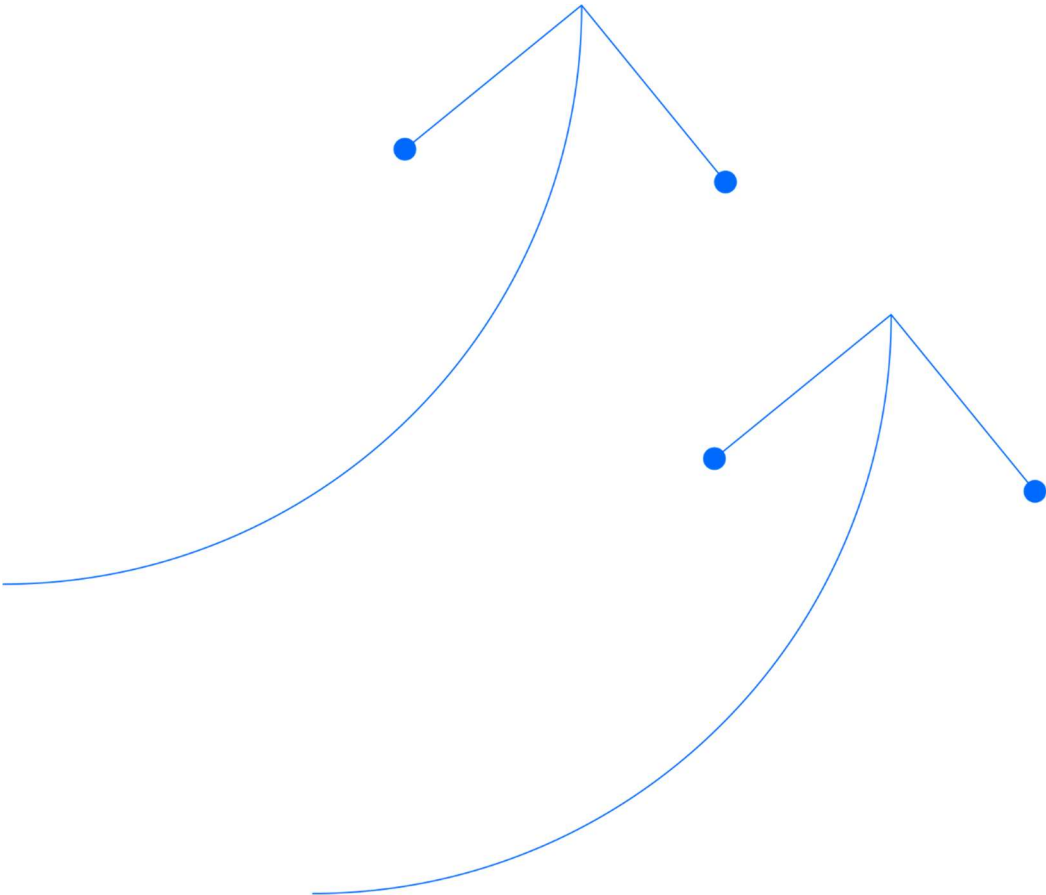


APPENDIX O: RISK ASSESSMENT

April 2026



ID #	Regulated Activity	Environmental Factor	Planned / unplanned event	Causes	Impacts	Inherent Risk			Relevant Code of Practice Section	Risk Management Controls	Residual Risk			Acceptable Criteria Achieved	Scientific Uncertainty Ranking	ALARP Type
						C	L	R			C	L	R			
AIR QUALITY																
1	All Activities	Air quality	Planned and unplanned emissions from dust generation during clearing, earthworks, appraisal activities and traffic	<ul style="list-style-type: none"> Land clearing and earthworks. Vehicle and mobile plant operation on unsealed roads. Wind erosion and disturbance of exposed soils. 	<ul style="list-style-type: none"> Temporary reduction in local air quality. Dust deposition on vegetation and surrounding environment. Reduced amenity for nearby receptors. Potential health and nuisance impacts to nearby receptors. 	3	C	L	<ul style="list-style-type: none"> A.3.1 Site Selection and Planning A.3.4 Erosion and Sediment Control A.3.5 Biodiversity Protection 	<ul style="list-style-type: none"> Vehicle and plant maintained in accordance with manufacturer specifications to minimise emissions. Traffic management measures implemented including speed limits on unsealed roads and access tracks. Dust suppression measures implemented during dry or high traffic conditions, including water carts where required. Use of existing access tracks where practicable to minimise disturbance and dust generation. Progressive rehabilitation of disturbed areas as activities are completed. Work activities reviewed during high wind conditions where there is increased risk of dust generation. 	2	B	VL	Yes	Low	A
2	All Activities	Atmospheric processes	Planned and unplanned atmospheric emissions including greenhouse gas emissions, fugitive methane releases, venting and flaring during exploration and appraisal activities	<ul style="list-style-type: none"> Operation of wells and associated infrastructure. Fugitive emissions from wastewater storage/transfer, valves, fittings and equipment. Venting and flaring activities. Higher than forecast fugitive emissions from venting/flaring resulting in increased GHG emissions. Operation of plant, equipment and vehicles associated with construction and operations (e.g. earthworks, onsite generators, pumps/compressors, lighting towers and vehicle movements). 	<ul style="list-style-type: none"> Excessive greenhouse gas emissions to atmosphere. 	3	C	L	<ul style="list-style-type: none"> D.5.1 Methane Emissions Management Plan D.5.2 Inspection Frequency and Procedure D.5.9 Venting and Flaring Part 4 – Methane emissions monitoring, leak detection and reporting 	<ul style="list-style-type: none"> Methane Emissions Management Plan Wells designed, constructed and maintained in accordance with NT Code of Practice – Well Integrity requirements, including leak detection and repair (LDAR) program. Routine inspection and maintenance of wellheads, valves, pipelines and associated infrastructure. Flaring preferred over venting, with venting limited to situations where flaring is not practicable and minimised in duration. Emissions estimated and reported in accordance with NGERs requirements. If the facility's Scope 1 emissions exceed 100,000 tCO₂-e in a financial year, comply with Safeguard Mechanism requirements. Maintenance of plant, equipment and vehicles in accordance with manufacturer requirements. 	2	B	VL	Yes	Low	A
PEOPLE																
3	Drilling and Appraisal Operations	Community and economy	Continuous operational noise emissions during drilling, hydraulic fracturing, testing and camp operations.	<ul style="list-style-type: none"> Operation of drilling rigs and stimulation equipment Operation of generators, pumps and compressors Camp power generation and associated infrastructure Continuous 24-hour operational schedule Vehicle movements and support activities 	<ul style="list-style-type: none"> Nuisance to nearby receptors Disturbance to landholders Disturbance to livestock and wildlife Reduced rural amenity 	2	E	M	<ul style="list-style-type: none"> A.3.1 Site Selection and Planning A.3.3 Noise 	<ul style="list-style-type: none"> Well pads located to maximise distance from sensitive receptors. Activities undertaken in accordance with NT Noise Management Framework Guideline. Preliminary noise assessment undertaken. Noise modelling completed for stimulation activities prior to commencement. Equipment operated and maintained in accordance with manufacturer specifications. Stakeholder consultation undertaken and recorded in Stakeholder Engagement Log. Site layout designed to minimise noise propagation. Install relevant engineering controls e.g. horizontal flare pit and earthen berm Comply with noise thresholds at sensitive receptors Flare rates managed, where required, to maintain compliance with applicable noise thresholds at sensitive receptors. Production testing flaring limited to a maximum of 30 days. 	2	C	L	Yes	Low	A
4	Drilling Activities	Community and economy	Artificial lighting and light spill during night-time and 24-hour operations associated with drilling, hydraulic fracturing, testing and camp operations.	<ul style="list-style-type: none"> Lighting towers for drilling / stimulation / testing activities Work area floodlighting for safety and operational tasks Camp lighting (accommodation, amenities, laydown, security) Camp power generation area lighting (generators and ancillary plant) Vehicle headlights and mobile plant lighting during night operations Temporary lighting used for maintenance, inspections and emergency response Flaring activities, including flame visibility and associated illumination during night-time operations. 	<ul style="list-style-type: none"> Reduced rural amenity for nearby receptors Disturbance to landholders Behavioural disturbance to livestock and wildlife (e.g. attraction/avoidance, altered movement) Light spill/glare affecting nearby road users where applicable 	2	D	L	A.3.1 Site Selection and Planning	<ul style="list-style-type: none"> Lighting towers directed inward toward the centre of the site where practicable. Task-specific lighting used to minimise unnecessary illumination. Lighting design implemented to minimise off-site light spill. Site layout maximises distance from sensitive receptors. Stakeholder engagement undertaken with nearby landholders. Install relevant engineering controls e.g. horizontal flare pit to reduce light impacts from flaring Limit duration of production test flaring to 30 days 	2	C	L	Yes	Low	A
