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Rewan Connectivity Plan, 2025
Comet Ridge Mahalo North, PL1128

Document Control

Revision History

Issue No	Date	Prepared by:	Reviewed by:	Comments
0	09/07/2025	Jeremy Haynes	Simon Garnett Dr Grazia Garguilo	Final

Abbreviations

Abbreviation	Description
ATP	Authority to Prospect
bgl	Below Ground Level
CSG	Coal Seam Gas
DA	Development Application
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EA	Environmental Authority
EC	Electrical Conductivity
ERT	Electrical Resistivity Tomography
EV	Environmental Value
GCF	Gas Compression Facility
GDE	Groundwater Dependent Ecosystem
GIA	Groundwater Impact Assessment
HCM	Hydrogeological Conceptual Model
IESC	Independent Expert Scientific Committee on Unconventional Gas Development and Large Coal Mining Development
PL	Petroleum Lease
PTDLs	Pressure Transducer Data Loggers
PWST	Produced Water Storage Tank
RO	Reverse Osmosis
TDS	Total Dissolved Solids
TSC	Terra Sana Consultants
VWPs	Vibrating Wire Piezometers
WTP	Water Treatment Plant
WMMP	Water Monitoring and Management Plan

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Table of Contents

List of Tables

List of Figures

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1 Introduction

Comet Ridge Mahalo North Pty Ltd (Comet Ridge) proposes to develop the Mahalo North Coal Seam Gas (CSG) Project (The Project), a greenfield gas development located in the northern section of the Bowen Basin, approximately 45 km north of Rolleston in Central Queensland.

The Project is situated within Authority to Prospect (ATP) 2048, which is transitioning to Petroleum Lease (PL) 1128.

The Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) provides advice to Federal and State regulators on the potential impacts of CSG and coal mining projects on water resources as part of the environmental impact assessment and approvals process.

The Department of Climate Change, Energy, the Environment and Water (DCCEEW) requested that the IESC provide advice on the Project, which was issued in Advice Reference IESC 2025-153.

The IESC indicated that the hydrogeological conceptual model (HCM) which formed the basis of the groundwater impact assessment (GIA) prepared by RDM Hydro (2023) required additional site-specific evidence to support the Rewan Formation's geological and hydraulic properties as an aquitard which would restrict "*the propagation of CSG drawdown to the overlying aquifers* (IESC, 2025)."

The IESC highlighted that while the vertical hydraulic conductivity of the Rewan Formation and underlying Permian Bandanna Formation are likely to be very low, field measurements and other lines of evidence confirming the hydrogeological properties of the Rewan are necessary to support the GIA conclusions and better constrain the risk for the Project to impact shallow groundwater and surface water resources and the Environmental Values (EVs) associated with the shallow groundwater and surface water systems, in particular, where the Rewan Formation subcrops at its easternmost extent within the PL.

The IESC recommended that multiple lines of evidence should be used to demonstrate that the Rewan Formation disconnects the shallow groundwater systems from the production target coal seams in the Bandanna Formation. These lines of evidence include:

- Lithological descriptions from well logs,
- Hydrochemical and isotopic data from groundwater samples;
- Permeability testing; and
- Piezometric head difference between the units in nested piezometers near identified geological faults, within the subcropping area of the Bandanna Formation, and near Comet Creek.

This Rewan Connectivity Study Work Plan (the Plan) has been prepared to address IESC advice to demonstrate the potential for hydraulic connectivity between shallow unconsolidated aquifers and the Permian coal seam aquifers, which are interpreted to be disconnected by the Rewan Formation. The Plan integrates a existing local and regional information with new monitoring bore drilling, core analysis, ongoing groundwater monitoring and modelling to characterise the Rewan Formation and the potential for fractures, faults and preferential pathways within the Rewan to connect shallow groundwater to the target CSG production coal seams.

1.1 Purpose and Scope

This Rewan Connectivity Plan outlines the strategy to assess the hydraulic properties of the Rewan Formation and the potential for hydraulic connection of the shallow aquifers and the target Permian coal seams. The purpose of the study is to investigate the potential for vertical flow of groundwater through the Rewan Formation via preferential flowpaths such as faults and/or fractures or through connected lithological units.

The primary objective is to collect sufficient data to understand the geological nature of the Rewan Formation across the PL in areas where the formation is thickest and where it subcrops to the east of the PL.

The proposed scope of work outlined in this Plan will be implemented following approval, dependent on equipment procurement timeframes and weather, and includes:

- Ground-based geophysical investigations to determine the optimum locations for the nested monitoring bores and piezometers;
- Drilling and construction of nested piezometers in four (4) locations across the PL;
- Detailed logging of the Rewan Formation;
- Collection of core samples for permeability analysis, where possible;
- Hydrochemical and isotopic analysis of groundwater samples from each of the target aquifers, where possible;
- Slug testing and permeability testing of shallow monitoring bores;
- Ongoing monitoring of piezometric head from the bore nests; and
- Integration of the new data into an updated HCM.

The Plan provides details on how each step of the connectivity study will directly inform the understanding of the Rewan Formation and the validity of the conclusions of the groundwater impact assessment.

1.2 Hydraulic Connectivity Mechanisms

There are generally three primary connectivity mechanisms which act as preferential flow pathways through low permeability strata (Adani, 2019):

1. Vertical faults and fractures which extend through the entire unit and act as a conduit;
2. Deeply weathered fractures with open apertures; and
3. Sandstone layers connected vertically and laterally through the formation.

The porosity and permeability of faults and fractures are driven by the length and width of apertures of the fractures, the weathering of the materials within the fractures and the extent of the fracture network, or in the case of a fault, the width of the shear zone (if present). The depth of weathering and fracture extent will drive connectivity in areas where the Rewan thins out at the subcrop in the east of the PL.

Figure 1 shows a schematic cross-section of the potential connectivity mechanisms through the Rewan Formation within the Project area (not to scale). The cross-section has been updated from the GIA (RDM Hydro, 2023) based on further analysis of geological and hydrogeological data, in particular the fault was relocated to the western boundary of the river channel to be more representative of the data from the geological model.

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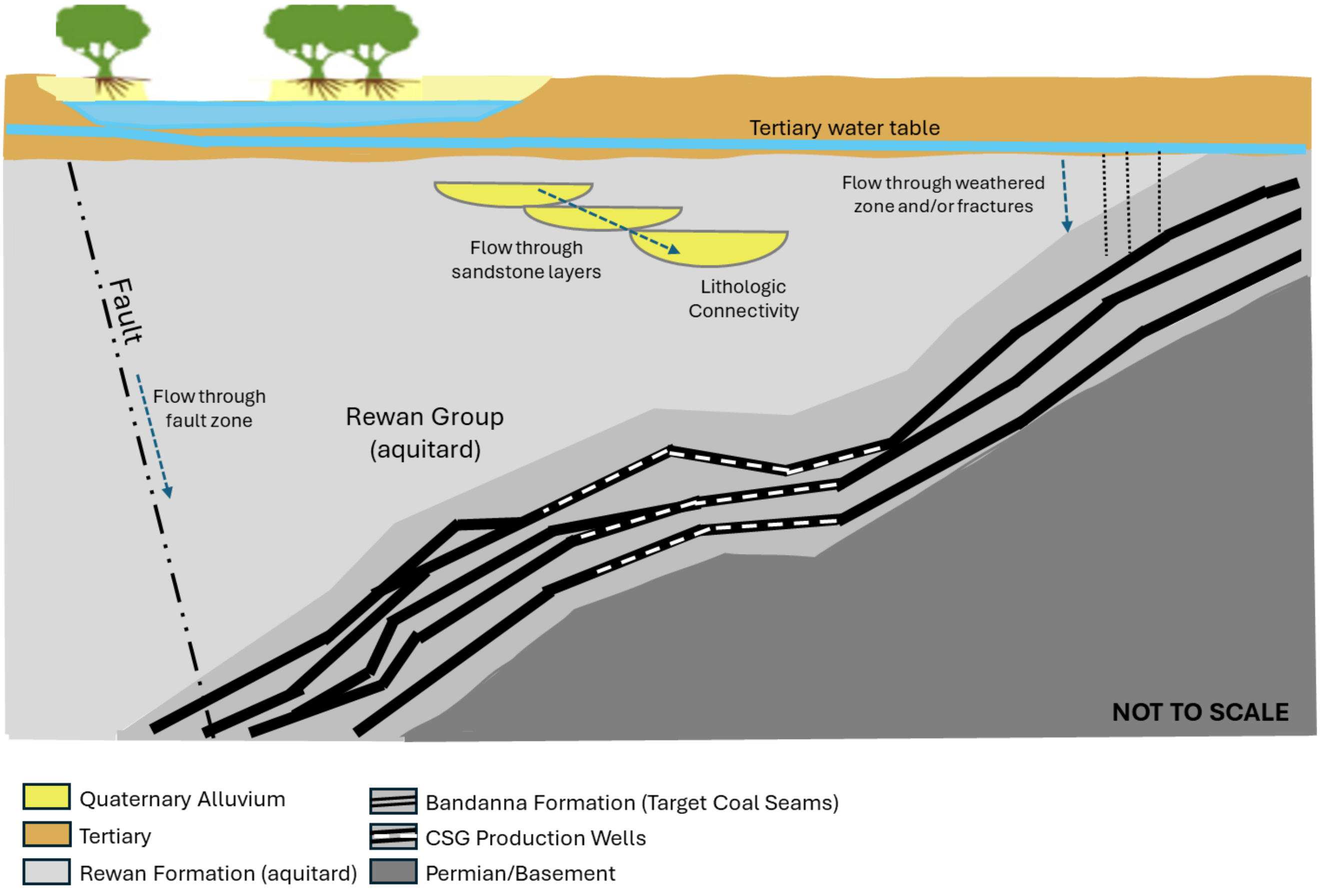

Figure 1 – Schematic Cross-Section of Potential Connectivity Mechanisms in Project Area

2 Project Overview

In October 2019, Comet Ridge was appointed as the preferred tender for the gas acreage PLR 2019-1-2 by the Queensland Government, and the block has since been given the ATP 2048 for the project now referred to as the Mahalo North Coal Seam Gas Project.

The Project represents a strategically significant resource development for Comet Ridge and the region. It targets the Bandanna Formation coal seams and has been designed to minimise surface disturbance while achieving commercial gas extraction through staged production.

The proposed development includes:

- 34 vertical CSG production wells.
- 34 lateral wells, drilled directionally to intersect productive coal seams within the Bandanna Formation.
- Water and gas gathering infrastructure, including buried flowlines
- access tracks.
- A central Gas Compression Facility (GCF) to manage produced gas and associated water.
- Supporting facilities including produced water storage tanks, a Water Treatment Plant (WTP) for Reverse Osmosis (RO) treatment of brackish water, brine storage infrastructure, and stormwater containment measures.

Key project details are summarised in Table 1. Figure 2 shows the production well layout and the proposed drilling schedule.

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Table 1 – Project Overview

Project Overview	
Project Name:	Mahalo North CSG Project
Location:	ATP2048, ~45 km north of Rolleston, Central Queensland
Lease area	PL1128 14,100 ha
Project Infrastructure:	● 34 vertical wells; ● 34 lateral wells (no hydraulic fracture stimulation); ● GCF; ● WTP with RO; ● Produced Water Storage Tanks (PWSTs), brine storage tanks, and RO permeate tanks; and ● Gathering pipelines and associated access infrastructure.
Production Method:	Dewatering only (no hydraulic fracture stimulation)
Project duration	~ 30 years (staged approach)
Maximum disturbance:	180 ha (1.2% of entire PL area)

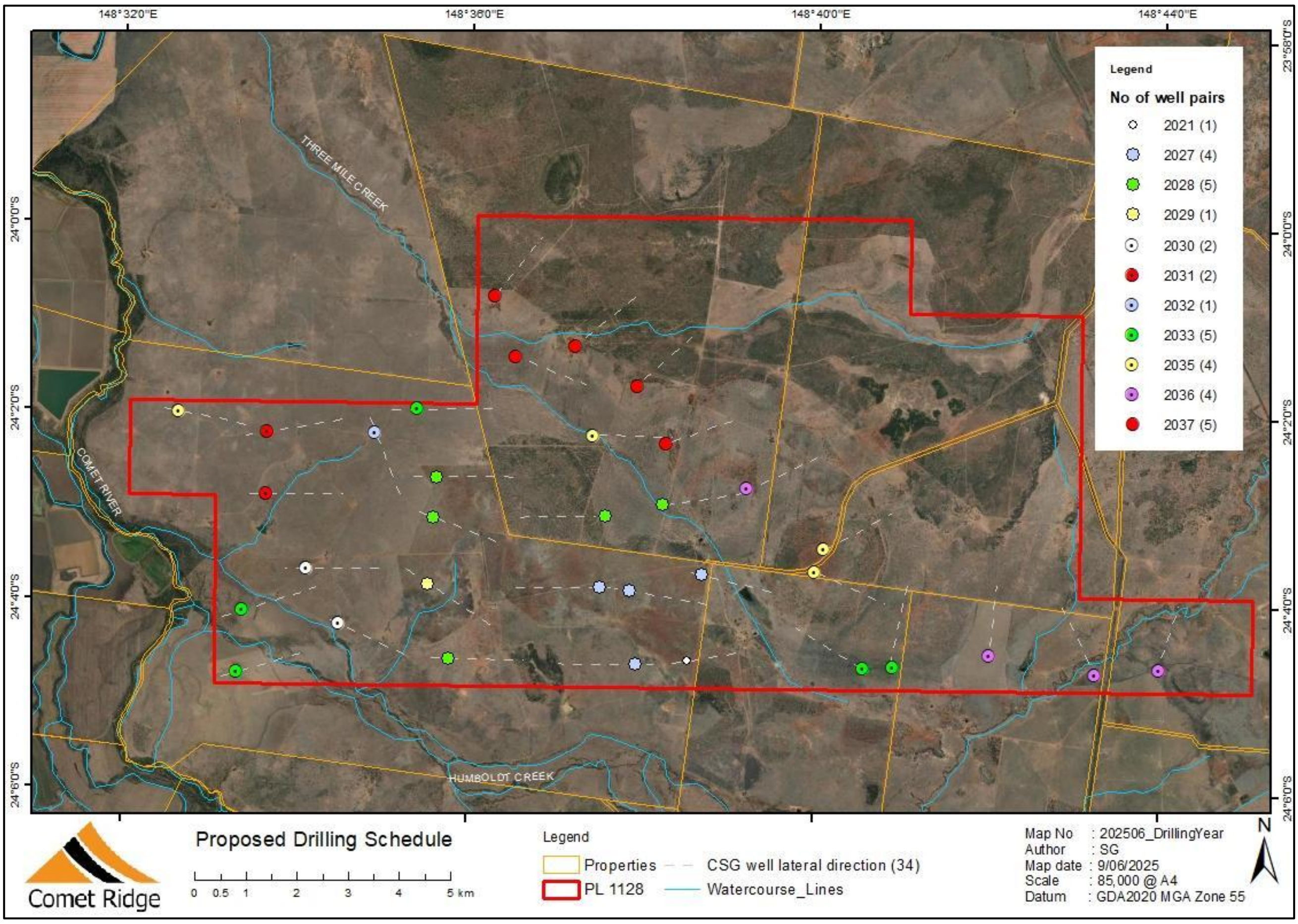

Figure 2 – Project Overview and Development Plan

3 Geological Setting

The Project is situated on the southern end of the Comet Ridge crest and is flanked by the Taroom Trough to the east and the Denison Trough to the west. The Denison Trough is a north northwest-south southeast trending syncline lying on the western margin of the central Bowen Basin.

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The structural geology is characterised by a series of broad, en echelon anticlines and synclines, with the Project being situated on the west-dipping limb of a syncline. Locally, the synclinal structure is bounded on the west by the Arcturus Fault, which is interpreted to be present west of the Comet River, west of the PL boundary.

The Project targets the coal seams within the Permian Bandana Formation, which is conformably overlain by the Triassic Rewan Formation. The Rewan Formation is unconformably covered with Tertiary basalts and unconsolidated silts, sands and clays and Quaternary alluvium, located along the Comet River, Humboldt Creek and Rockland Creek.

3.1 Comet Ridge Geological Model

Comet Ridge developed a 3D geological model from approximately 1,000 publicly available petroleum exploration boreholes and proprietary coal exploration drilling data from boreholes drilled on an approximate 250 m x 500 m grid across the PL and provides a good understanding of the local stratigraphy and lateral and vertical extent of the geological units within the PL. The Well Completion Report for the Comet Ridge Mahalo North Appraisal Well is attached in Appendix A as an example of the data used to develop the Project geology model and site-specific groundwater model.

Figure 3 shows the geology correlated with petroleum bores within the PL. The cross-section shows the subcrop of the Rewan Formation and Bandanna Formation within the PL boundary and the base of weathering, which extends through the Tertiary sediments into the Rewan Formation. The location of the petroleum bores and the cross-section line are shown in Figure 4.

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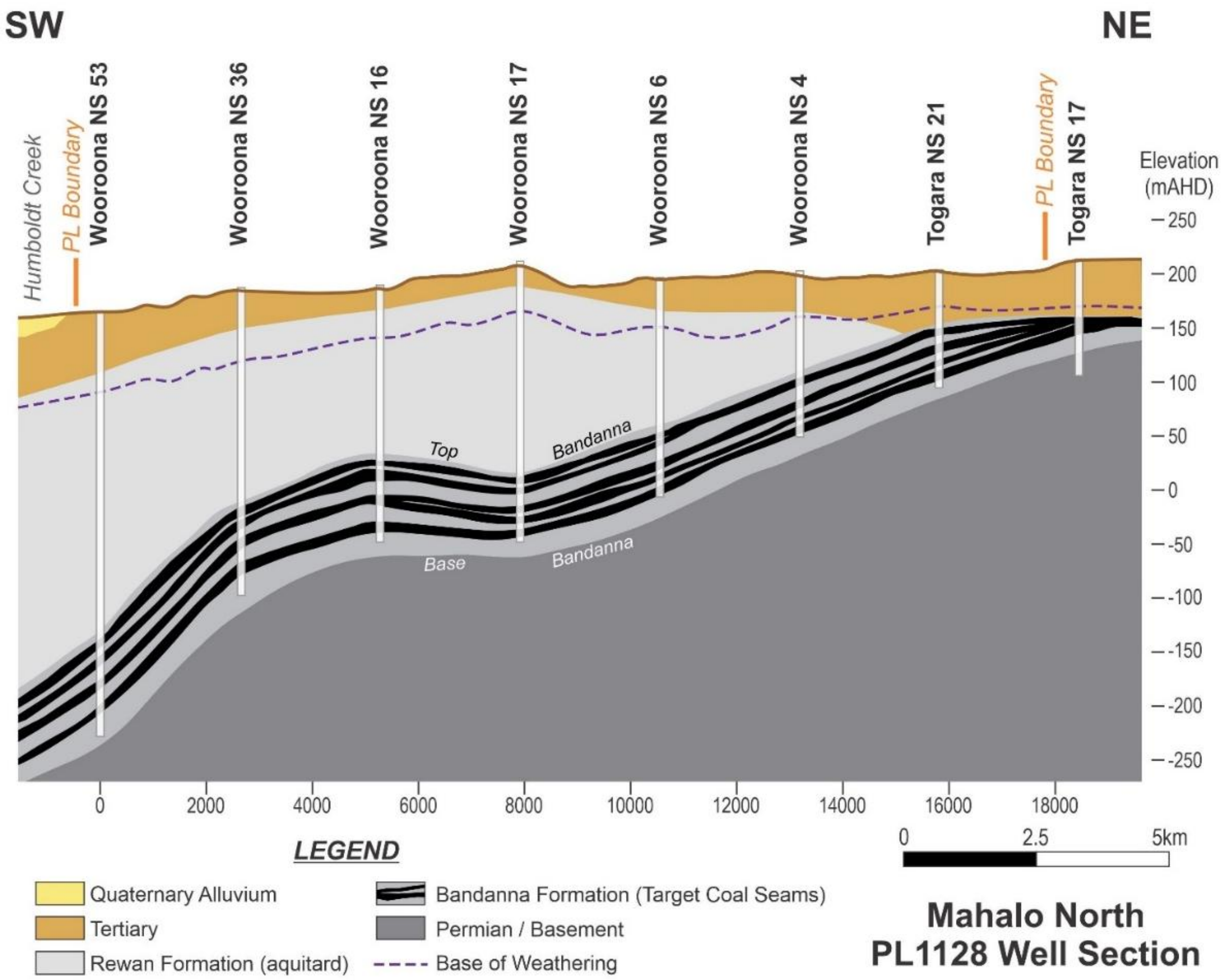

