JIF Annual Compliance Report

Reporting Period: 22 October 2024 to 21 October 2025

Revision history

Revision	Revision Date	Revision Summary
1	14 January 2026	Initial Issue

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1 Introduction

Arrow Energy's (Arrow) Surat Gas Project (SGP) was approved by the Australian Government under the *Environment and Protection and Biodiversity Conservation Act 1999* (EPBC Act) decision 2010/5344 on 19 December 2013. The SGP commenced development of coal seam gas (CSG) resources in the Surat Basin on 22 October 2020.

The conditions of Arrow's approval EPBC 2010/5344 were varied on 27 February 2025, in part to align the SGP with the Joint Industry Framework (JIF) (DCCEEW, 2021). In particular, Condition 14A (as varied) aligns the SGP with the JIF, such that the approval holder must manage impacts on water resources and EPBC-listed springs in accordance with the relevant risk management framework/s (which is defined as the JIF).

On 17 March 2021, the Australian Government issued the JIF to achieve defined environmental outcomes for groundwater in the Surat Basin. The JIF was collaboratively developed by the then Federal Department of Agriculture, Water and the Environment and the CSG industry, with technical and regulatory advice from the Queensland Government.

Section 10.6 of the JIF requires all approval holders, under standard administrative approval conditions, to submit an annual compliance report (this Report) within three months of the anniversary of the commencement of the action. Given Arrow commenced the SGP on 22 October 2020, the 2025 annual compliance report is therefore required to be submitted to DCCEEW by 22 January 2026. The reporting period for this Report is 22 October 2024 to 21 October 2025.

The Underground Water Impact Report (UWIR) 2021 for the Surat Cumulative Management Area (OGIA, 2021a) came into effect on 1 May 2022 and continued to be in effect throughout the 2025 reporting period. All assessments undertaken for the JIF during this reporting period used the 2021 UWIR outputs in accordance with the methodology outlined in the JIF.

2 Progress against JIF Outcomes

The JIF establishes outcomes to be achieved for EPBC-listed springs and water resources (associated users of water resources are defined as water supply bores, aquatic groundwater dependent ecosystems [GDE], terrestrial GDEs [TGDE] and subterranean GDEs [SGDE]). Each associated user of water resource has been assigned an outcome and a sub-outcome, while EPBC-listed springs has only an outcome. Approval holders will achieve the outcome for water resources if they achieve the corresponding sub-outcome for each type of associated user of the water resources. Section 2 of the JIF outlines the outcomes and sub-outcomes (water resources only) for EPBC-listed springs and water resources.

Sections 3 to 7 of the JIF provides management frameworks designed to achieve protection of EPBC-listed springs and water resources by meeting these established outcomes and sub-outcomes. Where a risk threshold (as defined in the JIF and based on OGIA model drawdown predictions) is exceeded, approval holders are required to implement the relevant risk management framework (i.e. preliminary risk assessment, supplementary risk assessment and site-specific assessment). Where a risk threshold has not been exceeded, and / or is not predicted to be exceeded, the approval holder is taken to not have impacted the EPBC-listed springs or water resources and is not required to implement the relevant risk management framework.

The following sections detail the current status of Arrow's progress towards achieving the JIF's outcomes (as per the frameworks provided in sections 3 to 7 of the JIF) for EPBC-listed springs and water resources as it relates to Arrow's SGP EPBC 2010/5344 approval conditions. A summary of the status is:

- Arrow has not exceeded the risk threshold in the JIF for EPBC-listed springs or aquatic GDEs,
- Arrow has complied or is currently in the process of complying with its make good obligations identified under the Queensland *Water Act 2000* (Water Act) and UWIR, and
- The risk threshold in the JIF for TGDEs and SGDEs was exceeded. Preliminary risk assessments have been completed, identifying ten and eight high risk sites for TGDEs and SGDEs respectively. Arrow is currently undertaking the supplementary risk assessment for the identified high risk sites. No site-specific assessments have yet been required to be undertaken.

2.1 EPBC-listed Springs and Aquatic GDEs

The 2021 UWIR identifies several 'spring of interest' within and to the east of Arrow's tenure. However, in Table H-1 of the 2021 UWIR, Arrow is not the responsible tenure holder for any of the sites, and no actions are assigned to Arrow. Therefore, in accordance with sections 3.4 and 5.4 of the JIF, the risk threshold for EPBC-listed springs and Aquatic GDEs has not been, or is not predicted to be, exceeded.

As required in section 10.6 of the JIF, and given the risk threshold for EPBC-listed springs and aquatic GDEs has not and is not predicted to be exceeded, Arrow confirms it has met its requirements within the UWIR for EPBC-listed springs and aquatic GDEs, and thus the outcomes for EPBC-listed springs and aquatic GDEs have been achieved and maintained in areas where Arrow is the responsible tenure holder (or responsible CSG operator [RCO] as defined under the JIF).

2.2 Water Supply Bores

Arrow has continued to meet its make good obligations under the UWIR and the Water Act. A summary of the status of Arrow's make good obligations assigned in every UWIR is provided in Table 2-1. Arrow continues to provide updates to OGIA on the progress of its make mood obligations when requested and, in accordance with section 4 of the JIF, Arrow is taken to have achieved the sub-outcome for water supply bores as it has complied with its make good obligations defined in section 409 of the Queensland *Water Act 2000*.

Table 2-1: Status of Arrow's Make Good obligations under the Water Act 2000

UWIR	Assigned Immediately Affected Area (IAA) Bores	Make Good Status
2012 UWIR	7	• 5 Make Good Agreements (MGA) executed • 2 bores abandoned and destroyed (A&D)
2016 UWIR	8	• 7 MGA executed • 1 bore A&D
2019 UWIR	63	• 27 MGA executed between 2019-2024 • 3 MGA executed in 2025 • 22 MGA in negotiation • 11 bores A&D
2021 UWIR	88	• 37 MGA executed between 2021-2024 • 9 MGA executed in 2025 • 31 MGA in negotiation • 11 bores A&D / could not find

UWIR	Assigned Immediately Affected Area (IAA) Bores	Make Good Status
Addendum Report 2025 for the Surat UWIR 2021	7	• 5 bore assessments fieldwork completed in August 2025. Reports to be finalised by 13 February 2026 • 1 bore owner denied access for bore assessment • 1 MGA in negotiation

2.3 TGDEs

During this reporting period, Arrow completed the TGDE risk threshold assessment and resultant preliminary risk assessment (based on the 2021 UWIR), submitting the results to DCCEEW by the required date of 27 May 2025. The preliminary risk assessment identified 12 high risk sites, however Arrow is not the RCO for two of the sites. Concurrent with Arrow's submission of the risk threshold and preliminary risk assessments, Arrow requested an extension to the submission date for the supplementary risk assessment to 15 February 2026 to allow field data to be collected. On 12 August 2025, DCCEEW informed Arrow that the method presented in Arrow's risk threshold and preliminary risk assessments adopts that outlined in section 9.1.1 of the JIF and addresses the requirements of condition 14A[1] of Arrow's EPBC approval conditions. On this date DCCEEW also granted the revised submission date for the supplementary risk assessment. A copy of the summary report for the TGDE risk threshold and preliminary risk assessments is provided in Appendix A.

Arrow is currently in the process of collecting field data for inclusion in the TGDE supplementary risk assessment report and, as such, no sites have been confirmed as high risk and a site-specific assessment is not yet required. For those sites identified as high risk sites in the preliminary risk assessment and currently being further assessed in the supplementary risk assessment framework, no limit is currently required to be identified in a site-specific assessment. Therefore Arrow is currently taken to have achieved the outcome or sub-outcome for TGDEs. If the outcomes of the supplementary risk assessment identify any sites remaining as high risk, a site-specific assessment will be completed.

In reference to section 10.6 of the JIF, the 2021 UWIR does not require Arrow to undertake monitoring directly related to TGDEs however the 2021 UWIR Water Monitoring Strategy (WMS) (OGIA, 2021b) outlines Arrow's obligations to monitor pressure and water quality at specific monitoring bores / production wells. Arrow undertakes this monitoring as required and provides the collected data to OGIA on a six monthly basis.

Inline with section 2 of the JIF, for those areas that are not high risk (i.e. those that are low or moderate) under the TGDE preliminary risk assessment framework and, resultantly, where no limit is required to be identified in a site-specific assessment, Arrow is taken to have achieved the outcome and sub-outcome for TGDEs.

2.4 SGDEs

During this reporting period, Arrow completed the SGDE risk threshold assessment and resultant preliminary risk assessment (based on the 2021 UWIR), submitting the results to DCCEEW by the required date of 27 May 2025. The preliminary risk assessment identified eight high risk sites. A copy of the summary report for the SGDE risk threshold and preliminary risk assessments is provided in Appendix B. Concurrent with Arrow's submission of the risk threshold and preliminary risk assessments, Arrow requested an extension to the

[1] Condition 14A. To ensure the outcomes in Condition 13A are achieved and maintained, the approval holder must manage impacts on water resources and EPBC-listed springs in accordance with the relevant risk management framework/s.

submission date for the supplementary risk assessment to 30 April 2027 to allow field data to be collected. On 12 August 2025, DCCEEW informed Arrow that the method presented in the risk threshold and preliminary risk assessments adopts that outlined in section 9.1.1 of the JIF and addresses the requirements of condition 14A[1] of Arrow's EPBC approval conditions. On this date DCCEEW also granted the revised submission date for the supplementary risk assessment.

Arrow is currently in the process of collecting field data for inclusion in the SGDE supplementary risk assessment report and, as such, no sites have been confirmed as high risk and a site-specific assessment is not yet required. For those sites identified as high risk sites in the preliminary risk assessment and currently being further assessed in the supplementary risk assessment framework, no limit is currently required to be identified in a site-specific assessment. Therefore, Arrow is currently taken to have achieved the outcome or sub-outcome for SGDEs. If the outcomes of the supplementary risk assessment identify any sites remaining as high risk, a site-specific assessment will be completed.

In reference to section 10.6 of the JIF, the 2021 UWIR does not require Arrow to undertake monitoring directly related to SGDEs however the 2021 UWIR WMS (OGIA, 2021b) outlines Arrow's obligations to monitor pressure and water quality at specific monitoring bores / production wells. Arrow undertakes this monitoring as required and provides the collected data to OGIA on a six monthly basis.

Inline with section 2 of the JIF, for those areas that are not high risk (i.e. those that are low or moderate) under the SGDE preliminary risk assessment framework and, resultantly, where no limit is required to be identified in a site-specific assessment, Arrow is taken to have achieved the outcome and sub-outcome for SGDEs.

2.5 Regional Safety Net

OGIA released three annual reports for the 2021 UWIR in 2022 (OGIA, 2023), 2023 (OGIA, 2024) and 2024 (OGIA, 2025a). Throughout all three reports, there were no new EPBC-listed springs, no new aquatic GDEs / watercourse springs, or information related to an increased risk to TGDEs or SGDEs in areas where Arrow is the RCO. Additionally, there were no significant changes to the existing regulatory arrangements in place for the protection of water resources.

OGIA released an amendment to the 2021 UWIR named *Addendum Report 2025 for the Surat Underground Water Impact Report 2021* (OGIA, 2025b). This amendment was to facilitate proactive 'make good' arrangements for water bores that may be impacted in 2025 as a consequence to a 12-month extension to the next UWIR. Arrow was assigned seven water bores as the responsible tenure holder relating to undertaking 'make good' obligations. The current status of Arrow's progress on its make good obligations (including these additional seven water bores) is provided in Section 2.2.

3 References

DCCEEW 2021, *Coal Seam Gas - Joint industry framework Managing impacts to groundwater resources in the Surat Cumulative Management Area under EPBC Act approvals*. Australian Government. Available at: https://www.dcceew.gov.au/environment/epbc/publications/coal-seam-gas-joint-industry-framework

OGIA 2021a. *Underground Water Impact Report 2021 for the Surat Cumulative Management Area. State of Queensland*. Available at: https://www.ogia.water.qld.gov.au/publications-reports

OGIA 2021b. *Details of the Water Monitoring Strategy for the Underground Water Impact Report 2021*. State of Queensland. Available at: https://www.ogia.water.qld.gov.au/publications-reports

OGIA 2023. *Annual Report 2022 for the Surat Underground Water Impact Report*. State of Queensland. Available at: https://www.ogia.water.qld.gov.au/publications-reports

OGIA 2024. *Annual Report 2023 for the Surat Underground Water Impact Report*. State of Queensland. Available at: https://www.ogia.water.qld.gov.au/publications-reports

OGIA 2025a. *Annual Review 2024 for the Surat Underground Water Impact Report*. State of Queensland. Available at: https://www.ogia.water.qld.gov.au/publications-reports

OGIA 2025b. *Addendum Report 2025 for the Surat Underground Water Impact Report 2021*. State of Queensland. Available at: https://www.ogia.water.qld.gov.au/publications-reports

Appendix A – JIF Terrestrial Groundwater Dependent Ecosystems Risk Threshold and Preliminary Risk Assessments, 2021 UWIR

JIF Terrestrial Groundwater Dependent Ecosystems Risk Threshold and Preliminary Risk Assessments

2021 UWIR

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Revision history

Revision	Revision Date	Revision Summary
1	26/05/2025	Initial Issue

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

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1 Introduction

This Report provides an overview of Arrow Energy's (Arrow) terrestrial groundwater dependent ecosystem (TGDE) risk threshold assessment and preliminary risk assessment as required by the Joint Industry Framework (JIF) based on the 2021 UWIR.

2 Background

Arrow Energy's Surat Gas Expansion Project (SGP) will develop coal seam gas (CSG) resources in the Surat Basin, approximately 250 km west of Brisbane.

The SGP was approved by the Australian Government under the Environment and Protection and Biodiversity Conservation Act 1999 (EPBC Act) decision 2010/5344 on 19 December 2013. The SGP commenced development of CSG resources in the Surat Basin on 22 October 2020.

The conditions of Arrow's approval EPBC 2010/5344 were varied on 27 February 2025 to align the SGP with the JIF particularly through Condition 14A (as varied) which states that the approval holder must manage impacts on water resources and EPBC-listed springs in accordance with the relevant risk management framework/s which is defined as the JIF.

On 17 March 2021, the Australian Government issued the JIF to achieve defined environmental outcomes for groundwater in the Surat Basin. The JIF was collaboratively developed by the Federal Department of Agriculture, Water and the Environment and the CSG industry, with technical and regulatory advice from the Queensland Government.

Section 6.4 of the JIF requires a risk threshold assessment and preliminary risk assessment to be completed within three months following the UWIR taking effect. Given the 2021 UWIR was in effect when Arrow's EPBC conditions were varied (27 February 2025), the required timing for the risk threshold assessment and preliminary risk assessment is taken to be three months from 27 February 2025.

3 Risk Threshold Assessment

Section 6.3 of the JIF notes the risk threshold for TGDEs is a prediction in the OGIA model of a long term predicted drawdown of more than 0.2 m in the outcrop of the formation that is caused by CSG development. This risk threshold is consistent with the 'area of interest' for TGDEs identified in the UWIR as part of the description of impacts to environmental values.

The 2021 UWIR area of interest for TGDEs was provided by OGIA as a shape file. The data as provided by OGIA, shown in Figure 3-1, are areas of geological outcrop where there is more than 0.2 m of groundwater drawdown predicted in the OGIA numerical model in the P50 long term affected area scenario.

The areas shown in Figure 3-1 are therefore areas of interest for mapped potential TGDEs which exceed the JIF TGDE risk threshold.

Of the risk threshold areas identified in Figure 3-1, and inline with Section 6.4 of the JIF and the assignment rules for reporting obligations identified in the 2021 UWIR, Arrow is the Responsible CSG Operator (RCO) for all of the identified areas of risk threshold exceedances located within Arrow's tenure and also those located to the east of Arrow's tenure where there is no other current petroleum tenure holders (Arrow being the closest

RCO). Arrow considers it is not the RCO for areas which are within its tenure but overlap with non-Arrow mining leases given the areas of interest are associated with geological outcrop (and TGDEs are known to only access shallow groundwater i.e. less than 20m) which would be directly impacted by mining operations and therefore are expected to be the predominant cause of any groundwater drawdown.

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

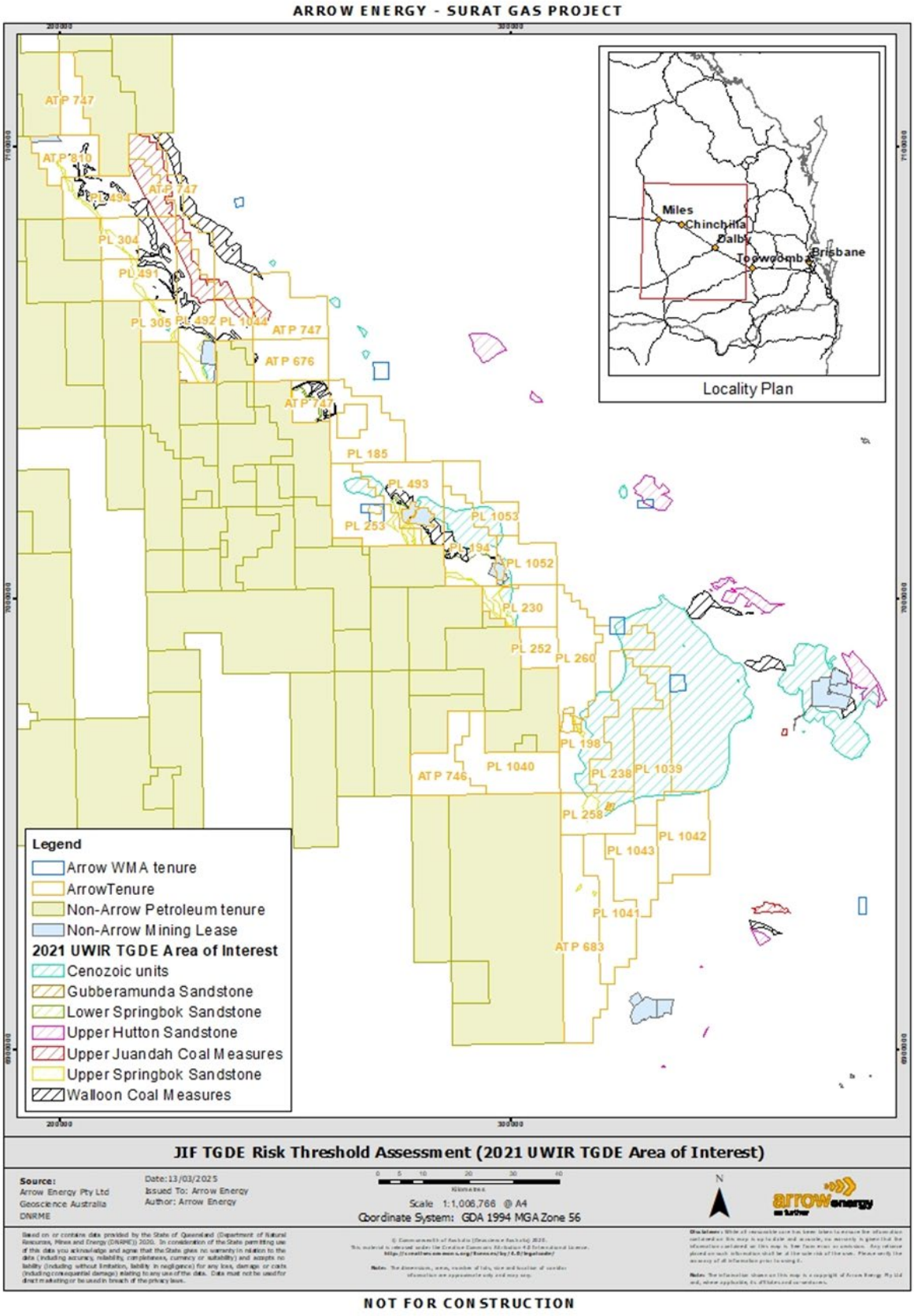


Figure 3-1 Location of areas which exceed the JIF TGDE Risk Threshold based on the 2021 UWIR data

4 Preliminary Risk Assessment

The preliminary risk assessment was undertaken by applying several GIS datasets to the results of the Risk Threshold to identify high risk sites inline with section 9.1.1 of the JIF.

The Terrestrial GDE – Preliminary Risk Assessment Matrix shown in Section 9.1.1 of the JIF shows four scenarios where a high risk outcome may occur, these are:

- >1m predicted drawdown in less than 3 years within an area of a Known GDE
- >0.2m and <1m predicted drawdown in less than 3 years within an area of Known GDE
- >1m predicted drawdown in <12 years and >3 years within an area of Known GDE
- >1m predicted drawdown in less than 3 years within an area of Derived GDE – High Confidence

The datasets overlaid in ArcGIS to test the above four scenarios' likelihood and consequence categories for high risk impacts are listed in Table 4-1. It should be noted that there are no Known GDEs mapped within or adjacent to Arrow's tenure and, as a result, no high risk sites associated with Known GDEs were identified in this assessment.

Table 4-1 Preliminary Risk Assessment datasets

Risk matrix attribute	Dataset	Source	Definition query
L1 – Magnitude of maximum drawdown prediction (within area of outcrop)	Drawdown - 2021 UWIR predicted groundwater drawdown for each aquifer (IAA [three years] P50)[1]	OGIA	Predicted drawdown range sorted to only display >1m
	Outcrop areas for each formation - 2021 UWIR area of interest for TGDEs (Section 3)	OGIA	
L2 – Timing of predicted exceedance	Drawdown timing - 2021 UWIR predicted groundwater drawdown for each aquifer (IAA [three years] P50)	OGIA	Nil, dataset already trimmed to three years
Consequence of predicted drawdown based on WetlandInfo mapping	Groundwater dependent ecosystems and potential aquifer mapping - Queensland	Queensland WetlandInfo via Queensland Spatial Catalogue (QSpatial) (https://qldspatial.information.qld.gov.au/catalogue/custom/detail.page?fid=%7b2DF30B15-FA92-47EC-BD2F-5FF1F311DC69%7d)	Attribute GDE_CONF sorted to display only 'Known GDE' and 'Derived GDE – high confidence'

[1] Section 6.4.5 of the 2021 UWIR states 'for the purposes of determining impacts for the UWIR 2021, the P50 predictions are utilised'

2021 UWIR

High risk sites are areas where the datasets in Table 4-1 overlap eachother for each aquifer unit. A total of 11 high risk sites were identified through this process. The location of the sites is shown in Figure 4-1 and listed below. Further information on each site is provided in Appendix A noting that the high risk areas are those where the light green polygon (WetlandInfo GDE) overlays the black hashed polygon (formation outcrop) and blue polygon (predicted groundwater drawdown greater than 2m and timing is less than 3 years).

