DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

REPT.BK.NO. 86/68
PIMBA TO OLYMPIC DAM ROAD,
DRILLING FOR CONSTRUCTION
WATER

GEOLOGICAL SURVEY

by

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GROUNDWATER & ENGINEERING

SEPTEMBER, 1986

DME.269/85

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DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

RPT. BK. NO. 86/68
D.M.E. NO. 269/85
DISK NO. 27

PIMBA TO OLYMPIC DAM ROAD, DRILLING FOR CONSTRUCTION WATER

ABSTRACT

Five wells were drilled to provide construction water for sealing the Pimba to Olympic Dam road.

Yields ranged from 1 to 5 L/s and salinities from 10 000 mg/L to 110 000 mg/L. Aquifers occur in the Arcoona Quartzite and Corraberra Sandstone at depths up to 180 m and in the Woomera Shale at less than 30 m.

The above five wells and three existing wells were pump-tested. Three wells showed linear flow conditions and the others radial flow.

INTRODUCTION

At the request of the Highways Department a drilling programme was conducted in May and April 1986 to develop water supplies for the construction of a sealed road from Pimba to Olympic Dam (Fig. 1). The Highways Department's requirement was a water supply of 4L/s every 20 km. As far as possible salinities were required to be under 30 000 mg/L, as greater salinities are only suitable for the lower part of the earthworks.

GEOLOGY AND HYDROGEOLOGY

The project area is in the Stuart Shelf where flat lying Adelaidean sediments overlie older Carpentarian rocks.

The geology of the area is shown in Johns et al (1982) and Dalgarno (1982).

The stratigraphy and hydrogeology are summarized in Table 1.

The area is characterised by highly saline groundwater. Salinities range from 11 000 mg/L to 110 000 mg/L. The high salinities reflect the low rainfall and high evaporation rates. Small salt lakes are scattered through the low-lying parts of the area, and are presumably local evaporative sinks.

Table 1 Stratigraphy & Hydrogeology

Unit	Lithology	Hydrogeological Characters
Andamooka Limestone		Above water table in project area. May be a good aquifer elsewhere.
Arcoona Quartzite Member	Hard white sandstone with some interbeds	Generally best aquifer in the area. Permeability varies widely and saturated thickness ranges from 0 in the south near Woomera to about 200 m around Olympic Dam.
Corraberra Sandstone Member	Brown micaceous sandstone and shales	Moderate aquifer - yields up to 5 L/s.
Woomera Shale	Brown micaceous siltstone	Low permeability generally, but yields up to 4 L/s where well fractured.

DRILLING

The Ingersoll Rand T4 rig belonging to Roxby Management Services was used for the drilling, and proved quite satisfactory. Five wells were drilled at the locations shown in Figure 2.

Reasons for siting wells are shown in Table 2 and results in Table 3. Water analyses are in Table 4 and depth yield graphs in Fig. 3.

Drilling was supervised by a SADME geologist and airlift yields measured with a V-notch.

Even with the large capacity high pressure compressor available, drilling was slow in the hard abrasive sandstones.

Table 2, Reasons for siting wells

Unit No.	Permit No.	Reason for siting	Result
6235WW65	94333	Close to old well known to have reasonable supply. On major linear feature about 30 km long.	Success
6235WW66	94334	20 km from the above and close to straight water course about 2 km long.	Success
6236WW52	44335	600 m from known successful well.	Success
6236WW53	94336	Convenience of Highways Dept. Hoped to get water under 30 000 mg/L.	Partial Success
6236WW54	94337	Close to Coorlay Creek, near possible minor E.W. fault	Partial Success

Table 3, Well Details

Unit No.	Permit No.	Depth (m)	Casing (m)	Slots (m)	SWL (m)	Recommended Pump-depth (m)	Salinity mg/L	100 day yield L/s	300 day yield L/s	Airlift Yield L/s	Aquifer
6235WW65*	94333	84	84	30-84	3.7	60	21 800	4.1	2.7	5	Corraberra Sandst.
6235WW66*	94334	130	130	106-130	23.2	110	10 700	4	4	4.2	Corraberra Sandst.
6236WW52*	94335	62	62	14-62	8.5	40	64 300 approx	3	2.8	5	Woomera Shale
6236WW53*	94336	199	117	105-117	21.5	116	19 000	1.6	1.5	2	Simmens Quartzite
6236WW54*	94337	152	8	-	17.3	140	110 000	1	0.9	2	Simmens Quartzite
6236WW55***	-	116	15	-	49.8	90	28 600	10	7.5**		
6236WW56***	-	138	15	-	55.0	127	26 700	1.4	1.4		
6236WW57***	-	208	62	-	49.2	200	67 000	2.5	2.4		

* Wells drilled in current program.

** Estimated 700 day yield is 5.6 L/s.

*** Wells drilled previousby by Roxby Management Services.

Table 4, Water Analyses

Unit No	TDS mg/L	Conductivity mhos	Ca^{2+} mg/L	Mg^{2+} mg/L	Na^{2+} mg/L	K^+ mg/L	HCO_3^- mg/L	SO_4^{2-} mg/L	Cl^- mg/L	NO_3^- Mg/L
6235WW65	21 800	31 000	1 150	520	6 100	62	244	2 310	11 500	<0.1
6235WW66	10 700	16 000	725	225	2 840	17	224	1 480	5 280	<1.0
6236WW52	64 300	74 000	1 590	1 490	20 500	160	238	4 700	35 700	.4
6236WW53	19 000	25 000	1 420	360	4 930	44	156	2 460	9 690	.3
6236WW54	110 000	112 000	1 130	2 700	36 300	170	242	9 550	60 100	.3
6236WW57	28 300	36 000	880	920	8 060	58	351	4 580	13 600	.3
6236WW56	67 000	70 700	2 200	1 200	20 000	600	72	5 000	38 000	.25
6236WW55	26 700	36 000	700	800	8 500	150	299	4 000	14 300	<0.4

PUMP TESTING

All wells drilled in this program and three driller earlier by Roxby Management Services (see Table 3) were pump-tested by Highways Department crews under the supervision of SADME personnel.

Results are in Appendix B. Estimated yields are in Table 3.

DISCUSSION

For over a century small supplies of potable and stock quality water have been sought in the Stuart Shelf area.

In the last decade mineral drilling and drilling for construction water for the Stuart Highway have greatly increased knowledge of the occurrence of higher-yielding saline aquifers.

The Adelaidean sediments of the Stuart Shelf are flat-lying and little deformated.

Nonetheless many units are sufficiently well fractured to provide worthwhile yields.

CONCLUSIONS

Moderate supplies of saline water are generally obtainable in Adelaidean sediments on the Stuart Shelf. Salinities range from marginal sheep waters (about 10 000 mg/L) to highly saline brines (over 100 000 mg/L).

RECOMMENDATION

Wells should be pumped as indicated in Table 3.

REFERENCES

JOHNS, R.K., HIERN, M.N., NIXON, L.G., FORBES, B.G., OLLIVER, J.G., 1981. TORRENS map sheet, Geological Atlas of South Australia, 1:250 000 Series. Geol. Surv. S. Aust.

DALGARNO, C.R., (compiler), 1982. ANDAMOOKA map sheet, Geological Atlas of South Australia, 1:250 000 Series. Geol. Surv. S. Aust.

APPENDIX A

Geological Logs

MF32

DEPARTMENT OF MINES AND ENERGY—SOUTH AUSTRALIA

WATER WELL LOG

PROJECT: Pimba to Olympic Dam Road

HOLE NO: PN94333

UNIT / NO. 6235WW65

DME

LOCATION OR COORDS:

SEC: HD. Out of

El. Surface m

El. Ref. Point m Datum

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	To:	SUPPLY l/sec *	Test Length (hrs)	Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	Analysis No:
	See water	Summary Sheet for details	0	84	5	While drlg.	Air lift	23 000	W — field test

DEPTH (m) From	To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia (mm)	From (m)	To (m)
0	1		Soil		Quaternary				
1	6		Weathered Shale	No samples	Corraberra Sandstone				
6	10		Siltstone	Med. grey mic. shaley siltstone.					
10	24		Siltstone	Med. grey & mod. brown mic. shaley siltstone.					
24	28		Siltstone	Mod. brown shaley mic. siltstone.					
28	30		Sandstone	Light brown fine gr.qtz. sandstone.					
30	36		Siltstone	Mod. brown & lt. grey-green siltstone.					
36	38		Siltstone	Mod. brown mic. shaley siltstone.					
38	42		Siltstone	Lt. green-grey shaley siltstone plus some mod. brown siltstone.					
42	44		Sandstone	Lt. grey-brown mic. v.fine gr. sandstone plus silt-stone as above.					
44	46		Sandstone	Lt. brown mic. fine to med.gr. sandstone plus silt-stone as before.					
46	48		Siltstone	Mod. brown.					
48	52		Siltstone	Mod. brown siltstone as above interbedded with lt. green-grey siltstone.					
52	54		Sandstone	Lt. brown coarse to med.gr. qtz. sandstone with well rounded grains.					
54	58		Sandstone	Fine gr., silty & micaceous.					

REMARKS:

* NOTE: l/sec = 800gals/hr

DRILL TYPE: Rotary/Hammer

COMPLETED: 18/3/86

CIRCULATION: Air

LOGGED BY: R. Read

DATE: 17/3/86

SHEET 1 OF 2

MF32 A

DEPARTMENT OF MINES AND ENERGY—SOUTH AUSTRALIA

WATER WELL LOG

CONTINUATION SHEET

HOLE NO: PN94333

UNIT / NO. 6235WW65

DME

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia (mm)	CASING From (m)	CASING To (m)
58	60		Siltstone	Mod. brown siltstone & silty sandstone. Some coarse rounded sand.					
60	62		Sandstone	Sample mostly coarse disaggregated sand. Some fine gr. well-indurated silty sandstone.					
62	64		Sandstone	Fine to med. grained light brown mic. sandstone.					
64	70		Sandstone	Lt. brown med.gr. qtz. sandstone.					
70	72		Sandstone	Mod. brown fine grained mic. silty sandstone.					
72	76		Siltstone	Mod. brown shaley siltstone plus fine gr. mic. silty sandstone.					
76	84		Siltstone	Moderate brown shaley siltstone.					
84				END OF HOLE					

SHEET 2 OF 2

MF32

PROJECT: Pimba to Olympic Dam Rd.

