

BHP Olympic Dam Great Artesian Basin Wellfields Report

1 July 2024 – 30 June 2025

Great Artesian Basin Wellfields Report

Olympic Dam

1 July 2024 – 30 June 2025



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1 EXECUTIVE SUMMARY

The Wellfields Report is prepared annually in accordance with the conditions of the *Roxby Downs (Indenture Ratification) Act 1982*, and the Olympic Dam and Stuart Shelf Indenture (Indenture) ratified by that Act. This report presents data that relates to the operation of the BHP Olympic Dam Great Artesian Basin water supply from Wellfields A and B for the FY25 period (1 July 2024 to 30 June 2025).

1.1 Abstraction

The average abstraction during FY25 was 34.1 ML/d comprising 3.8 ML/d from Wellfield A and 30.3 ML/d from Wellfield B, representing a 14.9 % decrease for Wellfield A and a 4.8 % increase for Wellfield B compared with FY24. This is consistent with processing demand requirements and that Wellfield B offsets a reduction of abstraction from Wellfield A.

Monthly total abstraction rates were variable, ranging from 27.9 to 38.8 ML/d, with lowest total abstraction in October 2024 and the highest in February 2025.

Average total daily abstraction from the wellfields area in FY25, which includes the Olympic Dam wells and pastoral wells, is estimated at 47.4 ML/d.

1.2 Wellfield A

Drawdowns remained consistent with 5- year averages and historical production rates. The average drawdowns for FY25 were smaller for all hydrogeological zones with the exception of the Wellfield Sub-basin which remained consistent with the 5-year average, and the Open GAB zone that demonstrated a slight increase compared to the 5-year average.

During FY25, the average drawdown between sites GAB8 and HH2 was inferred at 1.3 m, within the 4 m compliance criteria in the Environmental Protection and Management Program (EPMP).

The hydraulic gradient between NESB bores and HH2 remained above or equal to the leading indicator gradient of 0.0009 m by end of FY25.

1.3 Wellfield B

For Wellfield B, the drawdown pattern in FY25 is similar to that of previous reports and generally consistent with a confined aquifer response. Drawdown contour from a confined GAB aquifer will continue to expand over time proportional to the combined pumping rates and aquifer properties.

The area contained within the 10 m drawdown footprint for Wellfield B is 4,010 km², within the 4,450 km² compliance criteria in the EPMP but above the 4,000 km² leading indicator. The drawdown footprint is predicted to extend towards compliance criteria during FY26.

The average drawdown at monitoring bores S1/S1_New and S2 (dedicated monitoring wells closest to key GAB springs) is 0.1 m, which is less than the maximum 4 m drawdown compliance criteria in the Environmental Management Program (BHP, 2023a).

Drawdown at pastoral bores generally remained less than the predicted long-term impact (as presented in the Environmental Impact Statement; Kinhill Engineers, 1997 – updated Golder Associates 2016), with the exception of five locations (see Section 6.5).

1.4 Spring Flow

During FY25 the monitoring results indicated that the spring flows increased in all hydrogeological management zones except the Wellfield A hydrogeological zone, which remained stable. All monitored GAB spring flows remained within the predicted long-term impact (as presented in the Environmental Impact Statement; Kinhill Engineers, 1997 – updated Golder Associates 2016). Spring electrical conductivity data indicates no significant change from previously identified trends.

1.5 Monitoring Data

Monitoring of GAB bores and springs was conducted as per the Monitoring Program – Great Artesian Basin (GAB) 2023 (BHP, 2023b). A summary of compliance to monitoring plan is presented in Appendix 1.

2 INTRODUCTION

2.1 Scope

This report is produced in accordance with the conditions of the *Roxby Downs (Indenture Ratification) Act 1982*, and the Olympic Dam and Stuart Shelf Indenture (Indenture) ratified by that Act.

The Indenture states that an annual hydrogeological report shall be prepared to define the following:

- Aquifer response to wellfields operation.
- Ability of the resource to maintain the supply.
- Strategy for future abstraction and management.
- Requirements for further exploration or development.

Data presented relate to the operation of the BHP Olympic Dam Corporation Pty Ltd (ODC) Great Artesian Basin (GAB) water supply wellfields A and B, for FY25. The objectives are to:

- Meet the requirements of Clause 13 of the Indenture.
- Report total abstraction and individual well abstraction on a monthly basis.
- Report water pressure and levels in monitoring and production wells and at the boundary of Designated Areas.
- Report water quality at monitoring and production wells on a quarterly basis.
- Compare actual impacts to predictions in the Environmental Impact Statement (EIS) by Kinhill Engineers, 1997 (updated Golder Associates 2016). Ensure that impacts are within predictions and expectations.
- Evaluate drawdown response of the aquifer to ODC abstraction, particularly within the Designated Areas of both wellfields.
- Delineate the drawdown induced by the wellfields, and particularly the impact on pastoral water supplies and environmental flows.
- Identify possible changes in water chemistry that may occur.
- Assess compliance with legal requirements for the operation of the GAB water supply

2.2 Background

Water used at Olympic Dam and the Roxby Downs Township is pumped from two wellfields located within the GAB. Wellfield A is located 100 km north of the operation at the southwest margin of the GAB. Wellfield B is located an additional 80 km to the northeast of Wellfield A, further into the basin. The local hydrogeology has been previously described by Western Mining Corporation (WMC) during investigations for the establishment of Wellfield B (WMC, 1995). Wellfield A is located at the margin of the GAB, where there is a relatively complicated basin architecture and strong influence of aquifer boundary conditions. There are separate hydrogeological domains with distinctively different responses to the Wellfield A abstraction. The distribution of the aquifer is strongly influenced by both the depositional setting of the aquifer sediments and post-depositional faulting, which has formed sub-basins that are hydraulically separated. Wellfield B is located further into the basin where the aquifer is much thicker and extensive, aquifer zonation is less marked and the effects of faulting greatly reduced. As a result, the drawdown around Wellfield B is more radially symmetrical than that from Wellfield A.

A detailed description of the physical environment of the wellfields is contained in the Draft EIS (Kinhill-Stearns Roger, 1982) and the Survey and Assessment Report (Kinhill Engineers, 1995). Wellfield construction details are contained in 'Wellfield A Construction' (AGC, 1987) and 'Borefield B Development' (WMC, 1997) and related documents. The most recent hydrogeological conceptualisation was included in the GAB groundwater model developed in 2020 (Groundwater Logic et al, 2020).

3 MONITORING PROGRAM

A full and detailed description of monitoring sites, frequency, priorities and methodologies is maintained in the Monitoring Program – Great Artesian Basin (GAB) 2023 (BHP, 2023b).

4 ABSTRACTION

4.1 Development History

Trends in long-term abstraction are summarised in Figure 4-1 and Figure 4-2, with some additional commentary below:

- From FY11 until FY24 the annual average abstraction, from Wellfield A and Wellfield B combined, was between 32.1 and 33.3 ML/d with the exceptions of FY15 to FY19 and FY22. During these periods annual average abstraction reduced, due to various operational shutdowns, to between 26 to 28.8 ML/d.
- During FY25 the average abstraction was 34.1 ML/d.

4.2 Olympic Dam Abstraction during the Current Review Period

The average abstraction during FY25 was 34.1 ML/d comprising 3.8 ML/d from Wellfield A and 30.3 ML/d from Wellfield B, representing a 14.9 % decrease for Wellfield A and a 4.8 % increase for Wellfield B compared with FY24 Table 4-1. The small increase from Wellfield B remains consistent with processing demand requirements and offsets a reduction of abstraction from Wellfield A. The tonnage production at ODC decreased from 10.84 Mtpa in FY24 to 10.67 Mtpa in FY25.

Monthly total abstraction rates were variable, ranging from 27.9 to 38.8 ML/d, with lowest total abstraction in October 2024 and the highest in February 2025 (Table 4-2).

4.3 Total Abstraction

Flow rate from 28 important pastoral bores in the wellfields area, where variation in flow rate could produce short-term impacts on regional monitoring, is estimated at the end of the review period. Pastoral abstractions from those 28 bores and those from Wellfields A and B are shown in Figure 4-2.

Total abstraction from the wellfields area, including ODC wellfields and the 28 pastoral bores rose from approximately 40 ML/d in 1995 to 60–70 ML/d in 2000–01 and subsequently declined to 45–50 ML/d since 2010 (Figure 4-2). Total abstraction from the wellfields area in FY25 is estimated at 47.4 ML/d.

Pastoral flows have declined due to the significant bore closure program ODC has supported and participated in since 2000. Water savings of approximately 42 ML/d have been achieved through the sponsored closure of free-flowing pastoral wells in the ODC wellfield area. Third-party pastoral use was estimated during the reporting period.

Table 4-1 Wellfields average annual daily abstraction rate in ML/d

Year Ended	Wellfield A	Wellfield B	Total
30-Jun-1986	1.3	0.0	1.3
30-Jun-1987	2.2	0.0	2.2
30-Jun-1988	4.4	0.0	4.4
30-Jun-1989	8.9	0.0	8.9
30-Jun-1990	10.0	0.0	10.0
30-Jun-1991	10.6	0.0	10.6
30-Jun-1992	11.6	0.0	11.6
30-Jun-1993	12.6	0.0	12.6

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Year Ended	Wellfield A	Wellfield B	Total
30-Jun-1994	12.1	0.0	12.1
30-Jun-1995	13.5	0.0	13.5
30-Jun-1996	15.1	0.0	15.1
30-Jun-1997	8.2	7.4	15.6
30-Jun-1998	5.3	12.3	17.6
30-Jun-1999	4.9	17.3	22.2
30-Jun-2000	5.2	26.2	31.4
30-Jun-2001	6.1	25.5	31.6
30-Jun-2002	6.0	24.7	30.7
30-Jun-2003	6.1	25.3	31.4
30-Jun-2004	5.4	26.0	31.4
30-Jun-2005	5.9	28.1	34.0
30-Jun-2006	4.9	29.4	34.3
30-Jun-2007	4.5	27.9	32.4
30-Jun-2008	4.3	29.1	33.4
30-Jun-2009	4.6	27.8	32.4
30-Jun-2010	2.3	19.6	21.9
30-Jun-2011	5.8	27.4	33.2
30-Jun-2012	4.1	28.2	32.3
30-Jun-2013	4.5	27.9	32.4
30-Jun-2014	5.2	27.8	33.0
30-Jun-2015	4.9	23.9	28.8
30-Jun-2016	4.5	26.9	31.4
30-Jun-2017	4.0	25.2	29.2
30-Jun-2018	4.0	23.7	27.7
30-Jun-2019	4.5	23.9	28.4
30-Jun-2020	5.3	28.0	33.3
30-Jun-2021	5.2	26.9	32.1
30-Jun-2022	3.7	22.3	26.0
30-Jun-2023*	4.3	28.4	32.7
30-Jun-2024	4.4	28.9	33.3
30-Jun-2025	3.8	30.3	34.1

**Note: Data was reviewed, corrected and updated since FY23 report was published*

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Table 4-2 FY25 Monthly average abstraction rate (ML/d)

	Wellfield A							Wellfield B			Wellfields	
	GAB06	GAB12	GAB14	GAB15	GAB16	GAB18	Total	GAB51	GAB52	GAB53	Total	Total
Jul-24	0.05	0.00	0.00	0.00	2.09	2.41	4.56	10.65	7.84	9.10	27.59	32.15
Aug-24	0.58	0.00	0.00	0.00	0.81	1.47	2.86	12.29	9.07	10.61	31.96	34.82
Sep-24	0.00	0.00	0.00	0.00	1.78	2.79	4.56	11.70	8.78	10.14	30.62	35.18
Oct-24	0.05	0.00	0.00	0.00	0.65	1.01	1.70	10.03	7.41	8.81	26.25	27.95
Nov-24	0.50	0.00	0.00	0.00	1.23	2.01	3.74	10.36	7.87	9.07	27.30	31.03
Dec-24	0.56	0.00	0.00	0.00	1.20	1.95	3.71	11.82	8.82	10.20	30.85	34.56
Jan-25	0.56	0.00	0.00	0.00	1.45	2.15	4.15	11.16	8.37	9.67	29.20	33.35
Feb-25	0.63	0.00	0.00	0.00	1.43	2.48	4.55	13.11	9.80	11.29	34.20	38.75
Mar-25	0.56	0.00	0.00	0.00	1.32	1.90	3.78	11.75	8.68	10.16	30.59	34.38
Apr-25	0.49	0.00	0.00	0.00	1.37	1.99	3.84	12.35	8.47	10.66	31.48	35.32
May-25	0.48	0.00	0.00	0.00	1.14	1.90	3.52	13.23	8.22	13.76	35.21	38.73
Jun-25	0.56	0.00	0.00	0.00	1.48	2.39	4.42	11.68	6.90	10.08	28.66	33.09
Year Average (ML/d)	0.42	0.00	0.00	0.00	1.33	2.03	3.77	11.67	8.35	10.29	30.30	34.08
Year Total (ML)	152.4	0.0	0.0	0.0	483.9	741.2	1377.5	4258.3	3046.1	3756.0	11060.4	12437.9

Note: Sum of individual rows may not exactly match the totals due to rounding

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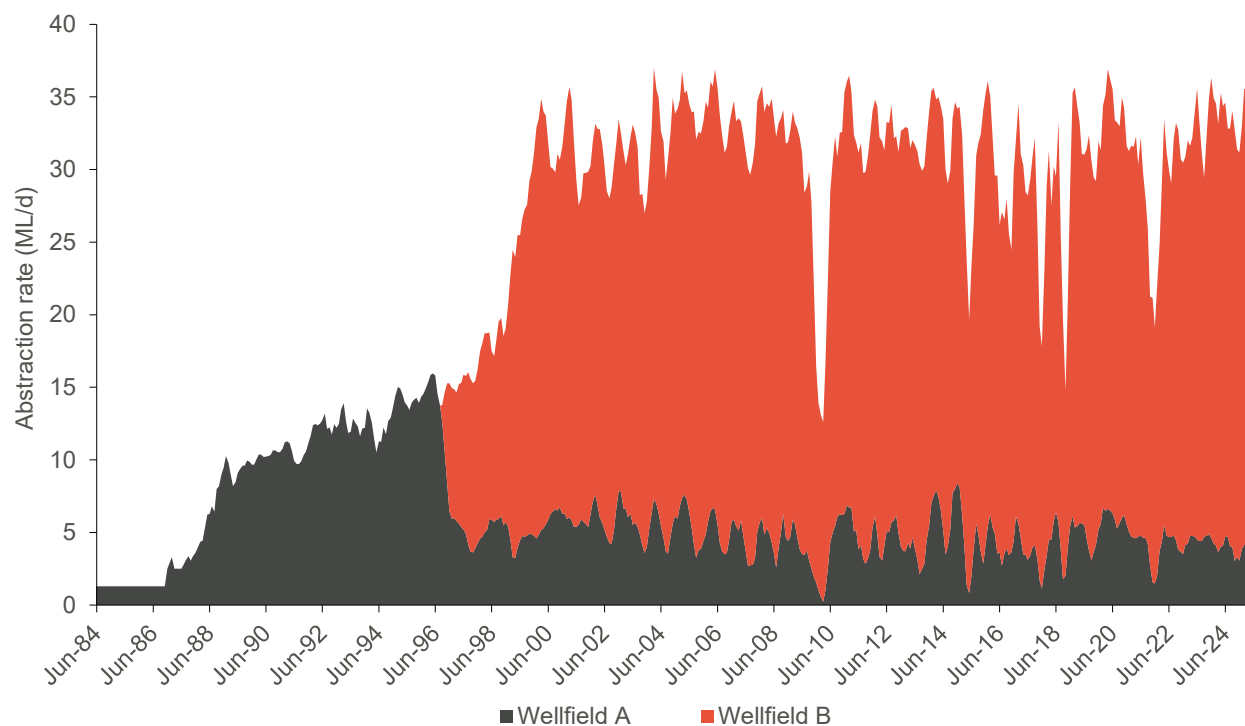


Figure 4-1 Historical abstraction from Wellfields A and B – 3 month moving average

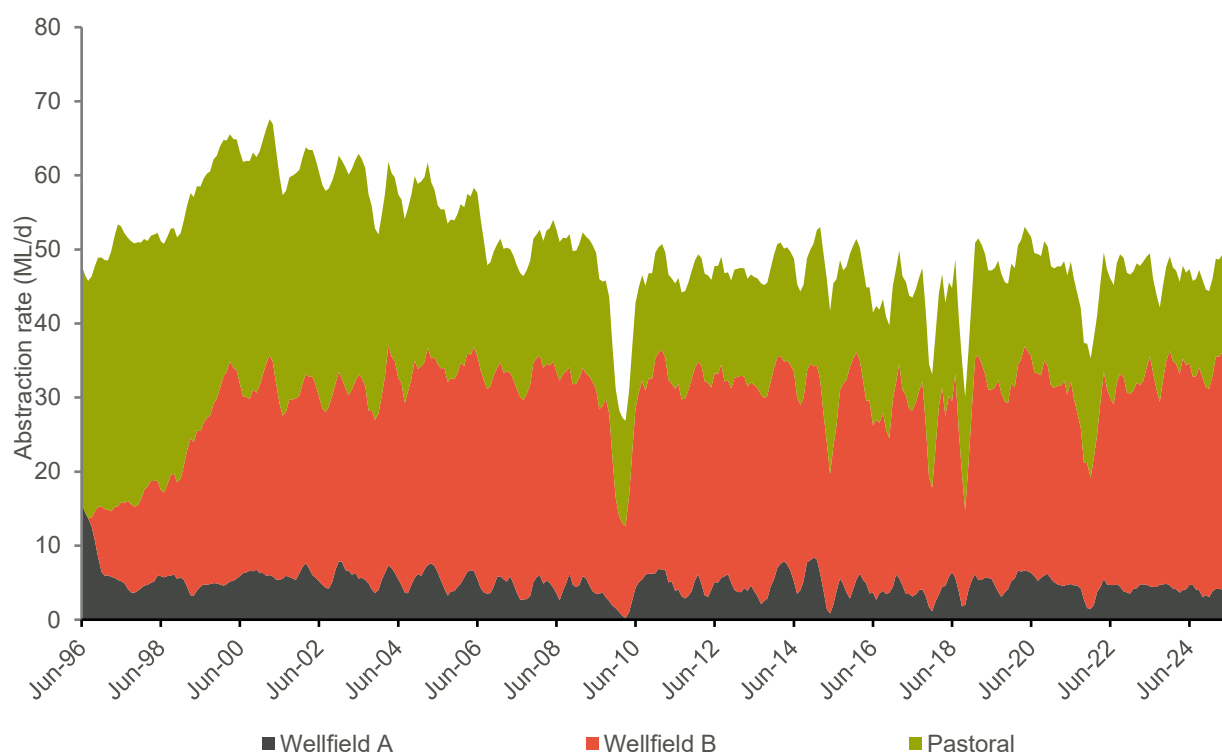


Figure 4-2 Historical abstraction from the Wellfields area – 3 month moving average

Note: See Appendix 7 for list of pastoral bores used to estimate pastoral GAB abstraction

5 WELLFIELD A AQUIFER PRESSURE RESPONSE

For the purposes of compliance, Wellfield A drawdown is measured in relation to reference heads established in May 1986 and, for monitoring bores MB1, MB5 and MB6, as a difference between contemporary and estimated 1996 Practical Reference Heads (PRHs) (BHP (Billiton), 2010).

5.1 Compliance Criteria

- A 4 m drawdown limit at the point on the designated area for Wellfield A that is mid-way between GAB8 and HH2 based on the 12-month moving average.

5.2 Leading Indicators

- A hydraulic gradient between wells in the NESB (North East Sub-Basin) and HH2 exceeding 0.0009 m/m, calculated as the six-monthly moving mean hydraulic gradient between HH2 and NESB wells GAB7, GAB8, GAB10, GAB11 and GAB19.

5.3 Wellfield A Monitoring Program Requirements

5.3.1 Purpose

- Quantify by routine and appropriate methods water pressures and water levels in all monitoring and production wells, and at the boundary of the Designated Areas, as approved by the State.
- Measure or infer the magnitude of the drawdown according to the relevant compliance criteria for Wellfield A.
- Provide data to support the leading indicator for GAB impacts, and alert management when levels approach the leading indicator value.

5.3.2 Deliverables

- Records of artesian pressure and groundwater level data for assessment of drawdown (GA 3.3).

5.4 Groundwater responses to Wellfield A

A summary of reference heads in m AHD is shown in Table 5-1. It is noted that some of these reference heads incorporate localised, prior drawdown effects due to the early operation of production bore GAB6. Average drawdown contours for FY25 are presented in Figure 5-1. The contour map for Wellfield A includes the geological boundaries and structures that are interpreted to influence the hydrogeology of the Wellfield A region and has been drawn using the kriging process for contouring as outlined for Wellfield B in Monitoring Program – Great Artesian Basin (GAB) 2023 (BHP, 2023b).

5.4.1 Wellfield A Hydrogeological Zone

Referred to as Wellfield Sub-basin in Table 5-1. The average drawdown within the zone during FY25 is within the 5-year average. Wellfield A average monthly abstraction rates ranged from 1.7 ML/d in October 2024 up to 4.6 ML/d in July and September 2024 with a yearly average of 3.8 ML/d (Table 4-2).

Drawdown measured within the Wellfield Sub-basin zone range from 19.2 m at GAB18A to 6 m at Venables Bore.

Drawdown propagation within the sub-basin is controlled by geological conditions, interpreted to be groundwater hydraulic barriers (grey shaded areas in Figure 5-1) causing asymmetrically and preferential drawdown to the northwest and southeast. The drawdown pattern for FY25 is shown in Figure 5-1.

5.4.2 North East Sub Basin (NESB) Hydrogeological Zone

Average drawdowns within the zone have remained consistent during FY25 (Table 5-1) with GAB8, GAB11 and HH2 having less drawdown than FY24. All monitoring points in the NESB remain at or lesser than the 5-year average (Table 5-1).

Drawdown was reduced at HH2, this is due to elevated pressures recorded throughout FY25; This is likely due to a local re-pressurisation of the aquifer following a nearby bore decommissioning (GAB20) during FY25.