- Cenozoic:
  - Condamine River (PL493) [Cenozoic – Condamine River]
- Upper Springbok Sandstone:
  - Back Creek (PL230) [USBS – Back Creek]
- Lower Springbok Sandstone:
  - Braemar Creek (PL194) [LSBS – Braemar Creek]
- WCM Non-Productive Zone:
  - Dogwood Creek (PL492 / PL305) [WCM Non-Prod Zone – Dogwood Creek]
- Upper Juandah Coal Measures (Layer 12):
  - Kogan Creek (PL493) [UJCM – Kogan Creek]
  - Braemar Creek (PL194) [UJCM – Braemar Creek]
  - Back Creek (PL194) [UJCM – Back Creek]
  - Dogwood Creek (PL492) [UJCM – Dogwood Creek]
- Lower Juandah Coal Measures (Layer 14):
  - Colamba Creek (PL1044) [LJCM – Colamba Creek]
- Taroom Coal Measures:
  - Rocky Creek (ATP747 / off tenure) [TCM – Rocky Creek]
  - Dogwood Creek (off tenure) [TCM – Dogwood Creek]
- Myall Creek (off tenure) [TCM – Myall Creek]

Consistent with the risk threshold assessment (Section 3), inline with Section 6.4 of the JIF and the assignment rules for reporting obligations identified in the 2021 UWIR, Arrow is the RCO for all of the identified areas of risk threshold exceedances located within Arrow's tenure and also those located to the east of Arrow's tenure where there is no other current petroleum tenure holders (Arrow being the closest RCO). Arrow considers it is not the RCO for areas which are within its tenure but overlap with non-Arrow mining leases given the areas of interest are associated with geological outcrop (and TGDEs are known to only access shallow groundwater i.e. less than 20m) which would be directly impacted by mining operations and therefore are expected to be the predominant cause of any groundwater drawdown. Therefore, Arrow is not the RCO for two high risk sites located on / adjacent to ML50074 (i.e. Cenozoic – Condamine River and UJCM – Kogan Creek).

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

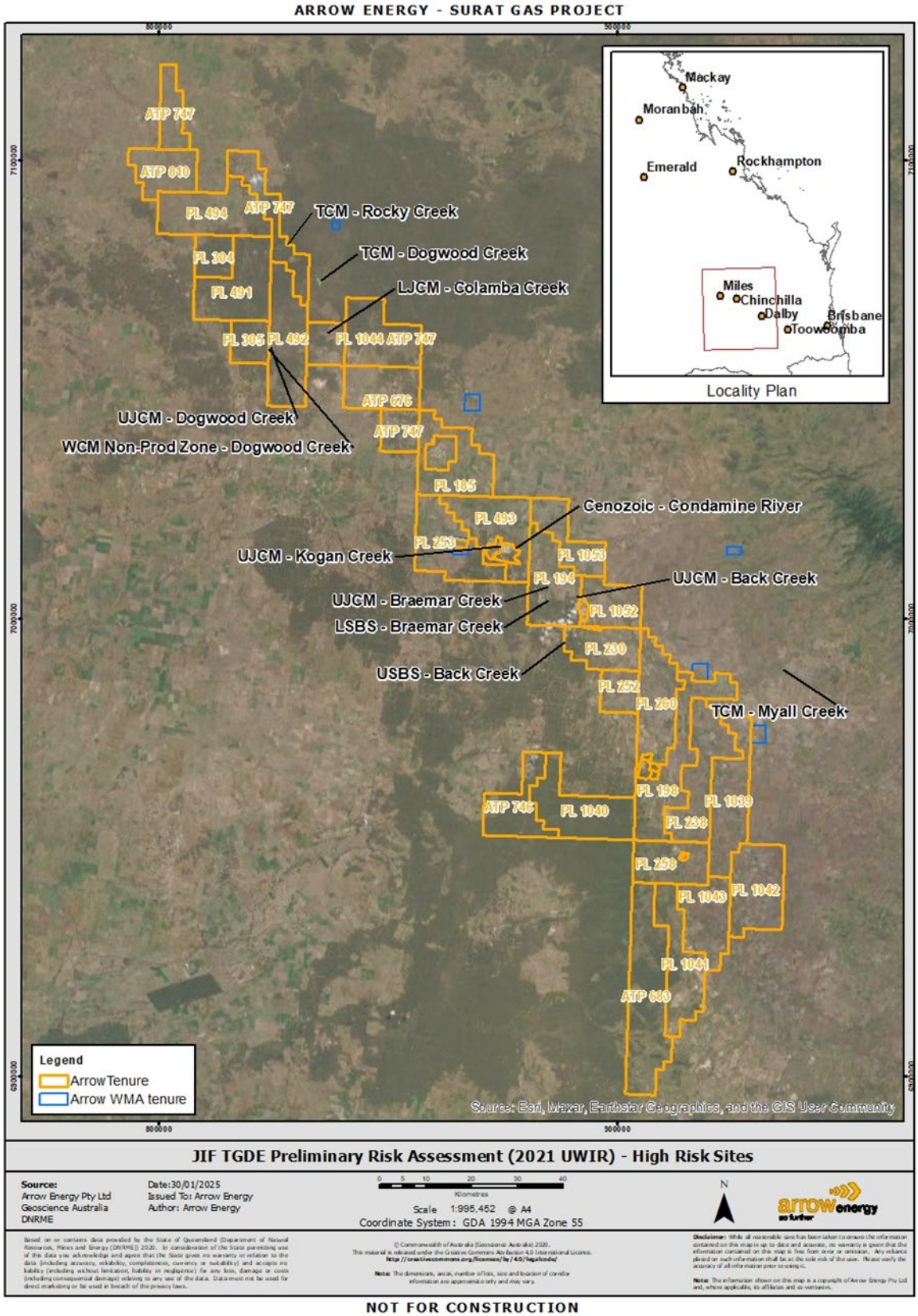


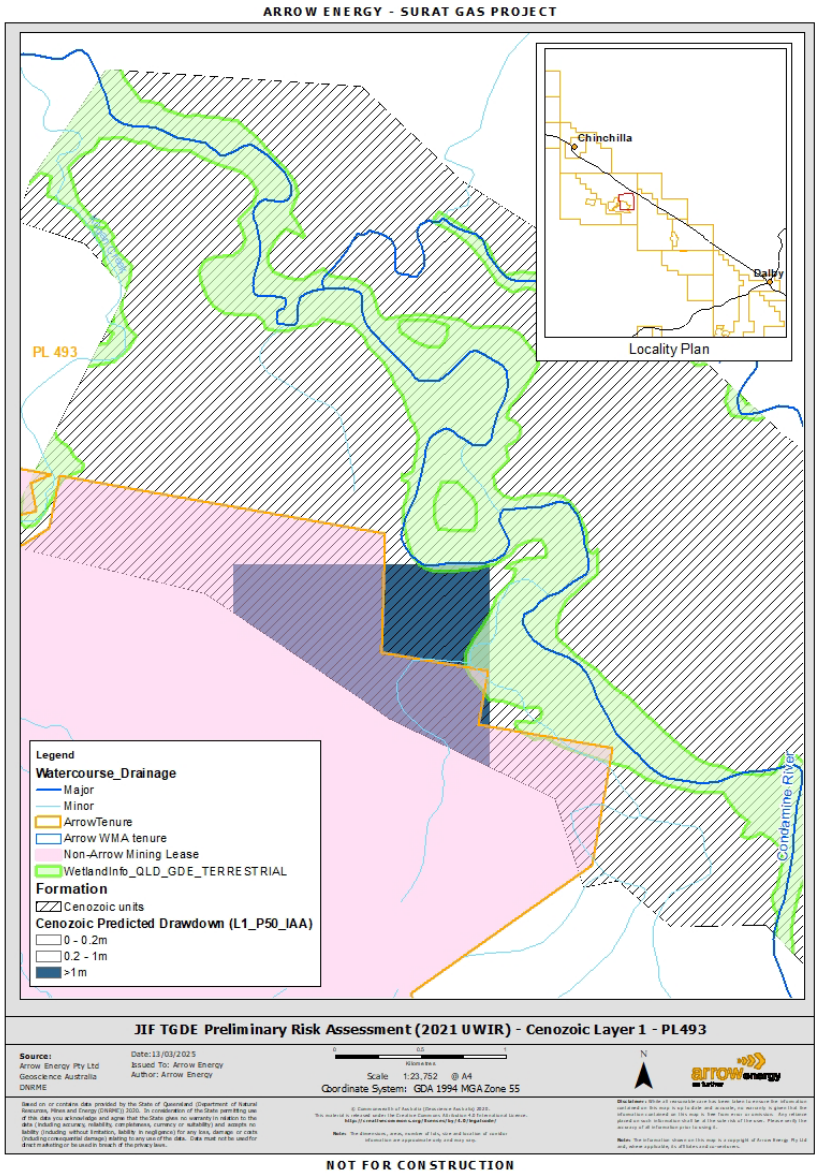
Figure 4-1 JIF TGDE Preliminary Risk Assessment (2021 UWIR) high risk sites

Appendix A – Preliminary Risk Assessment high risk sites' attributes

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Site	Cenozoic – Condamine River
Tenement	PL493
Formation	Cenozoic (Layer 1)
IAA Predicted Drawdown (P50) (m)	2.097



JIF TGDE Risk Threshold and Preliminary Risk Assessments

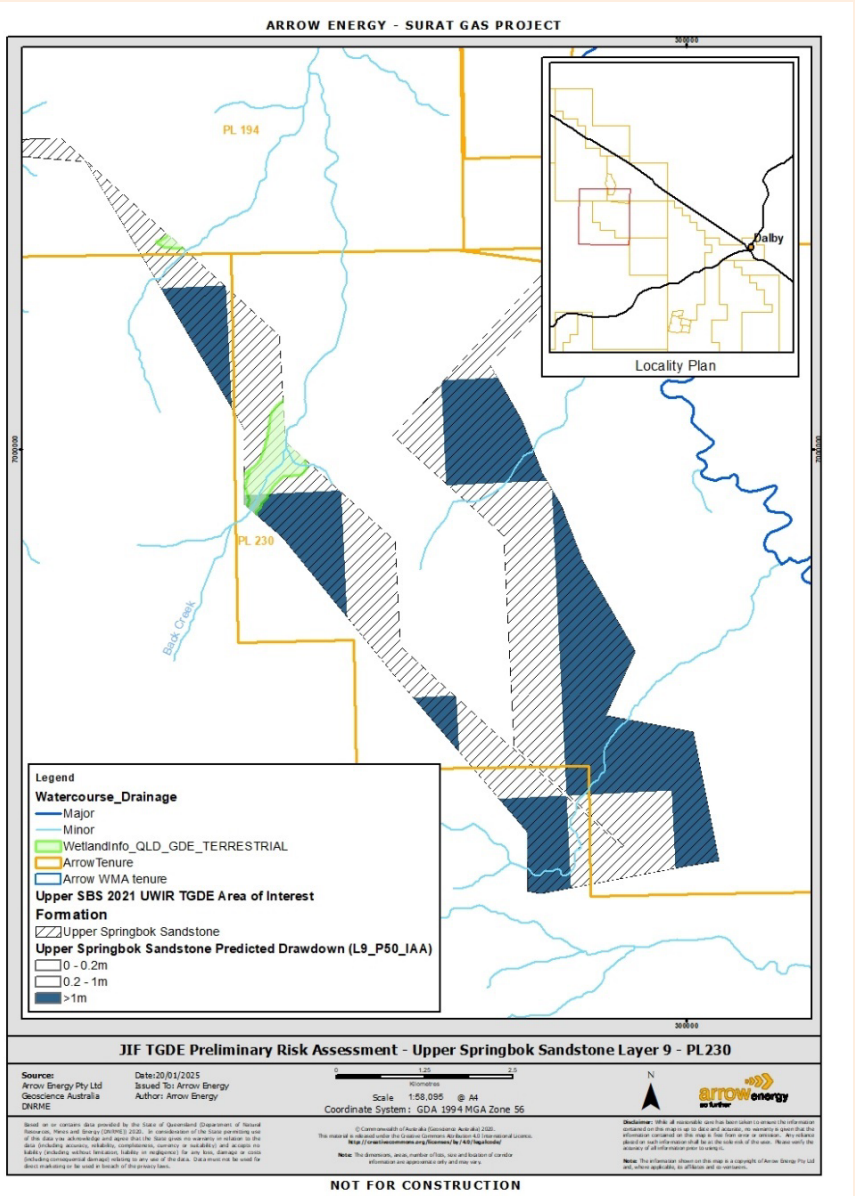
2021 UWIR

WetlandInfo	
Type of GDE	Terrestrial GDE
GDE Rule Set Name	Ecosystems intermittently connected to aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area
GDE Rule Part	Regional ecosystems dominated by Eucalyptus camaldulensis (river red gum), Eucalyptus intertexta (gum coolibah), and/or Corymbia tessellaris (Moreton Bay Ash) intermittently connected to aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area
GDE Confidence	Derived GDE - high confidence
GDE Rule ID	eMDB_RS_01W
GDE Evidence	Expert Opinion
Data Source	Biodiversity status of pre-clearing and remnant regional ecosystems v10.0
GDE Percent of Polygon Area	90
Conceptual Model	Alluvia
Legend for Display	81-100 Derived GDE - High Confidence
Temporal Nature of GW Connectivity Detailed	Intermittent
Link to document for Conceptual Model	https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/alluvia/
Link to document for Rule Set	https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/gde-background/gde-faq/gde-map-rules/
Class of GDE	Surface ecosystems dependent on the sub-surface presence of groundwater
Temporal Nature of GW Connectivity	Aseasonal, Intermittent
Source Aquifer Name	Alluvia
Source Aquifer Confinement	Unconfined
Source Aquifer Geology	Unconsolidated sedimentary
Source Aquifer Porosity	Primary
Source Aquifer Groundwater Flow System	Shallow alluvial, Local
Salinity of Groundwater Source	3 000 - 35 000 mg/L TDS
pH of GW Source	6-8
Dominant Recharge Process of GW Source	Infiltration (local)
Regional Ecosystem list	11.3.25/11.3.4/11.3.3
Regional Ecosystem percent list	80/10/10
Regional Ecosystems Remnant Vegetation of QLD	
RuleID	Category A or B containing of concern
Landzone	3

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Site	Upper SBS – Back Creek
Tenement	PL230
Formation	Upper Springbok Sandstone (Layer 9)
IAA Predicted Drawdown (P50) (m)	1.015



JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

WetlandInfo	
Type of GDE	Terrestrial GDE
GDE Rule Set Name	Ecosystems intermittently connected to aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area.
GDE Rule Part	
GDE Confidence	Ecosystems intermittently connected to perched aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area.
GDE Rule ID	Regional ecosystems dominated by Eucalyptus camaldulensis (river red gum), Eucalyptus intertexta (gum coolibah), and/or Corymbia tessellaris (Moreton Bay Ash) intermittently connected to aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area.
GDE Evidence	
Data Source	Regional ecosystems dominated by Eucalyptus camaldulensis (river red gum), Eucalyptus intertexta (gum coolibah), and/or Corymbia tessellaris (Moreton Bay Ash) intermittently connected to perched aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area.
GDE Percent of Polygon Area	Derived GDE - high confidence
Conceptual Model	eMDB_RS_01W, eMDB_RS_01X
Legend for Display	Expert Opinion
Temporal Nature of GW Connectivity Detailed	Biodiversity status of pre-clearing and remnant regional ecosystems v10.0
Link to document for Conceptual Model	20
Link to document for Rule Set	Alluvia
Class of GDE	01-80 Derived GDE - High Confidence
Temporal Nature of GW Connectivity	Intermittent
Source Aquifer Name	https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/alluvia/
Source Aquifer Confinement	https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/gde-background/gde-faq/gde-map-rules/
Source Aquifer Geology	Surface ecosystems dependent on the sub-surface presence of groundwater
Source Aquifer Porosity	Aseasonal, Intermittent
Source Aquifer Groundwater Flow System	Alluvia
Salinity of Groundwater Source	Unconfined
pH of GW Source	Unconsolidated sedimentary
Dominant Recharge Process of GW Source	Primary
Regional Ecosystem list	Shallow alluvial, Local. Perched
Regional Ecosystem percent list	3 000 - 35 000 mg/L TDS

JIF TGDE Risk Threshold and Preliminary Risk Assessments

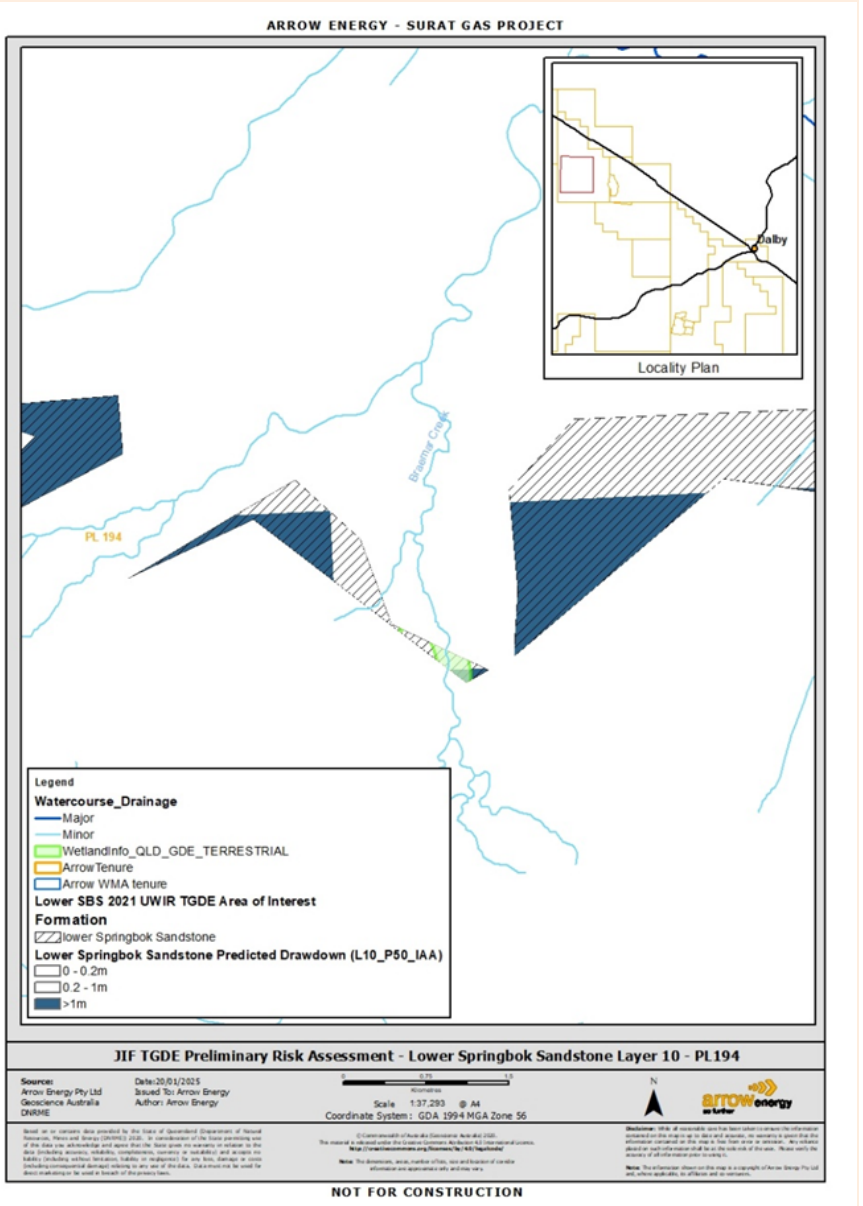
2021 UWIR

Regional Ecosystems Remnant Vegetation of QLD	
RuleID	Category A or B containing of concern
Landzone	3

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Site	Lower SBS – Braemar Creek
Tenement	PL194
Formation	Lower Springbok Sandstone (Layer 10)
IAA Predicted Drawdown (P50) (m)	11.786



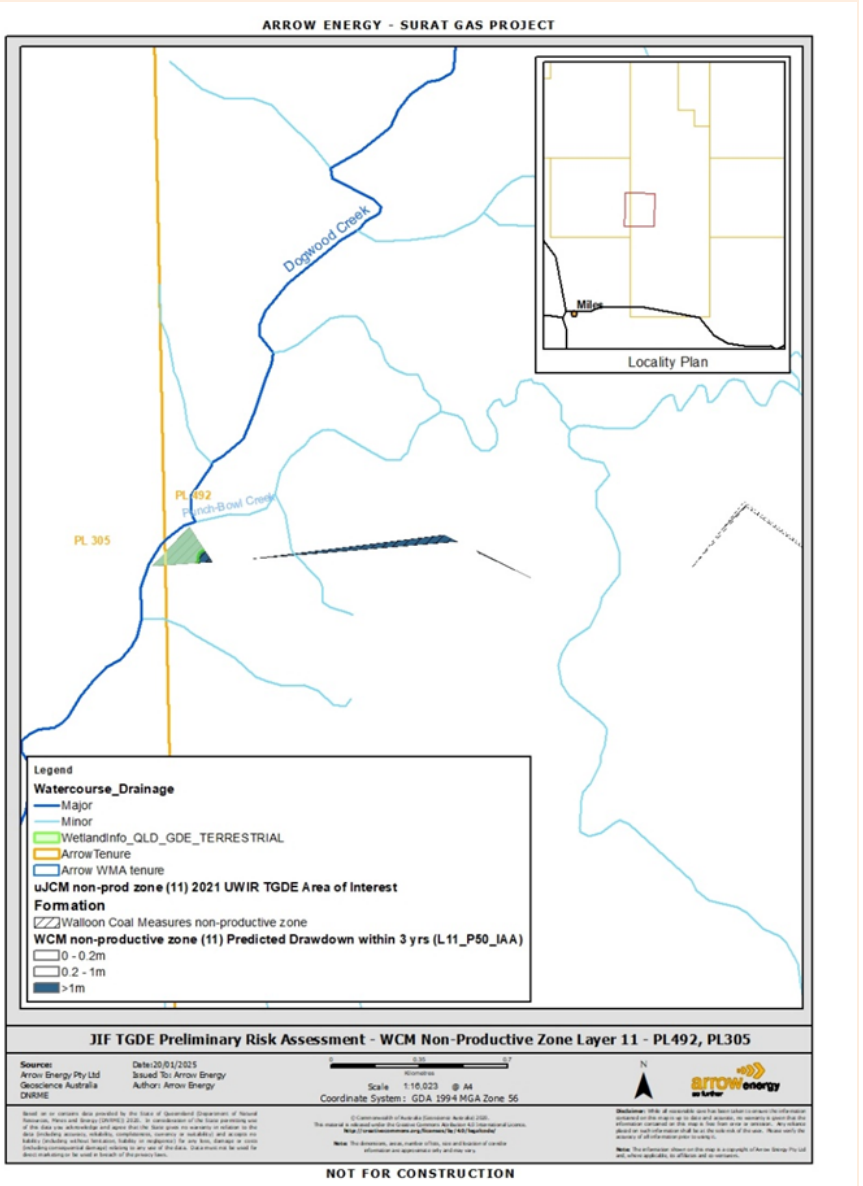
2021 UWIR

WetlandInfo	
Type of GDE	Terrestrial GDE
GDE Rule Set Name	Ecosystems intermittently connected to aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area
GDE Rule Part	Regional ecosystems dominated by Eucalyptus camaldulensis (river red gum), Eucalyptus intertexta (gum coolibah), and/or Corymbia tessellaris (Moreton Bay Ash) intermittently connected to aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area
GDE Confidence	Derived GDE - high confidence
GDE Rule ID	eMDB_RS_01W
GDE Evidence	Expert Opinion
Data Source	Biodiversity status of pre-clearing and remnant regional ecosystems v10.0
GDE Percent of Polygon Area	10
Conceptual Model	
Legend for Display	01-80 Derived GDE - High Confidence
Temporal Nature of GW Connectivity Detailed	Intermittent
Link to document for Conceptual Model	https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/alluvia/
Link to document for Rule Set	https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/gde-background/gde-faq/gde-map-rules/
Class of GDE	Surface ecosystems dependent on the sub-surface presence of groundwater
Temporal Nature of GW Connectivity	Aseasonal, Intermittent
Source Aquifer Name	Alluvia
Source Aquifer Confinement	Unconfined
Source Aquifer Geology	Unconsolidated sedimentary
Source Aquifer Porosity	Primary
Source Aquifer Groundwater Flow System	Shallow alluvial, Local
Salinity of Groundwater Source	3 000 - 35 000 mg/L TDS
pH of GW Source	6 - 8
Dominant Recharge Process of GW Source	Infiltration (local)
Regional Ecosystem list	11.3.18/11.5.1/11.3.25
Regional Ecosystem percent list	50/40/10
Regional Ecosystems Remnant Vegetation of QLD	
RuleID	Category A or B that is of least concern
Landzone	3

