Australia on  
10 September 2023



Before me:



A legal practitioner who has held a practice certificate for at least 2 years and who holds a current practice certificate

**Schedule**

No VID 647 of 2023

Federal Court of Australia  
District Registry: Victoria  
Division: General

**Respondents**

Second Respondent: Woodside Energy Scarborough Pty Ltd  
ACN 650 177 227

Third Respondent: Woodside Energy (Australia) Pty Ltd  
ACN 006 923 879

Date: 10 September 2023

Form 3 (adapted)  
Rule 29.02(8)

**Annexure certificate**

No VID 647 of 2023

Federal Court of Australia  
District Registry: Victoria  
Division: General

**Raelene Cooper**

Applicant

**National Offshore Petroleum Safety and Environmental Management Authority and  
others named in the schedule**

Respondents

This is the annexure marked [REDACTED]-1 produced and shown to [REDACTED] at the time of affirming his affidavit this 10 September 2023.

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Filed on behalf of: Woodside Energy Scarborough Pty Ltd and Woodside Energy (Australia) Pty Ltd,  
the Second and Third Respondents

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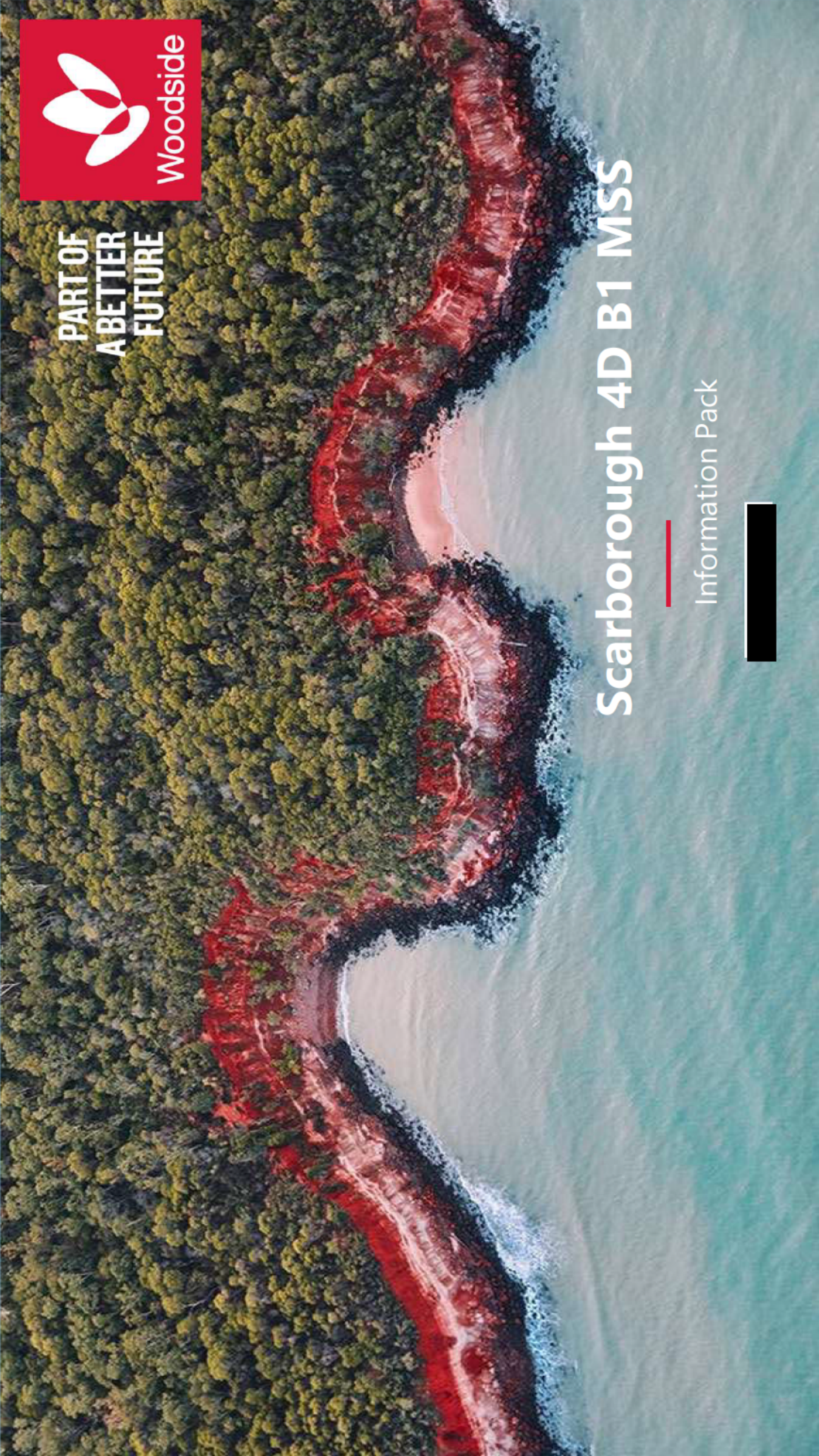
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PART OF  
A BETTER  
FUTURE