DEPARTMENT OF MINES AND ENERGY—SOUTH AUSTRALIA

WATER WELL LOG

HOLE NO: PN9334

UNIT / NO. 6235WW66

DME

LOCATION OR COORDS:

SEC. HD. El. Surface m El. Ref. Point m Datum

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY l/sec *	Test Length (hrs)	Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	Analysis No:
	68				v. small	while drlng.	Air lift	20 000 mhos	W — field test
	88				.25	"	"	19 000 mhos	"
	100				.4	"	"	17 000 mhos	"
	106				.5	"	"		
	108				4.2	30 min.			

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia (mm)	CASING From (m)	CASING To (m)
0	1		Soil	(No samples)	Quaternary				
1	8		Sandstone	(No samples)	Simmens Quartzite Member of Tent Hill Formation				
8	14		Sandstone	Med. to fine gr. hard white qtz. sandstone with some soft white weathered claystone. Round to well-rounded grains.					
14	16		Siltstone	V.pale yellow-grey weathered siltstone, soft & plastic.					
16	20		Sandstone	Med.gr. friable qtz. sandstone & soft weathered silty sandstone.					
20	22		Sandstone	Med.gr. white friable qtz. sandstone plus coarse disaggregated qtz. sand.					
22	26		Sandstone	Med.gr. white friable qtz. sandstone & white weathered siltstone.					
26	34		Sandstone	White well-ind. coarse to med.gr. qtz. sandstone.					
34	38		Sandstone	As above plus green weathered siltstone.					
38	40		Sandstone	As above, plus some friable brown med.gr. qtz. sandstone.					
40	42		Siltstone	Lt. green-grey soft weathered siltstone plus white sandstone as before.					
44	44		Sandstone	White friable med.gr. qtz. sandstone plus brown sandstone & grey-green siltstone.					
44	57		Sandstone	White friable coarse to med.gr. sandstone.					

REMARKS:

* NOTE: l/sec = 800gals/hr

DRILL TYPE: Rotary Hammer

COMPLETED: 21/3/86

CIRCULATION: Air

LOGGED BY: R. Read

DATE: 20/3/86

SHEET 1 OF 2

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DEPARTMENT OF MINES AND ENERGY—SOUTH AUSTRALIA

WATER WELL LOG

CONTINUATION SHEET

HOLE NO: PB84334

UNIT / NO. 6235WW66

DME

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia (mm)	CASING From (m)	CASING To (m)
57	58		Sandstone	Brown mic. shaley sandstone.					
58	76		Sandstone	White med.gr. qtz. sandstone.					
76	82		Sandstone	White med.gr. sandstone, with some dk.brown siltstone giving the samples an overall brown colour.					
82	88		Sandstone	White med.gr. sandstone plus brown silty sandstone.					
88	96		Sandstone	White med.gr. sandstone plus minor dk.brown & lt. green-grey shaley siltstone.					
96	106		Sandstone	Hard white med.gr. sandstone plus lt. to mod. brown sandstone. Minor lt. green-grey & brown mic. siltstone.					
106	110		Sandstone	Lt. brown fine to med.gr. sandstone.					
110	118		Sandstone	Lt. brown fine to med.gr. mic. sandstone.					
118	124		Sandstone	Lt. brown mic. fine to med.gr. sandstone.					
124	128		Sandstone	Lt. to mod. brown fine-gr. sandstone.					
128	130		Siltstone	Dk. brown mic. shaley siltstone & lt. brown sandstone.					
130				END OF HOLE					

DEPARTMENT OF MINES AND ENERGY—SOUTH AUSTRALIA

WATER WELL LOG

PROJECT: Pimba Olympic Dam Road

LOCATION OR COORDS:

SEC. HD. Out of

El. Surface m

El. Ref. Point m Datum

HOLE NO: PN94335

UNIT / NO. 6236WW52

DME

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY l/sec *	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	Analysis No:
	20				1.2	While drlng.	Air lift	Conductivity 90 000 mhos (field test)	W —
	29				4.4	"	"		
	35				5				
	62				5				

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia (mm)	CASING From (m)	CASING To (m)
0	2		Sand	Brown sand.	Quaternary				
2	8		Shale	Soft weathered green shale.	Woomera Shale				
8	12		Siltstone	Green-grey weathered siltstone.					
12	14		Siltstone	As above plus red-brown weathered siltstone.					
14	19		Siltstone	Med. grey weathered siltstone.					
19	26		Siltstone	Purple-brown siltstone.					
26	28		Siltstone	Lt. grey shaley siltstone, minor lt. brown dolomite.					
28	46		Siltstone	Lt. grey shaley siltstone.					
46	48		Siltstone	Med. grey & mod. purple-brown shaley siltstone.					
48	56		Siltstone	Lt. grey shaley siltstone.					
56	58		Siltstone	Lt. grey & purple-brown.					
58	62		Siltstone	Lt. grey shaley siltstone.					

REMARKS:

* NOTE: l/sec = 800gals/hr

DRILL TYPE: Rotary hammer

COMPLETED: 22/3/86

CIRCULATION: Air

LOGGED BY: R. Read

DATE: 21/3/86

SHEET 1 OF 1

MF32

DEPARTMENT OF MINES AND ENERGY—SOUTH AUSTRALIA

WATER WELL LOG

PROJECT: Pimba to Olympic Dam Road

LOCATION OR COORDS:

SEC. HD. Out of

El. Surface m

El. Ref. Point m Datum

HOLE NO: PN94336

UNIT / NO. 6236WW53

DME

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY l/sec *	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	Analysis No:
									W —

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia (mm)	CASING From (m)	CASING To (m)
0	1		Soil	No samples.					
1	8		Quartzite)						
8	10		Sandstone	Hard white medium grained qtz. sandstone.	Simmens Quartzite Member				
10	12		Sandstone	White silty weathered sandstone.					
12	16		Sandstone	Hard white med. grained sandstone plus soft weathered v.pale grey siltstone.					
16	18		Sandstone	V.light grey and pale brown friable qtz. sandstone plus light grey weathered siltstone.					
18	22		Siltstone	Med. grey soft mic. siltstone & minor sandstone.					
22	26		Sandstone	White to pale brown med. grained qtz. sandstone plus med. grey & lt. green-grey weathered mic. siltstone.					
26	30		Sandstone	Coarse to med. grained light grey & pale brown qtz. sandstone.					
30	36		Sandstone	As above plus dk. brown mic. shaley siltstone.					
36	38		Sandstone	Med. grey silty sandstone plus dk. brown mic. weathered siltstone.					
38	40		Siltstone	Dk. brown mic. siltstone plus soft lt. brown sandstone.					
40	48		Sandstone	Mod. brown coarse to med. grained silty qtz. sandstone plus dk. brown shaley siltstone.					

REMARKS:

* NOTE: l/sec = 800gals/hr

DRILL TYPE: Rotary Hammer

CIRCULATION: Air

DATE: 25/3/86

COMPLETED: 25/3/86

LOGGED BY: R. Read

SHEET 1 OF 2

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DEPARTMENT OF MINES AND ENERGY—SOUTH AUSTRALIA

WATER WELL LOG

CONTINUATION SHEET

HOLE NO: PN94336
UNIT / NO. 6236WW53
DME

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia (mm)	CASING From (m)	CASING To (m)
48	52		Sandstone	Lt. to mod. brown coarser med. gr. friable qtz. sandstone plus lt. green-grey & dk. brown siltstone.					
52	56		Sandstone	Fine to med. gr. lt. to mod. brown silty qtz. sandstone.					
56	62		Sandstone	White & lt. brown med. to coarse gr. qtz. sandstone & mod. brown med. gr. silty sandstone.					
62	76		Sandstone	Coarse gr. light brown.					
76	114		Sandstone	White, lt. brown & mod. brown coarse to med. gr. sandstone.					
114	116		Sandstone	hard white coarse gr. sandstone (aquifer). Large joint-bounded frags. indicate that it is broken.					
116	132		Sandstone	White & mod. brown sandstone.					
132	142			White & v.light green-grey coarse to med. grained sandstone.					
142	148		Sandstone	White med. grained sandstone.					
148	152		Sandstone	White & lt. brown sandstone with interbedded soft dk. brown shaley siltstone.					
152	166		Sandstone	Light brown med. grained sandstone.					
166	182		Sandstone	Mod. brown fine gr. sandstone with dk. brown mic. shaley partings.	Corraberra Sandstone				
182	199		Siltstone	Dk. brown shaley siltstone.	Woomera Shale				
199				END OF HOLE.					

SHEET 2 OF 2

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PROJECT: Pimba to Olympic Dam Road

MINES DEPARTMENT — SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: PN94337

UNIT / STATE NO 6236WW54

DM

LOCATION OR COORDS:

EL Surface m

SEC. HD. Out of EL Ref. Point m Datum

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	Analysis No:
	99-100	17.3	0	152	1.6	1/3	Air lift	110 000	W —

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
0	2		Gravel	No samples	Quaternary				
2	6		Sandstone	Red brown					
6	8		Sandstone	Purple-brown coarse to medium grained silty sandstone.	Tent Hill				
8	10		Sandstone	Pale yellow-brown, similar to the above.	Formation				
10	22		Sandstone	Interbedded white & purple-brown hard coarse to medium-grained sandstone.					
22	28		Sandstone	Moderate brown and white rather poorly sorted sandstone.					
28	30		Sandstone	As above plus dark brown shaley siltstone.					
30	44		Sandstone	Alternating white medium-grained and moderate-brown silty sandstone. Some dark brown shale.					

