

Gunnedah Shire Council – Liverpool Plains Coal Seam Gas Exploration, Petroleum Exploration Licence PEL1 & PEL12 – Kahlua Pilot Reactivation

Gunnedah Shire
Council Presentation

Presenters

Thomas Walters – Hydrogeologist
John Williams – Senior Hydrogeologist

18 October 2023



1

Introduction

Gunnedah Shire Council Presentation – 18 October 2023

A background introductory section

Presentation Request



State Government representatives to present on Coal Seam Gas (CSG) Exploration in PEL1 & PEL12 within the Gunnedah Shire Council local government area

Kahlua Pilot Reactivation CSG Activity

Provide information to guide community consultation

Department of Planning and Environment - Water



Our role in assessing major developments | Water (nsw.gov.au)



The Department of Planning and Environment (DPE) – Water Group

Develops and oversees water related laws, policies and planning.

- The department is responsible for managing NSW's surface water and groundwater resources. This includes issuing water access licences and approvals for SSD's, council and water utilities.
- The department develops and oversees the state's water-related laws and policies as well as ensures NSW's water resources are secure and sustainable by establishing regional and metropolitan water strategies and water sharing plans.

Fig 1 – Adapted from Who's who in NSW water management | Water

Groundwater Regulatory Framework



NSW Regulatory Framework

Water Management Act (WMA 2000)

- Minister of Water – Honourable Rose Jackson
- Protection and equitable sharing of water
- Defines ‘aquifer interference activities’

Water Sharing Plans (WSP)

- Required under Water Management Act 2000
- Water-sharing arrangements.

Water Management (General) Regulation 2018

- Licensing requirements for activities

NSW Aquifer Interference Policy (AIP)

- Developed in part to address coal seam gas activities
- Aquifer impact assessment – “no more than minimal harm”
 - Minimal impact considerations, thresholds for groundwater levels, pressures and quality

Commonwealth Framework

Environment Protection and Biodiversity Conservation Act 1999 (EPBC)

- Protection of water resources from coal seam gas and large coal mining developments
- NSW Minister of Water must seek advice from Independent Expert Scientific Committee (IESC) statutory committee formed under EPBC act

Commonwealth Water Act 2007

- Covers the interstate Murray-Darling Basin (MDB)
- MDB groundwater a national resource

Water Resource Plans

- Required under Water Act 2007
- Management and reporting of groundwater across the MDB

State Significant Development (SSD)

Relevant developments e.g.

- Mining and extraction operations

Significant classification

Over a certain size

- In a sensitive environmental area
- Exceed a specific capital investment value

Assessed

- Existing strategic plans and policies (including state, regional and local)
- Feedback and comments from the relevant local council(s)
- Specialised and technical input and advice received from federal and state government agencies
- Public submissions received during the exhibition
- The public interest

Consent authority

- Minister for Planning – Honourable Paul Scully
- Independent Planning Commission consent authority when:
 - Proposal not supported by relevant council(s)
 - Planning (DPE) receives >50 unique public objections

Modification

- Apply to the Minister for Planning to modify the request

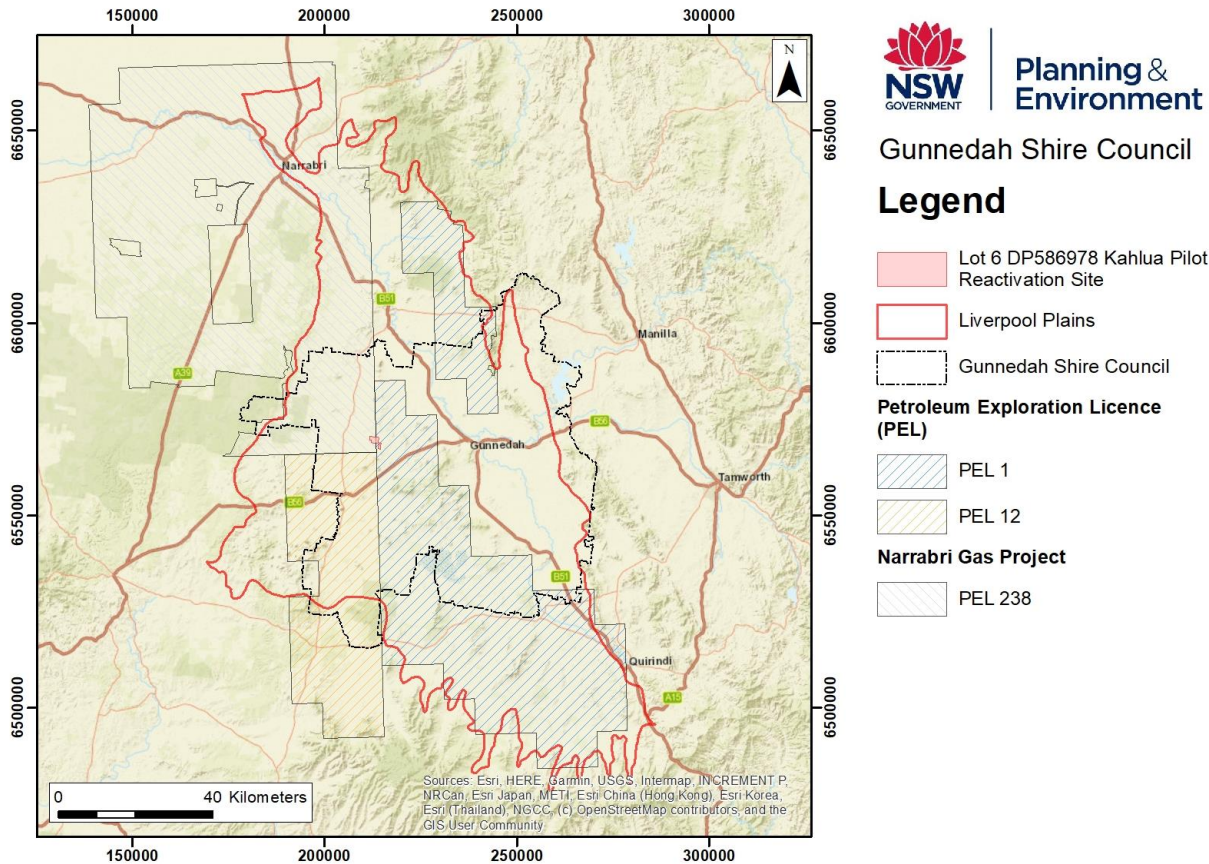
Appeals by applicant

- NSW Land and Environment Court

SSD documentation technical guidelines and requirements

- Groundwater Assessment Toolbox for Major Projects
- Guidelines for Groundwater Documentation SSD/SSI Projects
- Minimum Groundwater Modelling Requirements for SSD/SSI
- Cumulative Groundwater Impact Assessment Approaches

Coal Seam Gas Exploration in the Liverpool Plains



Petroleum Exploration Licence (PEL)