# Scarborough 4D B1 MSS

Information Pack



## INTRODUCTION

# Disclaimer and important notice

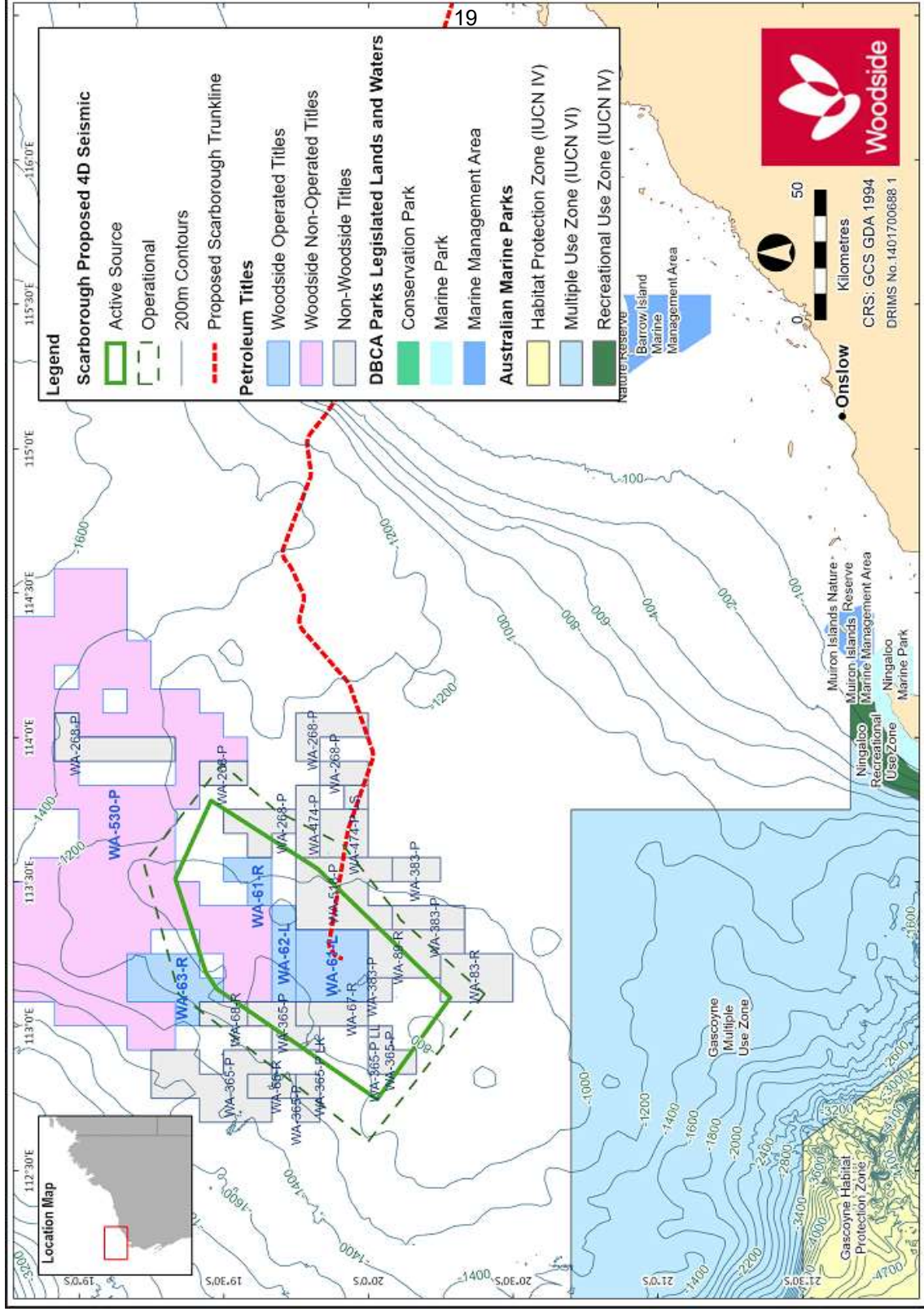
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This presentation contains forward looking statements that are subject to risk factors associated with oil and gas businesses. It is believed that the expectations reflected in these statements are reasonable but they may be affected by a variety of variables and changes in underlying assumptions which could cause actual results or trends to differ materially, including but not limited to: price fluctuations, actual demand, currency fluctuations, drilling and production results, reserve estimates, loss of market, industry competition, environmental risks, physical risks, legislative, fiscal and regulatory developments, economic and financial market conditions in various countries and regions, political risks, project delay or advancement, approvals and cost estimates.

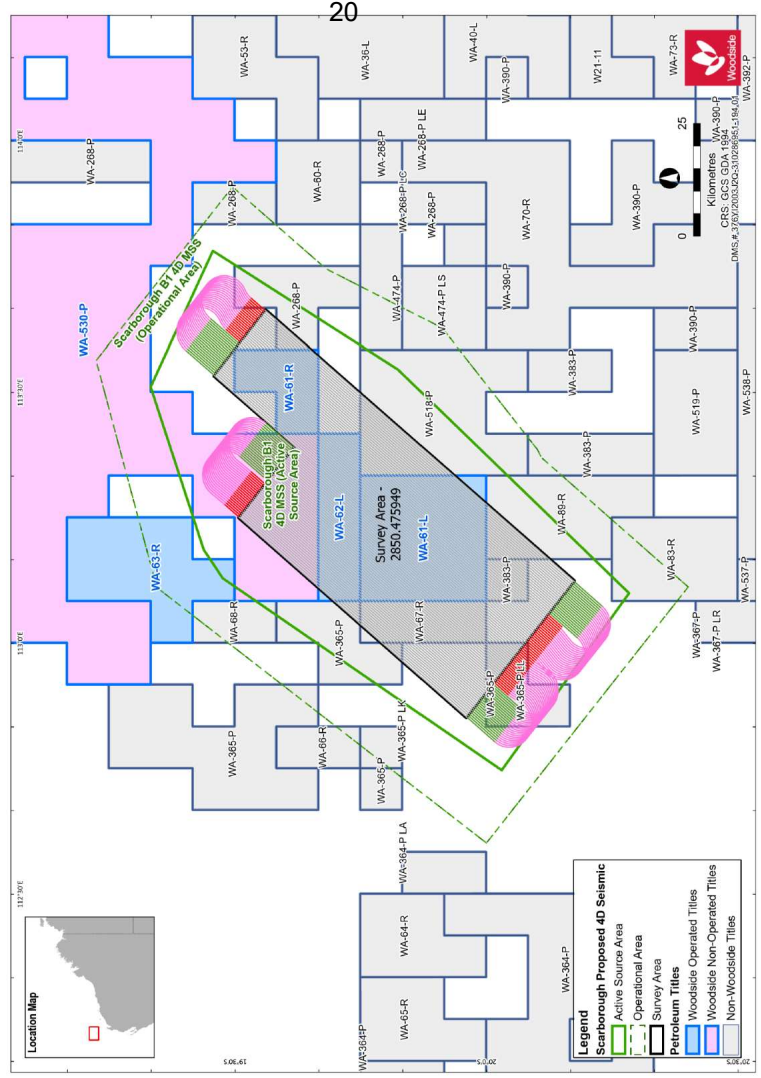
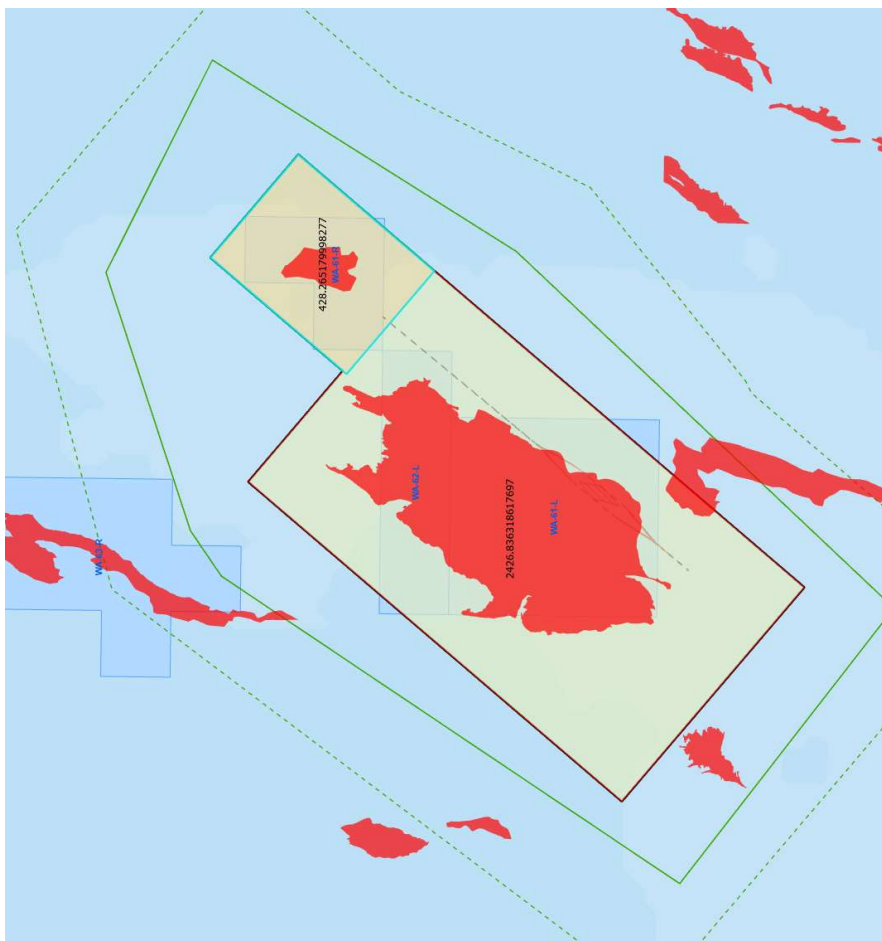
All references to dollars, cents or \$ in this presentation are to US currency, unless otherwise stated.