REMARKS:

*NOTE: 110 kl / day = 1000gals / hr.

DRILL TYPE: Rotary Hammer

COMPLETED: 3/4/86

CIRCULATION: Air

LOGGED BY: R. Read

SHEET 1 OF 3

DATE: 3/4/86

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MF32 A

DEPARTMENT OF MINES AND ENERGY—SOUTH AUSTRALIA

WATER WELL LOG

CONTINUATION SHEET

HOLE NO: PN94337
UNIT / NO. 6236WW54
DME

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia (mm)	CASING From (m)	CASING To (m)
44	46		Sandstone	Similar to the above. 30% dark brown shale.					
46	50		Sandstone	White and moderate brown medium grained sandstone, plus some coarse sandstone and shale.					
50	52		Sandstone	As above. Minor pale green sandstone.					
52	64		Sandstone	Moderate brown and white medium to coarse grained sandstone plus minor dark brown shaley siltstone.					
64	70		Sandstone	As above plus light green siltstone.					
70	74		Sandstone	White, light brown and light grey medium grained sandstone. Some dark brown shaley silt stone.					
74	100		Sandstone	Hard white medium-grained sandstone interbedded with dark brown shaley siltstone.					
100	102		Sandstone	Moderate brown silty sandstone, plus light brown sandstone, brown shale and minor green shale.	Corraberra Sandstone				
102	109		Sandstone	Hard light brown sandstone with some light green sandstone.					
109	130		Sandstone	Moderate brown silty medium grained sandstone plus dark brown shaley micaceous siltstone.					
130	132		Shale	60% Dark brown micaceous shaley siltstone 40% Sandstone, as before					
132	134		Sandstone	Moderate brown fine-grained silty sandstone with brown and green shale.					

MF32 A

DEPARTMENT OF MINES AND ENERGY—SOUTH AUSTRALIA

WATER WELL LOG

CONTINUATION SHEET

HOLE NO: PN94337

UNIT / NO. 6236WW54

DME

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia (mm)	CASING From (m)	CASING To (m)
134	136		Sandstone	Moderate brown medium to fine-grained micaceous silty sandstone.					
136	152		Siltstone	Dark brown shaley micaceous siltstone (some sandstone as above).	Woomera Shale.				
152				End of hole.					

SHEET........ OF......

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APPENDIX B

Pump-Testing

Wirrda Bore 6236WW57

Introduction

The well was pumped for 1230 minutes (22 hours) at 4.1 L/s. Because of a probe malfunction recovery was only observed for 30 minutes.

Response

The semi-log plot of drawdown (Fig. B-1) is a downward steepening curve suggestive of double-boundary conditions. The t/t_1 plot of recovery, which is roughly a straight line trending below the origin of graph, confirms this.

Therefore the plot of drawdown against the square root of time (Fig. B-2) has been used for extrapolation.

Well Equation

From Fig. B-2 an equation was derived for

$Q < 4.1$ L/s

$s = Q(0.42 + .18\sqrt{t})$

where s is drawdown in m

Q is pump rate in L/s

t is time in days

Well loss must be 1.60 m or less.

Therefore taking account of possible Q^2 well loss terms the well equation for $Q > 4.1$ L/s is

$$s = 0.095\,Q^2 + .03\,Q + .18\,Q\sqrt{t}$$

TOWN BORE, WB2 6236WW56

Testing

The well was pumped for 1440 minutes (24 hours) at 1.19 L/s. Recovery was observed for 360 minutes, when full recovery appeared to have occurred.

Response

The semi-log plot of drawdown is shown in Fig. B-3. Drawdown reached a steady state at about 300 minutes. This is borne out by the rapid recovery.

Well Equation

A conservative Δs value of 2 has been used to give equations.

$$s = (40.2 + 1.7 \log t)Q \text{ for } Q<1.2L/s$$

$$s = (34Q + 1.7 \log t)Q, \quad Q>1.2L/s$$

where s is drawdown in metres
t is time in days
Q is pumping rate in L/s.

Airstrip Bore, WB3 6236WW56

Testing

Two attempts to test this well were abandoned when the water level draw down rapidly to the limit of the probe. It was then decided to test the well by pumping 'on the fork' for 24 hours, that is with the water level at the pump intake.

Response

With an initial pumping rate of 3 L/s the water level fell rapidly, and reached the pump intake (81 m drawdown) in about 15 minutes. Pumping rate slowly declined through the remainder of the test, reaching about 2.0 L/s after 24 hours (see Fig. B-4).

Semi-log and $\sqrt{t}$ plots of recovery are shown in Figures B-5 and B-6.

The plot of $\sqrt{t}-\sqrt{t_1}$ appears to be linear. This has been used to derive a well equation.

Well Equation

The linear plot of $\sqrt{t}-\sqrt{t_1}$ has been used to derive the following equation for drawdown at the test rate.

$$s = 80 \ t \ 1.2 \ \sqrt{t}$$

From this can be deriven the equations

$$s = 40Q + 0.6Q\sqrt{t}. \quad Q<2.0 \text{ L/s}$$

$$s = 20Q^2 + 0.6 \ Q\sqrt{t} \text{ for } Q > 2.0 \text{ L/s}$$

where s is drawdown in m
Q is pump rate in L/s
t is time in days

from the above the 700 days yield is 2.0 L/s for a pump-setting of 165 m a 2.3 L/s for 200 m.

WELL PN 9433 — 6235WW65

Testing

The well was pumped for 1461 minutes (24 hours 21 minutes) at a rate of 4.5 L/s. Recovery was observed for 6 days.

Response

The semi-log plot of drawdown (Figure B-7) is generally linear, showing a slight downward curve at the end. The slow recovery (Figs B-7 and B-8) suggests the presence of double boundary conditions.

From straight lines fitted through both the drawdown against $\sqrt{t}$ and residual drawdown against $\sqrt{t}-\sqrt{t_1}$ the following equation was derived:

$$s = 13.9 + 3.5 \ \sqrt{t}$$

which becomes

$$s = Q(3.11 + .78 \ \sqrt{t}) \text{ for } Q < 4.5 \text{ L/s}$$

where s is drawdown in m

Q is pump rate in L/s

t is time in days

The plot recovery against $\sqrt{t}-\sqrt{t_1}$ (Fig B-8) appears to lie on a line above the origin suggesting the occurrence of leaky aquifer conditions.

<u>Long term yield</u>

The calculation of long term yield is complicated by the fact that the aquifer is only 25 m below water table, but is about 50 m thick (see Fig. 3). Some allowance must be made for the fact that the aquifer can be partially dewatered, but that the rate of drawdown will increase as this is done.

A maximum effective drawdown of 4.5 m has been assumed. This corresponds to an actual drawdown of 60 to 70 m.

Using this drawdown and the above equation the following yields are calculated:

Time	Yield L/s
100 day	4.1
300 day	2.7
700 day	1.9

Using the type curve method leaky strip-aquifers (Read, 1985) and matching with Figure B-9.

For R=1, $s_r = 0.06$ m

$\frac{x}{B} = 0.0005$

$\frac{Qx}{2TD} = \frac{sr}{R} = 0.06$

for

$\frac{x}{B} = 0.005$ $F(u, \frac{x}{B})$ steady state) $- F(u, \frac{x}{B})$ (end of test)= 1400

therfore increase in drawdown = 1400 x 0.06

= 80 m

Drawdown at the end of the test was 17.6 m, therefore hypothetical steady state drawdown at pumped rate is 98 m.

Since assumed available drawdown is 4.5 m long term yield is

$\frac{4.5 \times 4.5}{98} \sim 2$ L/s (approx)

This is too small for reasons which are not clear.

In view of the uncertainties in predicting the performance of this well it is recommended that it be pumped at 4 L/s. There is about a 50% chance that the well will perform satisfactorily at this rate. If not either an additional well can be drilled or the balance obtained from the Woomera pipeline.

WELL PN 94334 6235WW66

Testing

The pump test was marred by mechanical problems, which resulted in the well being pumped as shown in Table B-1.

TABLE B-1
Schedule of Pumping 6235WW66

Time	Date	
1250	3/4/86	Pump started, 4.2 L/s
1322	3/4/86	Pump rate reduced to 3.1 L/s
1955	3/4/86	Pump stopped-engine failure
0745	4/4/86	Pump started, 4 L/s
0804	4/4/86	Pump stopped
0900	4/4/86	Pump started, 3.1 L/s
0900	5/6/86	Pump stopped.

Response

Initially water levels fell rapidly, indicating high well losses, but from 30 minutes on the semi-log plot of drawdown (Fig. B-10) is roughly linear.

The plot of residual drawdown against t/t_1 shows an upward curve towards the origin which could be interpreted as indicating the presence of double boundary conditions.

It was suspected that this was a result of the well not being fully recovered from the previous episodes of pumping at the start of the test.

The recovery was therefore replotted agains the following function.

$$\left(\frac{t + t_1}{t}\right)\left(\frac{t + t_2}{t + t_3}\right)^{\frac{4}{3.1}} \quad \left(\frac{t + t_4}{t + t_5}\right)\left(\frac{t + t_6}{t + t_7}\right)^{\frac{4.2}{3.1}}$$

where t is time since pumping ceased

t_1 is length of last test (1440 minutes)

t_2 is time previous pump-phase at 4 L/s started before end of test (1515 minutes)

t_3 is time previous pump-phase of L/s stopped before end of test (1496 minutes)

t_4 is time since start of 2nd previous pump-phase before the end of the test (2618 minutes)

t_5 is time since end of 2nd previous pump-phase before the end of the test (2225 minutes)

t_6 is time since start of first pumping, phase before the end of the test (2650 minutes)

t_7 is time since the end of the first pumping phase before the end of the test (2618 minutes).