5	Well Operations	Community and economy	Introduction of well pads, camps and associated infrastructure within a rural landscape	<ul style="list-style-type: none"> Construction of well pad, camp and supporting infrastructure. Clearing and establishment of access tracks and facilities. 	<ul style="list-style-type: none"> Change to rural landscape character. Reduced visual amenity for landholders and road users. 	3	C	L	<ul style="list-style-type: none"> A.3.1 Site Selection and Planning A.3.2 Well Pad Site Selection Requirements 	<ul style="list-style-type: none"> Infrastructure located to minimise visual disturbance where practicable. Existing tracks used where possible to reduce clearing. Land access agreements established prior to regulated activities commencing. Stakeholder communication and consultation maintained through the Stakeholder Engagement Log. Disturbance footprint minimised during construction. 	2	B	VL	Yes	Low	A
6	Ancillary Infrastructure	Community and economy	Adverse interactions between the regulated activity workforce and landholders/community during exploration and appraisal activities	<ul style="list-style-type: none"> Mobilisation of drilling, stimulation and support personnel Temporary residence of workforce in a rural area Use of local services and infrastructure 	<ul style="list-style-type: none"> Increased demand on accommodation and local services Reduced availability of skilled labour for local businesses Increased interaction with landholders and community members 	3	C	L	A.3.1 Site Selection and Planning	<ul style="list-style-type: none"> Purpose built, temporary accommodation facilities built on the well pad to support well operations and minimise pressure on regional housing. Broader stakeholder engagement (above that required by Regulation 7) to create awareness of project and its activities. Workforce code of conduct implemented and communicated during inductions. Stakeholder engagement undertaken and recorded in the Stakeholder Engagement Log. Engagement with local contractors and suppliers where practicable. Workforce numbers managed to align with operational requirements. 	2	B	VL	Yes	Low	A
7	All Activities	Community and economy	Increased traffic movements associated with construction and operational activities.	<ul style="list-style-type: none"> Transport of equipment, water and materials associated with the regulated activity. Workforce travel to and from the regulated activity site. Use of public and private access roads for the regulated activity. 	<ul style="list-style-type: none"> Damage or degradation of public or private roads. Reduced safety for road users and community. Increased dust on access roads. Injury or death to livestock and fauna. Increased interaction with community and landholders. 	3	C	L	<ul style="list-style-type: none"> A.3.1 Site Selection and Planning A.3.2 Well Pad Site Selection Requirements 	<ul style="list-style-type: none"> Stakeholder engagement undertaken and recorded in the Stakeholder Engagement Log. Traffic Impact Assessment undertaken where required for upgrades or intersections with major roads including the Carpentaria Highway. Use of designated approved access tracks during operations. Existing access tracks utilised where practicable to minimise disturbance. Speed limits implemented across the Project Area (60 km/h on formed tracks, 40 km/h on unformed or rehabilitated tracks). Dust suppression measures implemented during high traffic and dry conditions. Access tracks maintained during operations where required. Activities planned to minimise disruption to surrounding land uses and infrastructure. Access to critical infrastructure such as the Ampitel telecommunications tower maintained at all times. 	2	B	VL	Yes	Low	A
8	All Activities	Human health	Ignition of bushfire resulting from project activities	<ul style="list-style-type: none"> Hot works and flaring activities Vehicle and machinery operation in dry vegetation Electrical faults or equipment malfunction Improper disposal of smoking materials Spark generation from plant and equipment 	<ul style="list-style-type: none"> Injury or death of livestock Loss of pasture, dwellings and infrastructure Damage to flora and fauna Impacts to local landscape and surrounding properties 	3	D	M	<ul style="list-style-type: none"> A.3.1 Site selection and Planning A.3.7 Fire Management B.4.11 Air and gas drilling B.4.13 Hydraulic stimulation and flowback operations 	<ul style="list-style-type: none"> Site-specific Bushfire Management Plan implemented. Well pad, camp and access tracks designed with cleared firebreaks. Flare positioned with adequate vegetation-free buffer to maintain radiant heat below 8 kW/m². Constant monitoring during flaring activities. Alarms and shutdown response if the flare is extinguished. Spark arresters fitted where practicable. Smoking restricted to designated cleared areas. No burning of solid waste on site. Machinery parked in low fuel-load areas. Weather and Fire Danger Ratings monitored during high-risk periods. Daily toolbox meetings include fire risk briefing. North Australian Fire Information (NAFI) mapping monitored. Firefighting equipment available on site. Water supply available for firefighting. Vehicles equipped with operational VHF/UHF communications. Coordination with pastoralists regarding fire management obligations. 	3	C	L	Yes	Low	B

