

APPENDIX N.1.3 Historic engagement – under approved

EMPs - Historic Kyalla 117 N2 stakeholder engagement

Appendix N.2 Part A- Stakeholder Engagement Log Summary

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?	Details of changes the interest holder has made as a result of the stakeholder engagement
				9 (1) f	9(1)c	9 (1)d	9 (1) e		9 (1)g
10/07/2018	Interest holder	NLC	Greg Macdonald	Written	Origin request to obtain site clearances for its proposed 2018/19/20 exploration program. This request included a description of the proposed activities (including up to 10 wells at each location, estimated duration and summary of key environmental considerations and risk controls.	No	NA	NA	NA
17/07/2018	Interest holder	NLC	Greg Macdonald	Written	Origin provided additional information regarding maps and proposed site locations.	No	NA	NA	NA
3/09/2019	Interest holder	NLC	Greg Macdonald	Meeting	Meeting to discuss up coming site clearances and scope amendment by Origin. Additional information on lease pad layout and revised site list include.	No	NA	NA	NA
4/09/2018	Interest holder	NLC	Greg Macdonald	Meeting	Revised work program spatial information sent to NLC outlining variation to site clearance scope. Additional information on lease pad layout and revised site list included	No	No	Yes	Location in proximity to Jingaloo community Kyalla W2-1 removed from scope
16/11/2019	stakeholder	Origin Energy	Stephanie Stonier	Written	NLC Conditions of Work Report to Operator_Orgin_181115 received. Report summarised clearance activities, identified restricted work areas and conditions of work.	No	Yes	Yes	Identified restricted work areas and conditions of work add to the emp where relevant.

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03/04/2019-10/04/2019	Interest Holder	NLC/TO	NLC/TO	Meeting	x6 on country meetings in Elliot with Native Title family groups regarding NLC Cleared Areas CA3 (Amungee NW1H (existing well site location), CA5 (Kyalla 117) and CA10 (Velkerri 76). Wednesday 8 May 2019, X1 meeting in Darwin with Native Title family for NLC Cleared Areas from Sacred Site Clearance and Avoidance Survey in response to Origin's WPS - All meeting included overview of the proposed work program and the environmental controls to address environmental risks. Origin used Story boards to present and discuss key aspects regarding the environment and its protection	No	NA	NA	NA
23/01/2019	Interest Holder	AAPA	AAPA	Written	Electronic application AAPA to Amend AAPA Certificate 2018/103 to include drilling, well testing and hydraulic fracturing activities	No	NA	NA	NA
18/02/2019	Interest Holder	AAPA	AAPA	Written	Email confirmation of wording within AAPA certificate 2018/13 variation application	No	NA	NA	NA
18/02/2019	stakeholder	Origin Energy	Stephanie Stonier	Written	Email requesting information associated with AAPA certificate amendment 2018/103 to include hydraulic fracture activities.	No	NA	NA	NA
19/02/2019	Interest Holder	AAPA	AAPA	Written	Email providing information requested from AAPA including exploration agreement with custodians and anthropological reports	No	NA	NA	NA

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?	Details of changes the interest holder has made as a result of the stakeholder engagement
19/02/2019	stakeholder	Origin Energy	Stephanie Stonier	Written	AAPA email to Origin confirming receipt of information.	No	NA	NA	NA
7/03/2019	Origin Energy	AAPA	AAPA	Written	AAPA issuing or AAPA certificate C2019/014 covering all drilling, stimulation and well testing activities. Please note, no constraint identified within the AAPA certificate (such as use of borrow pit identified) related to the Velkerri 76 S2 site.	No	Yes	Yes	Identified restricted work areas and conditions of work add to the emp where relevant.
23/04/2019	stakeholder	Origin Energy	Stephanie Stonier	Written	Electronic application to ammend certification C2019/014	No	NA	NA	NA
23/04/2019	Origin Energy	AAPA	AAPA	Written	Email confirmation of variation lodged for AAPA certificate C2019/014 to updated Gravel pit locations resulting from a report error	No	NA	NA	NA
24/04/2019	stakeholder	Origin Energy	Stephanie Stonier	Written	Updated GIS coordinate re-issued by AAPA due to GIS discrepancy with NLC data.	No	Yes	Yes	Gravel pit location amended through EMP to reflect correct locations
9/05/2019	Stakeholder	Origin Energy	Stephanie Stonier	Written	AAPA issuing of AAPA certificate C2020/003	No	Yes	Yes	Gravel pit location amended through EMP to reflect correct locations
28/11/2019	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Verbal- face to face	Discussed the current drilling operations and status of how things are working between the parties. Discussed potential future E&A activities on the site. The pastoralist ask questions regarding the access agreement, business opportunities, management of bushfires and monthly reporting. Compensation payment was discussed. Pastoralists provided a property tour to OE representatives to demonstrate and discuss their cattle operations to provide OE an understanding of how the property is run.	No	N/A	N/A	N/A

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?	Details of changes the interest holder has made as a result of the stakeholder engagement
10/12/2019	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Email	Origin mailed Pastoralist to thank them for the meeting and to let them know OE would be following up her questions.	No	N/A	N/A	N/A
18/12/2019	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Email	OE contact email Val with information to answer questions raised by pastoralist on the 28/11/2019. These are operational questions.	No	Origin provided an update of the Access agreement amendment, monthly report and revised bushfire management plan.	N/A	N/A
20/12/2019	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Verbal telephone	OE called to follow up on information provided to pastoralist and confirmed a stakeholder engagement pack for the additional 2 wells on site will be sent through.	No	N/A	No	
27/12/2019	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Email	OE emailed a copy of the stakeholder engagement pack that provides a description of the regulated activity, environmental impacts and risks, how the activity would impact on the pastoralists rights and environmental outcomes and objectives.	No	Yes - refer correspondence received on the 16/02/2020	No	N/A

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?	Details of changes the interest holder has made as a result of the stakeholder engagement
16/02/2020	stakeholder	Origin Energy	Dave Armstrong	Telephone conversation	Hayfield representative asked for additional information from the stakeholder engaging pack regarding: 1. cuttings and mud disposal on-site. 2. dispute resolution	No	Origin provided additional information regarding the Dispute resolution process, disposal of drill waste on-site, clarification on wastewater (sewage) irrigation, Water take volumes and general feedback on environmental outcomes.	No	Origin, through the EMP and compliance with the code of Practice is not authorised to dispose of Drilling waste onsite if such a disposal would create environmental harm. Origin is committed to complying with this condition and has other offsite disposals as backup.
03/03/2020	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Email	Origin Energy Emailed stakeholder a copy of the Land Access variation for the 2 additional wells.	NO	Val Dyer provided a written response on 12 March 2020 regarding status of LACA. Val Dyer also mentioned they had spoken to DENR regarding the disposal of drilling waste onsite and the approval processes. Val requested a copy of the independent assessment report when available, for which Origin has agreed to provide once completed. Stakeholder also mentioned they would not agree to onsite disposal if the area would be classified as "contaminated", as this would go against Origin's commitment to "no adverse impacts on soil"	NO	Origin, through the EMP and compliance with the code of Practice is not authorised to dispose of Drilling waste onsite if such a disposal would create environmental harm. This, as correctly pointed out by the stakeholder, would contravene the EMP Environmental outcome of having no adverse impacts to soil. Origin is committed to complying with this condition and has other offsite disposals as backup. Origin will provide the report to the Dyers.

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?	Details of changes the interest holder has made as a result of the stakeholder engagement
16/03/2020	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Email	Origin provided a further statement about its commitment to ensuring soil did not become contaminated through mud disposal. Origin also provided an overview of Origin's Coronavirus management strategy and strategies to protect the Pastoralist.	No	Stakeholder thanked Origin for the update	No	No
29/06/2020	Origin Energy	NLC	NLC	Face to Face	Meeting to provide an update of the Beetaloo exploration project and discuss sacred sites clearances.	No	Ongoing consultation/engagement with NLC regarding Origins current and future activities.	No	N/A

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?	Details of changes the interest holder has made as a result of the stakeholder engagement
23/07/2020	Origin Energy	NLC	NLC	Workshop	Overview of future project phases and approvals processes	No	Origin and NLC discussed the various phases of the project from exploration to development and the various activities associated.	No	N/A
22/09/2020	Origin Energy	NLC/ TO's	Russel Jeffrey/ Steph Stonier	Face to Face	Site visit to the Kyalla 117 N2 site to inspect the Kyalla 117 N2-1H site during stimulation. The Origin operations team walked the TO's through the site and provided them an overview of the processes and various environmental controls.	No	Origin fielded various questions regarding the processes	No	N/A

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?	Details of changes the interest holder has made as a result of the stakeholder engagement
27/10/2020	Origin Energy	NLC	N:V	Face to Face	Ongoing meeting to discuss sacred site clearances and exploration activities.	No	Origin discussed a range of future exploration activities and provided a summary of the relevant site and environmental constraints	No	N/A

Appendix N.2 PART B Detailed Stakeholder Summary of Information provided and relevant PER sections

Section 7(2)(a)	Document and Content	Date Provided
(i) “the regulated activity the interest holder proposes to carry out”	Email from Origin to APN Pty Ltd o Initial engagement and introduction post moratorium	2-Jul-18
	Email from Origin to APN Pty Ltd o Information of potential well locations and activities	5-Jul-18
	Email from Origin to APN Pty Ltd o Requesting access to the property to conduct greenhouse gas baseline emission monitoring - access granted	30-Jul-18
	Email from Origin to Val Dyer o Requesting access for scouting of drill location and weeds survey - access granted	22-Aug-18
	Letter from Origin to APN Group (on behalf of Hayfield Shenandoah) • Includes a table outlining the regulated activities Origin proposes to perform for Kyalla 117 N2 including: - o Drilling of 1-3 new wells; - o Construction of a new well pad; - o Drilling of 3-4 new water bores (1-2 extraction and 2 monitoring); - o Construction of a drilling camp; and - o Construction of a new access road. • Includes a timetable outlining the work program Origin proposes to undertake.	25-Aug-18
	Letter from Origin to APN Pty Ltd (Draft Land Access and Compensation Agreement) • Lists the activities Origin proposes to carry out on Hayfield Shenandoah from the date of the Agreement until December 2020, including: - o Monitoring, maintenance and rehabilitation of existing wells, access roads and monitoring bores; - o Walking the area of the exploration permits; - o Driving along existing roads and tracks in the area; - o Identifying and installing water monitoring or extraction bores including, where required, the construction of access roads to drill these bores; - o Taking soil or water samples; - o Geophysical surveying not involving site preparation; - o Aerial, electrical or environmental surveying; - o Emissions monitoring, including installation or monitoring stations; - o Survey pegging;	22-Aug-18

	- o Scouting (including preliminary consideration of appropriate sites for wells and other infrastructure); - o Investigations and surveys and any other minimal impact activities including, without limitation, environmental, flora and fauna, geotechnical, cultural heritage and native title field work; and - o All other activities incidental to the activities above which will have no impact or only a minor impact.	15-Sep-18
	Signed Early Access Agreement o Received signed Early Access Agreement from APN Pty Ltd	
	Access request to drill water monitoring bores under the signed Early Access Agreement - access granted	
	Draft Pastoral Land Access and Compensation Agreement • Clause 10 provides that Origin must not carry out any regulated activities within 5 kilometres of a residence and within 1 kilometre of a garden or artificial water accumulation. Origin must also erect and maintain appropriate temporary fencing. - o Gates, grids, fences and access points; - o Existing access roads; - o New access track(s); - o Petroleum exploration well; - o Rig laydown area; - o Laydown area; - o Water bore; - o Campsite; and - o Scouting, surveys and soil and water sampling activities. • Item 3 of Schedule 2 list the indicative duration of the Agreed Petroleum Activities.	13-Nov-18
	Hayfield homestead bore water test results o Origin provided water test results of the Hayfield homestead bore	
	Draft Beetaloo Basin Civil Construction Program – Kyalla 117 N2 Environment Management Plan • Provides detailed description of activity including lease pad, camp pad, access tracks gravel pits and all associated infrastructure.	
	Draft Beetaloo Basin Kyalla 117 N2Drilling, Stimulation and Well Testing Environment Management Plan • includes detailed description of all drilling, stimulation and well testing activities	
	Meeting with Val Dyer representing APN Pty Ltd and DEPWS in Darwin o Introduce APN Pty Ltd to DEPWS personnel and explain the process of assessing an EMP	11-Jun-19
	Meeting and presentation in Darwin to Val Dyer on behalf of APN Pty Ltd on June 11th to discuss specific details of EMP and landholder requests covering Lock the Gate letters including: - o Drilling activities - o Stimulation activities - o Wastewater management and risk to fauna - o Chemical management	11-Jun-19

	- o Well integrity and aquifer isolation - o Weed and groundwater monitoring - o General questions	□
	Meeting and presentation at Hayfield Station on July 3rd to discuss specific details of EMP and landholder requests covering: - o Well integrity and Design (specifically aquifer isolation) - o Cement design - o Wastewater storage- including risk to fauna - o Weed management - o General discussion on risk	3-Jul-19
	Kyalla 117 N2 Drilling, Stimulation and Well Testing EMP Variation Stakeholder Engagement Pack- 2 additional E&A wells - o Description and location of regulated activity - o Activity timeline - o Environmental Risk Summary - o consequences for stakeholder Rights and Activities	27-Nov-19
(ii) “the location (or locations) where it is proposed to carry out the activity”	Draft Pastoral Land Access and Compensation Agreement • Identifies the affected Pastoral Property (NT Portion 7026/7027) activities to be undertaken on • Item 2 of Schedule 2 states the access tracks and well site are shown in the plans attached to Annexure D of the agreement.	20-Nov-18
	Letter from Origin to Val Dyer (on behalf of Hayfield Shenandoah) • Includes a map and coordinates table detailing the locations and clearance buffers of proposed work at three well locations, including the Kyalla 117 N2 well. • The map included in the letter shows the planned route of access tracks across the land and the proposed clearance areas. • Attachment 2 is a draft work program of activities Origin intends to undertake on the land.	22-Aug-18
	Draft Beetaloo Basin Civil Construction Program – Kyalla 117 N2 Environment Management Plan • includes maps of proposed locations	3-May-19
	Draft Beetaloo Basin Kyalla 117 N2Drilling, Stimulation and Well Testing Environment Management Plan • includes maps of proposed locations	3-May-19
	Kyalla 117 N2 Drilling, Stimulation and Well Testing EMP Variation Stakeholder Engagement Pack- 2 additional E&A wells o Table 1- proposed infrastructure location and disturbance area	
	o Figure 2 and 3- maps provided overview of activity at both a regional and local scale.	
	Origin Beetaloo Sub-basin water Extraction Licence	17-May-19
(iii) “the anticipated environmental impacts and environmental risks of the activity’s		

AND (iv) “the proposed environmental outcomes in relation to the activity”	• Includes full details of Origin's proposed water use for all regulated activities. Licence also defines the allowed total volume that can extracted and the maximum monthly extraction rate. Provision of document was followed up with discussion with Origin representative of how this relates to total water draw and recharge of the aquifer.	
	Origin Response to APN questions on Operations and Environmental Risks • Various questions from APN regarding activities proposed and controls in place that will support • Detail questions and response pertaining to regulations	17-May-19
	Draft Beetaloo Basin Civil Construction Program – Kyalla 117 N2 Environment Management Plan • Provides detailed description for and associated risks of the physical environment of the EP98, EP117 and EP76 area, including : o Climate; o Geology; o Soils; o Hydrology; and o Hydrogeology. • Provides detailed description for and associated risks of the biological environment of the EP98, EP117 and EP76 area, including : o Bioregions; o Vegetation communities; o Flora; o Weeds; o Fauna; o Significant / endangered fauna; and o Feral and pest fauna. • Provides a description of environmental and cultural sensitives, including: o Native title; o Archaeology Assessment; o Areas of cultural significance; o Natural resources; o Non-indigenous heritage; o Historic heritage assessment; and o Protected or conservation areas. • Includes an outline of Origin’s risk management approach and management tools . • Includes detailed tables of environmental impacts, risks and outcomes for specific environmental aspects, including: o Soil and erosion; o Surface Water and Groundwater ;	3-May-19

	- o Protected or conservation areas. • Includes an outline of Origin’s risk management approach and management tools. • Includes detailed tables of environmental impacts, risks and outcomes for specific environmental aspects, including: - o Soil and erosion ; - o Surface Water and Groundwater - o Vegetation, Flora, Fauna and Habitat - o Weeds - o Waste Management ; - o Air Quality – Dust and Emissions ; - o Lighting, noise, vibration and visual amenity ; - o Bushfire ; - o Cultural heritage and sacred sites ; - o Community ; and - o Traffic • Provides an emergency response plan to account for situations of high risk of environmental harm occurring, including bushfire and contaminant spills). • Appendix F - Erosion and Sediment Control Plan includes an assessment of the permit area erosion susceptibility, including: - o Erosion hazard assessment for Kyalla; - o Soil loss estimate; and - o Erosion risk and determination of erosion and sediment control. • Appendix J– Environmental Risk Assessment includes detailed table assessing environmental factors against activity risk sources .	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
	Meeting and presentation in Darwin with Val Dyer representing APN Pty Ltd on June 11th to discuss specific details of EMP and landholder requests covering Lock the Gate letters including: - o Drilling activities - o Stimulation activities - o Wastewater management and risk to fauna - o Chemical management - o Well integrity and aquifer isolation - o Weed and groundwater monitoring - o General questions	11-Jun-19 ☐
	Meeting and presentation at Hayfield Station on July 3rd to discuss specific details of EMP and landholder requests covering: - o Well integrity and Design (specifically aquifer isolation) - o Cement design - o Wastewater storage- including risk to fauna	3-Jul-19

	- o Weed management - o General discussion on risk	TBA
	Kyalla 117 N2 Drilling, Stimulation and Well Testing EMP Variation Stakeholder Engagement Pack- 2 additional E&A wells - o updated risk assessment of all risks (including new scope) - o • Increase in groundwater take from approximately 50ML up to 120 ML (worst case) - o Increased generation of flowback and wastewater storage duration and volume - o Increase drilling mud and cutting waste storage and on-site disposal - o Potential increase in flaring intensity and duration (under a success case) - o Increased total activity duration by up to 18 months o Table 2- summarises the environmental outcomes, risks and controls for each relevant environmental aspect.	
(v) “the possible consequences of carrying out the activity to the stakeholder’s rights or activities”	Letter from Origin to Val Dyer (on behalf of Hayfield Shenandoah) • Includes a map and coordinates table detailing the locations and clearance buffers of proposed work at three well locations, including the Kyalla 117 N2 well. • The map included in the letter shows the planned route of access tracks across the land and the proposed clearance areas. • Attachment 2 is a draft work program of activities Origin intends to undertake on the land.	22-Aug-18
	Draft Pastoral Land Access and Compensation Agreement • Clause 3 provides that Origin must conduct the regulated activities in such a way: - o as to not interfere with the lawful rights or activities of the stakeholder; - o that is in accordance with good exploration and petroleum industry practice; - o that is within an agreed access area and not on any part of the pastoral property. • Clause 5 provides that Origin must give written notice of at least 10 business days before commencing the regulated activities. • Clause 7 provides the stakeholder with an opportunity to inspect the regulated activities. • Clause 8 provides the stakeholder an avenue to make suggestions to Origin about the regulated activities where they affect the stakeholder’s activities or rights. • Clause 10 provides that Origin must not carry out any regulated activities within 5 kilometres of a residence and within 1 kilometre of a garden or artificial water accumulation. Origin must also erect and maintain appropriate temporary fencing. • Clause 11 requires Origin to use best endeavours to ensure that the regulated activities do not cause an impaired capacity to any water aquifers beneath the property and having the property certified as ‘organic’.	20-Nov-18
	Beetaloo Basin Exploration Project – Kyalla 117 N2 civil Construction Environmental Management Plan • Includes detailed tables of environmental impacts, risks and outcomes for specific environmental aspects, including: - o Soil and erosion; - o Surface Water and Groundwater ; - o Vegetation, Flora, Fauna and Habitat; - o Weeds;	3-May-19

	Meeting with the Hayfield Station Members on the 28/11/2019 to discuss current operations and future potential Exploration Activities Discussed operational on ground access options, impacts on their cattle business and how to work together to reduce impacts, future activity time lines, potential drilling scenarios based upon locations (including the multi-well scenario at Kyalla 117 N2-1H), stakeholder engagement packs. information, Land access agreements and future options agreements, protection of groundwater, future communication and potential benefits to their business.	28-Nov-19
	Kyalla 117 N2 Drilling, Stimulation and Well Testing EMP Variation Stakeholder Engagement Pack- 2 additional E&A wells Email to Val Dyer - o updated activity description - o updated risk assessment of all risks (including new scope) - o Increase in groundwater take from approximately 50ML up to 120 ML (worst case) - o Increased generation of flowback and wastewater storage duration and volume - o Increase drilling mud and cutting waste storage and on-site disposal - o Potential increase in flaring intensity and duration (under a success case) - o Increased total activity duration by up to 18 months - o Environmental objectives and outcomes from undertaking the activities	27-Dec-19

Appendix N.2 Part C Stakeholder Engagement Pack Provided to Pastoralists



Pastoralist Engagement Pack

HAYFIELD/ SHENANDOAH KYALLA 117 N2 VARIATION

Pastoralist Engagement Pack

Provided to Pastoralist on 27/12/2019



Pastoralist Engagement Pack

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Appendix B General Well Site Construction and Operations

Appendix C Environmental Management Plan (EMP)

Appendix D Code of Practice for Onshore Petroleum Activities within the Northern Territory

1 Purpose

Origin is proposing to submit a variation to the Kyalla 117 N2 Drilling, Stimulation and Well Testing Environmental Management Plan NT-2050-15-MP-025. The variation will seek approval for an additional 2 exploration wells to be drilled, stimulated, tested, maintained and decommissioned on the Kyalla 117 N2 site.

Origin presents this document to the operators and interest holders of Hayfield/ Shenandoah Station to provide an understanding of:

- the regulated activity the interest holder proposes to carry out (Section 2,);
- the location (or locations) where it is proposed to carry out the activity (Section 2);
- The timeline of the proposed activity (section 3);
- the potential environmental impacts, risks, controls and outcomes of the activity (Section 4)
- the possible consequences of carrying out the activity to the Pastoral Lessees rights or activities (Section 5);
- a proposed plan for ongoing engagement (Section 5); and
- draft Environmental Management Plan provides a detailed scope of proposed regulated activities and associated risk assessments and risk management (Appendix C)

Origin proposes that any questions or feedback to the information provided in this pack is formalised via the form included in Appendix A within 60 days of receipt. Origin will ensure that all responses are reviewed, and feedback provided as appropriate. Origin also offers a face to face meeting with the Stakeholder where subject matter experts can present the information in this pack and answer any questions. Face to face meetings must be arranged within 30 days of receipt of the pack to ensure engagement can be completed within the allocated 60 day period. It should also be noted that Origin is committed to ongoing stakeholder engagement and discussion on the activities will be ongoing through-out the life of the activities.

Origin acknowledges that in some circumstances, there may exist a difference of opinion or view that cannot be addressed during the stakeholder engagement period. In such cases, Origin will seek the decision/advice of the Department of Environment and Natural Resources (DENR) through the EMP assessment and approval process.

1.1 Background

Origin holds three petroleum exploration permits in the Barkly region under the Beetaloo Joint Venture with Falcon Oil and Gas. These permits consist of EP76, EP98 and EP117 which cover 18,512 square kilometres (km²) of largely pastoral leases on the Sturt Plain, part of the Barkly Tableland, within the Northern Territory (Figure 1) and were originally granted by the NT Minister for Mines and Energy under the *Petroleum Act*.

Since becoming Operator of the exploration permits in 2014, Origin has drilled four vertical wells (Kyalla S-1, Amungee NW-1, Beetaloo W-1 and the recent Kyalla 117 N2) and one horizontal well (Amungee NW-1H). A successful hydraulic fracture stimulation and production test was undertaken on the Amungee NW-1H well in 2016, highlighting the potential of the Beetaloo Sub-Basin as a future unconventional shale gas development.

New exploration activity ceased in September 2016, when the Northern Territory Government (NTG) introduced a moratorium on hydraulic fracture stimulation of unconventional reservoirs pending the outcome of an independent scientific inquiry.

The Inquiry handed down its Final Report to the Northern Territory Government (NTG) on Tuesday 27 March 2018. The Inquiry concluded that the risks associated with unconventional onshore shale gas extraction in the NT could be appropriately managed provided all the recommendations were adopted and implemented. The NTG subsequently accepted all 135 recommendations and announced the lifting of the moratorium on 17 April 2018. Of the 135 recommendations, 35 were required to be implemented prior to the commencement of exploration, with the remaining recommendations required to be implemented prior to the commencement of production.

This stakeholder engagement pack provides information to you in relation to the proposed variation of Kyalla 117 N2 Drilling, Stimulation and Well Testing Environmental Management Plan NT-2050-15-MP-025 for 2 additional exploration wells proposed on the Hayfield Shenandoah Property. The pack will give you a detailed description of Origin's activities and how Origin proposes to manage the environmental impacts and risks associated with its activities, including how it will address its regulatory obligations and relevant Inquiry Recommendations that have underpinned the Code of Practice for Petroleum Activities in the NT (CoP). This engagement pack aims to leverage off the existing information within the approved Kyalla 117 Drilling Stimulation and Well Testing EMP. This ensures the communication regarding the proposed additional activities can be targeted, focusing on the proposed new scope and potential additional risks.

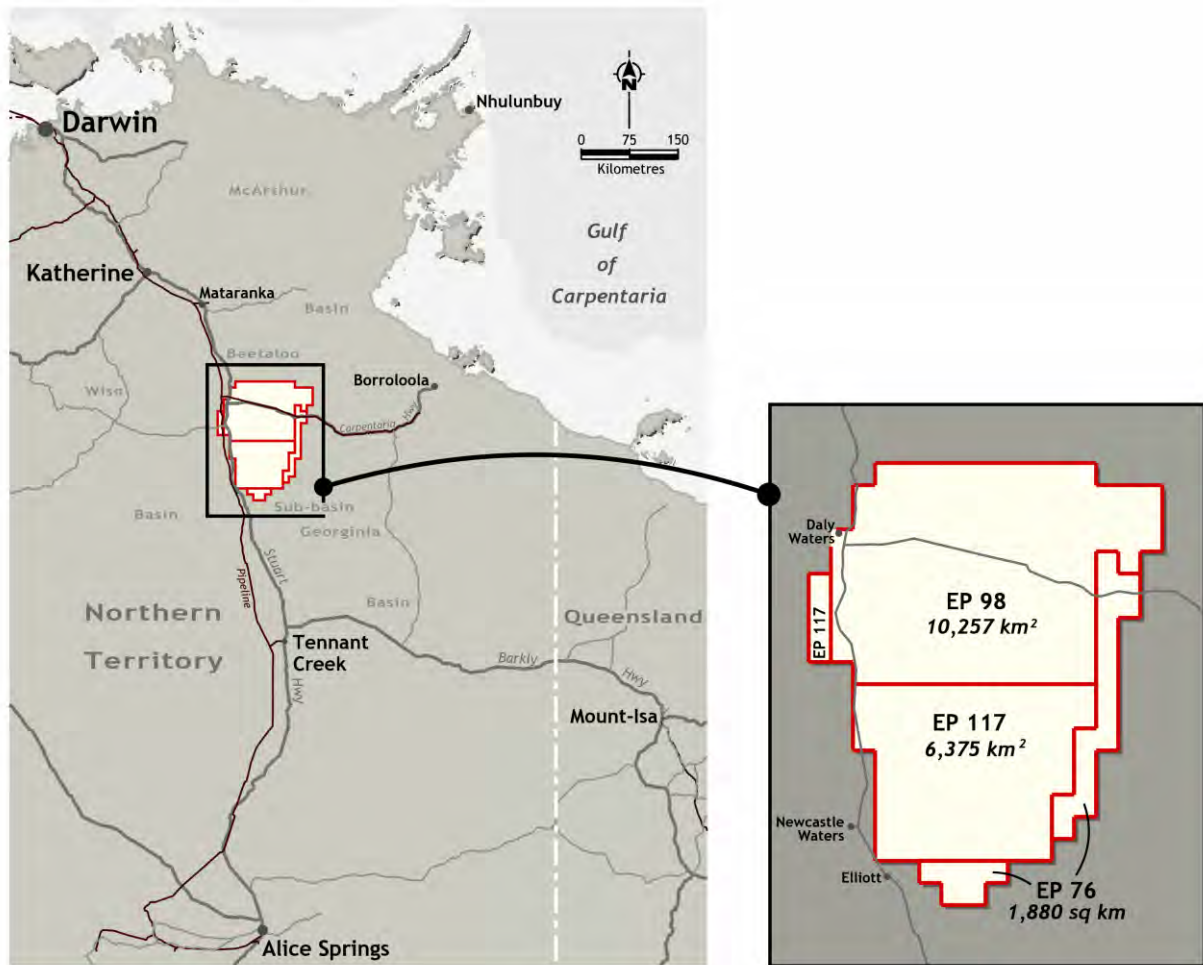


Figure 1: Location of Origin Permit Area.

2 Description and Location of the Regulated Activities Variation

Origin is proposing to submit a variation to the Kyalla 117 N2 Drilling, Stimulation and Well Testing Environmental Management Plan NT-2050-15-MP-025. The variation will seek approval for an additional 2 exploration wells to be drilled, stimulated, tested, maintained and decommissioned on the Kyalla 117 N2 site.

The proposed variation includes:

- Use of existing access tracks connecting the Stuart Highway to the Kyalla 117 N2 Site
- Use of existing gravel pits
- Use of existing Kyalla 117 N2 exploration well lease pad
- Use of existing water bore for water extraction as per Origin's licence conditions
- Potential extension of Kyalla 117 N2 lease pad by 1 hectare for additional wells (contingent), this extension will remain within the existing fenced area
- Use of existing camp pad and helipad and sewer spray fields
- Operation of a camp during drilling, stimulation and well testing, including wastewater irrigation
- Asset maintenance and monitoring works required for each new exploration well
- Maintenance, suspension and decommissioning of each new exploration wells

- Site decommissioning and rehabilitation
- The drilling, stimulation and well testing of an additional 2 horizontal exploration wells (Kyalla 117 N2-2 and Kyalla 117 N2-3), increasing the total wells onsite to 3.
- Drilling of each exploration well consisting of:
 - Construction of 2 additional well cellars to accommodate each exploration well
 - Modification to existing drilling mud sump to accommodate new well locations
 - Drilling of up to 2 additional; vertical exploration wells up to ~2000m below ground level
 - Drilling of up to 2 additional horizontal exploration well sections up to 3000m (refer to Figure 4: Proposed Kyalla 117 N2-1 well schematic)
- Hydraulic fracture stimulation of each horizontal exploration wells
 - stimulation of up to 30 stages each new well
 - storage and handling of bulk quantities of proppant (sand), fuel and chemicals to support drilling, stimulation and well testing activities.
- Exploration well completion and testing
 - up to 12 months of well testing of each of the 2 additional wells, which includes flaring and condensate storage and transportation
 - predicted 10-15ML of flowback wastewater stored in tank onsite double lined tanks (depending on recovery rates)
 - use of evaporation tanks and mechanical evaporators to reduce the volume of wastewater
- All low impact activities ancillary to the above.

The proposed locations of the infrastructure is within the NLC and AAPA cleared subject land area and is provided in Table 1, Figure 2 and Figure 3. It is noted that the nominated areas for infrastructure may be changed slightly to minimise environmental and heritage impacts (e.g. significant tree or habitat avoidance, or any chance-finds with archaeological artefacts) and to accommodate with pastoral requirements. Such modification will be made within the existing surveyed areas.

Table 1 Proposed infrastructure location and disturbance area

Exploration Permit	Infrastructure Name	Station	Zone*	Approx Easting	Approx Northing	Proposed Disturbance Area (ha)
EP117	Kyalla 117 N2 Lease Pad and sewer spray field	Hayfield	53	356370	8137492	1
EP117	Kyalla 117 Camp Pad and sewer spray field	Hayfield	53	356448	8137815	Existing
EP117	Kyalla 117 Helipad	Hayfield	53	356270	8137839	Existing
EP117	Gravel Pit 1 and access track	Hayfield	53	333794	8135076	3
EP117	Gravel Pit 2 and access track	Hayfield	53	339862	8134869	3
EP117	Gravel Pit 4 and access track	Hayfield	53	360391	8135085	3
EP117	Existing Access tracks Stuart Hwy to Kyalla 117 + Access to Amungee Mungee Boundary	Hayfield	53	See Figure 2		Existing

* Universal Transverse Mercator (UTM) geographic coordinate system is Geocentric Datum of Australia (GDA) 94.



Figure 2 Location of proposed activities within Origin's Exploration tenure

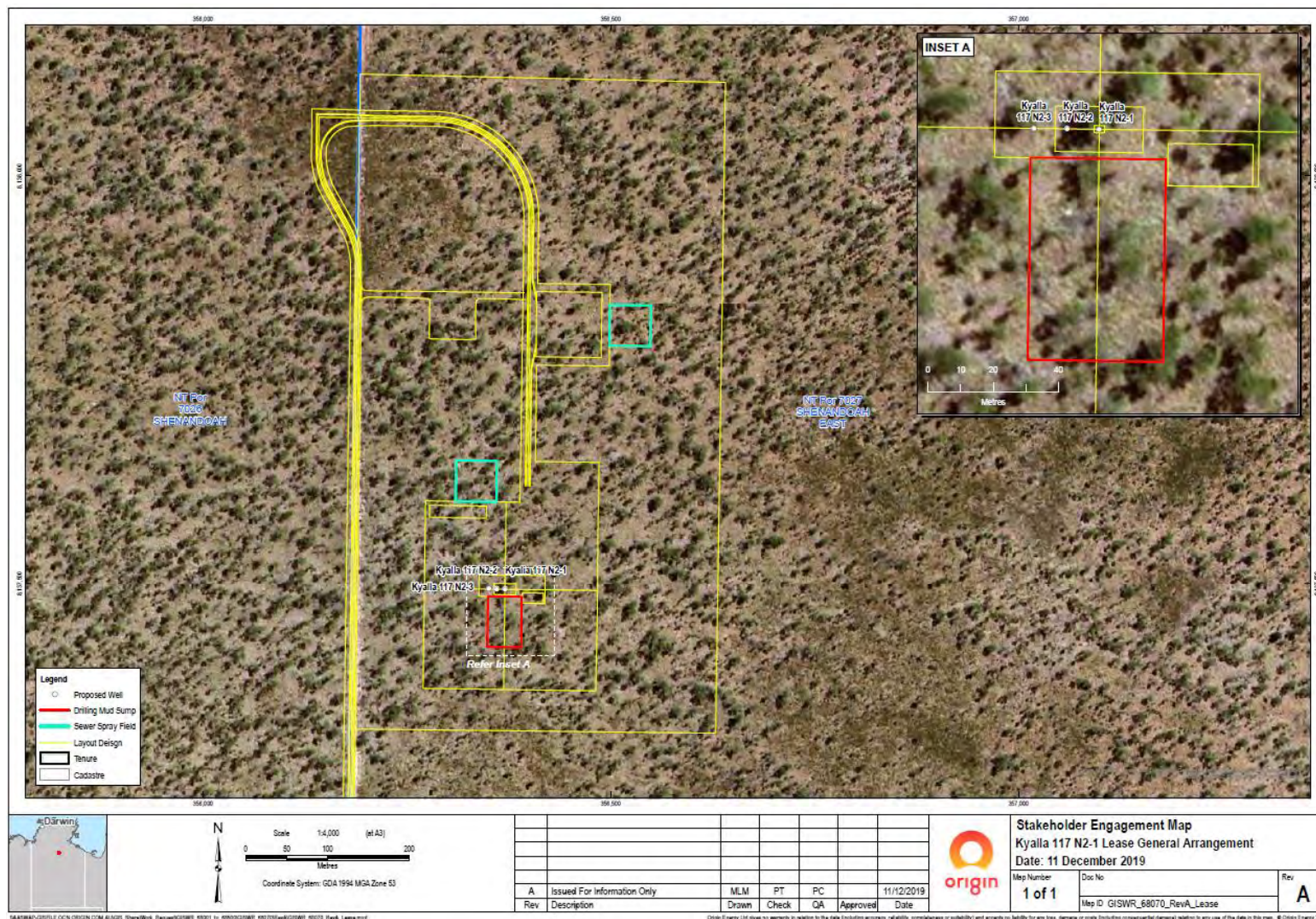


Figure 3 Site location map – note well locations indicative to change within pad area

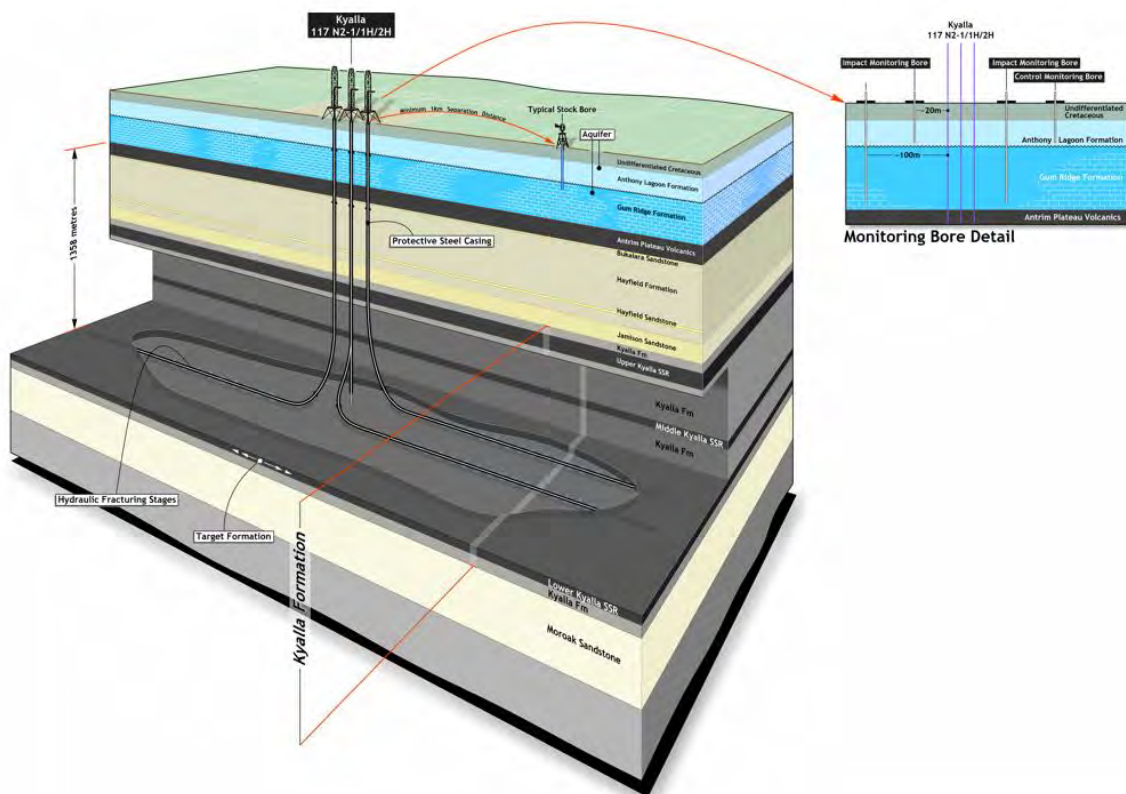


Figure 4: Proposed Kyalla 117 N2-1 well schematic

3 Activity Timeline

The additional 2 exploration wells proposed for the Kyalla 117 N2 site is subject to the results of the Kyalla 117 N2-1 exploration well. The potential timeline of the additional 2 wells is not yet fixed, with no firm decision to proceed with the decision to drill at this stage. Subsequently, four potential timelines exist:

- No additional wells are drilled.
- One and or two of the wells are drilled in 2020 immediately after well testing of the Kyalla 117 N2 well
- One and or two of the wells are drilled in late 2020 or 2021 after the drilling of Velkerri 76 S2 on the adjacent property.
- One and or two of the wells are drilled post 2021.