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Site	WCMj Non-Prod Zone – Dogwood Creek
Tenement	PL492, PL305
Formation	WCM Non-Productive Zone (layer 11)
IAA Predicted Drawdown (P50) (m)	1.068 – 4.43



JIF TGDE Risk Threshold and Preliminary Risk Assessments

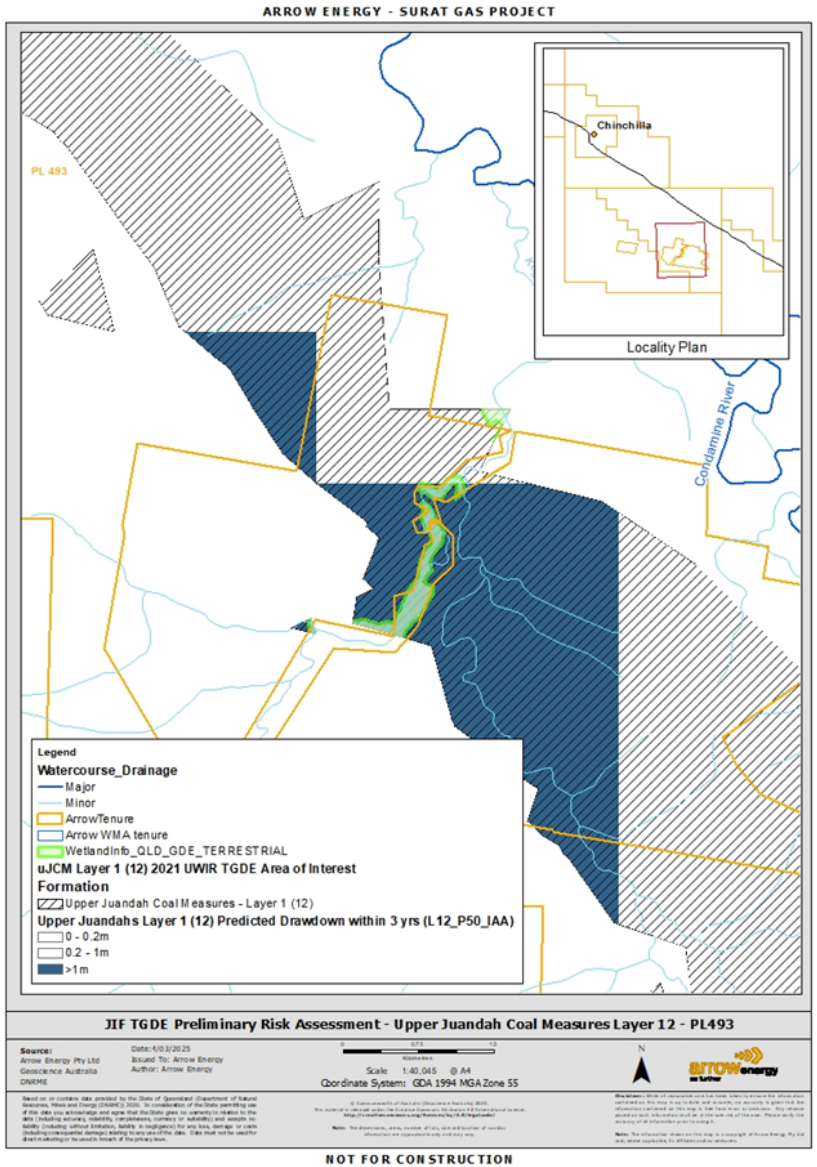
2021 UWIR

WetlandInfo	
Type of GDE	Terrestrial GDE
GDE Rule Set Name	Ecosystems intermittently connected to aquifers with brackish salinity and alkaline pH in unconsolidated Quaternary alluvia
GDE Rule Part	Regional ecosystems dominated by Eucalyptus camaldulensis (river red gum), Eucalyptus intertexta (gum coolibah), and/or Corymbia tessellaris (Moreton Bay Ash) intermittently connected to aquifers with brackish salinity and alkaline pH in unconsolidated Quaternary alluvia
GDE Confidence	Derived GDE - high confidence
GDE Rule ID	eMDB_RS_01D
GDE Evidence	Expert Opinion
Data Source	Biodiversity status of pre-clearing and remnant regional ecosystems v10.0
GDE Percent of Polygon Area	100
Conceptual Model	Alluvia
Legend for Display	81-100 Derived GDE - High Confidence
Temporal Nature of GW Connectivity Detailed	Intermittent
Link to document for Conceptual Model	https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/alluvia/
Link to document for Rule Set	https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/gde-background/gde-faq/gde-map-rules/
Class of GDE	Surface ecosystems dependent on the sub-surface presence of groundwater
Temporal Nature of GW Connectivity	Aseasonal, Intermittent
Source Aquifer Name	Alluvia
Source Aquifer Confinement	Unconfined
Source Aquifer Geology	Unconsolidated sedimentary
Source Aquifer Porosity	Primary
Source Aquifer Groundwater Flow System	Shallow alluvial, Local
Salinity of Groundwater Source	1 500 - 3 000 mg/L TDS
pH of GW Source	> 8
Dominant Recharge Process of GW Source	Infiltration (local)
Regional Ecosystem list	11.3.4/11.3.25
Regional Ecosystem percent list	70/30
Regional Ecosystems Remnant Vegetation of QLD	
RuleID	Category A or B containing of concern
Landzone	3

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Site	uJCM – Kogan Creek
Tenement	PL493
Formation	Upper Juandah Coal Measures (Layer 12)
IAA Predicted Drawdown (P50) (m)	6.046 – 17.508



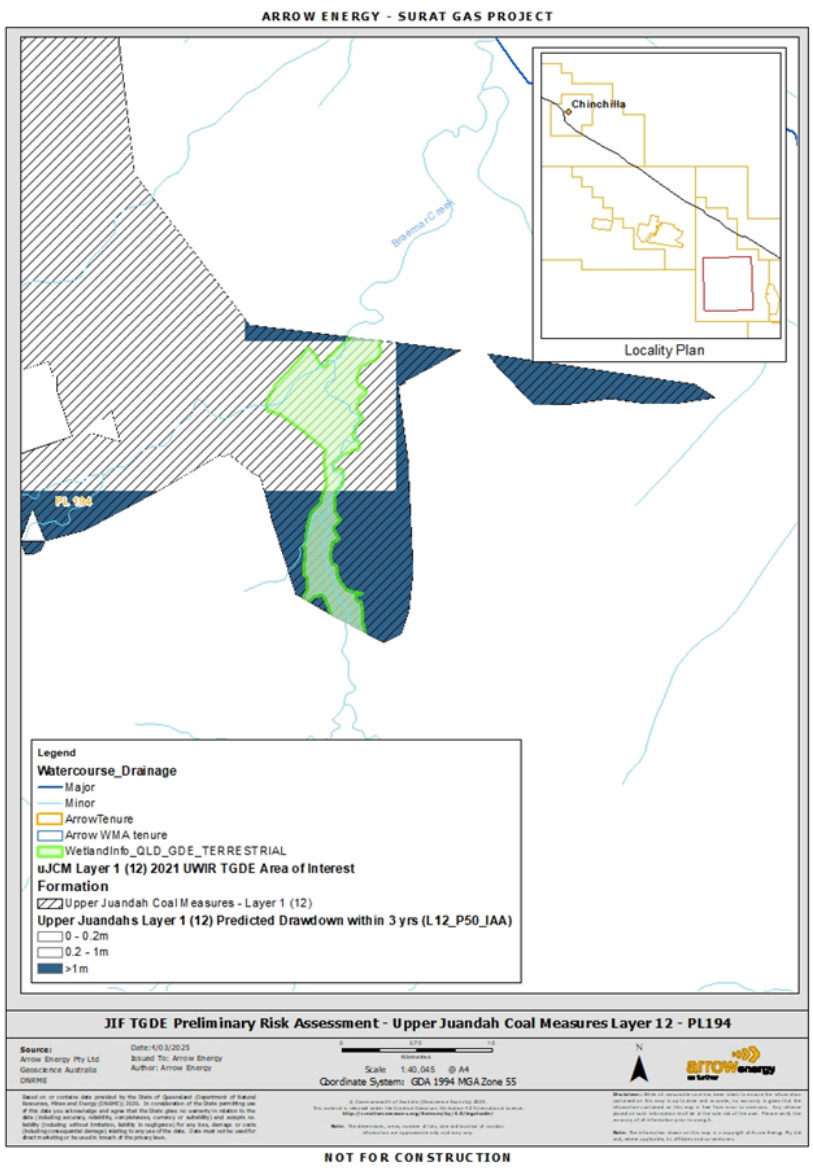
2021 UWIR

WetlandInfo	
Type of GDE	Terrestrial GDE
GDE Rule Set Name	Ecosystems intermittently connected to aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area
GDE Rule Part	Regional ecosystems dominated by Eucalyptus camaldulensis (river red gum), Eucalyptus intertexta (gum coolibah), and/or Corymbia tessellaris (Moreton Bay Ash) intermittently connected to aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area
GDE Confidence	Derived GDE - high confidence
GDE Rule ID	eMDB_RS_01W
GDE Evidence	Expert Opinion
Data Source	Biodiversity status of pre-clearing and remnant regional ecosystems v10.0
GDE Percent of Polygon Area	25
Conceptual Model	Alluvia
Legend for Display	01-80 Derived GDE - High Confidence
Temporal Nature of GW Connectivity Detailed	Intermittent
Link to document for Conceptual Model	https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/alluvia/
Link to document for Rule Set	https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/gde-background/gde-faq/gde-map-rules/
Class of GDE	Surface ecosystems dependent on the sub-surface presence of groundwater
Temporal Nature of GW Connectivity	Aseasonal, Intermittent
Source Aquifer Name	Alluvia
Source Aquifer Confinement	Unconfined
Source Aquifer Geology	Unconsolidated sedimentary
Source Aquifer Porosity	Primary
Source Aquifer Groundwater Flow System	Shallow alluvial, Local
Salinity of Groundwater Source	3 000 - 35 000 mg/L TDS
pH of GW Source	6-8
Dominant Recharge Process of GW Source	Infiltration (local)
Regional Ecosystem list	11.3.2/11.3.18/11.3.4
Regional Ecosystem percent list	40/35/25
Regional Ecosystems Remnant Vegetation of QLD	
RuleID	Category A or B containing of concern
Landzone	3

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Site	uJCM – Braemar Creek
Tenement	PL194
Formation	Upper Juandah Coal Measures (Layer 12)
IAA Predicted Drawdown (P50) (m)	1.388 – 1.463



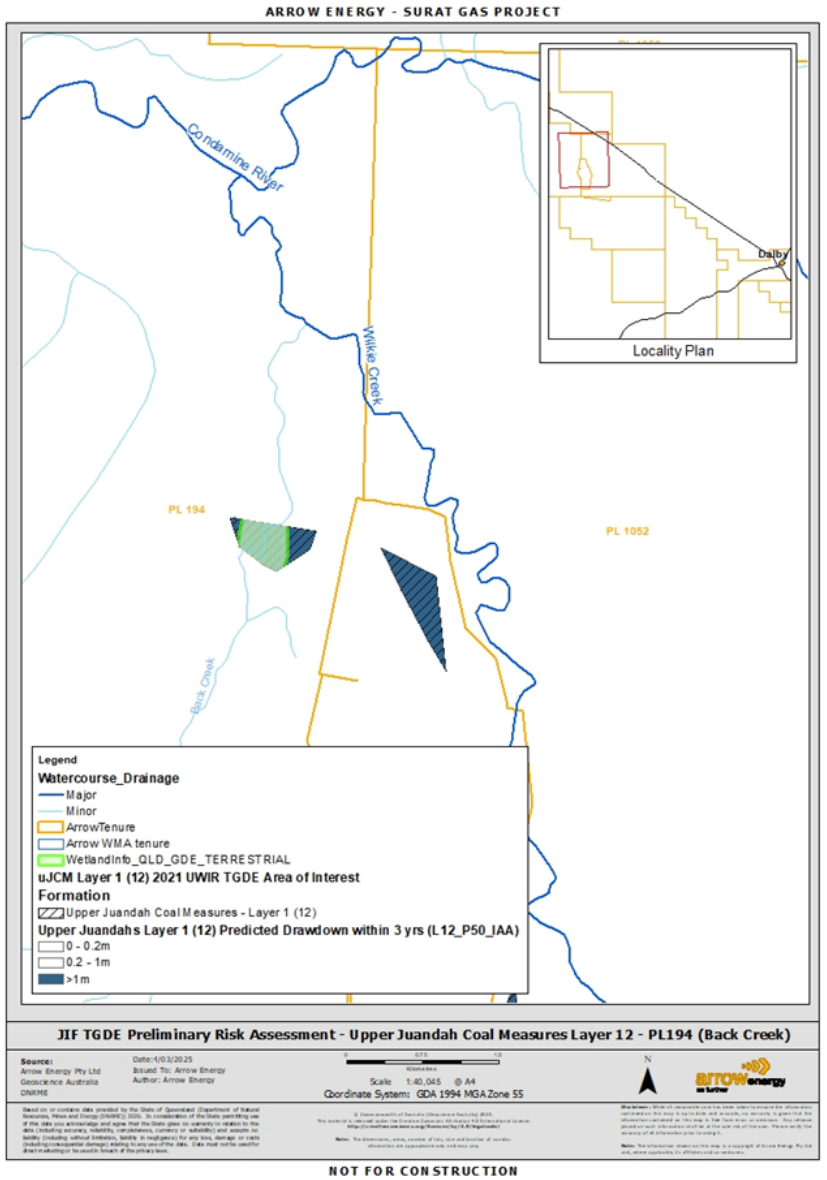
2021 UWIR

WetlandInfo	
Type of GDE	Terrestrial GDE
GDE Rule Set Name	Ecosystems intermittently connected to aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area
GDE Rule Part	Regional ecosystems dominated by Eucalyptus camaldulensis (river red gum), Eucalyptus intertexta (gum coolibah), and/or Corymbia tessellaris (Moreton Bay Ash) intermittently connected to aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area
GDE Confidence	Derived GDE - high confidence
GDE Rule ID	eMDB_RS_01W
GDE Evidence	Expert Opinion
Data Source	Biodiversity status of pre-clearing and remnant regional ecosystems v10.0
GDE Percent of Polygon Area	10
Conceptual Model	Alluvia
Legend for Display	01-80 Derived GDE - High Confidence
Temporal Nature of GW Connectivity Detailed	Intermittent
Link to document for Conceptual Model	https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/alluvia/
Link to document for Rule Set	https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/gde-background/gde-faq/gde-map-rules/
Class of GDE	Surface ecosystems dependent on the sub-surface presence of groundwater
Temporal Nature of GW Connectivity	Aseasonal, Intermittent
Source Aquifer Name	Alluvia
Source Aquifer Confinement	Unconfined
Source Aquifer Geology	Unconsolidated sedimentary
Source Aquifer Porosity	Primary
Source Aquifer Groundwater Flow System	Shallow alluvial, Local
Salinity of Groundwater Source	3 000 - 35 000 mg/L TDS
pH of GW Source	6-Aug
Dominant Recharge Process of GW Source	Infiltration (local)
Regional Ecosystem list	11.3.18/11.5.1/11.3.25
Regional Ecosystem percent list	50/40/10
Regional Ecosystems Remnant Vegetation of QLD	
RuleID	Category C or R that is of least concern
Landzone	3

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Site	uJCM – Back Creek
Tenement	PL194
Formation	Upper Juandah Coal Measures (Layer 12)
IAA Predicted Drawdown (P50) (m)	11.107



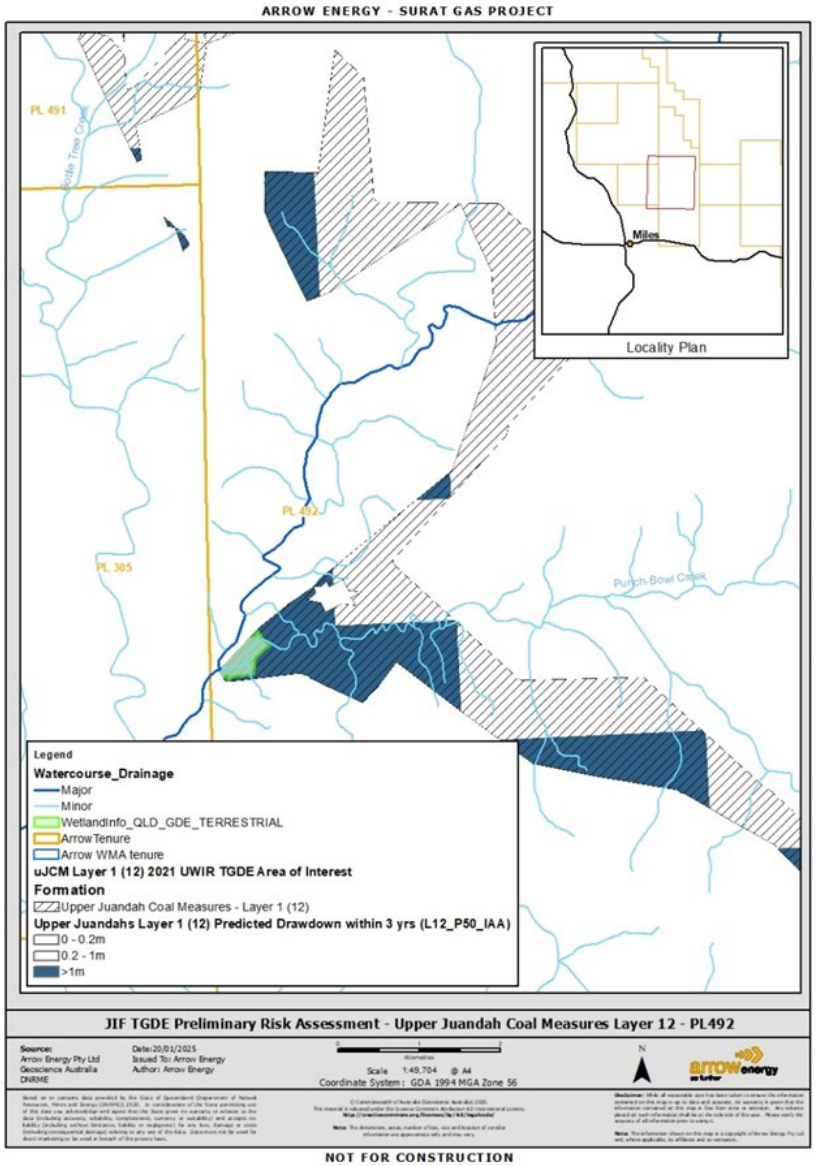
2021 UWIR

WetlandInfo	
Type of GDE	Terrestrial GDE
GDE Rule Set Name	Ecosystems intermittently connected to aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area
GDE Rule Part	Regional ecosystems dominated by Eucalyptus camaldulensis (river red gum), Eucalyptus intertexta (gum coolibah), and/or Corymbia tessellaris (Moreton Bay Ash) intermittently connected to aquifers with saline salinity and neutral pH in unconsolidated Quaternary alluvia in the Condamine River drainage basin sub-area
GDE Confidence	Derived GDE - high confidence
GDE Rule ID	eMDB_RS_01W
GDE Evidence	Expert Opinion
Data Source	Biodiversity status of pre-clearing and remnant regional ecosystems v10.0
GDE Percent of Polygon Area	20
Conceptual Model	Alluvia
Legend for Display	01-80 Derived GDE - High Confidence
Temporal Nature of GW Connectivity Detailed	Intermittent
Link to document for Conceptual Model	https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/alluvia/
Link to document for Rule Set	https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/gde-background/gde-faq/gde-map-rules/
Class of GDE	Surface ecosystems dependent on the sub-surface presence of groundwater
Temporal Nature of GW Connectivity	Aseasonal, Intermittent
Source Aquifer Name	Alluvia
Source Aquifer Confinement	Unconfined
Source Aquifer Geology	Unconsolidated sedimentary
Source Aquifer Porosity	Primary
Source Aquifer Groundwater Flow System	Shallow alluvial, Local
Salinity of Groundwater Source	3 000 - 35 000 mg/L TDS
pH of GW Source	6-8
Dominant Recharge Process of GW Source	Infiltration (local)
Regional Ecosystem list	11.3.2/11.3.25
Regional Ecosystem percent list	80/20
Regional Ecosystems Remnant Vegetation of QLD	
RuleID	Category A or B containing of concern
Landzone	3

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Site	uJCM – Dogwood Creek
Tenement	PL492
Formation	Upper Juandah Coal Measures (Layer 12)
IAA Predicted Drawdown (P50) (m)	9.58



