

Underground Water Impacts Report 2025-2028

Greater Kenmore & Bodalla Area

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Appendices

Appendix 1 – Dual Completion Well

Appendix 2 – Monitoring Data

Acronym	Definition
ANZECC	Australia New Zealand Environment and Conservation Council
ALARP	As Low as Reasonably Possible
ALS	Australian Laboratory Services
AS/NZS	Australia New Zealand Standard
BTEX	Benzene, Toluene, Ethyl-benzene and Xylene
DETSI	Department of Environment, Tourism, Science and Innovation
DNRM	Department of Natural Resources and Mines
DOR	Department of Resources
EA	Environmental Authority
ESA	Environmentally Sensitive Area
EPM	Equivalent Porous Medium
GAB	Great Artesian Basin
GDE	Groundwater Dependent Ecosystem
IAA	Immediately Affected Area
ML	Mega litres
NATA	National Association of Testing Authorities
LTAA	Long-Term Affected Area
NATA	National Association of Testing Authorities
OWC	Oil Water Contact
OWK	Oilwells Inc. Of Kentucky
PL	Petroleum Lease
STB	Stock Tank Barrel
SET	Senior Executive Team
SWL	Standing Water Level
TDS	Total Dissolved Solids
UWIR	Underground Water Impact Report

Executive Summary

This report outlines the potential impacts of petroleum-related extraction on groundwater and other associated ecological and social values associated with the State's water resources. An analytical groundwater model, using historic and projected water production volumes, was employed to assess the maximum water level drawdown below the Greater Kenmore and Bodalla Area (GKBA) and Satellite fields.

Updated groundwater model calculations predict that there will be no significant drawdown in the upper, unconsolidated layers of the Cooper and Eromanga Basins. Water levels in the lower layers remain minimally affected, with the drawdown limited to the target aquifer used for petroleum extraction.

All five formations identified in the groundwater model are predicted to experience stable or reduced maximum drawdown under current and projected water extraction scenarios.

Local pastoral bores typically access very shallow aquifers within the unconsolidated Winton Formation. Considering the depths from which water is extracted for petroleum, the geology of the Cooper and Eromanga Basins, and based on updated analytical model results, Bridgeport concludes GKBA operations will have no significant impact on landholder bores or other environmental values. Some depressurisation of the formations targeted for petroleum production can be expected, with limited propagation to layers immediately above it. The layer accessed by pastoral bores has a predicted drawdown of 1.3m. This is below the trigger threshold.

Bridgeport Energy applied a standardised risk assessment method to evaluate potential environmental or social impacts from water extraction. The assessment found no direct effects on groundwater, groundwater users, groundwater-dependent ecosystems, environmental values, or other water-related criteria.

Bridgeport Energy will continue to monitor and assess water extraction data, as well as its potential effects on landholders and environmental values, using the monitoring plan outlined in this UWIR. Results will be reported annually.

Statement of Compliance

This Underground Water Impact Report (UWIR) has been prepared in accordance with the requirements of the *Water Act 2000* and the Guidelines for Underground Water Impact Report and Final Reports (**ESR/2016/2000**).

The report:

- Identifies the tenure areas and petroleum and gas activities to which it applies;
- Assesses existing information on underground water levels and quality;
- Predicts the impacts of petroleum and gas activities on underground water in relevant aquifers;
- Identifies Immediately Affected Areas (IAAs) and Long-term Affected Areas (LAAs); and
- Outlines strategies for monitoring, make good obligations, and ongoing information management.
- The UWIR has been prepared by suitably qualified persons, using the best available science and data at the time of reporting, to ensure compliance with all legislative and regulatory requirements.

Since the approval of the Beach Energy UWIR in 2014 and subsequent submissions by Bridgeport in 2018 and 2022, the analysis of the collected data reveals limited material changes in the information, predictions, or impacts outlined in previous UWIR reports. The primary change in this report is the updated analytical model.

Legislation

The following legislation and guidelines were used to prepare the contents of this UWIR:

- *Water Act 2000* [reprint current from 19 June 2025)
- Underground water impact reports and final reports – ESR/2016/2000 Version 3.04 Effective 04 JUL 2025

As requested by DETSI in the approved UWIR 2025, "*An UWIR must contain the information that has been outlined in each of the following parts of this guideline*", including;

- Part A: Underground water extractions
- Part B: Aquifer Information and underground water flow
- Part C: Predicted water level declines for affected aquifers
- Part D: Impacts on environmental values
- Part E: Water monitoring strategy
- Part F: Spring Impact management strategy
- Part G: For a CMA assign responsibilities to resource tenure holders

Project Setting

Bridgeport Energy operates several conventional oilfields in the Eromanga Basin, approximately 280 km west of Charleville. The two main oilfields are Kenmore and Bodalla, with 16 and 6 wells respectively (Table 1). These main fields support a number of satellite fields, including Blackstump, Marcoola, Bargie, Byrock, Coolum, and Glenvale. These satellite fields contain significantly fewer wells (Table 1). All of these fields extend throughout the arid to semi-arid Channel Country in south-eastern Queensland.

Table 1: Bridgeport Energy Oilfields in the Greater Kenmore & Bodalla Area

Oil Field Name	Oil Field Type	PL Number	Number of producing wells (as of June 2025)
Kenmore	Main field, Conventional Oil Field	PL 32	16
Bodalla	Main field, Conventional Oil Field	PL 31	6
Blackstump	Conventional Oil Field	PL 47	0
Marcoola	Conventional Oil Field	PL 1064	1
Bargie	Conventional Oil Field	PL 1063	0
Byrock	Conventional Oil Field	PL 1064	0
Coolum	Conventional Oil Field	PL 1064	1
Glenvale	Conventional Oil Field	PL 1064	1

The oil fields of Kenmore (26°39'1.47"S, 143°26'11.47"E), Bodalla (26°27'23.59"S, 143°25'36.59"E), and Blackstump (26°37'36.40"S, 143°18'37.81"E), commonly known as the Greater Kenmore and Bodalla Area (GKBA), are situated approximately 280 km west of Charleville, the largest regional town in the immediate area (Figure 1). The closest township is Eromanga, which lies 16 kilometres to the west of the Kenmore production site.

The Kenmore production facility includes a small (up to 20-person) camp, a production plant, storage tanks, a loadout area, chemical storage, and evaporation ponds. The Bodalla production plant has a similar layout, with comparable facilities, but it is designed to run with a single operator. The Blackstump oil field is an unmanned satellite site, comprising two beam pumps, flow lines to vertical separators, a skimmer, and evaporation ponds. Marcoola, Bargie, Coolum, Glenvale, and Byrock share similarities with Blackstump, as they each only have one beam pump, along with fuel storage, flow lines, vertical separators, a skimmer, and evaporation ponds.



Figure 1: The location of PL 31, 32 & 47 (GKBA), PL 1063 (Bargie) and PL 1064 (Marcoola, Coolum and Glenvale and Byrock), 285 km west of Charleville.

Part A*: Underground water extractions

Requirements under section 376(a) of the Water Act
To meet the requirements under section 376(a) of the Water Act, an UWIR must include the following: **1. The quantity of underground water produced or taken from the area because of the exercise of underground water rights; and** **2. An estimate of the quantity of water to be produced or taken because of the exercise of underground water rights for a three-year period starting on the consultation day of the report.**

*Part A refers to Section 5.1.1 (page 9) of the guideline (DETSI 2025).

Bridgeport Energy has developed a monitoring strategy that complies with Section 376(a)(1) of the Water Act. This section details how water-related parameters are collected, including water produced or taken as part of exercising underground water rights.

Bridgeport Energy's monitoring strategy is based on three primary parameters:

- Formation water production
- Reservoir oil/water level depth
- Shut-in tubing head pressure (SITHP)

The volumetric measurements of oil and produced water are necessary from an operational perspective. This includes monitoring productivity to optimise separation processes (and thereby ensure the correct volumes of chemicals are used where applicable, reducing the amount of oil discharged into the post-separation treatment process), increasing processing capacity, and maximising oil production.

Since April 2017, Bridgeport Energy has monitored oil and water production, which can be used to calculate the volume of water extracted per well and standardised to beam pump operating time. In the field, each well is flow tested into an isolated test tank at different intervals. After a settlement period, the contents of the tank are volumetrically measured

using a dipstick and water-indicating paste. Volumes of both produced oil and water are determined from this measurement.

Daily water and oil production rates (total fluid rates) are standardised to the well operation time (up time) each day, to provide a more accurate water/oil production per unit per time of operation across the field.

As a result, historical water production data is available for the field and on a per-well basis (Appendix 2). Consequently, Bridgeport has a detailed understanding of extraction rates throughout its ownership history.

Methods for measuring underground water levels

Since a significant part of the requirements under S376 of the Water Act directly relate to the connection between water extraction and underground water levels, Bridgeport Energy has adopted two methods for assessing water levels.

The first method involves analysing current wells and their production status. Underground water levels tend to increase as oil is depleted. Therefore, when an existing well “waters out” (stops producing oil and only produces water), it indicates that the underground water level in the immediate localised area has risen to the depth of the well’s perforations. For the wells drilled in GKBA, this is approximately 1,400 m from the surface.

Another method involves identifying the oil/water contact (OWC) through petrophysical analysis as new wells are drilled. When new wells are drilled, the oil-water contact at the time of drilling is determined by log analysis conducted by independent third-party contractors. Since the depth of the oil/water contact is defined as the top of the aquifer, identification indicates the aquifer water level. Keeping records of these parameters helps establish the original reservoir water level and monitor how the water level depth may change over the field's production life as water displaces oil. However, the geological characteristics of the targeted Hutton or other formations do not always allow for consistent determination of the OWC, as discussed in detail below.

Bridgeport Energy has established a surface condition (pressure) monitoring program for shut-in wells. The aim of this program is to take periodic measurements of the shut-in

wellhead pressure at selected wells across the fields. Wells are selected based on their current shut-in status, suitability for monitoring, distribution throughout the field, and access to the relevant producing formations.

Surface pressure measurements (Shut-in tubing head pressure, or SITHP) do not directly indicate formation pressure and must be interpreted in conjunction with data on the free fluid level within the well or any built-up pressure in the tubing or annulus. Therefore, a SITHP measurement is typically paired with a Sono log to determine the free fluid level and to assess any gas pressure within the well. This gas pressure is periodically vented, so records of the frequency and volumes of gas released are also useful for estimating reliable formation pressure.

Cumulative assessment of water extracted

Bridgeport Energy took ownership of the majority of the GKBA producing assets in March 2017. From November 2016 to October 2025, a total of 17,306.97 ML of water was extracted across all tenements. Total water extraction has remained relatively constant from year to year. Overall, the total water extracted ranged from 1,763.95 ML in 2015 to 1,588.33 ML in 2022. Since 2022, annual water extraction has declined, falling to 1,257.14 ML in 2023, 1,172.05 ML in 2024, and 1,312.46 ML in 2025 (Table 2).

Kenmore remains the largest contributor to total water production across the GKBA tenements. Kenmore has extracted a total of 13,616.27 ML of the total (78%) water produced, compared to 3,373.26 ML at Bodalla (19%) and 319.06 ML of the combined Satellite Fields (1.8%).

Table 2: Annual water extracted from the GKBA fields between November 2016 and October 2025.

Year	Bodalla	Kenmore	Blackstump	Marcoola	Glenvale	Coolum	Bargie	Byrock	Total water extracted (ML)
2015	372.30	1,379.21	9.62	1.66	0.35	0.81	0.00	0.000003	**1,763.95**
2016	336.24	1,469.76	0.00	0.90	0.26	0.25	0.00	0.000000	**1,807.41**
2017	353.32	1,492.07	23.72	0.19	0.28	0.06	0.00	0.000000	**1,869.63**
2018	287.16	1,117.47	40.67	1.34	0.96	0.29	0.01	0.000000	**1,447.88**
2019	343.27	1,499.14	35.40	1.57	0.70	0.22	0.06	0.000000	**1,880.37**
2020	331.59	1,164.97	31.34	1.55	0.76	0.22	0.03	0.000000	**1,528.96**
2021	390.53	1,240.31	45.07	1.60	0.91	0.26	0.01	0.000000	**1,678.79**
2022	329.49	1,215.21	40.95	1.47	0.93	0.26	0.02	0.000000	**1,588.33**
2023	269.76	951.41	33.21	1.51	1.00	0.25	0.00	0.000000	**1,257.14**
2024	186.74	961.14	21.14	1.63	1.14	0.26	0.00	0.000000	**1,172.05**
2025*	172.86	1,125.38	11.07	1.56	1.35	0.24	0.00	0.000000	**1,312.46**
Total	**3,373.26**	**13,616.07**	**292.19**	**14.98**	**8.64**	**3.12**	**0.13**	**0.000003**	**17,306.97**

*This year contains actual and predicted values for the entire year.

Cumulative water production per well (in ML) between November 1st 2014, and October 31st 2025, in GKBA is quantified in Table 3Table 3.

Most water extraction comes from a small number of wells. For instance, at Kenmore, six wells account for a large share of the total, including Kenmore 8 (1,495.93 ML), Kenmore 10 (1,347.16 ML), Kenmore 27 (1,934.24 ML), Kenmore 28 (1,948.25 ML), Kenmore 30 (2,673.04 ML), and Kenmore 39 (3,721.12 ML). The other Kenmore wells make a much smaller contribution (Table 3). At Bodalla, the main contributors are Bodalla 5 (670.83 ML), Bodalla 9 (642.00 ML), Bodalla 14 (1,141.24 ML), and Bodalla 17 (589.10 ML) (Table 3).

A similar standard has been applied to ensure consistency in the current data, where a year's (12 months) data is reported from November 1st of the previous year to October 31st of the following year. This allows for reporting (e.g., 2022 data cover 1st November 2021 to 31st October 2022). In this UWIR, 2025 has also been included.

Table 3: Cumulative water (ML) extracted from each well in GKBA between 2015 and 2025.

Well	Cumulative water (ML)		Well	Cumulative water (ML)
Kenmore 1	207.30		**Kenmore 39**	3,721.12
Kenmore 2	248.77		**Kenmore 41**	5.78
Kenmore 3	448.07		**Kenmore 43**	8.68
Kenmore 8	1,495.93		**Bodalla 5**	670.68
Kenmore 9	45.52		**Bodalla 6**	248.10
Kenmore 10	1,347.16		**Bodalla 8**	4.77
Kenmore 11	274.89		**Bodalla 9**	642.00
Kenmore 13	82.68		**Bodalla 10**	82.12
Kenmore 15	932.92		**Bodalla 13**	367.27
Kenmore 16	73.67		**Bodalla 14**	1,141.24
Kenmore 17	77.11		**Bodalla 15**	180.01
Kenmore 18	88.44		**Bodalla 16**	15.91
Kenmore 20	296.21		**Bodalla 17**	589.10
Kenmore 22	70.63		**Bodalla 19**	0.27
Kenmore 24	48.26		**Bodalla 20**	14.63
Kenmore 26	12.22		**Bodalla 21**	179.38
Kenmore 27	1,934.24		**Bodalla 22**	84.41
Kenmore 28	1,948.25		**Bargie 01**	0.62

Kenmore 30	2,673.04		**Bargie 05**	0.06
Kenmore 31	0.46		**Blackstump 01**	336.67
Kenmore 32	5.41		**Blackstump 04**	40.06
Kenmore 33	271.45		**Blackstump 06**	1.50
Kenmore 34	17.64		**Marcoola 01**	19.52
Kenmore 35	32.95		**Coolum 01**	3.80
Kenmore 37	494.31		**Glenvale 01**	12.77

Annual water production (ML) histograms for wells in the Kenmore and Bodalla oil fields (including satellite fields) are displayed in Figure 2 and Figure 3. These figures show that extraction amounts vary for each well over time.

Three wells at Kenmore have seen increased production since 2022: Kenmore 27, Kenmore 28, and Kenmore 30. Other Kenmore wells, such as Kenmore 8, Kenmore 10, and Kenmore 39, have generally experienced a decline in average production. Bodalla wells display a similar pattern, with decreases at Bodalla 5, Bodalla 6, Bodalla 9, Bodalla 14, and so on. However, Bodalla 13 experienced a marginal increase.

The proportional contribution of the Satellite Fields is shown in Figure 3, where Marcoola, Coolum, and Glenvale are too low to be visible on the scale. Blackstump has not been contributing to produced water volumes and has recently decreased.

Trends in production per well continue to vary across the field, showing either a general decline or a consistent pattern.

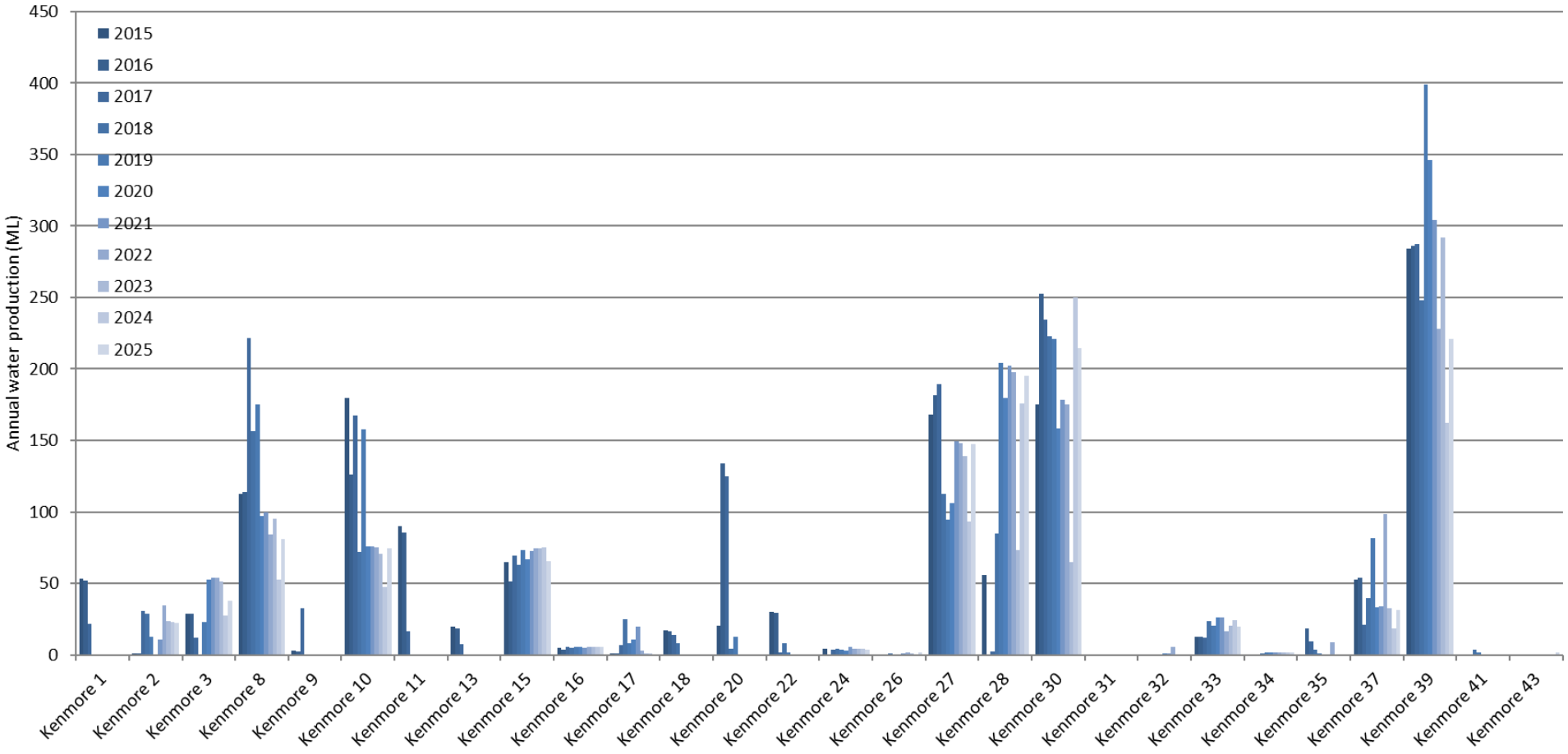


Figure 2: Annual water (ML) production per well at Kenmore from 2015 to 2025.

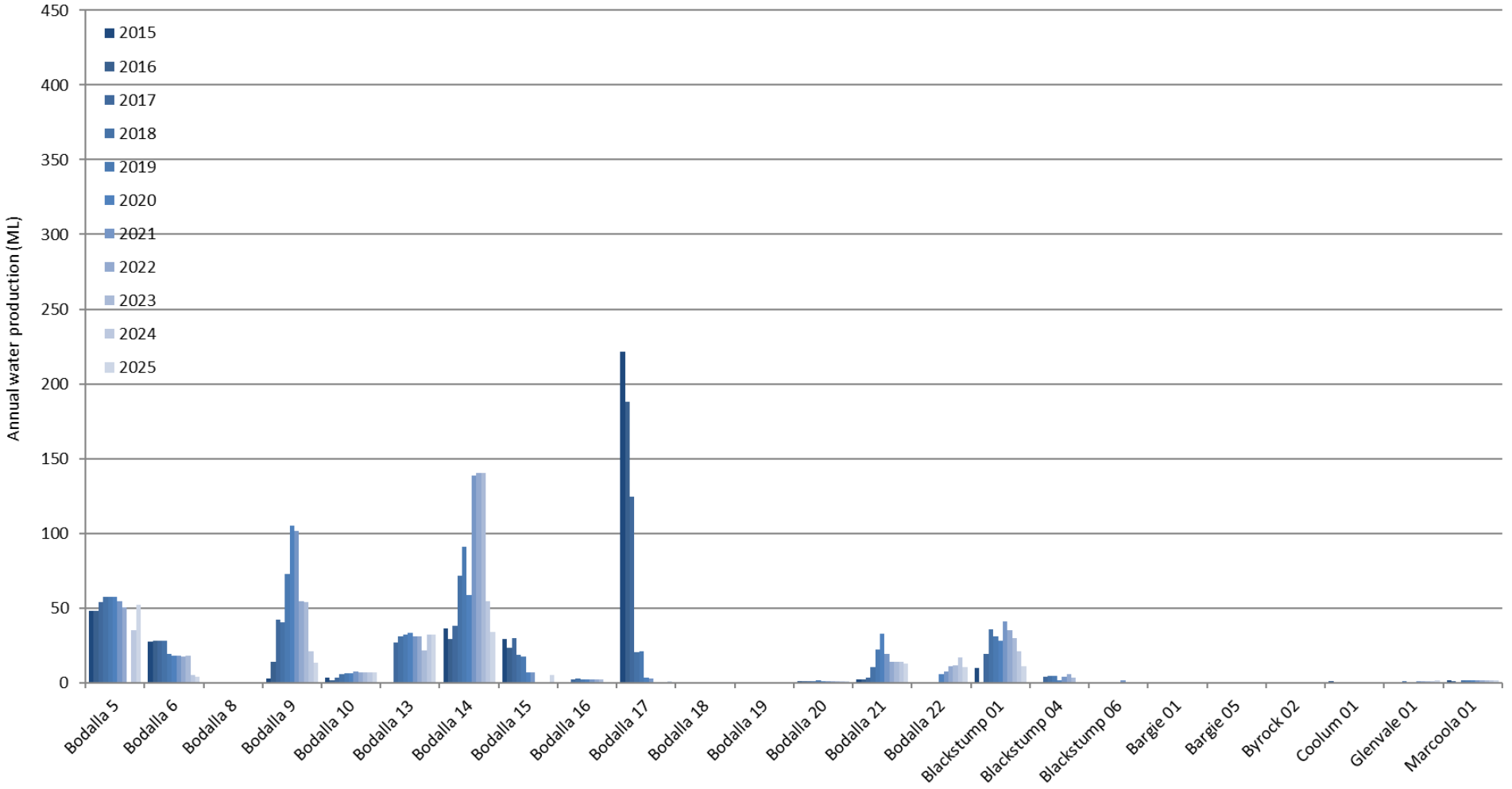


Figure 3: Annual water (ML) production per well at Bodalla and Satellite Fields from 2015 to 2025.

Previous Production Estimates

In 2022, Bridgeport produced 1,588.33 ML of water across the tenements, compared to a predicted 1,625.58 ML, a variation of 2.32%. In 2023, 1,257.15 ML of water was produced across tenements versus the predicted 1,631.72 ML, a variation of 25.92%. In 2024, Bridgeport produced 1,172.05 ML compared to the predicted 1,619.08 ML, a variation of 32.03%. Table 4 summarises the results between 2019 and 2024.

Table 4: A comparison between the predicted water production from each year from the Bridgeport UWIR (2018-2024)

Type	Year	Bodalla	Kenmore	Blackstump	Marcoola	Glenvale	Coolum	Bargie	Byrock	Total (ML)
Predicted	**2019**	289.24	1,152.48	44.61	2.14	1.04	0.38	0.0000	0.2200	**1,490.43**
Actual	**2019**	343.27	1,499.14	35.40	1.57	0.70	0.22	0.0600	0.0000	**1,880.37**
Predicted	**2020**	290.39	1,153.58	44.68	2.32	1.10	0.41	0.0000	0.2900	**1,493.13**
Actual	**2020**	331.59	1,164.97	31.34	1.55	0.76	0.22	0.0300	0.0000	**1,528.96**
Predicted	**2021**	291.23	1,154.52	44.75	2.41	1.16	0.44	0.0000	0.3400	**1,495.22**
Actual	**2021**	390.53	1,240.40	45.07	1.60	0.91	0.26	0.0100	0.0000	**1,678.79**
Predicted	**2022**	417.88	1,163.10	42.01	1.40	0.69	0.24	0.2500	0.0000	**1,625.58**
Actual	**2022**	329.49	1215.21	40.95	1.47	0.91	0.26	0.0149	0.0000	**1,588.30**
Predicted	**2023**	434.14	1153.91	40.92	1.35	0.65	0.24	0.51	0.0000	**1,631.72**
Actual	**2023**	269.76	951.41	33.21	1.51	1.00	0.25	0.0000	0.0000	**1,257.15**
Predicted	**2024**	427.80	1148.65	39.96	1.31	0.60	0.24	0.52	0.0000	**1,619.08**
Actual	**2024**	186.74	961.14	21.14	1.63	1.14	0.26	0.0000	0.0000	**1,172.05**

Future Production Estimates

Section 376(1)(ii) requires an estimate of the quantity of water to be produced or taken due to the exercise of the relevant underground water rights.

Given the volume and consistency of production history data recorded per well, Bridgeport Energy uses a method of decline curve analysis (DCA) applied in ValNav software (an industry-based reservoir engineering platform) to predict future production estimates. DCA was undertaken on a well-by-well basis for each of Bridgeport Energy's producing fields. The DCA analysis includes historical oil production, total liquid production, and water cut/WOR trends. Bridgeport Energy provides these predictions based on extrapolation using an industry-recognised approach, by an appropriately qualified Senior Reservoir Operations Engineer.

Bridgeport Energy forecasts that the annual water production will average 1,396.50 ML from the combined GKBA tenements between 2026 and 2028 (Table 5). Bridgeport predicts 1,299.97 ML in 2026, 1,440.96 ML in 2027, and 1,448.59 ML in 2028 (Table 5).

Bridgeport Energy predicts that total water extraction will remain fairly steady over the next three years, as wells are optimised and brought back online through workovers (Table 5).

Table 5: Actual and predicted water extraction (ML) from the GKBA group from 2016 to 2028.

Year	Bodalla	Kenmore	Blackstump	Marcoola	Glenvale	Coolum	Bargie	Byrock	Total extracted (ML)
2016	331.68	1479.56	0.00	0.67	0.25	0.12	0.0000	0.0000	1,812.28
2017	353.76	1445.29	31.44	0.24	0.41	0.10	0.0000	0.0000	1,831.24
2018	298.95	1165.03	40.30	1.50	0.91	0.29	0.0100	0.0000	1,506.98
2019	332.95	1427.03	37.88	1.59	0.60	0.17	0.0600	0.0000	1,800.27
2020	344.38	1167.10	28.06	1.53	0.91	0.26	0.0300	0.0000	1,542.28
2021	324.20	1036.81	38.52	1.35	0.76	0.22	0.0100	0.0000	1,401.87
2022	329.49	1215.21	40.95	1.47	0.91	0.26	0.0149	0.0000	1,588.30
2023	269.76	951.41	33.21	1.51	1.00	0.25	0.0000	0.0000	1,257.15
2024	186.74	961.14	21.14	1.63	1.14	0.26	0.0000	0.0000	1,172.05
2025*	172.86	1,125.38	11.07	1.56	1.35	0.24	0.0000	0.0000	1,312.47
2026	281.17	1,013.34	0.00	1.53	1.43	0.23	0.00	0.0000	1,299.97
2027	282.55	1,112.11	42.93	1.51	1.38	0.23	0.25	0.0000	1,440.96
2028	286.62	1,115.52	43.12	1.50	1.31	0.23	0.30	0.0000	1,448.59
Combined Total	**3,795.11**	**15,214.93**	**368.62**	**17.59**	**12.36**	**2.86**	**0.6749**	**0.0000**	**19,414.41**

*This year contains actual and predicted values for the entire year.

The total water production from 2015 to 2025 has been compared to the three projected years of 2026, 2027, and 2028 below (Figure 4).

Kenmore (Figure 4, frame A) experienced a decline after 2022, with a slight increase in 2025. Production at Kenmore is expected to remain steady around the average level from 2023 to 2025. Bodalla (Figure 4, frame B) also saw a decline during the same period, but unlike Kenmore, production did not rise in 2025. The production for the next three years is forecasted to be generally similar to 2023. Satellite Fields (Figure 4, frame C) have also declined, with predictions indicating a potential rise in production in 2027.

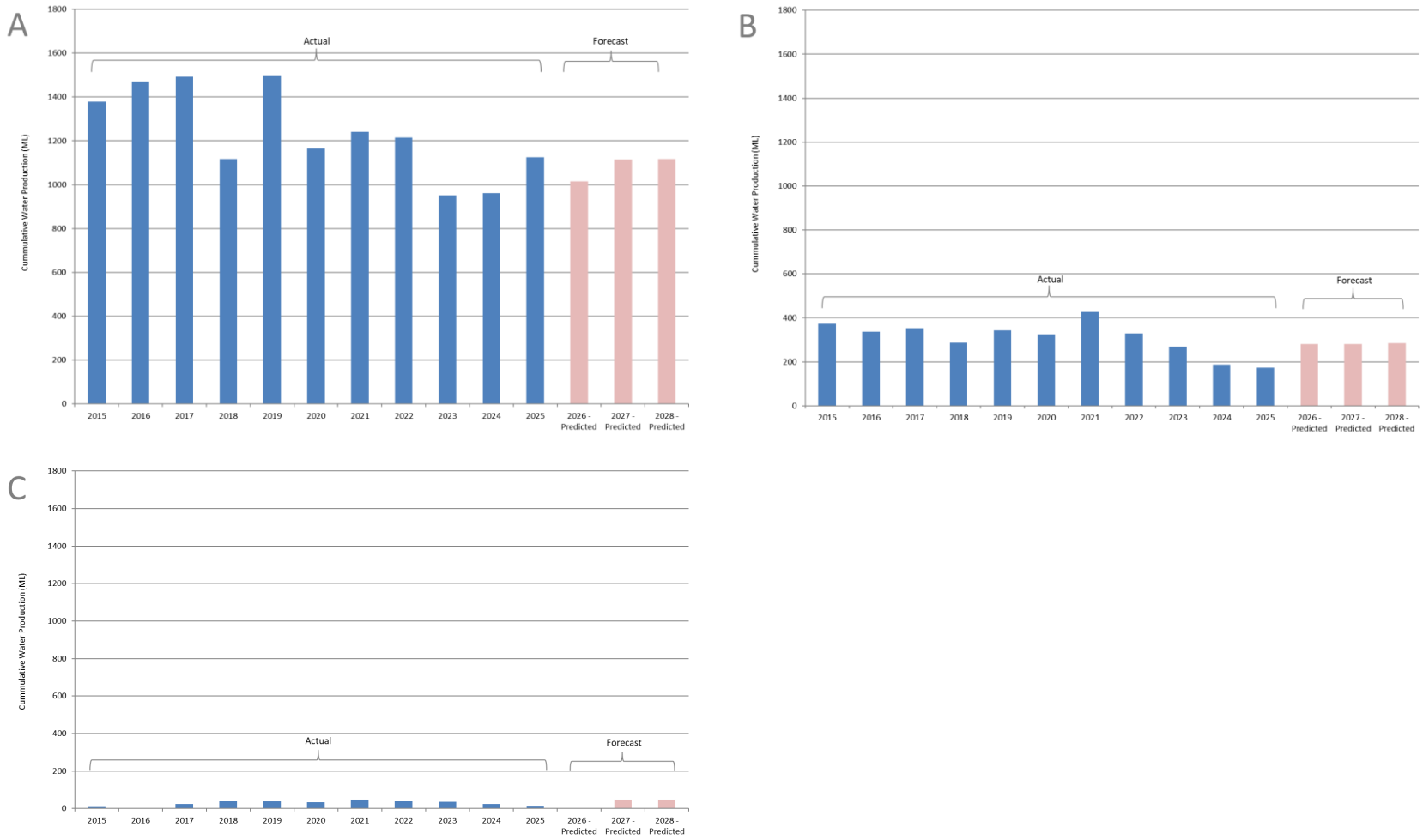


Figure 4: Cumulative annual water production (ML) per field at (A) Kenmore, (B) Bodalla and (C) Satellite Fields (including forecasts).

Part B*: Aquifer information and underground water flow

Requirement under sections 376(b)(i) to 376 (b)(iii) of the Water Act
For each aquifer affected, or likely affected, by the exercise of the relevant underground water rights, an UWIR must include: **1. A description of the aquifer;** **2. An analysis of the movement of underground water to and from the aquifer, including how the aquifer interacts with other aquifers; and** **3. An analysis of the trends in water level change for the aquifer because of the exercise of underground water rights.**

*Part B refers to Section 5.1.2 (page 10) of the guideline (DETSI 2025).

PL 31, 32 & 47 Kenmore, Bodalla and Blackstump

Location

The Eromanga and Cooper Basins are multi-layered hydro-stratigraphic basins within the Great Artesian Basin (GAB). These basins cover over a million square kilometres across Queensland, New South Wales, South Australia, and the south-east of the Northern Territory, making them some of the largest artesian basins in the world. On the surface, a wide variety of land and ecosystem values is shaped by geological, geomorphological, and hydrological influences.

Geological setting

The Eromanga Basin is overlain by the Lake Eyre Basin, a series of sediments from the Tertiary and Quaternary periods that are widely distributed across central Australia. In the northeast of South Australia, sediments of the Lake Eyre and Eromanga Basins were laid down during the Jurassic-Cretaceous period, reaching a maximum thickness of between 1200 m and 2700 m. These sediments were formed under fluvial, lacustrine, and later shallow-marine conditions, and are generally continuous across the basin. They are gently folded in some areas and feature extensive sandstone formations that act as oil reservoirs and regional

aquifers. The Eromanga Basin is the largest within the Great Artesian Basin (GAB). It is mainly situated in South Australia, with parts extending into Queensland and New South Wales. Production from the GAB is mainly sourced from this basin.

Beneath the Eromanga Basin, entirely covered by an unconformity, the extent of the Cooper Basin is defined by bounding faults and pinch-out edges. The tectonic history of the Cooper and Eromanga basins is intricate, marked by multiple phases of rift-related subsidence, followed by compressional uplift and erosion. This history has resulted in the division of the Cooper Basin into several large sub-troughs, separated by fault-bound ridges (Figure 5). The GKBA has exploration potential in this area, but exploration activity within the Cooper Basin, particularly on the Byrock field in PL 1064, has been limited.

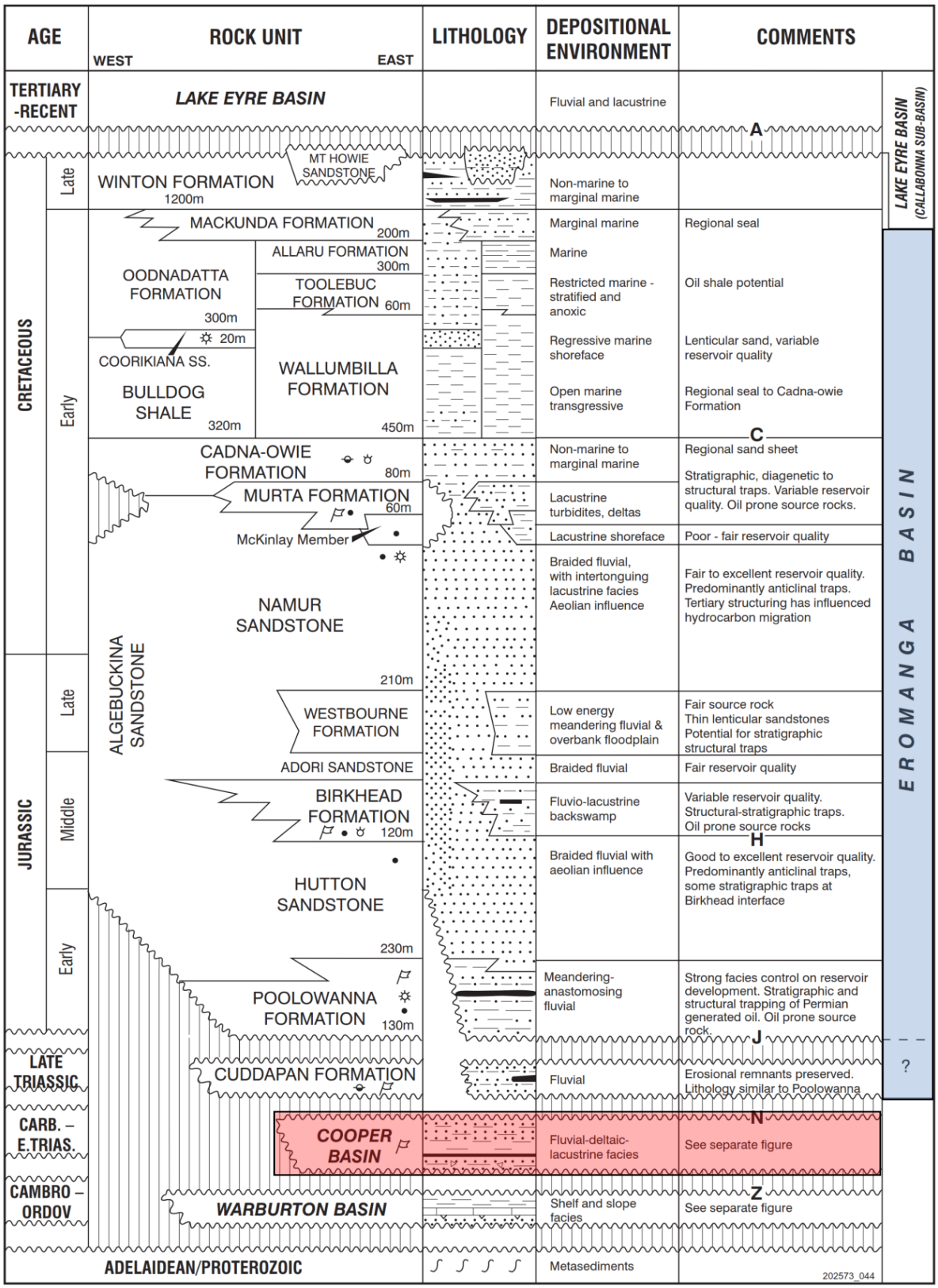


Figure 5: Stratigraphic column of the Eromanga Basin (blue) and Cooper Basin (red).