This plot appears to be a straight line. The trend below the origin is assumed to be a result of problems with the reference points.

Well Equation

On the assumption that flow is radial the following equation can be used for extrapolation at the test rate.

$$s = 39 + 3 \log t$$

(s in metres, t in days)

The Q^2 (well loss) component is estimated to be about 30 m. From this the following well equation is derived.

$$s = 3.12\, Q^2 + 2.9\, Q + Q \log t, \quad Q \geq 3.1 \text{ L/s}$$

s is drawdown in metres

Q is pump-rate in L/s

t is time in days.

From this at the proposed pumping rate of 4 L/s the 700 day drawdown is estimated at 72 m.

Therefore the well can be safely pumped at 4 L/s.

WELL PN94335 6236WW52

Testing

The well was pumped at 4.1 L/s for 1440 minutes (24 hours).

Response

The semilog drawdown curve (Fig B-11) shows progressive steepening due to partial dewatering of the aquifer.

Estimation of long-term yield is difficult because it was not possible to accurately record the position of the shallow aquifers.

The long term yield has been estimated by two methods.

a. By extrapolation the drawdown 100 day drawdown at the pump rate (4.1 L/s) is 5.5 + 4.6 = 10.1 m.
   Assuming that the available drawdown is 9 m (to 18 m) the 100 day yield is:
   $4.1 \times \frac{9}{10.1}$
   = 3.6 L/s
   or 300 day yield is 3.3 L/s.

b. The 1 hour air-lift yield was 5 L/s (measured by V-notch).
   At the pump-rate 1 hour drawdown was 3 m.
   Therefore effective available drawdown is
   $3 \times \frac{5}{4.1} = 3.6$ m

   Neglecting the portion of the curve effected by aquifer dewatering 100 day drawdown is 4.7 m
   Therefore 100 day yield is $4.1 \times \frac{3.6}{4.7}$
   = 3.1 L/s

   or 300 day yield is 2.9 L/s.

   Allowing a safety margin the folowing pump-rates are recommended:

   For 100 days, 3 L/s
   300 days, 2.8 L/s

WELL PN94336 6236WW53

Testing

The well was pumped at about 1.9 L/s for 100 minutes when the rate was reduced to 1.44 L/s to prevent the well from forking before the end of the test. Total pumping time was 1437 minutes.

Response

The well drawdown appears to be linear with log time (Fig B-12). The $\frac{t}{t_1}$ plot of recovery confirms that this is a valid approach, and suggests the presence of leaky conditions at late times.

Therefore a logarithmic extrapolation has been used for calculating long term yields.

The 100 day yield is calculated as 1.6 L/s and the 300 day yield as 1.5 L/s.

WELL PN94337 6236WW54

Testing

The well was pumped at 1.0 L/s for 415 minutes (7 hours approx), at which time the engine broke down.

Response

The semi-log plot of drawdown (Fig B-13) is roughly a straight ling with a 'delta-s' of 11 m towards the end of the test.

The $\frac{t}{t_1}$ plot of residual drawdown is a sigmoidal curve which trends toward a straight line of 'delta s' 14.

From the above the 100 day yield is estimated by 1 L/s and the 300 day yield 0.9 L/s.

DISCUSSION

Pump test results are summarized in Table B-2. Both radial-flow and linear-flow conditions have been identified in these tests.

Transmissivities range from 1.4 to 170 m^2/day. The two highest trasmissivities are for wells showing linear flow later in the tests, indicating that these wells have intersected narrow highly transmissive zones in rocks of generally lower transmissivity. In the case of 6236WW56 the high initial drawdowns suggest that the well may be close to, rather than in, such a zone. Typically the transmissivity of the Arcoona Quartzite is about 10 m^2/day.

TABLE B-2

Summary of Pump-test results

Unit No.	Response* type	Transmissivity m^2/day	100 day** yield	300 day* yield	Rate of Specific drawdown increase (m/L/s/day$^{1/2}$)
6235WW65	L	13.5	4.1	2.7	0.78
6235WW66	R	16	4	4	-
6236WW52	R	28	3.6 (3)	3.3 (2.8)	-
6236WW53	R	10	1.6	1.5	-
6236WW54	R	1.4	1	0.9	-
6236WW57	L	170	10	7.5	0.18
6236WW56	R	9.3	1.4	1.4	-
6236WW55	L	45	2.5	2.4	0.6

* L is linear flow (double boundary)
R is radial flow

** Figures in brackets are estimates which have been reduced by a safety margin.

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DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER

WELL No. 6236000WW00057
DRAWDOWN AND RECOVERY v. LOG TIME

COMPILED	R.R.
DRAWN	R.H.
DATE	Aug 1986
CHECKED	
SCALE	
PLAN NUMBER	S18831
C D O	30-9-86 (DATE)

