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Santos

03 February 2023

CONFIDENTIAL

[REDACTED]
NOPSEMA
Level 8, 58 Mounts Bay Road
Perth WA 6000

Dear [REDACTED]

We refer to NOPSEMA's General Direction dated 13 January 2023 (**Direction**) issued under section 574 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) in relation to the Barossa Gas Export Pipeline Installation Environment Plan (**EP**). The Direction was issued to Santos NA Barossa Pty Ltd, SK E&S Australia Pty Ltd and Santos Offshore Pty Ltd as the registered holders of Pipeline Licence NT/PL5.

Pursuant to Direction 4, 'the registered holders must submit progress reports to NOPSEMA detailing progress in undertaking the actions required by Directions 2 and 3 every 7 days from the date of this Direction, until those Directions have been met'.

We also note NOPSEMA's reference to the MOC process within the Explanatory Statement and also provide an update in respect of that specifically.

To date, Santos has submitted the following progress reports pursuant to Direction 4:

1. progress report dated 20 January 2023.
2. progress report dated 27 January 2023.

The report is contained in the annexure to this letter.

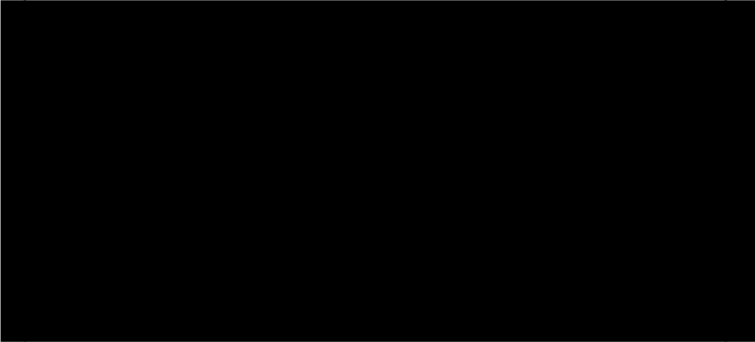
Should you require any further information, please let us know.

Yours sincerely

[REDACTED]
Santos Limited
Santos NA Barossa Pty Ltd, as Operator for and on behalf of the Barossa Joint Venture Parties

CC **JERA Barossa Pty Ltd**
SK E&S Australia Pty Ltd

Annexure

No.	Action Required	Status	Anticipated Completion Date
Direction 1			
<i>The registered holders must notify NOPSEMA of any future activities covered by the Barossa Gas Export Pipeline Installation Environment Plan (EP) that are to commence at least 10 days before the activity commences.</i>			
1.	Notify NOPSEMA of any future activities covered by the EP that are to commence at least 10 days before the activity commences.	No activities covered by the EP will commence within the next 10 days. 	N/A
		On 02/02/23, Santos advised NOPSEMA via letter (Appendix 1) that it is considering conducting various surveys under the GEP Installation EP to collect data of potential benefit to the assessment required by Direction 2.	
Direction 2			
<i>The registered holders must undertake and complete an assessment to identify any underwater cultural heritage places along the Barossa pipeline route (Pipeline Route) to which people, in accordance with Indigenous tradition, may have spiritual and cultural connections that may be affected by the future activities covered by the EP (the assessment), as follows:</i>			
<ul style="list-style-type: none"> a) The assessment is to be undertaken by suitably qualified and independent experts with relevant experience and research credentials (experts). b) In undertaking the assessment, the experts must: <ul style="list-style-type: none"> i. obtain information from people and/or organisations who have, in accordance with Indigenous tradition, spiritual and cultural connections to any underwater cultural heritage places along the Pipeline route that may be affected by the activities; and ii. record and have regard to the information obtained. 			

No.	Action Required	Status	Anticipated Completion Date
<p>c) The assessment must be recorded in a report that is to be provided on completion to:</p> <p>i. people and/or organisations who provided information under paragraph (b)(i) above; and</p> <p>ii. NOPSEMA.</p>			
2.	Undertake an assessment to identify any underwater cultural heritage places along the Pipeline Route. The assessment must be undertaken by suitably qualified and independent experts with relevant experience and research credentials.	<p>Santos confirms that it has engaged Wessex Archaeology Ltd (Wessex), together with its subcontractor Extent Heritage, as experts to undertake an archaeological scientific assessment of geophysical and geotechnical data relating to potential heritage along the pipeline route. The final scope of work is included at Appendix 2.</p> <p>Santos is continuing to select independent experts. Scopes of work, terms of engagement and contracts are in progress.</p> <p>As communicated in Santos General Direction Report #2 dated 27/01 and a letter addressed to NOPSEMA dated 01/02 (Appendix 1), supplementary data is planned for collection commencing in February to inform the assessment required by Direction 2 including:</p> <ul style="list-style-type: none"> Geophysical surveys will be undertaken to complete a sub-bottom profiling survey within the operation area. A remote operated vehicle survey has been proposed to support seabed characterisation of potential targets. <p>Santos is undertaking a Management of Change (MOC) process to confirm the surveys can be undertaken in accordance with the accepted Barossa Gas Export Pipeline Installation Environment Plan (EP; revision 3) and OPGGS (Environment) Regulations. If the MOC results in a requirement to revise and resubmit the EP, Santos will <u>not proceed</u> with the surveys and will notify NOPSEMA accordingly.</p> <p>Santos has identified a vessel and survey crew with availability to undertake the initial survey from approximately 20 February 2023. Time is therefore of the essence. To maintain the possibility of proceeding with the survey in the window available, Santos is making regulatory (including stakeholder) notifications in advance of a final decision to undertake the surveys.</p>	TBC