Groundwater head in the NESB has a more muted response to changes in abstraction from Wellfield A compared to other Wellfield A hydrogeological zones due to the increased distance from Wellfield A production bores and the hydraulic boundary effects associated with structural faults and aquifer geometry.

Drawdown has historically propagated from the Wellfield sub-basin firstly southeast and northwest; and subsequently to the NESB. As a result, heads in the NESB are not expected to change as dynamically as they do in the aquifer that is more hydraulically connected to and near the direct pumping influence from Wellfield A production bores.

5.4.3 South Western Hydrogeological Zone

Average drawdowns within the zone have remained consistent during FY25 or lesser than when compared to FY24 and are comparable with the 5-year average (Table 5-1).

5.4.4 Extension and Open GAB

Average drawdown at GAB 24 in the GAB extension zone has decreased in FY25 compared to FY24 and remains below the 5-year average. The mean drawdown for the Open GAB has increased during FY25 and remained similar in FY25 compared with FY24, being above the 5-year average.

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Table 5-1 Wellfield A – summary of drawdown FY25

Area	Well	Reference Elevation (m AHD)	Mean Drawdown FY25 (m)	Mean Drawdown FY24 (m)	FY20-24 Mean Drawdown (m)
Wellfield	GAB1	22.4	8.3	9.0	9.1
Sub-basin	GAB2	22.8	8.2	8.6	8.5
	GAB5A	27.7	6.6	7.0	7.3
	GAB6A	22.2	9.7	10.1	10.0
	GAB12A	27.2	14.3	14.6	15.0
	GAB13A	30.4	14.2	14.9	15.2
	GAB14A	30.1	13.7	14.7	16.4
	GAB16A	24.5	13.3	14.1	14.1
	GAB17	28.4	14.4	15.0	13.7
	GAB18A	28.8	19.2	18.8	17.7
	GAB21	25.4	12.6	13.2	13.1
	GAB22	24.7	12.0	12.6	12.6
	GAB23*	27.7	14.9	15.3	13.5
	MB2	22.2	6.5	6.8	6.5
	New Years Gift	22.6	9.0	9.7	9.6
	Venables	20.6	6.0	6.3	6.1
North East	GAB7	16	2.7	2.7	2.9
Sub-basin	GAB8	11.7	1.9	2.0	2.1
(NESB)	GAB10	19	2.9	2.9	3.1
	GAB11	20.7	2.8	2.9	3.0
	GAB19	15.1	2.4	2.4	2.4
	HH2	8.2	0.7	0.9	1.0
South West Sub-basin	HH1	11.1	0.1	0.1	0.1
	HH3	9.3	0.4	0.4	0.3
	HH4	14	-0.2	0.0	0.1
Extension	GAB24	39.2	5.7	6.0	6.4
Area	Well	Practical reference head (m AHD)	Mean Drawdown FY25 (m)	Mean Drawdown FY24 (m)	FY20-24 Mean Drawdown (m)
Open GAB	MB1	55.5	0.6	0.6	0.4
	MB5	75.5	1.6	1.7	1.1
	MB6	75.0	1.3	1.2	1.1

*Note: *No drawdown data collected in FY20 and FY21. Well head configuration blocked and impeded dipper.*

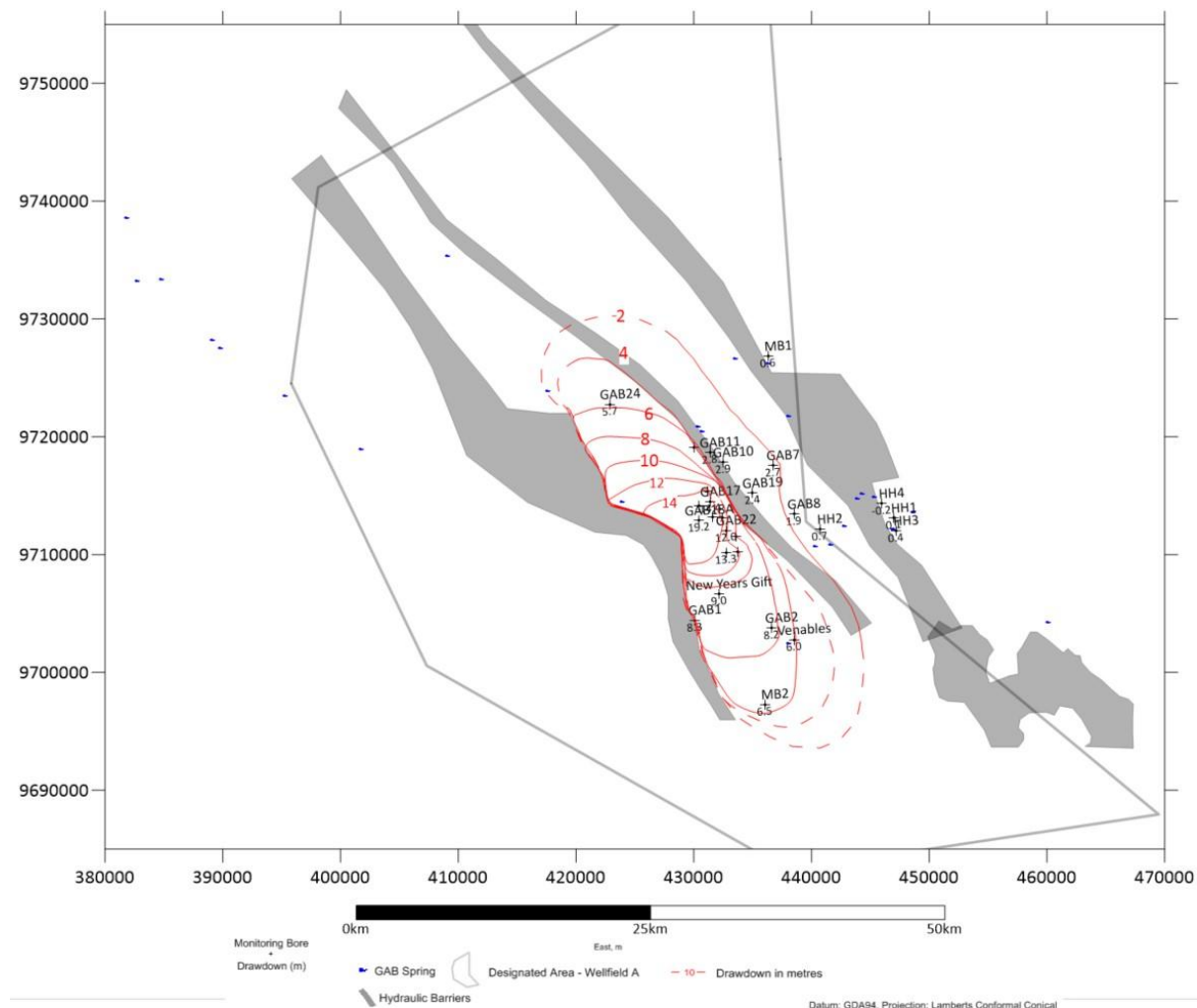


Figure 5-1 Wellfield A total drawdown contours for FY25

5.5 Evaluation against Compliance Criteria

5.5.1 Compliance Bores

The Wellfield A designated area boundary runs between bores GAB8 and HH2. Boundary drawdown is determined as the 12-month moving average drawdown at a point midway between these two sites.

The FY25 average drawdown at GAB8 was 1.9 m and 0.7 m at HH2 (Table 5-1) therefore average boundary drawdown was 1.3 m, within the 4 m compliance criteria (Figure 5-2).

5.5.2 Evaluation against Leading Indicator

GAB spring flows are primarily driven by groundwater pressure in the GAB aquifer, representing a head that is greater than the elevation of the spring vent. This pressure head and hydraulic gradient causes discharge and the development of spring flow.

The FY25 hydraulic gradient between wells in the NESB (GAB7, GAB8, GAB10, GAB11, and GAB19) and HH2 is 0.00091m/m, which is above the minimum leading indicator gradient of 0.0009 m/m (6-month moving average) at the end of the reporting period (Figure 5-3).

From September 2024 to March 2025, the 6-month moving average was below the leading indicator gradient of 0.0009 m/m. This was due to an uncharacteristic increase in pressure at the control monitoring point, HH2. Historically, pressure at HH2 has been predictably consistent, hence its use as a control point. The temporary increase in pressure at this location was likely due to the decommissioning of proximal bore, GAB20 in August 2023, causing a local re-pressurisation of the

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aquifer at HH2. This local re-pressurisation is a combined outcome of both bore decommissioning and the reduced abstraction limit of Wellfield A. In agreeance with this, FY25 spring flow data demonstrates either stable or increased flows of springs connected to Wellfield A (Section 7.3). Though the hydraulic gradient was lower than the leading indicator for a portion of FY25, the driving head towards the springs was retained at all times with multiple lines of evidence in support and spring flows improving overall.

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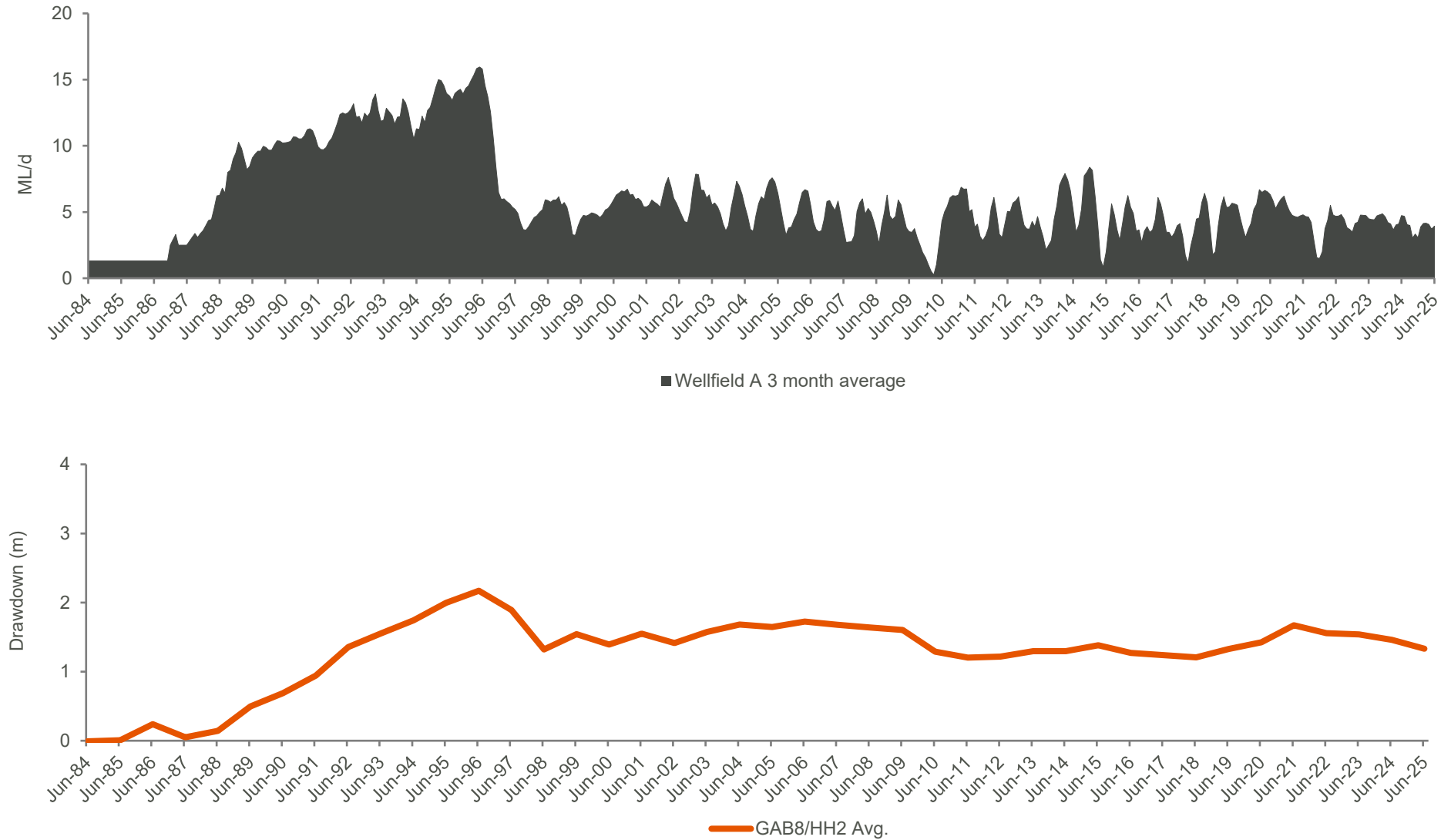


Figure 5-2 Wellfield A Compliance Bores GAB8/HH2 showing quarterly (top) and annual (lower) averages

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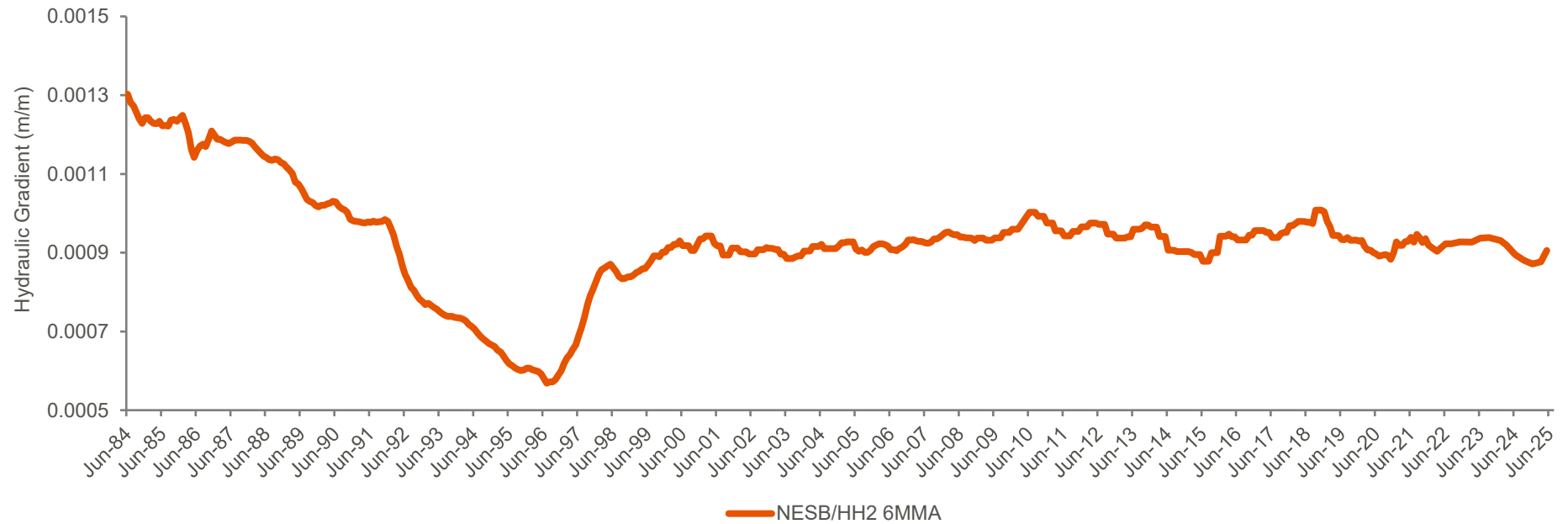


Figure 5-3 **Wellfield A Leading Indicator – NESB Hydraulic Gradient**

6 WELLFIELD B AQUIFER PRESSURE RESPONSE

Drawdown responses due to Wellfield B are measured and reported to the State in accordance with the Indenture as:

- *Temperature-exclusive drawdown*: wellhead pressure difference from practical reference pressures (PRPs) established for the bores monitored; or
- *Temperature-inclusive drawdown*: as a difference between current measurement and estimated 1996 practical reference heads (PRHs).

6.1 Compliance Criteria

- A 4 m drawdown limit for Wellfield B at the point between monitoring bores S1¹ and S2 (measured as the average drawdown of the two bores) and based on the 12-month moving average.
- A drawdown footprint for Wellfield B, measured as the area contained within the 10 m drawdown contour, that is less than or equal to 4,450 km².

6.2 Leading Indicators

- A drawdown trend at monitoring bore S1² that may exceed 4.5 m in the next 12 months.
- A drawdown footprint for Wellfield B, measured as the area contained within the 10 m drawdown contour that is greater than 4,000 km².
- A continuing drawdown trend at GAB pastoral bores that may exceed the predictions of the Olympic Dam Environmental Impact Statement of 1997.

6.3 Monitoring Program Requirements

6.3.1 Purpose

- Quantify by routine and appropriate methods water pressures and water levels in all monitoring and production wells, and at the boundary of the Designated Areas, as agreed with the State.
- Measure or infer the magnitude of the drawdown according to the relevant compliance criteria for Wellfield B.
- Provide data to support the leading indicator for GAB impacts, and alert management when levels approach the leading indicator value.

6.3.2 Deliverables

- Records of artesian pressure and groundwater level data for assessment of drawdown (GA 3.3).
- A contoured drawdown map for Wellfield B (GA 3.1).

¹ In December 2022 'S1' was decommissioned due to a downhole casing failure. Bore 'S1_New' was constructed to replace 'S1'.

² As above.

6.4 Groundwater responses to Wellfield B

6.4.1 Whole-of-Wellfield Drawdown Pattern

The drawdown contours, presented in Figure 6-1 shows asymmetry, reflecting structural and palaeogeographical control over aquifer conditions as well as uncontrolled antecedent flow in the south-east, resulting in differential drawdown responses. The production wells are situated in a northwest oriented hydrogeological trough that contains a thicker, more transmissive aquifer sequence. The trough is flanked by relatively lower transmissivity that limit the propagation of drawdown to the east and west (WMC, 1995).

Individual drawdown at bores used to create Figure 6-1 are listed in Table 6-1. General interpretative comments, describing the drawdown contour reported at individual sites, are:

- Drawdowns are reported at the production bores GAB51, GAB52, and GAB53 as the average difference between respective PRHs and flow pressures. The 3 production wells were not shut in during FY25.
- Drawdowns that exceed 10 m for FY25 are reported for ten monitored bores, namely: D3, Georgia 2, Lake Harry, Marion, MB8, Muloorina, Peachawarinna #3, S3A, S4, and S5. The drawdowns at Muloorina (controlled continuous flow), Peachawarinna #3 and Georgia 2 (pastoral offtake), D3 and MB8 are likely due to a combination of ODC and pastoral abstraction given the proximity to production bores GAB51, GAB52 and GAB53. Other locations exceeding 10m drawdown are discussed further below.
- Recorded pressures along an arc of bores situated to the south and west of Wellfield B (S2, WCB1, Callanna and HH4) and closest to the GAB springs, are negative indicating drawdowns are either higher than baseline conditions or less than 1m and, unlikely to be affected by GAB abstraction in Wellfield B designated area.
- The accuracy of the reported total drawdown at pastoral bores or at those used for any purposes other than dedicated monitoring, will be affected by antecedent flow and/or ageing infrastructure. Locations where antecedent flow impacted data integrity were: Georgia 2, Lake Harry, Peachawarinna #3, Muloorina, Two Mile 2, S4 and Sinclair.
- An artefact of the kriging process for contour preparation is interpreted to introduce an over-projection of drawdown trends from near Wellfield B to areas without any observations, such as from the north-west to the north-east of Georgia 2 in Figure 6-1. Kriging would have left the 1 to 8 m contours open. For these reasons, the 1 to 8 m contours in Figure 6-1 were blanked outside the Designated Area, from the north-west to the north-east of Wellfield B. This blanking, however, did not influence the size of the 10 m drawdown footprint.

The expansion of the 10 m drawdown contour to the north in comparison to that of FY24 is largely due the gradually increasing drawdown trend observed at Georgia 2. The extension of the 10 m drawdown contour to the southeast is due to both data integrity issues and third-party abstraction rather than ODC abstraction from Wellfield B.

Data integrity issues are defined by monitoring data not being representative of aquifer conditions. Monitoring data may not be representative when a bore has been recently flowed (antecedent flow), when a bore cannot be shut-in properly (leaks at surface) or if a bore has failed downhole (ageing infrastructure). All of these instances provide a lower-than-expected pressure measurement (kPa) which overestimates drawdown.

Third-party abstraction in the southeast has been observed (FY25) to maintain continuous open flow at Clayton 1, Clayton 2, Clayton Dam 2, Lake Billy 2, Tarkanina 2, and Yarra Hill. This is likely due to ageing infrastructure and concerns of bore failure if headworks are shut-in.

Third-party abstraction in the southeast has been noted previously, with a review of monitoring data undertaken in 2010 (BHP (Billiton), 2011) which identified a local drawdown depression caused by abstraction from Clayton 1 and Clayton 2. This depression extended to S5, Lake Harry, S4, Clayton Dam 2, and Tarkanina 2. It is likely then, that with observed continuous open-bore flow occurring in the southeast, the previously identified local depression will expand over time, deepening drawdowns

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at Clayton Dam 2, S5, S4, Lake Harry, Lake Billy 2, Tarkanina 2 and Yarra Hill, as well as potentially impact both Marion and S3A.

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Table 6-1 Summary of drawdowns used for Wellfield B contouring FY25

Bore	PRH ³ (m AHD)	Mean Drawdown FY 25(m)	Mean Drawdown FY 24 (m)	Change in Mean Drawdown (m)
Callanna	48.9	-5.2	-4.7	-0.5
D2	90.5	7.6	9.5	-1.9
D3	86	11.3	11.3	0.0
Dulkaninna ¹	88	6.5		
GAB51 ²	87.5	46.4	41.9	4.5
GAB52 ²	87.5	31.6	28.2	3.3
GAB53 ²	88	40.5	35.4	5.1
Georgia #2	83.5	10.0	8.4	1.6
HH1	11.1	0.1	0.1	0.0
HH2	8.2	0.7	0.9	-0.2
HH3	9.3	0.4	0.4	0.0
HH4	14	-0.2	0.0	-0.2
Jackboot	84	3.0	3.3	-0.2
Lake Harry	84.9	11.9	14.2	-2.3
Marion	87.5	11.9	12.7	-0.8
MB1	55.5	0.4	0.6	-0.2
MB5	75.5	1.7	1.7	0.0
MB6	75	1.0	1.2	-0.2
MB7	87	9.7	9.6	0.2
MB8	88	14.3	13.3	1.0
Muloorina	85.4	22.1	21.3	0.8
OB1	80	4.1	3.9	0.2
OB3	82	7.0	7.0	0.0
OB6	83	8.7	8.2	0.5
Peachawarrinna#3 ³	85.2	10.6	15.5	-4.9
S1_New ⁴	70.5	0.8	1.0	-0.2
S2	54	-0.7	-0.3	-0.4
S3	72.5	0.7	1.5	-0.8
S3A	85	11.3	10.2	1.1
S4	87	11.0	10.7	0.3
S5	86.5	15.4	15.7	-0.3
Sinclair	87	6.5	6.6	-0.2
Two Mile 2	1.6	1.5	0.1	1.6
WCB1	-1.8	-0.5	-1.3	-1.8
WCB2	7.5	7.3	0.2	7.5

Note: Where antecedent flow compromised data integrity, the data point was removed and FY25 data was averaged for the remaining data points. This occurred for Georgia #2, Peachawarrinna #3, Muloorina; Two Mile 2; S4 and Sinclair. Erroneous reads were also removed for MB8 and S3A.

