

# Modification Notice - Regulation 22

<b>Interest Holder</b>	Santos QNT Pty Ltd	<b>EMP Title</b>	McArthur Basin Drilling Program NT Exploration Permit (EP)161	<b>Unique EMP ID No.</b>	STO2-7	<b>Change/Mod No.</b>	4	<b>Date</b>	09/08/2024
<b>Brief Description</b>	The modifications to the EMP, controls and monitoring reflect reduced operational activity and reduced risk on the Tanumbirini well pad as described in letter from the interest holder to DEPWS dated 21 March 2024.								
<b>Geospatial Files Included?</b>	No								
<b>Does the proposed change result in a new, or increased, potential or actual environmental impact or risk?</b>	<b>If an INCREASE in an existing potential or actual environmental impact or risk, is it provided for in the approved EMP?</b>	<b>Does the proposed change require additional mitigation measures to be included?</b>	<b>Has additional stakeholder engagement been conducted?</b>	<b>Does it require additional environmental performance standards and measurement criteria?</b>	<b>Does it affect compliance with Sacred Site Authority Certificates?</b>	<b>Does it affect current rehabilitation, weed, fire, wastewater, erosion and sediment control, spill or emergency response plans?</b>	<b>Will the environmental outcome continue to be achieved and will the impacts and risks be managed to ALARP and acceptable?</b>		
No	N/A	No	No	No	No	No	Yes		
<b>Current EMP Text</b>				<b>Amended EMP Text</b>					
See: Table 6-1 Risk Assessment for proposed activities				See revised wording shaded in grey in updated in Table 6-1 Risk Assessment for proposed activities (below)					
See: Table 8-1 Environmental Outcomes, Environmental Performance Standards and Measurement Criteria				See revised wording shaded in grey in updated in Table 8-1 Environmental Outcomes, Environmental Performance Standards and Measurement Criteria (below)					
See: Table 8-5 Environmental Monitoring				See revised wording shaded in grey in updated in Table 8-5 Environmental Monitoring (below)					

<p><b>7.2.2.3 Fire Mitigation Measures</b></p> <p>All project infrastructure will be designed and constructed to mitigate risks of ignition. Project specific requirement to mitigate risk of ignition include:</p> <ul style="list-style-type: none"> <li>• Fire-fighting equipment and competent fire-fighting personnel will be available.</li> <li>• All vehicles will be equipped with portable fire extinguishers.</li> <li>• Machinery and vehicles should be parked in areas of low fire risk and be free of any combustible material.</li> <li>• Any petrol motor vehicles or petrol-powered pumps will be fitted with spark arresters.</li> <li>• All vehicles will be equipped with operational VHF and / or UHF radio transceivers.</li> <li>• Smoking will only be permitted in areas clear of vegetation, and there will be no disposal of butts.</li> </ul>	<p><b>7.2.2.3 Fire Mitigation Measures</b></p> <p>All project infrastructure will be designed and constructed to mitigate risks of ignition. Project specific requirement to mitigate risk of ignition include:</p> <ul style="list-style-type: none"> <li>• All vehicles will be equipped with portable fire extinguishers.</li> <li>• Machinery and vehicles should be parked in areas of low fire risk and be free of any combustible material.</li> <li>• Any petrol motor vehicles or petrol-powered pumps will be fitted with spark arresters.</li> <li>• All vehicles will be equipped with operational VHF and / or UHF radio transceivers.</li> <li>• Smoking will only be permitted in areas clear of vegetation, and there will be no disposal of butts.</li> </ul>
<p><b>7.2.3.2 Operational Fire Monitoring</b></p> <p>The Santos Onsite Company Representative is responsible for monitoring for bushfire alerts (primarily via the <a href="https://securent.nt.gov.au/alerts">https://securent.nt.gov.au/alerts</a> and <a href="https://www.bushfires.nt.gov.au/incidentmap/">https://www.bushfires.nt.gov.au/incidentmap/</a> websites and notifying all site personnel of the risks of fire. Communication of these alerts will via the daily toolbox meetings. Where bushfire alert information becomes known after the toolbox meeting, the Onsite Company Representative will communicate to all site personnel.</p>	<p><b>7.2.3.2 Operational Fire Monitoring</b></p> <p>Whenever personnel are onsite the Santos Onsite Company Representative is responsible for monitoring for bushfire alerts (primarily via the <a href="https://securent.nt.gov.au/alerts">https://securent.nt.gov.au/alerts</a> and <a href="https://www.bushfires.nt.gov.au/incidentmap/">https://www.bushfires.nt.gov.au/incidentmap/</a> websites and notifying all site personnel of the risks of fire. Communication of these alerts will be via the daily toolbox meetings whenever personnel are onsite. Where bushfire alert information becomes known after the toolbox meeting, the Onsite Company Representative will communicate to all site personnel.</p>
<p><b>8.9.1 Monitoring</b></p> <p>To ensure that the EMP requirements have been effectively implemented and that the Environmental Outcomes and Environmental Performance Standards have been met, a daily checklist will be completed on site by the Santos NT Projects Drilling Supervisor. The checklist will ensure compliance with mitigation and management measures detailed in Table 6-1.</p>	<p><b>8.9.1 Monitoring</b></p> <p>To ensure that the EMP requirements have been effectively implemented and that the Environmental Outcomes and Environmental Performance Standards have been met, a daily checklist will be completed on site by the Santos NT Projects Drilling Supervisor during drilling operations. During non-operational periods, inspections will be conducted monthly and managed via remote methods. The checklist will ensure compliance with mitigation and management measures detailed in Table 6-1.</p>
<p><b>8.9.2 Record Management</b></p> <p>Key records for management relating to the activity include:</p> <ul style="list-style-type: none"> <li>• Weed washdown records</li> </ul>	<p><b>8.9.2 Record Management</b></p> <p>Key records for management relating to the activity include:</p> <ul style="list-style-type: none"> <li>• Weed washdown records</li> </ul>