References to "Woodside" may be references to Woodside Petroleum Ltd. or its applicable subsidiaries.

# SCARBOROUGH 4D MSS Acquisition Plan

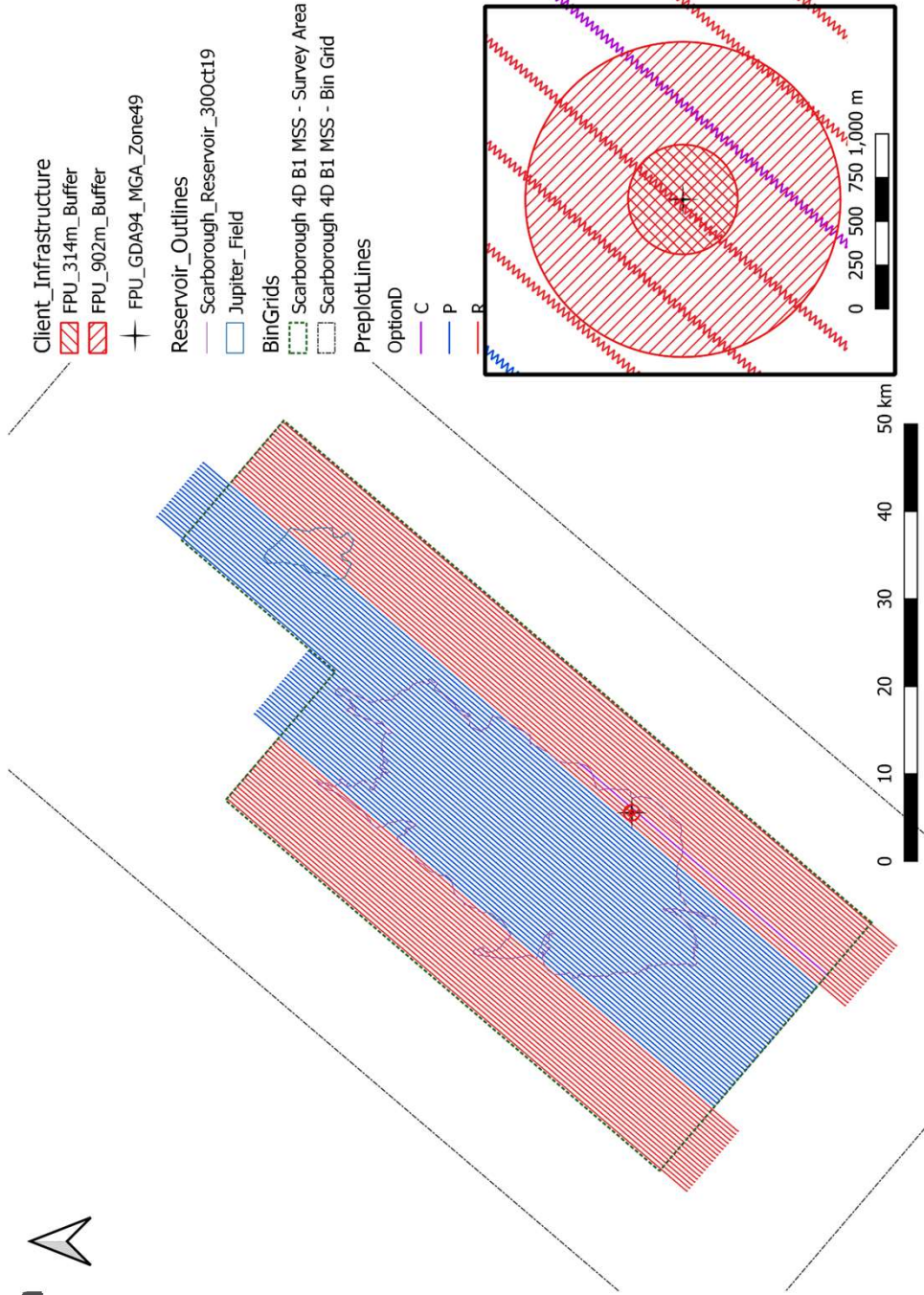


# SCARBOROUGH 4D MSS Acquisition Plan



# SCARBOROUGH 4D MSS

## Acquisition Plan



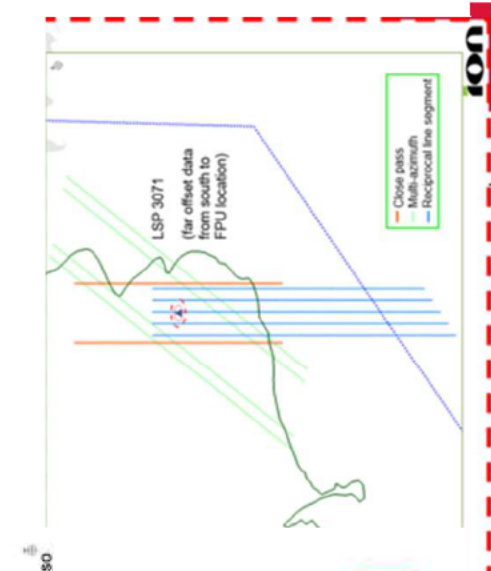
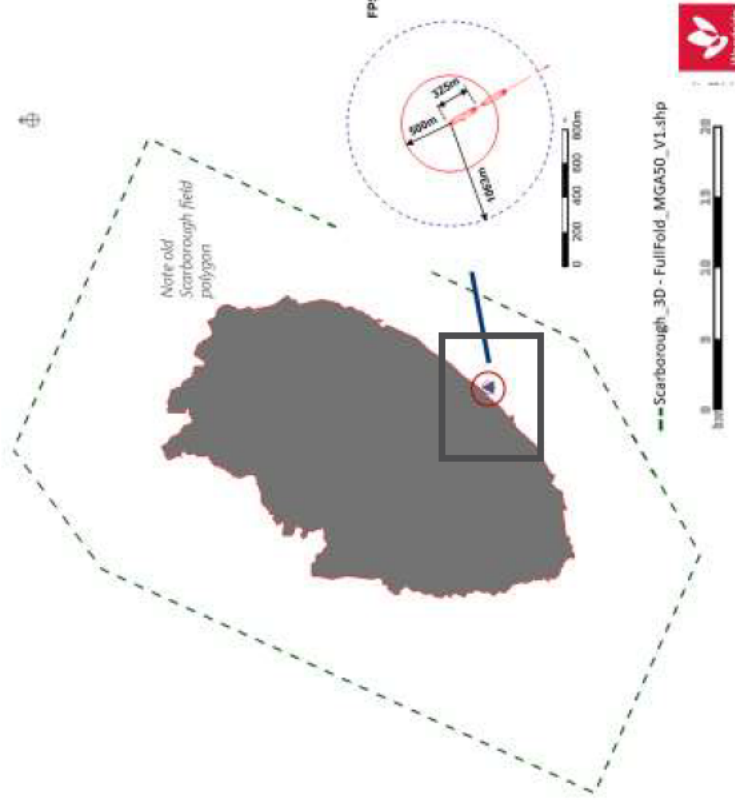
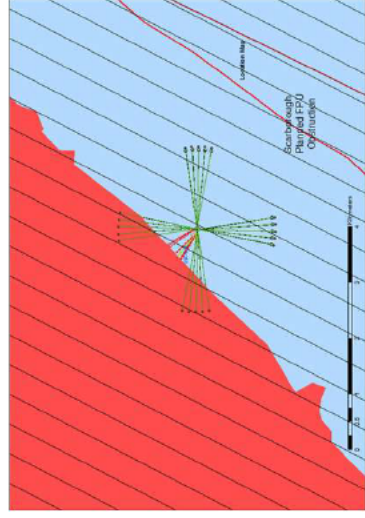
# SCARBOROUGH 4D B1 MSS STAKEHOLDER MEETING FUTURE FPU