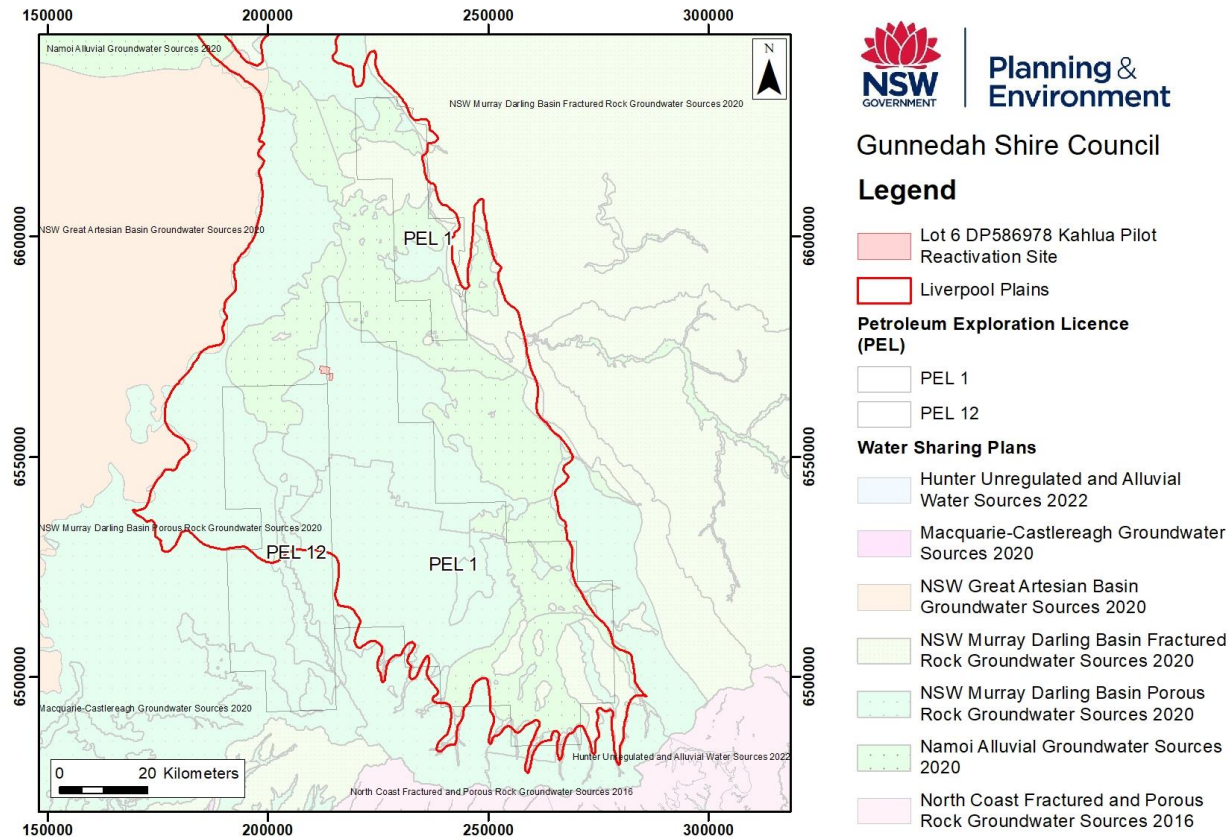
PEL1 & PEL12 - held by Australian Coalbed Methane Pty Ltd and Santos QNT Pty Ltd

PEL238 – held by Santos NSW Pty Ltd, Santos NSW (Narrabri Gas) Pty Ltd, SSD 6456

Licence	Expiry	Area (Km ²)
PEL1	12 April 2028	3,924
PEL12	12 April 2028	1,615
PEL238	17 December 2027	5,708

Fig 2 – Liverpool Plains, Gunnedah Shire Council and nearby PEL's

Water Sharing Plans applicable to the area



Water Sharing Plans (WSP's)

Location	WSP
Kahlua Pilot Reactivation Site	NSW Murray Darling Basin Porous Rock Groundwater Source 2020
	NSW Murray Darling Basin Fractured Rock Groundwater Source 2022
PEL1 & PEL 12	Namoi Alluvial Groundwater Sources 2020
	NSW Murray Darling Basin Porous Rock Groundwater Source 2020
	NSW Murray Darling Basin Fractured Rock Groundwater Source 2022

Fig 3 – Groundwater Sharing Plans

Monitoring Bores



Fig 4 – Nested monitoring bores at Plumb Road (southwest of Narrabri in the Pilliga)

Monitoring nest

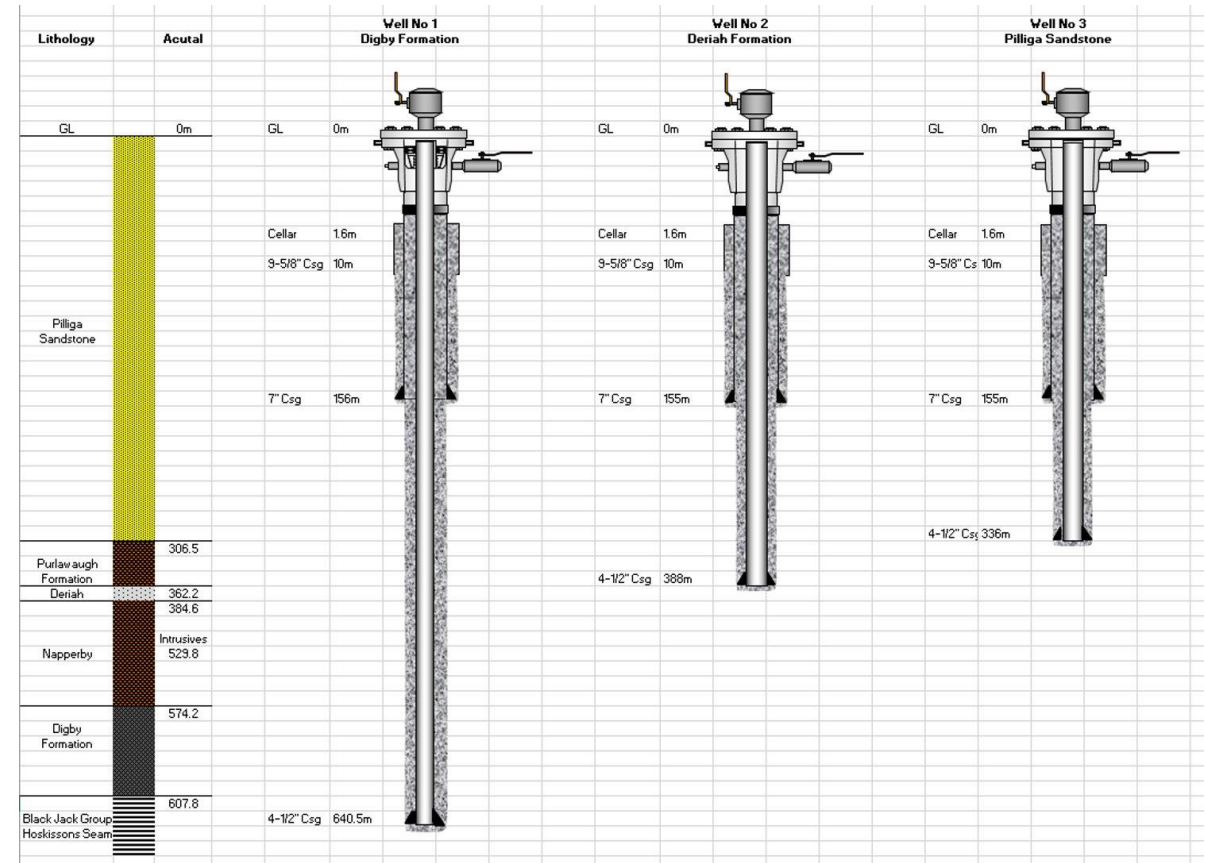


Fig 5 – Plumb Road bores monitoring aquifers over depth from DPE Narrabri Community Consultation Committees on Coal Basin Monitoring presentation