4 Environmental Risk Summary

The risks and potential impacts associated with the drilling stimulation, testing and maintenance are covered under the existing Kyalla 117 N2 Drilling, Stimulation and Well Testing EMP NT-2050-15-MP-025. A copy of the EMP can be found on the DENR website here: <https://denr.nt.gov.au/onshore-gas/environment-management-plan/approved-emps> and can be consulted where additional information on individual activities is required.

The potential additional risks and controls associated with the increase in the number of wells have been summarised in the following section, along with the proposed controls/ mitigating factors. The additional proposed scope and associated risks and controls will be submitted to DENR for formal assessment and approval.



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The increased risks/ impacts are restricted to the following aspects, as summarised below;

- Increase in groundwater take from approximately 50ML up to 120 ML (worst case)
- Increased generation of flowback and wastewater storage duration and volume
- Increase drilling mud and cutting waste storage and onsite disposal
- Potential increase in flaring intensity and duration (under a success case)
- Increased total activity duration by up to 18 months

Table 2 Environmental risks and controls of proposed variation

Aspect	Environmental Outcomes	Potential Impact/ Risk	Controls
Waste	- No adverse impacts on soil, surface water, groundwater, sensitive habitat and air quality - Minimise creation of food sources or habitat for pest species - Minimise waste generation through reduce, reuse, recycle programs	Additional wastewater to be stored onsite. Additional drill mud cutting to be stored and disposed of onsite.	Existing flowback tanks are likely to be able to manage predicted flowback volume. - flowback to be stored in double lined tanks with leak detection -enhanced evaporation units to be used to minimise offsite flowback transportation -Site to be bunded during flowback storage -Drill cuttings will be excavated from sump and dried within a lined containment area to enable additional cuttings and mud volumes. Once completed, cuttings and muds will be mixed, buried and covered onsite in accordance with the Code of Practice.
Traffic	Minimise the impact of traffic on pastoralist amenity and tourism	Access to the site is likely to extend for an additional 12-18 months (to end 2021) to accommodate additional drilling, stimulation and well testing activities. Success case may result in daily/weekly condensate trucking (depending on rates)	The majority of equipment is onsite. Site is located away from pastoralist main access points Maximum peak traffic during demobilisation is 44 movements per day for 2 weeks.

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Aspect	Environmental Outcomes	Potential Impact/ Risk	Controls
Water use ad quality	- To manage exploration activities to prevent unsustainable depletion of groundwater resources - Preserve groundwater quantity and quality for livestock supplies (the surrounding water use)	- Cumulative 2019/2020 groundwater take increased from approximately 50ML to 120ML (over 2 years) - All wells designed to protect aquifers with multiple engineered and verified well barriers in place.	Groundwater take is covered by a Water extraction Licence. The impact of all use has been assessed and approved by DENR.
Emissions	- Avoid environmental nuisance at sensitive receptors - Minimise greenhouse gas emissions	Potential increase in duration and intensity of flaring emissions (success case)	-Site located away from sensitive receptors -Increased flaring rates unlikely to materially increase impact of flare.
Noise	Minimise impacts to pastoralists and sensitive receptors from noise	No additional risks/ impacts predicted	Activities are located away from sensitive receptors.
Dust	Minimise impacts to pastoralists and surrounding ecological communities from dust	No additional risks/ impacts predicted	Dust suppression to be used on access tracks and adjacent sites to minimise dust emissions
Soils	- Avoid, minimise and control soil erosion and discharge of sediment or soil into waterways or established drainage systems - Minimise disturbance of soil, vegetation and drainage during site activities - Prevent the contamination of soil to maintain the viability of soil resources	No additional risks/ impacts predicted	Existing controls in place including: -Secondary containment -Spill management plan -lined wastewater tanks -Site maintained to minimise sediment releases, with erosion and sediment control plan in place
Bushfire	- Minimise the risk of causing bushfires from Origin's activities - Avoid impacts on pastoral infrastructure, environmental habitat and fauna, impacts on culturally-significant sites, public infrastructure and community lands	No additional risks/ impacts predicted	Existing bushfire management strategies in place.
Weeds	- Avoid the introduction of weeds - Avoid the spread of existing weeds	no increased weed risk	-All equipment and loads to be inspected and certified weed free.

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Aspect	Environmental Outcomes	Potential Impact/ Risk	Controls
Surface Water	- Avoid and minimise the potential contamination caused by the discharge of sediment or contaminated storm water to waterways or established drainage systems. - Contain any potential contaminants for treatment or disposal.	No increased risk	-No offsite releases of wastewater -Site fully bunded during wastewater storage -Site maintained to minimise sediment releases, with erosion and sediment control plan in place
Flora and Fauna	- Minimise disturbance to flora and fauna - No disturbance to high conservation areas	Minimal increase in risk to existing flora and fauna resulting in clearing	-The additional proposed 1 hectare clearance is located within the fenced area of the site. -The vegetation community surrounding the activity is regional extensive and not threatened. -Impacts to endangered flora and fauna are not anticipated.

5 Consequences for Stakeholder Rights and Activities

5.1 Stakeholders Rights

Pastoral Lessees within the Northern Territory have non-exclusive rights to conduct their pastoral activities on the land granted under the Northern Territory Pastoral Lands Act (2016). Origin respects these legal rights and seeks a sustainable relationship with Pastoral Lessees so that both parties' can co-exist on the land. Origin proposes to achieve this via the following key principles:

1. Formal engagement aligned with the requirements of Section 7.2 (a) of the *NT Petroleum (Environment) Regulations*
2. Structured and timely process for the execution of an access agreement and associated compensation
3. Mutually agreed ongoing, regular engagement and communications

5.2 Stakeholders Activities

The proposed additional activities under the existing Kyalla 117 Drilling, stimulation and Well Testing EMP (as defined in Section 2), are located in existing disturbed areas operated by Origin. The proposed additional activity will not directly interfere with existing pastoral infrastructure. Figure 2 and Figure 3 includes infrastructure layout maps of the location of the regulated activities in full detail. Appendix C provides detailed information on the environmental impacts, risks and impacts associated with these Regulated activities, which highlight the potential consequences to Pastoral operations. Key considerations when understanding the consequences to Pastoral operations:

- To ensure sustainable co-existence, Origin will compensate the Pastoral Lessee for the impact of Regulated activities on pastoral operations
- The regulated activities are associated with petroleum exploration activities, therefore likely to be temporary in nature. Origin will rehabilitate to its original condition or as agreed with the Pastoral Lessee.
- Pastoral Lessees receive beneficial use of the infrastructure that Origin installs upon completion of the activity (or otherwise agreed to by both parties)– this includes roads, laydowns and bores

A summary of the potential consequences of the activity and mitigation controls are summarised in Table 3 Potential consequences and control measures

Table 3 Potential consequences and control measures

Activity	Potential Consequence to Activities	Mitigations for Consequence
Land & Stock		
Wellpad and new access road	• Reduction in grazing area • Restricted access to well lease pads during activity duration	• Minimal additional disturbance area located within fenced zone • Short term use <3 yrs • Full fencing and bunding of wellpad • Industry-proven coexistence of cattle and petroleum industry • End of life rehabilitation to return land back to pre-existing state or as agreed to with pastoralist • Hayfield Code of Conduct agreed with Pastoral Lessee
Existing Access Tracks	• Traffic along access track • Temporary access restrictions during rig mobilisations and heavy transport operations • Interference with stock	• Ongoing maintenance of the existing road to enable dual carriage • Main traffic movements limited to over 3-6 month period • Hayfield Code of Conduct agreed with Pastoral Lessee

Activity	Potential Consequence to Activities	Mitigations for Consequence
		- Origin Pastoral lease notification of large movements - Road remains shared use asset of Pastoral lessee
Lease pads	- Contamination of soils from activities - Impact to organic certification	- All activities must comply with Codes of Practice for Petroleum activities, including spill management, wastewater management and waste management - site to be rehabilitated back to pre-disturbance level with no harmful contamination permitted. - Site fully bundled - Activity restricted to a small area, with no contaminants released to surrounding areas - Contaminants affecting organic certification (agrichemicals, GMO, pesticides etc) are typically not associated with Petroleum activities.
Water		
Ground Water	Pastoral bores rates and/or quality	- Modelling supported extraction limits set by DENR through extraction licence RF 10285 - No material reduction in water quality or quantity predicted to surrounding groundwater extraction bores - Baseline monitoring of local bores within 10km of petroleum wells - Ongoing control and impact groundwater water monitoring - Aquifer protected through the use of multiple cement and steel casing barriers - Well integrity validated prior to completing stimulation.
Weeds		
Weed Control	Noxious weeds	- Baseline weeds survey completed - Ongoing weeds surveys and NTG bi-annual monitoring - Vehicle and Equipment to be clean and have valid weed hygiene certificates prior to access - Weed identification training of key personnel - Weed management plans
Air Quality		
Dust	Dust	- Short period of high volume traffic movements - Equipment movements to consider time of day to reduce impacts on traffic - Dust suppression utilised during high volume traffic movements and around sensitive features (homesteads, cattle yards etc.)
Emissions	Increased Emissions from flares and wells	- Flares are used to reduce the risk associated with vented hydrocarbons - Short period of operations and testing

Activity	Potential Consequence to Activities	Mitigations for Consequence
		- Baseline emissions monitoring conducted and is ongoing - Emissions monitoring at all locations - No well pad within 50km of a residence
Light, Noise and Visual Amenity		
Light and Noise	Interaction with stock	- Site location chosen to minimise impacts on pastoralist operations- including appropriate separation distances between sensitive receptors and activities. - Short duration of drilling and stimulation activities
Visual Amenity	Pastoral visual amenity	- Site location chosen to minimise impacts on pastoralist amenity- including appropriate separation distances between sensitive receptors and activities. - Short duration of drilling and stimulation activities - Site not located in major thoroughfare and away from the majority of pastoralist activities.

5.3 Stakeholder Engagement Plan Feedback

Origin propose frequent discussions with nominated representatives of the Pastoral lease to ensure that clear understanding of the activities and ongoing program. Origin would also like to ensure that the Pastoral lessees have the ability to attend at exploration activities to further seek comfort in their understanding and to highlight the nature in which operations are conducted.

Origin seek a frequency suitable to the nominated representatives for a phone call or meeting to discuss these activities and progress as well as during field operations committing to formal reporting with updates on field activities. Additionally, as part of the induction process ,Origin extends an offer to the Pastoralists to address staff and contractors and provide them with an overview of the Pastoral business and history of the property and share their expectations in working to agreed work instructions and restricted areas.

All feedback on the proposed activities and their potential impacts, risks and proposed controls should be provided to Origin via the feedback form in Appendix A within 60 days.

All lessee comments and associated Origin responses will be documented within the final EMP submitted to DENR for assessment.

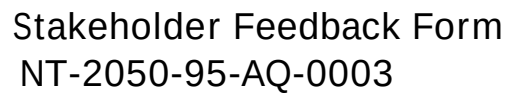
6 Acronyms & Abbreviations

Acronym	Meaning
AAPA	Aboriginal Areas Protection Authority
ALARP	As Low As Reasonably Practicable
BMP	Bushfire Management Plan
DENR	Department of Environment and Natural Resources
DOTEE	Department of The Environment and Energy (Cmwth)
DPIR	Department of Primary Industries and Resource (NT)
EC	Electrical Conductivity
EPA	Environment Protection Authority (NT)
EP	Exploration Permit (e.g. EP76, EP98 and EP117)
EMP	Environmental Management Plan
ERP	Emergency Response Plan
ESCP	Erosion and Sediment Control Plan
GHG	Greenhouse Gas
Ha	hectare
HFS	Hydraulic Fracture Stimulation
IBA	Important Bird Area
JV	Joint Venture
Km	Kilometre
LOS	Level of Service
m	metre
MEMP	Methane Management Plan
MSDS	Material Safety Data Sheet
mTVDGL	metre True Vertical Depth below ground level
Mm	millimetre
NGERS	National Greenhouse and Energy Reporting Scheme
NICNAS	National Industrial Chemicals Notification and Assessment Scheme
NT	Northern Territory
RWA	Restricted Work Area
SPMP	Spill Management Plan
TO	Traditional Owner
WEL	Water Extraction Licence
WMP	Weed management Plan
WWMP	Wastewater Management Plan



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Appendix A – Stakeholder Feedback Form

[illegible]

Appendix B General Well Site Construction and Operations



Figure 5: General Lease Construction



Figure 6: General Camp Area



Figure 7: General Drilling Operations



Figure 8: Example of stimulation lease layout.

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1. Panel Transportation



2. Panel assembly



3. Tank assembly



5. Geomembrane installation



8. Tank commissioning



8. Cover installation



7. secondary liner installation



6. Primary liner installation

Figure 9 Wastewater tank construction steps



Figure 10: Example of spill mats used to contain drilling and tarps to protect sand.



Figure 11: General Site Configuration



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Appendix C Environmental Management Plan (EMP)

Please note the accompanied EMP is in draft version and is currently awaiting approval from NT Government, pending response from the NT Government this EMP is subject to change. Please also note the timeframes presented are forecast only and are subject to change.



BEETALOO BASIN DRILLING, STIMULATION AND WELL TESTING PROGRAM

Environment Management Plan

EP117

Review record

Rev	Date	Reason for issue	Author	Reviewer	Approver
0	27/04/2018	EMP released for acceptance	M.Kernke	E.Wong	T.Boyes
1.0	05/08/2019	EMP released for approval	M.Kernke	E.Wong	T.Boyes
2.0	16/12/2019	EMP Variation to include additional wells	M.Kernke		

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Appendix D Code of Practice for Onshore Petroleum Activities within the Northern Territory

Code of Practice: Onshore Petroleum Activities in the Northern Territory

31 May 2019

Document details

Document title	Code of Practice: Onshore Petroleum Activities in the Northern Territory
Contact details	Department of Environment and Natural Resources 08 8924 4218
Approved by	Minister for Environment and Natural Resources and Minister for Primary Industry and Resources
Date approved	30 May 2019 and 31 May 2019
Document review	Minimum 2 years

Change history

Version	Date	Author	Changes made
1	15 March 2019	NT Govt	Public consultation draft
1.1	28 May 2019	NT Govt	Final draft
2	31 May 2019	NT Govt	Approved version. Title updated, dates included.

Appendix N.2: Community Engagement Log

Engagement item	Date of engagement
NLC Meeting held with NLC representatives to provide an update of the Beetaloo Exploration Project and discuss forward exploration activities and associated clearances	05/11/2020
NLC and Native Title Holder Sacred Stie clearance Origin representative provided the NLC and Native Title holders with information on Origin's Beetaloo Basin Project and Activities.	12/10/2020
Traditional Owner visit to site Origin representative provided Native title holders an escorted visit to the Kyalla 117 N2 site, discussed the regulated activities, environmental controls (such as groundwater monitoring) and provided an update to the Beetaloo Exploration Project.	22/09/2020
NLC Meeting held with NLC representatives to provide an update of the Beetaloo Exploration Project and discuss forward exploration activities and associated clearances	01/09/2020
NLC Meeting held with NLC representatives to provide an update of the Beetaloo Exploration Project	18/08/2020
NTG Onshore Supply chain working group Origin representative provided an update of the Beetaloo Exploration Project	16/06/2020
NLC Meeting held with NLC representatives to provide an update of the Beetaloo Exploration Project	29/05/2020
Energy Club NT	05/06/2020

Engagement item	Date of engagement
Origin representative provided an update of the Beetaloo Exploration Project and potential business opportunity discussion	
Red dust Origin Beetaloo exploration project presentation and partnership update	11/04/2020
Traditional owner meeting Origin representatives visited Native Title holder sin Elliot to provide an update on the Beetaloo Exploration Project	11/04/2020
Darwin Rotary Club Origin representative provided the rotary club an overview of the Beetaloo Exploration Project	06/05/2020
NLC Meeting held with NLC representatives to provide an update of the Beetaloo Exploration Project	05/02/2020
Back to Business in the Territory with Energy Club NT Origin provided the NT Business community an overview of Origin's potential future activities and potential business opportunities.	04/02/2020
NLC- Traditional Owner Employment opportunities Origin representative met with NLC representatives to discuss future employment opportunities for host Traditional Owners.	16/09/2019
Traditional Owner meeting Origin Chairman visited a number of Traditional owners within the Beetaloo to discuss the project and ongoing engagement.	16/08/2019
NT Environmental Protection Agency Meeting Origin and NT EPA meeting to discuss recent EMP content and future project overview	13/08/2019
Darwin show	25/07/2019

Engagement item	Date of engagement
Origin representative attended industry booth. Origin provided educational material in the form of story boards covering its proposed exploration activities, including an overview of shale exploration and hydraulic fracturing activities. Origin representatives also answered community questions about the Beetaloo exploration project and potential future job opportunities. Katherine Show Origin representative attended industry booth. Origin provided educational material in the form of story boards covering its proposed exploration activities, including an overview of shale exploration and hydraulic fracturing activities. Origin representatives also answered community questions about the Beetaloo exploration project and potential future job opportunities. Tennant Creek show Origin representative attended industry booth. Origin provided educational material in the form of story boards covering its proposed exploration activities, including an overview of shale exploration and hydraulic fracturing activities. Origin representatives also answered community questions about the Beetaloo exploration project and potential future job opportunities. Beetaloo "Meet the buyer" event with NT business in Tennant Creek Origin presented an overview of the Beetaloo exploration project, including local procurement opportunities to local business representatives. 1 on 1 meetings were held with local businesses to further understand capabilities. Beetaloo "Meet the buyer" event with NT business in Alice Springs Origin presented an overview of the Beetaloo exploration project, including local procurement opportunities to local business representatives. 1 on 1 meetings were held with local businesses to further understand capabilities. Full council meeting of the Northern Land Council	19/07/2019 12/07/2019 11/07/2019 9/07/2019 17/06/2019

Engagement item	Date of engagement
Origin representatives presented an overview of the Beetaloo Exploration Project to the NLC council.	
Beetaloo "Meet the buyer" event with NT business in Darwin Origin presented an overview of the Beetaloo exploration project, including local procurement opportunities to local business representatives. Origin's tier 1 contractors (such as Drillers and completion providers) also presented an outline of their scope and opportunities. 1 on 1 meetings were held with local businesses to further understand capabilities.	6/06/2019
Katherine mining services association conference Origin presented to the conference an overview and update on the Beetaloo Exploration Project.	16/05/2019
Darwin Port users Group Origin presented to the group an overview and update on the Beetaloo Exploration Project.	4/04/2019
GHD Beetaloo discussion Provided an update of the Beetaloo exploration project	3/04/2019
NT Cattleman's Association annual conference Origin representative attended the conference	28/03/2019
Meeting with the Alice Spring Chamber of Commerce annual conference Origin representative presented an overview and update of the Beetaloo exploration project and future business opportunities.	18/03/2019
NT Inquiry Community Business Reference Meeting Origin representative presented an overview and update of the Beetaloo exploration project	12/03/2019
Meeting with the Industry Capability Network Discussed the future Beetaloo exploration program and future opportunities	22/03/2019

Engagement item	Date of engagement
NT Economic Recovery Summit Origin representative presented an overview and update of the Beetaloo exploration project and future business opportunities.	27/02/2019
Indigenous Business Network Board Origin representative presented an overview and update of the Beetaloo exploration project and future potential indigenous employment and business opportunities.	15/02/2019
Energy Club NT Origin representative presented an overview and update of the Beetaloo exploration project, an update of the Us shale trip and future business opportunities.	13/02/2019
Industry Capability Network Origin provided an update to the Beetaloo exploration project and answered questions on the project.	1/02/2019
Roper Gulf regional Council Meeting to discuss overview of the Beetaloo Exploration project and forward plans	19-Dec-18
Geological and Bioregional Assessment Workshop- CSIRO, DEPWS, DIPR, Santos, Pangea and Central Petroleum Origin presented information : • Origin's tenure • Geology of the region • proposed forward exploration activities	04-05/12/2018
Roper Gulf Regional Council Origin provided an update on the Beetaloo Exploration Project.	19-Oct-18
NT Government Department of Business Innovation and Trade Origin provided an overview of the forward Beetaloo exploration project.	13-Oct-18

Engagement item	Date of engagement
Geological and Bioregional Assessment Meeting Discussion regarding the geology and hydrogeology of the Beetaloo Basin	11-Oct-18
Beetaloo industry operators meeting with CSIRO, DEPWS, Santos and Pangea General discussion on Origin's Beetaloo exploration project Discussion of water and wastewater management in the Beetaloo	
Beetaloo industry operators meeting with CSIRO, DEWPS, Santos and Pangea General discussion on Origin's Beetaloo exploration project Discussion of methane emission monitoring and management in the Beetaloo	10-Oct-18
Barkly Regional Council Provided update on the Beetaloo Exploration project	27-Sep-18
Barkly Regional Economic Development Committee Provided of the Beetaloo Exploration project	27-Sep-18 25-Sep-20
Charles Darwin University Meeting in Alice Springs to provide a project update and discuss training options for trades	13-Sep-18
Darwin Major Business Group Meeting Provided of the Beetaloo Exploration project	6-Sep-18
Meeting with Northern Land Council Meeting to discuss Beetaloo sacred sites clearance survey for future exploration work.	3-Sep-19
Geological and Bioregional Assessments first User Panel meeting Provided updated of Beetaloo exploration project and discussed forward GBA program	

Engagement item	Date of engagement
Darwin show Origin representative manning the APPEA booth providing an overview of the Beetaloo exploration project	26-Jul-19
Katherine show Origin representative manning the APPEA booth providing an overview of the Beetaloo exploration project	20-Jul-19
CSIRO Meeting to discuss Beetaloo project overview and proposed background methane monitoring program across Origin's tenure	16-Jul-19
Tennant Creek Show Origin representative manning the APPEA booth providing an overview of the Beetaloo exploration project	13-Jul-19
Alice Springs Show Origin representative manning the APPEA booth providing an overview of the Beetaloo exploration project	6-Jul-18
Northern Land council meeting to discuss the update on sacred site clearances for the proposed 2019 potential locations for exploration activities	
Engineers Australia Young Pipelines and Young Engineers Australia Origin presented information : • Origin's tenure • Geology of the region • proposed forward exploration activities	28-Jun-19
NT Department of Primary industry and Resources and Department of Environment and Natural Resources Discussing regarding the Inquiry recommendations and implementation strategy.	27-Jun-18

Engagement item	Date of engagement
GHD Origin provided GHD an overview of the future Beetaloo exploration program	24/05/2018 and 25/06/2018
NT Department of Primary industry and Resources and Department of Environment and Natural Resources Discussing regarding the Inquiry recommendations and implementation strategy.	25-May-18
NT Department of Primary industry and Resources and Department of Environment and Natural Resources Discussing regarding the Inquiry recommendations and implementation strategy.	18-May-18
Meeting with the NT Government Delegation at the APPEA conference update on the potential forward Beetaloo exploration project	16-May-18
NT Daly Waters Camp Draft Origin sponsored and attended event	5/05/2018
NT Department of Primary industry and Resources Discussing regarding the Inquiry recommendations and implementation strategy.	3/05/2018
Northern Territory Cattleman's Association Origin representatives attended NTCA	23-Mar-18
Alice Springs Chamber of Commerce Alice Springs Regional Mining conference Origin representatives attended NTCA	19-Mar-18

Appendix N.2 Project Poster Series

2019 Work Program

This year's work program consists of two exploration wells to evaluate liquids rich gas potential.



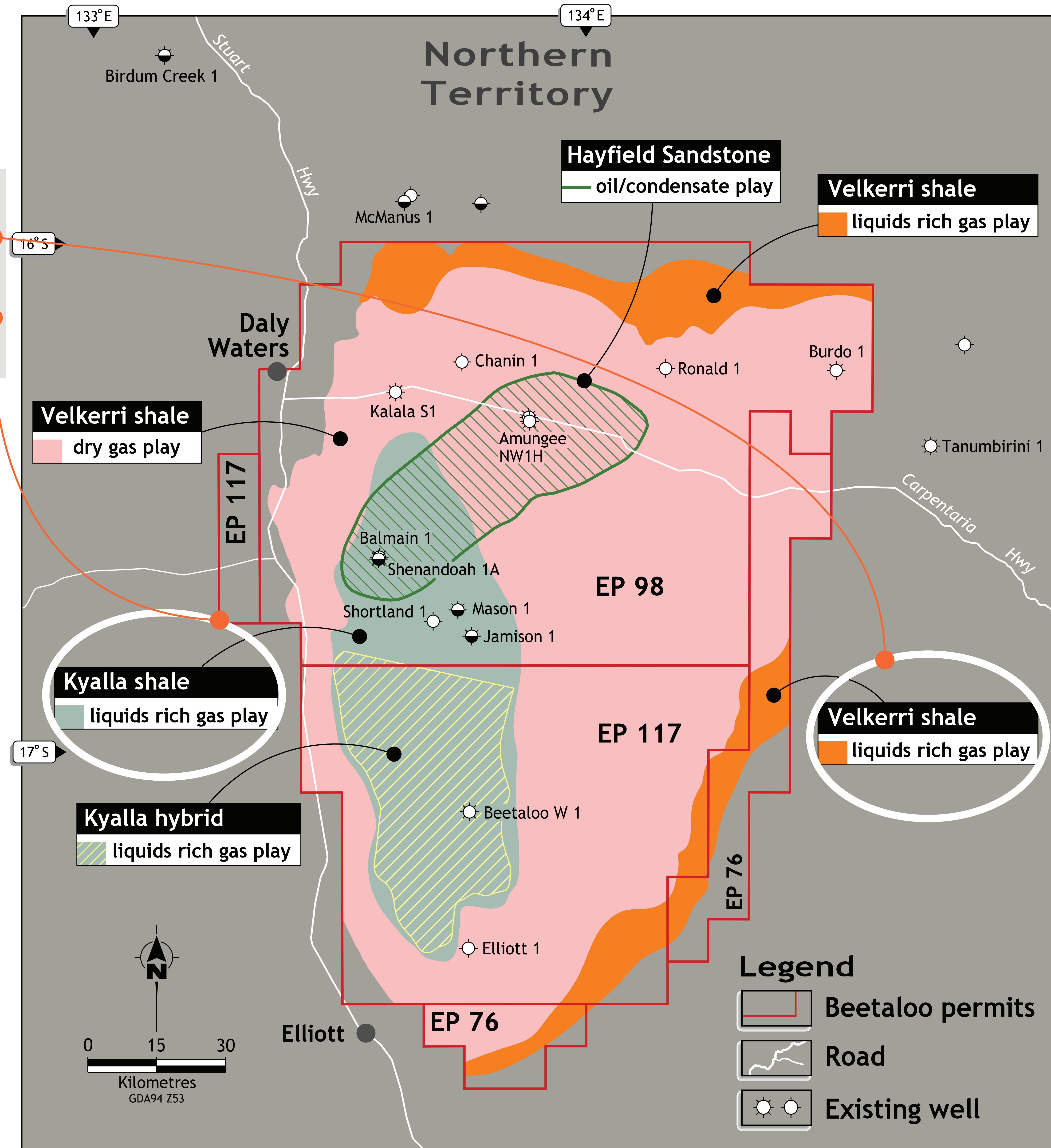
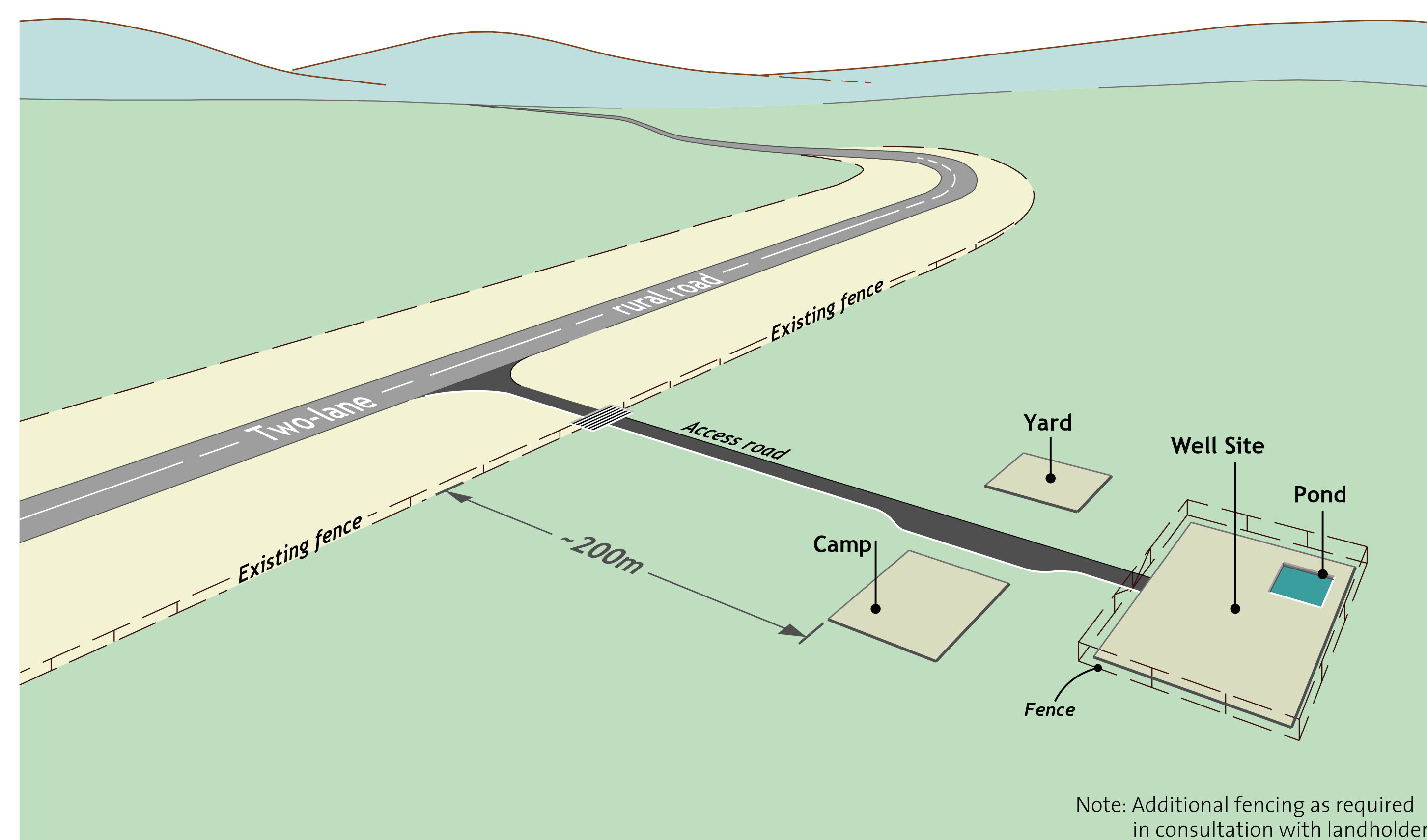
EP 76 Drill and fracture stimulate the Velkerri 76 well

EP 117 Drill and fracture stimulate the Kyalla 117 well

Native Title Holders and custodians together with the Northern Land Council (NLC) completed sacred site clearance and avoidance surveys for this work in September 2018.

Geological studies will continue in other exploration permit areas.

Drilling surface location layout



Amungee NW-1 & NW-1H (Drilling & Environmental Controls)



The Amungee NW-1 / NW-1H well is in the in centre of Exploration Permit 98 (EP98) in the northern Beetaloo Sub-Basin, just south of the Carpentaria Highway and around 60 km east of Daly Waters.

Amungee is the first horizontal well to be drilled in Origin's exploration program in the Beetaloo sub-basin and the first to be fracture stimulated, within existing regulations and with consent of the pastoralist and Traditional Owners.

The vertical stage of the well (NW-1) was successfully drilled in September 2015 to a depth of around 2,600 metres. The horizontal section (NW-1H), around 1,100 metres long, was drilled and fracture stimulated in 2016.

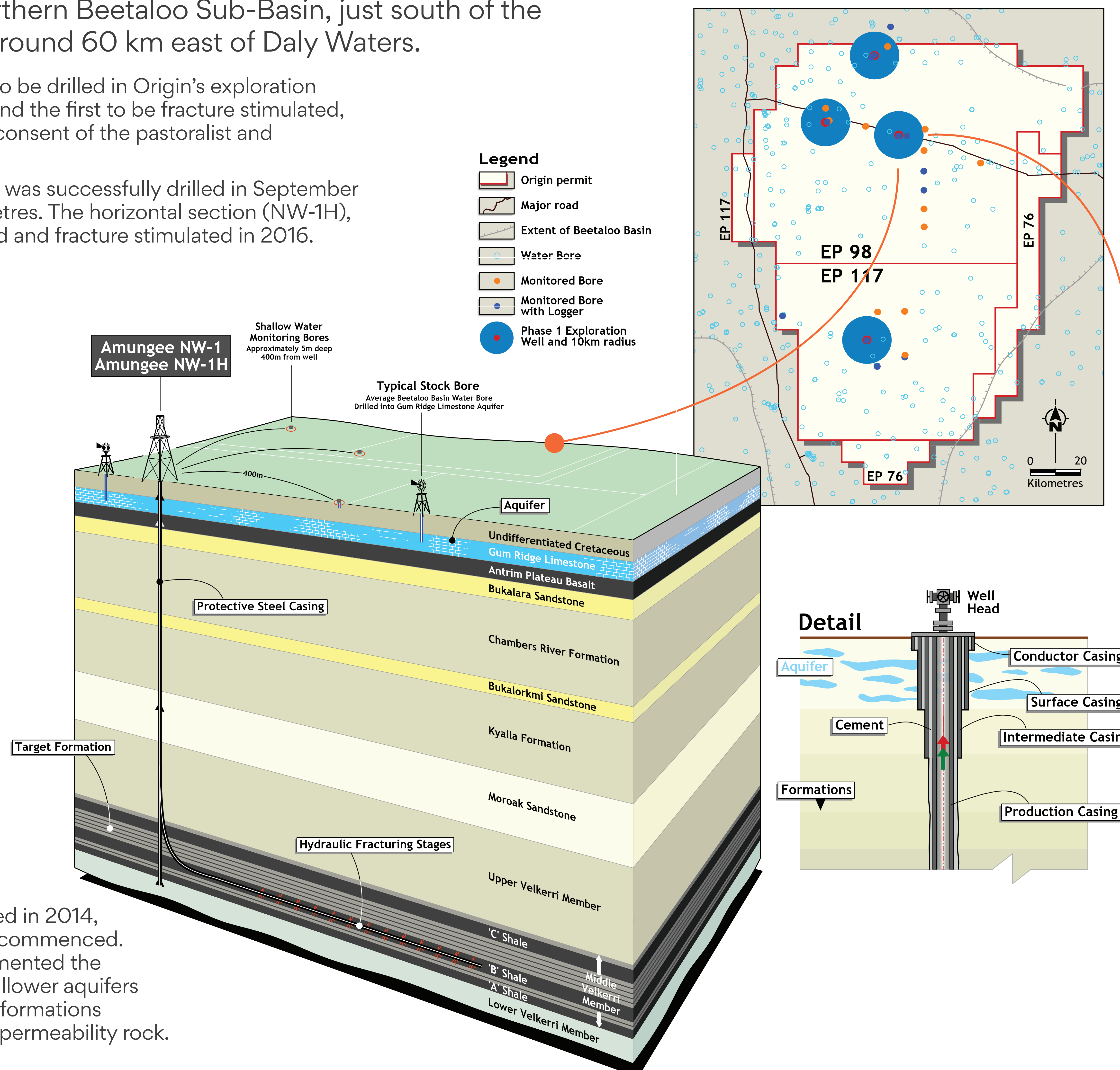
Subsequent production testing over a 57-day period confirmed the wells ability to flow gas, returning an average of 1.1 million cubic feet of gas per day.



Groundwater monitoring

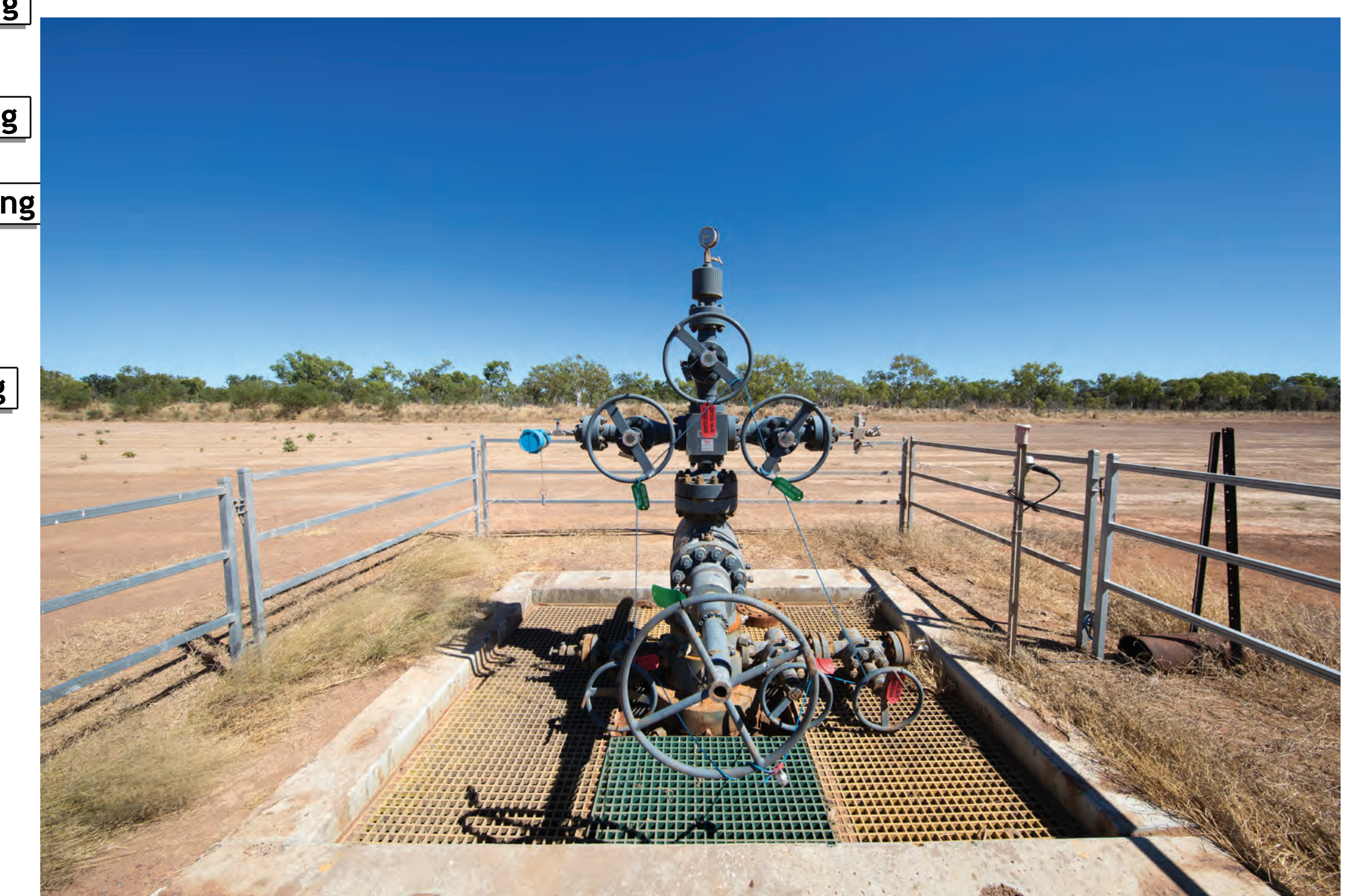
Groundwater monitoring is a regulatory requirement that allows us to detect any potential groundwater impacts that may occur from exploration activities. It also improves our understanding of the natural variability of water volumes and quality, and broader hydrogeological system in the Beetaloo sub-Basin.

Groundwater monitoring commenced in 2014, before current exploration activities commenced. A formal monitoring plan was implemented the following year - focussing on the shallower aquifers which are separated from the target formations containing gas by over 1.5km of low permeability rock.



This monitoring has found there no evidence of any impact from current exploration activities.

- Groundwater levels have remained stable in the shallower Cretaceous and Cambrian Limestone aquifers;
- The Cenozoic perched aquifer closest to surface responds strongly to rainfall, but water levels recede quickly suggesting a limited storage volume;
- Little or no hydrocarbons have been detected in bore sampling. Only one location found dissolved methane in trace concentrations
- All water sampled is suitable for stock use



Beetaloo Basin Gas



Our exploration program is evaluating both dry gas and liquids rich wet gas in the Velkerri and shallower Kyalla shale formations. Each play has different characteristics.