<ul style="list-style-type: none"> <li>• Induction records</li> <li>• Weekly checklists</li> <li>• Training records</li> <li>• Photopoint records</li> <li>• Records of monitoring program</li> <li>• Records related to audits / inspections</li> <li>• Records relating to investigation of incidents and non-compliances.</li> </ul>	<ul style="list-style-type: none"> <li>• Induction records</li> <li>• <del>Weekly</del> Monthly checklists/reports</li> <li>• Training records</li> <li>• Photopoint records</li> <li>• Records of monitoring program</li> <li>• Records related to audits / inspections</li> <li>• Records relating to investigation of incidents and non-compliances.</li> </ul>
<p><b>Appendix G: Wastewater Management Plan</b></p> <p><b>2.4.2 Proposed methods</b></p> <p><b>Fauna interaction</b></p> <p>Control measures to prevent the interactions of wildlife, stock, and human receptors with wastewater are detailed in Table 6-1 of the EMP and include:</p> <ul style="list-style-type: none"> <li>• Fauna ladders will be installed at all open pits</li> <li>• Pits and dams will be fenced</li> <li>• Fauna escapes provided in open excavations or pits</li> <li>• Daily checks of pits and dams throughout the drilling program</li> <li>• Daily inspection of fences to ensure they are intact throughout the drilling program</li> <li>• All gates are left in the condition in which they were found.</li> <li>• Bird Islands will be installed in all large water storage tanks</li> </ul> <p><b>2.7.2 Monitoring of stored water</b></p> <p><i>The quality and quantity of all water stored will be monitored as per the below.</i></p> <p><b>Quantity</b></p> <p>Volume of water that is abstracted from the water bore will be measured using flowmeter. This will be recorded weekly during bore operations.</p> <p>Fluid levels in storages containing abstracted groundwater will be monitored daily during well site operations. This provides a measure of the stored quantity of water.</p> <p><b>Quality</b></p>	<p><b>2.4.2 Proposed methods</b></p> <p><b>Fauna interaction</b></p> <p>Control measures to prevent the interactions of wildlife, stock, and human receptors with wastewater are detailed in Table 6-1 of the EMP and include:</p> <ul style="list-style-type: none"> <li>• Fauna ladders will be installed at all open pits</li> <li>• Pits and dams will be fenced</li> <li>• Fauna escapes provided in open excavations or pits</li> <li>• Daily checks of pits and dams throughout during the drilling program. During non-operational periods, inspections of pits will be conducted monthly and managed via remote monitoring methodologies.</li> <li>• Daily inspection of fences to ensure they are intact during onsite drilling activities program.</li> <li>• All gates are left in the condition in which they were found.</li> <li>• Bird Islands will be installed in all large water storage tanks.</li> </ul> <p><b>2.7.2 Monitoring of stored water</b></p> <p><i>The quality and quantity of all water stored will be monitored as per the below.</i></p> <p><b>Quantity</b></p> <p>Volume of water that is abstracted from the water bore will be measured using flowmeter. This will be recorded weekly during bore operations.</p> <p>Fluid levels in storages containing abstracted groundwater will be monitored daily during well site drilling operations. This provides a measure of the stored quantity of water.</p>

<p>Water quality of abstracted groundwater stored in tanks will be sampled monthly. The suite will be tested as per Table 2-8. Testing will comprise grab samples from the tank, or a sample of water pumped from the storage tank.</p> <p><b>2.7.3 Monitoring of drill fluid</b></p> <p><b>Quality</b></p> <p>A representative sample of stored drill fluids will be taken each month. The sample will be tested for the suite shown in Table 2-9. Sampling and testing will occur at least once each month throughout drilling operations.</p>	<p><b>Quality</b></p> <p>Water quality of abstracted groundwater stored in tanks will be sampled monthly during drilling operations. The suite will be tested as per Table 2-8. Testing will comprise grab samples from the tank, or a sample of water pumped from the storage tank.</p> <p><b>2.7.3 Monitoring of drill fluid</b></p> <p><b>Quality</b></p> <p>A representative sample of stored drill fluids will be taken each month during drilling operations. The sample will be tested for the suite shown in Table 2-9. Sampling and testing will occur at least once each month throughout during drilling operations.</p>
<p><b>Appendix H: Spill Management Plan</b></p> <p><b>4.2 Minimising the Risk of a Spill</b></p> <p>Through the implementation of the mitigations measures provided in the Table 6-1 of the EMP the following mitigation measures will be taken to minimise the risk of a spill at the well pad:</p> <ul style="list-style-type: none"> <li>• Daily checks of pits, dams, flowlines, tanks and chemical storage areas</li> <li>• Pre-spud checks / Pre-job checks when transferring mud</li> <li>• Spill management kits located onsite for response to any small scale spills</li> <li>• Use of drip trays for transfers.</li> <li>• Any spills contained and remediated.</li> <li>• Use of Rainfall management techniques such as diversions bunds.</li> </ul> <p><b>4.3 Spill Detection</b></p> <p>Spills monitoring measures used to detect spills throughout the Drilling Program include:</p> <ul style="list-style-type: none"> <li>• Drill fluids that are contained in engineered fluid storage tanks. These tanks and systems as a whole will be monitored throughout the Drilling Program.</li> <li>• Cuttings and fluid storages will be inspected daily to check integrity throughout drilling operations.</li> </ul>	<p><b>Appendix H: Spill Management Plan</b></p> <p><b>4.2 Minimising the Risk of a Spill</b></p> <p>Through the implementation of the mitigation measures provided in the Table 6-1 of the EMP the following mitigation measures will be taken to minimise the risk of a spill at the well pad:</p> <ul style="list-style-type: none"> <li>• Daily checks of pits, dams, flowlines, tanks and chemical storage areas during drilling operations.</li> <li>• Utilise remote monitoring methodologies during non-operational periods.</li> <li>• Pre-spud checks / Pre-job checks when transferring mud.</li> <li>• When chemical and fuel storage present, spill management kits located onsite for response to any small scale spills.</li> <li>• Use of drip trays for transfers.</li> <li>• Any spills contained and remediated.</li> <li>• Use of Rainfall management techniques such as diversions bunds.</li> </ul> <p><b>4.3 Spill Detection</b></p> <p>Spills monitoring measures used to detect spills throughout during the Drilling Program include:</p> <ul style="list-style-type: none"> <li>• Drill fluids that are contained in engineered fluid storage tanks. These tanks and systems as a whole will be monitored throughout during the Drilling Program.</li> </ul>

<ul style="list-style-type: none"> <li>• Daily monitoring of weather and for predicted significant rainfall events will be undertaken</li> <li>• Completion of the daily monitoring checklist, including but not limited to the inspection of chemical storage areas, flowlines, spill equipment and integrity of bunding and tank liners.</li> </ul> <p>Any contaminated material such as those found in drip tray liners, contaminated soil or waste water will be segregated and stored in the chemical store for offsite disposal by a licenced waste management contractor.</p> <p><b>5.1 Response</b> Small spills will be managed locally at the site using dedicated spill kits; which are readily available and appropriately stocked.</p>	<ul style="list-style-type: none"> <li>• Cuttings and fluid storages will be inspected daily to check integrity throughout during drilling operations. During non-operational periods, monthly inspections to be completed using remote monitoring methodologies.</li> <li>• Daily monitoring of weather and for predicted significant rainfall events will be undertaken during drilling operations, monthly during non-operational periods.</li> <li>• Completion of the daily monitoring checklist during drilling periods, including but not limited to the inspection of chemical storage areas, flowlines, spill equipment and integrity of bunding and tank liners (where applicable). During non-operational periods, completion of monthly reports using remote monitoring methodologies.</li> </ul> <p>Any contaminated material such as those found in drip tray liners, contaminated soil or waste water will be segregated and stored in the chemical store for offsite disposal by a licenced waste management contractor.</p> <p><b>5.1 Response</b> Small spills will be managed locally at the site using dedicated spill kits; which are readily available and appropriately stocked (when chemical and fuel storage present).</p>
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Table 6-1 Risk Assessment for proposed activities