Monitoring Network

Monitoring bore network

1,149 monitoring bores in the region, shown within this figure.

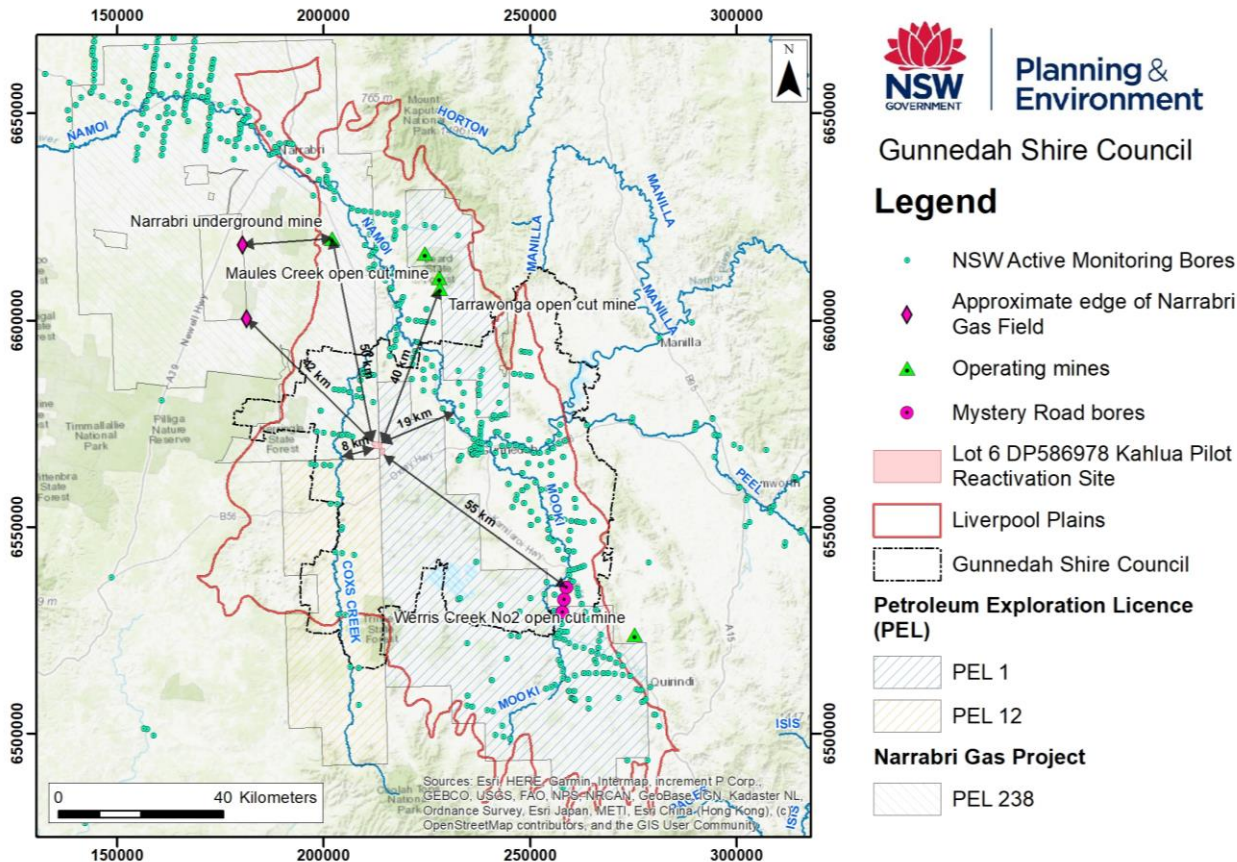
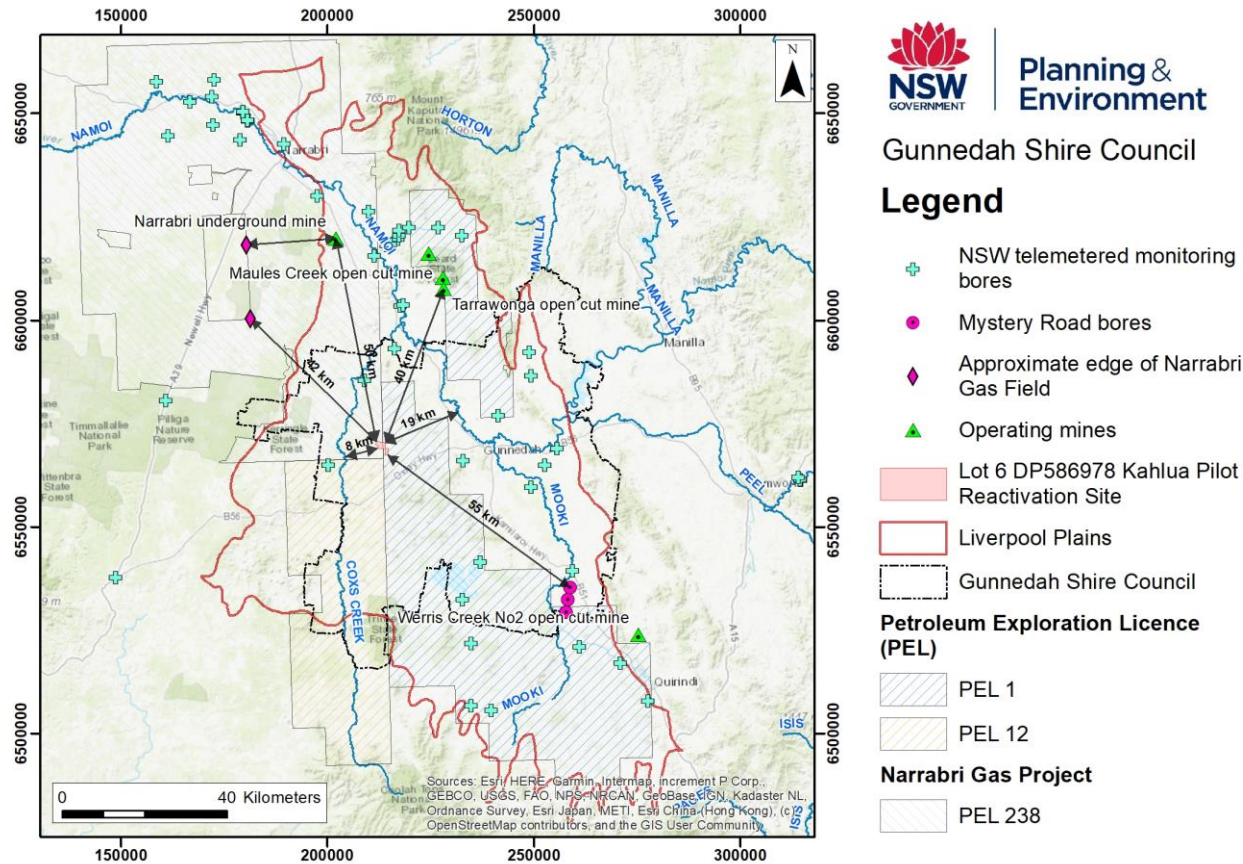