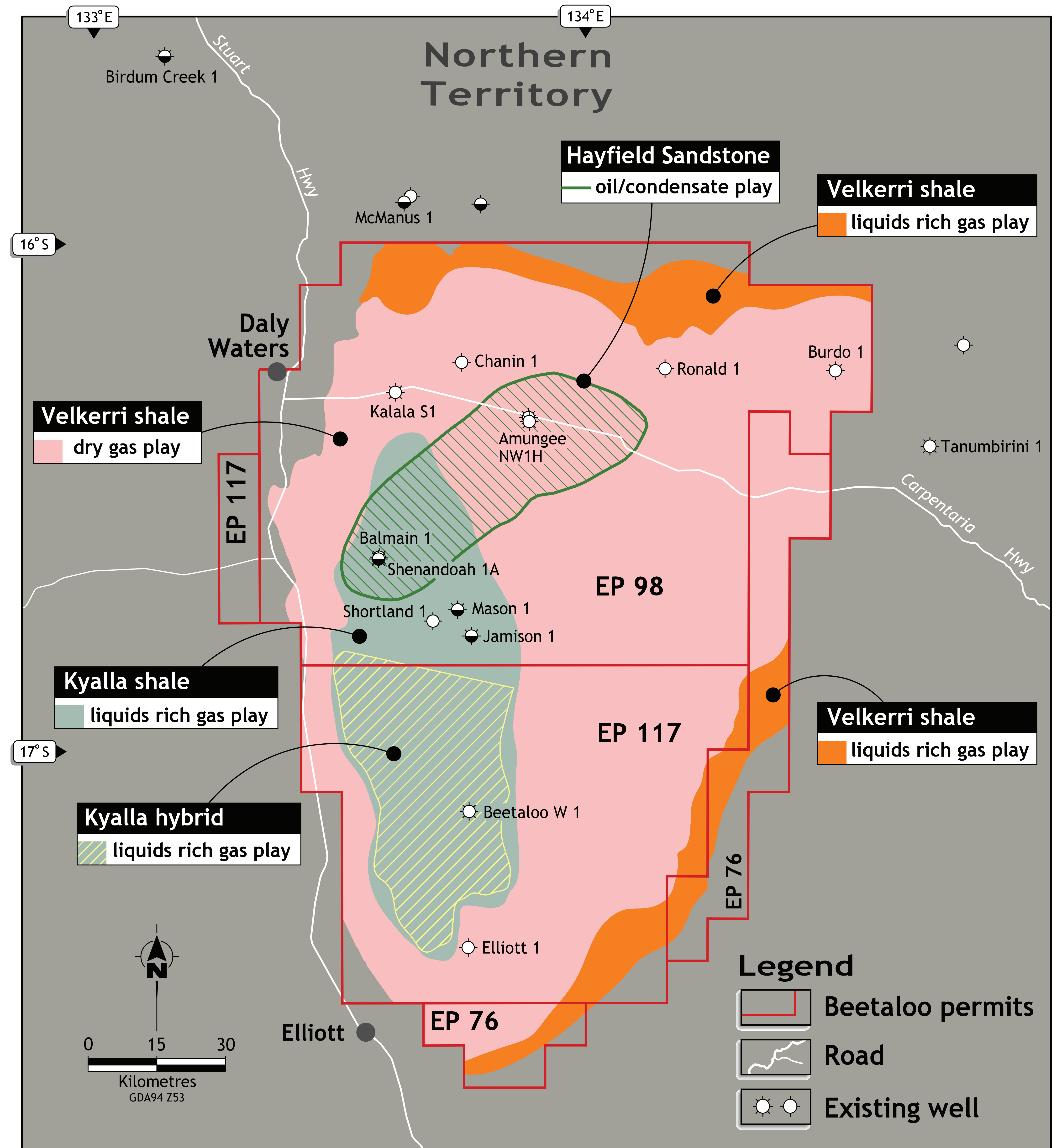
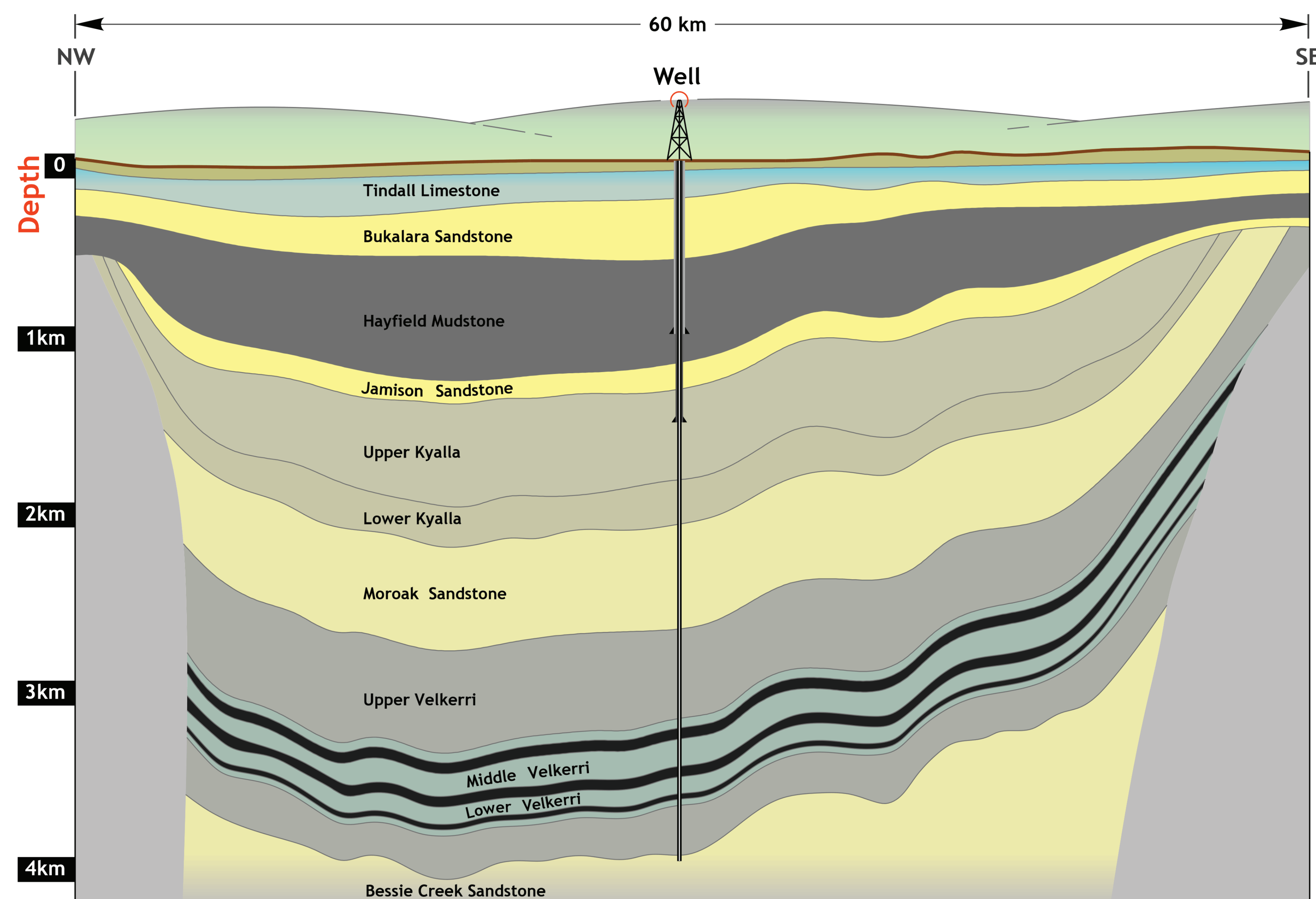
A Billion Years In The Making

The Beetaloo Basin is 1.4 billion years old - much older than the dinosaurs that roamed the earth between 150 to 200 million years ago.

It's the Proterozoic age, continents are yet to form and the Top End is part of a vast tropical sea.

The Earth's atmosphere is around 3% oxygen and complex life like plants and animals are yet to evolve. Micro-organisms like algae are the main life form. As they die they settle on the ocean floor.

The right combination of depth and temperature then combines to create the shale rocks we now know as the Velkerri formation, trapping vast reserves of natural gas around two and a half kilometers below surface.



Beetaloo Exploration Project



Origin, together with joint venture partner Falcon Oil and Gas, is exploring for gas in the Northern Territory’s Beetaloo Basin.



The Resource Potential

Our exploration project in the Beetaloo Basin is a multi-year, nine well shale gas project that started in mid-2014.

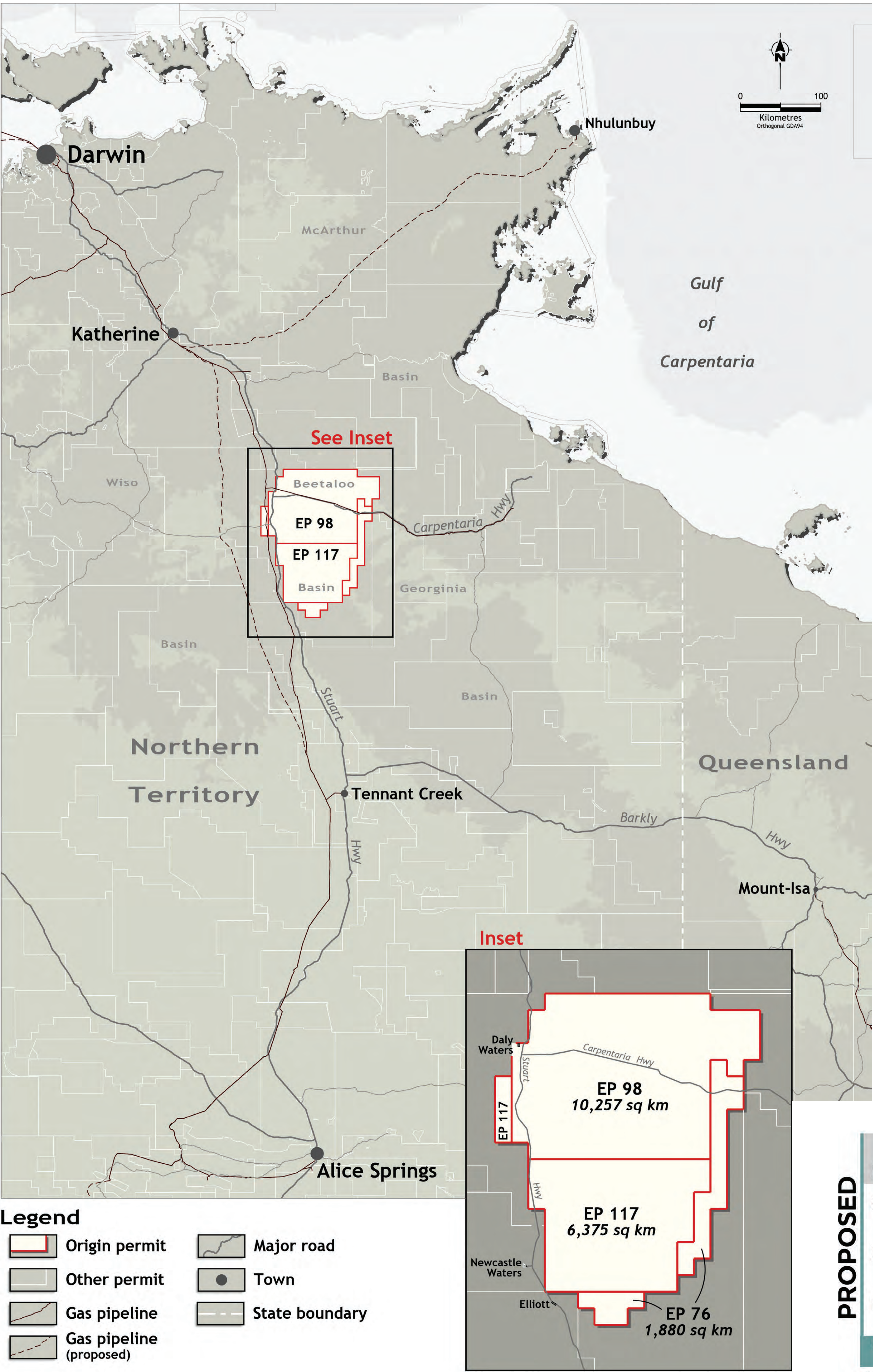
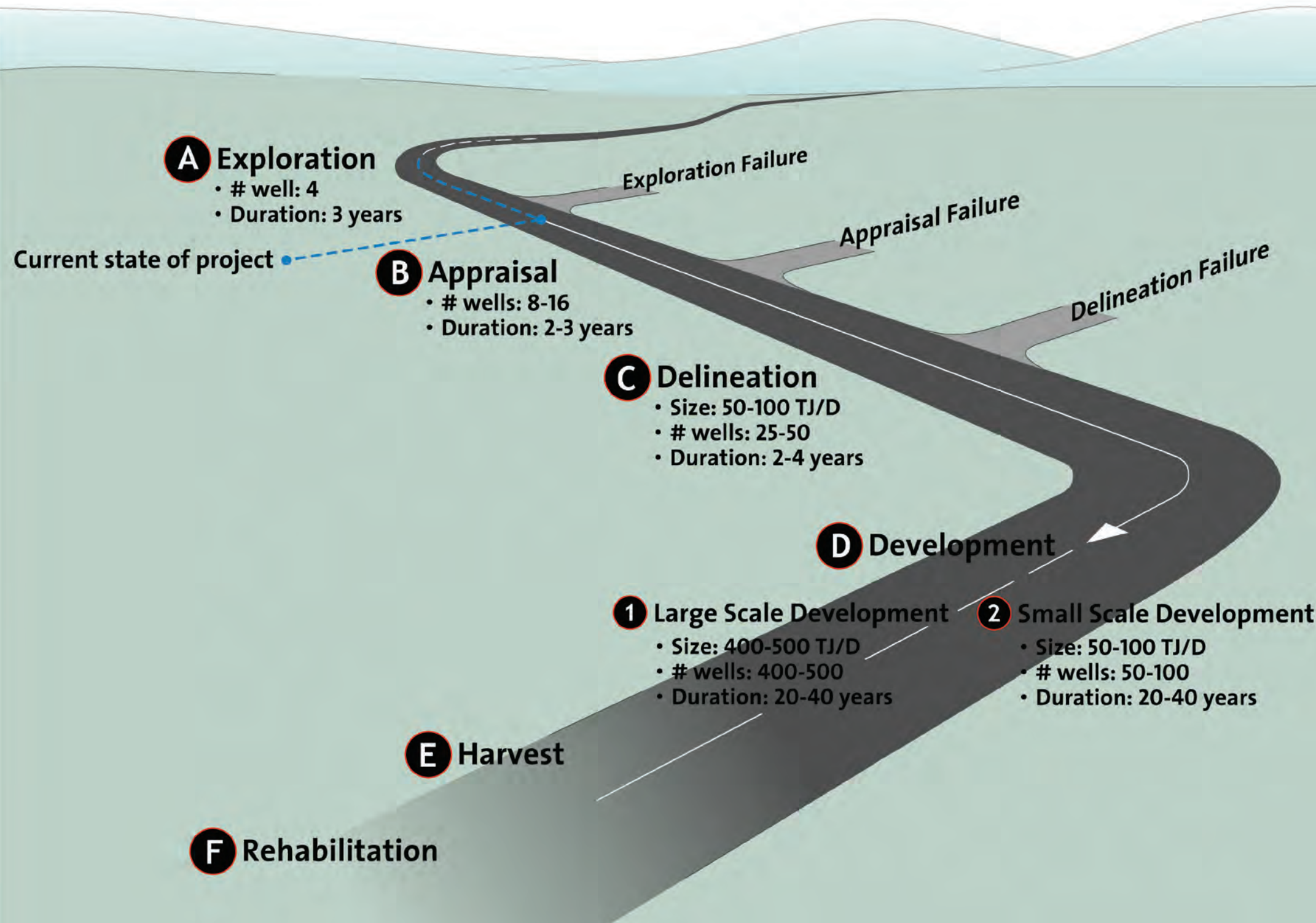
So far, we’ve drilled four wells. All within regulations and with the consent of the pastoralists and Native Title holders. We plan to drill two more this year (2019).

We think there’s a very large gas resource underneath the ground with outstanding potential.

We estimate our project could have as much as 61 trillion cubic feet of gas, with 6.6 trillion cubic feet of that already recognised as a contingent resource.

Just how big is this? The Inpex project is 12 trillion cubic feet and the Mereenie gas fields have produced around 240 billion cubic feet since the mid 1980’s.

The Road Ahead



The Benefits

- If successful, and development goes ahead, the project means:
- more work for and jobs with local companies, including Aboriginal companies
 - the opportunity to supply goods and services to the project
 - financial payment for host pastoralists and Native Title holders
 - taxes and royalties – providing government with more money that can go to improving community services, infrastructure and telecommunications
 - energy security (delivering gas to the Eastern Australia)

Our Permit Commitments

PROPOSED	EP				Moratorium		
		2014	2015	2016	2017-2018	2019-2020	2021-2022
98	98	Geological and geophysical studies	2 vertical wells, 1 horizontal well	1 HFS horizontal well		Geological and geophysical studies	Geological and geophysical studies
	117	Geological and geophysical studies	Geological and geophysical studies	1 vertical well		1 vertical pilot / evaluation well 1 HFS horizontal well	1 HFS horizontal well
	76	Geological and geophysical studies	Geological and geophysical studies	Geological and geophysical studies		1 vertical pilot / evaluation well 1 HFS horizontal well	1 HFS horizontal well
Permit Year		1	2	3		4	5

*HFS Hydraulic Fracture Stimulation 4 March 2019

Beetaloo W1 (Drilling & Environmental Controls)



The Beetaloo W-1 well is in the centre of Exploration Permit 117 (EP117) in the southern Beetaloo Sub-Basin, east of the Stuart Highway and around 54 km northeast of Elliott.

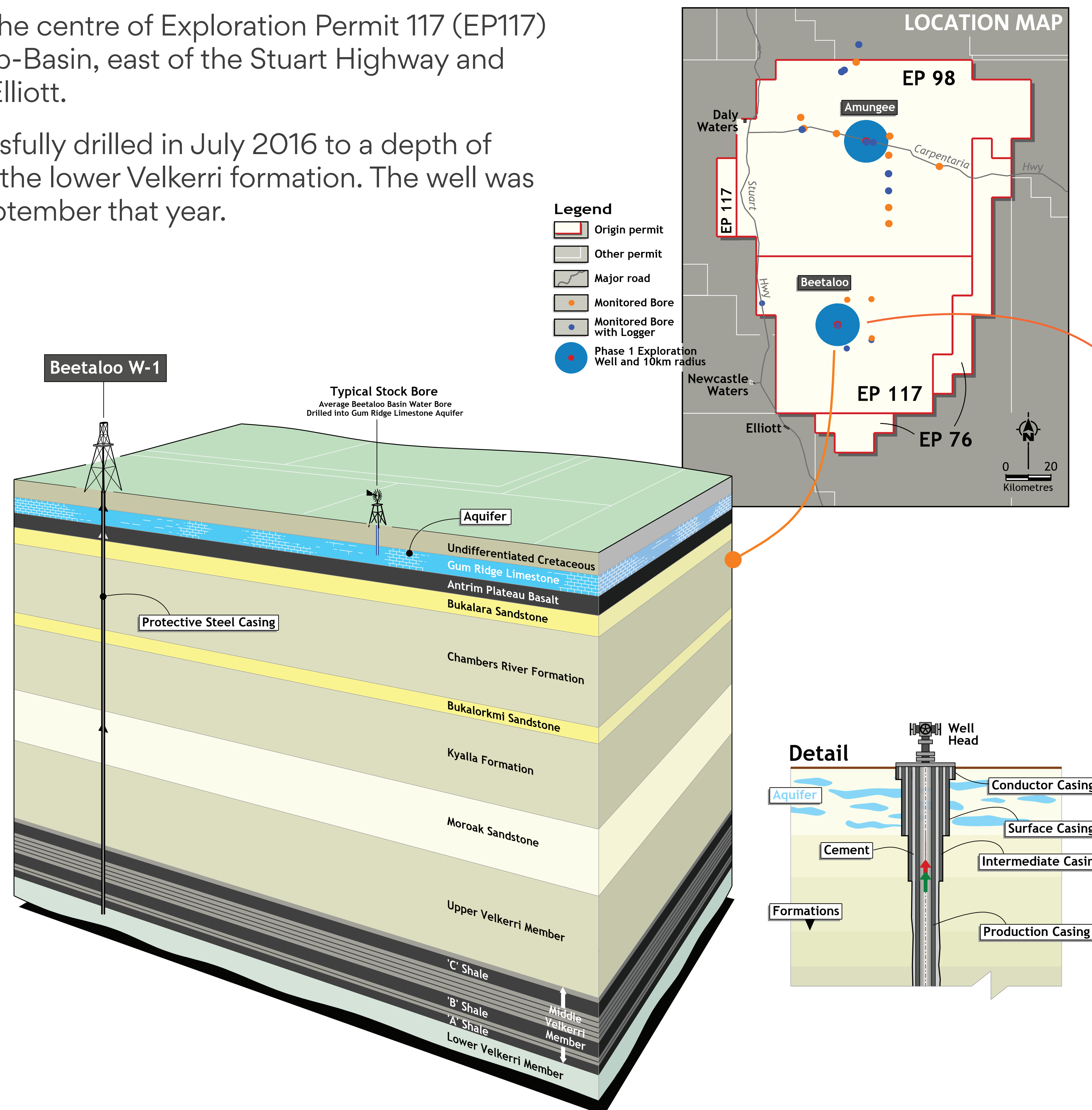
The vertical well was successfully drilled in July 2016 to a depth of around 3,100 metres within the lower Velkerri formation. The well was cased and suspended in September that year.



Groundwater monitoring

Groundwater monitoring is a regulatory requirement that allows us to detect any potential groundwater impacts that may occur from exploration activities. It also improves our understanding of the natural variability of water volumes and quality, and broader hydrogeological system in the Beetaloo sub-Basin.

Groundwater monitoring commenced in 2014, before current exploration activities commenced. A formal monitoring plan was implemented the following year - focussing on the shallower aquifers which are separated from the target formations containing gas by over 1.5km of low permeability rock.



This monitoring has found there no evidence of any impact from current exploration activities.

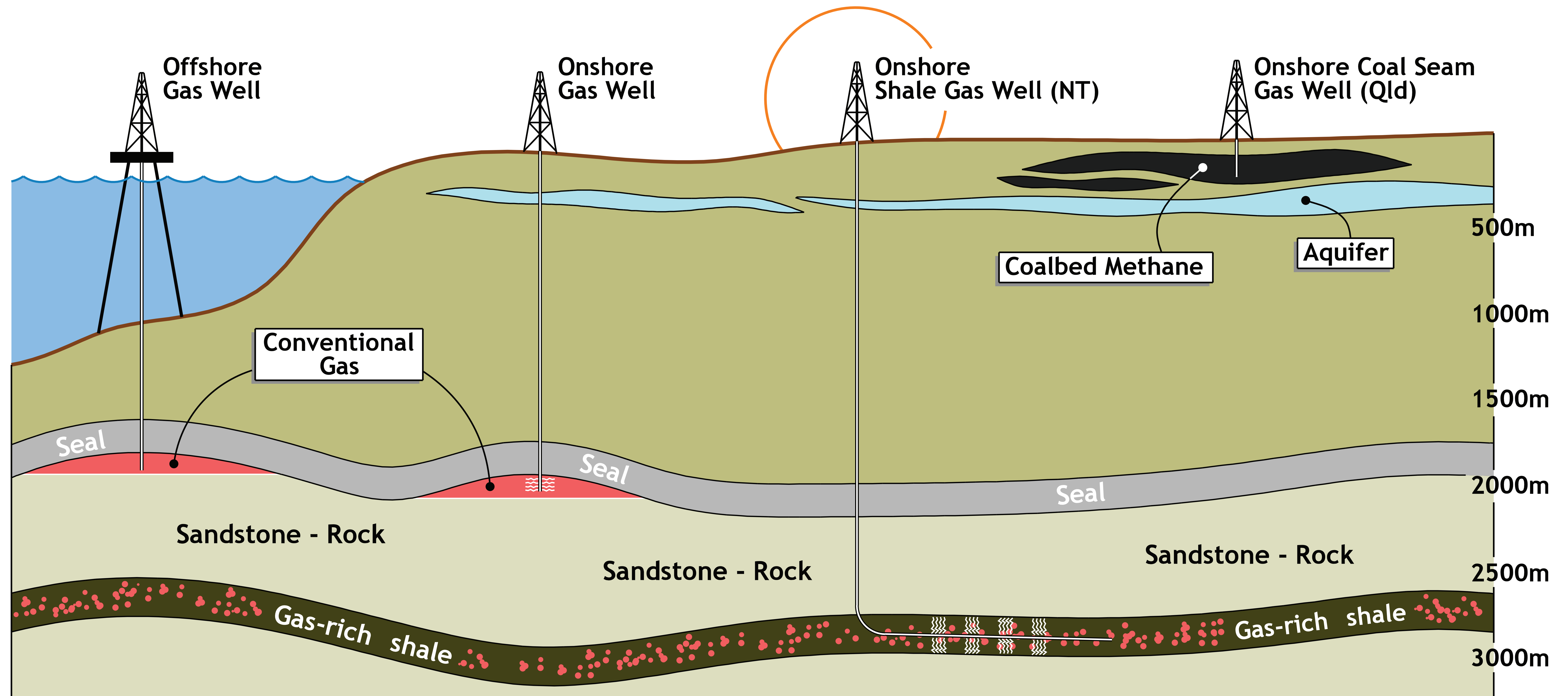
- Groundwater levels have remained stable in the shallower Cretaceous and Cambrian Limestone aquifers;
- The Cenozoic perched aquifer closest to surface responds strongly to rainfall, but water levels recede quickly suggesting a limited storage volume;
- Little or no hydrocarbons have been detected in bore sampling. Only one location found dissolved methane in trace concentrations
- All water sampled is suitable for stock use



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Unconventional gas is typically extracted from where it formed, in coal seams or shale formations that can be less porous and are sometimes described as tighter.

Less than a quarter of Origin's unconventional coal seam gas wells in Queensland are fracked.



Drilling For Shale Gas



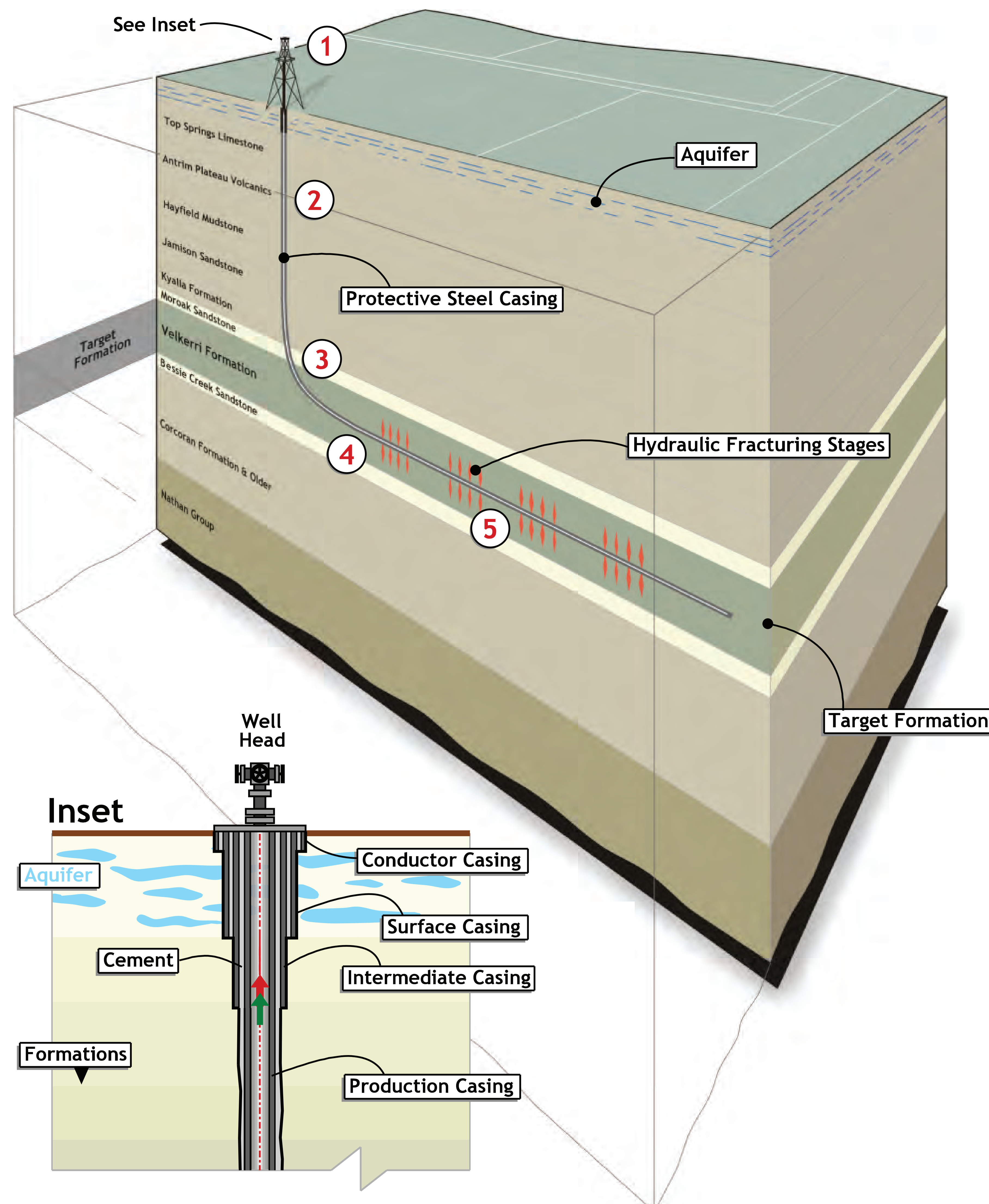
Our exploration program includes drilling both vertical and horizontal wells that target the underground shale rock formations in the Beetaloo Basin.



Long Reach Horizontal Drilling

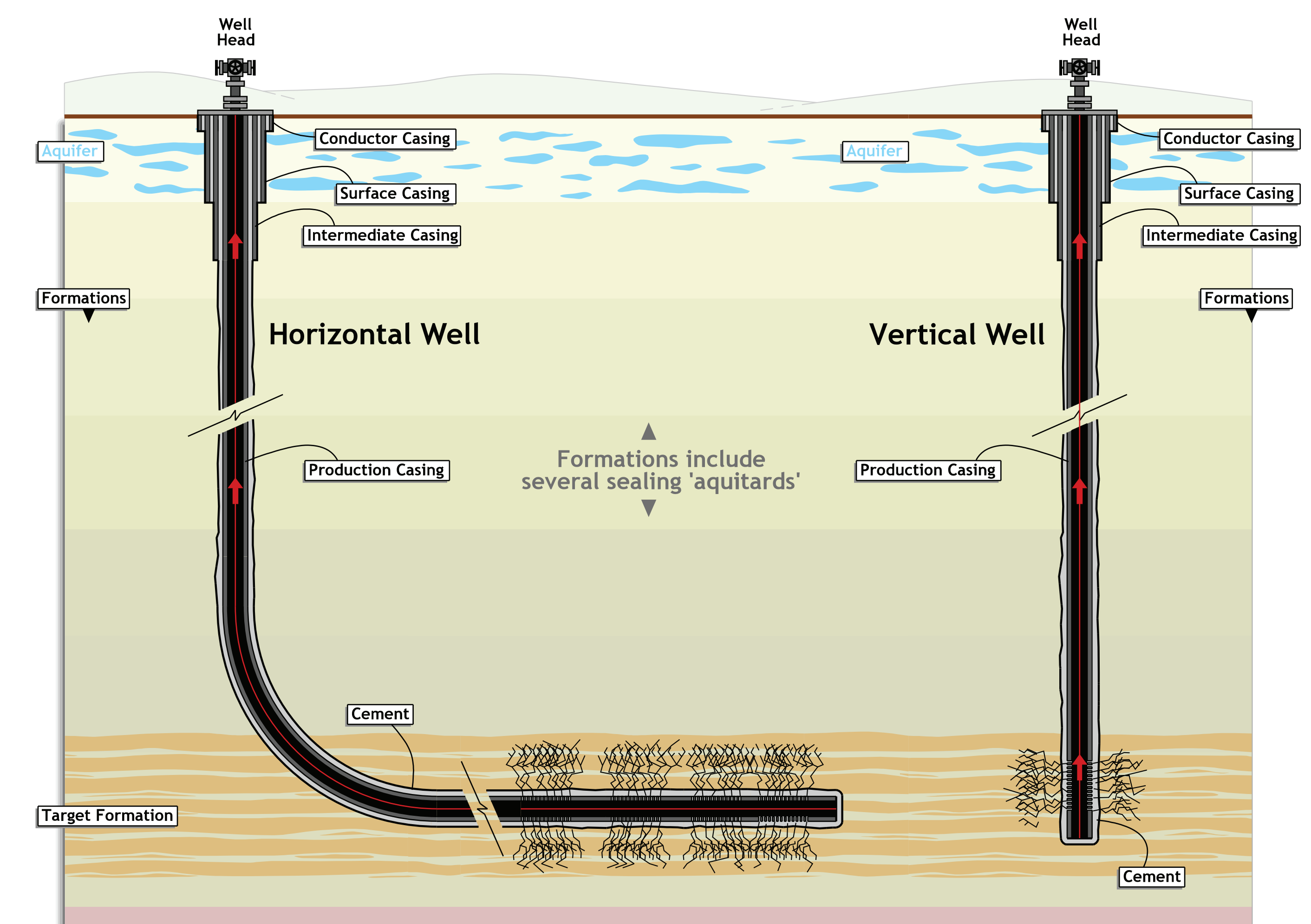
Steps in Horizontal Drilling:

1. Negotiate and agree access, obtain approval and bring in drilling rig and equipment
2. Drill vertical section of well using conventional methods
3. Drill kick-off (curved) section, with the use of a downhole motor mounted directly above the bit, in order to make the turn from vertical to horizontal. Downhole instruments called MWD (measuring while drilling) packages transmit sensor readings upward, allowing operators at the surface to build the angle
4. Drill horizontal wellbore, still using MWD to hold the angle and direction
5. Case off the well with steel casing and cement to allow for completion and fracture stimulation, preparing the well for production



Vertical Wells and Long Reach Horizontal Wells

- Origin will drill both vertical and horizontal wells during the Exploration Phase/s
- Vertical wells allow a more cost effective assessment of the potential for gas and liquids in the target zones and provide some information on production capability
- Horizontal wells will be required to assess the potential for economic gas and liquid recovery rates
- Horizontal wells are most likely to be required for field development



Groundwater Monitoring



Groundwater monitoring is a regulatory requirement that allows us to detect any potential groundwater impacts that may occur from exploration activities.

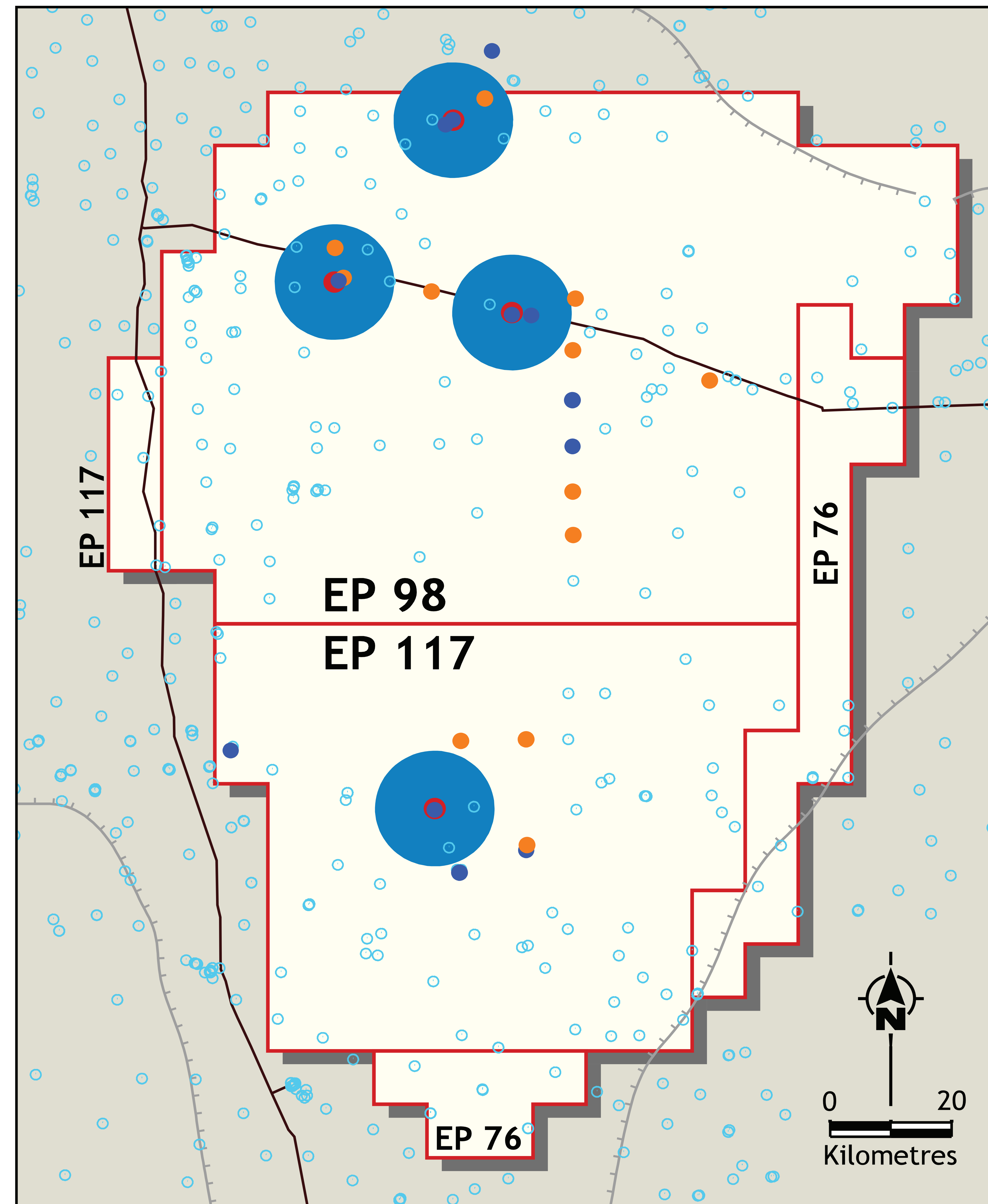
It also improves our understanding of the natural variability of water volumes and quality, and broader hydrogeological system in the Beetaloo sub-Basin.



Groundwater monitoring commenced in 2014, before current exploration activities commenced. A formal monitoring plan was implemented the following year - focussing on the shallower aquifers which are separated from the target formations containing gas by over 1.5km of low permeability rock.

This monitoring has found there no evidence of any impact from current exploration activities.