Hydrogeological setting

The targeted formations of the Kenmore oil field include the Birkhead Formation, the Hutton Sandstone, and the Poolowanna Formation (also known as the Basal Jurassic) in the Eromanga Basin. These targets are >1,400 m below the surface.

In the Kenmore oil field, the Birkhead Formation consists of interbedded shales, siltstones, and sandstones and is approximately 70 meters thick. The Hutton Sandstone is composed of highly porous sandstone, measuring approximately 115 to 120 meters thick. The Poolowanna Formation consists of interbedded carbonaceous shale and sandstone, approximately 40 m thick.

Much like Kenmore, the Bodalla oil field targets the Birkhead Formation, Hutton Sandstone, and Poolowanna Formation. The Birkhead Formation consists of well-sorted, fine to medium-grained sandstones interbedded with mud rocks. The Hutton Sandstone comprises two units: a coarse lower bed and an upper unit of finer-grained sandstones. The Poolowanna Formation includes fine to coarse-grained sandstones with minor coals and mud rocks.

There are two wells at Blackstump that target the Poolowanna Formation. The formation consists of multiple sandstone intervals, including lacustrine sand bodies, each with permeability ranging from $2.8x10^{-4}$ m/day to 1.59 m/day.

The formations that Bridgeport targets for extraction are sealed, above and below, by impervious strata. These impervious layers possess properties that prevent fluid migration. They are characterised by extremely low permeability and porosity, both features that concentrate oil within a specific formation.

Each well is drilled according to international standards, including casing and cementing that are designed to prevent production volumes from interacting with the overlying strata.

Potential faults intersecting the aquifers

Extensive shales separate major sand bodies, acting as a vertical barrier to hydrocarbon migration across the Kenmore and nearby fields. There is no evidence of significant faulting that could facilitate water movement between aquifers.

Well histories

Due to limited access to historical records before Bridgeport Energy ownership, a full history of each well cannot be determined. Table 6 displays well history details from 2017 to 2025.

Table 6: Individual well histories at Kenmore, Bodalla and Blackstump from 2017 to 2025.

Well	Status	Formation	History
Kenmore 1	Producing	Basal Jurassic	
Kenmore 2	Producing	Hutton	June 2017 - Slick line work to conduct flow and build up tests. Pulled and replaced tubing, June 2021.
Kenmore 3	Producing	Hutton	
Kenmore 4	Suspended	Hutton	Currently suspended
Kenmore 5	Suspended		
Kenmore 6	Producing	Hutton	
Kenmore 7	Producing	Hutton	
Kenmore 8	Producing	Hutton	
Kenmore 9	Producing	Hutton	
Kenmore 10	Producing	Hutton	
Kenmore 11	Producing	Hutton	
Kenmore 13	Producing	Hutton	
Kenmore 14	Suspended	Hutton	
Kenmore 15	Producing	Hutton	
Kenmore 16	Producing		
Kenmore 17	Producing	Basal Jurassic	May 2017 - Pulled out rods and replaced with new downhole pump and rods. Pulled rods and ran in rod string and pump, 2021.
Kenmore 18	Producing	Hutton	June 2017 - Slick line work to conduct flow and build up tests.
Kenmore 19	Producing	Hutton	
Kenmore 20	Suspended	Hutton	
Kenmore 21	Suspended	Hutton	
Kenmore 22	Producing	Hutton	June 2017 - Slick line work to conduct flow and build up tests. October 2017 Run in downhole pump and rods, installed artificial lift to bring well online.

Well	Status	Formation	History
Kenmore 23	Producing	Hutton	
Kenmore 24	Producing	Hutton	January 2017 - Pulled out rods and tubing and replaced with new tubing, downhole pump and rods. Pulled and replaced pump and rod string, 2021.
Kenmore 26	Producing	Basal Jurassic	Re-ran pump and rod string, June 2021.
Kenmore 27	Producing	Hutton	
Kenmore 28	Producing	Hutton	June 2017 - Slick line work to conduct flow and build up tests. October 2017 - Pulled tubing and jet pump and ran with new tubing and jet pump.
Kenmore 29	Suspended	Hutton	
Kenmore 30	Producing	Hutton	
Kenmore 31	Suspended	Hutton	
Kenmore 32	Producing	Hutton	January 2017 - Pulled out rods and replaced with new downhole pump and rods.
Kenmore 33	Producing	Hutton	Replaced parted rod string and downhole pump in November 2019.
Kenmore 34	Producing	Hutton	April 2017 - Pulled out rods and tubing and replaced with new tubing, downhole pump and rods
Kenmore 35	Producing	Adori & Westbourne	
Kenmore 36	Suspended	Hutton	Perforated Birkhead over 1391-1396m and put on hydraulic pump.
Kenmore 37	Producing	Hutton	
Kenmore 39	Producing	Hutton	
Kenmore 43	Producing	Hutton	
Bodalla 1	Suspended	Hutton	
Bodalla 2	Suspended	Hutton	
Bodalla 3	Suspended	Hutton	
Bodalla 4	Suspended	Hutton	
Bodalla 5	Free flow	Basal Jurassic	
Bodalla 6	Free flow	Basal Jurassic	
Bodalla 8	Suspended	Hutton	
Bodalla 9	Producing	Hutton	
Bodalla 10	Producing	Birkhead	Rod change in March 2020.

Well	Status	Formation	History
Bodalla 11	Suspended	Hutton	
Bodalla 12	Suspended	Hutton	
Bodalla 13	Producing	Hutton	
Bodalla 14	Producing	Hutton	
Bodalla 15	Producing	Hutton	
Bodalla 16	Producing	Hutton	
Bodalla 17	Producing	Hutton	
Bodalla 18	Suspended	Hutton	
Bodalla 19	Producing	Birkhead	July 2017 - Installed artificial lift to bring well online.
Bodalla 20	Producing	Basal Jurassic	June 2017 - Pulled out rods and tubing and replaced with new tubing, downhole pump and rods. Rod repair in March 2020.
Bodalla 21	Producing	Basal Jurassic	
Blackstump 1	Producing	Basal Jurassic	March 2017 - Pulled out rods and tubing and replaced with new tubing, downhole pump and rods. September 2019 upgraded downhole pump. April 2020 replaced and upgraded downhole pump.
Blackstump 4	Producing	Basal Jurassic	March 2017 - Pulled out rods and tubing and replaced with new tubing, downhole pump and rods. Pull completed, re-run rods and pump, March 2021.
Blackstump 6			

PL 1063 Bargie

Location

The satellite field of Bargie (26°28’22.85”S, 143°44’17.64”E) is situated 255 km directly west of Charleville and 55 km north-west of Quilpie (Figure 6). The currently shut-in Bargie 1 well was drilled on 1 January 1994 to a total depth of 1732.0 m.



Figure 6: PL 1063 Bargie, 55km to the west north-west of Quilpie. The tenement is approximately 15 km^2, with 0.23 km^2 of oil field.

Geological setting

The geological setting of Bargie is considered the same as that described for the GKBA as depicted in Figure 5 above.

Hydrogeological setting

The Basal Jurassic or Poolowanna Formation in the Eromanga Basin is the target formation in the Bargie tenement. The formation comprises multiple sandstone intervals, with the uppermost containing lacustrine sand bodies, each exhibiting permeability values from $2.8x10^{-4}$ m/day to 1.59 m/day. The structure is also sealed by overlying strata, trapping oil within this zone. Bargie 1 well is perforated into this formation at 1609.7 to 1614.0 m.

Potential faults intersecting the aquifer

The Poolowanna Formation at the Bargie field is characterised by a four-way closure on a north-south plunging anticline. There is no evidence of significant faulting that could enable water movement between aquifers.

Well histories

Due to limited access to historical records before Bridgeport Energy ownership, a full history of each well cannot be determined. Table 7 shows the available well history.

Table 7: Individual well history at Bargie

Well	Status	Formation	History
Bargie 1	Producing	Basal Jurassic	Drilled January 1994
Bargie 2	Plugged & Abandoned		Spudded April 1995
Bargie 3	Plugged & Abandoned		Spudded May 1995
Bargie 4	Plugged & Abandoned		Spudded October 2003

PL 1064 Marcoola

Location

The Satellite field at Marcoola (26°51'54.50"S, 143°4'10.73"E) is situated about 321 km west-south-west of Charleville and 30 km south-west of the smaller township of Eromanga (Figure 7). The tenement blocks over this field cover approximately 12 km². The area of disturbance is less than 0.01 km², consisting of one well and associated ponds. The well was initially drilled in 2007 into the Hutton Sandstone. No well completion report is available for the 2007 drilling.

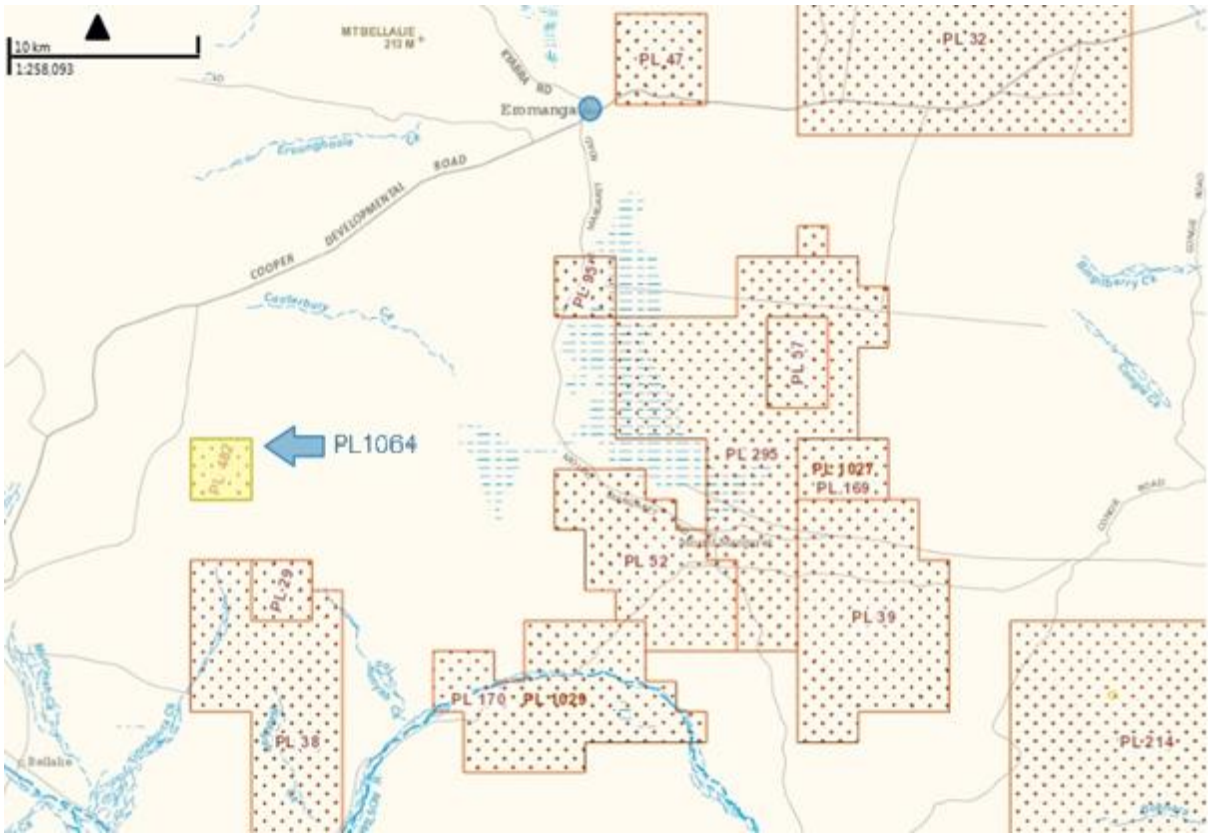


Figure 7: Marcoola, 30 km south west or Eromanga. The tenement is 12 km², with >0.01 km² of oil field.

Geological setting

The geological setting of Marcoola is considered the same as that for the general GKBA, as depicted in Figure 5.

Hydrogeological setting

The target formation for the Marcoola field is the Hutton Sandstone. The Hutton Sandstone in this field can be divided into two separate parts: the upper section, composed of fine to medium-grained sandstone that is well sorted, sub-rounded, and contains a white clay matrix, with excellent inferred porosity; and a lower section characterised by rare siltstone. The well at Marcoola is a co-mingled production well, with new perforations at 916.5 – 923.2 m RDT in the Murta Formation (M2 Sandstone), while legacy perforations are in the Hutton. Because of the co-mingled production, it is not possible to precisely determine the individual volumes of oil and water produced from each formation (Appendix 1).

Potential faults intersecting the aquifers

Near the Marcoola oil field, there is an anticlinal structure known as the Harkaway Anticline, extending from southeast to northwest. The structure is also sealed by overlying strata, which traps oil within this zone.

Well histories

Due to limited access to historical records before Bridgeport Energy ownership, a full history of each well cannot be determined. Table 8 shows the available well history.

Table 8: Individual well history at Marcoola

Well	Status	Formation	History
Marcoola 1	Producing	Hutton	Parted rod string replacement August 2014. Re-perforated into Murta reservoir December 2017.

Coolum & Glenvale

Location

The satellite fields of Coolum and Glenvale (26°44’33.32”S, 143°23’45.09”E) are located 280 km west of Charleville and 15 km south-east of Eromanga (Figure 8). Two wells were drilled in this tenement, Coolum 1 and Glenvale 1, and both are still actively producing. Coolum 1 was drilled to a depth of 1468 m, and Glenvale 1 to 1487 m. A potential site for a second well has been identified and is pending. This well would be called Glenvale 2 but has not been drilled yet.



Figure 8: Coolum & Glenvale, 15 km to the south-east of Eromanga. The tenement is 3 km^2, with<0.08 km^2 of oil field.

Geological setting

The geological setting of Coolum and Glenvale is considered the same as that for the general GKBA, as depicted in Figure 5.

Hydrogeological setting

The target formations of the two wells in Coolum and Glenvale are part of the Westbourne Formation from the Late Jurassic in the Eromanga Basin. The Westbourne Formation is generally regarded as a confining bed with uniform properties. It consists of interbedded siltstone and sandstone units with poor to fair porosity, and oil is trapped from vertical migration by overlying shales.

Potential faults intersecting the aquifer

There are no significant faults in the aquifer targeted within the Coolum and Glenvale tenements. There is a dome shaped four-way hydrocarbon dip trap in the Glenvale field, comprising of sandstones.

Well histories

Due to limited access to historical records before Bridgeport Energy ownership, a full history of each well cannot be determined. Table 9 shows the available well history.

Table 9: Individual well history at Coolum and Glenvale

Well	Status	Formation	History
Coolum 1	Producing	Westbourne	Spudded January 2005
Glenvale 1	Producing	Westbourne	Spudded September 1985

Byrock

Location

The Satellite field of Byrock (26°19’58.67”S, 143°20’30.36”E) is located approximately 290 km west of Charleville and 38 km northeast of Eromanga (Figure 9).

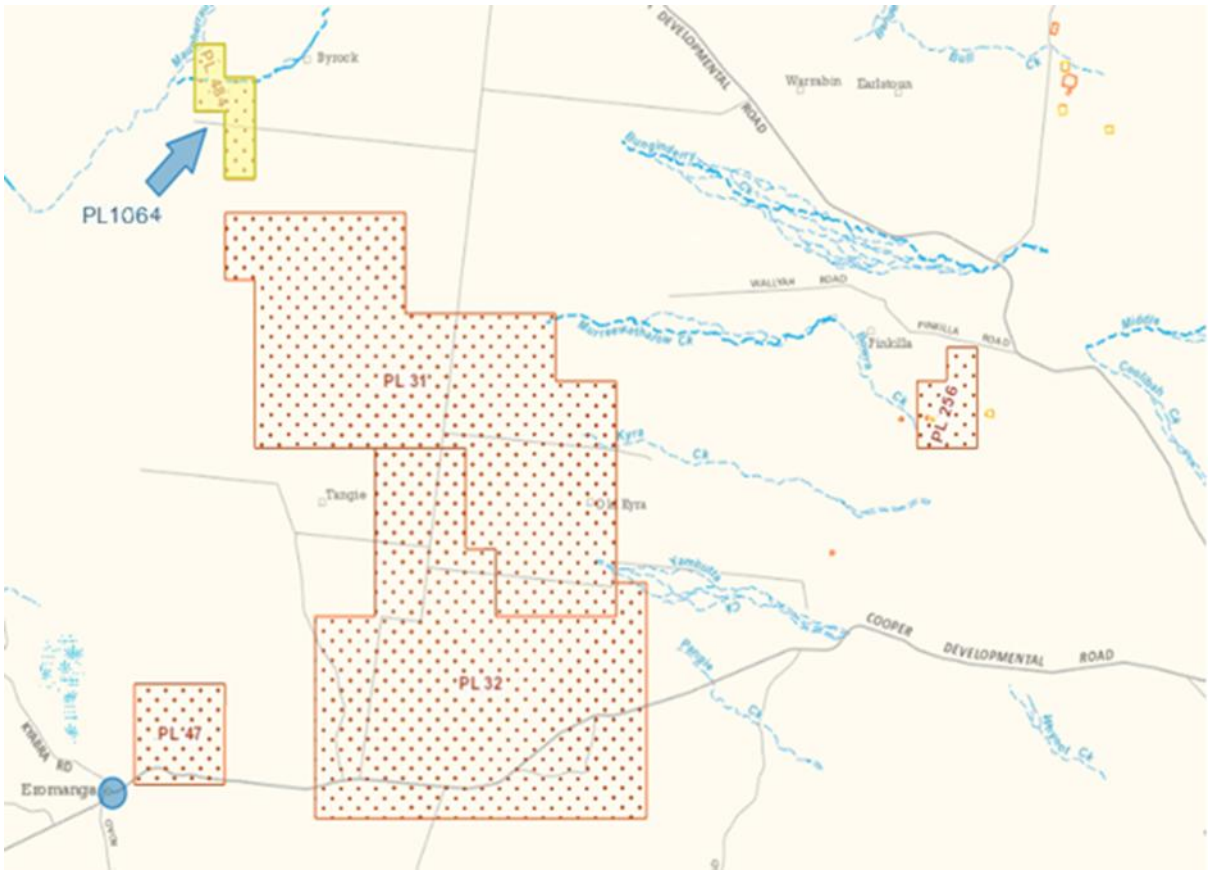


Figure 9: Byrock, 38 km to the northeast of Eromanga. The tenement is 15.5 km^2, with <0.03 km^2 of oil field.

Geological setting

The geological setting of Byrock is considered the same as that for the general GKBA, as depicted in Figure 5.

Hydrogeological setting

The target of the Byrock 2 well is the Toolachee Formation of Carboniferous Age in the Cooper Basin, characterised by thick seams of hydrocarbon-rich coal mixed with sandstone and conglomerate, but with low overall permeability.

Any significant faults that intersect the aquifer

A hydrocarbon trap is situated in the Byrock oilfield, forming an anticline closure running from northwest to southwest. The structure is sealed by overlying shale layers, which concentrates oil within this zone.

Well histories

Due to limited access to historical records before Bridgeport Energy ownership, a full history of each well cannot be determined. Table 10 shows the available well history.

Table 10: Individual well history at Coolum and Glenvale

Well	Status	Formation	History
Byrock 1	Plugged & Abandoned		
Byrock 2	Producing	Toolachee	Spudded February 1986

An analysis of the movement of underground water to and from the aquifer, including how the aquifer interacts with other aquifers;

Bridgeport Energy does not collect quantitative data on the movement of underground water into or from other aquifers. Instead, Bridgeport Energy focuses on the volumes of crude oil and water extracted, as well as reservoir pressure in hydrocarbon-producing reservoirs. These measurements are used to help model the impacts on the targeted aquifers. Bridgeport Energy does not have wells or resources that target or isolate other aquifers unrelated to petroleum; therefore, monitoring capabilities are limited.

Information for this section has been sourced from the Ecological and Bioregional Assessment Program, compiled by the Department of the Environment and Energy, Bureau of Meteorology, CSIRO, and Geoscience Australia (Evans et al. 2020). The program aims to provide independent geological and environmental scientific advice on bioregions, including the Cooper Basin, which covers Greater Kenmore and the Bodalla Area. The hydrogeological assessment was based on data from petroleum-related activities. Bridgeport Energy has summarised key points from Evans et al. 2020 (accessed at; https://www.bioregionalassessments.gov.au/sites/default/files/gba-coo-stage2-appendix_hydrogeology_final.pdf; as of November 2021), highlighting movement to and from targeted aquifers. The Cooper Basin report also covers the entire Eromanga Basin (which includes a portion of the Great Artesian Basin). Evans et al. (2020) state, “From bottom to top these include the artesian GAB aquifers (e.g., Hutton Sandstone and Cadna-owie–Hooray

aquifer), the Rolling Downs aquitard and the Winton–Mackunda partial aquifer". Both the Rolling Downs and Westbourne aquitards separate artesian GAB aquifers from shallow aquifers. In the deeper artesian GAB aquifers, hydraulic gradients and flow rates are likely near stagnant.

The primary source of groundwater for landholder bores is the Winton-Mackunda aquifer, which is influenced by the land's topography. Fewer bores target depths below this aquifer, and those that do typically target resources such as gas, coal, and oil. Petroleum fields often cause localised depressurisation, especially along the western edge of the Cooper Basin, leading to fluctuating hydraulic head levels. Other factors influencing hydraulic head include the progress of petroleum extraction over time, reservoir compartmentalisation, permeability, and recharge. Evans et al. (2020) also conclude that pressure and salinity indicate some connectivity between artesian aquifers in the Eromanga and Cooper Basins, and that hydrochemistry and dissolved gas levels might suggest links between deeper and shallower system parts. However, the "uncoupled nature of both deep fault sets, and polygonal fault systems is one impediment for direct connectivity pathways to the near-surface unconfined aquifers."

Evans et al. (2020) are aware of the lack of data and assumptions made from limited temporal and spatial sample points, as well as conclusions drawn from data from wells that only target specific uses (e.g., petroleum). A recurring theme in Evans et al. (2020) is the recognition of significant data and knowledge gaps. One issue is the lack of data from sources other than petroleum wells targeting hydrocarbons. Petroleum wells have specific limitations because they focus only on certain top zones or peaks within a particular aquifer. The knowledge gap also includes the shallower Winton-Mackunda aquifer, as few wells are regularly tested, and the perforation or open producing depths are not well known.

Bridgeport Energy acknowledges that the main focus of petroleum operations limits the ability to determine the movement to and from other aquifers. Hydrocarbon traps are, by their nature, capped by impermeable geological layers, which restrict the movement of both hydrocarbons and water. These structures are intentionally targeted for resource extraction. Conclusions about lateral or vertical movement depend on pressure gradients, which may be

influenced by historic and ongoing production. A lack of wells and perforations in alternative reservoirs restricts Bridgeport Energy's ability to draw conclusions about reservoir interactions. Bridgeport Energy believes that the best summary of groundwater interactions between aquifers in the Cooper Basin can be found in a report with a more complete data set and independent research, such as that by Evans *et al.* (2020). This report is probably the most recent and comprehensive analysis of groundwater movement in the region. The report is available here: https://www.bioregionalassessments.gov.au/sites/default/files/gba-coo-stage2-appendix_hydrogeology_final.pdf (as of 2025) (Figure 10).

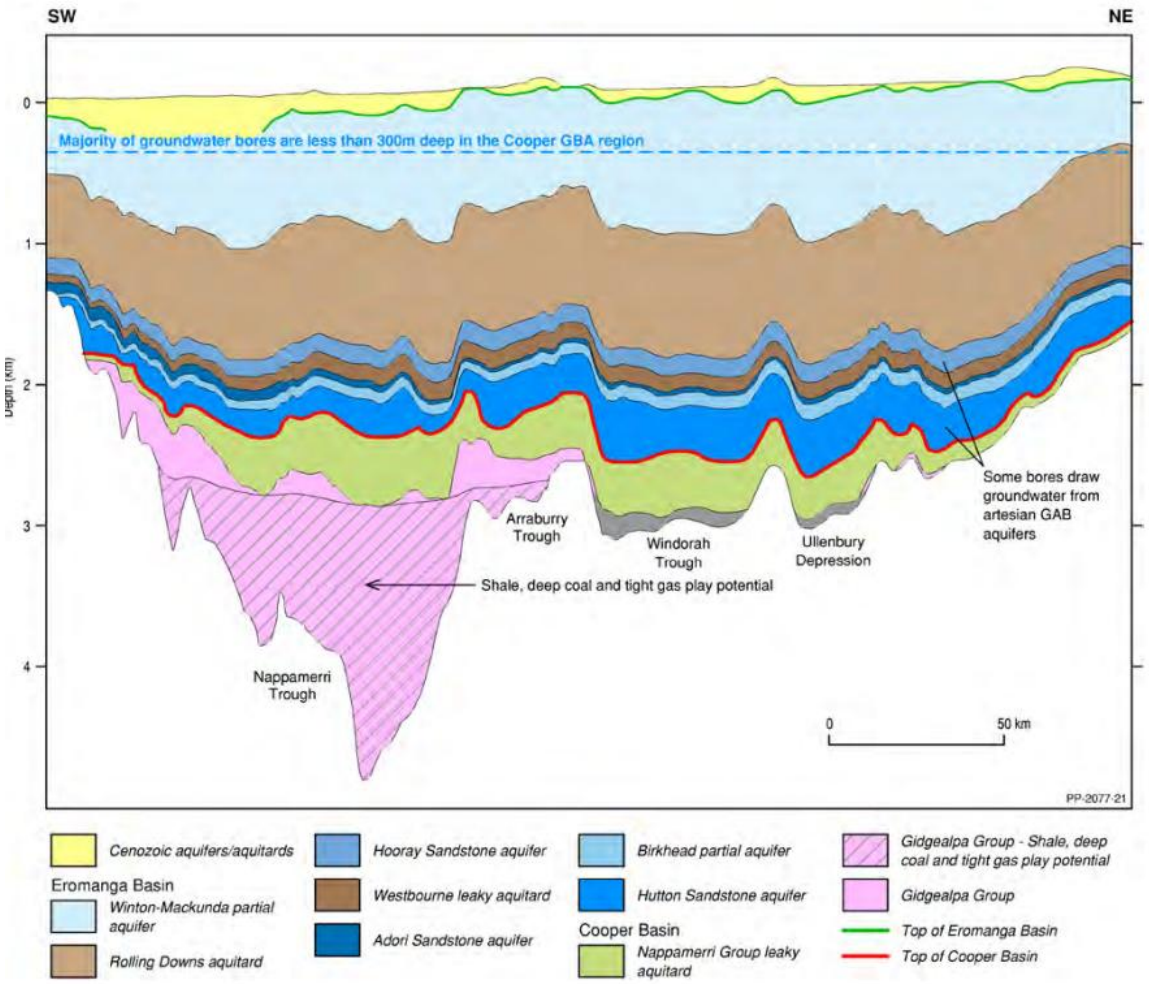


Figure 10: An example figure from Evans et al. (2020), including Cooper GBA cross section. Significant aquitards present.

An analysis of the trends in water level change for the aquifer due to the exercise of underground water rights. Please refer to the following section.

Part C: Predicted water level declines for affected aquifers

Requirements under sections 376(b)(iv) to 376(e) of the Water Act
To meet the requirements of the Water Act, an UWIR must include the following: **1. Maps showing the IAA and the LTAA (sections 376(b)(iv) and 376(b)(v) of the Water Act** **2. A description of the methods used to produce these maps (section 376(c) of the Water Act)** **3. Information about all water bores in the IAA (including the number of bores in the area, maps showing the location of these bores and the authorised use of each bore) (section 376(d) of the Water Act); and** **4. A program for conducting an annual review of the accuracy of maps produced and giving the chief executive a summary of the outcome of each review, including a statement of whether there has been a material change in the information of predictions used to prepare the maps (section 376(e) of the Water Act).**

*Part C refers to Section 5.1.3 (page 12) of the guideline (DETSI 2025).

1. Maps showing the IAA and the LTAA (sections 376(b)(iv) and 376(b)(v) of the Water Act

This section details predicted maximum groundwater drawdown (for the IAA and LTAA periods) for the five layers modelled for this UWIR. Maximum predicted drawdown for each modelled layer are shown in Table 11.

Table 11: Tabulated maximum drawdown, Eromanga Basin

Layer number	Layer description	Maximum predicted drawdown (m)		
		2015–2025 (production data)	2026–2028 (forecast)	2026–2035 (forecast)
2 (includes Layer 1)	Quaternary and Tertiary sediments, Winton and Mackunda formations **Unconsolidated**	1.6	1.3	1.3
3	Allaru, Toolebuc and Wallumbilla formations **Consolidated**	7.3	6.2	5.9
4	Cadna-owie Formation and Hooray Sandstone **Consolidated**	16.6	15.2	13.3
5	Westbourne, Adori, Birkhead and Poolowanna formations and Hutton Sandstone **Consolidated**	41.9	36.2	34.0

Trigger levels for establishing the significance of impact on an aquifer in the event of a decline in water levels are:

- a 5 m decline in water levels within a consolidated aquifer;
- a 2 m decline in water levels within an unconsolidated aquifer

The Immediate Affected Area (IAA), defined in the Water Act (2000) as the area where groundwater drawdown exceeds the bore trigger threshold within three years after the consultation day for the report (2026-2028).

The predicted drawdown in modelled Layer 2 is below the 2m threshold for an unconsolidated aquifer. There is therefore no IAA for Layer 2. Figure 11 shows the geographical extent of predicted drawdown in Layer 2 from 2026-2028. It should be noted that all pastoral bores are located within the formations modelled under Layer 2 (including the Winton and Muckunda Formations).

The predicted drawdown for Layers 3, 4 and 5 are predicted to exceed the 5m threshold trigger for consolidated aquifers. IAA maps for these layers are shown in Figures 12-14.

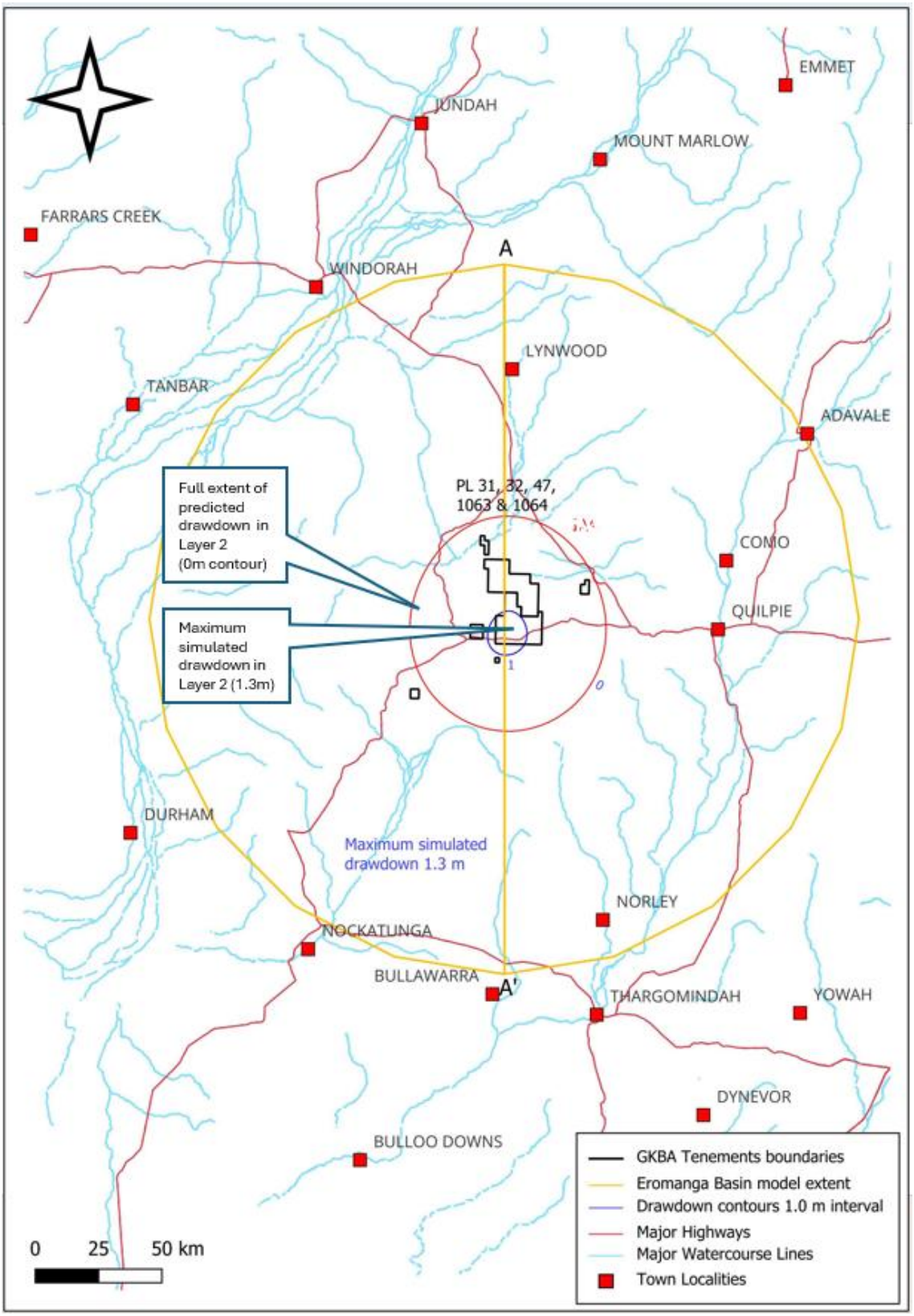


Figure 11: Predicted drawdown in Layer 2 for 2026-2028. Contours in 1m intervals.