ID #	Regulated Activity	Environmental Factor	Planned / unplanned event	Causes	Impacts	Inherent Risk			Relevant Code of Practice Section	Risk Management Controls	Residual Risk			Acceptable Criteria Achieved	Scientific Uncertainty Ranking	ALARP Type
						C	L	R			C	L	R			
9	Clearing and Earthworks	Cultural Heritage	Disturbance of Aboriginal cultural heritage sites or artefacts during ground disturbance activities	<ul style="list-style-type: none"> Clearing and earthworks Vehicle movement outside approved tracks Inadvertent discovery of previously unidentified heritage items 	<ul style="list-style-type: none"> Damage to Aboriginal artefacts Disturbance of sacred sites or restricted areas Breach of AAPA Authority Certificate conditions 	4	C	M	A.3.1 Site Selection and Planning A.3.2 Well Pad Site Selection Requirements Aboriginal Areas Protection Authority (AAPA) Authority Certificates	<ul style="list-style-type: none"> Site selection informed by AAPA Authority Certificates and on-ground cultural heritage surveys including Traditional Owners. Disturbance restricted to subject land defined in Authority Certificates. Restricted work areas avoided in accordance with Certificate conditions. Preferential use of existing access tracks and disturbed areas. All vehicles to remain on designated approved access tracks. Declared areas and mapped artefacts excluded from clearing. Implementation of approved Unexpected Finds Protocol. Immediate cessation of works if artefacts are discovered. Notification to NT Heritage Branch where required. Inductions include mandatory cultural heritage awareness, cultural heritage approval processes, and incident reporting requirements. Workers briefed on AAPA conditions prior to commencing works. GIS database maintained for cultural heritage constraints and works conditions. Santos Ltd cultural heritage approval processes applied to any changes in siting or activities that may affect approved heritage constraints 	2	D	L	Yes	Low	A
WATER																
10	Clearing and Earthworks	Hydrological processes	Earthworks and site development disrupt natural drainage; flooding/overland flow mobilises sediments and/or contaminants	<ul style="list-style-type: none"> Clearing and earthworks altering surface drainage Concentrated flows around pads/tracks/borrow pits High rainfall, flooding or overland flow affecting disturbed areas 	<ul style="list-style-type: none"> Altered local hydrological processes and drainage function Erosion and sediment transport Mobilisation of contaminants from disturbed/operational areas during flood events 	3	C	L	A.3.1 Site selection and planning A.3.4 Erosion and Sediment Control and Hydrology A.3.8 Containment of contaminants A.3.9 Rehabilitation	<ul style="list-style-type: none"> Well pads located to avoid riparian clearing where practicable (Appendix J). Separation maintained from mapped watercourses (4.5 km Newcastle South; 6 km Jibera South to nearest Stream Order 1 watercourse). Flood modelling used for site selection; key infrastructure located outside 1% AEP flood extent where practicable. Erosion and sediment controls designed, installed, inspected and maintained in accordance with the ESCP (including pre/post rainfall inspections). Drainage controls implemented to prevent concentration of flows and protect downslope areas. Tank pads and chemical storage areas banded/bermed with secondary containment (110% of largest vessel) to prevent release during storm events. Seismic lines and disturbed areas inspected for erosion during rehabilitation; rectification undertaken where required. 	2	B	VL	Yes	Low	A
11	Water Management Infrastructure – Drilling and Appraisal Activities	Hydrological processes	Heavy rainfall, flooding or overland flow causes inundation/overlapping or failure of sumps, pits, tanks or embankments leading to wastewater release to land or surface water	<ul style="list-style-type: none"> Extreme rainfall and flooding Inadequate freeboard or containment Berm/bund failure or stormwater ingress Unattended site during rain events 	<ul style="list-style-type: none"> Localised contamination of soil and/or surface water Release of wastewater to local drainage pathways 	3	D	M	A.3.8 Containment of Contaminants A.3.4 Erosion and sediment control and hydrology B.4.16 Site material and fluids management C.4.2 Management of produced water and flowback fluid C.5.3–C.5.5 (monitoring/storage) C.6 Monitoring mandatory requirements C.7.1 Wastewater Management Plan C.7.2 Spill Management Plan	<ul style="list-style-type: none"> Wastewater Management Plan and Spill Management Plan implemented (Appendix F/E). Flood modelling informs site selection; key infrastructure located outside 1% AEP where practicable. Pad constructed with bund/berm and drainage controls to divert clean stormwater away from operational areas and prevent stormwater ingress. Wastewater storage infrastructure designed and operated with verified freeboard, with freeboard maintained in accordance with the Wastewater Management Plan and Code requirements (including seasonal freeboard for open-top tanks and 0.5 m freeboard for closed-top tanks) Wastewater tanks may be fitted with covers during the wet season to limit stormwater ingress and preserve available storage capacity. Perimeter bunding/secondary containment maintained around pits/tanks and chemical storage; secondary containment sized to 110% of largest vessel where applicable. Pit/tank levels monitored (including remotely when unattended). Shutdown/response actions implemented ahead of significant rainfall where required by the Wastewater/Spill Management Plans. 	2	C	L	Yes	Low	A