¹ Dulkaninna could not be shut in for FY24

² Drawdown for wells GAB51-53 was measured with flow pressures during FY25.

³ Peachawarrinna#3 replaces decommissioned Peachawarrinna bore

⁴ S1_New replaces. The PRH is corrected for S1_New to consider the different height in bore headworks.

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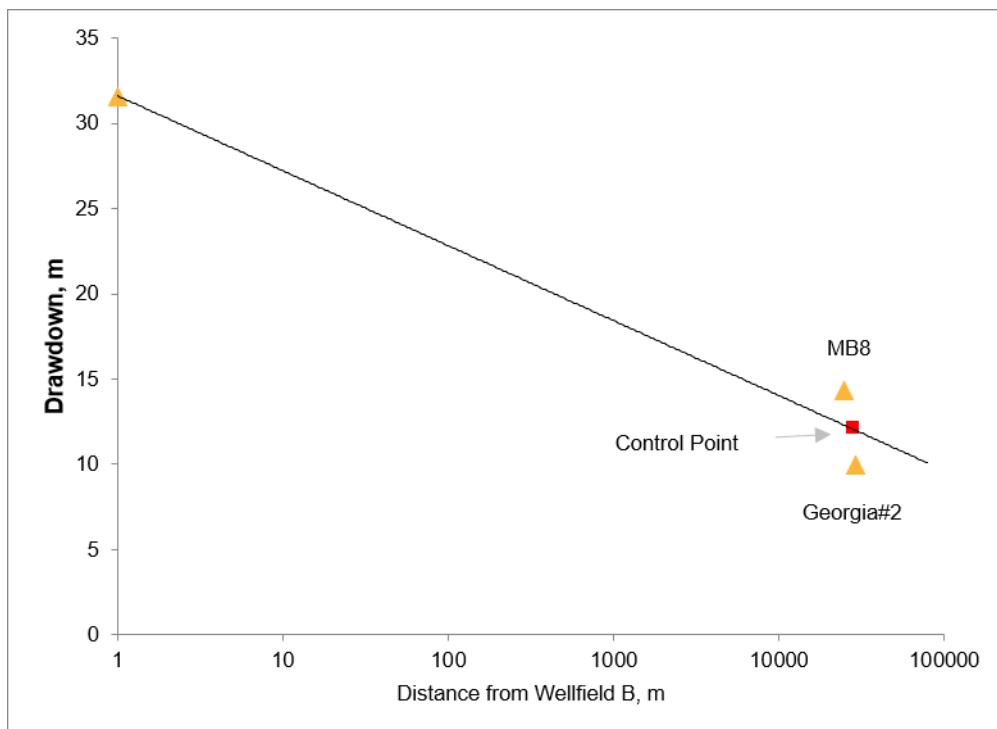
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6.4.2 Drawdown Pattern around Wellfield B

The drawdown map presented in Figure 6-1 followed the procedure as described in the Monitoring Program – Great Artesian Basin (GAB) 2023 (BHP 2023b). Two control points were used to the north-west of Wellfield B, between MB8 and Georgia Bore 2 (Control Point #1), and MB7 and Georgia Bore 2 (Control Point #2).

The drawdown for the control points in the north-west (Control 1 and Control 2 in Figure 6-1) was determined as follows:

1. Drawdowns at Wellfield B GAB52 (31.6 m), MB8 (14.3 m) and Georgia Bore 2 (10.0 m) were plotted vs. their respective distance from Wellfield B. For Wellfield B, a nominal distance of 1 m was used.
2. Drawdowns at Wellfield B GAB52 (31.6 m), MB7 (9.7 m) and Georgia Bore 2 (10.0 m) were plotted vs. their respective distance from Wellfield B. For Wellfield B, a nominal distance of 1 m was used.
3. The Control Points were calculated as 12.2 m for Control Point 1 (the average for MB8 and Georgia Bore 2) and 9.9 m for Control Point 2 (the average for MB7 and Georgia Bore 2).
4. A logarithmic trend was fitted to the distance-drawdown relationship, a standard and simplified groundwater hydraulic relationship for an extensive confined aquifer.
5. Using the logarithmic distance-drawdown trend, the control points were placed at that distance and to the north-west of Wellfield B (red marker in Figure 6-2 “Control 1” and “Control 2” in Figure 6-1).



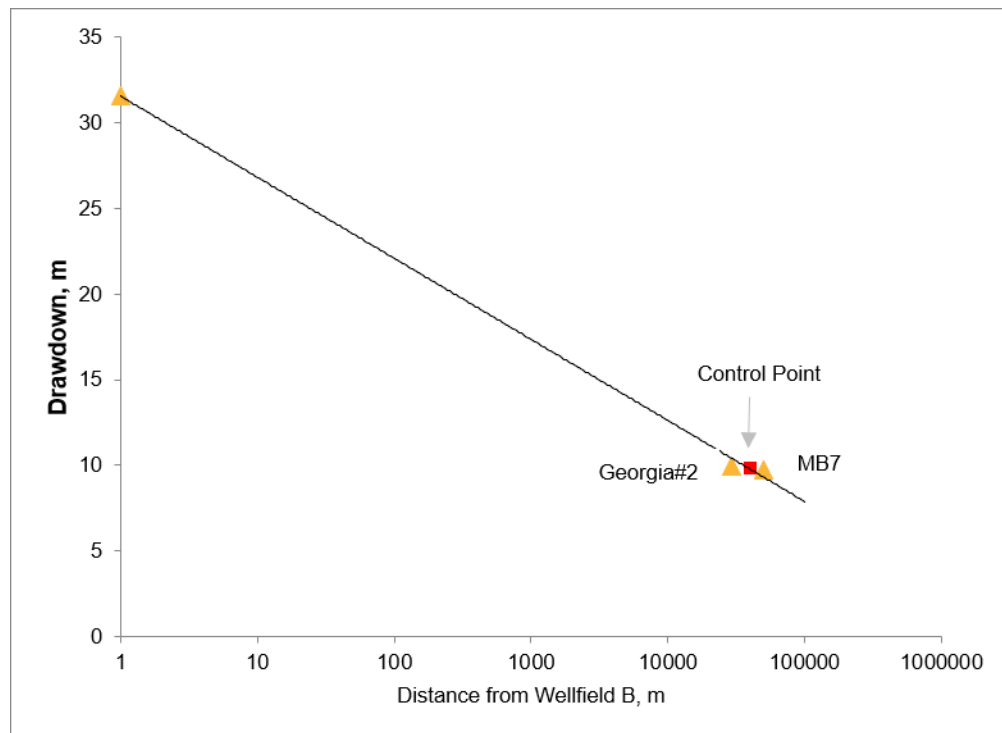


Figure 6-2 Assessment of drawdown at control points 1 (top) and 2 (lower)

6.5 Evaluation against Compliance Criteria

6.5.1 The Area Contained Within the 10 m Drawdown Contour

The area contained within the 10 m drawdown contour line in Figure 6-1 is 4,010 km², below the maximum 4,450 km² compliance criteria, but above the 4,000 km² leading indicator.

The 10 m drawdown contour has expanded from 3,934⁴ km² (FY24) to 4,010 km² (FY25). This expansion is consistent with updated numerical model predictions undertaken in FY24 (see Figure 6-3 and Section 10.6).

The increase in the 10m contour area of 76 km² between FY24 and FY25 is less than the annual increases of between 400 km² and 500 km² observed since 2019 due to the replacement of Peachawarrina bore by Peachawarrina #3 and the subsequent pressure recover which has reduced the 10m contour propagation to the NE and limited expansion in FY25.

The extension of the 10 m drawdown contour to the north is largely due the gradually increasing drawdown observed at Georgia 2 and MB7.

The extension of the 10 m drawdown contour to the southeast is not representative of ODC abstraction alone - but rather a conflation of inherent errors in the monitored dataset compounded by third-party abstraction estimates. To address this, in FY25 ODC undertook a bore census, monitoring procedure audit and database audit to more accurately define bore use and data integrity in Wellfield B.

⁴ 'During the development of the FY 25 report, it was identified that there was an error presented in the FY24 AWR as it relates to the 10m drawdown contour area. This area was reported as 4,010 km² however should have been reported as 3,934 km². The FY25 AWR will compare annual drawdown changes using the amended FY24 value.'

The proximity of the FY25 10 m drawdown contour (4,010 km²) to the compliance criteria 4,450 km² is being addressed by the FY26 Technical Program of Works, which aims to better understand and estimate third-party abstraction as well as review potential impacts to third-parties. The intent of the current compliance criteria is to prevent significant adverse impacts to existing third-party users' right to access water from within the GAB wellfield designated area as a result of ODC activities (BHP, 2023a and 2023b). Under the current reporting mechanism, the 10 m drawdown contour reports a cumulative impact rather than the result of ODC activities alone.

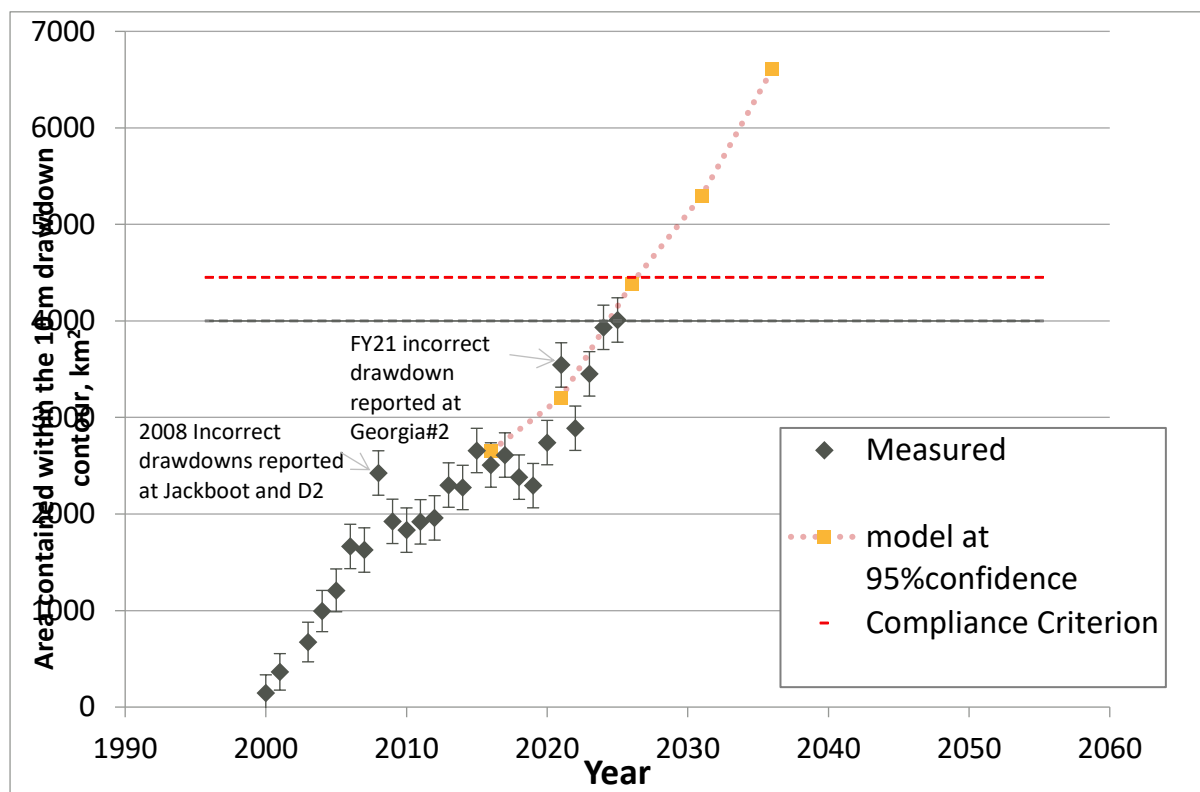


Figure 6-3 Area Contained within the 10 m Drawdown Contour

Note: 'model at 95% confidence' has been updated following the triennial groundwater model review in FY24. Also, in 2015, drawdown reporting switched from temperature-exclusive (using pressure (kPa) as a baseline) to temperature-inclusive (using PRHs as a baseline),

6.5.2 Drawdown at bores S1 and S2

Sites S1 (replaced by S1_New) and S2 are the closest dedicated monitoring bores to GAB springs and were therefore selected as compliance sites.

Table 6-2 Summary of drawdown at S1 and S2, to June 2025

Bore	PRH (m AHD)	Mean Potentiometric Head FY25 (m AHD)	Mean Drawdown FY25(m)
S1/S1_New	70.3*	69.5	0.8
S2	54.0	54.6	- 0.7
S1/S1_New – S2 12 month moving drawdown average			0.1

Note: PRH (m AHD) has been adjusted to incorporate the 0.5m RL difference between S1 and S1_New

As Figure 6-4 indicates, the average drawdown in these monitoring bores has fluctuated between -0.7 and 0.8 m and has remained very consistent and close to 0 m since 2010. The latest reported drawdown at the point between monitoring bores S1/S1_New and S2 (measured as the average drawdown of the two bores based on the 12-month moving average) is 0.1 m, within the 4 m drawdown compliance criteria.

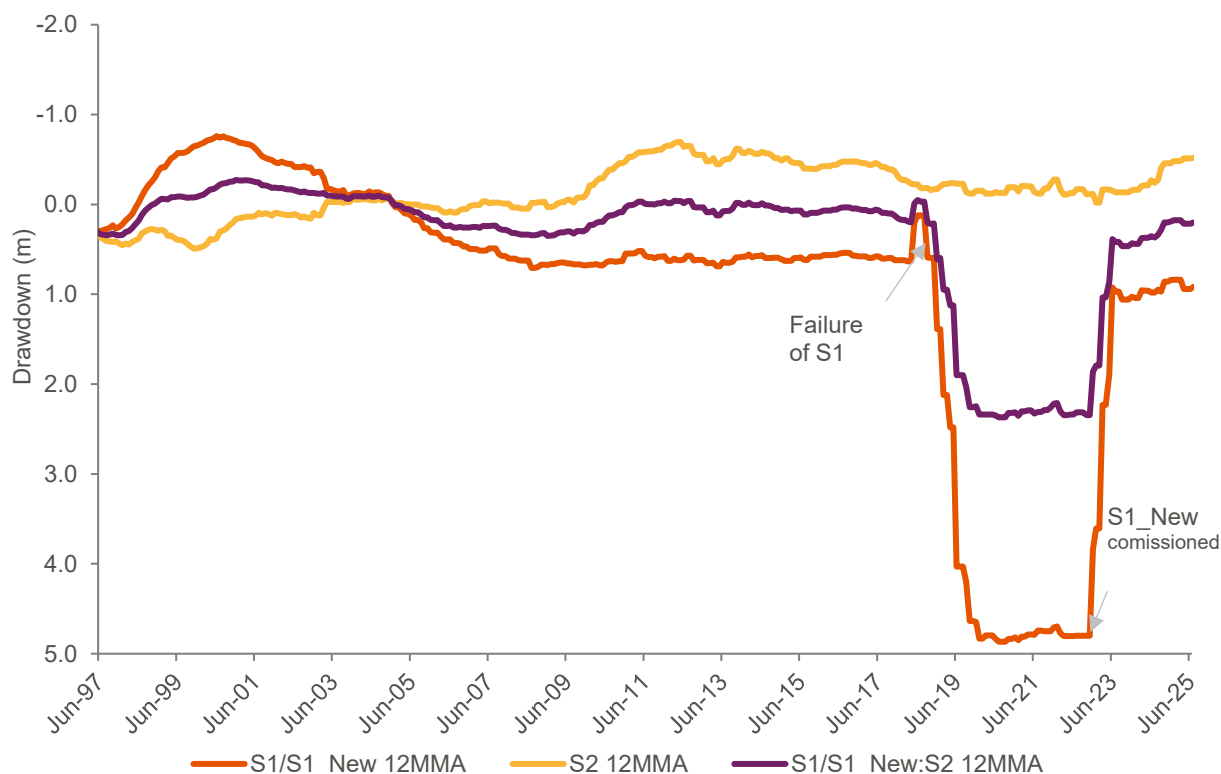


Figure 6-4 Drawdown at Wellfield B Compliance Bores S1/S1_New and S2

6.5.3 Evaluation against Leading Indicator

Pastoral wells are monitored to increase the density of observation points and to confirm that artesian pressures are preserved. As the pastoral properties are large (~ 5000 km²), the water supply lines for their livestock are long, exceeding 20 km in places. The area is remote and the drilling costs for bores, that are several hundred metres deep, are high. As a consequence, many of these pastoral wells are used continuously and have influence on pressure and temperature measurements collected during monitoring events. An example of this is the re-establishment of Jackboot Bore headworks. Prior to re-establishment the estimated drawdowns were suspected to be over-estimated. After headworks improvement the recovery of shut-in pressure confirmed the previous over-estimation of drawdown by several metres. This was again confirmed in FY25 in the decommissioning and replacement of Peachawarrina bore, which was confirmed failed downhole. The difference between the decommissioned Peachawarrina bore and the replacement bore (Peachawarrina #3) was an overestimation of five metres drawdown (Table 6-1).

Drawdown of the aquifer in Wellfield B is a cumulative outcome of ODC abstraction, pastoral abstraction, and abstraction from the Oil and Gas industry to the north. Pastoral abstraction is not metered and monitoring data from pastoral wells often overestimates drawdown. For this reason, it is difficult to separate the cause of drawdown between ODC abstraction and that of third-parties. Therefore, the drawdowns presented in this report are total drawdowns rather than those solely attributed to ODC abstraction.

Total drawdown at EIS pastoral bore sites (Kinhill Engineers, 1997, updated Golder Associates 2016) can be assessed from Figure 6-1, which shows drawdown contours in the Wellfield B area due to all groundwater abstractions. A summary of drawdowns at monitored pastoral bores is shown in Table 6-3.

Drawdown is not reported for all 1997 EIS pastoral sites in Table 6-3. The reasons for this vary. For some bores there is no baseline head or pressure available or those assigned proved to be incorrect; for others contemporary measurements are not possible (the bore cannot be accessed or shut-in). For some bores, the shut-in times appear to be insufficient (not long enough to minimise the influence of antecedent flow). Leaks inside bores or on the wellhead or the delivery infrastructure also render some pressure measurements non-representative of the GAB aquifer (the pressure measured is lower than the correct pressure at the same place and time in the aquifer) and hence would report incorrect drawdowns

The Practical Reference Head (PRH) for EIS pastoral bores has been calculated as the temperature corrected 1997 EIS kPa value. The predicted drawdown is taken from the review and update completed in 2016 by Golder Associates.

In general, drawdown at pastoral bores remains less than the predicted long-term impact as presented in the EIS (Kinhill Engineers, 1997, updated Golder 2016) with the exception of five locations and explanations for these are provided below.

Of the 21 pastoral bores reported in Table 6-3, five locations could not be monitored as bores could not be shut-in (no shut-in permitted), and three could not be shut-in entirely due to leaking headworks. Of the 16 pastoral bores that monitoring data could be collected, five (Cannuwaukaninna 2, Chapalana 2, Cooryaninna, Kopperamanna, and Muloorina) demonstrated drawdown larger than what was predicted in 2016.

Muloorina continues to have large antecedent flow which feeds an extensive wetland. This uncontrolled flow, combined with non-representative data (difficulty obtaining sufficient shut-in time) provides a large but likely overestimation of drawdown at this location. Muloorina is also close to the ODC production bores GAB 51, GAB 52, and GAB 53; drawdown from all of these locations is likely to interact, but without representative monitoring data at Muloorina, it is difficult to determine the cause of drawdown that is larger than predicted. Notably, the drawdown at Peachawarinna #3, which is also close to the ODC production bores, remains within predicted drawdowns.

Both Cannuwaukaninna 2 and Kopperamanna locations showed drawdowns larger than those predicted. These bores are situated north of the Wellfield B designated area, and despite Cannuwaukaninna 2 being a relatively new bore (commissioned in 2019 (Unit No. 6640-30)) the monitored pressures continue to lower over time. Investigations in FY26 will include likely sources of aquifer drawdown including aquifer losses due to downhole bore failure, improved data capture (i.e. permanent flow meters rather than instantaneous flow meters) and updated modelling to determine potential influence of Oil & Gas abstraction from further north in the GAB. It is unlikely that the drawdowns at Cannuwaukaninna 2 and Kopperamanna are solely due to ODC activities as the 10m drawdown contour (see Figure 6-1) is not continuous to the north from the ODC production bores.

Chapalana 2 has been monitored since 2017, with an average drawdown of 2.5 m. The last reliable pressure reading occurred in FY23 of 2.8 m drawdown. Since then, monitoring data has been unreliable or not obtainable; either the well head cannot be shut-in at all (FY24), or the well head cannot be shut in entirely and leaks are observed (FY25). Where leaks occur, any pressure read is likely to be lower than expected and drawdowns are then overestimated. Until the well head infrastructure is fixed, it is unlikely that representative data can be obtained from the Chapalana 2 location.

Likewise, Cooryaninna has had wellhead leaks observed since 2015 with those leaks exacerbating over time. Leaking is often observed at the monitoring valve and bore flow can be heard even when the wellhead is shut-in, suggesting ineffective shut-in. This leads to an overestimation of drawdown. As such Cooryaninna is unlikely to provide representative monitoring data until the leaks are fixed.