JIF TGDE Risk Threshold and Preliminary Risk Assessments

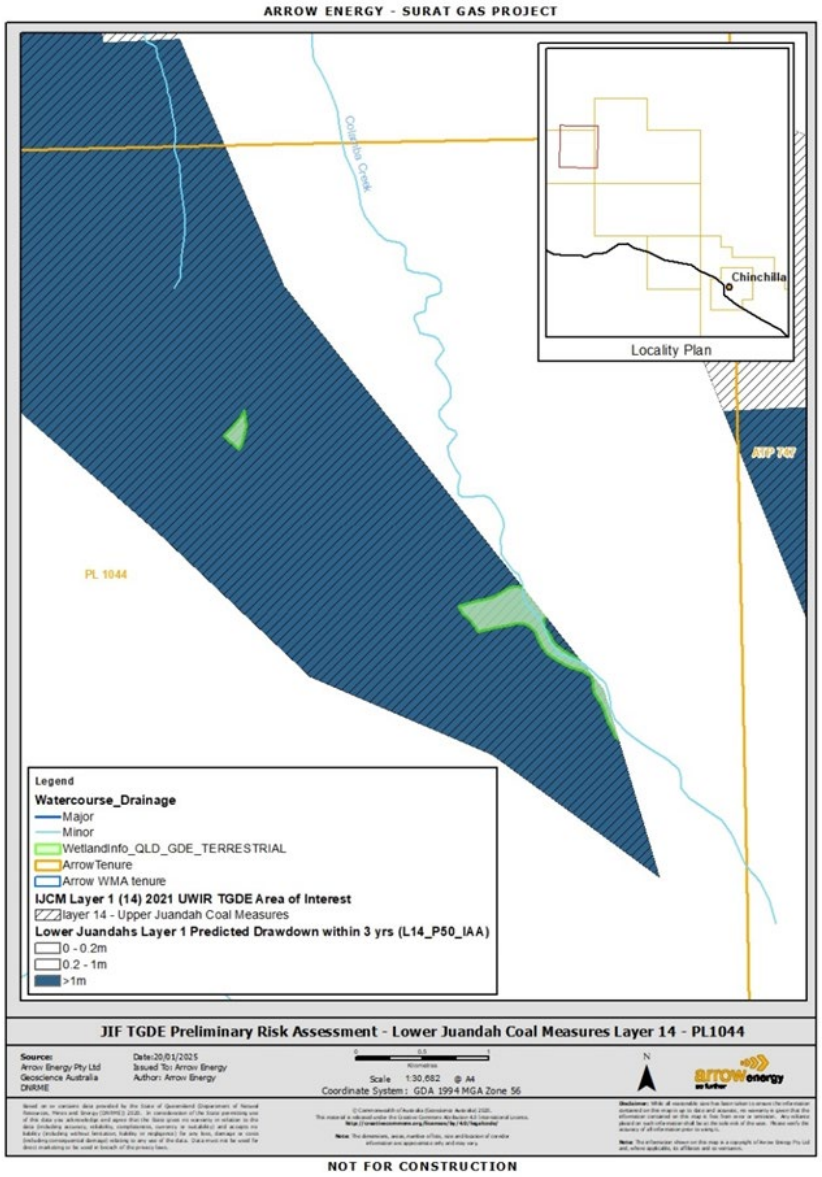
2021 UWIR

WetlandInfo	
Type of GDE	Terrestrial GDE
GDE Rule Set Name	Ecosystems intermittently connected to aquifers with brackish salinity and alkaline pH in unconsolidated Quaternary alluvia
GDE Rule Part	Regional ecosystems dominated by Eucalyptus camaldulensis (river red gum), Eucalyptus intertexta (gum coolibah), and/or Corymbia tessellaris (Moreton Bay Ash) intermittently connected to aquifers with brackish salinity and alkaline pH in unconsolidated Quaternary alluvia
GDE Confidence	Derived GDE - high confidence
GDE Rule ID	eMDB_RS_01D
GDE Evidence	Expert Opinion
Data Source	Biodiversity status of pre-clearing and remnant regional ecosystems v10.0
GDE Percent of Polygon Area	100
Conceptual Model	Alluvia
Legend for Display	81-100 Derived GDE - High Confidence
Temporal Nature of GW Connectivity Detailed	Intermittent
Link to document for Conceptual Model	https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/alluvia/
Link to document for Rule Set	https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/gde-background/gde-faq/gde-map-rules/
Class of GDE	Surface ecosystems dependent on the sub-surface presence of groundwater
Temporal Nature of GW Connectivity	Aseasonal, Intermittent
Source Aquifer Name	Alluvia
Source Aquifer Confinement	Unconfined
Source Aquifer Geology	Unconsolidated sedimentary
Source Aquifer Porosity	Primary
Source Aquifer Groundwater Flow System	Shallow alluvial, Local
Salinity of Groundwater Source	1 500 - 3 000 mg/L TDS
pH of GW Source	> 8
Dominant Recharge Process of GW Source	Infiltration (local)
Regional Ecosystem list	11.3.4/11.3.25
Regional Ecosystem percent list	70/30
Regional Ecosystems Remnant Vegetation of QLD	
RuleID	Category A or B containing of concern
Landzone	3

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Site	IJCM – Colamba Creek
Tenement	PL1044
Formation	Lower Juandah Coal Measures (Layer 14)
IAA Predicted Drawdown (P50) (m)	10.629 – 23.382



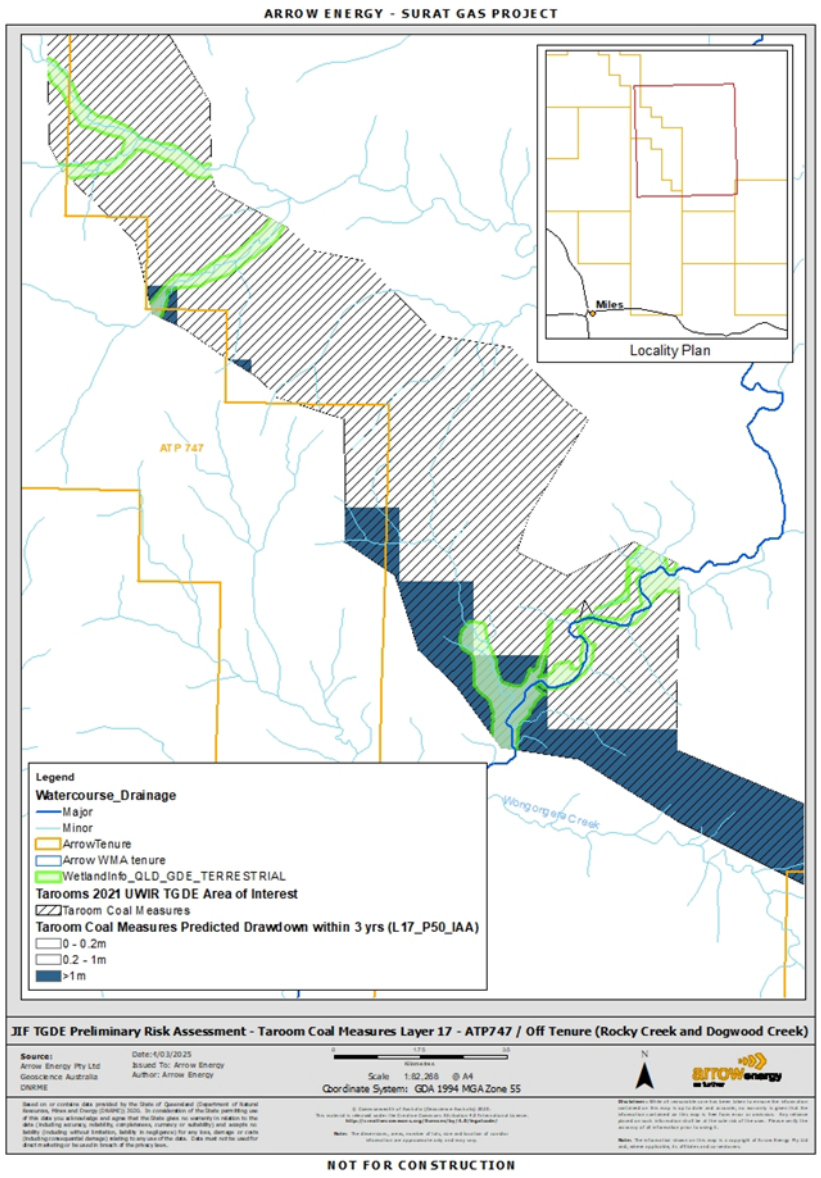
2021 UWIR

WetlandInfo	
Type of GDE	Terrestrial GDE
GDE Rule Set Name	Ecosystems intermittently connected to aquifers with brackish salinity and alkaline pH in unconsolidated Quaternary alluvia
GDE Rule Part	Regional ecosystems dominated by Eucalyptus camaldulensis (river red gum), Eucalyptus intertexta (gum coolibah), and/or Corymbia tessellaris (Moreton Bay Ash) intermittently connected to aquifers with brackish salinity and alkaline pH in unconsolidated Quaternary alluvia
GDE Confidence	Derived GDE - high confidence
GDE Rule ID	eMDB_RS_01D
GDE Evidence	Expert Opinion
Data Source	Biodiversity status of pre-clearing and remnant regional ecosystems v10.0
GDE Percent of Polygon Area	10
Conceptual Model	Alluvia
Legend for Display	01-80 Derived GDE - High Confidence
Temporal Nature of GW Connectivity Detailed	Intermittent
Link to document for Conceptual Model	https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/alluvia/
Link to document for Rule Set	https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/gde-background/gde-faq/gde-map-rules/
Class of GDE	Surface ecosystems dependent on the sub-surface presence of groundwater
Temporal Nature of GW Connectivity	Aseasonal, Intermittent
Source Aquifer Name	Alluvia
Source Aquifer Confinement	Unconfined
Source Aquifer Geology	Unconsolidated sedimentary
Source Aquifer Porosity	Primary
Source Aquifer Groundwater Flow System	Shallow alluvial, Local
Salinity of Groundwater Source	1 500 - 3 000 mg/L TDS
pH of GW Source	> 8
Dominant Recharge Process of GW Source	Infiltration (local)
Regional Ecosystem list	11.3.2/11.4.3/11.3.25/11.7.7
Regional Ecosystem percent list	40/40/10/10
Regional Ecosystems Remnant Vegetation of QLD	
RuleID	Category A or B containing endangered.
Landzone	Category C or R containing endangered

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Site	TCM – Rocky Creek and Dogwood Creek
Tenement	ATP747 / off tenure
Formation	Taroom Coal Measures (Layer 17)
IAA Predicted Drawdown (P50) (m)	1.06 – 5.499



JIF TGDE Risk Threshold and Preliminary Risk Assessments

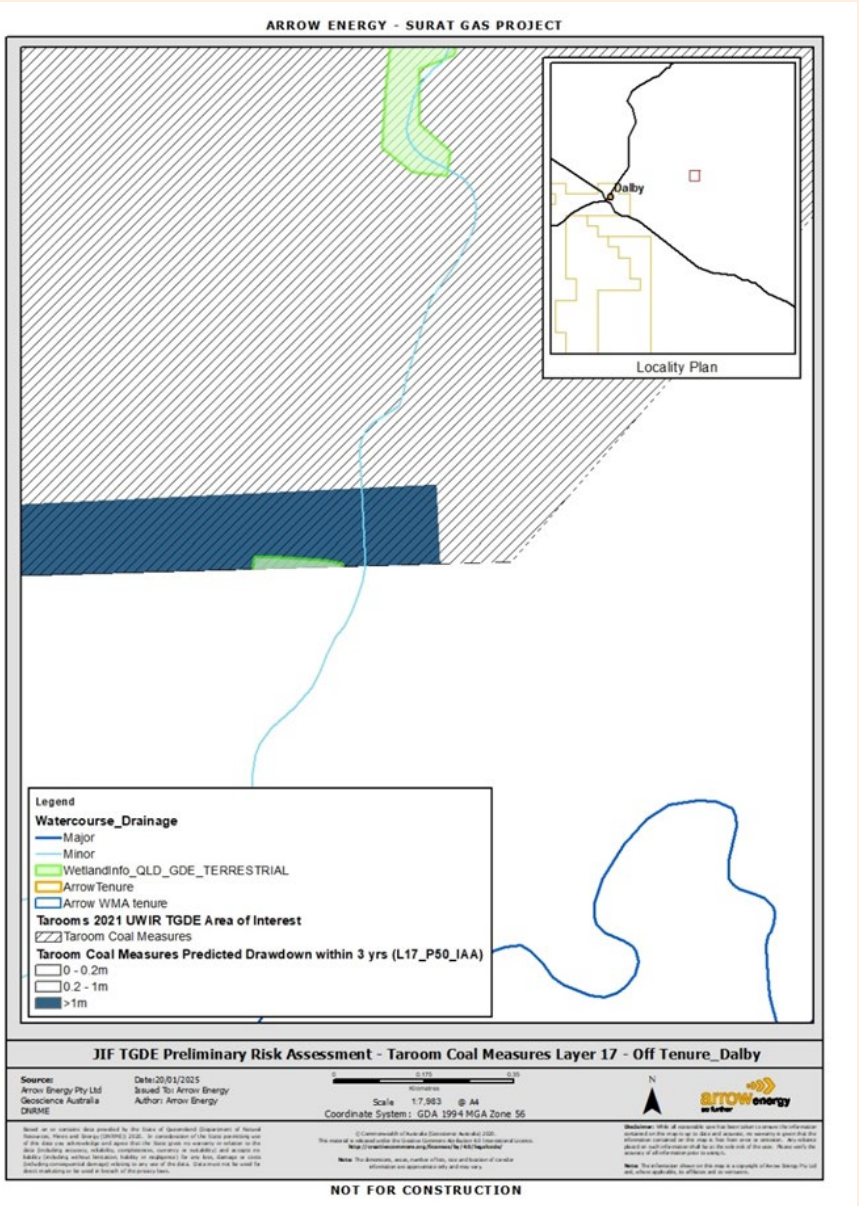
2021 UWIR

WetlandInfo	
Type of GDE	Terrestrial GDE
GDE Rule Set Name	Ecosystems intermittently connected to aquifers with brackish salinity and alkaline pH in unconsolidated Quaternary alluvia
GDE Rule Part	Regional ecosystems dominated by Eucalyptus camaldulensis (river red gum), Eucalyptus intertexta (gum coolibah), and/or Corymbia tessellaris (Moreton Bay Ash) intermittently connected to aquifers with brackish salinity and alkaline pH in unconsolidated Quaternary alluvia
GDE Confidence	Derived GDE - high confidence
GDE Rule ID	eMDB_RS_01D
GDE Evidence	Expert Opinion
Data Source	Biodiversity status of pre-clearing and remnant regional ecosystems v10.0
GDE Percent of Polygon Area	10
Conceptual Model	Alluvia
Legend for Display	01-80 Derived GDE - High Confidence
Temporal Nature of GW Connectivity Detailed	Intermittent
Link to document for Conceptual Model	https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/alluvia/
Link to document for Rule Set	https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/gde-background/gde-faq/gde-map-rules/
Class of GDE	Surface ecosystems dependent on the sub-surface presence of groundwater
Temporal Nature of GW Connectivity	Aseasonal, Intermittent
Source Aquifer Name	Alluvia
Source Aquifer Confinement	Unconfined
Source Aquifer Geology	Unconsolidated sedimentary
Source Aquifer Porosity	Primary
Source Aquifer Groundwater Flow System	Shallow alluvial, Local
Salinity of Groundwater Source	1 500 - 3 000 mg/L TDS
pH of GW Source	> 8
Dominant Recharge Process of GW Source	Infiltration (local)
Regional Ecosystem list	11.3.14/11.3.25/11.5.1
Regional Ecosystem percent list	85/10/5
Regional Ecosystems Remnant Vegetation of QLD	
RuleID	Category A or B that is of least concern
Landzone	3

JIF TGDE Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Site	TCM – Myall Creek
Tenement	off tenure
Formation	Taroom Coal Measures (Layer 17)
IAA Predicted Drawdown (P50) (m)	1.198



2021 UWIR

WetlandInfo	
Type of GDE	Terrestrial GDE
GDE Rule Set Name	Ecosystems intermittently connected to aquifers with brackish salinity and neutral pH in unconsolidated Quaternary alluvia supported by groundwater flow from geologically stratified, fractured basalt aquifers in low rainfall areas
GDE Rule Part	Deep rooted regional ecosystems intermittently connected to alluvial aquifers with brackish salinity and neutral pH supported by groundwater flow from basalt aquifers
GDE Confidence	Derived GDE - high confidence
GDE Rule ID	eMDB_RS_01M
GDE Evidence	Expert Opinion
Data Source	Biodiversity status of pre-clearing and remnant regional ecosystems v10.0
GDE Percent of Polygon Area	81-100_GDE
Conceptual Model	Alluvia
Legend for Display	81-100 Derived GDE - High Confidence
Temporal Nature of GW Connectivity Detailed	Intermittent
Link to document for Conceptual Model	https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/alluvia/
Link to document for Rule Set	https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/gde-background/gde-faq/gde-map-rules/
Class of GDE	Surface ecosystems dependent on the sub-surface presence of groundwater
Temporal Nature of GW Connectivity	Aseasonal, Intermittent
Source Aquifer Name	Alluvia supported by groundwater flow from basalt
Source Aquifer Confinement	Unconfined
Source Aquifer Geology	Unconsolidated sedimentary
Source Aquifer Porosity	Primary
Source Aquifer Groundwater Flow System	Shallow alluvial, Local
Salinity of Groundwater Source	1 500 - 3 000 mg/L TDS
pH of GW Source	6-8
Dominant Recharge Process of GW Source	Infiltration (local)
Regional Ecosystem list	11.3.2
Regional Ecosystem percent list	100
Regional Ecosystems Remnant Vegetation of QLD	
RuleID	Category A or B containing of concern
Landzone	3

Appendix B – JIF Subterranean Groundwater Dependent Ecosystems Risk Threshold and Preliminary Risk Assessments, 2021 UWIR

JIF Subterranean Groundwater Dependent Ecosystems Risk Threshold and Preliminary Risk Assessments

2021 UWIR

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Revision history

Revision	Revision Date	Revision Summary
1	26/05/2025	Initial Issue

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

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JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

1 Introduction

This Report provides the details of Arrow Energy's (Arrow) subterranean groundwater dependent ecosystems (GDEs) risk threshold assessment and preliminary risk assessment as required by the Joint Industry Framework (JIF), based on the 2021 Underground Water Impact Report (UWIR).

2 Background

Arrow Energy's Surat Gas Expansion Project (SGP) will develop coal seam gas (CSG) resources in the Surat Basin, approximately 250 km west of Brisbane.

The SGP was approved by the Australian Government under the *Environment and Protection and Biodiversity Conservation Act 1999* (EPBC Act) decision 2010/5344 on 19 December 2013. The SGP commenced development of CSG resources in the Surat Basin on 22 October 2020.

The conditions of Arrow's approval EPBC 2010/5344 were varied on 27 February 2025 to align the SGP with the JIF particularly through Condition 14A (as varied) which states that the approval holder must manage impacts on water resources and EPBC-listed springs in accordance with the relevant risk management framework/s which is defined as the JIF.

On 17 March 2021, the Australian Government issued the JIF to achieve defined environmental outcomes for groundwater in the Surat Basin. The JIF was collaboratively developed by the Federal Department of Agriculture, Water and the Environment (now the Department of Climate Change, Energy, the Environment and Water [DCCEEW]) and the CSG industry, with technical and regulatory advice from the Queensland Government.

Section 7 of the JIF requires a risk threshold assessment and preliminary risk assessment to be completed within three months following a Surat Cumulative Management Area (CMA) UWIR taking effect. Given the 2021 UWIR was in effect when Arrow's EPBC conditions were varied (27 February 2025), the required timing for the risk threshold assessment and preliminary risk assessment is taken to be three months from 27 February 2025.

3 Risk Threshold Assessment

Section 7.3 of the JIF notes the risk threshold for subterranean GDEs is a prediction in the OGIA model of:

- A long term predicted drawdown of more than 2 m for unconfined hydrogeological units caused by CSG development; or
- A long term predicted drawdown that dewaters the aquifer habitat for confined hydrogeological unit noting that dewater in this instance means a model prediction at any point in time where aquifer pressure in confined units is reduced to the top of the hydrostratigraphic unit, after which point dewatering occurs.

The risk threshold assessment results are provided in the following sections.

3.1 Unconfined hydrogeological units

The risk threshold assessment for unconfined hydrogeological units was undertaken by overlaying the following shape file layers which, where they overlap, indicate risk threshold exceedances:

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

- Unconfined hydrogeological units (outcrop): 2021 UWIR area of interest for terrestrial GDE (TGDE) provided by OGIA as a shape file. The data, as provided by OGIA, are areas of geological outcrop where there is more than 0.2 m of groundwater drawdown predicted in the OGIA numerical model in the P50 long term affected area scenario. This dataset forms the basis for the outcrop extent relevant to this assessment and is considered appropriate given the subterranean GDE risk threshold predicted drawdown value (>2 m) is greater than 0.2 m and, therefore, would be within the 2021 UWIR area of interest polygon.
- Long term predicted drawdown of 2 m: 2021 UWIR predicted groundwater drawdown for each aquifer (Longterm Affected Area [LAA] P50)[1] as provided by OGIA.

Areas of risk threshold exceedance are shown in Figure 3-1 to Figure 3-9.

Of the risk threshold areas identified in Figure 3-1 to Figure 3-9, and inline with Section 7.4 of the JIF and the assignment rules for reporting obligations identified in the 2021 UWIR, Arrow is the Responsible CSG Operator (RCO) for all of the identified areas of risk threshold exceedances located within Arrow's tenure and also those located to the east of Arrow's tenure where there is no other current petroleum tenure holders (Arrow being the closest RCO). However, Arrow considers it is not the RCO for areas which overlap with non-Arrow mining leases given the JIF's definition of an unconfined hydrogeological unit is where its geological formation is at ground surface (outcrop) which would be directly impacted by mining operations and therefore are expected to be the predominant cause of any groundwater drawdown.