Figure 3 – Geological Cross-Section across PL 1128

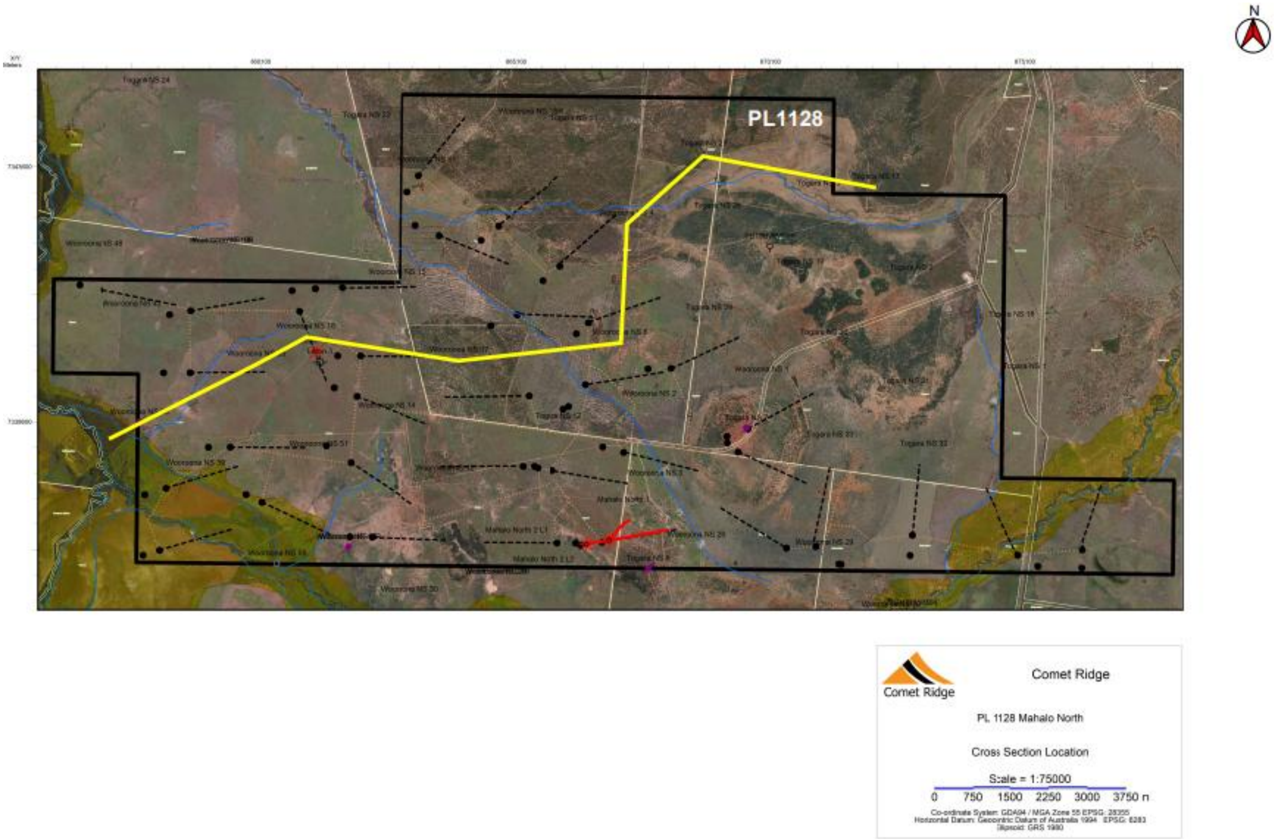

Figure 4 – Geological Cross-Section Locations

The stratigraphic units relevant to the project and their hydrogeological status are summarised in Table 2.

Table 2 – Summarised Stratigraphy and Hydrostratigraphy in Project Area

HSU	Depth (m bgl)	Thickness (m)	Lithology	Type	Hydraulic Conductivity (m/s)	Description
Bandanna Formation	~75–380	75 to 100	Coal seams, mudstone	Aquifer	$<1\times10^{-7}$	CSG production target
Rewan Formation	5 to 50	0 to 250	Mudstone, siltstone	Regional Aquitard	$<1\times10^{-8}$	Confining layer, limits vertical flow
Basalt	1 to 20	0 to 50	Fractured basalt flows	Discontinuous Aquifer	Variable (fracture-controlled)	Primary aquifer for stock/domestic bores in project area, where present laterally discontinuous, within palaeochannels
Alluvium	2–8 (saturated)	0 to 20	Sand, gravel, clay	Shallow Aquifer	10^{-5} to 10^{-6} (where present)	Limited extent in the project area; Mapped along watercourses of the Comet River, Humboldt Creek, Rockland Creek. not used for supply; environmental relevance

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3.2 Hydrostratigraphy

The key hydrostratigraphic units (HSUs) (from oldest to youngest) are summarised below.

3.2.1 Bandanna Formation (Target Reservoir)

The Bandanna Formation is the primary reservoir for CSG production, with low hydraulic conductivity ($<1\times10^{-7}$ m/s). The unit consists of interbedded coal seams, mudstone, and sandstone, encountered at ~75 to 380 m below ground level (bgl). The Bandanna Formation subcrops under 75 m of Tertiary sediments near the eastern boundary of the PL and dips to the southwest. The approximate depth to the target CSG production zone is 120 to 220 m bgl.

3.2.2 Rewan Formation (Overlying Aquitard)

The Rewan Formation overlies Bandanna Formation and represents a regionally extensive confining aquitard. Composed predominantly of fine-grained mudstone and siltstone, this unit exhibits extremely low vertical permeability, effectively inhibiting hydraulic connectivity between the Bandanna coal seams and overlying aquifers such as the Tertiary basalt and Quaternary alluvium across much of the PL. However, where the Rewan Formation subcrops in the eastern portion of the PL, the unit thins and pinches out. In this area, the unit likely exhibits a weathered profile with a higher relative hydraulic conductivity relative to the unweathered Rewan Formation, which is greater than 200 m thick across the majority of the PL.

Figure 5 shows the mapped extent and thickness of the Rewan Formation across the PL. The Rewan Formation dips to the west southwest and thickens from 5 to 250 m across the PL. The contour interval in Figure 5 is 5 m and refers to the thickness of the Rewan Formation.

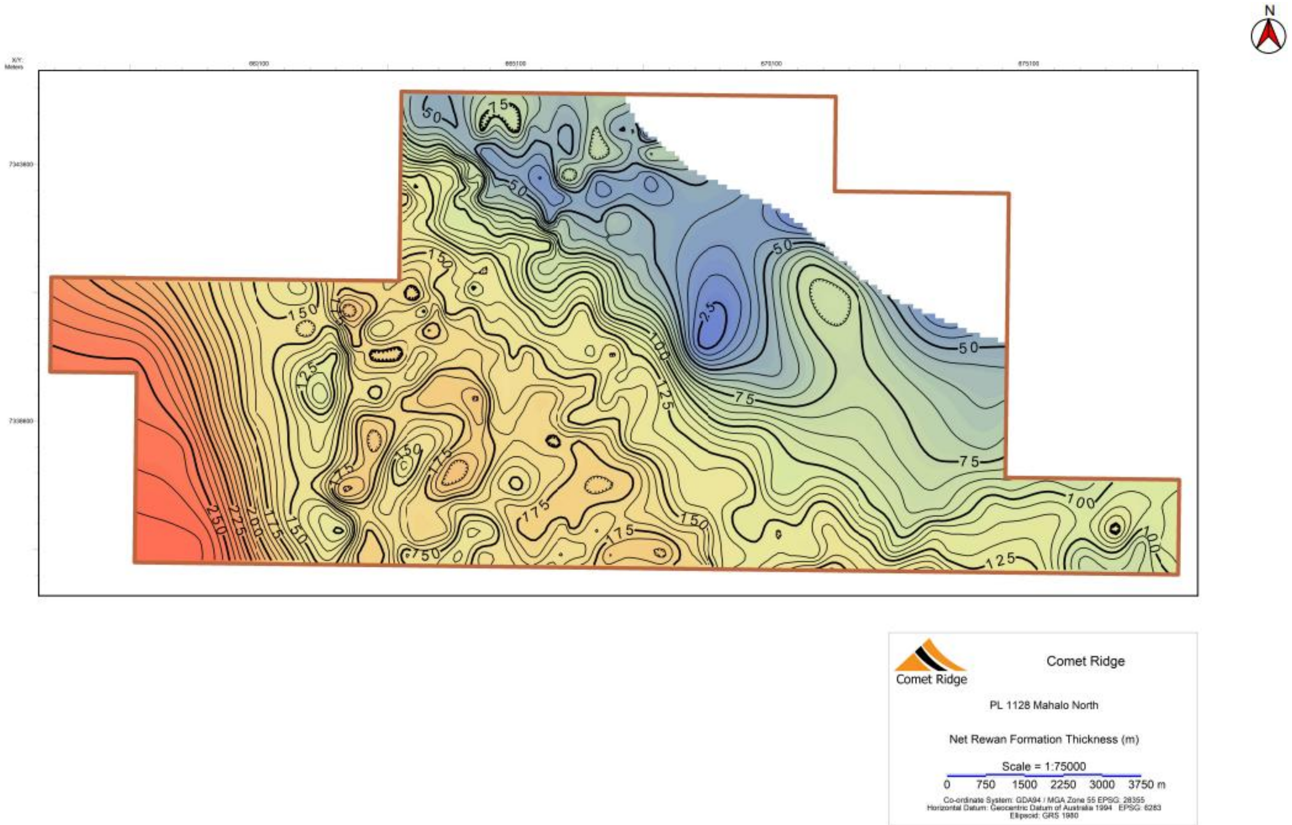

Figure 5 – Rewan Formation distribution within the Mahalo North Project

3.2.3 Tertiary Basalt (Discontinuous Aquifer)

Present in laterally discontinuous, isolated pockets, the Tertiary basalt comprises weathered and fractured volcanic flows with moderate yields in areas of structural enhancement. The basalt is incised into a broad blanket of generally low permeability Tertiary sediments. The Tertiary sediments generally do not host groundwater. The basalt acts as the primary water source for stock and domestic supply across Meroo Downs, Togara Station, and Struan, with saturated thicknesses depending on local structural and weathering conditions.

Figure 6 shows the distribution and thickness of basalt across the PL with a 5 m contour interval. Undifferentiated Tertiary sediments blanket the entire PL. Basalt is present in laterally discontinuous dendritic patterns that fill northwest-trending palaeochannels, depicted by the yellow shading. There is no basalt present in the blue areas.

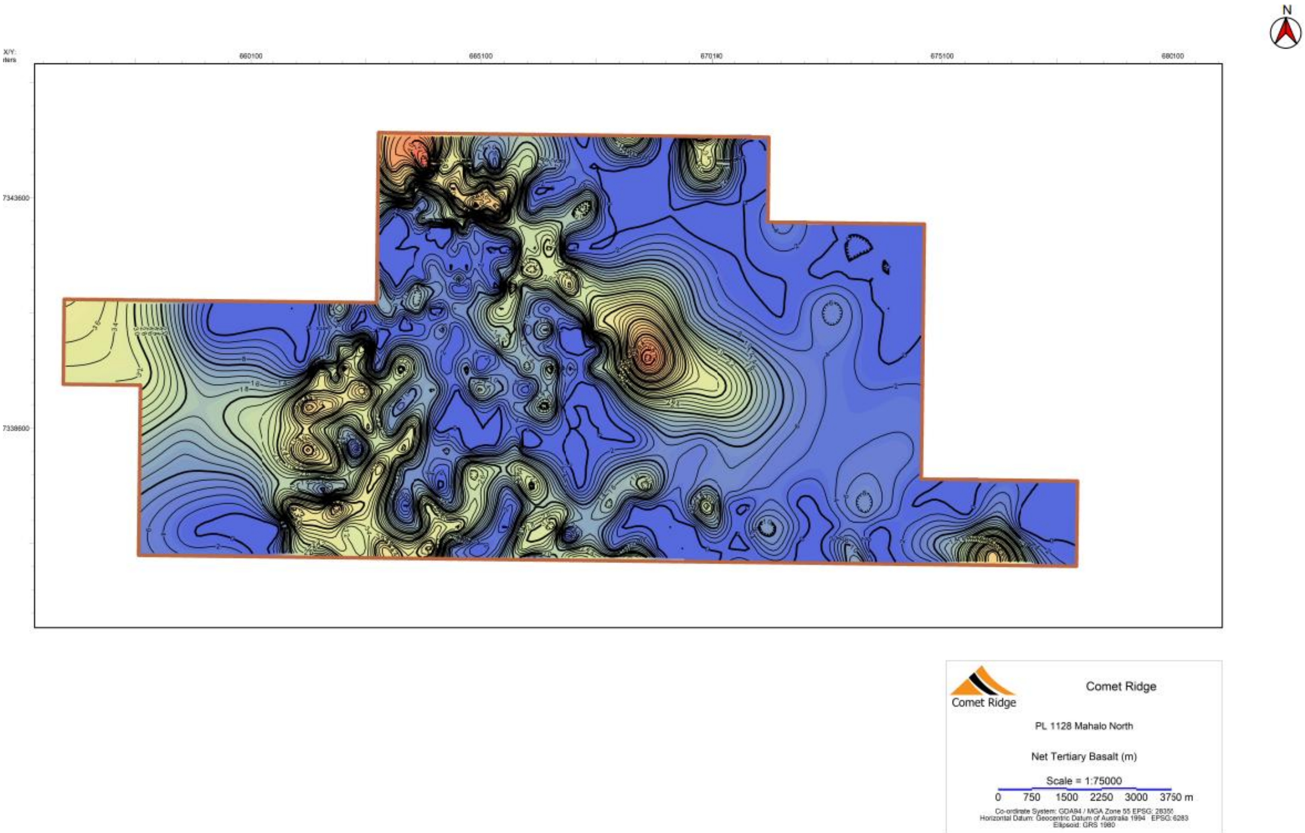

Figure 6 – Tertiary Basalt Distribution within the Mahalo North Project

3.2.4 Quaternary Alluvium (Shallow Aquifer)

Alluvial sediments, comprised of lenticular deposits of sand, silt and clay are associated with the Comet River, Humboldt Creek and Rockland Creek. The Comet River floodplain does not extend within the PL boundary and the river is close to the channel boundary, with limited alluvial sediment present in the southwest at the confluence of the Comet River and Humboldt Creek. The extent of alluvium is limited to the stream channels in the ephemeral Humboldt and Rockland Creeks. Quaternary Alluvium is shown in Figure 7.

The alluvial sediments west of the Comet River are likely to host groundwater, which is exploited by local users as a water supply. The alluvial sediments of the ephemeral streams are unlikely to be permanently saturated

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and host groundwater for a brief period after significant rain events and stream flow. The streams are likely to be a recharge zone and do not receive groundwater discharge except for periods of very high rainfall.

Quaternary alluvial deposits limited to the creek valleys and are not present across much of the PL, as observed in Figure 7. Mapped alluvium is limited to the confluence of Humboldt Creek and The Comet River in the southwest corner of the PL, where the Rewan Formation is thickest (>200 m). Alluvium is also present within the valley of Rockland Creek in the southeast corner of the PL.

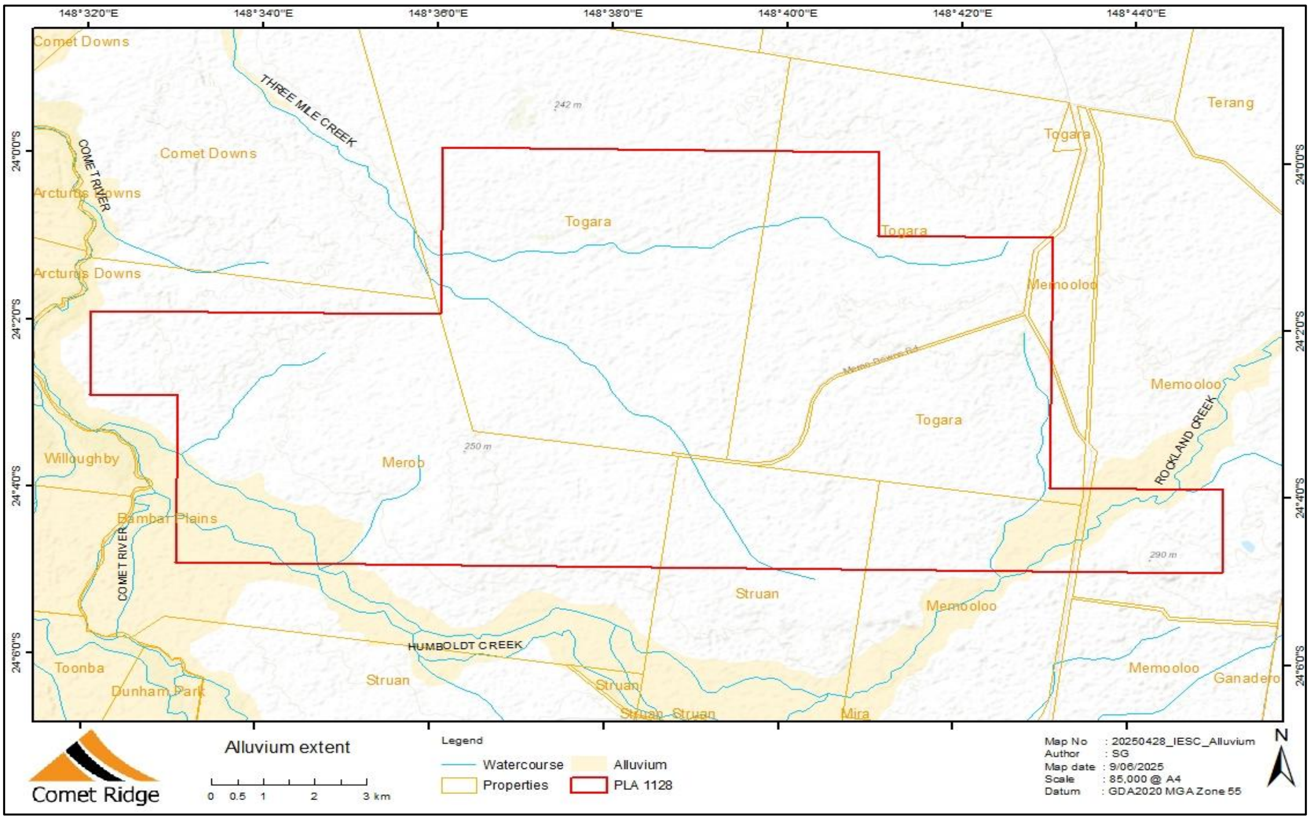

Figure 7 – Alluvium Distribution within the Mahalo North Project

4 Potential for Hydraulic Connectivity Through Rewan Formation in the Project Area

The regional down-dip structure and stratigraphy of the Rewan Formation is shown along a 40 km long cross-section in Figure 8.

The Rewan is thickest under the Comet River, Comet River alluvial deposits up to 6.5 km wide and PL is on eastern margin, with little alluvium encountered within the PL boundaries. The Rewan Formation thickens from northeast to southwest and terminates west of the Comet River, approximately 15 km southwest of the PL boundary. The unit is situated within a north northwest trending syncline with the Arcturus Fault interpreted to be located along the axis of the syncline. The juxtaposition of the Bandanna and Rewan Formations in this area could represent the Arcturus Fault.

Groundwater quality data from regional registered water bores suggests some limited hydraulic connectivity between the Rewan and Bandanna Formations where these units subcrop under the Tertiary sediments and Quaternary alluvium (see Section 4.6 of the GIA Report, RDM Hydro (2024). The report notes that salinity ranges from the Rewan and Bandanna Formations were similar to alluvium samples and fresher than Tertiary

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groundwater samples, which suggests that there could be some hydraulic connectivity between the units and alluvium, where the units are in contact. The only location where the Bandanna Formation is in physical contact with alluvial deposits is along the western boundary of the Comet River flood plain, 16 km southwest of the PL boundary (see Figure 8).

Based on the geological model and supporting bore logs, the base of weathering extends to a approximate total depth of 50 m and 10 to 25 m into the top of the Rewan Formation. The weathered profile would have enhanced permeability and storage with some hydraulic connectivity with the overlying units. However, the thickness of the Rewan Formation across the Project area as well as the properties of the formation as an aquitard would reduce or limit any vertical connectivity through the Rewan to the zero-margin along the eastern edge of the PL, where there are no identified groundwater dependent ecosystems (GDEs) or water courses with mapped alluvium.