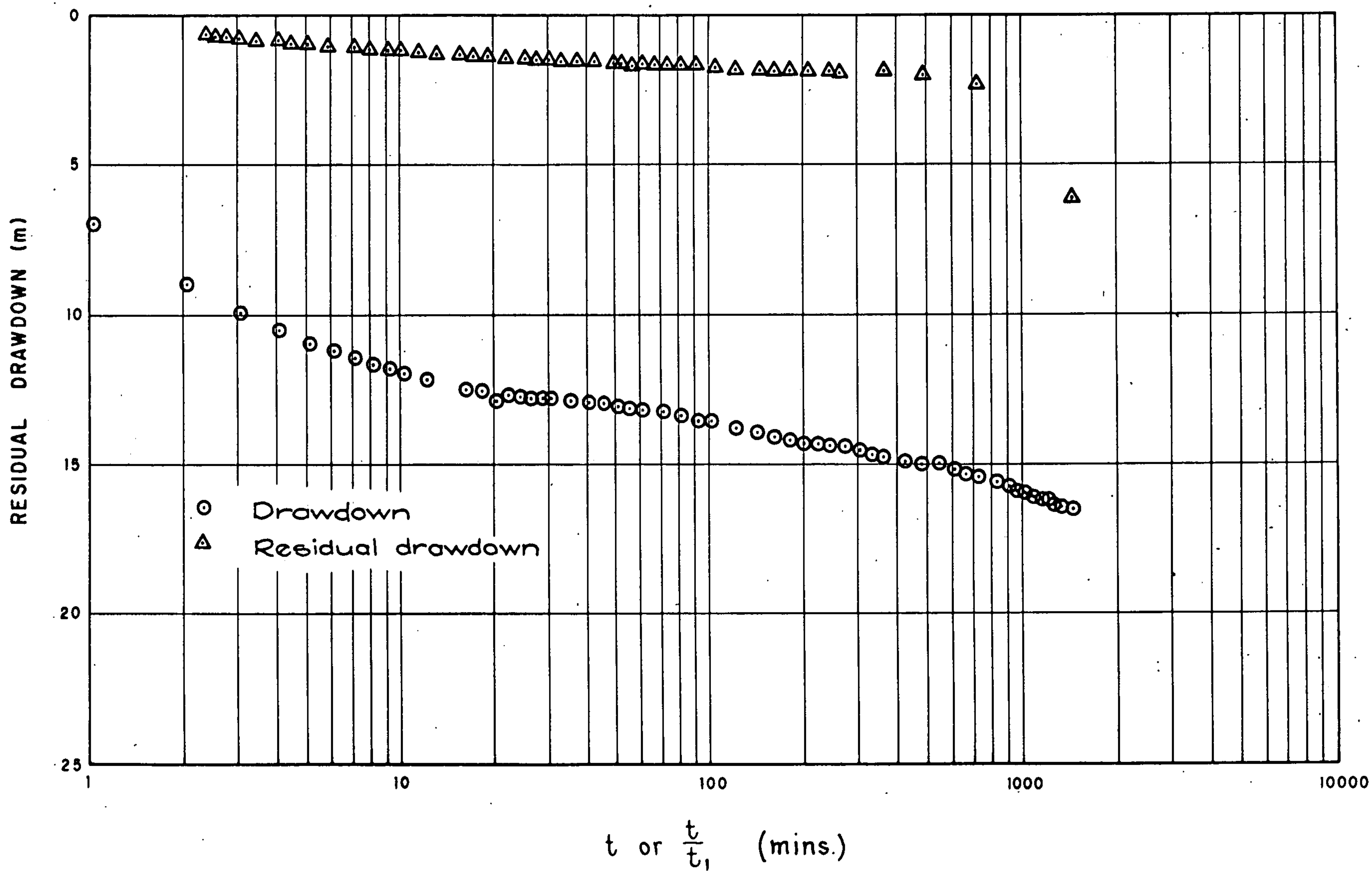


Fig. B-1

4186

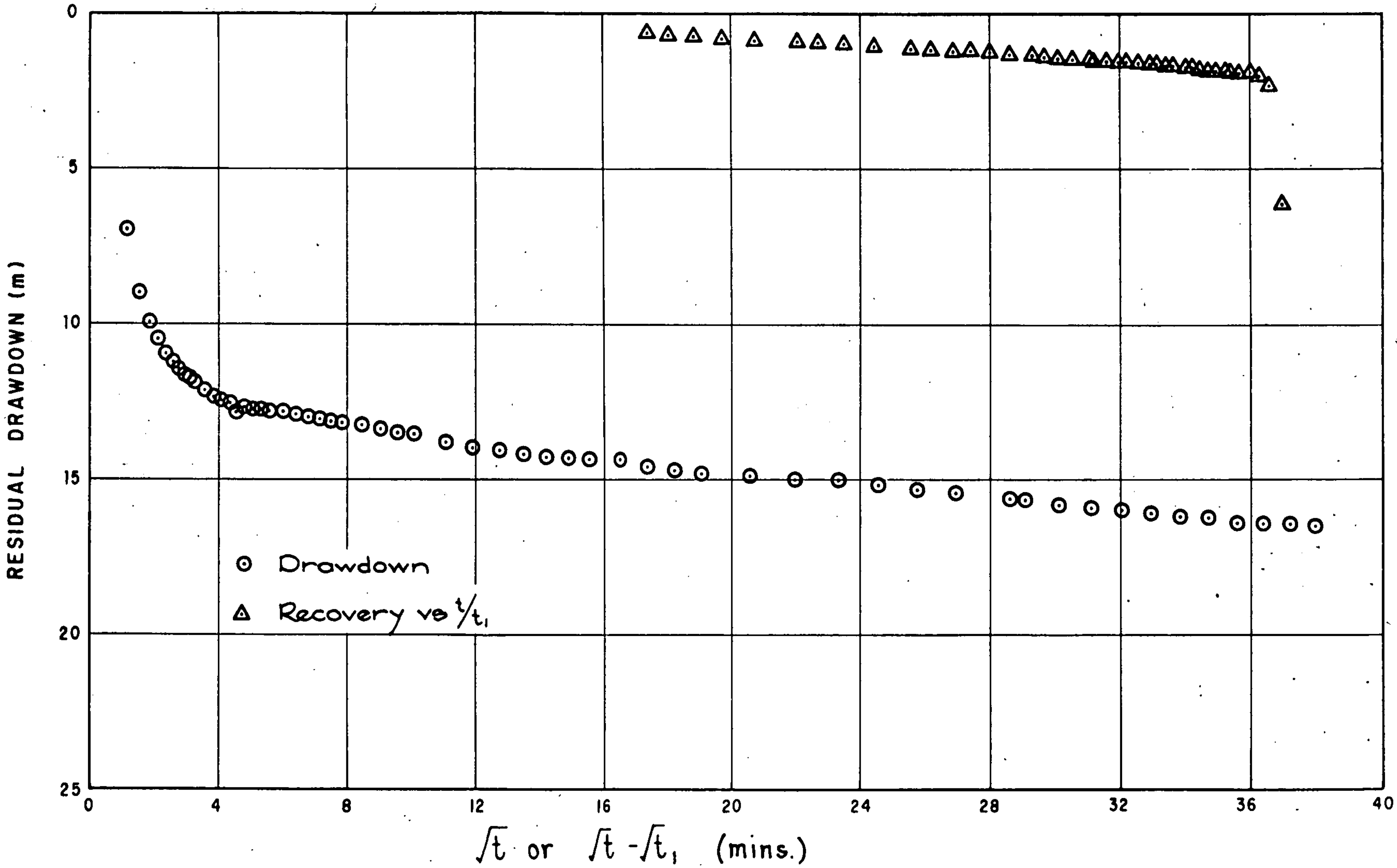
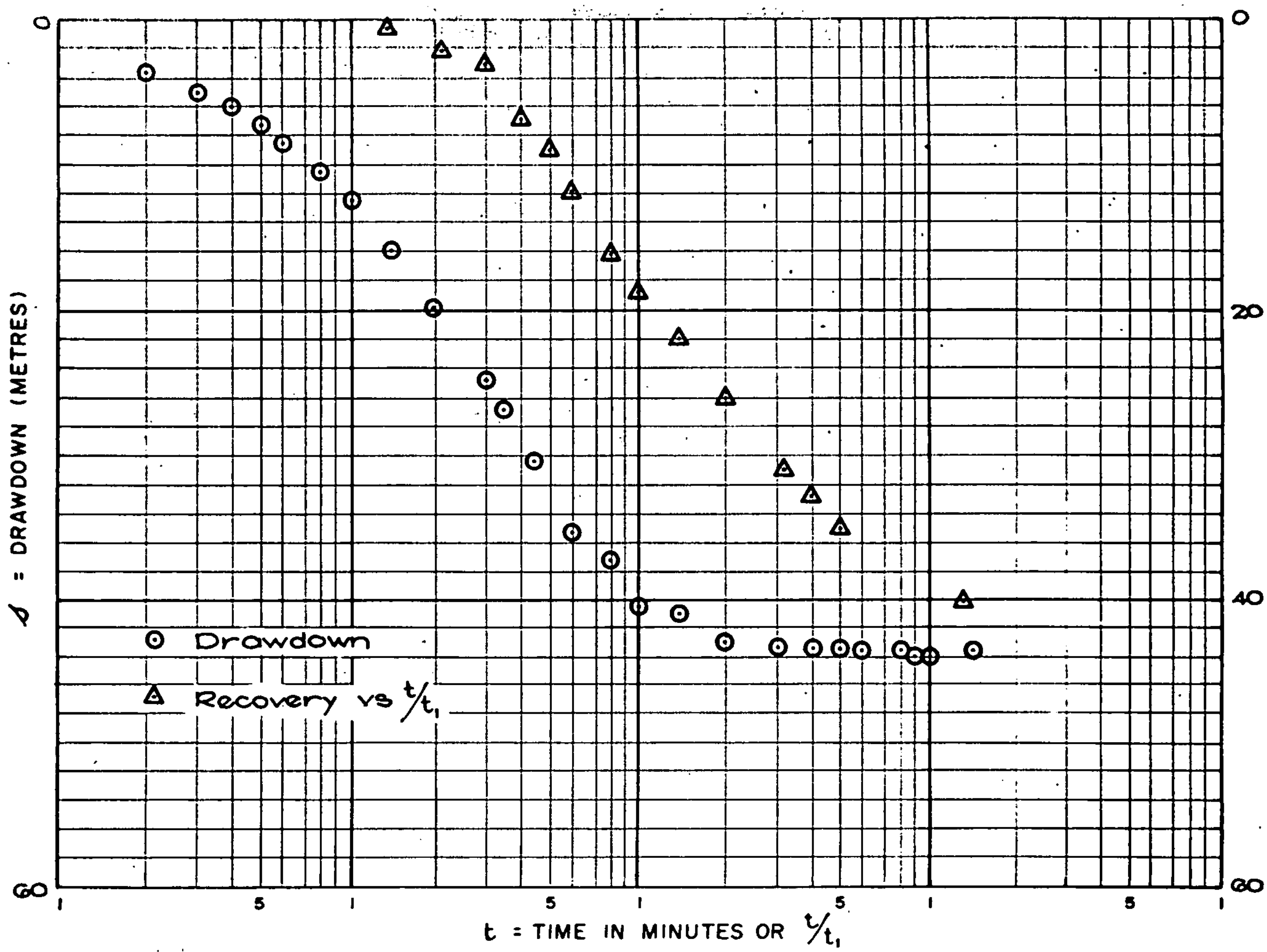


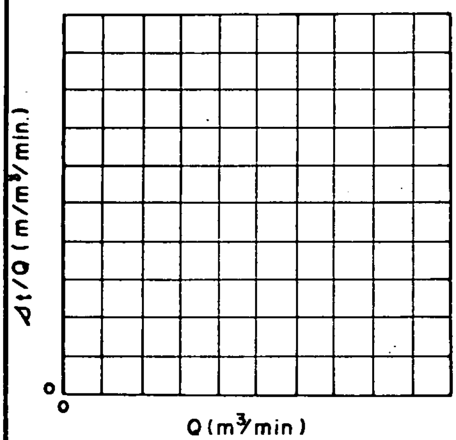
Fig........B-2

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER
WELL No. 6236000WW00057
DRAWDOWN AND RECOVERY v. SQUARE ROOT TIME

COMPILED R.R.	C.D.O. 30.9.86 DATE
DRAWN R.H.	SCALE
DATE Aug 1986 CHECKED	PLAN NUMBER S 18832





STEP	Q L/s	st=1	st=1/Q	st=10	st=10/Q	st=100	st=100/Q	Δs	Δs/Q	T*
1	1·8									

*JACOB EQUATION : $T = \frac{0{\cdot}183.\,Q}{\Delta s}$

STATE/UNIT No. 6236WW56 LENGTH OF TEST 24hrs

INTERVAL TESTED DEPTH OF PUMP INTAKE .... m.

From 55 m. to 138 m. DEPTH OF WATER LEVEL

HOLE DEPTH 138 m. AT START OF TEST 55 m.

AQUIFER AVAILABLE DRAWDOWN .... m.

From 124 m. to 138 m.