Clayton Dam 2, Tarkaninna #2 and Yarra Hill bores, which are nearby to Chapalana 2, have not been shut-in since 2018 at the owner's request. Similarly, Clayton 1, Clayton 2 have not been shut-in since 2004 at the owner's request. Collectively, the southeastern corner of the Wellfield B monitoring network does not have representative data for aquifer drawdown. Flow estimates for these bores are provided in Appendix 7.

Predicted drawdowns were updated by modelling undertaken in 2016. The purpose of these predicted drawdowns was to consider the potential impact to pastoral bores attributed to ODC abstraction in Wellfield B. The issue with these predicted drawdowns is abstraction from Wellfield B is not only attributed to ODC abstraction but to a cumulative effect of both BHP and third-party abstraction. Third-party abstraction has historically been extrapolated from a limited dataset of flow measurements; as such, modelled predictions carry a level of uncertainty. Though the 2016 predicted drawdowns would have been the best estimate at the time, third-party abstractions are likely to have changed since then. It is also probable that bore infrastructure has degraded with age and pastoral bores are incurring aquifer losses downhole; this has the same effect as antecedent flow and records a lower pressure (kPa) than expected at the wellhead, thus overestimating drawdown.

In FY26, ODC will work with the State and third-parties to better understand both cumulative abstraction and the separation of ODC abstraction versus third-party use.

Table 6-3 Drawdown at 1997 EIS Pastoral bores

Well	Temperature-exclusive	Temperature-inclusive		
	Modelled drawdown until 2036 (m)	PRH (m AHD)	FY25 annual drawdown - from PRH baseline (m)	5yr drawdown change 2021-2025 (m)
Callanna	0.8*	48.9	-5.2	-5.2
Cannuwaukaninna 2	5.6	90.2	9.8	3.3
Chapalana 2	2.8	92	4.0	2.0
Charles Angus	2.8	50.5	No SIP	No SIP
Clayton #1	10.9	71.5	No SIP	No SIP
Clayton #2	10.9	73.8	No SIP	No SIP
Cooranna	4.3	43.3	-18.2	-4.1
Cooryaninna	4.2	96.3	9.2	0.2
Dulkaninna 2	7.5	88	6.5	-1.3
Jackboot	5.1	84	3.0	-1.6
Kopperamanna	4.9	92.1	12.3	0.6
Lake Harry	15.2	84.9	11.9	0.9
Marion	15.0	87.5	11.9	0.2
Maynards	1.4*	55.4	-1.4	-1.4
Morphetts	1.0	54.3	0.7	-0.7
Morris Creek#2	4.2	63	-4.2	0.7
Muloorina	16.2	85.4	22.1	4.7
Peachawarrina #3	13.4	85.2	10.6	-2.3
Peters	12.1	52.4	6.4	1.9
Tarkanina #2	5.2	86.8	No SIP	No SIP
Yarra Hill	2.6	87.7	No SIP	No SIP

Notes:

1. Predicted drawdowns are provided in the Great Artesian Basin Monitoring Program (BHP, 2023b) and are modelled predictions from 2016 (Golder Associates 2016); where there are gaps in this dataset, the 1997 EIS predictions are used (*), i.e. Callanna and Maynards. Note the modelled drawdown predictions are temperature-exclusive and as such are not directly comparable to temperature-inclusive drawdowns provided for FY25, but are approximate. Typographical error from FY24 corrected for Clayton 1, Clayton 2 and Yarra Hill (#)
2. Temperature exclusive predicted drawdowns are calculated as $1\text{kPa} = 0.102129\text{ m}$
3. PRH is calculated as the temperature corrected EIS pressure from 1997
4. Cooranna baseline pressure was given in the 1997 EIS as 61kPa. This is an incorrect value for the bore and represents a flow pressure rather than a shut-in pressure. Corrected Practical Reference Pressure (PRP) is 222kPa.
5. First measurement from Chapalana was 2017.
6. Cannuwaukaninna was replaced with Cannuwaukaninna #2 in 2022. The PRH has been corrected from 90.3 to 90.2m AHD to account for the difference in headworks.
7. Measured pressures and calculated heads at Peters appear to be below those of adjacent GAB bores. Although drawdown is calculated, the reference level for the well may be incorrect
8. The monitoring points that demonstrated non-representative data were: Chapalana 2; Charles Angus; Clayton #1; Clayton #2; Cooryaninna; Lake Harry; Muloorina; Tarkanina #2 and Yarra Hill. Where data has been omitted ('No SIP') a pressure read was not possible. Where data has been provided, the drawdowns are likely an over-estimation.
9. No SIP = No Shut-in Pressure. This is due to no shut-in of the bore permitted by the land owner (Clayton #1; Clayton #2; Tarkanina #2; Yarra Hill) or significant leaks at headworks prevented shut-in (Charles Angus)

7 GAB SPRING FLOWS

Groundwater abstraction from the GAB has the potential to reduce aquifer pressures and the flow of water to the springs in the vicinity of wellfield pumping. In turn a reduction in spring flow can potentially affect the hydrological conditions and associated spring habitat area that is available to organisms, increasing the likelihood of spring extinctions. A core group of 41 GAB springs in the vicinity of the wellfields are monitored annually (BHP 2023b). During this monitoring, flow rates and field chemistry (pH, EC and temperature) are recorded.

7.1 Leading Indicator

- A combination of the following factors that can be attributed to water extraction from Wellfields A and B:

Evidence that flow reductions at GAB springs in the vicinity of the wellfields may exceed the predictions made in the Olympic Dam Environmental Impact Statements of 1982 and 1997.

Evidence of water quality change (measured as pH or conductivity) at GAB springs

7.2 Monitoring Program Requirements

7.2.1 Purpose

- Determine the extent of flow change at GAB springs within each hydrogeological zone of impact that may be attributed to water abstraction from Wellfields A and B.
- To provide data to support the leading indicator for GAB impacts, and alert management when levels approach the leading indicator value.

7.2.2 Deliverables

- Records of spring flow data for assessment of flow trends and possible drawdown impacts (GA 3.4).

7.3 Evaluation against Leading Indicator

Spring flows are presented by hydrological zone based on Kinhill Stearns (1984) and Kinhill Engineers (1997) (updated Golder Associates 2016) and further refined in the BHP GAB Contingency Plan (BHP, 2023c). Individual springs within each zone are listed in APPENDIX 8.

Monitored Spring Zone Flows (MSZF) are shown in Figure 7-1. Flows are calculated as a 3-year rolling average (Table 7-1)

Since 2000, Olympic Dam has contributed to a program of bore flow restrictions in conjunction with multiple government programs (GABSI, IGABDR and GABWSP) to recover pressure in the Wellfields A & B area. Through the provision of closed reticulation, decommissioning wells and restricting flows ODC has realised approximately 42 ML/d in ongoing water savings for the GAB region. Since FY21, ODC has limited the abstraction from Wellfield A to 5 ML/d. The cumulative reduction in local GAB abstraction correlates with increasing trends of spring flows in the Wellfields area (Figure 7-1).

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Table 7-1 Summary of Spring Flow data FY25

Hydrogeological Zone	No. of records in period	2023-2025 average (L/s)	1996-1998 average (L/s)	Predicted Loss (%) 1982 EIS	Predicted Change (% 1996-2016) 1997 EIS	EIS Predicted Decline (%)	Change from 1996 – 1998 baseline (%)
Coward	3	13.2	9.7	<1	0	<1	+36.4
South West	14	1.6	1.1	>1<3	-1	>1- <3	+41
Western Lake Eyre South	4	4.2	4	2	- 3-17	3-17	+4.7
South East	7	2.5	2.5	<1	- 3-16.5	3-16.5	+0.9
North East	10	1.8	1.6	8-20	- 1	8-20	+12.1
Wellfield A	3	0.2	0.4	60-100	-	60-100	-38.7

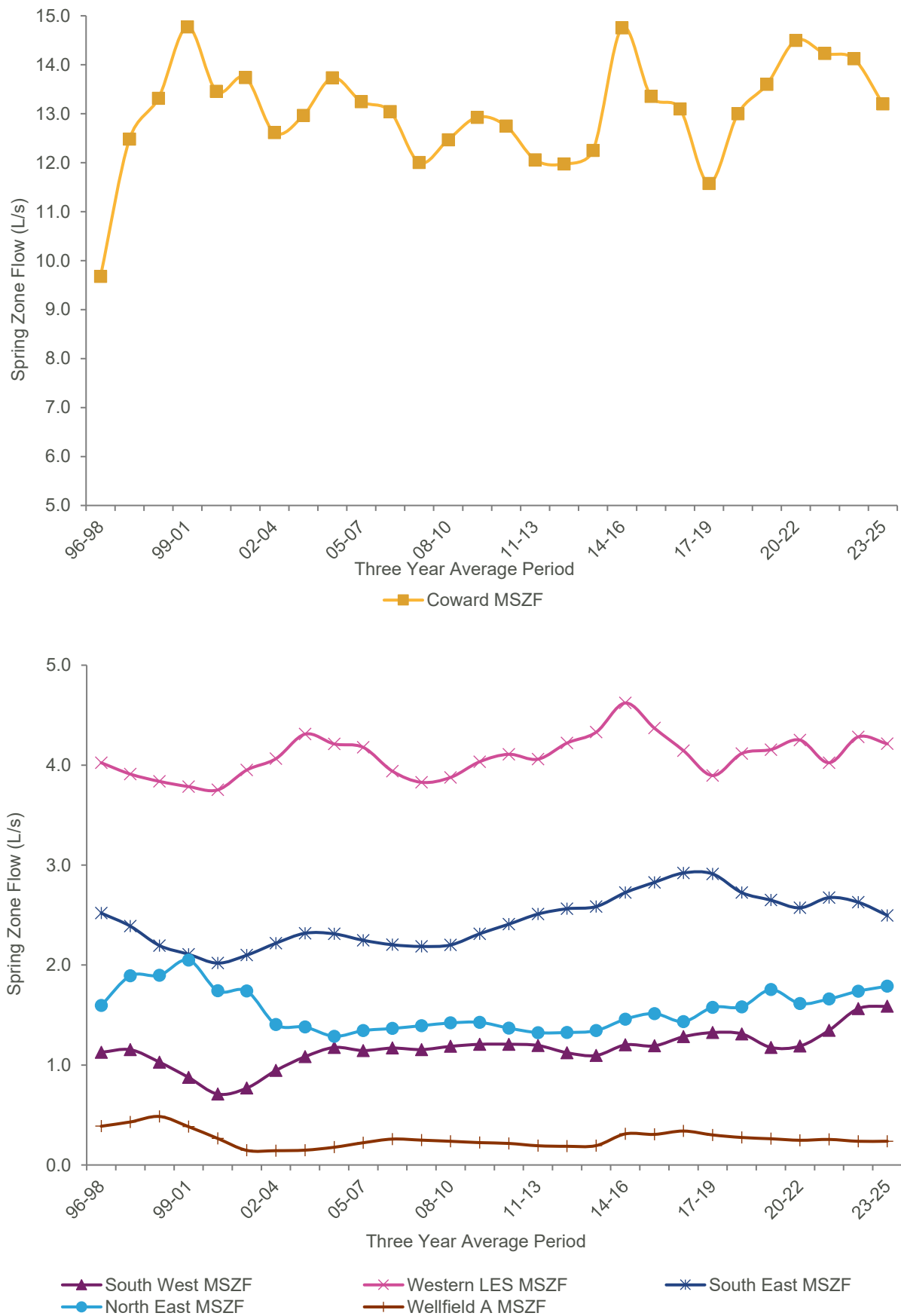


Figure 7-1 Monitored Spring Zone Flows (MSZF)

7.3.1 Coward Zone

Springs in the Coward zone have been observed to produce highly variable flow rates. Measured flow in FY25 remained within historical ranges. Measured flow rate was 36.4 % (3.5 L/s) higher than the 1996-1998 average (Table 7-1).

7.3.2 South West Zone

GAB Spring flow rates in the South Western Zone increased again from FY24 and are consistently above historical variation with an increasing trend being observed since FY19. Measured flow rate was 40.9 % (0.5 L/s) higher than the 1996-1998 average (Table 7-1).

7.3.3 Western Lake Eyre South Zone

GAB Spring flow rates in the Western LES zone have demonstrated an increased trend since FY19. The measured flow rate was 4.7 % (0.2 L/s) higher than 1996-1998 average (Table 7-1).

7.3.4 South Eastern spring Zone

GAB Spring flow rates in the South Eastern spring Zone remained stable compared to FY24. The measured flow rate was within 1 % of the 1996-1998 average (Table 7-1).

7.3.5 North East Zone

GAB spring flow rates in the North East Zone have demonstrated an increased trend since FY14. The measured flow rate was 12.1 % (0.2 L/s) higher than the 1996-1998 average EIS baseline (Table 7-1).

7.3.6 Wellfield A Zone

GAB Spring flow rates in the Wellfield A Zone remained stable and within the range of historical observations. The measured flow rate was 38.7 % (0.2 L/s) lower than the 1996-1998 average (Table 7-1) and remains within the predicted decline of 60-100%.

8 GROUNDWATER CHEMISTRY

Assessment of spatial variation of groundwater chemistry throughout the wellfield and monitored area has been discussed previously by AGC (1982) and Habermehl (1983) and is not included in this report. In general, spatial variations in chemistry of the GAB aquifer occur on a very broad scale. A review of groundwater chemistry data collected in the vicinity of the OD Wellfields has been provided in a previous wellfield report (WMC, 2004).

Shallow aquifers containing saline water (20,000–50,000 mg/L TDS) occur in the vicinity of Wellfields A and B. A reduction in aquifer pressures caused by abstraction could conceivably reverse the potential for upward groundwater movement from the GAB aquifer to the shallow aquifers and potentially affect water quality in the main GAB aquifer in the very long term.

Salinity, measured as Electrical Conductivity (EC) is the simplest, most robust diagnostic monitoring parameter and is the focus of the monitoring program.

8.1 Leading Indicator

- Evidence of water quality change (measured as pH or conductivity) at GAB springs that can be attributed to water extraction from Wellfields A and B.

8.2 Monitoring Program Requirements

8.2.1 Purpose

- Quantify by routine and appropriate methods, water qualities in all monitoring and production wells on a quarterly basis, as stated in the Indenture.
- Identify any changes in EC at bores and springs in the region of either Wellfields A or B that, combined with other influencing factors, may be attributed to abstraction.
- Provide data to support the leading indicator for GAB impacts, and alert management when levels approach the leading indicators.

8.3 Deliverables

- Records of GAB water EC, pH and temperature data for assessment of changes and trends in water quality. (GA 3.2)

8.4 Evaluation against Leading Indicator

A summary of EC and pH values during FY25 and historical bounds is provided in Appendix 3. Large variations of the average EC quality can occur at many springs from year to year. Despite such fluctuations, averages of field water quality generally remained within or close to the historical ranges.

Data shown in Appendix 3 include the 5th and 95th percentile values for the historical range of values and identify where the FY25 average is above the 95th percentile.

As in previous years, statistically significant linear regression coefficients over the entire record (different from zero at the 95% confidence level) were identified and are shown in Figure 8-1.

Sites identified by this method that had a regression coefficient (the slope of a regression line fitted to the dataset) outside the range of -0.10 to +0.10 were further analysed. Of the 113 groundwater and spring sites sampled during FY25, four were identified as having regression coefficients outside that range, three of which having appeared consistently in previous years. Welcome WWS001 and Welcome WWS013 have been historically identified as having an increasing salinity trend, while Old Finniss HOF033 has a decreasing trend. Bopeechee HBO007 has indicated increasing salinity in previous years but this year has moved back into the main grouping (+/-0,1).

GAB21 is identified as being outside the 95th percentile as it has been in previous years, but this year is also outside the regression coefficient bounds and continues the increasing EC trend seen since approximately 2019.

Individual trend graphs for these sites are provided in Appendix 5.

8.4.1 Wellfield A Salinity Trends

Two sites were identified in Wellfield A:

- One site with increasing salinity trend (GAB21),
- One site with decreasing salinity trend (Old Finniss HOF033),

The results above are consistent with the general rise in salinity for Wellfield A, discussed in a previous wellfield report (BHP, 2005). It should be noted from the graphs however, that correlations (as measured by the correlation coefficient square) in Appendix 5, particularly for springs, are generally poor.

The increasing trend observed at Bopeechee HBO007 once again did not continue in FY25, having been reducing since FY23. As a result, it has moved back into the main site grouping and has not been separately identified this year.

The decreasing trend observed since the mid 2000's at Old Finniss HOF033 has further stabilised in FY25.

The increasing trend identified at GAB21 is also seen in the nearby well GAB 16, but no other proximal bores (GAB16A or GAB6A) thus is interpreted as a being isolated and not part of a broader trend. Previous reports identified increased salinity trends in proximal well GAB15, which was identified as upwards leakage from basement rocks (WMC 2004; and Woodward-Clyde 1992).

8.4.2 Wellfield B Salinity Trends

There were no monitoring sites in Wellfield B for FY25 that identified trending data greater than the 95th percentile.

The two springs in the Welcome group (WWS001 and WWS001) have been previously identified over many years.

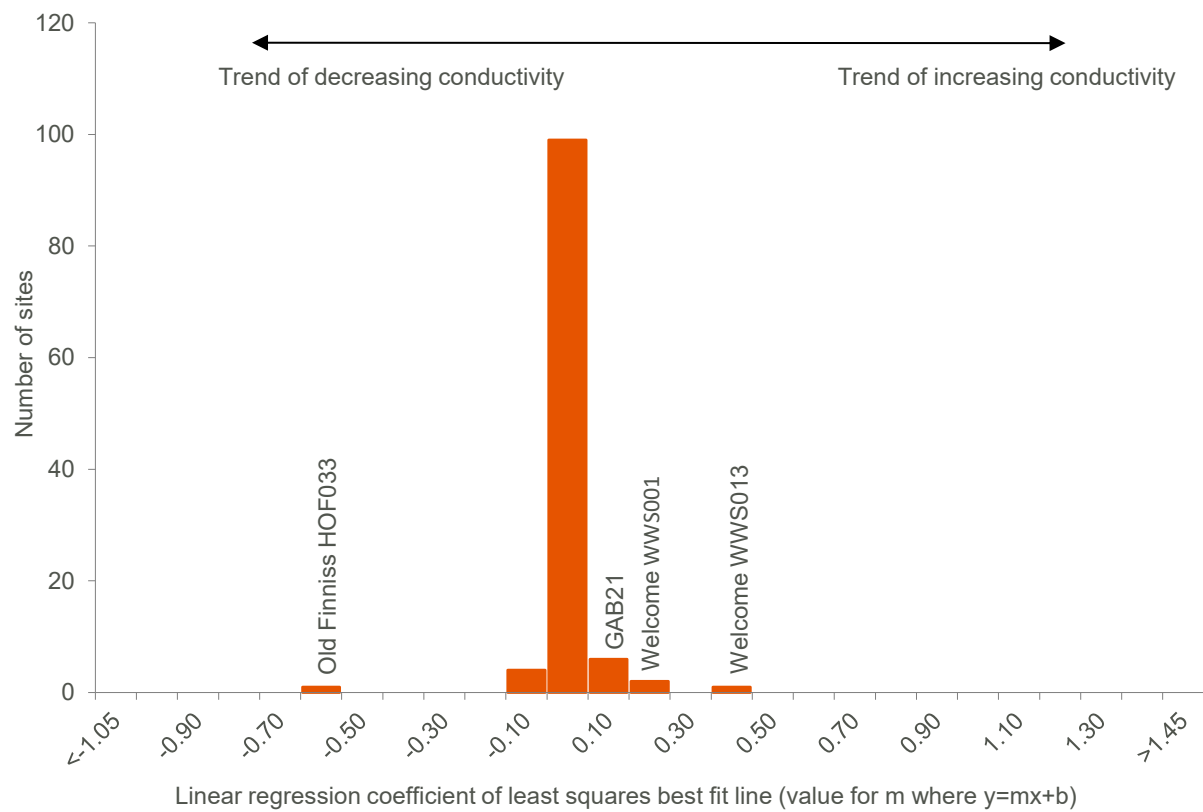


Figure 8-1 Frequency distribution of conductivity trends for the wellfields area.

9 GAB WATER USE EFFICIENCY

The efficiency of water use at Olympic Dam and Roxby Downs is a significant driver in minimising the rate of water abstraction from the GAB. Efficient water use practice at the operation and the Roxby Downs township is promoted through education and engineering controls. Targets and key performance indicators are developed to promote continuous improvement in water use efficiency. An efficiency rate of 1.24 kL of water per tonne of ore milled (kL/t), for a production rate of 200,000 tonnes per annum was anticipated in the 1997 EIS (Kinhill Engineers, 1997). The 1997 EIS assessment report (Department of the Environment, 1997) required Olympic Dam to improve efficiency of water use and supply practices.

9.1 Monitoring Program Requirements

9.1.1 Purpose

- Measure the industrial water use efficiency of the operation and total potable water use of associated townships and accommodation villages, including Andamooka.
- Quantify by routine and appropriate methods total water quantities withdrawn from any wellfield on both an individual well and wellfield basis, with abstraction added to the record on a monthly basis, as required by the Indenture.
- Provide a 10-year forward schedule for abstraction of groundwater from the GAB.

9.1.2 Deliverable(s)

- Collated domestic and industrial water use efficiency data, to assess performance against improvement targets (GA 3.5).
- Ten-year water use schedule to be submitted to the Indenture Minister by 1 January annually (GA 3.5).

9.2 Results

In FY25 the GAB Industrial Water Efficiency of the operation was 1.01 kL/t compared to the target of 1.16 kL/t and actual of 1.00 kL/t for FY24.

It is worth noting that the water efficiency for FY25 remains amongst the best recorded over the history of Olympic Dam's operations. This is largely due to the high milled tonnes, however previous years with similar production did not achieve the same efficiency. The efforts of ODC to control water use have therefore contributed to the 0.98 and 1.0 kL/t figures. This has been achieved by incorporating monitoring of water use into daily production review meetings, to improve understanding of the drivers of water consumption, and to respond quickly to variations.

Domestic water use during FY25 averaged 2.32 ML/d compared to 2.35 ML/d in FY24, below the target of 3.2 ML/d.