Based on the available information, the potential for hydraulic connectivity through the Rewan Formation is driven by the following key observations:

- The Rewan is thickest underlying the Comet River and to the west of the PL where alluvial systems are present;
- The Rewan is 100 to 200 m thick in the planned CSG production zone, which will limit the vertical connectivity

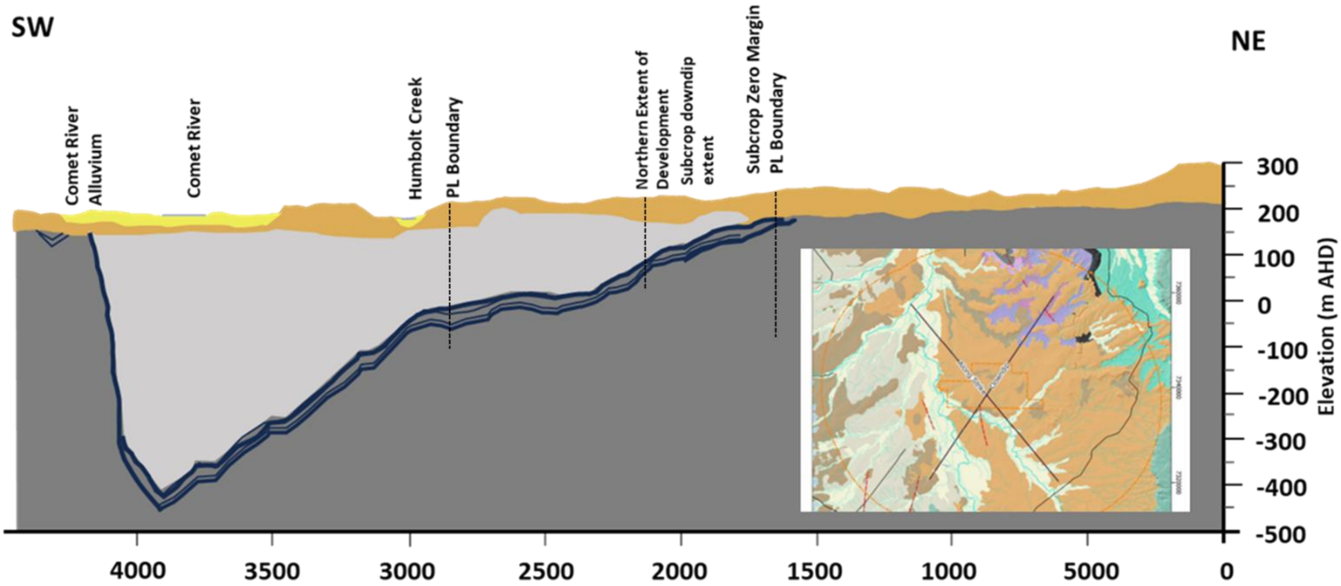

Figure 8 – Geological Cross-Section across Project Area

5 Field Investigations

This Plan outlines supplemental field investigations and desktop analyses intended to improve the understanding of the hydraulic properties of the Rewan Formation and the potential for hydraulic connectivity through the Rewan Formation. The outcomes of these investigations and ongoing analysis will be used to determine if further assessment is necessary to manage the potential risks to GDEs and shallow groundwater systems.

The supplementary investigations include:

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- Geophysical surveys to define the appropriate locations for monitoring bores
- Drilling and construction of nested piezometers at four strategic locations across the PL
- Packer testing and aquifer testing
- Detailed analysis of core samples (core permeability testing, lithological logging)
- Groundwater sampling and analysis (hydrogeochemistry, isotopes)
- Ongoing groundwater monitoring (piezometric pressure)

The hydraulic properties, lithological data and ongoing monitoring will be combined with the existing database to analyse and describe groundwater interactions across the Project area. The increased understanding will determine if further assessment of the risks to shallow groundwater systems and GDEs is necessary as per the IESC advice and inform the Water Monitoring and Management Plan (WMMP).

All field investigation will be carried out within the boundaries of PL1128. This section outlines the proposed field investigations and data analysis for the Plan.

5.1 Approach and Methodology

The hydrogeological assessment for the Project suggests limited vertical hydraulic connectivity between the Bandanna Formation (the target CSG reservoir) and the overlying aquifers. The intervening Rewan Formation is interpreted as a regionally extensive aquitard with low permeability, restricting vertical groundwater flow between deeper and shallower systems.

The available regional data and sensitivity modelling presented in the site-specific MODFLOW-USG model supports the assumption of low to negligible vertical flux between the coal seams and shallow aquifers. However, data collected from the proposed shallow monitoring bores during baseline monitoring and early production phases will be critical to verifying this assumption and managing associated risks to GDEs and watercourses which may rely on groundwater for baseflow to streams within the PL.

Multiple-lines-of-evidence will be collected to improve the understanding of the Rewan Formation, including:

- Lithology and Hydraulic Properties
    1. Detailed lithological logging during drilling to define local stratigraphy and unit thickness at each monitoring location
    2. Core samples will be collected from key lithological zones for laboratory permeability analysis to determine hydraulic conductivity.
    3. Packer tests will be completed in the Rewan Formation at identified fracture zones to estimate permeability and flow characteristics and slug tests will be completed in shallow monitoring bore to collect hydraulic parameters.
- Hydraulic Head Monitoring
    1. Bores will be equipped with Pressure Transducer Data Loggers (PTDLs) or Vibrating Wire Piezometers (VWPs) to record continuous groundwater pressure data.
    2. Focus will be placed on identifying pressure differentials between units and assessing temporal drawdown responses during CSG production.
- Isotopic Tracing
    1. Environmental isotopes will be used to identify recharge sources, residence times, and potential inter-aquifer mixing.
- Hydrogeochemistry
    1. Groundwater samples will be analysed for major ions, trace metals, and geochemical indicators.

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2. The goal is to establish a time-series of baseline water chemistry for each hydrostratigraphic unit and identify any shifts that might indicate vertical mixing or leakage.

5.2 Monitoring Bore Design and Strategy

To directly assess potential vertical leakage associated with CSG production-induced pressure gradients, a series of four (4) nested bore clusters (M1 to M4) will be installed at strategically selected locations. The nominated locations are focused on better understanding the hydraulic conditions at identified areas of risk based on the previous groundwater modelling and Project impact assessment.
Each cluster will monitor hydraulic conditions across the following hydrostratigraphic units, where these units exist within the nominated bore locations as noted in Table 3 below:

- Bandanna Formation – target coal seam for CSG production
- Rewan Formation – confining aquitard
- Tertiary Basalt/Sediments – potentially semi-confined, fractured aquifer
- Quaternary Alluvium – shallow unconfined aquifer associated with stream valleys

Each bore location will target a specific unit to enable depth-discrete monitoring of pressure and water quality (where possible), enabling clear interpretation of vertical gradients. Some bores will be stand-pipe piezometers to allow for routine groundwater sampling, while the deeper bores will be installed as vibrating wire piezometers (VWPs) to prevent gas migration while still allowing pressure monitoring. The bores may be constructed in discrete boreholes targeting specific intervals or as a combination of VWPs in a single borehole, dependent on drilling conditions and feasibility. By default, the shallow aquifers will be constructed as standpipe piezometers in separate boreholes for sample collection and pressure head monitoring. The Rewan Formation and Bandanna Formation pressure head will be monitored by VWPs installed in a single borehole.

Figure 9 shows the general nested piezometer configuration through the PL in the thickest areas of the Rewan Formation and along the subcrop of the unit. These locations will provide detailed information in areas where the Rewan is thickest and near shallow groundwater zones and aquatic ecosystems and where the Rewan is highly weathered and in contact with Tertiary sediments.

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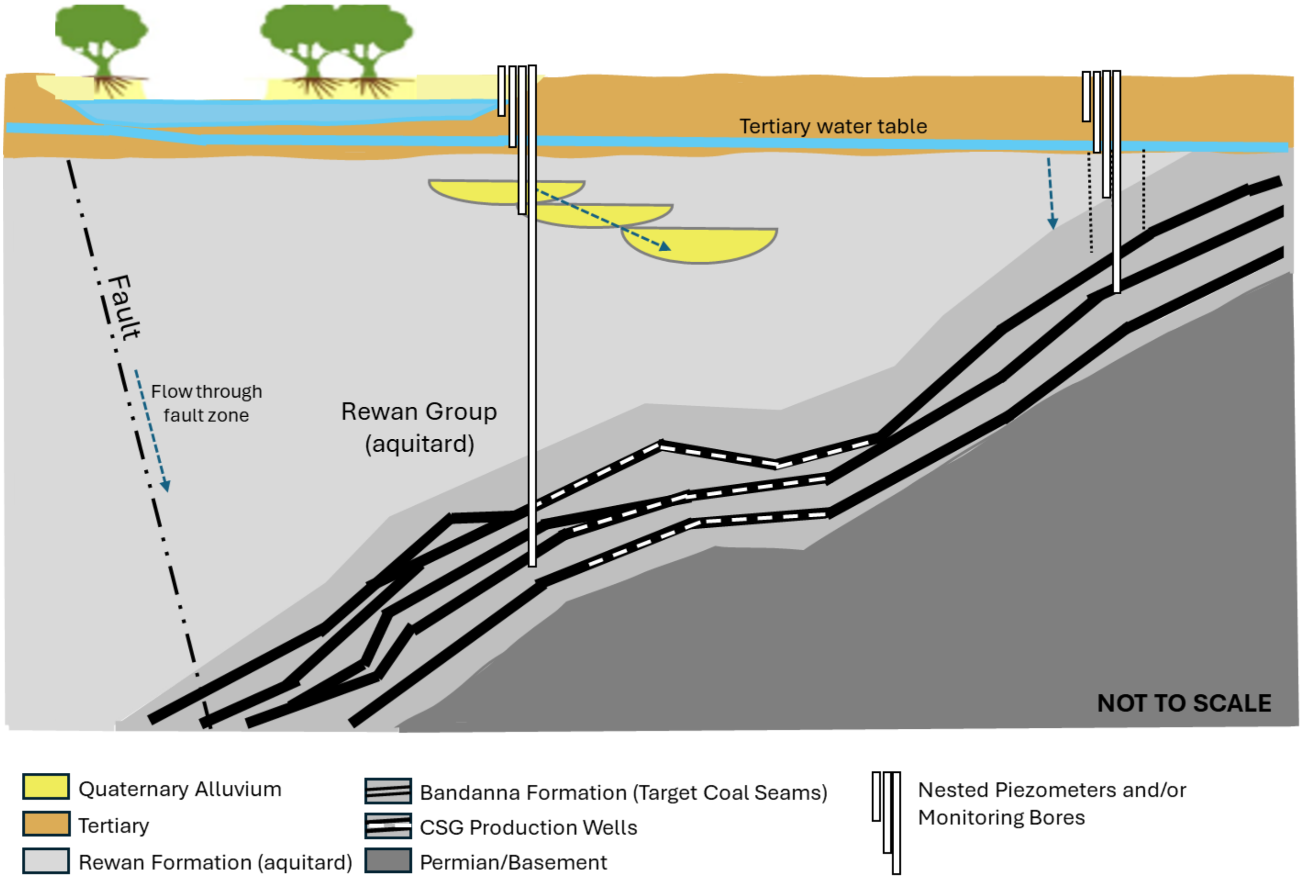

Figure 9 – Nested Bores Design and Strategy

The strategy and rationale for each bore nest is summarised in Table 3. Bore nests will be installed within the boundaries of the PL as close as possible to identified receptors, watercourses and geological features in alignment with the strategic context outlined in the table to achieve the proposed objectives.

Table 3 – Bore Nest Strategy and Rationale for Locations

Bore Nest	Strategic Context	Targeted Formations	Geological Considerations	Purpose / Monitoring Objective
M01	Western edge near Comet River and Arcturus Fault; Near landholder bores for data integration	Rewan, Bandanna	Near fault zone	Baseline monitoring, Rewan connectivity and fault-related connectivity.
M02	Southern margin near Humboldt Creek; recharge zone. Near the Mahalo North Pilot is positioned to capture any potential early-stage pressure responses from production.	Alluvium, Tertiary deposits, Rewan Bandanna	Transition zone; fault-crossing with potential vertical leakage.	Surface water/groundwater interaction, early-stage pressure responses from production.
M03	Central-north, higher elevation area with thin, weathered Rewan near the formation subcrop; positioned near proposed CSG wells and surface drainage.	Alluvium, Basalt Rewan, Bandanna	Presence of saturated alluvium subcrop and weathering of Rewan; production drawdown influence	Interconnectivity between aquifers through the thinner, weathered Rewan formation;

Bore Nest	Strategic Context	Targeted Formations	Geological Considerations	Purpose / Monitoring Objective
				sensitive receptor check; verify predicted drawdown propagation.
M04	Eastern zone near Rockland Creek; targets preserved stratigraphy and wider basalt extent; away from identified faults.	Alluvium, Tertiary sediments or basalt (if present), Rewan, Bandanna	subcrop and weathering of Rewan; end of hydraulic gradient; intersects floodplain.	Surface water/groundwater interactions, long-term impact tracking near ecologically sensitive areas.

The general location of each bore nest (M01 to M04) is shown in Figure 10. The specific location of each bore will be determined using a targeted geophysical survey to identify the presence of the targeted strata within the nominated area.

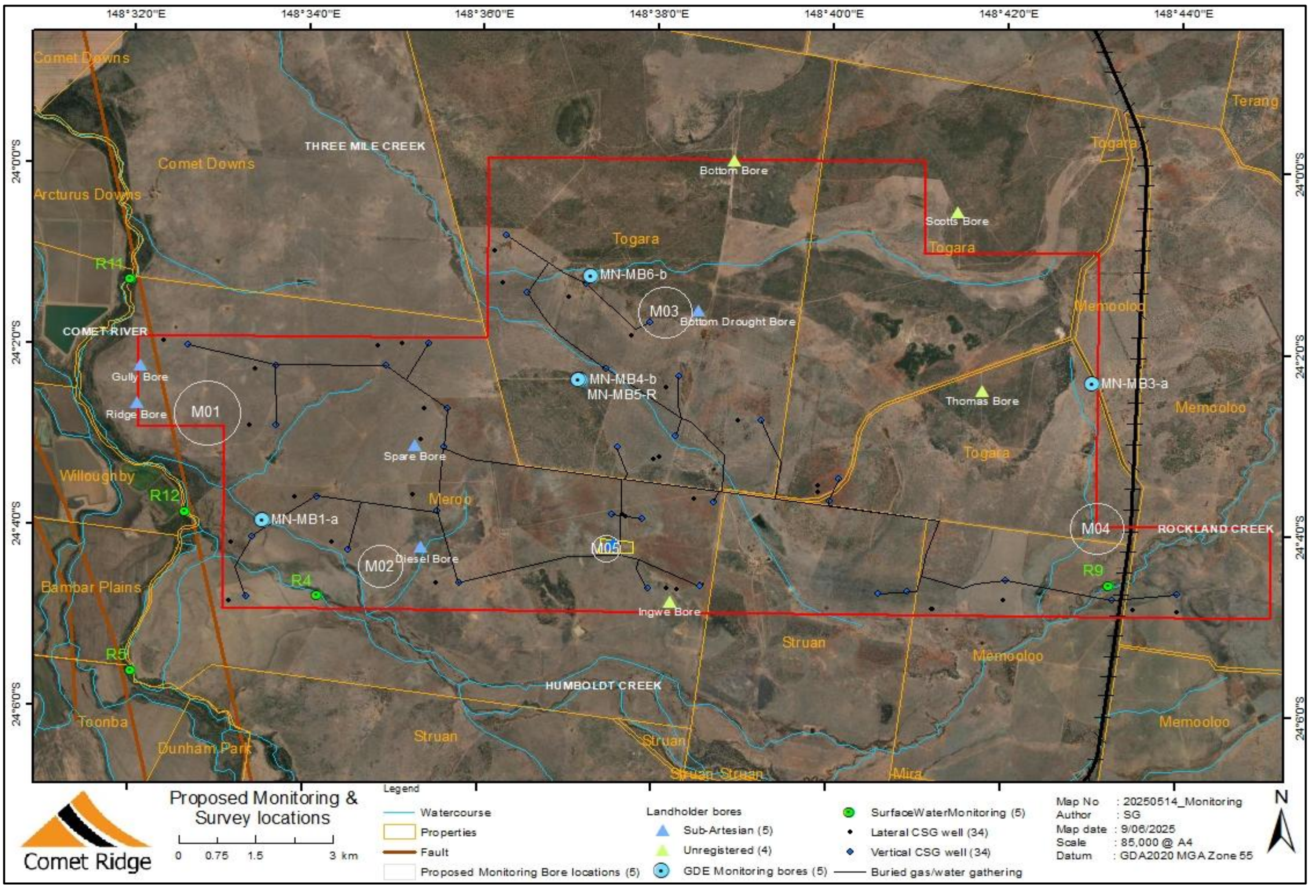

Figure 10 – Aquifer Interconnectivity Monitoring Locations

5.2.1 Bore Siting and Geophysics

Monitoring bore locations will be refined and confirmed using Electrical Resistivity Tomography (ERT) to improve the confidence in intersecting the intended hydrostratigraphic units. This geophysical data will inform the siting of the bore nests to confirm the presence of the targeted units and to inform bore nest design. By integrating ERT prior to drilling, the program aims to reduce uncertainty in bore stratigraphy and ensure alignment with the project's aquifer interconnectivity and impact assessment objectives. The ERT study was

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completed in late June 2025; however, the results of the survey were not available for inclusion in this plan. The results will be reviewed and incorporated into the drilling plan before the piezometer nests are drilled.

Following IESC advice, the Comet Ridge geological model was reviewed to develop this Plan, including review of well completion reports and bore logs to outline the expected stratigraphy and unit thicknesses at each monitoring nest location.

Table 4 summarises the stratigraphy and thickness at each proposed monitoring bore nest.

Table 4 – Expected Geology at each Monitoring Bore

Bore Nest and Stratigraphy	Depth Range (m)	Thickness Range (m)	Comments
MO1			
Quaternary Sediments	NA	NA	
Tertiary Sediments	0	20	
Top Tertiary Basalt	20	30	edge basalt flow channel - high chance
Top Rewan Formation	52	250	
Base Weathering	70-80	NA	
Top Coal	301	2.3	Aries
Target Coal	301-350	1-2.5	Area is outside a sector but close to Aries, Castor-Pollux
MO2			
Quaternary Sediments	0	4-15	
Tertiary Sediments	NA	NA	
Top Tertiary Basalt	0-4	0-50	edge basalt flow channel - high chance, less chance in SW
Base Weathering	30-70		
Top Rewan Formation	15-50	130-160	
Top Coal	170-210	1-2	Aries
Target Coal	205-260	4.4-6.6	Castor-Pollux
MO3			
Quaternary Sediments	NA	NA	
Tertiary Sediments	0	1-20	
Top Tertiary Basalt	1-20	0-105 (50-60)	basalt flow channel - high chance
Base Weathering	45-90		
Top Rewan Formation	20-50	40-110	
Top Coal	100-130	0.5-1.5	Aries
Target Coal	130-170	3-4	Pollux
MO4			
Quaternary Sediments	0	15	
Tertiary Sediments	NA	NA	
Top Tertiary Basalt	0-10	0-5	basalt flow channel - low chance
Base Weathering	20-60		
Top Rewan Formation	5-10	70-110	
Top Coal	80-115	1.4-1.7	Aries
Target Coal	100-150	3-5	Castor-Pollux

5.2.2 Bore Construction and Risk Mitigation

To mitigate cross-aquifer flow and potential gas migration risks:

- Grouted completions will be implemented for the Rewan and Bandanna bores using VWPs;

- Bore designs will comply with "*Minimum Construction Requirements for Water Bores in Australia* (2020)";
- All installations will follow strict drilling and well integrity protocols to prevent unintended connectivity.
- A suitably experienced hydrogeologist will be onsite during drilling of the bores, to log the geological units

6 Limitation

Terra Sana Consultants Pty Ltd (TSC) has prepared this report for the sole use of the Client. The report has been prepared in accordance to the usual care and thoroughness of the consulting profession. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. The methodology adopted to sources of information used by TSC includes interview(s), review of documentation, inspection, sampling or other means of investigation. TSC has made no independent verification of the information supplied by the representative of Client's representative and assumes no responsibility for any inaccuracies or omissions. This report is based on the conditions encountered and information reviewed at the time of preparations. TSC disclaims responsibility for any changes that may have occurred after this time. This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Any changes in regulations or scientific understanding could impact on our conclusions and recommendations. TSC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

7 References

- Adani. (2018). Adani Mining – Rewan Formation Connectivity Research Plan. Version P. 5 November 2019.
- RDM Hydro (2024). Groundwater Impact Assessment
- Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development. (2025). Advice Reference IESC 2025-153.
- National Uniform Drillers Licensing Committee. (2020). Minimum Construction Requirements for Water Bores in Australia.