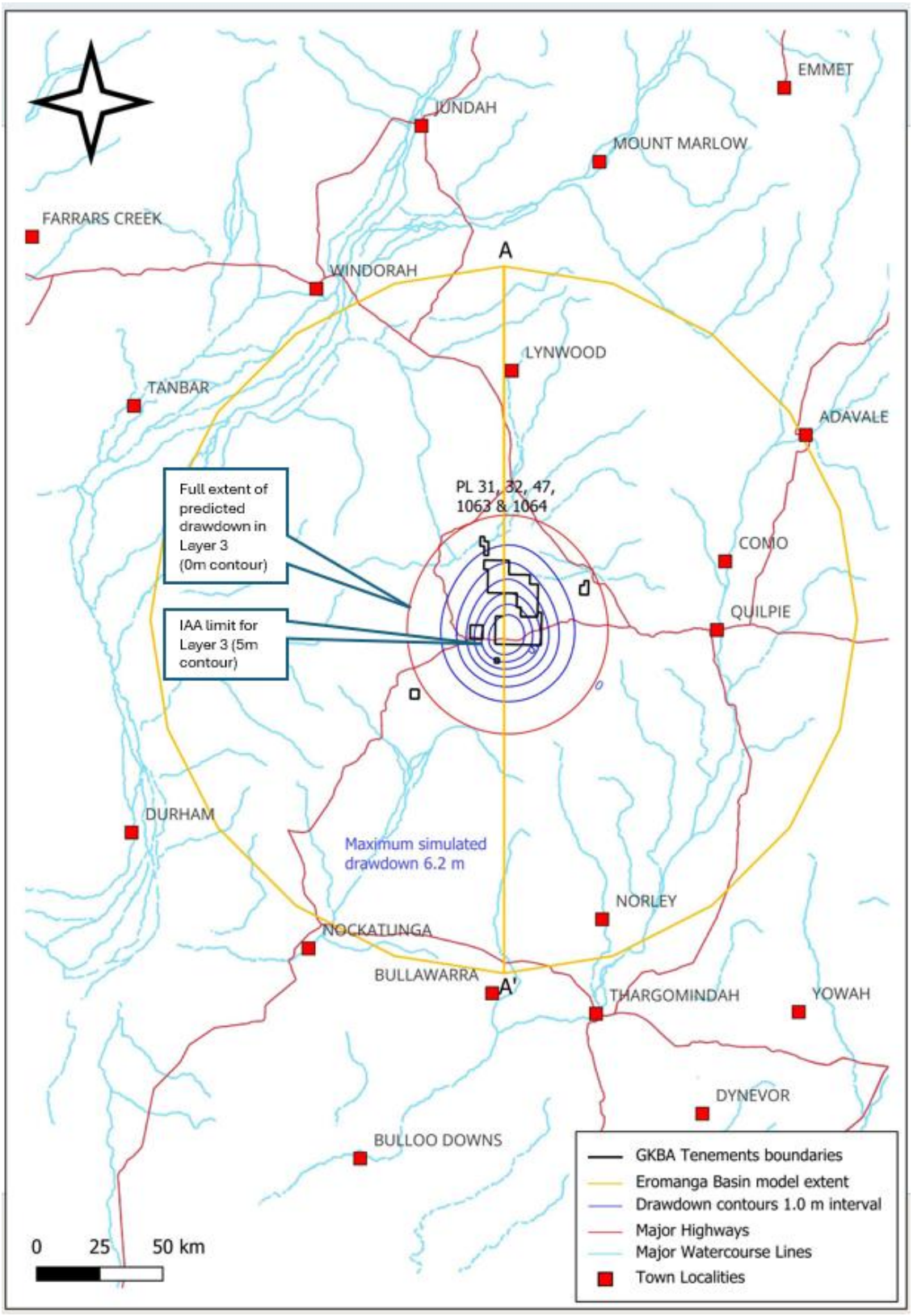


Figure 12: Calculated drawdown in Layer 3 for 2025-2028. Contours in 1m intervals

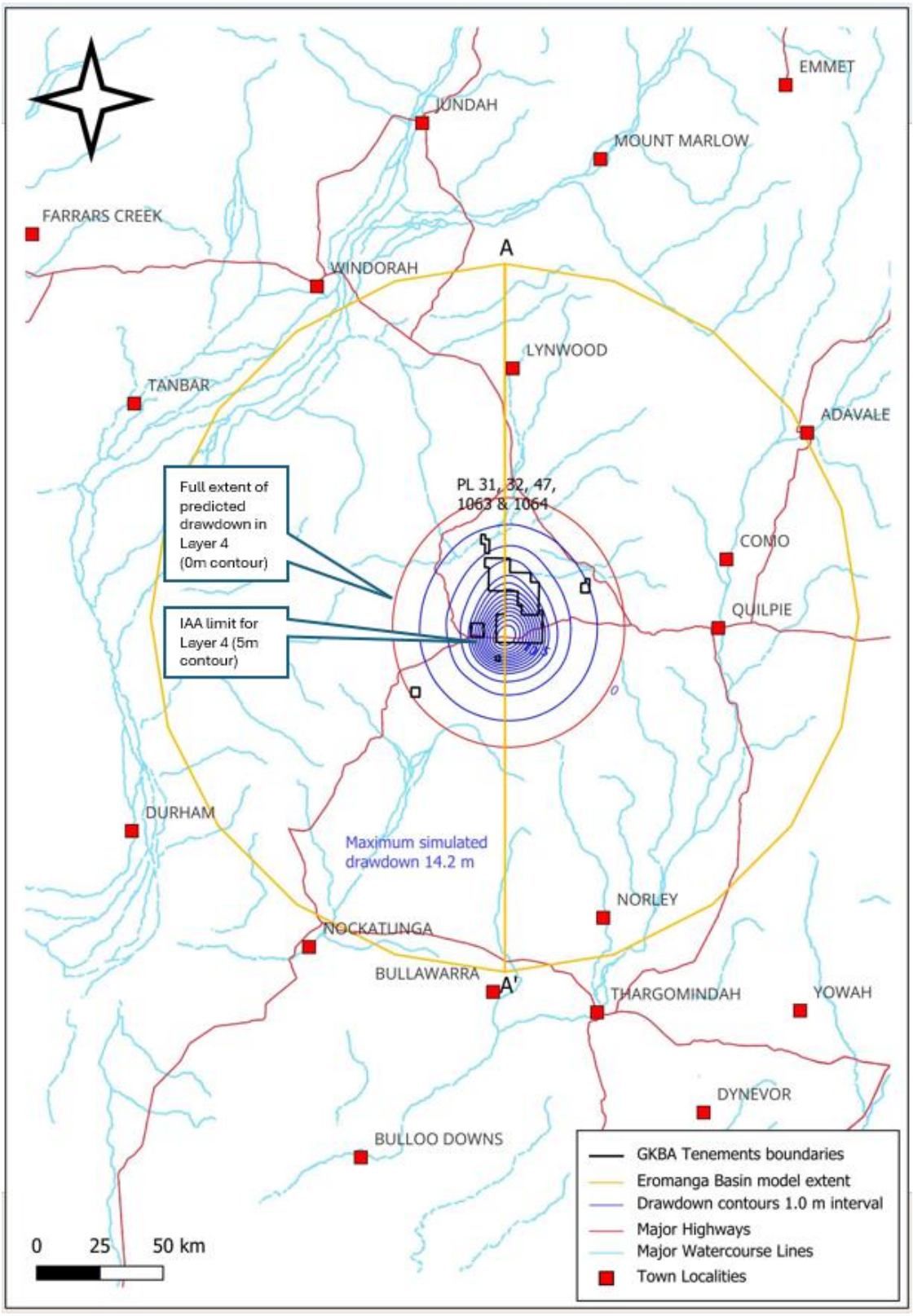


Figure 13: Calculated drawdown in Layer 4 for 2025-2028. Contours in 1m intervals

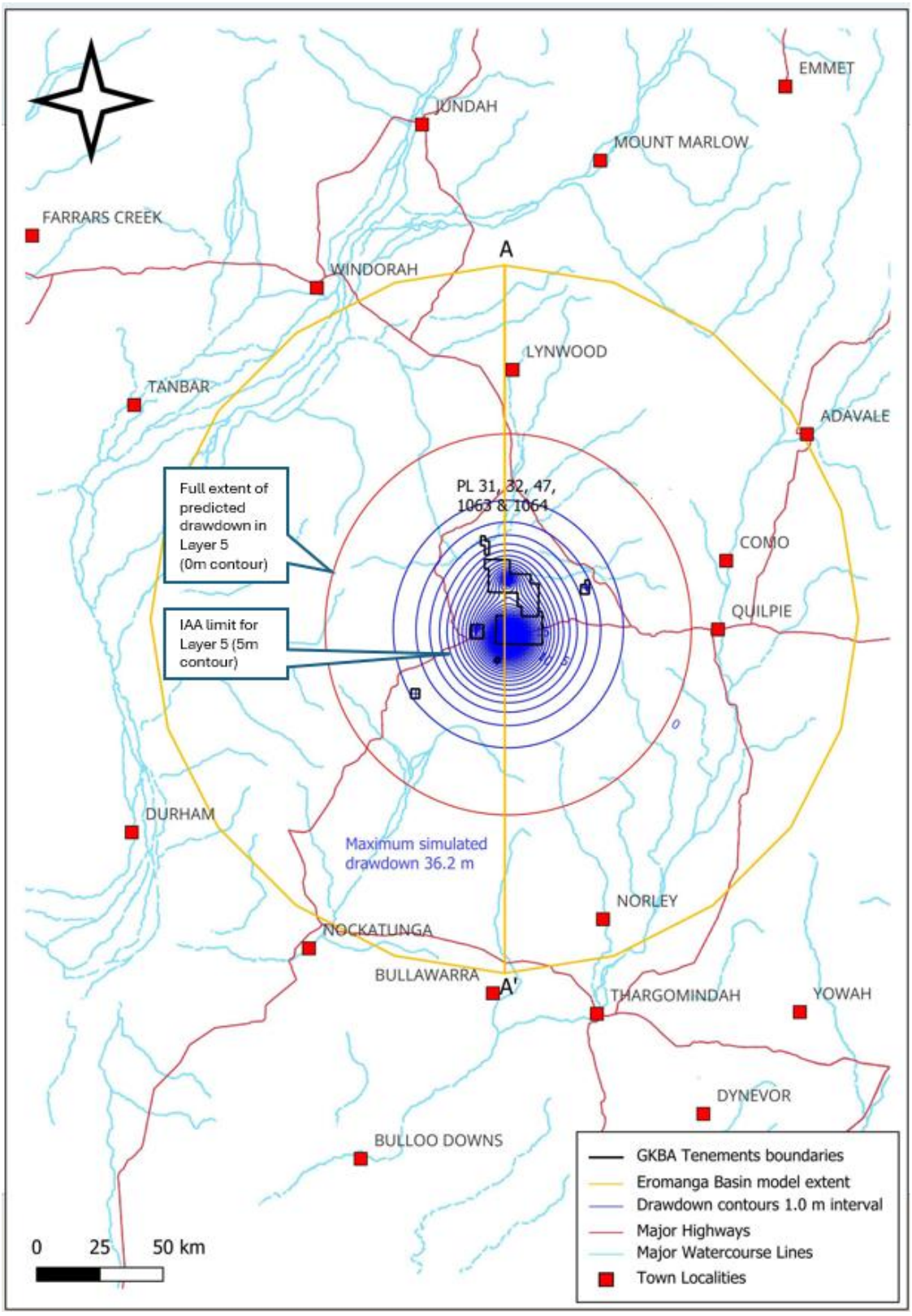


Figure 14: Calculated drawdown in Layer 5 for 2025-2028. Contours in 1m intervals

The Long-Term Affected Area (LTAA), defined as the area where groundwater drawdown exceeding the trigger threshold is predicted to occur at any time due to the exercise of relevant underground water rights (forecast to 2035).

The predicted drawdown in modelled Layer 2 is below the 2m threshold for an unconsolidated aquifer. There is therefore no LTAA for Layer 2. Figure 15 shows the geographical extent of predicted drawdown in Layer 2 from 2026-2035. It should be noted that all pastoral bores are located within the formations modelled under Layer 2 (including the Winton and Muckunda Formations).

The predicted drawdown for Layers 3, 4 and 5 are predicted to exceed the 5m threshold trigger for consolidated aquifers. LTAA maps for these layers are shown in Figures 16-18.

As production rates during the long-term forecast (2026-2035) are slightly lower than during the short-term forecast (2026-2028), the aquifer tends to recover during the long-term forecast period after 2028. Consequently, the LTAA modelled at the end of the 2026-2035 period is slightly smaller than the IAA modelled at the end of the 2026-2028 period. As such the LTAA is expected to be the same as the IAA, which is consistent with the approach and outcomes adopted in previous assessments, including (Golder, 2012), (Golder, 2018) and (Golder, 2021).

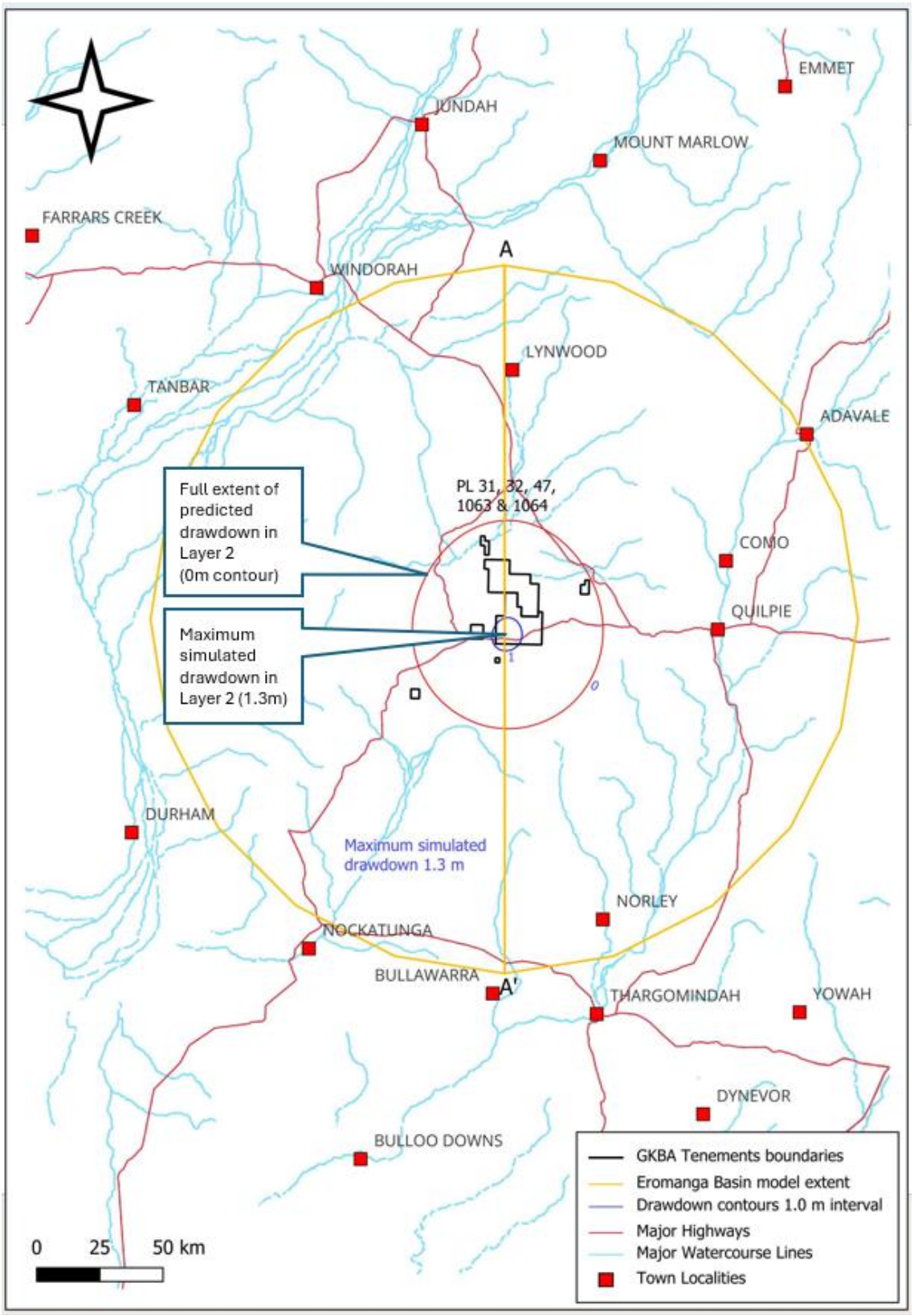


Figure 15: Calculated drawdown in Layer2 for 2026-2035. Contours in 1m intervals

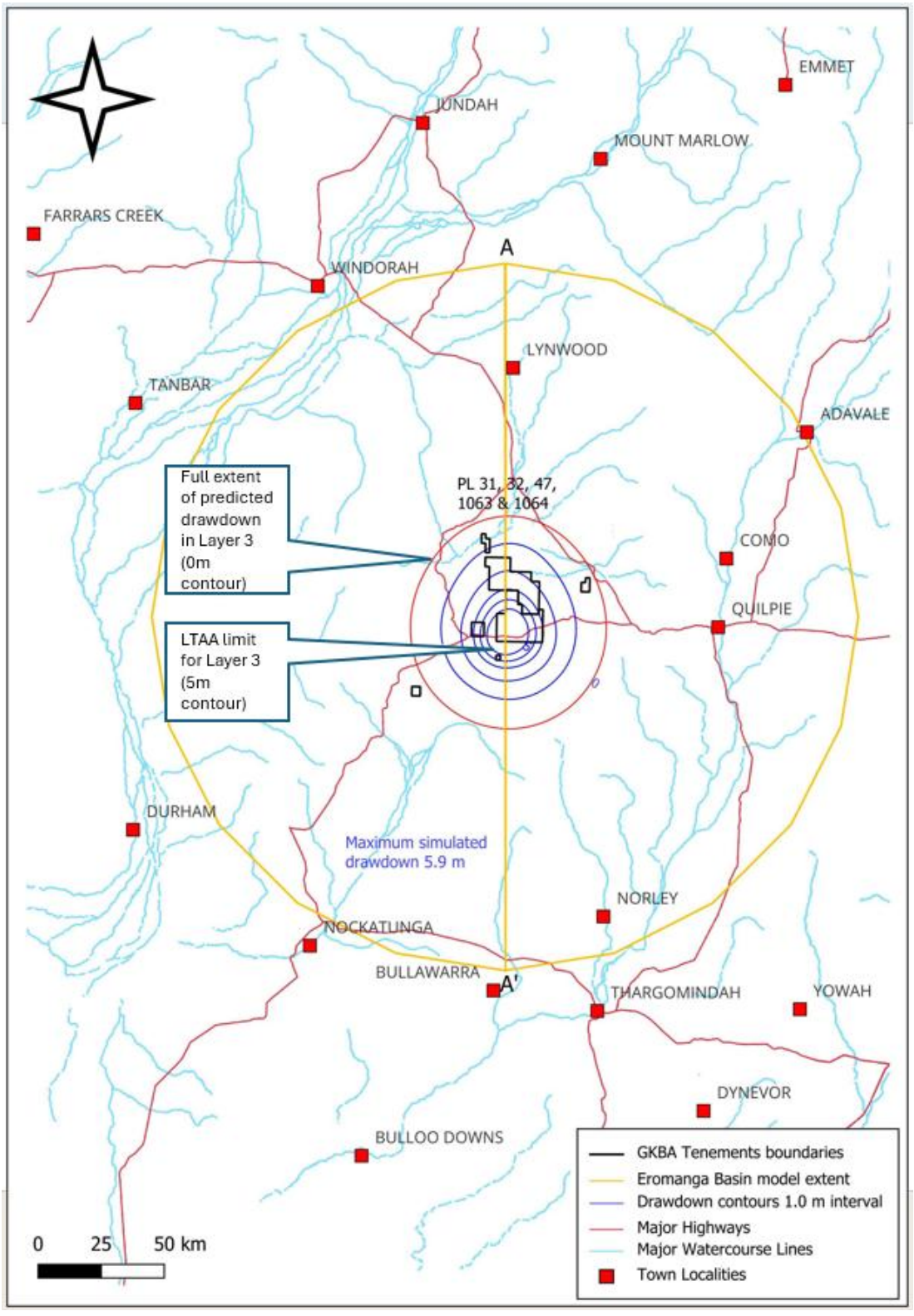


Figure 16: Calculated drawdown in Layer3 for 2026-2035. Contours in 1m intervals

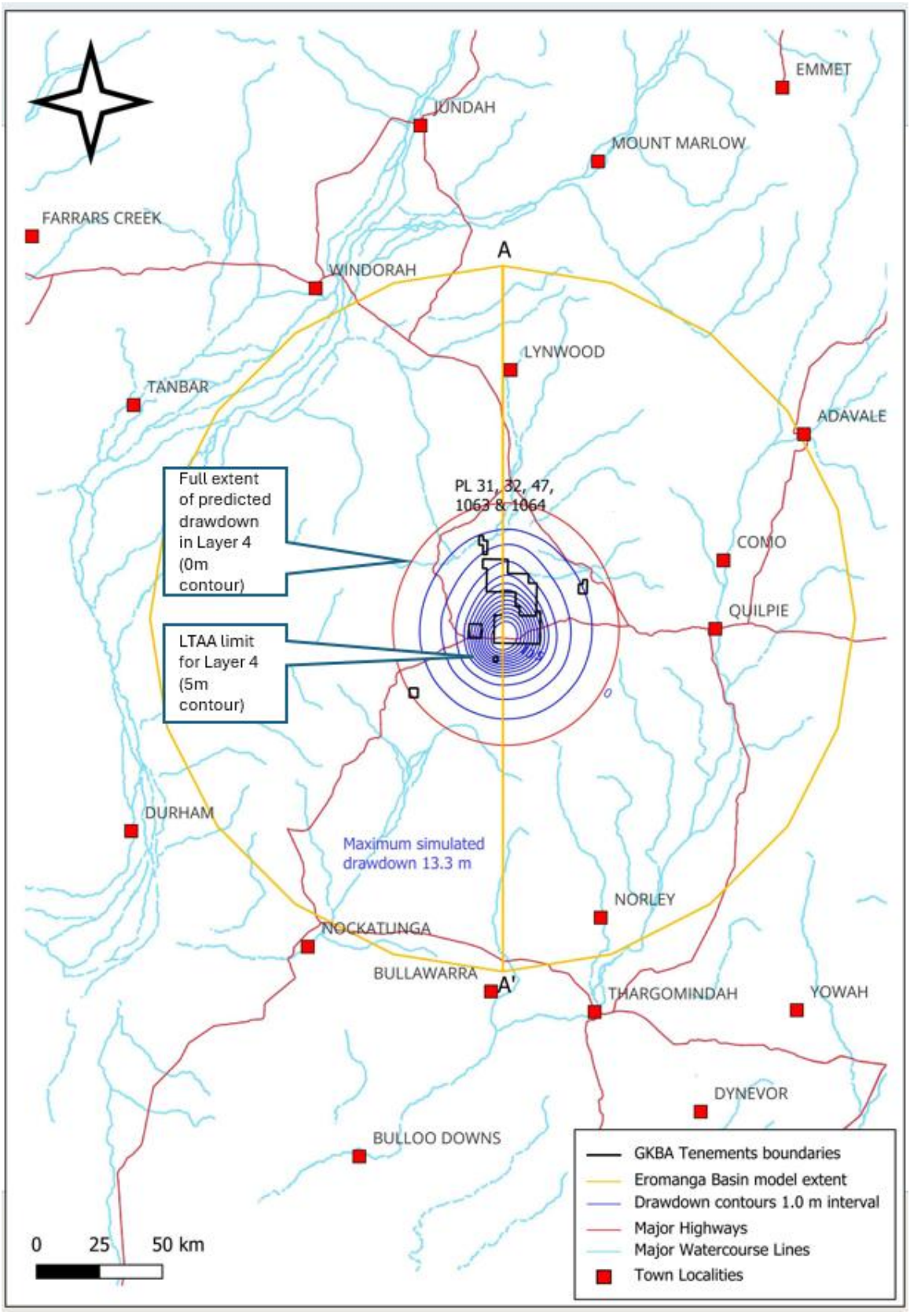


Figure 17: Calculated drawdown in Layer4 for 2026-2035. Contours in 1m intervals

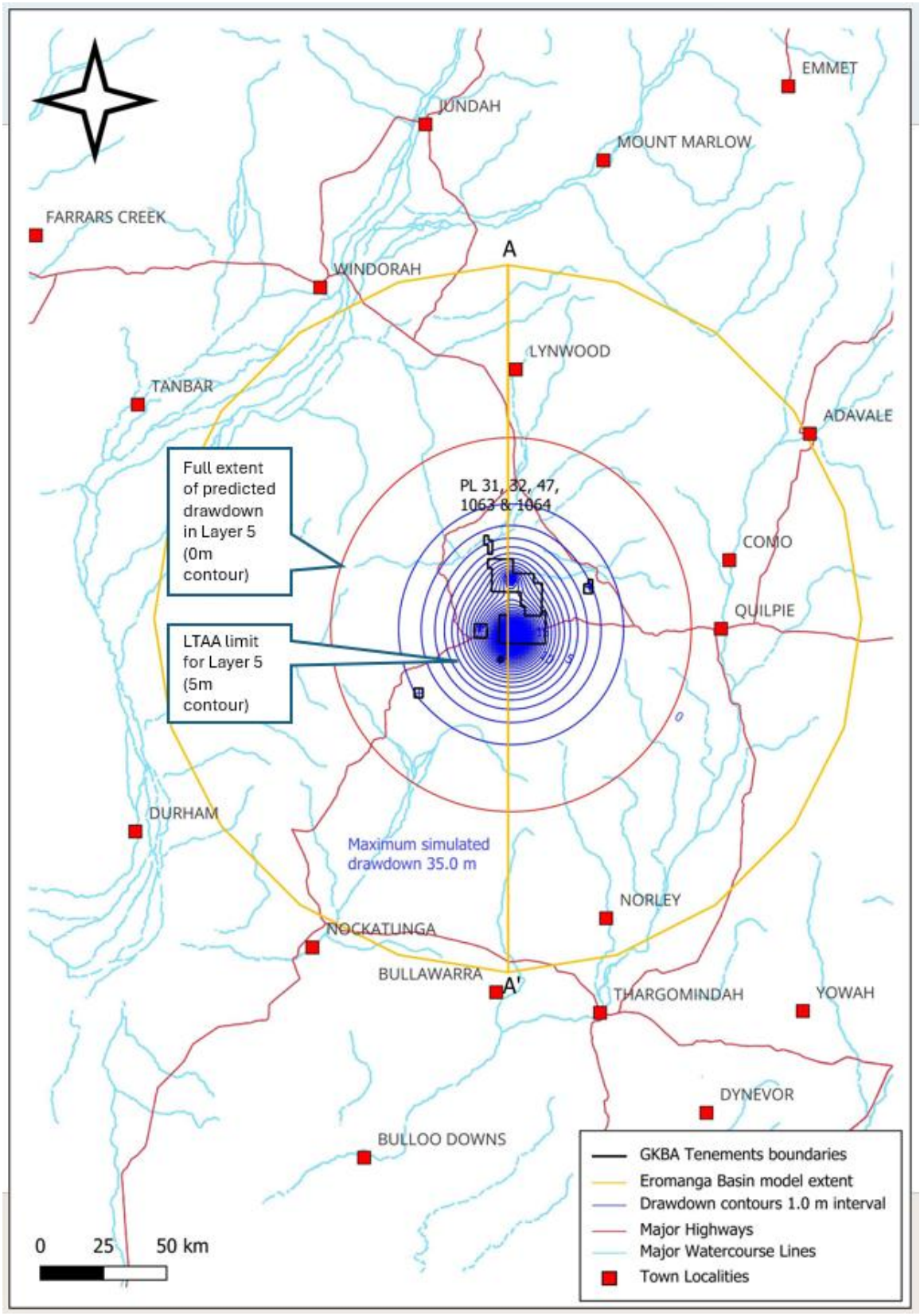


Figure 18: Calculated drawdown in Layer5 for 2026-2035. Contours in 1m intervals

2. **A description of the methods used to produce these maps (section 376(c) of the Water Act)**

Model development and testing

Golder Associates (now known as WSP) has developed a model for water extraction targeting the formations of the Eromanga oil fields (Beach Energy 2014). WSP has re-run the analytical model with updated production data provided by Bridgeport Energy.

The method used to develop the IAA and LTAA maps and model is described below.

The model has been developed to provide indicative potential drawdown levels of the targeted aquifers, using all relevant data. Data includes quantitative details on geological mapping and formation details, tenure locations, groundwater levels, and historical and predicted water and oil production.

Details of the model, including its calibration, assumptions, and other relevant information, are discussed below.

AnAqSIM Software

The groundwater impact assessment was carried out using an analytical software program called AnAqSim (version 2011-2). AnAqSim is analytical software capable of overlaying multiple analytical calculations (using flow equation calculations) to produce a composite solution consisting of equations for head and discharge as functions of location and time. Although the analytical equations are expressed in two dimensions, three-dimensional flow can be simulated using simple planar multiple levels. In multi-level calculations, the resistance to vertical flow is considered through the vertical leakage between levels.

AnAqSim is a numerical modelling software well-suited for use in a UWIR system and for determining an IAA and LTAA.

The conceptual model was simplified to represent the vertical distribution of strata (‘layers’) and represent levels, but not basin structure or geometry.

The software allows up to five planar layers with their initial groundwater levels. To assess each basin's potential impact, the analysis was split into two separate calculation exercises.

1) Eromanga Basin: including tertiary and quaternary sediments overlying Cretaceous to early Jurassic strata, namely the GAB aquifers: and

2) Cooper Basin: containing the deeply confined Permian and Triassic strata, namely the older pre-GAB aquifers.

The calculations are shown in Table 13 and Table 14 respectively.

The division into two separate domains allowed for the allocation of five layers in the Eromanga Basin, functioning as a distinct hydraulic system, excluding the underlying Cooper Basin strata. It was expected that the effects of extraction in the Cooper Basin would not extend beyond the top of the Tinchoo Formation (i.e., the top of the Cooper Basin) due to the thickness of the low-permeability layers and the small extraction rate (one well).

If the analysis at the top of the Cooper Basin predicted no impact, it was considered reasonable to exclude this from the calculations in the overlying Eromanga Basin.

Assumptions and Limitations

The following assumptions and limitations are inherent to the analytical modelling process:

Calculations for both basins were conducted under steady state conditions (i.e., not time-varying) to evaluate the worst-case scenario for groundwater impact estimation. This is considered a worst-case scenario because there is no fluctuating or limiting extraction from the strata. A steady state solution essentially determines the response to continuous extraction until no further (or greater) drawdown occurs due to extraction. For this reason, two scenarios were examined in the calculations, as this approach is most appropriate for a steady state analysis of this nature.

- Immediate Affected Area: was considered to be the average historical annual rate of water plus oil production, and

- Long-term Affected Area: is defined as the immediate Affected Area rates combined with the average predicted annual water and oil production for the next three years.

Other extractors, such as non-Bridgeport wells in the Tintaburra field, were excluded from the calculation as they lie outside the scope of this study, and no data is available.

Layering in the analysis was maximised when replicating the strata, either to represent all the units in the strata or until the maximum allowed number of layers was reached in the software. Combining adjacent strata in a model is referred to as equivalent porous medium (EPM) modelling. EPM modelling assigns a single value for each hydraulic parameter of the grouped adjacent strata, ensuring that the overall behaviour is accurately reflected in the analysis. This was considered a reasonable simplification given the availability of hydraulic parameter data, especially at increasing depths in both areas.

The top layer for each model was designated as a dummy layer to establish the observed heads. This layer was then duplicated below (layer 2 in each model) to accurately represent the true aquifer conditions. Where no groundwater level data were available in the vicinity of the site, inferred values were used, which is typical for this kind of deeply confined basin.

The essential combination of layers—considering they are, in reality, interbedded high and low permeability strata—into a single equivalent porous medium layer results in a worst-case scenario, as the overall hydraulic connectivity of the model layer may not account for some of the lower permeability aquitards present in the basin.

AnAqSim provides the calculated drawdown for the top of each layer (no results are available for each subdivision). The model calculates the drawdown as water head pressure. Where the formations are artesian, the calculated drawdown corresponds to a water pressure decline (unless the extent of the pressure decline is such that the bore reaches sub-artesian conditions). In non-artesian formations (as in the upper formations targeted for water supply

by the community), the drawdown corresponds to a decrease of water level. The model is therefore designed to provide indicative worst-case scenario results.

Methodology for the measurement and calculation of oil and water extraction volumes

Measurement

Oil and water extracted from each formation are measured through a total fluid test. The well is tested over a specified period, with all formation fluids collected in a dedicated test tank. The formation fluid is allowed to settle to aid the separation process. A water-detection chemical (paste) is used to identify the water–oil contact point, and the volumes of water and oil are determined from the tank dipstick and the measured total volume in accordance with API procedures. The water–oil flow rates are then adjusted to a 24-hour test rate, which is subsequently used daily to determine the amount of oil and water extracted from each formation. These well tests are repeated to verify results and are periodically retested to update the extraction rates. They can also be adjusted to account for any potential mechanical downtime.

The above method is used at Kenmore. Bodalla employs a combination of the above methods and uses a pressure vessel to separate oil and water, with rates being recorded via a water meter. The oil rate is determined by the amount recovered in the production tank during the test period.

The estimated quantities of water and oil for each well in each formation are based on the latest oil-water rates, projected over the next three years for various production plans per well. The oil rate is expected to decline naturally over this period, while the water rate will increase slightly to offset this decline. Since the formations are naturally recharged, the formation pressure is unlikely to decrease significantly, keeping the formation fluid extraction rate relatively stable.

Calculation for Model

Bridgeport Energy provided WSP with monthly oil and water production volumes in megalitres (ML), broken down by tenement and well. This data covers all wells that have

extracted either groundwater or oil at any time during the past three years or within the previous UWIR period.

A monthly average for each well for oil, water, and combined oil + water was calculated over the well's operation period and converted to cubic metres per month. These values were then divided by 30 days to determine the rate used by the model (m^3/day) (see Average Extraction Rates for Modelling).

In the model, each well that has currently and historically extracted water and/or oil has, therefore, been modelled with its own individual extraction rate. The value used in the modelling is the average rate for oil plus water, as the removal of any liquid—specifically oil at the beginning of a well's production life—may cause depressurisation of the aquifer and potential leakage of groundwater from overlying aquifers used by the community.

Bridgeport Energy supplied future production rates for each well, which are planned to continue over the next three years.

This approach enabled the worst-case scenario to be modelled for both historic and future projected production because it does not consider wells that may have only been in production for a few years or intermittently, i.e., only marginally lowering the piezometric surface during their short operation. Instead, it assumes a constant rate of extraction and calculates the maximum drawdown that would occur at that pumping rate over an infinite period. An example of this is Kenmore 4, which was only in production during the 1980s, allowing the piezometric surface to re-establish equilibrium.

Assumptions of the calibration process for the sensitivity analysis

Calibration was used to refine the hydraulic parameters in the model, especially where there was a scarcity of observed results from field or laboratory testing (e.g., the cap rock).

The section “Observed groundwater levels and calibration targets” discusses the process of fitting modelled groundwater head to a representative groundwater head in each model layer. Calibration was carried out by adjusting hydraulic parameters and groundwater flux rates under unpumped conditions to produce a calibrated model.

All parameters were varied within probable ranges, based on available site investigation data, published values, and reasonable representative figures for each type of strata, as outlined in Section “Rationale for selection of hydraulic parameters”.

Throughout calibration, statistical analysis was carried out on the results to evaluate the “goodness of fit” of the model outputs compared to the calibration targets. This process anecdotally informed the subsequent sensitivity analysis, as changes to the vertical hydraulic conductivity had the greatest impact on the distribution of head pressures throughout the model.

Assumptions related to sensitivity analysis, derived from the calibration process, included demonstrating that the grouping of strata was reasonable, as discussed in Section “Justification for the layering in AnAqSim”. This was supported by achieving a good fit between modelled and observed groundwater head distribution using appropriate hydraulic parameter values for each layer. Grouping similar hydro stratigraphical units in this way is a common technique to simplify the actual strata where similar hydraulic parameters are expected within each group.

It is important to verify the accuracy of this assumption during calibration, for example, whether the single layer in the models used to represent the cap rock truly reflects multiple strata layers in the Basins. Without achieving reasonable calibration, this assumption might have been considered invalid, and the layering in the model may have needed revision. However, since a satisfactory vertical head distribution was achieved with reasonable parameters, this was not deemed necessary.

Changing the vertical hydraulic conductivity of the cap rock by an order of magnitude during sensitivity analysis was deemed reasonable as an upper limit of the possible values, partly based on calibration modelling.

Since the model was run in steady state, there was no need to examine the storage coefficient of the strata.

Groundwater impact calculation input parameters

This section covers the input parameters needed for groundwater impact calculation.

The simplified geological layering used in the calculation for the Eromanga Basin and Cooper Basin is shown in Table 12, Table 13, and Table 14, respectively. This simplified layering grouped similar adjacent strata where appropriate, to reduce the observed stratigraphy to no more than five layers.

Rationale for selection of hydraulic parameters

The following section outlines how the hydraulic parameters in Table 12, Table 13, and Table 14 were inferred or derived from supporting information, along with a discussion of the assumptions related to these parameters.

Thickness of the aquifer

The thickness of the aquifer was determined using details provided on 'Well formation Well Cards' supplied by Beach Energy in 2014. These well cards included the top and bottom elevations for each formation encountered in all relevant tenements and drilled wells. Geological cross sections were created based on data from Beach Energy well cards. Information from the Department for Environment and Heritage Protection (DEHP) indicated that the elevations from both sources closely matched, giving high confidence. For modelling purposes, the average elevation of the top and base of each formation was used.

Table 12: Hydraulic Parameters

Basin	Formation	Hydraulic Classification	Hydraulic Conductivity (m/d)		Porosity (fraction)
			Min.	Max.	
Eromanga Basin	Quaternary and Tertiary Alluvium	Aquifer	-	-	-
	Winton Formation	Major Aquifer	-	-	-
	Mackunda Formation Allaru Mudstone Toolebuc Formation Wallumbilla Formation	Aquifer with confining bed	-	-	-
	Cana-Owie Formation	Aquifer and Aquitard (part)	-	-	-
	Hooray Sandstone	Major Aquifer	$4.3x10^{-4}$	1.96[4]	0.19[3]
	Westbourne Formation Adori Sandstone and Birkhead Formation	Confining bed/Reservoir Aquifer Water bearing/Reservoir	$8.0x10^{-7}$ [2] $2.8x10^{-5}$[3]	$2.5x10^{-4}$ [2] $2.3x10^{1}$[3]	0.2 [2] 0.05 to 0.23[3]
	Hutton Sandstone	Major Aquifer/ Reservoir	$3.5x10^{-1}$ $5.7x10^{-5}$[3]	$9.8x10^{-3}$ $2.3x10^{1}$[3]	[3] 0.01 to 0.24
	Poolowanna Formation	Major Aquifer/Reservoir	$1x10^{-7}$ [2] $2.8x10^{-4}$[3]	$3.7x10^{-3}$ [2] 1.59[3]	0.18 [2] 0.11 to 0.19[3]
Cooper Basin	Tinchoo / Arrabury Formations	Primarily confining beds	-	-	-
	Toolachee Formation	Major Aquifer/Reservoir	$2.0x10^{-3}$ [1]	$4.3x10^{-3}$	0.15 0.1 to 0.15[3]

Sources include (1) Government of South Australia Primary Industries and Resources, SA. Petroleum and Geothermal in South Australia – Cooper Basin, 2009. (2) Alexander, E.M, Reservoirs and Seals of the Eromanga Basin (undated) (3) historical information provided by Beach and (4) DEHP pumping data

Table 13: Eromanga Basin Analytical Calculation Parameters

Layer	Top Elevation (mAHD)	Bottom Elevation (mAHD)	Average Head (mAHD)	Horizontal Hydraulic Conductivity (m/d)	Vertical Hydraulic Conductivity (m/d)	Average Abstraction per Well (m^3/d)	Number of Beach Energy Wells	Hydraulic Properties
TOP OF MODEL – ground level								
1: UPPER: Tertiary and Quaternary strata, Winton Formation and Mackunda Formation (UNCONFINED)	160 (Ground level) [1&2]	-120 [1&2]	154 [1&2]	$5.0x10^{-2}$ [3]	$5.0x10^{-4}$ [3]	0 [2]	0	Aquifer
2: LOWER: Tertiary and Quaternary strata, Winton Formation and Mackunda Formation (CONFINED)	-120 [1&2]	-400 [1&2]	154 [1&2]	$5.0x10^{-2}$ [3]	$5.0x10^{-4}$ [3]	0 [2]	0	Aquifer
3: Allaru, Toolebuc and Wallumbilla Formations	-400 [1&2]	-870 [1&2]	162 [1]	$1.0x10^{-2}$ [3]	$1.0x10^{-4}$ [3]	0 [2]	0	Aquitard
4: Cadna-owie Formation and Hooray Sandstone	-870 [1&2]	-1080 [1&2]	255 [1]	$1.0x10^{-3}$ [4]	$1.0x10^{-5}$ [4]	0 [2]	0	Aquifer and Aquitard (part)
5: Westbourne, Adori and Birkhead Formations and Hutton Sandstone and Poolowanna Formation	-1080 [1&2]	-1390 [1&2]	480 [2]	$1.2 x10^{-1}$ [2]	$1.0x10^{-4}$ [4]	126.8 (See Appendix F for individual well abstraction rates) [2] *	65	Aquifer
BASE OF MODEL – major unconformity at base of Eromanga Basin								

Table 14: Cooper Basin Analytical Calculation Parameters

Layer	Top Elevation (mAHD)	Bottom Elevation (mAHD)	Average Head (mAHD)	Horizontal Hydraulic Conductivity (m/d)	Vertical Hydraulic Conductivity (m/d)	Average Abstraction per well (m^3/d)	Number of Beach Energy wells	Hydraulic Properties
TOP OF MODEL – major unconformity at top of Cooper Basin								
1: UPPER: Tinchoo and Arrabury Formations (UNCONFINED)	-1470 [1&2]	-1500 [1&2]	315 [3]	$1.0x10^{-4}$ [3]	$1.0x10^{-5}$ [3]	0 [2]	0	Aquitard
2: LOWER Tinchoo and Arrabury Formations	-1500 [1&2]	-1535 [1&2]	315 [3]	$1.0x10^{-4}$ [3]	$1.0x10^{-5}$ [3]	0 [2]	0	Aquitard
3: Toolachee Formation	-1535 [1&2]^	-1560 [1&2]	622 [2]	$3.9x10^{-3}$ [4]	$3.9x10^{-4}$ [4]	1.55 (See Appendix F for individual well abstraction rates) [2] *	1	Aquifer
BASE OF MODEL – Daralingie Formation aquitard / confining layer								

Sources include (1) DEHP database (2) Beach Reports/Beach DST/ Beach groundwater monitoring and extraction data (3) inferred value (4) literature value *total extraction from all strata was grouped into a single model layer in both basins (Eromanga Basin extraction was from Layer 5 and Cooper Basin extraction was from Layer 3) Section "Justification for the layering in AnAqSim" and Section "Assigning extraction in the calculation" discussed the justification for the selected layering.

^The bottom elevation of the model is based on the depth of the extraction well and not the base of the Toolachee formation. Model assumes horizontal flow only in the reservoir.

Average Head

The average head for all formations in the Eromanga basin, up to and including the Hooray Sandstone, was primarily calculated from historical data in the DEHP database. This historical data is considered applicable as the purpose of this UWIR assessment is to evaluate the total impacts on groundwater from Bridgeport's current extraction operations, and therefore provides a baseline for the assessment.

Sufficient data was available for the head in Layer 1 and Layer 2, with 237 water level measurements collected across the study area (Golder Associates, 2014, Appendix D, Groundwater Elevation Data – Shallow Units), mainly from the DEHP database. Of these, 4 measurements were taken from Beach Energy's gauging of surrounding bores in April 2011. These water level measurements align well with those supplied by DEHP for this layer. Although coverage is limited for Layer 3 (10 data points) and Layer 4 (4 data points), the available data for each layer generally falls within the same range and supports the expected conceptual model, which suggests that with increasing depth, groundwater elevation rises, due to increased overburden pressure and the confined nature of the aquifers/reservoirs.