Risk Event	Potential Impact	Relevant Environmental Factor	Risk Source	Initial Risk Ranking*			Mitigation and Management Measures		Residual Risk Ranking*			Effective Controls	Uncertainty Ranking
				L	C	R	EMP Commitments	Relevant Code of Practice	L	C	R		
Physical disturbance including vehicle and plant movements	Disturbance to soil	Terrestrial environmental quality	vehicles leave the previously constructed roads or work areas	F	I	2	Driving is only permitted on designated access.	A.3.1 Site Selection and Planning A.3.4 Erosion and sediment control	C	I	1	Yes	Type A Risk – Risks are well-understood with established management practices (e.g. Land Clearing Guidelines and the ESCP)
Physical disturbance including vehicle and plant movements	Disturbance to Aboriginal archaeological sites	Culture and Heritage	vehicles leave the previously constructed roads or work areas	B	II	1	Archaeological surveys completed by independent consultant(s) prior to activity commencement. Results indicate that no Aboriginal archaeological or historical sites/relics will be encountered or impacted by proposed activities in this portion of EP161. Driving is only permitted on designated access	A.3.1 Site Selection and Planning	A	I	1	Yes	Type A Risk – Risks are well-understood heritage survey complete with avoidance measures in place
Groundwater extraction	Reduction in groundwater quantity	Hydrological processes	Use of groundwater for project activities	B	II	1	Valid water extraction licence. Compliance with water extraction licence limits and conditions. Ensure groundwater extraction is limited to the volumes required by the drilling program (See water use estimates in Section 3). Bore numbers and estimated extraction volumes will be provided to DITT and DEPWS.	A.3.1 Site Selection and Planning B.4.17 Groundwater monitoring	A	II	1	Yes	Type A Risk – Risks are well-understood. The regional understanding of the CLA is sufficient to understand the risks. Groundwater Monitoring has been undertaken and will continue.
Groundwater extraction	Reduction in groundwater available for other users	Communities and economy	Use of groundwater for project activities	B	IV	2	Valid water extraction licence. Compliance with water extraction licence limits and conditions. Ensure groundwater extraction is limited to the volumes required by the drilling program (See water use estimates in Section 3). Bore numbers and estimated extraction volumes will be provided to DITT and DEPWS.	B.4.17 Groundwater monitoring	A	III	1	Yes	Type A Risk – Risks are well-understood. The regional understanding of the CLA is sufficient to understand the risks. Groundwater Monitoring has been undertaken and will continue.
Creation of dust	Smothering of flora	Terrestrial ecosystems	Vehicle and plant movements	F	II	3	Driving is only permitted on designated access roads. Speeds on unsealed roads will be limited to a maximum of 60 km/hr. Water trucks will be used, to manage dust emissions from vehicle movement and drilling activities as appropriate.	A.3.1 Site Selection and Planning A.3.5 Biodiversity protection	B	I	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices.
Creation of dust	Loss of amenity	Communities and economy	Vehicle and plant movements	F	I	2	Driving is only permitted on designated access roads. Speeds on unsealed roads will be limited to a maximum of 60 km/hr. Water trucks will be used, to manage dust emissions from vehicle movement and drilling activities as appropriate.	A.3.1 Site Selection and Planning A.3.4 Erosion and sediment control	A	I	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices.
Creation of dust	Public ingesting dust	Human health	Vehicle and plant movements	D	II	2	Driving is only permitted on designated access. Speeds on unsealed roads will be limited to a maximum of 60 km/hr. Water trucks will be used, to manage dust emissions from vehicle movement and drilling activities as appropriate.	A.3.1 Site Selection and Planning A.3.4 Erosion and sediment control	B	I	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices.
Creation of atmospheric emissions	Reduction in air quality	Air quality atmospheric processes	Vehicle and plant movements	C	II	2	Vehicles and fixed plant maintained as per maintenance schedule.	A.3.1 Site Selection and Planning	B	I	1	Yes	Type A Risk - Risks associated with diesel combustion are well known, both within Australia and Internationally. Methods for estimating emissions are available via the National Pollutant Inventory and NGERs.



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				L	C	R	EMP Commitments	Relevant Code of Practice	L	C	R		
Creation of atmospheric emissions	Reduction in air quality	Air quality atmospheric processes	Fugitive emissions	C	II	2	Real time monitoring of conditions during drilling including drilling monitoring and gas detection monitoring. Wells to be constructed with cement isolation. All cement slurries to be laboratory tested for ensure slurry is fit for purpose. Cement placement modelling conducted prior to the job including but not limited to casing standoff, drilling fluid displacement, anticipated job pressures and equivalent circulating densities. A geohazard assessment was used to select the well locations to mitigating shallow gas hazards.	A.3.1 Site selection and planning D.5.1 Baseline Methane assessment D.5.9.4 Other fugitive emissions	B	I	1	Yes	Type A Risk - Risks and impacts associated with Fugitive emissions are well known. Emissions during petroleum activities are estimated using the NGERS estimation tools.
Noise and vibration from project activities	Disturbance to native fauna	Terrestrial ecosystems	Vehicle movements and drilling activities	D	II	2	Engines/Machinery will be maintained as per planned maintenance systems. Engines/machinery will have noise suppression devices.	A.3.1 Site selection and planning A.3.3 Noise	C	I	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices.
Noise and vibration from project activities	Disturbance to landholders	Communities and economy	Vehicle movements and drilling activities	D	II	2	Engines/Machinery will be maintained as per planned maintenance systems. Engines/machinery will have noise suppression devices. Wells are located >8km from the Tanumbirini homestead.	A.3.1 Site selection and planning A.3.3 Noise	B	I	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices. Land access agreements are in place and stakeholder engagement is ongoing.
Light from project activities	Disturbance to native fauna	Terrestrial ecosystems	Vehicle movements and drilling activities at night Lighting from camp.	F	I	2	Task focussed lighting will be used and all boundary lighting for the camp will be positioned to face inwards to provide adequate lighting for safe operations, without excessive overspill.	A.3.1 Site selection and planning 4.3.2 Well pad site selection requirements	B	I	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices. Santos has extensive experience in managing disturbance to native fauna.
Light from project activities	Disturbance to landholders	Communities and economy	Vehicle movements and drilling activities at night, Lighting from camp.	F	I	2	Task focussed lighting will be used and all boundary lighting will be positioned to face inwards to provide adequate lighting for safe operations, without excessive overspill. Wells are located >8km from the Tanumbirini homestead.	A.3.1 Site selection and planning 4.3.2 Well pad site selection requirements	B	I	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices. Land access agreements are in place.
Fauna interaction	Disturbance, injury or death to terrestrial fauna	Terrestrial ecosystems	Vehicle movements, drilling activities, and entrapment in open pits	E	I	2	Fauna ladders will be installed at all open pits. Driving is only permitted on designated access roads and seismic lines. Speeds on unsealed roads will be limited, with to a maximum of 60 km/hr. Pits and dams will be fenced. Daily checks of pits and dams throughout during the drilling program. During non-operational periods, conduct monthly checks utilising remote monitoring methodologies.	A.3.5 Biodiversity protection A.3.8 Containment of contaminants	C	I	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices (e.g. site roads are speed limited). Santos has extensive experience in managing fauna interactions and entrapment.
Fauna interaction	Disturbance, injury or death to livestock	Communities and economy	Vehicle movements, drilling activities, and entrapment in open pits.	E	I	2	Relevant landowners and occupiers are notified prior to the commencement of the activity. All gates are left in the condition in which they were found (i.e. open / closed). When necessary, all fences are restored to satisfaction of landowner / managers. Speeds on unsealed roads will be limited to a maximum of 60 km/hr. Pits and dams will be fenced. Daily checks of pits and dams throughout during the drilling program. During non-operational periods, conduct monthly checks utilising remote monitoring methodologies.	A.3.5 Biodiversity protection A.3.8 Containment of contaminants	C	I	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices (e.g. site roads are speed limited).