APPENDIX A – WCR for Mahalo North 1

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Comet Ridge

MAHALO NORTH 1

WELL COMPLETION REPORT

ATP 2048

BOWEN BASIN CENTRAL QUEENSLAND

MAHALO NORTH 1
WELL COMPLETION REPORT

ATP 2048
BOWEN BASIN
CENTRAL QUEENSLAND

Approved by COI
30/03/2022

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Table of Contents

G	MDT Report
H	Daily Completion Reports
I	Site Survey Report
ENCLOSURES	
1	Wireline Logs (i) PEX-AIT-GR 1:100 & 200 (ii) PEX-AIT-GR 1:500 (iii) FMI 1:40 (iv) FMI PROCESSED 1:20
2	Composite Log (i & ii), Detailed Strip Log (iii) General Strip Log (iv)
DIGITAL DATA	
1	Wireline, FMI (Additional digital data submitted under separate cover), MDT, Coal & Gas Analysis

1.0 WELL SUMMARY

1.1 DRILLING SUMMARY

Table 1: Well Drilling Summary

Well Name	Mahalo North 1
Well Classification	CSG Appraisal
Country / State	Australia, Queensland (Central)
Permit	ATP 2048
Basin	Bowen Basin
Petroleum Field	Mahalo North
Operator	Comet Ridge Mahalo North Pty Ltd GPO BOX 798 Brisbane QLD 4001
Permit Holder (s)	Comet Ridge Mahalo North Pty Ltd – 100% GPO BOX 798 Brisbane QLD 4001
Reference Datum	GDA 2020, Zone 55
Seismic Line	SP2703, TOG97-101
Surface Latitude	-24° 04' 36.8804505" South
Surface Longitude	148° 38' 31.8694135" East
Surface Easting	666944.435m
Surface Northing	7336282.067m
Bottom Hole Latitude	-24° 04' 36.85" South
Bottom Hole Longitude	148° 38' 31.89" East
Bottom Hole Easting	666945.05m
Bottom Hole Northing	7336282.98m
Ground Level Elevation	235.055m AHD
RT to GL / RT	4.2m / 239.255m AHD
Drilling Contractor / Rig No.	Silver City Drilling Rig #23
Primary/Secondary Target Basin	Bowen Basin / NIL
Primary/Secondary Target Formation	Bandanna Formation / NIL
Primary/Secondary Resource Target	Coal Seam Gas / NIL
Spud Date	10:30 16 October 2021
Reached TD	12:15 21 October 2021
Rig Release	14:00 23 October 2021
Well Completion	18:00 20 December 2021
Total Depth Driller / Logger	314.00m / 313.70m (MDRT)
Well Profile	Single Vertical
Maximum Deviation Angle	0.57°
12-1/4" Hole / 9-5/8" Surface Casing	87.0m (MDRT) / 84.6m (MDRT)

8-1/2" Hole / 7" Production Casing	314.0m (MDRT) / 311.02m (MDRT)
Well status on Rig Release	Cased & Suspended

Table 2: Formation Tops (from wire-line logs)

Formation	Prognosed			Actual				
	Depth		Thickness	Depth			Thickness	Difference (-ve Hi)
	mTVDSS	mMDRT	m	mTVDSS*	mMDRT	mTVD*	m	m
RT	+239.255	0.0		+239.255	0.00	0.0		
GL	+235.055	4.2		+235.055	4.2	4.2		
Rewan Group	+235.055	4.2	191.21	+235.055	4.2	4.2	196.76	0
Base Tertiary Basalt	+199.26	40.0		NA	NA	NA		
Base of Weathering	+184.26	55.0		+163.26	76.0	76.0		+21
Bandanna Formation	+43.85	195.41	114.59+	+38.30	200.96	200.96	113.04	+5.55
Aries Seam	+20.48	218.78		+23.53	215.72	215.72		-3.06
Castor Seam	-12.63	251.89		-12.88	252.13	252.13		+0.24
Pollux Seam	--17.72	256.48		-15.41	254.66	254.66		-1.82
Orion Seam	NA	NA		-33.79	273.04	273.04		
TD	-70.75	310.0		-74.75	314.0	314.0		

*Actual TVD depths corrected to deviation survey.

Table 3: Coal Seam Intervals

Formation	Coal Seam	Depth from (mMDRT)	Depth to (mMDRT)	Net Coal (m)	Net Coal/Seam (m)
Bandanna Formation	Aries Upper Ply	215.72	216.12	0.40	1.52
	Aries Thick Ply	220.51	221.48	0.97	
	Aries Lower Ply	223.96	224.11	0.15	
	Castor Seam	252.13	254.66	2.53	6.87
	Pollux Seam	254.66	259.00	4.34	
	Orion Upper Ply	273.04	273.47	0.43	0.64
	Orion Lower Ply	273.96	274.17	0.21	
			Total Net Coal (m)	**9.03**	**9.03**

Table 4: Wireline Logging Summary

Run	Tool String	Interval (mMDRT)	Contractor
1	PEX-AIT-GR-SP (Triple Combo)	313.7-84.6m 313.7 – 5.0m (GR)	Schlumberger
2	SONIC-GPIT-FMI (Sonic-Deviation Survey-Resistivity Image Log)	313.7-84.6m 313.7 – 5.0m (GR)	Schlumberger
3	MDT (Modular Dynamic Tester)	See Formation Testing	Schlumberger

Wireline Log Data is included under Digital Data and Enclosure 1i to 1iv.

Table 5: Sample Details

Geological Samples	
Coring	Continuous core (wire line retrievable) was drilled from 200m to 268.56mMDRT. 68.6m of core was recovered with 99.9% recovery. 14 coal desorption samples were collected for further analysis.
Cuttings	Ditch cuttings were collected at 10m intervals from 11m to 180m MDRT, 3m intervals from 180m to 200mMDRT & 10m from 268.56m to 314mMDRT.

Core and Cuttings Descriptions are included in **Appendix B, C & D.** Coring Report is included under **Appendix E.** Core and cuttings photos are included in **Appendix C & D.**

Table 6: Hole, Casing and Cement Details

Hole Details			
Type	Conductor	Surface	Production
Size	24"	12-1/4"	8-1/2"
Depth (mMDRT)	11.0	87.0m	314.0m
Casing Details			
Interval	Conductor	Surface	Production
OD	13-3/8"	9-5/8"	7"
Shoe (mMDRT)	10.3	84.6m	311.02m
Wt	64.5 lb/ft	36 lb/ft	23 lb/ft
Grade	K-55	K-55	N80-L80-K55 with 1 x GRE hybrid joint (250.46 to 259.40mMDRT)
Thread	BTC	BTC	BTC
Cement Details			
Type	Surface – Single Stage		Production – Single Stage
Class	GP/A Class		GP/A Class
Slurry Volume (bbls)	24.00		35.0
Weight (ppg)	15.6ppg		14.5ppg
Additives	Defoaming agent (CDA-204), Cement Extender (SM-A), Cement Dispersant (CDS-1)		Fly Ash, Defoaming Agent (CDA-204), Cement Extender (SM-A), Cement Fluid Loss (CFL-177)
Freshwater Spacer (bbls)	5		10
Displacement Water Volume (bbls)	21.2		37.90
Cement Returns Volume (bbls)	3.0		0.5
Comments	Pressure Tested lines to 3000psi for 5mins. Bumped plug with 30psi increasing to 1000psi for 10mins		Pressure Tested lines to 3000psi for 5mins. Bumped plug with 350psi increasing to 1000psi for 10mins
Cemented By	WellPro		WellPro

Details are included in **Appendix F.**

Table 7: Formation Testing

Test No	Formation	Coal Seam	Interval From (mMDRT)	Interval To (mMDRT)	Gauge Depth (mMDRT)	Final BU Pressure (psia)
MDT 1	Bandanna Formation	Castor-Pollux Seam	251.7	259.6	259.2	307.06

Details are included in **Appendix G.**

Table 8: Drilling Mud Data

Top (mMDRT)	Base (mMDRT)	Hole Size	Mud Type	Mud Weight	Viscosity	Additives
11.0	87.0	12 -1/4"	4% KCL	8.65-8.9ppg	29-30sec/qt	AMC Biocide, Xanbore & Soda Ash
87.0	314.0	8-1/2"	4-5% KCL	8.0-8.85ppg	33-39sec/qt	AMC Biocide, Xanbore, Soda Ash, Aus-Dex, Citric Acid &\ AMC Defoamer

Table 9: Drilling Bit Data

Bit#	Size	Type	Make	Serial	Depth In	Depth Out	Meters Drilled	Hours	Average ROP (m/hrs)	WOB (Klbs)	RPM	Condition
1	12-1/4"	PDC DSH519M	NOV	A196541	11.0	87.0	76	5.0	15	1-5	60-110	1/1/-/A/N/I/RR/CSG
2	8-1/2"	PDC TKC56	NOV	E256350	87.0	200.0	113	5.0	22.60	1-2	80-90	1/1/-/A/X/I/RR/CP
3C	8-1/2"	Corebit CEP513S	NOV	A275612	200.0	268.5	41.6	3.0	13.86	2-8	40-65	0/0/-/A/X/I/RR/BHA
2RR	8-1/2"	PDC TKC56	NOV	E256350	268.0	314.0	46	2.25	20.44	2-7	100	0/0/-/A/X/I/RR/TD

Table 10: Well Integrity Tests

Test Type	Casing Size	Hole Depth (mMDRT)	Casing Depth (mMDRT)	Mud Weight (ppg)	Surface Pressure (psi)	EMW (ppg)
LOT	9-5/8"	90.0	84.6	8.9	210	23.3

1.2 OPERATIONS TEAM

Table 11: Operations Team

Operations Manager	Dale Aaskow
Operations Geologist	Melanie Fitzell
Drilling Engineer	Jordan Bunning/Dylan Shaw
HSE Manager	Gary Proctor
Drilling Supervisor	Mick Marshall/Steve Muirhead

2.0 WELL HISTORY AND GEOLOGICAL SETTING

2.1 WELL SUMMARY

Mahalo North 1 is located approximately 4.5km off the Comet-Rolleston Road on Meroo Station in the southern part of the ATP 2048 (**Figure 1**).

The well is located in the central Bowen Basin and will intersect stratigraphy typical of the Denison Trough (**Figure 3**), with the exception of the Moolayember Formation and Clematis Group which are absent from the southern permit area. The stratigraphic prognosis is shown in **Table 2.**

Well control in the vicinity of Mahalo North 1 is provided by coal seam gas exploration well Mahalo 1 & 2 (**Figure 1**) and a significant number of surrounding coal exploration holes including TS0753, TS0736, TS0611 & TS0737 and DMR Togara NS8. Mahalo North 1 is located closest to shot point 2703 on seismic line TOG95-101 from the Togara South 2D 1995 survey acquired by Trans-Natal Australia Pty Ltd in 1995.

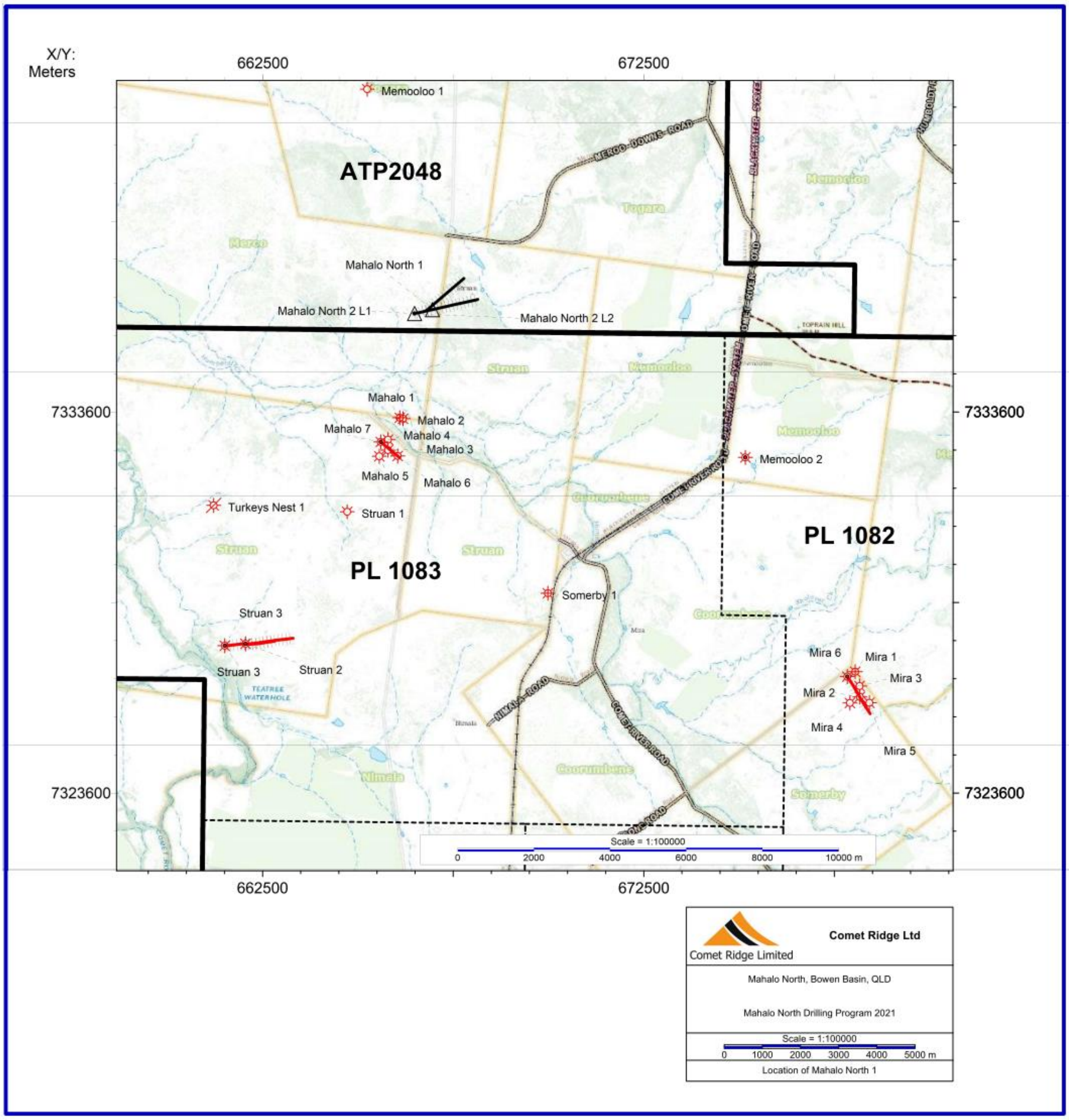
Mahalo North 1 is a cored exploration well which has been designed to evaluate the coal seam gas potential (extent, permeability, gas content and saturation) of the Permian Bandanna Formation in the southern portion of ATP 2048. It is also planned to be used as the vertical production well for the planned Mahalo North 2 dual lateral well.

Mahalo North 1 was spudded on the 16 October 2021 and reached a total depth of 314.00mMDRT (driller's depth) in the Permian Bandanna Formation on the 21 October 2021. Formations were encountered close to prognosis depths with the top of the Bandanna Formation at 200.96mMDRT, 5.55m low to the prognosis depth. The well was drilled as a vertical well and continuously cored from 200.0m to 268.56mMDRT through the upper three coals seams of the Bandanna Formation. The well intersected 3 coal seams within the Bandanna Formation with the potential to produce coal seam gas. A single MDT test was run over the coalesced Castor-Pollux seam interval. A total of 9.03m of coal was intersected.14 coal desorption samples were collected and put on test for gas desorption analysis. The well was then drilled from 268.56mMDRT to TD (314.0mMDRT). The well deviated from the vertical by a maximum of 0.57 degrees. TD was reached at 1215 on 21 October 2021.

On completion of wireline logging and testing, 7" casing was run to 311.02mMDRT and cemented to surface. Mahalo North 1 was suspended via a tubing hanger installed and pressure tested within the wellhead in preparation for production testing. The rig was released at 1400 on 23 October 2021.

Secure Well Services Rig #2 was mobilised to the Mahalo North 1 well location on 18 December 2021 to install a 2-7/8" tubing string / PCP completion assembly. A progressive cavity pumping assembly installed on 2-7/8" tubing was landed via the tubing hanger at a depth of 277.2m MDRT. A Netzsch (NOP5088) rotor was installed on 2-7/8" rods and space-out. Rod-lock was engaged in preparation for future production and the rig was demobilised from site at 1800 on the 20 December 2021.

FIGURE 1: MAHALO NORTH 1 LOCATION



2.2 EXPLORATION HISTORY

ATP 2048 is located in the Denison Trough in the Bowen Basin in central Queensland. Early petroleum exploration in the region had focussed on conventional resources in Permian sandstone reservoirs, resulting in the discovery of several gas fields. Springton and Arcturus conventional gas fields adjacent to and to the west of the permit area. These gas fields are serviced by processing and separation facilities located in the northern Denison Trough and gas is distributed via the state natural gas pipeline network when on production.

Prior to commencement of CSG exploration in the permit area, a number of petroleum wells had been drilled within the area now comprising ATP 2048.

Memooloo 1, a conventional petroleum exploration well was drilled in 1970 to test a small Permian structure in the centre of the permit area. All Permian sandstone target reservoirs were water saturated and as a result the well was plugged and abandoned.

Luton 1 was drilled in 1970 approximately 4.4km south-west of Memooloo 1 to test a small Permian anticline structure on the upthrown side of a normal fault. Gas indications were recorded over the target sandstone intervals however formation tests indicated the formations were either water wet or tight. Results suggest the structure may not be closed to the north.

Between 2006 and 2008, research and development wells Zerogen 1 to 4 were drilled within the western portion of the permit area to investigate storage and flow capacity of the Permian sandstones and sealing capacity of intra-formational and regional seals within the Northern Denison Trough for potential CO_2 storage sites. The primary aim of the wells was to acquire core and run logs over key sandstone reservoir intervals for further analysis. All four wells were plugged and abandoned.

Although the Permian coals were not the primary target in the historical wells, gas indications were noted across coals within the Bandanna Formation and Mantuan Formation on logs and lithological descriptions (where intersected).

Hundreds of shallow coal holes (drilled by Queensland Government and coal exploration companies) have previously been drilled within the southern and central portion of the permit area where coals are at shallow depths for surface and underground coal extraction. Data for many coal exploration wells remained confidential until early 2021 when coal data confidentiality periods were amended by Queensland Government. A significant amount of data was able to be accessed prior to drilling Mahalo North 1 and has been a critical dataset for planning the drilling program. These shallow wells provide confidence that coal is extensive across the permit area.

The first coal seam gas well drilled in the permit area was Luton 2, in 2004 as a twin to Luton 1 to evaluate the coal seam gas potential of the coals within the Bandanna and Mantuan coal seams within the same small anticlinal closure that Luton 1 was drilled. Prospective net coal and gas shows were encountered in both the Bandanna and Mantuan coal seams.

Nine years later, Belle 1 was drilled in the north-eastern portion of the permit area to evaluate coals of the Late Permian Fair Hill Formation and Early Permian Reids Dome beds. The well was drilled to 1084m and encountered poorly developed coals within the Fair Hill Formation. The Reids Dome beds were not present. No formation tests were undertaken, however the well was logged and then plugged and abandoned.

The Mahalo North permit area is prospective for both coal seam gas and coal extraction from the coal measures of the Permian Bandanna Formation that are draped over a structural high known as the Comet Ridge nose anticline.

Comet Ridge Limited was awarded ATP 2048 in early 2020 as part of a petroleum tender release. Comet Ridge has many years of history and CSG exploration and appraisal experience in the area to the south of ATP 2048. Comet Ridge currently holds 40% equity in Mahalo Gas Project (JV) Area (which includes PL 1082 and PL 1083, PCA 302, PCA 303 and PCA 304) directly adjacent to and contiguous with ATP 2048.

13 fully cored coal seam gas exploration wells, 2 four-well pilots, 3 single lateral wells and 1 dual lateral well have been drilled across the Mahalo Gas Project Area to appraise coal seam gas resources within the Bandanna Formation. In addition, hundreds of coal exploration bores have been drilled across the northern part of the project area.

Results from exploration and appraisal work over the extent of the project area have resulted in delineation of commercial and potentially commercial areas for coal seam gas extraction. Comet Ridge has certified and booked 106PJ of 2P reserves and 89PJ of 2C contingent prospective resources across the project area.

Mahalo North 1 is the first commitment exploration core hole drilled by Comet Ridge (100% equity) in ATP 2048.

2.3 DRILLING RATIONALE

Mahalo North 1 is a step out well to the north of the Mahalo Pilot scheme, located in PL 1083 (Comet Ridge holds 40% equity as part of the Mahalo Gas Project) (**Figure 1**).