12	Well design, construction, casing, cementing, stimulation and abandonment.	Inland Water Environmental Quality	Uncontrolled release due to barrier failure or loss of well integrity causing crossflow/contamination of aquifers during drilling, stimulation, workover, suspension or decommissioning	<ul style="list-style-type: none"> Inadequate barrier design/verification Casing/cement failure or poor cement placement Loss of well control/abnormal pressures Hydraulic stimulation growth outside target interval (credible worst case) Inadequate suspension/decommissioning plugs/barriers Unexpected aquifer encounter during drilling 	<ul style="list-style-type: none"> Cross-contamination between aquifers Potential change to groundwater-dependent surface ecosystem values (including Hot Springs Valley springs) if cross-contamination were to occur Long-term degradation of groundwater quality and beneficial uses Potential uncontrolled release of gas/fluids to surface Safety and fire hazards (secondary) 	4	D	H	B.4.2 Aquifer Protection B.4.10 Drilling Fluids B.4.11 Air and gas drilling fluids B.4.13 Hydraulic Stimulation and Flowback Operations B.4.14 Workover and intervention B.4.15 Well suspension and decommissioning B.4.17 Groundwater Monitoring B.5 BTEX Limits	<ul style="list-style-type: none"> WOMP developed in accordance with the NT Code of Practice – Well Integrity and approved by the regulator prior to operations. Regulated activities must be undertaken in accordance with the approved WOMP. Basis of Well Design includes aquifer protection outcomes and barrier philosophy. Cement slurry design and pumping schedule prepared by competent engineers; cement job QA/QC implemented. Barrier verification undertaken (e.g., cement bond log / testing) prior to completions and as required; remedial cementing completed where verification indicates deficiencies. Blowout preventers (BOP) installed/used once surface casing installed in accordance with the drilling program. Continuous monitoring of drilling fluids for gains/losses; LCM available to prevent/remediate losses. Groundwater monitoring implemented in accordance with Code requirements (B.4.17). Hydraulic stimulation undertaken in target shale >2500 m TVD below shallow beneficial-use aquifers; fracture design based on modelling of height/length to stay within target zone; monitoring and verification undertaken during operations. HFS/drilling fluids comply with BTEX limits and Code requirements; restrictions applied for shallow aquifer drilling where required. Well integrity management and lifecycle checks applied (pressure/casing integrity/corrosion monitoring as relevant). Suspension/decommissioning: plug and abandon in accordance with Code, using verified cement plugs/barriers; records and verification reports retained per WOMP/Code. If an aquifer is discovered that was not identified prior to drilling, notify and manage in accordance with approval conditions (e.g., PER requirements) and WOMP. Competency requirements for drilling and cementing contractors. 	3	C	L	Yes	Medium	A
13	Groundwater Bore Construction and Water Extraction	Inland Water Environmental Quality	Poorly constructed water supply bores create pathways for cross-contamination between aquifers	<ul style="list-style-type: none"> Inadequate bore construction/sealing Poor drilling practices or records Incorrect siting or lithological misunderstanding 	<ul style="list-style-type: none"> Cross contamination between aquifers, formations and/or springs Long-term degradation of groundwater resources 	4	D	H	Water Extraction Licence Minimum Construction Requirements for Water Bores in Australia, 4th Edition	<ul style="list-style-type: none"> Compliance with Water Extraction Licence conditions and allocation limits Bores constructed by appropriately qualified/licensed driller in accordance with Minimum Construction Requirements (4th Ed.). Bore construction details recorded (depths, casing, seals, annular grout) and retained for verification. 	3	C	L	Yes	Low	B
14	Groundwater Extraction for Drilling and Hydraulic Fracturing Operations	Inland Water Environmental Quality	Temporary drawdown of aquifers due to operational water demand	<ul style="list-style-type: none"> Water demand for drilling, completions and HFS Concurrent regional extraction (if applicable) 	<ul style="list-style-type: none"> Reduced groundwater availability for other users/GDEs Potential reduction in spring discharge (including Hot Springs Valley springs) Drawdown exceeding expected levels 	4	D	H	B.4.17 Groundwater monitoring C.6.1 Water and wastewater tracking and reporting requirements	<ul style="list-style-type: none"> Compliance with Water Extraction Licence conditions and allocation limits. Source and volume of water used recorded for all well operations. Groundwater monitoring undertaken in accordance with the approved monitoring program. Adaptive management triggers applied if monitoring indicates unexpected drawdown (review extraction rates, investigate causes, notify regulator if required). 	3	C	L	Yes	Medium	B
15	Drilling Activities	Inland Water Environmental Quality	Spill or improper use of drilling/HFS chemical additives causing contamination of soil and/or shallow groundwater	<ul style="list-style-type: none"> Storage/handling/transfer failures (hoses, valves, fittings, containers) Inappropriate chemical selection or uncontrolled use Human error during mixing/transfer 	<ul style="list-style-type: none"> Localised soil contamination requiring remediation Potential localised impact to shallow groundwater (if not contained) Impacts to flora, fauna and GDE's 	3	D	M	B.5 BTEX Limits B.4.17 Groundwater Monitoring C.5 Monitoring mandatory requirements C.7.1 Wastewater Management Plan C.7.2 Spill Management Plan	<ul style="list-style-type: none"> Chemical risk assessment completed for all anticipated chemicals (drilling and HFS), including SDS review and selection of lower-toxicity alternatives where practicable. Wastewater Management Plan and Spill Management Plan implemented (classification, response and reporting). Chemicals stored in banded areas/secondary containment; secondary containment sized appropriately (110% of largest container where applicable). Transfers undertaken in designated areas with drip trays under connections; spill kits available at storage and transfer locations. Daily inspections during operations of storage/containment areas; spilled material removed from secondary containment promptly. Stormwater and Groundwater Monitoring Plan implemented (Appendix I). 	2	B	VL	Yes	Medium	A
