

Pre- and post-mining inspections are undertaken for private boreholes as prescribed in the Appin Area 7 (AA7) Longwall 707 to 710 Environmental Management Plan (EMP). Inspections can also focus on other property features as required, including farm dams, and are undertaken in consultation with the property owner or tenant, where access is approved. Inspections are conducted by the Illawarra Metallurgical Coal Environmental Field Team (IMCEFT). Additional inspections may be conducted by IMCEFT at the request of the landholder and/or in response to any trigger in the EMP.

This post-mining report includes observations and field data recorded for relevant features on Lot 900 DP1072947, including borehole GW101986 and property dam (MSEC ID: F17d01) (Figure 1).

Pre-mining Inspection

On 22 February 2018, a pre-mining inspection of property Lot 900 DP1072947 was undertaken. The borehole on the property was identified and inspected. During this inspection water quality was measured using the water in the tub (Photo 1). Water samples were collected from water that was pumped directly from the bore into a glass container (Photo 2).



Photo 1: Photo of GW101986 and pump. Taken 22/2/2018.



Photo 2: Photo of water sample taken from GW101986. Taken 22/2/2018.

Post-mining Inspections

A Longwall 707 post-mining inspection of the property was conducted by IMCEFT on 6 August 2018 and a follow-up inspection undertaken on 14 September 2018. Water that was pumped directly from the bore into a bucket was used to measure water quality and to collect water samples. No observable changes to the borehole were identified.

The most recent inspection was undertaken on 17 March 2022 following completion of Longwall 708. During this inspection the samplers were unable to use the borehole pump without the property owner and therefore a water sample was unable to be collected. No iron staining or salinity was observed around the pump. The property dam was inspected, water samples collected, and key observations recorded.

Property Borehole (GW101986)

Location: E288261, N6217360

Borehole/Aquifer Properties: The borehole is located approximately 200 metres northeast of the residence (Figure 1). The borehole was drilled to a depth of 210m and was completed on 20 February 1998. On 22 February 2018 a pre-mining inspection was completed on the property with field water quality measured and samples were taken for laboratory analysis. On 6 August 2018 and 14 September 2018 post-mining inspections were completed on the property, with field water quality measured and samples taken (Photo 3 to Photo 6). The Longwall 708 post-mining inspection was undertaken on 17 March 2022 (Photo 7 and Photo 8). The borehole water is now pumped directly into a water tank. Borehole water samples were unable to be collected on the latest inspection.

Water Properties: Water properties could not be assessed as water is stored in a tank and the landholder was not present at the time of inspection. No signs of iron, salinity staining or gas were observed around the borehole or around the outlet. Previous sample results from ALS for laboratory analysis are included below in Table 1.

Dam (F17d01, L900_D1072947_DAM)

On 17 March 2022, the dam was full and surrounding grass was saturated, following recent heavy rainfall (Photo 8). The water was brown in colour. The dam wall appears to be in good condition. Field water quality was collected, and samples sent for laboratory analysis (Table 1 and Table 2).

Table 1: Results of water chemistry analyses for samples collected from the property borehole (GW101986) and dam (L900_D1072947_DAM).

Analytes (mg/L unless stated)	GW101986 22/02/2018	GW101986 6/08/2018	GW101986 14/9/2018	L900_D1072947_DAM 17/03/2022
Dissolved Arsenic	<0.001	-	-	<0.001
Dissolved Copper	0.001	<0.001	0.017	0.001
Dissolved Iron	0.14	0.72	<0.05	0.15
Dissolved Lead	<0.001	-	-	<0.001
Dissolved Nickel	<0.001	<0.001	<0.001	0.001
Dissolved Sulfate as SO4 2-	47	28	22	3
Dissolved Zinc	0.011	0.008	0.156	0.009
Electrical Conductivity @ 25° C (µs/cm)	5650	3570	4110	248
pH Value (pH Unit)	7.76	7.34	7.28	7.15
Suspended Solids	28	8	<5	<5
Total Aluminium	<0.01	<0.01	<0.01	1.09
Total Dissolved Solids @180° C	2900	1900	2080	140
Total Iron	0.29	0.82	0.67	1.03
Total Manganese	0.007	0.006	0.010	0.112

Table 2: Field water quality parameters from the property dam (L900_D1072947_DAM). Note: Electrical Conductivity removed from the 22/02/2018 due to measurement error in field. See lab results above for value.