Mahalo North 1 is being drilled to better understand the coal seam gas potential of the southern portion of ATP 2048 and area directly north of the Mahalo Pilot. The primary objective is to extend reserves to the north of Mahalo Pilot area and confirm permeability, gas content and saturation. It is also planned to be used as the vertical production well for the Mahalo North 2 dual lateral well set.

The well was prognosed to intersect approximately 115m of the Bandanna Formation with 3 target coals seams (Aries, Castor & Pollux) with net coal estimated to be approximately 9.25m. It was planned to continuously core the Aries, Castor and Pollux coal seam interval of the Bandanna Formation and collect samples for gas desorption and coal analysis. After reaching TD of approx. 300m, wireline log evaluation including MDT's, the target Castor and Pollux coal seams would be completed for future production. It is interpreted that the Castor and Pollux seams are coalesced at this location. The formation test would be used to assess the producibility of the target coal seams.

Mahalo North 1 is planned to be used as the vertical intersect well for Mahalo North 2 dual lateral well. Mahalo North 2 is planned to be drilled immediately after Mahalo North 1. Two lateral well sections are planned to be drilled within the coalesced Castor and Pollux seams, with one lateral intersecting the Mahalo North 1 well bore and continuing within seam to an approximate total measured depth of 2300m. The second lateral will be drilled roughly parallel to the first lateral to an approximate total measured depth of 1800m, however, will not intersect the Mahalo North 1 well. On completion of drilling Mahalo North 2, Mahalo North 1 will be completed as a future production well from the combined Castor and Pollux seams. Production testing of Mahalo North 1 will be undertaken to gain longer term flow data from the lateral sections of the coalesced Castor and Pollux seams.

2.4 GEOLOGICAL SETTING

The Permian to Triassic Bowen Basin is a large north-south trending retro-arc foreland basin complex (Kassan, 1993), which extends over 1000km from central Queensland into northern New South Wales. The Queensland potion of the basin covers an area of approximately 180,000 km^2.

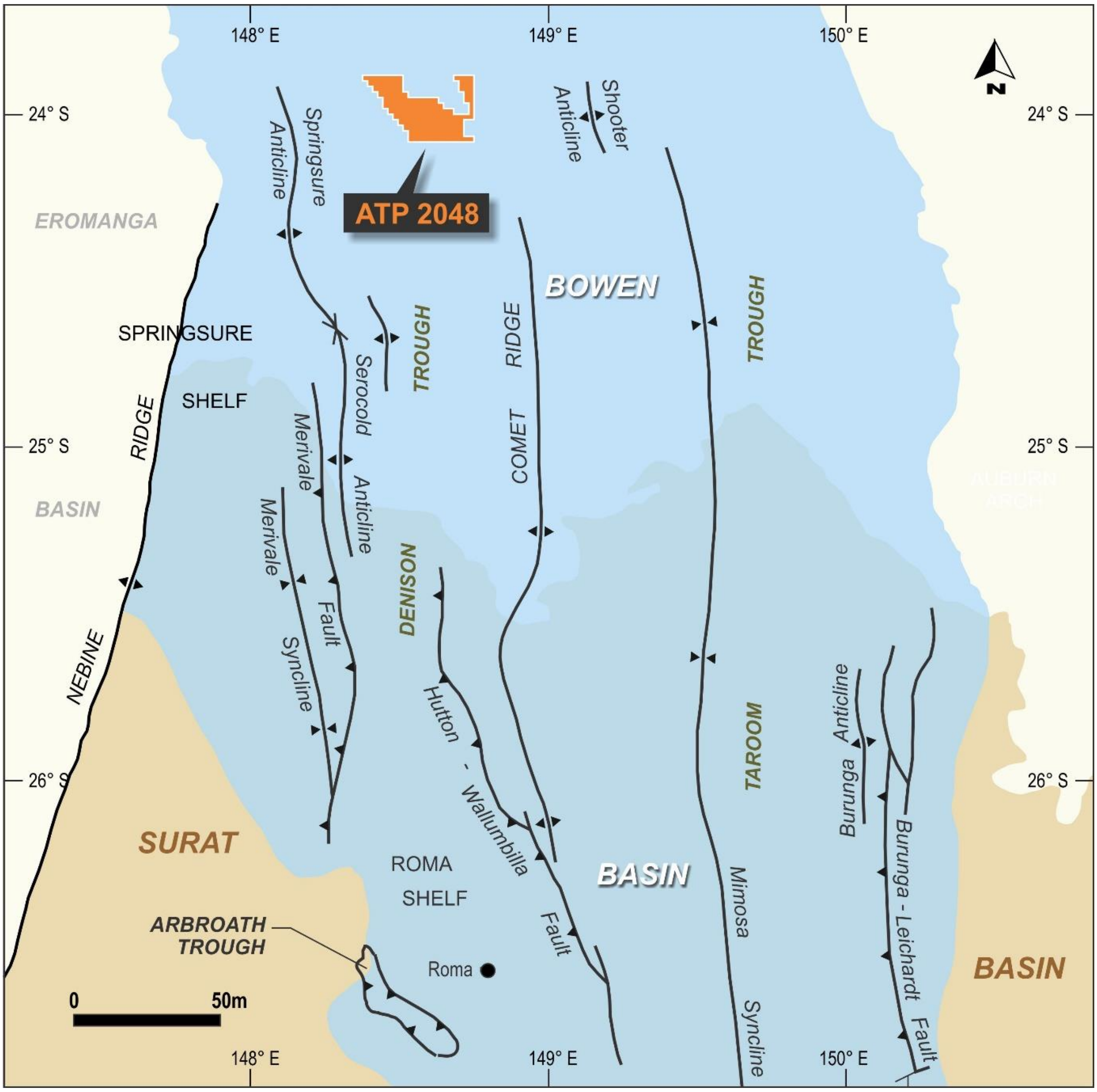
The following section has primarily been summarised from Green (Editor), 1997 and Bradshaw et al 2009.

Within Queensland the basin is generally divided into three areas based on regional architecture (**Figure 2**). The southern area comprising the main Late Permian- Middle Triassic depocentre, the Taroom Trough and basement high including the Roma Shelf. The western area comprising an Early Permian depocentre, the Denison Trough and adjoining basement highs, the Comet Ridge, and Springsure Shelf and the northern area incorporating the Collinsville Shelf and Nebo Synclinorium. Continental and shallow-marine clastic and volcanic sediments with extensive coal measures of Permian to Triassic in age, obtain thicnlesses up to 10,000m within the Taroom and Dension Troughs.

Basement predominantly comprises Devonian-Carboniferous meta-sediments, volcanics, and igneous rocks of the Tasman Fold Belt, and in places Early Permian volcanic rocks. The basin partially overlies the Late Devonian – Early Carboniferous Drummond Basin in the west and the southern portion is partially overlain by the Jurassic-Cretaceous Surat Basin.

Basin initiation occurred during the Late Carboniferous to Early Permian during a period of back-arc extension. This extensional period produced a number of half-grabens (i.e. Denison Trough) to the west of an active continental volcanic arc in the east. Initial deposition included continental fluvial, alluvial and lacustrine sediments, including coals within the Denison Trough. Contemporaously, volcanics and volcaniclastics associated with the arc were deposited in the east.

FIGURE 2: STURCTURAL ELELMENTS BOWEN BASIN IN QUEENSLAND



Extension was followed by a period of thermal relaxation and subsidence during the Permian, allowing marine incursion over most of the basin east of the Roma Shelf to the Denison Trough in the north. Depocentres were connected and infilled by Early-Late Permian marine and fluvial-deltaic facies. These deltas persisted into the Late Permian resulting in the formation of coastal swamps and subsequent accummulation of extensive coal deposits.

The main depocentre shifted to the Taroom Trough between the Late Permian-Early Triassic with the onset of foreland loading and thrust related deformation phase of basin development. During this time continental sedimentation and widespread deposition of thick coal measures dominated. An influx of volcano-lithic sediments were sourced from uplifted areas along the eastern margin, while westward prograding deltas resulted in extensive peat accumulation and assocaited fluvial facies. A pause in thrusting during the Middle Triassic led to a switch in provenance with quartz-rich sediments predominantly being sourced from the uplifted western craton instead of the arc in the east.

E-W compression during the final stages of basin development during the Middle Triassic resulted in the reactivation of pre-exisiting extensional faults and generation of new thrusts. This compressional event between the Middle to Late Triassic initiated regional uplift and estimated erosion of up to 3000m of sediments from the basin sequence prior to initial deposition of fluvial sediments of the overlying Late Jurassic-Early Cretaceous Surat Basin sequence.

2.5 DENISON TROUGH - GEOLOGY

ATP 2048 is located in an area which overlies the Comet Ridge structural feature. The area is directly adjacent to the Denison Trough in the west and Taroom Trough in the east (**Figure 2**).

The following section is primarily summarised from Green, P. M. (Eds.), 1990 and Cadman et al. 1998.

Late Carboniferous to Early Permian extensional tectonism initiated half-graben development in the Denison Trough. The onset of extensional subsidence saw the deposition of sediments primarily comprising non-marine, fluivial, lacustrine and volcanilastics (Reids Dome Beds). Thermal relaxation and subsidence between the Early to Late Permian led to multiple marine incursions across the Denison Trough. The initial marine transgression is represented by sandstones and mudstones of the Cattle Creek Formation. A major regression in the Early Permian led to the deposition of a thick sequence of deltaic sandstones and conglomerates (Aldebaran Sandstone). Compression during this period led to reverse movement on re-exisiting faults and development of a mid-Aldebaran Sandstone unconformity. During this time the Comet Ridge became a positive feature and provided additional source of sediments for the subsiding Dension Trough. A sandy, marginal marine sequence (Freitag Formation) was followed by a return in marine conditions with the deposition of dark siltstones and shales (Ingelara Formation) over much of the area. This was followed by a transition to shoreline and nearshore shelf sands fed by fluvial channels (Catherine Sandstone) which were deposited over a more restricted area.

Shallow marine conditions returned during the Late Permian with the deposition of shales, siltstones, limestones and lithic sandstones (Peawaddy Formation) and in the northern part of the Denison Trough, a series of non-marine sandstones facies (Mantuan Formation). Towards the end of the Late Permian waning marine conditions transitioned to fluvio-deltaic sedimentation resulting inthe deposition of tuffaceous silts and shales (Black Alley Shale) and widespread peat accumulation resulting in extensive coal deposits (Bandanna Formation).

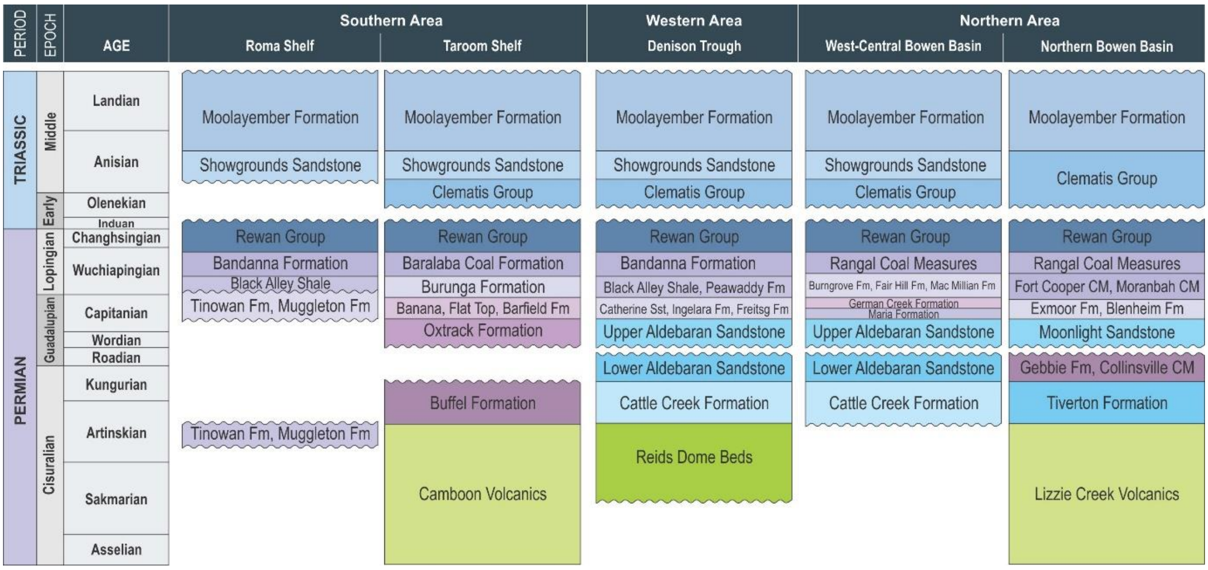
During the Late Permian much of the Bowen Basin was covered by coal swamp environment, however changing climatic conditions gave way to drier, continental conditions. Deposition of fine grained red and green mudstones, grading to basal sandy and conglomeritic facies (Rewan Formation) continued to be deposited over most of the basin into the Early Triassic. Uplift during the Middle Triassic led to deposition of quartz-rich braided stream sediments (Clematis Group) and widespread fluvial lacustrine sediments (Moolayember Formation). Sedimentation ended with an E-W compressional event during the Middle Triassic which led to folding, uplift and widespread erosion which resulted in a basin wide mid-Triassic unconformity at the top of the Bowen Basin sequence.

Coal development within the Denison Trough is limited to the Permian. There are multiple coal-bearing units within the trough; the Early Permian Reids Dome Beds Measures, Aldebaran Sandstone and Freitag Formation and the Bandanna Formation. Coal measures within the Reids Dome beds are primarily associated with extensional phase and desposited within fluvial and detaic environments. Scattered coals occur in the Aldebaran Sandstone and Freitag Formation but rarely seen greater than 3m in thickness. Late Permian Bandanna Formation coals are the most widespread throughout the Denison Trough and adjacent Comet Ridge area. The Bandanna coals were deposited in a large freshwater delta system passing upwards into a fluvial environment. Although seams vary in thickness (up to 10m), all have a high degree of lateral continuity and are the major reservoir for coal seam gas resources within the Bowen Basin.

The objective of the well is coal seams of the Bandanna Formation. The Late Permian Bandanna Formation typically comprises interbedded brown-black, carbonaceous shales, coal, siltstone, mudstone and minor sandstone. Coal are generally sub-bituminous, dull to vitreous with variable but commonly moderate to excellent cleat development, the coals are commonly interbedded with and grade into carbonaceous mudstone with minor lithic sublabile sandstone, tuff bands, bands of calcareous sandstone nodules and concretional ironstone. Calcite mineralisations is common within cleats and fractures.

The stratigraphy of the Bowen Basin is shown in **Figure 3**.

FIGURE 3: STRATIGRAPHIC COLUMN



2.6 WELL GEOLOGY SUMMARY

Mahalo North 1 was spudded into undifferentiated alluvium on top of the weathered Triassic Rewan Formation. The well proceeded to penetrate the standard stratigraphic sequence of the Early Triassic to Late Permian Bowen Basin.

Rewan Group
Interval: 4.2.0-200.96mMDRT
Thickness: 196.76m
Age: Early Triassic

The top of the Rewan was intersected at approximately 4.2mMDRT. Base of weathering was recorded at 76.0mMDRT.

The Rewan Formation comprises an interbedded sequence of sandstone, siltstone, and mudstone. Basal section generally increases in sand content.
The siltstones were described as greenish grey, low to medium hardness, low to medium strength and platy with rare sandstone and mudstone fragments.
The mudstones were described as reddish grey, low hardness, low strength, and platy.
The sandstones were described as light grey, very fine grained, well rounded to sub-rounded, spherical to sub-spherical, well to moderately sorted, well cemented with rare siltstone fragments, medium strength and hardness.

Bandanna Formation
Interval: 200.96-314.0mMDRT
Thickness: 170.96+m
Age: Late Permian

Mahalo North 1 was drilled vertically to intersect the Bandanna Formation at 200.96mMDRT, 5.5m low to prognosis. The Aries seam was prognosed to be approximately 15.0m below the prognosed top depth of the Bandanna Formation. The Aries seam was intersected 3.06m high to prognosis. The Castor and Pollux seams were intersected within 0-2m of prognosis depth. The accuracy of the prognosis was largely due to a significant number of coal exploration bores across the area which had been wireline logged and provided high accuracy coal intersection picks. Prognosed net coal across the Aries, Castor and Pollux was 9.25m. The Orion seam was not prognosed to be intersected. A thin poorly developed Orion coal seam (total of 0.64m) was intersected after coring was completed. Actual net coal intersected across the Aries, Castor, Pollux, and Orion was 9.03m (after wireline logging).

The Bandanna Formation comprises an interbedded brown-black carbonaceous mudstone, coal, siltstone, mudstone, sandstone with siderite bands.

The sandstones were described as quartz sub lithic, light grey to light whitish grey, very fine to medium grained, well to moderately rounded, sub-spherical, well to moderately sorted, with calcareous cement, rare siltstone clasts and occasional carbonaceous laminae, medium hardness, and high strength. The carbonaceous mudstones were described as dark brown to black, with rare calcareous and coal laminae, low strength, and low hardness. The mudstones were described as grey to dark grey, with calcareous infill, platy to blocky, medium strength and medium hardness. The siltstones were described as light grey to grey, with very fine sandstone laminae and rare carbonaceous mudstone bands, medium hardness and medium strength, platy to blocky. The coal is described as black, bright banded to dull banded, dull, minor bright to bright to stony in parts, low strength with minor calcite infill, stony intervals have abundant tuffaceous and carbonaceous mudstone laminations throughout. Siderite bands were described as reddish brown, very high hardness, very high strength.

2.7 HYDROCARBON SIGNIFIGANCE

The Aries, Castor & Pollux seams within the Bandanna Formation are hydrocarbon bearing at Mahalo North 1.

The top of the Aries seam was proposed to be intersected at approximately 218.0mMDRT. Subsequently coring commenced at 200.0mMDRT to ensure the Aries seam was cored and recovered for desorption testing. The top of the Aries seam was intersected at 215.72mMDRT, 3.06m low to prognosis. The Aries seam comprises three plies at the Mahalo North 1 location with a total net coal of 1.52m. The Castor and Pollux seams were interpreted to be either coalesced or have a maximum 1.75m separation. The entire Castor and Pollux section was fully cored with a total net coal of 6.87m. The Castor and Pollux seams were coalesced at Mahlo North 1 location.
The Orion seam was not prognosed to be intersected at the Mahalo North 1 location and subsequently, coring ceased once the Castor and Pollux section was intersected. A thin, poorly developed coal was intersected approximately 14m below the base of the Pollux seam. Net coal derived from wireline logs confirmed the Orion seam is present at the Mahalo North 1 location with total net coal of 0.64m. Total net coal intersected at Mahalo North 1 was 9.03m (from wireline logs).

The objective of Mahalo North 1 was to intersect and core the Aries, Castor, and Pollux seams of the Bandanna Formation. 14 coal samples were collected across the three seams for coal desorption, coal analysis to obtain gas content, coal quality and gas saturation data and gas composition analysis. Formation testing using MDT was undertaken across the coalesced Castor and Pollux seam bearing interval to obtain permeability data. Results confirm coals at this location have suitable gas content, gas composition and saturation at depths between 215 and 260m for commercial gas production. Formation testing confirmed significant potential productivity of the Castor-Pollux seam at this location.

In addition to collecting core for coal and gas analysis data, the well was drilled as the vertical intersect well for Mahalo North 2 dual lateral well. The Castor and Pollux seams are of acceptable thickness to drill a lateral well bore of significant length. On completion of drilling Mahalo North 2, Mahalo North 1 was completed for future production testing. Production testing of Mahalo North 1 will provide a reasonable assessment of the production potential from an extended length lateral drilled within the coalesced Castor and Pollux seam in the southern portion of the permit area.

Mahalo North 1 will be evaluated against the production performance of nearby lateral wells at both the Mahalo (PL 2083) and Mira Pilots (PL 2082).