[1] Section 6.4.5 of the 2021 UWIR states 'for the purposes of determining impacts for the UWIR 2021, the P50 predictions are utilised'

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

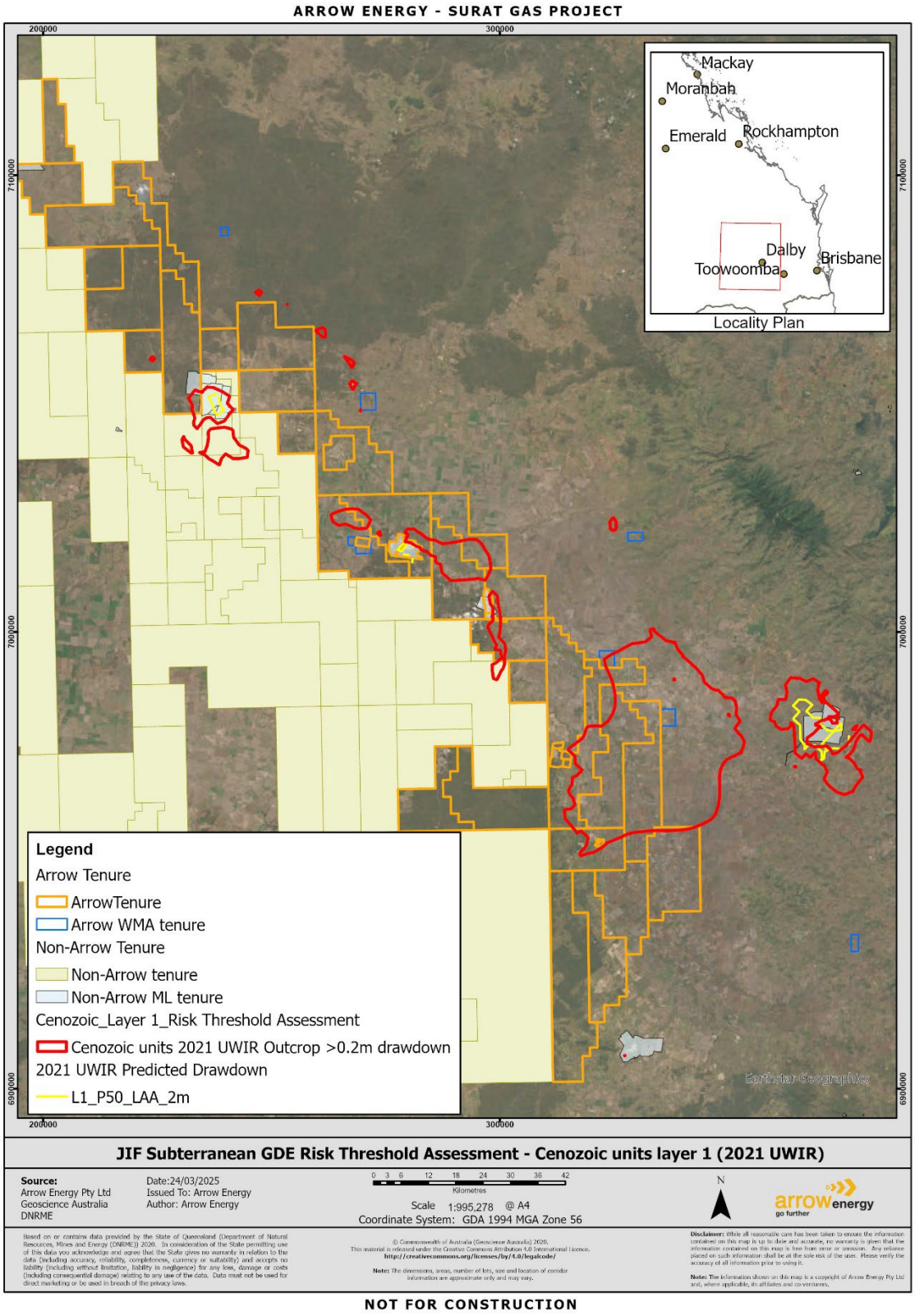

Figure 3-1 JIF Subterranean GDE Risk Threshold Assessment – Cenozoic units layer 1 (2021 UWIR). Exceedances are areas where the 2021 UWIR outcrop (2021 UWIR Outcrop >0.2m drawdown) overlaps with the 2021 UWIR longterm predicted drawdown (L1_P50_LAA_2m)

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

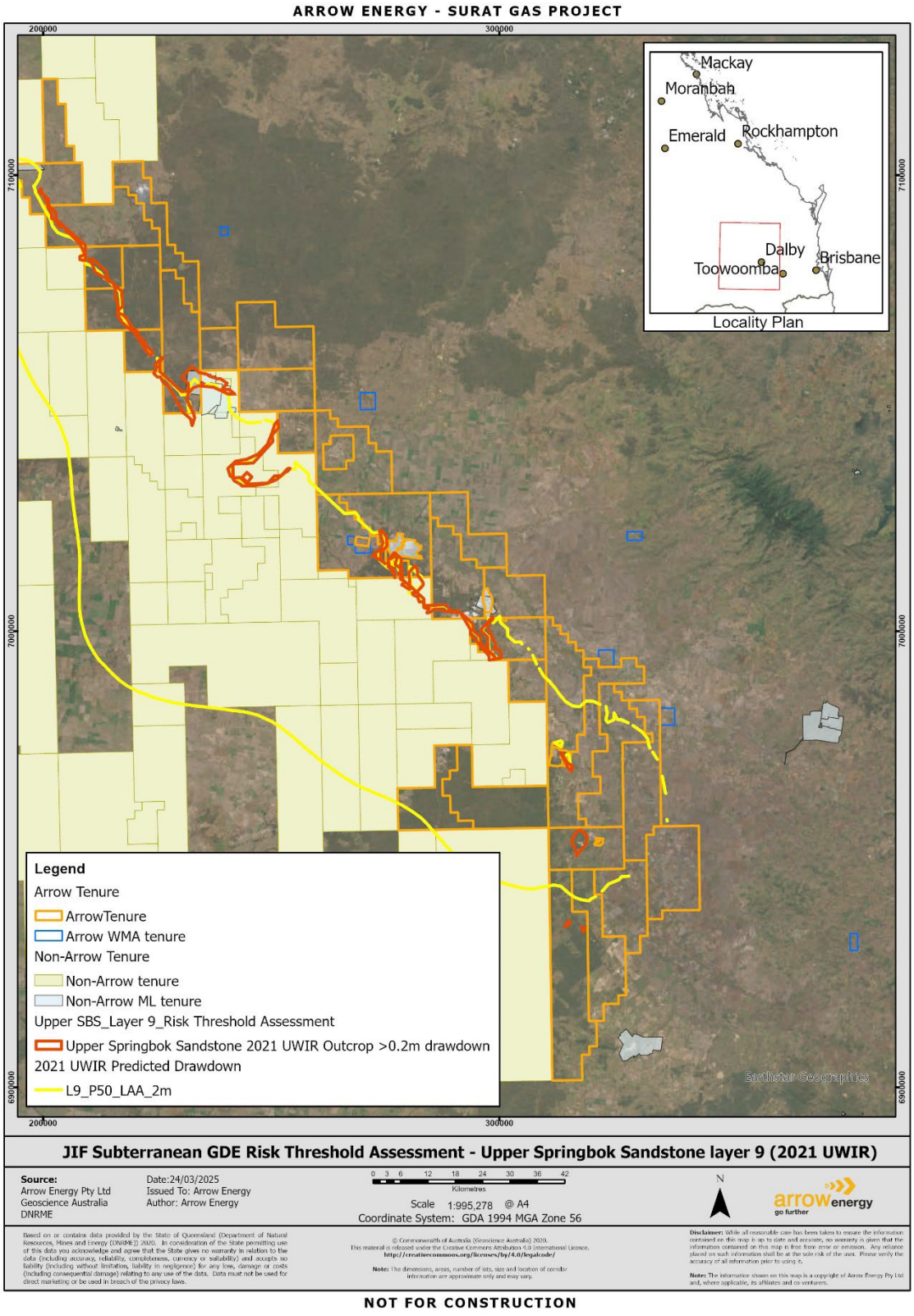

Figure 3-2 JIF Subterranean GDE Risk Threshold Assessment – Upper Springbok Sandstone layer 9 (2021 UWIR). Exceedances are areas where the 2021 UWIR outcrop (2021 UWIR Outcrop >0.2m drawdown) overlaps with the 2021 UWIR longterm predicted drawdown (L9_P50_LAA_2m)

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

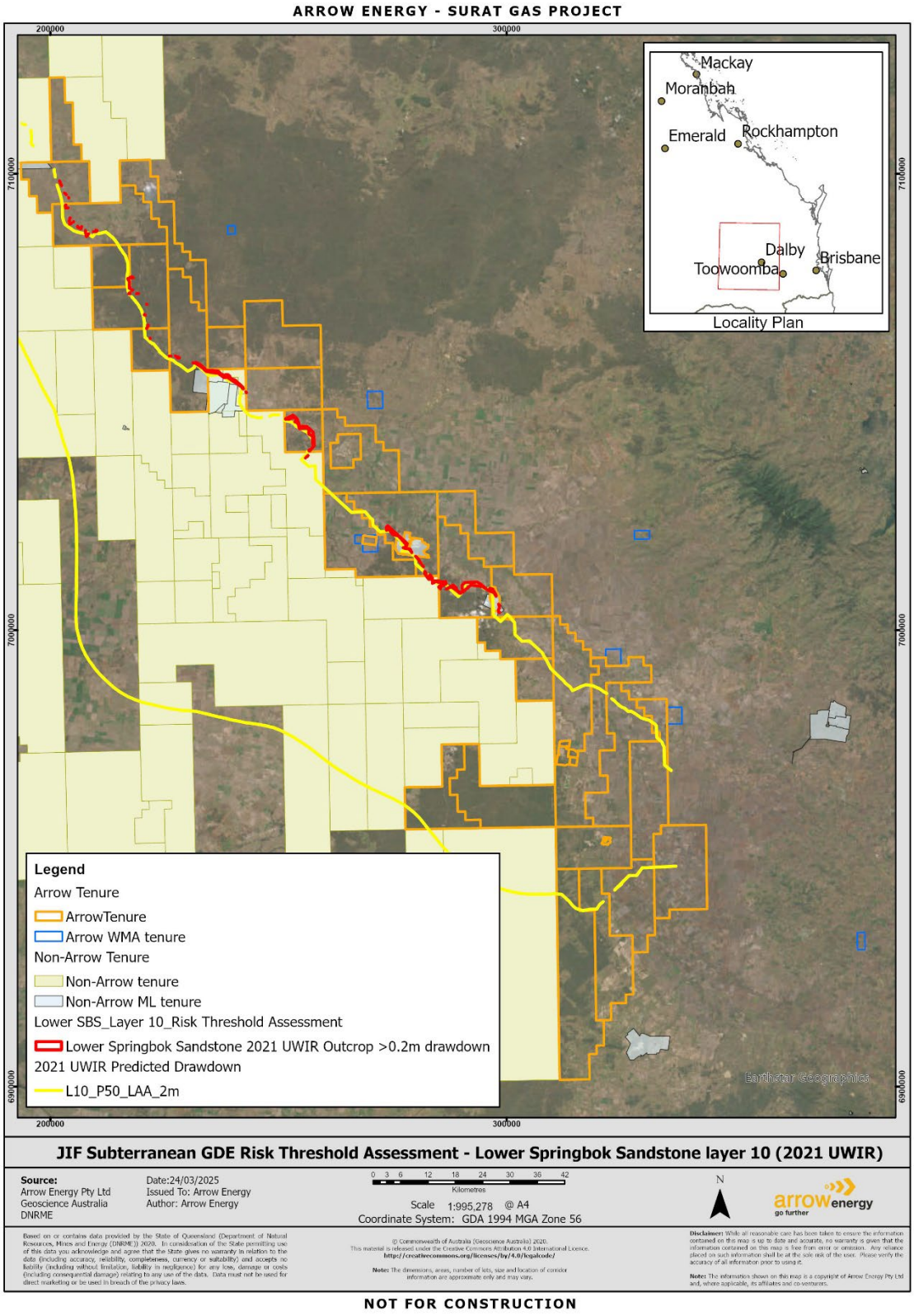

Figure 3-3 JIF Subterranean GDE Risk Threshold Assessment – Lower Springbok Sandstone layer 10 (2021 UWIR). Exceedances are areas where the 2021 UWIR outcrop (2021 UWIR Outcrop >0.2m drawdown) overlaps with the 2021 UWIR longterm predicted drawdown (L10_P50_LAA_2m)

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

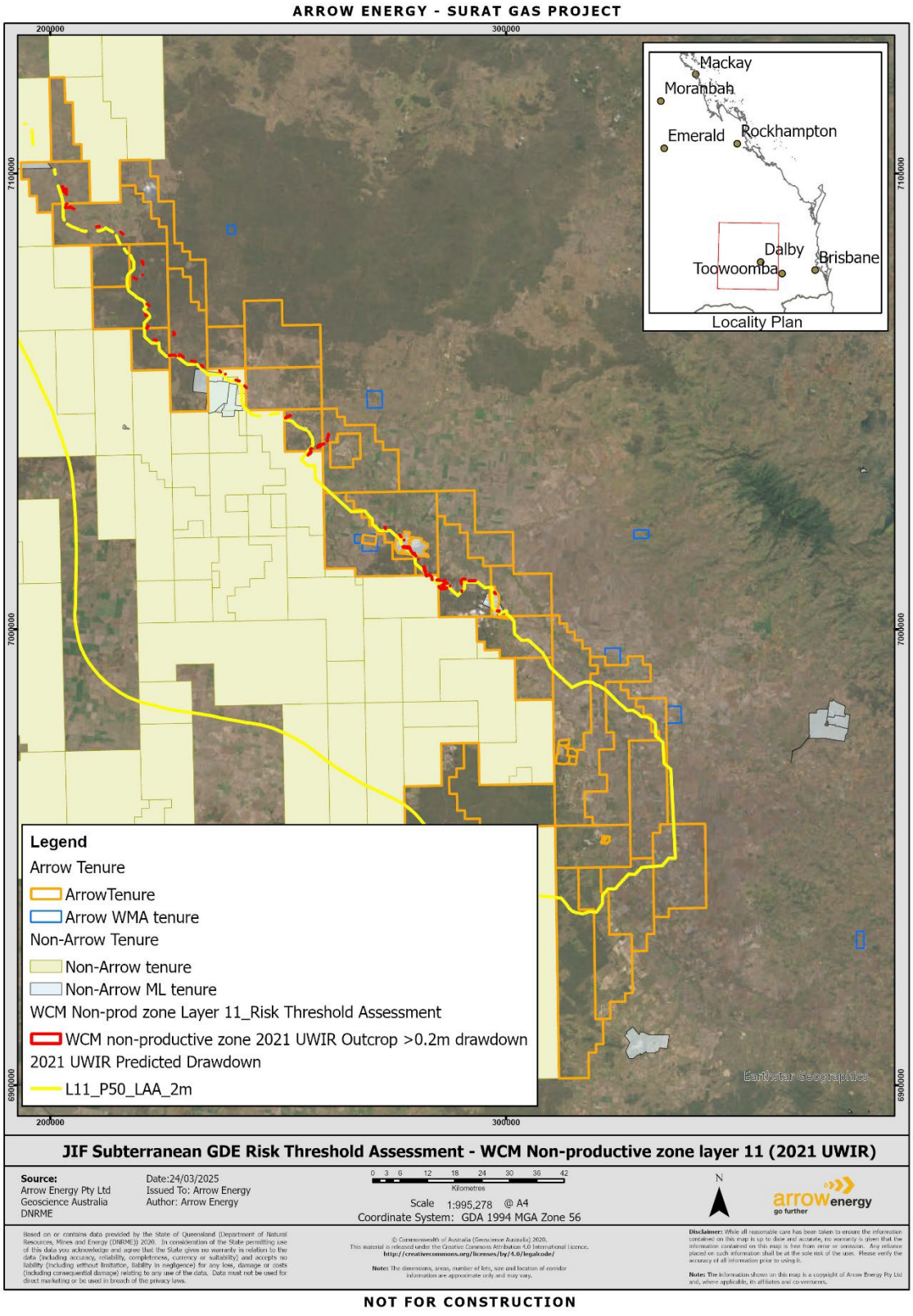

Figure 3-4 JIF Subterranean GDE Risk Threshold Assessment – WCM Non-productive zone layer 11 (2021 UWIR). Exceedances are areas where the 2021 UWIR outcrop (2021 UWIR Outcrop >0.2m drawdown) overlaps with the 2021 UWIR longterm predicted drawdown (L11_P50_LAA_2m)

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

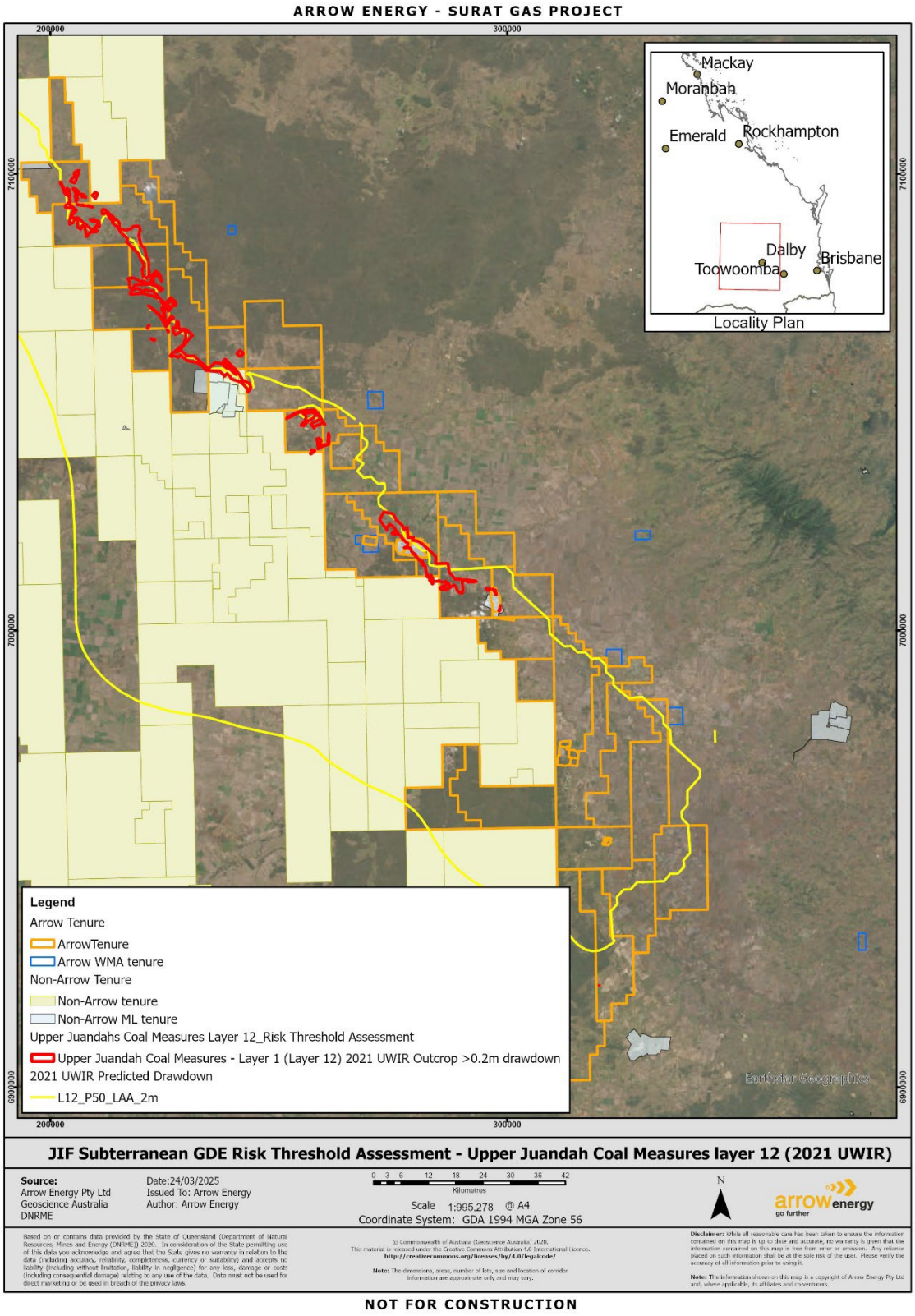

Figure 3-5 JIF Subterranean GDE Risk Threshold Assessment – Upper Juandah Coal Measures layer 12 (2021 UWIR). Exceedances are areas where the 2021 UWIR outcrop (2021 UWIR Outcrop >0.2m drawdown) overlaps with the 2021 UWIR longterm predicted drawdown (L12_P50_LAA_2m)

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

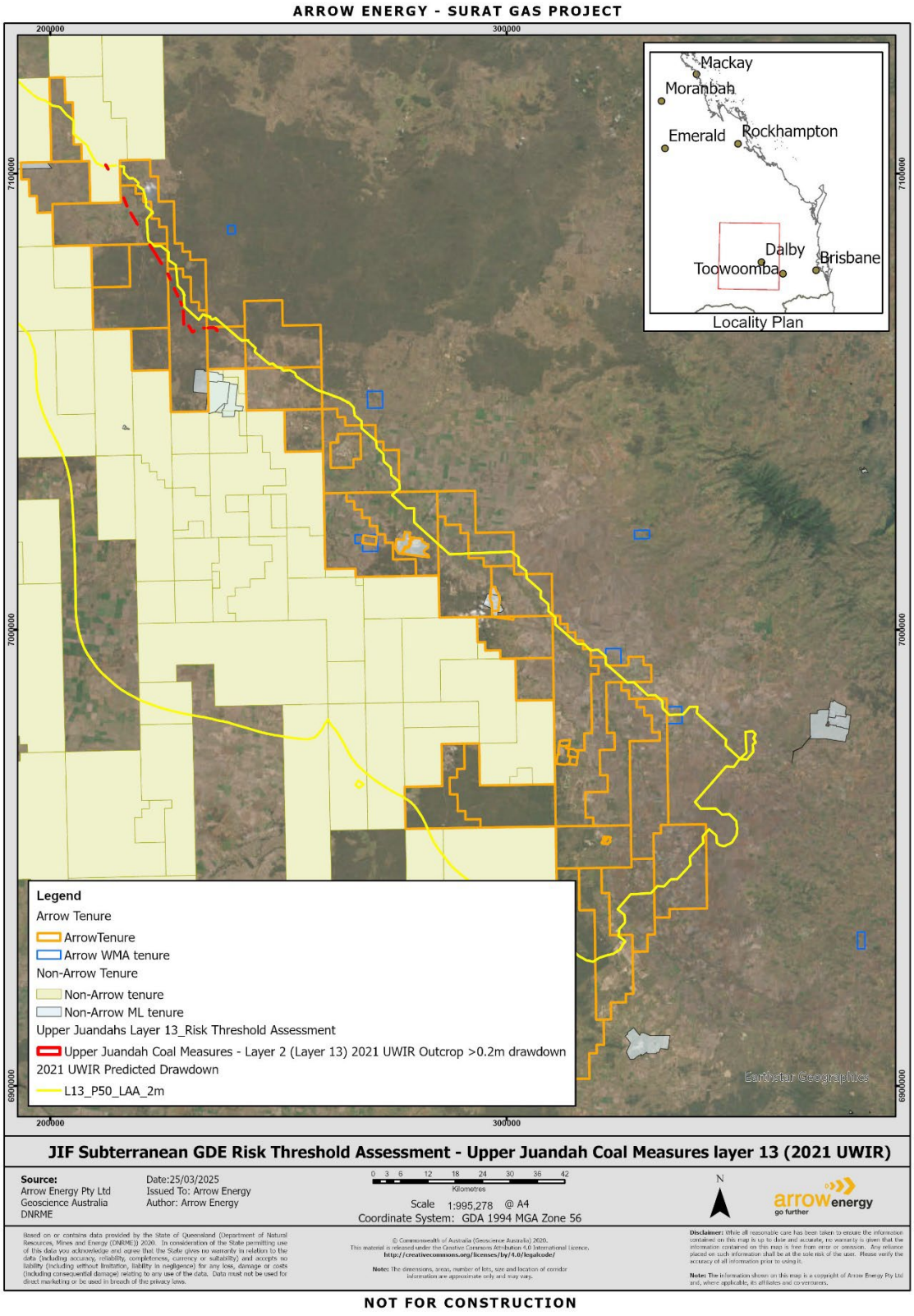

Figure 3-6 JIF Subterranean GDE Risk Threshold Assessment – Upper Juandah Coal Measures layer 13 (2021 UWIR). Exceedances are areas where the 2021 UWIR outcrop (2021 UWIR Outcrop >0.2m drawdown) overlaps with the 2021 UWIR longterm predicted drawdown (L13_P50_LAA_2m)