No.	Action Required	Status	Anticipated Completion Date
		<p>Santos is reporting this to NOPSEMA so it has an opportunity to raise any concerns or queries in relation to the surveys. Santos will keep NOPSEMA fully updated of the outcome of our MOC process and final decision on whether the surveys will proceed.</p> <p>On 01/02, communications on the surveys were sent to stakeholders identified in the GEP EP (Appendix 3). The communications were sent three weeks prior to any proposed survey in accordance with the notification timelines outlined in the GEP EP (control measure C 1.5). As above, Santos is making notifications in advance of a final decision to undertake the surveys.</p>	
3.	<p>The experts must:</p> <ol style="list-style-type: none"> obtain information from people and/or organisations who have, in accordance with Indigenous tradition, spiritual and cultural connections to any underwater cultural heritage places along the Pipeline Route that may be affected by the activities; and record and have regard to the information obtained. 	<p>The Wessex scope of work does not include a requirement to obtain information from traditional owners and organisations in relation to underwater cultural heritage places along the pipeline route. Other experts will be engaged to carry out this scope of work and will work collaboratively with Wessex to ensure seamless interfaces in carrying out the requirements of Direction 2 as a whole.</p> <p>As previously reported, Santos commenced public advertising on January 21 via a number of channels, requesting people with spiritual and cultural connections to underwater cultural heritage places to come forward and provide information. This includes:</p> <ul style="list-style-type: none"> • ½ page advertisement in the NT News • ½ page advertisement in National Indigenous Times • Targeted social media advertisements • Information on the Santos website. <p>The advert was again published on 28 January.</p>	TBC

No.	Action Required	Status	Anticipated Completion Date
		<p>No feedback has been received to date through the community hotline or via the dedicated email (address: [REDACTED]).</p> <p>Preparation has continued for Santos' visit to the Tiwi Islands between 6-10 February for meetings with Tiwi clans. As part of our meeting agenda, a relevant expert will be outlining the studies proposed and we will be inviting input from people and/or organisations who have, in accordance with Indigenous tradition, spiritual and cultural connections to any underwater cultural heritage places along the pipeline route that may be affected by the activities.</p> <p>[REDACTED]</p>	
4.	<p>Provide a report containing the assessment to:</p> <ul style="list-style-type: none"> i. people and/or organisations who provided information under Direction 2, paragraph (b)(i); and ii. NOPSEMA. 	Nothing to report at present.	N/A
<p style="text-align: center;">Direction 3</p> <p><i>Following the completion of the assessment required by Direction 2, if any underwater cultural heritage places along the Pipeline Route to which people, in accordance with Indigenous tradition, may have spiritual and cultural connections are identified that may be affected by future activities covered by the EP, the registered holders must update the EP. This must include relevant content as required under regulation 13 and regulation 14 of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Environment Regulations), including details and evaluation of impacts and risks (the evaluation) of future activities, including:</i></p> <ul style="list-style-type: none"> a) <i>the methods and results of the evaluation on any identified underwater cultural heritage places along the Pipeline Route to which people, in accordance with Indigenous tradition, may have spiritual and cultural connections identified in undertaking Direction 2;</i> b) <i>details of the control measures (if any) adopted to demonstrate that the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable (ALARP) and be of acceptable levels;</i> c) <i>a description of any other legislative requirements that apply to the activity and a demonstration of how those will be met; and</i> d) <i>how any information obtained from people and / or organisations who provided information under paragraph 2(b)(i) above, has been taken into account in the evaluation, and in determining control measures.</i> 			
5.	Assuming that any underwater cultural heritage places along the Pipeline Route are identified	Nothing to report at present.	N/A

No.	Action Required	Status	Anticipated Completion Date
	that may be affected by future activities covered by the EP, update the EP to include an updated environmental assessment pursuant to regulations 13 and 14 of the Environment Regulations.		

Explanatory Statement

- Santos acknowledges receipt of the draft NOPSEMA inspection report provided at 5.25 pm on 25 January 2023. The covering NOPSEMA email requested notification by 1 February for a meeting to discuss the findings and conclusions in the draft report, and any written comments on the report by 3 February 2023. Santos emailed NOPSEMA on 01 February requesting a time extension, being a meeting on 08 February and written comments by 10 February. NOPSEMA agreed to the follow extension via email on the same day.
- Santos commenced its Management of Change (MoC) - #268 - relating to the assessment of underwater cultural heritage places on 3 January 2022 (activities included in report above).
- Santos has a meeting with NOPSEMA on 03 February. A primary objective of the meeting is to understand how Santos can proceed with planning the Barossa Gas Export Pipeline (GEP) installation given the significant regulatory uncertainty.

Other Related Matters

Santos understands representatives of both the EDO and ECNT have visited the Tiwi Islands during the week commencing 30 January specifically to discuss the Barossa project and Santos engagement sessions.

Annexure

Santos

Appendix 1: Santos letter to NOPSEMA dated 01/02

Santos

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01 February 2023

CONFIDENTIAL

NOPSEMA
Level 8, 58 Mounts Bay Road
Perth WA 6000

Dear [REDACTED]

We refer to NOPSEMA's General Direction dated 13 January 2023 (**Direction**) issued under section 574 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) in relation to the Barossa Gas Export Pipeline Installation Environment Plan (**EP**). For clarity, any references in this letter to the EP are to revision 3 which was accepted by NOPSEMA on 9 March 2020.