WELL EQUATION : $s = aQ + cQ^2 + b.Q.\log_{10} t$

OR $\frac{st}{Q} = a + cQ + b.\log_{10} t$

From $\frac{st}{Q}$ versus Q, a =

b =

c =

=

Therefore st = Q + Q^2 + $Q\log_{10} t$

WELL RECOVERY

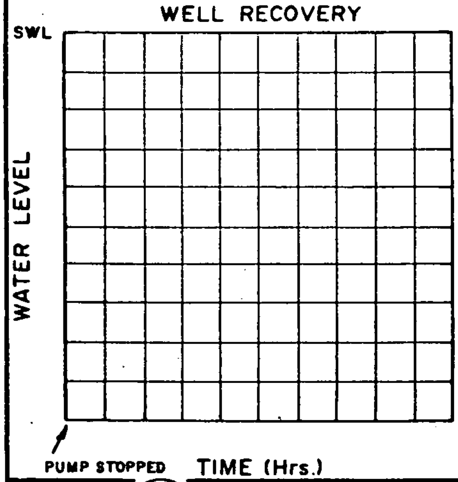


Figure B-3

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER

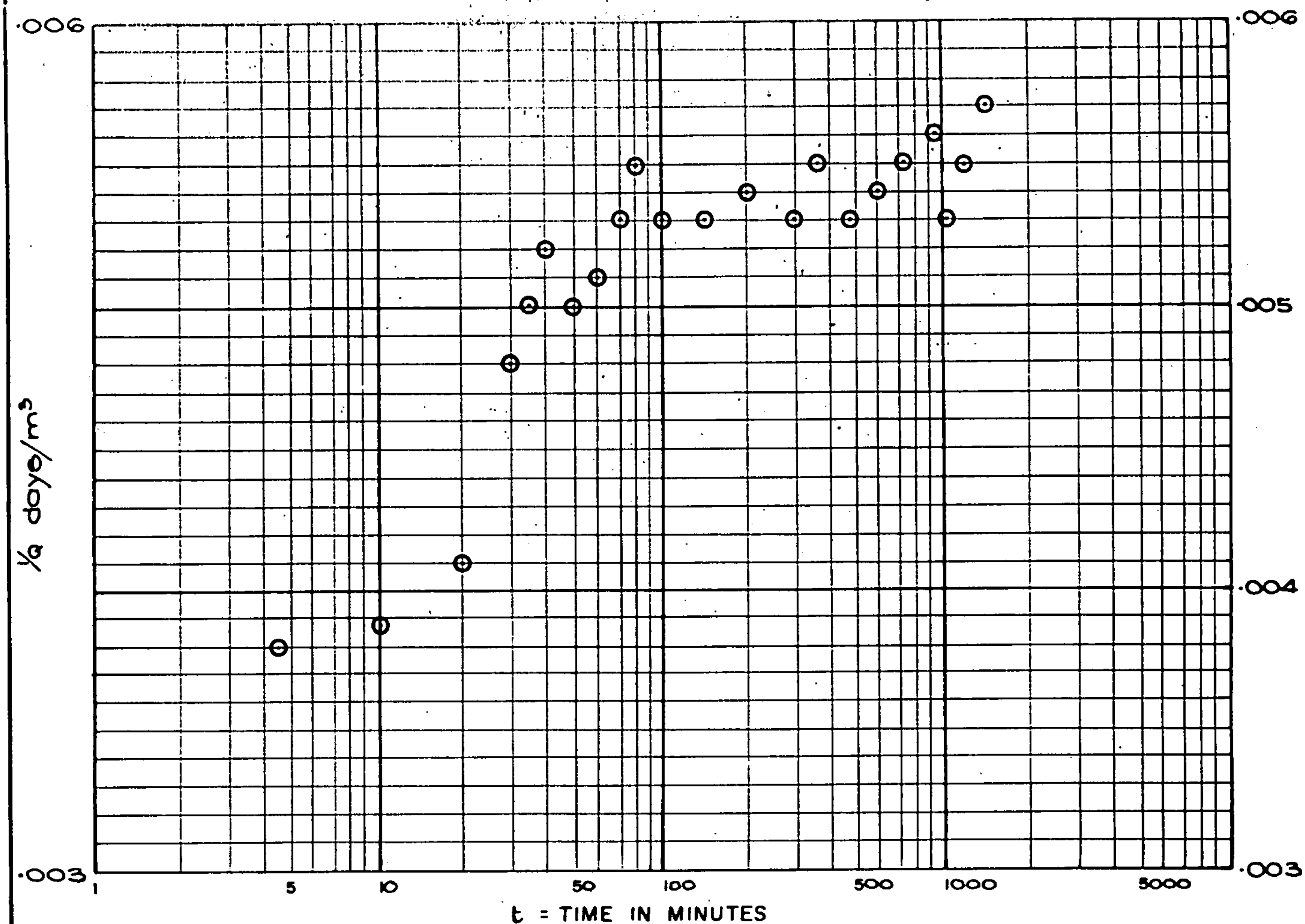
WELL No. 6236000WW00056

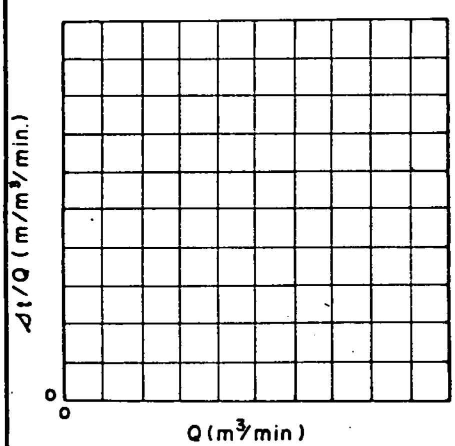
STEP DRAWDOWN TEST

COMPILED R. Read	WR C.D.O	30·9·86 DATE	
DRAWN E. Calabio	SCALE ——		
DATE	PLAN NUMBER		
CHECKED	S 18833		

4186

MF 88





STEP	Q (m³/min)	Δt = 1	Δt=1 / Q	Δt = 10	Δt=10 / Q	Δt = 100	Δt=100 / Q	ΔΔ	ΔΔ / Q	T*

* JACOB EQUATION : $T = \frac{0\cdot183.\,Q}{\Delta s}$

STATE/UNIT No. 6236WW55

INTERVAL TESTED

From 62 m. to 208 m.

HOLE DEPTH 208 m.

AQUIFER

From .... m. to .... m.

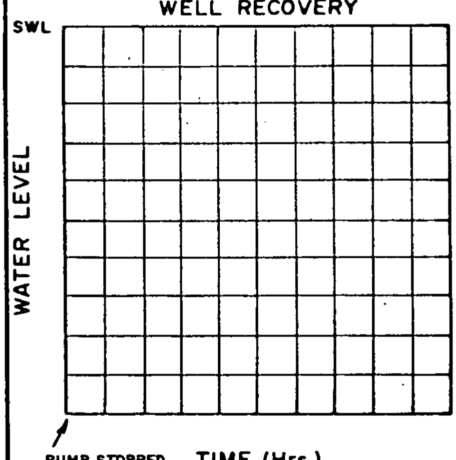
LENGTH OF TEST 24hrs.

DEPTH OF PUMP INTAKE 130 m.

DEPTH OF WATER LEVEL AT START OF TEST 49 m.

AVAILABLE DRAWDOWN 81 m.

WELL RECOVERY



WELL EQUATION : $s = aQ + cQ^2 + b.Q.\log_{10} t$

OR $\frac{\Delta t}{Q} = a + cQ + b.\log_{10} t$

From $\frac{\Delta t}{Q}$ versus Q, a =

b =

c =

=

Therefore Δt = Q + Q^2 + $Q\log_{10} t$

Figure B-4

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD

DRILLING FOR CONSTRUCTION WATER

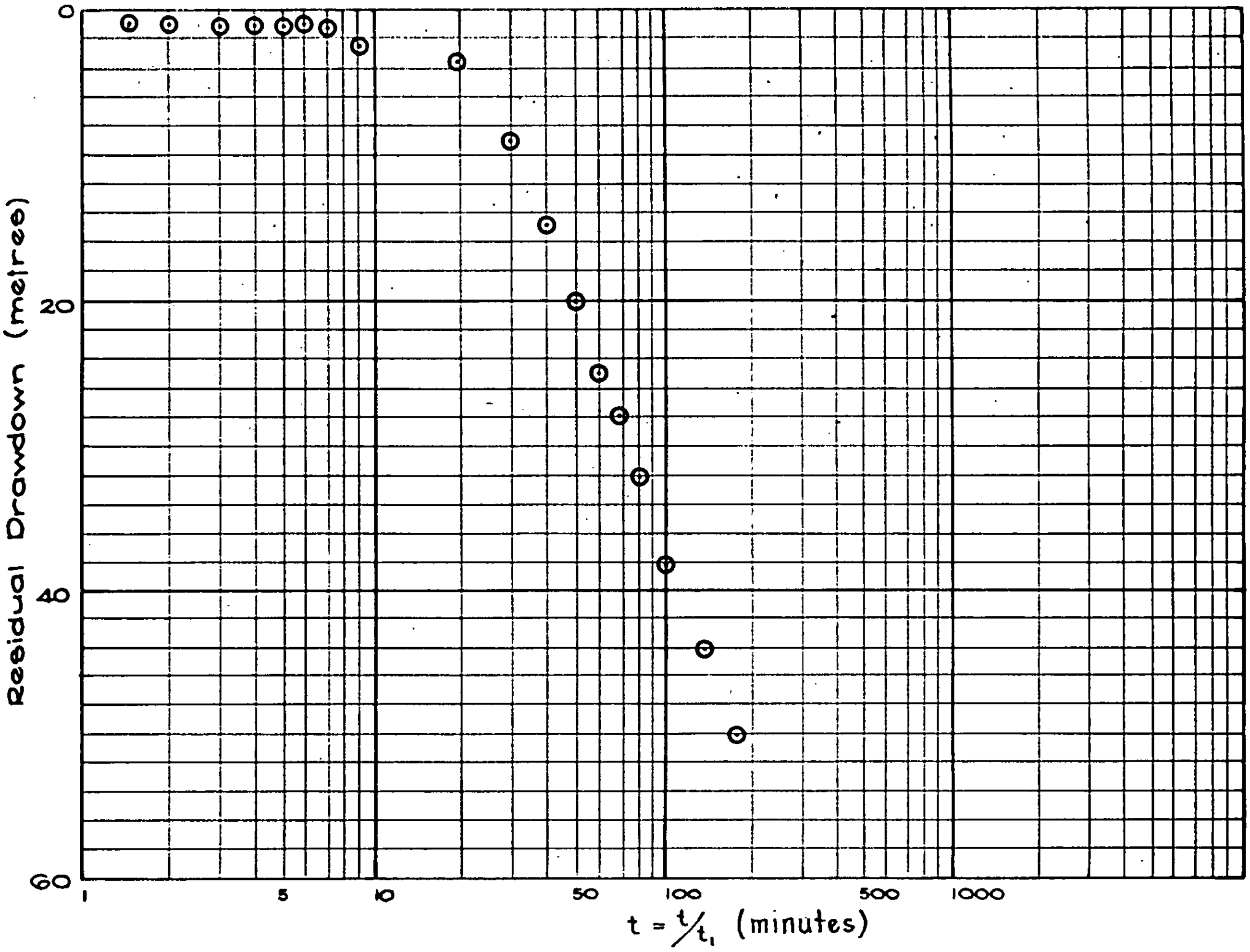
WELL No. 623600WW00055

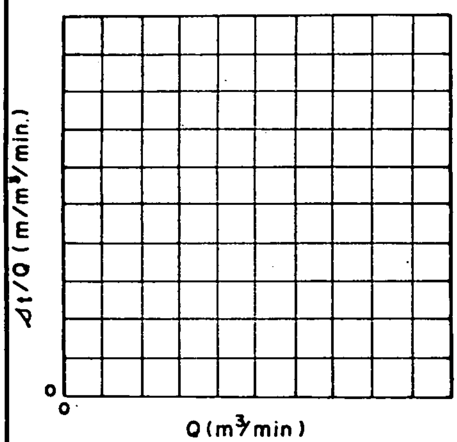
CONSTANT DRAWDOWN TEST

COMPILED	R. Read	C.D.O.	DATE 30·9·86
DRAWN	E. Calabio	SCALE	—
DATE		PLAN NUMBER	S 18834
CHECKED			

4186

ME 88





STEP	Q (m³/min)	Δt=1	Δt=1 / Q	Δt=10	Δt=10 / Q	Δt=100	Δt=100 / Q	ΔΔs	ΔΔs / Q	T*
	See Fig. B-4									

*JACOB EQUATION : $T = \frac{0{\cdot}183.\,Q}{\Delta s}$

STATE/UNIT No. 6236WW55

INTERVAL TESTED

From 62 m. to 208 m.