- Groundwater levels have remained stable in the shallower Cretaceous and Cambrian Limestone aquifers;
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- All water sampled is suitable for stock use



Legend

- Origin permit
- Major road
- Extent of Beetaloo Basin
- Water Bore
- Monitored Bore
- Monitored Bore with Logger
- Phase 1 Exploration Well and 10km radius

Hydraulic Fracture Stimulation (Fracking)

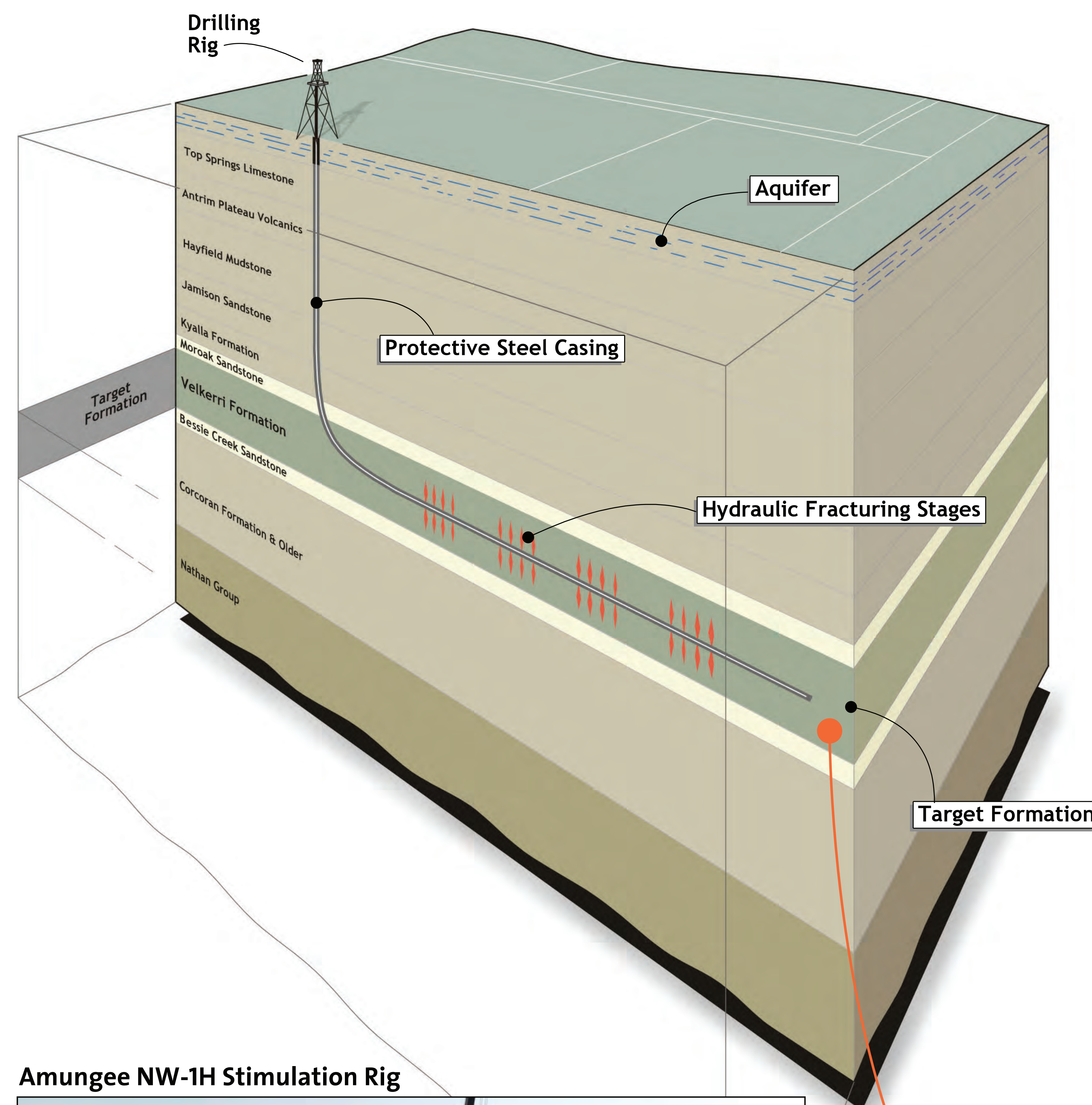
Fracking is the technical process designed to release the gas trapped in the dense shale rocks deep underground.

It involves pumping water mixed with sand and some chemical additives in low concentrations under pressure to fracture the shale, creating tiny pathways in the rock that allow the gas to flow into the well and be brought to the surface.



Key facts about fracking in the Beetaloo

- Distance offers important protection – there's over 2 kilometres between the shallower aquifers and the deeper rocks where gas is found.
- Both zones are effectively sealed off by several thick geological layers in between called aquatards.
- It's not physically possible for a fracture to extend upwards into the aquifer. Because of the distance, and because the amount of energy and pressure used in fracking isn't enough to connect and create pathways outside of the rock formation where gas is found.
- Any natural vertical fractures or old abandoned bores are extremely unlikely to provide a pathway for fracking fluids to reach a fresh water zone due to the greater weight (what's called hydrostatic head pressure) pushing down from above.
- Seismic work allows us to map the geology and avoid any large structures or faults.



Amungee NW-1H Stimulation Rig

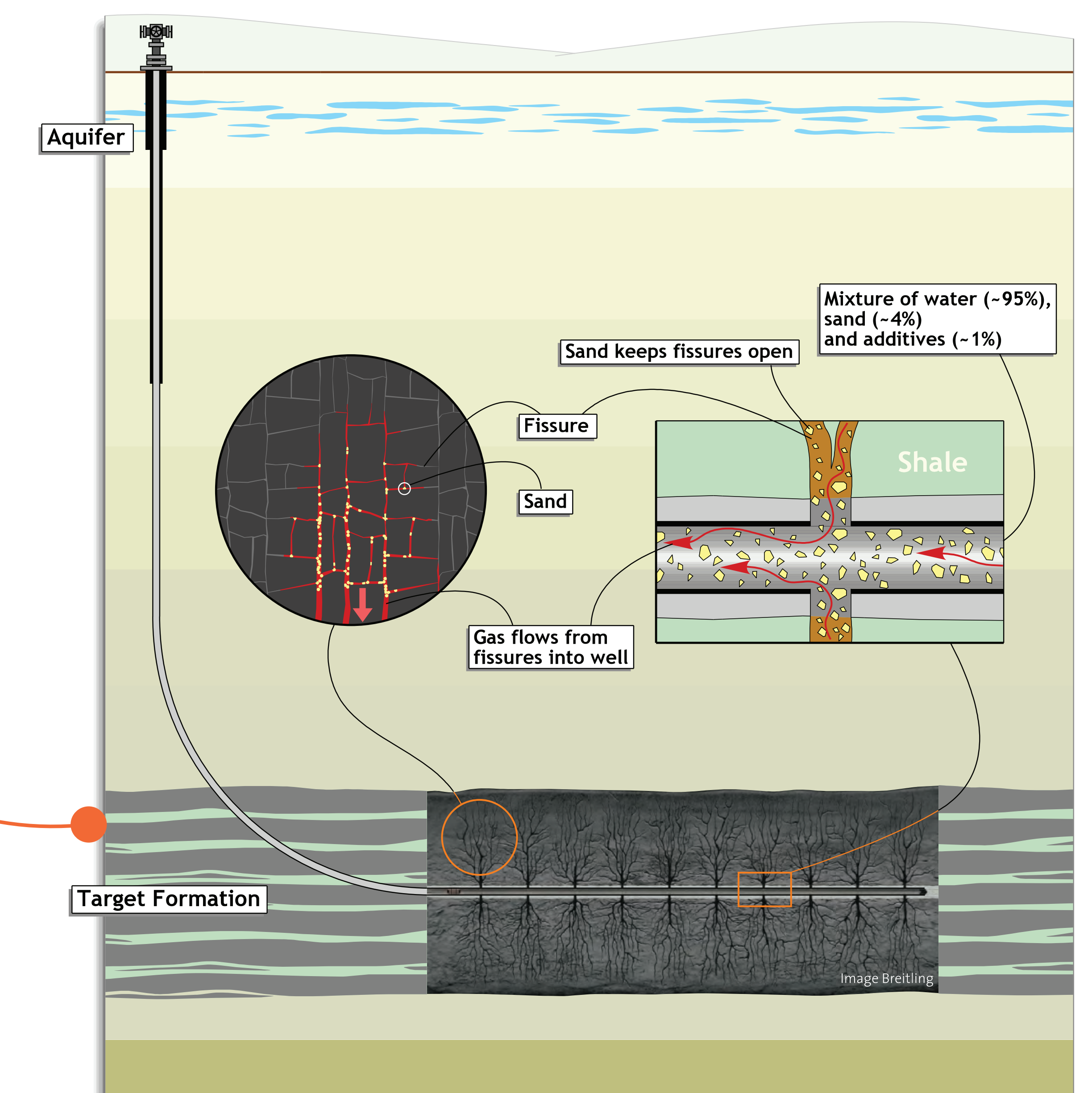


Protecting groundwater

We understand how important groundwater resources are to Traditional Owners, pastoralists and the community.

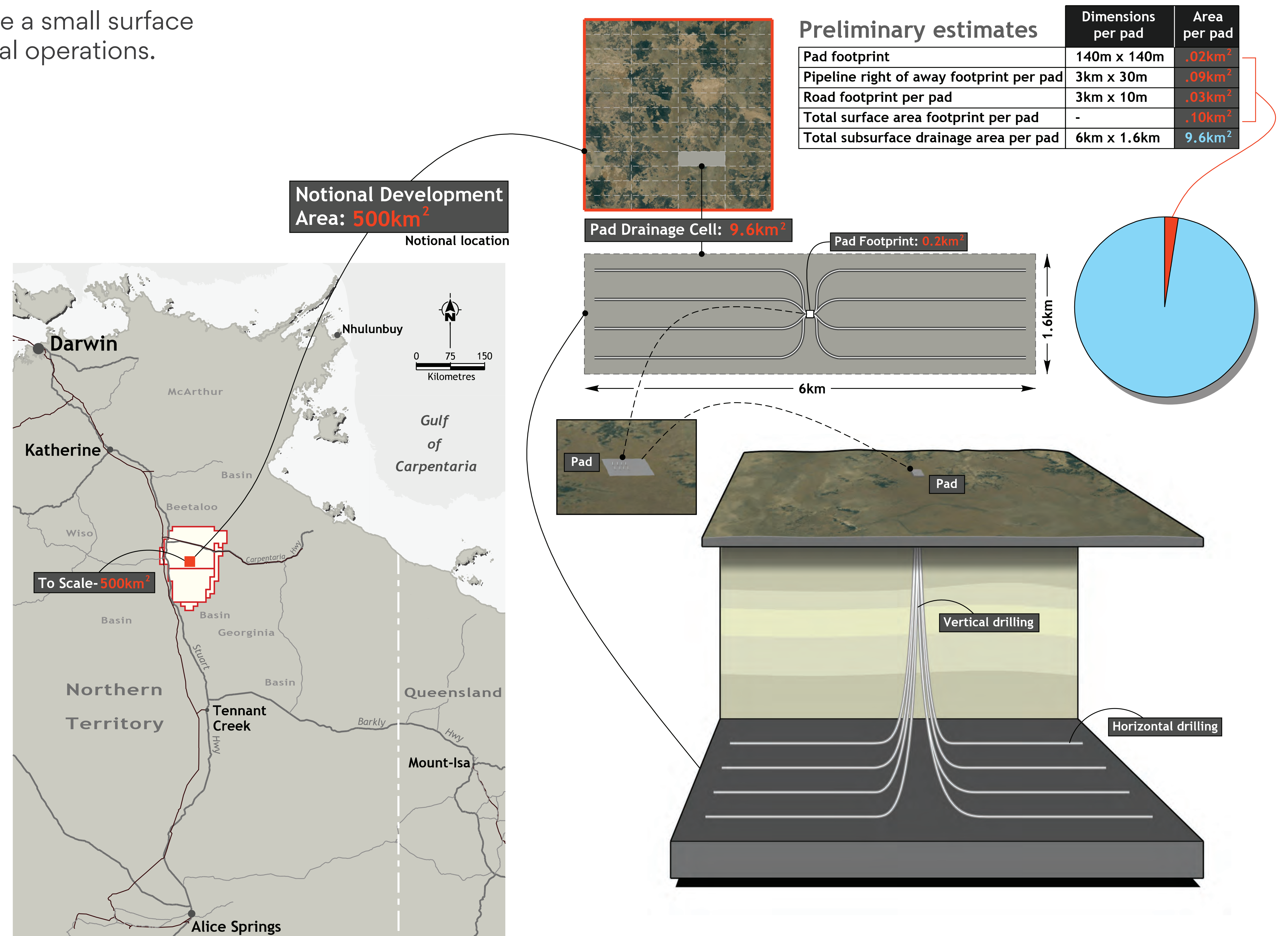
Both engineered and natural geological barriers isolate and protect underground water sources.

Multiple controls are put in place to protect the environment and groundwater. If these controls aren't successfully met when we drill - we don't frack.



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- In our submission to the NT Scientific Inquiry we described the surface footprint for large scale development scenario being no more than 10 square kilometres.
- This is based on multi-pad well design, and related surface infrastructure taking up no more than 2 per cent of a 500 square km land area.
- As further context, this total development area would occur on a handful of pastoral leases.



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A photograph of a wellhead or valve assembly in an open field. The assembly is mounted on a concrete base and features several large, grey handwheels for manual operation. A green safety grate is positioned in front of the lower part of the assembly. The surrounding area is a dry, open field with sparse vegetation and a clear blue sky. A metal fence is visible in the background.

Category	Description	Risk
Origin's minimum design requirement for a producing well Origin's minimum design requirement for a P&A well Origin's Beetaloo wells	1 Shallow surface casing + top of production casing cement below over pressured hydrocarbon reservoir	High ↓ Low
	2 Shallow surface casing + top of production casing cement below under pressured hydrocarbon reservoir	
	3 Shallow surface casing + top of production casing cement above top of gas	
	4 Shallow surface casing + top of production casing cement above surface casing shoe	
	5 Deep surface casing + top of production casing cement below under pressured hydrocarbon reservoir	
	6 Deep surface casing + top of production casing cement above top of gas	
	7 Deep surface casing + top of production casing cement above surface casing shoe	
	8 Deep surface casing + 1 intermediate casing + top of production casing cement below top of gas	
	9 Shallow surface casing + 1 intermediate casing + top of production casing cement above casing shoe	
	10 Deep surface casing + 1 intermediate casing + top of production casing cement above top of gas	
	11 Deep surface casing + 1 intermediate casing + top of production casing cement above casing shoe	
	12 Deep surface casing + 2 intermediate casing strings + top of production casing cement above casing shoe	

[illegible]

About Origin



Many Australians know Origin as one of the country's largest electricity retailers. We also have significant interests in power generation and natural gas production. This includes exploring for natural gas reserves to develop as future energy sources. Where we find that it makes good sense to produce the gas, we develop and deliver it to our customers in Australia and overseas.



How We Operate

We know we have to get energy right. For our customers. For our communities. For the planet.

Relationships are built on trust and doing what we say what will do. We realise every community is different and that locals know the areas where we work far better than we do.

We promise to talk with you about our plans and listen, to help better guide our decision making.

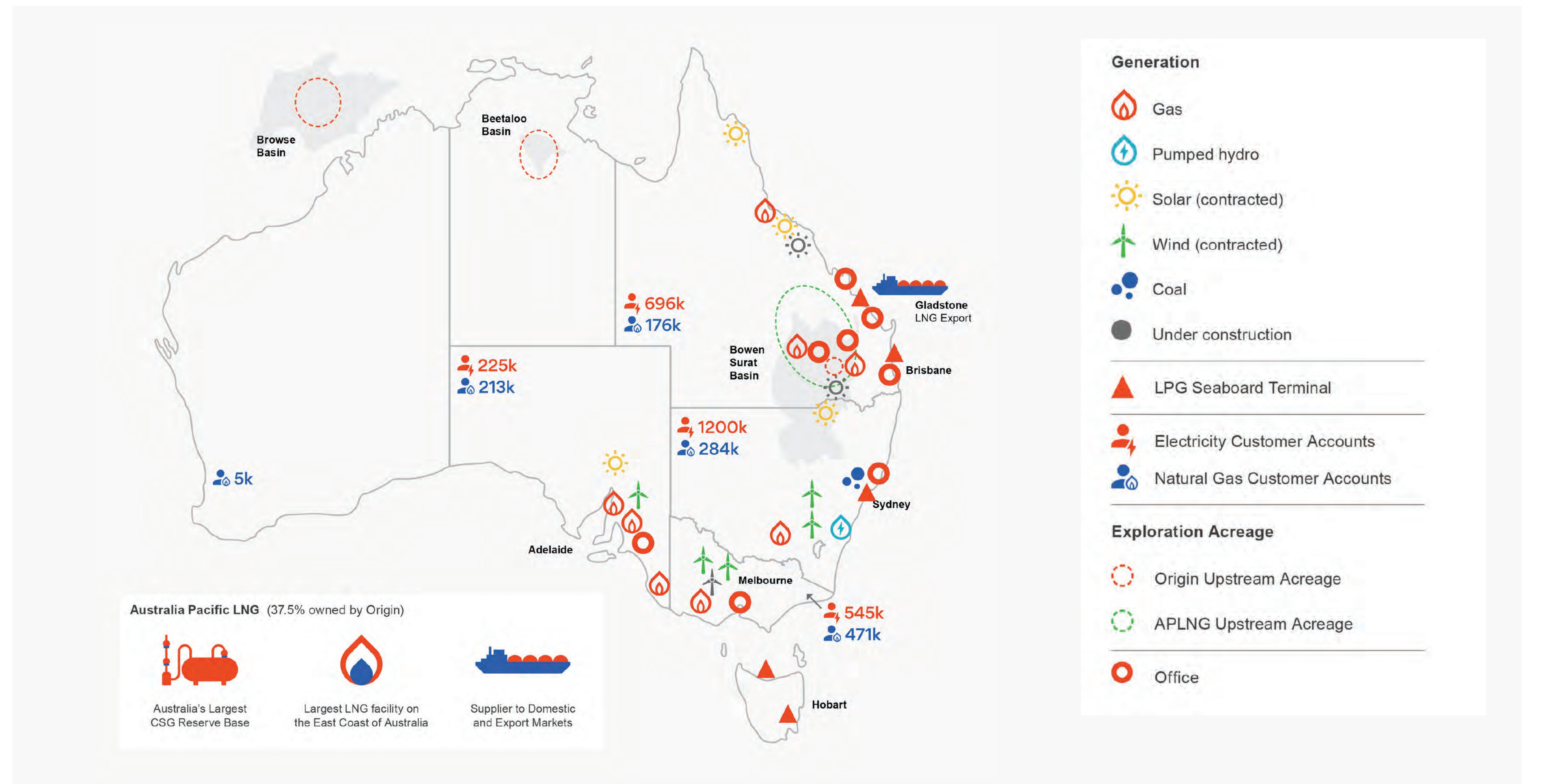
Co-existence is a proven reality in other parts of the country today.

We will always look for ways we can work together to create shared benefit for all Territorians.

Gas wells on Qld grazing lands



Where We Operate



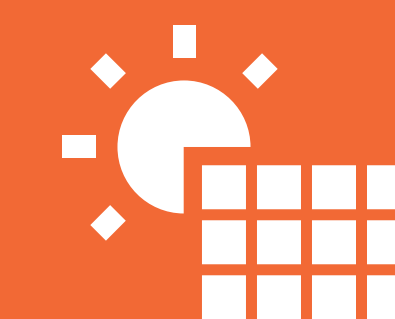
One Of Australia's Leading Energy Companies



Australia's Leading Energy Retailer
4.1 million gas, electricity and LPG customer accounts



Ensuring Domestic Gas Supply
Delivering around 30% of all gas on the east coast with APLNG



Growing Renewable Supply
Targeted to make up more than 25% of our generation mix by 2020

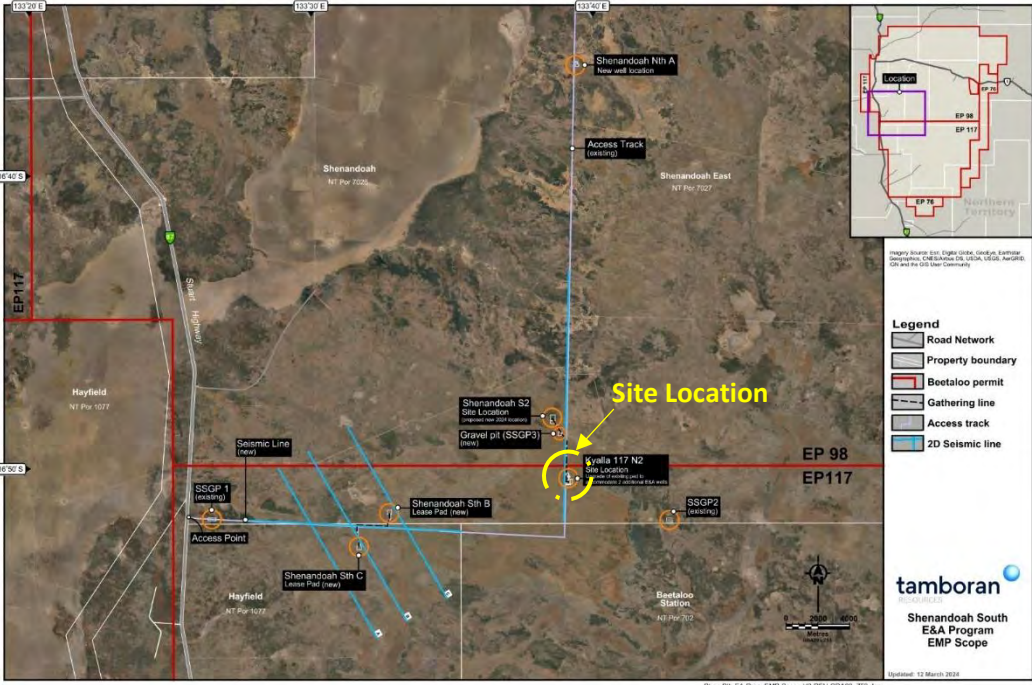


Powering Australia
7,000 MW of gas, coal and renewable generation and storage across the east coast

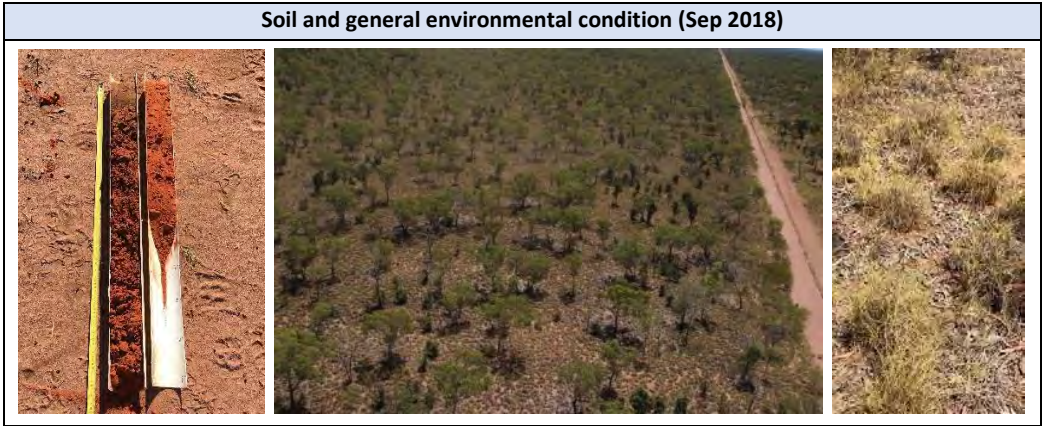


APPENDIX O Rehabilitation Management Plans

Location of Kyalla 117 N2	
Property and land uses	Gas exploration, cattle grazing, and native title rights and interests recognised by the native title determinations over the land and waters.
Climate	The permit area is described as arid to semi-arid. Climate is influenced by the monsoon and there is a distinct wet and dry season. Most rainfall (90%) occurs during the summer months, between October and March. Annual rainfall varies across the permit area is around 680 mm, with rainfall totals show moderate variability and drought conditions are known to occur every 10 years.
Pre-disturbance land condition summary	Kyalla 117 N2 location (GDA94, zone 53, 356379.72m E, 8137498.48m N) is on EP 117. The natural vegetation community that exists at Kyalla 117 N2 is of Eucalyptus low woodland which is broadly dominated by <i>Corymbia dichromophloia</i> and ground cover of <i>Triodia bitextura</i>. The landform at Kyalla 117 N2 is characterised by plains and rises associated with deeply weathered lateritic profiles, including sand sheets. Soils at this site are sandy at the surface, with a loamy sand to sandy loam A horizon. The site is in good ecological condition. The site contained moderate to high habitat values for wildlife, with coverage of leaf litter, grass cover and woody debris. Seemingly good continuous cover exists adjoining adjacent woodland habitat. Minor disturbance was evident from recent grazing and burning impacts. There is no evidence of weeds or feral animals.



Rehabilitation aims and objectives	
Site management aim	The aim is to rehabilitate any part of the land affected by the regulated activity to its pre-disturbed condition in accordance with Section A.3.9(d) of the Code.
Rehabilitation objectives	The rehabilitation objective is to provide a stable landform, which supports a) the rights and interests of the Native Title Holders in the land and water, and b) a resilient self-sustaining vegetation community that can withstand impacts including fire and cattle grazing and is safe to humans and wildlife.



The RMP should be read in conjunction with the overarching Environment Management Plan and Emergency Response Plans for Tamboran's operations in the Beetaloo Basin. Prepared by AECOM Australia Pty Ltd, 20 March 2024 on behalf of Tamboran B2 Pty Ltd.

Name	Contact details
Robert Wear Beetaloo Field Manager	[REDACTED]

Rehabilitation zones			
Infrastructure	Size (ha)	Soil type / slope	Vegetation community / dominant species
Well pad (existing)	5.25	Lateritic plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products, sandy and earth soils. <1% slope.	Comm 2a-<i>Corymbia dichromophloia</i> ± <i>Erythrophleum chlorostachys</i> open woodland, over <i>Acacia difficilis</i> ± <i>Terminalia canescens</i> , <i>Erythrophleum chlorostachys</i> open shrubland, over hummock grassland.
Well pad (expansion)	3.80		
Camp	1.50		
Access track incl turn-ins & passing bays	0.90		
Helipad	0.50		
Fence line & Fire Break	4.00		
Gathering lines Kyalla 117 N2 - Shenandoah S2	4.50		
Gravel pits (SSGP1 and SSGP2)	8.75		
Disturbance	29.20	Incl clearing for previous activities at Kyalla 117 N2.	



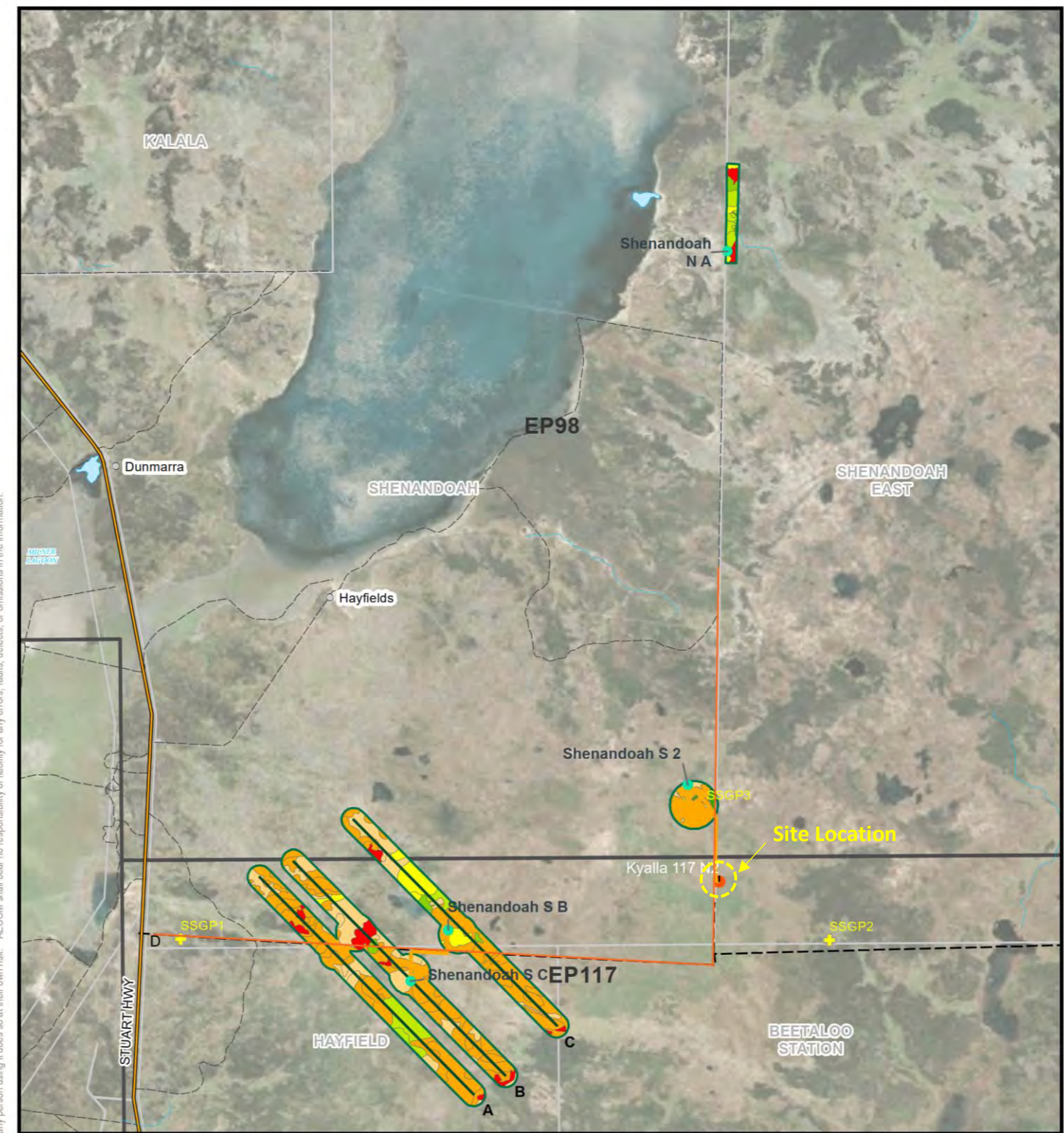
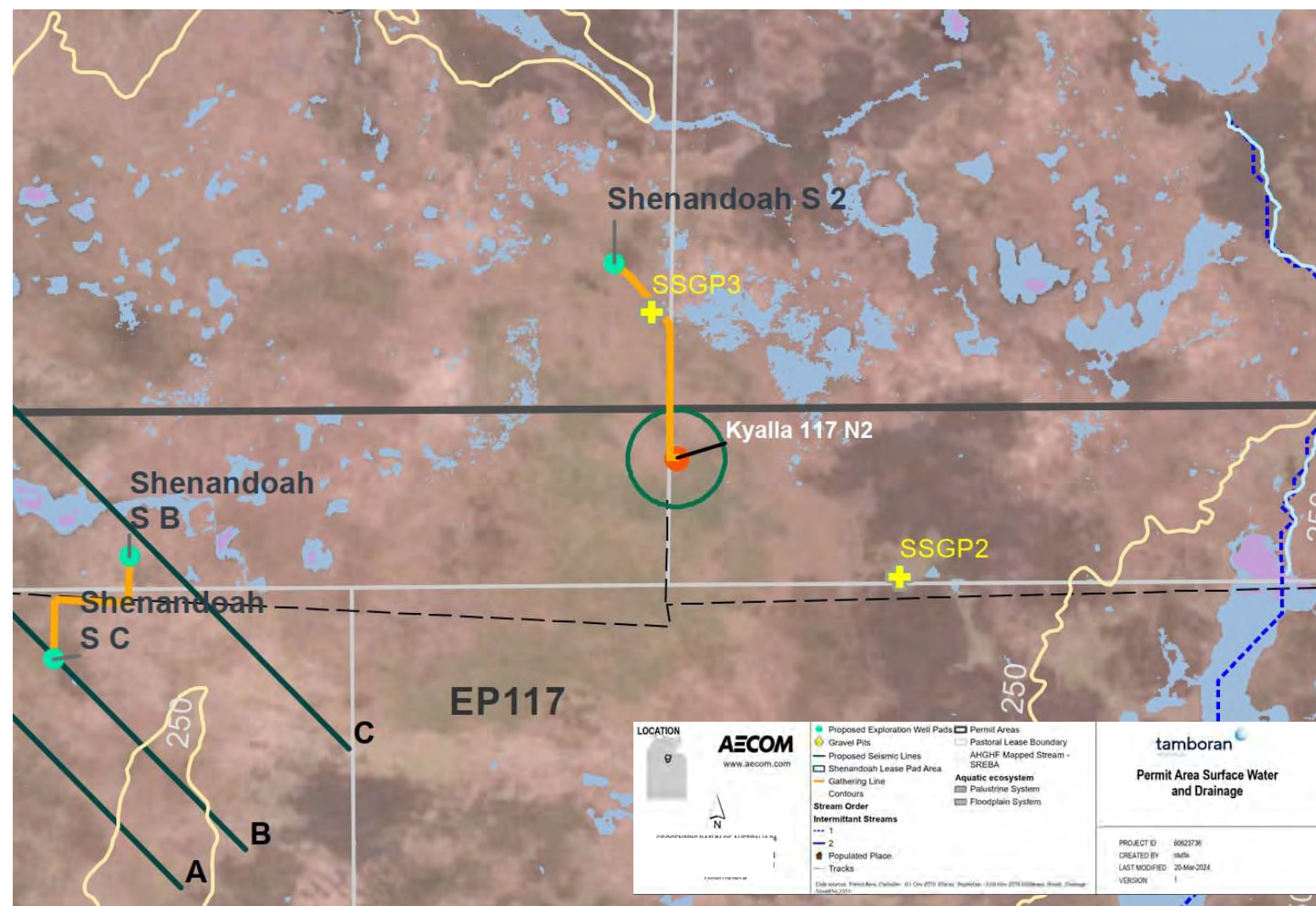
Rehabilitation risk	
Key Risks	Controls
Drought - impacting the establishment of rehabilitated vegetation	- Time rehabilitation actions to coincide with the beginning of the wet season, to ensure access to the site and maximise the establishment period of vegetation over the wet season. - Re-spread topsoil across the site to utilise the local seed bank. - Ongoing monitoring to identify if further seed inputs are required. - Collection of seed from the local area to ensure seed stock is suited to the climatic conditions of the site.
Fire - impacting revegetation	- Establish a mix of perennial and annual grass species. - Establish a mix of resprouting (e.g., <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp.) and reseeded species (e.g., <i>Acacia</i> spp.). - Ongoing monitoring to determine fire impacts on revegetation. - Ongoing monitoring to determine if further seed inputs are required.
Grazing - impacting revegetation	- Establish a mix of perennial and annual grass species. - Re-spread timber with topsoil. - Ongoing monitoring to determine grazing impacts on revegetation. - Ongoing monitoring to determine if further seed inputs are required. - Ongoing monitoring to determine if fencing is required.
Exposed ground - leading to an increase in weed establishment and/or erosion	- Remove windrows and topsoils. - Respread of topsoil and vegetated matter across the site. - Annual weed surveys of rehabilitated area once rehabilitation is established. - Control of any weed incursions.



Rehabilitation strategy		
Parameter	Methods	Objective
Vegetation	- Rehabilitation will be implemented for disturbance areas following completion of the individual activity within 12 months. - Disturbed areas to be allowed to naturally regenerate or revegetate on completion of the regulated activity. - All compacted areas to be ripped and scarified to promote regeneration of vegetation, this may require assistance through spread of native seed stock. Where possible, native seed stock would be supplied by local indigenous suppliers.	- Establish vegetation trending toward the target vegetation community for the area disturbed (i.e. species richness, %cover and structure) and in accordance with the Code (Clause A.3.9(d)). - Reinstate disturbance area to its pre-disturbed condition.
Ground cover	- Previously removed vegetation and topsoil will be uniformly respread over disturbed area. This will assist with the rehabilitation process by increasing infiltration and returning seed-bearing topsoil, as well as reducing erosion. - After first 12 months, additional input of native seed mix may be required from the area to assist rehabilitation process.	The type of ground cover applied to completed earthworks is to be compatible with the anticipated long-term land use, environmental risk, and site rehabilitation measures.
Landform stability	All windrows are to be removed post construction and at completion of the activities.	

Final success criteria	
Area to be rehabilitated	- Total area of approved surface disturbance is 29.20 ha. - Total area required for rehabilitation 29.20 ha.
Vegetation composition	- Vegetation composition (i.e. type, density) trending towards the target vegetation community and self-sustaining. - Vegetation is sustainable for long term with the only required maintenance consistent with the final land use. - Sign of woody vegetation regrowth (i.e. <i>Acacia</i>, <i>Eucalypt</i> and <i>Bullwaddy</i>) following rehabilitation and within 12-18 months. - Ground foliage cover consistent with the target vegetation community where disturbance occurred. - Achieve minimum of 30% diversity within the first 12 months and maintained for at least 3 years following rehabilitation consistent with analogue sample site. - Final success based on the following attributes - % canopy and ground cover, stratum 3 species richness, woody species diversity.
Watercourse crossings	- All stream crossings, where intersected, to be reinstated to the original topography. - No evidence of erosion as result of activity present within first 12 months.
Erosion	- Site stabilisation to occur and all erosion and sediment control infrastructure removed. - Less than 5 % erosion should be evident after the first 12 months and no subsidence or erosion should be evident for at least 5 years after completion.
Weeds	No establishment of weed species declared under the NT <i>Weeds Management Act</i>.
Hazardous materials and waste	- All hazardous material and waste removed from site upon completion of works to licensed landfill facilities or recycling facilities. - No residual soil contamination that poses a threat of environmental harm.
Safety for humans and wildlife	- Rehabilitation of disturbance areas should be similar in landform to the surrounding area. No steep slopes or barriers to remain on site that endanger wildlife, livestock or humans. - Windrows removed. - Water bores and exploration wells to be sealed and isolated (as required). - Removal of all surface facilities including fencing (star pickets / fencing wire).

Monitoring program and schedule			
Stage	Timing	Method	Measurable attributes
Progressive rehabilitation	Within 6-12 weeks of completion of activities	- Topsoil, windrows and cleared vegetation stockpiled are to be respread following the works. - Refer to detail in Tamboran's Erosion and Sediment Control Plan	All disturbed areas must be considered suitably stabilised as per IECA Table in the Tamboran Erosion and Sediment Control Plan.
Preliminary assessment	Post rehabilitation, end of wet season survey (February to June) within 12 months.	- Analogue sites will be established for the two vegetation communities identified in the baseline Land Condition Assessment (AECOM 2023) at adjacent undisturbed sites. - Permanent 100 m x 4 m transects (one per vegetation community), will be established at disturbed and analogue sites including photo monitoring point(s). - Collect 1 x 1 m ground cover quadrats every 10 m along each 100 m transect. - Transects to be positioned <20 m from pastoral and gas infrastructure assets (i.e. access tracks, fence lines, well pads, water troughs) to reduce edge effects.	Following measurable attributes will be compared with analogue sites: - Seedling/sapling density of dominant species respective to each vegetation community. - Percentage of ground cover respective to bare land and vegetation. - Number of species at canopy, mid and ground strata. - Evidence of erosion (type of erosion, approximate area of erosion). - Weed presence/absence (species and density). - Disturbance (fire frequency and intensity, evidence of feral animal/ cattle) - Incidental observations.
Early rehabilitation	Years 1, 2 and 3 post rehabilitation, end of wet season survey (February to June).	- Monitoring to be undertaken using permanent transects at analogue and disturbed sites. - Collect data as per preliminary methods. - Compare results from monitoring sites with analogue sites and previous year's assessment to determine if require additional management inputs (i.e. seeding, stabilisation).	- Early assessment of rehabilitation will determine attributes of woody plants in each 100 m x 4 m transect. - Including assessment of species, DBH (>1.5 cm) and height (>2 m), in addition to parameters described within the preliminary assessment.
Long-term rehabilitation	Annually until final success criteria has been met, end of wet season survey (February to June).	- Implement reseeded if species richness does not show a trajectory to achieving pre-disturbance conditions 5 years post disturbance. - Species which fail to naturally recover from soil seed bank will be selected for reseeded. - Annually review success criteria.	Long-term assessment to determine establishment, recruitment, and growth rate attributes of plant species, in addition to parameters described during early rehabilitation stage.