Analytes	Unit	Borehole (GW101986)			Dam (L900_D1072947_DAM)	
		22/02/2018	06/08/2018	14/09/2018	14/9/2018	17/03/2022
Field pH	pH Unit	8.25	6.99	7.84	8.45	7.85
Dissolved Oxygen	%	51	55.9	70.7	100.2	80.2
Final ORP	mV	288.555	204.089	350.978	329.614	398.072
Electrical Conductivity	µS/cm	-	3780	7310	4080	246
Temperature	Degrees Celsius	-	-	-	-	22.04



Photo 3: Borehole GW101986 and pump. Taken on 6/08/2018.



Photo 4: Water sample from borehole GW101986. Taken on 6/08/2018.



Photo 5: Borehole GW101986 and pump. Taken on 17/03/2022.



Photo 6: Water sample from borehole GW101986. Taken on 14/09/2018.



Photo 7: Property Dam. Taken on 14/09/2018



Photo 8: Property Dam. Taken on 17/03/2022.

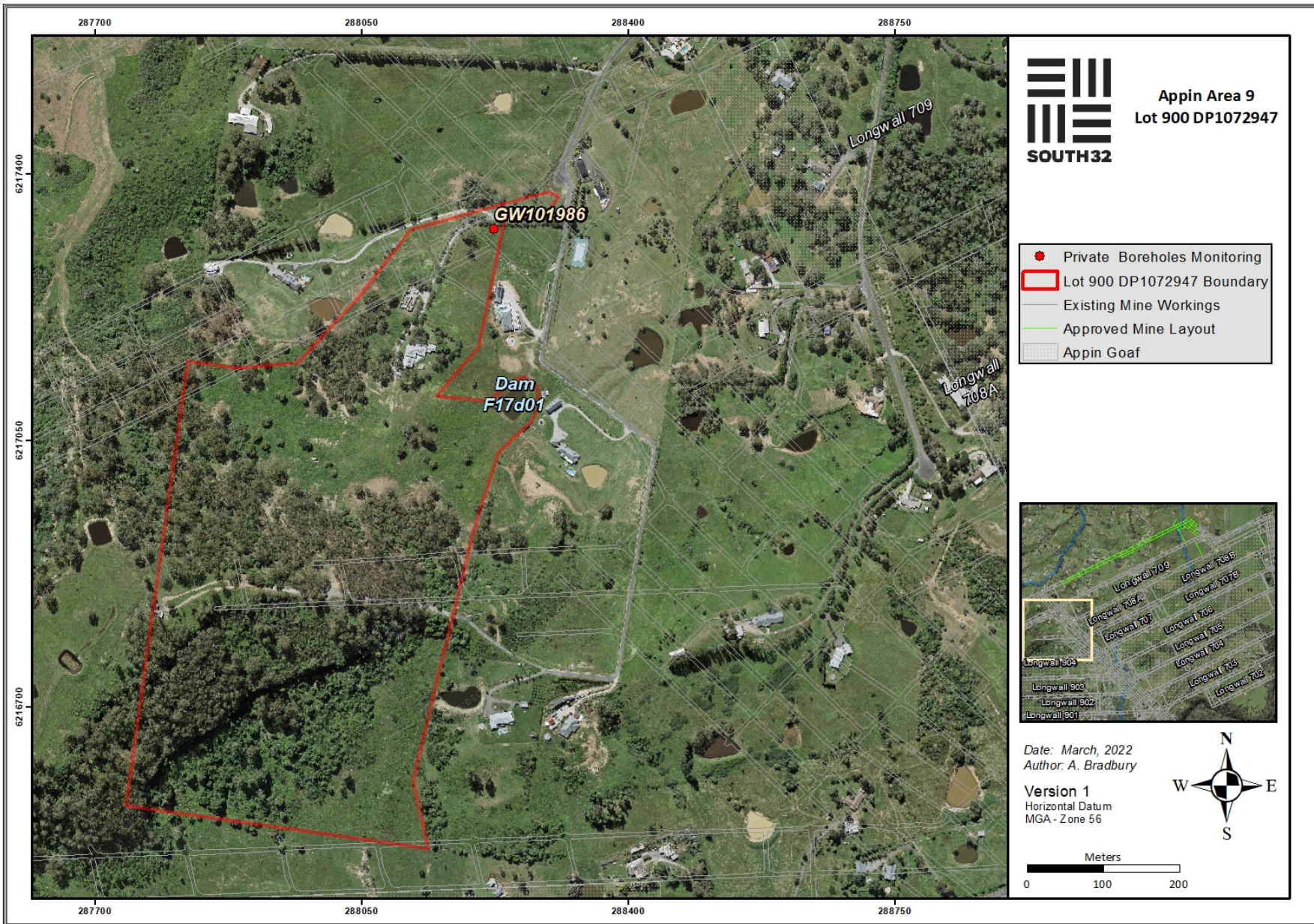


Figure 1: Map showing location of inspected borehole GW101986 and dam F17d01 on Lot 900 DP1072947.

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This report includes pre- and post-mining observations and results gathered for borehole GW072874 and dam (MSEC ID: F11d01) on Lot 10 DP245756 (Figure 1).

Pre-mining Inspection

On 25 July 2018, a pre-mining inspection for Longwall 708 of Lot 10 DP245756 property was undertaken. The borehole, GW072874, was inspected, water samples collected, and key observations recorded.

Post-mining Inspection

On 16 March 2022, a post-mining inspection for Longwall 708 was undertaken at the property. Borehole GW072874 was inspected, however no sample was collected due to the pump not working with high dam water levels. The property dam was inspected, water samples collected, and key observations recorded.

Property Borehole (GW072874)

Location: 0288567E, 6217600N

