Santos

ATTACHMENT 1
RPI24/007: SANTOS – LEGHORN DEV C RESPONSE TO REQUIREMENT NOTICE

1. Introduction

On 2 December 2024, Santos Limited (Santos) submitted a Regional Interests Development Approval (RIDA) application (RPI24/007: Santos – Leghorn Dev C) to the Department of State Development, Infrastructure and Planning (DSDIP). On 16 December 2024 via a Requirement Notice, DSDIP requested further information for the assessment against the criteria contained in the *Regional Planning Interests Act 2014* (RPI Act) and the *Regional Planning Interests Regulation 2014* (RPI Regulation).

2. Requirement Notice Issues and Santos Response

The information requested regarding RPI24/007 RIDA application and Santos' response is outlined in Table 1 below.

Table 1 - DSDIP Information Requirement and Santos' Response

DSDIP Information Request *Information required for assessment against SEA criteria – Schedule 2, Part 5 of the Regional Planning Interests Regulation 2014 (RPI Regulation)*	**Santos Response**
Issue 1: The application states that the Leghorn Dev C development includes one conventional gas well and a total maximum disturbance area of 22.8 hectares. As part of the development, a new borrow pit (measuring 0.8 hectares and excavated to a maximum depth of 3 metres) will be established to supply material for infrastructure construction and access track maintenance. Schedule 2, Part 5, Item 3 of the RPI Regulation provides a definition of 'conventional gas or oil' and a definition for 'unconventional gas or oil'. Under part (b) of the latter, the definition makes reference to gas or oil extraction methodologies - including '(iii) infrastructure which has a high or widespread impact on the environment.' The note immediately following that reference states: Examples of infrastructure that may have a high or widespread impact on the environment- • single well sites that disturb an area greater than 1 ha or multiple well sites that disturb an area greater than 1.5ha • extensive borrow pits greater than 0.2ha and deeper than 2m • a petroleum facility Given that both the well site disturbance area and the borrow pit exceed these thresholds, there are concerns regarding the environmental impact and that the proposal does not meet the 'conventional gas or oil' definition.	
Action: Please provide a detailed justification explaining why the proposed single well site disturbance area and borrow pit (given the size and depth) do not fall under the category of 'unconventional gas or oil' development, as defined in Schedule 2, Part 5, Item 3 of the RPI Regulation.	**SCHEDULE 2, PART 5, ITEM 3 OF THE RPI REGULATION** DSDIP asked Santos to explain why the proposed well site disturbance area and borrow pit, given their size and depth, do not fall under the category of 'unconventional gas or oil' development. To define scope of works within Leghorn Area as 'unconventional gas or oil', Schedule 2, Part 5, Item 3 (a) or Item (b) (i), (ii) and (iii) RPI Regulation must be established: unconventional gas or oil means— (a) any of the following gases— (i) coal seam gas; (ii) deep coal gas; (iii) shale gas; (iv) tight gas; or (b) a gas or oil contained in, or extracted from, a natural underground reservoir that is part of a complex geological formation or structure that prevents, or significantly limits, the recovery or release of the gas or oil to ground level without the use of innovative technological solutions for extraction, such as the use of each of the following—

DSDIP Information Request *Information required for assessment against SEA criteria – Schedule 2, Part 5 of the Regional Planning Interests Regulation 2014 (RPI Regulation)*	Santos Response
	(i) extensive hydraulic fracturing; (ii) more than 2ML of ground or surface water for each petroleum well used for the recovery or release of the gas or oil; (iii) infrastructure which has a high or widespread impact on the environment. Examples of infrastructure that may have a high or widespread impact on the environment— • single well sites that disturb an area greater than 1ha or multiple well sites that disturb an area greater than 1.5ha • extensive borrow pits greater than 0.2ha and deeper than 2m • a petroleum facility. The definition of 'unconventional gas or oil' is not applicable to the Leghorn Area. The primary reservoir target is the porous sandstone within the Toolachee Formation. At the Leghorn Field, gas is trapped by buoyancy within a simple anticlinal closure. The Permian-age porous sandstones of the Toolachee Formation are of sufficient quality that they do not meet the requirements of a geological formation that significantly limits the recovery or release of the gas from the reservoir. These geological characteristics unequivocally conform to the requirements of Item 3 of the RPI Regulation's definition of conventional gas or oil. In other words, the Toolachee sandstones in the Leghorn area are a conventional gas target. Additionally, in the absence of explicit use of "and" or "or" in the definition of 'unconventional gas or oil', general principles of statutory interpretation require a presumption that the legislature intended for all the listed criteria to be satisfied. This is emboldened by the inclusion of 'each of the following'. This means that all three criteria under Schedule 2, Part 5, Item 3(b) (i), and (ii), and (iii) of the RPI Regulation must be met for oil or gas to be classified as "unconventional." Based on the explanation above and further detailed in Santos' response to Issue 2, Santos confirms that the Leghorn Area scope of works meets the definition of "conventional gas or oil" and does not fall under the definition of "unconventional gas or oil" as defined in the RPI Regulation. Further explanation as to why the proposed single well site disturbance area and borrow pit (given the size and depth) do not fall under the category of 'unconventional gas or oil' development and other aspects under Item 3 (b) (i)-(ii) is not required as the proposed works are part of a petroleum resource activity involving conventional gas or oil only. The proposed infrastructure, including a borrow pit and well pad, are proposed to support conventional gas development and are typical in their size and extent for conventional oil or gas operation purposes. The infrastructure is designed, constructed and operated to ensure it will not have an irreversible or widespread impact on the environment.

<table>
<tr><th>DSDIP Information Request
Information required for assessment against SEA criteria – Schedule 2, Part 5 of the Regional Planning Interests Regulation 2014 (RPI Regulation)</th><th>Santos Response</th></tr>
<tr><td></td><td>Comparison of the Leghorn Dev C RPI24/007 application scope to Schedule 2, Part 5, Item 3 (specifically the definition of unconventional gas or oil) within the RPI Regulation is detailed in the below table.
<table>
<tr><td>unconventional gas or oil means—
(a) any of the following gases—</td><td>Not relevant to this application.
Santos is not proposing unconventional gas or oil activities as part of this application.
The proposed activities within this application align with conventional gas or oil operations as defined by Part 5 Item 15 Subsection (3)(a) and (b).
Details demonstrating the alignment are provided below and in Santos' response to Issue 2.</td></tr>
<tr><td>(i) coal seam gas;</td><td>Not relevant to this application.
Santos is not proposing activities related to extraction of coal seam gas.
Primary reservoir target is the conventional sandstones within the Toolachee Formation. The target is reservoired in Permian-age porous sandstones, trapped in discrete accumulations (anticlinal closures) by buoyancy which aligns to Item 3 of the RPI Regulation's definition of conventional gas or oil. The RPI Regulation also states that where a natural underground reservoir is largely consisting of sandstone capped by impermeable rock and has reduced porosity and permeability, hydraulic fracturing in certain circumstances can be required for conventional gas operations trapped in anticlinal closures by buoyancy. Leghorn Dev C scope of work has one stage of fracturing planned.
Please refer to Santos' response to Issue 2 for the data on nearby drills that demonstrate expected results for the Leghorn Dev C scope.</td></tr>
<tr><td>(ii) deep coal gas;</td><td>Not relevant to this application.</td></tr>
</table>
</td></tr>
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DSDIP Information Request *Information required for assessment against SEA criteria – Schedule 2, Part 5 of the Regional Planning Interests Regulation 2014 (RPI Regulation)*	Santos Response	
		Santos is not proposing activities related to extraction of deep coal gas. Primary reservoir target is the conventional sandstones within the Toolachee Formation. The target is reservoired in Permian-age porous sandstones, trapped in discrete accumulations (anticlinal closures) by buoyancy which aligns to Item 3 of the RPI Regulation's definition of conventional gas or oil. The RPI Regulations also states that where a natural underground reservoir is largely consisting of sandstone capped by impermeable rock and has reduced porosity and permeability, hydraulic fracturing in certain circumstances can be required for conventional gas operations trapped in anticlinal closures) by buoyancy. Leghorn Dev C scope of work has one stage of fracturing planned. Please refer to Santos' response to Issue 2 for the data on nearby drills that demonstrate expected results for the Leghorn Dev C scope.
	(iii) shale gas;	Not relevant to this application. This application is not proposing activities related to extraction of shale gas. Primary reservoir target is the conventional sandstones within the Toolachee Formation. The target is reservoired in Permian-age porous sandstones, trapped in discrete accumulations (anticlinal closures) by buoyancy which aligns to Item 3 of the RPI Regulation's definition of conventional gas or oil. The RPI Regulations also states that where a natural underground reservoir is largely consisting of sandstone capped by impermeable rock and has reduced porosity and permeability, hydraulic fracturing in certain circumstances can be required for conventional gas operations trapped in anticlinal closures)

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		by buoyancy. Leghorn Dev C scope of work has one stage of fracturing planned. Please refer to Santos' response to Issue 2 for the data on nearby drills that demonstrate expected results for the Leghorn Dev C scope.
	(iv) tight gas; or	Not relevant to this application. This application is not proposing activities related to extraction of tight gas. Primary reservoir target is the conventional sandstones within the Toolachee Formation. The target is reservoired in Permian-age porous sandstones, trapped in discrete accumulations (anticlinal closures) by buoyancy which aligns to Item 3 of the RPI Regulation's definition of conventional gas or oil. The RPI Regulations also states that where a natural underground reservoir is largely consisting of sandstone capped by impermeable rock and has reduced porosity and permeability, hydraulic fracturing in certain circumstances can be required for conventional gas operations trapped in anticlinal closures) by buoyancy. Leghorn Dev C scope of work has one stage of fracturing planned. Please refer to Santos' response to Issue 2 for the data on nearby drills that demonstrate expected results for the Leghorn Dev C scope.
	(b) a gas or oil contained in, or extracted from, a natural underground reservoir that is part of a complex geological formation or structure that prevents, or significantly limits, the recovery or release of the gas or oil to ground level without the use of innovative technological solutions for extraction,	Not relevant to this application. This application is not proposing activities related to a gas or oil contained in, or extracted from, a natural underground reservoir that is part of a complex geological formation or structure that prevents, or significantly limits, the recovery or release of the gas or oil to ground level.