3.0 DRILLING DATA

3.1 PRIMARY CONTRACTORS AND SERVICE PROVIDERS

Table 12: Primary Contractors and Service Providers

Service	Company
Drilling Contractor	Silver City Drilling Pty Ltd
Camp Contractor	Silver City Drilling Pty Ltd
Civil Contractor	Sydney Earth Moving
Drilling Fluid & Engineering Services	AMC Drilling Fluids
Cementing Services	WellPro Services
Coring Services	NOV - Coring
Slickline Services	MPC Kinetic
Wireline Logging Services	Schlumberger
Desorption Services	ALS Global
Rig Mobilisation / Logistics Services	Silver City Drilling Pty Ltd / S&D Haulage / Roma Transport
Lay Down Yard Service	S&D Haulage
Wellsite Supervisor Services	inGauge Energy Pty Ltd
Drill Bit Supplier	NOV
Downhole Tool Rentals	Hofco
Wellhead Supplier	Cactus Wellhead
Casing Supplier	MITO
Casing Accessories	General Petroleum Oil Tools
Daily Reporting Supplier	inGauge Energy Pty Ltd
Fluid/Solid Disposal	CoHo
Frac Tank and Drill Pipe Rental	Tango
Completion Rig Contractor	Secure Well Services Pty Ltd

3.2 DRILLING RIG SPECIFICATIONS

Table 13: Drilling Rig Specifications

Drilling Contractor	Silver City Drilling Pty Ltd
Rig Name	Rig # 23
Type	Schramm T200XD
Engine	Detroit MTU 760HP
Mud Pumps	2 x Gardner Denver PZ-8 triple pumps, total 2,000 HP. Diesel
Mast	Schram Telemast Hoist Capacity 200,000lbs Pull Down Capacity 32,000lbs
Carrier	Kimble Custom Chassis Gooseneck Tri Axle
Sub-Structure	Tri Axle Trailer with 36” Front and 41” Rear Jacks. 80 x 14’ Wide Rig Floor.
BOP & Accumulators	9” 3000psi Annular and Double Gate Rams
Hydraulics	3 x Fixed Displacement cement type & 7 x variable volume type pumps
Pipe Handler	Schramm Load Safe Kimble Custom Chassis
Mud Tank Capacity	460bbls total volume. 2 x 130bbl equalizing tanks, 1 x 100bbl pill tank, 1 x 80bbl settling tank.
Mud Pumps	2 x Gardner Denver PZ-8 Triple Pumps Skid Mounted with Hydraulic Jacks
Camp	Silver City Drilling Pty Ltd

3.3 OPERATIONS SUMMARY

Mahalo North 1 was spudded at 1030 on the 16 October 2021. The well took 15.46 days from rig on location to rig release, and the drilling portion of the well took 5.07 days (121.68hrs) from spud to total depth. The 12-1/4” surface hole was drilled to 87.0mMDRT and a 9-5/8” casing string set at 84.6mMDRT. The 8-1/2” production hole was drilled to 200mMDRT. The well was continuously cored (wireline retrievable) from 200.0 to 268.56mMDRT. The 8-1/2” production hole was then drilled from 268.56mMDRT to total depth (TD) at 314.0mMDRT. Total depth was reached at 1215 on the 21 October 2021. At TD, electric logs consisting of triple-combo (gamma ray-density-neutron-resistivity) logging suite were acquired. In addition, an image log (with survey) and monopole sonic log was acquired, and a single MDT (modular formation dynamics tester) was undertaken across the Castor-Pollux seam within the Bandanna Formation. A 7” production casing string including one joint of GRE liner was run and cemented at 312.02mMDRT to surface. On completion of cementing the production casing, the well was suspended via tubing hanger. The rig was released at 1400 on 23 October 2021. Daily drilling reports are included in **Appendix A**.

3.3.1 Mobilisation

SCD Rig 23 was mobilised from Moura to Rolleston staging area and well site commencing at 0600 on 8 October 2021.

3.3.2 12-1/4” Hole Section, 11.0 to 87m

Mahalo North 1 was spudded at 1030 on the 16 October 2021, with a pre-set 13-3/8” conductor cemented in place at 10.3mMDRT prior to commencement of drilling. A 12-1/4” stabilised rotary assembly was made up and RIH to drill the surface hole to section TD of 87.0mMDRT. The 12-1/4” surface hole was drilled with 4% KCL with high viscosity sweeps. At section TD, a high yield viscosity sweep was pumped, and the hole circulated clean prior to POOH.

A string of 9-5/8” 36 K-55 BTC casing was run to 84.6mMDRT. The hole was circulated clean while reciprocating casing prior to cementing operations. A 5bbl freshwater spacer was pumped, and lines were pressure tested to 500psi for 5 minutes and 3000psi for 5 minutes. 14.25bbls of 15.6ppg GP cement was mixed and pumped. An additional 9.75bbls of 15.6bbl cement slurry was mixed and pumped. The top plug was released, and cement displaced with 21.2bbls of bore water. Pressure increased approximately 20psi prior to bumping the plug. Pressure was incrementally increased to 1,000psi and held for 10 minutes. After testing, the pressure was bled back with 0.2bbls returned to the displacement tanks and floats held. 3.0bbls cement returns were recorded at surface during cement displacement. Full returns were observed throughout the cement job.

The cementing equipment was rigged down. A Cactus manufactured MBU-A 11” x 9-5/8” BTC 3M wellhead system was then installed onto the 9-5/8” surface casing. 11” 3M blow-out preventers were then nippled up to the Cactus wellhead and pressure tested. The BOP’s and lines were successfully pressure tested prior to drilling ahead.

3.3.3 8-1/2" Hole Section, 87m to 314.0m

An 8-1/2" PDC rotary drilling assembly was made up and RIH with top of cement tagged at 82.25mMDRT. The cement plug, shoe float and cement were drilled out and to 87.0mMDRT. 3m of new formation was drilled to 90.0mMDRT. The hole was circulated to ensure a consistent fluid density. An LOT was performed with 8.9ppg fluid to an equivalent density of 23.3ppg (210psi surface pressure).

The 8-1/2" production hole was drilled to 200.0mMDRT as per program using 4-5% KCL drilling fluid. The hole was circulated clean and a 10bbl high viscosity sweep was pumped and hole circulated clean prior to POOH.

The continuous wireline coring assembly was prepared and made ready. The 8-1/2" coring assembly and BHA was made up and RIH to 200.0mMDRT. The well was circulated clean prior to initiating core runs.

6-1/8" core continuously cut 68.6m core over 11 core runs from 200.0mMDRT to 268.56mMDRT. 14 coal desorption samples were collected across three seams during coring operations and were placed on desorption. On completion of coring, a high viscosity pill was pumped, and the hole circulated clean prior to POOH.

The remainder of the 8-1/2" production hole was drilled with a PDC rotary drilling assembly from 268.56mMDRT to section TD at 314.0mMDRT. At TD, the well was circulated until shakers were confirmed clean and 2 x 10bbl high yield sweeps were pumped prior to POOH for wireline logging. The maximum deviation on the 8-1/2" production hole was 0.57 degrees.

The following logging suites were run:

Run 1: PEX-AIT-GR-SP

Run 2: SONIC (MONOPOLE)-GPIT-FMI

Run 3: MDT 1: 251.7 to 259.6mMDRT

On completion of wireline logging and testing, a string of 7" 23ppf BTC mixed string (N80-L80-K55) with 1 x GRE fibreglass hybrid joint (250.76 to 259.40mMDRT) production casing was run to 311.02mMDRT. The 7" casing was landed in the wellhead via a casing hanger which was pressure tested to 250psi for 5 minutes and 3000psi for 15 minutes prior to rigging up for cementing operations.

A 7" cement head was installed onto the 7" landing joint and surface lines were flushed clean with 20bbls SAPP spacer. A 5bbl freshwater spacer was pumped ahead, and lines were pressure tested to 500psi for 5 minutes and 3000psi for 5 minutes. A second 5bbl freshwater spacer was pumped and the bottom plug released prior to mixing and pumping 35bbls of 14.5ppg cement slurry. The top plug was released, and cement displaced with 37.9bbls of bore water. The pump pressure remained constant at approximately 350psi before bumping the plug. The pressure was gradually increased to 1000psi and held for 10 minutes. Pressure was bled back with 0.3bbls returned to displacement tank and floats held. Full cement returns were observed at surface throughout the entire job with 0.5bbls of cement returned to surface.

A BPV in 2-7/8" tubing hanger in nesting hanger was seated in wellhead and pressure testing of seals was attempted. The pressure test was not successful, and seals were changed out. Follow-up pressure testing was only able to be achieved from above and it was decided to remediate after rig release. The well was suspended with nested hanger installed. Lock screws were engaged, and the BOPE was nippled down prior to rig release.

The rig was released at 1400 on the 23 October 2021.

3.3.4 Post Rig Release

While drilling Mahalo North 2, a 3-1/8" 3M gate assembly was installed on top of the rod lock assembly to allow nipple up of the Earth Reach Range finder during intersect. No BPV was in the hanger after drilling.

The well was intersected at 257.09mTVD (-17.83mSS) while drilling the first lateral section. The lateral was then lined with 3-1/2" perforated fibreglass tubing (GRE liner) which crossed the Mahalo North 1 vertical bore. After ranging operations were completed, the 3-1/8" gate valve was removed from the top of the well blind flange put in place. The well was suspended with BPV in place.

3.3.5 Install PCP Completion

Post drilling Mahalo North 2, Secure Well Services Rig #2 was mobilised to the Mahalo North 1 well location on 18 December 2021. The rig was rigged up over well centre, mud tanks were filled, and surface lines pressure tested (250psi/1500psi). BOPE were nippled up and blooie line installed. The BOPE was pressure tested (250psi/1500psi).

The tubing hanger was retrieved from the well and a 4-3/4" flat bottom mill clean-out assembly was run in hole and tagged the GRE liner at 257.97mMDRT. A power swivel head was rigged up and the well was filled with 20bbls fluid. The GRE liner was milled out to 259.05mMDRT with no weight on bit. The milled area was worked over with rotary, up and down until slick. The power swivel head was rigged down.

The 4-3/4" assembly was run-in hole and the well filled with 20bbls fluid and tagged fill at 259.5mMDRT. The assay was washed down to 276.98mMDRT.

The well was circulated at 276.98mMDRT, however no fill returned to surface and downhole fluid loses of +/- 80bbls/hr were recorded.

The clean-out assembly was POOH to 248.45mMDRT and well was secured overnight. The following day, the 4-3/4" clean-out assembly was run back in hole and tagged soft fill at 277.88mMDRT. POOH 2-7/8" EUE tubing.

A progressive cavity pumping assembly was RIH with gauge carrier and cable on 2-7/8" tubing and set at depth of 267.2mMDRT. Pressure sensor cable was terminated through the tubing hanger and hanger was set and pressure tested (250psi/1500psi).

BOPE were then nippled down and rod-lock installed onto wellhead and pressure tested (250psi/3000psi). A rotor was run in hole on 7/8" rods and spaced-out. Rod-lock was engaged, and SWS Rig #2 was demobilised from site at 1800 on 20 December 2021. Daily completion reports are included under **Appendix H**.

3.4 TIME ANALYSIS

Spud to release for Mahalo North 1 took 7.15 days. Of this, 5.07 days was required from spud to reach a total well depth of 314.0mMDRT. The pre-drill estimate for Mahalo North 1 was 5.1 days spud to release. The time v depth curve for Mahalo North 1 is shown in **Figure 4**.

3.4.1 Productive Time

An analysis of time by well phases is provided in **Figure 5**. The most time intensive operation (20%) was coring operations during the 8-1/2" section.

3.4.2 Non-Productive Time

A total of 24.25hrs non-productive time was incurred. An overview of issues can be seen below in **Table 14**.

Table 14: NPT Break Down

Phase	NPT (hr)	Description
12-1/4" surface hole section	1.0	Winch repair
12-1/4" surface hole section	5.0	Pipe ram and annular control line failure
12-1/4" surface hole section	1.25	Repair leaking flow nipple
8-1/2" production hole section	16.75	Repair leak in hydraulic motor seals
Run & Cement 7" Casing	0.25	Troubleshoot pump issues

Figure 4: Time versus Depth

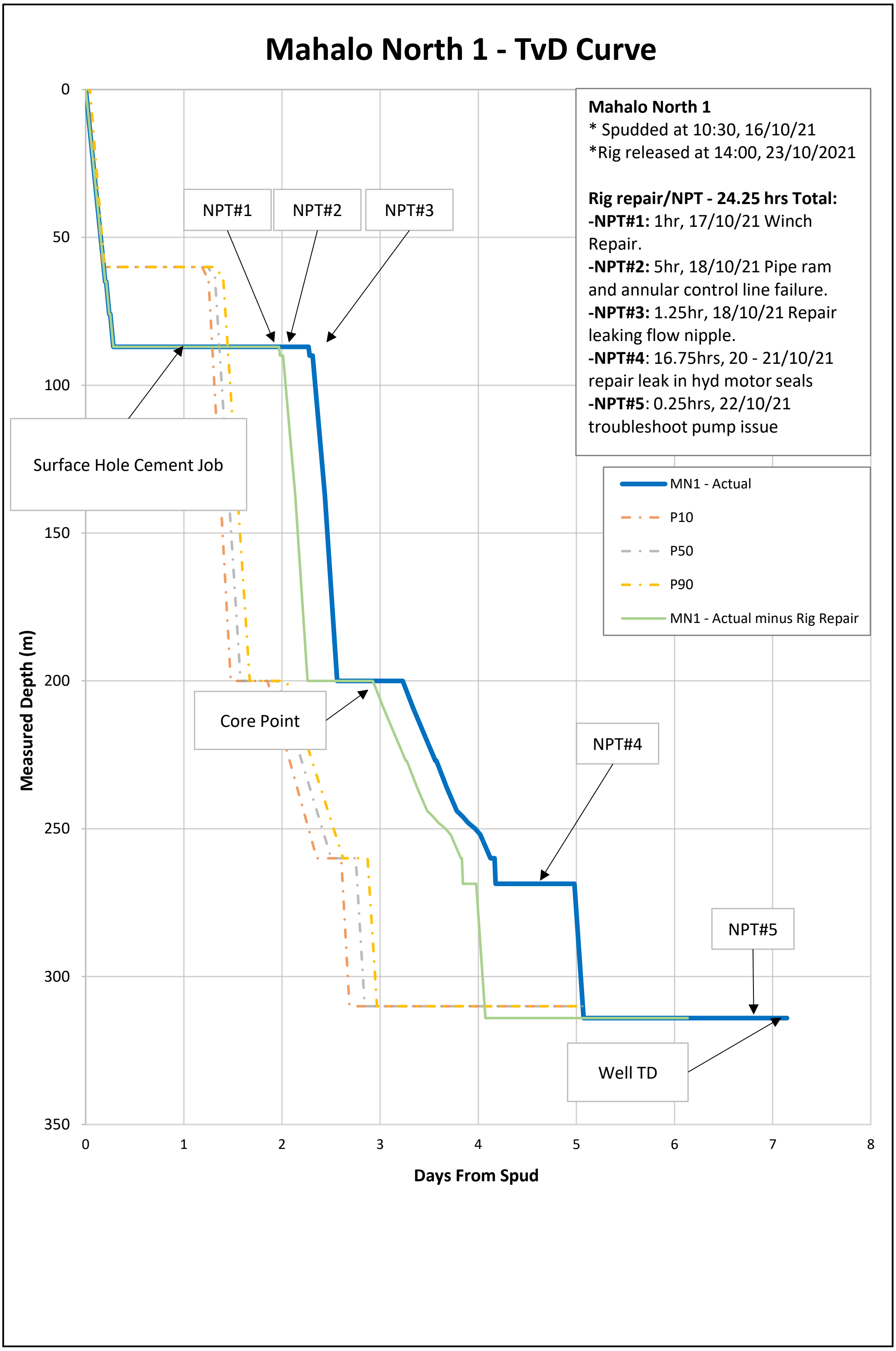
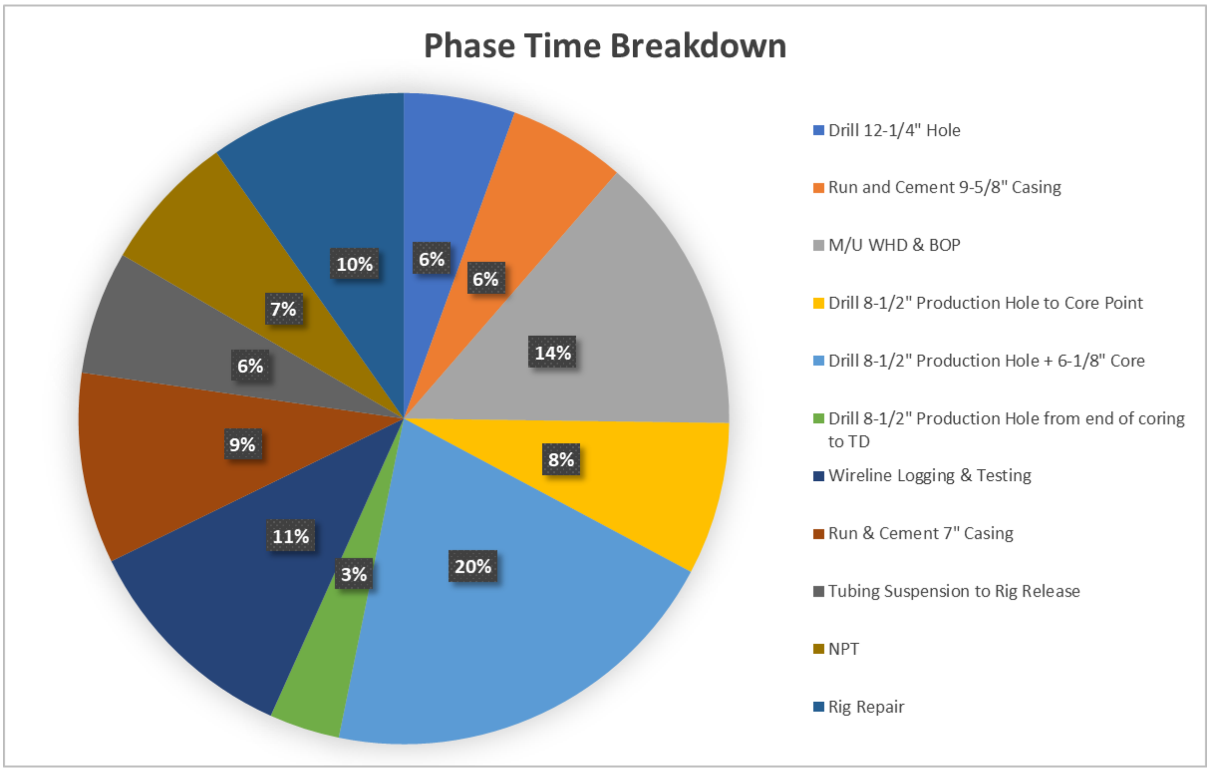


Figure 5: Time Breakdown



3.5 BIT RECORD

Bit data is provided in **Table 15**.

Table 15: Bit Record

Bit#	Size	Type	Make	Serial	Depth In	Depth Out	Meters Drilled	Hours	Average ROP (m/hrs)	WOB (Klbs)	RPM	Condition
1	12-1/4"	PDC DSH519M	NOV	A196541	11.0	87.0	76	5.0	15	1-5	60-110	1/1/-/A/N/I/RR/CSG
2	8-1/2"	PDC TKC56	NOV	E256350	87.0	200.0	113	5.0	22.60	1-2	80-90	1/1/-/A/X/I/RR/CP
3C	8-1/2"	Corebit CEP513S	NOV	A275612	200.0	268.5	41.6	3.0	13.86	2-8	40-65	0/0/-/A/X/I/RR/BHA
2RR	8-1/2"	PDC TKC56	NOV	E256350	268.0	314.0	46	2.25	20.44	2-7	100	0/0/-/A/X/I/RR/TD

3.6 BOTTOM HOLE ASSEMBLY RECORD

BHA data is provided in **Tables –16 to 19**.