The current 10-year water use schedule, as provided to the Minister for Mineral Resources Development in December 2024, is presented in Appendix 6. An updated schedule will be provided by 1 January 2026.

10 RESOURCE SUSTAINABILITY AND MANAGEMENT

10.1 Further Exploration and Development

The 10-year forecast includes current business as usual (BaU) operations. This additional water abstraction is expected to come from saline sources within the OD Special Mining Lease.

10.2 Future Perspective

The 10-year BaU forecast (Appendix 6) predicts total Olympic Dam wellfield abstraction to reach 35.8 ML/day by 2035 and total water demand for Olympic Dam is forecast to reach 43.3 ML/d. Abstraction rates for Wellfield A are expected to be consistent at 4.5 ML/d and vary from Wellfield B in preparation for planned shut downs and major projects, but at a maximum of 31.3 ML/d at 2030 with the balance to come from saline sources within the OD Special Mining Lease.

10.3 Sustainability Comments

Since 2000, Olympic Dam has contributed to a program of bore flow restrictions in conjunction with multiple government programs (GABSI, IGABDR and GABWSP) to recover pressure in the Wellfield A & B designated areas. Through the provision of closed reticulation systems, decommissioning wells and restricting flows ODC has realised approximately 340 GL in cumulative water savings for the GAB region since 1999 at an ongoing rate of approximately 42 ML/d – above BHP's 5 year average abstraction rate of ~ 30 ML/d (Figure 10-1). Since FY21, ODC has limited the abstraction from Wellfield A to 5ML/d. The cumulative reduction in local GAB abstraction coincided with observed increased aquifer pressure and increased spring flows associated with the Wellfield A & B areas.

In the Wellfield A area, groundwater heads and spring flow rates have now been relatively stable for approximately 20 years and showing improvement since the 5M L/d cap implemented in 2020. Boundary drawdown, determined as the average drawdown at GAB8 and HH2, was 1.3 m, better than the average since 2010 and well under the 4 m compliance criteria.

GAB spring flows are primarily driven by groundwater pressure as a potentiometric head in the GAB aquifer. Springs flow when, the aquifer pressure head is maintained greater than the elevation of the spring vent – creating a driving head or aquifer flow direction. The FY25 hydraulic gradient between nominated wells in the Wellfield A region was better than the minimum Leading Indicator by the end of the FY25 reporting period; in addition, from September 2024 until May 2025 monitoring data suggested there was a local re-pressurisation in Wellfield A due to progressive closure of unused bore infrastructure.

For Wellfield B, the drawdown response and propagation of the potentiometric surface continues to expand over time. This is an expected response to abstraction occurring from a closed system.

The area contained within the 10 m drawdown contour line is 4,010 km², below the maximum 4,450 km² compliance criteria. The latest reported average drawdown for bores S1/S1_New and S2 was 0.1 m, less than the maximum 4 m drawdown limit set for Wellfield B. The existing abstraction rate, attributable with ODC operations, has demonstrated a consistent 30 m drawdown contour and predictable 20 m contour in alignment with modelling predictions. However, the 10 m drawdown contour is a reflection of cumulative abstraction attributable to multiple users north of Wellfield B and third-party antecedent flow to the south and east of the Wellfield B designated area. The 10 m drawdown contour is predicted to expand further to the south, east and north in FY26. The work proposed for FY26 includes a re-calibration of the GAB model as well as investigation into the contributions of multiple users to the impact and management of the aquifer.

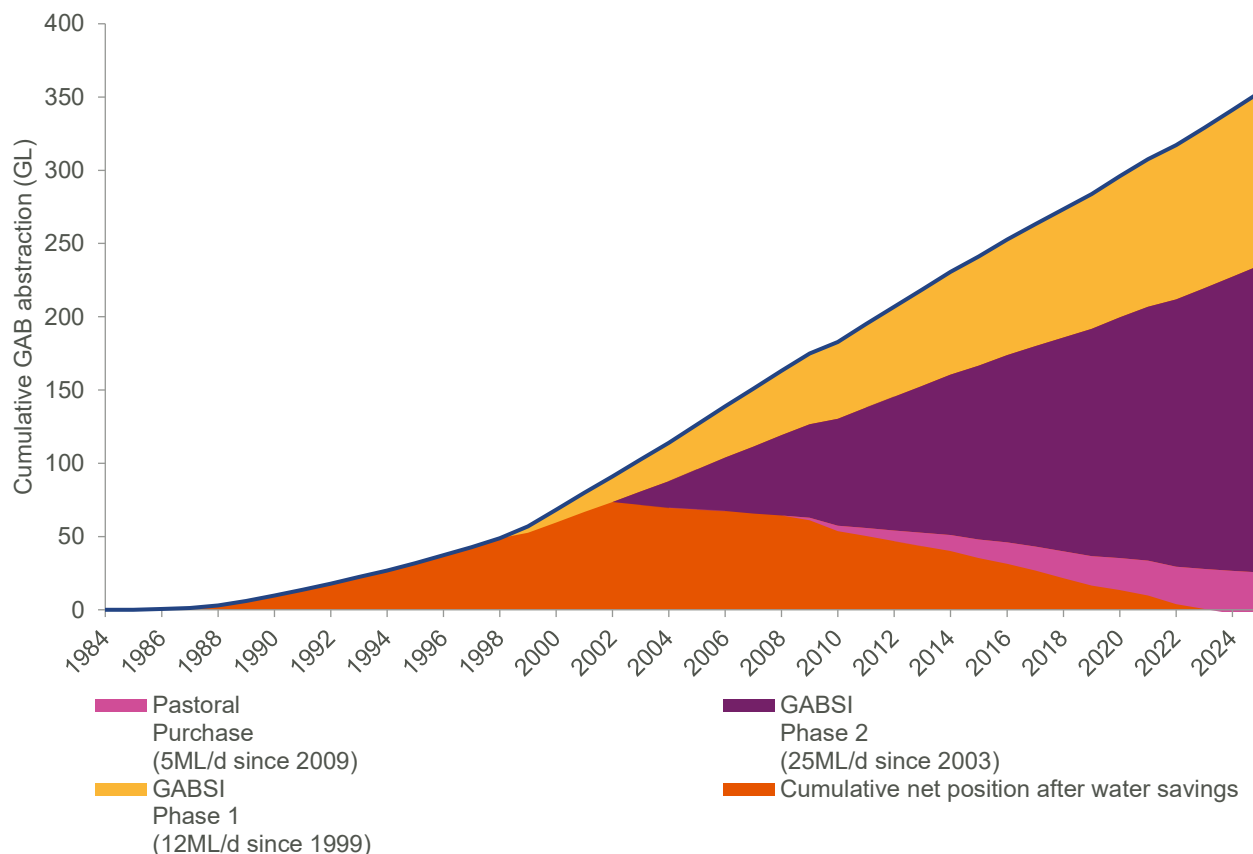


Figure 10-1 ODC estimated cumulative GAB water savings

10.4 GAB groundwater model update

In FY24 a triennial update of the GAB groundwater model (ODGABv2) was undertaken, as part of ODC's commitments (BHP, 2023a and 2023b). The ODGABv2 model was developed in 2020 and is the most recent and major update of ODC's GAB groundwater model, that includes a complete model rebuild based on an updated hydrogeological conceptualisation (Groundwater Logic, 2020).

The triennial update provided improved simulated pressure responses to abstraction, minor improvements to history-matching, and identified differences between expected and observed aquifer pressure in the eastern part of Wellfield B – likely due to groundwater use external to ODC abstraction such as antecedent flow, third-party use and ageing bore infrastructure, which is also discussed in Section 6.5.1 and 6.5.3.

11 REFERENCES

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- WMC 2004, 'Great Artesian Basin Wellfields Report 1 January 2004 – 31 December 2004', WMC Report ODCENV027.

12 APPENDIX 1: SUMMARY OF MONITORING RECORDS FOR FY25

Site	SIP/SWL		Flow Pressure		Flow Rate		Quality		Comments
	Required	Actual	Required	Actual	Required	Actual	Required	Actual	
Beatrice Bore HBS004					1	1	1	1	
Boocaltaninna	1	3	1	4	1	1	1	4	
Bopeechee Bore HBO013	4	4	4	0	4	1	4	4	Infrastructure does not allow for flow pressure to be taken
Bopeechee HBO004					1	1	1	1	
Bopeechee HBO007					1	1	1	1	
Bopeechee HBO011					1	1	1	1	
Callanna	1	4	1	2	1	1	1	2	
Cannuwaukaninna 2	1	4	1	4	1	2	1	4	
Chapalanna 2	1	4	1	1	1	1	1	4	
Charles Angus	1	0	1	2	1	1	1	2	
Clayton #1	1	0	1	2	1	2	1	2	Well was not shut in/monitored at land owners request. Last SIP taken 1994
Clayton #2	1	0	1	3	1	2	1	3	Well was not shut in/monitored at land owners request. Last SIP taken 2001

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Site	SIP/SWL		Flow Pressure		Flow Rate		Quality		Comments
	Required	Actual	Required	Actual	Required	Actual	Required	Actual	
Clayton Dam 2	1	0	1	1	1	1	1	4	Well was not shut in/monitored at land owners request. Last SIP taken 2018
Cooranna	2	4	1	1	1	1	2	4	
Cooryaninna	1	3	1	3	1	2	1	3	
Coward CBC001					1	1	1	1	
Coward CBC002					1	1	1	1	
Coward CBC013					1	1	1	1	
D2	4	4					4	4	
D3	4	4		2			4	4	
Davenport WDS001					1	1	1	1	
Davenport WDS042					1	1	1	1	
Davenport WDS052					1	1	1	1	
Dead Boy HDB004					1	1	1	1	
Dead Boy HDB005					1	1	1	1	

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Site	SIP/SWL		Flow Pressure		Flow Rate		Quality		Comments
	Required	Actual	Required	Actual	Required	Actual	Required	Actual	
Dulkaninna 2	1	3	1	4	1	1	1	4	
Emerald LES001					1	1	1	1	
Fred LFE001					1	1	1	1	
Fred LFE006					1	1	1	1	
GAB1	4	4				1	4	4	
GAB2	4	4					4	0	Well sub artesian and WQ cannot be collected
GAB5A	4	4				1	4	4	
GAB6	4	4			Continuous		4	4	SIP only measured is production well not in use.
GAB6A	4	4				1	4	4	
GAB7	4	4				1	4	4	
GAB8	4	4				1	4	4	WQ only collected when well is artesian flow
GAB10	4	4				1	4	4	
GAB11	4	4				1	4	4	

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Site	SIP/SWL		Flow Pressure		Flow Rate		Quality		Comments
	Required	Actual	Required	Actual	Required	Actual	Required	Actual	
GAB12	4	0			Continuous		4	0	SIP only measured as production well not in use.
GAB12A	4	4				1	4	4	
GAB12S	4	4							
GAB13A	4	4					4	0	When well is sub artesian WQ cannot be collected
GAB14	4	0			Continuous		4	0	When well is not running WQ cannot be collected. SIP only measured as production well not in use.
GAB14A	4	4					4	4	When well is sub artesian WQ cannot be collected
GAB14S	4	4							
GAB16	4	0			Continuous		4	4	SIP only measured as production well not in use.
GAB16A	4	4					4	4	
GAB17	4	4						4	When well is sub artesian WQ cannot be collected.
GAB18	4	4			Continuous		4	4	When well is not running WQ cannot be collected. SIP only measured as production well not in use.
GAB18A	4	4					4		When well is sub artesian WQ cannot be collected
GAB19	4	4				1	4	4	

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Site	SIP/SWL		Flow Pressure		Flow Rate		Quality		Comments
	Required	Actual	Required	Actual	Required	Actual	Required	Actual	
GAB21	4	4				1	4	4	
GAB22	4	4				1	4	4	
GAB23	4	4					4	0	SIP only collected when well is artesian condition. When well is sub artesian WQ cannot be collected
GAB24	4	4				1	4	4	
GAB30A	4	4				1	4	4	
GAB31A	4	4				1	4	4	
GAB33A	4	4					4	4	
GAB51	4		4	4	Continuous		4	4	Production wells were not shut in
GAB52	4		4	4	Continuous		4	4	Production wells were not shut in
GAB53	4		4	4	Continuous		4	4	Production wells were not shut in
Georgia 2	4	5	4	4	1	2	4	4	
Gosse LGS002					1	1	1	1	
Gosse LGS004					1	1	1	1	

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Site	SIP/SWL		Flow Pressure		Flow Rate		Quality		Comments
	Required	Actual	Required	Actual	Required	Actual	Required	Actual	
Hermit Hill HHS028					1	1	1	1	
Hermit Hill HHS035					1	1	1	1	
Hermit Hill HHS101					1	1	1	1	
Hermit Hill HHS125A					1	1	1	1	
Hermit Hill HHS137					1	1	1	1	
Hermit Hill HHS170					1	1	1	1	
HH1	4	4				1	4	4	
HH2	4	4				1	4	4	
HH3	4	4					4	0	Sub artesian well, WQ cannot be collected.
HH4	4	4				1	4	4	
Highway	1	2	1	0	1	0	1	2	Infrastructure prevented flow pressure to be taken. No flow upon arrival so no flow rate taken
Jackboot	4	5	4	2	1	0	4	4	Bore is permanently shut-in. No offtakes therefore no flow rate required
Jewellery Creek	1	0	1	0	1	0	1	0	Jewellery Creek #2 bore decommissioned. No access granted to Jewellery Creek #3

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Site	SIP/SWL		Flow Pressure		Flow Rate		Quality		Comments
	Required	Actual	Required	Actual	Required	Actual	Required	Actual	
Kopperamanna	1	4	1	4	1	2	1	4	
Lake Billy #2	4	4	4	4	1	2	4	4	
Lake Harry	2	4	2	4	1	1	2	4	
Marion	1	4	1	4	1	1	1	4	
Maynards	1	2	1	2	1	1	1	2	
MB1	4	4					4	4	
MB2	4	4					3	0	Sub artesian well, WQ cannot be collected.
MB5	4	4					4	4	
MB6	4	4					4	3	
MB7	4	4		3			4	4	
MB8	4	4		3			4	4	
McLachlan LMS004B					1	1	1	1	
Morphetts	1	2	1	3	1	1	1	3	

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Site	SIP/SWL		Flow Pressure		Flow Rate		Quality		Comments
	Required	Actual	Required	Actual	Required	Actual	Required	Actual	
Morris Creek	1	3	1	1	1	1	1	3	
Muloorina	2	4	2	4	1	2	2	4	
New Years Gift	4	4				1	4	4	
OB1	4	4					4	4	
OB3	4	4	4	3	1	2	4	4	
OB6	4	4					4	4	
Old Finniss HOF004					1	1	1	1	
Old Finniss HOF033					1	1	1	1	
Old Finniss HOF081					1	1	1	1	
Old Finniss HOF094					1	1	1	1	
Old Finniss HOF096					1	1	1	1	This site is HFL001. The mis-label was identified in FY25. All historical records for HOF096 should be ascribed to HFL001
Old Woman HOW009					1	1	1	1	
Old Woman HOW015					1	1	1	1	

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Site	SIP/SWL		Flow Pressure		Flow Rate		Quality		Comments
	Required	Actual	Required	Actual	Required	Actual	Required	Actual	
Old Woman HOW025					1	1	1	1	
Peachawarrina #3	1	4	1	2	1	1	1	2	Peachawarrina decommissioned and replaced by Peachawarrinna #3
Peters	1	4	1	4	1	2	1	4	
S1_New	4	4					4	3	
S2	4	4					4	4	
S3	4	4					4	0	WQ cannot be collected – well does not sustain flow. WQ is collected from S3A in lieu
S3A	4	4		1			4	4	
S4	4	4		2		1	4	4	
S5	4	4		2			4	3	
Sinclair	1	4	1	4	1	2	1	4	
Sulphuric HSS011					1	1	1	1	
Sulphuric HSS012					1	1	1	1	
Sulphuric HSS024					1	1	1	1	

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Site	SIP/SWL		Flow Pressure		Flow Rate		Quality		Comments
	Required	Actual	Required	Actual	Required	Actual	Required	Actual	
Tarkanina #2	4	0	4	2	1	2	4	3	Well has failed below ground and cannot be shut in. Last SIP taken 2018
Tent Hill	4	4					4	0	WQ cannot be collected – well does not sustain flow
Two Mile #2	4	4		0		0	1	0	Infrastructure not amenable to representative WQ readings
Venables	4	4			1	0	1	0	WQ and flow rate not collected as well non-artesian
WCB01	4	3	4	1	1	0	4	4	No flow upon arrival, hence no flow rate taken
WCB02	4	4	4	1	1	0	4	4	No flow upon arrival, hence no flow rate taken
Welcome WWS001					1	1	1	1	
Welcome WWS002					1	1	1	1	
Welcome WWS004					1	1	1	1	
Welcome WWS013					1	1	1	1	
Well Creek #2	4	2	4	1	1	0	4	2	
West Finnis HWF002					1	1	1	1	
West Finnis HWF003					1	1	1	1	

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Site	SIP/SWL		Flow Pressure		Flow Rate		Quality		Comments
	Required	Actual	Required	Actual	Required	Actual	Required	Actual	
West Finnis HWF048					1	1	1	1	
Wirringinna Spring MWI001	4	0					1	0	Water in well not safe to reach – unstable ground conditions
Yarra Hill	1	0	1	3	1	1	1	4	Offtakes for SIP unable to be accessed. Last SIP taken 2018

Note: Categories are defined in Monitoring Program – Great Artesian Basin (GAB) (BHP 2023a). Monitoring frequency was increased in FY25 in response to a leading indicator of Wellfield B being triggered in FY24.

13 APPENDIX 2: CALIBRATION CERTIFICATES FOR DRUCK PRESSURE TRANSDUCER



Abstec Calibrations Australia Pty Ltd
A.C.N. 074 824 847 ABN 91 751 155 014
79 Ledger Road, Beverley SA 5009
Telephone (08) 8244 1355
abstec@abstec.com.au
www.abstec.com.au

Calibration Report Digital Pressure Gauge

BHP Billiton
Olympic Way
Olympic Dam SA 5725

Report No: A44767PA
Report Date: 22 July 2024
Page Number: Page 1 of 1
Order No: Credit Card
Calibration Date: 22 July 2024
Next Calibration: 22 July 2025

Manufacturer:	Druck	Max Range:	0 kPa to 2000 kPa	Ambient Temp:	20.1 ± 1°C
Model:	DPI 705E	Divisions:	0.1 kPa	Humidity:	54.1 ± 5%
Serial Number:	12396987	Mount Angle:	Vertical	Calibration Location:	Abstec Laboratory
ID Number:	N/A	Test Medium:	Nitrogen		
References Used:	32640-L				
Tolerance:					
Manufacturers Specification: 0.1 %fsd					

Test Procedure Information:

Abstec Test Procedure TPV6 2.15 & MSA Test method 1 - 2008, Calibration of Pressure Calibrators, Indicators & Transducers.

Maximum error as found: 0.13 % fsd

Maximum error after adjustment: 0.01% fsd

Summary of Results:

The unit was adjusted. The maximum as found error is listed above. The tabulated information relating to the uncertainty of each test is expressed at approximately 95% confidence level. K=2.01

Actual Applied Pressure	Calibration Units	Specified Tolerance	Rising Reading	Rising Correction	Falling Reading	Falling Correction	Uncertainty	Conformity
0.0	kPa	±2.0	0.0	0.0	0.0	0.0	±0.06	Conforms
200.0	kPa	±2.0	199.8	+0.2	199.9	+0.1	±0.06	Conforms
400.0	kPa	±2.0	399.8	+0.2	399.9	+0.1	±0.06	Conforms
600.0	kPa	±2.0	599.8	+0.2	599.9	+0.1	±0.06	Conforms
800.0	kPa	±2.0	799.8	+0.2	799.9	+0.1	±0.06	Conforms
1000.0	kPa	±2.0	999.8	+0.2	999.9	+0.1	±0.06	Conforms
1200.0	kPa	±2.0	1199.8	+0.2	1199.9	+0.1	±0.06	Conforms
1400.0	kPa	±2.0	1399.9	+0.1	1400.0	+0.0	±0.06	Conforms
1600.0	kPa	±2.0	1600.0	+0.0	1600.1	-0.1	±0.06	Conforms
1800.0	kPa	±2.0	1800.0	+0.0	1800.1	-0.1	±0.06	Conforms
2000.0	kPa	±2.0	2000.1	-0.1			±0.06	Conforms

Signed:

Nazila Hekmati Authorised Signatory

Checked By:

Accredited for compliance with ISO/IEC 17025 – Calibration. Measurement results are metrologically traceable to the international system of units (SI) through the National Measurement Institute of Australia (NMI) or other National Metrological Institutes that are signatories of the CIPM MRA or subsequent laboratories accredited for calibrations by ILAC MRA signatories including NATA. Non SI unit conversion is in accordance with NIST Special Publication 811. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, and inspection reports. This document shall not be reproduced except in full.

BHP Olympic Dam Great Artesian Basin Wellfields Report

1 July 2024 – 30 June 2025



Abstec Calibrations Australia Pty Ltd
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Calibration Report Digital Pressure Gauge

BHP Billiton
Olympic Way
Olympic Dam SA 5725

Report No: A41925PB
Report Date: 3 August 2023
Page Number: Page 1 of 1
Order No: Nil
Calibration Date: 3 August 2023
Next Calibration: 3 August 2024

Manufacturer:	Druck	Max Range:	0 kPa to 2000 kPa	Ambient Temp:	20.1 ± 1°C
Model:	DPI 705E	Divisions:	0.1 kPa	Humidity:	54.1 ± 5%
Serial Number:	12396987	Mount Angle:	Vertical	Calibration Location:	Abstec Laboratory
ID Number:	N/A	Test Medium:	Nitrogen		
References Used:	32640-L				
Tolerance:					
Manufacturers Specification: 0.1 %fsd					

Test Procedure Information:

Abstec Test Procedure TPV6 2.15 & MSA Test method 1 - 2008, Calibration of Pressure Calibrators, Indicators & Transducers.