We also refer to Santos':

- + weekly update dated 27 January 2023, submitted to NOPSEMA in accordance with Direction 4; and
- + letter dated 22 December 2022 containing an undertaking to NOPSEMA.

Engagement of Archaeologist and Proposed Surveys

As identified in the weekly update, Santos continues to progress the expert engagements necessary to support the assessment required by Direction 2. Santos confirms that it has engaged Wessex Archaeology Ltd (**Wessex**), together with its subcontractor Extent Heritage, as suitably qualified and experienced, independent experts to undertake an archaeological scientific assessment of geophysical and geotechnical data relating to potential heritage along the pipeline route.

In order to support the assessment required by Direction 2, further data acquisition is proposed, including a sub-bottom profiling (**SBP**) survey and subsequent ROV survey proposed to be undertaken along, and at either end, of the pipeline route (**Proposed Surveys**). The Proposed Surveys would supplement a desktop archaeological assessment of existing data as it relates to the pipeline route.

The Proposed Surveys:

- a. will be limited to an archaeological scientific assessment that aims to identify submerged buried landforms and areas of sea floor that may have the potential to retain Aboriginal cultural heritage;
- b. will be carried out along and at either end of the pipeline route (within the Operational Area); and
- c. will be carried out over cross-sections of the pipeline route up to the width of the Operational Area (around 4 km tie lines).

The results of the archaeological assessment (including after the completion of the Proposed Surveys) will be recorded in a final report that will identify the characteristics and features of the submerged landscape.

We confirm that survey contractors engaged by Santos would undertake the Proposed Surveys within the Operational Area, in accordance with the EP.

As NOPSEMA may be aware, the EP authorises site surveys as part of the petroleum activities. In particular, SBP and ROV surveys are permitted by the EP as follows:

- + Table 3-1 of the EP identifies 'pre-lay surveys' as a 'key activity';
- + Table 3-4 of the EP describes the 'Potential Activities' to be undertaken by 'marine survey vessels', including pre-lay surveys of the pipeline route using SBP; and
- + Section 3.5.1 of the EP provides that 'site surveys' will be undertaken at 'various stages throughout the GEP installation campaign', which include the use of SBPs using acoustic pulses *'transmitted from a towed surface or deep-sea source and collected by a receiver array that is towed below the water surface.'* Survey methods also include ROV mounted equipment including that required for visual inspection.

Based on its review to date, Santos does not consider that the Proposed Surveys will involve any significant modification or new stage of the activity, nor will it involve any new significant impact or risk that is not otherwise provided for in the EP. However, Santos is undertaking a Management of Change (MOC) process to confirm the above, and will finalise this process before it commences the Proposed Surveys. This letter is to notify you at least 10 days prior to the commencement of the Proposed Surveys pursuant to Direction 1, noting that if the MOC results in a requirement to revise and resubmit the EP, Santos will not proceed with the Proposed Surveys and will notify NOPSEMA accordingly.

Santos has identified a vessel and survey crew with availability to undertake the Proposed Surveys from approximately 20 February 2023. Time is therefore of the essence. To maintain the possibility of proceeding with the Proposed Surveys in the window available, Santos is making regulatory notifications in advance of a final decision to undertake the Proposed Surveys.

Santos is providing this update to NOPSEMA so it has an opportunity to raise any concerns or queries in relation to the Proposed Surveys. We will keep you fully updated of the outcome of our MOC process and final decision on the Proposed Surveys.

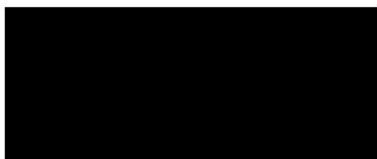
Undertaking

On 22 December 2022, Santos sent a letter to NOPSEMA containing an undertaking *'not to commence pipeline construction until the MOC has been completed, and NOPSEMA has inspected, notwithstanding any delay to Santos' scheduled commencement of activities under the Pipeline EP.'*

For clarity, Santos does not consider that the Proposed Surveys will constitute 'pipeline construction' and therefore the undertaking is not applicable to them.

In the event that NOPSEMA has any queries or concerns, or would like further information, we would be grateful if you could let Santos know at the earliest opportunity.

Yours sincerely



Santos Ltd, as Operator for and on behalf of the Barossa Joint Venture Parties

CC to JERA & SK

End

Appendix 2: Final Wessex Scope of Work



[Redacted]
Santos
Ground Floor Santos Centre
60 Flinders Street
Adelaide
South Australia 5000

Our ref: [Redacted] 275911/25.01.23

Wednesday 2nd February 2023

Via e-mail

Dear [Redacted]

Re: Barossa Gas Export Pipeline Heritage Consultancy

Wessex Archaeology and our subcontractor Extent Heritage are pleased to provide the following proposed Scope of Works in respect to the geophysical and geotechnical assessment of data relating to the heritage in the shallow water environment impact of this project.

- Our proposed scope of work and offer of services is limited to an archaeological scientific assessment that aims to identify submerged buried landforms and areas of sea floor that may have potential to retain Aboriginal cultural heritage deposited during periods of lower sea level – the submerged palaeolandscape.
- Our report will identify and show characteristics and features of the submerged palaeolandscape. We are happy for our report to be provided to Tiwi Island Traditional Owners and their anthropologists, which they may use to assist in identifying any cultural values that may be associated with the submerged palaeolandscape.
- Our report will note that our research does not include a consideration of cultural, social or spiritual values to the Traditional Owners and Knowledge Holders who speak for Country. We understand this is a separate scope of work being undertaken by Santos' consulting anthropologists.