Fig 6 – Monitoring bore network

Monitoring Network



Telemetered bore network

75 monitoring bores are fitted with digital loggers reporting readings back to government servers

Data can be viewed at:

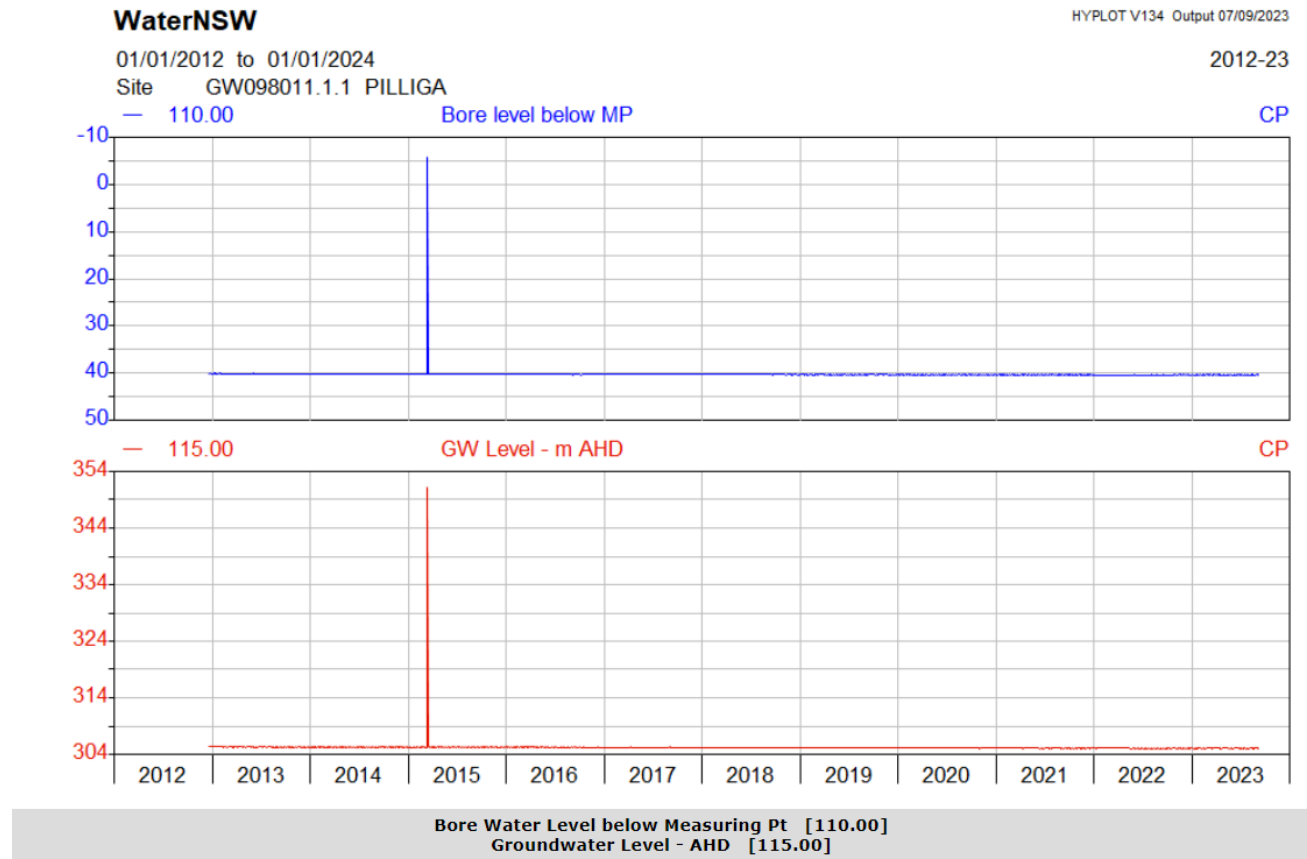
[Real-time water data \(waterNSW.com.au\)](http://waterNSW.com.au)

Or WaterNSW's latest website

<https://waterinsights.waterNSW.com.au/>

Fig 7 - Telemetered bores

Hydrograph – Pilliga example



Groundwater (Telemetered Data) » Real Time Data - Bores » Great Artesian Basin

PILLIGA

All data times are Eastern Standard Time

Latest Values Details Custom Outputs

Latest instantaneous values

Bore level below MP	40.410	15:00 06/09/2023	↓
GW Level - m AHD	305.080	15:00 06/09/2023	↑
GW depth below gmd	39.340	15:00 06/09/2023	↓