DSDIP Information Request *Information required for assessment against SEA criteria – Schedule 2, Part 5 of the Regional Planning Interests Regulation 2014 (RPI Regulation)*	Santos Response	
	such as the use of each of the following—	The reason why this definition of unconventional gas or oil does not apply is because the primary reservoir target is the Toolachee Formation which is made of conventional gas accumulations and is not a geological formation that prevents or significantly limits the recovery or release of gas or oil to ground level. Primary reservoir target is the conventional sandstones within the Toolachee Formation. The target is reservoired in Permian-age porous sandstones, trapped in discrete accumulations (anticlinal closures) by buoyancy which aligns to Item 3 of the RPI Regulation's definition of conventional gas or oil. The RPI Regulations also states that where a natural underground reservoir is largely consisting of sandstone capped by impermeable rock and has reduced porosity and permeability, hydraulic fracturing in certain circumstances can be required for conventional gas operations. trapped in anticlinal closures) by buoyancy. Leghorn Dev C scope of work has one stage of fracturing planned. Santos has provided the Leghorn 1 Well Summary in **Appendix A**, the Leghorn 1 and Leghorn 2 cross section in **Appendix B**, and **Appendix C** presents a Leghorn / Toolachee Formation Depth Map to aid in the definition of conventional gas or oil operations being proposed as part of this application. Please refer to Santos' response to Issue 2 for the data on nearby drills that demonstrate expected results for the Leghorn Dev C scope. Further explanation as to why the proposed single well site disturbance area and borrow pit (given the size and depth) do not fall under the category of 'unconventional gas or oil' development and other aspects under Item 3 (b) (i)-(ii) is not required as the proposed works are part of a petroleum resource activity involving conventional gas or oil only.
	(i) extensive hydraulic fracturing;	
	(ii) more than 2ML of ground or surface water for each petroleum well used for the recovery or release of the gas or oil;	
	(iii) infrastructure which has a high or widespread impact on the environment.	
	Examples of infrastructure that may have a high or widespread impact on the environment— • single well sites that disturb an area greater than 1ha or multiple well sites that disturb an area greater than 1.5ha • extensive borrow pits greater than 0.2ha and deeper than 2m. • a petroleum facility	

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	Given the minor nature of the proposed activities and the mitigation measures described throughout the RPI24/007 Assessment Report and Santos's response to each issue in the Requirement Notice, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country Strategic Environmental Area (SEA).

Issue 2:

Further to Issue 1 above, the application states, 'As described in Table 1 and illustrated in Figure 1, the proposed Leghorn Dev C development is comprised of one new conventional gas well and associated infrastructure.' However, the application does not provide sufficient information to demonstrate how the proposed development meets the definition of "conventional gas", as provided in Schedule 2, Part 5, Item 3 of the RPI Regulation. Specifically, the definition requires that the gas be contained in, or extracted from, specific types of natural underground reservoirs with distinct characteristics. On the information provided, it is unclear if the proposed development aligns with these criteria.

Action:

Provide a detailed explanation of how the proposed gas well meets the definition of conventional gas or oil (as outlined in Schedule 2, Part 5, Item 3 the of the RPI Regulation) by providing information about the type of underground reservoir, its characteristics (e.g., porosity, permeability, and geological structure), and confirmation of the extraction method (i.e., no fracking will be required). Additionally, include any relevant geological data or studies that support the classification of the well as conventional.

RPI REGULATION

The scope of work within Leghorn Area clearly meets the criteria of Schedule 2, Part 5, Item 3(a)(i) as the gas is contained within a natural underground reservoir largely consisting of porous sandstone, capped by impermeable rock and trapped in discrete accumulations by buoyancy, allowing for its recovery to ground level from a petroleum well. In accordance with Schedule 2, Part 5, Item 3(a)(i) and Item 3(b) of the RPI Regulation, Leghorn is defined as 'conventional gas or oil' as (emphasis added in **bold**):

> *conventional **gas** or **oil**—*
>
> *(a) means a **gas** or **oil contained in**, or extracted from—*
>
> *(i) **a natural underground reservoir** largely consisting of **porous sandstone** capped by impermeable rock in which the gas or oil is trapped **in discrete accumulations by buoyancy allowing release or recovery of the gas or oil to ground level** from a petroleum well and, for a gas, often without the need for pumping; **or***
>
> *…*
>
> ***(b) does not include unconventional gas or oil.***

As mentioned in Santos' response to Issue 1, in the absence of explicit use of "and" or "or" in the definition of 'unconventional gas or oil', all three criteria under Schedule 2, Part 5, Item 3(b) (i), **and** (ii), **and** (iii) of the RPI Regulation must be met for oil or gas to be classified as "unconventional."

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	Furthermore, the definition of **conventional** gas or oil as per Item 3(a)(ii)(B) in the RPI Regulations states hydraulic fracturing may be required for the release or recovery of the gas or oil to ground level when the geological formation largely consists of sandstone capped by impermeable rock and has reduced porosity and permeability: ***conventional*** *gas or oil—* *…* *(B) has reduced porosity and permeability and* ***may require hydraulic fracturing*** *in certain circumstances to allow the release or recovery of the gas or oil to ground level;.* The RPI Regulation explicitly contemplates the recovery of conventional gas or oil from geological formations may require hydraulic fracturing in certain conventional gas or oil circumstances. Due to the expected lower porosity nature of the target reservoir based on nearby exploration well results, the application of a single stage of hydraulic fracturing may be required to support gas production as part of the Leghorn Dev C well development. This is consistent with the approach taken for field development nearby. In response Issue 1 and Issue 2, the information provided for the proposed Leghorn Dev C development aligns with the definition of 'conventional gas or oil' as outlined in the RPI Regulation. Given the minor nature of the proposed activities and the mitigation measures described throughout the RPI24/007 Assessment Report and Santos's response to each issue in the Requirement Notice, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA. **LEGHORN AREA** For the Leghorn Dev C proposed activities, the primary reservoir target is the conventional sandstones within the Toolachee Formation. Santos operations in the Leghorn Area are defined as conventional operations because the gas is reservoired in Permian-aged porous sandstones, trapped in discrete accumulations (anticlinal closures) by buoyancy which aligns to Section 3 of the RPI Regulation's definition of conventional gas or oil. The RPI Regulation also states that where a natural underground reservoir is largely consisting of sandstone capped by impermeable rock and has reduced porosity and permeability, hydraulic fracturing in certain circumstances can be required for conventional gas operations. Santos is exploring for and developing conventional gas in the Leghorn area (where the RPI24/007 application's scope of works is proposed to occur) (**Leghorn Area**). Results from testing sites within the Leghorn Area (specifically the millidarcies and porosity of nearby Leghorn 1 and Leghorn 2 drills).

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	As mentioned above, the Santos operations in the Leghorn Area are defined as conventional operations because the gas is reservoired in Permian-aged porous sandstones, trapped in discrete accumulations (anticlinal closures) by buoyancy. Primary reservoir target is the conventional sandstones within the Toolachee Formation Permeabilities within the Leghorn Area are expected in the range of 1 to 1000s of millidarcies, with maximum mobility of 1323md/cP measured at Leghorn 1. Average porosity within the Toolachee Formation reservoir in Leghorn 1 was 13.3%, with an average permeability of 539 millidarcy (**Appendix A** demonstrates the well evaluation summary for the nearby Leghorn 1 drill). Leghorn 2 appraisal drill encountered poorer reservoir quality with an average porosity of 7.8% during its exploration scope, permeability of 1 millidarcy and measured mobilities up to 1.89md/cP. Fracture stimulation was required for sufficient hydrocarbon flow in Leghorn 2 and one fracture stimulation stage was executed. In addition to **Appendix A** (the Leghorn 1 Well Summary), **Appendix B** presents the Leghorn 1 and Leghorn 2 cross section, while **Appendix C** provides a Leghorn / Toolachee Formation Depth Map.
Issue 3: The application states, 'The proposed Leghorn Dev C development does not include any of the unacceptable uses prescribed by Schedule 2, Part 5, Item 15(2) of the RPI Reg.' However, the supporting information does not provide an explanation (or evidence) as to how the conclusion has been reached. Notably, the Channel Country Strategic Environmental Area is fully overlaid by areas with Designated Precinct status. The prescribed solutions in the RPI Regulation identify certain activities as 'unacceptable uses' which are not permitted in the Designated Precinct. A 'Water storage (dam)' is listed as an unacceptable use - and is also a 'regulated activity,' as defined in Part 4, s11 (3) of the RPI Regulation. A water storage (dam) is prohibited unless the water is used solely for specific purposes, such as meeting domestic water needs or watering livestock. Further to the above, the application states the proposed borrow pit will cover a total area of 0.8 hectares, with a quarried pit of 6000 square metres (m2) and a maximum depth of 3 metres. The application material maintains the disturbance area is necessary for project facilitation, including the work area, seedstock pile, excavation machinery turning points, and the pit itself. However, the justification for such a large borrow pit is unclear. Moreover, there is concern the borrow pit could be used for water storage.	
Action: a) Please provide a clear and detailed justification for the size of the proposed borrow pit and why such a large area is necessary for the development. Also clarify whether the borrow pit could be used for water storage. If the borrow pit	a) The proposed borrow pit size is the typical size used for the proposed activities and throughout Santos conventional oil and gas operations in the Cooper Basin. It is the same size as works proposed previously and subsequently approved by DSDIP such as the Santos RPI20/023 Leghorn 1 Jarra 7 & 8 and Wallis 1 RIDA application. This size allows for access to an adequate volume of appropriate material to use during construction instead of increasing the surface disturbance or building multiple smaller pits throughout the construction disturbance zone. This size also