## SCARBOROUGH 4D B1 MSS APR MEETING Future Obstructions

- Planned FPU is included within the survey area.
- FPU has a planned exclusion zone radius of 500m from the vessel bow location.
- An additional exclusion zone defines where the seismic source must not encroach (modelled for a 14 streamer vessel with doors).

There are two options to future proof the 4D baseline seismic data repeatability:

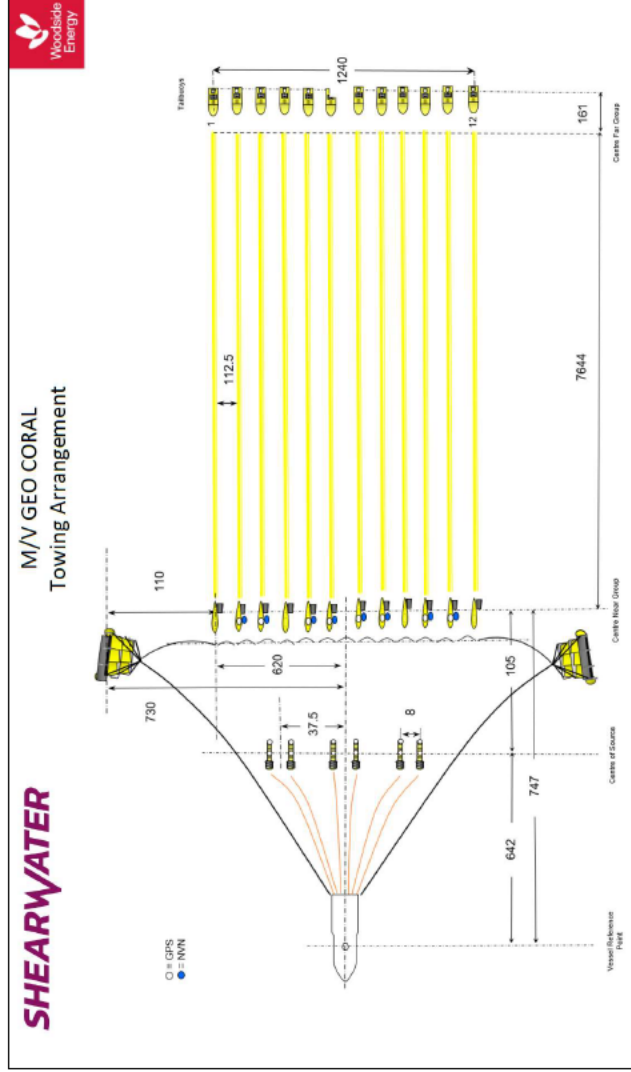
1. Acquire phantom obstructed pre-plot lines around future FPU site/exclusion zone.
2. Acquire lines with a small 3D patch of nodes around future FPU site/exclusion zone.



# SCARBOROUGH 4D B1 MSS STAKEHOLDER MEETING

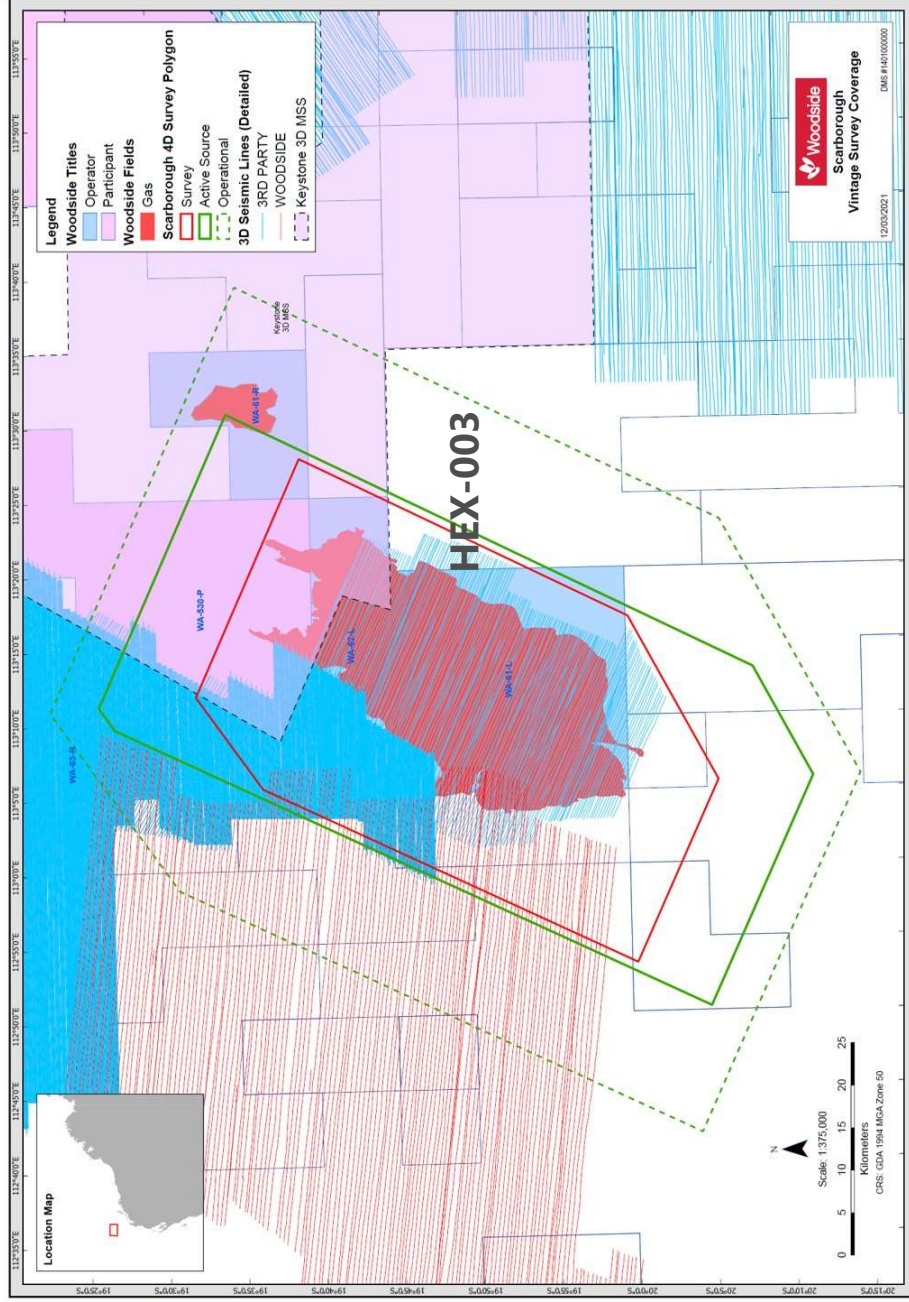
## Acquisition and Technical Specifications