Risk Event	Potential Impact	Relevant Environmental Factor	Risk Source	Initial Risk Ranking*			Mitigation and Management Measures		Residual Risk Ranking*			Effective Controls	Uncertainty Ranking
				L	C	R	EMP Commitments	Relevant Code of Practice	L	C	R		
Introduction of pest species	Loss of native vegetation through competition for resources	Terrestrial ecosystems	Plant and vehicles carrying weeds from outside the project area. Spread of weeds in project area through vehicle movements.	D	III	3	A Weed Management Plan has been developed for the project (Appendix E). Mitigation measures described in the Weed Management Plan for the project will be implemented.	A.3.6 Weed management A.5.3 Biodiversity protection	B	III	2	Yes	Type A Risk – Risks are well-understood with established and proven management practices. Baseline weed survey complete and DEPWS approved weed management plans in place.
Introduction of pest species	Loss of pasture species through competition for resources	Communities and economy	Plant and vehicles carrying weeds from outside the project area. Spread of weeds in project area through vehicle movements.	D	II	2	A Weed Management Plan has been developed for the project (Appendix E). Mitigation measures described in the Weed Management Plan for the project will be implemented.	A.3.6 Weed management	B	II	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices. Baseline weed survey complete and DEPWS approved weed management plans in place.
Fire	Disturbance or death to terrestrial fauna, loss of terrestrial flora	Terrestrial ecosystems	Ignition sources from plant and machinery Inappropriate disposal of cigarettes.	C	III	2	All vehicles will be equipped with portable fire extinguishers. Machinery and vehicles should be parked in areas of low fire risk. Any petrol motor vehicles or petrol-powered pumps will be fitted with spark arresters. All vehicles will be equipped with operational VHF and / or UHF radio transceivers. Smoking will only be permitted in areas clear of vegetation, and there will be no disposal of butts to land. All personnel will receive information prior to the commencement of the activity relating to: <ul style="list-style-type: none"> <li>Provisions of the Emergency Response Plan including procedures during a fire emergency</li> <li>The operation of firefighting equipment and communications</li> <li>Restricted smoking requirements</li> </ul> Toolbox meetings will be conducted to: <ul style="list-style-type: none"> <li>Alert the workforce of the fire risk level for the day</li> <li>Discuss any fire risk management breaches and remedial actions</li> </ul>	A.3.7 Fire management	B	II	1	Yes	Type A Risk - Risks associated with bushfire are well known, with numerous literature and NT Government mapping and management plans in place.



Risk Event	Potential Impact	Relevant Environmental Factor	Risk Source	Initial Risk Ranking*			Mitigation and Management Measures		Residual Risk Ranking*			Effective Controls	Uncertainty Ranking
				L	C	R	EMP Commitments	Relevant Code of Practice	L	C	R		
Fire	Injury or death to livestock, loss of pasture, dwellings and infrastructure	Communities and economy	Ignition sources from plant and machinery and well control events (flaring) Inappropriate disposal of cigarettes.	C	III	2	<p>All vehicles will be equipped with portable fire extinguishers.</p> <p>Machinery and vehicles should be parked in areas of low fire risk and be free of any combustible material.</p> <p>Any petrol motor vehicles or petrol-powered pumps will be fitted with spark arresters.</p> <p>All vehicles will be equipped with operational VHF and / or UHF radio transceivers.</p> <p>Smoking will only be permitted in areas clear of vegetation, and there will be no disposal of butts.</p> <p>All personnel will receive information prior to the commencement of the activity relating to:</p> <ul style="list-style-type: none"> <li>Provisions of the Emergency Response Plan including procedures during a fire emergency,</li> <li>The operation of firefighting equipment and communications,</li> <li>Restricted smoking requirements.</li> </ul> <p>Toolbox meetings will be conducted to:</p> <ul style="list-style-type: none"> <li>Alert the workforce of the fire risk level for the day,</li> <li>Discuss any fire risk management breaches and remedial actions.</li> </ul>	A.3.7 Fire management	B	II	1	Yes	Type A Risk - Risks associated with bushfire are well known, with numerous literature and NT Government mapping and management plans in place.
Disturbance to landholder/public	Disturbance to landholders activities	Communities and economy	Vehicle and plant movements throughout the project area	D	II	2	<p>Relevant landowners and occupiers are notified prior to activity of preparation of camp sites, preparation of survey lines and undertaking of operations.</p> <p>Inductions for all employees and contractors cover pastoral, conservation, legislation and infrastructure issues.</p> <p>System is in place for logging public/landholder complaints to ensure that issues are addressed.</p> <p>Damage to station tracks and fences is reported and restored to satisfaction of landowner / managers.</p> <p>All gates are left in the condition in which they were found (i.e. open / closed).</p> <p>Speeds on unsealed roads will be limited to a maximum of 60 km/hr.</p>	A.3.1 Site selection and planning 4.3.2 Well pad site selection requirements	B	I	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices. Land access agreements are in place and stakeholder engagement is ongoing.