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<tr><td>will not be used for water storage, please confirm this in your response.
b) Provide a detailed explanation of how the proposed development complies with the requirements of Schedule 2, Part 5, Item 15(2) of the RPI Regulation. This should include an assessment of the proposed uses in relation to the prescribed unacceptable uses and any relevant supporting documentation.</td><td>allows for the site to be set out in a safe manner with batters that are ramped to ensure safe egress can be achieved by people and fauna.

Santos does not use borrow pits for water storage.

Given the temporary and minor nature of the proposed activities and the measures described throughout this response and other Issues raised below, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.

b) A comparison of the RPI24/007 proposed scope of works in relation to the prescribed unacceptable uses defined in Part 5 Item 15(2) of the RPI Regulations is presented in the below table:

<table>
<tr><td>(2) The following are unacceptable uses for a designated precinct in a strategic environmental area—</td><td>Not relevant to this application.
Santos is not proposing development that is an unacceptable use.</td></tr>
<tr><td>(a) if the designated precinct is in the Cape York strategic environmental area—a mining resource activity;</td><td>Not relevant to this application.
The proposed activities within this application are not located in the designated precinct of the Cape York strategic environmental area.</td></tr>
<tr><td>(b) if the designated precinct is in the North Queensland strategic environmental area—a resource activity;</td><td>Not relevant to this application.
The proposed activities within this application are not located in the designated precinct of the North Queensland strategic environmental area.</td></tr>
<tr><td>(c) if the designated precinct is in the Channel Country strategic environmental area—a petroleum resource activity;</td><td>Not relevant to this application.
Refer to Santos response for subsection (2A)(c)(i)) as to why subsection (2)(c) does not apply in relation to this RIDA application.
Santos lodged a petroleum lease (PL) application under the Petroleum and Gas (Production and Safety) Act 2004 (P&G Act) for PL 1055 on 31 October 2018 to replace 22 blocks of ATP 1189. The proposed scope of works within this application is to support ongoing petroleum production from the PL 1055 lease.</td></tr>
<tr><td>(d) open cut mining, other than open cut mining for a critical mineral in a critical minerals reach in the Channel</td><td>Not relevant to this application.
Santos is not proposing an open cut mine in this application.</td></tr>
</table>
</td></tr>
</table>

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	Country strategic environmental area;	
	(e) broadacre cropping;	Not relevant to this application. Santos is not proposing broadacre cropping activities in this application.
	(f) water storage (dam).	Not relevant to this application. Santos is not proposing a water storage (dam) in this application. Borrow pits are not used for water storage. Santos notes Part 4, subsection 11(3) of the RPI Regulation defines 'Water storage (dam)' as follows: (3) *Water storage (dam) is storing water using a dam, other than storing water on land to be used only for any or all of the following purposes—* *(a) to meet the domestic water needs of the occupants of the land;* *(b) to water the stock that is usually grazed on the land;* *(c) to water stock that is travelling on a stock route on or near the land.* The borrow pits have berms designed to exclude runoff from the surrounding catchment, and there is no pumping of water into the pits for storage. The purpose of the borrow pits is to supply construction material (gravel for example) for use in construction of well pads, berms, roads, etc. and are not used for water storage. Borrow pits are constructed outside of watercourses (please refer to the spatial data provided during the submission for the RPI24/007 application). In addition, the exclusion of overland flow is critical to the operation of borrow pits because water in the pit will limit the ability to safely extract construction material in the event of rain. Given the minor nature of the proposed borrow pit and the mitigation measures described throughout the RPI24/007 Assessment Report and Santos's response to each issue in the Requirement Notice, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.

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	(2A) However, subsection (2)(c) does not apply in relation to an application to the extent the application relates to—	Relevant to this application. Refer to Santos' response to Subsection (2A)(c)(i).
	(a) a petroleum resource activity to be carried out under an authority to prospect, or a petroleum lease, that—	Not relevant to this application. Refer to Santos' response to Subsection (2A)(c)(i).
	(i) was in effect immediately before 22 December 2023; and	
	(ii) has not been amended, renewed or transferred on or after 22 December 2023; or	
	(b) a petroleum resource activity involving conventional gas or oil only to be carried out under a petroleum lease that—	Not relevant to this application. Refer to Santos' response to Subsection (2A)(c)(i).
	(i) was in effect immediately before 22 December 2023; and	
	(ii) has been amended, renewed or transferred on or after 22 December 2023; or	
	(c) a petroleum resource activity involving conventional gas or oil only to be carried out under a petroleum lease granted on or after 22 December 2023 for—	Relevant to this application. Refer to Santos' response to Subsection (2A)(c)(i).
	(i) an application made under the *Petroleum and Gas (Production and Safety) Act 2004* before 22 December 2023; or	Relevant to this application. Santos lodged a PL application under the P&G Act for PL 1055 on 31 October 2018 to replace 22 blocks of ATP 1189. The proposed scope of works within this application is to support ongoing petroleum production from the PL 1055 lease.

DSDIP Information Request *Information required for assessment against SEA criteria – Schedule 2, Part 5 of the Regional Planning Interests Regulation 2014 (RPI Regulation)*	Santos Response

(ii)	an application made under the *Petroleum and Gas (Production and Safety) Act 2004*, section 117 between 22 December 2023 and 30 August 2024, both dates inclusive; or	Not relevant to this application. Refer to Santos' response to Subsection (2A)(c)(i).
(iii)	a grant application for a replacement tenure mentioned in the *Petroleum and Gas (Production and Safety) Act 2004*, section 908(2).	Not relevant to this application. Refer to Santos' response to Subsection (2A)(c)(i).

Issue 4:

Figure 3 within the assessment report acknowledges "marsh/wetland -production" as a predominant land use within PL 1055. However, the text of the assessment report does not mention this marsh/wetland area. The report states:

The proposed Leghorn Dev C development is located on Durham Downs (1SP133822). Durham Downs is an 8,910 square kilometre (km2) cattle station with a carrying capacity of 21,000 cattle (S. Kidman, 2024). The primary land uses within and surrounding the proposed Leghorn Dev C development on Durham Downs are cattle grazing and petroleum activities (refer to Figure 3) (ABARES, 2016).

The marsh/wetland area is not acknowledged in this description.

Action:	
Please revise the assessment report to include a clear acknowledgment of the "marsh/wetland - production" land use, as shown in Figure 3. The report should accurately reflect all predominant land uses within and surrounding the proposed development area, including the marsh/wetland areas, and explain how these land uses may interact with the proposed development.	Santos has updated Section 3.2 of the RPI24/007 Assessment Report (please refer to Attachment 2 of Santos' response package) to acknowledge the smaller portion in the south-west corner of the proposed development interacting with the 'marsh/wetland - production' mapped area. As per the Australian Land Use and Management Classification Version 8 (2016), the "Marsh/wetland – production" water feature falls under Class 2, which includes land subject to relatively low levels of intervention. While the land may be grazed, the natural vegetation structure generally remains intact, though some floristic changes may occur. This aligns with the broader context of land use surrounding the proposed development. Santos further acknowledges that wetlands, being areas of permanent or periodic inundation, have important environmental and hydrological roles. However, Santos analysis indicates that the activities related to the proposed