- 1a - Acacia shirleyi woodland over Macropteranthes kekwickii ± Atalaya hemiglauc, Acacia holosericea open shrubland over open tussock grassland
- 2a - Corymbia dichromophloia ± Erythrophleum chlorostachys open woodland over Acacia difficilis ± Terminalia canescens, Erythrophleum chlorostachys open shrubland over hummock grassland
- 2b - Acacia shirleyi, Corymbia dichromophloia ± Eucalyptus leucophloia, open woodland over Macropteranthes kekwickii, Petalostigma pubescens, Hakea arborescens open shrubland over tussock grassland
- 2c - Eucalyptus leucophloia, Corymbia dichromophloia, Acacia shirleyi woodland over Dodonaea hispida, Calytrix extipitata open shrubland over open hummock grassland
- 3a - Eucalyptus chlorophylla, Corymbia polycarpa ± Corymbia confertiflora open woodland over Erythrophleum chlorostachys, Acacia holosericea, Acacia difficilis open shrubland over tussock grassland
- 4a - Acacia shirleyi ± Eucalyptus pruinosa, Eucalyptus chlorophylla woodland over Melaleuca viridiflora, Eucalyptus pruinosa, Eucalyptus chlorophylla open shrubland over open tussock grassland
- 4b - Eucalyptus microtheca, Corymbia polycarpa, Eucalyptus camaldulensis open woodland over Acacia holosericea, Acacia lysiphloia, Macropteranthes kekwickii open shrubland over tussock grassland
- 4c - Eucalyptus camaldulensis open woodland over Eucalyptus microtheca open shrubland
- 4d - Eucalyptus camaldulensis low woodland over Melaleuca viridiflora sparse shrubland over open tussock grassland

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PROJECT ID: 60623736
CREATED BY: stutta
LAST MODIFIED: 20-Mar-2024
VERSION: 1

Existing Exploration Well Pads

Gravel Pits

Proposed Exploration Well Pads

Proposed Seismic Lines

Shenandoah Lease Pad Area

Shenandoah South Well Pad Access Track

Populated Place

Tracks

Highway

Gathering Line

Water Bodies

Permit Areas

Pastoral Lease Boundary

Access Track Seismic Line

tamboran
RESOURCES

Shenandoah South Project Area Vegetation Groups

PROJECT ID: 60623736
CREATED BY: stutta
LAST MODIFIED: 20-Mar-2024
VERSION: 1

Location of Shenandoah South 2

Property and land uses	Gas exploration, cattle grazing, and native title rights and interests recognised by the native title determinations over the land and waters.
Climate	The permit area is described as arid to semi-arid. Climate is influenced by the monsoon and there is a distinct wet and dry season. Most rainfall (90%) occurs during the summer months, between October and March. Annual rainfall varies across the permit area is around 680 mm, with rainfall totals show moderate variability and drought conditions are known to occur every 10 years.
Pre-disturbance land condition summary	The Shenandoah South 2 location (GDA94, Zone 53, 355291.00mE, 8140676.00mN). The natural vegetation community is <i>Corymbia dichromophloia</i> ± <i>Erythrophleum chlorostachys</i> open woodland over <i>Acacia difficilis</i> ± <i>Terminalia canescens</i>, <i>Erythrophleum chlorostachys</i> open shrubland over hummock grassland and <i>Acacia shirleyi</i>, <i>Corymbia dichromophloia</i> ± <i>Eucalyptus leucophloia</i>, <i>Corymbia polycarpa</i> open woodland, over <i>Macropteranthes kekwickii</i>, <i>Petalostigma pubescens</i>, <i>Hakea arborescens</i> open shrubland, over tussock grassland. The landform at Shenandoah South 2 is characterised by lateritic plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products, sandy and earth soils. Habitat surrounding the site is in good condition. The habitat contained good refuge opportunities for small birds and reptiles in the form of dense grass cover, with some large woody debris and tree hollows and logs.



Rehabilitation aims and objectives

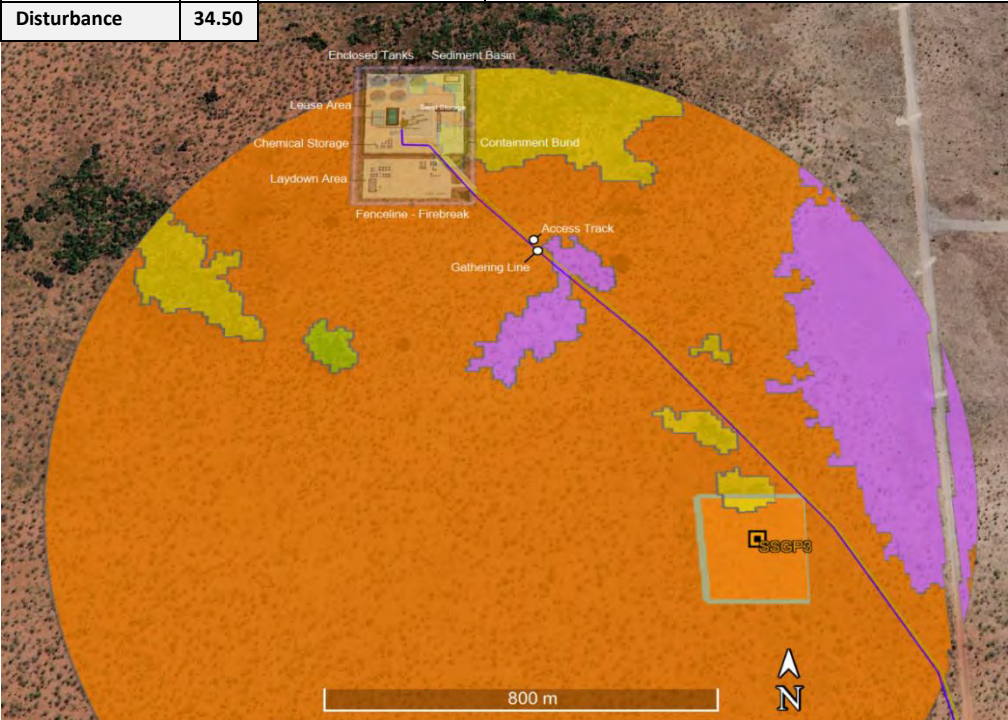
Site management aim	The aim is to rehabilitate any part of the land affected by the regulated activity to its pre-disturbed condition in accordance with Section A.3.9(d) of the Code.
Rehabilitation objectives	The rehabilitation objective is to provide a stable landform, which supports a) the rights and interests of the Native Title Holders in the land and water, and b) a resilient self-sustaining vegetation community that can withstand impacts including fire and cattle grazing and is safe to humans and wildlife.

Soil and general environmental condition (Dec 2022)



The RMP should be read in conjunction with the overarching Environment Management Plan and Emergency Response Plans for Tamboran's operations in the Beetaloo Basin. Prepared by AECOM Australia Pty Ltd, 20 March 2024 on behalf of Tamboran B2 Pty Ltd.

Name		Contact details	
Robert Wear		[REDACTED]	
Beetaloo Field Manager		[REDACTED]	
Rehabilitation zones			
Infrastructure	Size (ha)	Soil type / slope canopy / ground cover	Vegetation community / dominant species
Lease pad	12.00	Lateritic plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products, sandy and earth soils	Comm 2a- <i>Corymbia dichromophloia</i> ± <i>Erythrophleum chlorostachys</i> open woodland, over <i>Acacia difficilis</i> ± <i>Terminalia canescens</i> , <i>Erythrophleum chlorostachys</i> open shrubland, over hummock grassland
Laydown	5.00		
Gravel Pit	5.00		
Helipad	-		Comm 2b- <i>Acacia shirleyi</i> , <i>Corymbia dichromophloia</i> ± <i>Eucalyptus leucophloia</i> , <i>Corymbia polycarpa</i> open woodland, over <i>Macropteranthes kekwickii</i> , <i>Petalostigma pubescens</i> , <i>Hakea arborescens</i> open shrubland, over tussock grassland
Camp	1.00		
Fencing & firebreaks	4.00		
Access track & gathering line	7.50		
		Floodplain/drainage depression	Comm 4d- <i>Eucalyptus camaldulensis</i> low woodland over <i>Melaleuca viridiflora</i> sparse shrubland over open tussock grassland
Disturbance	34.50		



- 2a - *Corymbia dichromophloia* ± *Erythrophleum chlorostachys* open woodland over *Acacia difficilis* ± *Terminalia canescens*, *Erythrophleum chlorostachys* open shrubland over hummock grassland
- 2b - *Acacia shirleyi*, *Corymbia dichromophloia* ± *Eucalyptus leucophloia*, open woodland over *Macropteranthes kekwickii*, *Petalostigma pubescens*, *Hakea arborescens* open shrubland over tussock grassland
- 3a - *Eucalyptus chlorophylla*, *Corymbia polycarpa* ± *Corymbia confertiflora* open woodland over *Erythrophleum chlorostachys*, *Acacia holosericea*, *Acacia difficilis* open shrubland over tussock grassland
- 4a - *Acacia shirleyi* ± *Eucalyptus pruinosa*, *Eucalyptus chlorophylla* woodland over *Melaleuca viridiflora*, *Eucalyptus pruinosa*, *Eucalyptus chlorophylla* open shrubland over open tussock grassland
- 4b - *Eucalyptus microtheca*, *Corymbia polycarpa*, *Eucalyptus camaldulensis* open woodland over *Acacia holosericea*, *Acacia lysiphloia*, *Macropteranthes kekwickii* open shrubland over tussock grassland
- 4c - *Eucalyptus camaldulensis* open woodland over *Eucalyptus microtheca* open shrubland
- 4d - *Eucalyptus camaldulensis* low woodland over *Melaleuca viridiflora* sparse shrubland over open tussock grassland

Rehabilitation risk

Key Risks	Controls
Drought - impacting the establishment of rehabilitated vegetation	- Time rehabilitation actions to coincide with the beginning of the wet season, to ensure access to the site and maximise the establishment period of vegetation over the wet season. - Re-spread topsoil across the site to utilise the local seed bank. - Ongoing monitoring to identify if further seed inputs are required. - Collection of seed from the local area to ensure seed stock is suited to the climatic conditions of the site.
Fire - impacting revegetation	- Establish a mix of perennial and annual grass species. - Establish a mix of resprouting (e.g., <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp.) and reseeded species (e.g., <i>Acacia</i> spp.). - Ongoing monitoring to determine fire impacts on revegetation. - Ongoing monitoring to determine if further seed inputs are required.
Grazing - impacting revegetation	- Establish a mix of perennial and annual grass species. - Re-spread timber with topsoil. - Ongoing monitoring to determine grazing impacts on revegetation. - Ongoing monitoring to determine if further seed inputs are required. - Ongoing monitoring to determine if fencing is required.
Exposed ground - leading to an increase in weed establishment and/or erosion	- Remove windrows and topsoils. - Respread of topsoil and vegetated matter across the site. - Annual weed surveys of rehabilitated area once rehabilitation is established. - Control of any weed incursions.

Pre-disturbance photos of vegetation community



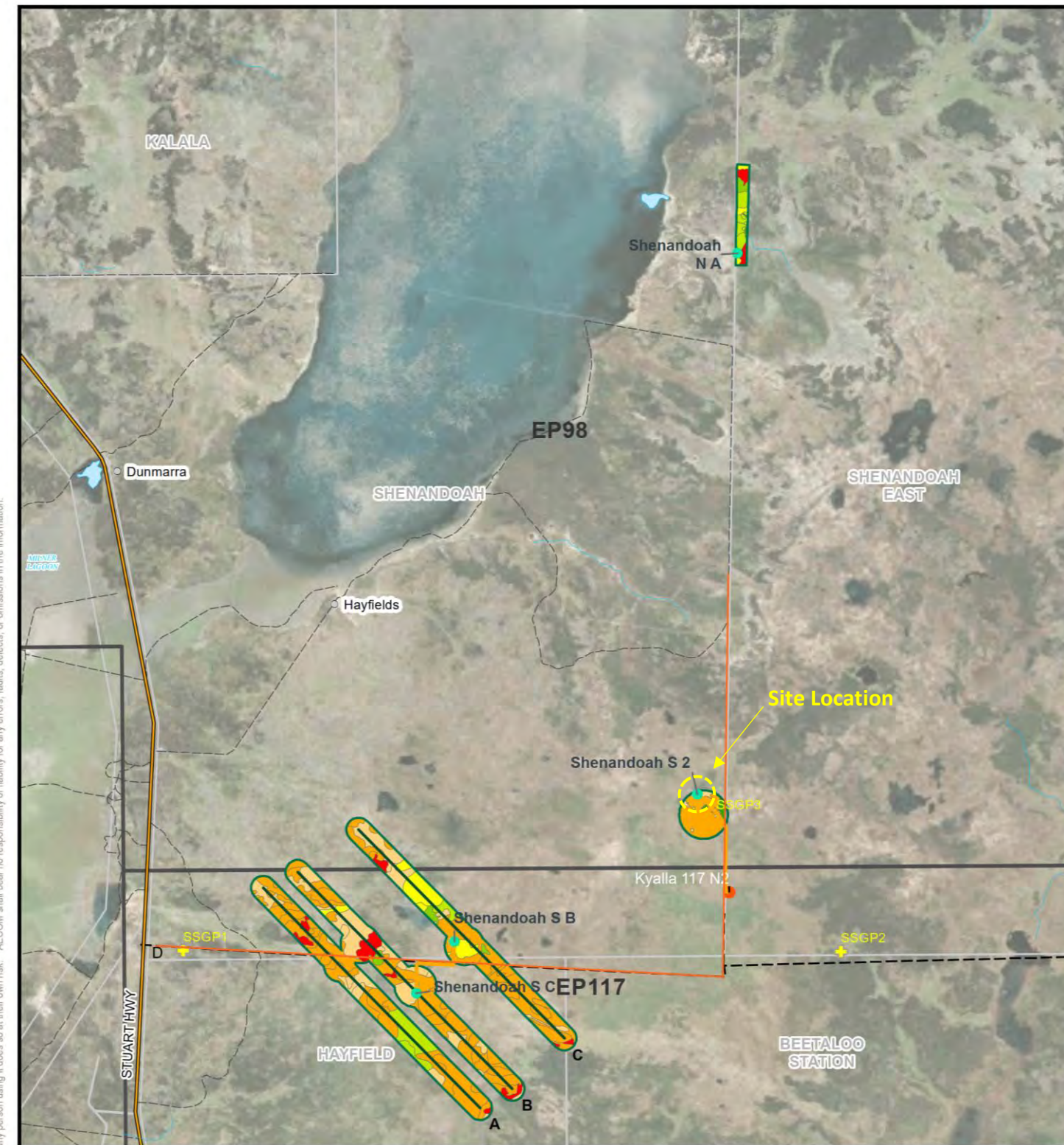
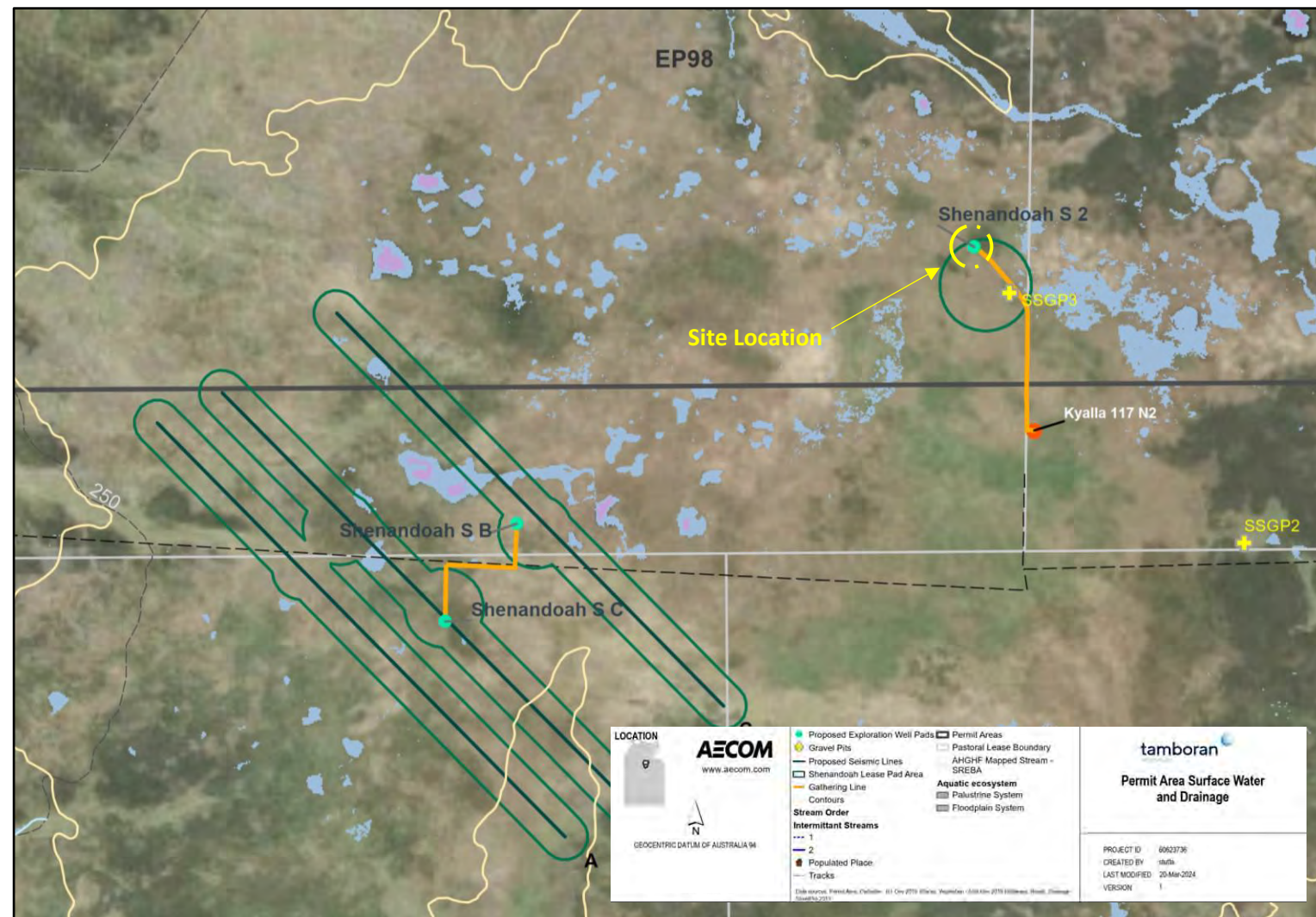
Rehabilitation strategy

Parameter	Methods	Objective
Vegetation	- Rehabilitation will be implemented for disturbance areas following completion of the individual activity within 12 months. - Disturbed areas to be allowed to naturally regenerate or revegetate on completion of the regulated activity. - All compacted areas to be ripped and scarified to promote regeneration of vegetation, this may require assistance through spread of native seed stock. Where possible, native seed stock would be supplied by local indigenous suppliers.	- Establish vegetation trending toward the target vegetation community for the area disturbed (i.e. species richness, %cover and structure) and in accordance with the Code (Clause A.3.9(d)). - Reinstate disturbance area to its pre-disturbed condition. - The type of ground cover applied to completed earthworks is to be compatible with the anticipated long-term land use, environmental risk, and site rehabilitation measures.
Ground cover	- Previously removed vegetation and topsoil will be uniformly respread over disturbed area. This will assist with the rehabilitation process by increasing infiltration and returning seed-bearing topsoil, as well as reducing erosion. - After first 12 months, additional input of native seed mix may be required from the area to assist rehabilitation process.	
Landform stability	All windrows are to be removed post construction and at completion of the activities.	

Final success criteria

Area to be rehabilitated	- Total area of approved surface disturbance is 34.50 ha. - Total area required for rehabilitation 34.50 ha.
Vegetation composition	- Vegetation composition (i.e. type, density) trending towards the target vegetation community and self-sustaining. - Vegetation is sustainable for long term with the only required maintenance consistent with the final land use. - Sign of woody vegetation regrowth (i.e. <i>Acacia</i>, <i>Eucalypt</i> and <i>Bullwaddy</i>) following rehabilitation and within 12-18 months. - Ground foliage cover consistent with the target vegetation community where disturbance occurred. - Achieve minimum of 30% diversity within the first 12 months and maintained for at least 3 years following rehabilitation consistent with analogue sample site. - Final success based on the following attributes - % canopy and ground cover, stratum 3 species richness, woody species diversity.
Watercourse crossings	- All stream crossings, where intersected, to be reinstated to the original topography. - No evidence of erosion as result of activity present within first 12 months.
Erosion	- Site stabilisation to occur and all erosion and sediment control infrastructure removed. - Less than 5 % erosion should be evident after the first 12 months and no subsidence or erosion should be evident for at least 5 years after completion.
Weeds	No establishment of weed species declared under the NT <i>Weeds Management Act</i>.
Hazardous materials and waste	- All hazardous material and waste removed from site upon completion of works to licensed landfill facilities or recycling facilities. - No residual soil contamination that poses a threat of environmental harm.
Safety for humans and wildlife	- Rehabilitation of disturbance areas should be similar in landform to the surrounding area. No steep slopes or barriers to remain on site that endanger wildlife, livestock or humans. - Windrows removed. - Water bores and exploration wells to be sealed and isolated (as required). - Removal of all surface facilities including fencing (star pickets / fencing wire).

Monitoring program and schedule			
Stage	Timing	Method	Measurable attributes
Progressive rehabilitation	Within 6-12 weeks of completion of activities	- Topsoil, windrows and cleared vegetation stockpiled are to be respread following the works. - Refer to detail in Tamboran's Erosion and Sediment Control Plan	All disturbed areas must be considered suitably stabilised as per IECA Table in the Tamboran Erosion and Sediment Control Plan.
Preliminary assessment	Post rehabilitation, end of wet season survey (February to June) within 12 months.	- Analogue sites will be established for the two vegetation communities identified in the baseline Land Condition Assessment (AECOM 2023) at adjacent undisturbed sites. - Permanent 100 m x 4 m transects (one per vegetation community), will be established at disturbed and analogue sites including photo monitoring point(s). - Collect 1 x 1 m ground cover quadrats every 10 m along each 100 m transect. - Transects to be positioned <20 m from pastoral and gas infrastructure assets (i.e. access tracks, fence lines, well pads, water troughs) to reduce edge effects.	Following measurable attributes will be compared with analogue sites: - Seedling/sapling density of dominant species respective to each vegetation community. - Percentage of ground cover respective to bare land and vegetation. - Number of species at canopy, mid and ground strata. - Evidence of erosion (type of erosion, approximate area of erosion). - Weed presence/absence (species and density). - Disturbance (fire frequency and intensity, evidence of feral animal/ cattle) - Incidental observations.
Early rehabilitation	Years 1, 2 and 3 post rehabilitation, end of wet season survey (February to June).	- Monitoring to be undertaken using permanent transects at analogue and disturbed sites. - Collect data as per preliminary methods. - Compare results from monitoring sites with analogue sites and previous year's assessment to determine if require additional management inputs (i.e. seeding, stabilisation).	- Early assessment of rehabilitation will determine attributes of woody plants in each 100 m x 4 m transect. - Including assessment of species, DBH (>1.5 cm) and height (>2 m), in addition to parameters described within the preliminary assessment.
Long-term rehabilitation	Annually until final success criteria has been met, end of wet season survey (February to June).	- Implement reseedling if species richness does not show a trajectory to achieving pre-disturbance conditions 5 years post disturbance. - Species which fail to naturally recover from soil seed bank will be selected for reseedling. - Annually review success criteria.	Long-term assessment to determine establishment, recruitment, and growth rate attributes of plant species, in addition to parameters described during early rehabilitation stage.



- 1a - Acacia shirleyi woodland over Macropteranthos kekwickii ± Atalaya hemiglauc, Acacia holosericea open shrubland over open tussock grassland
- 2a - Corymbia dichromophloia ± Erythrophleum chlorostachys open woodland over Acacia difficilis ± Terminalia canescens, Erythrophleum chlorostachys open shrubland over hummock grassland
- 2b - Acacia shirleyi, Corymbia dichromophloia ± Eucalyptus leucophloia, open woodland over Macropteranthos kekwickii, Petalostigma pubescens, Hakea arborescens open shrubland over tussock grassland
- 2c - Eucalyptus leucophloia, Corymbia dichromophloia, Acacia shirleyi woodland over Dodonaea hispidula, Calytrix exstipulata open shrubland over open hummock grassland
- 3a - Eucalyptus chlorophylla, Corymbia polycarpa ± Corymbia confertiflora open woodland over Erythrophleum chlorostachys, Acacia holosericea, Acacia difficilis open shrubland over tussock grassland
- 4a - Acacia shirleyi ± Eucalyptus pruinosa, Eucalyptus chlorophylla woodland over Melaleuca viridiflora, Eucalyptus pruinosa, Eucalyptus chlorophylla open shrubland over open tussock grassland
- 4b - Eucalyptus microtheca, Corymbia polycarpa, Eucalyptus camaldulensis open woodland over Acacia holosericea, Acacia lysiphloia, Macropteranthos kekwickii open shrubland over tussock grassland
- 4c - Eucalyptus camaldulensis open woodland over Eucalyptus microtheca open shrubland
- 4d - Eucalyptus camaldulensis low woodland over Melaleuca viridiflora sparse shrubland over open tussock grassland

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GEOCENTRIC DATUM OF AUSTRALIA 94

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Kilometres

Existing Exploration Well Pads

Gravel Pits

Proposed Exploration Well Pads

Proposed Seismic Lines

Shenandoah Lease Pad Area

Shenandoah South Well Pad Access Track

Populated Place

Tracks

Highway

Gathering Line

Water Bodies

Permit Areas

Pastoral Lease Boundary

Access Track Seismic Line

tamboran
RESOURCES

Shenandoah South Project Area Vegetation Groups

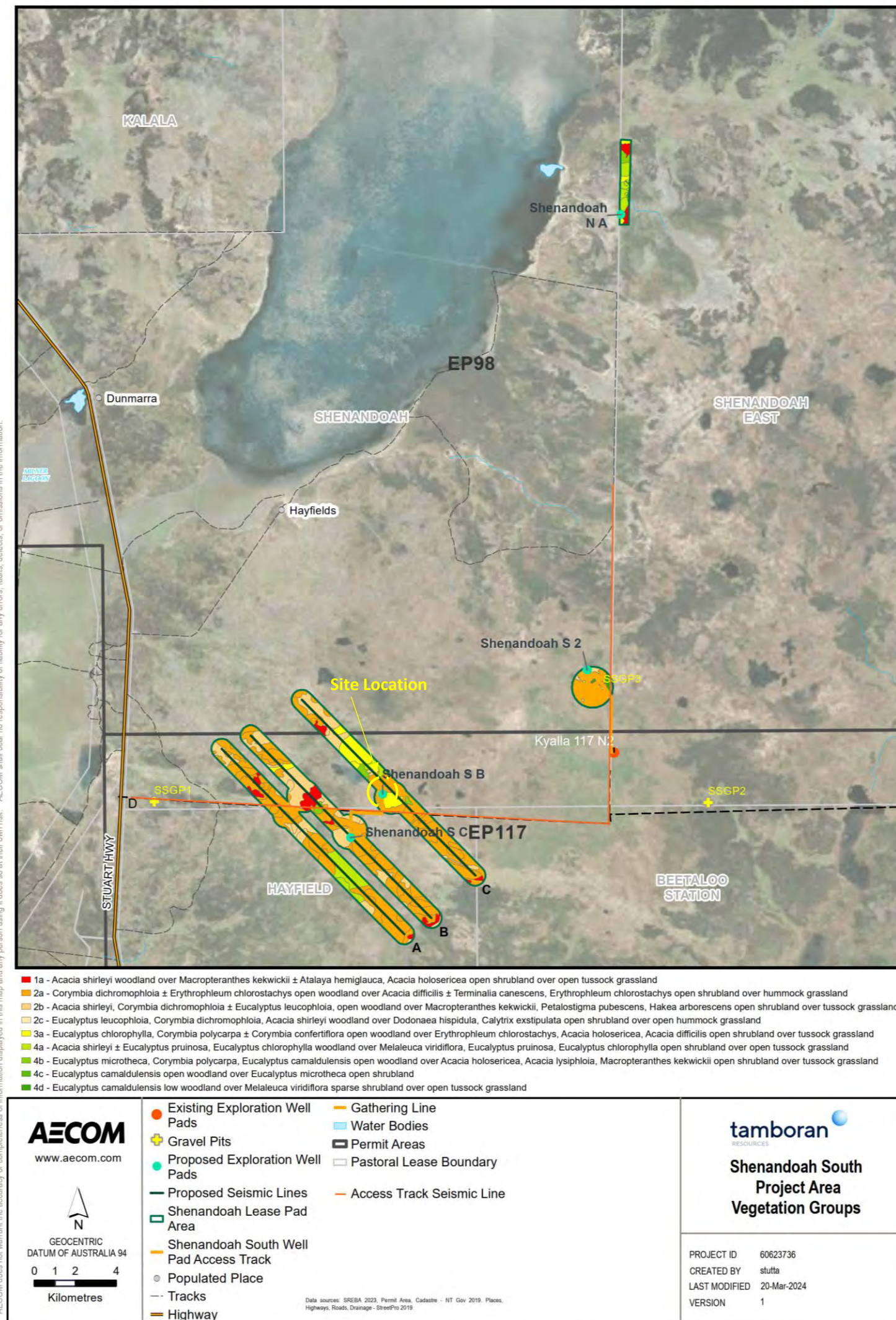
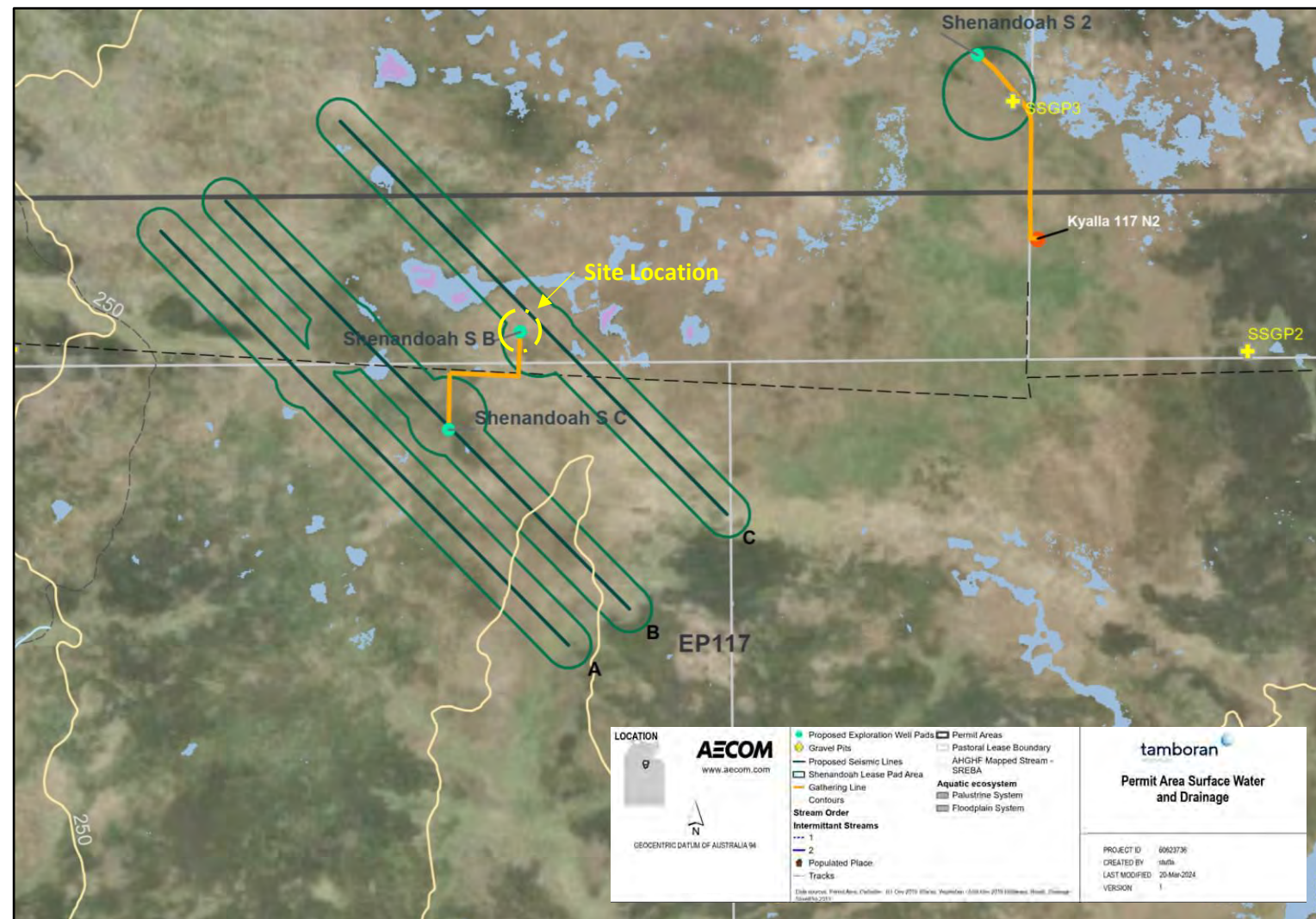
PROJECT ID: 60623736

CREATED BY: stutta

LAST MODIFIED: 20-Mar-2024

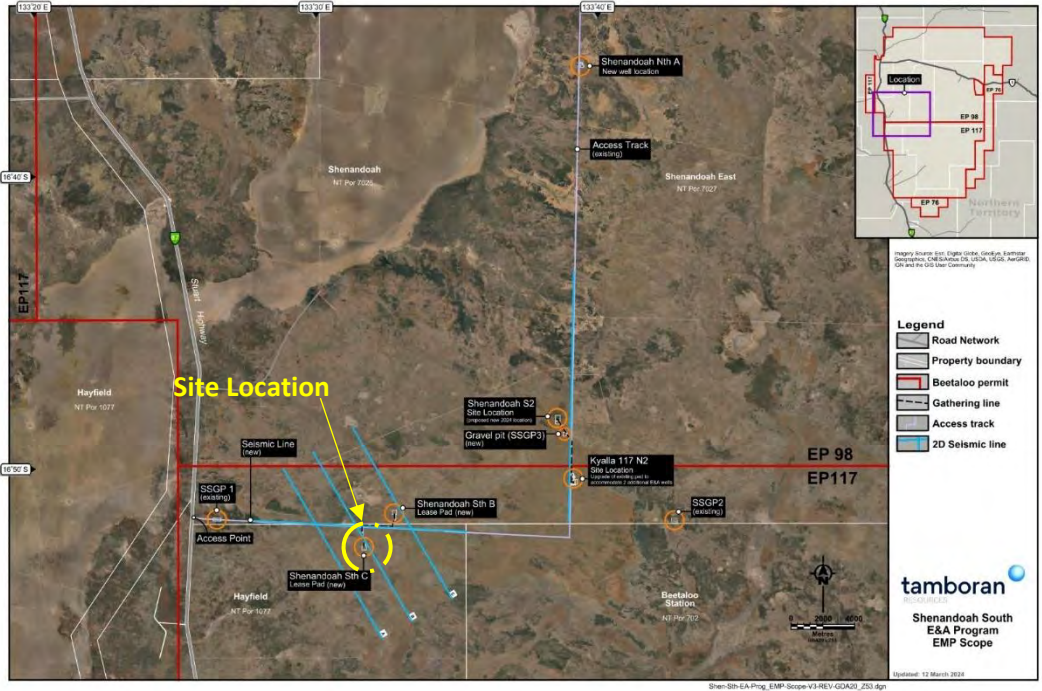
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Monitoring program and schedule			
Stage	Timing	Method	Measurable attributes
Progressive rehabilitation	Within 6-12 weeks of completion of activities	- Topsoil, windrows and cleared vegetation stockpiled are to be respread following the works. - Refer to detail in Tamboran's Erosion and Sediment Control Plan	All disturbed areas must be considered suitably stabilised as per IECA Table in the Tamboran Erosion and Sediment Control Plan.
Preliminary assessment	Post rehabilitation, end of wet season survey (February to June) within 12 months.	- Analogue sites will be established for the two vegetation communities identified in the baseline Land Condition Assessment (AECOM 2023) at adjacent undisturbed sites. - Permanent 100 m x 4 m transects (one per vegetation community), will be established at disturbed and analogue sites including photo monitoring point(s). - Collect 1 x 1 m ground cover quadrats every 10 m along each 100 m transect. - Transects to be positioned <20 m from pastoral and gas infrastructure assets (i.e. access tracks, fence lines, well pads, water troughs) to reduce edge effects.	Following measurable attributes will be compared with analogue sites: - Seedling/sapling density of dominant species respective to each vegetation community. - Percentage of ground cover respective to bare land and vegetation. - Number of species at canopy, mid and ground strata. - Evidence of erosion (type of erosion, approximate area of erosion). - Weed presence/absence (species and density). - Disturbance (fire frequency and intensity, evidence of feral animal/ cattle) - Incidental observations.
Early rehabilitation	Years 1, 2 and 3 post rehabilitation, end of wet season survey (February to June).	- Monitoring to be undertaken using permanent transects at analogue and disturbed sites. - Collect data as per preliminary methods. - Compare results from monitoring sites with analogue sites and previous year's assessment to determine if require additional management inputs (i.e. seeding, stabilisation).	- Early assessment of rehabilitation will determine attributes of woody plants in each 100 m x 4 m transect. - Including assessment of species, DBH (>1.5 cm) and height (>2 m), in addition to parameters described within the preliminary assessment.
Long-term rehabilitation	Annually until final success criteria has been met, end of wet season survey (February to June).	- Implement reseeding if species richness does not show a trajectory to achieving pre-disturbance conditions 5 years post disturbance. - Species which fail to naturally recover from soil seed bank will be selected for reseeding. - Annually review success criteria.	Long-term assessment to determine establishment, recruitment, and growth rate attributes of plant species, in addition to parameters described during early rehabilitation stage.



Location of Shenandoah South C

Property and land uses	Gas exploration, cattle grazing, and native title rights and interests recognised by the native title determinations over the land and waters.
Climate	The permit area is described as arid to semi-arid. Climate is influenced by the monsoon and there is a distinct wet and dry season. Most rainfall (90%) occurs during the summer months, between October and March. Annual rainfall varies across the permit area is around 680 mm, with rainfall totals show moderate variability and drought conditions are known to occur every 10 years.
Pre-disturbance land condition summary	The Shenandoah South C location (GDA94, Zone 53, 343472.00mE, 8133331.00mN) is on EP 117. The natural vegetation community is <i>Acacia shirleyi</i>, <i>Ventilago viminalis</i> mid high open woodland over <i>Macropteranthes kekwickii</i>, <i>Terminalia volucris</i>, <i>Eucalyptus chlorophylla</i> mid high open shrubland over <i>Sorghum intrans</i>, <i>Eulalia aurea</i>, <i>Chrysopogon fallax</i> mid high tussock grassland. The landform at Shenandoah South C is characterised by lateritic plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products, sandy and earth soils. Habitat surrounding the site is in moderate condition. The habitat contained refuge opportunities for small birds and reptiles in the form of large woody debris and flowering plants. A likelihood of occurrence assessment identified nine fauna and one flora species that are listed under the EPBC Act 1999 and/or Territory Parks and Wildlife Conservation Act 1976. Impacts on listed species assessed can be mitigated through measures identified in the EMP.



Rehabilitation aims and objectives

Site management aim	The aim is to rehabilitate any part of the land affected by the regulated activity to its pre-disturbed condition in accordance with Section A.3.9(d) of the Code.
Rehabilitation objectives	The rehabilitation objective is to provide a stable landform, which supports a) the rights and interests of the Native Title Holders in the land and water, and b) a resilient self-sustaining vegetation community that can withstand impacts including fire and cattle grazing and is safe to humans and wildlife.