Borehole/Aquifer Properties: Borehole GW072874 is located on the south-western side of the property (Figure 1). It is located approximately 28m north of Longwall 708. According to NSW Office of Water Work Summary Report, the borehole is 189m deep and was drilled on 11 September 1992. During the pre-mining inspection, on 25 July 2018, the standing water level was measured at 64.2m below top of borehole casing (+/- 0.2m). The standing water level could not be recorded during the post-mining inspection due to access issues, however the piezometer data was downloaded.

Bore Pumping Purpose and Performance: The water is pumped directly from the borehole into the dam. Water is used for irrigation and livestock purposes. On the pre-mining inspection, on 25 July 2018, an initial pumping rate was recorded at 1.88L/s. On the post-Longwall 708 inspection, the landholder advised the pump is not currently working due to high water levels in the dam.

Borehole Water properties: During the pre-mining inspection, water appeared clear with no signs of iron staining or salt residue observed in the water, or around the borehole outlet (Photo 1). No gas was

identified. Water was purged for 17 minutes before field parameters were recorded and water samples collected, which were sent for laboratory analysis. Field parameters and water sample results are presented below (Table 1 and Table 2, respectively).

Field parameters and water samples were not able to be collected during the post-mining inspection due to high dam levels preventing access to the borehole outlet. No observable iron staining or salinity around the pump system was observed (Photo 3).

Dam (Lot 10 DP245756, F11d01)

On the latest inspection on 16 March 2022, the dam was full (Photo 4). The water in the dam was turbid and brown in colour. Heavy rainfall was recorded in the area in the preceding weeks. A slight sheen was observed on the water surface (Photo 5). The dam wall was observed to be in good condition with water outflowing via the spillway. Water quality was recorded, and water samples sent for laboratory analysis (Table 1 and Table 2).