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	development are not expected to cause a widespread or irreversible impact to the environmental attributes within the Channel Country SEA. The development's footprint has been minimised to the greatest extent possible by co-locating infrastructure to existing disturbance completed under ATP 1189, ensuring minimal interaction with sensitive areas, including the marsh/wetland zones. Section 5 of the RPI24-007 Assessment Report specifies the potential impacts to environmental attributes and details mitigation measures. Given the minor nature of the proposed activities and the measures described, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
Issue 5: The assessment report states that following the drilling of the well is expected to take up to 11 days, during which time the drilling fluids removed from the bore will be stored within an adjacent drilling sump. Following completion of these works, the backfilling of the sump is expected to be completed up to 6 months later. There is concern that during this time, this may result in stormwater, either directly falling into the sump or via surface flows of water coming into contact with the drilling fluids and becoming contaminated. Given the sensitive nature of the surrounding environment, this contaminated water may not be suitable for release and may require treatment or collection and disposal to an appropriate facility. Given the remote nature of the location there is concern about how this will be monitored and managed. The assessment report states: *Well stimulation techniques including hydraulic fracturing may be used to increase the recovery of resources (in this case, gas) by increasing the permeability of the reservoir. Hydraulic fracturing involves pumping a fluid under pressure into the reservoir to open and connect fractures within the reservoir rock, thereby increasing the opportunity for the resource to move within the reservoir rock and flow toward the well. After the fracture process is completed, fluids that return to surface when the pressure is released are captured for reuse, recycling or transported to a licenced water management facility.* There is concern that the returned material may include additional contaminants obtained through the stimulation process (i.e. dissolved salts and minerals) that may pose a risk to the water quality of any receiving waters.	
Action: a) Provide further information on the decision criteria for the external removal or in-situ disposal of waste drill fluids via the mix-bury-cover method. This must include any certification obtained by a suitably qualified third party of the material being of acceptable quality for	a) In-situ burial is the typical practice Santos conducts for residual drilling material (RDM) in the Cooper Basin. The petroleum leases' relevant EAs in Southwest Queensland (SWQ) (including tenures within the SEA) have been issued by the administering authority (the Department of Environment, Tourism, Science and Innovation (DETSI)) under the *Environmental Protection Act 1994* (EP Act) and has authorised Santos to implement a specific SWQ RDM burial methodology. This method has been certified by a third-party as appropriate management of RDM, and this approval condition allows for a consistent disposal to land methodology to be apply in SWQ.

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disposal to land and that the proposed method will not result in environmental harm;	A suitability qualified third party has provided certification that the methodology for disposal to land meets the relevant environmental authority conditions. This certification was aided by Santos engaging a third-party consultant to investigate the RDM chemicals used throughout its operations in SWQ. The *Cooper Basin Residual Drilling Material Burial Assessment* (EHS Support Pty Ltd, 2020) is the basis to meet the Environmental Authority (EA) Conditions to burial methodology certification (**Appendix D**). This assessment conducted by a third-party consultancy provides a summary of the quality of RDM found from Santos operations, risks associated, and the relevant controls required to mitigate each risk. One of the main findings of the risk assessment is that the concentration of constituents in Cooper Basin RDM are typically below National Environment Protection Measure (NEPM) Health Screening Levels (HSLs) and Health Investigation Levels (HILs) for soils. The assessment also considered the risks and impacts associated with other management methods and found that, subject to a number of conditions, the use of the managed burial approach was the most appropriate method for RDM management in the Cooper Basin. The RDM burial methodology consists of the following steps: • Drill fluids remain in-situ for a short period of time whilst operations are occurring (duration of drilling and well completion activities). Prior to backfilling, the waste drill fluids / sump liquids are removed to a suitable location (e.g. nearby active sump or dedicated pond for processing or licensed facility). • Once all drill fluids have been removed, RDM will be buried as aligned to the certified disposal method. Breakdown of the burial steps are as follows: 1. Take photo of sump and stockpile area prior to backfill. 2. Prior to backfilling, sump liquids are to be removed to a suitable location (e.g. nearby active sump or dedicated flowback pond). 3. (*Hold Point prior to proceeding to next burial steps*) RDM within sump must be 1.5 metres or greater below natural ground level. The backfill operator is to provide written evidence that this (freeboard) has occurred. 4. Use bulldozer to push stockpiled soil material into sump. 5. Track roll backfilled sump using bulldozer. 6. Finished ground level on sump footprint to be 300 mm (millimetre) higher than surrounding lease level to allow slumping. 7. Stockpile area to be contoured to pre-existing natural ground conditions/levels. 8. Take photo(s) of backfill area and stockpile area to verify completion. 9. All records of this Method are to be retained for five years.

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	The RDM burial method involves the rehabilitation of sumps to a depth that considers the chance of slumping and aids in the returning it to ground level, with use of native soils as cover to encourage natural rehabilitation. This methodology and the overall results of RDM in the Cooper Basin being low risk, demonstrates that the activity will not result in a widespread or irreversible impact on an environmental attribute of a SEA as per the required outcome defined in Schedule 2 Part 5 Item 14 of the RPI Regulations. An overarching concept of RDM management Santos enforces is that disposal of residual drilling material must not result in a direct or indirect release of contaminants to any waters. Santos has an incident management system (IMS) in place (including event response, reporting, and investigation processes) in the unlikely event that an incident does occur.
b) Provide further information as to why backfilling of the drilling sump is expected to take up to 6 months;	b) As mentioned in the above response to Issue 5 (a), Santos implements an SWQ wide burial methodology which was informed by a risk-assessment conducted by an independent consultancy and certified by an appropriately qualified third party. Undertaking burial within approximately 6-months ensures that the material in the sump is dry and of a firm consistency to enable burial and assist with ensuring civil works are able to be completed without deformation of the material in the sump. Surface excavations, such as the drilling fluids sump, have the potential to result in diversion or interception of a negligible amount of overland flow. Both are relatively small compared to the surrounding catchment, and the drilling fluids sump would be designed to exclude overland flow. All workover operations (i.e. drilling fluid sumps) will be temporary in nature and scheduled to be completed outside of wet weather events (i.e. infrastructure removed prior to Cooper Creek flood events), therefore diversion or interception of overland flow is not expected. Given the temporary and minor nature of the proposed RDM activities and the measures described, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
c) Provide further information as to how stormwater will be managed to prevent contact with the drill material and the release of any contaminated waters, this includes contaminated stormwaters captured in the drilling sump seeping into the underlying soil and groundwaters;	c) As mentioned in response to Issue 5 point (a), an overarching concept that Santos enforces is that there is no direct or indirect release of RDM contaminants to any waters (which is further actioned via condition sets historically authorised for EAs located in the SWQ (including EAs within the SEA)). Santos has an incident management system (IMS) in place (including event response, reporting, and investigation processes) should an incident occur. <u>Stormwater management:</u>

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	In the first instance, Santos practices avoidance measures to stop stormwaters being captured in a drilling sump. Santos has internal processes in place that ensure drill sumps are designed and constructed in a way that prevents overland flow entering the sump (i.e. contoured / earth bunded to prevent surface water entry). Notably, managing commensurate site-specific risk of erosion and sediment release is allowed via EA condition sets issued under Chapter 5 of the EP Act by the administering authority (DETSI), is already applied throughout the SEA for existing PL activities and is a key aspect into applying appropriate avoidance and mitigation techniques for project development. By Santos ensuring its operations are planned, designed, operated and are maintained to meet its EA condition sets, impacts on the environment are minimised to the greatest extent possible. As per current SWQ operations, Santos will implement this site-specific approach, and it will be captured in something referred to as a Site Environmental Plan (SEP). This SEP captures all development activities which includes controls around the management of stormwater and Erosion and Sediment Control (ESC) measures implemented during the different phases of the project. Measures within the SEP that are used to mitigate project risk of erosion and sediment release to waters include upholding the following aspects: • Allow for stormwater to be diverted around or pass through the site in a controlled manner; • Minimise soil erosion resulting from wind, rain, and flowing water; • Minimise the duration that disturbed soils are exposed to the erosive forces of wind, rain, and flowing water; • Minimise work-related soil erosion and sediment runoff; and • Minimise negative impacts to land or properties adjacent to the activities (including roads). At minimum, ESC measures are put in place for all disturbed areas and must be adequate to prevent erosion and the subsequent release of sediment from the construction area. Examples include (but not limited to): • Batters / bund are built around the sump to ensure water is diverted from entering. • Weather forecast and pending wet weather are taken into consideration prior to undertaking any civil works, particularly in relation to topsoil stripping and works within a drainage feature or watercourse. As a minimum, ESC must be in place when there is a 70% chance of greater than 10 mm of rainfall. • Prior to disturbance being stabilised and as part of the SEP during the construction / initial disturbance phase of projects, Santos conducts regular inspections of the integrity and suitability of controls. <u>Seepage Monitoring:</u> As mentioned in response to Issue 5 (a), the constituents in Cooper Basin RDM are low risk.