Wessex Archaeology and Extent Heritage have previously worked together on heritage projects in Australia and bring a local and international perspective to the investigation of heritage and submerged palaeolandscape features. Both Extent Heritage and Wessex Archaeology, as a UK educational charity, retain an independent stance over the reporting of heritage findings during this project.

The key project elements are set out in detail below, comprising:

- Proposed Scope of Works;
- Detailed Methodology;
- Fee proposal.

Yours sincerely

[Redacted signature block]





Barossa Gas Export Pipeline Heritage Consultancy

Ref: 275911

Proposed Scope of Works

1. Desk based study of the submerged palaeolandscape and sensitivity mapping.

This will entail a review of available marine geophysical data and local sea level history data to identify submerged buried landforms or features that have the potential to preserve archaeological deposits.

2. An Aboriginal ethnohistory.

Informed by desktop historical and archival research work. This would provide information about Traditional Owner use and occupation patterns on the coastal landscape adjacent to the study area and analogous to the study area.

3. Desktop archaeological literature review.

To identify patterns of Aboriginal use and occupation across coastal landscapes adjacent to the study area and analogous to the study area. This would include a review of Aboriginal sites database, published research reports and grey literature consulting studies (where available and accessible to our team).

4. Aboriginal heritage predictive model

A GIS based analysis and model of terrestrial coastal Aboriginal heritage drawing on the ethnohistorical research and desktop archaeological literature review. The predictive model will serve as a 'terrestrial analogue' to help inform our identification and assessment of landforms on the submerged palaeolandscape that are likely to have potential to retain archaeological deposits.





Barossa Gas Export Pipeline Heritage Consultancy

Ref: 275911

Detailed Methodology

Wessex Archaeology Geophysics and Geotechnical Scopes of Works

Wessex Archaeology has considerable experience working on seabed and submerged palaeolandscape features associated with the most recent post-glacial maximum marine transgression, which have also impacted the areas of this study. As we are working on other similar projects, we have been able to apply industry best practice and international knowledge to the integration of existing data and the design and interpretation of new data.

While acknowledging that assessment of these data is performed to provide insight of the potential impact of the pipeline route on the tangible and intangible cultural heritage of Traditional Owners of the study area, no assessment or inference of cultural values shall be made, and the reporting will reference geophysical, geological, and submerged palaeolandscape interpretations only. Stakeholder engagement is beyond the scope of this proposal.

Introduction

The proposal allows for the archaeological assessment of existing Side-Scan Sonar (SSS), Multi-Beam Echo-Sounder (MBES), and Sub-Bottom Profiler (SBP) data for the defined study area, comprising the export pipeline corridor and associated routes. No Magnetometer and/or gradiometer (Mag) datasets have been acquired or are expected during this study.

In addition, the imminent acquisition of further SBP datasets is expected and advice based on an audit of existing data shall be provided to aid planning of pre-plots of these new data in conjunction with the survey contractor. These "new" data shall subsequently be integrated and assessed alongside the existing data.

In general terms, the approach will cover the identification of any surface features from the full-fidelity raw Sidescan Sonar and corrected Multibeam Echosounder data. These will be correlated with the shallow geological interpretation of the shallow seismic Sub-Bottom profiler data and potentially public domain 2D exploration seismic. Existing contact lists from a variety of sources will also be considered and any relevant information from the Geotechnical data used to delineate any stratigraphically significant horizons. The primary output shall be the identification of potentially sub-aerially exposed palaeolandscape surfaces, and their relative juxtaposition to current and recent deposition along the pipeline route.

It is intended that Wessex Archaeology will be available provide advice, consultancy, and feedback before, during, and after the provision of these services. Within reason, this shall be performed irrespective of any time-zone restrictions. After the completion of works these archaeological reviews will be combined into a single report of the geophysical data which will:

- confirm the presence of known or previously located marine sites of archaeological potential and to comment on their apparent character.
- identify, locate and characterise hitherto unrecorded marine sites of archaeological potential.
- compare archaeological gazetteers and pre-existing survey contact lists.
- comment on the potential effects of the proposed project on known archaeological sites; and
- provide recommendations for archaeological mitigation.

This offer can be considered firm for the scope of works as currently understood (based on post-and pre-plot line plans) and elaborated by Wessex Archaeology's pricing schedule. Should the final scope differ from these assumptions, the costs shall be amended as appropriate. In this regard the



suggested contingency may be required for extra volumes of data on consultancy steps in order to provide advice, we strongly recommend that this is carried in the budget.



Due to the urgency of this project the analysts shall work as data arrives and shall be maintained on standby for these contingencies. Our preference is that the data be digitally transmitted from the vessel if possible, in any case all meta data shall be made available in a timely manner along with daily production reports, track-plots, and other supporting information. It is expected that, subject to delivery of the data electronically to our UK facility, initial interpretational turnaround will be of the order of a working week.

SoW assumptions



The maps and matrices below define the types and extents of the data that will be assessed. We will use discretion to reduce the number of lines and/or km where an assessment does not add value to the overall aims of the project, however any data that provides information sub-perpendicular to the pipeline route and dip to the prevailing geological fabric will be of a premium to the context of the study. This is especially so as any new data would be constrained by a 4km wide license corridor centred on the construction centreline.