Soil and general environmental condition (April 2023)

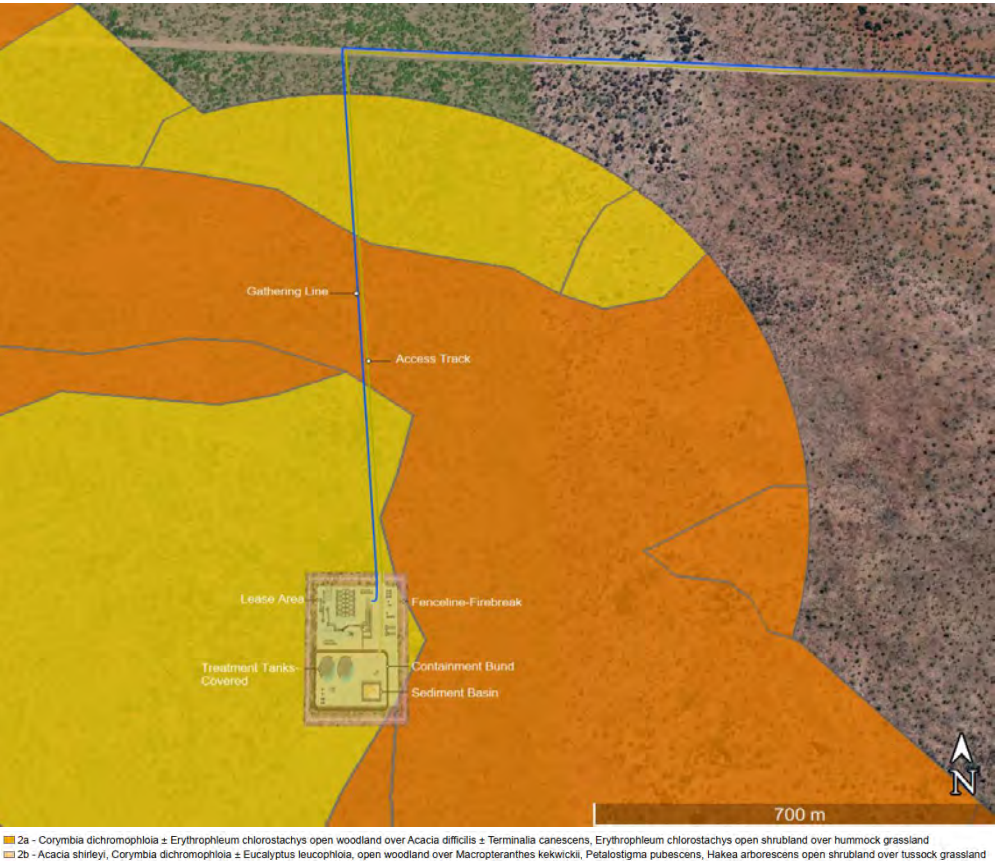


The RMP should be read in conjunction with the overarching Environment Management Plan and Emergency Response Plans for Tamboran's operations in the Beetaloo Basin. Prepared by AECOM Australia Pty Ltd, 20 March 2024 on behalf of Tamboran B2 Pty Ltd.

Name	Contact details
Robert Wear Beetaloo Field Manager	[REDACTED]

Rehabilitation zones

Infrastructure	Size (ha)	Soil type / slope	Vegetation community / dominant species
Lease pad	7.50	Lateritic plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products, sandy and earth soils. <1% slope.	Comm 2a- <i>Corymbia dichromophloia</i> ± <i>Erythrophleum chlorostachys</i> open woodland, over <i>Acacia difficilis</i> ± <i>Terminalia canescens</i> , <i>Erythrophleum chlorostachys</i> open shrubland, over hummock grassland
Laydown	-		
Access tracks / gathering line	3.30		
Helipad	-		Comm 2b- <i>Acacia shirleyi</i> , <i>Corymbia dichromophloia</i> ± <i>Eucalyptus leucophloia</i> , <i>C. polycarpa</i> mid high open woodland
Camp	1.00		
Fencing & firebreaks	4.00		
Disturbance	17.30		



Rehabilitation risk	
Key Risks	Controls
Drought - impacting the establishment of rehabilitated vegetation	- Time rehabilitation actions to coincide with the beginning of the wet season, to ensure access to the site and maximise the establishment period of vegetation over the wet season. - Re-spread topsoil across the site to utilise the local seed bank. - Ongoing monitoring to identify if further seed inputs are required. - Collection of seed from the local area to ensure seed stock is suited to the climatic conditions of the site.
Fire - impacting revegetation	- Establish a mix of perennial and annual grass species. - Establish a mix of resprouting (e.g., <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp.) and reseedling species (e.g., <i>Acacia</i> spp.). - Ongoing monitoring to determine fire impacts on revegetation. - Ongoing monitoring to determine if further seed inputs are required.
Grazing - impacting revegetation	- Establish a mix of perennial and annual grass species. - Re-spread timber with topsoil. - Ongoing monitoring to determine grazing impacts on revegetation. - Ongoing monitoring to determine if further seed inputs are required. - Ongoing monitoring to determine if fencing is required.
Exposed ground - leading to an increase in weed establishment and/or erosion	- Remove windrows and topsoils. - Respread of topsoil and vegetated matter across the site. - Annual weed surveys of rehabilitated area once rehabilitation is established. - Control of any weed incursions.

Pre-disturbance photos of vegetation community



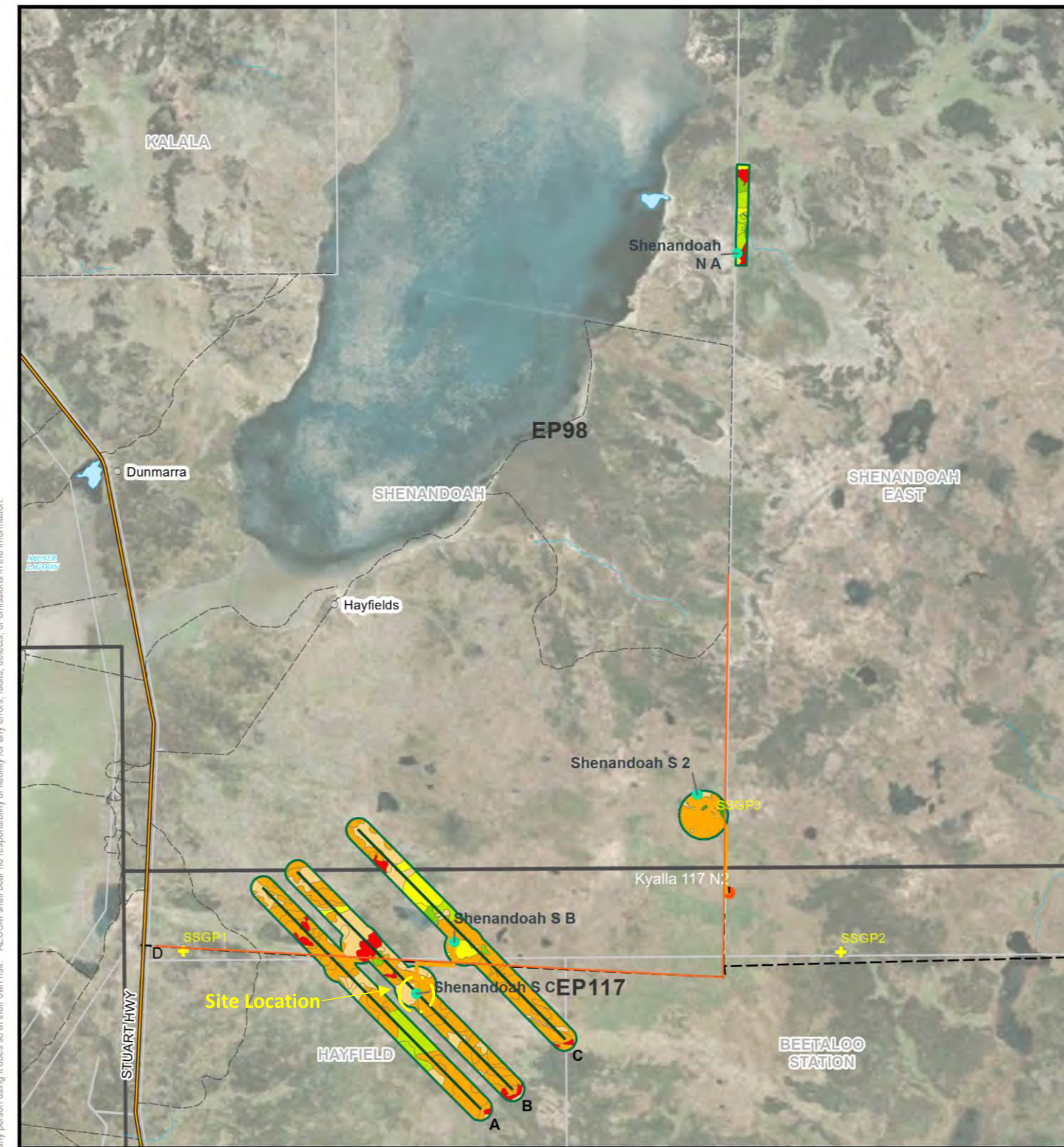
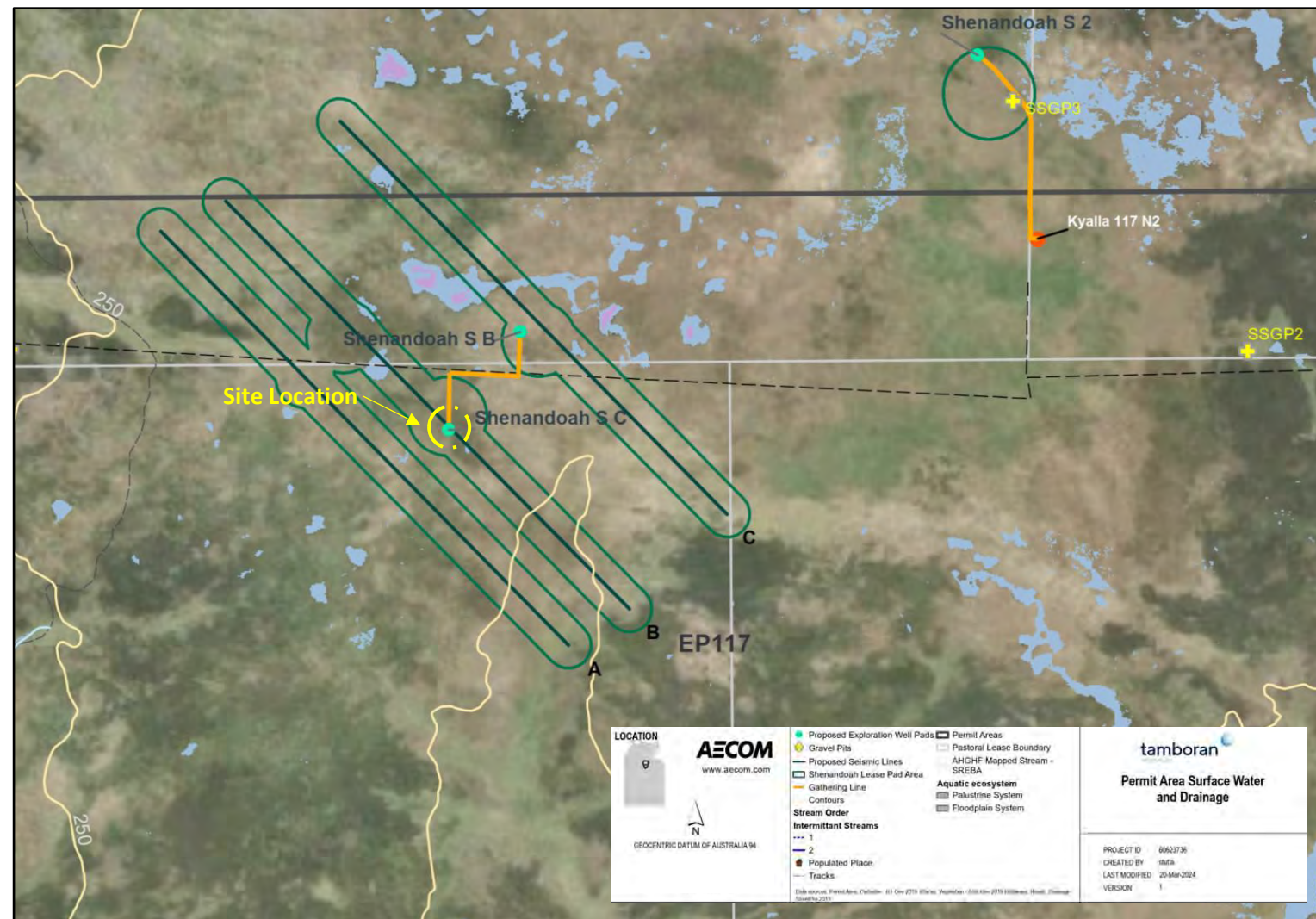
Rehabilitation strategy

Parameter	Methods	Objective
Vegetation	- Rehabilitation will be implemented for disturbance areas following completion of the individual activity within 12 months. - Disturbed areas to be allowed to naturally regenerate or revegetate on completion of the regulated activity. - All compacted areas to be ripped and scarified to promote regeneration of vegetation, this may require assistance through spread of native seed stock. Where possible, native seed stock would be supplied by local indigenous suppliers.	- Establish vegetation trending toward the target vegetation community for the area disturbed (i.e. species richness, %cover and structure) and in accordance with the Code (Clause A.3.9(d)). - Reinstate disturbance area to its pre-disturbed condition. - The type of ground cover applied to completed earthworks is to be compatible with the anticipated long-term land use, environmental risk, and site rehabilitation measures.
Ground cover	- Previously removed vegetation and topsoil will be uniformly respread over disturbed area. This will assist with the rehabilitation process by increasing infiltration and returning seed-bearing topsoil, as well as reducing erosion. - After first 12 months, additional input of native seed mix may be required from the area to assist rehabilitation process.	
Landform stability	All windrows are to be removed post construction and at completion of the activities.	

Final success criteria

Area to be rehabilitated	- Total area of approved surface disturbance is 17.30 ha. - Total area required for rehabilitation 17.30 ha.
Vegetation composition	- Vegetation composition (i.e. type, density) trending towards the target vegetation community and self-sustaining. - Vegetation is sustainable for long term with the only required maintenance consistent with the final land use. - Sign of woody vegetation regrowth (i.e. <i>Acacia</i>, <i>Eucalypt</i> and <i>Bullwaddy</i>) following rehabilitation and within 12-18 months. - Ground foliage cover consistent with the target vegetation community where disturbance occurred. - Achieve minimum of 30% diversity within the first 12 months and maintained for at least 3 years following rehabilitation consistent with analogue sample site. - Final success based on the following attributes - % canopy and ground cover, stratum 3 species richness, woody species diversity.
Watercourse crossings	No water crossings associated with Shenandoah S C well pad and access track areas.
Erosion	- Site stabilisation to occur and all erosion and sediment control infrastructure removed. - Less than 5 % erosion should be evident after the first 12 months and no subsidence or erosion should be evident for at least 5 years after completion.
Weeds	No establishment of weed species declared under the NT <i>Weeds Management Act</i>.
Hazardous materials and waste	- All hazardous material and waste removed from site upon completion of works to licensed landfill facilities or recycling facilities. - No residual soil contamination that poses a threat of environmental harm.
Safety for humans and wildlife	- Rehabilitation of disturbance areas should be similar in landform to the surrounding area. No steep slopes or barriers to remain on site that endanger wildlife, livestock or humans. - Windrows removed. - Water bores and exploration wells to be sealed and isolated (as required). - Removal of all surface facilities including fencing (star pickets / fencing wire).

Monitoring program and schedule			
Stage	Timing	Method	Measurable attributes
Progressive rehabilitation	Within 6-12 weeks of completion of activities	- Topsoil, windrows and cleared vegetation stockpiled are to be respread following the works. - Refer to detail in Tamboran's Erosion and Sediment Control Plan	All disturbed areas must be considered suitably stabilised as per IECA Table in the Tamboran Erosion and Sediment Control Plan.
Preliminary assessment	Post rehabilitation, end of wet season survey (February to June) within 12 months.	- Analogue sites will be established for the two vegetation communities identified in the baseline Land Condition Assessment (AECOM 2023) at adjacent undisturbed sites. - Permanent 100 m x 4 m transects (one per vegetation community), will be established at disturbed and analogue sites including photo monitoring point(s). - Collect 1 x 1 m ground cover quadrats every 10 m along each 100 m transect. - Transects to be positioned <20 m from pastoral and gas infrastructure assets (i.e. access tracks, fence lines, well pads, water troughs) to reduce edge effects.	Following measurable attributes will be compared with analogue sites: - Seedling/sapling density of dominant species respective to each vegetation community. - Percentage of ground cover respective to bare land and vegetation. - Number of species at canopy, mid and ground strata. - Evidence of erosion (type of erosion, approximate area of erosion). - Weed presence/absence (species and density). - Disturbance (fire frequency and intensity, evidence of feral animal/ cattle) - Incidental observations.
Early rehabilitation	Years 1, 2 and 3 post rehabilitation, end of wet season survey (February to June).	- Monitoring to be undertaken using permanent transects at analogue and disturbed sites. - Collect data as per preliminary methods. - Compare results from monitoring sites with analogue sites and previous year's assessment to determine if require additional management inputs (i.e. seeding, stabilisation).	- Early assessment of rehabilitation will determine attributes of woody plants in each 100 m x 4 m transect. - Including assessment of species, DBH (>1.5 cm) and height (>2 m), in addition to parameters described within the preliminary assessment.
Long-term rehabilitation	Annually until final success criteria has been met, end of wet season survey (February to June).	- Implement reseedling if species richness does not show a trajectory to achieving pre-disturbance conditions 5 years post disturbance. - Species which fail to naturally recover from soil seed bank will be selected for reseedling. - Annually review success criteria.	Long-term assessment to determine establishment, recruitment, and growth rate attributes of plant species, in addition to parameters described during early rehabilitation stage.



- 1a - Acacia shirleyi woodland over Macropteranthes kekwickii ± Atalaya hemiglauc, Acacia holosericea open shrubland over open tussock grassland
- 2a - Corymbia dichromophloia ± Erythrophleum chlorostachys open woodland over Acacia difficilis ± Terminalia canescens, Erythrophleum chlorostachys open shrubland over hummock grassland
- 2b - Acacia shirleyi, Corymbia dichromophloia ± Eucalyptus leucophloia, open woodland over Macropteranthes kekwickii, Petalostigma pubescens, Hakea arborescens open shrubland over tussock grassland
- 2c - Eucalyptus leucophloia, Corymbia dichromophloia, Acacia shirleyi woodland over Dodonaea hispida, Calytrix exstipulata open shrubland over open hummock grassland
- 3a - Eucalyptus chlorophylla, Corymbia polycarpa ± Corymbia confertiflora open woodland over Erythrophleum chlorostachys, Acacia holosericea, Acacia difficilis open shrubland over tussock grassland
- 4a - Acacia shirleyi ± Eucalyptus pruinosa, Eucalyptus chlorophylla woodland over Melaleuca viridiflora, Eucalyptus pruinosa, Eucalyptus chlorophylla open shrubland over open tussock grassland
- 4b - Eucalyptus microtheca, Corymbia polycarpa, Eucalyptus camaldulensis open woodland over Acacia holosericea, Acacia lysiphloia, Macropteranthes kekwickii open shrubland over tussock grassland
- 4c - Eucalyptus camaldulensis open woodland over Eucalyptus microtheca open shrubland
- 4d - Eucalyptus camaldulensis low woodland over Melaleuca viridiflora sparse shrubland over open tussock grassland

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GEOCENTRIC DATUM OF AUSTRALIA 94

0 1 2 4
Kilometres

Existing Exploration Well Pads

Gravel Pits

Proposed Exploration Well Pads

Proposed Seismic Lines

Shenandoah Lease Pad Area

Shenandoah South Well Pad Access Track

Populated Place

Tracks

Highway

Gathering Line

Water Bodies

Permit Areas

Pastoral Lease Boundary

Access Track Seismic Line

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RESOURCES

Shenandoah South Project Area Vegetation Groups

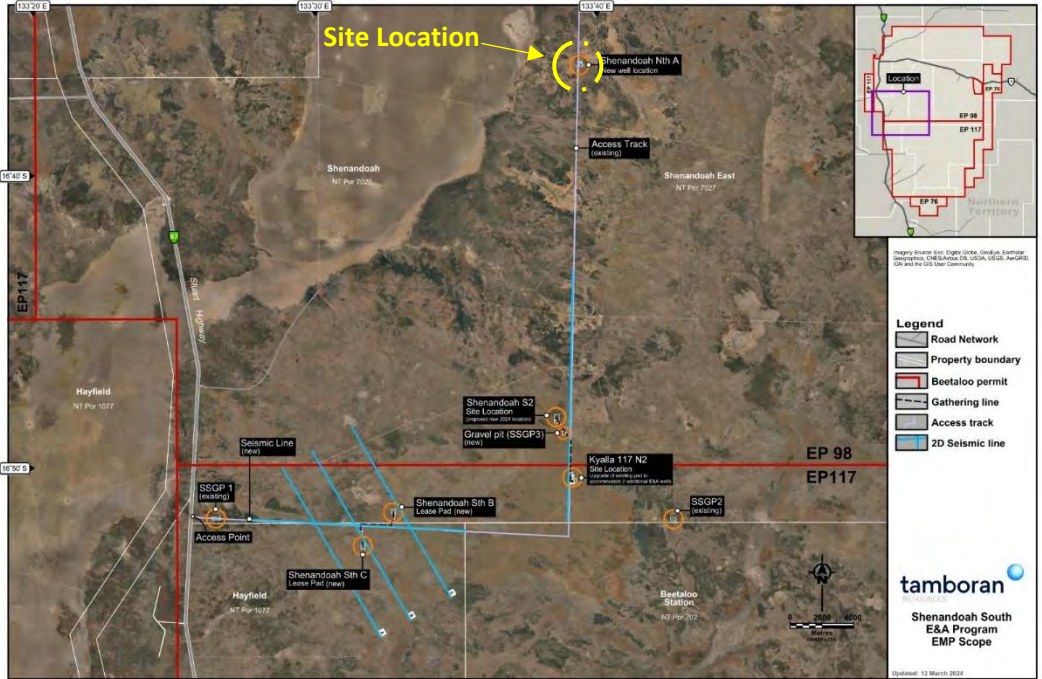
PROJECT ID 60623736

CREATED BY stutta

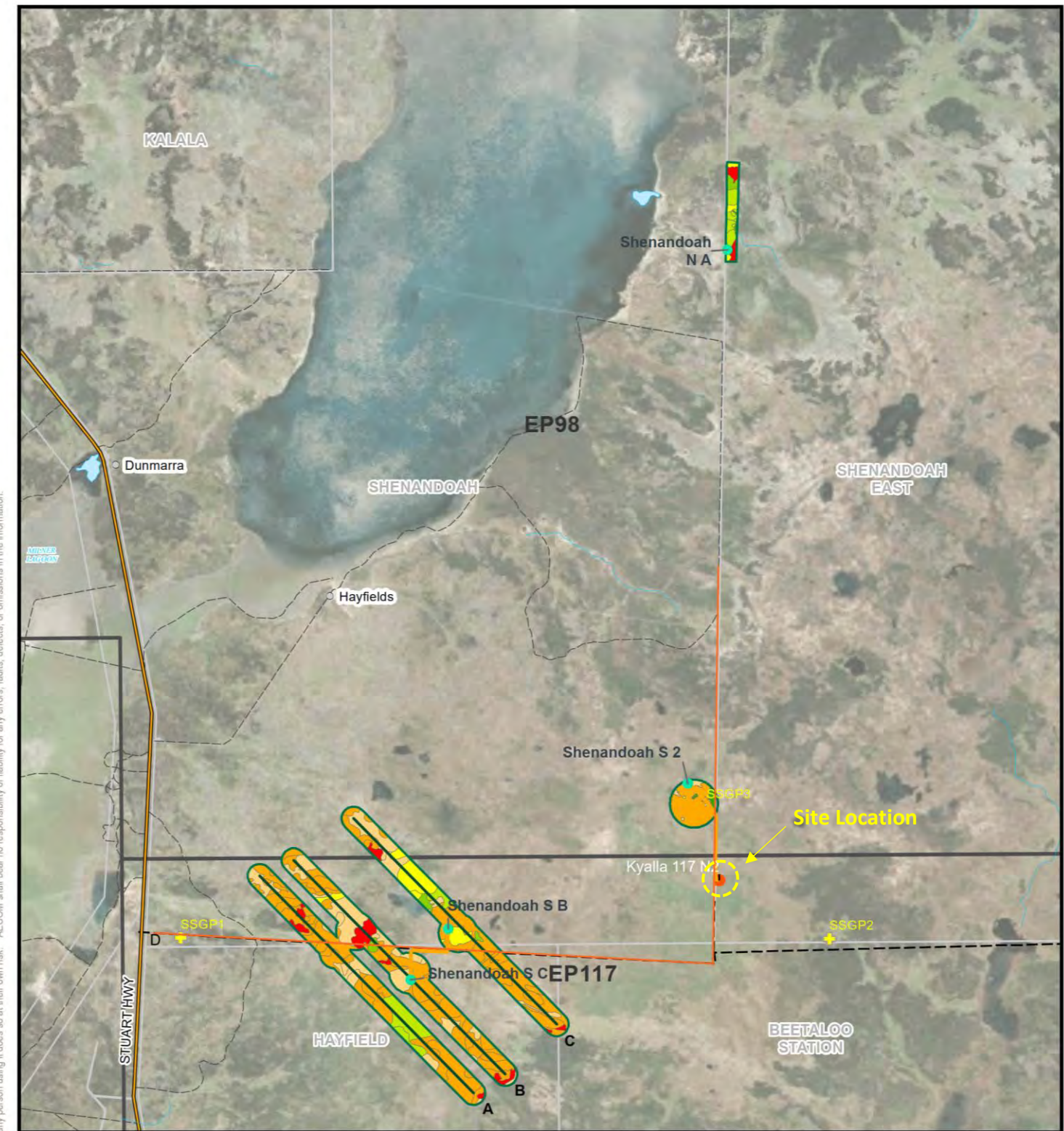
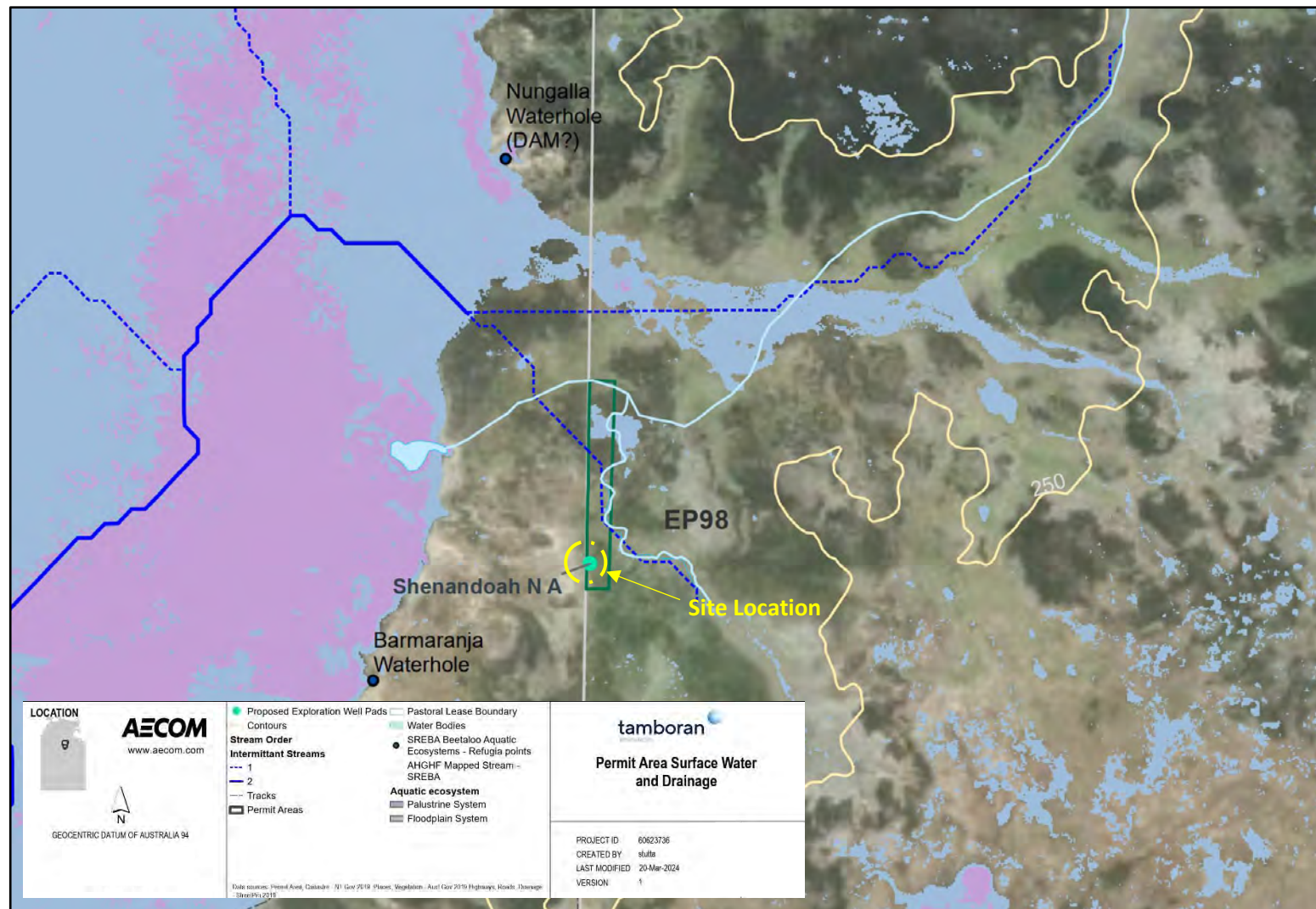
LAST MODIFIED 20-Mar-2024

VERSION 1

Location of Shenandoah North A	
Property and land uses	Gas exploration, cattle grazing, and native title rights and interests recognised by the native title determinations over the land and waters.
Climate	The permit area is described as arid to semi-arid. Climate is influenced by the monsoon and there is a distinct wet and dry season. Most rainfall (90%) occurs during the summer months, between October and March. Annual rainfall varies across the permit area is around 680 mm, with rainfall totals show moderate variability and drought conditions are known to occur every 10 years.
Pre-disturbance land condition summary	The Shenandoah North A location (GDA94, zone 53, 356687.00 mE, 8163762.00 mN) is on EP 98. The natural vegetation community is <i>Acacia shirleyi</i> mid high woodland over <i>Macropteranthes kekwickii</i> ± <i>Atalaya hemiglauca</i>, <i>Acacia holosericea</i> mid high open shrubland over <i>Fimbristylis</i> sp., <i>Brachyachne convergens</i>, <i>Aristida</i> sp.³ mid high open tussock grassland. The landform at Shenandoah N A is characterised by lateritic plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products, sandy and earth soils. A small intermittent stream (Stream Order 1) is located 450 m from well pad but will not be impacted by activities. Habitat surrounding the site is in moderate condition. The habitat contains moderate refuge opportunities for small birds and reptiles. The site is does not have any tree hollows, mistletoe and a low leaf litter (5%). Fallen logs and flowering plants are common.



Monitoring program and schedule			
Stage	Timing	Method	Measurable attributes
Progressive rehabilitation	Within 6-12 weeks of completion of activities	- Topsoil, windrows and cleared vegetation stockpiled are to be respread following the works. - Refer to detail in Tamboran's Erosion and Sediment Control Plan	All disturbed areas must be considered suitably stabilised as per IECA Table in the Tamboran Erosion and Sediment Control Plan.
Preliminary assessment	Post rehabilitation, end of wet season survey (February to June) within 12 months.	- Analogue sites will be established for the two vegetation communities identified in the baseline Land Condition Assessment (AECOM 2023) at adjacent undisturbed sites. - Permanent 100 m x 4 m transects (one per vegetation community), will be established at disturbed and analogue sites including photo monitoring point(s). - Collect 1 x 1 m ground cover quadrats every 10 m along each 100 m transect. - Transects to be positioned <20 m from pastoral and gas infrastructure assets (i.e. access tracks, fence lines, well pads, water troughs) to reduce edge effects.	Following measurable attributes will be compared with analogue sites: - Seedling/sapling density of dominant species respective to each vegetation community. - Percentage of ground cover respective to bare land and vegetation. - Number of species at canopy, mid and ground strata. - Evidence of erosion (type of erosion, approximate area of erosion). - Weed presence/absence (species and density). - Disturbance (fire frequency and intensity, evidence of feral animal/ cattle) - Incidental observations.
Early rehabilitation	Years 1, 2 and 3 post rehabilitation, end of wet season survey (February to June).	- Monitoring to be undertaken using permanent transects at analogue and disturbed sites. - Collect data as per preliminary methods. - Compare results from monitoring sites with analogue sites and previous year's assessment to determine if require additional management inputs (i.e. seeding, stabilisation).	- Early assessment of rehabilitation will determine attributes of woody plants in each 100 m x 4 m transect. - Including assessment of species, DBH (>1.5 cm) and height (>2 m), in addition to parameters described within the preliminary assessment.
Long-term rehabilitation	Annually until final success criteria has been met, end of wet season survey (February to June).	- Implement reseedling if species richness does not show a trajectory to achieving pre-disturbance conditions 5 years post disturbance. - Species which fail to naturally recover from soil seed bank will be selected for reseedling. - Annually review success criteria.	Long-term assessment to determine establishment, recruitment, and growth rate attributes of plant species, in addition to parameters described during early rehabilitation stage.



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Shenandoah Lease Pad Area
Shenandoah South Well Pad Access Track
Populated Place
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Geocentric Datum of Australia 94
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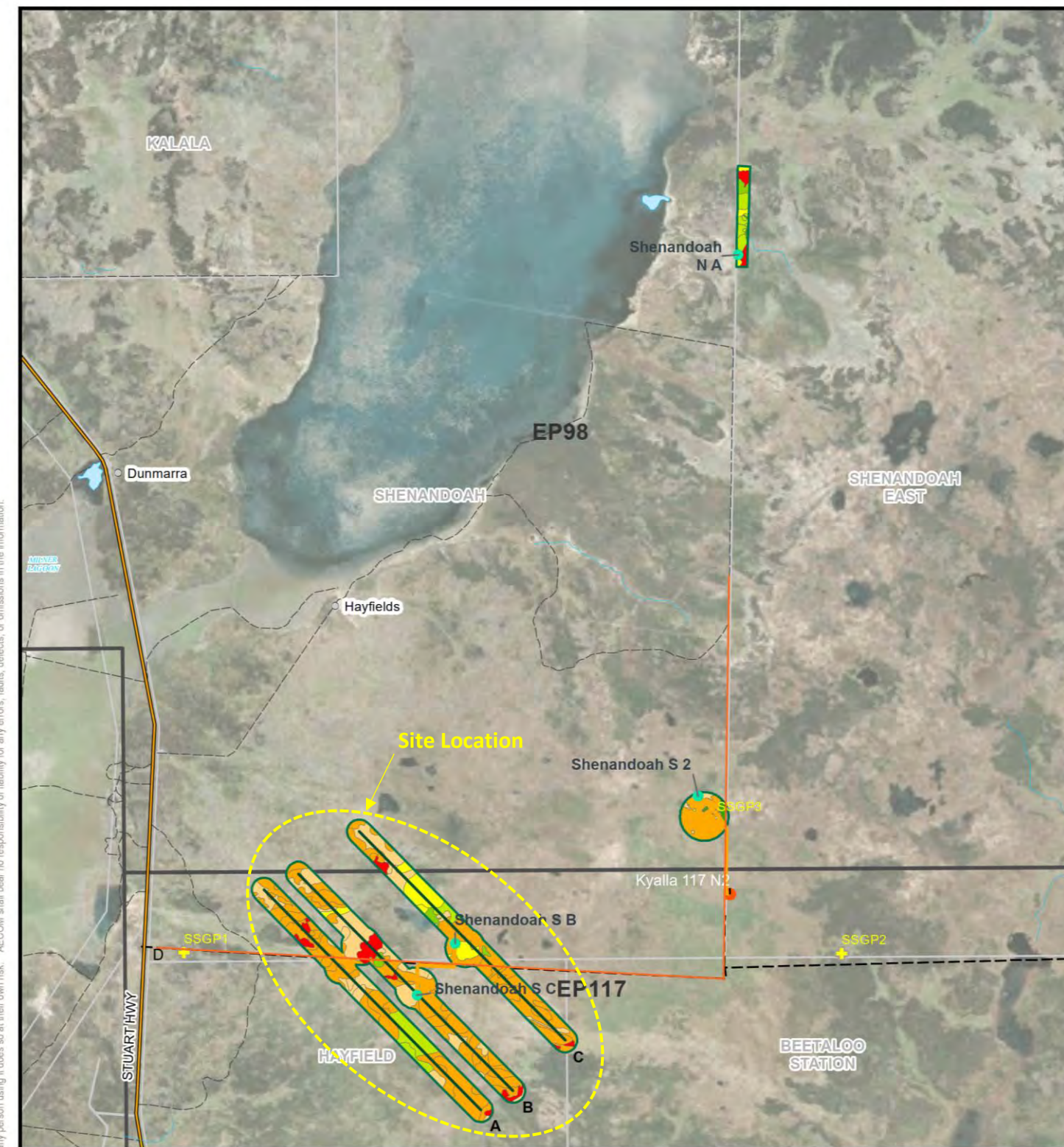
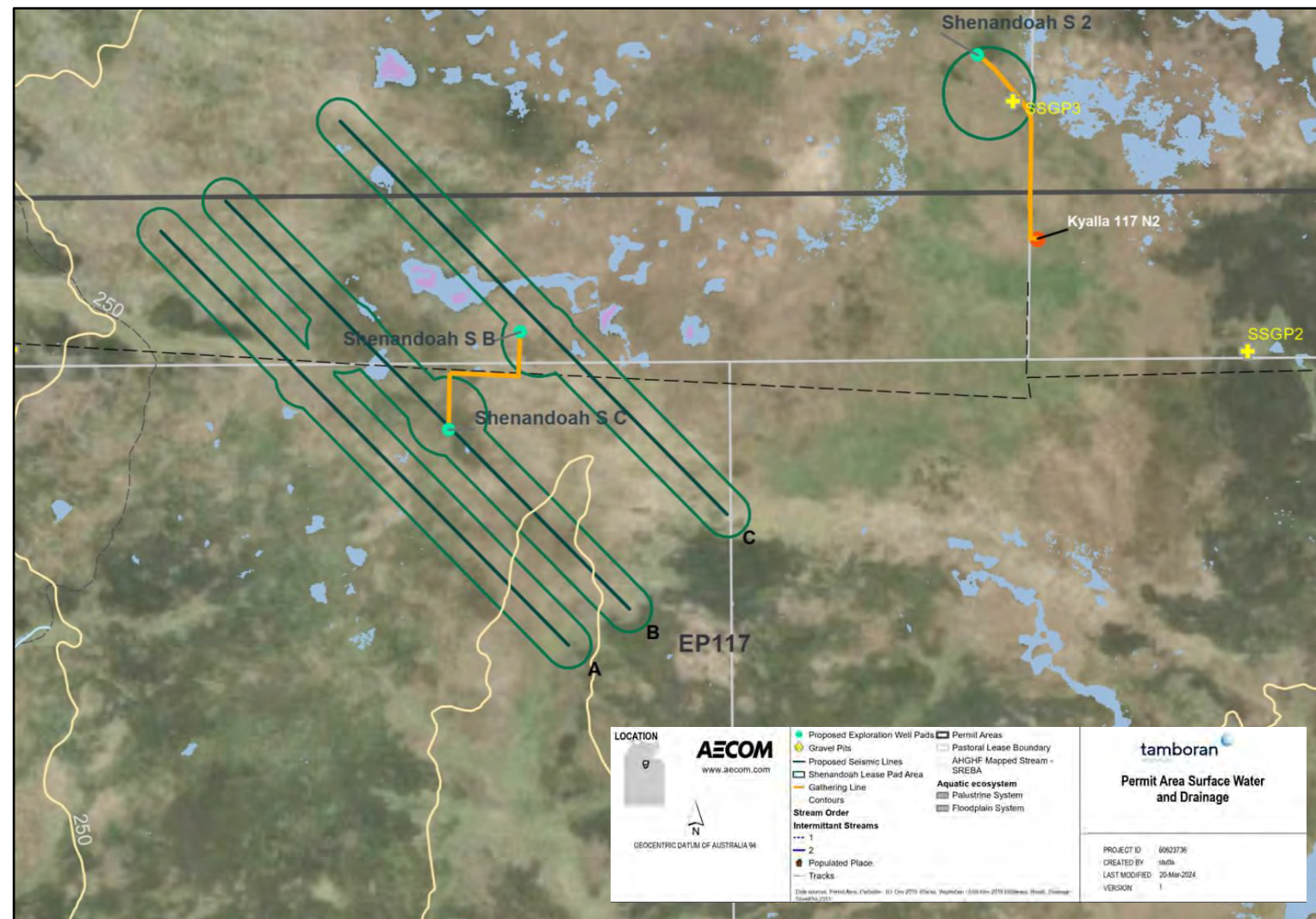
Data sources: SREBA 2023, Permit Area, Cadastre - NT Gov 2019, Places, Highways, Roads, Drainage - StreetPro 2019

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RESOURCES

Shenandoah South Project Area Vegetation Groups

PROJECT ID: 60623736
CREATED BY: stutta
LAST MODIFIED: 20-Mar-2024
VERSION: 1

Monitoring program and schedule			
Stage	Timing	Method	Measurable attributes
Progressive Rehabilitation (following data recording)	Within 2 - 6 weeks of completion of the survey	- Topsoil, windrows and cleared vegetation stockpiled are to be respread following the works. - Refer to detail in Tamboran's Erosion and Sediment Control Plan	All disturbed areas must be considered suitably stabilised as per IECA Table in the Tamboran Erosion and Sediment Control Plan.
Preliminary assessment	Post rehabilitation, end of wet season survey (February to June) within 12 months.	- Analogue sites will be established for six vegetation communities identified in the baseline Land Condition Assessment (AECOM 2023) at adjacent undisturbed sites. - Permanent 100 m x 4 m transects (one per vegetation community), will be established at disturbed and analogue sites including photo monitoring point(s). - Collect 1 x 1 m ground cover quadrats every 10 m along each 100 m transect. - Transects to be positioned <20 m from pastoral and gas infrastructure assets (i.e. access tracks, fence lines, well pads, water troughs) to reduce edge effects.	- Following measurable attributes will be compared with analogue sites: - Seedling/sapling density of dominant species respective to each vegetation community. - Percentage of ground cover respective to bare land and vegetation. - Number of species at canopy, mid and ground strata. - Evidence of erosion (type of erosion, approximate area of erosion). - Weed presence/absence (species and density). - Disturbance (fire frequency and intensity, evidence of feral animal/ cattle) - Incidental observations.
Early rehabilitation	Years 1, 2 and 3 post rehabilitation, end of wet season survey (February to June).	- Monitoring to be undertaken using permanent transects at analogue and disturbed sites. - Collect data as per preliminary methods. - Compare results from monitoring sites with analogue sites and previous year's assessment to determine if require additional management inputs (i.e. seeding, stabilisation).	- Early assessment of rehabilitation will determine attributes of woody plants in each 100 m x 4 m transect. - Including assessment of species, DBH (>1.5 cm) and height (>2 m), in addition to parameters described within the preliminary assessment.
Long-term rehabilitation	Annually until final success criteria has been met, end of wet season survey (February to June).	- Implement reseeding if species richness does not show a trajectory to achieving pre-disturbance conditions 5 years post disturbance. - Species which fail to naturally recover from soil seed bank will be selected for reseeding. - Annually review success criteria.	Long-term assessment to determine establishment, recruitment, and growth rate attributes of plant species, in addition to parameters described during early rehabilitation stage.