Photo 1: Borehole GW072874 and pump located on the south-western side of the property. Taken 25/07/2018.



Photo 2: Borehole GW072874 outlet discharge into dam. Taken 25/07/2018.



Photo 3: Borehole GW072874. Taken 16/03/2022.



Photo 4: Property Dam. Taken 16/03/2022.



Photo 5: Sheen on water surface. Taken 16/03/2022.

Table 1: Field water quality parameters from the property borehole (GW072874) and dam (L10_DP245756_DAM). *Note- different values are expected due to different water sources.*

Parameter	GW072874 25 July 2018	L10_DP245756_DAM 16 March 2022
Temperature (°C)	20.34	20.30
DO (% sat)	16.8	61.0
SpC (µS/cm)	4880	228
pH	6.92	7.43
ORP (mV)	-128	140
Time (24hr)	0859	0850

Table 2: Results of water chemistry analysis for samples collected from the property borehole (GW072874) and dam (L10_DP245756_DAM). *Note- different values are expected due to different water sources.*

Analyte (mg/L unless stated)	GW072874 25 July 2018	L10_DP245756_DAM 16 March 2022
Dissolved Copper	<0.001	0.003
Dissolved Iron	3.11	0.50
Dissolved Manganese	0.018	0.074
Dissolved Nickel	<0.001	0.002
Dissolved Sulfate as SO4 2-	6	3
Dissolved Zinc	0.006	0.007
Electrical Conductivity (µS/cm @ 25 ° C)	4730	222
pH Value (pH Unit)	7.7	7.21
Total Aluminium	<0.01	0.84
Total Iron	2.9	1.67
Total Manganese	0.018	0.138



Figure 1: Map showing location of inspected borehole and dam on Lot 10 DP072874.

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This post-mining report includes observations and field data recorded for relevant features on Lot 73 DP883462, including borehole GW105376 and the property dam (MSEC ID: D21d01).

Pre-mining Inspection

On 19 February 2018, a Longwall 708 pre-mining inspection was undertaken. A follow-up inspection was undertaken on 25 July 2018. On both inspections, borehole GW105376 and the property dam were inspected, with key observations recorded. Samples were also taken for laboratory analysis.

Post-mining Inspections

A Longwall 708 post-mining inspection was completed on 17 March 2022. The borehole and dam were inspected to compare key observations and water chemistry results to those found in the pre-mining inspection.

Borehole (GW105376)

Location: E289486, N6218358

Borehole/Aquifer Properties: The borehole is located to the southeast of the residence and water is pumped around the property via several pipes (Figure 1 and Photo 1). The landholder has advised that the borehole was drilled in 2002 to a depth of 218m and had a standing water level of 76m following installation.

Bore Pumping Purpose and Performance: Water is extracted from the borehole consistently daily. The landowner has advised that on occasion when day-time temperatures are high, the borehole is used only at night. Water is extracted from the bore for multiple uses, including land maintenance, dam water supply, and care of horses also kept on the property. The property owner advised that the

pressure of the borehole has generally been consistent since it's installation. During each inspection, water from the bore was allowed to purge for 5 - 10 minutes before water quality measurements, samples and observations were taken (Photo 2). Water samples and field parameters for the borehole were taken from the water tank, to which the borehole directly flows. This was due to restricted access to the bore directly.

Water Properties: No signs of iron, salinity staining, or gas were observed in the water or around the borehole on this inspection. Water quality parameters were measured in-situ and water samples were taken for laboratory analysis during both pre-mining and post-mining inspections (Table 1 and Table 2).