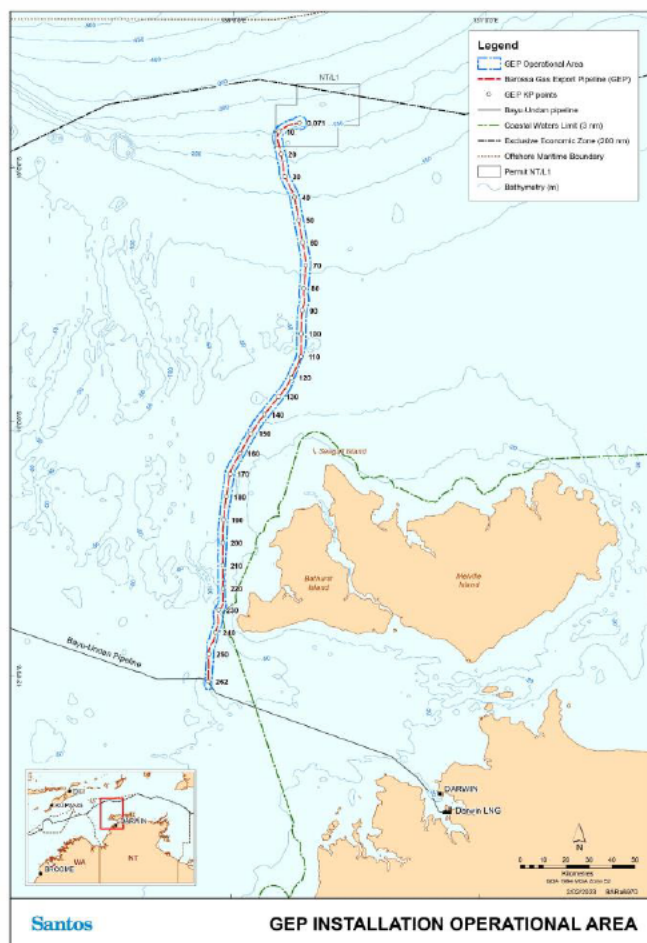


In addition, public domain (NOPIMS) exploration 2D and 3D data will be assessed for suitability, although it is far from certain that this will add value and may not form part of the final deliverable. Some of this data is of 1960s vintage and may not be as adaptable as more modern data to a shallower target.

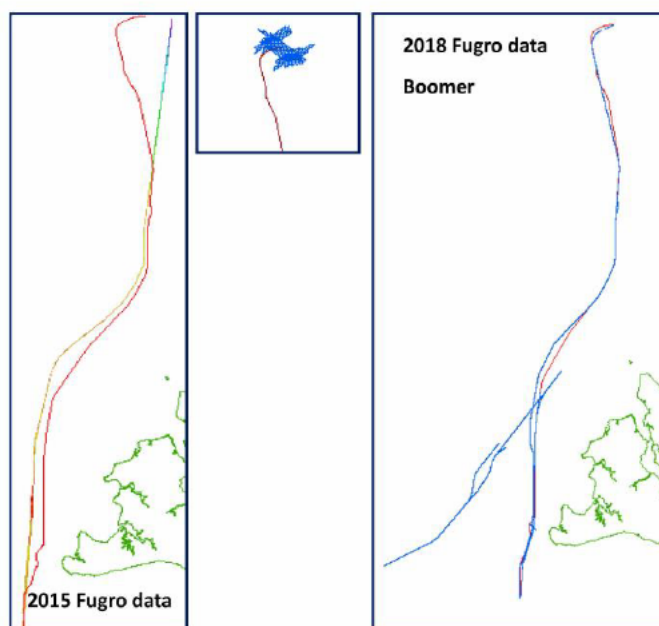
In addition, the geotechnical borehole, sample, and logging runs will be used to inform the dating and other parameters of the recent sedimentation.

The overriding object of these SOWs is to assess the existing data exhaustively from a scientific perspective while concentrating effort on those data which truly bring holistic value to the context of informing the wider stakeholder engagement.

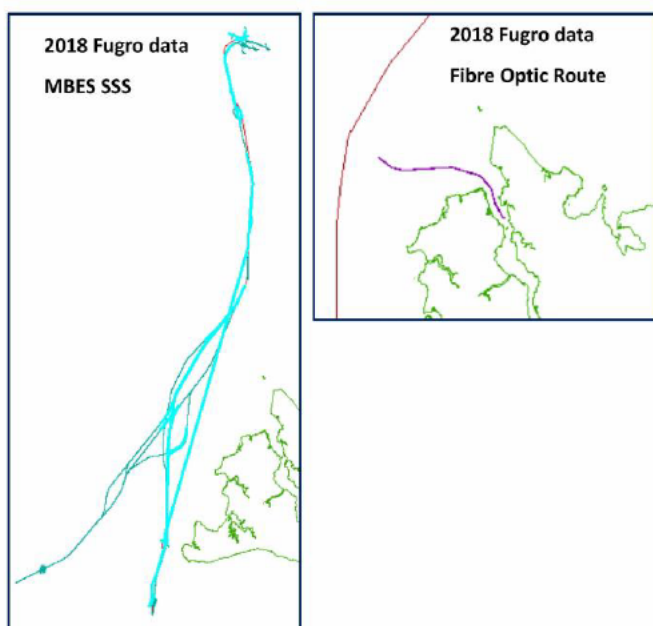




Map 1: Santos supplied pipeline route



Map 2: Composite image 2015 and 2018 available data



Map 3: Composite image 2018 available data

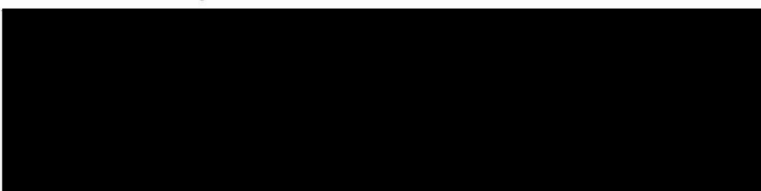
The pipeline study area contains multiple vintages and routings of data.