No data was available in the DEHP database for Layer 5 (the target formations of Beach Energy's operations), likely due to the depth of the formations. Head data for this layer was, however, available from DSTs undertaken by Beach Energy (or previous operators) during drilling and installation of the wells (Appendix D, DST and Groundwater Elevation Data). A total of 87 measurements were used to calculate the average head of Layer 5. Once again, the measurements obtained from the DSTs are generally within the same range and align well with the anticipated conceptual model, giving a high degree of confidence in the measurements.

Limited data was available within the study area from both the DEHP database and Beach Energy's records on groundwater levels in the deeper Cooper Basin. No data was available for Layer 1 and Layer 2. The average head was therefore inferred, and as a result, there is a high level of uncertainty associated with these numbers.

Only two DST results were available for the Toolachee Formation (Layer 3), with a 206 m AHD difference between them. Consequently, there is a high level of uncertainty associated with these numbers.

Horizontal hydraulic conductivity

No hydraulic conductivity data was available through literature review, the DEHP database or Beach Energy's data for Layer 1 and Layer 2 of the Eromanga Basin model. The values were therefore inferred based on the lithology. A value of 5 x 10^{-2} m/day was used for Layer 1 and Layer 2, composed primarily of sandstone, siltstone, and shale, which is typical of a mid-range value for a sandstone (Freeze and Cherry, 1979). There is uncertainty associated with this value due to the lack of site-specific data.

Additionally, no data was available for Layer 3. A value of 1 x 10^{-2} m/day was estimated for the Allaru Mudstone, Toolebuc Formation, and Wallumbilla Formation, which comprise predominantly mudstones, siltstones, and fine-grained sandstones. This value is typical of a moderate hydraulic conductivity for a sandstone. It was inferred because the sandstone units within Layer 3 are believed to be where most groundwater flow would occur. There is uncertainty with this estimate due to the absence of site-specific data.

No data from Beach Energy was available for specific hydraulic conductivity results in Layer 4. However, a range of literature values along with pumping test data from DEHP was available for the Hooray Sandstone and is presented in Table 12. These values range from 4.3 x 10^{-4} to 1.96 m/day. A value at the lower end of the literature range was selected to account for the less permeable Cadna-owie Formation within the layer (1 x 10^{-3} m/day). These values carry less uncertainty compared to those used for Layer 1 to Layer 3.

Both literature and site-specific values for units within Layer 5 were available. The literature values range from 8 x 10^{-7} to 2.5 x 10^{-4} m/day but do not include values for the Poolowanna Formation. The site-specific values, derived from intrinsic permeability data, flow test data, tenement-specific reports, and measurements on core plugs (all supplied by Beach Energy), were available for all units in Layer 5. These values ranged from 2.8 x 10^{-5} to 22.7 m/day

(Golder Associates, 2014, Appendix D). A geometric mean based on the site-specific data for all five layers was used for modelling purposes (0.12 m/day). This figure falls within the higher range of permeabilities typical for sandstone units, which is expected since Layer 5 contains the sandstone oil reservoirs targeted by Bridgeport. Because all geological units are based on site-specific data, there is increased certainty regarding the hydraulic conductivity values assigned to this layer.

No literature or site-specific values for hydraulic conductivity were available for the Tinchoo and Arrabury Formations in the Cooper Basin. Limited drilling has been undertaken by Beach Energy or other operators in the basin, with only one production well currently and historically installed. Values for the Tinchoo and Arrabury Formations (Layer 1 and Layer 2) have therefore been inferred. There is uncertainty associated with this value due to the lack of site-specific data.

No site-specific values are available for the Toolachee Formation. Literature values are provided in Table 12 and range from 2 x 10^{-3} to 4.3 x 10^{-3} m/day. A mid-range value of these literature figures has been used (3.9 x 10^{-3} m/day). This value is considered appropriate in the absence of site-specific data and falls within the mid-range of hydraulic conductivities for a sandstone unit.

Vertical hydraulic conductivity

In the absence of published site investigation values, the vertical hydraulic conductivity of the units was typically assumed to be 1% of the horizontal hydraulic conductivity. Due to the interbedded nature of the sandstone bodies in the study area and the presence of vertical barriers to hydrocarbon migration—and therefore groundwater—in the form of laterally extensive siltstone, shale, and mudstone units, as previously described, it is regarded that vertical groundwater flow is negligible. A value of 1% is therefore considered conservative. Although no site-specific data is available, the presence of hydrocarbon seals inherently indicates resistance to vertical groundwater movement.

Additional anisotropy of 0.1% was added for Layer 5 (Westbourne, Adori, Birkhead Formations, Hutton Sandstone, and Poolowanna Formation). This was seen as representative of the probable anisotropy of this layer.

Cooper Basin anisotropy was assumed to be 10% throughout the model. This value was considered conservative for the stratum at this depth and was adopted in light of the limited hydraulic data available in this basin.

Average extraction per well

The average extraction rate per well was determined using historical volumes recorded by previous operators, including Beach Energy and currently Bridgeport Energy, for individual wells on a monthly basis, alongside projected monthly volumes for the next three years of operation. A detailed methodology explaining how the volumes were calculated is provided above. Since extraction volumes are reported per well, per month, per geological unit over the well's lifespan, there is minimal uncertainty associated with the extraction rates used in the model.

More uncertainty is associated with the three-year predicted future rates, as the volumes are merely forecasts based on production scenarios that may differ.

Number of extraction wells

The number of extraction wells was based on the existing and historic wells that have been extracting a mix of water and oil since operations began, as supplied by both Beach Energy and Bridgeport Energy.

The role of Departmental (registered) monitoring Bores

As discussed in the previous section, information obtained from bores in the DEHP database, along with data supplied by Beach Energy (and subsequently Bridgeport Energy), was used to produce geological cross sections across the study area. Elevations of the tops of each unit were derived from both the DEHP data and well data provided by Beach Energy. This allowed

the validation of elevations obtained from Beach Energy well card information to determine the aquifer thicknesses.

Data obtained from DEHP was used to calculate average head data, especially for the shallower units in Layer 1, Layer 2, and Layer 3 in the Eromanga Basin model (as previously discussed in Section "Rationale for selection of hydraulic parameters" above), due to the lack of data from Beach Energy on the shallower units. However, no DEHP data was available for the deeper target formations, so data from Beach Energy was used.

Pumping test data (transmissivity values) were available for limited geological units from DEHP. These values were predominantly for the Hooray Sandstone, but also included the Etonvale Formation and the Adavale Group Equivalent, the latter two being located in the Adavale Basin, below the Cooper Basin, and therefore not relevant to this assessment. The values obtained from DEHP pumping test data for the Hooray Sandstone were used in Table 12.

The role of departmental bores in model calibration and review is discussed in Section "Sensitivity Analysis", but primarily involves the use of observed groundwater SWLs obtained for the shallower units.

Extent of calculation and boundary conditions

The extent of the Cooper Basin and Bridgeport Energy tenements was used in conjunction with the distribution of the relevant extraction wells to form the extent of the calculation domain. This included a buffer to ensure the boundary conditions did not influence the results.

Boundary conditions were set as lines of zero flux (i.e., no flow boundaries) and located at a sufficient distance from the area of interest to be far-field boundaries.

The upper and lower extents of the model were assigned as head-dependent flux and flux conditions, respectively. This permitted the increasing groundwater level with depth conditions by creating the head elevation at the top of the model and a small flux at the base.

In the Eromanga Basin, the value assigned to the head-dependent flux was 154 m AHD at the top of the model (to represent the approximated observed water table in the upper layer). The flux at the base of the model was calibrated at $2.5x10^{-5}$ m/d (equivalent to 9.1 mm/year recharge to the base of the model). This was necessary to simulate the observed or likely increasing hydraulic pressure with depth in both basins.

For the Cooper Basin, the upper model boundary had a head-dependent flux set at 315 m AHD, to replicate inferred heads, and a flux at the base of $2x10^{-5}$ m/d (equivalent to 7.3 mm/year recharge to the base of the model). The value for the flux at the base of the model was achieved through the calibration process that matched modelled groundwater levels to the approximated observed and inferred groundwater levels.

The extent of the Eromanga Basin calculation can be seen in Beach (2014), and the extent of the Cooper Basin calculation domain can be seen in Beach (2014).

No recharge was applied to any model due to the use of the head dependant flux on the upper surface of the model.

Water Production volumes used for the calculation

The water extraction rates for the model were defined as follows:

- The average historical observed water (plus oil) extraction rate represents the Immediate Effected Area; and
- The average historical observed water (plus oil) extraction rates, along with the average predicted annual rate for the next three years, were used to represent the Long-term Affected Area.

A summary of the extraction rates used in the original modelling is as follows:

Eromanga Basin

- For the Eromanga Basin immediately affected area, an average extraction rate (equivalent to the observed historical average extraction) of 120.2 m^3/day was adopted for the wells (with a range of 1.2 m^3/d to 594.2 m^3/d);

- For the Eromanga Basin long term affected area an extraction rate (equivalent to the long-term average extraction) of 124.9 m^3/day was adopted over the 42 wells (with a range of 1.0 m^3/d to 673.3 m^3/d).
- Although the maximum and average extraction are slightly higher in the long-term affected area, the total extraction is less because there are fewer wells.

Cooper Basin

- For the Cooper Basin immediately affected area an extraction rate (equivalent to the observed historical average extraction) of 1.2 m^3/day was adopted for a single well used in the model;
- For the Cooper Basin predictive model, the long-term affected area and extraction rate (equivalent to the long-term average extraction) of 1.6 m^3/day was adopted for the single well used in the model.
- The values for historical and predicted extraction were similar for both basins.

Justification for the layering in AnAqSim

The Eromanga Basin was grouped into five EPM layers according to the hydraulic properties of the strata, combining adjacent strata with broadly similar hydraulic properties as well as combining the observed target stratum for oil and gas extraction. Combining target extraction layers was necessary to maintain numerical stability in the analysis.

Layer 1: The shallowest major aquifers in the study area (i.e., those aquifers most heavily developed for water supply, including the unconfined shallow Quaternary, Tertiary, Winton and Mackunda Formation aquifers) were grouped as a single hydro stratigraphic unit, with the entire unit then split into an upper and lower layer in the model (Layer 1 comprising the upper layer). No extraction was assigned to this upper layer in the model, as this upper portion contained the head-dependent flux boundary.

Layer 2: consisted of the lower half of the Quaternary, Tertiary and Winton and Mackunda Formation. These have been split into the upper two layers in order to investigate the potential impact of the deeper oil and gas extraction.

Layer 3: consisted of the underlying Allaru, Toolebuc and Wallumbilla Formations. These formations are generally considered to collectively act as an aquitard with very little groundwater extraction and no oil or gas extraction in the Eromanga Basin.

Layer 4: combined the Cadna-owie Formation and Hooray Sandstone. Oil and gas wells are often screened in both these formations, and they exhibit similar geological characteristics, both being generally thinly interbedded sandstone and siltstone with occasional coarse grained, brecciaed or pebble beds.

Layer 5: consisted of the Westbourne, Adori and Birkhead Formation aquifers and aquitards as well as the underlying Hutton Sandstone and Poolowanna Formation. Oil and gas extraction wells are often screened over a combination of these strata generally comprising interbedded siltstone, shale, fine sandstone and occasional coal seams. The Hutton Sandstone and Poolowanna Formation were considered to be more permeable and accounted for the highest extraction rate by Beach Energy (and subsequently Bridgeport) operations by an order of magnitude. The Hutton Sandstone and Poolowanna Formation are therefore the main targets for oil extraction.

The Base of the model was formed by the base of the Eromanga Basin, which is marked by a major unconformity. Underlying the Eromanga Basin are the aquitards of the Tinchoo and Arrabury Formations. It was considered suitable to separate the Cooper Basin into a separate model due to the hydraulic separation of the two basins as well as the low average extraction from the underlying Cooper Basin.

The Cooper Basin was grouped into three layers, with the upper layer being split into two layers with identical properties. This was to permit the response of pumping to be observed in the Tinchoo and Arrabury Formations. The layers were configured as follows:

Layer 1: the upper portion of the Tinchoo and Arrabury Formations comprise Layer 1. This had the head dependant flux boundary condition applied to the top in order to replicate the inferred groundwater levels. Layer 1 was assigned identical hydraulic properties to the underlying Layer 2 Tinchoo and Arrabury Formations.

Layer 2: represented the lower half of the Tinchoo and Arrabury Formation aquitards. No oil or gas extraction was identified to target these strata. These are generally interbedded siltstone and fine sandstone with low permeabilities.

Layer 3: represented the Toolachee Formation at the base of the Cooper Basin. This was not utilised for water supply and only a single Beach Energy (and now Bridgeport) extraction well extracts from these strata.

Note that although AnAqSim allows the division of a layer in two sections, the calculated results are provided for the full layer (no results available for each subdivision).

Assigning extraction in the calculation

Extraction was assigned to a single layer in each basin model. This was considered a reasonable simplification to represent the behaviour, given the EPM model approach adopted in this analysis. Extraction well details were interrogated to give a single extraction target in each basin. In the Eromanga Basin model, the Westbourne, Adori and Birkhead Formations, Hutton Sandstone and Poolowanna Formation were grouped together as the bottom layer of the model and therefore also combined the extraction from these strata into the single layer.

In the Cooper Basin, since the single extraction was deemed to be at a low rate, it was considered sufficient to examine this in a separate model and assess the potential impact at the top of the basin.

To simulate an immediately impacted area and a long term impacted area in steady state analysis, average historical and average predicted extraction rates were analysed respectively, using observed and predicted oil and water extraction data provided by Beach Energy (and subsequently Bridgeport) (refer to Section “Water production volumes for the calculations”).

The grouping of the strata in the software (Table 13) and treating adjacent grouped strata as an EPM removed the necessity to establish the target formation beyond the defined layers within the software. This is because extraction can only be assigned to defined software layers and not specific target depths or strata within an individual layer. This allowed a much coarser definition of assigning the extraction target formation. WSP considered that this was an acceptable assumption as the software does not allow for further refinement; the EPM approach already provided a bulk representative behaviour of the adjacent grouped strata. As the focus of impact is the strata generally overlying the extraction targets, this was deemed to be a suitable methodology.

Observed groundwater levels and calibration targets

Groundwater levels in the shallow aquifers and those that are utilised for groundwater extraction or monitored by DEHP were generally obtained from the DEHP groundwater database.

Hydrostatic pressure data were available for strata targeted for oil extraction. This was obtained from Beach Energy, with representative groundwater levels presented in Table 13 and Table 14, where available. The selected value for groundwater level is derived from numerous spatially distributed wells and from a range of elevations and depths across the basins (relevant to the layer). As the calculation required the layers to be horizontal and planar, the groundwater levels were also set at simplified representative levels.

Where no groundwater level data were available (Tinchoo and Arrabury in the Cooper Basin), it was necessary to use a representative value derived from likely groundwater pressure extrapolated from adjacent layers.

Calibration was performed on both calculations, using observed/inferred groundwater levels versus calculated groundwater levels under unpumped conditions. The bottom flux and hydraulic conductivity values were altered until a satisfactory fit was achieved. A plot of modelled versus observed groundwater level for the Eromanga Basin is given in Figure 19.

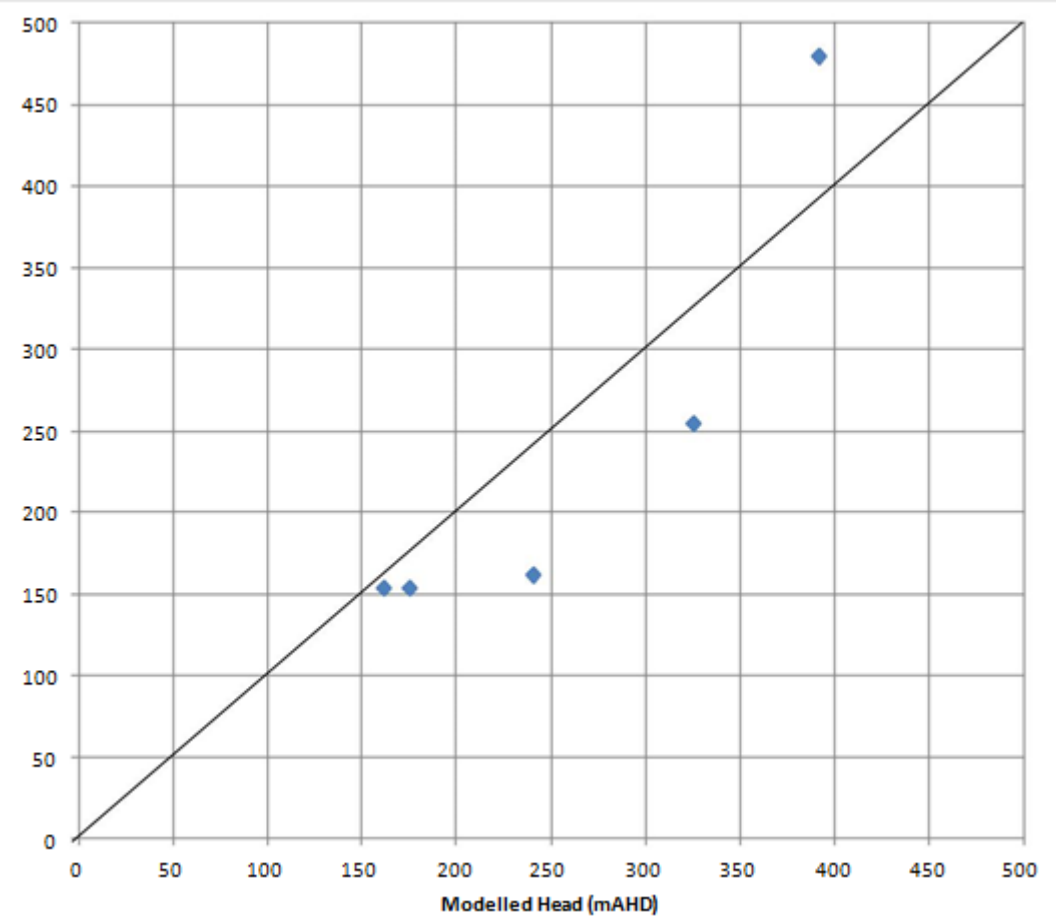


Figure 19: Eromanga Basin: Observed versus modelled groundwater level

A reasonable fit between modelled and observed groundwater head was achieved in using the parameters given in Table 15.

Table 15: Cooper Basin: Tabulated Observed versus modelled groundwater level

Calibration Target	Observed Groundwater Level (mAHD)	Modelled Groundwater Level (mAHD)	Residual (m)
OBH Layer 1	Not known	345	n/a
OBH Layer 2	Not known	410	n/a
OBH Layer 3	622	446	176

Both models were considered to contain representative head values sufficient for the purposes of the impact assessment, and able to demonstrate the potential impact of e. This is because the likely groundwater gradient was achieved and the resultant drawdown is the important factor in this analysis, this is not impacted by the initial pressure head.

Modelling extent is demonstrated in Figure 20.

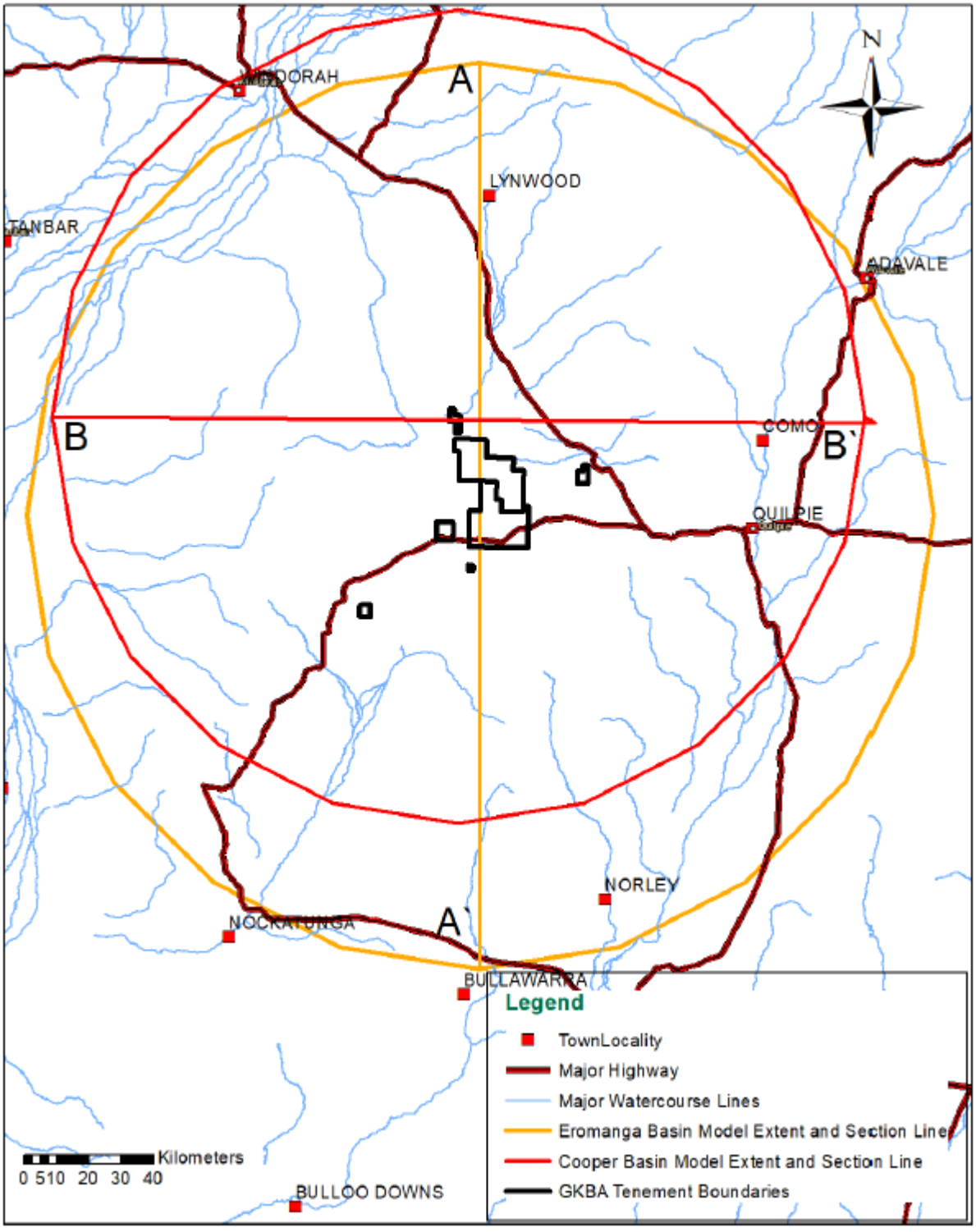


Figure 20: Extent of the Eromanga (orange) and Cooper (red) Basin models, including locations for the hydraulic head calculations.

Sensitivity Analysis

Calibration modelling and sensitivity analysis were conducted on both the Cooper Basin and Eromanga Basin models, following the MDBC (2000) guidelines and the more recent Australian Groundwater Modelling Guidelines (Barnett et al. 2012). Hydraulic parameter sensitivity analysis involved increasing the vertical hydraulic conductivity of the cap rock (the overlying aquitard layer above the extraction targets) by an order of magnitude. All other input parameters in the model remained unchanged from those in the impact scenarios described above.

Sensitivity analysis was carried out selectively for several reasons. The justification for choosing the cap rock and the vertical hydraulic conductivity as the main parameters for sensitivity analysis can be summarised for both models, as follows:

Calibration modelling anecdotally corroborated WSP's hydrogeological assessment that the key calibration parameter was the vertical hydraulic conductivity of the cap rock.

Horizontal hydraulic conductivity was not considered likely to significantly affect the results, as the main concern is the potential vertical propagation of groundwater depressurisation through the model layers that could impact features of interest (i.e. private bores, springs, and groundwater-dependent ecosystems. This is because the vertical distance between the target formations for oil extraction and the potentially affected features is quite large. The vertical hydraulic conductivity and the depth of the target formations are viewed as having a greater influence on the vertical propagation of hydraulic depressurisation than horizontal hydraulic conductivity.

Performing sensitivity analysis on the cap rock was deemed appropriate due to limited hydraulic data for these strata. This is likely because this layer is not a primary target for groundwater, oil, or gas in this part of the Eromanga Basin, as discussed in Section "Assumptions for calibration process for the sensitivity analysis". Hydraulic parameter values were obtained for most other strata within the model domain; therefore, the cap

rock was considered the least well constrained in terms of its hydraulic properties and should be assessed through sensitivity analysis.

The presence of oil in the Eromanga Oil Fields demonstrated that the cap rock was an effective aquitard, as without it, oil would have migrated towards the surface over geological time. It is this layer that was therefore the key driving force in the flow dynamics of the system, and it is this layer that should determine the rate and scale of the propagation of a depressurisation effect through the model. Increasing the hydraulic conductivity of model layers overlying the cap rock would not significantly influence the result, as the limiting factor in the propagation of potential impacts would still be the low permeability cap rock.

Altering the hydraulic parameters of the target formation (i.e., below the cap rock) was not considered beneficial for achieving greater precision in the model, as it would likely have effects. These effects included;

Increasing the hydraulic conductivity of the target formation should decrease the maximum depressurisation near the extraction wells while expanding the radius of influence of the depressurisation. Acting on the base of the low permeability cap rock, this would likely result in a reduced impact above the cap rock. This is because the magnitude of depressurisation would be lower, thereby reducing the potential for depressurisation to propagate through the cap rock. Since there are no features of interest close to the trigger level drawdown zone, this was considered not to be significant.

Decreasing the hydraulic conductivity of the target formation may result in unrealistically low hydraulic conductivity values such that the observed yield would not be obtained from the modelled wells. Reducing the hydraulic conductivity of the target formation was therefore considered unrealistic, as site observation of the yield of the wells, some of which have been extracting since 1984, constrained a lower limit for the target formations and any significant decrease through sensitivity analysis was considered unrealistic.

Hydraulic sensitivity analysis

An analysis of how changes in the vertical hydraulic conductivity of the cap rock affect groundwater impact estimates was conducted. To adopt a conservative approach in sensitivity testing, the vertical hydraulic conductivity was increased by an order of magnitude, as follows:

SA1: Hydraulic Parameter Sensitivity Analysis on the Cooper Basin: Layer 1 and Layer 2 (upper and lower portions of the Tinchoo and Arraburry Formation) vertical hydraulic conductivity increased to $1x10^{-4}$ m/d; and

SA2: Hydraulic Parameter Sensitivity Analysis on the Eromanga Basin: Layer 3 (the grouped layer consisting of the early to late Cretaceous Allura Mudstone, Toolebuc Formation and Wallumbilla Formation) vertical hydraulic conductivity increased to $1x10^{-3}$ m/d.

Sensitivity analysis steady state calibration

The sensitivity analysis models (SA1 and SA2) were calibrated in the same manner as the groundwater impact estimation scenario. Results from the final calibrated steady state calculations for all sensitivity scenarios are tabulated in Table 16.

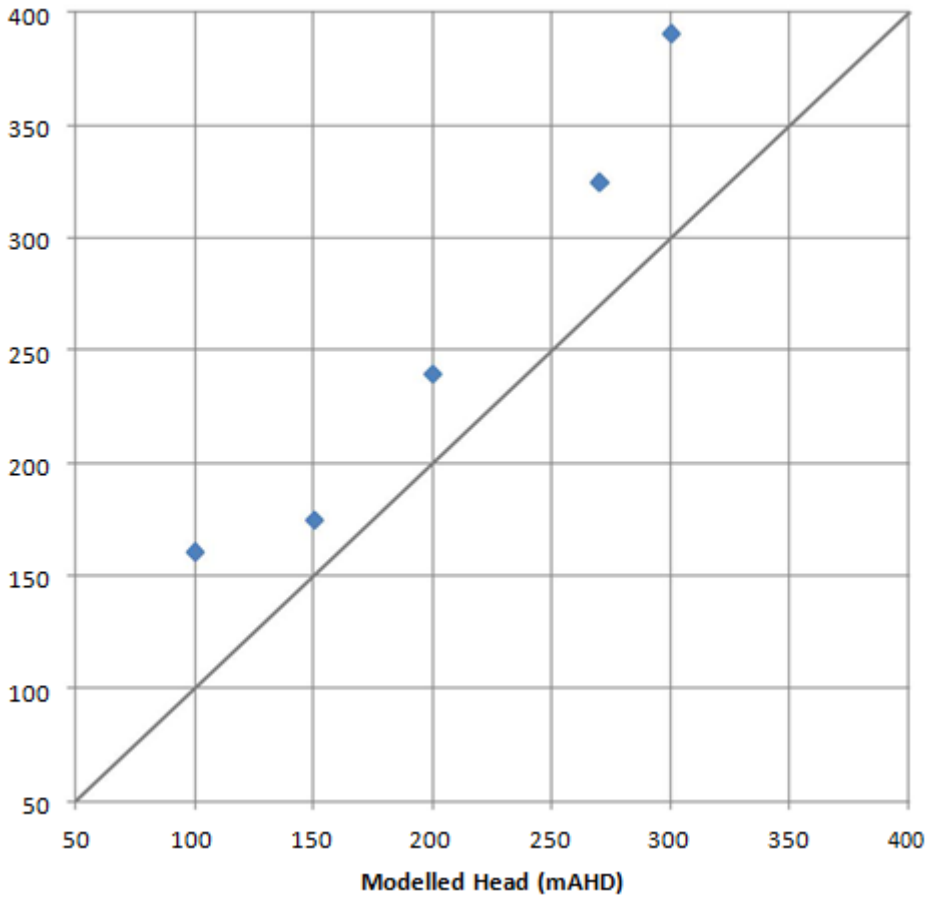


Figure 21: Eromanga Basin SA2: Observed versus modelled groundwater level

The Cooper Basin and Eromanga Basin calibration results are shown in tabulated form in Table 16.

Table 16: Sensitivity analysis calibration

Model Layer (and modelled groundwater level [mAHD])		Observed Groundwater Level (mAHD)		Sensitivity Analysis versus Observed Groundwater Level Residual (m)	
SA1 Cooper Basin	SA2 Eromanga Basin	Cooper Basin	Eromanga Basin	SA1 Cooper Basin	SA2 Eromanga Basin
Layer 1: 618	Layer 1: 161	Not known	100	n/a	61
Layer 2: 624	Layer 2: 175	Not known	150	n/a	25
Layer 3: 624	Layer 3: 240	622	200	2	40
-	Layer 4: 325	-	270		55
-	Layer 5: 391	-	300		91

These calibration results were deemed appropriate for conducting the sensitivity analysis modelling.

3. **Information about all water bores in the IAA (including the number of bores in the area, maps showing the location of these bores and the authorised use of each bore) (section 376(d) of the Water Act);**

Figure 22 shows the location of registered water bores relative to the full extent of predicted drawdown for each layer. There are forty-six (46) registered water bores within this area. Details for these bores are shown in Table 18. Of the 46 bores, 42 target the Winton formation with a maximum depth of 353m (ID14877) although most are much shallower. The remaining 4 bores are slightly deeper and target the Mackunda Formation. The Mackunda bores range from a depth of 331 to 441m.

All of the water bores identified are within Layers 1 and 2 and are predicted to have a maximum drawdown of 1.3m for both the 2026-2028 (IAA) period and 2026 to 2035 (LTAA) period. The predicted drawdown is below the trigger threshold of 2m for an unconsolidated aquifer. On this basis, there are no bores within the mapped IAA or LTAA for the shallow Winton and Mackunda Formation. The only bores affected by the predicted pressure decline due to extraction are those used specifically for extracting petroleum at depths related to the exercise of water rights.

As production rates decline, groundwater elevations in the targeted aquifers are expected to recover ‘slightly’ between 2028 (end of the short-term forecast) and 2035 (end of the long-term forecast). The extent of the LTAA is thus slightly smaller than the IAA.

To provide further context, the average depth for all water bores within 20km of the centre of each main oilfield and 8km from the centre of the satellite fields has been determined. Results are shown in Table 17. All of these bores are located within Layers 1 or 2 with maximum predicted drawdown of 1.3m.

Table 17: Average depth of bores within a 20km radius from the centre of each main field (8km from the centre of each Satellite Field) (excluding hydrocarbon targeting wells and Abandoned and Destroyed wells

Site	Average Bore Depth (m)
Kenmore	51.27 m
Bodalla	55.88 m
Blackstump	26.75 m
Coolum & Glenvale	275.63 m
Byrock	37.49 m
Bargie	265.00 m
Marcoola	284.68 m

It is highly unlikely that the extraction of water from Bridgeport's targeted formations (>1400m below ground) would affect shallower formations (100-400m deep) due to hydraulic barriers (aquitards) that limit water movement between these depths. Bridgeport also safeguards shallower aquifers and reservoirs by installing cemented steel casing in production wells and testing and validating the integrity of the boreholes with wireline logging assessments.

Moreover, water and oil production have declined significantly compared to historical rates, with less total volume produced from fewer wells in each field. This is reflected in the stable or declining maximum drawdown estimates predicted in all layers for the 2026 to 2035 period. The declining production trend will further reduce the likelihood of groundwater impacts.

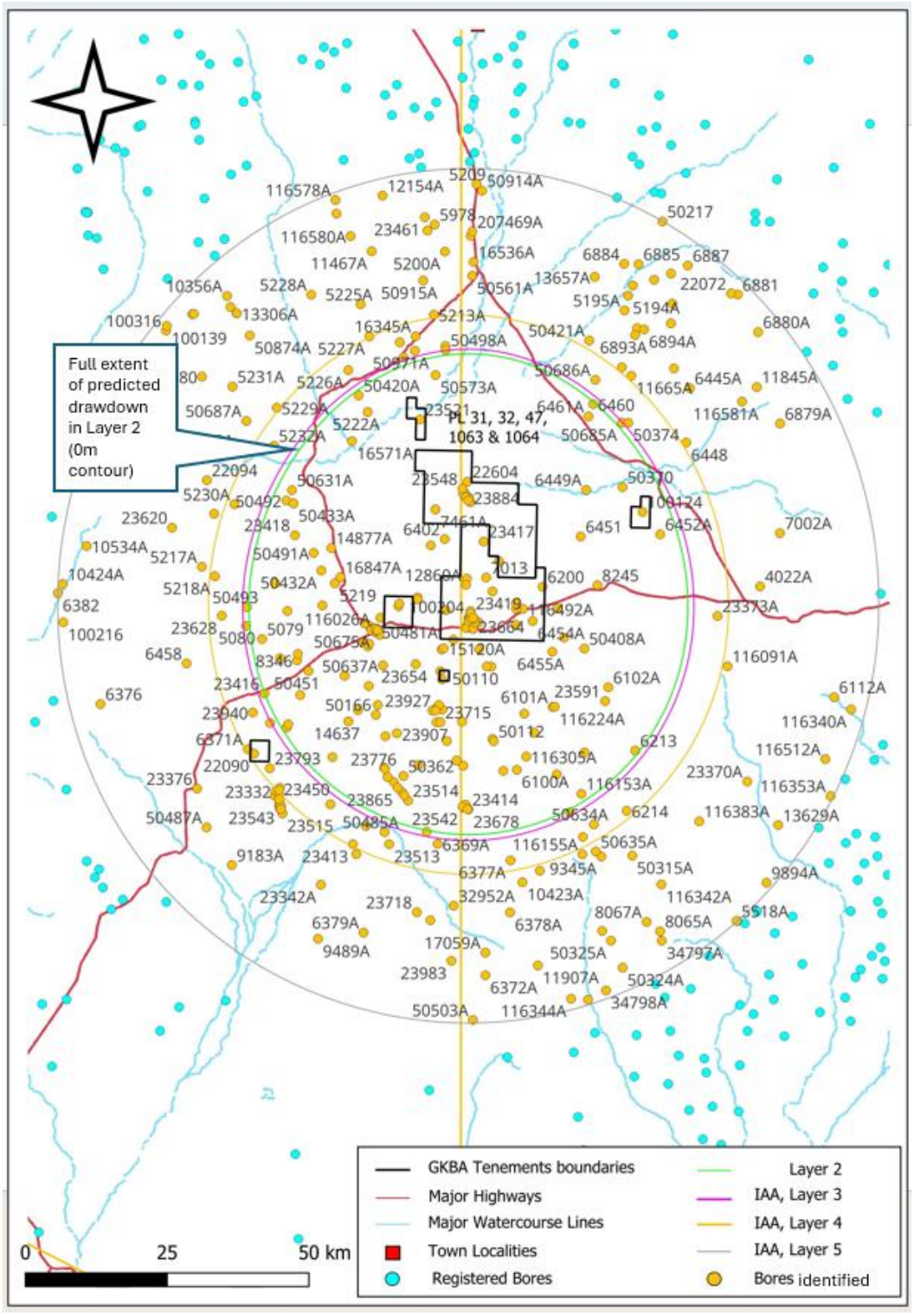


Figure 22: Location of registered water bores relative to the full extent of predicted drawdown for each layer.

Table 18: Details of all water bores within the full extent of predicted drawdown for each layer.