Property Dam (D21d01)

The dam is located to the northeast of the residence (Figure 1, Photo 3 and Photo 4), and is routinely supplied with water from the borehole. During the pre-mining inspection the landholder advised that the dam was relatively low. Soil cracking was found around the extent of the dam during the pre-mining inspection (Photo 5), with major soil cracking also found on the walls of the dam. In the post-mining inspection, on 17 March 2022, the water level was much higher compared to previous inspections. The soil cracking previously reported was engulfed by the dam's water (Photo 6). Water quality parameters were measured in-situ and water samples were taken for laboratory analysis.

Table 1: Field water quality parameters collected at borehole GW105376 and dam. *Note- pre-mining electrical conductivity readings were removed from table following comparison with laboratory conductivity for the same date (19/02/2017). It is likely that the instrument was reading incorrectly. Post-mining conductivity parameters appear consistent with those from the laboratory.*

Parameter	GW105376			Property Dam		
	Pre-Mining 19/2/2018	Follow-up Inspection 25/7/2018	Post-Mining 17/3/2022	Pre-Mining 19/2/2018	Follow-up Inspection 25/7/2018	Post-Mining 17/3/2022
Temperature (°C)	21.97	16.52	20.57	25.52	12.72	20.95
Electrical Conductivity (µS/cm)	-	3070	3060	-	2500	265
pH (pH units)	7.15	7.20	7.12	7.47	8.33	7.63
ORP (mV)	291	179	159	184	270	138
Dissolved Oxygen (% sat.)	63.0	32.0	59.7	38.2	95.3	28.6

Table 2: Results of chemical analyses for water samples collected from borehole GW105376 and property dam.

Analyte (mg/L unless stated)	GW105376			Property Dam		
	Pre-mining (19/02/2018)	Follow-up inspection (25/07/2018)	Post-mining (17/03/2022)	Pre-mining (19/02/2018)	Follow-up inspection (25/07/2018)	Post-mining (17/03/2022)
Dissolved Arsenic	<0.001	<0.001	<0.001	0.002	0.001	0.001
Dissolved Copper	0.005	<0.001	<0.001	0.003	<0.001	0.002
Dissolved Iron	0.07	0.37	<0.05	<0.05	<0.05	0.69
Dissolved Lead	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Manganese	0.031	0.02	0.012	0.2	0.018	0.250
Dissolved Nickel	<0.001	<0.001	<0.001	0.002	0.001	0.001
Dissolved Sulfate as SO ₄ ²⁻	13	17	16	9	21	1
Dissolved Zinc	0.008	<0.005	0.007	<0.005	<0.005	0.009
Electrical Conductivity @ 25° C (µs/cm)	2280	3070	3110	1950	2470	264
pH Value (pH Units)	7.87	7.66	8.00	8.05	8.32	7.38
Suspended Solids	8	-	<5	114	-	9
Total Aluminium	<0.01	0.02	0.04	2.5	0.25	1.25
Total Dissolved Solids @180° C	1100	-	1620	985	-	182
Total Iron	0.13	0.39	0.93	5.24	0.97	2.33
Total Manganese	0.03	0.023	0.018	0.248	0.079	0.259



Photo 1: Borehole GW105376. Taken on 19/02/2018.



Photo 2: Borehole during post-mining inspection.
Taken on 17/03/2022



Photo 3: Dam located east of the residence during pre-mining inspection. Taken on 19/02/2018



Photo 4: Dam during post-mining inspection. Taken on 17/03/2022



Photo 5: Soil cracking present around extent of dam edges observed during pre-mining inspection. Taken on 19/02/2018.



Photo 6: Soil cracking no longer visible due to high water level in dam, looking south. Taken on 17/03/2022



Photo 7: Water collected and sampled from GW105376 during pre-mining inspection. Taken on 19/02/2018.



Photo 8: Water collected and sampled from GW105376 during post-mining inspection. Taken on 17/03/2022.