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

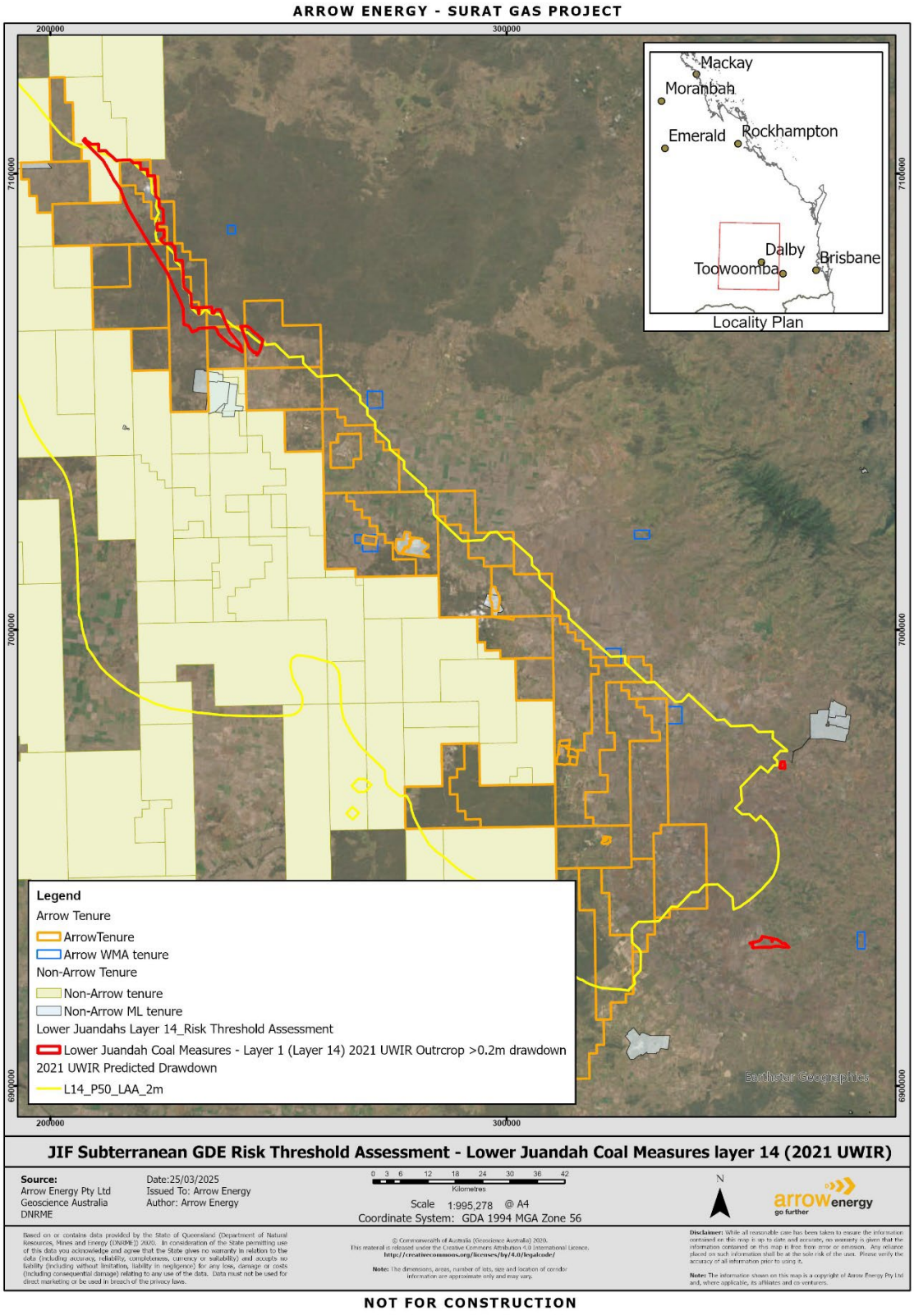

Figure 3-7 JIF Subterranean GDE Risk Threshold Assessment – Lower Juandah Coal Measures layer 14 (2021 UWIR). Exceedances are areas where the 2021 UWIR outcrop (2021 UWIR Outcrop >0.2m drawdown) overlaps with the 2021 UWIR longterm predicted drawdown (L14_P50_LAA_2m)

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

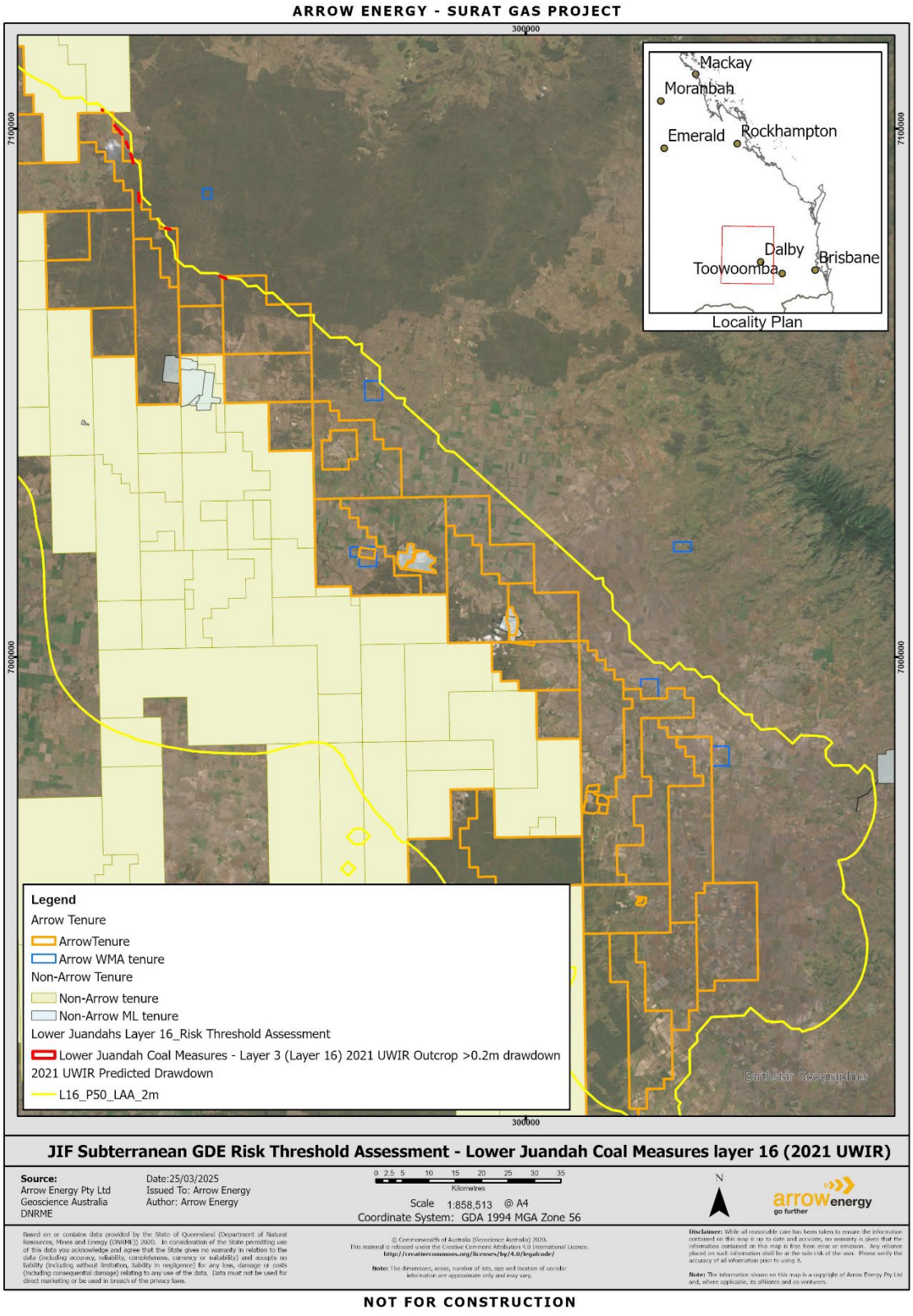

Figure 3-8 JIF Subterranean GDE Risk Threshold Assessment – Lower Juandah Coal Measures layer 16 (2021 UWIR). Exceedances are areas where the 2021 UWIR outcrop (2021 UWIR Outcrop >0.2m drawdown) overlaps with the 2021 UWIR longterm predicted drawdown (L16_P50_LAA_2m)

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

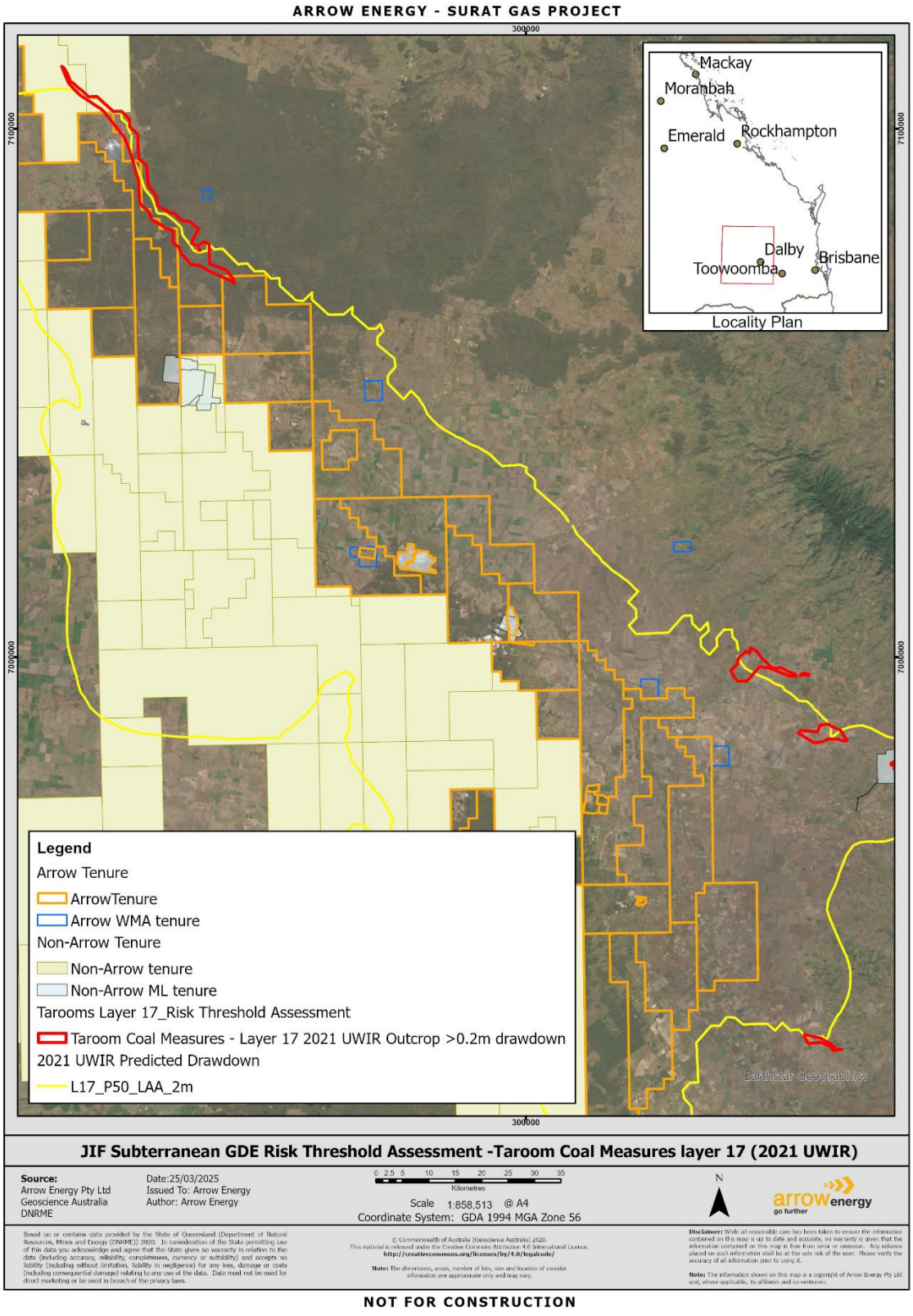

Figure 3-9 JIF Subterranean GDE Risk Threshold Assessment – Taroom Coal Measures layer 17 (2021 UWIR). Exceedances are areas where the 2021 UWIR outcrop (2021 UWIR Outcrop >0.2m drawdown) overlaps with the 2021 UWIR longterm predicted drawdown (L17_P50_LAA_2m)

3.2 Confined hydrogeological units

The risk threshold assessment for confined hydrogeological units was undertaken through the following workflow:

i. Identify existing monitoring bores for each formation and review for adequacy the spatial distribution of the network relative to Arrow's tenure and the 2021 UWIR P50 LAA predicted groundwater drawdown (>2 m) extent.
ii. Identify static water level (SWL) (m AHD) (***initial SWL***) for each monitoring bore at the beginning of 2021 (coinciding with the 2021 UWIR) based on Arrow monitoring data.
iii. Identify 2021 UWIR ***predicted LAA groundwater drawdown*** (metres) for the respective formation at the location of the monitoring bore. Where a formation is represented by multiple layers (i.e. Springbok Sandstone is separated into upper [layer 9] and lower [layer 10]), the greatest predicted drawdown of the sub-layers is applied.
iv. Determine the ***long term reduced SWL*** (m AHD) by subtracting the predicted LAA groundwater drawdown from the initial SWL.
v. Identify the ***elevation of the top of the respective formation*** (m AHD) at the location of the monitoring bore using the 2021 UWIR geological Petrel model, and confirm the respective formation is confined[2] at this location (if the 2021 UWIR geological Petrel model shows the respective formation is unconfined then this monitoring bore would be disregarded for the confined hydrogeological unit assessment).
vi. Compare the long term reduced SWL to the elevation of the top of the formation to identify if the long term SWL is reduced to the top of / below the elevation of the formation top. If true, this is a risk threshold exceedance.

Areas of confined hydrogeological units risk threshold exceedance are shown where monitoring bores exceed the risk threshold in Figure 3-10 to Figure 3-13. There were no risk threshold exceedances for the Hutton Sandstone or the Precipice Sandstone.

As shown in Figure 3-10 to Figure 3-13, the location and distribution of Arrow's existing monitoring network demonstrates the appropriateness of the monitoring bore's spatial distribution for the purpose of conducting this risk threshold assessment.

Further details of the assessment are provided in Appendix A.

The approach outlined above was adopted due to the large distances between groundwater level / pressure data points which would be used to generate a potentiometric surface which would then be used to determine the long term reduced SWL surface. The large spatial area between data points can create error when interpolating groundwater elevation / flow direction across large distances including across areas within and outside of active CSG production. Similarly, utilising the 2021 UWIR potentiometric surface creates the same potential error as it is generated based on regional monitoring data (consisting almost entirely of Arrow monitoring points within the Arrow tenements). The adopted approach provides for representative data points across the predicted drawdown areas utilising actual water level monitoring data. While the output of this

[2] Section 13 of the JIF defines a confined hydrogeological unit as a hydrogeological unit that is not at the ground surface in the OGIA model

approach identifies individual bore risk threshold exceedances, cumulatively this output identifies areas of risk threshold exceedances based on clusters of exceedances.

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

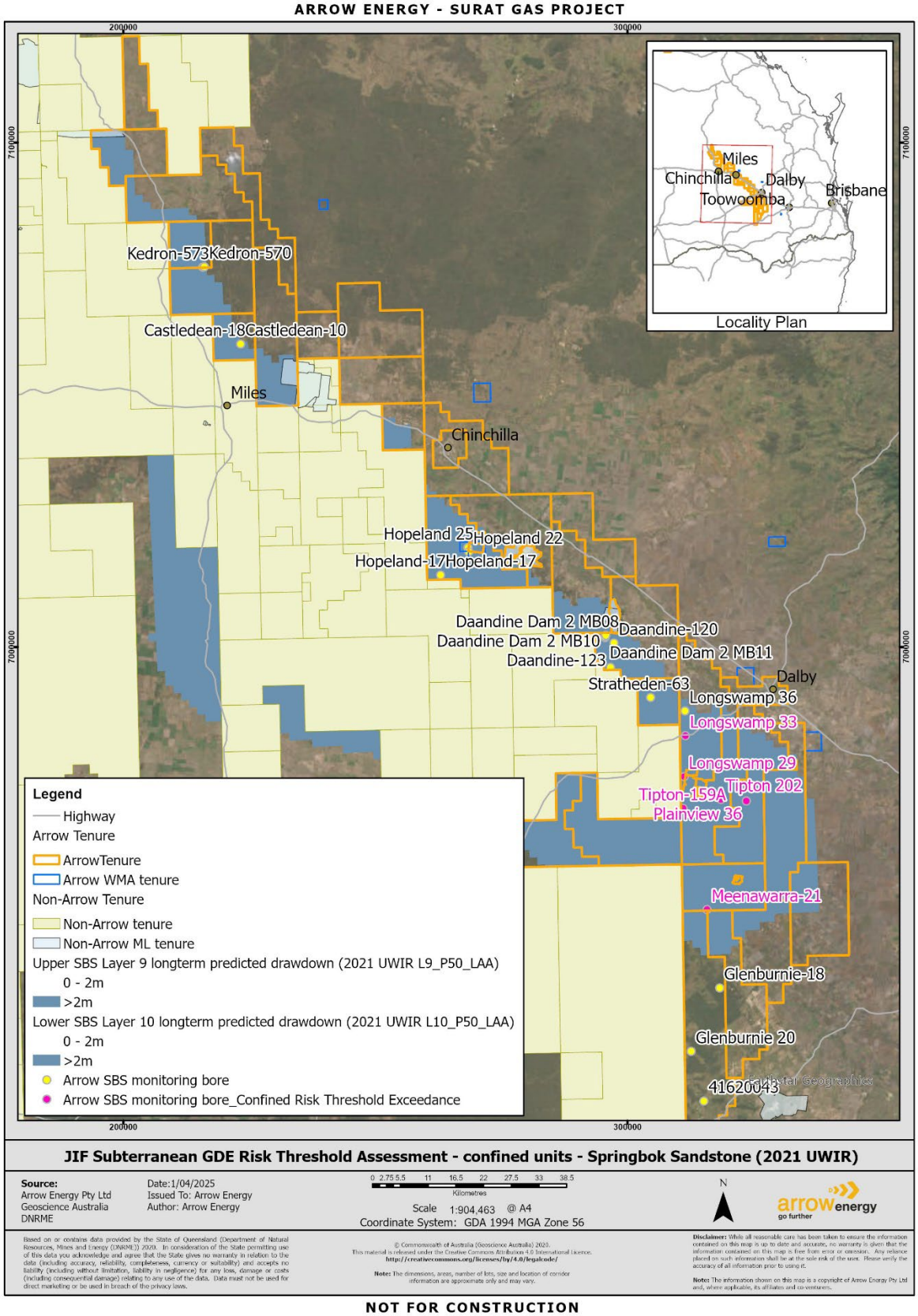

Figure 3-10 JIF Subterranean GDE Risk Threshold Assessment, Confined Units - Springbok Sandstone

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

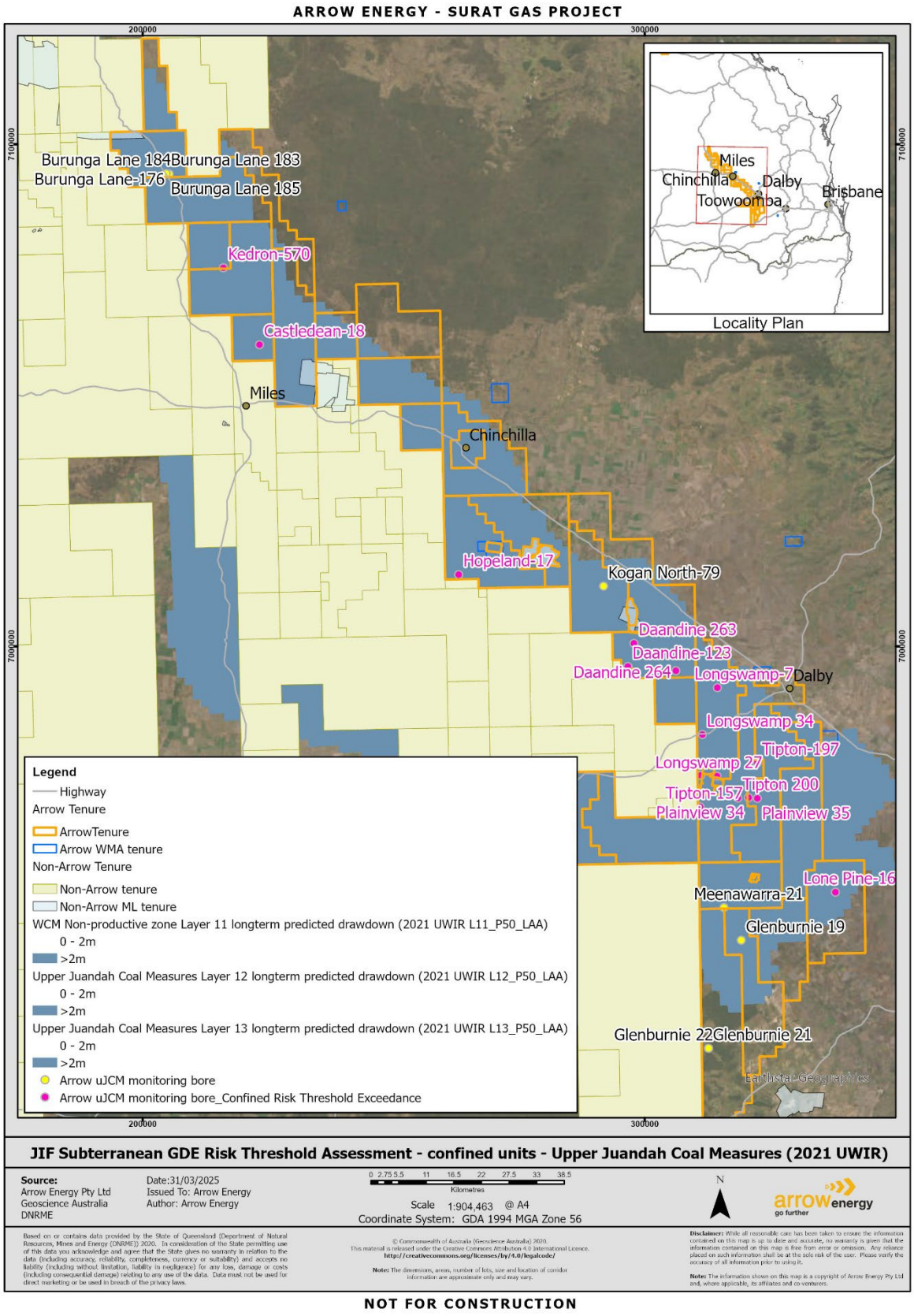

Figure 3-11 JIF Subterranean GDE Risk Threshold Assessment, Confined Units – Upper Juandah Coal Measures