Maximum error as found: 0.12 % fsd

Maximum error after adjustment: 0.05% fsd

Summary of Results:

The unit was adjusted. The maximum as found error is listed above. The tabulated information relating to the uncertainty of each test is expressed at approximately 95% confidence level. K=2.01

Actual Applied Pressure	Calibration Units	Specified Tolerance	Rising Reading	Rising Correction	Falling Reading	Falling Correction	Uncertainty	Conformity
0	kPa	±2	0	0	0	0	±0.6	Conforms
200	kPa	±2	200	0	200	0	±0.6	Conforms
400	kPa	±2	400	0	400	0	±0.6	Conforms
600	kPa	±2	600	0	600	0	±0.6	Conforms
800	kPa	±2	800	0	800	0	±0.6	Conforms
1000	kPa	±2	999	+1	999	+1	±0.6	Conforms
1200	kPa	±2	1200	0	1200	0	±0.6	Conforms
1400	kPa	±2	1400	0	1400	0	±0.6	Conforms
1600	kPa	±2	1600	0	1600	0	±0.6	Conforms
1800	kPa	±2	1800	0	1800	0	±0.6	Conforms
2000	kPa	±2	2000	0			±0.6	Conforms

Signed:

N.T. Doherty Authorised Signatory

Checked By:

Accredited for compliance with ISO/IEC 17025 – Calibration. Measurement results are metrologically traceable to the international system of units (SI) through the National Measurement Institute of Australia (NMIA) or other National Metrological Institutes that are signatories of the CIPM MRA or subsequent laboratories accredited for calibrations by ILAC MRA signatories including NATA. Non SI unit conversion is in accordance with NIST Special Publication 811. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, and inspection reports. This document shall not be reproduced except in full.



CALIBRATION CERTIFICATE

Page 1 of 1

UNIT UNDER TEST (UUT)

Manufacturer : Druck
Type : DPI705E
Serial Number : 12999289
Works Order ID : 32498422
Calibration Date : 04 April 2024
Calibrated By : Phyllis Tolan

UNIT 2.

Ambient Conditions

Ambient Temperature : 20°C

Comments

Calibrator Information

Instrument	Serial Number	Calibrated Against ^[1]	Medium
PACE1003	11420850	UKAS Lab.0822	Air

Performance Data

Parameter Range 0.000 to 20.000 bar g

Applied	Reading ^[2]	Deviation ^[3]	Permissible ^[4] Deviation
-0.0001 bar	-0.0003 bar	-0.0002 bar	±0.0160 bar
3.9986 bar	3.9984 bar	-0.0002 bar	±0.0160 bar
7.9970 bar	7.9968 bar	-0.0002 bar	±0.0160 bar
9.9966 bar	9.9963 bar	-0.0003 bar	±0.0160 bar
11.9959 bar	11.9956 bar	-0.0003 bar	±0.0160 bar
15.9948 bar	15.9945 bar	-0.0003 bar	±0.0160 bar
19.9930 bar	19.9925 bar	-0.0005 bar	±0.0160 bar
9.9974 bar	9.9968 bar	-0.0006 bar	±0.0160 bar
0.0003 bar	-0.0006 bar	-0.0009 bar	±0.0160 bar

Parameter Range 0.000 to 290.075 psi g

Applied	Reading ^[2]	Deviation ^[3]	Permissible ^[4] Deviation
-0.0015 psi	-0.0044 psi	-0.0029 psi	±0.2321 psi
57.9948 psi	57.9919 psi	-0.0029 psi	±0.2321 psi
115.9866 psi	115.9837 psi	-0.0029 psi	±0.2321 psi
144.9884 psi	144.9840 psi	-0.0044 psi	±0.2321 psi
173.9858 psi	173.9814 psi	-0.0044 psi	±0.2321 psi
231.9849 psi	231.9805 psi	-0.0044 psi	±0.2321 psi
289.9738 psi	289.9666 psi	-0.0073 psi	±0.2321 psi
145.0000 psi	144.9913 psi	-0.0087 psi	±0.2321 psi
0.0044 psi	-0.0087 psi	-0.0131 psi	±0.2321 psi

Parameter Range 0.000 to 2000.000 kPa g

Applied	Reading ^[2]	Deviation ^[3]	Permissible ^[4] Deviation
-0.0100 kPa	-0.0300 kPa	-0.0200 kPa	±1.6000 kPa
399.8600 kPa	399.8400 kPa	-0.0200 kPa	±1.6000 kPa
799.7000 kPa	799.6800 kPa	-0.0200 kPa	±1.6000 kPa
999.6600 kPa	999.6300 kPa	-0.0300 kPa	±1.6000 kPa
1199.5900 kPa	1199.5600 kPa	-0.0300 kPa	±1.6000 kPa
1599.4800 kPa	1599.4500 kPa	-0.0300 kPa	±1.6000 kPa
1999.3000 kPa	1999.2500 kPa	-0.0500 kPa	±1.6000 kPa
999.7400 kPa	999.6800 kPa	-0.0600 kPa	±1.6000 kPa
0.0300 kPa	-0.0600 kPa	-0.0900 kPa	±1.6000 kPa

Signed : _____

Stamp : _____



Date: 03 May 2024

Notes

[1] This certificate provides traceability of measurement to recognised national standards and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories.

[2] Actual recorded values. For specification see Permissible Deviation column.

[3] Deviation calculated from reading minus actual applied value.

[4] Non linearity, hysteresis and repeatability.

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Druck Ltd, Fir Tree Lane, Groby, Leicestershire LE6 0FH
PS1206



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Calibration Report Digital Pressure Gauge

BHP Billiton
Olympic Way
Olympic Dam SA 5725

Report No: A47282PA
Report Date: 30 May 2025
Page Number: Page 1 of 2
Order No: ad quote acceptance
Calibration Date: 30 May 2025
Next Calibration: 30 May 2026

Manufacturer: Druck
Model: DPI 705E
Serial Number: 12999289
ID Number: Unit 2

Ambient Temp: 20.1 ±1°C
Humidity: 54.1 ±5%
Calibration Location: Abstec Laboratory
Reference Level: Connection Port

References Used:	Serial Number	Certificate Number
	32640-L	APL214267

Tolerance:
Manufacturers Specification: 0.1 %fsd

Test Procedure Information:
Abstec Test Procedure TPV6 2.15 & MSA Test method 1 - 2008, Calibration of Pressure Calibrators, Indicators & Transducers. The readings were taken after a warm up time of 30 min and a settling time of 15 Seconds.

Maximum error as found: 0.02% fsd

Summary of Results:
The unit was not adjusted. The tabulated information relating to the uncertainty of each test is expressed at approximately 95% confidence level. K=2.1. Conformance is listed in the table.

Signed:
N.T. Doherty Authorised Signatory

Checked By:

Accredited for compliance with ISO/IEC 17025 – Calibration. Measurement results are metrologically traceable to the international system of units (SI) through the National Measurement Institute of Australia (NMI) or other National Metrological Institutes that are signatories of the CIPM MRA or subsequent laboratories accredited for calibrations by ILAC MRA signatories including NATA. Non SI unit conversion is in accordance with NIST Special Publication 811. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, and inspection reports. This document shall not be reproduced except in full.

1 July 2024 – 30 June 2025



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Calibration Report Digital Pressure Gauge

Report No: A47282PA
Report Date: 30 May 2025
Page Number: Page 2 of 2

Manufacturer: Druck
Model: DPI 705E
Serial Number: 12999289
ID Number: Unit 2

Max Range: 0 kPa to 2000 kPa
Divisions: 0.1 kPa
Mount Angle: Horizontal
Test Medium: Nitrogen

Actual Applied	Calibration Units	Specified Tolerance	Rising Reading	Rising Correction	Falling Reading	Falling Correction	Uncertainty	Conformity
0.0	kPa	±2.0	0.0	0.0	0.0	0.0	±0.06	Conforms
200.0	kPa	±2.0	200.1	-0.1	200.1	-0.1	±0.09	Conforms
400.0	kPa	±2.0	400.0	0.0	400.1	-0.1	±0.09	Conforms
600.0	kPa	±2.0	600.1	-0.1	600.2	-0.2	±0.09	Conforms
800.0	kPa	±2.0	800.1	-0.1	800.2	-0.2	±0.09	Conforms
1000.0	kPa	±2.0	1000.1	-0.1	1000.1	-0.1	±0.09	Conforms
1200.0	kPa	±2.0	1200.3	-0.3	1200.3	-0.3	±0.09	Conforms
1400.0	kPa	±2.0	1400.3	-0.3	1400.3	-0.3	±0.09	Conforms
1600.0	kPa	±2.0	1600.3	-0.3	1600.3	-0.3	±0.09	Conforms
1800.0	kPa	±2.0	1800.3	-0.3	1800.3	-0.3	±0.09	Conforms
2000.0	kPa	±2.0	2000.3	-0.3			±0.09	Conforms

Accredited for compliance with ISO/IEC 17025 – Calibration. Measurement results are metrologically traceable to the international system of units (SI) through the National Measurement Institute of Australia (NMI) or other National Metrological Institutes that are signatories of the CIPM MRA or subsequent laboratories accredited for calibrations by ILAC MRA signatories including NATA. Non SI unit conversion is in accordance with NIST Special Publication 811. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, and inspection reports. This document shall not be reproduced except in full.

14 APPENDIX 3: SUMMARY OF FIELD CHEMISTRY DATA FY25

Site	No. of records	FY25 average		Historical range		FY25 average above 95th percentile
		EC25 (µS/cm)	pH	5th percentile	95th percentile	
Beatrice Bore HBS004	1	3521	8.76	3284	4427	
Boocaltaninna	3	1499	6.93	1326	1788	
Bopeechee Bore HBO013	1	4080	7.15	3500	4650	
Bopeechee HBO004	1	4448	7.34	3588	6687	
Bopeechee HBO007	1	4074	8.26	3526	5716	
Bopeechee HBO011	4	3968	8.02	3493	4303	
Callanna	1	2300	7.9	2384	3546	
Cannuwaukaninna 2	3	1749	6.91	1616	2286	
CHAPALANNA2	3	1780	7.56	1682	2170	
Charles Angus	2	2885	7.42	2561	3317	
Clayton #1	2	1848	7.53	1676	2321	
Clayton #2	3	1839	7.53	1650	2225	
CLAYTONDAM2	4	2311	7.55	2541	7158	
Cooranna	3	2423	7.91	2159	2670	
Cooryaninna	2	1603	7.25	1305	1992	
Coward CBC001	1	7495	7.6	6218	7805	
Coward CBC002	1	3394	7	2670	5550	
Coward CBC013	1	5737	7.1	4728	5800	
D2	4	1811	7	1662	2180	
D3	3	2073	7.54	1909	2466	
Davenport WDS001	1	3922	7.74	3000	4180	
Davenport WDS042	1	3783	8.39	3007	4856	
Davenport WDS052	1	3454	8.89	2575	5530	
Dead Boy HDB004	1	3916	7.45	2717	6890	
Dead Boy HDB005	1	3592	7.46	3164	5105	
Dulkaninna	3	1674	7.1	1524	2069	
Emerald LES001	1	3196	8.44	3084	4693	
Finniss Well HFL001						Refer to HOF096 record
Fred LFE001	1	3166	8.62	2803	4463	

BHP Olympic Dam Great Artesian Basin Wellfields Report

1 July 2024 – 30 June 2025

Site	No. of records	FY25 average		Historical range		FY25 average above 95th percentile
		EC25 (µS/cm)	pH	5th percentile	95th percentile	
Fred LFE006	1	3166	8.62	2801	4488	
GAB001	1	3121	8.26	2570	4880	
GAB2	0			2508	2934	No samples. Well non-artesian in FY25
GAB005A	4	5290	7.29	4521	5675	
GAB006	0			2730	3365	
GAB006A	4	3013	7.22	2674	3292	
GAB007	4	3680	7.12	3168	3958	
GAB008	4	3595	7.13	3256	3900	
GAB010	4	3258	7.17	2970	3634	
GAB011	4	3343	7.21	2846	3910	
GAB012	4	2948	7.2	2664	3382	Bore disconnected
GAB012A	4	3268	7.17	2958	3656	
GAB13A	0					No samples. Well non-artesian in FY25
GAB014	0			3135	3777	Production bore not pumping during sampling periods
GAB14A	0					No samples. Well non-artesian in FY25
GAB016	4	3958	7.14	3308	3990	
GAB016A	4	3530	7.16	3390	3960	
GAB17						No samples. Well non-artesian in FY25
GAB018	4	4090	7.1	3443	4567	
GAB18A	0					No samples. Well non-artesian in FY25
GAB019	4	3045	7.23	2770	3482	
GAB021	4	6175	6.96	3360	6082	EC 96 (µS/cm) above 95th percentile
GAB022	4	3545	7.14	3308	3916	
GAB23	0			3425.5	3864	No samples. Well non-artesian in FY25
GAB024	4	3620	7.09	3058	4030	
GAB030A	4	3518	7.09	3126	3873	
GAB031A	4	3320	7.13	3040	3740	
GAB033A	4	4017	7.33	3656	4431	
GAB051	4	2618	7.17	2463	3253	
GAB052	4	2610	7.14	2344	3150	
GAB053	4	2535	7.03	2420	3070	

BHP Olympic Dam Great Artesian Basin Wellfields Report

1 July 2024 – 30 June 2025

Site	No. of records	FY25 average		Historical range		FY25 average above 95th percentile
		EC25 (µS/cm)	pH	5th percentile	95th percentile	
GEORGIA2	3	2180	6.89	2108	2876	
Gosse LGS002	1	2988	7.29	2697	3200	
Gosse LGS004	1	2955	7.55	2551	3100	
Hermit Hill HHS028	1	3070	8.45	2972	5478	
Hermit Hill HHS035	1	5053	9.35	2751	6712	
Hermit Hill HHS101	1	3953	8	3490	9900	
Hermit Hill HHS125A	1	2813	8.38	2190	3775	
Hermit Hill HHS137	1	3832	8.86	2643	4999	
Hermit Hill HHS170	1	2847	8.41	2615	3725	
HH001	4	3010	7.52	2738	3345	
HH002	4	3255	7.22	2803	3610	
HH003	0					No sample. Well Sub artesian
HH004	4	3020	7.54	2885	5504	
Highway	1	3500	7.69	2994	3824	
Jackboot	4	4245	7.28	4010	4898	
Jewellery Creek #3	0					Jewellery Creek decommissioned, Jewellery Creek #3 access denied
Kopperamanna	3	1604	6.93	1514	2081	
Lake Billy #2	3	5897	7.11	5173	6560	
Lake Harry	3	2323	7.52	2105	2641	
Marion	3	2283	7.63	2001	2594	
Maynards	2	3235	7.65	2769	3749	
MB001	4	2860	7.28	2526	3086	
MB02	0			3841	4546	No sample. Well Sub artesian
MB005	4	3840	7.12	3667	4445	
MB006	3	6857	6.69	6300	7690	
MB007	4	2503	7	2411	3016	
MB008	4	2540	7.14	2374	3044	
McLachlan LMS004B	1	3081	8.76	2697	3604	
Morphetts	3	3730	7.65	3329	4099	
Morris Creek	3	2890	7.35	2571	3288	
Muloorina	3	2493	7.41	2350	2965	

BHP Olympic Dam Great Artesian Basin Wellfields Report

1 July 2024 – 30 June 2025

Site	No. of records	FY25 average		Historical range		FY25 average above 95th percentile
		EC25 (µS/cm)	pH	5th percentile	95th percentile	
New Years Gift	4	4370	7.34	3803	5205	
OB001	4	2543	7.72	2410	2850	
OB003	3	2707	7.69	2585	3077	
OB006	4	2521	7.66	2444	2970	
Old Finnis HOF004	1	2901	8.23	2352	4663	
Old Finnis HOF033	1	5211	8.43	4025	12725	
Old Finnis HOF081	1	3511	7.52	2998	4822	
Old Finnis HOF094	1	3181	9	3104	8130	
Old Finnis HOF096 ⁵	1	3155	0	2950	3522	Refer to HFL001 record
Old Woman HOW009	1	8218	8.11	7778	10800	
Old Woman HOW015	1	4326	8.74	4023	8420	
Old Woman HOW025	1	3983	8.2	2713	5573	
Peachawarrina #3	2	2505	7.08	2370	3030	
Peters	3	2273	7.76	2078	2517	
S1 New (S1 replacement)	3	2683	7.76	2478	3055	
S002	3	3507	7.91	3004	3830	
S003	0					Well does not flow – no sample
S003A	4	2245	7.71	2065	2540	
S004	2	2595	7.48	2378	2955	
S005	2	2055	7.33	1893	2478	
Sinclair	3	1818	7.46	1684	2209	
Sulphuric HSS011	1	3986	8.48	3292	4006	
Sulphuric HSS012	1	3259	7.49	3074	5002	
Sulphuric HSS024	1	2881	8.47	2631	4500	
Tarkanina #2	3	1972	7.55	1849	2310	
Tent Hill	0					No samples. Well does not flow enough to collect water samples
Two Mile #2	0			2746	3762	No samples. Well non-artesian in FY25
Venables	0			5309	6965	No samples. Well non-artesian in FY25
WCB01	3	2857	7.96	2582	3138	
WCB02	3	2347	7.88	2150	2600	

⁵ HOF096 has been historically mis-identified. All records relating to HOF096 are now referred to as HFL001

BHP Olympic Dam Great Artesian Basin Wellfields Report

1 July 2024 – 30 June 2025

Site	No. of records	FY25 average		Historical range		FY25 average above 95th percentile
		EC25 (µS/cm)	pH	5th percentile	95th percentile	
Welcome WWS001	1	5664	7.8	4159	7622	
Welcome WWS002	1	7599	7.87	6090	8714	
Welcome WWS004	1	3545	7.84	3532	4213	
Welcome WWS013	1	7765	8.03	2723	8004	
Well Creek #2	1	2500	7.88	2197	2829	
West Finnis HWF002	1	3199	8.33	3095	5300	
West Finnis HWF003	1	3928	8.91	3145	5925	
West Finnis HWF048	1	3487	8.31	2760	5660	
Wirringinna Spring MWI001	0			3285	10380	Stagnant water – no sample taken
Yarra Hill	4	2041	7.62	1730	2355	

15 APPENDIX 4: PRESSURE TREND DATA

The EPMP deliverables require records of artesian pressure (kPa) and groundwater level data (temperature- inclusive) for assessment of drawdown (GA 3.3). Below are a selection of groundwater levels and pressures taken during FY25. These locations are selected due to their proximity to the edges of the designated areas.