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	PL relevant EAs in SWQ (including ones issued capturing tenures within the SEA) have been issued by the administering authority (DETSI) under Chapter 5 of the EP Act 1994 authorisation for Santos to construct and operate sumps. The EAs prohibit the release of contaminants to land and groundwaters unless specifically authorised. The use of sumps is managed by Santos as a short-term use, with the free fluids in the sump readily removed following drilling and prior to any flooding events. This reduces any head pressure on material within the sump, and in accordance with the approved methodology permits the RDM to be buried on site. Due to the limited time of use of the sump, limited amount of fluid contained within it, and lack of any continual source of fluid entering the sump following drilling, there is a very low risk of seepage from the sump that would affect any environmental values. Given the temporary and minor nature of the proposed RDM activities and the measures described, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
d) Given the remote nature of the sites, provide further information as to how the sites will be managed and monitored during the period of time, prior to works being completed to backfill the sumps to ensure no release of contaminated materials occur;	d) As per Chapter 7, Part 1, Division 2 of the EP Act, Santos cannot release unauthorised volumes of prescribed contaminants to water or land. As mentioned in response to Issue 5 (a), Santos removes fluids in sumps once drilling and well completion activities have finished. It then typically takes 6 months to dry out prior to backfilling. Whilst the sumps are drying and backfilling has yet to occur, the monitoring that occurs on these sites will be defined in the SEP for this project. Though rainfall is expected to be low, and design prevents interactions in the first instance with water entering sumps as mentioned in response to Issue 5 (c), the SEP will outline the site-specific monitoring requirements that must be undertaken at a frequency that is appropriate to site and weather conditions, including wet weather preparedness actions for sumps that are drying out. In addition, workover operations will be scheduled to be completed outside of the wet weather events. Therefore, all surface infrastructure, including a drill sump, will be restored prior to Cooper Creek flood events. Furthermore, Santos has an incident management system in place should an incident such as release of contaminated materials occur. This system acknowledges the requirement to notify an administering authority through the Pollution Hotline and in writing, as soon as possible, but within 48 hours of becoming aware of any such event occurring. Given the temporary and minor nature of the proposed RDM activities and the measures described, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
e) Provide further information as to how the fluids used during stimulation will be managed. This	e) Santos enforces the requirement that stimulation fluids must not include restricted stimulation fluids as prescribed by the EP Act.

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includes how returned stimulation fluids returned to the surface are stored prior to collection and removal from the site.	Santos has an approved Stimulation Impact Monitoring Program (SIMP) in place for its SWQ operations in accordance with the requirements of the Environmental Authority issued under the EP Act. To align with this, monitoring of stimulation fluids during the stimulation activity is to be performed at sufficient frequency and which represents the quality and quantity of source water, stimulation fluid and flowback. Representative flowback sampling is to be undertaken on a case-by-case basis and is to be completed when flowback or produced water is recovered at surface. Flowback fluid would be contained in lined pits or tanks and removed from site for authorised reuse or disposal at the completion of hydraulic fracturing operations. This is either in onsite storages (and then transported to a fluid handling facility) or transported through the gathering system to a centralised facility for treatment and disposal. Given the temporary and minor nature of the proposed RDM activities and the measures described above, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
Issue 6: The assessment report states that, 'A Right-of-Way (RoW) width of approximately 15 m is required for installation of the proposed buried gas flowline'. It is noted that the soil types in this area are extremely prone to erosion. There is concern that the construction of this ROW will provide a preferential pathway for the surface flows of water as they offer a flow path of less resistance. Additionally, given the relatively low rate of rainfall in these areas, any disturbance will likely require significantly longer periods for revegetation to become established and required more direct intervention by the applicant (i.e., to ensure that areas will be likely to survive long enough to allow the department to consider that sufficient rehabilitation has occurred to allow the environmental authority to be surrendered). There are concerns regarding the potential impact of these activities as they relate to: • potential for erosion; • deposition of sediment; • subsequent impacts on the hydrological characteristics of the area; and • impacts on the function of riparian processes associated with the adjacent watercourses, lakes, floodplains and wetlands present in the area.	
Action: a) Confirm the total length of the proposed pipeline;	a) The proposed development requires 1.46 km (kilometre) of 100 mm diameter (DN 100) steel pipe to connect the well to existing gas gathering infrastructure.

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b) Provide further information regarding how erosion and sediment will be managed within these areas during construction as well as during the life of the project;	b) As mentioned in response to Issue 5 (c) the monitoring and management of erosion and sediment during the life of the project are managed through the implementation of the SEP. Management of each phase of the proposed buried pipelines is mentioned in Section 2.1.2 of the RPI24/007 Assessment Report. Commensurate site-specific standard considerations made for implementing relevant ESCs are again the following aspects: • Allow stormwater to be diverted around or pass through the site in a controlled manner. • Minimise soil erosion resulting from wind, rain, and flowing water. • Minimise the duration that disturbed soils are exposed to the erosive forces of wind, rain, and flowing water. • Minimise work-related soil erosion and sediment runoff. • Minimise negative impacts to land or properties adjacent to the activities (including roads). Examples of controls include during flowlines (but not limited to): • Appropriate turnout drains on roadways constructed as needed. • Stockpiles are located at least 10m away from the high bank of a watercourse with appropriate sediment controls (e.g. bunds). • Access tracks drainage pathways will be constructed at grade to ensure no interruption of flows. • As mentioned in the response to Issue 5 (c), the weather forecast and any pending wet weather will be taken into consideration prior to undertaking any civil works (and other project phases beyond), particularly in relation to topsoil stripping. • Prior to disturbance being stabilised and as part of the SEP during the construction / initial disturbance phase of projects, Santos conducts regular inspections of the integrity and suitability of controls. The areas where Santos has previously operated, steep terrain is relatively uncommon, and as a result, sediment flow caused by direct rainfall is not typically a concern during routine maintenance inspections of activities post the construction phase. Given the temporary and minor nature of the proposed construction phases of flowlines and the mitigation measures described, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
c) Provide further information on the installation of the flow lines. Further information should address the construction methods employed to	c) As mentioned in Section 2.1.2.1 of the RPI24/007 Assessment Report, the proposed RoW required for the flowline comprises of the topsoil bank either side of the RoW, access for pipe truck and side boom tractor/excavator as well as the flowline trench and a trench spoil bank. Further mentioned in this section, once the flowline is laid within the trench, it is backfilled and compacted. Appendix B of the RPI24/007 Assessment Report also provided a visual cross-section of the works proposed to be conducted during flowlines construction.

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prevent significant disturbance to the soil profile and soil structures;	As mentioned in Section 2.1.2.1.1 of the RPI 24/007 Assessment Report, the installation of flowlines will be undertaken in such a way as to prevent significant disturbance to the current soil profile and site topography. This is demonstrated in past SEP's implemented prior to construction activities which capture the following actions that aid in managing soil profiles that the activities will interact with: • Where at all possible, Santos will leave ground undisturbed to minimise rehabilitation required. • Stripping the topsoil profile and storing separately for later use in rehabilitation. • Once pipe has been placed, soil reinstated as soon as practicable. • Stripped soil remains at least 10 m from watercourses. Given the temporary and minor nature of the proposed construction phases of flowlines and the measures described above, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
d) Provide further information on the rehabilitation of the proposed flow lines and right of ways. Further information should address how the original topography is re-established and maintenance of the 15m wide right of way;	d) As mentioned in Section 2.1.2.3 of the RPI24/007 Assessment Report, rehabilitation of disturbed areas take place progressively, as works are staged. The RoW will then be reinstated to the condition and profiles existing at the commencement of activities. All wheel and equipment ruts along the flowline route will be filled in and levelled by grading. Topsoil and seed stock removed during installation will be re-spread over the RoW and windrows removed. Where seed stock has not been displaced during installation, the area will be lightly scarified to promote regrowth. Section 2.1.2.2 noted only a maximum three (3) metre wide corridor within the rehabilitated RoW will be used for the inspections and maintenance via light vehicles. No formed roads will be required along the RoW. Section 2.1.2.1 of the RPI24/007 Assessment Report states a temporary RoW width of approximately 15 m is required for installation of the proposed buried gas flowline. This area comprises the topsoil bank on either side of the RoW, access for pipe truck and side boom tractor/excavator, the flowline trench, and a trench spoil bank (refer Appendix B within the RPI24/007 Assessment Report for a typical layout). Further mentioned in Section 2.1.2.1.1 of the Report, Santos will ensure the original topography of the site will be re-established following the installation of the proposed flow lines and RoW by capturing sufficient evidence of site condition at initial scope assessment prior to construction. Photographic evidence of the original topography will be collected and retained as evidence for re-establishment. Trenches are backfilled after pipe laying and rehabilitated no longer than three months after completion which aligns with the condition sets issued under the EP Act. After completion of the RoW, reinstatement with the original stored topsoil and seed stock will proceed. An operational pipeline RoW must then align with the following conditions typically implemented via the EP Act:

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	• Be a stable landform, exhibiting no subsidence or erosion gullies for the life of the operational pipeline (whereby inspections will occur); and • Be re-profiled to a level consistent with surrounding soils; and • Be re-profiled to original contours and established drainage lines; and • Plant pest species are not present or are consistent with the surrounding areas. Given the temporary and minor nature of the proposed construction phases of flowlines such as the RoW reducing to 3m upon completion of the construction phases, with the measures described above the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
e) Provide the proposed timeframe for rehabilitation to be completed following the installation of the flow lines;	e) As mentioned in the above Issue 6 (d), rehabilitation works are staged progressively, and this aligns with condition sets issued under the EP Act for typical Santos' EA for this resource activity. Specifically, the timeframe for rehabilitation of the construction RoW to be completed following the installation of the flowlines is as soon as practicable but not longer than three (3) months after completion. Section 2.1.2.1.1 of the RPI24/007 Assessment Report details how the trenched soils of the flowline will be reinstated after construction efforts have finished. Rehabilitation of disturbed areas that are no longer required for on-going petroleum activities (e.g. Santos decommissions the flowline) will commence within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met). Given the temporary and minor nature of the proposed activities and the measures described above, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
f) Provide further information as to how revegetation of these areas will be undertaken to ensure a successful and timely rehabilitation outcome.	f) As mentioned throughout Section 2 of RP24/007 Assessment Report and detailed throughout Santos' response to Issue 6, rehabilitation of the construction RoW is undertaken as soon as practicable or within 3-months of installation being completed, with a 3m wide operational corridor remaining. Topsoil is a valuable resource in rehabilitation as it contains the seeds of plant species indigenous to the local environment (as well as nutrients and organic matter). The topsoil is stored separately during initial phases of the proposed activities. This allows the rehabilitation efforts to encourage natural revegetation of the disturbed areas after the construction phases finishes and Section 2.1.2.1.1 states the RoW will be reinstated to the condition and profiles existing at the commencement of activities which continues to aid in successful and timely rehabilitation of the disturbance. Given the temporary and minor nature of the proposed construction phases of flowlines such as the RoW reducing to 3m upon completion of the construction phases, with the measures described above the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.