Latest values plots



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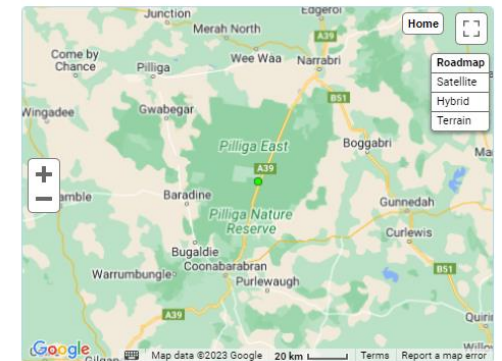
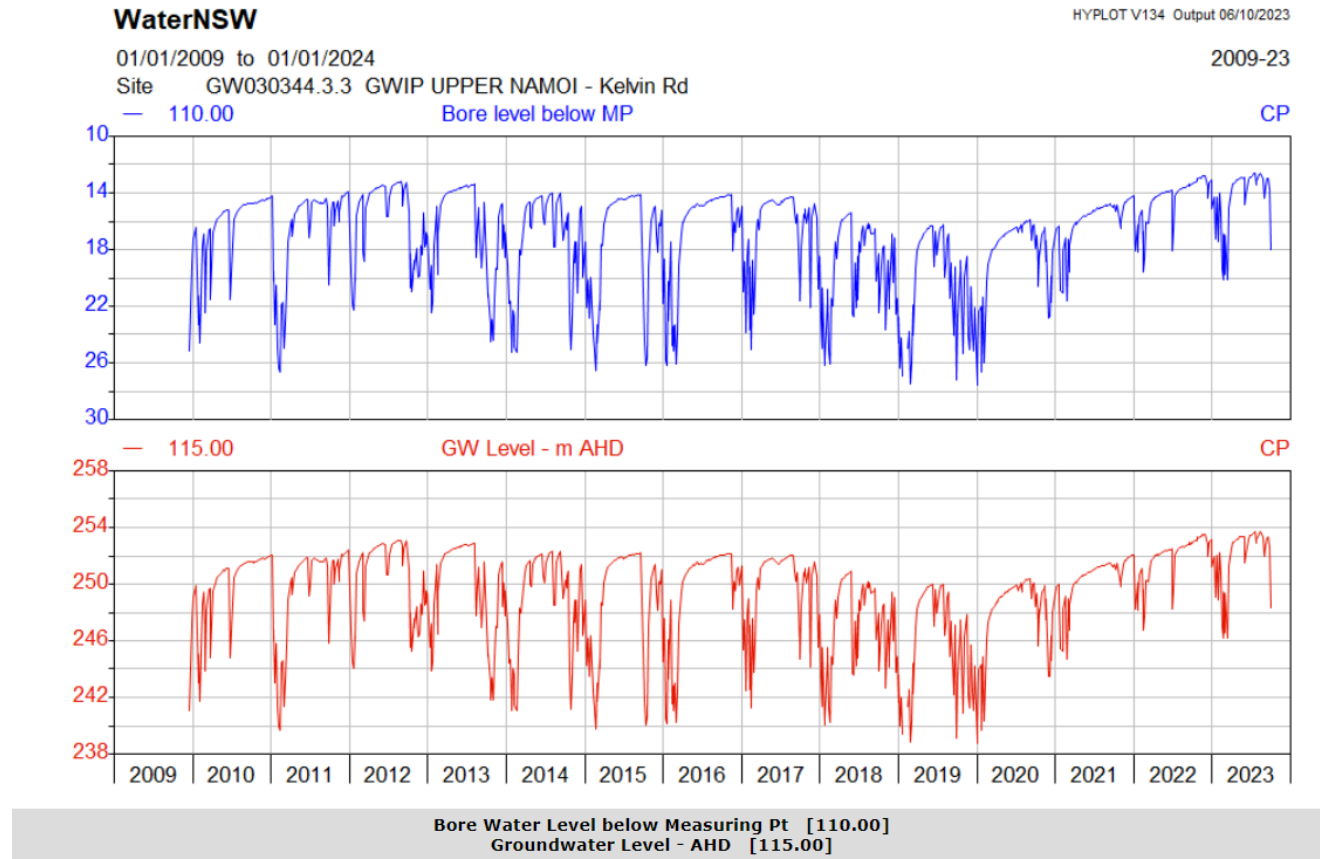


Fig 8 – Hydrograph and location GW098011.1.1 Pilliga

Hydrograph – Upper Namoi example



Groundwater (Telemetered Data) » Real Time Data - Bores » Namoi River Basin

GWIP UPPER NAMOI - KELVIN RD

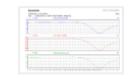
All data times are Eastern Standard Time

Latest Values Details Custom Outputs

Latest instantaneous values

Bore level below MP	14.528	12:00 06/10/2023	↓
GW Level - m AHD	251.772	12:00 06/10/2023	↑
GW depth below gmd	13.428	12:00 06/10/2023	↓

Latest values plots



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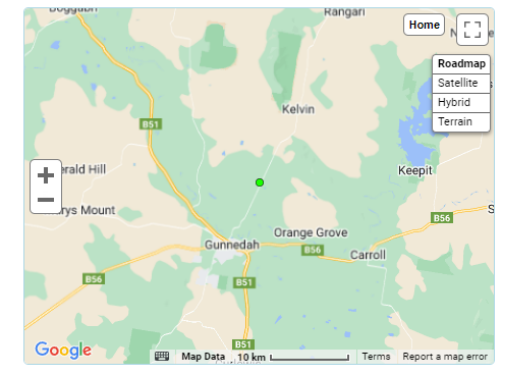