Table 16: 12-1/4” Drilling BHA

Item	Description	Type	Serial Number	Manufacturer	OD (")	ID (")	Length (m)	Cum. Length (m)
1	12-1/4” PDC Bit, 6-5/8” Reg Pin	PDC	A196541	NOV	12.25	3.0	0.41	0.41
2	12-1/4” NB stab. 6-5/8” Reg B x B	Full-gauge. W/ Float	S823	Hofco	12.25	3.0	1.75	2.16
3	Crossover – 6-5/8” P x NC46 B	N/A	8-41	Hofco	8.28	2.94	0.63	2.79
4	6-1/4” Spiral DC, NC46 P x B	91ppf, Spiral type	N/A	SCD	6.25	2.50	9.14	11.93
5	Crossover – NC46 pin x 6-5/8” Reg B	N/A	15616.00.02	SCD	8.00	2.81	0.8	12.73
6	12-1/4” String Stab, 6-5/8” Reg P x 6-5/8” Reg B	N/A	S827	Hofco	12.25	3.00	1.5	14.23
7	Crossover, 6-5/8” Reg P x NC46 B	N/A	8-40	Hofco	8.25	2.92	0.75	14.98
8	7 x 6-1/4” Spiral DC, NC46 P x NC46 B	N/A	N/A	SCD	6.25	2.50	82.75	97.73
9	6 x 4” HWDP, NC46 P x NC46 B	N/A	N/A	SCD	4.50	2.75	As reqd	As reqd

Table 17: 8-1/2” Rotary BHA

Item	Description	Type	Serial Number	Manufacturer	OD (")	ID (")	Length (m)	Cum. Length (m)
1	8-1/2” PDC Bit, 4-1/2” Reg P	TKC49	E229123	NOV	8.5	2.25	0.28	0.28
2	8-1/2” NB stab. 4-1/2” Reg B x NC46 B	Full-gauge W/ Float	S6564	Hofco	8.5	2.53	0.694	0.97
3	6-1/4” Spiral DC, NC46 P x B	91ppf, Spiral type	N/A	SCD	6.25	2.5	9.5	10.47
4	8-1/2” String stab. NC46 P x B	Full Gauge	S6569	Hofco	8.5	2.5	0.626	11.10

5	7 x 6-1/4" Spiral DC, NC46 P x B	91ppf, Spiral type	N/A	SCD	6.25	2.5	66.5	77.60
6	6 x 4" HWDP, NC46 P x NC46 B	N/A	N/A	SCD	4.5	2.75	57.0	134.60
7	Crossover – NC46 Px XT39 B	N/A	29796-01-01	SCD	6.25	2.25	0.79	135.39
8	4" drill pipe to surface, XT39 B x XT39 P	14ppf	N/A	SCD	4.0	3.34	As req'd	As req'd

Table 18: 8-1/2" Coring BHA

Item	Description	Type	Serial Number	Manufacturer	OD (")	ID (")	Length (m)	Cum. Length (m)
1	8-1/2" PDC Core Head, DDD B	w/ integral stabiliser	A275612	NOV	8.5	N/A	0.59	0.59
2	6-1/2" Core Barrel, DDD P x B	c/w inner barrel	165075	NOV	6.5	4.25	9.41	10.00
3	Seat Sub, DDD P x DDD P	Inline	33300272	NOV	6.5	4.25	0.5	10.5
4	8-11/16" String Stabilizer, DDD B x DDD B		1310222-1-2	NOV	8.6875	4.25	0.76	11.26
5	6-1/2" Spiral DC, DDD P x DDD B		GEM 11901	NOV	6.5	4.25	94.26	105.52
6	Crossover, DDD P x NC50 B		N/A	NOV	6.5	4.25	0.5	106.02
7	5" Drill Pipe to surface, NC50 P x NC50 B		NA	NOV	5"	4.25	As reqd	As reqd

Table 19: Assembly Run Summary

Assembly #	Assembly Type	From (m MDRT)	To (m MDRT)
1	Assembly – As per Table 16	10.3	87.0
2	Assembly – as per Table 17	87.0	200.00
3	Assembly – As per Table 18	200.0	268.56
4	Assembly – as per Table 17	268.56	314.0

3.7 DEVIATION SUMMARY

Open hole deviation surveys were acquired with a digital survey tool. Deviation angles were from 0 to 0.56°. Maximum inclination recorded was 0.56°. Deviation data is presented below in **Table 20**:

Table 20: Deviation Data

MD (m)	INCL (deg)	AZIM (deg)	TVD (m)	VSEC (m)	N/-S (m)	E/-W (m)	Closure (m)	at AZIM (deg)	DLS (deg/30m)
0	0	0	-	0	0	0	0	0	90
81.23	0.38	45.5	81.23	81.23	0.19	0.19	0.19	0.27	45.5
90.37	0.56	14.48	9.14	90.37	0.25	0.25	0.22	0.34	41.58
99.52	0.44	25.24	9.14	99.52	0.33	0.33	0.25	0.41	37.37
108.66	0.48	46.55	9.14	108.66	0.39	0.39	0.29	0.48	37.22
117.81	0.57	48.18	9.14	117.8	0.44	0.44	0.35	0.57	38.72
126.95	0.52	40.51	9.14	126.95	0.5	0.5	0.42	0.65	39.49
136.09	0.38	41.63	9.14	136.09	0.56	0.56	0.46	0.72	39.63
145.24	0.32	58.42	9.14	145.23	0.59	0.59	0.5	0.78	40.31
154.38	0.35	66.27	9.14	154.38	0.62	0.62	0.55	0.83	41.71
163.53	0.37	59.75	9.14	163.52	0.64	0.64	0.6	0.88	43.06
172.67	0.31	44.45	9.14	172.67	0.68	0.68	0.64	0.93	43.61
181.81	0.21	24.93	9.14	181.81	0.71	0.71	0.67	0.98	43.32
190.96	0.11	9.04	9.14	190.95	0.73	0.73	0.68	1	42.73
200.1	0.05	30.57	9.14	200.1	0.75	0.75	0.68	1.01	42.41
209.25	0.1	65.28	9.14	209.24	0.75	0.75	0.69	1.02	42.54
218.39	0.14	52.36	9.14	218.39	0.76	0.76	0.71	1.04	42.81
227.53	0.2	30.15	9.14	227.53	0.78	0.78	0.72	1.06	42.72
236.68	0.26	18.3	9.14	236.67	0.82	0.82	0.74	1.1	42.1
245.82	0.28	3.65	9.14	245.82	0.86	0.86	0.74	1.14	40.97
254.97	0.23	339.79	9.14	254.96	0.9	0.9	0.74	1.16	39.51
264.11	0.18	318.12	9.14	264.11	0.93	0.93	0.72	1.17	38.03
273.25	0.14	299.39	9.14	273.25	0.94	0.94	0.7	1.18	36.77
282.4	0.13	280.07	9.14	282.39	0.95	0.95	0.68	1.17	35.76
291.54	0.13	257.34	9.14	291.54	0.95	0.95	0.66	1.16	34.94
300.69	0.13	248.27	9.14	300.68	0.94	0.94	0.64	1.14	34.31
309.83	0.1	251.42	9.14	309.83	0.94	0.94	0.63	1.13	33.79

3.8 DRILLING FLUID SUMMARY

A mud program was supplied by AMC Fluids for Mahalo North 1. A mud engineer was only available onsite for the start of the well.

The 12-1/4" hole section was drilled using 8.65-9.0ppg 4% KCL.

The 8-1/2" hole section was drilled using 8.0-8.8ppg 4-5% KCL.

Hi viscosity sweeps were run are required to assist with hole cleaning.

3.9 CASING AND CEMENTING SUMMARY

A string of 9-5/8" 36 K-55 BTC casing was run to 84.6mMDRT. The hole was circulated clean while reciprocating casing prior to cementing operations. A 5bbl freshwater spacer was pumped, and lines were pressure tested to 500psi for 5 minutes and 3000psi for 5 minutes. 14.25bbls of 15.6ppg GP cement was mixed and pumped. An additional 9.75bbls of 15.6bbl cement slurry was mixed and pumped. The top plug was released, and cement displaced with 21.2bbls of bore water. Pressure increased approximately 20psi prior to bumping the plug. Pressure was incrementally increased to 1,000psi and held for 10 minutes. After testing, the pressure was bled back with 0.2bbls returned to the displacement tanks and floats held. 3.0bbls cement returns were recorded at surface during cement displacement. Full returns were observed throughout the cement job.

A string of 7" 23ppf BTC mixed string (N80-L80-K55) with 1 x GRE fibreglass hybrid joint (250.76 to 259.40mMDRT) production casing was run to 311.02mMDRT. The 7" casing was landed in the wellhead via a casing hanger which was pressure tested to 250psi for 5 minutes and 3000psi for 15 minutes prior to rigging up for cementing operations. A 7" cement head was installed onto the 7" landing joint and surface lines were flushed clean with 20bbls SAPP spacer. A 5bbl fresh water spacer was pumped ahead, and lines were pressure tested to 500psi for 5 minutes and 3000psi for 5 minutes. A second 5bbl freshwater spacer was pumped and the bottom plug released prior to mixing and pumping 35bbls of 14.5ppg cement slurry. The top plug was released, and cement displaced with 37.9bbls of bore water. The pump pressure remained constant at approximately 350psi before bumping the plug. The pressure was gradually increased to 1000psi and held for 10 minutes. Pressure was bled back with 0.3bbls returned to displacement tank and floats held. Full cement returns were observed at surface throughout the entire job with 0.5bbls of cement returned to surface.

Details are included in **Appendix F**.

3.10 TEMPERATURE

A maximum bottom hole temperature of 34.84°C at 256.95mMDRT was recorded 7.6 hours after last circulation on the first logging suite. A temperature gradient of 2.65°C/100m was estimated using an ambient temperature of 25°C.

3.11 WELL SUSPENSION & COMPLETION

A BPV in 2-7/8" tubing hanger in nesting hanger was seated in wellhead and pressure testing of seals was attempted. The pressure test was not successful, and seals were changed out. Follow-up pressure testing was only able to be achieved from above and it was decided to remediate after rig release. The well was suspended with nested hanger installed. Lock screws were engaged, and the BOPE was nippled down prior to rig release.

The well suspension schematic is illustrated under **Figure 6.**

While drilling Mahalo North 2, a 3-1/8" 3M gate assembly was installed on top of the rod lock assembly to allow nipple up of the Earth Reach Range finder during intersect. No BPV was in the hanger after drilling.

The well was intersected at 257.09mTVD (-17.83mSS) while drilling the first lateral section. The lateral was then lined with 3-1/2" perforated fibreglass tubing (GRE liner) which crossed the Mahalo North 1 vertical bore. After ranging operations were completed, the 3-1/8" gate valve was removed from the top of the well blind flange put in place. The well was suspended with BPV in place.

Secure Well Services Rig #2 was mobilised to the Mahalo North 1 well location on 18 December 2021. The rig was rigged up over well centre, mud tanks were filled, and surface lines pressure tested (250psi/1500psi). BOPE were nippled up and blooie line installed. The BOPE was pressure tested (250psi/1500psi).

The tubing hanger was retrieved from the well and a 4-3/4" flat bottom mill clean-out assembly was run in hole and tagged the GRE liner at 257.97mMDRT. A power swivel head was rigged up and the well was filled with 20bbls fluid. The GRE liner was milled out to 259.05mMDRT with no weight on bit. The milled area was worked over with rotary, up and down until slick. The power swivel head was rigged down.

The 4-3/4" assembly was run-in hole and the well filled with 20bbls fluid and tagged fill at 259.5mMDRT. The assay was washed down to 276.98mMDRT.

The well was circulated at 276.98mMDRT, however no fill returned to surface and downhole fluid loses of +/- 80bbls/hr were recorded.

The clean-out assembly was POOH to 248.45mMDRT and well was secured overnight. The following day, the 4-3/4" clean-out assembly was run back in hole and tagged soft fill at 277.88mMDRT. POOH 2-7/8" EUE tubing.

A progressive cavity pumping assembly was RIH with gauge carrier and cable on 2-7/8" tubing and set at depth of 267.2mMDRT. Pressure sensor cable was terminated through the tubing hanger and hanger was set and pressure tested (250psi/1500psi).

BOPE were then nippled down and rod-lock installed onto wellhead and pressure tested (250psi/3000psi). A rotor was run in hole on 2-7/8" rods and spaced-out. Rod-lock was engaged, and SWS Rig #2 was demobilised from site at 1800 on 20 December 2021. Daily completion reports are included under **Appendix H**.

The well completion schematic is illustrated under **Figure 7.**

Figure 6: Well Suspension Schematic

Comet Ridge Limited

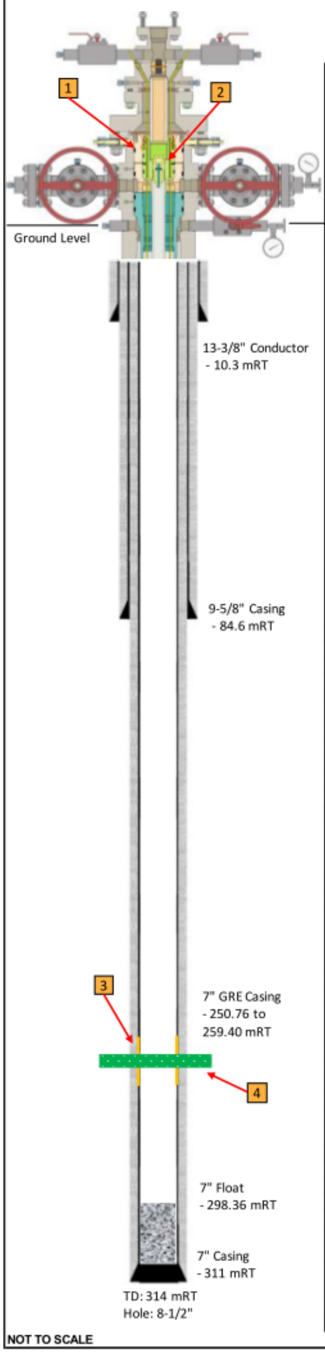
Mahalo North 1

INGAUGE

Latitude: 24°4'36.88045"S
Longitude: 148°38'31.86941"E

Well Spudded: 16-Oct-2021
Rig Released: 23-Oct-2021

Ground Level: 235.06 mAHD
RT elevation: 239.26 mAHD



ITEM No	DESCRIPTION	LTH (m)	DTH (mRT)	MIN I.D. (inch)	MAX O.D. (inch)
1	Pack-off , CW, MBU-A, 11" x 7" Nominal LR Bowl, With 9.500" 4 Stub Acme 2G Left Hand Pin. Lower dovetail seal failed for two pack-offs. Upper seal tested from above OK.	0.33	3.70	7.00	11.00
2	Tubing Hanger pre-installed into Pack-off, CW, MBU-A-LRCCL, 7-1/16" x 2-7/8" EU Box Bottom x 3.750" 4 Stub Acme 2G Left Hand Box Top, With 2-1/2" HBPV Thread & Two 1/4" CCL. Seal tests passed. No BPV installed.	0.25	3.70	2.441	7.06
3	7" GRE Casing fibreglass section.	8.64	250.76	6.276	7.00
4	3-1/2" Perforated Fibreglass liner placed across 6-1/8" intersect hole		257.09		

BRIEF HISTORY OF WELL

Mahalo North 1 was drilled as a vertical production well in the Mahalo North field targeting the Castor and Pollux coal seams. The aim was to core both seams and place 7" fibreglass casing across the Pollux seam. The well was spudded at 10:30 hours on the 16th of October 2021 with Silver City Drilling Rig 23, a Schramm T200XD. The 12-1/4" surface hole was drilled vertically using a PDC bit and stabilised BHA to section TD of 87 mRT. A 9-5/8" surface casing was then run and cemented at 84.6 mRT.

The 8-1/2" Rotary BHA was RIH and tagged cement at 82.25 mRT. The cement and 3m of new formation was drilled to 90 mRT before conducting an FIT to 23.4ppg EMW. The hole was then drilled vertically to core point of 200mRT. The rotary BHA was then POH and a 8-1/2" x 3" NOV coring BHA was RIH. The well was then cored to 268.56 mRT. Attempted to seat the drill rod but encountered hydraulic pump failure on rig carrier. POH coring BHA and repair rig. RIH 8-1/2" rotary BHA and drill to TD of 314 mRT. Well TD was achieved within 4.18 days from spud. SLB was used for the wireline logging to conduct a two logging runs and wireline MDT testing. This data was then used to select the packer setting depth, develop the casing tally and calculate the programmed cement volume. The production casing was a mixed string of 7"-23ppf-N80-BTC, 7"-23ppf-L80-BTC, 7"-23ppf-K55-BTC and 7"-GRE-BTC. The casing string was run and cemented at 311.02 mRT.

During land out of the nested tubing hanger the Pack-Off lower dovetail seal did not hold pressure. Achieved successful test on upper seal from above. The well was suspended with the nested hanger installed. On top of the rod lock assembly a 3-1/8" 3M gate valve was installed to allow nipple up of EarthReach range finders during intersect. No BPV was run in the hanger after drilling.

The well was then intersected at 257.09 mRT while drilling the first 6-1/8" lateral section of Mahalo North 2. The lateral was then lined with 3-1/2" perforated fibreglass tubing which crossed the vertical MN1 bore. After ranging operations were completed the 3-1/8" gate valve was removed from the top of the well and a blind flange put in place. The well was suspended with a BPV in place.

CONDUCTOR

CASING DETAILS		CEMENTING DETAILS:
Size:	13-3/8"	Installed by civil contractor.
Weight:	54.5ppf	
Grade:	K55	
Range:	3	
Depth Set:	10.3	

SURFACE

CASING DETAILS		CEMENTING DETAILS:
Size:	9-5/8"	Mixed and pumped 14.25bbls of 15.6ppg cement slurry. Stop pumping and mixed 2bbls 15.6 slurry and pumped. Mixed and pumped 7.75 bbls 15.6ppg slurry. Released top plug. Displaced a total of 21.2bbls of Ingwe Bore water from tanker. The pump pressure rose to +/-30psi before the plug was bumped. The pressure was incremented up to 1000psi and pressure held over 10 mins for a good casing test. The pressure was bled back, 0.2 bbls returned. Cement was in place at 05:15hrs. 3 bbls cement was observed as returned to surface by the end of the job. Full returns were seen throughout the job.
Weight:	36ppf	
Grade:	K55	
Range:	3	
Depth Set:	84.60	

PRODUCTION

CASING DETAILS		CEMENTING DETAILS:
Size:	7"	Flushed surface lines with 20 bbls SAPP spacer ahead. Pumped 10 bbl of water. Released bottom plug and mixed and pumped 35bbls of 14.5ppg cement slurry. Released top plug and displaced total of 37.90bbls of Ingwe Bore water. Pump pressure remained constant at +/-350psi while reducing pump rate (1.2bbls/min) before the plug was bumped. Pressure test casing to 1000psi for 10 mins. Bled back with 0.3 bbls returned, floats held. +/-0.5 bbls cement was estimated as returned to surface and confirmed by final sample taken from 2" LP lower side outlet on wellhead. Sample hardened after +/-7hrs. Full returns during job.
Weight:	23ppf	
Grade:	Mixed	
Range:	3	
Depth Set:	311.02	

FORMATION	FORMATION INTERVAL (mRT)	GUN:		CHARGES:		
		SIZE	TYPE	SPF	TYPE	WT(g)
Tertiary Sediments	4.2 - 40					
Rewan Formation	40 - 200					
Bandanna Formation	200 - 314					
Aries Upper Seam	216.02 - 216.41					
Aries Thick Seam	220.77 - 221.82					
Aries Lower Seam	224.24 - 224.46					
Castor and Pollux Seams	252.55 - 259.39 (seams coalesced at this location)					
PRESSURE	Not measured					
TEMPERATURE	Not measured					

TAGGED DEPTHS:	
ANNULUS FLUID:	
INDICATED STRING WEIGHT:	
CALCULATED STRING WEIGHT:	
LANDED WEIGHT:	
REMARKS:	

WELLSITE SUPERVISORS: Mick Marshall/Steve Muirhead		
DRAFTED BY: Dylan Shaw	DATE:	26 November 2021
REVISED BY:	DATE:	
CHECKED BY: Jordan Bunning	DATE:	29 November 2021

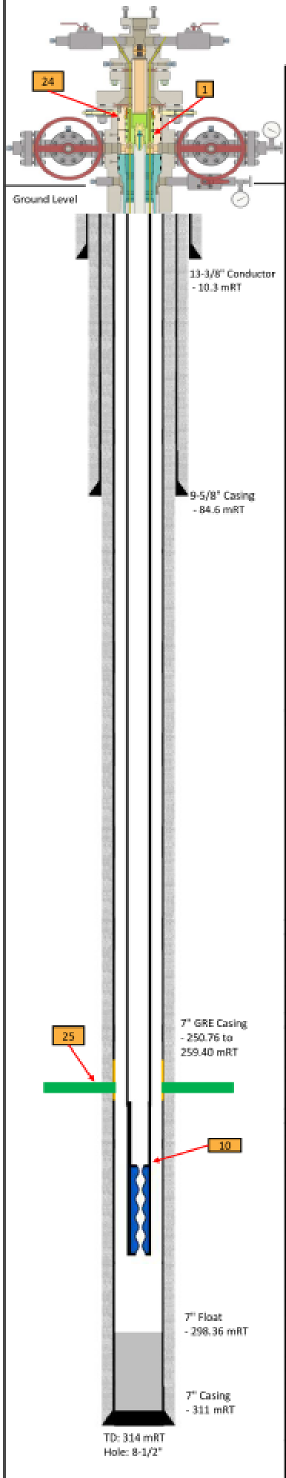
Figure 7: Well Completion Schematic

Mahalo North 1

Comet Ridge Limited

iNGAUGE

Latitude:	24°4'36.88045"S	**Well Spudded:** 16-Oct-2021	**Ground Level:**	235.06	mAHD
Longitude:	148°38'31.86941"E	**Rig Released:** 23-Oct-2021	**RT elevation:**	239.26	mAHD