16	Drilling Activities	Inland Water Environmental Quality	Loss of containment of produced water/flowback during storage and handling in above ground tanks	<ul style="list-style-type: none"> Tank/liner failure, valve/hose failure Overfilling or inadequate freeboard Stormwater ingress/inundation leading to overtopping 	<ul style="list-style-type: none"> Localised soil contamination Potential contamination of surface water/shallow groundwater Impacts to flora, fauna and GDE's 	3	D	M	C.4.2 Management of produced water and flowback fluid C.5.3 Hydraulic fracturing fluid monitoring C.5.4 Flowback fluid monitoring C.5.5 Produced water and flowback fluid storage C.6 Monitoring mandatory requirements C.7.1 Wastewater Management Plan C.7.2 Spill Management Plan	<ul style="list-style-type: none"> WOMP developed in accordance with the NT Code of Practice – Well Integrity and approved by the regulator prior to operations. Wastewater Management Plan and Spill Management Plan implemented (Appendix F/E). Flowback fluids stored in above-ground tanks in accordance with the Wastewater Management Plan and Code requirements; installation QA/QC completed and documented. Flowback fluids reused/recycled where suitable to reduce stored volumes and offsite disposal requirements (as per WWMP). Minimum freeboard maintained in accordance with Code and the Wastewater Management Plan; level monitoring undertaken (telemetry/cameras where used). Closed-top tanks may be used during the wet season to limit stormwater ingress and preserve available storage capacity. Bunding/berms and stormwater controls implemented to prevent stormwater ingress and contain releases. Routine inspections of pits/tanks/separators/sumps during operations and while testing. Site selection and layout minimise interaction with drainage pathways and flood risk. 	3	B	L	Yes	Low	A

ID #	Regulated Activity	Environmental Factor	Planned / unplanned event	Causes	Impacts	Inherent Risk			Relevant Code of Practice Section	Risk Management Controls	Residual Risk			Acceptable Criteria Achieved	Scientific Uncertainty Ranking	ALARP Type
						C	L	R			C	L	R			
17	Drilling & flowback operations	Inland Water Environmental Quality	Loss of containment or improper handling of NORM-containing fluids or drill cuttings.	• Drilling through formations containing naturally occurring radioactive material (Velkerri and Kyalla formations), resulting in NORM presence in produced water, flowback fluids or drill cuttings.	• Contamination of soil, surface water or shallow groundwater • Occupational exposure risks	3	D	M	B.4.14 Workover and Intervention B.4.15 Well Suspension and Decommissioning C.4.2 Management of Produced Water and Flowback Fluid C.5.2 Drilling Materials C.7.1 Wastewater Management Plan	• Wastewater Management Plan implemented for handling, storage and disposal of NORM-containing fluids. • Drill cuttings pits constructed with impermeable liners in accordance with NT Code requirements. • Radiological monitoring undertaken where required in accordance with ARPANSA (2008) Safety Guide for Management of NORM. • Drill cuttings reuse or disposal undertaken under approved procedure. • Storage and transport of NORM materials undertaken in accordance with relevant radiation safety guidance. • Records of monitoring, handling, transport and disposal maintained.	2	C	L	Yes	Low	A
18	Drilling fluid and cuttings management	Inland Water Environmental Quality	Loss of containment of drill cuttings, drilling mud or associated fluids.	• Inadequate design, construction, monitoring or maintenance of drill cuttings containment systems (including liner failure, insufficient freeboard or non-compliance with approved procedures).	• Localised soil contamination • Potential groundwater contamination	3	D	M	C.4.1 Drilling Fluids C.4.2 Management of Produced Water and Flowback Fluid C.7.1 Wastewater Management Plan A.3.9 Rehabilitation	• WOMP developed in accordance with the NT Code of Practice – Well Integrity and approved by the regulator prior to operations. • Wastewater Management Plan implemented. • Drill cuttings and mud contained within lined and constructed sumps compliant with NT Code requirements. • Freeboard maintained to design specification at all times. • Routine inspection of liner integrity and sump condition. • Tanks used where appropriate to minimise open pit storage. • Stock exclusion fencing installed where required. • Spill response procedures implemented in the event of containment breach. • Final rehabilitation includes burial of dried sump contents with minimum 1.5 m clean fill cover where required. • Post-closure inspection to confirm stability and absence of seepage.	2	C	L	Yes	Low	A
19	Storage and transport of hazardous chemicals	Inland Water Environmental Quality	Loss of containment of hazardous chemicals, fuels, drilling additives or dangerous goods during storage, handling or transport.	• Failure of storage systems, transfer operations, transport incidents, equipment failure, human error or inadequate secondary containment	• Soil contamination • Surface water contamination • Groundwater contamination	3	D	M	A.3.8 Containment of Contaminants C.7.2 Spill Management Plan	• Spill Management Plan implemented. • Secondary containment provided for fuel, oil and chemical storage areas (≥110% largest container). • Bunds/drip trays used during refuelling and chemical transfer. • Refuelling undertaken in designated areas away from riparian buffers. • Daily inspection of chemical storage and containment areas. • Spill kits maintained on site and personnel trained in spill response. • Transport undertaken in accordance with Dangerous Goods legislation. • SDS and manifests maintained and available. • Immediate clean-up and reporting of spills in accordance with Incident Management Procedure. • Fuel and lubricants stored and managed in accordance with AS1940.	3	C	L	Yes	Low	A