HOLE DEPTH 208 m.

AQUIFER

From 198 m. to 208 m.

LENGTH OF TEST 1440 min.

DEPTH OF PUMP INTAKE .... m.

DEPTH OF WATER LEVEL

AT START OF TEST 49 m.

AVAILABLE DRAWDOWN .... m.

WELL EQUATION : $s = aQ + cQ^2 + b.Q.\log_{10}t$

OR $\frac{\Delta s}{Q} = a + cQ + b.\log_{10}t$

From $\frac{\Delta s}{Q}$ versus Q, a =

b =

c =

Therefore $s = \quad Q + \quad Q^2 + \quad Q\log_{10}t$

WELL RECOVERY

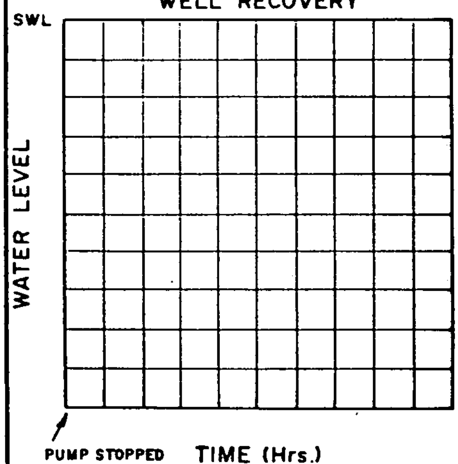


Figure B-5

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER

WELL No. 623600OWW00055

RECOVERY TEST

COMPILED R. Read	[signature] C.D.O. 30·9·86 DATE
DRAWN E. Calabio	SCALE ——
DATE	PLAN NUMBER
CHECKED	S 18835