- Acquisition Specifications:
- Streamers: 12 x 112.5m x 7,650m
  - Source: 3 x 37.5m
  - Near offset: ~110m
  - Shot Point Interval :12.5m
- Acquisition swath: 675m  
 Baseline line spacing: 575m



Parameter	Specification
Number of streamers	12 x 112.5m x 7,650m
Streamer spacing	112.5m
Streamer length	7,650m
Streamer depth	15m
SPI	12.5m
Number of sources	Triple source (3 x 37.5m)
Source volume	~2,820 cubic in (approx.)
Source depth	7m (+/-1m)
Source separation	37.5m
Dither method	Natural dither
Survey orientation	40.5° / 220.5° (orthogonal to HEX-003)
Bin size	6.25 x 18.75
Fold	102

# Scarborough 4D B1 MSS – Scarborough and Jupiter Vintage Data

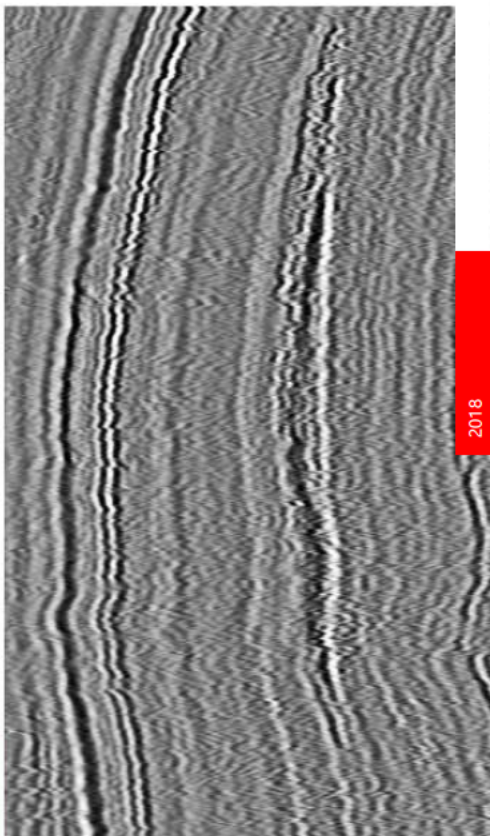


PART OF  
ABETTER  
FUTURE

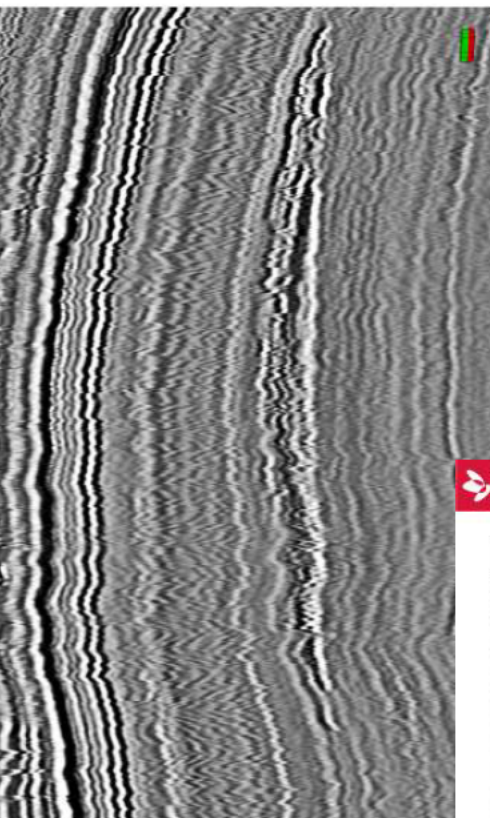


# Scarborough Baseline 4D MSS Improved 3D data (HD3D)

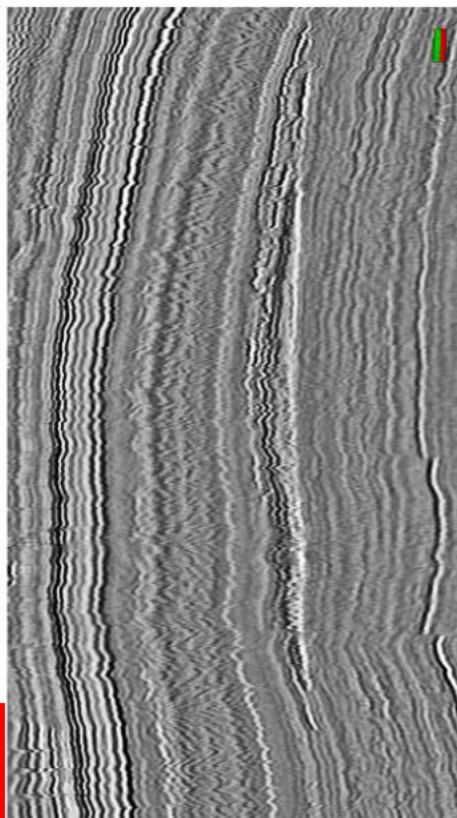
2004



2010



2018



Form 3 (adapted)  
Rule 29.02(8)

**Annexure certificate**

No VID 647 of 2023

Federal Court of Australia  
District Registry: Victoria  
Division: General

**Raelene Cooper**

Applicant

**National Offshore Petroleum Safety and Environmental Management Authority and  
others named in the schedule**

Respondents

This is the annexure marked [REDACTED]-2 produced and shown to [REDACTED] at the time of affirming his affidavit this 10 September 2023.