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VERSION: 1

Existing Exploration Well Pads

Gravel Pits

Proposed Exploration Well Pads

Proposed Seismic Lines

Shenandoah Lease Pad Area

Shenandoah South Well Pad Access Track

Populated Place

Tracks

Highway

Gathering Line

Water Bodies

Permit Areas

Pastoral Lease Boundary

Access Track Seismic Line

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Shenandoah South Project Area Vegetation Groups

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VERSION: 1

APPENDIX P Environmental Commitment Register

APPENDIX P Environmental Commitment Register

Obligation details	Accountability	When
The layout of the site and exact placement of infrastructure will be informed by the environmental sensitivities and mitigation measures identified in this EMP. This includes additional scouting as required, where infrastructure placement and 2D seismic lines need to be moved to accommodate pastoral or new / additional cultural heritage considerations.	Project Manager and Beetaloo Field Manager	Site establishment
Land clearance will not be undertaken as a part of this activity, unless authorised to do so.	VP Drilling and Completions and Beetaloo Field Manager	Continuous
The monitoring and maintenance under the erosion and sediment control plan shall be implemented.	VP Drilling and Completions	Pre and post wet season
The spill management plan will be implemented including spill prevention, detection, response and reporting measures.	VP Drilling and Completions	Throughout the activity
The wastewater management plan will be implemented including the use of covered tanks, wastewater characterisation, storage monitoring and appropriate disposal.	VP Drilling and Completions	Throughout the activity
The bushfire management plan will be implemented to reduce the risk of bushfires. This includes the use of appropriate separation distances between flares and the surrounding vegetation.	VP Drilling and Completions	Throughout the activity
The methane emission management plan shall be implemented, including strategies to prevent, detect, remediate and report potential leaks.	VP Drilling and Completions	Throughout the activity
Secondary containment will be implemented for all chemical storage and handling areas.	VP Drilling and Completions	Throughout the activity
Tamboran and its subcontractors will prioritise the use of local labour where such skill sets are available.	Project Manager Contracts Administrator	Activity planning
The weed management plan shall be implemented, including assuring all equipment and vehicles on-site have a valid weed hygiene certificate and routine monitoring is completed. All identified weeds associated with Tamboran's activities to be treated and managed in consultation with the DEPWS Onshore Petroleum Weed Management Officer.	Beetaloo Field Manager VP Drilling and Completions	Throughout the activity
Records of weed distribution will be maintained within Tamboran's GIS and if required provided to the DEPWS Onshore Petroleum Weed Management Officer.	Environment and Approvals Manager	Throughout the activity
The site shall be fenced to prevent fauna and livestock access to wastewater.	Beetaloo Field Manager VP Drilling and Completions	Site establishment and post drilling
Where monitoring confirms fauna mortality associated with on-site wastewater storages above the investigation thresholds outlined in the EMP, Tamboran may implement additional preventative controls.	VP Drilling and Completions	During wastewater storage
The Well Operations Management Plan (WOMP) approved by DITT will be implemented to ensure the protection of aquifers and the environment. This includes protecting aquifers through multiple cement and casing barriers and performing the specified well integrity verification testing.	VP Drilling and Completions	All E&A drilling, stimulation, well testing and decommissioning activities

Obligation details	Accountability	When
All groundwater will be extracted, monitored and recorded in accordance with the water extraction licence.	VP Drilling and Completions and Environment and Approvals Manager	Throughout the activity
All wastes will be transported and disposed of at licensed facilities in accordance with the <i>NT Waste Management and Pollution Control Act 1998</i> .	VP Drilling and Completions	Throughout the activity
Drilling muds and cuttings will be tested in accordance with the Code. Where an independent expert considers on-site disposal of muds and cuttings as being environmentally sound, a report will be submitted to DEPWS for approval a to the proposed disposal approach and potential risks.	HSE Manager and Environment and Approvals Manager	Prior to the disposal of muds
Where Tamboran's activities cause a material impact on the quality and quantity of a stock or domestic bore, Tamboran will make good such impacts in accordance with section 7.5.2.2 of the Inquiry Report. This may include adjusting pump heights, compensation or where appropriate, re-drilling/modifying the bore into an alternative water source.	Project Manager	Upon confirmation an activity has resulted in impairment to a water supply point
No material changes in the quality and quantity of aquifers will result from Tamboran's activities.	Project Manager	Throughout the activity
Surface water will not be used for any activities proposed in this EMP or future operations.	Project Manager	Throughout the activity
Stormwater flooding across the cleared site will be managed to minimise impacts from erosion and sedimentation.	Project Manager	Throughout the activity
Tamboran have committed to comply with conditions as prescribed by AAPA for the duration of the program.	Project Manager	Throughout the activity
Tamboran has committed resources and time to allow competent and experienced personnel to participate in educational and community information sessions from Darwin in the north, to Alice Springs in the south and across to Borroloola in the east.	Project Manager	Planning and implementation of activities
Appropriate housekeeping standards will be maintained, and the site will be maintained free of rubbish.	Beetaloo Field Manager or Operating Company Representative (OCR)	Throughout the activity
Camps will be used to mitigate the impact on available accommodation and townships.	Project Manager/	Throughout the activity
Wastewater, sewage and sullage generated by the domestic camp activities will be managed by a Department of Health approved sewage treatment system or captured and removed from site.	VP Drilling and Completions	During wastewater (sewage) management
Monitor road conditions to ensure deterioration with possible increase in dust creation, does not occur and undertake road rehabilitation as required.	Beetaloo Field Manager or Operating Company Representative (OCR)	Daily during the activity
Tamboran will progressively implement a rehabilitation plan to rehabilitate all disturbed areas.	Health Safety and Environment Representative	With 12 months of determining an asset is no longer required
Work instructions summarising the requirements of this EMP shall be prepared and submitted to contractors performing work under this EMP.	HSE Representative	Prior to commencement of an activity.

APPENDIX Q Emergency Response Plan

APPENDIX Q Emergency Response Plan



Beetaloo Basin Emergency Response Plan

TAMBORAN RESOURCES LIMITED INTEGRATED MANAGEMENT SYSTEM		
DOCUMENT TITLE:	Emergency Response Plan	
DOCUMENT NO:	TBN-HSE-MP-05	REVISION NO: 3
DOCUMENT CUSTODIAN:	HSE Manager	REVISION DATE: 15/03/2024

Revision

Rev. No	Revised By	Justification	Date
2	G Bertini	Minor wording changes, update to contact details and site locations	16/11/2023
3	G Bertini	Minor wording changes, update to contact details emergency response mapping and inclusion of wastewater loss of containment response actions	15/03/2024

Document Approval

Responsibility	Approver
Owner of the Emergency Management Plan	Ed Wong VP Drilling and Completions

Abbreviations

Abbreviations and acronyms used within this document:

Abbreviation	Definition
AAR	After Action Review
BMP	Bushfire management plan
CMT	Crisis Management Team
DEPWS	Department of Environment, Parks and Water Security
DITT	Department of Industry, Tourism and Trade
DMO	Duty Medical Officer
EAP	Employee Assistance Program
EMT	Emergency Management Team
EMT-L	Emergency Management Team Leader
ERN	Emergency Response Notification
ERT	Emergency Response Team
EPT	Extended production testing
ERP	Emergency Response Plan (this document)
ERIP	Emergency Response Interface Plan
ERT	Emergency Response Team
GPS	Global Positioning System
HSEMS	Health and safety management system
HLSO	Helicopter Landing Site Officer
OSC	On-Scene Commander
MAE	Major Accident Event
PPRR	Prevent Prepare Respond Recover
SEMT-L	Site Emergency Management Team Leader
SIMOPS	Simultaneous Operations
SIF	Serious injury or fatality
SITREP	Situation Report
SMP	Spill Management Plan
TPC	Third party contractor
VP	Vice President

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1 Introduction

1.1 Purpose

This ERP is designed to guide the On-Scene Commander (OSC) and Site Emergency Team to respond effectively to a site level emergency and then return the site to normal operations.

The plan will:

- Briefly describe the Tamboran emergency response structure
- Explain the notification and escalation pathway
- Identify key personnel and their role in an emergency scenario
- Describe information about the site including:
 - Site location/s and geographic area
 - Emergency equipment and medical resources available
 - Exclusion zones (if applicable)
- Identify the tools for use during an emergency.

Support for the Emergency Management Team is provided through the Tamboran Crisis Management Plan (TRL-HSE-PL-03).

1.2 Scope

This emergency response plan encompasses all Tamboran's activities within the Beetaloo Basin. The plan applies to all employees, contractors, and visitors and includes (but is not limited to) the following activities:

- All regulated activities approved under the environment management plans (EMPs) and legislated under Regulation 5 of the Petroleum (Environment) Regulations 2016
- Transport to and from work areas (excluding chartered flights to and from Daly Waters)
- Field scouting (environmental, cultural heritage, constructability etc)
- Groundwater bore construction, monitoring and sampling
- Site inspections and well-head maintenance

Where site operations are under the HSEMS of a Lead Contractor then bridging arrangements and interfaces will be agreed to and documented.

Out of scope:

- Charter flights and commercial flights to and from Daly Waters and Darwin
- Logistics and freight haulage from depots to Daly Waters laydown
- Accommodation in commercial establishments (hotels etc)

1.3 Compliance with Legislation

This plan meets the requirements as identified by legislation for emergency response plans including:

- Work Health and Safety (National Uniform Legislation) Act 2011
- Work Health and Safety (National Uniform Legislation) Regulations 2011
- Petroleum Act 1984
- Petroleum Regulations 2020
- Petroleum (Environment) Regulations 2016
- Code of Practice for Petroleum Activities in the Northern Territory 2019
- Bushfire Management Act 2016
- Bushfire Management (General) Regulations 2018
- Dangerous Goods Act 1998
- Dangerous Goods Regulations 1985

- Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act and Regulations
- Waste Management and Pollution Control Act 2016
- Northern Territory Contaminated Land Guideline (June 2017)

1.4 Operator Details

Tamboran Resources Ltd (Tamboran)
100 Barangaroo Avenue
Barangaroo NSW 2000

1.5 Beetaloo Basin Location

The Beetaloo Basin is located approximately 700 km south of Darwin with operational activity being undertaken in 4 permit areas (EP76, 98, 117 and 136) as per Figure 1 below.

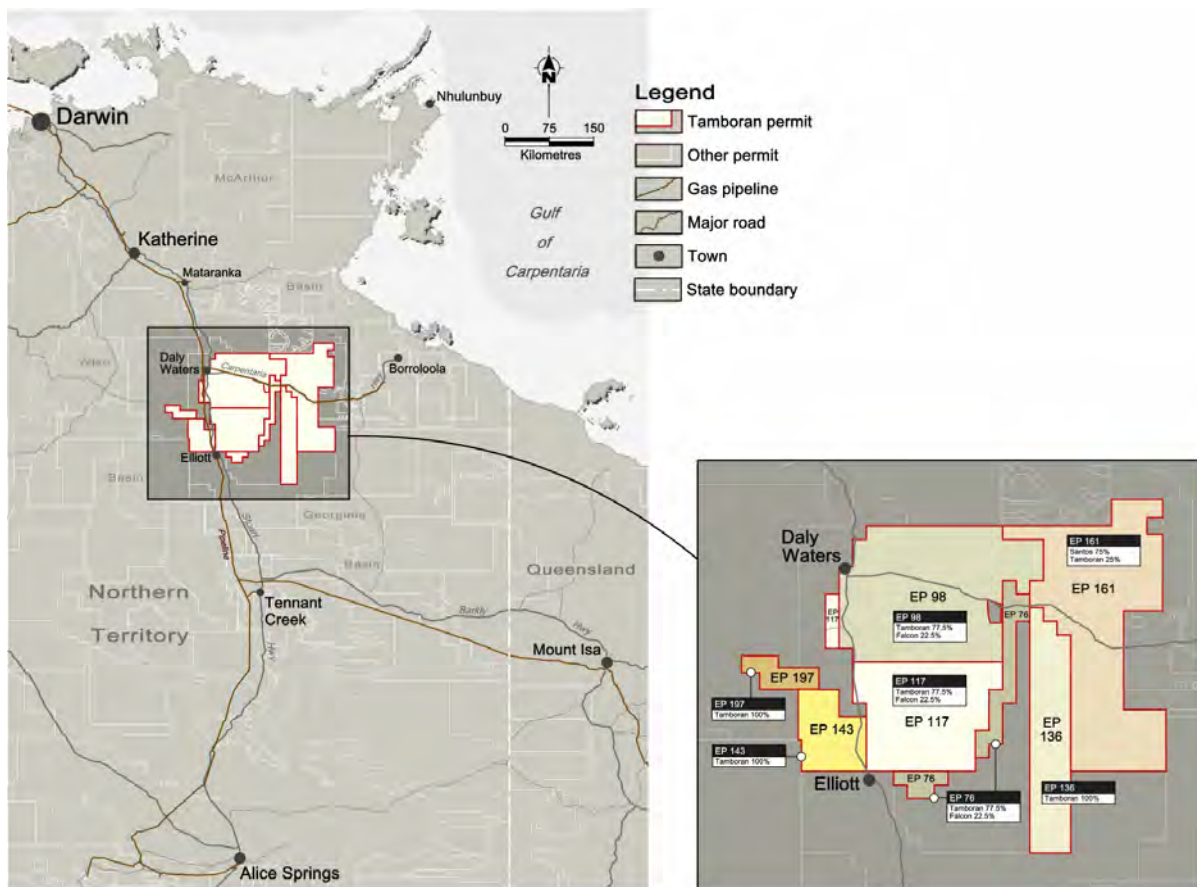


Figure 1. Beetaloo Basin permit areas

2 Emergency Management Structure

The overall Emergency Management structure is three-tiered as shown in Figure 2 with:

- An Emergency Response Team (ERT) on site. This will be led by a Tamboran Representative and supported by specialist contractors and local emergency services.
- An office-based Emergency Management Team (EMT) lead by Tamboran VP Drilling and Completions.
- The Tamboran Crisis Management Team (CMT) is led by the Tamboran COO.

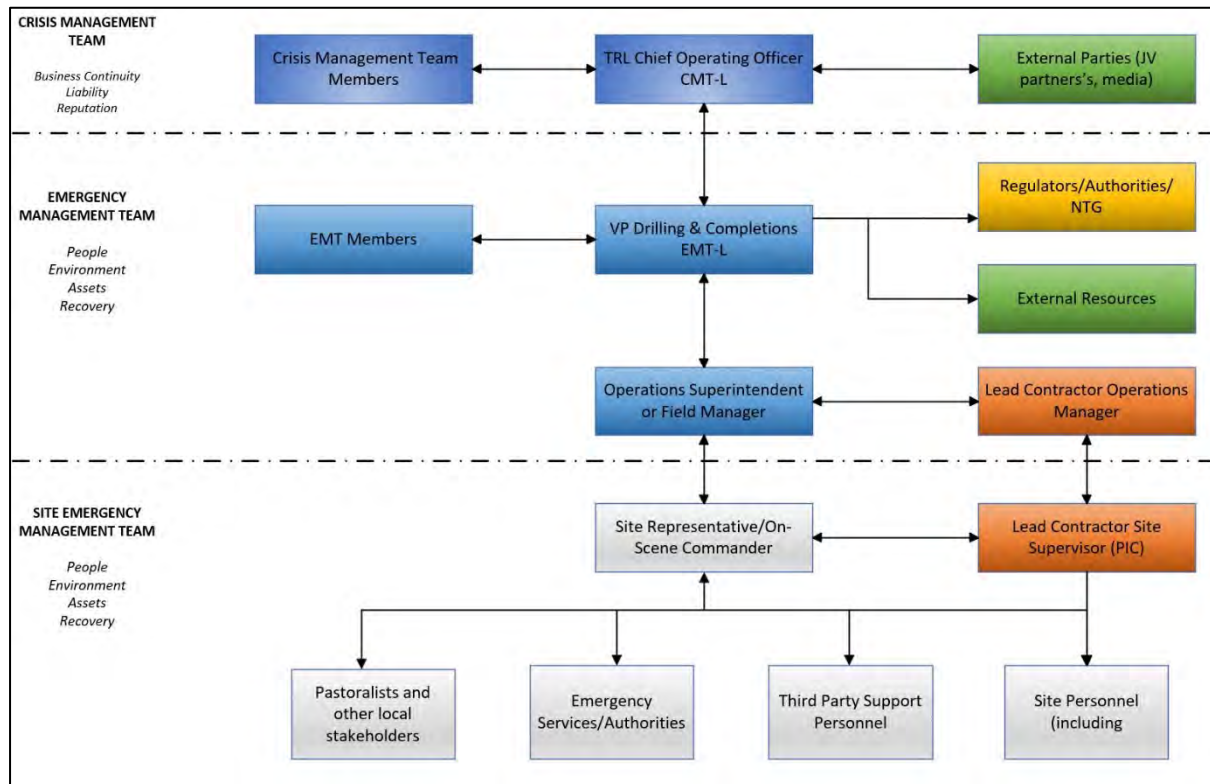


Figure 2. Emergency Management Structure

2.1 Emergency Response Philosophy

The site emergency response team will have the ability to provide a basic response to incipient fires, spills and medical emergencies to preserve life and reduce the impact to people, community, environment, and assets.

Where increased response capability to mitigate the consequences of incident types such as loss of well control or bushfire, specialist contractors (including emergency services) will be engaged to undertake the response.

3 Emergency Management

3.1 Definition of a Site Emergency

An emergency is defined as an unplanned event which requires a response to normalize an activity that has resulted in:

- Injury to an individual or group of people
- A near miss with SIF potential
- Loss of control of any health, safety environment or community related incident
- Uncontrolled release of a substance to air, land, or water
- Loss of reputation or business continuity
- Loss or damage to equipment or assets
- The potential for any of the above

3.2 Emergency Response Plan Activation

This Site Emergency Response Plan (SERP) should be activated for emergencies that cause or have the potential to cause SERIOUS or greater consequences. Consequence classification is based on Tamboran's Risk Matrix.

The Site Emergency Management Team Lead (SEMT-L) or On Scene Commander (OSC) has the authority to activate this SERP. Escalation to the Emergency Management Team Lead (EMT-L) must occur so that activation of the EMT can be considered and stood up if required.

Figure 3 below describes activation pathway for the SERT.

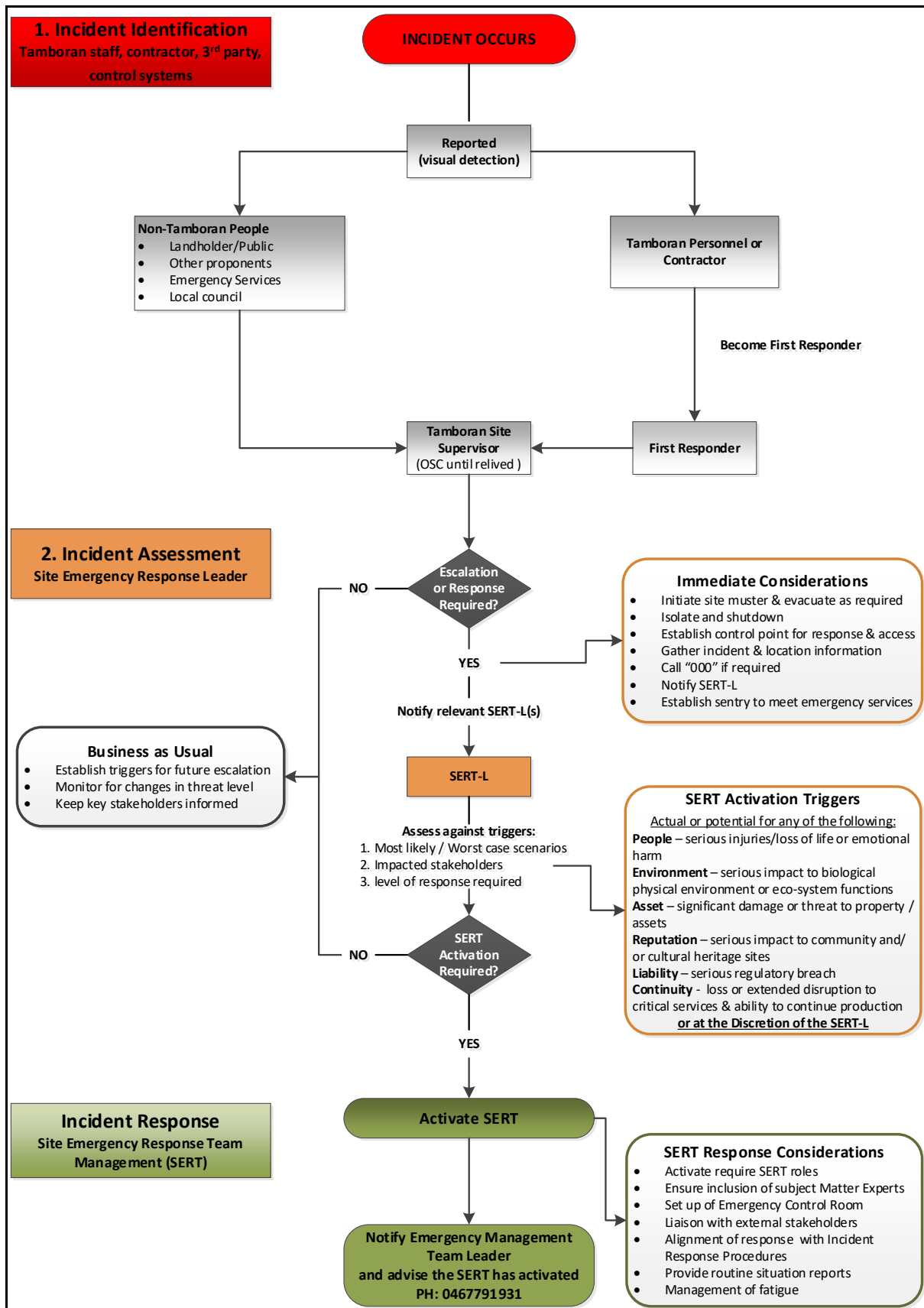


Figure 3. Identification and Escalation

Triggers for Activation			
People	Serious injury/illness or worse to any person		☐
Environment	Moderate effects on biological physical environment and serious short-term effect to eco-system functions		☐
Asset	Serious damage or loss to production, property and/or infrastructure		☐
Reputation	Serious impact to community or cultural heritage		☐
Liability	Serious breach of law or regulation		☐
1 – Isolate and Evacuate			
Muster	Account for all personnel (upwind) whilst assessing the situation		☐
Isolate	Either through Emergency Shutdown Devices (ESD’s) or remotely		☐
Evacuate	If required evacuate to designated evacuation points either upwind or at a safe distance as determined by event type or respective response guideline		☐
Control	Establish control points to coordinate response and restrict access		☐
Meeting Points	Nominate pre-determined emergency services meeting points near known landmarks or road intersections and establish personnel to meet emergency services upon their arrival		☐
2 – Communicate and Escalate			
Confirm	Confirm details of the emergency (type of emergency, injuries, contained oruncontained etc.) and response required.		☐
Activate	Activate SERT, EMT and CMT, contact Emergency Services and communicate with other Stakeholders		☐
Escalate	Consider likely impacts		☐
Impacts (actual & potential)	Most likely	What is realistically likely to happen and who / what is impacted?	☐
	Worst case	How bad could it really get and then who / what is impacted?	
3 – Respond			
• Continually reassess situation		• Appoint OSC	☐
• Designate communication channels		• Establish exclusion zones	☐
• Activate appropriate resources		• Develop SMEACS briefing	☐
• Apply Incident Response Guidelines		• Provide regular updates	☐
4 – Response Management			
Personnel	Appropriate personnel in the ERT, CMT and from outside resources		☐
Resources	Appropriate resources available to manage the incident		☐
Tools	Appropriate tools available for the ERT, CMT, OSC and other responders		☐

Table 1. ERP activation and actions

3.3 Emergency Scenario Guides

The Emergency Scenario Guides provide an easy to understand, detailed response to the below identified emergency situations. The guides define the key roles and responsibilities to ensure essential response actions are undertaken and should be used in conjunction with this plan.

Category	Response Procedures
FIRE	▪ Bushfire
PERSONAL SAFETY	▪ Medical Emergency ▪ Vehicle Accident ▪ Missing Overdue worker ▪ Lone Worker ▪ Snakebite
ENVIRONMENT	▪ Environment Related Incident (earthquake/cyclone) ▪ Environment – Weather Related Incident – ▪ Loss of containment or spill ▪ Flood
HAZMAT	▪ Hazardous chemicals ▪ Loss of well control (level 1 or 2)
SECURITY	▪ Protest / Trespass ▪ Bomb Threat ▪ Armed Intruder ▪ Lockdown

3.3.1 Spill Response and Loss of Containment

The Beetaloo Spill Management Plan (TB2-HSE-MP-09) provides specific information on how to manage and handle spill response within the Beetaloo Asset (including spills located off tenure). This document should be referenced for all emergency spill response scenarios.

Refer to Appendix E for additional guidance steps and considerations in the event of a loss of containment from wastewater storage.

3.3.2 Chemical Response

The Chemical Response guidelines (CDN 4411922) provide specific information for specific chemicals that are used on Tamboran sites. The guidelines provide information on:

- PPE requirements
- Chemical details and description
- First aid requirements
- Evacuation considerations
- Fire and spill management

Additionally, a Chemical Risk Assessment was completed for activities. The fluid systems reviewed were:

- Hydraulic fracture stimulation fluids;
- Hydraulic fracture chemical tracers; and
- Drilling fluids

As part of the Chemical Risk Assessment a hazard assessment was undertaken with the evaluation of the environmental hazard of the chemical additives in the hydraulic fracturing fluid systems, based on their environmental persistence, bioaccumulation, and aquatic toxicity properties. Also included was an evaluation of human health effects (i.e. genotoxicity, carcinogenicity, reproductive toxicity, oral toxicity, inhalation toxicity, dermal toxicity, chronic repeated dose toxicity).

A hard copy emergency manifest, identifying notifiable quantities of hazardous substances, must be in the emergency box located at the muster point of all field locations.

3.3.3 Bushfire

Specific wellsite Bushfire Managements Plans (BMPs) have been prepared for each wellsite. A copy of the relevant bushfire management plan is found on site and is easily accessible for all personnel.

The below tools should be utilized by site personnel for additional support and guidance during bushfire season (Northern Territory runs from April – November) can provide technical advice in developing bushfire management processes and emergency planning during the fire season.

- <https://www.pfes.nt.gov.au/incidentmap>
- [NAFI \(firenorth.org.au\)](http://NAFI.firenorth.org.au)

3.3.4 Security

In addition to the ER response guide, the Tamboran Beetaloo Basin Security Plan (TBN-OPS-MP-01) should be enacted and supports a response to security scenarios.

3.3.5 Aviation

Daly Waters Airstrip

Daly Waters Airstrip is used for undertaking medical retrievals by Care Flight and The Royal Flying Doctors. Tamboran has supplied a set of emergency landing lights which must be deployed for night landings. These lights are for use by Tamboran and the Daly Waters community and are stored within the Tamboran storage shed at Daly Waters. Contact the Tamboran Field Manager for deployment or access to the lighting. See Appendix J for Daly Waters Emergency Landing Lights Layout.

Helicopter Landing Site Officer (HLSO)

If a helicopter is required for an emergency a designated trained Helicopter Landing Site Officer (HLSO) should be sourced (where available) to support ground activities. It is the responsibility of the HLSO to ensure that they are familiar with the landing locations.

Purpose built helicopter landing pads are located at Amungee NW, Velkerri 76 and Kyalla 117. Landing site coordinates are identified in Appendix D and in the Emergency Response Notification (ERN) document that is prefilled by the Tamboran Operating Company Representative when moving to a new well location or if conducting a campaign then nominated in the campaign specific bridging document.

3.3.6 Medical Emergency

First Responders must notify the OSC and in turn the SEMT-L if they call Emergency Services. Once notified, the OSC is responsible for all communications back to the SEMT.

In the event of a medical emergency, the medical clinician, and first aiders (if requested to assist) will commence immediate treatment.

Due to the remoteness of the Beetaloo Basin, there may be a delay to external medical resources responding should they be required therefore life-threatening injury/illness should be escalated without delay.

To initiate external medevac support for priority 1 and 2 patients:

- The onsite medical clinician is to contact emergency services by calling the St John on call Duty Medical Officer on 08 8999 8666 or using 000
- External medical resources will be arranged by the DMO and deployed. Providers include Care Flight, St Johns Ambulance (from Katherine) and Royal Flying Doctor Service.
- At the first available opportunity, the Aspen Duty Medical Officer will also be contacted by the medical clinician and informed of the incident, the patient's condition, and current treatment / medivac plan.

Depending on the situation, the Aspen Duty Medical Officer will assist with telehealth advice in consultation with the Care Flight and Top End Health Services Duty Medical Officers.

Priority 1 – Life threatening / time critical

Priority 2 – Urgent (early surgical intervention required)

Priority 3 - Serious but not time critical (e.g, severe abdominal pain without compromise)

For Priority 3 patients alternate medivac options may be available to the medical clinician and these need to be considered on a case-by-case basis in consultation with the NT Duty Medical Officers and Tamboran site leadership team.

Priority 4 (illness/injury that can be treated onsite with capability and resources available) the medical clinician will commence treatment and will contact the Aspen Duty Medical Officer as required to discuss treatment strategies.

3.4 Contractor Scenarios

If an incident occurs, the Tamboran Representative will become the On-Scene-Commander (OSC) and liaise with the associated contractor. If an emergency event exceeds the contractor's capability, ie loss of well control, then Tamboran will assume control of the incident and delegate management as required.

When working under their own HSEMS, it will be the responsibility of the Contractor to provide an initial emergency response and co-ordinate the emergency event. If a Tamboran employee is involved in an emergency event at a site under the control of a contractor, it is expected that the Tamboran employee will conform to the contractor's response requirements and support the contractor if willing and competent to do so.

3.5 Major Accident Event

A Major Accident Event is an uncontrolled incident, including fire, explosion, or release of dangerous substance with the potential to lead to multiple fatalities or major environmental damage (potential for critical or catastrophic consequence as per Tamboran Risk Matrix).

A loss of well control is considered a Major Accident Event (MAE) which, while rare, requires additional controls and engineering assessments to mitigate potential consequences.

See Appendix E for details on well control incidents and classification.

4 Roles and Responsibilities

The following roles and responsibilities are essential to ensure effective communication when responding to emergency events.

- First Responder (FR), located at the incident scene and may be a Contractor
- On Scene Commander (OSC) located at the incident scene
- Site Emergency Management Team Leader (SEMT-L)

Individuals may undertake multiple roles depending on the nature of the emergency, its duration and complexity. The functional roles that will assist the EMT-L are listed below and known as the Emergency Management Team (EMT).

- Operations
- Planning
- Logistics
- Log Keeper

Additional roles such as technical engineering, travel and accommodation services may support the CMT depending on the type of incident.

If the EMT-L is unable to undertake their responsibilities a competent alternate or delegate must be appointed to ensure the EMT continues to function.

SERT Roles	Responsibilities
Work parties (including contractors) /First Responder	- Respond to the situation as per the contractor's emergency response plan. - Actively participate in the risk management process to assist in the development of emergency action plans; - Check notice boards for any recent updates to information; - Maintain a high level of awareness of actions to be taken in the event of an emergency. - Follow instructions from Emergency Controller, Emergency Services personnel, First Aiders, and other designated emergency personnel as appropriate; and - Prior to commencing any work or entering a work area, sign onto JSEA for associated activity
First Aiders	- Ensure first aid competencies (minimum Apply First Aid and CPR) are maintained - Provide first aid treatment or assessment as needed whilst working within their skill level - Determine need for medical assistance and provide information to medical personnel or emergency services as required - Ensure that first aid kits are maintained, complete and items are in-date; and - Ensure that all treatments provided, regardless of the type or complexities are recorded
Paramedic/Remote Area Nurse	- Be familiar with current work groups and work locations within Beetaloo Basin - Provide emergency health care on site (12hr workday and on call 24/7) - Ensure that medical response emergency equipment (including medications and ambulance) is fit for purpose, in date and in good working order. - Liaise with external medical emergency services (Care Flight, St Johns etc)
Tamboran On Scene Commander	- Manage first response at site level. During first response, ensure safety of other personnel and ensure that the emergency is communicated effectively to the required people. - Act as Site Emergency Management Team Leader (SEMT-L) - Nominate personnel to act in support roles (log keeper, logistics) - Escalate to Emergency Services, if required. - Ensure that emergency action plans are discussed regularly at pre-start meetings, so that all persons under their control are aware of emergency procedures. - Ensure that emergency equipment is maintained in good working order (complete, clean and available for immediate use)
Site personnel	- Be familiar with individual work sites including muster points and evacuation routes - Be familiar with this plan and the steps required to implement the plan - Keep themselves and others safe from danger during an emergency
EMT Roles	Responsibilities
Emergency Management Team (lead by VP Drilling and Completions)	- Ensure adequate personnel and resources are available to manage and support an emergency - Nominate personnel to act in support roles (log keeper, logistics etc) - Provide technical support and advice. - Co-ordinate with other Operators for use of Well Control package - Support field team with emergency service direction/calls as requested - Escalate and communicate with Crisis Management Team if required. See Crisis Management Plan for defined roles and responsibilities.

Table 2. Roles and Responsibilities

4.1 Toolkit and Supporting Resources

The below forms and checklists provide a detailed overview of the additional administrative tools to be utilized by emergency team.

Operations Checklist	TBN-HSE-FRM-02
Planning Checklist	TBN-HSE-FRM-03
Logistics Checklist	TBN-HSE-FRM-04
Administration/Log Keeper Checklist	TBN-HSE-FRM-05
Situation Report Form (SITREP)	TBN-HSE-FRM-06

4.1.1 Emergency Response Equipment

The below emergency response equipment is always available on operational sites.

Equipment	Location
Remote Area Nurse/Paramedic and Ambulance	On active drilling, completions, stim, EPT and active construction sites.
Medical clinic	Based within the camp accommodation and supports the above activities. Used to provide basic primary health care and emergency medical care
Front end loader	Operational D&C sites
Trash pumps (including hoses)	Operational D&C sites Daly Waters (contingency and for transport/use at unmanned sites as required)
Fire extinguisher/s	Tamboran vehicles Site offices and camp (when established)
Spill kits (oil/fuel and general purpose)	Spill kits are strategically located at active drilling, completions, stim, EPT and active construction sites. Size of kits is dependent on type and duration of activity and are provided by the contractor
Water cart	Available on-site during high-risk fire danger and utilized for dust suppression in first instance
First aid kits	Tamboran vehicle Site office (where established)

5 Emergency Management and Control

After an emergency is detected, the following management stages will be used to control and contain the incident and return to business as usual.

- Raise the alarm
- Isolate and secure
- Communicate and escalate
- Respond and recover

5.1 Raise the alarm

One or more of the following methods can be used to raise the alarm:

- in person
- radio (UHF, VHF etc)

- phone (mobile, satellite or landline)
- emergency alarm/siren
- Leak detection alerts at unmanned locations

5.2 Isolate and evacuate

Stop all work and make sure the worksite is safe:

- secure the well, or impacted area
- stop vehicle and mobile plant operations

If you need to abandon vehicles and mobile plant:

- pull over and park in a safe area
- ensure access and egress to the site is not impeded
- switch off and leave the keys in the ignition

Plan a safe route to the muster point and avoid movement through unsafe areas:

- account for all people
- standby at the muster point until instructed to evacuate

5.3 Communicate and escalate

- Gather information – where is the emergency, what has happened, who is affected, is anyone missing, where are the safe areas etc
- Advise and update the Tamboran Supervisor
- Call Emergency Services (Police, Ambulance, Fire) if required
- Identify meeting points for responders (Medical Providers, ERT etc) and Emergency Services
- EMT and/or CMT to be activated if required

5.4 Respond and recover

- Apply first aid to injured people (if safe to do so)
- Consider Simultaneous Operations (SIMOPS), advise nearby work groups
- Assist Emergency Services
- Follow response procedures. Take into consideration emergency scenarios (ie loss of containment) that have occurred at an unmanned location.
- Secure the scene if Regulator involvement is required. This should include physical barricading (flagging, rope etc) to ensure equipment is not interfered with.
- Initiate incident investigation
- Conduct after action review of the emergency response effort and assign corrective actions

6 Other Considerations

6.1 Meeting Emergency Services

Where Emergency Services such as Ambulance, Police and Fire are dispatched by road or air, a Tamboran employee or contractor representative will meet the Emergency Service at a designated location and guide them to the incident site.

Designated location - Hi-Way Inn (cnr Stuart and Carpentaria Highways, Daly Waters)

Additional meeting points may be required and will be identified and communicated on call out. These will be dependent on the type of emergency, access availability and exclusion zones.

To enable an effective response, a detailed annual work program is provided to NT Police, Fire & Emergency Services. At the beginning of each campaign of work, a copy of the worksite ERN (emergency response notification) shall be provided to Emergency Services in Mataranka and Katherine. This ERN provides site specific details, GPS co-ordinates, directions to site and contact phone numbers. This will enable emergency services to be familiar with the work location prior.

6.2 Hazard Awareness

All personnel arriving at the incident site must be made aware of:

- Hazards present because of the incident (fire, heat radiation, flooding/water, chemical exposure etc)
- Hazardous areas and exclusion zones
- Safe locations and muster points
- Additional PPE (if required)

6.3 Shift Changeover

Shift changeovers are required for continuity of emergency management. The EMT-L is responsible for changeover of personnel involved in the emergency. Effective changeover will be achieved by:

- Staggering changeover times
- Avoiding changeovers during critical periods
- Having changeovers in daylight, where possible
- Briefing incoming personnel

7 Termination of Emergency

The emergency can be considered over when:

- Emergency services have declared the emergency over and have returned control of the site back to Tamboran.
- The emergency team has returned the site to a safe condition
- All personnel are accounted for
- Injured/ill personnel have been stabilized and/or evacuated
- Environmental controls are in place

8 Recovery and Post Emergency Actions

8.1 After Action Review

After Action Review (AAR) is to be held after each emergency. This process is designed to discuss strengths and weaknesses and necessary improvements for this plan and related procedures. All actions arising from the review shall be entered into Tamboran's Risk and Compliance Management System and tracked through to completion and closure.