Risk Event	Potential Impact	Relevant Environmental Factor	Risk Source	Initial Risk Ranking*			Mitigation and Management Measures		Residual Risk Ranking*			Effective Controls	Uncertainty Ranking
				L	C	R	EMP Commitments	Relevant Code of Practice	L	C	R		
Chemical spills and leaks associated with chemical and fuel storage and handling	Localised contamination of soil	Terrestrial Environmental Quality	Inappropriate storage or handling of hazardous substances, including drilling muds. Poor refuelling or fuel transfer practices	D	III	3	Bunded containment for storage of hydraulic fluid. Spill containment for storage of liquid drilling chemicals. When chemical and fuel storage present, spill management kits located onsite for response to any small scale spills. Use of drip trays for transfers. Any spills contained and remediated. Fuel and other lubricants will be appropriately stored and managed in accordance with SDS and meet NT WorkSafe requirements with industry standards. Riser and diverter will be used to prevent mud spills. Pre-spud checks / Pre-job checks when transferring mud. Secondary containment in use for storage of chemicals will comply with clause A.3.8(g) of the code, including the requirement that Secondary containment will have sufficient capacity to hold 110% of the volume of the largest container. Drilling fluid system mixed, contained and monitored in engineered fluid storage tanks. Code of Practice: Onshore Petroleum Activities (the code) will be implemented. The code includes requirements for well operations and wastewater management. A WOMP will be developed to cover well activities. The Project will not commence until a WOMP has been approved.	B.4.16 Site material and fluid management C.7.2 Spill management plan	B	III	2	Yes	Type A Risk – Risks are well-understood with established and proven management practices. Santos has extensive experience in drilling conventional and unconventional petroleum wells in the NT and across Australia and this experience includes managing storage and handling of hazardous substances.
Chemical spills and leaks associated with chemical and fuel storage and handling	Reduction in surface and groundwater water quality	Inland Water Environmental Quality	Inappropriate storage or handling of hazardous substances Poor refuelling or fuel transfer practices	D	III	3	Installation of blow-out prevention equipment systems. Bunded containment for storage of hydraulic fluid. Spill containment for storage of liquid drilling chemicals. When chemical and fuel storage present, spill management kits located onsite for response to any small scale spills. Use of drip trays for transfers. Any spills contained and remediated. Fuel and other lubricants will be appropriately stored and managed in accordance with SDS and meet NT WorkSafe requirements with industry standards. Riser and diverter will be used to prevent mud spills. Pre-spud checks / Pre-job checks when transferring mud. Secondary containment in use for storage of chemicals will comply with clause A.3.8(g) of the code, including the requirement that Secondary containment will have sufficient capacity to hold 110% of the volume of the largest container. Primary Drilling fluid system mixed, contained and monitored in engineered fluid storage tanks. Cuttings transferred from a cuttings skip to a lined cutting pit/sump Code of Practice: Onshore Petroleum Activities (the code) will be implemented. The code includes requirements for well operations and wastewater management. A WOMP will be developed to cover well activities. The Project will not commence until a WOMP has been approved.	B.4.16 Site material and fluid management C.7.2 Spill management plan C.3 Well site water management	B	II	2	Yes	Type A Risk – Risks are well-understood with established and proven management practices. Santos has extensive experience in drilling conventional and unconventional petroleum wells in the NT and across Australia and this experience includes managing storage and handling of hazardous substances including fuels.

Risk Event	Potential Impact	Relevant Environmental Factor	Risk Source	Initial Risk Ranking*			Mitigation and Management Measures		Residual Risk Ranking*			Effective Controls	Uncertainty Ranking
				L	C	R	EMP Commitments	Relevant Code of Practice	L	C	R		
Spill of water based drill fluid during fluid recycling process	Localised contamination of soil	Terrestrial environmental quality	Inappropriate storage or handling of potentially hazardous substances	D	I	2	Water based drilling mud system planned. Spill containment for storage of liquid drilling chemicals. When chemical and fuel storage present, spill management kits located onsite for response to any small scale spills. Any spills contained and remediated. Pre-spud checks / Pre-job checks when transferring mud. Primary Drilling fluid system mixed, contained and monitored in engineered fluid storage tanks. Drill Rig active fluid storage system tanks are monitored and alarmed (Gain/Loss) during drilling operations. Cuttings transferred from a cuttings skip to a lined cutting pit/sump Excess drilling cuttings fluid transferred from cuttings pit/sump to drilling fluid storage tanks to be treated/recycled back into the active system to minimise wastage and reduce total disposal volume. Cuttings pit / sump freeboard planned to maintain a 1.5m to mitigate against a 1 in 1000year rain event	B.4.16 Site material and fluid management C.7.2 Spill management plan C.3 Well site water management	C	I	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices. Santos has extensive experience in drilling conventional and unconventional petroleum wells in the NT and across Australia and this experience includes managing storage and handling of drilling fluids.
Transport of chemicals and wastewater on unsealed roads during the wet season	Localised contamination of soil	Terrestrial environmental quality	Transport vehicle accident due to weather Transport vehicle stuck truck being stuck due to mechanical or weather events	C	II	2	Road conditions for heavy vehicle transport will be assessed prior to mobilisation on unsealed roads. Transport of wastewater will only occur in enclosed tanks. Detailed weather monitoring and forecasting to be used. In the event of a truck being stuck due to mechanical or weather reason, transfer or recovery will only occur once safe. Licenced waste transporters to be used to transport listed wastes.	A.3.8 Containment of contaminants	A	II	1	Yes	Type A Risk – Risks are well-understood with established management practices. Rainfall data and the use of enclosed tanks for transport.
Transport of chemicals and wastewater on unsealed roads during the wet season	Reduction in surface and groundwater water quality	Inland Water Environmental Quality	Transport vehicle accident due to weather Transport vehicle stuck truck being stuck due to mechanical or weather events	C	II	2	Road conditions for heavy vehicle transport will be assessed prior to mobilisation on unsealed roads. Transport of wastewater will only occur in enclosed tanks. Detailed weather monitoring and forecasting to be used. In the event of a truck being stuck due to mechanical or weather reason, transfer or recovery will only occur once safe. Licenced waste transporters to be used to transport listed wastes.	A.3.8 Containment of contaminants	A	II	1	Yes	Type A Risk – Risks are well-understood with established management practices. Rainfall data and the use of enclosed tanks for transport.