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

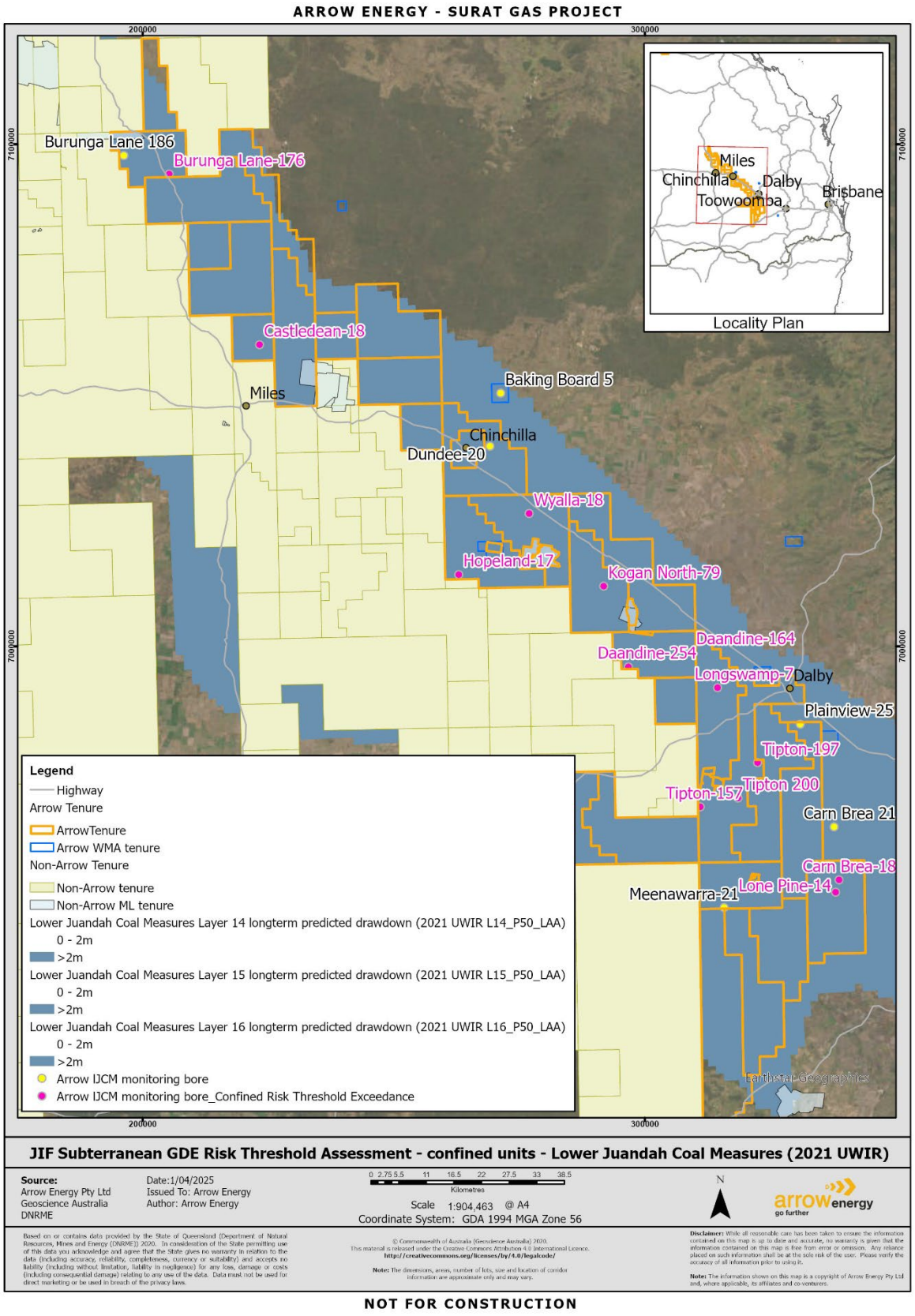

Figure 3-12 JIF Subterranean GDE Risk Threshold Assessment, Confined Units – Lower Juandah Coal Measures

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

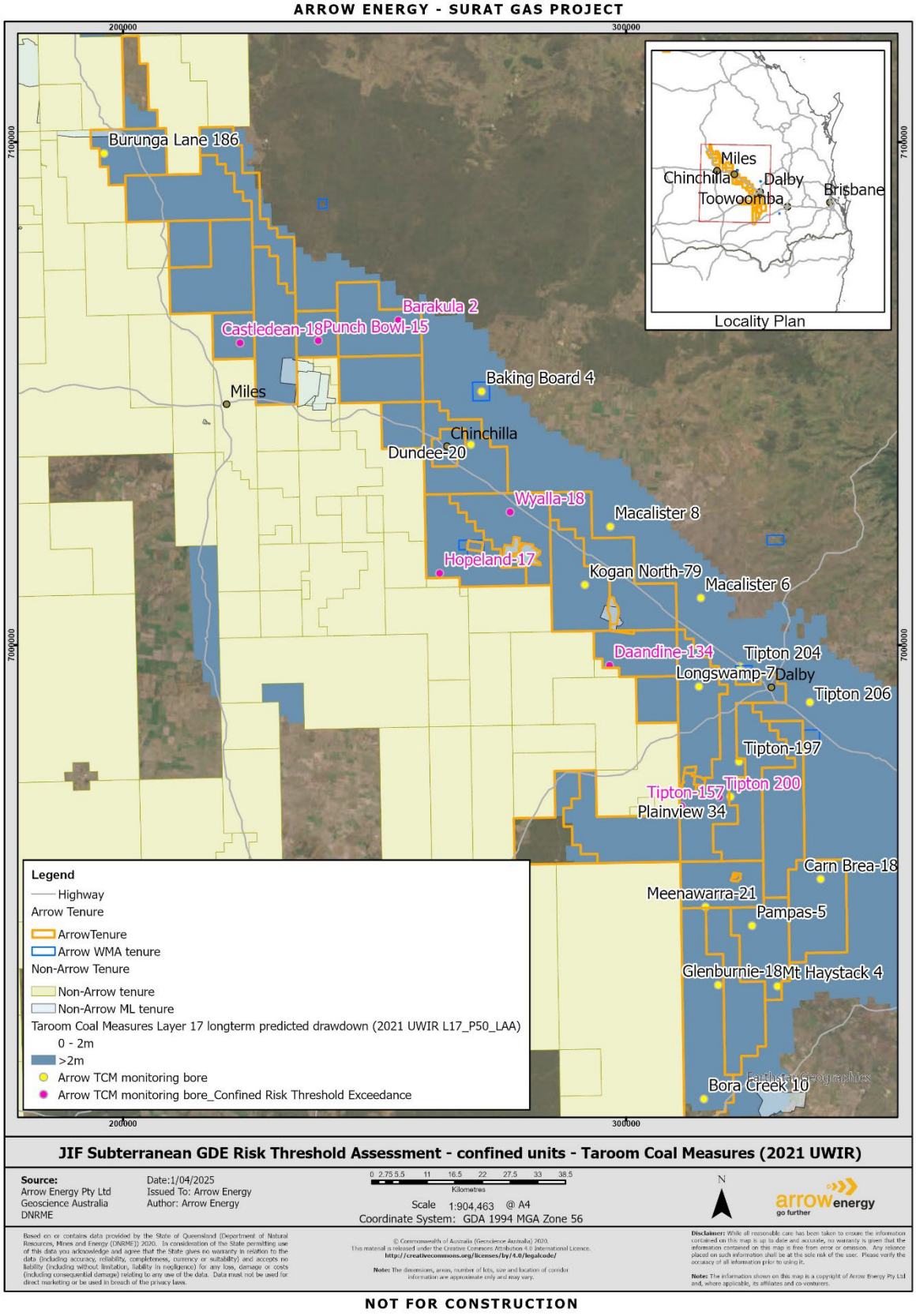

Figure 3-13 JIF Subterranean GDE Risk Threshold Assessment, Confined Units – Taroom Coal Measures

4 Preliminary Risk Assessment

The preliminary risk assessment was undertaken by applying several GIS datasets to the results of the risk threshold assessment to identify high risk sites inline with section 9.1.2 of the JIF.

The subterranean GDE Preliminary Risk Assessment Matrix in Section 9.1.2 of the JIF shows high risk outcomes are only possible where the likelihood equals more than 2 m of predicted drawdown occurring in less than three years. As a result, only the results of the Immediately Affected Area (IAA) (drawdown predicted to occur in the next three years) predicted drawdown values are discussed in this Report with non-high risk scenarios to be reported in the Annual Compliance Report as per Section 7.4 of the JIF.

Furthermore, noting that the 2021 UWIR IAA P50 predicted groundwater drawdown (as provided by OGIA) in consolidated and confined hydrogeological units (in areas where Arrow is considered the RCO) is less than 1 m/day (applying the average daily rate calculated from the IAA predicted drawdown), based on the subterranean GDE preliminary risk assessment categories (Table 5 of the JIF) there is no high risk outcome potential for consolidated and confined hydrogeological units.

There are no known subterranean fauna surveys (or accessible data) undertaken within Arrow's tenure relevant to the assessed formations.

Based on the above, the datasets overlaid in ArcGIS to identify areas of high risk impact are listed in Table 4-1. Identified high risk sites are shown in Figure 4-1 to Figure 4-5. High risk areas were identified in the following formations:

- Upper Springbok Sandstone
- Walloon Coal Measures Non-productive zone
- Upper Juandah Coal Measures (layer 12)
- Lower Juandah Coal Measures (layer 14)
- Taroom Coal Measures

As per the risk threshold assessment (Section 3), inline with Section 7.4 of the JIF and the assignment rules for reporting obligations identified in the 2021 UWIR, Arrow is the Responsible CSG Operator (RCO) for all of the identified areas of preliminary risk assessment high risk sites located within Arrow's tenure and also those located to the east of Arrow's tenure where there is no other current petroleum tenure holders (Arrow being the closest RCO). Nonetheless, Arrow considers it is not the RCO for areas which overlap with non-Arrow mining leases given the JIF's definition of an unconfined hydrogeological unit is where its geological formation is at ground surface (outcrop) which would be directly impacted by mining operations and therefore are expected to be the predominant cause of any groundwater drawdown.

Table 4-1 Preliminary Risk Assessment datasets

Risk matrix attribute	Dataset	Source	Definition query
L1 – Timing of predicted exceedance (<3 years)	Drawdown - 2021 UWIR predicted groundwater drawdown for each aquifer (IAA [three years] P50)	OGIA	Predicted drawdown range sorted to only display >2m
C1 – Outcrop geology	Outcrop areas for each formation where 0.2 m of groundwater drawdown is predicted to occur in the long term (further defined in Section 3.1)	OGIA	Attribute 'Layer' sorted for each respective formation

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Risk matrix attribute	Dataset	Source	Definition query
	Minimum (25 m) geological formation thickness for the Springbok Sandstone (inline with footnote 2 of Table 5 in Section 9.1.2 of the JIF)	OGIA	Disregard areas of Springbok Sandstone outcrop where formation thickness is less than 25 m
C2 – Rate of CSG drawdown	Drawdown - 2021 UWIR predicted groundwater drawdown for each aquifer (IAA [three years] P50)	OGIA	Daily average calculated from the IAA total predicted drawdown
C3 – Knowledge of subterranean fauna presence	Literature review for field surveys	Web research	NA

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

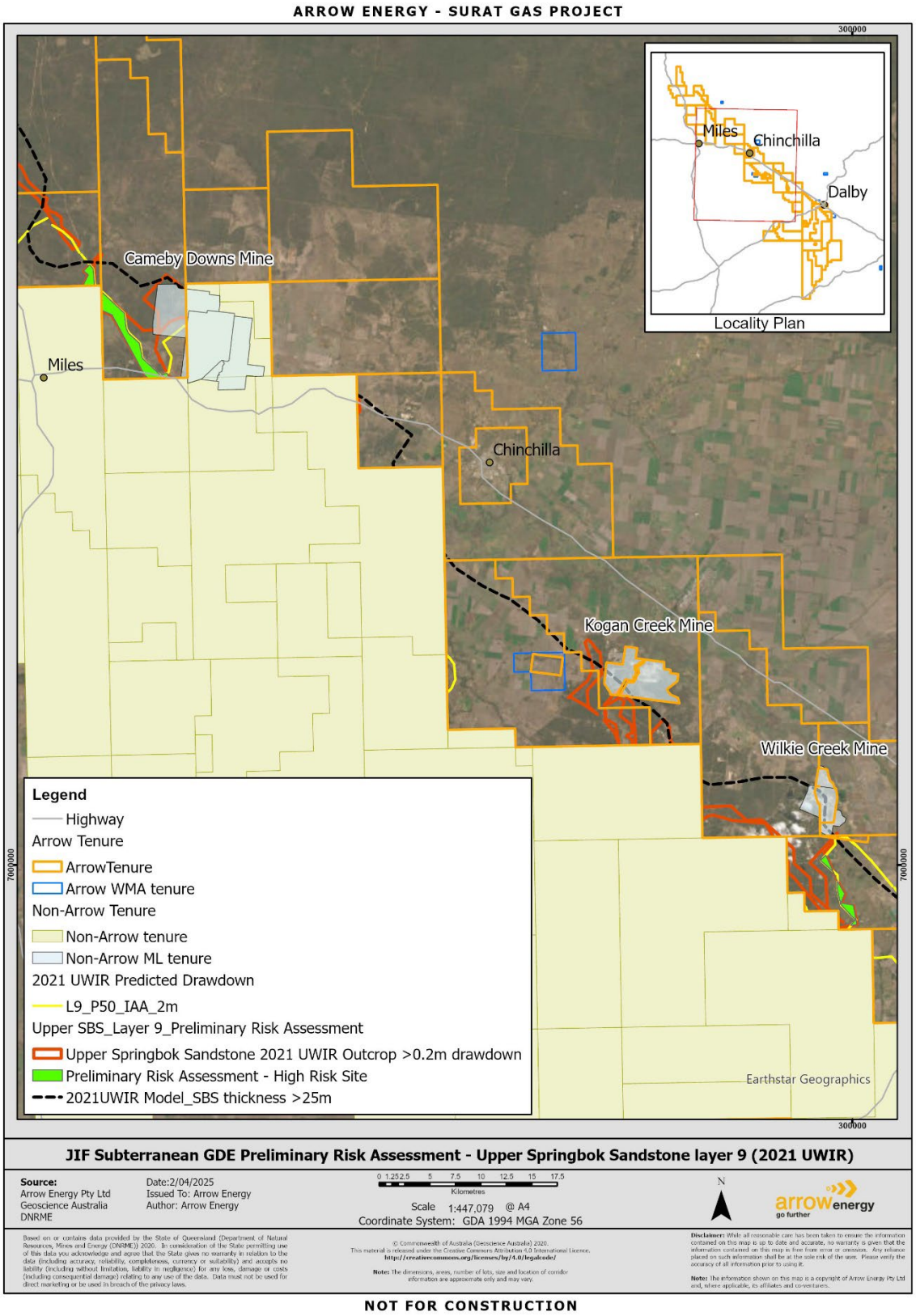

Figure 4-1 JIF Subterranean GDE Preliminary Risk Assessment – Upper Springbok Sandstone layer 9 (2021 UWIR). Preliminary high risk sites (Arrow RCO) shown as green polygons

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

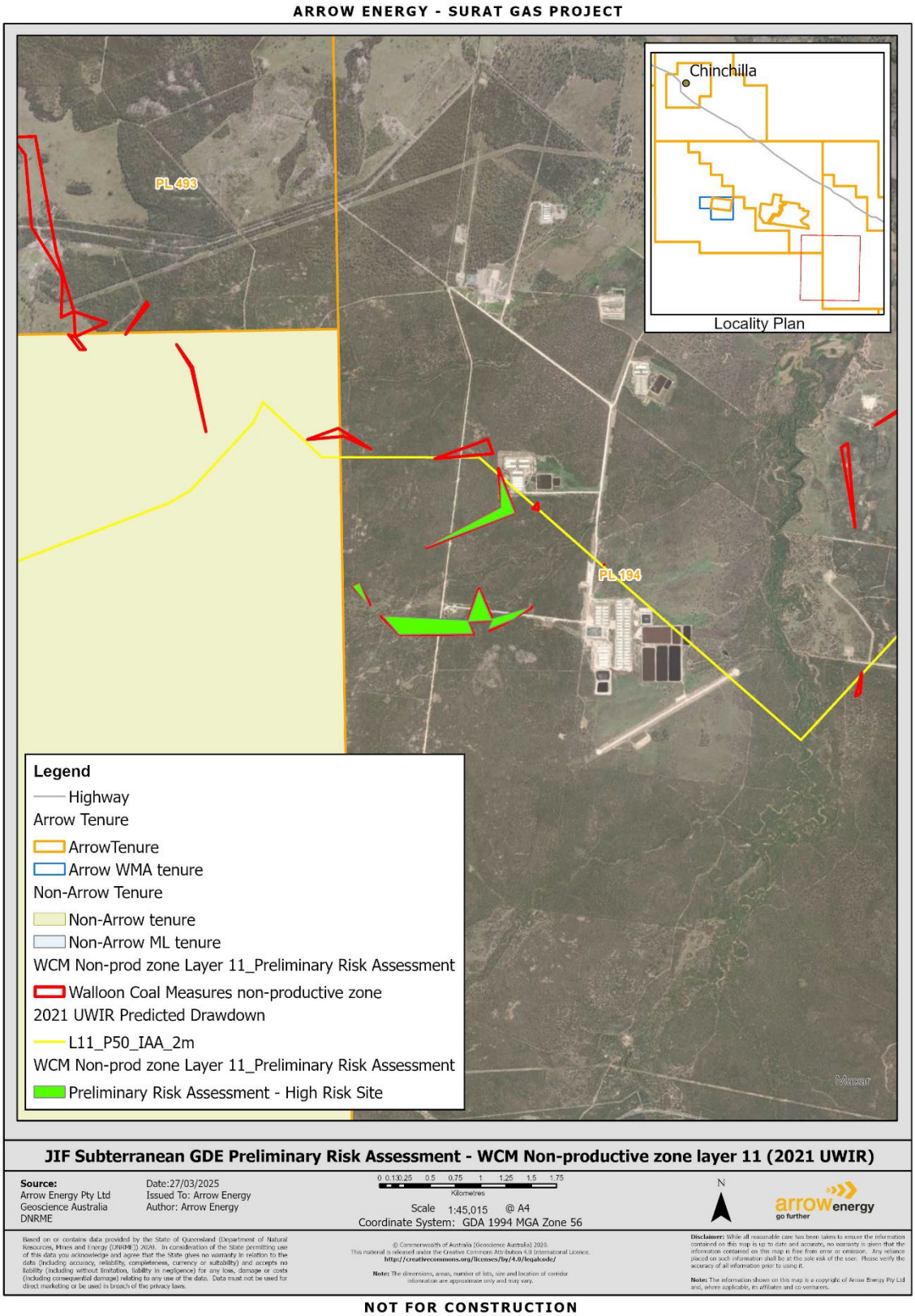

Figure 4-2 JIF Subterranean GDE Preliminary Risk Assessment – WCM Non-productive zone layer 11 (2021 UWIR). Preliminary high risk sites (Arrow RCO) shown as green polygons

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

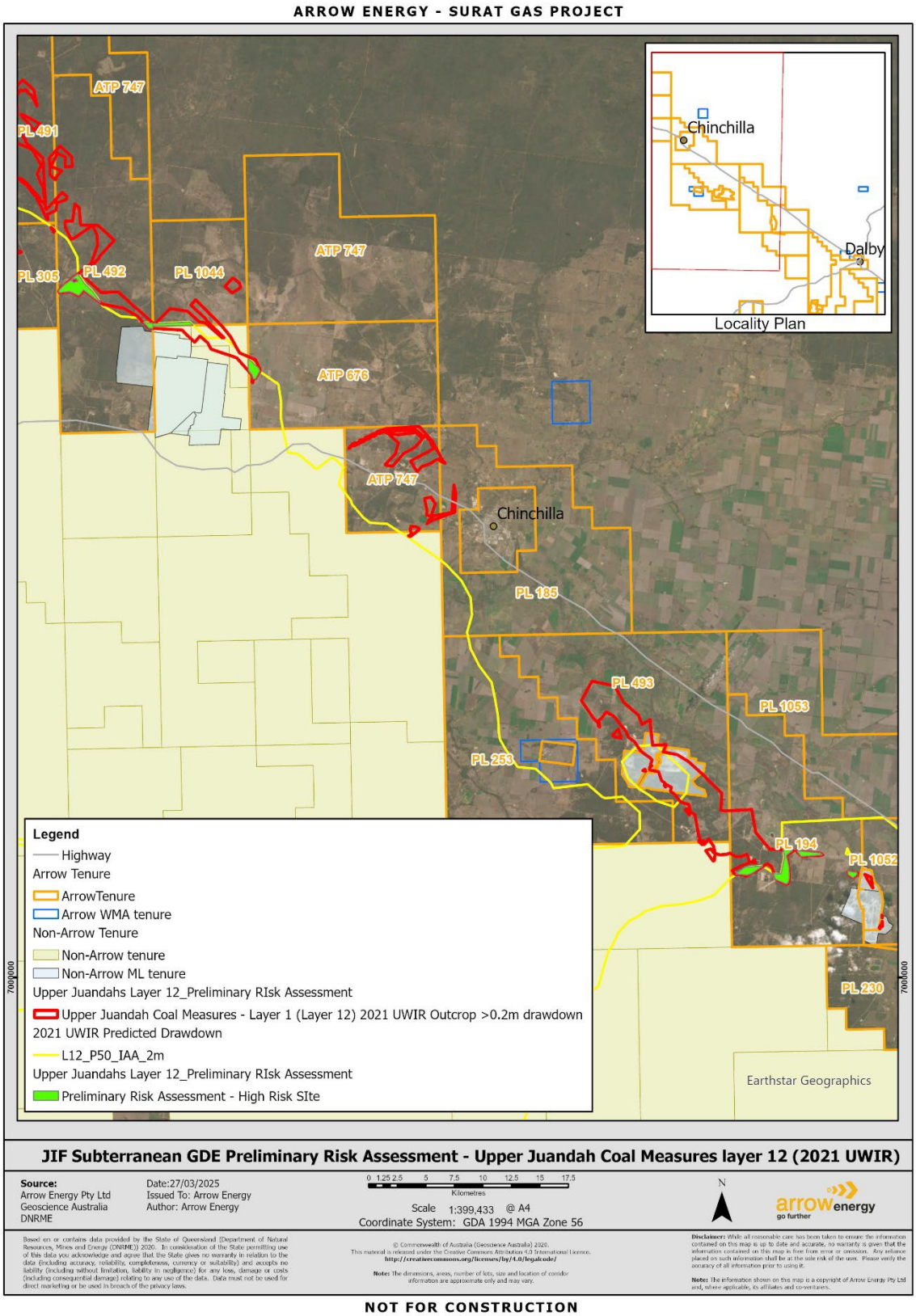

Figure 4-3 JIF Subterranean GDE Preliminary Risk Assessment – Upper Juandah Coal Measures layer 12 (2021 UWIR). Preliminary high risk sites (Arrow RCO) shown as green polygons