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Filed on behalf of: Woodside Energy Scarborough Pty Ltd and Woodside Energy (Australia) Pty Ltd,  
the Second and Third Respondents

Prepared by: Jeremy Quan-Sing

Law firm: Allens

Tel: (08) 9488 3700

Fax: (08) 9488 3701

Email: Jeremy.Quan-Sing@allens.com.au

**Address for service:**

Level 11, Mia Yellagonga Tower 2, 5 Spring Street, Perth WA 6000

Email: Jeremy.Quan-Sing@allens.com.au

COMMONWEALTH OF AUSTRALIA

*Section 243*  
*Offshore Petroleum and Greenhouse Gas Storage Act 2006*

**GRANT INSTRUMENT**  
**PETROLEUM ACCESS AUTHORITY WA-106-AA**

I, **GRAEME ALBERT WATERS**, the National Offshore Petroleum Titles Administrator, hereby grant to

**Woodside Energy Scarborough Pty Ltd**  
(ACN: 650 177 227)

**Woodside Energy (Australia) Pty Ltd**  
(ACN: 006 923 879)

Petroleum Access Authority WA-106-AA in respect of the blocks described hereunder, being blocks within the offshore area of Western Australia, and subject to the conditions set out hereunder, to have effect for a period of 180 days from and including the date hereof.

**INTERPRETATION**

In this document, "the Act" means the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* and includes any Act with which that Act is incorporated and words used in this document have the same respective meanings as in the Act.

The titleholder of this petroleum access authority shall at all times comply with:

- (a) the provisions of the Act; and
- (b) all directions given to him under the Act and all regulations for the time being in force under the Act.

**DESCRIPTION OF BLOCKS**

The reference hereunder is to the name of the map sheet of the 1:1,000,000 series prepared and published for the purposes of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* and to the numbers of graticular sections shown thereon.

**Map Sheet SE49**

<b>Block No.</b>	<b>Block No.</b>	<b>Block No.</b>	<b>Block No.</b>	<b>Block No.</b>
2875	2944	2945	2946	2947
2948	2949	3015	3016	3017
3018	3019	3020	3021	3022
3085	3086	3087	3088	3089
3090	3092	3093	3094	3156
3157	3158	3159	3160	3161

3164	3165	3228	3229	3234
3235	3236	3299	3300	3301
3305	3306	3307	3371	3372
3373	3377	3378	3379	3442
3443	3444	3445	3449	3450

**Map Sheet SF49 (Cloates)**

<b>Block No.</b>	<b>Block No.</b>	<b>Block No.</b>	<b>Block No.</b>	<b>Block No.</b>
0057	0058	0059	0060	0061
0062	0063	0064	0065	0130
0131	0132	0133	0134	0135
0136	0204	0205	0206	0207
0277	0278			

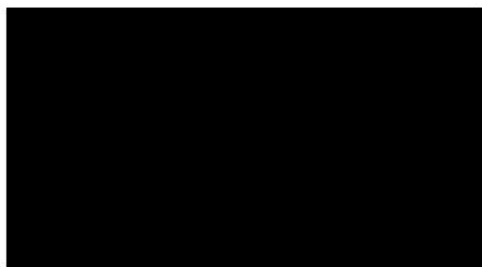
Assessed to contain 77 blocks.  
(Map at **Attachment 1**)


**CONDITIONS**

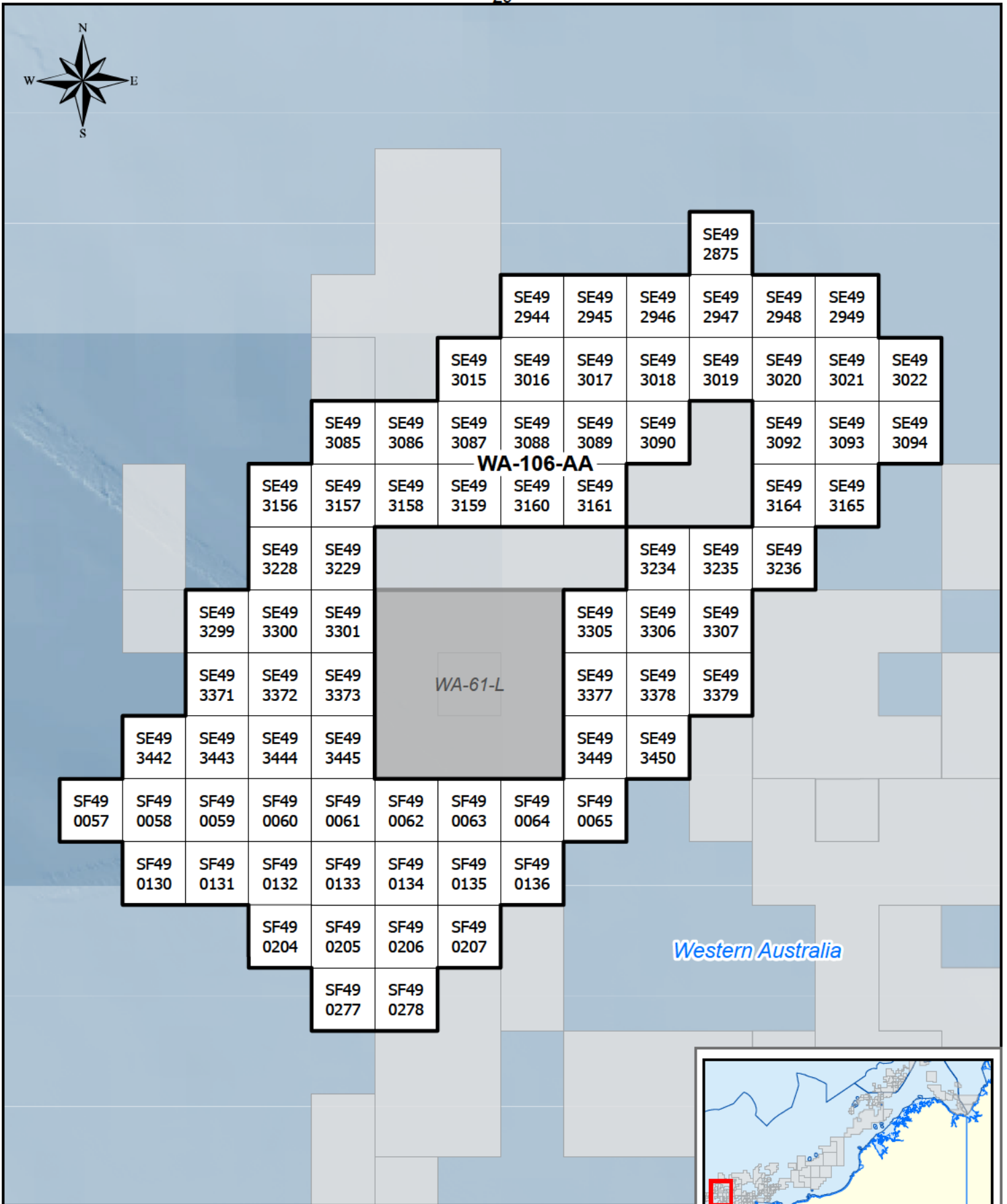
1. If:
  - (a) some or all of the area in respect of which this petroleum access authority is in force overlaps with a Commonwealth reserve declared under Division 4 of Part 15 of the *Environment Protection and Biodiversity Conservation Act 1999* (the overlapping area); and
  - (b) a management plan is in operation for that reserve,  
the holder of this petroleum access authority must comply with that management plan in relation to the overlapping area.
2. The holder of this petroleum access authority shall not carry on in the area in respect of which it is in force any petroleum exploration operations other than the Scarborough 4D B1 Marine Seismic Survey.