Photo 9: Dam wall during initial post-mining inspection, looking west. Taken on 25/7/2018



Photo 10: Dam wall during post-mining inspection, looking northwest. Taken on 17/03/2022

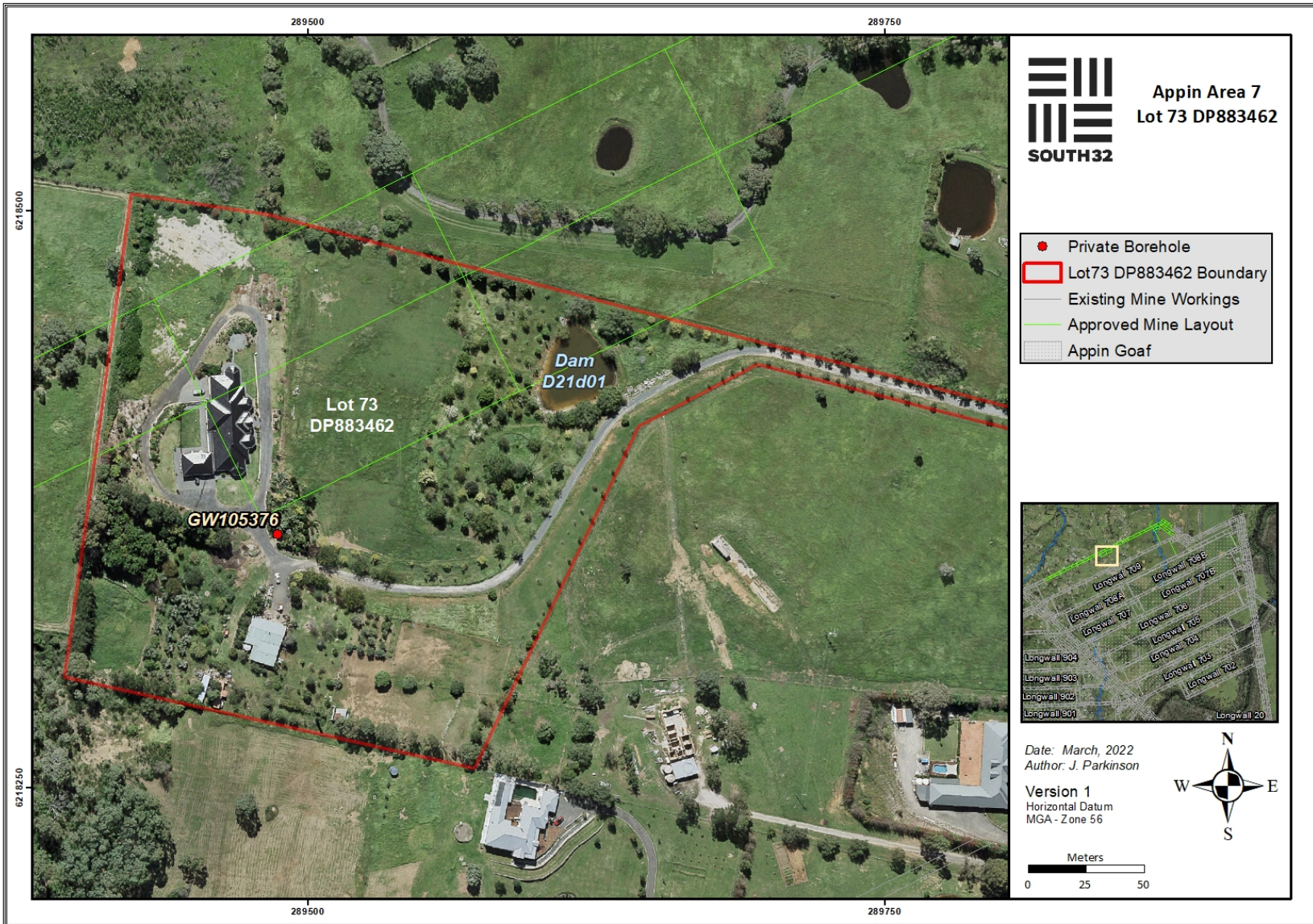


Figure 1: Location of borehole GW105376 and dam on Lot 73 DP883462.