Fig 9 – Hydrograph and location GW030344.3.3 Upper Namoi - Kelvin Road

Groundwater Extraction

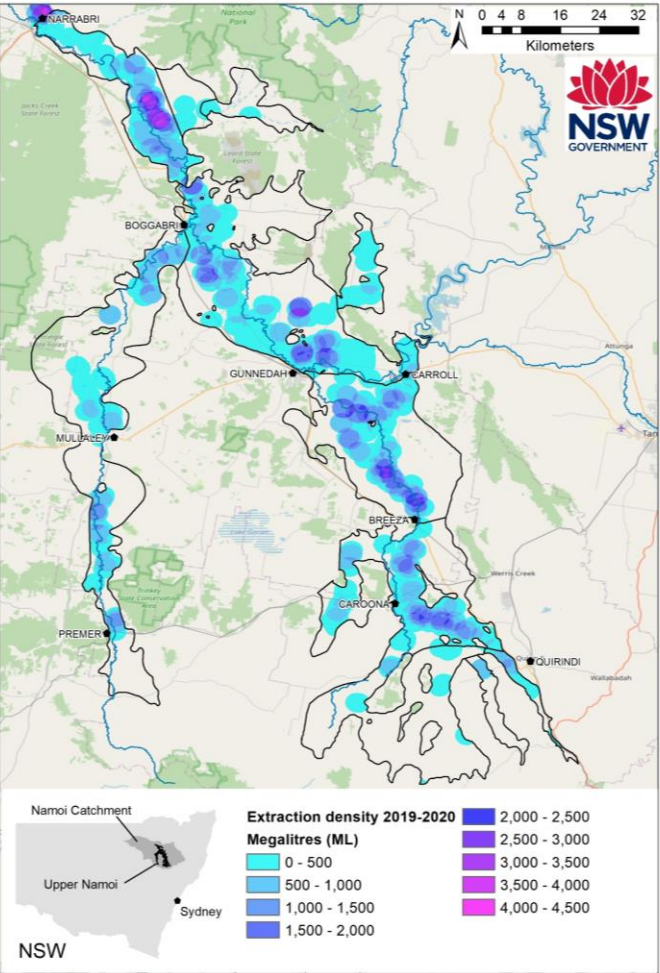


Fig 10 – Groundwater density extraction in Upper Namoi 2019-2020

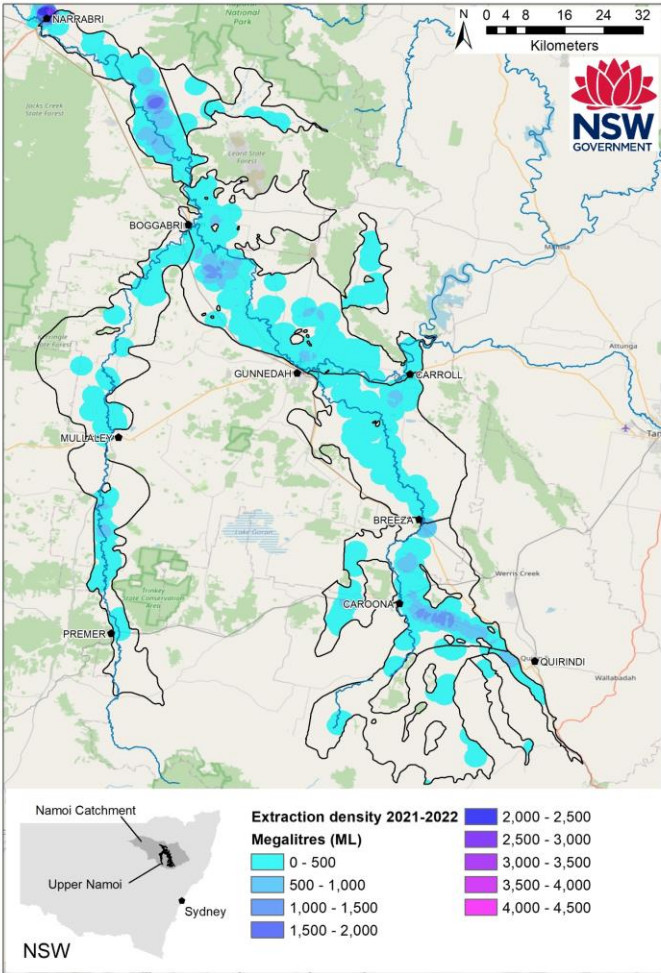


Fig 11 – Groundwater density extraction in Upper Namoi 2021-2022

2

Kahlua Pilot Reactivation

Gunnedah Shire Council Presentation – August 2023

Kahlua Pilot Reactivation



Exploration activities

Managed by the NSW Resource Regulator

- Kahlua activity - dewater a coal seam to release coal seam gas and estimate gas resources
- Site located 25 km west of Gunnedah
- Four wells planned to operated K2, K3, K4 and K5
- Two monitoring locations
- Water produced/extracted about 9 ML/year predicted for up to two years (GHD 2022)
- Mandatory reporting conditions
 - Bore construction, well integrity and code of practice requirements
 - Monitoring plans
 - Trigger Action Response Plans (TARPS)

Kahlua Pilot Reactivation Groundwater Impact Assessment

Undertaken by AGE Consultants in 2022

- Reporting and groundwater modelling
- Comply with minimal impact considerations of AIP (GHD 2022)
- Predicted impacts minor or negligible and temporary (GHD 2022)

Kahlua Pilot Reactivation Review of Environmental Factors (REF)

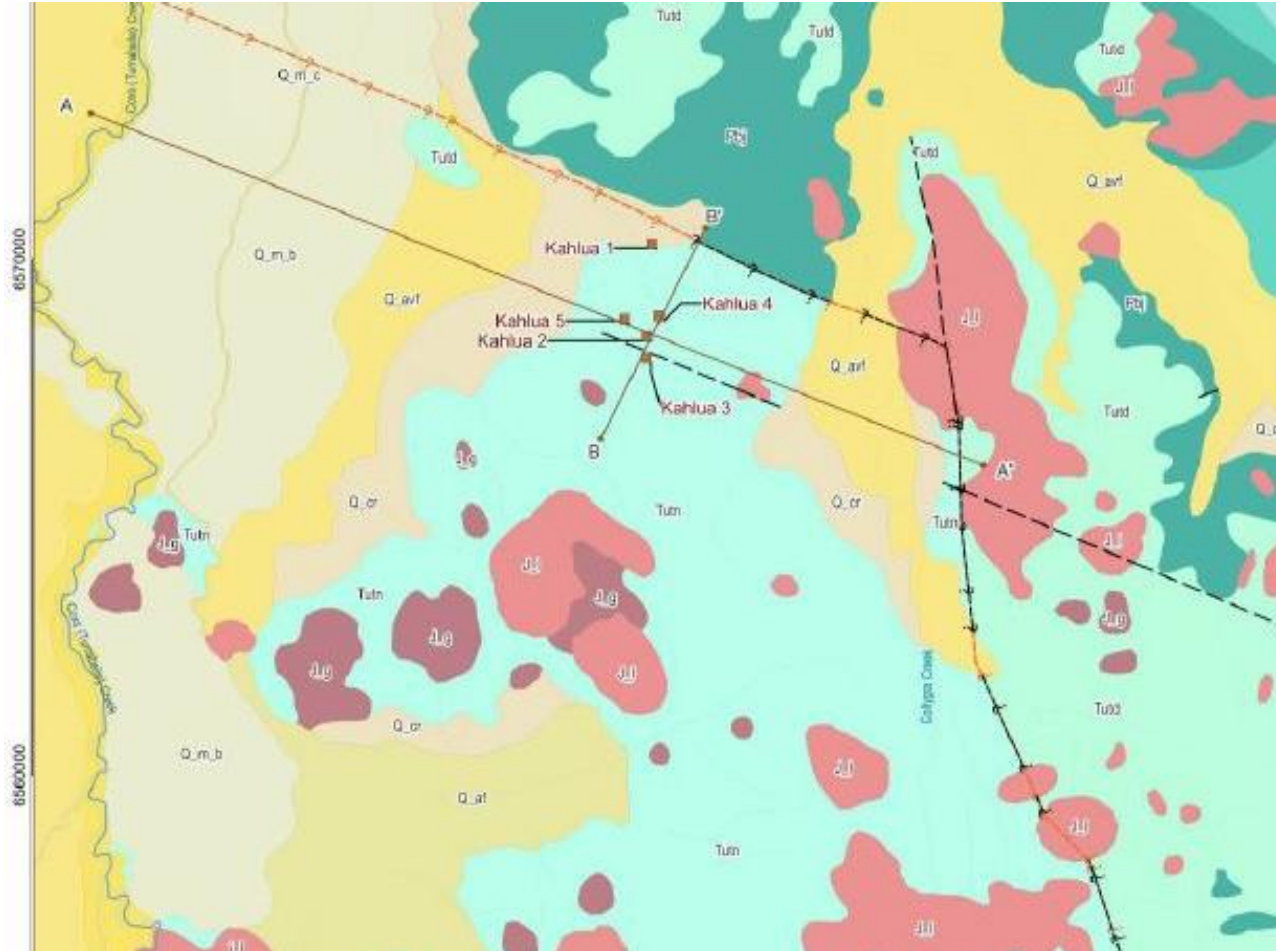
Undertaken by GHD Consultants in 2022

- Surrounding environmental review air, soil, water etc.

Water Approval – consent conditions

Water Supply Work Approval with a range of conditions to meet.