NOT TO SCALE

ITEM No	Qty	DESCRIPTION	Top Con	Bot Con	LTH (m)	DTH (mRT)	MIN I.D.	MAX O.D.
1	1	Tubing Hanger, CW, MBU-A-LRCCL, 7-1/16" x 2-7/8" EU Box Bottom x 3.750" 4 Stub Acme 2G Left Hand Box Top, With 2-1/2" HBPV Thread & Two 1/4" CCL. Seal tests passed. BPV installed	3-3/4" 4-Stub Acme BOX	2-7/8" EUE BOX	0.25	3.70	2.441	7.0625
2	1	2-7/8" EUE J55 R2 Tubing - PIN x PIN	2-7/8" EUE PIN	2-7/8" EUE PIN	9.45	3.95	2.441	3.668
3	24	2-7/8" EUE J55 R2 Tubing	2-7/8" EUE BOX	2-7/8" EUE PIN	226.80	13.40	2.441	3.668
4	1	2-7/8" EUE, Pump Seating Nipple	2-7/8" EUE BOX	2-7/8" EUE PIN	0.35	240.20	2.28	3.668
5	1	2-7/8" EUE J55 R2 Tubing	2-7/8" EUE BOX	2-7/8" EUE PIN	9.45	240.55	2.441	3.668
6	1	2-7/8" EUE J55 4' Pup Joint - Gauge Carrier Joint	2-7/8" EUE BOX	2-7/8" EUE PIN	1.22	250.00	2.441	3.668
7	1	2-7/8" EUE J55 R2 Tubing	2-7/8" EUE BOX	2-7/8" EUE PIN	9.45	251.22	2.441	3.668
8	1	2-7/8" EUE J55 6' Pup Joint	2-7/8" EUE BOX	2-7/8" EUE PIN	1.83	260.67	2.441	3.668
9	1	PCP, Model: NTZ 350*120ST25-SH-THT-P (25-1200) - Orbit Tube	2-7/8" EUE BOX	-	3.13	262.50		3.700
10	1	PCP, Model: NTZ 350*120ST25-SH-THT-P (25-1200) - Stator	-	2-7/8" EUE PIN	5.83	265.63		3.700
		Completion TD				**271.46**		
		- Downhole Gauge -						
11	1	Wellhead Termination				3.13		
12	1	Tubing Encapsulated Cable, 4mm 316SS armour with 11mm encapsulation			246.87	3.13		
13	1	Gauge Carrier, 2-3/8"			1.22	250.00		
		Gauge TD				**251.22**		
		- Rods -						
14	1	Polished Rod 1.25" x 26ft, 7/8" pin	N/A	7/8" PIN	7.92	1.75		
15	1	Polished rod x sucker rod crossover	7/8" BOX	7/8" PIN	0.10	9.67	-	1.25
16	33	Sucker Rod, 7/8" - with 2 x rod guides per rod	7/8" BOX	7/8" PIN	249.15	9.77	-	2.15
17	2	Pony Rod, 7/8" x 4FT	7/8" BOX	7/8" PIN	2.44	258.92	-	1.19
18	0	Pony Rod, 7/8" x 6FT	7/8" BOX	7/8" PIN	0.00	261.36		1.19
19	1	Pony Rod, 7/8" x 8FT	7/8" BOX	7/8" PIN	2.44	261.36	-	1.19
20	1	Crossover 7/8" x 1" X-Torque	7/8" BOX	1" XT PIN	0.10	263.80	-	2.30
21	1	Pump Pony Rod - 1" X-Torque	1" XT BOX	-	1.22	263.90		2.30
22	1	Pump Rotor	-	-	6.06	265.12	-	2.10
		Rod TD				**271.18**		
		- Other Items -						
23	1	7" GRE Casing fibreglass section.			8.64	250.76	6.125	7.00
24	1	Packoff , CW, MBU-A, 11" x 7" Nominal LR Bowl, With 9.500" 4 Stub Acme 2G Left Hand Pin. Lower dovetail seal failed for two packoffs. Upper seal tested from above OK.			-	-	7.00	11.00
25	1	3-1/2" Fibre Glass Liner placed Across 6-1/8" intersect Hole				257.09		

BRIEF HISTORY OF WELL

Mahalo North 1 was drilled as a vertical production well in the Mahalo North field. The well was spudded at 10:30 hours on the 16th of October 2021 with Silver City Drilling Rig 23, a Schramm T200XD. The 12-1/4" surface hole was drilled vertically using a PDC bit and stabilised BHA to section TD of 87 mRT. A 9-5/8" surface casing was then run and cemented at 84.6 mRT. The cement and 3m of new formation was drilled to 90 mRT before conducting an FIT to 23.4ppg EMW. The hole was then drilled vertically to core point of 200mRT. The rotary BHA was then POH and a 8-1/2" x 3" NOV coring BHA was RIH. The well was then cored to 268.56 mRT. RIH 8-1/2" rotary BHA and drill to TD of 314 mRT. Well TD within 4.18 days from spud. Conducted two logging runs and wireline MDT testing. The production casing was a mixed string of 7"-23ppf-N80-BTC, 7"-23ppf-L80-BTC, 7"-23ppf-K55-BTC and 7"-GRE-BTC. The casing string was run and cemented at 311.02 mRT. During land out of the nested tubing hanger the Pack-Off lower dovetail seal did not test. Achieved successful test on upper seal from above. The well was suspended with the nested hanger installed. The well was then intersected at 257.09 mRT while drilling the first 6-1/8" lateral section of Mahalo North 2. The lateral was then lined with 3-1/2" perforated fibreglass tubing which crossed the vertical bore. After ranging operations were completed the 3-1/8" gate valve was removed from the top of the well and a blind flange put in place. The well was suspended with a BPV in place.

CONDUCTOR

CASING DETAILS		CEMENTING DETAILS:
Size:	*13-3/8"*	Installed by civil contractor.
Weight:	*54.5ppf*	
Grade:	*K55*	
Range:	*3*	
Depth Set:	*10.3*	

SURFACE

CASING DETAILS		CEMENTING DETAILS:
Size:	*9-5/8"*	Mixed and pumped 14.25bbls of 15.6ppg cement slurry. Stop pumping and mixed 2bbls 15.6 slurry and pumped. Mixed and pumped 7.75 bbls 15.6ppg slurry. Released top plug. Displaced a total of 21.2bbls of Ingwe Bore water from tanker. The pump pressure rose to +/-30psi before the plug was bumped. The pressure was incremented up to 1000psi and pressure held over 10 mins for a good casing test. The pressure was bled back, 0.2 bbls returned. Cement was in place at 05:15hrs. 3 bbls cement was observed as returned to surface by the end of the job. Full returns were seen throughout the job.
Weight:	*36ppf*	
Grade:	*K55*	
Range:	*3*	
Depth Set:	*84.60*	

PRODUCTION

CASING DETAILS		CEMENTING DETAILS:
Size:	*7"*	Flushed surface lines with 20 bbls SAPP spacer ahead. Pumped 10 bbl of water. Released bottom plug and mixed and pumped 35bbls of 14.5ppg cement slurry. Released top plug and displaced total of 37.90bbls of Ingwe Bore water. Pump pressure remained constant at +/-350psi while reducing pump rate (1.2bbls/min) before the plug was bumped. Pressure test casing to 1000psi for 10 mins. Bled back with 0.3 bbls returned, floats held. +/-0.5 bbls cement was estimated as returned to surface and confirmed by final sample taken from 2" LP lower side outlet on wellhead. Sample hardened after +/-7hrs. Full returns were seen throughout the job.
Weight:	*23ppf*	
Grade:	*Mixed*	
Range:	*3*	
Depth Set:	*311.02*	

FORMATION	FORMATION INTERVAL (mRT)	GUN: SIZE	GUN: TYPE	CHARGES: SPF	CHARGES: TYPE	CHARGES: WT(g)
Tertiary Sediments	4.2 - 40					
Rewan Formation	40 - 200					
Bandanna Formation	200 - 314					
Aries Upper Seam	216.02 - 216.41					
Aries Thick Seam	220.77 - 221.82					
Aries Lower Seam	224.24 - 224.46					
Castor and Pollux Seams	252.55 - 259.39 (seams coalesced at this location)					
PRESSURE	Not measured					
TEMPERATURE	Not measured					

TAGGED DEPTHS:	
ANNULUS FLUID:	
INDICATED STRING WEIGHT:	
CALCULATED STRING WEIGHT:	Tubing = 5.7 klbs, Rods = 1.9 klbs
LANDED WEIGHT:	
REMARKS:	

WELLSITE SUPERVISORS: Drilling - Mick Marshall/Steve Muirhead

DRAFTED BY: Dylan Shaw	DATE:	23 November 2021
REVISED BY:	DATE:	
CHECKED BY: Jordan Bunning	DATE:	25 November 2021

3.12 SAFETY RECORD

A total of 7903 accident-free man hours were accumulated, based on a 12-hour shift per person on site. The operation employed a Magna board name tag system to identify personnel on and off site. The Permit to Work system was used. A pre spud safety meeting was held prior to spud. Pre-tour meetings were held prior to each shift. Toolbox safety meetings were held prior to any operation relating to well control including wellhead and BOP installation and testing, and operations such as drilling operations, flow checks and clean-out operations. A muster drill and meeting were held to discuss well control contingencies on completion of BOPE installation and testing. In addition, toolbox safety meetings were held prior to non-standard rig operations, such as cementing, coring, logging, and testing operations. All those who attended these meetings signed the safety forms for proper documentation.

Appropriate signage for pressure testing and radioactive sources was prominently displayed. Food preparation and eating areas were maintained hygienically and smoke free. Camp and rig rooms were regularly cleaned and maintained.

4.0 FORMATION SAMPLING AND EVALUATION

4.1 MUD LOGGING

Mud logging services were not required on this well.

4.2 DITCH CUTTINGS

Ditch cuttings (approximately 250g washed and dried) were collected at 10m intervals from 11.0mMDRT to 180.0mMDRT and 268.56mMDRT to 314.0mMDRT.

All samples were described by the contract geologist on shift and are included under the **Appendix B, C & D**. Daily Geological Reports are included under **Appendix B.**

4.3 CORING

Mahalo North 1 was mud rotary drilled to 200.0mMDRT within the Bandanna Formation. The well was then continuously cored using NOV Corion Express coring system from 200.0mMDRT to 268.56mMDRT.

Core was measured, marked up and packed in core trays by ALS and described by the contract geologist. The Coring Report is included under **Appendix E**. Core descriptions are included in **Appendix C & Appendix D** and Core Photographs in **Appendix D**.

A total of 68.6m of 6-1/8" core was recovered from 68.6m cut from the interval 200.0mMDRT to 268.56mMDRT (**Table 21**), giving 99.9% core recovery for the well.

Table 21: Core Recovery

Core Run	BHA #	Core Barrel Length (m)	Hole Size (")	Catcher Type	Depth in (m)	Depth Out (m)	Cored (m)	Recovered (m)	Time (min)	ROB (m/hr)	Recovery (%)
1	1	9m	8.5	SC+FB	200.00	209.00	9.0	8.84	30	18.00	98
2	1	9m	8.5	SC+FB	209.00	218.00	9.0	9.08	35	15.43	101
3	1	9m	8.5	SC+FB	218.00	227.00	9.0	9.02	38	14.21	100
4	1	9m	8.5	SC+FB	227.00	236.00	9.0	9.02	34	15.88	100
5	1	9m	8.5	SC+FB	236.00	244.00	8.0	7.94	23	20.87	99
6	1	9m	8.5	SC+FB	244.00	246.00	2.0	2.00	7	17.14	100
7	1	9m	8.5	SC+FB	246.00	248.00	2.0	2.00	7	17.14	100
8	1	9m	8.5	SC+FB	248.00	250.00	2.0	1.90	5	24.00	95
9	1	9m	8.5	SC+FB	250.00	252.00	2.0	2.00	6	20.00	100
10	1	9m	8.5	SC+FB	252.00	260.00	8.0	7.39	23	20.87	92
11	1	9m	8.5	SC+FB	260.00	268.56	8.6	9.33	44	11.67	100
						Total (m)	**68.60**	**68.52**	**Coring ROP (m/hr)**	**16.30**	
						Recovery (%)		**99.88**			

Details are included in **Appendix D.**

4.4 FORMATION TOPS

Formation tops were derived from electric logs, cuttings, and core data. All depths in this section are referenced to electric log depth.

Table 22: Formation Tops

Formation	**Prognosed**			**Actual**				
	Depth		Thickness	Depth			Thickness	Difference (-ve Hi)
	mTVDSS	mMDRT	m	mTVDSS*	mMDRT	mTVD*	m	m
RT	+239.255	0.0		+239.255	0.00	0.0		
GL	+235.055	4.2		+235.055	4.2	4.2		
Rewan Group	+235.055	4.2	191.21	+235.055	4.2	4.2	196.76	0
Base Tertiary Basalt	+199.26	40.0		NA	NA	NA		
Base of Weathering	+184.26	55.0		+163.26	76.0	76.0		+21
Bandanna Formation	+43.85	195.41	114.59+	+38.30	200.96	200.96	113.04	+5.55
Aries Seam	+20.48	218.78		+23.53	215.72	215.72		-3.06
Castor Seam	-12.63	251.89		-12.88	252.13	252.13		+0.24
Pollux Seam	--17.72	256.48		-15.41	254.66	254.66		-1.82
Orion Seam	NA	NA		-33.79	273.04	273.04		
TD	-70.75	310.0		-74.75	314.0	314.0		

*Actual TVD depths corrected to deviation survey.

4.5 WELL LITHOLOGY

Detailed lithological descriptions are included in **Appendix B, C & D.**

4.6 WIRELINE LOGGING

Wireline logging services were conducted by Schlumberger. The first run comprised a triple combo tool string (gamma ray-neutron-density-induction-caliper). The entire hole length (5.0-313.7mMDRT) was logged in High Resolution mode (2.5cm sample rate). Gamma ray was acquired to surface and density and neutron were acquired to surface casing shoe depth of 84.6mMDRT. The second run comprised an FMI (fullbore formation microimager), deviation, gamma ray and monopole sonic log. The Logger’s TD was 313.70mMDRT which was 30cm shallower than Drillers TD (314.0mMDRT). The third run comprised the MDT tool, which tested 1 interval. The logging suites run are as per **Table 23**. Digital LAS format wireline log data **(Digital Data)** and PDF wireline log plots (**Enclosure 1**) accompany this report. Geological and wireline log data are combined on the Composite Log and Strip Log (**Enclosure 2**).

Table 23: Wireline Logging Programme

Run	Tool String	Interval (mMDRT)	Contractor
1	PEX-AIT-GR-SP (Triple Combo)	313.7-84.6m 313.7 – 5.0m(GR)	Schlumberger
2	SONIC-GPIT-FMI (Sonic-Deviation Survey-Resistivity Image Log)	313.7-84.6m 313.7 – 5.0m(GR)	Schlumberger
3	MDT (Modular Dynamic Tester)	See Formation Testing	Schlumberger

4.7 FORMATION TESTING

One MDT (modular formation dynamics tester) was undertaken across the Castor-Pollux interval (**Table 24**) within the Bandanna Formation.

Table 24: Formation Testing

Test No	Formation	Coal Seam	Interval From (mMDRT)	Interval To (mMDRT)	Gauge Depth (mMDRT)	Final BU Pressure (psia)
MDT 1	Bandanna Formation	Castor-Pollux Seam	251.7	259.6	259.2	307.06

The final MDT report is included under **Appendix G**.

4.8 GAS DESORPTION AND ANALYSIS

14 samples were selected by the wellsite geologist for further analysis. These were put on gas desorption test by ALS immediately after recovery and continued to be monitored in the laboratory in Brisbane for approximately 80 days. All 14 samples were predominantly coal with minor carbonaceous mudstone. The final gas desorption report is included in **Appendix D.**

Table 25: Desorption Summary

Desorption Sample No	Sampling Date	Top Depth (mMDRT)	Bottom Depth (mMDRT)	Time on Test (Days)	Raw Lost Gas (scc/g)	Raw Desorbed Gas (scc/g)	Raw Residual Gas (scc/g)	Total Raw Gas Content (scc/g)	Total DAF Gas Content (scc/g)	Seam
MNH001_001	19/10/2021	215.710	216.100	79	0.31	2.71	0.60	3.62	4.54	Aries
MNH001_002	19/10/2021	220.460	221.050	79	0.27	2.31	0.42	2.99	4.29	Aries
MNH001_003	19/10/2021	221.050	221.510	79	0.36	2.20	0.23	2.79	4.72	Aries
MNH001_004	20/10/2021	223.930	224.150	79	0.26	2.08	0.20	2.55	4.63	Aries
MNH001_005	20/10/2021	252.060	252.830	78	0.51	2.49	0.26	3.26	4.89	Castor
MNH001_006	20/10/2021	252.830	253.520	78	0.93	3.25	0.68	4.87	6.14	Castor
MNH001_007	20/10/2021	253.520	254.240	79	0.95	3.67	0.23	4.85	5.79	Castor
MNH001_008	20/10/2021	254.240	254.990	79	0.80	3.37	0.24	4.43	5.44	Castor/Pollux
MNH001_009	20/10/2021	254.990	255.630	79	0.79	3.45	0.28	4.52	5.81	Pollux
MNH001_010	20/10/2021	255.630	256.380	79	1.05	3.37	0.28	4.70	5.87	Pollux
MNH001_011	20/10/2021	256.380	257.110	79	0.71	3.39	0.26	4.36	5.52	Pollux
MNH001_012	20/10/2021	257.110	257.830	79	0.84	3.58	0.41	4.83	5.92	Pollux
MNH001_013	20/10/2021	257.830	258.580	80	0.80	3.65	0.27	4.73	5.62	Pollux
MNH001_014	20/10/2021	258.580	258.900	80	0.60	2.75	0.35	3.70	5.04	Pollux

4.9 SITE SURVEY

The well was surveyed for a final location prior to spud. The site survey diagram is provided under **Appendix I.**

5.0 REFERENCES

ALS, 2021, Comet Ridge Limited – Mahalo North 1 TD Field Report. S*ubmitted as part of this report. Appendix C*

ALS, 2022, Comet Ridge Limited – Mahalo North 1 Gas Desorption and Analysis Report. S*ubmitted as part of this report. Appendix D*

Bradshaw, B.E., Spencer, L.K., Lahtinen, A.C., Khider, K., Ryan, D.J., Colwell, J.B., Chirinos, A., and Bradshaw, J. (2009). Queensland carbon dioxide geological storage atlas.

Cadman, S.J. and Pain, L., (1998) Bowen and Surat Basins, Clarence-Moreton Basin, Gunnedah Basin, and other minor onshore basins, Queensland, NSW and NT. Australian Petroleum Accumulations Report 11, Bureau of Resource Sciences, Canberra.

COI, 2021, Comet Ridge Limited, Mahalo North 1, Daily Drilling Reports. *Submitted as part of this report. Appendix A*

COI, 2021, Comet Ridge Limited, Mahalo North 1, Daily Completion Reports. *Submitted as part of this report. Appendix H*

COI, 2021, Mahalo North 1 Well Proposal and Drilling Programme. Comet Ridge Limited, *unpublished report.*

Green, P.M (Editor), 1997: The Surat and Bowen Basins, south-east Queensland. Queensland Minerals and Energy Review Series, Queensland Department of Mines and Energy.

NOV Wellbore Technologies, 2021, Comet Ridge - Mahalo North 1 – Coring Services EOWR, NOV Wellbore Technologies. S*ubmitted as part of this report. Appendix E*

APPENDIX A

DAILY DRILLING REPORTS

APPENDIX B

DAILY GEOLOGICAL REPORTS

APPENDIX C

ALS TOTAL DEPTH FIELD REPORT

APPENDIX D

ALS GAS DESORPTION REPORT

APPENDIX E

CORING REPORT

APPENDIX F

CASING & CEMENTING REPORT

APPENDIX G

MDT REPORT

APPENDIX H

DAILY COMPLETION REPORTS

APPENDIX I

SITE SURVEY REPORT

ENCLOSURE 1

WIRELINE LOGS

(i) PEX-AIT-GR 1:100 & 200
(ii) PEX-AIT-GR 1:500
(iii) FMI-MSIP-GR 1:40
(iv) FMI PROCESSED 1:20

ENCLOSURE 2

(i) Composite Log 1:200
(ii) Composite Log 1:500
(iii) Strip Log Detailed 1:20
(iv) Strip Log General 1:100

DIGITAL DATA

WIRELINE LOGS
FMI DATA
MDT DATA
DIGITAL COAL & GAS ANALYSIS DATA

ADDITIONAL FMI DATA
CAN BE OBTAINED BY CONTACTING

Geoscience Information Services
Geological Survey of Queensland
Department of Resources (DoR)
GSQOpenData@resources.qld.gov.au
or
geological_info@resources.qld.gov.au