8.2 Incident Investigation

Incident investigations should be undertaken in accordance with Tamboran's Incident Investigation processes with the following steps being considered:

- Securing the incident site and restricting access until investigators (both internal and external) have completed their work and handed back control of the site.
- Gathering of evidence that may assist the investigation (list of personnel involved, response logs, situation boards, photographs etc)

8.3 Recovery Actions

Prior to resuming work, develop a recovery plan that considers the following:

- Check plant and equipment for structural, physical, and electrical/instrumentation integrity
- Ensure all active detection and protection systems are restored
- Replenish emergency response equipment as required
- Replace or return third-party emergency equipment

In addition, consider the following points:

- People who were involved may require counselling, depending on the nature of the incident
- People should be debriefed with all relevant information captured for a “lessons learnt”
- Conduct a toolbox talk on specific start up activities before restarting work
- Consider the potential for loss of confidence or potential IR issues following the incident or the response to that incident
- Emergency response plans and training may need to be revised before resuming the work activity

8.4 Clean Up

Post incident clean up should be done using the following guidelines:

- Conduct initial site inspection to identify extent of equipment and/or plant damage
- Assess potential decontamination requirements (removal of chemicals/foam/oil/contaminated soil)
- Store all contaminated material in proper containers pending offsite disposal by licensed hazardous waste contractors
- Assess damage or potential damage to surrounding environment. This may include conducting soil testing of contaminated area/s to inform site remediation requirements.
- Repair and/or replace damaged equipment/plant
- Inspect and test affected equipment

9 Training and Capability

All personnel must be given specific training on how to respond to an emergency, fulfill their role in the site ERT and use of emergency equipment available.

Training may be in the form of:

- External or internal competency-based training
- Emergency response drills (both practical and desktop exercises)

9.1 Exercises

Emergency response exercises will be conducted monthly as per the schedule below. This schedule should be dynamic and align with the current operations, type and level of risk that exists on site.

Exercises must involve escalation and activation of the Emergency Management Team (EMT) and Crisis Management Team (CMT) as indicated on schedule below.

	JAN	FEB	MAR	APR	MAY	JUN
Primary	HAZMAT	Structural failure	Environment	Personnel safety – medical emergency	Fire	Personnel safety
Secondary	Flood	Personnel safety	HAZMAT	Personnel safety	Personal safety	Personnel safety

	JUL	AUG	SEP	OCT	NOV	DEC
Primary	Personnel safety	Fire	Environment – oil/chemical spill	Personal safety – medical emergency	Flood	Structural failure
Secondary	Security - protest	Personal safety	HAZMAT	Security	Personal safety	Environment - loss containment

Table 3. Emergency response exercise schedule. Note white shading indicates inclusion of EMT and CMT in the exercise

It is recommended that a Level 3 loss of containment event be simulated yearly as a minimum to test the Emergency Management structure (EMT, CMT) in line with the requirements set out in this ERP. Scenarios should progress from level 1 to level 3 (blowout stage) to ensure that all Emergency Management leaders are provided with an opportunity to participate.

In addition, the drills should include the primary well control contractor and support contractors to test their state of readiness. The aim of the exercise is to simulate the loss containment event, test personnel's response to the event, test the mobilisation and function of the Emergency Management structures, and test the mobilisation of the contractors required to respond to the well control event.

Any lessons learned from the exercise should be incorporated when appropriate to continually improve Tamboran's response to such an event.

10 Stakeholder Management

10.1 Pastoralists

Contact with Pastoralists can be initiated by the SEMT-L in urgent circumstances (i.e. bushfire threat) however, the Landholder Relations Advisor should be used in the first instance. See Appendix C for contact details.

10.2 Next of Kin

In the event of a death, serious injury or other emergency, involving Tamboran personnel, advice to relatives about the condition of a person or about the incident will be coordinated by Human Resources through the Crisis Management Team.

During or after an emergency, the SEMT-L will refer any queries or concerns from relatives to Human Resources. HR may also activate Employee Assistance Program (EAP) providers to support site personnel or relatives affected by an incident.

Principal Contractors and Contractor companies are responsible for management of next of kin communication in consultation with Police services, and EAP management in accordance with their emergency response plans and relevant State obligations.

10.3 Dealing with Media Enquires

During an emergency event, media attention may occur at the affected site. If personnel receive an enquiry from a journalist or reporter, whether in person or by phone and are asked about Tamboran, they should say:

"I am not able to comment. If you give me your name and telephone number I will organize for the most appropriate person to call you."

Always ask for:

- the journalist / reporter's name.
- publication / media outlet.
- contact phone number and/or email.

It is important to remember that there is no such thing as "off the record". Even if you are speaking informally, you may be quoted at any time.

The EMT-L will advise the CMT-L of any media contact or enquiry.

11 Review and Update

The ERP will be reviewed and updated as necessary in response to one or more of the following:

- annually
- when major changes have occurred, which may affect the response coordination or capabilities.
- following routine testing of the plan
- after an actual emergency

During the review, the following aspects are to be considered:

- lessons learned from an emergency
- changes in legal requirements
- improvements to effectiveness in terms of response strategy, management, and communication
- developments in the latest techniques and technology in handling an emergency.
- changes to, or movement of people within the organization
- changes to contact numbers of internal and external organizations
- revisions to existing or availability of emergency management tools and equipment, resource suppliers or contractors

12 Associated Documents

Document	Document Reference
Beetaloo Basin Spill Management Plan	TB2-HSE-MP-09
Tamboran Resources Crisis Management Plan	TRL-HSE-PL-03
Emergency Scenario Guides	NA
After Action Review	TBN-HSE-FRM-07
Chemical Response Guidelines	CDN-4411944
Tamboran Risk Toolkit	NA
Bushfire Management Plan – Shenandoah S2 (Rev 1)	NA
Bushfire Management Plan – Kyalla 117 N2 (Rev 1)	NA
Bushfire Management Plan – Amungee NW (Rev 3)	NA
Bushfire Management Plan - Beetaloo W1 (Rev 1)	NA
Bushfire Management Plan – Maverick 1 (Rev 1)	NA
Bushfire Management Plan – Velkerri 76 S2 (Rev 1)	NA
Bushfire Management Plan – Kalala (Rev 1)	NA

Appendix A. Contact List (Tamboran)

Tamboran Contacts		
Role	Name	Primary contact details
Field Manager	Robert Wear	[REDACTED]
Drilling Superintendent	James Boorman	[REDACTED]
Tamboran Field HSE	Emma Cartwright Scott McEwan	[REDACTED]
VP Drilling & Completions	Ed Wong	[REDACTED]
HSE Manager	Gabrielle Bertini	[REDACTED]
Environment and Approvals Manager	Matt Kernke	[REDACTED]
Logistics Superintendent	Dean Langford	[REDACTED]
Senior Counsel	Rohan Vardaro	[REDACTED]
Landholder Relations	David Armstrong	[REDACTED]
Human Resources	Lisa Vassallo	[REDACTED]

Appendix B. Contact List (External Agencies)

External Agencies		
Role	Name	Primary
Emergency Services	Police, Fire, Ambulance	000 (or 112 from mobile)
St Johns Duty Medical Officer	N/A	(08) 8999 8666
Hospital	Katherine Hospital Kintore Clinic Katherine	(08) 8973 9211 (08) 8972 1677
McArthur River Mine Medical Resource	N/A	1800 211 573
Bushfires NT	Fire control officer	Katherine (08) 8973 8871 Darwin (08) 8922 0844
Volunteer Bushfire Brigade	N/A	(08) 8975 9936
Emergency helicopter operations	HM Air Services	(08) 8975 0777 OR 0413 002 407
Regional Shire Council	Roper Gulf Shire	(08) 8972 9000 OR (08) 8977 2300 (Mataranka Office)
Regional Shire Council	Barkley Shire	(08) 8962 0000 OR 0448 071 878 (after hours emergency)
Police (non-emergency)	Police Link	131 444 Elliott – (08) 8969 2010 Katherine – (08) 8973 8000
Poisons Information Centre	N/A	13 11 26
Bureau of Meteorology	Cyclone Warnings Forecasts & Warnings	1300 659 211 (08) 8920 3826
NT DITT Petroleum Operations	N/A	+61 1300 935 250
NT DEPWS	N/A	1800 064 567 (NT EPA Pollution Hotline – caller to state it's a petroleum matter) onshoregas.depws@nt.gov.au
NT EPA Pollution Hotline	N/A	1800 064 567 (as above)
NT WorkSafe	N/A	1800 019 115 ntworksafe@nt.gov.au
National Land Council (NLC)	N/A	(08) 8920 5100 (business hours only)
Well Control and Prevention	Wild Well Control Inc.	+1 281 784 4700

Appendix C. Contact List (Pastoralists)

Property Name	Contact Name	Phone
Amungee Mungee	Adrian Brown	[REDACTED] [REDACTED]
Beetaloo Station	Scott & Jane Armstrong	[REDACTED]
Sturt Plains Hayfield/Shenandoah	Brad & Lisa Dyer Justin & Sally Dyer	[REDACTED] [REDACTED] [REDACTED]
Hidden Valley	David & Jenny James	[REDACTED]
Kalala	Des Carey	[REDACTED]
Newcastle Waters	Jack	[REDACTED]
Nutwood Downs	Rod & Rayna Dunbar	[REDACTED]
Tanumbirini Station	Mick Tasker (Manager)	[REDACTED]

Appendix D. Site Location Specifics

PERMIT AREA	EP98
Well Pad	Kalala South
Associated water bore	N/A
Well location	-16° 17' 37.7" S / 133° 36' 44.3" E -16.2941, 133.6124 (GDA94) E: 351740, N: 8198023 (MGA Zone 53)
Nearest town by vehicle	Daly Waters
Nearest major road	Carpentaria Highway
Nearest airstrip by vehicle	Daly Waters: 25 min/25 km OR Elliott: 2hrs / 165 km
Nearest hospital by vehicle	Katherine Hospital (299 km)
Well Pad	Amungee NW-1H
Associated water bore	VEL 98 N1 CMB-G (RN40894)
Well location	Amungee NW-1H -16°20'51.034"S / 133°53'4.403"E -16.34751, 133.8846 (GDA94) E: 380859, N: 8192292 (MGA Zone 53) Amungee NW-2H -16 22' 4.513"S / 133 58' 6.56"E 389833.037, 8190103.376
Helicopter landing pad	-16.34298, 133.88520 (GDA94)
Nearest town by vehicle	Daly Waters
Nearest major road	Carpentaria Highway
Nearest airstrip by vehicle	Daly Waters: 1hr /61 km OR Elliott 2.5hrs /202 km
Nearest hospital by vehicle	Katherine Hospital (329 km)
PERMIT AREA	EP76
Well Pad	Velkerri 76 S2
Associated water bore	VEL76-S2CMB-AL (RN41133) VEL76-S2CMB-G (RN41134) VEL98-N1 CMB (RN040894)
Well location	-16°51' 20.13"S; 134°23' 39.85"E -16.85571, 134.3939 (GDA94) E: 435432, N: 8136301 (MGA Zone 53)
Helicopter Landing Pad	16.856275S 134.395751 E Zone 53K
Nearest town by vehicle	Daly Waters
Nearest major road	Stuart Highway
Nearest airstrip by vehicle	Daly Waters: 2.5 hr /190 km OR Elliott: 3.0 hr /198 km
Nearest hospital by vehicle	Katherine Hospital (442 km)

Permit Area	EP117
Well Pad	Kyalla 117 N2
Associated water bore	KYA117-N2 CMB (RN40895) KYA117-N2 CMB (RN40896) KYA117-N2 CMB-G (RN41132) KYA117-N2 IMB-AL(R041137) KYA117-N2 IMB-G (RN041136)
Well location	Kyalla 117 -16°50' 29.01"S; 133°39' 0.16"E -16.84141, 133.6501 (GDA94) E: 356183, N: 8137492 (MGA Zone 53) Shenandoah South 1 E: 356183, N: 8137492 (MGA Zone 53) -16.84141, 133.6501 (GDA94)
Helicopter Landing Pad	16.836500 S 133.658333 E Zone 53 K
Nearest town by vehicle	Daly Waters
Nearest major road	Stuart Highway
Nearest airstrip by vehicle	Daly Waters: 1 hr /92 km OR Elliott: 1.5 hr /117 km
Nearest hospital by vehicle	Katherine Hospital (365 km)
Exploration well	Shenandoah South 2
Location	E: 355291; N: 8140676 (MGA Zone 53)
Nearest town by vehicle	Daly Waters
Nearest major road	Stuart Highway
Nearest airstrip by vehicle	Daly Waters: 1hr 10 mins (73 km)
Nearest hospital by vehicle	Katherine Hospital (367 km)
Exploration well pad	Beetaloo West-1
Well location	-17° 7'13.82"S / 133°45'43.63"E -17.12051, 133.7621 (GDA94) E: 368312, N: 8106689 (MGA Zone 53)
Nearest town by vehicle	Stuart Highway
Nearest major road	Elliot: 1hr 20mins (95kms)
Nearest airstrip by vehicle	Katherine (399kms)
Nearest hospital by vehicle	Elliott

Permit Area	EP136
Exploration well pad	Maverick 1
Well location	146° 30' 53.93" E / 16° 31' 5.47" S
Nearest town by vehicle	Daly Waters
Nearest major road	Carpentaria Highway
Nearest airstrip by vehicle	Daly Waters 1hr 30mins (130kms)
Nearest hospital by vehicle	Katherine (400kms)

Permit Area	EP117 – PROPOSED LOCATIONS
Exploration well pad	Shenandoah North A
Well location	E: 356687, N: 8163762 (MGA Zone 53)
Nearest town by vehicle	Daly Waters
Nearest major road	Daly Waters 1hr 20 mins (83 km)
Nearest airstrip/s by vehicle	Katherine Hospital (377 km)
Nearest hospital by vehicle	Stuart Highway
Exploration well pad	Shenandoah South B (PROPOSED)
Well location	E: 345035; N: 8135464 (MGA Zone 53)
Nearest town by vehicle	Daly Waters
Nearest major road	Stuart Highway
Nearest airstrip/s by vehicle	Daly Waters: 1.5 hr /81 km OR Elliott: 1.5 hr /117 km
Nearest hospital by vehicle	Katherine Hospital (354 km)
Exploration well pad	Shenandoah South C (PROPOSED)
Well location	E: 343471; N: 8133330 (MGA Zone 53)
Nearest town by vehicle	Daly Waters
Nearest major road	Stuart Highway
Nearest airstrip by vehicle	Daly Waters: 1.5 hr/86 km OR Elliott: 1.5 hr /117 km
Nearest hospital by vehicle	Katherine Hospital (359 km)

Appendix E. Loss of Containment (Wastewater)

In the event of a loss of containment from any wastewater storage, the following guide will be used to ensure the appropriate steps are implemented to minimise environmental harm. All actions are to be undertaken as a part of the steps outlined in section 5 of this plan and the Spill Management Plan

1. Loss of containment detected	
Type of infrastructure involved: - Enclosed tank - C-ring - Flex-pond - Drilling sump - Gathering line	How has the loss of containment been detected? - Routine inspection - Remote telemetry/alarm
2. Review site location and determine response timeframe	
Where has the loss of containment occurred: - Operational site - Unmanned site	Operational site: - Commence rapid spill assessment in accordance with SMP and actions below. - Progress with site assessment and clean up in accordance with the SMP and actions below. Unmanned site: - Tamboran Representative must review data immediately to determine level of response. A site inspection must be undertaken as soon as possible to investigate if a serious loss of containment is suspected. Weather (ie flooding) and access must be considered with alternative transport arrangements (helicopter) implemented to facilitate site assessment. - Commence rapid spill assessment in accordance with SMP and actions below. - Progress with site assessment and clean up in accordance with the SMP and actions below.
3. Actions	
- Confirm lease perimeter bund is intact and that wastewater hasn't left the site. - Inspect the storage infrastructure and identify exact location and cause of leak. - Determine whether further loss can be prevented. Consider: - Closing or replacing valves - Transfer of fluid to alternate storage (if available) - Emergency earthworks using equipment available on site - Determine extent of contamination - Estimate volume of the release - Undertake field test of water quality (pH and EC) - Recovery response actions. For ponding and spilled wastewater, actions need to be planned with weather conditions and site access in mind, especially during periods of high rainfall (wet season) and constraints such as road closures. Equipment needed to recover fluid: - Vacuum truck - Trash pumps and hoses - Front end loader - Mobilisation of earthmoving equipment may need to be considered.	

Appendix F. Well Control (Incident Classification)

Three levels of well control event have been defined and are mirrored in the Well Control Standard (TBN-D&C-TS-01). If a well control Incident exceeds level 1 and 2, the Tamboran Operating Company Representative (OCR) will activate the Site ERT and notify the EMT-L.

The involvement of a contracted third-party specialist to handle the well control integrity event may also be required.

The specific response plan is detailed in the Tamboran Well Control Standard (TBN-D&C-TS-01)

The following information is guidance on different levels of well control. Additionally, Appendix G4 provides a basic overview of how Well Control events are managed.

Each level defines the level of escalation required including potential mobilisation of the Well Control contractor.

Level 1 (uncomplicated kick or lowrisk production / well integrity event)	Level 2 (a kick with some complications or low – moderate risk well integrity event)	Level 3 (complete loss of well control or moderate – high risk well integrity event)
These are events that commonly occur during drilling and workover operations, or. Low risk well integrity events during the production phase. Emergency interfacing is limited due to pressure and flow containment. Personnel and equipment are not threatened, and there are no injuries or fire involved. These events can be handled using resources and procedures available on-site (or readily mobilised in the case of a well integrity event). The situation is immediately managed by the Driller who will keep the rig manager informed of the situation. Caution: Level 1 incidents can escalate quickly to a more serious and threatening level if not handled properly.	A Level 2 event can be defined as an abnormal well control event during drilling and workover operations involving some sort of complication in which: - Well control has NOT been lost at the surface - Resources beyond the normal capabilities of the rig crew or production operations staff may be required - Outside well control consultation, materials, equipment, or personnel may be required Includes low – moderate risk production events (e.g. noticeable leak or significant annular pressure). There are no injuries or fires associated with this incident level since control has not been totally lost. The situation is typically managed by the Rig with the OSC liaising. The EMT is on standby but not activated. The incident is generally not sufficiently threatening to activate the CMT.	A Level 3 emergency denotes a complete loss of well control at surface during drilling and workover operations with no opportunity to restore it using all the resources available on-site. Includes moderate – high risk well integrity events during the production phase. Level 3 Incidents require the EMT to activate including notification to the CMT to effectively deal with the situation. External Well Control support (i.e. Boots & Coots, Wild Well Control, Cudd, etc.) must be activated upon confirming that the well is out of control at surface and measures must be immediately taken to protect people, the environment and material assets. These emergencies, although serious at the outset, have the potential to escalate further during control attempts. Such escalation may cause serious structural damage or total loss of the facility, rig, BOP stack and wellhead due to explosion, fire, loss of buoyancy or location subsidence.

Well Control Incident Level 1 – Uncomplicated Kick	
Situation managed by:	OCR in consultation with Drilling Superintendent, Drilling/Completion Engineer
Support:	Usually none required
Communication:	OCR or Drilling Superintendent to liaise with Brisbane based engineering team as required
Example situation:	Influx while drilling

Well Control Incident Level 2 – Kick with Complication	
Situation managed by:	OCR in consultation with Drilling Superintendent, Drilling/Completion Engineer SERT on standby
Support:	Technical team as required Well control specialist as required
Communication:	Drilling Superintendent to liaise with Technical Team
Example situation:	▪ Severe lost circulation combined with influx into wellbore ▪ Kick taken with pipe out of hole ▪ Leak or mechanical failure of well control equipment ▪ Gain and loss situations ▪ Plugged work string ▪ Influx taken while running casing or pumping cement ▪ Loss of casing shoe integrity ▪ Any complication experienced during live well operations

Well Control Incident Level 3 – Loss of Containment	
Situation managed by:	Onsite: SERT Office: Crisis Management Team
Support:	Technical Team to support SERT and CMT as required Well control specialist onsite and in office as required
Communication:	ERT-L to liaise with CMT-L Support functions to report to ERT-L or CMT-L as required
Example situation:	▪ Severe lost circulation combined with influx into wellbore ▪ Kick taken with pipe out of hole ▪ Leak or mechanical failure of well control equipment ▪ Gain and loss situations ▪ Plugged work string ▪ Influx taken while running casing or pumping cement ▪ Loss of casing shoe integrity ▪ Any complication experienced during live well operations

Response to Level 3 Well Control Event

Personnel safety shall always be the highest priority in a well control event. Untrained personnel should never attempt to conduct well intervention activities due to the extreme risk for significant injury, fatality, or event escalation.

The primary focus immediately following a Level 3 well control event should consist of rig evacuation and care for injured parties. During drilling/completion operations the rig contractor's evacuation procedures shall be the prevailing document(s). The senior contractor representative (Rig Manager) shall serve as the On Scene Commander (OSC) during evacuation and search and rescue operations.

Upon completion and confirmation of a full muster, the Rig Manager shall be relieved of OSC duties by the Tamboran OCR.

Initial actions shall include, but are not limited to:

- Evacuate and make sure all personnel are safe and accounted for
- Isolate the area and restrict access
- Notify applicable groups (including well control specialists if required)
- Conduct initial assessments

In the event of a well control event, factually correct information is essential to aid in decision making. Once the site has been secured, personnel accounted for and appropriate notifications made, information should be gathered which aids the response to the incident. Appendix C8 & C9 include templates to aid in gathering the information necessary in such an event.

Once the site has been secured, some hazards and potential solutions are outlined in Appendix C10. Information in this Appendix should be used to identify the site-specific issues relevant to the event and mobilise services and materials that may be required to respond.

Contractor Mobilisation

The well control contractor is Wild Well Control. Tamboran VP, Drilling and Completions must authorise the mobilisation.

Mr. Don Guedry, Vice President
Wild Well Control Inc.

[REDACTED]
[REDACTED]
[REDACTED]

Appendix G. Well Control (Documentation and Information Gathering)

Initial information to be obtained following an incident:

Question	Answer
Are there any injuries and is immediate assistance required for evacuation of personnel?	
What assistance is currently underway for injured personnel?	
Has the rig been evacuated?	
What are the weather conditions?	
Has the location been secured?	
When were applicable contingency plans put into effect?	
Status of the emergency:	
Is there a fire? If not, should ignition be considered.	
Is there any pollution?	
Can source of pollution be stopped?	
Are toxic gases present?	
What is the condition of the drilling/workover rig?	
Should rig, or can rig, be moved off location?	
Are the BOP's operable?	
Status of the well	
Is the wellhead/tree intact?	
Pressure readings (annulus and drill pipe)?	
Previous casing size and depth?	
What is the well depth?	
Mud weight?	
Where is the drill pipe/tubing?	
Is an attempt to shut in the well feasible if not already done?	

Appendix H. Well Control (Call in Documentation)

Date and time of incident:		Location:	
Contact name:		Contact number:	
Rig:		WC Incident Level:	
Injured parties:			
	Name	Company	Type of Injury
1.			
2.			
3.			
4.			
Brief Summary (facts only):			
What has been done so far to secure the site:			
Who has been contacted so far:			
Government/Regulatory Bodies Notified and Media Coverage:			

Initial well conditions			
Shut In Drill pipe pressure (psi):		Shut In Casing pressure (psi):	
Pit gain volume (bbl):		Mud weight (ppg):	
Well depth (m MDRT): (m TVDRT if required)		Casing shoe depth (m MDRT): (m TVDRT if required)	
Last casing size (in):		Last FIT/LOT (ppg):	
Hole size (in):		Bit depth (m MDRT): (m TVDRT if required)	
Float in drill string: Ported?		If yes, drill pipe pressure to open float (psi):	
Operation in progress at time of kick:			
Actions since time of kick:			
Current conditions (if different from initial conditions reported above):			
Shut In Drill pipe pressure (psi):		Shut In Casing pressure (psi):	
BOPs closed (Y/N):			
Current operation and plans:			

Appendix I. Well Control (Hazards and Control Considerations)

Hazard	Services/Materials	Task
Security		
Visitors entering site	Self-powered site office with toilet and fridge.	Secure entry to site (ie lock gate) Contact security contractor to mobilise personnel/equipment as required
Lack of communication	Digital radios	Supply digital radios for working party
Visibility at night	Light plants	Contact primary contractor to mobilise equipment as required
Landowner not informed of situation	N/A	Contact made through Beetaloo Field Manager or Landholder Relationship Advisor
People		
Fatigue	Additional SERT personnel	Ensure sufficient personnel at site location to man SERT 24hrs
Lease Preparation		
Fire – overgrown with grass	Slasher	Contact primary contractor to mobilise equipment as required
Uneven ground	Grader	Contact primary contractor to mobilise equipment as required Seek approval and blade fire break if safe to do so
Removal ground soil	Excavator	Contact primary contractor to mobilise equipment as required
Ignition	N/A	Ensure any possibly ignition sources present are removed/disabled if safe to do so
Movement around well	Bobcat & Backhoe	Contact primary contractor to mobilise equipment Tentatively confirm work to remove fence around well pending well controls specialist advice upon arrival
Water used in well kill operations causing contamination	Bobcat and/or backhoe	Consider if application(s) of permits required to construct any in earth holding basin or water recovery trenches Contact primary contractor to mobilise equipment as required
Housekeeping – equipment on well pad / lease	Crane/Forklift Truck	Contact primary contractor to mobilise equipment Clear lease to allow access to wellhead, if safe to do so, considering equipment which may be required to resolve the loss of containment.
Loss of containment effecting nearby wells	Operations coordination	If other wells are nearby (ie on production pad), check wells are secure and check annulion wells to ensure pressures have not significantly changed

Water		
Insufficient water to respond to event – fire control and well kill	Water	Confirm an adequate water source close by
Inability to deliver sufficient water to site	Water trucks	Determine volume of water required for event. See below for method to estimate water requirements Contact primary contractor to mobilise equipment as required
Inability to pump water required	Water pump(s) w/- suction & discharge hose	Contact primary contractor to mobilise equipment as required
Inability to store sufficient water at site	Onsite fluid storage tanks	Determine volume of water required for event. Contact primary contractor to mobilise equipment as required
Logistics		
Inability to move heavy equipment around well	100 t crane(s)	Contact primary contractor to mobilise equipment as required
Delay due to lack of road transport	Road transport	Contact primary contractor to mobilise equipment as required Sufficient road transport available to move required equipment (may need 24hr coverage)
Wellbore Fluids		
Gas	SCUF vent tank with generator to run same	Contact primary contractor to mobilise equipment as required
Return fluids	Storage tank	Contact primary contractor to mobilise equipment as required
Storage tank overflow	Vac trucks to remove fluid	Contact primary contractor to mobilise equipment as required
Well Kill/Isolation		
Inability to kill well	Mud or cementing pump with sufficient hard lines	Contact primary contractor to mobilise equipment as required
Inability to kill well	Fluid Storage/Mud Tank(s) with sufficient hard lines	Contact primary contractor to mobilise equipment as required
Hydrocarbon zone isolation	Cement unit, cement, additives and associated equipment	Contact primary contractor to mobilise equipment as required
Wellhead Equipment		
Isolation of well before side outlet valve removal	VR plug lubricator	Contact primary contractor to mobilise equipment as required
Specialised Services		
Unable to fabricate equipment	Machine shop	Contact primary contractor to mobilise equipment as required
Removal of equipment/fabrication	Welding services	Contact primary contractor to mobilise equipment as required
HSE		
HSE – hydrocarbon spill, uncontrolled release of well fluids into the air	Evaluate if any specialist services are required (ie air sampling, radiation, noise)	Contact primary contractor to mobilise equipment as required

Appendix J. Well Control (Water Requirements)

Surface intervention of a blowout requires massive volumes of water. Well Control specialists will determine pumping, volume of water required onsite and ongoing water requirements.

If water cannot be stored in ground pits, or surface ponds, water shall be stored on location utilizing multiple manifolded 450-barrel portable frac tank containers. Combined storage capacity up to 2,000,000 million gallons may be required (subject to confirmation). Tamboran shall consider the requirements for application(s) of any permits required to construct any in earth holding basin or water recovery trenches. It is critical to the safety of the well control crews and ultimate success of the well control mitigation that water supply remain uninterrupted. Water from the storage tanks will be piped to the fire pump(s) and distributed to fire monitor stands and hand lines as deemed appropriate by the well control specialist.

Water volume requirements vary from one blowout to another. For example, only one pump would be required for a minor fire (with backup pump circulating water as a redundant system) for a minor fire, whereas two or more pumps would be required for a major rig fire, thus doubling the water volume required. Typically, a benchmark of 2,000,000 gallons per day (48,000 bbls per day) is used in the Well Control Contingency Plan (WCCP) calculations.

A well on fire requires a tremendous volume of water. For example, the following calculations show how a fast 1,000,000-gallon (24,000 bbls) pit would be emptied using various capacity fire pumps:

- $1,000,000 \text{ gallons} / (4,000 \text{ gpm} + 4,000 \text{ gpm}) = 125 \text{ minutes}$

Beetaloo Basin wells are typically supported by up to 2 x water bores located on the lease pad, each capable of supplying up to 20 lts./sec., or 72m³ per hour.

Water Supply Calculations – Using Tankers Only

Before mobilising water storage tanks and water to site, liaise with Boots and Coots to determine likely water requirements. Below are sample calculations only based on a worst-case scenario.

The following calculations give the number of tanker loads needed to replenish the pit with water:

- $1\text{m}^3 = 6.29 \text{ bbls}$
- $24\text{m}^3 \text{ tanker capacity} \times 6.29 \text{ bbls/m}^3 = 150 \text{ bbls}$
- $24,000 \text{ bbls} / 150 \text{ bbls per load} = 160 \text{ tanker loads}$

The following calculation factors in a water recovery rate of 30%:

- $160 \text{ tanker loads} \times (1.0 - .3) = 112 \text{ tanker loads.}$

Using the two minimum 4,000 gpm fire pumps, it would require 61 tanker loads per hour to maintain operations.

With a remote pit containing an additional 1,000,000-gallon capacity for a total of a 2,000,000 gallon capacity (48,000 bbls), operations could be maintained for four (4) hours using two 4,000 gpm pumps. The flowing calculations give tanker load totals for 10 hours of wintertime daylight operations:

- $(10 \text{ hours operations}) - (4 \text{ hours water supply on hand}) = 6 \text{ hours additional water supply}$
- $(6 \text{ hours}) \times (61 \text{ tanker loads per hour}) = 366 \text{ tanker loads}$
- $(366 \text{ tanker loads}) / (10 \text{ hours}) = 37 \text{ tanker loads per hour}$

37 tanker loads per hour, although cumbersome, is far more manageable than 61 tanker loads per hour. However, using the above calculation, at the end of 10 hours the pits will be dry. The following calculation gives the tanker loads per hour to overnight replenish the 2,000,000 gallons (48,000 bbls):

- $48,000 \text{ bbls} / 150 \text{ per load} = 320 \text{ tanker loads}$
- $24 \text{ hours} - 10 \text{ hours daylight operations} = 14 \text{ hours to refill pits}$
- $320 \text{ tanker loads} / 14 \text{ hours} = 23 \text{ tanker loads per hour overnight}$

Appendix K. Daly Waters Runway Lighting Plan

Daly Waters Aerodrome Emergency Landing Lights Layout Procedure



Purpose

This procedure describes how to layout the Eflare night landing lights for the safe arrival and departure of emergency aeroplanes such as Careflight and RFDS in under 60 minutes from the time of activation.

Scope

The Daly Waters community and any other stakeholders who may be able to assist in the lay out emergency landing lights in the event of an emergency.

Minimum Resources

Vehicles - to have UHF, amber flashing light / hazard lights and headlights on.

Personnel - to have torch, hi vis and reflective personal protective equipment.

Communications - UHF channel 16 is being monitored by all personnel in the aerodrome.

Key contacts

NT Careflight Operations
1300 650 654 or 0417 826 336

RFDS Alice Springs

For 24-hour medical and emergency assistance call:

NT (Central Australia) - 1800 733 768

HF Radio (4010kHz, 6890kHz or 8165kHz)

Satellite Telephone: 08 8648 9555 or +61 1800 733 772

Version 1 O1261840



Set up and planning

- 1 Split into 2-3 teams each with 2 persons and 1 vehicle.
Teams: Runway 14, Runway 32 and Taxiway / Apron
- 2 Prepare vehicle - conduct radio checks, check lights and clear our rear seat including footwells.
- 3 Secure the respective eflare kit in back right seat of the vehicle with the seatbelt.
Each kit to include the following lights and rubber bases:

Runway 14	Runway 32	Taxiway / Apron
• 24 x White lights	• 23 x White lights	• 2 x Orange hold point lights
• 4 x Red threshold lights	• 4 x Green/Red threshold lights	• 22 x Blue lights
• 8 x Green displaced threshold lights		
- 4 The On Scene Commander to monitor the time of arrival and monitor the CTAF frequency and provide updates and warning to personnel via UHF radio deploying eflares as necessary.
- 5 **CAUTION:** Where the aerodrome is delayed in setting up the eflares and leaving the aerodrome in an unsafe state for a landing, the pilot is to be notified on the CTAF 126.7 frequency advising on when the aerodrome will be available.
- 6 In the event an approaching aircraft is spotted either notify the aircraft directly or if unsuccessful notify personnel deploying the eflares on the UHF "Vacate runway immediately, aircraft on final, vacate runway immediately".
- 7 Where time permits a final runway inspection is conducted to identify any foreign objects or debris as part of the Eflare deployment. The vehicle should head on a 32 approach so approaching aircraft can be seen.

Placing and retrieving eflares



WARNING: When both deploying and retrieving eflares, the passenger needs to get out of the vehicle to place each light. Don't reach down from the vehicle as this risk over extension resulting in a back injury.

The driver must:

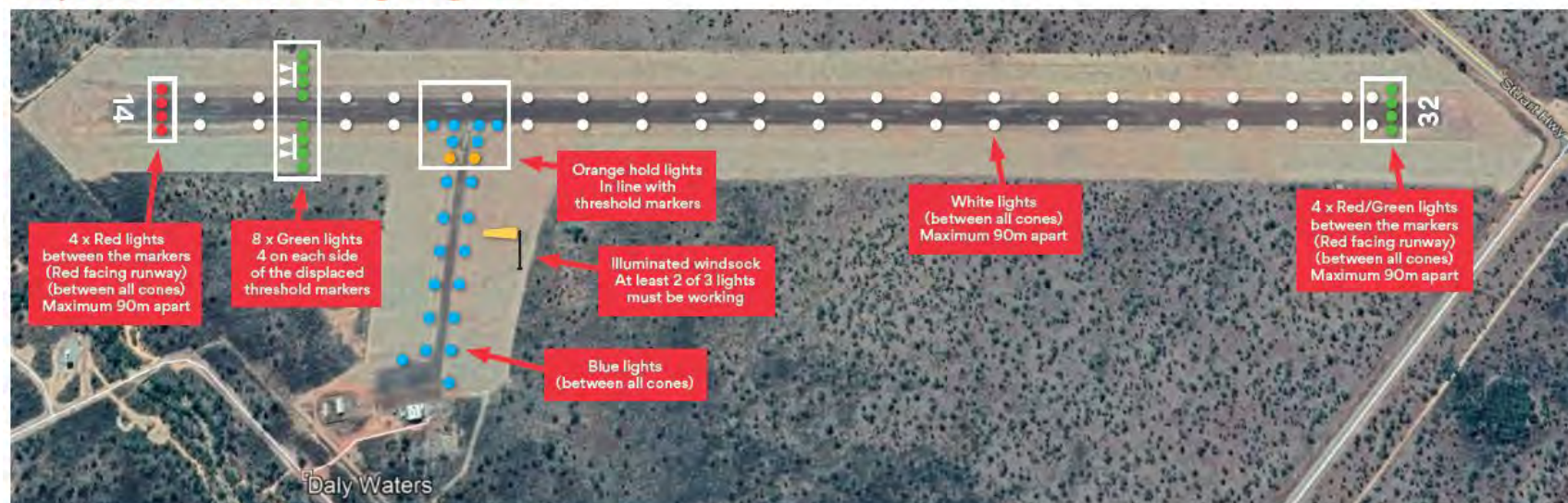
- Drive no faster than 25km/hr
- Drive on the right-hand side of the runway cones
- Stop in line with the rear left passenger door
- Wait for passenger to indicate they are ready before proceeding to the next light location

The person deploying the eflares must:

- Only remove the seatbelt on the runway when travelling less than 25km/hr
- Only set up 1 light at a time
- Avoid turning on the light in the vehicle
- Indicate to the driver when ready to go to next light location

Wait 10 minutes after aircraft has taken off before retrieving runway eflares.

Daly Waters Aerodrome Lighting Plan



Layout Procedures

Layout Runway 14

- 1 Start at the 14 end of runway (**turn left** from the taxiway).
- 2 4 x Red lights - place evenly between the end cones. Locations are indicated with spray paint.
- 3 4 x Green lights (each side) - placed each side on the white displaced threshold markers.
- 4 8 x White runway lights - start on the East side or the **left side** if looking down the runway. Place a light between each cone so no more than 90m apart. Locations are indicated with spray paint markings.

Layout Runway 32

- 1 Start at the 32 end of runway (**turn right** from the taxiway).
- 2 4 x Green/Red lights - place the Green side facing the away from the runway, evenly between the end cones. Locations are indicated with spray paint.
- 3 23 x White runway lights - start on the East side or the **left side** if looking down the runway. Place a light between each cone so no more than 90m apart. Locations are indicated with spray paint markings.

Layout apron / taxiway

- 1 Start on the runway and work back towards the apron.
- 2 6 x Blue lights - 3 lights placed each side of the taxiway between the cones. Locations are indicated with spray paint.
- 3 2 x Orange lights - place each side on the taxiway. Locations are indicated with spray paint.
- 4 14 x Blue lights - placed between the cones along the taxiway. Remaining lights spaced approximately 60m apart.
- 5 1 x Red light - placed near unserviceable marker in centre of apron.

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Appendix L. Example ERN (Emergency Response Number)

EMERGENCY RESPONSE CONTACT NUMBERS - RIG	
Rig Name	: SilverCity Rig 40
Well Name	: Amungee NW 2H
Lease Number	: EP 98
GPS Coordinates	: LAT 16° 20' 51.034" S LONG 133° 53' 4.403" E

Field Medical Support
Note - in the event of a medical emergency and the site paramedic can not be raised, contact CareFlight directly as per number listed below
CareFlight Emergency - 1300 650 654
Aspen Paramedic- 0447 879 992
Site Contact - UHF Ch. 10
Emergency Services 000 from landline 112 from mobile phone

ADDITIONAL NUMBERS	
Rig Manager:	0458206987
Well Site Representative:	0474084934
Camp Manager:	0458777190
Site Medic Sat Phone:	0147140631
UHF Channel:	10
DIRECTIONS FROM RIG TO HELICOPTER LANDING ZONE: Helipad LAT 16° 20' 48" S LONG 133° 53' 3" E	

SPECIAL INSTRUCTIONS:
<i>*All travel plans must be approved by the Well Site Rep prior to starting any trip</i>
<i>*All equipment must have a weed hygiene certificate</i>
<i>*Make arrangements with the Well Site Rep to have your equipment inspected before entering any access roads or well sites</i>
<i>*Ensure all personnel sign in at the access gate with Weed Inspection details .</i>

DIRECTIONS TO SITE: From intersection of Stuart Highway and Carpentaria (Hi-Way Inn Daly Waters)	
1.	Travel East on the Carpentaria highway for 56.8 km.
2.	Turn right onto the access road and travel 200m to the gate. 40 Kph
3.	Pass through the gate (remember to close after) follow road to the left. Travel 300m to camp pad
4.	Continue past camp pad 500m to lease.

Appendix M. Emergency Response Planning Map