Bore ID	Location	Drilled Date	Formation	Depth	Name	Status	Likely Use
50420	-26.296524819 143.23258864	28/11/1982	Winton	40m	Rotary bore	Existing	Water Bore
50573	-26.261801231 143.367586603	11/11/1986	Winton	37.49m	Byrock bore	Existing	Water bore
5222	-26.322635815 143.24897748	01/01/1926	Winton	139m	Orange Creek	Existing	Water bore
6461	-26.322909882 143.638972219	18/07/1938	Winton	19.5m	Harms Well	Existing	Water bore
6460	-26.303187561 143.646749807	-	Winton	23m	Warrabin Well	Existing	Water bore
50685	-26.33179821 143.698138	25/02/1989	Winton	34.3m	House Bore	Existing	Water bore
50370	-26.434298392 143.701749886	-	Winton	48.8m	Tongalderry Bore	Existing	Water bore
6452	-26.508186769 143.770082803	1/1/1931	Mackunda	441m	Opal Creek	Existing	Water bore
6451	-26.51429926 143.629529096	1/1/1902	Winton	28m	Gilmore Well	Existing	Water bore
6449	-26.439854578 143.637584085	-	Winton	112.5m	Walyah Bore	Existing	Water bore
1657	-23.823769069 139.60482207	1/1/1900	Winton	91.5m	Lobs Yard	Existing	Water bore
50631	-26.44489631 143.09617348	19/03/1989	Winton	125m	Saddlers Bore	Existing	Water bore
50433	-26.4760584 43.11414839	6/12/1982	Winton	134m	Shed bore	Existing	Water bore
14877	-26.540136948 143.188701879	13/12/1961	Winton	353m	Kyabra Job	Existing	Water bore
50491	-26.548470479	3/5/1985	Winton	35m	Johnsons	Existing	Water bore
50493	-26.63822092 143.04802969	-	Winton	106m	New bore	Existing	Water bore
5219	-26.596247845 143.195924138	-	Winton	27.4m	6 Mile Well	Existing	Water bore
12860	-26.59344429 143.42475385	13/8/1955	Winton	304.6	Nobles Creek	Existing	Water bore
7013	-26.582634258 143.463698488	-	Winton	21.3m	Allston	Existing	Water bore
6200	-26.595688891 143.563975029	-	Winton	18.3m	Hartley's	Existing	Water bore
8245	-26.59124357 143.66091811	4/11/1940	Winton	136.2m	Grass Hut Bore	Existing	Water bore
5080	-26.666249131 143.040093559	-	Winton	225.70	Berelamm 2	Existing	Water bore
5079	-26.686804467 143.068704481	-	Winton	30.2m	Homestead	Existing	Water bore

11602	-26.878081646 150.993986513	1/1/1950	Winton	38.4m	-	Existing	Water bore
116492	-26.63138889 143.53	13/10/2018	Winton	42m	-	Existing	Water bore
8346	-26.719859553 143.131481755	-	Winton	29.6m	Malcom's Bore	Existing	Water bore
50675	-26.66895198 143.2682593	24/2/1989	Winton	32.5m	B. Pegler	Existing	Water bore
50481	-26.67208062 143.271757189	30/6/1985	Winton	18m	Berella	Existing	Water bore
15120	-26.69652412 143.390922429	12/5/1962	Winton	128m	Stony Hill	Existing	Water bore
6454	-26.66068076 143.5486134	1/1/1916	Winton	17m	House Well	Existing	Water bore
50408	-26.692632871 143.640085827	1/1/1926	Winton/ Mackunda	413.3	The Bore	Existing	Water bore
6102	-26.753465917 143.683974975	1/1/1924	Winton/ Mackunda	393.7m	Goat	Existing	Water bore
6455	-26.698744535 143.583419922	1/1/1910	Winton	18m	Shearing Shed	Existing	Water bore
50110	-26.724023401 143.468143918	-	Winton	18.3m	Cranstoun 1	Existing	Water bore
50637	-26.7426217059 143.2771312876	30/8/1988	Winton	135m	Glenvale House	Existing	Water bore
8346	-26.719859553 143.131481755	-	Winton	29.6m	Malcom's	Existing	Water bore
50451	-26.736526068 143.152037145	-	Winton	36m	Sharkey's	Existing	Water bore
50166	-26.78643299 143.27083777	-	Winton	12.5m	House Well	Existing	Water bore
6101	-26.786522416 143.585921059	1/1/1923	Winton	29.5m	Shearing	Existing	Water bore
14637	-26.815692213 143.224259313	1/1/1957	Winton	17.4m	Twin Bore	Existing	Water bore
50362	-26.9026673 143.3214542	-	Winton	-	-	Existing	Water bore
116305	-26.86638889 143.5411111	7/2/2014	Winton	72m	-	Existing	Water bore
6213	-26.853187837 143.734253452	28/4/37	Mackunda	331.6m	-	Existing	Water bore
6100	-26.887634095 143.524811908	1/1/1923	Winton	19.2m	-	Existing	Water bore
116152	-26.92377677 143.6401333	2/2/2005	Winton	116m	Congie South	Existing	Water bore

4. **A program for conducting an annual review of the accuracy of maps produced and giving the chief executive a summary of the outcome of each review, including a statement of whether there has been a material change in the information of predictions used to prepare the maps (section 376(e) of the Water Act).**

An annual review of the accuracy of the prepared IAA and LTAA predictions will be undertaken.

The Chief Executive will be provided with a summary of the outcomes of the annual review by the end of each calendar year, including a statement as to whether a material change in the information or predictions used to prepare the maps has occurred.

The review will consider the following:

• new hydrogeological data that significantly alter the conceptual model;

• whether any significant changes to production have occurred; and

• results from water monitoring undertaken.

The outcome of this annual review will be reported to the Department of the Environment, Tourism, Science and Innovation (DETSI) as required per Section 376(1)(e)(ii) of the Water Act, including a statement of whether there has been a material change in the information or predictions presented in this UWIR. The program for the implementation of the WMS will also be reported to the Office of Groundwater Impact Assessment (OGIA) every six months.

In addition to the annual review, the UWIR will be updated every three years. However, if any material changes occur in the assumptions underpinning the UWIR or the annual review, a reassessment and potential revision of the UWIR will be triggered.

Part D*: Impacts on environmental values

Requirements under sections 376(da) and 376 (db) of the Water Act
To meet the requirements of the Water Act, an UWIR must include the following; **1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);** **2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act)-** **i. For a three-year period starting on the consultation day for the report; &** **ii. Over the projected life of the resource tenure.**

*Part D refers to Section 5.1.4 (page 14) of the guideline (DETSI 2025).

To describe the potential impacts of Bridgeport Energy on Environmental Values (EVs), an analysis tool was developed using templates from Work Health and Safety & Environment templates used in other Bridgeport Energy areas, such as Production. The use of matrices enhances understanding and classification of the potential risks to EVs and provides the Department with clarity on how Bridgeport Energy has reached its conclusions regarding impacts. The following table illustrates Bridgeport Energy's EV risk allocation framework. The framework is simply used to define the Likelihood and Consequence, in order to determine the Level of Risk (Table 19).

Table 19: Bridgeport Energy Risk Allocation Framework applied to Environmental Values

EV Risk Allocation Framework						
Likelihood		Consequence				
		Insignificant	Minor	Moderate	High	Catastrophic
A	Almost certain	Medium	High	Extreme	Extreme	Extreme
B	Likely	Medium	High	High	Extreme	Extreme
C	Possible	Low	Medium	High	Extreme	Extreme
D	Unlikely	Low	Low	Medium	High	Extreme
E	Rare	Low	Low	Low	Medium	High
F	Incapable of occurring	No risk	No risk	No risk	No risk	No risk

Consequence Rating		
Level	**Description**	**Definition**
Insignificant	**Almost Certain**	No unauthorised adverse impact on environment values
Minor	**Likely**	Temporary and minor unauthorised effect on environmental values – non reportable environmental harm
Moderate	**Possible**	Serious temporary or minor permanent unauthorised damage to environmental values – reportable incident with local attention
High	**Unlikely**	Significant unauthorised harm to environmental values - reportable incident with adverse national publicity
Catastrophic	**Rare**	Major unauthorised event causing significant unauthorised harm to environmental values, loss of company credibility with stakeholders and likely prosecution

Likelihood Rating		
Level	**Description**	**Definition**
A	**Almost Certain**	(1) Reasonably expected to occur within a month (2) Will likely occur in most circumstances
B	**Likely**	(1) Likely to occur within the next year (2) Probably occur in the near future
C	**Possible**	(1) Likely to occur over ten years (2) Might occur at some time
D	**Unlikely**	(1) Not specifically expected to occur but may occur sometime (2) May occur in exceptional circumstances
E	**Rare**	(1) Foreseeable but not normally expected to occur (2) May occur in exceptional circumstances
F	**Incapable of occurring**	(1) Incapable of occurring regardless of time (2) Impossible to occur physically
**Please note this table is a guide to determining the likelihood rating. The frequency may change depending on the risk type and the context in which it occurs.		

Environmental Risks		
Level of Risk	**Authority to approve the risk**	**Action Required**
Extreme	Senior Executive Team (SET) Board of Director must be made aware	Unacceptable Risk – STOP or DO NOT START the action until controls are established to reduce the risk to an acceptable level. Establish permanent control measures and review for effectiveness. The highest level of management must be made aware.
High	Operations Manager sign off Board of Director must be made aware	Activity may only proceed if: likelihood is tolerable; personnel are competent; risks are adequately assessed; legal and mandatory requirements are met;
Medium	SSM to sign off Manager must be made aware	Acceptable – apply adequate safeguards and review for effectiveness. Monitor for changes which may cause escalation of risk level.
Low	No approval but must document risk in the UWIR	Acceptable – apply safeguards as considered necessary. Monitor for changes which may cause escalation of risk level.
No risk	No approval but must document risk in the UWIR	Acceptable – apply safeguards as considered necessary. Monitor for changes which may cause escalation of risk level.

Bridgeport used the definition of environmental values (EVs) as provided by legislation and other Government policies, procedures or departments as outlined below.

The Environmental Protection Act (1994) define EVs as;

> (a) a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety;
>
> (b) another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation.

The Environmental Protection (Water) Policy (2009) also has an EV definition,

> *"those qualities of the waterway that make it suitable to support particular aquatic ecosystems or human use".*

The Department of Environment and Science (2019) also have an apt definition;

> *"EVs for water are the qualities that make it suitable for supporting aquatic ecosystems and human water uses."*

Environmental values are scheduled into the Environmental Protection (EPP) (Water and Wetland Biodiversity) Policy 2019 through a legislative process. These EVs are detailed in Schedule 1 of the EPP (Water and Wetland Biodiversity) Policy 2019.

In Queensland, all tidal and non-tidal waters, including wetlands, lakes, and groundwater, have EVs, as described in the environmental values and water quality objectives within the Environmental Protection (Water and Wetland Biodiversity) Policy document.

A short list of Environmental Values includes:

- Aquatic Ecosystem Health
- Agricultural uses (e.g. stock watering and irrigation)
- Recreational uses (e.g. swimming, wading, boating, fishing and aesthetics)
- Drinking water (raw water supply)
- Industrial uses (e.g. mining, mineral refining and processing) and

- Cultural and spiritual values.

The type and presence of environmental values (EVs) were determined using the Department of Environment, Tourism, Sciences and Innovations website and the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 Schedule 1 [https://www.legislation.qld.gov.au/view/html/inforce/current/sl-2019-0156#sch.1].

The GKBA fields are within a project area classified as “future programs", indicating a current lack of spatial layers related to EVs in this area. Similarly, live spatial data services show no layers over the project area. The Schedule does not include definitions related to the GKBA project area (Figure 23). The closest EPP (Water and Wetland Biodiversity) Overview Map region related to the GKBA area is the Queensland Murray-Darling and Bulloo Basins map. The GKBA assets would likely be classified in the “Lake Eyre” region of the EPP (Water) mapping, as described in the Queensland Water Quality Guidelines (Department of Environment and Science 2018).

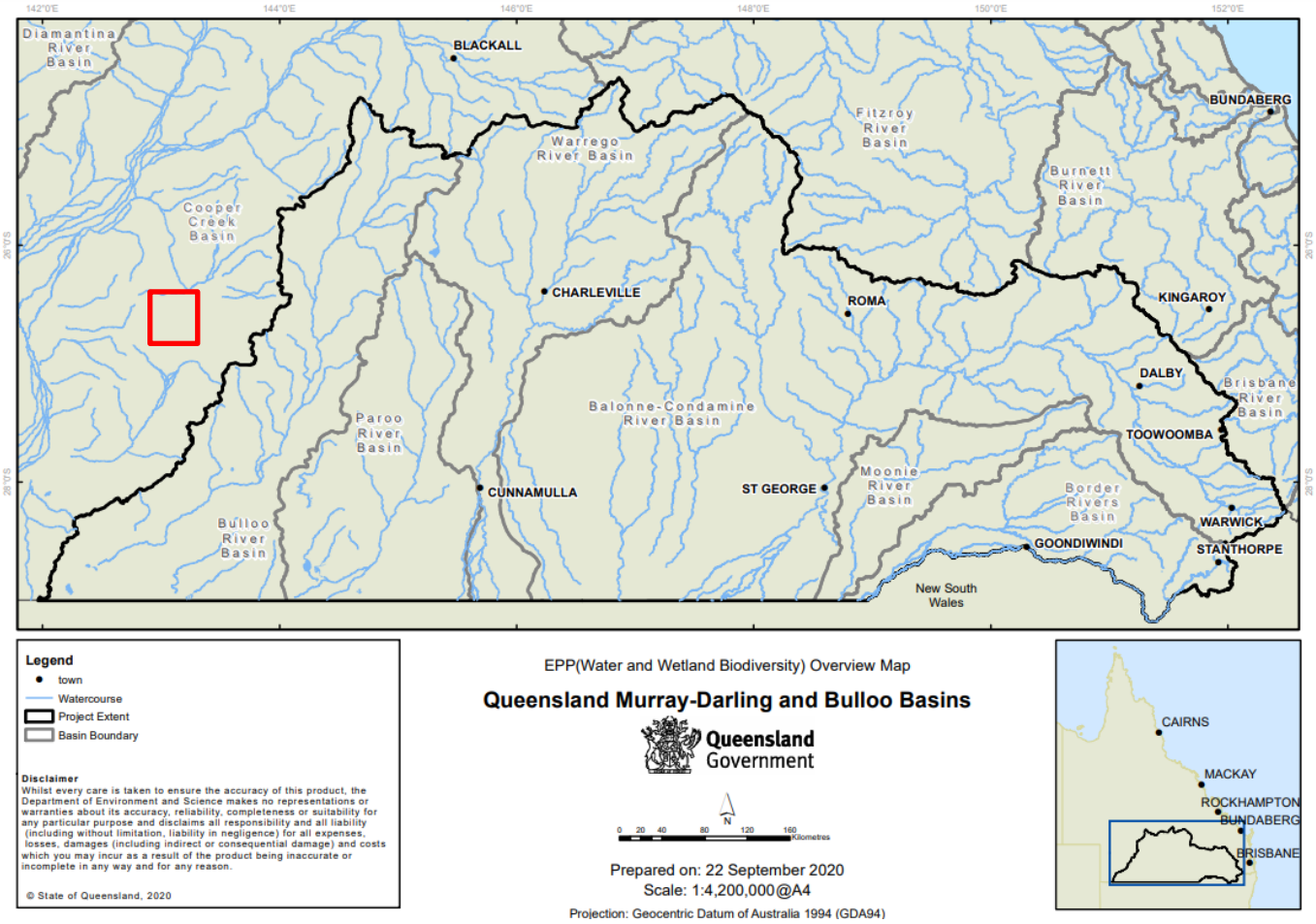


Figure 23: The EPP (Water and Wetland Biodiversity) Overview Map region that is closest to GKBA (red square). The dark line represents the Queensland Murray-Darling and Bulloo Basin. GKBA would occur within the "Lake Eyre" region.

The absence of spatial data and the mapping classification within the EPP (Water and Wetland Biodiversity) Guideline for the specific region related to GKBA has been highlighted above to demonstrate our attempt to use specific Queensland Government resources to identify relevant features related to water extraction, and why they do not feature further in this UWIR.

Bridgeport Energy summarises and describes EVs relevant to water extraction associated with GKBA assets (see Table 20). Bridgeport Energy assesses the EVs according to the Risk Allocation Framework provided in Table 19 with reference to the conditions around the GKBA tenement areas and the UWIR requirements as follows:

Requirement 1.1. A description of the impacts on environmental values that have occurred or are likely to occur due to any previous exercise of underground water rights (section 376(da) of the Water Act).

Requirement.1.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act) -

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Table 20: Environmental Values as described in Healthy waters for Queensland: Environmental values, management goals and water quality objectives—frequently asked questions (DETSI) and the EPP (Water and Wetland Biodiversity) Schedule 2.

Section	Environmental Value	Definition
D.1	**Aquatic ecosystem**	'A community of organisms living within or adjacent to water, including riparian or foreshore area'. (EPP (Water and Wetland Biodiversity), schedule 2). The intrinsic value of aquatic ecosystems, habitat and wildlife in waterways and riparian areas, for example, biodiversity, ecological interactions, plants, animals, key species (such as turtles, platypus, seagrass and dugongs) and their habitat, food and drinking water. Waterways include perennial and intermittent surface waters, groundwaters, tidal and non-tidal waters, lakes, storages, reservoirs, dams, wetlands, swamps, marshes, lagoons, canals, natural and artificial channels and the bed and banks of waterways. (This EV incorporates the 'wildlife habitat' EV used in the Southeast Queensland Regional Water Quality Management Strategy (SEQRWQMS)).
D.2	**High ecological/conservation value waters**	'Waters in which the biological integrity of the water is effectively unmodified or highly valued.'

D.3	**Slightly disturbed waters**	'Waters that have the biological integrity of high ecological value waters with slightly modified physical or chemical indicators but effectively unmodified biological indicators'.
D.4	**Moderately disturbed waters**	'Waters in which the biological integrity of the water is adversely affected by human activity to a relatively small but measurable degree.'
D.5	**Highly disturbed waters**	'Waters that are significantly degraded by human activity and have lower ecological value than high ecological value waters or slightly or moderately disturbed waters.'
D.6	**Irrigation**	Suitability of water supply for irrigation, for example, irrigation of crops, pastures, parks, gardens and recreational areas.
D.7	**Farm water supply/use**	Suitability of domestic farm water supply, other than drinking water. For example, water used for laundry and produce preparation.
D.8	**Stock watering**	Suitability of water supply for production of healthy livestock.
D.9	**Human consumers of aquatic foods**	The suitability of the water for producing aquatic foods for human consumption such as fish, crustaceans and shellfish from natural waterways.
D.10	**Primary recreation**	Means a use that involves the following types of contact with the water—full body contact, frequent immersion by the face and trunk, frequent contact with spray by the face where it is likely some water will be swallowed or inhaled, or come into contact with ears, nasal passages, mucous membranes or cuts in the skin e.g. diving, swimming, surfing.

D.11	**Secondary recreation**	Means a use that involves the following types of contact with the water—contact in which only the limbs are regularly wet, and other contact, including the swallowing of water, is unusual (examples—boating, fishing, wading) or occasional inadvertent immersion resulting from slipping or being swept into the water by a wave.
D.12	**Visual recreation**	Means a use that does not ordinarily involve any contact with the water—for example angling from the shore, sunbathing near water.
D.13	**Drinking water supply**	Suitability of the water for supply as drinking water having regard to the level of treatment of the water.
D.14	**Industrial use**	Suitability of water supply for industrial purposes, for example, food, beverage, paper, petroleum and power industries, mining and minerals refining/processing. Industries usually treat water supplies to meet their needs.
D.15	**Cultural and spiritual values**	Means scientific, social or other significance to the present generation or past or future generations, including Aboriginal People or Torres Strait Islanders. This includes custodial, spiritual, cultural and traditional heritage, hunting, gathering and ritual responsibilities, symbols, landmarks and icons (such as waterways, turtles and frogs). • lifestyles (such as agriculture and fishing).
D.16	**Environmentally Sensitive Areas**	ESAs are areas of habitat, described as important for key ecological functions in legislation (e.g. Nature Conservation Act 1994, Marine Parks Act 2004, etc.). ESAs are split into two categories, Category A and

		Category B, and the appropriate formal definition can be found in the Environment Protection Regulation (2019).

D.1 Aquatic ecosystem

Definition: 'A community of organisms living within or adjacent to water, including riparian or foreshore areas'. (EPP (Water and Wetland Biodiversity), schedule 2).

The intrinsic value of aquatic ecosystems, habitat and wildlife in waterways and riparian areas, for example, biodiversity, ecological interactions, plants, animals, key species (such as turtles, platypus, seagrass and dugongs) and their habitat, food and drinking water. Waterways include perennial and intermittent surface waters, groundwaters, tidal and non-tidal waters, lakes, storages, reservoirs, dams, wetlands, swamps, marshes, lagoons, canals, natural and artificial channels and the bed and banks of waterways.

(This EV incorporates the 'wildlife habitat' EV used in the South East Queensland Regional Water Quality Management Strategy (SEQRWQMS)).

Description

To assess the extent of watercourse, wetlands, springs (including other relevant environmental values and layers), or river improvement trust asset areas on PL 31, 32 & 47, PL 1063, and PL 1064, the following layers were downloaded and overlaid onto the tenement. These layers include watercourse areas, pondage, major watercourse lines, groundwater-dependent ecosystems (areas, watercourses, and springs), water plans (waterholes and lakes), active springs, a directory of important wetlands, high ecological significance wetlands, a watercourse identification map (watercourses), MSES (high ecological significance wetlands), fish habitat, and the River Improvement Trust Areas (Figure 24).

There is a very small (500 m) section of a major watercourse line in the upper north-east boundary of PL 31 Bodalla. This section is the start of a larger ephemeral watercourse and begins 9 km from the main production facility and 8.5 km from the nearest production well.

There are no other watercourses, wetlands, GDEs, or springs within the boundaries of PL 31, 32, 47, PL 1063, and PL 1064. Wetland lines are present in PL 31, 32, 1063, and 1064. These

lines are near PL 32 Kenmore Field, on the eastern side of the wells, and are not affected by petroleum disturbance. Other lines are not close to petroleum-related assets.

Pondage is shown in PL 31, 32, and 47, also referred to as low-hazard category dams licensed as environmentally relevant activities (ERA) for the evaporation of produced water.

There are no significant watercourses, wetlands, groundwater-dependent ecosystems, or springs within PL 1063, although a major watercourse runs through the northernmost part of the tenement. PL 1063 is operated by a single, low-production well. There are no significant watercourses, wetlands, groundwater-dependent ecosystems, or springs within Marcoola and Coolum & Glenvale (PL 1064). In Byrock (PL 1064), a major watercourse lines the northern section of the tenement. The crude oil facility and authorised activities are situated 1.8 km south of this watercourse and are not expected to interfere with or impact it, especially given the small amount of water extracted at Byrock, which cycles on and off at different times.

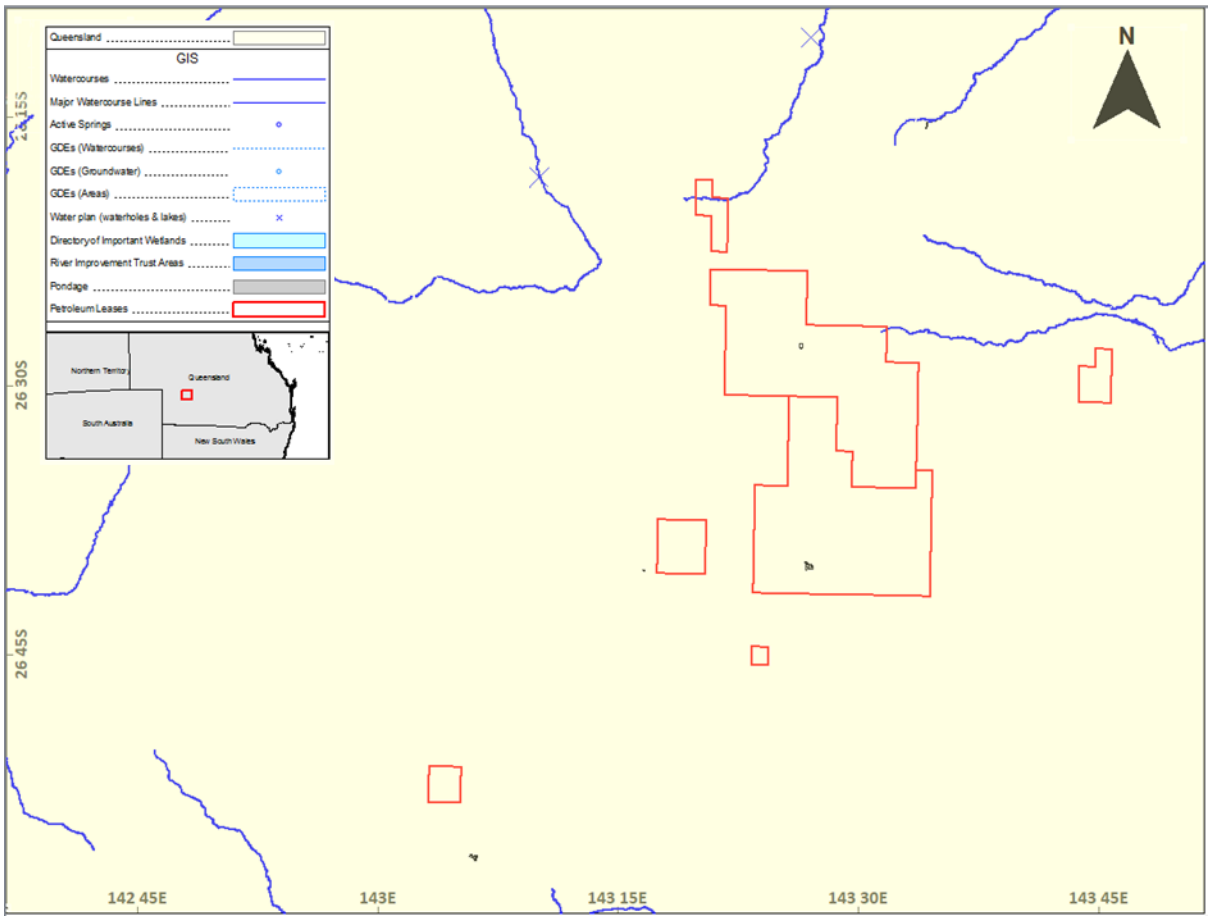


Figure 24: Shapefiles and layers applied to the appropriate GKBA UWIR tenements for aquatic features.

The aquatic features around the tenement areas are in a generally degraded state. They are characterised by little to no riparian vegetation, with only mature trees remaining. These mature trees are tall enough to withstand constant grazing. The recruitment of new vegetation is minimal due to climatic conditions and ongoing grazing, which reduces groundcover, trees, and shrubs.

Water sources are accessible to livestock (both domestic and feral), including cattle, sheep, kangaroos, goats, pigs, and horses, with surrounding vegetation often grazed down to bare soil in large parts of the year.

The aquatic features identified are ephemeral, meaning they only hold water during periods of heavy rainfall. There are no ecosystems dependent on groundwater, and the region—known as the Channel Country—is famous for its large rainfall inflows, rapid flooding, and

quick drying of surface waters. Any potential impacts from operations would likely include small impacts from localised spills of hydrocarbon or chemicals and impacts from produced water discharge (which will be covered in a Section D.8).

These features or descriptions do not preclude Bridgeport Energy's right to take water from impacting aquatic EVs; however, they are provided to set a realistic context for the land in which the project operates.

Note, this information is relevant to subsequent EVs but will not be repeated in each section. A reference back to this section will be provided.

Bridgeport Risk Allocation

D.1.1. Bridgeport Energy has assessed the likelihood of aquatic ecosystem environmental values being impacted by the previous exercise of underground water rights as a 'Likelihood of D, or Unlikely,' with the explanation being (1) Not specifically expected to occur, but may occur sometime. The impact consequence is Minor, leading to a Low risk level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

D.1.2.i. Bridgeport Energy has assessed the likelihood of impact on aquatic ecosystem environmental values due to the exercise of underground water rights over the next three years as a Likelihood of D, or Unlikely, with the explanation being (1) Not specifically expected to occur but may occur sometime. The consequence of impact is Minor, resulting in a Low risk level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring) and escalating the risk level if necessary.

D.1.2.ii. Bridgeport Energy has assessed the likelihood of impacts on aquatic ecosystem environmental values over the life of the resource tenure from exercising underground water rights as a Likelihood of D, or Unlikely, with the explanation being (1) Not specifically expected to occur but may occur sometimes. The consequence of impact severity is Minor, resulting in a Low consequence level. Actions required from this risk include applying relevant safeguards (e.g., monitoring) and escalating the risk level if necessary.

Bridgeport's assessment of risk and consequence is based on the limited presence of aquatic ecosystems within or near Bridgeport petroleum production areas. Any such aquatic ecosystems would not be affected by the exercise of underground water rights over different time periods.

D.2 High ecological/conservation value waters

Definition: 'Waters in which the biological integrity of the water is effectively unmodified or highly valued.'

Description

There are no waters of high ecological or conservation value within or near the Bridgeport Energy tenements related to GKBA. All environmental values pertain to highly disturbed waters.

See section D.1 Aquatic Ecosystem above for a comprehensive summary of the ecological and conservation waters values.

Bridgeport Risk Allocation

D.2.1. Bridgeport Energy has assessed the likelihood of high ecological/conservation water values being impacted by the previous exercise of underground water rights as a Likelihood of F, or incapable of occurring, with the explanation that impacts are (2) impossible to occur. The consequence of impact is insubstantial, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g., continued monitoring) and escalating the risk level if appropriate.

D.2.2.i. Bridgeport Energy has assessed the likelihood of high ecological and conservation water values being affected by the exercise of underground water over the next three years as a Likelihood of F, or incapable of occurring, with the explanation that impacts are (2) Impossible to occur. The consequence of impact is Insignificant, resulting in a No risk consequence level. Actions required for this risk include applying relevant safeguards (e.g., continued monitoring) and escalating the risk level if appropriate.

D.2.2.ii. Bridgeport Energy has assessed the likelihood of high ecological or conservation water values being affected over the duration of the resource lease from exercising underground water rights as a Likelihood of F, or incapable of occurring, with the explanation that impacts are (2) Impossible to occur. The consequence of impact is deemed Insignificant, resulting in a No risk consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., continued monitoring) and escalating the risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact that there are no high ecological or conserved ecosystems within or near Bridgeport petroleum production that would be affected by the exercise of underground water rights for the varying periods.

D.3 Slightly disturbed waters

Definition: 'Waters that have the biological integrity of high ecological value waters with slightly modified physical or chemical indicators but effectively unmodified biological indicators'.

Description

There are no slightly disturbed ecological water values within or near Bridgeport Energy tenements in relation to GKBA; all environmental water values surrounding Bridgeport Energy tenements are highly disturbed.

See Section D.1, "Aquatic Ecosystem," above, for a comprehensive summary of the ecological and conservation values related to water.

Bridgeport Risk Allocation

D.3.1. Bridgeport Energy has assessed the likelihood of slightly disturbed water figures being affected by the previous exercise of underground water rights as a Likelihood of F, or unlikely to occur, with the explanation being impacts are (2) Impossible to occur. The consequence of the impact is Insignificant, resulting in a No risk consequence level. Actions needed from this

risk assessment include applying relevant safeguards (e.g., ongoing monitoring) and increasing the risk level if necessary.

D.3.2.i. Bridgeport Energy has assessed the likelihood that slightly disturbed water levels could be affected by the exercise of underground water rights over the next three years as a 'Likelihood of F,' indicating it is unlikely to occur, with the explanation that impacts are (2) impossible to happen. The impact consequence is considered Insignificant, resulting in a No risk consequence level. Actions required for this risk include applying relevant safeguards (e.g., continued monitoring) and escalating the risk level if needed.

D.3.2.ii. Bridgeport Energy has assessed the likelihood of slightly disturbed water values being affected over the life of the resource tenure from exercising underground water rights as a Likelihood of F, or incapable of occurring, with the explanation that impacts are (2) impossible to occur. The impact consequence is deemed Insignificant, resulting in a No risk consequence level. Actions required for this risk include applying relevant safeguards (e.g., continued monitoring) and escalating the risk level if necessary.

The risk and consequence levels determined by Bridgeport Energy are based on the fact that there are no slightly disturbed waters within or near Bridgeport Energy petroleum production that would be affected by the exercise of underground water rights for different periods.

D.4 Moderately disturbed waters

Definition: 'Waters in which the biological integrity of the water is adversely affected by human activity to a relatively small but measurable degree.'

Description

There are no moderately disturbed waters within or near the Bridgeport Energy tenements relating to GKBA. All environmental values are associated with highly disturbed waters.

See section D.1 Aquatic Ecosystem above for a comprehensive summary of the ecological and conservation waters values.

Bridgeport Energy Risk Allocation

D.4.1. Bridgeport Energy has assessed the likelihood of moderately disturbed water values being affected by the previous exercise of underground water rights as a Likelihood of F, or incapable of occurring, with the explanation that impacts are (2) impossible to occur. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required for this risk include applying relevant safeguards (e.g., continued monitoring) and escalating the risk level if appropriate.

D.4.2.i. Bridgeport Energy has assessed the likelihood of moderately disturbed water values being impacted by the exercise of underground water rights over the next three years as a Likelihood of F, or incapable of occurring, with the explanation that impacts are (2) impossible to occur. The consequence of this impact is Insignificant, leading to a No risk consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., continued monitoring) and escalating the risk level if appropriate.

D.4.2.ii. Bridgeport Energy has assessed the likelihood of moderately disturbed water values being impacted over the life of the resource tenure from exercising underground water rights as a Likelihood of F, or incapable of occurring, with the explanation being impacts are (2) Impossible to occur. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalating the risk level if appropriate.

The risk and consequence levels determined by Bridgeport Energy are based on the fact that there are no moderately disturbed waters within or near Bridgeport Energy petroleum production that would be affected by exercising underground water rights for different time periods.

D.5 Highly disturbed waters

Definition: 'Waters that are significantly degraded by human activity and have lower ecological value than high ecological value waters or slightly or moderately disturbed waters.'

Description

The water values within or near Bridgeport Energy tenements meet the definition of highly disturbed waters. The absence of environmental features within or close to most tenements significantly reduces the likelihood of direct impacts. Any potential impacts are from accidental spills of chemicals or petroleum products, as well as water releases for stock use (see D.8 below). The environmental features mapped within or near Bridgeport Energy tenements are geographically distant from actual petroleum infrastructure. For example, the small watercourse on the eastern side of PL 31 is approximately 9 km from any petroleum-related activity, and the watercourse crossing PL 1063 is 1.8 km away from such activities. It is highly improbable that petroleum activities could cause any physical impact. The depth at which Bridgeport Energy extracts water, combined with modelling showing no pressure decline in surface reservoirs and the highly disturbed water quality that does not depend on subsurface reservoirs, further suggests that there would be no impact on surface waters from extraction.

Bridgeport Energy Risk Allocation

D.5.1. Bridgeport Energy has assessed the likelihood of highly disturbed water values being affected by the previous exercise of underground water rights as a Likelihood of D or Unlikely, with the explanation that impacts are (2) may occur in exceptional circumstances. The impact consequence is Minor, resulting in a Low consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., continued monitoring) and escalating the risk level if appropriate.

D.5.2.i. Bridgeport Energy has assessed the likelihood of highly disturbed water values being affected by the exercise of underground water rights over the next three years as either a Likelihood of D or Unlikely, with the explanation that impacts are (2) may occur in exceptional

circumstances. The impact's consequence is minor, resulting in a low consequence level. Actions required for this risk include applying relevant safeguards (e.g., ongoing monitoring) and escalating the risk level if necessary.

D.5.2.ii Bridgeport Energy has assessed the likelihood of highly disturbed water values being impacted over the life of the resource tenure from exercising underground water rights as a Likelihood of D or Unlikely, with the explanation that impacts (2) may occur in exceptional circumstances. The consequence of impact is minor, leading to a low consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., continued monitoring) and escalating the risk level if appropriate.

The risk and consequence levels determined by Bridgeport Energy are based on the fact that there are very few highly disturbed waters within or near Bridgeport Energy petroleum production sites. Any highly disturbed water features that do exist are not dependent on water reservoirs related to or affected by water extracted during petroleum production over the periods for exercising underground water rights. Modelling shows no drawdown in the unconfined aquifer (Layer 1 & 2 of the model above), such as the Winton Formation, where all local landholder bores are targeted. This indicates there are no identified IAA/LTAA that impact local landholders' bores if they are used for livestock watering.

D.6 Irrigation

Definition: Suitability of water supply for irrigation, for example, irrigation of crops, pastures, parks, gardens and recreational areas.

The predominant land use in the project area (both during and post petroleum operations) will be broad-acre marginal/extensive sheep and cattle grazing of the remaining vegetation. There will be no pasture or cropping. The irrigation program at Kenmore (PL 32) is intended to support rehabilitation and revegetation while vegetation establishes. There are no gardens, parks, pastures, or recreational areas, nor their irrigation, in the region. Therefore, none are affected by groundwater extraction.

Bridgeport Energy Risk Allocation

D.6.1. Bridgeport Energy has assessed the likelihood of irrigation environmental values being affected by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, resulting in a No risk consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

D.6.2.i. Bridgeport Energy has assessed the likelihood of irrigation environmental values being impacted by the exercise of underground water rights over the next three years as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g. monitoring) and escalating the risk level if appropriate.

D.6.2.ii. Bridgeport Energy has assessed the likelihood of irrigation environmental values being impacted over the life of the resource tenure from exercising underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

These conclusions are appropriate because there are currently no irrigation programs whose water quantity or quality would be affected by underground use over the different periods. The physical environment, habitat types, landforms, soil types, and current and future land use precludes irrigation.

D.7 Farm water supply/use

Definition: Suitability of domestic farm water supply, other than drinking water. For example, water used for laundry and produce preparation.

Description

There are no domestic farm facilities near the centre of each petroleum field, nor are there domestic farms that use water from Bridgeport Energy operations. Modelling shows no drawdown in the unconfined aquifer (Layers 1 & 2 of the model above), such as the Winton Formation, which all local landholder bores target. This indicates there are no identified IAA/LTAA that affect local landholder bores that may draw water for domestic farm use.

Bridgeport Energy Risk Allocation

D.7.1. Bridgeport Energy has assessed the likelihood of farm water supply or use values being affected by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is deemed Insignificant, resulting in a No risk consequence level. Actions required for this risk include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

D.7.2.i. Bridgeport Energy has assessed the likelihood that farm water supply and use values will be impacted by the exercise of underground water rights over the next three years as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of this is considered Insignificant, resulting in a No risk consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring) and escalating the risk level if necessary.

D.7.2.ii. Bridgeport Energy has assessed the likelihood of farm water supply or use values being impacted over the life of the resource tenure from exercising underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence

level. Actions required for this risk include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

These conclusions are appropriate because there are currently no farms that are dependent on water supply or water quality values that would be affected by exercising underground water rights over different periods.

D.8 Stock watering

Definition: Suitability of water supply for production of healthy livestock.

Description

Most pastoral bores access the Winton Formation (Table 18) and are drilled to depths of no more than 60m. Generally, groundwater extraction in this management area is quite limited and marginal. Some bores listed in Table 17 have also been abandoned and decommissioned since drilling.

The extraction of water from Bridgeport Energy targets formations over 1400 m below ground and does not affect the shallower formations less than 100 m deep due to geological barriers, where water movement is highly restricted. Bridgeport Energy protects shallower aquifers and reservoirs by installing cement and steel casings in production wells and by testing and validating borehole integrity using wireline logging and sono-log recordings.

Bridgeport Energy Risk Allocation

D.8.1. Bridgeport Energy has assessed the likelihood of livestock water supply or use values being affected by the previous exercise of underground water rights as a Likelihood of E, or Rare, with the explanation that (1) it is foreseeable but not usually expected to occur. The consequence of impact is considered Minor, resulting in a Low risk consequence level. Actions required for this risk include applying relevant safeguards (e.g., monitoring) and escalating the risk level if necessary.

D.8.2.i. Bridgeport Energy has assessed the likelihood of livestock water supply or use values being affected by the exercise of underground water rights over the next three years as a

Likelihood of E, or Rare. This is because it is (1) foreseeable but not normally expected to occur. The consequence of impact is Minor, resulting in a Low risk consequence level. Actions needed for this risk include implementing relevant safeguards (e.g., monitoring) and escalating the risk level if necessary.

D.8.2.ii. Bridgeport Energy has assessed the likelihood of livestock water supply or use values being impacted over the life of the resource tenure from exercising underground water rights as a Likelihood of E, or Rare, with the explanation that (1) it is foreseeable but not normally expected to occur. The consequence of impact is Minor, leading to a Low risk consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

These conclusions are appropriate because there are currently no impacts to livestock watering during the different periods of exercising underground water rights. Significant natural (geological) and engineered (concrete and steel casing) barriers prevent resource extraction from affecting the much higher and distinct targeted aquifers of pastoral bores. Modelling indicates no drawdown in the unconfined aquifer (Layer 1 & 2 of the model above), such as the Winton Formation, which is where all local landholder bores are aimed. This means there are no identified IAA or LTAA that influence landholder bores used primarily for livestock watering.

D.9 Human consumers of aquatic foods

Definition: The suitability of the water for producing aquatic foods for human consumption such as fish, crustaceans and shellfish from natural waterways.

Description

The predominant land use during and after petroleum operations will be broad acre marginal/extensive sheep and cattle grazing of remnant native vegetation. There are no aquaculture, mariculture, or freshwater fisheries within or in proximity to, Bridgeport Energy tenements.

Bridgeport Energy Risk Allocation

D.9.1. Bridgeport Energy has assessed the likelihood of aquatic food values being impacted by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalating the risk level if appropriate.