Table 1: Scopes of works, existing and new data.

Data	SBP		SSS		Comments
	Acquired	Assessed	Acquired	Assessed	
2015 Fugro	337	20	0	0	Field Area limited assessment proposed
2018 GP1577	554	554	912	372	All SBP(boomer) and limited SSS proposed
2018 FO route	132	132	132	132	All data on 3 sub-parallel lines proposed
2021 EGS	0	0	270	0	Assuming NO SSS is available raw
Existing totals	1023	706	1314	504	Totals to assess in SoW
New data					
2023 Fugro	272	272	0	0	Assume coverage of entire pipeline route +/- 10m and several 4km tie lines to 2018 data



New data route planning



Data Formats

This proposal assumes that the data cannot be provided on our preferred physical media (preferably HDD) in a timely fashion and will be compact enough to be efficiently e-delivered. Time and costs are assumed for these transfers, subject to network quality at the end locations. A start-up meeting including the relevant stakeholders (developer, consultants, survey contractor, and Wessex Archaeology) has been seen to be beneficial to manage data flows and will be convened late January 2023 before the vessel mobilisation.

- Bathymetry (MBES) data, in the form of cleaned, de-spiked and tidally-corrected text (x,y,z) files per line or Bathymetry xyz files gridded at 1m cell size or less, if practical;
- SSS data in fully corrected and mosaic format as a GeoTiff in block-by-block arrangement.
- Additionally, SSS data in the form of raw, un-mosaicked files in *.xtf format or similar (including corrected navigational data or details thereof); Note SonarViz™ files created for other purposes have been seen to contain "clipped" data and the raw version must be supplied for archaeological purposes.
- [If supplied Magnetometer data as cleaned, de-spiked ascii text (including easting, northing, nT and altitude as minimum) files per line, including layback, and raw data files.]
- Shallow seismic SBP data as SEG-Y files or similar, including navigational data and layback.
- Track plots as shapefiles or *.dgn files, survey logs (e.g., as *.xls or *.pdf), if available.
- Survey report detailing the technical specifications of the survey.
- Final Survey Company derived contact lists against which the final Gazetteer will be correlated.
- Any and all previous relevant reports required for comparison.

Data assessment rationale

This proposal covers a methodology which is intended to be interactive between Wessex Archaeology, Santos, and other interested stakeholders. The general approach is to assess all the available data.

- Linear schemes do not respond well to any data decimation approach
- Recognition that the limited re-routing available within the pipeline corridor requires full assessment at the earliest stages.

Methodology



Communications between the relevant Santos and survey contractor personnel is crucial to the timely arrival and assessment of these data.



Sub Bottom Profiler (SBP) data

The SBP data will be interpreted using Coda™ Survey Engine Seismic+ software in order to identify any palaeolandscape features of archaeological potential. The extents of any such features will be recorded, and full descriptions (including feature type, possible fill, and archaeological potential) will be entered into a gazetteer.

Magnetometer (Mag) data

Any Mag data will be processed and interpreted using our proprietary software.

Multi-Beam Echo-Sounder (MBES) data

MBES data will be analysed to identify seabed structures that could be anthropogenic in origin including shipwrecks, plane crash-sites, or other anthropogenic debris. In this instance the interpretations will be correlated with the SBP, SSS [and Mag] interpretation. The data will be analysed using QPS Fledermaus™ software suite, which enables 3-D visualisation of the acquired data and geo-picking of seabed anomalies.

Side-Scan Sonar (SSS) data

The raw SSS data will be processed and interpreted by Wessex Archaeology using Coda™ Survey Engine Sidescan+ software. The data will be interpreted for any objects of possible anthropogenic origin; the position and dimensions of any such objects will be recorded in a gazetteer.

Wessex is a proponent of the use of raw sidescan sonar data as the "gold-standard" for archaeological assessment of geophysical data. It allows for the retention of extra dimensionality in the shadow, the ability to ensonify from both aspects. Assessment from raw is proposed on a selection of the data in this instance. On detailed project work we never actually see saturation, or the point where extra resolution does not add value to the output.

Contact lists

Wessex has some experience in the co-analysis of survey company contact listings and their archaeological significance. In all the instances where we have made the comparison significant divergences occur.

False positives: where any object is correctly listed, by survey companies, as debris or obstruction but has no discernible archaeological significance. In many instances this is related to an increasingly common use of auto picking of boulders by AI algorithms trained to spot, unsurprisingly, boulders. Archaeology however, seldom resembles a boulder and therefore up to 10 : 1 too many contacts may be listed.



False negatives: where either by-eye or by-algorithm an anomaly has been identified as having archaeological significance, but because of its dimensions, is deemed to be below a survey significance, and is not reported by survey companies. An obvious example of this is multiple small anomalies whose juxtaposition increases the likelihood of being a debris field of anthropogenic origin and then also increases potential archaeological significance.