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Issue 7: The assessment report states: *Approximately 945 metres (m) of new access track would be constructed to provide access to the wells lease and borrow pit.* *The proposed access track will be up to 13 m in width to accommodate a trafficable roadway and table drains either side of the roadway, spaced out as per Santos Class D Road classification spacing recommendations* *Access track width may increase above 8 m when cutting into areas of elevated topography* *The proposed access track will be designed to convey natural surface water flows consistent with the existing hydrology and will not be accessed during prolonged wet weather.* It is unclear how the proposed access track will be designed to convey natural surface water flows consistent with the existing hydrology. The construction of access tracks has the potential to directly and indirectly affect the function of wildlife corridors of the area by causing changes that will impact the natural habitat present in the watercourse. It is unclear at this time if there are also springs present in the area; however, given that the area is mapped as including potential groundwater dependant ecosystems, it is a possibility. Finally, the activity has the potential to impact the natural water quality of the watercourse channels and aquifers and on flood plains in the area. The risk of intensifying the erosion rate and sediment deposition is further exacerbated by the extremely fragile and sensitive nature of the area	
Action: a) Provide spatial data provided also includes the proposed additional 945 m of tracks;	a) Spatial data package has been updated to include the access tracks indicated in the RPI24/007 Assessment Report (please refer to Attachment 3 of the response package).
b) Provide further information as to why it is necessary to construct these tracks 13 m wide (or wider);	b) Santos will construct roads to accommodate the vehicles and equipment required to be used for the works. The roads are constructed to a 6 m or 8 m wide running surface, requiring additional 1-2 m either side of the running surface for table drains / topsoil / seed stock / vegetation stockpile. Flood ways / creek crossings will be free of any such features / bunds and constructed at bed level. Santos provided a typical road cross section in **Appendix C** of the RPI24/007 Assessment Report that provides a visual of the proposed tracks. 13 m is conservative to ensure we remain compliant within conditions of the RIDA. This will cover activities such as rehabilitation of the road where Santos may need to go beyond the original constructed width to pull back in windrows / topsoil over the road. Given the temporary and minor nature of the proposed activities and the measures described above, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.

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c) Provide further information regarding how erosion and sediment control will be managed within these areas during construction as well as during the life of the project;	c) There are a number of land types situated in Santos' working tenements in SWQ. Each land type requires to be approached differently depending on the type of works, machinery required and EA conditions. Similar to Santos' responses regarding Issue 6, the SEP considers these factors and implements internal instructions for the life of the project which are tailored to the unique landforms it operates on. ESC measures put in place are commensurate site-specific risk of erosion, and risk of sediment release to waters via the SEP. Examples of controls included (but are not limited to) the following: • Appropriate turnout drains on roadways constructed as needed. • Stockpiles are located at least 10m away from the high bank of a watercourse with appropriate sediment controls (e.g. bunds). • Access tracks drainage pathways will be constructed at grade to ensure no interruption of flows. • Blade work will be kept to a minimum, so the soil profiles remain undisturbed • As mentioned in the response to Issue 5 (c), the weather forecast and any pending wet weather will be taken into consideration prior to undertaking any civil works (and other project phases beyond), particularly in relation to topsoil stripping. • Reticulate dunes are to be crossed perpendicular to minimise disturbance, although they are all fairly deflated in this area • Prior to disturbance being stabilised and as part of the SEP during the construction / initial disturbance phase of projects, Santos conducts regular inspections of the integrity and suitability of controls. • Proposed access tracks will be designed to convey natural surface water flows consistent with the existing hydrology and will not be accessed during prolonged wet weather. As mentioned in Section 2.1.3.1.1 of the RPI24/007 Assessment Report, the track preparation will only be sufficient to meet the needs of vehicles accessing the site. Appendix C of the RPI24/007 Assessment Report demonstrates the typical road cross section that Santos will implement for its Class D roads. Given the minor nature of the proposed activities and the avoidance and mitigation measures described above, the proposed activities related to access tracks are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
d) Provide further information as to how the construction of these tracks will be undertaken in such a way as to prevent significant disturbance to the current soil	d) As mentioned above in response to Issue 7 (c), road alignment preferentially avoids areas with significant vegetation and blade work will be kept to a minimum, so the soil profiles remain undisturbed where possible. In addition to the response of Issue 7 (c) which touched on avoidance techniques, Santos noted soil management in response to construction phases of flowlines (Issue 6 (c)) and these measures are carried over during the construction

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profile and soil structures and general topography of the site;	phases of access tracks. Access track construction management and ESC techniques were also mentioned in Section 2.1.3 of the RPI24/007 Assessment Report. Given the minor nature of the access tracks and the measures described above, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
e) Provide information as to how the topography will be re-established following the installation of the access tracks;	e) As mentioned in response to Issue 6 (d), the original topography is captured during a scope kick off where multiple 'before' photos are captured as will be required in the SEP. This is then added to the scope folder and issued to the Supervisors to ensure that the original arrangement of the features is put back in such a way that no course is altered, 'after' photos are then also provided as evidence of this occurring. As mentioned in Section 2.1.3.3 of the RPI24/007 Assessment Report and in response to Issue 6 (d), rehabilitation of disturbed areas must meet the following aspects: • Be a stable landform, exhibiting no subsidence or erosion gullies. • Be re-profiled to a level consistent with surrounding soils. • Be re-profiled to original contours and established drainage lines. • Plant pest species (restricted matter) are not present or are consistent with the surrounding areas. • There must be no significant subsoil on the surface. • No subsidence is to be evident. Given the minor nature of the proposed activities and the avoidance and mitigation measures described above, the proposed activities related to access tracks are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
f) Provide further information as to how revegetation of these areas will be undertaken to ensure a successful and timely rehabilitation outcome.	f) Santos has provided details on its rehabilitation methods, topography reestablishment approach, and revegetation techniques that help to achieve a successful and timely rehabilitation outcome in response to Issue 6 (c), (d), (e) and (f), as well as during the response to Issue 7 (d) and (e). Iin addition, details on Access Tack rehabilitation and Decommissioning aspects were provided in Section 2.1.3.3 of the RPI24/007 Assessment Report. Revegetation will occur through the utilisation of the existing seedbank in the native topsoil and through naturally dispersed seed from the surrounding environment. Plant species in SWQ have adapted to readily grow and propagate further seed during times of flood or inundation, which generally leads to successful and timely establishment of vegetation upon favourable conditions. Final decommissioning (and therefore indication of final rehabilitation) of the proposed infrastructure will commence within 12 months of no longer being required for on-going petroleum activities (unless an exceptional circumstance

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	in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met). Santos is of the firm view that these actions will lead to successful and timely rehabilitation outcomes for other phases of the proposed activities and the same principles will be utilised for access tracks. Given the minor nature of the proposed activities and the avoidance and mitigation measures described above, the proposed activities related to access tracks are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
Issue 8: The assessment report states: *The total area of the proposed borrow pit will be 0. 8 ha. This disturbance area is required for project facilitation and is inclusive of the work area surrounding the pit, seedstock pile, excavation machinery turning point, and the quarried pit. The proposed quarried pit will be 6000 square metres (m2) and excavated to a maximum depth of 3 m; the volume of this pit is approximately 12 megalitres (ML).* The activity increases the risk of erosion, potentially affecting hydrological processes both locally and downstream due to sediment deposition. As the borrow pits will be maintained for an ongoing material source, the total disturbance area may increase over the project's lifespan, especially given the erosion-prone soil. While other extraction methods are required to manage 24-hour rainfall events with a 1 in 10-year AEP, the applicant has not clarified how erosion and sediment control will be managed within these areas.	
Action: a) Confirm the exact location and extent of the proposed borrow pit, including GPS coordinates (GDA2020 with 6 decimals) for each corner;	a) The CDZ has been created to ensure any onsite findings are avoided or the scope of works is able to mitigate impacting findings (such as Cultural Heritage, large gullies for natural changes, etc.). The exact location may shift within the CDZ but the extent of the proposed borrow pit is evident in the spatial files ('Infrastructure ID' = IDP-2605-S33). Coordinates for each corner as currently proposed within the CDZ are as follows: • 27.180072 (S), 142.074758 (E) • 27.179830 (S), 142.075183 (E) • 27.181290 (S), 142.075625 (E) • 27.181048 (S), 142.076051 (E)
b) Provide details on the pit rehabilitation methodology, including final landform, topsoil application, and re-vegetation plans;	b) Rehabilitation of the borrow pit will occur as described in Section 2.1.4.2 of the RPI24-007 Assessment Report. The floor and sides of the pit will be ripped to a depth of approximately 500 mm, with the original topsoil returned to the area at a uniform depth across. The borrow pit topography will be reestablished using methods as described in the Santos' response to Issue 6 (d).