Risk Event	Potential Impact	Relevant Environmental Factor	Risk Source	Initial Risk Ranking*			Mitigation and Management Measures		Residual Risk Ranking*			Effective Controls	Uncertainty Ranking
				L	C	R	EMP Commitments	Relevant Code of Practice	L	C	R		
Chemical spills and leaks and aquifer / reservoir cross-flow	Reduction in groundwater quality	Inland Water Environmental Quality	Cross-flow during well drilling, construction, operation and decommissioning of wells at a Multi-well pad operation  Well blow out Faults or major structures enables cross-flow	C	IV	3	<p>Installation of blow-out prevention equipment systems.</p> <p>A geohazard assessment has been performed and the results of this assessment indicate that subsurface hazards such as abnormal pressure zones, shallow gas, lost circulation and potential zones of instability are unlikely to be encountered.</p> <p>To avoid interconnection of exploration wells, the proposed horizontal wells have been planned to be approximately 10m apart at surface i.e., wellhead to wellhead, and the lateral sections planned to be 500m apart (Figure 3-8 and Figure 3-10). The horizontals will target separate shale intervals and be vertically separated with a minimum spacing of approximately 50mTVD.</p> <p>After being completed with casing/tubing, the wells will also be monitored with pressure gauges to detect communication during operations.</p> <p>Drilling of wells off-structures using seismic data for control.</p> <p>Wells are located away from major faults and structures based on seismic data control; further seismic data acquisition planned where "dip" and "strike" line control is not available.</p> <p>Ground water monitoring bores installed on location prior to drilling operations. Baseline monitoring conducted six months prior to and post drilling operations.</p> <p>Shallow aquifers isolated behind cemented concentric casing strings.</p> <p>Water based drilling fluids proposed.</p> <p>Cemented casing, following the Code of Practice requirements, will prevent aquifer cross-flow once well is constructed and passes well acceptance criteria. Specifically the casing is designed to:</p> <ul style="list-style-type: none"> <li>Maintain hole stability and withstand all planned life cycle well loading conditions without loss of well integrity,</li> <li>Ensure the establishment of the well barriers required at various stages of the well life,</li> <li>Ensure equivalent circulating density in the next hole section does not exceed the fracture propagation pressure while maintaining the required static overbalance,</li> <li>Ensure the formation strength at the previous casing shoe or at a deeper zone will not be exceeded whilst circulating out a gas influx taken from the bottom of the open hole with the anticipated fluid weight and 0.5 ppg (60 g/l) kick intensity over prognoses formation pressure.</li> </ul> <p>Code of Practice: Onshore Petroleum Activities (the code) will be implemented. The code includes requirements for well operations and wastewater management.</p> <p>A WOMP will be developed to cover well activities. The Project will not commence until a WOMP has been approved.</p>	B.4.1 Well Integrity management B.4.2 Aquifer protection B.4.3 Well design and well barriers B.4.6 Casing and tubing B.4.7 Primary cementing B.4.9 Well control C.7.2 Spill management plan	B	II	2	Yes	Type A Risk – Risks are well known and have been extensively assessed through the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory (2018) Final Report. In addition the CSIRO regional baseline monitoring program is underway and the knowledge of the regional aquifers is well established.  Santos has extensive experience in drilling conventional and unconventional petroleum wells in the NT and across Australia.  Control and monitoring bores as per Preliminary Guidelines: Groundwater Monitoring bores for Exploration Petroleum Wells in the Beetaloo Sub-Basin
Waste	Fauna attracted to waste	Terrestrial ecosystems	Waste stored inappropriately attracting native fauna	F	II	2	<p>Waste will be segregated and stored on site and all putrescible waste material will be held in fauna proof containers.</p> <p>Only waste from approved wastewater systems and grey water will be disposed of to land.</p> <p>Licensed waste contractor will be used for any offsite transfer or disposal.</p>	C.7.1 Wastewater management plan	B	I	1	Yes	Type A Risk – Risks are well-understood with established and proven management practices.  Santos has extensive experience in managing wastes to avoid attracting native fauna.

Risk Event	Potential Impact	Relevant Environmental Factor	Risk Source	Initial Risk Ranking*			Mitigation and Management Measures		Residual Risk Ranking*			Effective Controls	Uncertainty Ranking
				L	C	R	EMP Commitments	Relevant Code of Practice	L	C	R		
Waste	Reduction in surface water and groundwater quality	Inland Water Environmental Quality	Overflow of pits Leaching from pit increases cutting volumes as a result of additional horizontal wells	D	III	3	<p>Storage tanks and pits are designed and operated to prevent overtopping due to rainfall and designed with enough freeboard to accommodate total rainfall anticipated.</p> <p>During drilling operations, daily monitoring of weather and for predicted significant rainfall events will be undertaken.</p> <p>Cuttings pits and fluid storage levels will be monitored during and after high rainfall at all times while drilling. During non-operational periods, monitoring will be completed monthly and managed via remote monitoring methodologies.</p> <p>Cuttings pit will be appropriately designed and constructed with an impermeable containment barrier.</p> <p>Cuttings pit will be inspected daily to check integrity during drilling operations. During non-operational periods, inspections will be completed monthly and managed via remote monitoring methodologies.</p> <p>Code of Practice: Onshore Petroleum Activities (the code) will be implemented. The code includes requirements for well operations and wastewater management.</p> <p>Implementation of an approved Spill Management Plan and Wastewater Management Plan, as defined by the code.</p> <p>A WOMP will be developed to cover well activities. The Project will not commence until a WOMP has been approved.</p>	<p>A.3.8 Containment of contaminants</p> <p>B.4.16 Site material and fluids management</p> <p>C.7.2 Spill management plan</p> <p>C.7.1 Wastewater management plan</p>	B	II	2	Yes	<p>Type A Risk – Risks are well known and have been extensively assessed through the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory (2018) Final Report.</p> <p>Preliminary water balance modelling completed.</p> <p>Santos has extensive experience in drilling conventional and unconventional petroleum wells in the NT and across Australia including the management of fluids and cuttings.</p>
Waste	Impact to soil quality	Terrestrial Environmental Quality	Overflow of pits Leaching from pits Additional horizontal wells increases cutting volumes	D	II	2	<p>Storage tanks and pits are designed and operated to prevent overtopping due to rainfall and designed with enough freeboard to accommodate total rainfall anticipated.</p> <p>Cuttings and flare pit levels will be monitored for overflow during and after high rainfall at all times while drilling. During non-operational periods, monitoring will be managed via remote monitoring methodologies.</p> <p>An assessment of environmental hazards posed by the drill cuttings and residual drilling fluid will be carried out including a baseline sample to drilling, sampling cuttings pit fluid post drill and sampling cuttings when dried out.</p> <p>The hazard of NORMs in cuttings will be assessed using continuous, real-time, quantitative monitoring of NORMs concentrations from X-ray fluorescence data against the <i>Radiation Protection Act 2004 (NT)</i>.</p> <p>Cuttings blending and burial or isolation and removal will be subject to sampling results and on the advice of an independent environmental consultant.</p> <p>Cuttings pit will be appropriately designed and constructed with an impermeable containment barrier.</p> <p>Cuttings pit will be inspected daily to check integrity during drilling operations. During non-operational periods, inspections will be completed monthly and managed via remote monitoring methodologies.</p> <p>At the completion of the project a decision on the in-situ disposal of the drilling cutting will be made on the advice of an independent environmental consultant.</p> <p>Code of Practice: Onshore Petroleum Activities (the code) will be implemented. The code includes requirements for well operations and wastewater management.</p> <p>Implementation of an approved Spill Management Plan and Wastewater Management Plan, as defined by the code.</p> <p>A WOMP will be developed to cover well activities. The Project will not commence until a WOMP has been approved.</p>	<p>A.3.8 Containment of contaminants</p> <p>B.4.16 Site material and fluids management</p> <p>C.7.2 Spill management plan</p> <p>C.7.1 Wastewater management plan</p>	C	II	2	Yes	<p>Type A Risk – Risks are well known and have been extensively assessed through the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory (2018) Final Report.</p> <p>Preliminary water balance modelling completed.</p> <p>Santos has extensive experience in drilling conventional and unconventional petroleum wells in the NT and across Australia including the management of fluids and cuttings.</p>