For the sake of clarity, the survey company contact lists remain correct and are fully valid for the purposes they were acquired, but they are not analogous to an archaeological gazetteer; and even if similar their overlap is not consistent.



Multi-data grouping and ranking.

The various datasets described above, once assessed, will yield individual gazetteers ranked by archaeological significance. The significance will obviously be ranked from most significant – and may include close contact with palaeoland surfaces or potential ship or aircraft – to low significance – which may include smaller and less distinctive or less definitely anthropogenic anomalies. The most significant anomalies will be assigned an interpretation, potentially a recommend Archaeological Exclusion Zones (AEZ) and a recommendation for further work. In the first instance this could be the tasking of an ROV pass for potential ground truthing.



The methods employed for the archaeological assessment will be in accordance with the guidance set out by the Chartered Institute for Archaeologists (CIfA, 2014).





Geophysical Assessment Reporting

Only after near real-time advice and consultancy has been performed will we move to a reporting stage. The results of the archaeological review will be compiled as an illustrated technical report in the standard Wessex Archaeology format unless otherwise specified. The report will comprise:

- Executive summary detailing the pertinent results and recommendations.
- A concise introduction detailing project background, aims and objectives.
- Methodology section to include details of the archaeological assessment and data quality, details of third-party baseline data.
- Results section to include an assessment of the seabed geophysical anomalies and palaeolandscape features of archaeological potential, with gazetteers of the archaeological interpretation and potential archaeological significance provided as an appendix
- Recommendations will be made for any archaeological exclusion zones and additional mitigation.
- Recommendations for sites of intermediate significance where further investigation of the underlying data is warranted before future phases of the project proceed.
- Comparison of contact lists and gazetteers.
- Recommendations will be made for continuing Geoarchaeological work as it impacts coring and borehole location requirements for palaeolandscape studies.

Under normal circumstances, subject to your satisfaction with our proposal, we would be pleased to initiate the assessment upon receipt of the survey data, and a contract or purchase order. In this case certain works have been undertaken in good faith commencing Monday 16th January.

It is anticipated that the draft report will be delivered by at a date determined in consultation with the client once work has been fully assessed. Please see cost proposal below. We have included time for relevant management and technical specialists to attend sessions such as Expert Topic Groups with regulators and other bodies.

Wessex Archaeology has one of the largest geophysical teams in the UK, with many years of experience undertaking archaeological assessments of marine geophysical data. In addition to this, we are also able to provide further archaeological advice in relation to your site, if required, drawing on our team of in-house consultants and specialists.

Schedule

I can confirm current availability of the required equipment and personnel to perform these scopes of works to the schedule required in Q1 2023. This includes disruption to work patterns imposed by adherence to current UK government pandemic advice; with the technical ability to work safely and efficiently away from the permanent office.