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	Given the temporary and minor nature of the proposed activities related to the borrow pit and the measures described above, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
c) Outline erosion and sediment control measures during construction and throughout the project's life;	c) As mentioned throughout Santos' response to Issue 6 and Issue 7, a SEP is put in place prior to construction occurring. The SEP will note the required ESC measures to be put in place that are commensurate with the site-specific risk of erosion, and risk of sediment release to waters. In addition to Santos's response on ESC captured in Issue 6 and Issue 7, Section 2.1.4.1.1 further details the minimum erosion and sediment management of borrow pits as per life of the project. At minimum, ESC measures are put in place for all disturbed areas and must be adequate to prevent erosion and the subsequent release of sediment from the construction area. Examples include (but not limited to): • Batters / bund are built around the borrow pit to ensure water is diverted. • Weather forecast and pending wet weather are taken into consideration prior to undertaking any civil works, particularly in relation to topsoil stripping and works within a drainage feature or watercourse. As a minimum, ESC must be in place when there is a 70% chance of greater than 10 mm of rainfall. • Prior to disturbance being stabilised and as part of the SEP during the construction / initial disturbance phase of projects, Santos conducts regular inspections of the integrity and suitability of controls. Given the temporary and minor nature of the proposed activities related to borrow pits and the measures described above, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
d) Specify the AEP event for sediment control measures and provide supporting documentation that demonstrates this.	d) As mentioned in response to Issue 3 (b) and within Section 2.1.4.1.1 of the RPI24-007 Assessment Report, Santos' primary measure to exclude the capture of overland flow is locating borrow pits outside watercourses. Where there are flood ways and channels where and no reasonable or practicable alternative exists, Santos will locate borrow pits in pre-existing areas of clearing of significant disturbance. The order of preference is captured during the planning stages of proposed development. The application of a 0.5 m high and 3 m wide perimeter berm will exclude the risk of accumulation of overland flow within the borrow pit and prevent any material from within the borrow pit from spreading to the surrounding environment. ESC measures will be appropriate for the expected length of construction, project phase and commensurate with the controls applied through the SEP for the project.

DSDIP Information Request *Information required for assessment against SEA criteria – Schedule 2, Part 5 of the Regional Planning Interests Regulation 2014 (RPI Regulation)*	Santos Response
	Given the temporary and minor nature of the proposed activities related to borrow pits and the measures described above, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA.
Issue 9: Figure 2 of the Assessment Report and the provided shapefiles suggest that the north-eastern extent of the proposed development footprint may be near or overlap a potential watercourse or drainage feature, as identified by the Department's watercourse identification mapping. It is unclear from the application whether this feature will be disturbed during the project.	
Action: Please provide additional information and clarification on whether the potential watercourse or drainage feature will be impacted in any way by the proposed development and, if so, detail how such impacts will be managed.	The proposed development is not expected to interact nor impact the watercourse/drainage located north-east of the disturbance footprint. Given the temporary and minor nature of the proposed activities and the measures described above, the proposed activities are unlikely to result in widespread or irreversible impacts within the Channel Country SEA nor directly or indirectly impact the potential watercourse or drainage feature found north-east of the proposed development.
Issue 10: Potential Groundwater Dependent Ecosystems (GDEs) have been identified in the area.	
Action: Please provide detailed information on how impacts to Derived Terrestrial GDEs and Potential GOE aquifers will be managed throughout the project.	Santos complies with the *Code of Practice for the construction and abandonment of petroleum wells and associated bores in Queensland (2019).* Specifically, this code demonstrates the key principles related to aquifer isolation and managing risk (see Section 3.2 Well design and barriers, 3.3 Casing & Tubing, 3.6 Cementing and 3.7 Aquifer isolation). Specifically as set out in item 3.7.2 of the Code: "*For wells in the Cooper / Eromanga basin in Queensland, all aquifer units, as identified by the South Australia Cooper Basin Statement of Environmental Objectives (SEO): Drilling, Completions and Well Operations must be isolated from each other and permeable hydrocarbon bearing zones by primary cementing. The SEO clearly identifies formations designated as aquifers for management*". As mentioned in Section 2.1.1.1 and Section 4.3.5 of the RPI24-007 Assessment Report, well integrity and leak prevention are ensured through isolation of all shallower aquifers and reservoirs with American Petroleum Institute (API) class cement

DSDIP Information Request *Information required for assessment against SEA criteria – Schedule 2, Part 5 of the Regional Planning Interests Regulation 2014 (RPI Regulation)*	Santos Response
	behind production and surface casing which act to isolate groundwater from oil and gas formations, preventing cross-contamination. Ongoing management and monitoring are undertaken across the lifespan of the well to ensure integrity. Below are some key points in relation to how casing integrity is managed: • Production casing annulus pressure is surveyed every 6-months. This data is reviewed along-side surface casing annulus pressure and tubing pressure, also surveyed every 6-months, to detect potential communication; • Production casing annulus pressure tests are conducted at least every 5-years, but more frequently at the discretion of the well integrity engineer; • All single-barrier wells (such as gas monobores) have casing corrosion inspection logs run on a risk-based frequency, and assessed for deterioration over time; and • Cement evaluation logs are deployed on a case-by-case basis, where the integrity engineer may identify concerns over the quality of the cement job. The isolation measures on shallow aquifers implemented during construction and operation of the proposed development, coupled with ongoing monitoring efforts, will avoid potential impacts on the natural hydrologic processes of groundwater sources. As well as avoiding any impacts to GDEs and potential GOE aquifers.

Appendix A – Well Evaluation Summary (Leghorn 1)

WELL EVALUATION SUMMARY: 19120

Santos

LEGHORN_1

PERMIAN

Plot Created by : harrt Date : 17-Feb-2020 Time : 14:47:27
layout: WES_MM_XY_ENG_MD_paysum_Gaswells_metres_litho_gasratio_caliper

Location: Cooper Basin	Total Depth: 2468m	Bit Size: 6.75 in	Rm: 0.06 @ 77.54F	Analysed by: RATNO
Licence:	KB/RT: 81.76m	Mud Type: KCl	Rmf: 0.05 @ 78.08F	Logging:
Latitude: 27 11 55.70S	Vertical Scale: 200	DFD: 9.9 PPG	Rmc: 0.07 @ 76.1F	Spud Date: 10-11-2019
Longitude: 142 03 29.74E	Vertical Units: METRES	BHT: 271.62 F	KCl: 4%	

Rw used in Analysis:

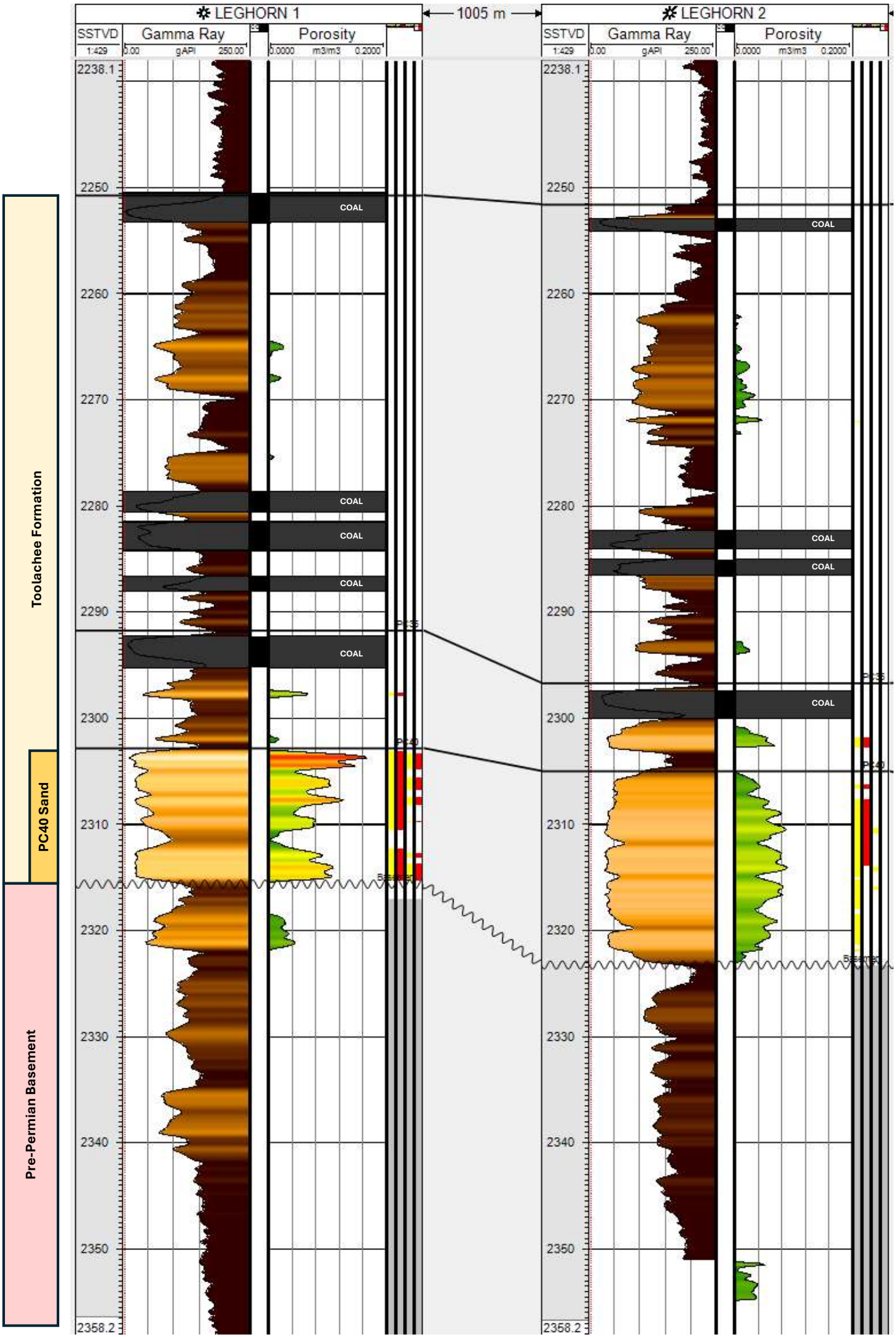
TOOLACHEE 0.7 ohmm @ 75 degF
ohmm @ 75 degF
ohmm @ 75 degF