Geology



Kahlua area geology

- Basement volcanics
- Sedimentary rocks dipping west
- Faulted
- Intruded by volcanics
- Alluvial deposits
- Cross sections A-A' and B-B'

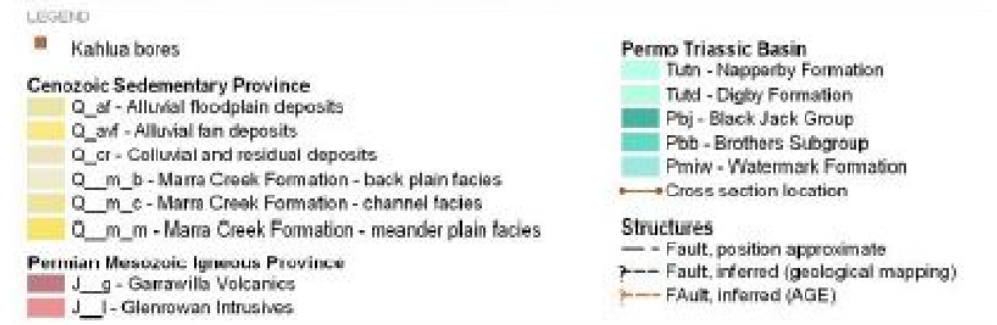
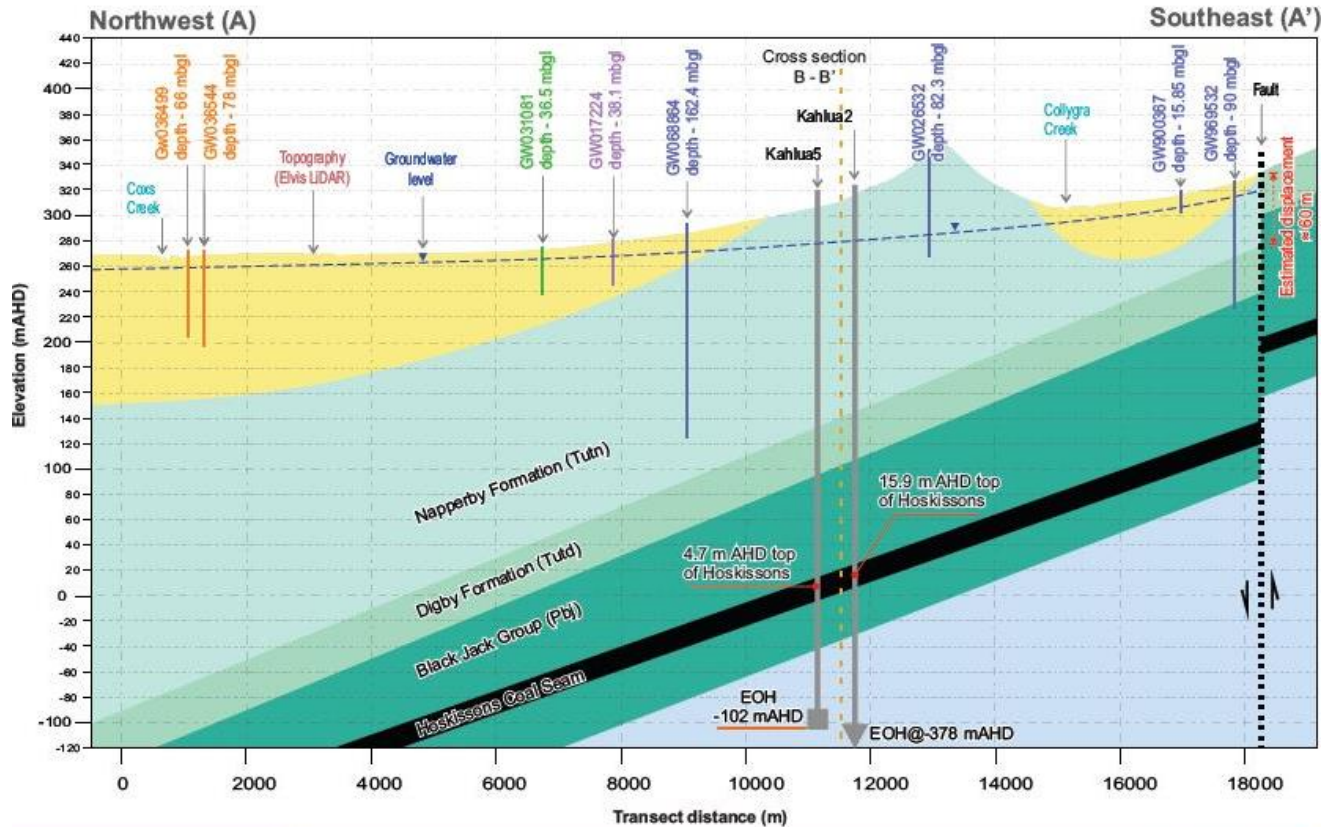


Fig 12 – Kahlua area geology (AGE 2022)

Geology



Conceptual geological/hydrogeological cross section (A-A')

Figure - 4.2

Kahlua Pilot Reactivation Groundwater Assessment (SAN5001.001)

G:\Project\SAN5001.001\Kahlua Pilot Reactivation Groundwater Assessment\05\Waterpacks\001_Deliverable\04\02_SAN5001.001_Conceptual geological/hydrogeological cross section (A-A').cbr



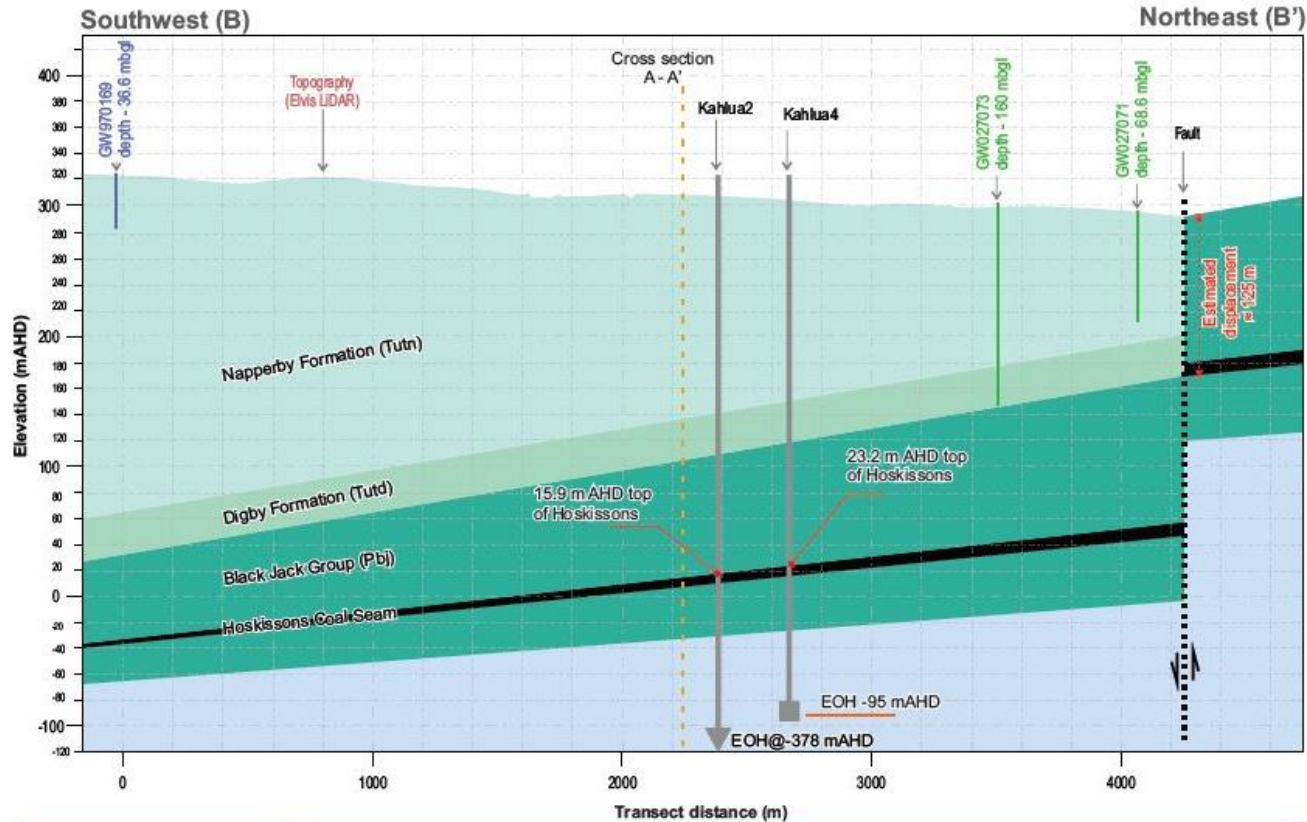
Table 5.1 Hydrogeology of the project site (Golder Associates 2010)