Dated this 14<sup>th</sup> day of August 2023.




Made under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*  
of the Commonwealth of Australia.

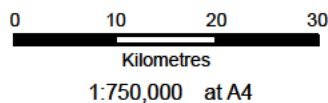


<b>DATE OF REGISTRATION</b> 
<b>TITLES ADMINISTRATOR OFFSHORE PETROLEUM AND GREENHOUSE GAS STORAGE ACT 2006</b>



**Attachment 1  
Access Authority  
WA-106-AA  
Scarborough 4D B1 MSS**

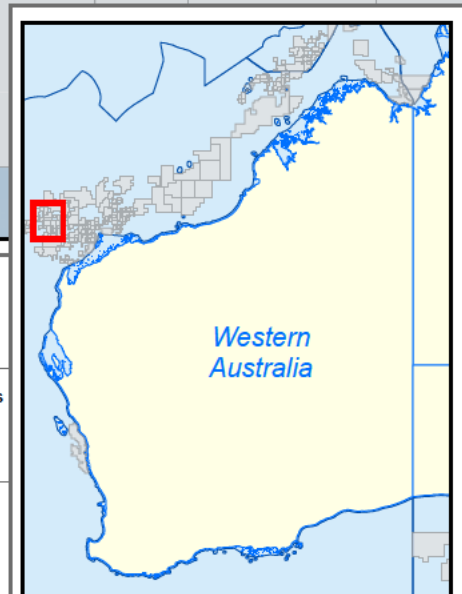
-  Access Authority (WA-106-AA)
-  Originating Title
-  Other Petroleum Titles



The displayed boundary is defined by the following datasets  
 - AMB2014 (Coastal Water Boundary),  
 - APB2014 (Australian Petroleum Blocks, 5' x 5').  
 Data source: Geoscience Australia



**Australian Government**  
**National Offshore Petroleum**  
**Titles Administrator**



Form 3 (adapted)  
Rule 29.02(8)

**Annexure certificate**

No VID 647 of 2023

Federal Court of Australia  
District Registry: Victoria  
Division: General

**Raelene Cooper**

Applicant

**National Offshore Petroleum Safety and Environmental Management Authority and  
others named in the schedule**

Respondents

This is the annexure marked [REDACTED]-3 produced and shown to [REDACTED] at the time of affirming his affidavit this 10 September 2023.

---

Filed on behalf of: Woodside Energy Scarborough Pty Ltd and Woodside Energy (Australia) Pty Ltd,  
the Second and Third Respondents

Prepared by: Jeremy Quan-Sing

Law firm: Allens

Tel: (08) 9488 3700

Fax: (08) 9488 3701

Email: Jeremy.Quan-Sing@allens.com.au

**Address for service:**

Level 11, Mia Yellagonga Tower 2, 5 Spring Street, Perth WA 6000

Email: Jeremy.Quan-Sing@allens.com.au



**Australian Government**  
**National Offshore Petroleum**  
**Titles Administrator**

14 August 2023

Alluvion Building  
 Level 8, 58 Mounts Bay Road Perth WA 6000  
 GPO Box 7871, Perth WA 6850  
[www.nopta.gov.au](http://www.nopta.gov.au)

ABN 74 599 608 295

[REDACTED]  
 Woodside Energy Scarborough Pty Ltd

Via email to: [REDACTED] [@woodside.com](mailto:[REDACTED]@woodside.com)  
 [REDACTED] [@woodside.com](mailto:[REDACTED]@woodside.com)

Woodside Energy (Australia) Pty Ltd

Via email to: [woodsidetitles@woodside.com](mailto:woodsidetitles@woodside.com)

NEATS Ref: 4PTQP8

Dear Applicants

**GRANT OF PETROLEUM ACCESS AUTHORITY WA-106-AA**

I refer to the application validly submitted on 7 July 2022 for a petroleum access authority. In accordance with section 243 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006 (the Act)*, I advise that I have granted Petroleum Access Authority WA-106-AA. Please find enclosed a copy of the title instrument.

Please note that under section 280 of the Act, a titleholder carrying out activities in an offshore area must not interfere with any activities of another person being lawfully carried on, and must also ensure that their activities do not interfere with navigation, fishing, conservation of the resources of the sea and seabed or the enjoyment of native title rights and interests within the meaning of the *Native Title Act 1993* to a greater extent than is necessary for the reasonable exercise of the rights and performance of the duties of the titleholder.

In addition, I acknowledge notification from the Applicants on 7 August 2023 with respect to the requirements of Regulation 12.07 of the *Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011* requiring a titleholder to notify the Titles Administrator, at least 48 hours before the proposed start of the survey, of the following:

- (i) the proposed date and time that the survey will start;
- (ii) the duration of the survey;
- (iii) the survey area coordinates;
- (iv) in the case of a seismic survey — the length of the streamers to be towed by the survey vessel.

Please note the provisions of Regulations 7.15 to 7.18 regarding submission requirements for survey data.

OFFICIAL: SENSITIVE

Should you have any queries regarding the content of these documents, please contact Christine Ferrinda on (08) 6424 5357 or [titles@nopta.gov.au](mailto:titles@nopta.gov.au).



Encl: Instrument



Form 3 (adapted)  
Rule 29.02(8)

**Annexure certificate**

No VID 647 of 2023

Federal Court of Australia  
District Registry: Victoria  
Division: General

**Raelene Cooper**

Applicant

**National Offshore Petroleum Safety and Environmental Management Authority and  
others named in the schedule**

Respondents

This is the annexure marked [REDACTED]-4 produced and shown to [REDACTED] at the time of affirming his affidavit this 10 September 2023.

---

Filed on behalf of: Woodside Energy Scarborough Pty Ltd and Woodside Energy (Australia) Pty Ltd,  
the Second and Third Respondents

Prepared by: Jeremy Quan-Sing  
Law firm: Allens  
Tel: (08) 9488 3700 Fax: (08) 9488 3701  
Email: Jeremy.Quan-Sing@allens.com.au

**Address for service:**

Level 11, Mia Yellagonga Tower 2, 5 Spring Street, Perth WA 6000  
Email: Jeremy.Quan-Sing@allens.com.au

# Scarborough & Jupiter Vs Scarborough Only Time Difference Calculation

SurvOpt scenarios for option 2 (3 seams); full survey and trimmed longlines.

Main survey (50 lines), low priority outer lines (6 lines), phantom close pass (5 lines) and dead-heads (3 lines) are included.

25% standby, 15% infill, 10% tech downtime.

4.5 knts straight-line speed, 4.2 knots turn speed.