D.9.2.i. Bridgeport Energy has assessed the likelihood of aquatic food values being impacted by the exercise of underground water rights for the next three years as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalating the risk level if appropriate.

D.9.2.ii. Bridgeport Energy has assessed the likelihood of aquatic food values being impacted over the life of the resource tenure from exercising underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalating the risk level if appropriate.

These conclusions are appropriate because there are currently no aquaculture programs whose water quality values would be affected by exercising underground water rights over different time periods.

D.10 Primary recreation

Definition: Means a use that involves the following types of contact with the water—full body contact, frequent immersion by the face and trunk, frequent contact with spray by the face where it is likely some water will be swallowed or inhaled, or come into contact with ears, nasal passages, mucous membranes or cuts in the skin e.g. diving, swimming, surfing.

Description

There are no primary recreation activities that take place within or near the Bridgeport Energy GKBA petroleum leases. There is no immersive swimming, frequent bodily contact, inhalation or contact with products related to or impacted by, the exercise of underground water rights.

Bridgeport Energy Risk Allocation

D.10.1. Bridgeport Energy has assessed the likelihood of primary recreation values being impacted by the previous exercise of underground water rights as a Likelihood of F, or Incapable to Occur, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

D.10.2.i. Bridgeport Energy has assessed the likelihood of primary recreation values being impacted by the exercise of underground water rights over the next three years as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, resulting in a No risk consequence level. Actions required for this risk include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

D.10.2.ii. Bridgeport Energy has assessed the likelihood of primary recreation values being affected over the life of the resource tenure from exercising underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The impact consequence is Insignificant, leading to a No risk consequence level.

Actions required for this risk include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

These conclusions are appropriate because there are no primary recreational areas near locations affected by exercising underground water rights over different periods.

D.11 Secondary recreation

Definition: Means a use that involves the following types of contact with the water—contact in which only the limbs are regularly wet, and other contact, including the swallowing of water, is unusual (examples—boating, fishing, wading) or occasional inadvertent immersion resulting from slipping or being swept into the water by a wave.

Description

There are no secondary recreation activities that take place within or near the Bridgeport Energy GKBA petroleum leases. There is no boating, fishing or wading commonly occurring, nor occasional incidental contact with products related to or impacted by, the exercise of underground water rights.

Bridgeport Energy Risk Allocation

D.11.1. Bridgeport Energy has assessed the likelihood of secondary recreation values being affected by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The impact is considered Insignificant, leading to a No risk consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

D.11.2.i. Bridgeport Energy has assessed the likelihood of secondary recreation values being affected by the exercise of underground water rights over the next three years as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, resulting in a No risk consequence level. Actions required for this risk include implementing relevant safeguards (e.g., monitoring) and escalating the risk level if necessary.

D.11.2.ii. Bridgeport Energy has assessed the likelihood of secondary recreation values being affected over the life of the resource tenure from exercising underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

These conclusions are appropriate because there will be no secondary recreational areas near any locations impacted by exercising underground water rights over different time periods.

D.12 Visual recreation

Definition: Means a use that does not ordinarily involve any contact with the water—for example angling from the shore, sunbathing near water.

Description

There are no visual recreation activities that take place within or near the Bridgeport Energy GKBA petroleum leases. There are no recreational activities or amenities near these tenements, especially none that are related to or impacted by, the exercise of underground water rights. The only instance of visual recreation at these fields is likely incidental tourism whereby tourists take pictures near a specifically constructed “tourist appropriate” beam pump designed and installed for that purpose.

Bridgeport Energy Risk Allocation

D.12.1. Bridgeport Energy has assessed the likelihood of visual impacts resulting from the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the Explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required for this risk include applying relevant safeguards (e.g., monitoring) and escalating the risk level if necessary.

D.12.2.i. Bridgeport Energy has assessed that the likelihood of visual recreation values being affected by underground water rights over the next three years is classified as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The

consequence of impact is deemed Insignificant, resulting in a no-risk consequence level. Actions required for this risk include applying relevant safeguards (e.g., monitoring) and escalating the risk level if necessary.

D.12.2.ii. Bridgeport Energy has assessed the likelihood of visual recreation values being impacted over the life of the resource tenure from exercising underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

These conclusions are appropriate because there are no, and will be no, visual recreational areas in close proximity to areas affected by exercising underground water rights at any time for the varying periods.

D.13 Drinking water supply

Definition: Suitability of the water for supply as drinking water having regard to the level of treatment of the water.

Description

No water is sourced from or near the GKBA tenements for drinking water supply and is treated. The ongoing extraction of water from around GKBA would not negatively affect the water treatment required at the nearest township of Eromanga, approximately 16km to the west of the Kenmore (PL 32) field. Any local landholder bores are extremely shallow and access water from bores less than 50m deep, far removed from the petroleum wells that are over 1,300m deep (as detailed in appropriate sections earlier in this document). These shallow bores are typically for livestock consumption and are not treated.

Bridgeport Energy Risk Allocation

D.13.1. Bridgeport Energy has assessed the likelihood of drinking water being affected by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact

consequence is Insignificant, resulting in a No risk consequence level. Actions required for this risk include implementing relevant safeguards (e.g., monitoring) and escalating the risk level if necessary.

D.13.2.i. Bridgeport Energy has assessed the likelihood of drinking water being affected by the exercise of underground water rights over the next three years as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The impact consequence is considered Insignificant, resulting in a No risk consequence level. Actions required for this risk include applying relevant safeguards (e.g., monitoring) and escalating the risk level if necessary.

D.13.2.ii. Bridgeport Energy has assessed the likelihood of drinking water being impacted over the life of the resource tenure from exercising underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

These conclusions are justified because there are no drinking water or treatment facilities where water quality would be affected by exercising underground water rights for different time periods. Modelling indicates no drawdown in the unconfined aquifer (Layers 1 & 2 of the model above), such as the Winton Formation, which all local landholder bores target. This means there are no identified IAA/LTAA that influence local landholder bores used for drinking water.

D.14 Industrial use

Definition: Suitability of water supply for industrial purposes, for example, food, beverage, paper, petroleum and power industries, mining and minerals refining/processing. Industries usually treat water supplies to meet their needs.

Description

There are no alternate industries in or near the Bridgeport tenements that relate to this UWIR. There are no food or beverage manufacturers, no electricity producers, light or commercial industrial groups. The predominant land use during and after petroleum operations will be broad acre marginal/extensive sheep and cattle grazing of remnant native vegetation. There will be no pasture, cropping or other commercial activities. There are small scale opal mining operations around the Bargie field (PL 1063), but these are shallow surface mines, and as such, are not affected by the ongoing or future exercise of water rights.

Bridgeport Energy Risk Allocation

D.14.1. Bridgeport Energy has assessed the likelihood of industrial uses being impacted by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

D.14.2.i. Bridgeport Energy has assessed the likelihood that industrial irrigation uses might be affected by the exercise of underground water rights over the next three years as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is considered Insignificant, resulting in a No risk consequence level. Actions required for this risk include applying relevant safeguards (e.g., monitoring) and escalating the risk level if appropriate.

D.14.2.ii. Bridgeport Energy has assessed the likelihood of industrial use values being affected over the lifespan of the resource tenure from exercising underground water rights as a

Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is considered Insignificant, resulting in a No risk consequence level. Actions needed for this risk include applying relevant safeguards (e.g., monitoring) and escalating the risk level if necessary.

These conclusions are justified because there are currently no other industrial uses or programs whose water quantity or quality values would be affected by exercising underground water rights over the different time periods.

D.15 Cultural and spiritual values

Definition: Means scientific, social or other significance to the present generation or past or future generations, including Aboriginal people or Torres Strait Islanders.

- custodial, spiritual, cultural and traditional heritage, hunting, gathering and ritual responsibilities
- symbols, landmarks and icons (such as waterways, turtles and frogs)
- lifestyles (such as agriculture and fishing).

Description

Bridgeport Energy tenements overlay numerous Native Title claims. Bridgeport Energy GKBA tenements overlay the Native Title Claim of the Boonthamurra People. Their claim is represented by several classifications by the Aboriginal and Torres Strait Islander Partnerships including the Tribunal Number (QCD2015/008) and QUD reference number (QUD435/2006).

Bridgeport Energy have a Native Title Policy that guides staff and contractors on their awareness and treatment of Aboriginal cultural heritage, as well as a Cultural Heritage Management Plan with the Boonthamurra that guides our working relationship and decisions on key areas of interest to both parties.

Regardless of these agreements, Bridgeport Energy is aware of the potential for cultural heritage points and areas to be located within the boundaries of our lease, and possibly

outside the direct leases, in areas that could be affected by our water extraction. Bridgeport Energy is actively engaged in protecting this cultural heritage wherever possible.

The potential impacts on cultural heritage from exercising underground water rights, both historically and in the future, would mainly involve physical disturbance to surface cultural heritage, including objects and features such as artefacts. This disturbance is mitigated through industry best practice and the processes agreed upon by the Boonthamurra, which include cultural clearance before any disturbance to undisturbed or previously uncleared areas.

These impacts could potentially occur any time when there is a physical disturbance on Bridgeport tenements, including during the three-year period and the projected lifespan of the resource tenure.

To describe some of the registered physical cultural heritage recorded on the GKBA assets, a search was conducted for each tenement using the Aboriginal and Torres Strait Islander Cultural Heritage Database and Register (Table 21). All tenement searches included a 5 km buffer around the tenement boundary.

Table 21: Search per tenement via the Department of Aboriginal and Torres Strait Islander Partnerships

Tenement	A&TSI Cultural Heritage Site Points	A&TSI Cultural Heritage Polygons	Figure Reference
PL 31	No	No	Figure 25
PL 32	Yes	No	Figure 26
PL 47	No	No	Figure 27
PL 1063	Yes	No	Figure 28
PL 1064	Yes	No	Figure 28
PL 1064	Yes	No	Figure 28
PL 1064	Yes	No	Figure 28

There were no cultural heritage bodies, no cultural heritage management plans, no Designated Landscape Areas (DLA), and no Registered Cultural Heritage Study Areas recorded in these search areas.

Bridgeport Energy is aware of other significant Aboriginal cultural heritage features within its tenement boundaries. Water extraction will not affect these features directly or indirectly, neither during the three-year period nor for the duration of the tenure. There is no physical harm to these features from current petroleum activities or associated water extraction, and they have been left in their original condition.

The Register of National Estate (RNE) was a list of significant places across Australia, including Commonwealth heritage sites of local and state importance. References to the RNE within the *Environment Protection and Biodiversity Conservation Act* (1999) and the *Australian Heritage Council Act 2003* have since been repealed, and the register is now closed. Although closed, the register (which remains searchable) still contains mentions of cultural heritage areas near Eromanga. One of these is likely the Cunnavalla Creek Area, located 72 km west of PL 32 Kenmore. This cultural heritage site is east of Eromanga township and will not be affected by water extraction over the next three years or during the expected lifespan of these fields.

The following cultural heritage points have been registered and are provided by the Aboriginal and Torres Strait Islander Cultural Heritage Database and Register, indicating locations of cultural significance on the surface area of each tenement (and buffer area).

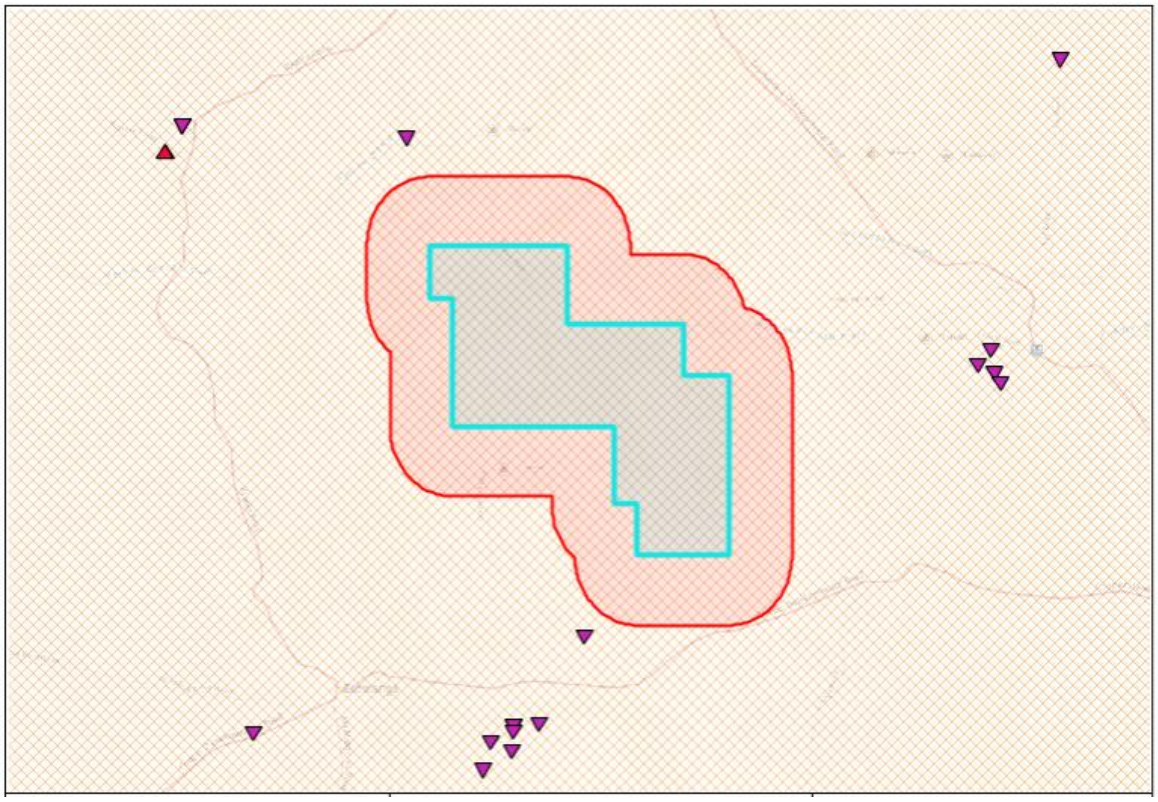


Figure 25: Cultural heritage points around the PL 31 boundary, 5km buffer zone.

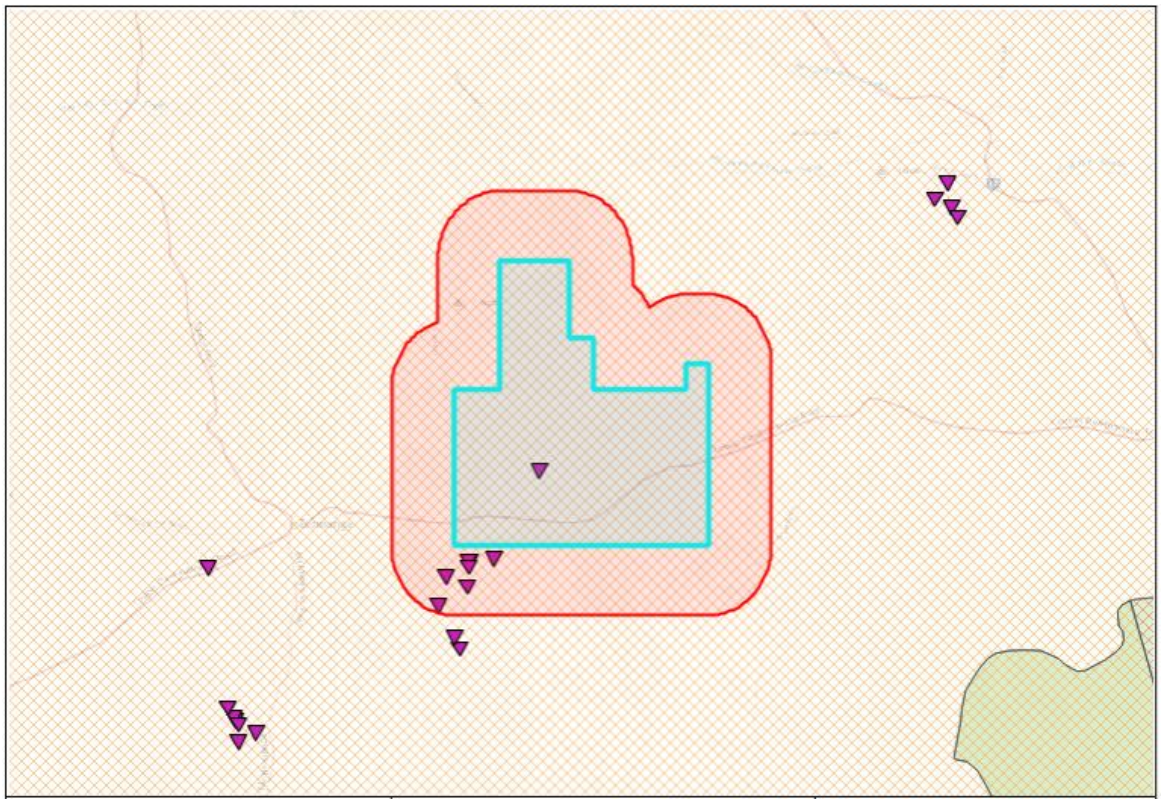


Figure 26: Cultural heritage points around the PL 32 boundary, 5km buffer zone.

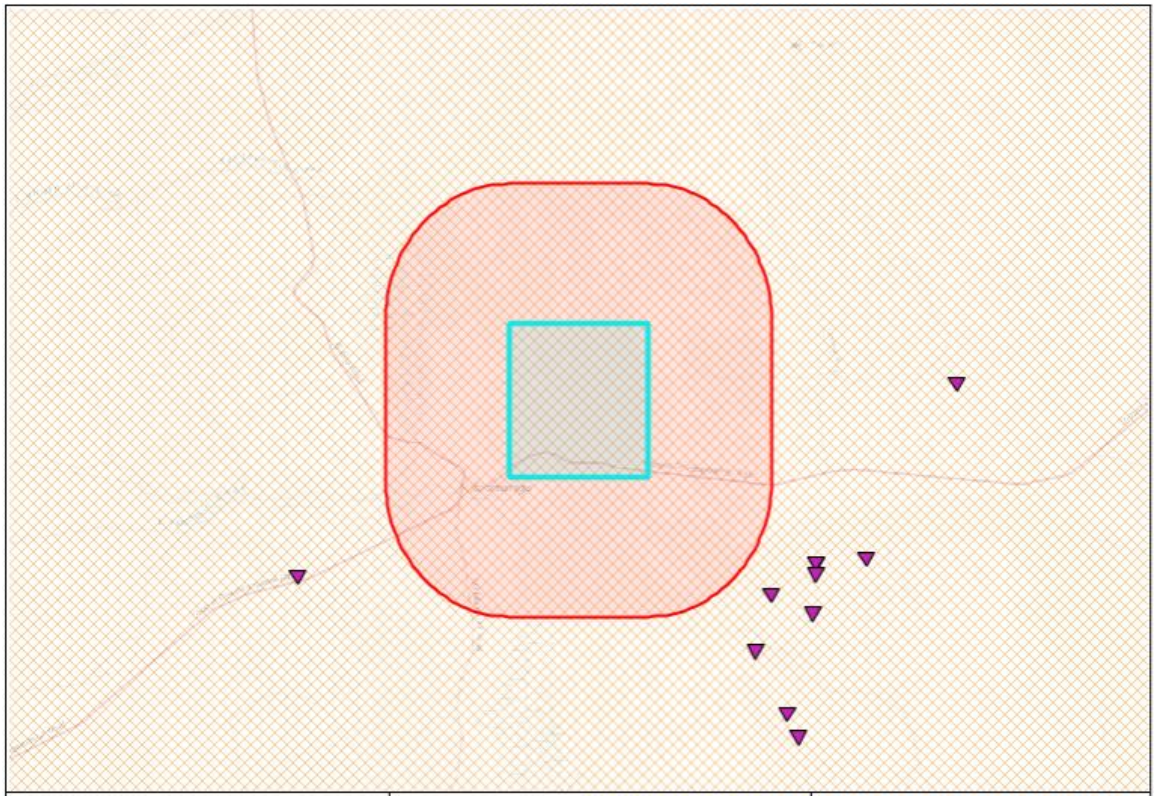


Figure 27: Cultural heritage points around the PL 47 boundary, 5km buffer zone.

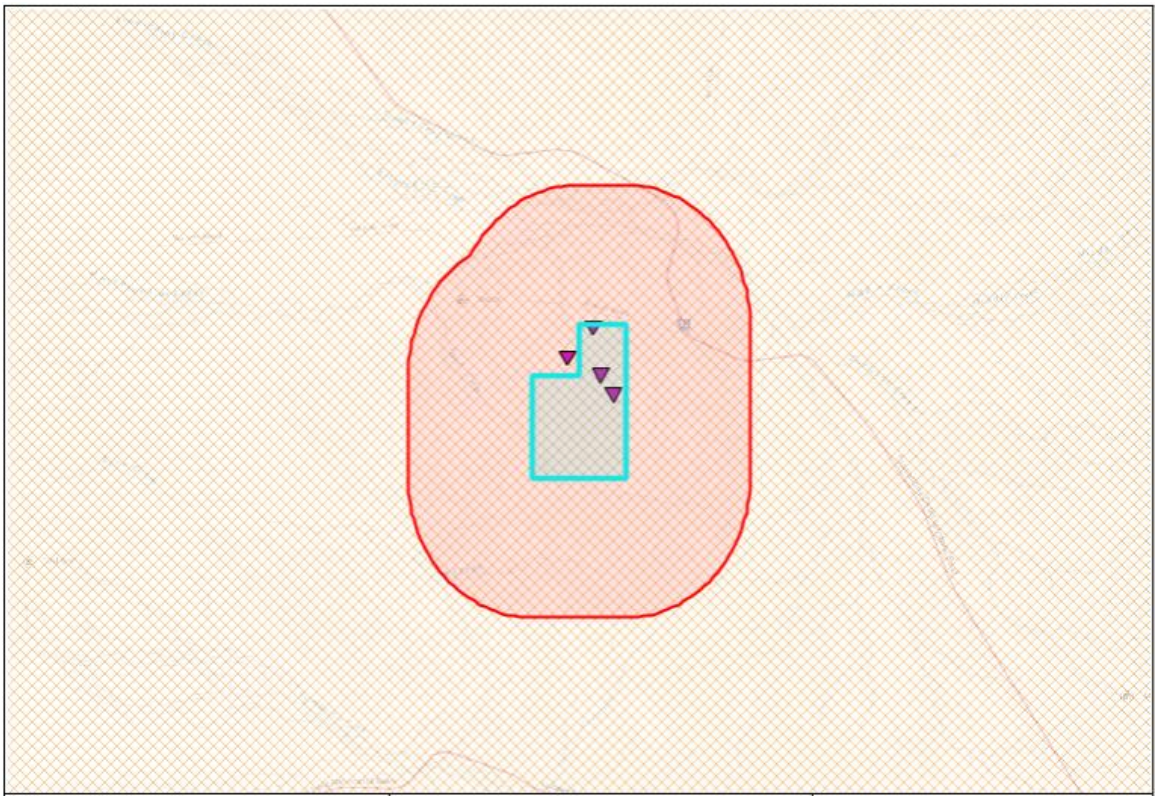


Figure 28: Cultural heritage points around the PL 1063 boundary, 5km buffer zone.

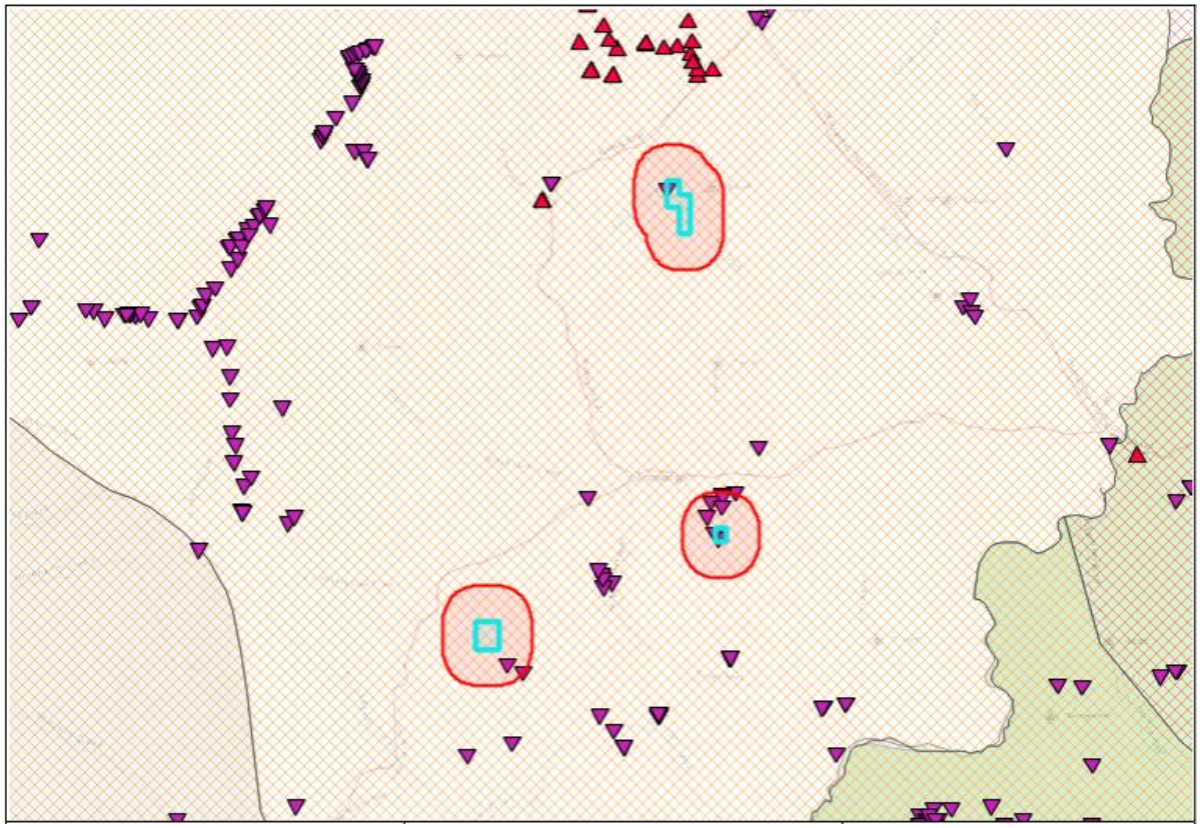


Figure 29: Cultural heritage points around the PL 1064 boundary, 5km buffer zone.

The impact on these cultural values has been and will continue to be minimised through appropriate Aboriginal Cultural Heritage clearance and management procedures before any physical disturbance.

Bridgeport Energy Risk Allocation

D.15.1. Bridgeport Energy has assessed the likelihood of cultural and spiritual values being impacted by the previous exercise of underground water rights as a Likelihood of E, or Rare, with the explanation that (1) it is foreseeable but not normally expected to occur. The consequence of this impact is high, leading to a medium consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring), reviewing for effectiveness, and escalating the risk level if appropriate.

D.15.2.i. Bridgeport Energy has assessed the likelihood of Cultural and spiritual values being impacted by the exercise of underground water rights over the next three years as a Likelihood of E, or Rare, with the explanation that (1) it is foreseeable but not normally

expected to occur. The consequence of impact is rated High, leading to a Medium level of consequence. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring), reviewing their effectiveness, and escalating the risk level if necessary appropriate.

D.15.2.ii. Bridgeport Energy has assessed the likelihood of Cultural and spiritual values being impacted over the life of the resource tenure from exercising underground water rights as a Likelihood of E, or Rare, with the explanation that (1) it is foreseeable but not normally expected to occur. The consequence of this impact is High, resulting in a Medium consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring), reviewing for effectiveness, and escalating the risk level if appropriate.

These conclusions are justified because there have always been and will continue to be safeguards in place to review cultural and spiritual values before any further physical activity occurs (e.g., cultural heritage clearance by relevant Native Title groups) for the different periods of water rights exercising. Modelling indicates there is no drawdown in the unconfined aquifer (Layers 1 and 2 of the model above), such as the Winton Formation, which could impact other cultural values. This means no IAA/LTAA have been identified that influence cultural and spiritual values.

D.16 Environmental Sensitive Areas (ESAs)

Definition: ESAs are areas of habitat, described as important for key ecological functions in legislation (e.g. *Nature Conservation Act 1992*, *Marine Parks Act 2004*, etc.). ESAs are split into two categories, Category A and Category B, and the appropriate formal definition can be found in the *Environment Protection Regulation 2019*.

Description

Queensland Government's databases were used to update the extent of environmentally sensitive areas (ESAs) in relation to each tenement boundary. This included PL 31 Bodalla (Figure 35), PL 32 Kenmore (Figure 36), PL 47 Blackstump (Figure 37), PL 1063 Bargie (Figure 38), and PL 1064 Marcoola, Coolum & Glenvale, and Byrock (Figure 39).

1: Environmentally Sensitive Areas (ESAs) – non-mining resource activities

Environmentally sensitive areas (ESAs) are defined in the *Environmental Protection Regulation 2019* (Schedule 19, Part 1, Section 2) and can be related to EVs. There are multiple Categories of ESA, category A and B. The most applicable ESAs relating to the Bridgeport Energy tenements in GKBA include;

(a) any of the following areas under the Nature Conservation Act 1992

i. *a coordinated conservation area (e.g. conservation park, national park, marine park etc.);*
ii. *an area of critical habitat or major interest identified under a conservation plan;*
iii. *an area subject to an interim conservation order;*

(b) an area subject to the following conventions to which Australia is a signatory

i. *the 'Convention on the Conservation of Migratory Species of Wild Animals' (Bonn, 23 June 1979);*
ii. *the 'Convention on Wetlands of International Importance, especially as Waterfowl Habitat' (Ramsar, Iran, 2 February 1971);*

iii. the 'Convention Concerning the Protection of the World Cultural and Natural Heritage' (Paris, 23 November 1972);

(e) the following under the Queensland Heritage Act 1992

i. a place of cultural heritage significance;

ii. a Queensland heritage place, unless there is an exemption certificate issued under that Act;

(f) an area recorded in the Aboriginal Cultural Heritage Register established under the Aboriginal Cultural Heritage Act 2003, section 46, other than the area known as the 'Stanbroke Pastoral Development Holding', leased under the Land Act 1994 by lease number PH 13/5398;

(g) a feature protection area, State forest park or scientific area under the Forestry Act 1959;

(h) a declared fish habitat area under the Fisheries Act 1994;

(j) an endangered regional ecosystem identified in the database known as the 'Regional ecosystem description database' published on the department's website.

The Queensland Government's Department of Environment, Tourism, Science and Innovation's Maps of environmentally sensitive areas was used to identify ESAs related to PL 31, 32, 47, 1063 and 1064 [https://environment.des.qld.gov.au/management/maps-of-environmentally-sensitive-areas].

These maps have a single ESA category within each tenement, which is the Of Concern Regional Ecosystems (remnant biodiversity status) layer, which is categorised as Category C. A regional ecosystem is classified as category C under the *Environment Protection Act 1994* if remnant vegetation is 10-30% of its pre-clearing extent across the bioregion. This Category C mapping is considered indicative. Each tenement is represented in Figure 30, Figure 31, Figure 32, Figure 33 and Figure 34. There were no Category A (e.g. National or Conservation Parks)

or Category B (e.g. heritage, special habitat) areas occurring within or in proximity to the GKBA tenements.

Climatic conditions, especially rainfall, and existing land use, such as grazing, are the main factors influencing the condition of natural ecosystems on the tenements. Low rainfall and high summer temperatures, combined with an extremely dry and harsh climate, limit the abundance and diversity of species and habitats across the region. Further constraining these ecosystems are the historic and current land uses, particularly broad-acre grazing. This practice involves large, open areas used by domestic animals, such as cattle and sheep. The open landscape and accessible watering points have also enabled introduced species such as horses, goats, and pigs to thrive. Historic grazing practices, along with the increased presence of feral animals, are known to negatively impact the quality of natural habitats in Australia. These impacts include a decline in native species abundance and diversity, reduced ground cover, and increased soil erosion.

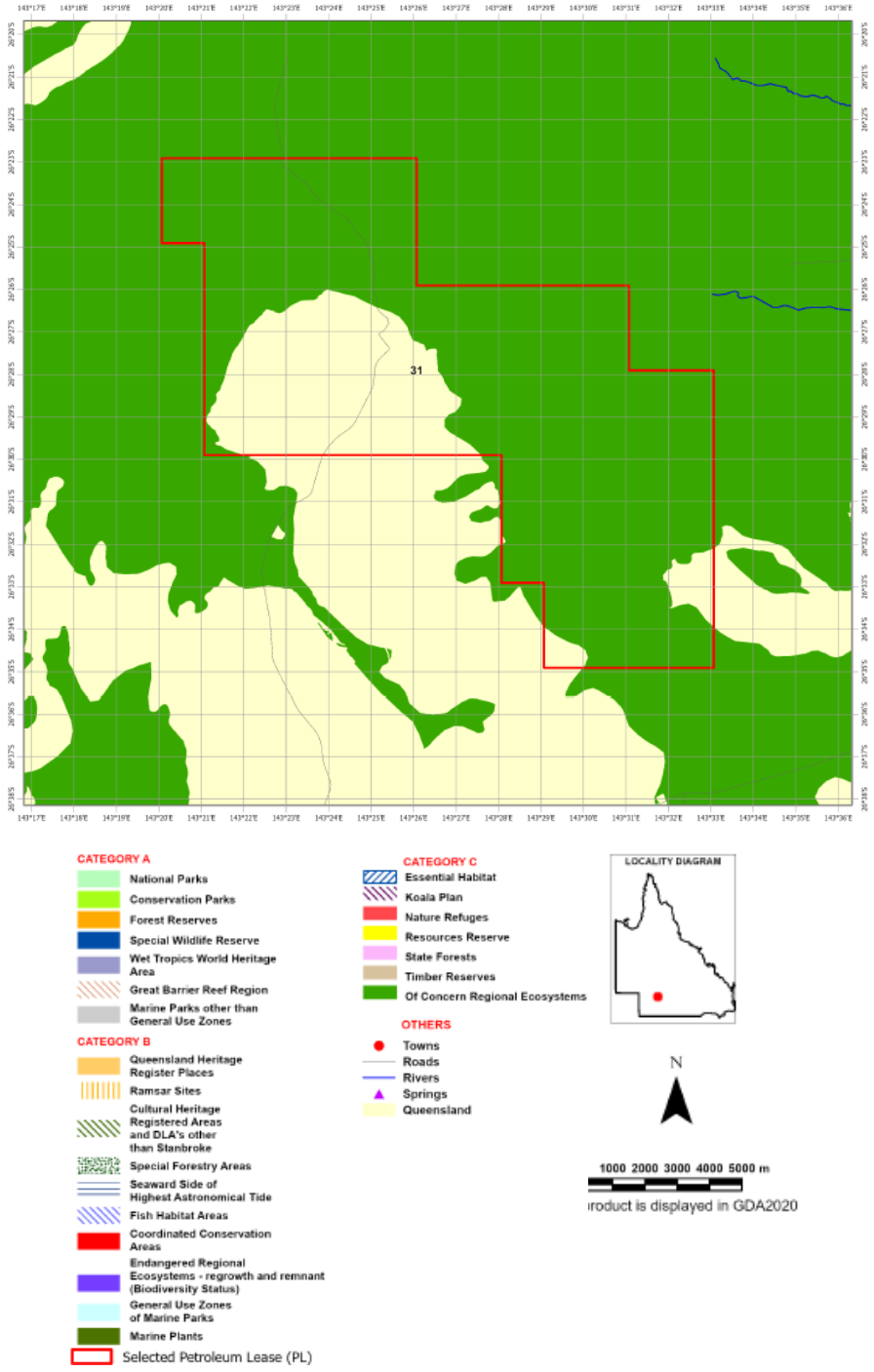


Figure 30: Environmentally sensitive areas around the PL 31 Bodalla.

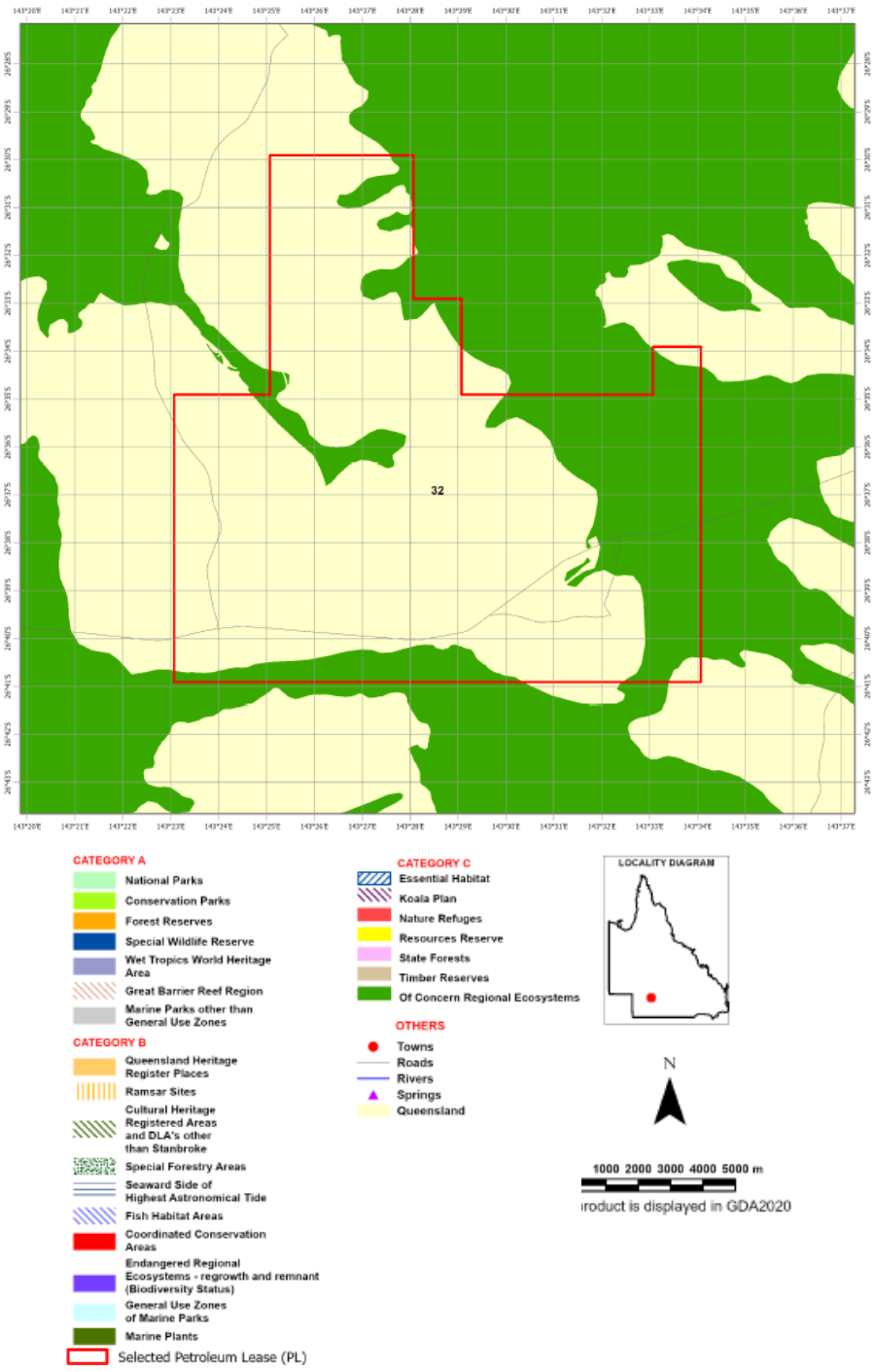


Figure 31: Environmentally sensitive areas around the PL 32 Kenmore.