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

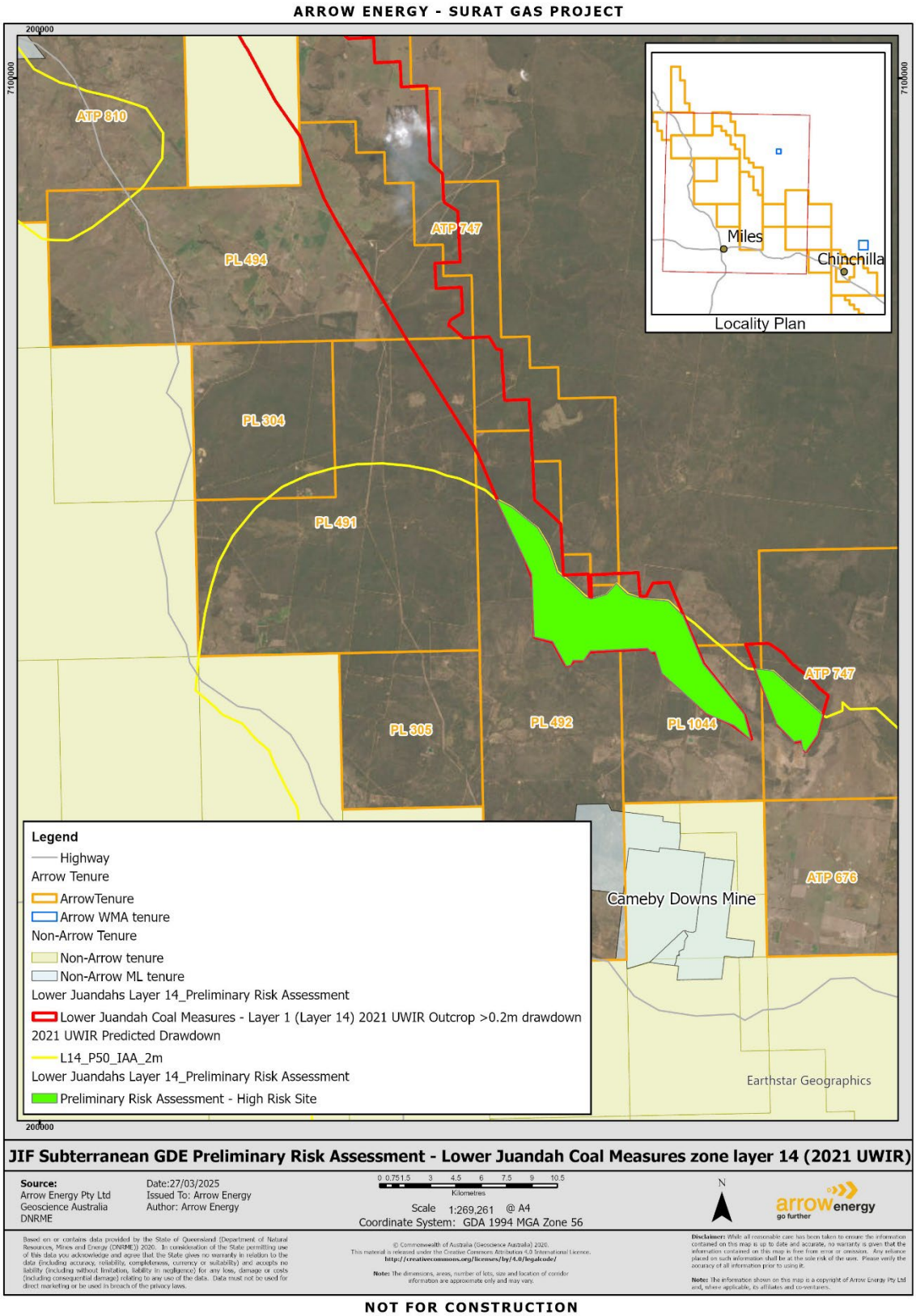

Figure 4-4 JIF Subterranean GDE Preliminary Risk Assessment – Lower Juandah Coal Measures layer 14 (2021 UWIR). Preliminary high risk sites (Arrow RCO) shown as green polygons

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

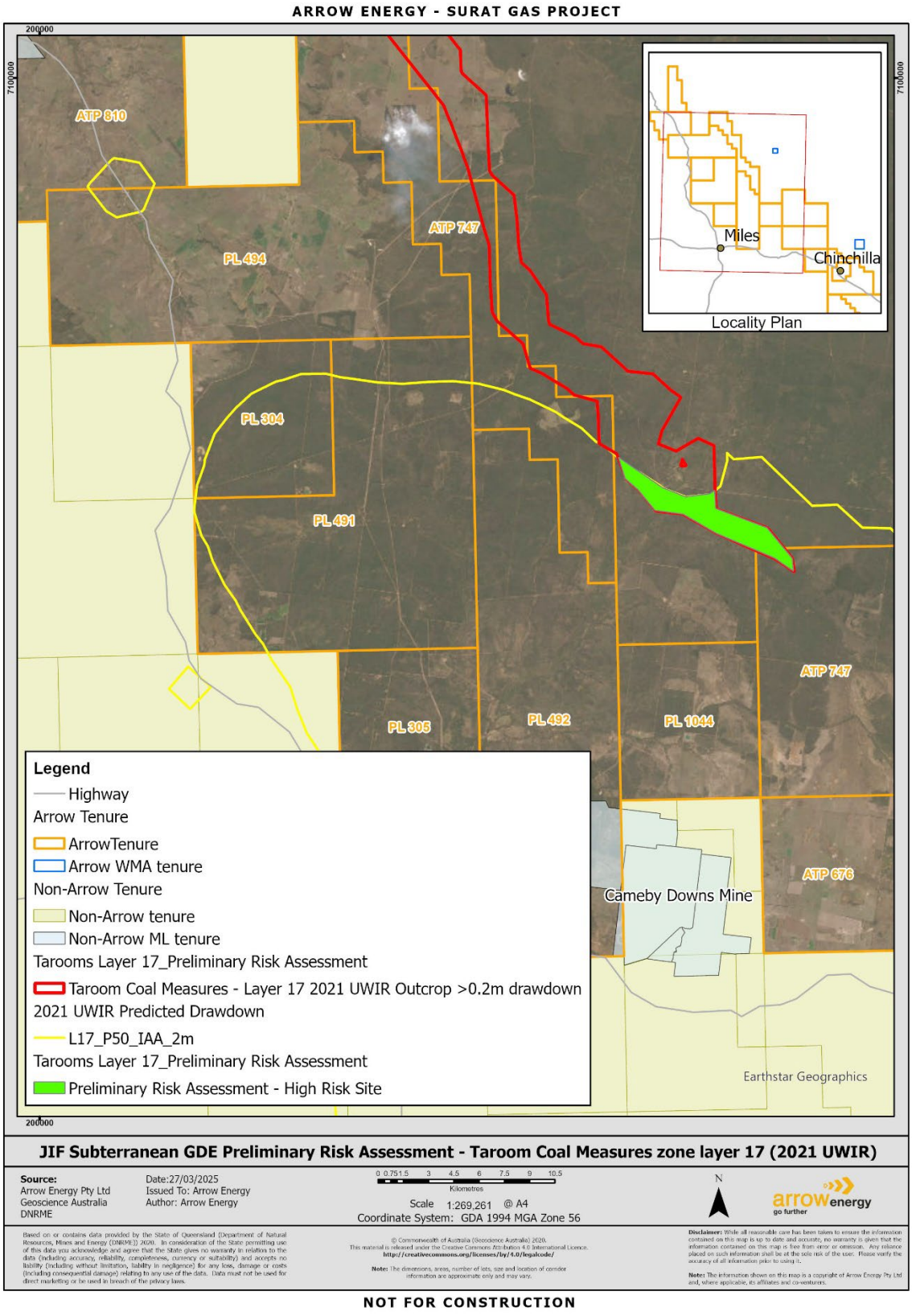

Figure 4-5 JIF Subterranean GDE Preliminary Risk Assessment – Taroom Coal Measures layer 17 (2021 UWIR). Preliminary high risk sites (Arrow RCO) shown as green polygons

Appendix A – Confined Hydrogeological Units Risk Threshold Assessment

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Table A1 Confined Hydrogeological Units Risk Threshold Assessment – Springbok Sandstone

Monitoring Bore ID	Initial SWL (mAHD)	2021 UWIR Predicted Longterm Affected Area (LAA) Drawdown (P50) (metres)		Longterm Reduced SWL (mAHD)	Springbok Sandstone Formation Top Elevation		Distance between Longterm Reduced SWL and Formation Top Elevation (m)	Risk Threshold Exceeded
		Layer 9 - Upper Springbok Sandstone	Layer 10 - Lower Springbok Sandstone		2021 UWIR Model (mAHD)	Comments		
Daandine Dam 2 MB08	307.98	0.00	43.95	264.04	342.9	Unconfined, no overlying layer	-	-
Daandine Dam 2 MB10	309.00	0.00	43.95	265.06	340.163	Unconfined, no overlying layer	-	-
Daandine Dam 2 MB11	307.36	0.00	43.95	263.42	342.421	Unconfined, no overlying layer	-	-
Daandine-120	313.25	12.61	40.01	273.24	327.99	Unconfined, no overlying layer	-	-
Daandine-123	318.90	15.08	65.33	253.57	337.25	Unconfined, no overlying layer	-	-
Glenburnie-18	339.66	0.00	0.39	339.27	390.85	Unconfined, no overlying layer	-	-
Hopeland 22	297.27	12.21	32.96	264.31	318.536	Unconfined, no overlying layer	-	-
Hopeland 25	293.62	11.02	29.31	264.31	317.064	Unconfined, no overlying layer	-	-
Longswamp 29	319.00	2.00	33.61	285.39	300.602	Confined	-15.22	Yes
Longswamp 33	316.81	10.74	23.52	293.29	301.076	Confined	-7.78	Yes
Longswamp 36	316.82	2.81	5.76	311.06	287.035	Confined	24.02	No
Meenawarra-21	301.45	4.81	7.82	293.63	344.55	Confined	-50.91	Yes
Plainview 36	331.30	35.69	102.06	229.24	319.48	Confined	-90.23	Yes
Stratheden-63	316.03	10.47	22.33	293.70	289.32	Confined	4.38	No
Tipton 202	297.21	21.23	75.61	221.60	319.7	Confined	-98.10	Yes
Tipton-159A	324.10	11.69	52.71	271.40	283.93	Confined	-12.53	Yes
Castledean-18	dry	5.49	7.18		292.58	Confined	-	No, formation dry
Kedron-570	dry	0.00	6.43		353.45	Unconfined, no overlying layer	-	-

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Monitoring Bore ID	Initial SWL (mAHD)	2021 UWIR Predicted Longterm Affected Area (LAA) Drawdown (P50) (metres)		Longterm Reduced SWL (mAHD)	Springbok Sandstone Formation Top Elevation		Distance between Longterm Reduced SWL and Formation Top Elevation (m)	Risk Threshold Exceeded
		Layer 9 - Upper Springbok Sandstone	Layer 10 - Lower Springbok Sandstone		2021 UWIR Model (mAHD)	Comments		
Hopeland-17	312.81	16.86	44.79	268.02	234.88	Confined	33.14	No

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Table A2 Confined Hydrogeological Units Risk Threshold Assessment – Upper Juandah Coal Measures

Monitoring Bore ID	Initial SWL (mAHD)	2021 UWIR Predicted Longterm Affected Area (LAA) Drawdown (P50) (metres)			Longterm Reduced SWL (mAHD)	Upper Juandah Coal Measures Formation Top Elevation		Distance between Longterm Reduced SWL and Formation Top Elevation (m)	Risk Threshold Exceeded
		Layer 11 – WCM Non-productive zone	Layer 12 - uJCM	Layer 13 - uJCM		2021 UWIR Model (mAHD)	Comments		
Burunga Lane 183	267.22	0.00	0.00	2.21		267.33	Unconfined, no overlying layer	-	-
Burunga Lane 184	270.92	0.00	0.00	2.21		267.33	Unconfined, no overlying layer	-	-
Burunga Lane 185	265.23	0.00	0.00	2.21		267.33	Unconfined, no overlying layer	-	-
Burunga Lane 186	251.36	11.70	21.27	29.05	222.31	196.74		25.58	No
Burunga Lane-176	261.00	0.00	0.20	3.22		268.13	Unconfined, no overlying layer	-	-
Castledean-18	272.93	31.50	80.70	117.80	155.13	278.58	Confined	-123.45	Yes
Daandine 263	251.85	40.60	86.30	134.30	117.55	255.19	Confined	-137.64	Yes
Daandine 264	236.16	6.80	55.70	114.80	121.36	266.20	Confined	-144.84	Yes
Daandine-123	260.00	66.50	157.50	205.00	55.00	174.25	Confined	-119.25	Yes
Daandine-254	261.34	66.50	157.50	205.00	56.34	174.18	Confined	-117.84	Yes
Glenburnie 19	361.55	6.55	32.02	57.95	303.60	291.00	Confined	12.60	No
Glenburnie 21	367.49	0.06	0.11	0.26	367.23	348.27	Confined	18.96	No
Glenburnie 22	376.96	0.06	0.11	0.26	376.70	348.30	Confined	28.40	No
Hopeland-17	215.58	57.87	130.00	194.00	21.58	61.88	Confined	-40.30	Yes
Kedron-570	294.72	6.75	74.40	132.61	162.11	338.45	Confined	-176.34	Yes
Kogan North-79	291.66	0.00	16.40	63.00		317.75	Unconfined, no overlying layer	-	-
Lone Pine-16	324.92	0.00	55.56	86.96	237.96	286.51	Confined	-48.55	Yes
Longswamp 27	309.32	44.32	126.86	185.78	123.54	205.70	Confined	-82.16	Yes
Longswamp 30R	320.93	37.88	162.10	240.10	80.83	153.60	Confined	-72.77	Yes
Longswamp 34	313.93	24.15	63.34	129.77	184.16	251.07	Confined	-66.91	Yes

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Monitoring Bore ID	Initial SWL (mAHD)	2021 UWIR Predicted Longterm Affected Area (LAA) Drawdown (P50) (metres)			Longterm Reduced SWL (mAHD)	Upper Juandah Coal Measures Formation Top Elevation		Distance between Longterm Reduced SWL and Formation Top Elevation (m)	Risk Threshold Exceeded
		Layer 11 – WCM Non-productive zone	Layer 12 - uJCM	Layer 13 - uJCM		2021 UWIR Model (mAHD)	Comments		
Longswamp-7	315.88	0.30	36.96	112.17	203.71	260.06	Confined	-56.35	Yes
Meenawarra-21	358.98	9.86	60.13	61.37	297.61	260.55	Confined	37.06	No
Plainview 34	332.95	233.64	234.70	239.47	93.48	198.50	Confined	-105.02	Yes
Plainview 35	328.64	241.90	248.40	283.26	45.38	182.74	Confined	-137.36	Yes
Tipton 200	285.08	102.78	155.71	191.38	93.70	219.65	Confined	-125.95	Yes
Tipton-157	279.04	70.20	179.33	231.82	47.22	131.28	Confined	-84.06	Yes
Tipton-197	324.10	71.84	128.94	159.35	164.75	242.62	Confined	-77.87	Yes

2021 UWIR

Table A3 Confined Hydrogeological Units Risk Threshold Assessment – Lower Juandah Coal Measures

Monitoring Bore ID	Initial SWL (mAHD)	2021 UWIR Predicted Longterm Affected Area (LAA) Drawdown (P50) (metres)			Longterm Reduced SWL (mAHD)	Lower Juandah Coal Measures Formation Top Elevation		Distance between Longterm Reduced SWL and Formation Top Elevation (m)	Risk Threshold Exceeded
		Layer 14 – UCM	Layer 12 - UCM	Layer 13 - UCM		2021 UWIR Model (mAHD)	Comments		
Baking Board 5	dry	0	11	19	-	278.00		-	-
Burunga Lane 186	251.48	32	21	13	219.21	77.53	Confined	141.68	No
Burunga Lane-176	274.00	151	154	143	120.06	170.00	Confined	-49.94	Yes
Carn Brea 21	336.99	119	118	118	217.51	173.00	Confined	44.51	No
Carn Brea-18 (Argyle seam)	337.95	169	233	247	90.91	207.00	Confined	-116.09	Yes
Carn Brea-18 (Wambo seam)	327.98	169	233	247	80.94	207.00	Confined	-126.06	Yes
Castledean-18	292.03	165	220	266	25.77	174.00	Confined	-148.23	Yes
Daandine-164	307.55	100	123	136	172.04	197.00	Confined	-24.96	Yes
Daandine-254	79.64	257	302	311	-231.42	102.00	Confined	-333.42	Yes
Dundee-20	292.88	36	52	69	224.12	205.00	Confined	19.12	No
Hopeland-17	161.24	270	239	263	-108.32	-28.00	Confined	-80.32	Yes
Kogan North-79	265.40	119	154	196	69.00	201.00	Confined	-132.00	Yes
Lone Pine-14	332.87	136	137	137	195.64	215.00	Confined	-19.36	Yes
Longswamp-7	317.59	142	171	186	131.14	181.00	Confined	-49.86	Yes
Meenawarra-21	365.06	95	71	99	265.68	176.00	Confined	89.68	No
Plainview-25	314.49	85	81	79	229.55	172.00	Confined	57.55	No
Tipton 200	246.45	236	293	298	-51.64	143.00	Confined	-194.64	Yes
Tipton-157	141.42	268	314	358	-217.04	81.00	Confined	-298.04	Yes
Tipton-197	332.40	186	207	210	122.71	171.00	Confined	-48.29	Yes
Wyalla-18 (Argyle seam)	291.81	75	125	191	100.90	228.00	Confined	-127.10	Yes

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Monitoring Bore ID	Initial SWL (mAHD)	2021 UWIR Predicted Longterm Affected Area (LAA) Drawdown (P50) (metres)			Longterm Reduced SWL (mAHD)	Lower Juandah Coal Measures Formation Top Elevation		Distance between Longterm Reduced SWL and Formation Top Elevation (m)	Risk Threshold Exceeded
		Layer 14 – IJCM	Layer 12 - IJCM	Layer 13 - IJCM		2021 UWIR Model (mAHD)	Comments		
Wyalla-18 (Wambo seam)	284.40	75	125	191	93.49	228.00	Confined	-134.51	Yes
Baking Board 5	dry	0	11	19	-	278.00	Confined	-	-

Table A4 Confined Hydrogeological Units Risk Threshold Assessment – Lower Juandah Coal Measures

Monitoring Bore ID	Initial SWL (mAHD)	2021 UWIR Predicted Longterm Affected Area (LAA) Drawdown (P50) (metres)	Longterm Reduced SWL (mAHD)	Lower Juandah Coal Measures Formation Top Elevation		Distance between Longterm Reduced SWL and Formation Top Elevation (m)	Risk Threshold Exceeded
		Layer 17 – Taroom Coal Measures		2021 UWIR Model (mAHD)	Comments		
Baking Board 4 (Condamine seam)	290.05	36.87	253.18	238.14	Confined	15.04	No
Baking Board 4 (Upper Taroom seam)	291.85	36.87	254.98	238.14	Confined	16.84	No
Bora Creek 10	374.57	2.71	371.86	262.00	Confined	109.86	No
Barakula 2	315.49	78.09	237.40	291.00	Confined	-53.60	Yes
Burunga Lane 186	293.31	31.02	262.29	-167.00	Confined	429.29	No
Castledean-18	287.84	347.40	-59.56	-16.00	Confined	-43.56	Yes
Carn Brea-18	341.41	261.57	79.84	-63.00	Confined	142.84	No
Daandine-134	-20.90	429.93	-450.83	-114.00	Confined	-336.83	Yes
Dundee-20 (Condamine seam)	277.27	94.33	182.94	73.00	Confined	109.94	No
Dundee-20 (Upper Taroom seam)	274.17	94.33	179.84	73.00	Confined	106.84	No
Glenburnie-18	345.92	206.68	139.24	98.35	Confined	40.89	No
Hopeland-17	135.30	469.83	-334.53	-211.00	Confined	-123.53	Yes
Kogan North-79	289.95	175.62	114.33	12.00	Confined	102.33	No
Longswamp-7	315.27	243.06	72.21	28.50	Confined	43.71	No
Macalister 6	306.07	16.78	289.29	192.00	Confined	97.29	No
Macalister 8	298.34	54.21	244.13	184.00	Confined	60.13	No
Mt Haystack 2	423.38	0.01	423.37	381.00	Confined	42.37	No
Mt Haystack 4	354.17	28.44	325.73	254.00	Confined	71.73	No
Meenawarra-21	323.67	124.85	198.82	-29.00	Confined	227.82	No
Punch Bowl-15	299.43	230.80	68.63	105.00	Confined	-36.37	Yes
Pampas-5	348.14	180.09	168.06	75.00	Confined	93.06	No
Plainview 34	195.73	280.52	-84.79	-110.00	Confined	25.21	No

JIF Subterranean GDEs Risk Threshold and Preliminary Risk Assessments

2021 UWIR

Monitoring Bore ID	Initial SWL (mAHD)	2021 UWIR Predicted Longterm Affected Area (LAA) Drawdown (P50) (metres)	Longterm Reduced SWL (mAHD)	Lower Juandah Coal Measures Formation Top Elevation		Distance between Longterm Reduced SWL and Formation Top Elevation (m)	Risk Threshold Exceeded
		Layer 17 – Taroom Coal Measures		2021 UWIR Model (mAHD)	Comments		
Tipton-157	28.53	458.40	-429.87	-139.00	Confined	-290.87	Yes
Tipton-197	328.12	320.69	7.43	-49.00	Confined	56.43	No
Tipton 200	89.75	432.98	-343.23	-102.00	Confined	-241.23	Yes
Tipton 204	325.17	76.86	248.31	139.00	Confined	109.31	No
Tipton 206	324.64	55.80	268.84	173.00	Confined	95.84	No
Wyalla-18	285.26	276.20	9.06	42.15	Confined	-33.09	Yes