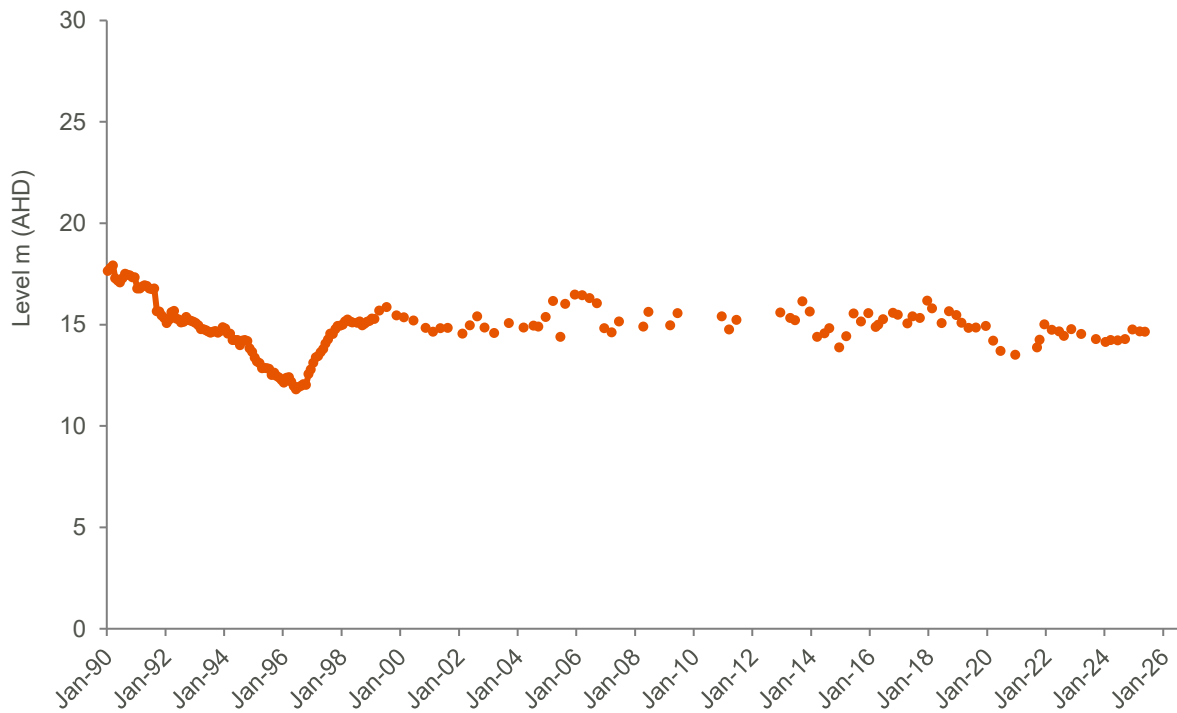


Figure 15-1 Groundwater Level for GAB2

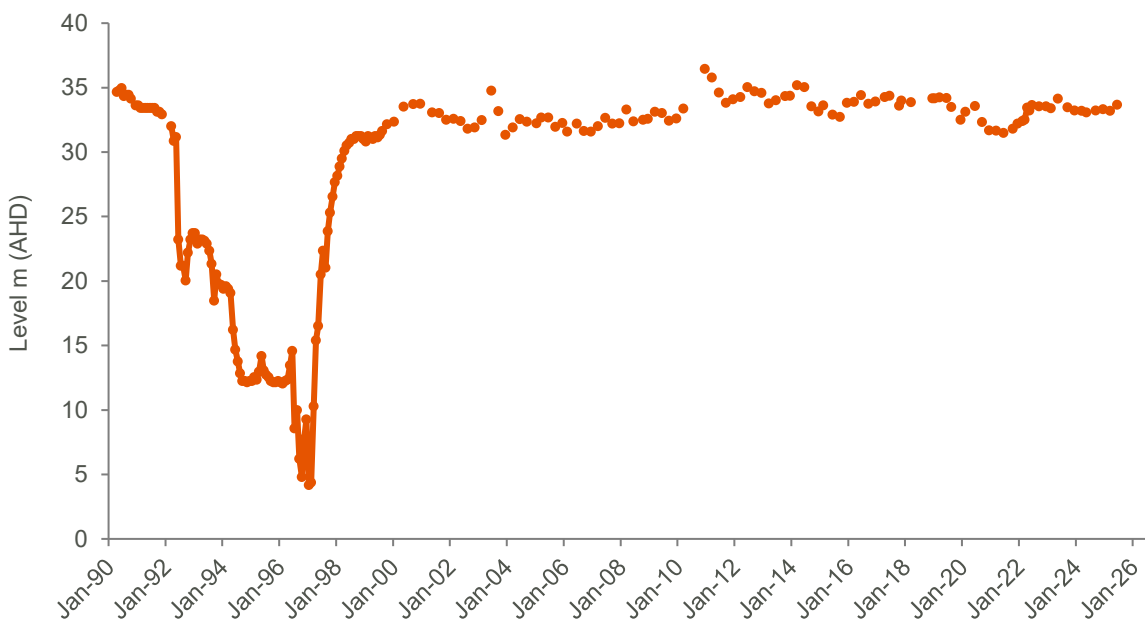


Figure 15-2 Groundwater Level for GAB24

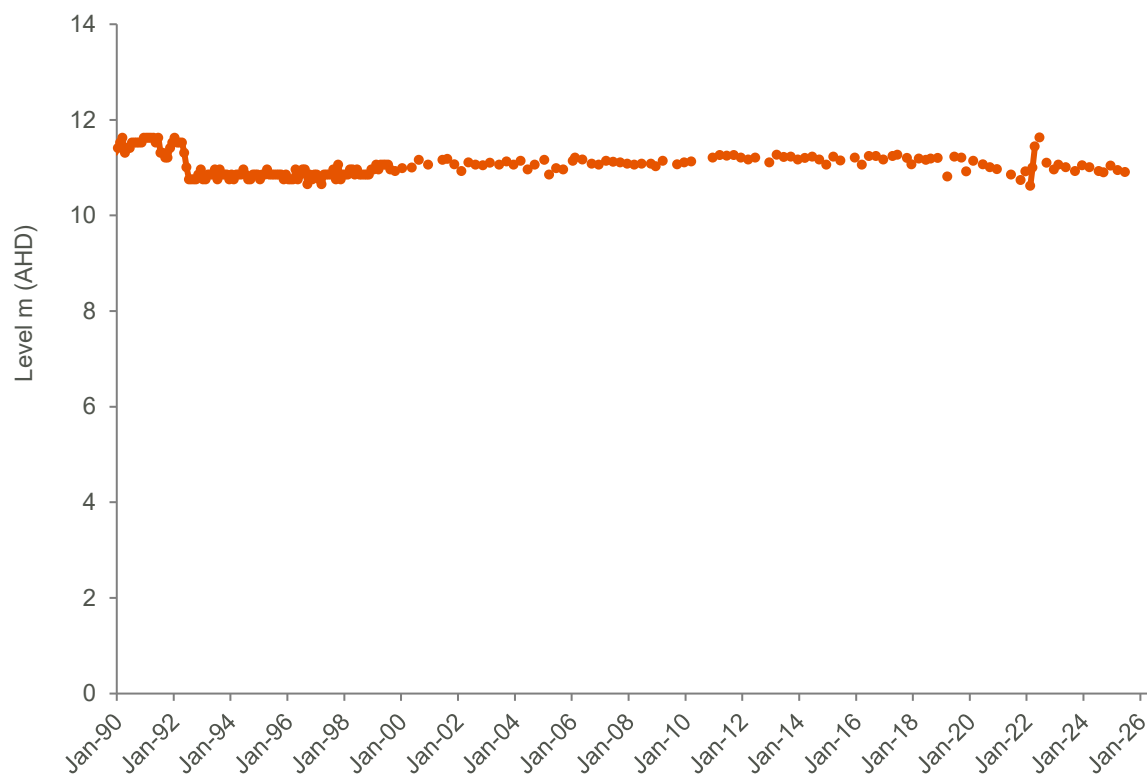


Figure 15-3 Groundwater Level for HH1

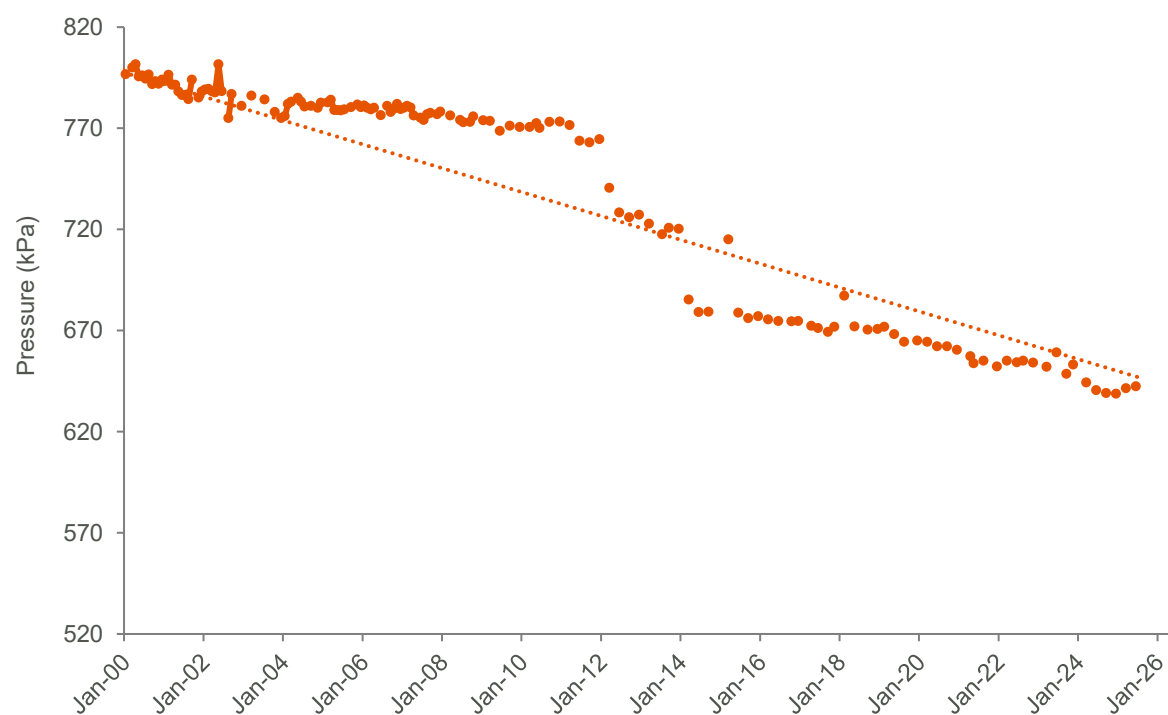


Figure 15-4 Groundwater Pressure for D2

* Pressure measurements at D2 are taken as a cold shut in pressure since 2014. Prior to this, a pre-heat procedure was used measuring maximum pressure rather than cold pressure.

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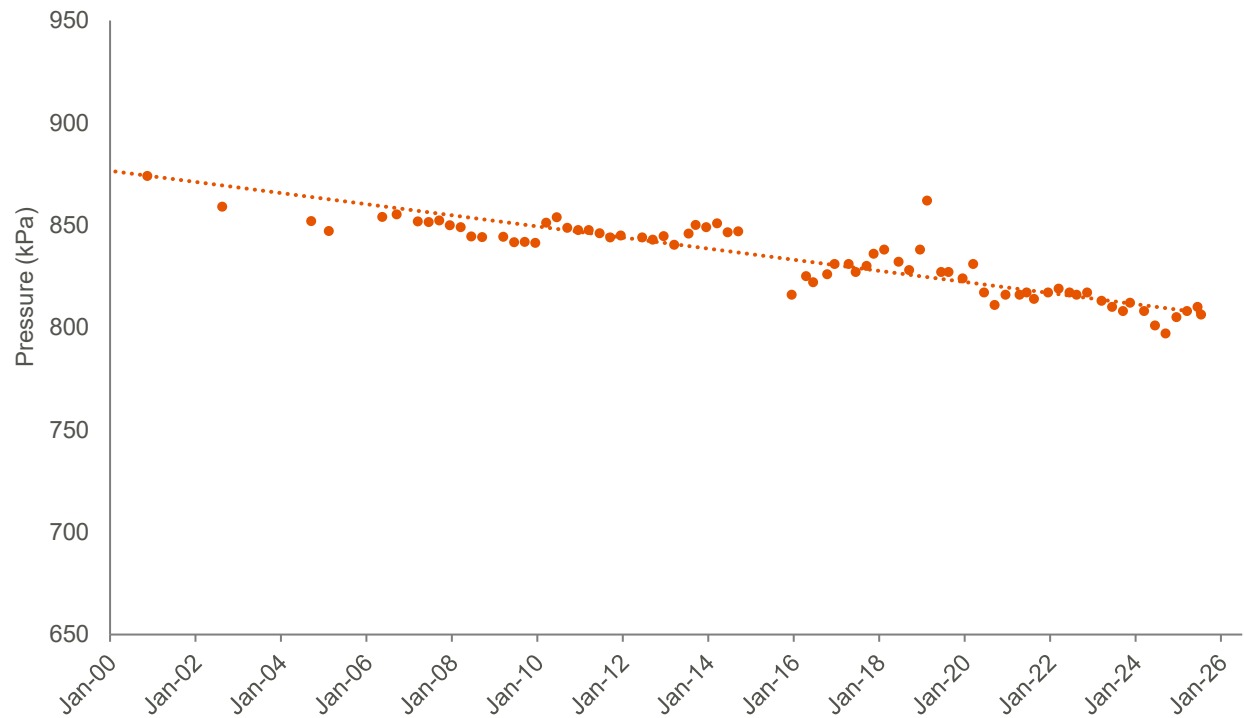


Figure 15-5 Groundwater Pressure for Georgia/Georgia #2

Measurements from October 2016 are from Georgia 2 – this well has a higher reference AHD hence a change in measured kPa.

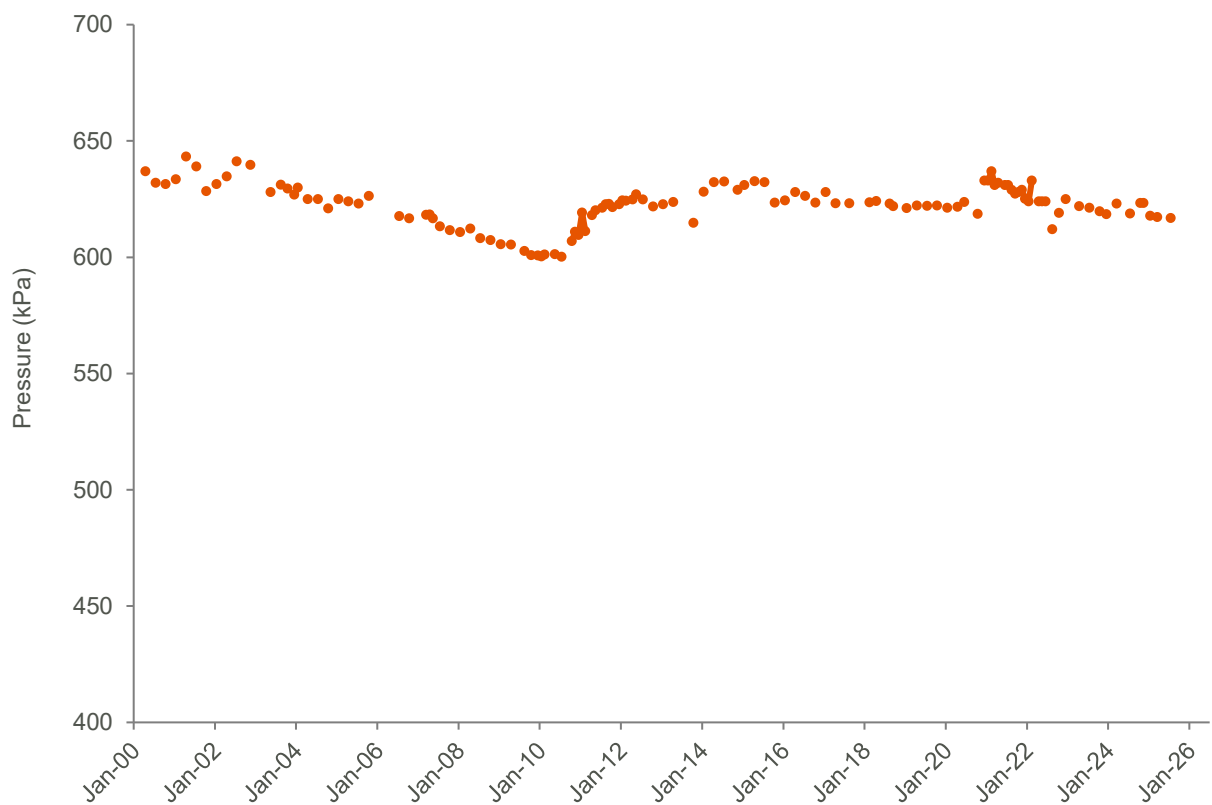


Figure 15-6 Groundwater Pressure for Jackboot

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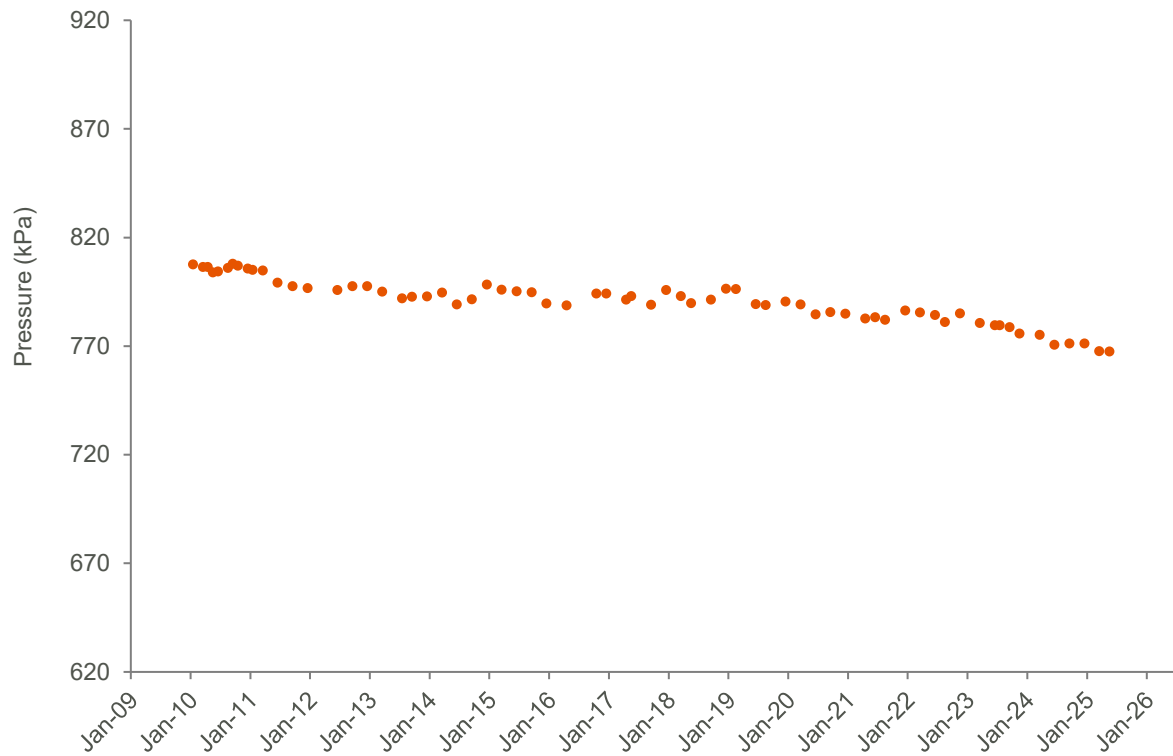


Figure 15-7 Groundwater Pressure for MB8

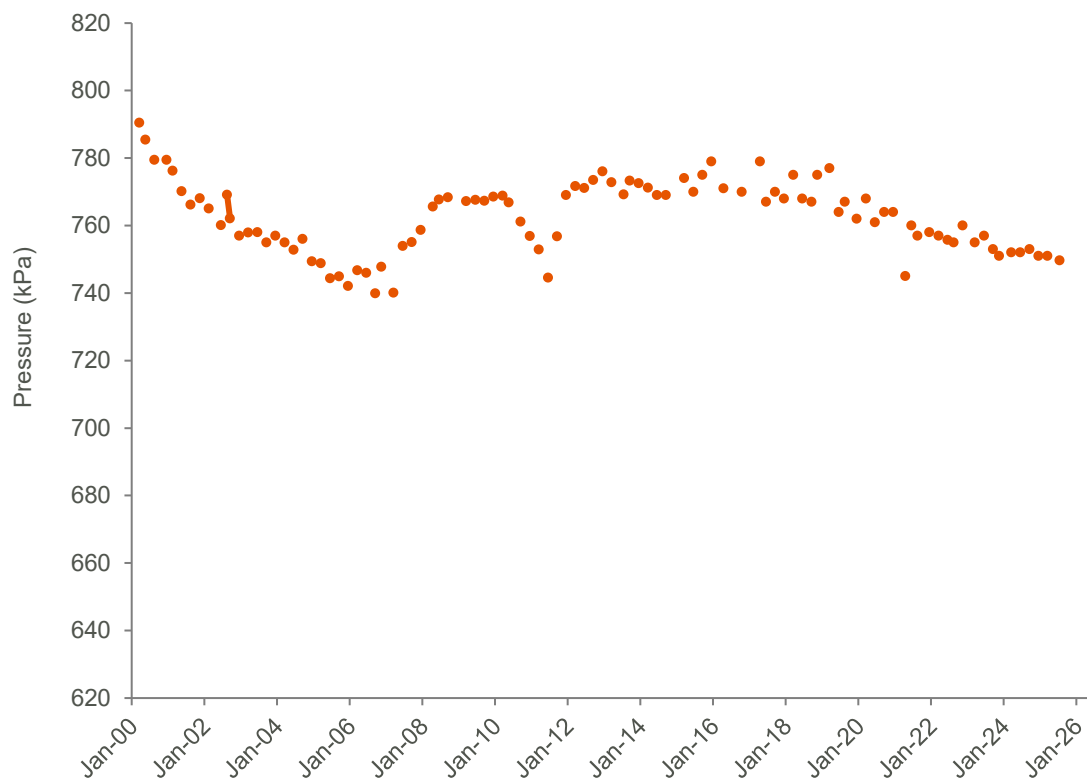


Figure 15-8 Groundwater Pressure for OB3

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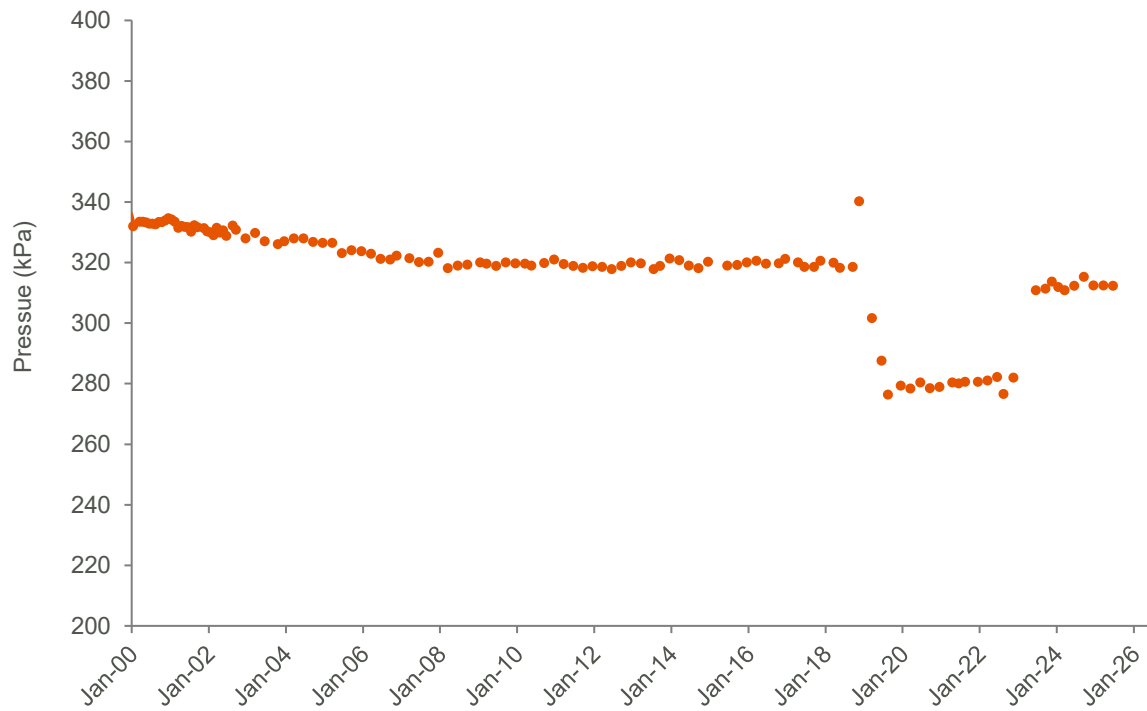


Figure 15-9 Groundwater Pressure for S1/S1_New

Measurements from June 2023 are from S1_New – this well has a lower reference AHD (approximately 0.5m) hence a change in measured kPa.