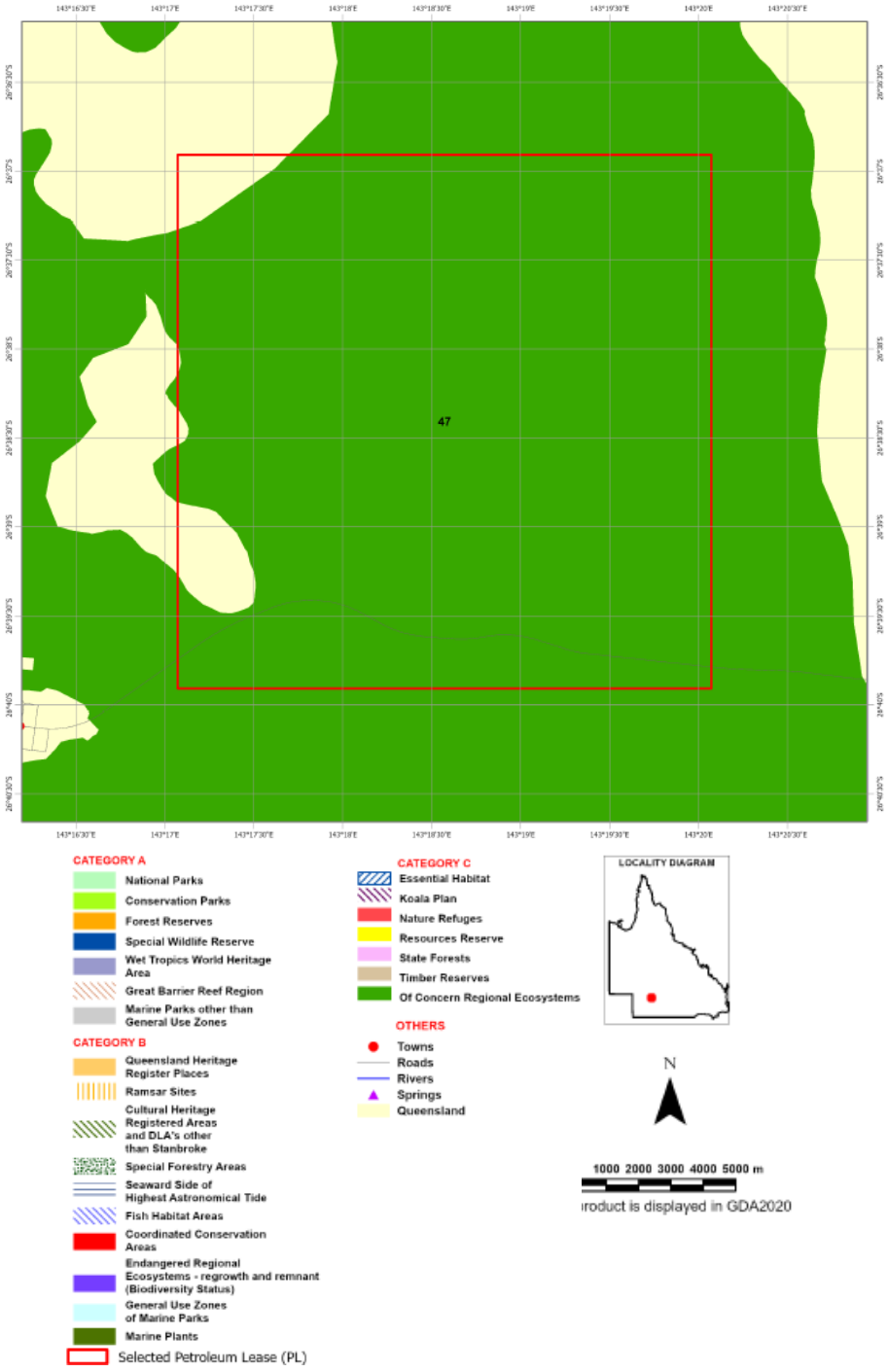


Figure 32: Environmentally sensitive areas around the PL 47 Blackstump.

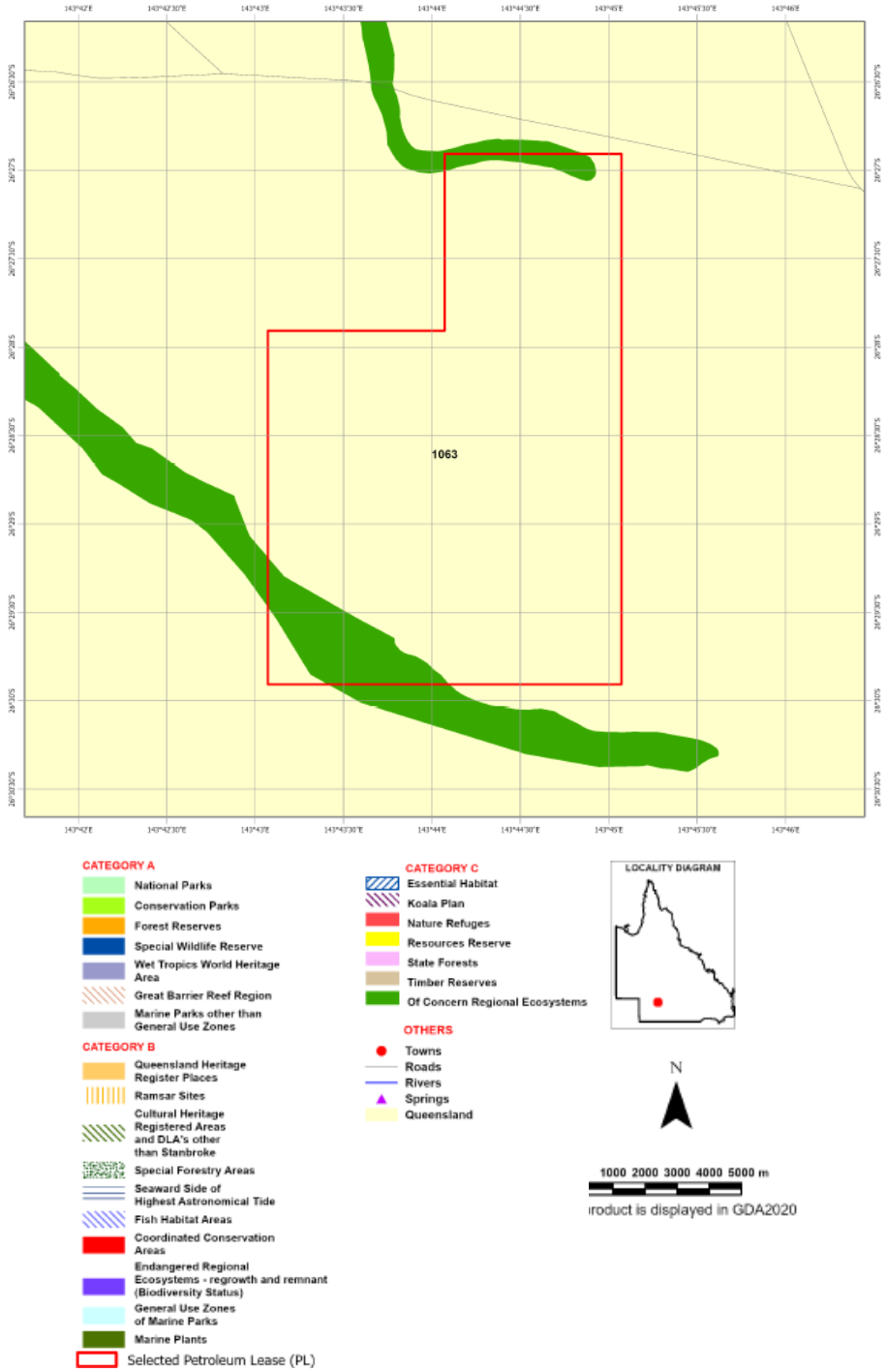


Figure 33: Environmentally sensitive areas around the PL 1063 Bargie.

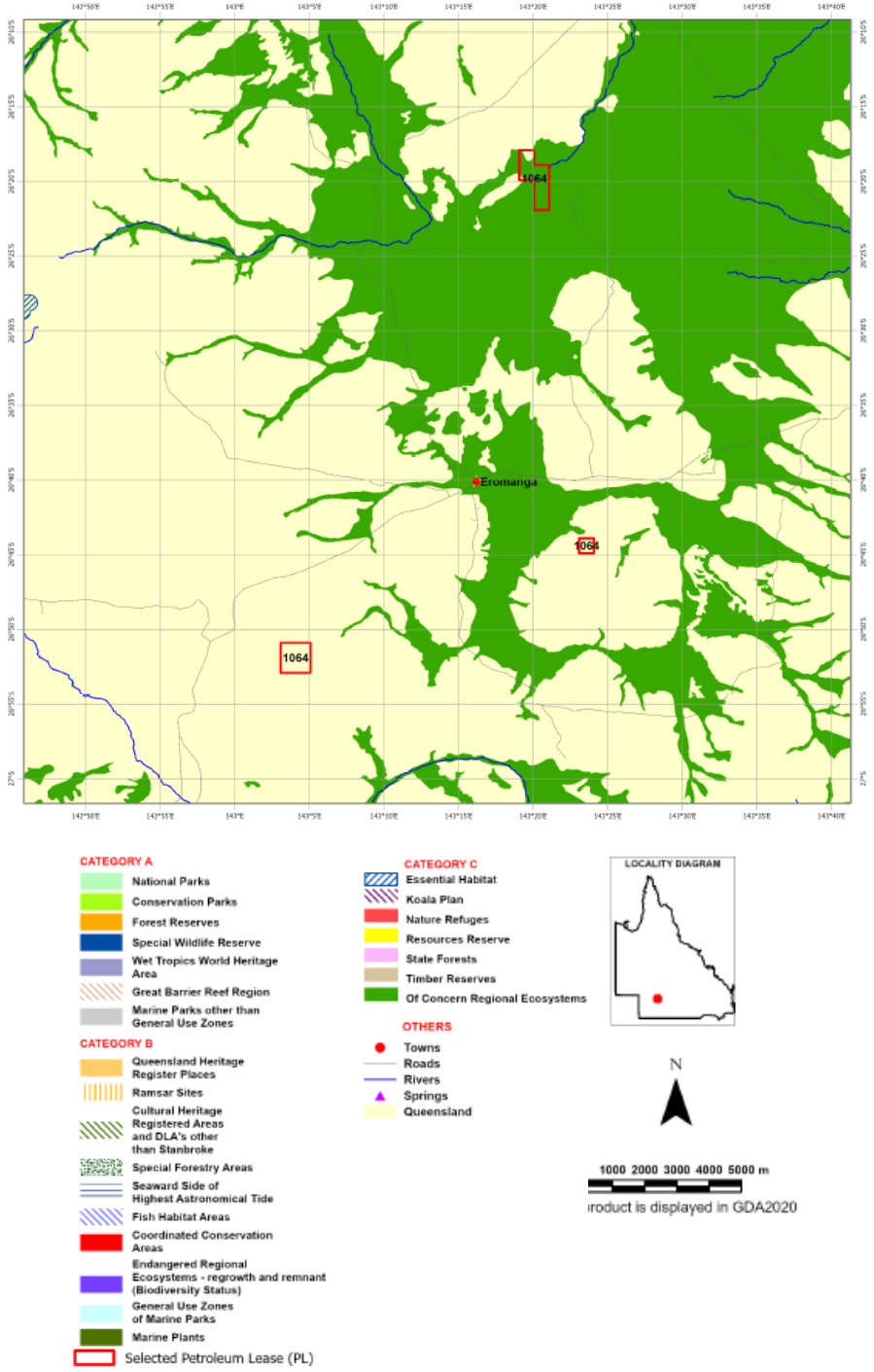


Figure 34: Environmentally sensitive areas around the PL 1064 Marcoola, Coolum & Glenvale and Marcoola.

An indication of the broader context in which the exercise of water rights takes place is explored in Figure 35.

The following layers were displayed in context to the GKBA tenement boundaries (Figure 35):

Shapefiles include:

- Coordinated conservation areas – Queensland
- Special wildlife reserves
- Nature refuges – Queensland
- Protected areas of Queensland
- Ramsar sites
- Fish habitat areas

None of these layers intersect Bridgeport Energy GKBA tenements (Figure 40). The nearest mapped ESA is approximately 100 km away from a GKBA tenement boundary.

Furthermore, none of the shallow unconfined aquifers (such as the Winton Formation (-Layer 1 in the WSP model as above)), which may affect the condition of these ESAs, are impacted or potentially impacted by water extraction within Bridgeport Energy tenements (see Section Results of sensitivity analysis modelling).

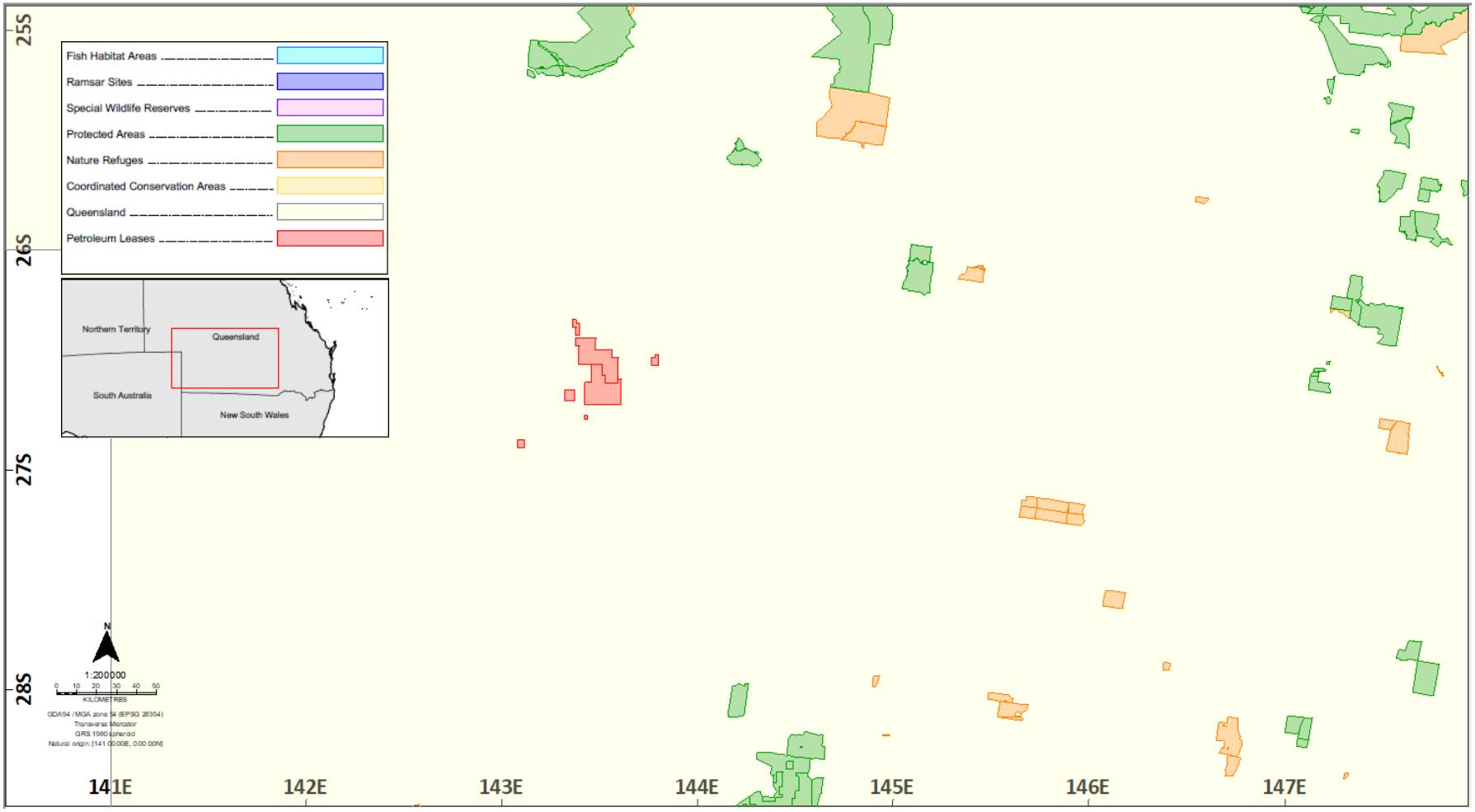


Figure 35: Relevant layers of conservation ESAs in comparison to Bridgeport Energy GKBA assets.

The following sections describe the environmentally relevant activities using various other layers (extracted from the Queensland Government resource, QSpatial).

2: Environmentally Sensitive Areas (Category A, B & C Vegetation) under the *Environmental Protection Regulation 20019*

To assess the scope of Category A environmentally sensitive areas (categorised under the *Environmental Protection Regulation 20019*), including areas other than dwellings, educational or medical institutions, commercial activities, or public amenities, a layer was obtained from the Queensland Spatial Catalogue, labelled Vegetation Management Regional Ecosystem Map.

The closest ESA to Bridgeport Energy GKBA tenements is mapped as “remnant vegetation”. Remnant vegetation is defined as being 10-30% of its pre-clearing extent across the bioregion or having more than 30% of its pre-clearing extent remaining, with the remnant area less than 100 km2. Beyond the “remnant vegetation” category, under the EP Act, the area can also be classified as Of Concern if 10-30% of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss. The only remnant regional ecosystem mapped near or within Bridgeport Energy tenements is listed as Of Concern. Remnant vegetation has been mapped using the Queensland Spatial Catalogue overlaid on the boundaries of PL 31, 32 & 47 (Figure 41).

The largest fields, PL 31 (Bodalla) and 32 (Kenmore), are classified as non-remnant areas, as they consist of cleared land for activities like agriculture and oilfield development. Land immediately surrounding each facility is regarded as of no concern. Blackstump (PL 47) lies within both a remnant Of Concern area and a no-concern area. The facility has a small footprint, utilising existing roads where possible. Bargie (PL 1063) is mainly surrounded by No Concern habitat (Figure 42), while Marcoola and Coolum & Glenvale (PL 1064) (Figure 43) are entirely in No Concern areas. Byrock (PL 1064) features mostly No-concern/Of Concern regional habitat (Figure 43).

This geospatial information was obtained from the Queensland Spatial Catalogue [http://qldspatial.information.qld.gov.au/catalogue] and edited in GIS software to better clarify the location of physical assets.

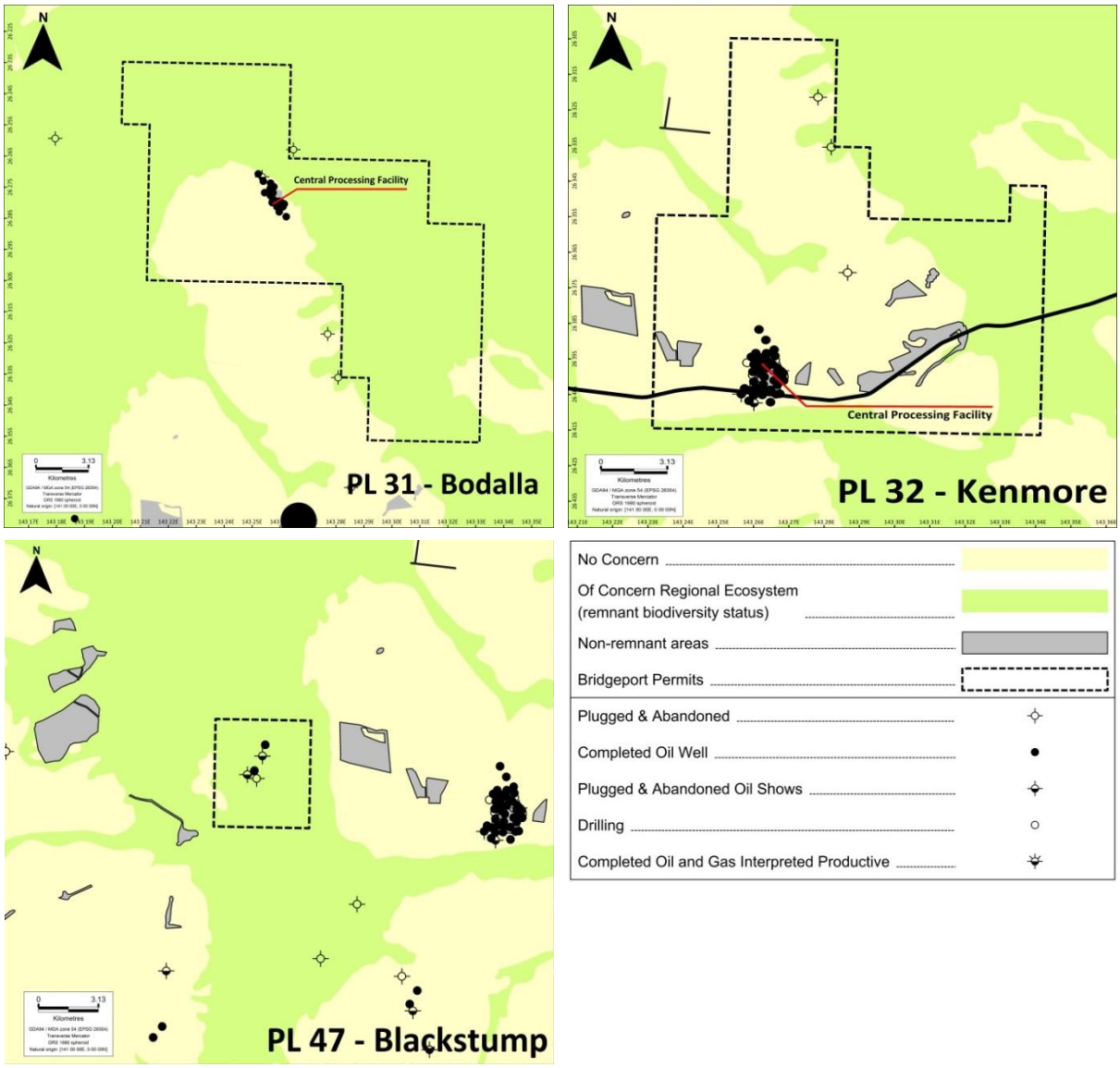


Figure 36: Environmentally sensitive areas – non-mining resource activities (EP Act) layer on the boundary of PL 31, 32 and 47.

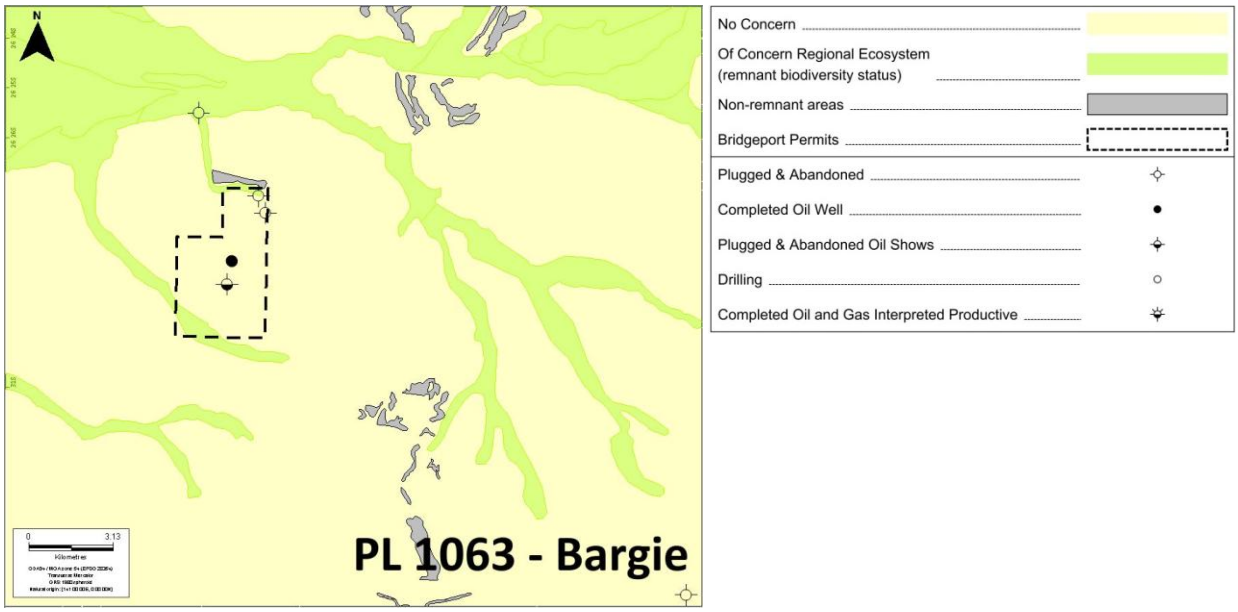


Figure 37: Environmentally sensitive areas – non-mining resource activities (EP Act) layer on the boundary of PL 1063.

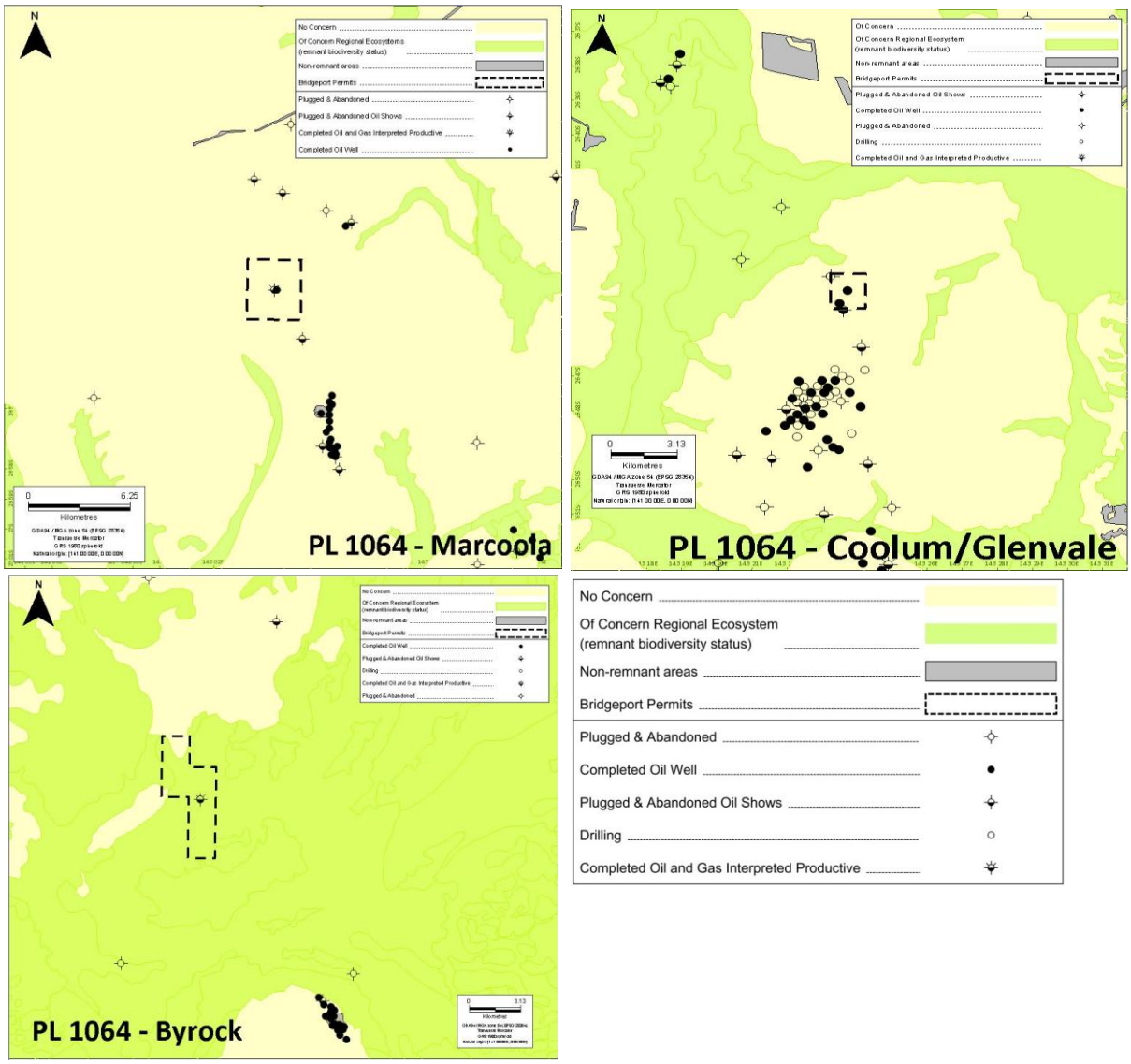


Figure 38: Environmentally sensitive areas – non-mining resource activities (EP Act) layer on the boundary of PL 1064 (Marcoola, Coolum/Glenvale and Byrock).

Bridgeport Energy tenements occur across a limited range of regional ecosystems. To describe the ecosystems where our petroleum activities take place, we use data from the State of Queensland. The state has mapped broad regional ecosystems, defined by specific vegetation communities that are consistently linked with particular combinations of geology, landform, and soil type. Within these regional ecosystems, there can be many vegetation types. The individual vegetation types associated with each broad regional ecosystem are listed in the tables below (Table 29, Table 30, Table 31, Table 32, and Table 33).

The majority of the Of Concern habitat types found within the boundaries of Bridgeport Energy tenements are related to floodplain or riverine fringing vegetation, or Tussock and Forblands. The latter is the most dominant Of Concern habitat type across our tenements. The impact from petroleum activities is limited, as most of this habitat occurs outside main facilities or oil fields.

The majority of the surface area within Bridgeport Energy tenements is dominated by the Least Concern/No concern at present Acacia dominated woodlands/shrublands, Eucalypt forest and Mulga Forest.

The broad ecosystems within the boundaries of PL 31 (Bodalla) are dominated by two types: open forests, woodlands, and shrublands dominated by Acacia, and tussock grassland and forblands. Smaller areas include Eucalypt open forests and woodlands on floodplains, as well as Acacia aneura (Mulga) dominated open forests, woodlands, and shrublands.

The most abundant broad regional ecosystems within the boundary of PL 32 (Kenmore) are Other Acacia-dominated open forests, woodlands, and shrublands. There are Eucalypt open forests and woodlands on floodplains, *Acacia aneura* (Mulga)-dominated open forests, woodland and shrublands, as well as tussock grassland and forblands. More non-remnant areas are present within PL 32, including cleared commercial and industrial surfaces, such as petroleum facilities. These mainly occur in Mulga forests. There are no field facilities in areas of the Of Concern habitat type in PL 32.

There are two main ecosystems within the boundaries of PL 47 (Blackstump): eucalypt open forests and woodlands on floodplains, and other acacia-dominated open forests, woodlands, and shrublands. A small area in the southern boundary of the tenement contains tussock grassland and forblands; this is the only part of the Concern regional ecosystem within the tenement. It is located on the southern edge of the tenement and is not affected by petroleum operations.

The types of vegetation that categorise the habitat within Bargie (PL 1063) include *Acacia aneura* (Mulga) dominated open forests, woodlands, and shrublands, as well as other Acacia dominated open forests, woodlands, and shrublands.

At Marcoola (PL 1064) the main types of vegetation include *Acacia aneura* (mulga) dominated open forests and *Acacia aneura* (mulga) woodlands and shrublands.

At Coolum & Glenvale (PL 1064) the main type of vegetation is *Acacia aneura* (mulga) dominated open forests, woodlands and shrublands.

At Byrock (PL 1064), the main types of vegetation groups are *Acacia cambagei* low woodland, *Atriplex* spp., *Sclerolaena* spp., species of *Asteraceae* and/or short grasses in open herbland, and Floodplain (excluding floodplain wetlands).

To determine Category B and C environmentally sensitive areas (ESA) under the *Environmental Protection Regulation 20019*, two layers, Category B and C endangered or Of Concern regulated vegetation layers, were overlayed with Bridgeport tenements. No protected areas occur within any GKBA tenement.

Table 22: A detailed summary of each regional ecosystem in PL 31 (Bodalla)

Regional Ecosystem	Short Description	Vegetation Management Act Class	Biodiversity Status
6.3.5	*Eucalyptus ochrophloia*, *Acacia cambagei*, *E. coolabah* woodland on alluvium	Least concern	No concern at present
6.3.6	*Acacia cambagei* low woodland on braided channels or alluvial plains	Least concern	No concern at present
6.3.13	*Atriplex* spp., *Sclerolaena* spp., species of *Asteraceae* and/or short grasses open herbland on alluvial plains	Least concern	Of Concern
6.3.13a	Floodplain (other than floodplain wetlands). Forbs, frequently *Atriplex* spp. and *Sclerolaena* spp., predominate with short grasses present, becoming co-dominant or dominant in some situations. Scattered shrubs such as *Chenopodium auricomum* and *Eremophila polyclada*. Associated with depressions on frequently flooded alluvial plains.	Not mentioned	Not mentioned
6.5.8	*Acacia aneura*, *Eucalyptus populnea*, *Eremophila gilesii* low woodland	Least concern	No concern at present
6.5.16	*Acacia aneura* groved with *Corymbia terminalis* or *C. blakei* tall open shrubland on Quaternary sediments	Least concern	No concern at present
6.6.1b	Open forbland usually with scattered low shrubs. Common forb species include *Crotalaria eremaea*, *Salsola*		Of Concern

	kali, *Tribulus terrestris* and *Chamaesyce myrtoides*. Grasses such as *Eriachne aristidea* and *Eragrostis basedowii* are common. Shrub species include *Atalaya hemiglauca*, *Acacia aneura*, *Hakea chordophylla* and *Owenia acidula* occur as scattered individuals and sometimes form an open-shrubland to 4.5 meters tall. Occurs on isolated low dunes and sand mounds, and sometimes rounded mobile crests and often occurring in groups. Occurs in the northern parts of the bioregion (subregion 10) formed from Quaternary windblown sands overlying alluvia. Soils are red to yellow siliceous sands on dunes with sandy surface texture contrast soils on flanks.		
6.7.9	*Acacia aneura*, *A. stowardii*, *Eremophila latrobei,* tall open shrubland on residuals	Least concern	No concern at present
6.7.14	*Acacia* spp., *Eucalyptus* spp. open shrubland on crests and tops of residuals	Least concern	No concern at present

Table 23: A detailed summary of each regional ecosystem in PL 32 (Kenmore)

Regional Ecosystem	Short Description	Vegetation Management Act Class	Biodiversity Status
6.3.5	*Eucalyptus ochrophloia*, *Acacia cambagei*, *E. coolabah* woodland on alluvium	Least concern	No concern at present
6.3.6	*Acacia cambagei* low woodland on braided channels or alluvial plains	Least concern	No concern at present
6.3.13	*Atriplex* spp., *Sclerolaena* spp., species of *Asteraceae* and/or short grasses open herbland on alluvial plains	Least concern	Of Concern
6.3.13a	Floodplain (other than floodplain wetlands). Forbs, frequently *Atriplex* spp. and *Sclerolaena* spp., predominate with short grasses present, becoming co-dominant or dominant in some situations. Scattered shrubs such as *Chenopodium auricomum* and *Eremophila polyclada*. Associated with depressions on frequently flooded alluvial plains.	Not mentioned	Not mentioned
6.5.16	*Acacia aneura* groved with *Corymbia terminalis* or *C. blakei* tall open shrubland on Quaternary sediments	Least concern	No concern at present
6.7.9	*Acacia aneura*, *A. stowardii*, *Eremophila latrobei,* tall open shrubland on residuals	Least concern	No concern at present
6.7.14	*Acacia* spp., *Eucalyptus* spp. open shrubland on crests and tops of residuals	Least concern	No concern at present

Table 24: A detailed summary of each regional ecosystem in PL 47 (Blackstump)

Regional Ecosystem	Short Description	Vegetation Management Act Class	Biodiversity Status
6.3.5	*Eucalyptus ochrophloia*, *Acacia cambagei*, *E. coolabah* woodland on alluvium	Least concern	No concern at present
6.3.6	*Acacia cambagei* low woodland on braided channels or alluvial plains	Least concern	No concern at present
6.3.13	*Atriplex* spp., *Sclerolaena* spp., species of *Asteraceae* and/or short grasses open herbland on alluvial plains	Least concern	Of Concern

Table 25: A detailed summary of each regional ecosystem in PL 1063 (Bargie)

Regional Ecosystem	Short Description	Vegetation Management Act Class	Biodiversity Status
6.7.7	*Acacia catenulate*, *Eucalyptus thozetiana* and/or *A. ensifolia* low open woodland with *Triodia spp.* and/or *A. petraea*, *A. aneura* on scarps and plateaus	Least concern	No concern at present
6.7.9	*Acacia aneura*, *A. stowardii*, *Eremophila latrobei,* tall open shrubland on residuals	Least concern	No concern at present
6.7.14	*Acacia* spp., *Eucalyptus* spp. open shrubland on crests and tops of residuals	Least concern	No concern at present
6.9.4	*Acacia cambagei, Senna spp., Sida platycalyx* tall open shrubland on undulating mantled pediments and scarp retreat zones	Least concern	No concern at present

Table 26: A summary of each regional ecosystem in Marcoola, Coolum & Glenvale and Byrock (PL 1064)

Tenement	Regional Ecosystem	Short Description	Vegetation Management Act Class	Biodiversity Status
Marcoola	5.5.2	*Acacia aneura* low open woodland, *Acacia sibirica* & *Eremophila latrobei* on Quaternary deposits	Least concern	No concern at present
	5.6.2	*Acacia georginae* and/or *Acacia cambagei* low open woodland, *Eremophila spp.* on interdune areas and clay plains at interface with dune fields	Least concern	No concern at present
	6.7.14	*Acacia* spp., *Eucalyptus* spp. open shrubland on crests and tops of residuals	Least concern	No concern at present
Coolum & Glenvale	6.5.16	*Acacia aneura* groved with *Corymbia terminalis* or *C. blakei* tall open shrubland on Quaternary sediments	Least concern	No concern at present
	6.7.9	*Acacia aneura*, *A. stowardii*, *Eremophila latrobei,* tall open shrubland on residuals	Least concern	No concern at present

	6.7.14	*Acacia* spp., *Eucalyptus* spp. open shrubland on crests and tops of residuals	Least concern	No concern at present
	6.7.17	*Eriachne mucronata* open grassland wooded with *Acacia aneura* and/or *Corymbia terminalis* on plains or flat tops of residuals	Least concern	No concern at present
Byrock	6.3.6	*Acacia cambagei* low woodland on braided channels or alluvial plains	Least concern	No concern at present
	6.3.13	*Atriplex* spp., *Sclerolaena* spp., species of *Asteraceae* and/or short grasses open herbland on alluvial plains	Least concern	Of Concern
	6.3.13a	Floodplain (other than floodplain wetlands). Forbs, frequently *Atriplex* spp. and *Sclerolaena* spp., predominate with short grasses present, becoming co-dominant or dominant in some situations. Scattered shrubs such as *Chenopodium auricomum* and *Eremophila polyclada*. Associated with depressions on frequently flooded alluvial plains.	Not mentioned	Not mentioned

3: Matters of Environmental Significance (MNES) under the *Environmental Protection and Biodiversity Conservation Act 1999*

To identify Matters of Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999*, the Australian Federal Government's Protected Matters Search Tool was utilised. Each tenement served as a search boundary, with a 1km buffer applied. The tool supplies information and details on all matters of national environmental significance overlapping each tenement. This includes threatened species and those listed under the *Environment Protection and Biodiversity Conservation Act 1999*. The tool lists all matters that "may occur in, or may relate to" the search area and is intended as an indicative guide only.