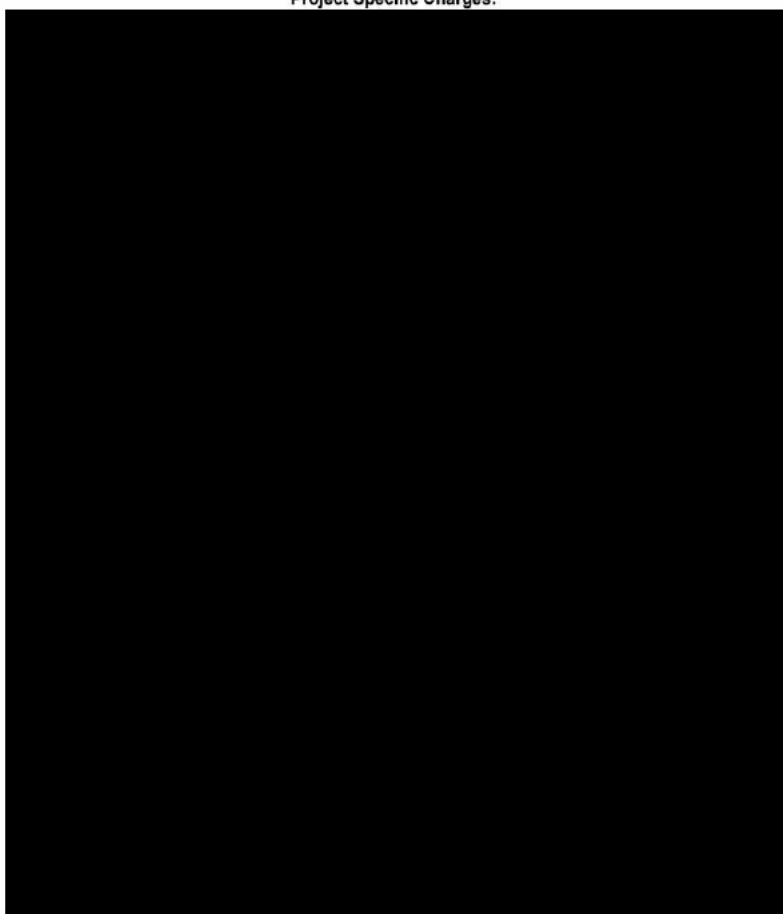




Barossa Gas Export Pipeline Heritage Consultancy

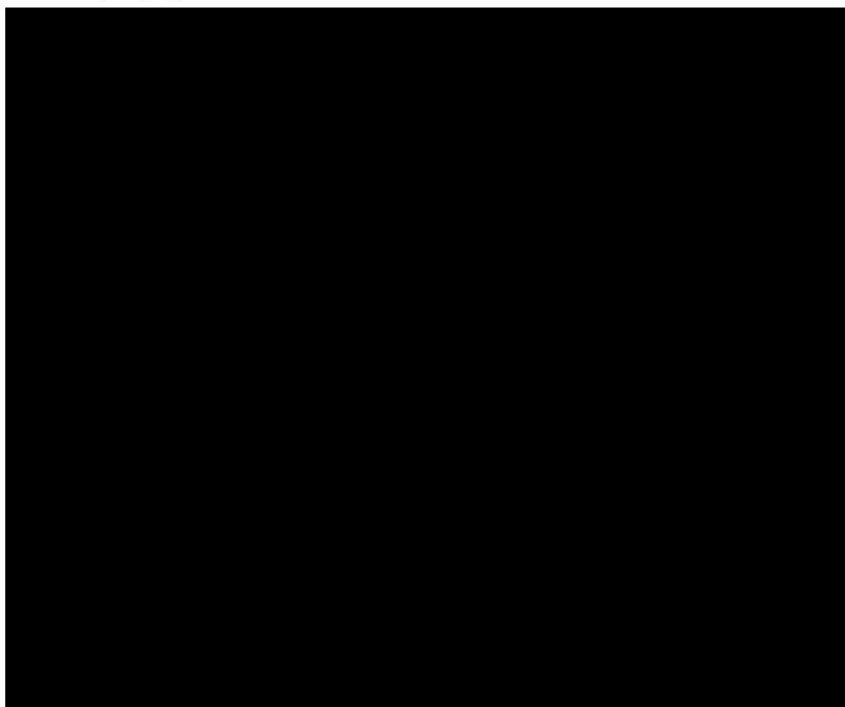
Ref: 275911

Project Specific Charges:



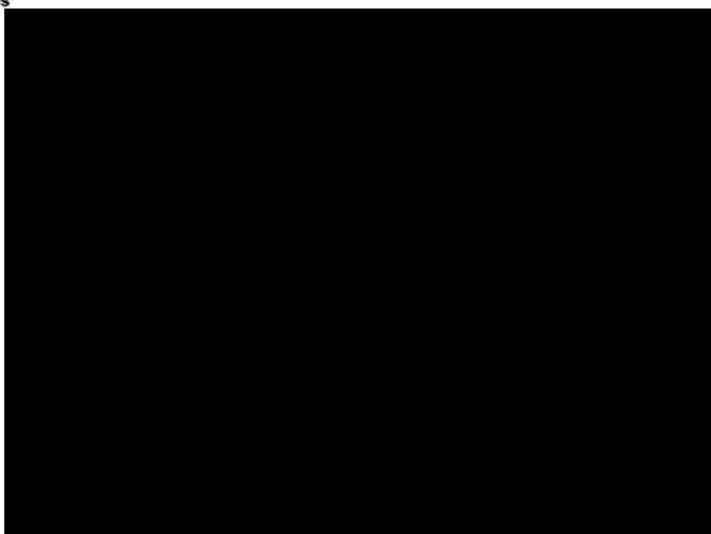


Detailed Costing for Item 1: Desk based study of the submerged palaeolandscape and sensitivity mapping.





Rates



Assumptions and Exclusions

We have attempted to include all reasonable costs in our proposal where work scopes can be estimated, based on current information or drawing on experience from similar previous projects.

The following assumptions and exclusions have been included, however, because it is not possible for us to predict or estimate certain circumstances and costs at this stage:

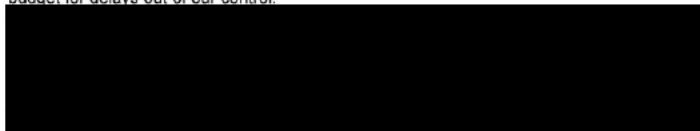
1. The scope of work is limited to the work outlined in this fee proposal. Any variation must be agreed in writing and we may need to seek additional time and/or cost allowances to complete the work.

2.



3. Timing estimates do not allow for any unforeseen delays that may arise during the project. Timeframes will be dependent on heritage consent agency and regulatory requirements and the availability of data necessary to undertake the assessment work. We would provide as much notice as possible about any implications for our agreed project scope, timeline, and budget for delays out of our control.

4.





- [REDACTED]
6. While a high level of care and quality assurance will be taken with the preparation of documentation for this project, the assessment methodologies and recommendations will be subject to review and approval by external heritage consent agencies and approval bodies, who have wide discretionary powers to refuse, request amendments or request additional work. Any additional work required as a result of these statutory processes may require approval of additional budget and time allowances.
 7. [REDACTED]
 8. Extent and Wessex have allowed for preparation of mapping and scoping assuming one round of mapping work. If there are changes in design or study area boundaries, this may require additional mapping and spatial analysis time. We would advise of any additional cost or time implications that might arise from changes to design or study areas.
 9. We have not included costings for fees associated with Aboriginal site register searches as it is unclear how many new sites or places may be found during initial database query. We would advise Santos of any site register access fees when we have had the opportunity to scope out the cost associated with these fees.
 10. Additional meetings and advice beyond what has been have been allowed for in this fee proposal will be charged for at hourly rates, or the subject of a variation.
 11. No allowances have been included for boat hire or physical underwater investigations because the necessity and scope of any such investigation is currently unclear and can only be determined after the desktop assessment and geophysical analysis work is completed.

Wessex Archaeology Ltd, Jan 2023