Table 8-1 Environmental Outcomes, Environmental Performance Standards and Measurement Criteria

Risk Sources	Environmental Outcome	Environmental Performance Standard	Measurement Criteria
<b>Environmental Value: Terrestrial Ecosystems</b>			
<p>Vehicle and plant movements generating dust and depositing on flora</p> <p>Vehicle and plant movements generating noise and vibration and disturbing wildlife</p> <p>Vehicle movement, drilling activities and camps generating light and disturbing wildlife</p> <p>Disturbance, injury or death to terrestrial fauna due to vehicle strike, drilling activities and / or entrapment in open excavations</p>	No significant impact to threatened flora or fauna species, their habitat or sites of conservation significance resulting from conduct of the regulated activity.	Injury and disturbance to threatened fauna during the conduct of the activity will be minimised	<p>Site induction records show all personnel have completed site inductions, which includes requirements for managing impacts to terrestrial fauna.</p> <p>IVMS records show 60km/hr speed limit adhered to and any non- compliance recorded.</p> <p>IVMS records show no off-road driving.</p> <p>Equipment maintenance logs demonstrate engines and machinery have been maintained in accordance with required maintenance schedule and have been fitted with noise suppression devices.</p> <p>Audit records of lighting at the camp show inward-facing lights that are adequate for safe operations.</p> <p>Daily checklist shows inspection of fences, excavations, pits, storages for entrapped fauna and fauna escapes intact during drilling operations. During non-operational periods inspections of pits will be managed monthly via remote monitoring methodologies.</p> <p>During non-operational periods, domestic waste receptacles will be removed from site.</p> <p>During drilling operations, daily checklist shows all domestic waste receptacles have lids secured.</p> <p>Audit records show only waste from approved wastewater systems and grey water disposed of to land.</p>
Vehicle and plant movements generating dust and depositing on flora		Dust generation on the well pad in the dry season will be minimised through tracking of wind forecasts, use of dust suppression when undertaking operations, and strict adherence to speed limits on unsealed roads.	<p>Records show when and where water trucks have been used for dust control including weather condition observations.</p> <p>IVMS records show no off-road driving.</p> <p>IVMS records show 60km/hr speed limit adhered to and any non- compliance recorded.</p>
Plant and vehicles distributing weeds from outside or within the project area		No introduction of new species of weeds or plant pathogens, or increase in abundance of existing weed species, as a result of project activities.	<p>Site induction records show all personnel have completed site inductions, which include information on weeds in the region and method of spread.</p> <p>Audit records show weed management plan implemented in accordance with stated schedule.</p> <p>Hygiene declaration available for all vehicles coming into EP161 on each occasion.</p> <p>Weed monitoring shows no new weed species introduced to work area.</p>
Ignition sources from plant and machinery causing fire.		No fire in EP161 as a result of conduct of the regulated activity.	<p>Site induction records show all personnel have completed site inductions, which include information on fire risk and impact to landholder for unplanned fire.</p> <p>When flammable material stores present on site (during drilling operations), weekly checklist shows SDS available and appropriate and in-test fire- fighting equipment next to flammable material stores.</p> <p>When vehicles present on site (during drilling operations), weekly checklist shows all vehicles have portable fire extinguishers and operational VHF or UHF radio transceivers.</p> <p>No use of petrol motor vehicles and audits show all petrol-powered pumps have spark arresters fitted.</p> <p>Training records shows staff trained in use of fire-fighting equipment.</p> <p>Training records verify that operations personnel participate in at least annual fire and emergency drills.</p> <p>Records show toolbox meeting discussions of fire risk levels and fire risk management and remedial actions.</p> <p>When flammable material stores present on site (during drilling operations), records show daily assessment of fire weather during dry season.</p> <p>No smoking allowed on site and any instance of smoking recorded as a non-conformance.</p>
<b>Environmental Value: Terrestrial Environmental Quality</b>			
Vehicles leave the previously constructed roads or work areas	No significant impact to the quality and integrity of land and	No unauthorised physical disturbance to soil.	<p>Site induction records shows all personnel have completed site inductions in accordance with section 7 of this Environmental Management Plan.</p> <p>Records show the erosion and sediment control plan implemented prior to the commencement of the activity.</p>



Risk Sources	Environmental Outcome	Environmental Performance Standard	Measurement Criteria
	soils resulting from conduct of the regulated activity		IVMS records show no off-road driving. IVMS records show 60km/hr speed limit adhered to and any non-compliance recorded.
Inappropriate storage or handling of potentially hazardous substances Transport vehicle accident due to weather Overflow of Pits		No releases of contaminants (wastes, wastewater, chemicals, hydrocarbons or drilling fluids) resulting in long-term contamination of the soil	During drilling operations, weekly inspection checklists report confirms all hazardous materials and stored and managed in accordance with the EMP, the Code of practice and the WOMP, whilst stores exist on site. Records of spills and completed remediation in the Santos Incident Management System. A record of the assessment of environmental hazards posed by the drill cuttings to determine disposal methods. Daily inspection records confirm the freeboard is sufficient to accommodate the relevant wet season and dry season freeboard requirements, and that the pit integrity is appropriate, during drilling operations. During non-operational periods, freeboard inspections will be conducted monthly and managed via remote monitoring methodologies. Audit records show Bureau of Meteorology provided timely notification significant rainfall event and site evacuation plan put into place following notification.
<b>Environmental Value: Inland Environmental Water Quality</b>			
Cross-flow during well drilling, construction, operation and decommissioning, well blow out, faults or major structures enables cross-flow Inappropriate storage or handling of hazardous substances Transport vehicle accident due to weather Overflow of pits	No significant impact on Inland environmental water quality resulting from conduct of the regulated activity	No releases of contaminants (wastes, wastewater, chemicals, hydrocarbons or drilling fluids) resulting in long-term contamination of the waters.	Well control monitoring demonstrates adequate well control. Well acceptance criteria met. Weekly inspection checklist confirms compliance with the EMP, the Code and the WOMP. Records of spills and completed remediation in the Incident Management System. Road conditions for heavy vehicle transport will be assessed prior to mobilisation on unsealed roads. Daily inspection records confirm the freeboard is sufficient to accommodate the relevant wet season and dry season freeboard requirements, and that the pit integrity is appropriate, during drilling operations. During non-operational periods, freeboard inspections will be managed via remote monitoring methodologies. Audit records show Bureau of Meteorology provided timely notification significant rainfall event and site evacuation plan put into place following notification.
Project groundwater extraction results in the reduction in groundwater quantity		No reduction to groundwater resource availability in the area as a result of project activities.	Groundwater extraction volumes at the end of the project provided to DITT and DEPWS. Groundwater monitoring results show groundwater quality, extraction volumes and static water level are relatively unchanged and water availability is unchanged.
<b>Environmental Value: Air Quality and Atmospheric Processes</b>			
Vehicle and plant movements	No significant impact on air quality and minimise emissions (including greenhouse gas emissions) and their impact so that environmental values are maintained	No reduction in air quality as a result of project activities.	Audit records demonstrate vehicles compliant with Northern Territory Motor Vehicle registry regulation and work health and safety regulations. Real time monitoring and gas detection monitoring data confirms no reduction in air quality / fugitive emissions, during drilling operations.
Vehicle and plant movements Fugitive emissions		Minimise greenhouse gas emissions resultant from project activities.	Audit records demonstrate that actual emissions were reported in compliance NGERs.
<b>Environmental Value: Human Health</b>			
Vehicle and plant movements generating Dust and impacting on health or amenity	No impact on the health of the Northern Territory population	Dust generation on the well pad in the dry season will be minimised through tracking of wind forecasts, use of dust suppression when undertaking operations, and strict adherence to speed limits on unsealed roads.	Site induction records show all personnel have completed site inductions in accordance with section 7 of this Environmental Management Plan. IVMS records show speed limits adhered to. Any off-road has been reported to the supervisor and investigated. Stakeholder engagement records demonstrate all reasonable dust complaints received were resolved; or if unable to be resolved, dust monitoring demonstrates dust emissions comply with the relevant legislation.