Regarding threatened species, the tool compares the search area to known distribution ranges for each species, categorised as "Species or species habitat likely to occur" and "Species or species habitat may occur" within the search area. The species listed below may or may not occur within Bridgeport Energy tenements, and local knowledge should be considered alongside the information from the tool. To Bridgeport Energy's knowledge, there has been no record of a threatened species on PL 31, 32 & 47, PL 1063 or PL 1064. Threatened

species and their status under the Environment Protection and Biodiversity Conservation Act (1999) are detailed in Table 34. There are numerous Matters of National Environmental Significance species whose distribution is mapped as potentially occurring over Bridgeport tenements. There were multiple Listed Threatened Species (Table 27). These species are known to have ranges potentially occurring over PL 31, 32 & 47, PL 1063 and PL 1064 (Table 27).

To Bridgeport Energy's knowledge, none of these species has been physically recorded or sighted on Bridgeport Energy tenements.

There are "other matters protected by the EPBC Act" provided as part of the records search not included in Table 27 (for brevity) and include Listed Marine Species and migratory (terrestrial, wetland and bird) species).

Coongie Lakes is listed as a Ramsar Wetland of International Importance in the Protected Matters Report tool for each tenement. Each tenement occurs 200-300km upstream from Coongie Lakes.

This geospatial/distribution information was accessed from the Australian Governments Department of Environment and Energy's Protected Matters Search Tool website [https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool] in 2025. Layers used are described in Table 28.

Table 27: A list of Threatened species whose distribution as recorded by the Australian Governments Protected Matters Search Tool, overlapping Bridgeport tenements.

Species	Listing Status*	PL 31	PL 32	PL 47	PL 1063	PL 1064
Birds						
Amytornis barbatus barbatus (Grasswren)	Endangered					√
Aphelocephala leucopsis (Southern Whiteface)	Vulnerable	√	√	√	√	√
Calidris acuminata (Sharp-tailed Sandpiper)	Vulnerable	√	√	√	√	√
Calidris ferruginea (Curlew Sandpiper)	Critically Endangered	√	√	√	√	√
Erythrotriorchis radiatus (Red Goshawk)	Endangered	√	√		√	√
Falco hypoleucos (Grey Falcon)	Vulnerable	√	√	√	√	√
Gallinago hardwickii (Latham's Snipe)	Vulnerable	√	√	√	√	√
Grantiella picta (Painted Honeyeater)	Vulnerable	√	√	√	√	√
Lophochroa leadbeateri leadbeateri (Major Mitchell)	Endangered	√	√	√	√	√
Neophema chrysostoma (Blue-winged Parrot)	Vulnerable	√	√	√	√	√
Pedionomus torquatus (Plains-wanderer)	Critically Endangered	√	√	√	√	√
Pezoporus occidentalis (Night Parrot)	Endangered	√	√	√	√	√
Rostratila australis (Australian Painted Snipe)	Endangered	√	√	√	√	√
Mammals						
Petrogale xanthopus celeris (Yellow-footed Rock Wallaby)	Vulnerable		√		√	√
Macroderma gigas (Ghost Bat)	Vulnerable	√			√	√
Vegetation						
Frankenia plicata (Frankenia)	Endangered					√
Sclerolaena walkeri (Copperburrs)	Vulnerable	√	√	√	√	√
Xerothamnella parvifolia (Small-leaved Little Dry Shrub)	Vulnerable	√	√	√	√	√
Wetlands						
Coongie Lakes	In feature area	√	√	√	√	√

*Environment Protection and Biodiversity Conservation Act 1999

4: Matters of State Environmental Significance (MNES) under the Environmental Offsets Regulation (2014)

There are no areas that trigger an Offset requirement (Spatial Catalogue layer: MSES_Legally_secured_offset_area_vegetation_offsets and MSES Legally secured offset area offset register) in either PL 31, 32 & 47, PL 1063 or PL 1064.

5: Areas of regional interest under the Regional Planning Interest Act 2014

To identify areas of regional interest under the Regional Planning Interest Act 2014, three layers were used: Queensland Regional Planning Interests' Priority Living Areas, Priority Agricultural Areas, and Strategic Environmental Areas shape files.

There were no Priority agricultural areas and priority living areas overlapping PL 31, 32 & 47, PL 1063 and PL 1064. There was a Strategic Environmental Area (designated precinct 2.11, Channel Country – Critical minerals Reach) area overlapping portions of PL 31, 47 and PL 1064.

6: Endangered, vulnerable, rare or near threatened wildlife species under the Nature Conservation Act 1992

To identify areas potentially affected by water rights activities on endangered, vulnerable, rare, or near-threatened wildlife species under the Nature Conservation Act 1992, layers from the Queensland Spatial Catalogue, including protected areas of Queensland, Nature Refuges Queensland, and Nature Conservation Act Protected Plant Species, were overlaid on Bridgeport tenements. None of these layers overlap the GKBA tenements.

7: Watercourse, wetlands, springs (including relevant environmental values) or river improvement trust asset areas

Watercourses, wetlands and springs are discussed in the appropriate Sections above.

Table 28: Summary of the important environmental features of the land, and spatial layers from DETSI.

Category	Relevant			GIS data used to determine relevance*
	PL 31, 32 & 47	PL 1063	PL 1064	
1: Category A environmentally sensitive areas (ESA) under the *Environmental Protection Regulation 2019*	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	Queensland Government Department of Environment and Sciences' Maps of environmentally sensitive areas webpage
2: Category B environmentally sensitive areas (ESA) under the *Environmental Protection Regulation 2019*	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	MSES___Regulated_vegetation___category_B_endangered_or_of_concern
3: Category C environmentally sensitive areas (ESA) under the *Environmental Protection Regulation 2019*	☐ No ☑ Yes	☐ No ☑ Yes	☐ No ☑ Yes	MSES___Regulated_vegetation___category_C_endangered_or_of_concern
3: Matters of National Environmental Significance (MNES) under the *Environmental Protection and Biodiversity Conservation Act 1999*	☐ No ☑ Yes	☑ No ☐ Yes	☑ No ☐ Yes	Australian Federal Governments Protected Matters Interactive Search Tool, that provides indicative ranges of species, described in more detail above.
4: Matters of State Environmental Significance (MSES) under the *Environmental Offsets Regulation 2014*	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	Matters of state environmental significance: Legally secured offset area - offset register Legally secured offset area - vegetation offsets
5: Areas of regional interest under the *Regional Planning Interest Act 2014*	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	Regional_planning_interests_Priority_living_area Regional_planning_interests_Priority_agricultural_area Regional_planning_interests_Strategic_environmental_area
6: Endangered, vulnerable, rare or near threatened wildlife species under the *Nature Conservation Act 1992*	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	Protected_areas (estate) Protected_areas (nature refuges) Coordinated conservation areas Special wildlife reserves Nature Conservation Act Protected Plant Species
7: Watercourse, wetlands, springs (including relevant environmental values) or river improvement trust asset areas	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	Watercourse areas Major watercourse lines Groundwater Dependent Ecosystems (Watercourses) Pondage Water plan (waterholes and lakes) Active Springs Directory of important wetlands Groundwater Dependent Ecosystems (Springs) MSES (high ecological significance wetlands) Watercourse identification map (watercourses) River Improvement Trust Areas (Queensland) et al.

Bridgeport Energy Risk Allocation

D.16.1 Bridgeport Energy has assessed the likelihood of environmentally sensitive areas being affected by the previous activity of underground water rights as a Likelihood of E, or Rare, with the explanation that it (2) May occur in exceptional circumstances. The consequence of impact is considered Moderate, leading to a Low consequence level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring), reviewing their effectiveness, and escalating the risk level if necessary.

D.16.2.i. Bridgeport Energy has assessed the likelihood of environmentally sensitive areas being impacted by the exercise of underground water rights over the next three years as a Likelihood of E, or Rare, with the explanation being that it may occur in exceptional circumstances (2). The consequence of impact is considered Moderate, resulting in a Low impact level. Actions required from this risk assessment include applying relevant safeguards (e.g., monitoring), reviewing their effectiveness, and escalating the risk level if necessary.

D.16.2.ii. Bridgeport Energy has assessed the likelihood of environmentally sensitive areas being affected over the life of the resource tenure from exercising underground water rights as a Likelihood of E, or Rare, with the explanation that (2) may occur in exceptional circumstances. The impact's consequence is Moderate, resulting in a Low consequence level. Actions required for this risk include applying relevant safeguards (e.g., monitoring), reviewing their effectiveness, and escalating the risk level if necessary.

This conclusion is appropriate because there are no environmentally sensitive areas that would be impacted on or near the Bridgeport tenements, and suitable safeguards are in place to review environmentally sensitive areas before any physical activity occurs, which are unlikely to change over time.

Conclusion: Summary of the Assessment of Environmental Values

The tenements relating to this UWIR are located in a rugged and remote part of south-western Queensland. The land has been heavily disturbed by widespread, extensive, and intensive stock grazing over long periods. Grazing pressure, along with the effects of a harsh

climate, has significantly influenced the presence and quality of environmental values across a broad area, especially near petroleum production assets. Where environmental features and values exist, these do not depend on groundwater, meaning they are not groundwater-dependent ecosystems. Considering the licenced water extraction occurs from an isolated region more than 1,400 meters below the surface, it is geologically and physically separated from the primary water target in the Winton formation (less than 100 meters deep). Modelling confirms there is no direct impact at the surface from water extraction in the petroleum target aquifers. Consequently, the chances of environmental values being impacted are rare, unlikely, or impossible (Table 36).

Table 29: Summary of the associated likelihood, consequence and therefore associated environmental risk as a consequence of exercising the right to take water for each Environmental Value.

Section	Environmental Value	UWIR Requirement	Likelihood	Consequence	Environmental Risk
D.1	**Aquatic ecosystem**	**D.1.1**	Unlikely	Minor	Low
		D.1.2.i	Unlikely	Minor	Low
		D.1.2.ii	Unlikely	Minor	Low
D.2	**High ecological/conservation value waters**	**D.2.1**	Incapable of occurring	Insignificant	No Risk
		D.2.2.i	Incapable of occurring	Insignificant	No Risk
		D.2.2.ii	Incapable of occurring	Insignificant	No Risk
D.3	**Slightly disturbed waters**	**D.3.1**	Incapable of occurring	Insignificant	No Risk
		D.3.2.i	Incapable of occurring	Insignificant	No Risk
		D.3.2.ii	Incapable of occurring	Insignificant	No Risk
D.4	**Moderately disturbed waters**	**D.4.1**	Incapable of occurring	Insignificant	No Risk
		D.4.2.i	Incapable of occurring	Insignificant	No Risk
		D.4.2.ii	Incapable of occurring	Insignificant	No Risk
D.5	**Highly disturbed waters**	**D.5.1**	Unlikely	Minor	Low
		D.5.2.i	Unlikely	Minor	Low
		D.5.2.ii	Unlikely	Minor	Low
D.6	**Irrigation**	**D.6.1**	Incapable of occurring	Insignificant	No Risk
		D.6.2.i	Incapable of occurring	Insignificant	No Risk
		D.6.2.ii	Incapable of occurring	Insignificant	No Risk
D.7	**Farm water supply/use**	**D.7.1**	Incapable of occurring	Insignificant	No Risk

		D.7.2.i	Incapable of occurring	Insignificant	No Risk
		D.7.2.ii	Incapable of occurring	Insignificant	No Risk
D.8	**Stock watering**	**D.8.1**	Rare	Minor	Low
		D.8.2.i	Rare	Minor	Low
		D.8.2.ii	Rare	Minor	Low
D.9	**Human consumers of aquatic foods**	**D.9.1**	Incapable of occurring	Insignificant	No Risk
		D.9.2.i	Incapable of occurring	Insignificant	No Risk
		D.9.2.ii	Incapable of occurring	Insignificant	No Risk
D.10	**Primary recreation**	**D.10.1**	Incapable of occurring	Insignificant	No Risk
		D.10.2.i	Incapable of occurring	Insignificant	No Risk
		D.10.2.ii	Incapable of occurring	Insignificant	No Risk
D.11	**Secondary recreation**	**D.11.1**	Incapable of occurring	Insignificant	No Risk
		D.11.2.i	Incapable of occurring	Insignificant	No Risk
		D.11.2.ii	Incapable of occurring	Insignificant	No Risk
D.12	**Visual recreation**	**D.12.1**	Incapable of occurring	Insignificant	No Risk
		D.12.2.i	Incapable of occurring	Insignificant	No Risk
		D.12.2.ii	Incapable of occurring	Insignificant	No Risk
D.13	**Drinking water supply**	**D.13.1**	Incapable of occurring	Insignificant	No Risk
		D.13.2.i	Incapable of occurring	Insignificant	No Risk
		D.13.2.ii	Incapable of occurring	Insignificant	No Risk
D.14	**Industrial use**	**D.14.1**	Incapable of occurring	Insignificant	No Risk

		D.14.2.i	Incapable of occurring	Insignificant	No Risk
		D.14.2.ii	Incapable of occurring	Insignificant	No Risk
D.15	**Cultural and spiritual values**	**D.15.1**	Rare	High	Medium
		D.15.2.i	Rare	High	Medium
		D.15.2.ii	Rare	High	Medium
D.16	**Environmentally Sensitive Areas**	**D.16.1**	Rare	Moderate	Low
		D.16.2.i	Rare	Moderate	Low
		D.16.2.ii	Rare	Moderate	Low

Part E*: Water monitoring strategy

Requirements under section 378 of the Water Act
To meet the requirements of the Water Act, an UWIR must include the following; **1. A rationale for the strategy** **2. A timetable for strategy** **3. The parameters to be measured** **4. The locations for taking measurements** **5. The frequency of the measurements** **6. A program for the responsible tenure holder or holders to undertake a baseline assessment for each water bore that is outside the area of a resource tenure, but within the predicted LTAA; and** **7. A program for reporting to the OGIA about the implementation of the monitoring strategy.**

*Part E refers to Section 5.1.5 (page 18) of the guideline (DETSI 2025).

Based on the hydrogeological conceptualisation and the findings of the groundwater impact assessment for both IAA and the LTAA outlined in this UWIR, the groundwater resources potentially impacted from Bridgeport's GKBA operations are the oil reservoir formations, namely the Hutton Sandstone and Birkhead Formations. These aquifers are located at depths of 1,000-1,200 metres below the shallow groundwater extraction zones, such as the Winton and Mackunda Formations used by pastoralists. The upper formations are also hydraulically separated by the Allaru, Toolebuc and Wallumbilla aquitard layer.

Although no adverse impacts on environmental or pastoral values within either the IAA or LTAA are anticipated, a groundwater monitoring program is proposed to validate these predictions. In addition to the ongoing pressure monitoring of six production wells, it is proposed that two nearby registered water bores also be included in the monitoring network to confirm that no impacts are occurring at these existing groundwater users (Winton and

Mackunda Formations). Standing water level will be measured via manual dip where feasible. Water monitoring at the two registered bores will commence in 2026.

If the nominated monitoring bores are not suitable due to access for equipment or other factors, then an alternative bore targeting similar depths will be used. Updated monitoring bore information will be provided in the UWIR annual review.

Water extraction rates for all production wells are monitored on an ongoing basis. Bridgeport has also adopted a surface condition (pressure) monitoring program for shut-in wells in the GKBA area. The objective of this program is to take periodic measurements of the shut-in wellhead pressure (SITHP) at selected shut-in wells across the fields. The wells are selected based on their current shut-in status and suitability for monitoring, as well as their spread across the field and access to the relevant producing formations. Significant changes in reservoir pressure can indicate alterations in wellbore or reservoir conditions.

Details of the monitoring bores are shown in Table 30.

An annual review of monitoring data will be undertaken to determine whether there are any material changes in groundwater conditions or changes to the existing conceptual model. Results of the annual monitoring data review and water monitoring strategy implementation will be reported in the annual report. If gaps are identified in the water monitoring strategy, then additional programs will be developed and detailed in the annual UWIR review.

Ongoing water monitoring and assessment will improve the understanding of the impacts of underground water extraction on aquifers by providing long-term data recording changes to aquifer conditions in response to specific extraction rates.

Table 30: Details of UWIR groundwater monitoring parameters and frequency

Bore ID[1]	Formation	Tenure	Type	Location	Aquifer pressure (SITHP)	Volume extracted	Water level	Water Quality	
								Parameters	Frequency
TBC[1]	Winton	PL32	Shallow Pastoral bore	TBC	-	-	Manual dip where feasible (annual)	pH, EC/TDS, Major ions, Major anions, metals	Annually
TBC[1]	Winton	PL32	Shallow Pastoral bore	TBC	-	-	Manual dip where feasible (annual)	pH, EC/TDS, Major ions, Major anions, metals	Annually
Kenmore 5	Hutton	PL32	Oil production	-26.6546 143.4452	Quarterly	Monthly	-	-	-
Kenmore 22	Hutton	PL32	Oil production	-26.659956 143.4449	Quarterly	Monthly	-	-	-
Kenmore 29	Hutton	PL32	Oil production	-26.6624 143.4277	Quarterly	Monthly	-	-	-
Kenmore 31	Hutton	PL32	Oil production	-26.6510 143,4319	Quarterly	Monthly	-	-	-
Bodalla 4	Hutton	PL31	Oil production	-26.450428 143.4203	Quarterly	Monthly	-	-	-
Bodalla 8	Hutton	PL31	Oil production	-26.45564 143.4305	Quarterly	Monthly	-	-	-

[1] The specific bore to be monitored is to be determined in collaboration with the relevant landholder for the water bores and shut in status for the production wells.

Part F*: Spring impact management strategy

Requirements under section 379 of the Water Act
To meet the requirements of the Water Act, an UWIR must include the following: **1. The details of the spring, including its location;** **2. An assessment of the connectivity between the spring and the aquifer(s) over which the spring is located:** **3. The predicted risk to, and likely impact on, the ecosystem and cultural and spiritual values of the spring because of the decline in water level of the aquifer over which the spring is located;** **4. A strategy for preventing or mitigating the predicted impacts outlined above; or if a strategy for preventing or mitigating the predicted impacts is not included, the reason for not including the strategy;** **5. A timetable for implementing the strategy; and** **6. A program for reporting to OGIA about the implementation of the strategy.**

*Part F refers to Section 5.1.6 (page 20) of the guideline (DETSI 2025).

There are no Great Artesian Basin (GAB) Springs within the boundaries of the GKBA tenements. There are no GAB Springs in the LTAA/IAA area. The nearest GAB Spring is located 200 km to the south-west of GKBA. Considering the volumes extracted and the distance to the spring, it is considered there is no connectivity between this spring and the aquifers that are potentially impacted by Bridgeport and its extraction.

No other Groundwater Dependent Ecosystem (GDE) has been identified within the boundaries of GKBA or within the LTAA/IAA areas.

The predicted risk and impact on springs are therefore zero, given their complete absence from areas related to resource extraction, including within or near the tenement boundaries of GKBA or the LTAA/IAA.

Part G (a)*: For a CMA assign responsibility to resource tenure holders

Requirements under section 365, 369, 374 *et. al.* of the Water Act
If OGIA is responsible for preparing the UWIR or final report, the UWIR must: **1. Propose a responsible tenure holder for each report obligation; and** **2. For each IAA, propose a responsible tenure holder who must comply with any make good obligations for water bores within the IAA.** **Report obligations may include obligations relating to Part E and F of the UWIR.**

*Part G refers to Section 5.1.7 (page 24) of the guideline (DETSI 2025).

Under the Water Act, a Cumulative Management Area (CMA) can be declared where multiple resource tenures operate, as these may have a combined impact on groundwater due to their resource extraction.

The Queensland Chief Executive has declared the Surat Cumulative Management Area under the Water Act (2000). The GKBA tenures (PL 31, 32 & 47, PL 1063 and PL 1064) are not within this declared area or any other declared CMA. OGIA is therefore not responsible for preparing a UWIR or final report for these tenements under a CMA.

Part G (b): Final Reports

Requirements under section 377 of the Water Act
In addition, a final report must include the following additional information to meet the requirements of the Water Act: **1. A summary about underground water bores in the LTAA (including the number of bores and the location and authorised use or purpose of each bore)** **2. A summary about how the make good obligations of the responsible tenure holder for each water bore to which the final report relates have been compiled with by the holder over the term of the tenure;** **3. A summary of the make good obligation of the responsible tenure holder for each water bore that have not yet been compiled with by the holder and a plan about how these obligations will be complied with; and** **4. Statements about any matters outlined in previous strategies that have not yet been complied with, along with a timetable of planned actions to address these outstanding matters.**

*Part G refers to Section 6 (page 24) of the guideline (DETSI 2025).

A summary about underground water bores in the LTAA (including the number of bores and the location and authorised use or purpose of each bore)

Modelling by WSP (results in sections above) indicated that no wells in unconfined aquifers would be affected by an IAA or LTAA.

A summary about how the make good obligations of the responsible tenure holder for each water bore to which the final report relates have been compiled with by the holder over the term of the tenure;

There are no make good obligations that the responsible tenure holder has identified to be complied with, as no bores sit within an IAA or LTAA.

A summary of the make good obligation of the responsible tenure holder for each water bore that have not yet been compiled with by the holder and a plan about how these obligations will be complied with;

There are no make good obligations that the responsible tenure holder has not yet complied with.

Statements about any matters outlined in previous strategies that have not yet been complied with, along with a timetable of planned actions to address these outstanding matters.

There were no matters outlined in previous strategies that have not yet been complied with. There is therefore no timetable or planned actions to address any outstanding matters.

Part H*: Additional Information, including public consultation

Requirements under section 381 and 382(3) of the Water Act
To meet the requirements under section 382(3) of the Water Act, a public notice must state the following; - **A description of the area to which the report relates;** - **That copies of the report may be obtained from the responsible entity;** - **How the copies may be obtained;** - **That written submissions on the report may be given;** - **That submissions must be given to the responsible entity:** - **That a copy of the submission must be given to the Chief Executive** - **A day that is at least 20 business days after the notice is published by which submissions may be made; and** - **Where the submissions may be given.**

*Part H refers to Section 4.5 (page 8) of the guideline (DETSI 2025).

Bridgeport Energy undertook public consultation following the requirements of the Underground water impact reports and final reports Guideline (DETSI 2025).

A description of the area to which the report relates;

The public consultation notice included a brief description of the area to which the report relates;

> *e.g. "… Bridgeport Energy Pty Ltd has developed an underground water impact report (UWIR) for its operations within PL 1063, PL 1064 and PL 31, 32 & 47 located in the Eromanga Basin, ~280km west of Charleville."*

The public notice also includes a map of the region, including main roads, main town names, highlighted tenements and rivers (a feature many people use in the region) to also graphically represent the area to which the report relates.

That copies of the report may be obtained from the responsible entity and how they can be obtained;

The public consultation notice included a statement on where the report may be obtained;

> *"You have the opportunity to review and comment on this UWIR. You can access the UWIR by visiting www.bridgeport.net.au You can also phone (02) 8960 8400 to arrange for a hard copy to be posted to you."*

That written submissions on the report may be given;

The public consultation notice included a statement on written submissions;

> *"Written submissions on any of the UWIRs may be made to Bridgeport Energy Pty Ltd and mailed to:*
>
> *Attn: Erik Kadri*
> *Bridgeport Energy*
> *Level 7, 111 Pacific Highway*
> *Sydney NSW 2060"*

That submissions must be given to the responsible entity;

The public consultation notice included a statement on how submissions must be given to the responsible entity;

> *"Written submissions on any of the UWIRs may be made to Bridgeport Energy Pty Ltd and mailed to:*
>
> *Attn: Erik Kadri*
> *Bridgeport Energy*
> *Level 7, 111 Pacific Highway*
> *Sydney NSW 2060"*

That a copy of the submission must be given to the Chief Executive;

The public consultation notice included a statement on how all submissions must be given to the chief executive;

> *"Please note that as required by Section 382(3)(d) of the Water Act, copies of all received submissions must be provided to the Chief Executive. All submissions will be considered as part of the assessment process."*

A day that is at least 20 business days after the notice is published by which submissions may be made;

The public consultation notice included a statement on a date, which was at least 20 business days after the publication notice (first published on 22/08/2025), by which submissions could be made;

> *"Your submission must be: In writing and received by COB 29/09/2025"*

Where the submissions may be given;

The public consultation notice will include a statement on where the submission may be given;

> *"Written submissions on any of the UWIRs may be made to Bridgeport Energy Pty Ltd and mailed to:*
>
> *Attn: Erik Kadri*
> *Bridgeport Energy*
> *Level 7, 111 Pacific Highway*
> *Sydney NSW 2060"*

The public advertisement (approximately 160mm x 40mm coloured ad) has been published across multiple issues of the Maranoa Today, a regional newspaper circulated in rural Queensland.

The total number of Business days the public consultation ad has been featured in The Maranoa Today was 25 business days.

The UWIR was available online [www.bridgeport.net.au] from 22/08/2025 up to 29/09/2025, which was the end of the public notice.

Bridgeport Energy considers publishing the Public Notice in the Maranoa Today to be appropriate. The Maranoa Today publication has a distribution of Roma, Mitchell, Surat and Charleville, making it a relevant choice for rural areas. The Warrego Watchman would have been another suitable option, but the Editor ceased publication in May 2024.

Bridgeport Energy used the standard template provided by DETSI for the public advertisement.

PUBLIC NOTICE

Pursuant to Section 382 of the *Water Act 2000*
Release of UNDERGROUND WATER IMPACT REPORT

In accordance with the requirements of Section 381 and Section 382 of the *Water Act 2000* (Water Act), Bridgeport Energy Pty Ltd has developed an underground water impact report (UWIR) for its operations within PL 1063, PL 1064 and PL 31, 32 & 47 located in the Eromanga Basin, ~280km west of Charleville.

You have the opportunity to review and comment on this UWIR. You can access the UWIR by visiting www.bridgeport.net.au

You can also phone (02) 8960 8400 to arrange for a hard copy to be posted to you.

Written submissions on any of the UWIRs may be made to Bridgeport Energy Pty Ltd and mailed to:

Attn: Erik Kadri
Bridgeport Energy
Level 7, 111 Pacific Highway
Sydney NSW 2060

Your submission must be:

In writing and received by COB 29/09/2025

Please note that as required by Section 382(3)(d) of the Water Act, copies of all received submissions must be provided to the Chief Executive. All submissions will be considered as part of the assessment process.



Figure 39: The proof image of the public consultation notice. This advertisement has been published in the Maranoa Today publication.

Summary of submissions received

No submissions were received during the 2025 public consultation period.

References

Evans TJ, Martinez J, Lai ÉCS, Raiber M, Radke BM, Sundaram B, Ransley TR, Dehelean A, Skeers N, Woods M, Evenden C and Dunn B (2020) Hydrogeology of the Cooper GBA region. Technical appendix for the Geological and Bioregional Assessment.

Freeze, RA and Cherry JA (1979) Groundwater, Prentice-Hall, the University of Michigan, United States

Other Reports

Beach Energy (2015) Annual review - Underground water impact report for Beach Energy oilfields, Eromanga area, SWQ (2015) pp. 1 – 9.

Beach Energy (2016) Annual review - Underground water impact report for Beach Energy oilfields, Eromanga area, SWQ (2016) pp. 1 – 9.

Bridgeport Energy (2017) UWIR 2017 Annual Report for Beach Energy oilfields, Eromanga Area, SWQ, pp. 1-21.

Bridgeport Energy (2018) UWIR 2018 Annual Update, Bridgeport Energy, Sydney Australia

Bridgeport Energy (2019) UWIR 2019 Annual Update, Bridgeport Energy, Sydney Australia

Bridgeport Energy (2020) UWIR 2020 Annual Update, Bridgeport Energy, Sydney Australia

Bridgeport Energy (2021) UWIR, Bridgeport Energy, Sydney Australia

Bridgeport Energy (2022) UWIR 2020 Annual Update, Bridgeport Energy, Sydney Australia

Bridgeport Energy (2023) UWIR 2020 Annual Update, Bridgeport Energy, Sydney Australia

Bridgeport Energy (2024) UWIR 2020 Annual Update, Bridgeport Energy, Sydney Australia

Golder Associates (2014) Underground water impact report for Beach energy oilfields, Eromanga area, SWQ, pp. 1 – 341, South Australia

Golder Associates (2018) Technical Memorandum: Update of groundwater impact assessment for the Eromanga area, SWQ, report prepared for Bridgeport Energy Pty Ltd

Golder Associates (2021) Technical Memorandum: Update of groundwater impact assessment for the Eromanga area, SWQ, report prepared for Bridgeport Energy Pty Ltd

WSP Australia Pty Ltd (2025) Technical Memorandum: Update of groundwater impact assessment for the Eromanga area, South West Queensland, report prepared for Bridgeport Energy Pty Ltd

Legislation

Environmental Protection Act 1994 (*Environment Protection (Water and Wetland Biodiversity) Policy 2019*

Environment Protection Regulation 2019

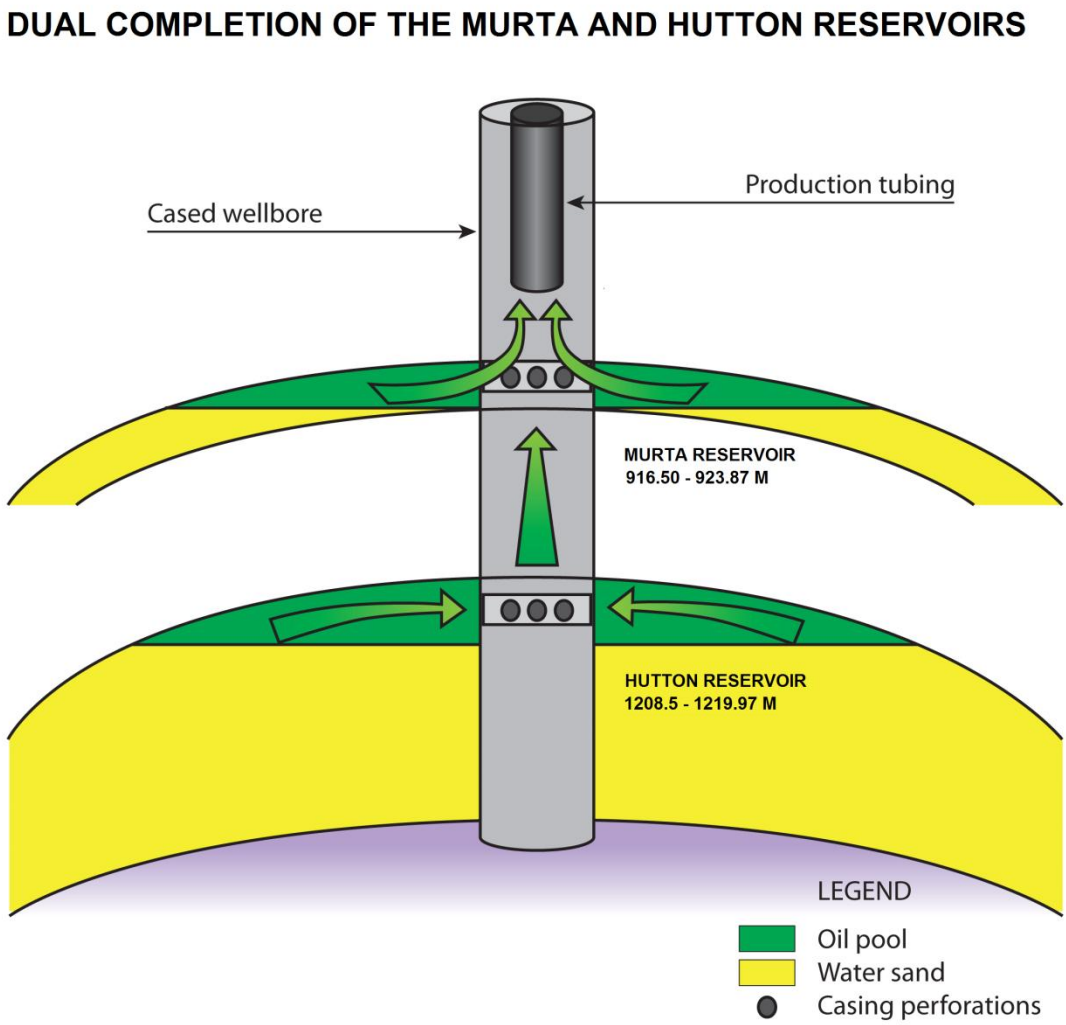
Nature Conservation Act 1992

Marine Parks Act 2004

Petroleum and Gas (Production and Safety) Act 2004

Water Act 2000

Appendix 1: Dual-Completion Well



Appendix 2: Data

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Blackstump 01	9.62	0.00	19.47	35.85	31.10	28.10	40.88	35.29	29.90	21.14	11.07	0.00	37.06	37.20
Blackstump 04	0.00	0.00	4.25	4.82	4.30	1.75	4.20	5.65	3.31	0.00	0.00	0.00	5.87	5.92
Blackstump 06	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bodalla 05	47.82	48.33	54.22	57.24	57.44	57.58	54.50	50.48	0.30	35.14	51.88	51.89	51.90	51.95
Bodalla 06	27.70	27.97	27.97	27.92	19.30	18.36	18.25	17.26	18.26	5.32	4.01	11.91	11.91	11.95
Bodalla 08									0.00	0.00	0.00	0.00	0.00	4.77
Bodalla 09	2.65	13.71	41.91	40.41	72.58	105.01	101.81	54.79	53.65	20.96	13.56	40.26	40.28	40.41
Bodalla 10	3.40	1.59	3.26	5.93	6.23	6.31	7.25	7.07	7.11	7.12	6.90	6.72	6.65	6.57
Bodalla 13	0.00	0.49	27.02	31.22	32.06	33.56	30.90	31.26	21.73	32.12	32.33	31.48	31.50	31.60
Bodalla 14	36.50	29.22	37.97	71.74	91.22	58.65	138.63	140.30	140.30	54.44	34.24	102.42	102.64	102.96
Bodalla 15	29.52	23.46	29.96	18.62	17.53	6.65	6.65	0.04	0.00	0.00	4.86	14.42	14.36	13.95
Bodalla 16	0.38	0.13	2.32	2.60	2.43	2.19	2.01	1.91	1.94	0.00	0.00	0.00	0.00	0.00
Bodalla 17	221.27	187.91	124.53	20.19	20.79	3.51	2.54	0.01	0.00	0.00	0.84	2.50	2.50	2.51
Bodalla 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bodalla 19	0.01	0.00	0.05	0.14	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bodalla 20	1.08	1.03	0.87	0.96	1.38	1.29	1.11	1.15	1.20	0.95	1.07	0.92	0.84	0.76
Bodalla 21	1.96	2.39	3.25	10.19	22.28	32.63	19.05	14.25	13.72	13.67	12.72	11.60	11.05	10.62
Bodalla 22	0.00	0.00	0.00	0.00	0.00	5.85	7.75	10.96	11.55	17.02	10.45	7.04	6.94	6.85
Kenmore 01	53.55	52.07	21.71	0.00	0.00	0.20	0.15	0.10	0.09	0.00	0.00	0.00	30.01	49.44
Kenmore 02	1.09	1.06	30.83	28.70	12.55	0.00	10.46	34.25	23.86	23.04	22.54	21.33	20.08	18.99
Kenmore 03	28.94	29.04	11.74	0.57	23.11	52.84	53.91	54.04	51.51	27.59	37.85	26.89	25.59	24.46
Kenmore 08	112.86	113.76	221.56	156.17	175.36	97.39	99.37	84.06	95.28	52.86	80.88	69.45	68.72	68.21
Kenmore 09	2.65	2.08	32.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.69	5.35
Kenmore 10	179.88	125.94	167.71	72.18	158.03	75.86	75.69	75.09	70.52	47.27	74.85	74.76	74.77	74.62
Kenmore 11	89.96	85.72	16.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.01	38.04
Kenmore 13	19.58	18.72	7.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.57	18.27
Kenmore 15	64.88	51.08	69.32	62.84	73.21	66.69	72.85	74.21	74.45	74.88	65.75	61.23	60.88	60.66
Kenmore 16	4.90	3.85	5.22	5.17	5.35	5.48	5.11	5.43	5.45	5.49	5.54	5.54	5.55	5.58
Kenmore 17	1.00	0.87	7.01	25.11	8.31	10.46	20.00	2.67	0.82	0.73	0.13	0.00	0.00	0.00
Kenmore 18	16.92	16.69	13.61	8.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.38	16.73
Kenmore 20	20.47	134.11	124.54	4.23	12.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kenmore 22	30.26	29.16	1.79	7.98	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kenmore 24	4.10	0.21	3.79	4.16	3.48	2.88	5.31	4.02	4.05	4.21	3.36	2.91	2.89	2.86
Kenmore 26	0.00	0.00	0.00	1.18	0.00	0.00	0.89	1.88	1.00	0.13	1.64	1.88	1.83	1.78
Kenmore 27	168.35	181.59	189.22	112.50	94.54	105.96	149.08	147.80	138.75	92.98	147.30	142.05	135.19	128.95
Kenmore 28	56.02	0.19	2.09	85.00	204.07	179.66	202.22	197.95	73.20	175.47	195.38	191.11	192.17	193.71
Kenmore 30	174.89	252.60	234.32	223.17	221.10	158.61	178.62	174.85	64.66	250.00	214.47	175.83	175.22	174.68
Kenmore 31	0.00	0.02	0.29	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kenmore 32	0.03	0.00	0.42	0.46	0.58	0.75	0.76	0.41	0.34	0.35	0.34	0.33	0.33	0.33
Kenmore 33	12.67	12.61	11.96	23.83	20.50	26.26	26.00	21.38	20.55	23.93	19.56	17.36	17.39	17.47
Kenmore 34	0.00	0.04	0.25	0.68	1.61	1.90	1.87	2.00	1.80	1.39	1.52	1.60	1.52	1.45
Kenmore 35	0.00	18.45	9.45	3.52	1.28	0.24	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kenmore 37	52.30	53.59	21.18	39.86	81.45	33.44	34.12	29.57	32.62	18.15	31.28	22.37	22.23	22.15
Kenmore 39	283.91	286.30	287.06	248.04	398.97	346.36	303.98	305.49	292.19	162.10	221.15	198.68	195.08	191.81
Kenmore 41	0.00	0.00	0.57	3.86	1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kenmore 43									0.29	0.57	1.85	2.28	1.98	1.71
Kenmore North 01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kenmore North 02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bargie 01	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.30
Bargie 05	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Byrock 02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coolum 01	0.81	0.25	0.06	0.29	0.22	0.22	0.26	0.26	0.25	0.26	0.24	0.23	0.23	0.23
Glenvale 01	0.35	0.26	0.28	0.96	0.70	0.76	0.91	0.93	1.00	1.14	1.35	1.43	1.38	1.31
Marcoola 01	1.66	0.90	0.19	1.34	1.57	1.55	1.60	1.47	1.51	1.63	1.56	1.53	1.51	1.50