20	Camp and ancillary infrastructure operations	Inland Water Environmental Quality	Uncontrolled runoff, seepage or over-irrigation of treated wastewater.	• Inadequate system design, hydraulic overloading, equipment malfunction, poor irrigation management or failure to maintain treatment systems.	• Localised soil contamination • Shallow groundwater contamination • Waterlogging or salinisation • Runoff to surface waters	3	D	M	A.3.1 Site Selection and Planning A3.8 Containment of contaminants A3.9 Rehabilitation	• Irrigation completed by use of sprinklers or dispersion hoses to prevent pooling and runoff/attractants to fauna or stock. • Sewerage wastewater will be irrigated as per the Department of Health Code of Practice for Wastewater Management. • Approved transportable aerated wastewater treatment plants used for rigs / camps. • Areas will be appropriately sized to accommodate irrigation volume. • Irrigation areas will be located away from watercourses. • The wastewater system performance will be monitored according to the Original Manufacturer's requirements. • Stormwater diversion implemented to prevent interaction with wastewater irrigation areas and uncontrolled runoff.	2	B	VL	Yes	Low	A
21	Groundwater Bore Construction and Water Extraction	Aquatic Ecosystems	Temporary drawdown resulting in negative impacts to GDEs and stygofauna	• Water demand for drilling, completions and HFS • Concurrent regional extraction	• Reduced groundwater availability for other users/GDEs • Drawdown exceeding expected levels • Potential impact to aquatic GDE values/stygofauna habitat including groundwater-dependent surface values (if water levels are altered)	3	D	M	Water Extraction Licence Minimum Construction Requirements for Water Bores in Australia, 4th Edition B.4.17 Groundwater monitoring C.6.1 Water and wastewater tracking and reporting requirements	• Compliance with Water Extraction Licence conditions and allocation limits • Bores constructed by appropriately qualified/licensed driller in accordance with Minimum Construction Requirements (4th Ed.). • Bore construction details recorded (depths, casing, seals, annular grout) and retained for verification. • Source and volume of water used recorded for all well operations. • Groundwater monitoring undertaken in accordance with the approved monitoring program. • Adaptive management triggers applied if monitoring indicates unexpected drawdown (review extraction rates, investigate causes, notify regulator if required).	2	C	L	Yes	Medium	B
22	Drilling & flowback operations	Aquatic Ecosystems	Groundwater quality changes resulting in negative impacts to GDEs and stygofauna	• Loss of containment of chemicals, wastewater, drilling fluids or produced fluids • Inadequate barrier design/verification • Casing/cement failure or poor cement placement • Hydraulic stimulation outside target interval	• Long-term degradation of groundwater resources (if groundwater quality is affected) • Potential impact to aquatic GDE values/stygofauna habitat including groundwater-dependent surface values (if water quality is altered)	3	D	M	Water Extraction Licence B.4.2 Aquifer Protection B.4.13 Hydraulic Stimulation and Flowback Operations B.4.17 Groundwater Monitoring B.5 BTEX Limits C.7.1 Wastewater Management Plan C.7.2 Spill Management Plan	• WOMP developed in accordance with the NT Code of Practice – Well Integrity and approved by the regulator prior to operations. • Regulated activities undertaken in accordance with the approved WOMP • Hydraulic stimulation designed and undertaken to remain within the target formation • HFS and drilling fluids comply with BTEX limits and Code requirements • Wastewater Management Plan and Spill Management Plan implemented • Chemicals, drilling fluids and wastewater stored and handled with secondary containment and spill response measures • Groundwater monitoring undertaken in accordance with the approved monitoring program • Adaptive management and incident response implemented if groundwater quality impacts are identified	2	C	L	Yes	Medium	B
LAND																
23	Site Preparation, Clearing and Earthworks	Landforms	Clearing and earthworks result in soil compaction and degradation of soil structure.	• Heavy machinery and light vehicle movements • Repeated trafficking outside designated tracks • Topsoil stripping and storage	• Reduced soil permeability and infiltration • Altered surface drainage • Prolonged rehabilitation timeframes	3	C	L	A.3.1 Site Selection and Planning A.3.2 Well Pad Site Selection Requirements A.3.4 Erosion and Sediment Control and Hydrology A.3.9 Rehabilitation	• Vehicle movements restricted to designated approved access tracks. • Site design and clearing aligned with NT Land Clearing Guidelines (DEPWS 2024). • Topsoil stripped and stockpiled separately for later respreading. • Progressive rehabilitation undertaken where practicable. • Rehabilitation includes respreading topsoil and stabilisation of disturbed areas.	2	B	VL	Yes	Low	A
24	Borrow Pit Excavation and Earthworks	Landforms	Borrow pit excavation alters landform and drainage characteristics.	• Excavation of soil/gravel for well pad and access road construction • Over-extraction • Poor siting relative to drainage lines	• Disturbance of natural landforms • Alteration of surface drainage • Increased erosion potential • Exposure of subsurface materials	3	C	L	A.3.1 Site Selection and Planning A.3.4 Erosion and Sediment Control and Hydrology A.3.9 Rehabilitation	• Borrow pits located outside drainage lines, flood-prone areas and shallow groundwater zones. • Extraction depths and volumes managed to maintain landform stability. • Surface water controls implemented to prevent offsite runoff. • Monitoring undertaken during operations to identify and rectify erosion. • Borrow pits rehabilitated progressively where practicable.	2	B	VL	Yes	Low	A