Risk Sources	Environmental Outcome	Environmental Performance Standard	Measurement Criteria
<b>Environmental Factor: Communities and Economy</b>			
Noise from vehicle movements and drilling activities results in noise disturbance to landholders	Minimise negative impact to communities and enhance the economy	Noise complaints from vehicle movements and drilling activities associate with the project are minimised. Amicable resolution of complaints	Stakeholder engagement records show active consultation with surrounding stakeholders on any potential noise increase and results of these consultations.
Vehicle movements, drilling activities, and entrapment in open pits results in disturbance, injury or death to livestock		Disturbance, injury or death to livestock from vehicle movements and drilling activities minimised through active stakeholder engagement	<p>During drilling operations, daily inspection records show fences are intact, gates are left in the condition in which they were found and no livestock entrapment. During non-operational periods, inspections of pits for livestock entrapment will be conducted monthly and managed via remote monitoring methodologies.</p> <p>Site induction records show all personnel have completed site inductions in accordance with section 7 of this Environmental Management Plan.</p> <p>Stakeholder engagement records demonstrate active stakeholder engagement (i.e. notification prior to the commencement of activities).</p>
Vehicle and plant movements throughout the project area results in disturbance to landholders		Disturbance to landholders from vehicle movements and drilling activities minimised. Amicable resolution of complaints.	<p>Site induction records show all personnel have completed site inductions in accordance with section 7 of this Environmental Management Plan.</p> <p>Stakeholder engagement records demonstrate all reasonable disturbance complaints received were resolved; or if unable to be resolved, dust monitoring demonstrates dust emissions comply with the relevant legislation.</p>
<b>Environmental Factor: Culture and heritage</b>			
Vehicle and plant movements throughout the project area results in disturbance to sacred sites.	Protect sacred sites, culture and heritage	No impact to sacred sites, culture and heritage	<p>Audit records show that all activities including horizontal drilling occur within the areas shown in AAPA Authority Certificate C2019/043.</p> <p>Records show that sacred site data provided for it in the GIS is accurate, maintained and updated.</p>

# Modification Notice - Regulation 22

Table 8-5 Environmental Monitoring

Monitoring program	Description	Frequency
Induction Monitoring	Ensure induction records are kept to demonstrate what was covered in the induction and who was inducted.	Following any site induction
Baseline soil monitoring	An assessment of physical properties of representative baseline soils at each well site will be conducted in accordance with the code.	Prior to establishing the well site
Daily Inspection Checklist	<p>Daily Inspection during drilling operations includes:</p> <ul style="list-style-type: none"> <li>Daily checks of pits and dams throughout during the drilling program,</li> <li>Real time monitoring of conditions during drilling including drilling monitoring &amp; gas detection monitoring has been undertaken,</li> <li>Pre-spud checks / Pre-job checks have been undertaken when transferring mud,</li> <li>Monitoring of the cuttings and flare pit levels during and after rainfall events,</li> <li>Inspection of fences, excavations, pits, storages for entrapped fauna and fauna and to ensure escapes are intact,</li> <li>Inspection of all domestic waste receptacles to ensure they have lids secured.</li> </ul>	Daily During drilling operations
	<ul style="list-style-type: none"> <li>Monthly remote monitoring methodology inspection during non-operational periods.</li> </ul>	Monthly during non-operational periods
Drill Fluid Monitoring	The fluid levels in tanks containing drilling fluids will be monitored to calculate the stored volume of drilling fluid in tanks.	Daily during drilling operations
	A representative sample of stored drill fluids will be taken. and tested for the suite shown in WWMP.	At least monthly during drilling operations
Drill fluid, mud and cutting characterisation	The composition of residual drill cuttings will be analysed to determine whether it is consistent with the assumptions used for the assessment of environmental hazards and the design of proposed disposal methods.	At the end of drilling operations
Weather monitoring	Monitoring of weather and for predicted significant rainfall events will be undertaken. The Bureau of Meteorology have been engaged to provide rapid and accurate notifications in of a significant rainfall event.	Daily during drilling operations
Weed Monitoring	A post wet-season weed survey will be conducted of both lease pads and access tracks. All weed monitoring and survey activities will be recorded in accordance with the <i>NT Weed Data Collection Guidelines</i> .	Annual to coincide with the end of the wet season
Groundwater Monitoring	Detect changes in groundwater as a result of drilling and stimulation activities. Monitoring will be done in accordance with Government guidelines for groundwater monitoring for petroleum operations such as <i>Preliminary Guideline: Groundwater Monitoring Bores for Exploration Petroleum Wells in the Beetaloo Sub-basin</i> .	Ongoing For control monitoring bores - 6 months prior to drilling, and preferably to include both wet

Monitoring program	Description	Frequency
		season and dry season samples
	Volume of water that is abstracted from the water bore will be measured using flowmeter. This will be recorded weekly during bore operations.	Ongoing
	Fluid levels in storages containing abstracted groundwater will be monitored to provide a measure of the stored quantity of water.	Daily during drilling operations
Rehabilitation Monitoring	Photo points established and revisited as part of the civils scope.	Photo points established and revisited.
Operational Fire Monitoring	During drilling operations, Onsite Company Representative is responsible for monitoring for bushfire alerts (primarily via the <a href="https://secure.nt.gov.au/alerts">https://secure.nt.gov.au/alerts</a> and <a href="https://www.bushfires.nt.gov.au/incidentmap/">https://www.bushfires.nt.gov.au/incidentmap/</a> websites) and notifying all site personnel of the risks of fire during toolbox meetings conducted during operations whenever personnel are onsite.	Daily during drilling operations
Fire Fuel Load Monitoring	Vegetation removal requirements will be assessed during the post wet weed survey when vegetation growth will be greatest. If required, slashing / grading will occur to remove well site vegetation.	Annual to coincide with the end of the wet season done in conjunction with the weed survey