Period	Litho - stratigraphy		Main Rock Types	
Quaternary	Un-consolidated sediments	Narrabri Formation	Clays, minor sands and gravel beds	
		Gunnedah Formation	Gravel and sand with minor clay beds	
Triassic	Gunnedah Basin Sequence	Napperby Formation	Interbedded fine sandstone & siltstone	
		Digby Formation	Ulinda Sandstone	Quartz sandstone
			Bomera Conglomerate	Conglomerate
		Late Permian	Black Jack Group	Nea Subgroup
Wallala Formation	Conglomerate, sandstone, siltstone, minor coal bands			
Breeza Coal	Coal & claystone			
Clare Sandstone	Medium to coarse-grained quartzose sandstone; quartzose conglomerate			
Coogal Subgroup	Howes Hill Coal		Coal	
	Benelabri Formation		Claystone, siltstone & sandstone; fining up cycles; more sandy towards top of unit	
	Hoskissons Coal		Coal, minor claystone bands	
	Brigalow Formation		Fining-up sequence of medium to coarse-grained quartzose sandstone and siltstone	
Brothers Subgroup	Arkarula Formation	Sandstone & siltstone; burrowed & bioturbated		
	Melvelles Coal	Coal		
	Pamboola Formation	Sandstone, siltstone, minor claystone & coal		
Mid Permian	Millie Group	Watermark Formation	Marine - sandy siltstone, siltstone/claystone, silt/sand laminites, sandstone	
		Porcupine Formation	Marine - diamictite, sandy-mudstone	

Note: Aquitards are shaded light brown, potential or poor aquifers are shaded light blue. Significant aquifers are shaded darker blue.

Fig 13 – Conceptual cross section A-A' (AGE 2022)

Geology



Conceptual geological hydrogeological cross section (B-B')

Figure - 4.3

Kahlua Pilot Reactivation Groundwater Assessment (SAN5001.001)

10:\Project\5AN001.001\Kahlua_Pilot_Reactivation_Groundwater_Assessment\1_GSW\workspace\001_Deliverable\04\03_SAN5001.001_Conceptual_geological_hydrogeological_cross_section(B-B').cd*



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		Porcupine Formation	Marine - diamictite, sandy-mudstone	

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Fig 14 - Conceptual cross section B-B' (AGE 2022)

5

Conclusion

Gunnedah Shire Council Presentation – 18 October 2023

Liverpool Plains Coal Seam Gas – Risk to Groundwater?

CSG Exploration in the Liverpool Plains

1. The DPE Water Group has no stance on CSG exploration activities, all projects are assessed based on science
2. CSG exploration approvals are managed by the NSW Resource Regulator
3. There are no other or new Coal Seam Gas State Significant Developments before the Water Group
4. All current exploration activities are approved:
 - Kahlua Pilot Reactivation – 9 ML/year over 2 years – low volume
 - Low risk to alluvial and fractured or porous rock aquifers, users and the environment
5. What if new scientific evidence arises?
 - Future activities will be required to investigate all lines of information prior to submitting for an approval
6. What if new CSG projects are proposed?
 - All future activities will require approval
 - Future activities will be required to investigate all lines of information prior to submitting for an approval
 - The applicants of major projects are required to collect data to inform their impact assessment including potential connectivity with alluvium aquifers
 - The Department of Planning and Environment will assess all activities within the NSW regulatory framework
 - Groundwater impact in principle “no more than minimal harm”
 - There is published guidance in the *Guidelines for Groundwater Documentation for SSD/SSI projects: Technical Guideline*.

References & Resources



References

AGE, 2022. Kahlua Pilot Reactivation Groundwater Assessment. Report SAN5001.001 Kahlua Pilot Reactivation GA v02.01.docx, prepared by Australasian Groundwater and Environmental Consultants Pty Ltd for Santos Pty Ltd. July.

GHD, 2022. Kahlua Pilot Reactivation: Review of Environmental Factors. Report prepared by GHD Pty Ltd for Santos Pty Ltd. December. [Report available from the NSW Government Resource Regulator website: PEL1 Santos Kahlua application package](#)

WaterNSW, 2023. WaterNSW Real Time Data website. [Real-time water data \(waternsw.com.au\)](#)

Resource Regulator

[About us | NSW Resources Regulator](#)

[Document Library | NSW Resources Regulator | Kahlua](#)

Groundwater Resources

[Who's who in NSW water management | Water](#)
[Water agencies | Water \(nsw.gov.au\)](#)

[Our role in assessing major developments | Water \(nsw.gov.au\)](#)

[Water Management Act 2000 No 92 - NSW Legislation](#)

[Water sharing plans | Water \(nsw.gov.au\)](#)

[Water Management \(General\) Regulation 2018 - NSW Legislation](#)
[Environment Protection and Biodiversity Conservation Act 1999 \(legislation.gov.au\)](#)

[Water Act 2007 \(legislation.gov.au\)](#)

[Major Projects | Planning Portal - Department of Planning and Environment \(nsw.gov.au\)](#)

[Groundwater technical guidelines and requirements](#)

[Narrabri Community Consultation Committees on Coal Basin Monitoring](#)

[Real-time water data \(waternsw.com.au\)](#)



**John Williams &
Thomas Walters**

With this in mind

**Thank you for listening, feel free to
contact the Groundwater Management
and Science Unit**