Remarks :

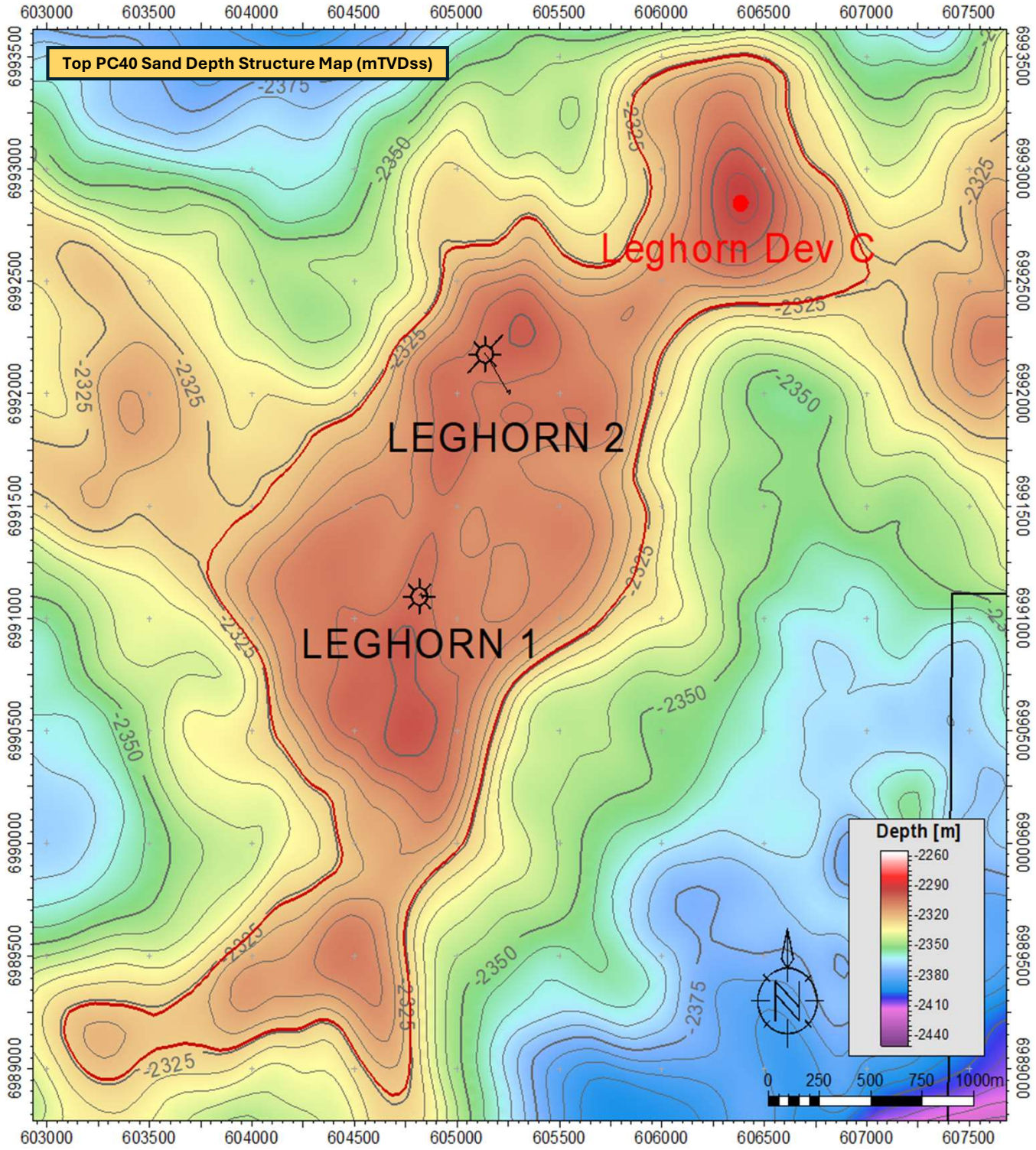
Permeability : Coates FFI

Water Saturation Method: Dual-Water Non-Linear

Appendix B – Leghorn 1 and Leghorn 2 cross section


LEGHORN 1
1005 m
LEGHORN 2
SSTVD
Gamma Ray
Porosity
1:429
0.00 gAPI 250.00
0.0000 m3/m3 0.2000
2238.1
2250
2260
2270
2280
2290
2300
2310
2320
2330
2340
2350
2358.2
COAL
Toolachee Formation
PC40 Sand
Pre-Permian Basement

Appendix C – Top PC40 Sand Depth Structure Map


Top PC40 Sand Depth Structure Map (mTVDss)
Leghorn Dev C
LEGHORN 2
LEGHORN 1
Depth [m]
-2260
-2290
-2320
-2350
-2380
-2410
-2440
0
250
500
750
1000m
N
603000
603500
604000
604500
605000
605500
606000
606500
607000
607500
6993500
6993000
6992500
6992000
6991500
6991000
6990500
6990000
6989500
6989000
-2325
-2350
-2375

Appendix D - Suitably qualified third-party verification of Santos SWQ RDM Methodology (EP Act issued Waste Schedule Conditions)

Statutory Declaration

Resource activities other than mining

Declaration of compliance for written documents

A statutory declaration is a written statement of facts that is sworn or declared under the Oaths Act 1867. *This statutory declaration has been prepared to declare the authority holders compliance with the provisions of the* Environmental Protection Act 1994 *(EP Act) or an environmental authority condition that stipulates the requirement to submit a certified written document to the administering authority.*

Oaths Act 1867

QUEENSLAND
TO WIT

Re: Written documents relating to an environmental authority for a resource activity other than mining under the *Environmental Protection Act 1994*.

Written document: South-West Queensland Residual Drilling Material Burial Method, dated June 2020

(Insert type of document, e.g. contingency plan for emergency environmental incidents)

Subject matter: Compliance with the Waste Schedule conditions I1, I2, I3, I4, I5 and I6 within Santos' Cooper Basin Environmental Authorities.

(Insert subject matter, e.g. compliance with environmental authority number PEN1001222222)

Authority holder: Santos Ltd

I, Nigel Goulding

(Insert full name of person making this declaration)

of, 3900 Stonewater Drive, Columbus OH 43221

(Insert suburb and city of the person making this declaration)

Statutory Declaration

Declaration of compliance for written documents

in the State of Queensland do solemnly and sincerely declare that:

1. I am a suitably qualified person as defined in the environmental authority; having professional qualifications, training, skills and experience relevant to the subject matter and can give authoritative assessment, advice and analysis relative to the subject matter using the relevant protocols, standards, methods or literature. A copy of my curriculum vitae is Annexure A to this declaration[1];
2. The authority holder has fully complied with the requirements of environmental authority conditions in South-West Queensland Residual Drilling Material Burial Method, dated June 2020
3. All relevant material has been considered in preparing the South-West Queensland Residual Drilling Material Burial Method, dated June 2020
4. The content of the South-West Queensland Residual Drilling Material Burial Method, dated June 2020 is accurate and true.
5. The South-West Queensland Residual Drilling Material Burial Method, dated June 2020 meets the requirements of the Waste Schedule conditions I1, I2, I3, I4, I5 and I6 within Santos' Cooper Basin Environmental Authorities; EPSX01915014, EPPG00421513, EA0001254, EA0001589, EA0001803 and EA0002052.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the *Oaths Act 1867*.

Taken and declared before me, at By FaceTime 753 Sandgate Rd Clayfield Australia
(Insert name of town or city and suburb)

this 19th day of June in the year 2020.
(Insert day, e.g. 18th) (Insert month) (Insert year)

Signed
(Person making this declaration)

Signed
(Cross out whichever is not applicable)

Justice of the Peace / Commissioner for Declarations / Solicitor / Barrister

(Print name)

ROBERT JOHN BAX
Solicitor & Notary Public
753 Sandgate Road Clayfield
AUSTRALIA

[1] The signatory do annexure, but it does need to be marked with the following:
"This is the [*insert n* the [insert name of document] marked with the letter "A" referred to in the Statutory Declaration d/solemnly declared] before me at [insert day] of [insert month], [insert year].