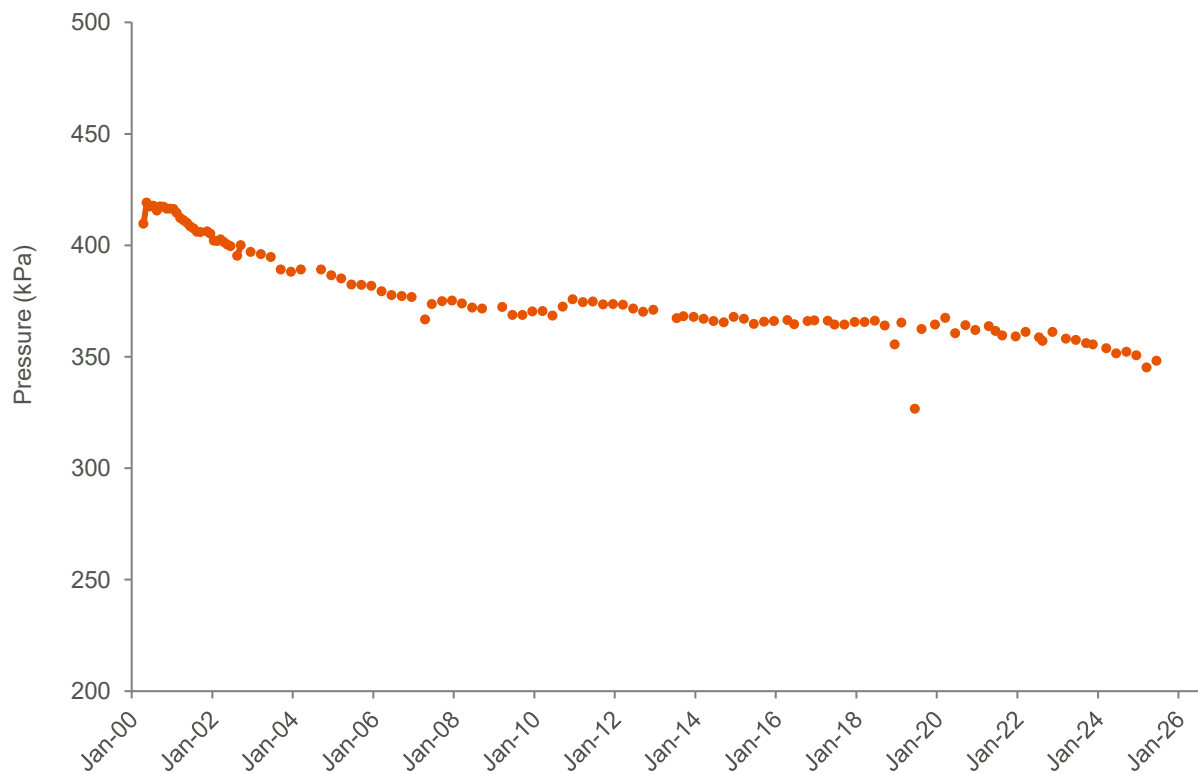


Figure 15-10 Groundwater Pressure for S3A

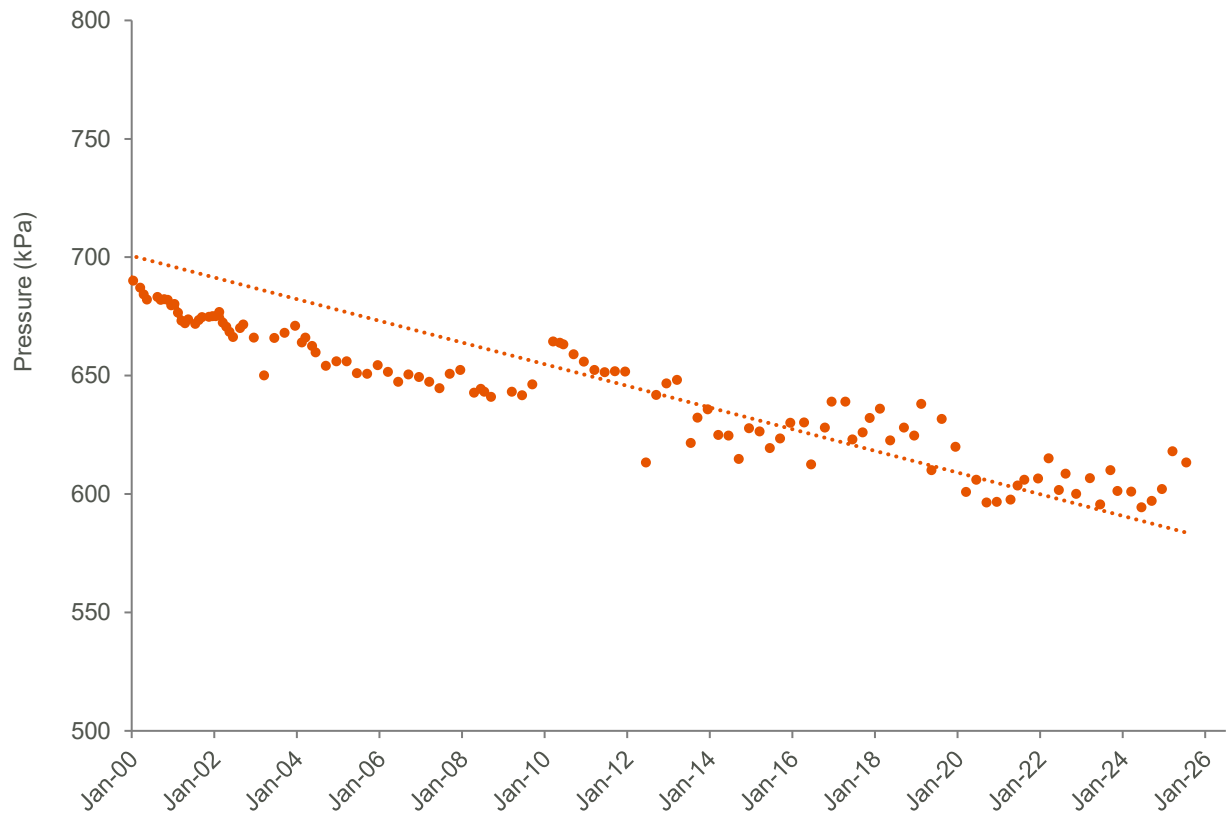


Figure 15-11 Groundwater Pressure for S5

16 APPENDIX 5: CONDUCTIVITY TREND DATA

Conductivity trend graphs are provided here for:

- Bores and springs that have a regression coefficient that statistically differs from zero at the 95% confidence level and is greater than 0.10 or less than -0.10.
- Bores and springs that have an average conductivity for FY25 that is greater than the 95th percentile for that bore or spring.

Refer to Section 8 for discussion of these data.

The following statistics are provided for each graph in this section:

n	The number of data points used in the regression calculation.
F	Overall F test value for null hypothesis $H_0:m=0$ versus the alternative $H_a:m\neq 0$, where m is the slope of the line (regression coefficient) in the equation $y=mx+b$.
p	The associated significance value for the F test at the 95% confidence level.
r ²	R squared.

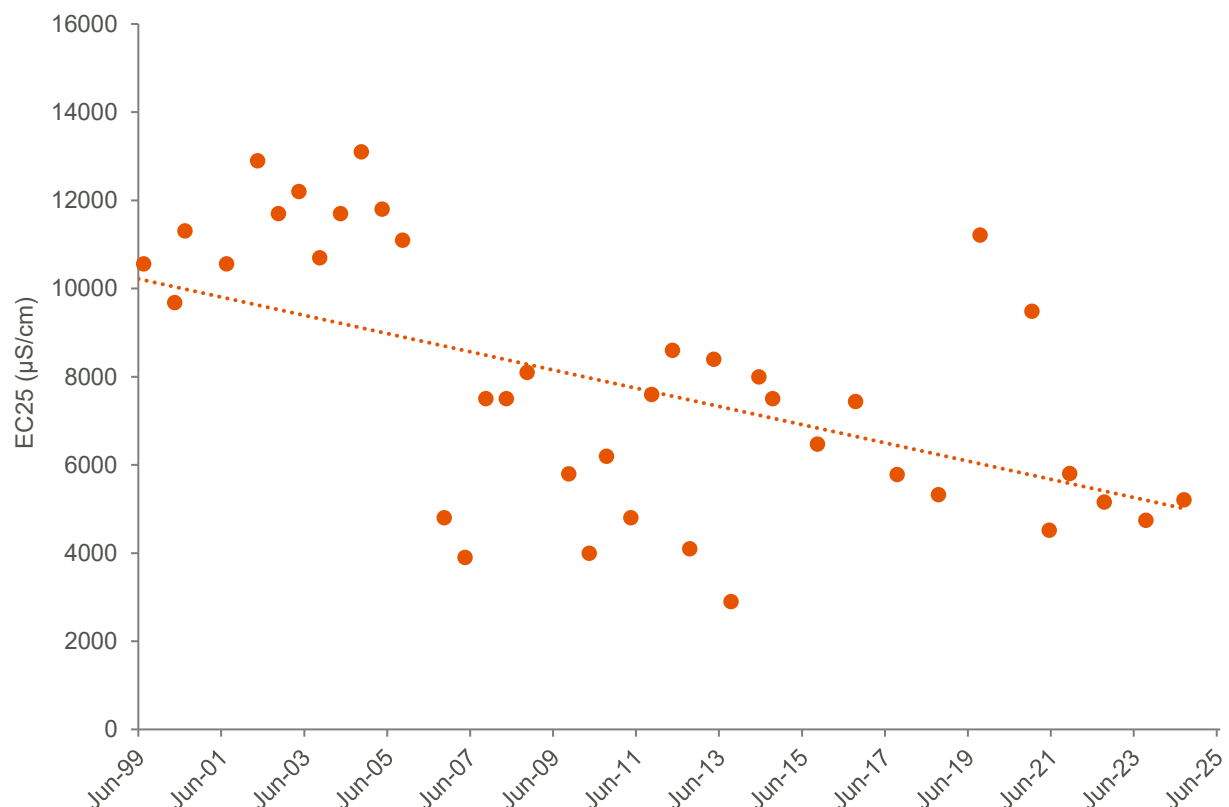


Figure 16-1 Conductivity trend for Old Finnis HOF033

$n = 46$, $F = 26.89$, $p = 5.20E-6$, $r^2 = 0.38$, significant ($P < 0.05$) trend.

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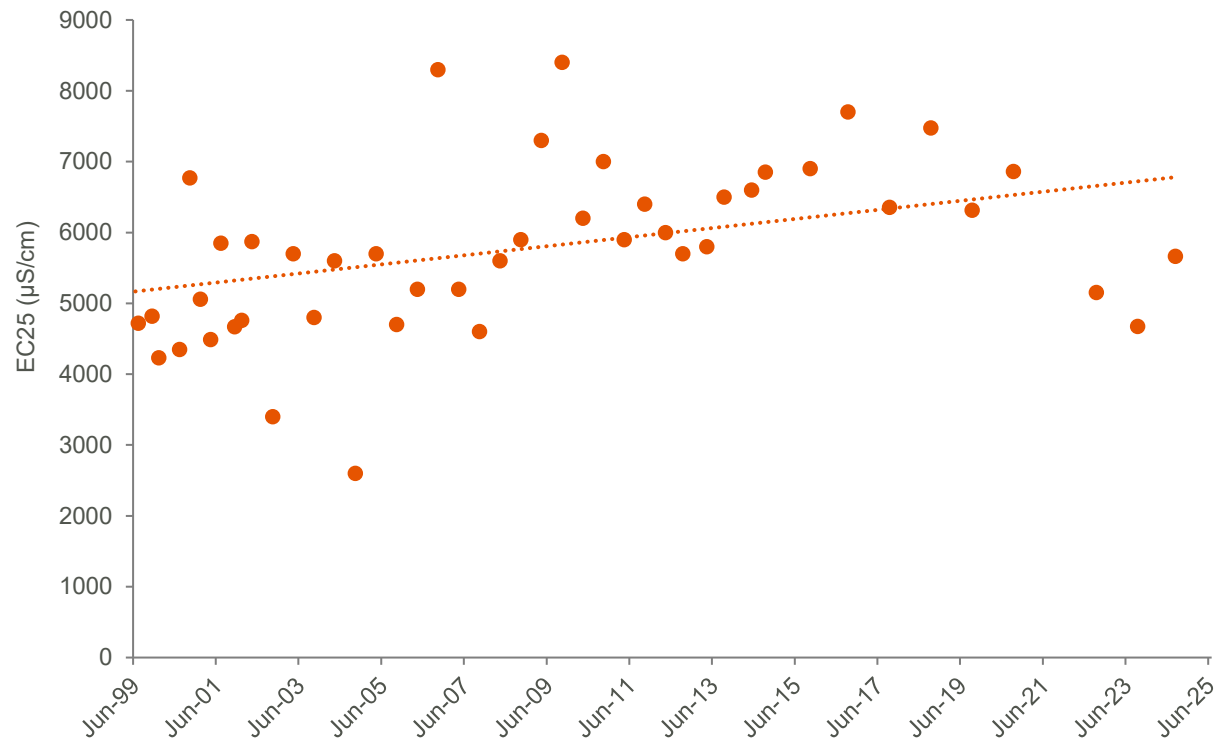


Figure 16-2 Conductivity trend for Wellcome WWS001*

$n = 48$, $F = 8.22$, $p = 0.0062$, $r^2 = 0.15$, significant ($P < 0.05$) trend.

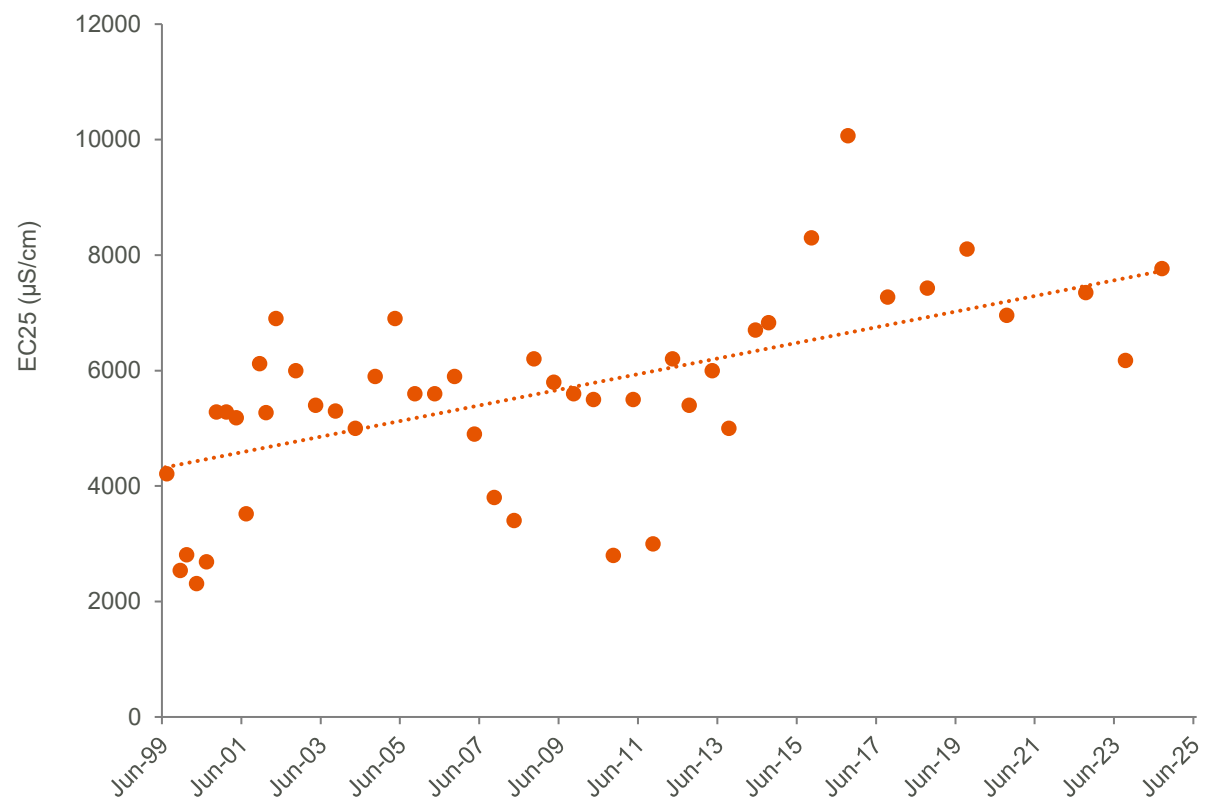


Figure 16-3 Conductivity trend for Wellcome WWS013*

$n = 47$, $F = 24.18$, $p = 1.21E-5$, $r^2 = 0.35$, significant ($P < 0.05$) trend.

1 July 2024 – 30 June 2025

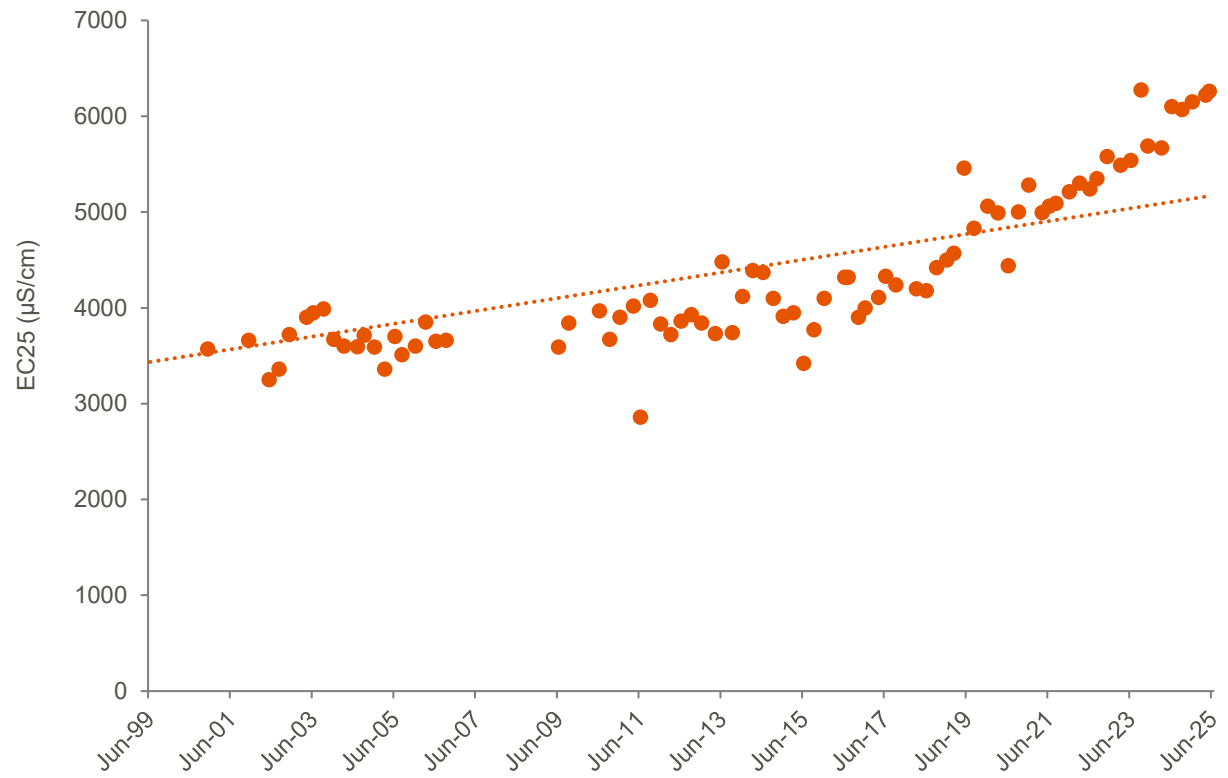


Figure 16-4 Conductivity trend for GAB21

$n = 93$, $F = 134.40$, $p = 1.28E-19$, $r^2 = 0.60$, significant ($P < 0.05$) trend.

17 APPENDIX 6: TEN YEAR FORWARD SCHEDULE FOR GAB ABSTRACTION

CY	Demand (ML/day)			Total Water Requirement ML/day	Supply – Source of Water (ML/d)		
	Potable Water Township	Potable Water Plant & Mine	Non-potable Water Plant & Mine		GAB Borefield A	GAB Borefield B	On-Site Sources
2025	2.6	9.0	24.9	36.5	4.5	31.0	1.0
2026	2.6	9.1	24.2	35.9	4.5	30.4	1.0
2027	2.6	9.1	23.4	35.1	4.5	29.6	1.0
2028	2.6	8.9	21.7	33.2	4.5	28.2	0.5
2029	2.6	10.1	22.7	35.4	4.5	29.9	1.0
2030	2.6	10.1	22.8	35.5	4.5	31.3	0
2031	2.6	13.7	25.7	42.0	4.5	31.3	6.2
2032	2.6	13.9	25.7	42.2	4.5	31.3	6.4
2033	2.6	14.1	25.5	42.2	4.5	31.3	6.4
2034	2.6	14.4	25.6	42.6	4.5	31.3	6.8
2035	2.6	14.6	26.1	43.3	4.5	31.3	7.5

Note: As provided to the Minister for Energy and Mining in December 2024. An updated schedule will be provided by 1 January 2026.

18 APPENDIX 7: PASTORAL BORES IN THE WELLFIELD B AREA

Bore	Flow (ML/d)	Flow Measured (M) / Estimated (E)
Boocaltaninna	0.23	M
Cannuwaukaninna 2	0.22	M
Chapalanna 2	0.02	M
Charles Angus	0.11	M
Clayton 1	0.24	M
Clayton 2	1.28	M
Clayton Dam 2	0.48	M
Cooranna	0.03	M
Cooryaninna	0.53	M
Dulkaninna	0.96	M
Georgia #2	0.20	M
Highway (Brolga)	0.00	E
Jewellery Creek #3	1.07	E
Kopperamanna	1.71	M
Lake Harry	0.28	M
Marion	0.13	M
Maynards	<0.01	M
Morphetts	3.06	M
Morris Creek	0.16	M
Muloorina	4.04	M
Peachawarinna #3	0.78	M
Peters	0.01	M
Prices	0.20	E
Sinclair	0.04	M
Tarkanina #2	0.48	M
Yarra Hill	0.59	M

**Note: Peachawarinna and Jewellery Creek bores have been decommissioned and replaced by Peachawarinna#3 and Jewellery Creek#3 respectively. Same for Mulka and Mungeranie bores. Poonarunna decommissioned. Mulka #2 and Mungeranie#2 removed due to significant distance from Wellfield B designated area and not regularly monitored.*

19 APPENDIX 8: GAB SPRING ZONES

Hydrogeological zone	Springs within zone
Coward	Blanche Cup
South West	Hermit Hill, Finnis Well, Old Finnis, Old Woman
Western Lake Eyre South	Emerald, Gosse, McLachlan
South East	Davenport, Welcome
North East	Bopeechee, Sulphuric, Dead Boy, West Finnis
Wellfield A	Beatrice, Venables, Fred