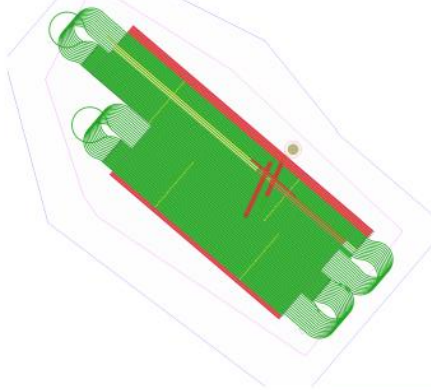
- Scarborough & Jupiter: 63 days 5 hrs 45 min
- Scarborough: 57 days 9 hrs

Time difference = 5 days 21 hrs

## 4039A Scarborough 4D 4039W Woodside Scarborough.2.0 Geocentric Datum of Australia 1994 - Geo Coral 12x112x7650

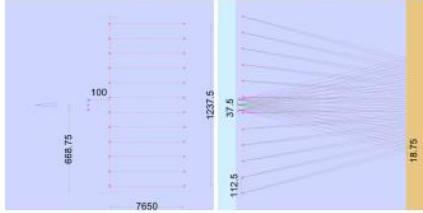
### General Information

Project Name: 4039A Scarborough 4D  
 Scenario Name: 4039W Woodside Scarborough.2.0 Geocentric Datum of Australia 1994  
 Vessel Name: Geo Coral  
 Start Of Mobilization: 15/08/2023 00:00  
 Start Of Production: 03/09/2023 10:00  
 Vessel Time: 03/09/2023 10:00  
 Client Name: Woodside  
 Area Name: Scarborough  
 Comment: 4D baseline



### Vessel Configuration

Equipment Configuration	
Streamers	12
Sources	3
Separation	112.5
Streamer Spread	1237.5
Extra Spread (m)	100
Total Spread (m)	1337.5
Streamer Length (m)	7650
Total Length (m)	8150
Performance	
Turn Radius (m)	5200
Online Speed (knots)	4.50
Offline Speed (knots)	4.50
Turning Speed (knots)	4.20
Safe Draft (m)	100
Contract	
Run In (m)	7650
Run Out (m)	3825
Max Missed Shots	8
Line Change Limit	8:00
Configuration Statistics	
Expected Shot Interval (sec)	5:40
Min Circle Duration	6:02
Min Normal Line Change	3:29



### Preplots

Preplots	68
Heading(s)	40.5, 115.0
SPI (m)	12.50
Total Length (km)	4596.10 (not including runouts)
Average Length (km)	68.94
Spacing (m)	N/A
Area (Sq. km)	2910.97

### Incomplete Lines

Type	Total (km)	Average Length (km)	Total Length (km)	% Length Total
All	64	73.25	4687.74	100.00 %
Prime	61	75.23	4589.00	97.89 %
Infill	0	0.00	0.00	0.00 %
Reshoot	3	32.91	98.74	2.11 %

### Completed Lines

Type	Total (km)	Average Length (km)	Total Length (km)	% Length Total
All	0	0.00	0.00	0.00 %
Prime	0	0.00	0.00	0.00 %
Infill	0	0.00	0.00	0.00 %
Reshoot	0	0.00	0.00	0.00 %
(DNP)	0	0.00	0.00	0.00 %

### Basic Allowances

Infill Rate	15.00 %
Infill Efficiency	100.00 %
Downtime	10.00 %
Standby	25.00 %

### Useful Numbers

% Complete	0.0 %
% Prime Complete	0.0 %
% Prime Incomplete	100.0 %
% Complete Infill	0.0 %
% Required Infill	0.0 %
% Undershoot	0.0 %

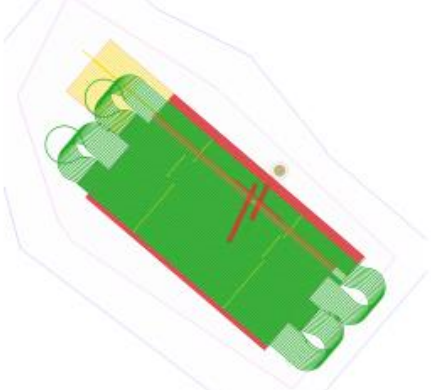
### Objects

Circular Objects	3
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## 4039A Scarborough 4D 4039W Woodside Scarborough.2.0 Geocentric Datum of Australia 1994 - Geo Coral 12x112x7650

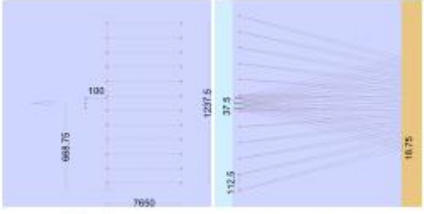
### General Information

Project Name: 4039A Scarborough 4D  
 Scenario Name: 4039W Woodside Scarborough.2.0 Geocentric Datum of Australia 1994  
 Vessel Name: Geo Coral  
 Start Of Mobilization: 15/08/2023 00:00  
 Start Of Production: 03/09/2023 10:00  
 Vessel Time: 03/09/2023 10:00  
 Client Name: Woodside  
 Area Name: Scarborough  
 Comment: 4D baseline



### Vessel Configuration

Equipment Configuration	
Streamers	12
Sources	3
Separation	112.5
Streamer Spread	1237.5
Extra Spread (m)	100
Total Spread (m)	1337.5
Streamer Length (m)	7650
Total Length (m)	8150
Performance	
Turn Radius (m)	5200
Online Speed (knots)	4.50
Offline Speed (knots)	4.50
Turning Speed (knots)	4.20
Safe Draft (m)	100
Contract	
Run In (m)	7650
Run Out (m)	3825
Max Missed Shots	8
Line Change Limit	8:00
Configuration Statistics	
Expected Shot Interval (sec)	5:40
Min Circle Duration	6:02
Min Normal Line Change	3:29



### Preplots

Preplots	66
Heading(s)	40.5, 115.0
SPI (m)	12.50
Total Length (km)	4596.10 (not including runouts)
Average Length (km)	69.64
Spacing (m)	N/A
Area (Sq. km)	2910.97

### Incomplete Lines

Type	Total (km)	Average Length (km)	Total Length (km)	% Length Total
All	64	64.65	4137.87	100.00 %
Prime	61	64.62	3941.97	95.27 %
Infill	0	0.00	0.00	0.00 %
Reshoot	3	65.30	195.90	4.73 %

### Completed Lines

Type	Total (km)	Average Length (km)	Total Length (km)	% Length Total
All	0	0.00	0.00	0.00 %
Prime	0	0.00	0.00	0.00 %
Infill	0	0.00	0.00	0.00 %
Reshoot	0	0.00	0.00	0.00 %
(DNP)	0	0.00	0.00	0.00 %

### Undershoots

Undershoots	4
Total Length on Preplots (m)	8737
Avg Length on Preplot (m)	9100.01
Total Obstructed Shots	539
Avg Obstructed Shots	134.75

### Objects

Circular Objects	3
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