25	Site Preparation and Civil Construction	Landforms	Civil works modify natural landform and surface morphology.	• Grading, excavation and soil removal • Construction of pads and tracks	• Alteration of natural drainage patterns • Loss of natural soil horizons • Visual modification of landscape	3	C	L	A.3.1 Site Selection and Planning A.3.2 Well Pad Site Selection Requirements A.3.4 Erosion and Sediment Control and Hydrology A.3.9 Rehabilitation	• Infrastructure sited on relatively flat terrain where practicable. • Existing access tracks used where possible. • New tracks crossing watercourses aligned perpendicular to flow where required. • Rehabilitation restores contours to as close to pre-disturbance condition as practicable.	2	B	VL	Yes	Low	A
26	Site Preparation and Earthworks	Terrestrial Environmental Quality	Rainfall acting on cleared areas results in erosion and sediment transport.	• Vegetation clearing • Exposed soils • High-intensity rainfall	• Soil erosion • Sediment release to surrounding land • Dust generation	3	D	M	A.3.1 Site Selection and Planning A.3.4 Erosion and Sediment Control and Hydrology A.3.9 Rehabilitation	• Erosion and Sediment Control Plan (ESCP) implemented (Appendix G). • Controls installed prior to disturbance and inspected and maintained in accordance with the ESCP (including daily inspections during active ground disturbance, and pre/post significant rainfall inspections where safe access is available). • Stormwater diversion bunding implemented around pads. • Clearing scheduled to avoid significant rainfall where practicable. • Rehabilitation Management Plan implemented (Appendix K). • Disturbed areas stabilised promptly.	3	C	L	Yes	Low	A

ID #	Regulated Activity	Environmental Factor	Planned / unplanned event	Causes	Impacts	Inherent Risk			Relevant Code of Practice Section	Risk Management Controls	Residual Risk			Acceptable Criteria Achieved	Scientific Uncertainty Ranking	ALARP Type
						C	L	R			C	L	R			
27	Rehabilitation and Land Restoration	Terrestrial Environmental Quality	Disturbed areas fail to achieve stabilisation and revegetation objectives.	• Poor management of soils and cleared vegetation	• Weed infestation and poor regeneration of previously disturbed areas • Sediment release from cleared areas during project operations. • Poor vegetation regrowth	3	C	L	A.3.4 Erosion and sediment control and hydrology A.3.9 Rehabilitation	• Rehabilitation Management Plan implemented (Appendix K). • Topsoil stripped, stored and respread in accordance with approved methodology. • Progressive rehabilitation undertaken wherever practicable. • Temporary erosion and sediment controls maintained until vegetation establishment is demonstrated. • Post-rehabilitation inspections conducted to confirm stabilisation and revegetation performance. • Weed management implemented in accordance with Weed Management Plan. • Seismic lines and disturbed areas inspected during rehabilitation phase. • Drilling pits (sumps) reinstated and stabilised in accordance with Rehabilitation and Wastewater Management Plans at cessation of activity.	2	C	L	Yes	Low	A
28	Site Preparation and Vegetation Clearing	Terrestrial Ecosystems	Clearing impacts habitat of threatened or significant fauna species (EVNT Species).	• Vegetation clearing • Ground disturbance • Habitat removal	• Habitat loss or fragmentation • Disturbance to breeding or shelter sites • Adversely affecting critical habitat or the breeding pattern of; - Grey falcon - Gouldian finch - Brushtail possum - Yellow spotted monitor, Mertens water monitor - Crested shrike-tit - Bluetongue lizard	3	D	M	A.3.1 Site Selection and Planning A.3.5 Biodiversity Protection	• Fauna spotter-catcher present during clearing. • Pre-clearing inspections for nests and habitat features. • Active relocation where required. • Fauna ladders installed in pits. • Workforce inductions include habitat protection requirements. • Clearing limited to approved footprint.	2	C	L	Yes	Low	A
29	Site Preparation and Vegetation Clearing	Terrestrial Ecosystems	Clearing outside approved footprint or indirect impacts to adjacent vegetation.	• Unauthorised clearing • Sediment or spill migration	• Habitat fragmentation • Vegetation degradation • Reduced ecological connectivity	3	D	M	A.3.1 Site Selection and Planning A.3.5 Biodiversity Protection A.3.9 Rehabilitation	• Clearing strictly confined to approved disturbance footprint. • Existing tracks utilised where practicable. • Mature trees and hollow-bearing trees flagged for avoidance. • Riparian zones avoided. • Rehabilitation and topsoil respreading undertaken post-activity.	2	C	L	Yes	Low	A
30	Drilling Operations	Terrestrial Ecosystems	Entrapment of fauna or livestock in open pits or water bodies.	• Open sumps and water storage pits	• Injury or mortality of fauna/stock	2	E	M	A.3.5 Biodiversity Protection A.3.8 Containment of Contaminants	• Fauna ladders installed. • Pit embankments graded to allow escape. • Fencing to prevent stock access. • Routine inspections. • Timely decommissioning of pits.	2	C	L	Yes	Low	A
31	All Activities	Terrestrial Ecosystems	Spread of biosecurity risk material (e.g. weed and seed) to, or within the Project Area during operations.	• Movement of heavy and light vehicles and machinery. • Clearing and earthworks of vegetation and soil.	• Localised spread of new weed and pest species	3	D	M	A.3.1 Site selection and Planning A.3.5 Biodiversity Protection A.3.6 Weed Management	• Implementation of a site-specific Weed Management Plan aligned with the requirements of the NT Weed Management Planning Guide. • Baseline weed survey conducted before clearing operations for the identification and management of weeds (included within the Weed Management Plan – Appendix D). • Training and inductions for project staff and contractors will cover vehicle weed hygiene requirements. • Vehicle and machinery will be cleaned down and inspected before mobilisation to the Project Area. • Vehicles will stay on cleared/formed access tracks unless involved in the clearing. • Where weeds are identified, weed control measures in line with Northern Territory Weed Management Handbook will be implemented [DEPWS, 2021] as required. • An annual weed survey of the work areas will be completed as per the NT Code of Practice standards. • Record weed monitoring and survey works in accordance with the NT Weed Data Collection Guidelines. • Santos will notify the NT Weed Management Branch of any new weed incursions. • Fencing of the site to minimise interaction with livestock. • Clean-down records maintained • Weed outbreaks managed with follow-up inspections	2	D	L	Yes	Low	A
32	Waste generation & storage	Waste Management	Uncontrolled release or improper disposal of solid waste.	• Failure of waste segregation, storage, containment or contractor management systems.	• Injury to stock or wildlife • Contamination of soil or waterways • Attraction of pests	2	E	M	C.3.1 Waste management hierarchy	• Application of the waste hierarchy system (avoids, reduce, reuse, recycle, treat, dispose). • Waste streams are segregated on site where appropriate to maximise opportunities for waste recovery, reuse and recycling. • Covered bins are provided for the collection and storage of wastes. • Rubbish loads are covered during transport to a licensed waste facility. • Good housekeeping standards maintained. • Other than waste from approved wastewater systems and grey water, there will be no disposal of waste to the natural environment. • A licenced waste contractor will be used for any off-site transfer or disposal. Tracking or other records to be kept. • During operations, daily inspections of the designated waste disposal area will be undertaken to ensure the area is clean and bins have appropriate capacity.	2	B	VL	Yes	Low	A
CUMULATIVE IMPACTS																
33	Cumulative Impacts	Hydrological processes	Water use from industry appraisal programs impacting on aquifers	• Multiple proponents extracting large volumes of water at one time.	• Significant draw down resulting in impacts to existing water extraction rights. • Draw down impacting natural draw down of the regional aquifer	4	D	H	Water Extraction Licence Minimum Construction Requirements for Water Bores in Australia, 4th Edition	• Compliance with Water Extraction Licence conditions and allocation limits • Bores constructed by appropriately qualified/licensed driller in accordance with Minimum Construction Requirements (4th Ed.). • Bore construction details recorded (depths, casing, seals, annular grout) and retained for verification.	2	B	VL	Yes	Low	A
34	Cumulative Impacts	Terrestrial ecosystem	Increased clearing within the regional landscape	• Petroleum exploration activities and agriculture resulting in impacts to vegetation, flora and fauna.	• Fragmentation of habitat brought by clearing activities • Increased exploration resulting in increased clearing of previously undisturbed habitat	3	D	M	A.3.1 Site Selection and Planning A.3.5 Biodiversity protection	• Clearing is minimised to that only required to undertake the activities. • Well pad design and layout allow for future expansion on the same pads, if required, to reduce the need for additional new disturbance. • Utilise existing access tracks to minimise new clearing.	2	C	L	Yes	Low	A
35	Cumulative Impacts	Atmospheric Emissions	Increased Greenhouse Gas emissions impact on NT and Australian targets	• More exploration activity within the Beetaloo resulting in increase industrial infrastructure present in a rural landscape.	• Multiple appraisal projects would result in cumulative GHG emissions in one year.	3	D	M	D.5.1 Methane Emissions Management Plan D.5.9 Venting and Flaring	• Methane Emissions Management Plan • Wells designed, constructed and maintained in accordance with NT Code of Practice – Well Integrity requirements, including leak detection and repair (LDAR) program. • Flaring preferred over venting, with venting limited to situations where flaring is not practicable and minimised in duration. • Routine inspection and maintenance of wells, valves and associated infrastructure undertaken to minimise fugitive emissions. • Emissions estimated and reported in accordance with NGERS requirements. • If the facility's Scope 1 emissions exceed 100,000 tCO ₂ -e in a financial year, comply with Safeguard Mechanism requirements.	2	B	VL	Yes	Low	A
36	Cumulative Impacts	Community and economy	Increased petroleum assets and disturbance within the regional landscape	• More exploration activity within the Beetaloo resulting in increase industrial infrastructure present in a rural landscape.	• Petroleum infrastructure impacting the rural landscape amenity.	3	C	L	A.3.1 Site Selection and Planning	• Delivery of multiple wells per well pad which will localise the visual and amenity impact of the appraisal program. • Appraisals not in close proximity (>50km) to other proponent's investigation scope.	2	B	VL	Yes	Low	A
37	Cumulative Impacts	Community and economy	Increased traffic from petroleum exploration activities	• More exploration activity within the Beetaloo resulting in increase traffic in a rural landscape.	• Impacts to access tracks, local and territory road condition • Increased safety hazard risk due to more frequent and larger vehicles on the local road network	3	C	L	A.3.1 Site Selection and Planning	• Traffic management measures implemented (speed limits, designated access tracks, driver requirements) • Implement Santos Ltd and other entity procedures and 'Life Saving Rules' focused on the safe operation of vehicles.	2	B	VL	Yes	Low	A