4186

ME 88

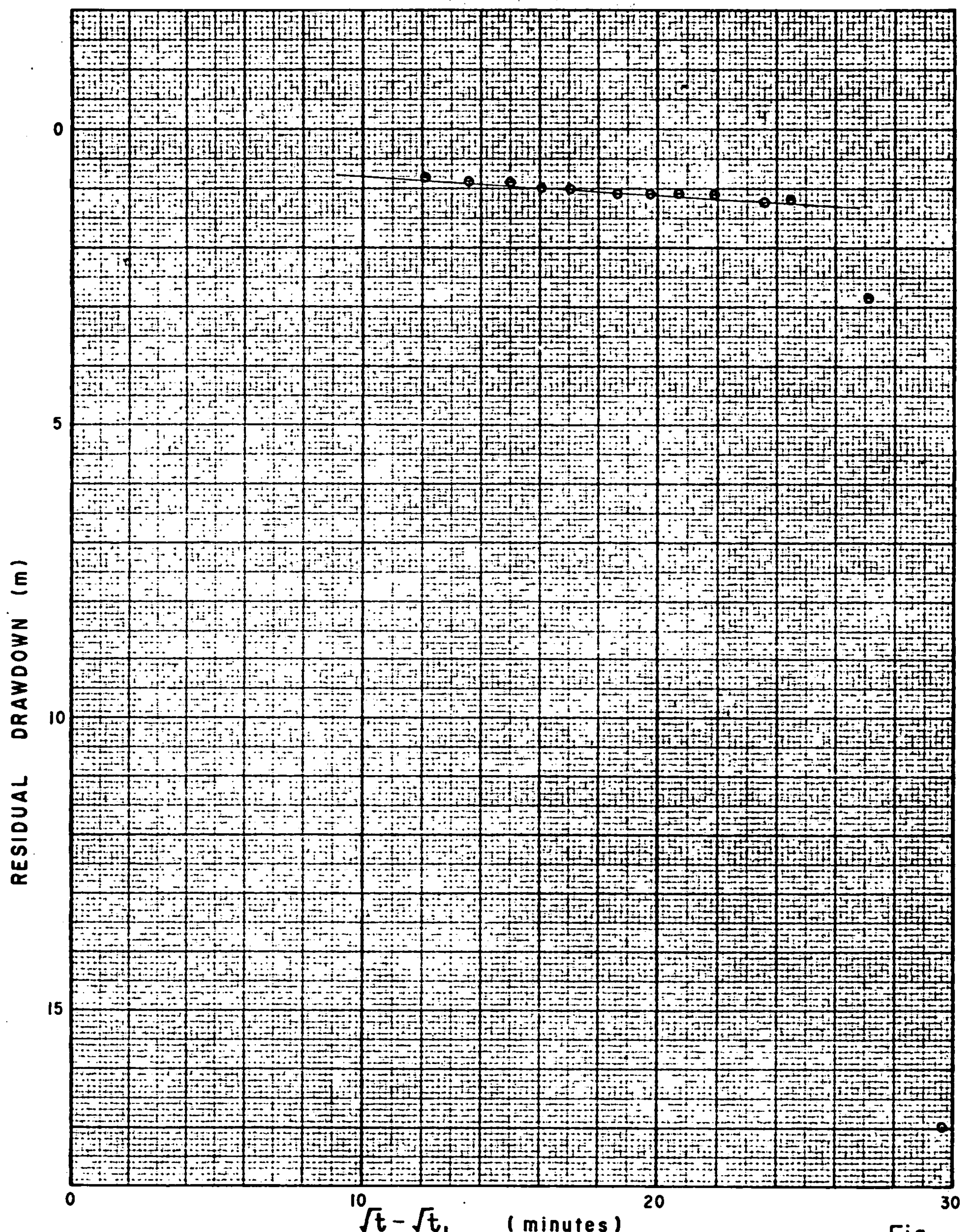


Fig...... B6

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

COMPILED R.R.	C.D.O. 30.9.86 DATE	
DRAWN R.H.	SCALE	
DATE Aug 1986	PLAN NUMBER	
CHECKED	S 18836	

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER

WELL No. 6236000WW00055

RESIDUAL DRAWDOWN v. $\sqrt{t} - \sqrt{t_1}$

4186

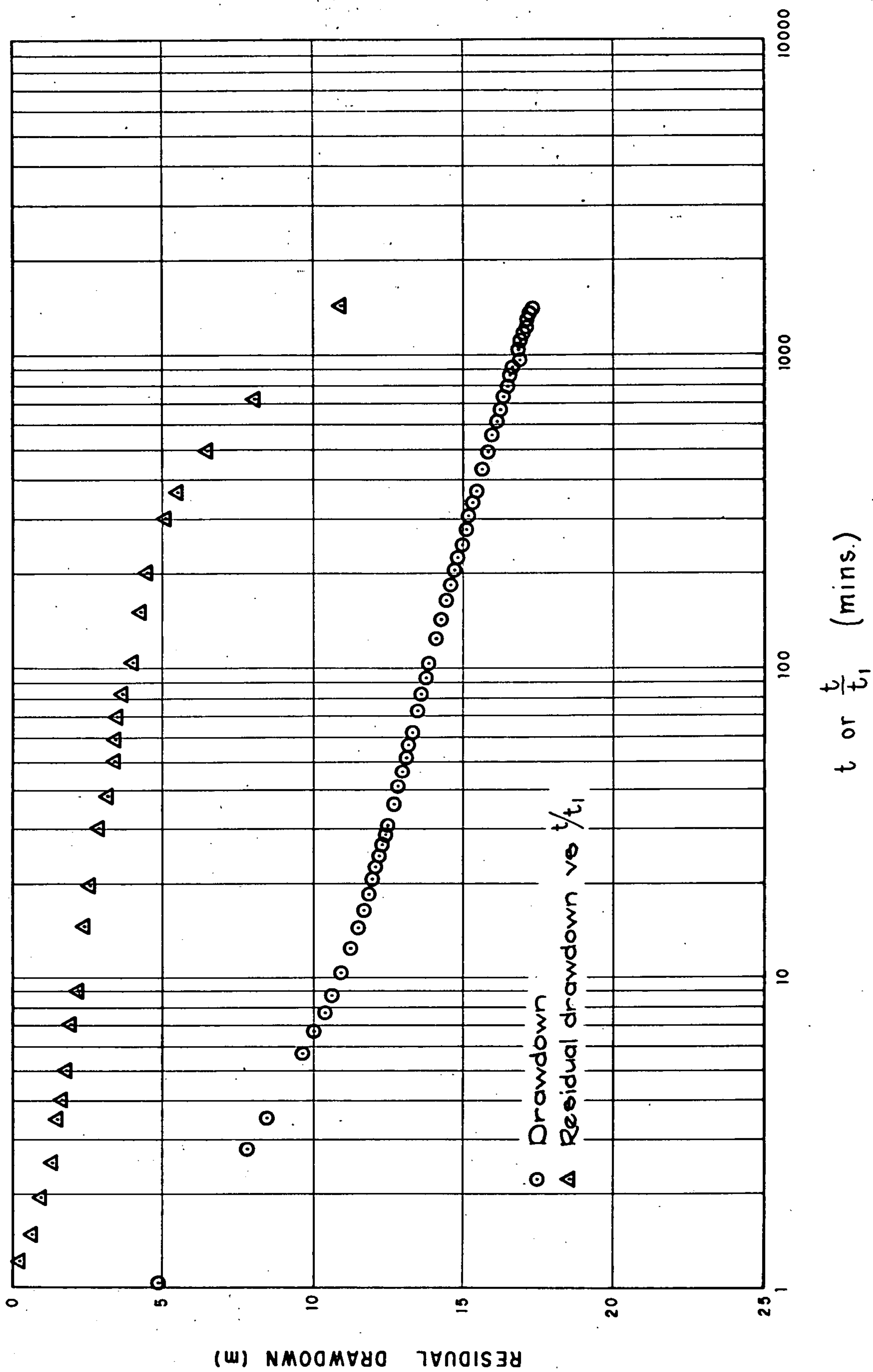


Fig........B-7

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER

WELL No. 6235000WW00065

DRAWDOWN AND RECOVERY v. LOG TIME

COMPILED R.R.	CDO 30·9·86 DATE
DRAWN R.H.	SCALE
DATE Aug 1986	PLAN NUMBER
CHECKED	S 18837

4186

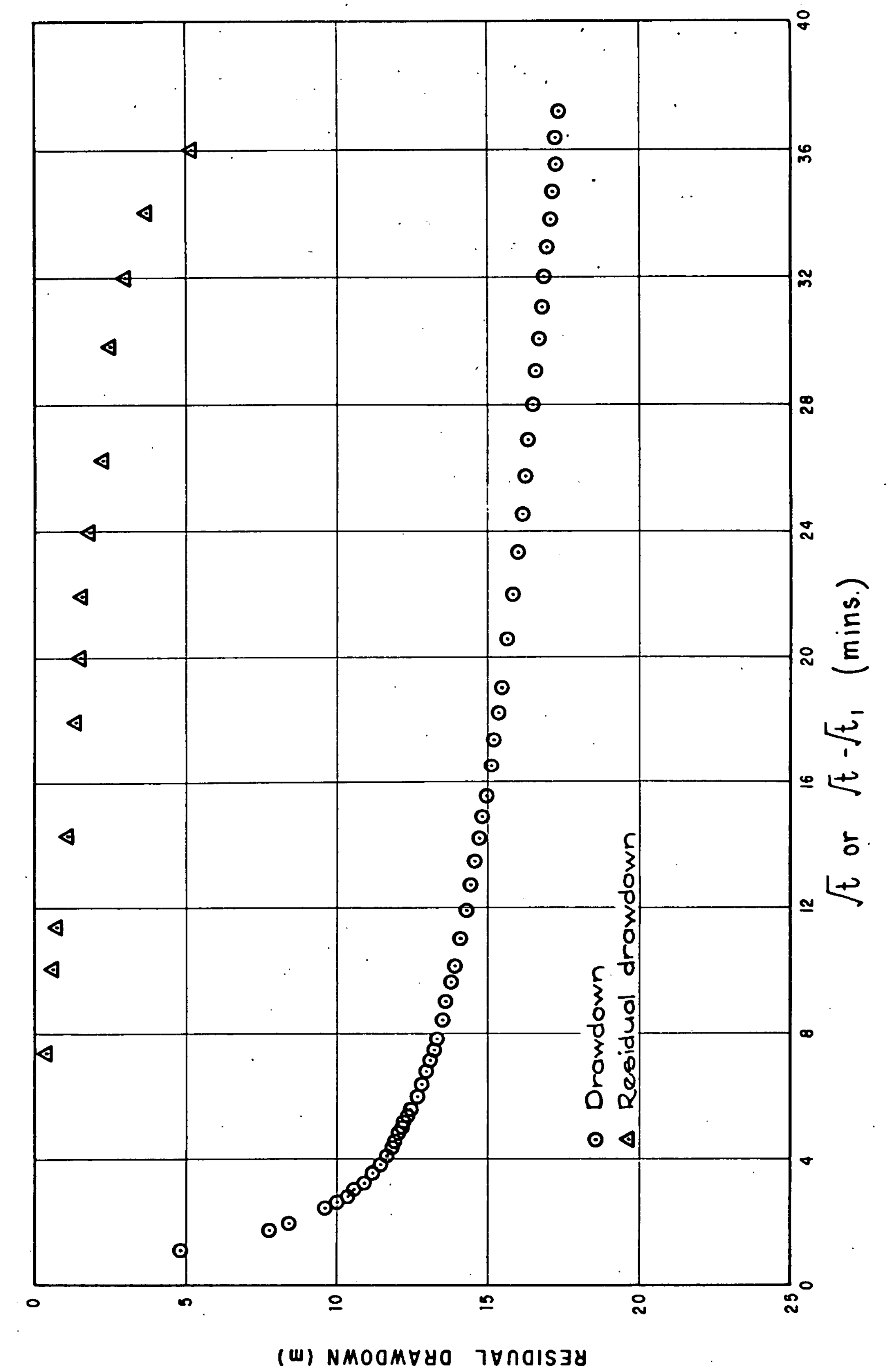


Fig.........B-8

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	COMPILED R.R.	C.D.O. 30·9·86 DATE
PIMBA TO OLYMPIC DAM ROAD DRILLING FOR CONSTRUCTION WATER	DRAWN R.H.	SCALE
WELL No. 6235000WW00065	DATE Aug 1986	PLAN NUMBER
DRAWDOWN AND RECOVERY v. SQUARE ROOT TIME	CHECKED	S 18838

4186

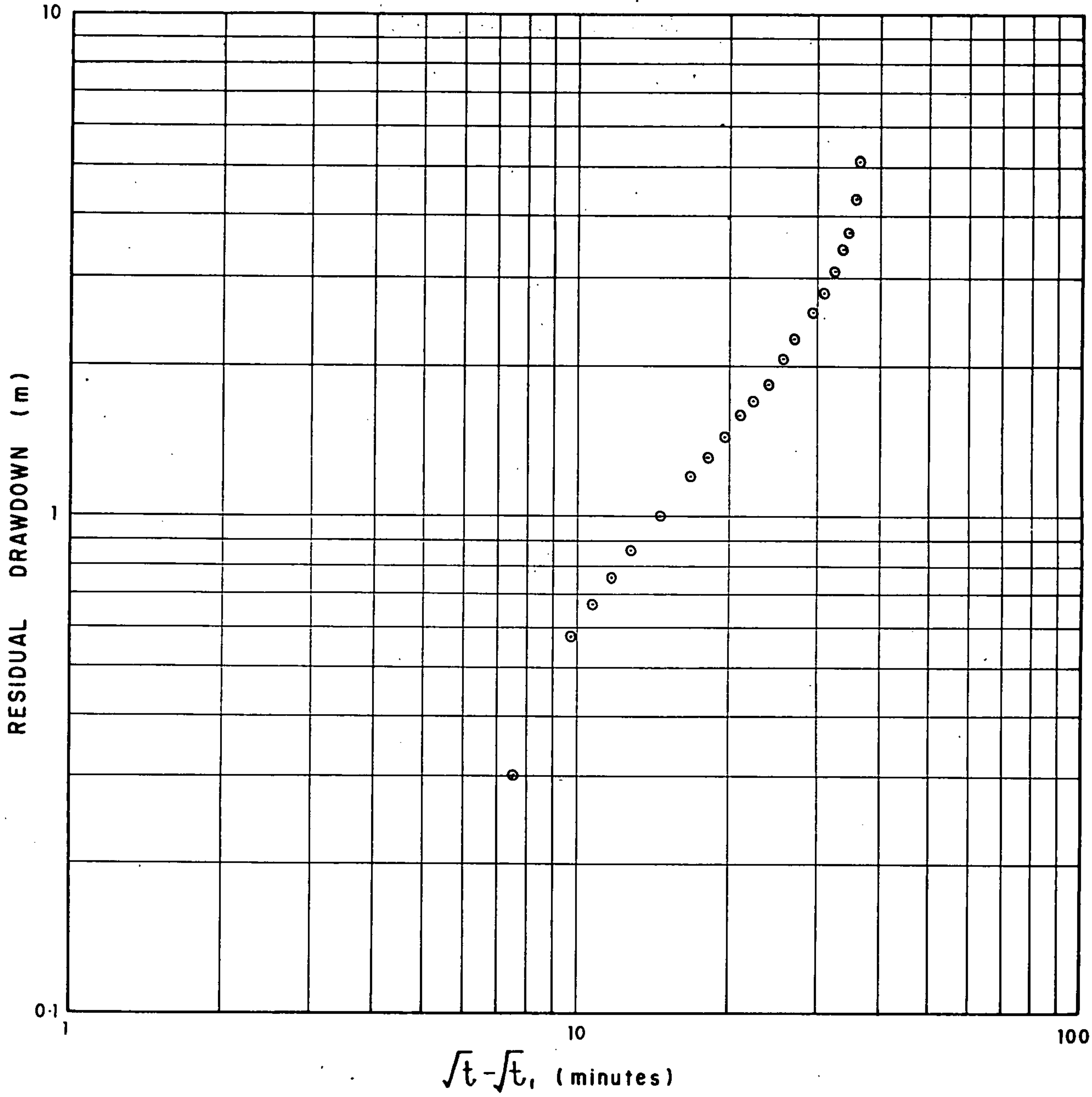


Fig........ B9

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

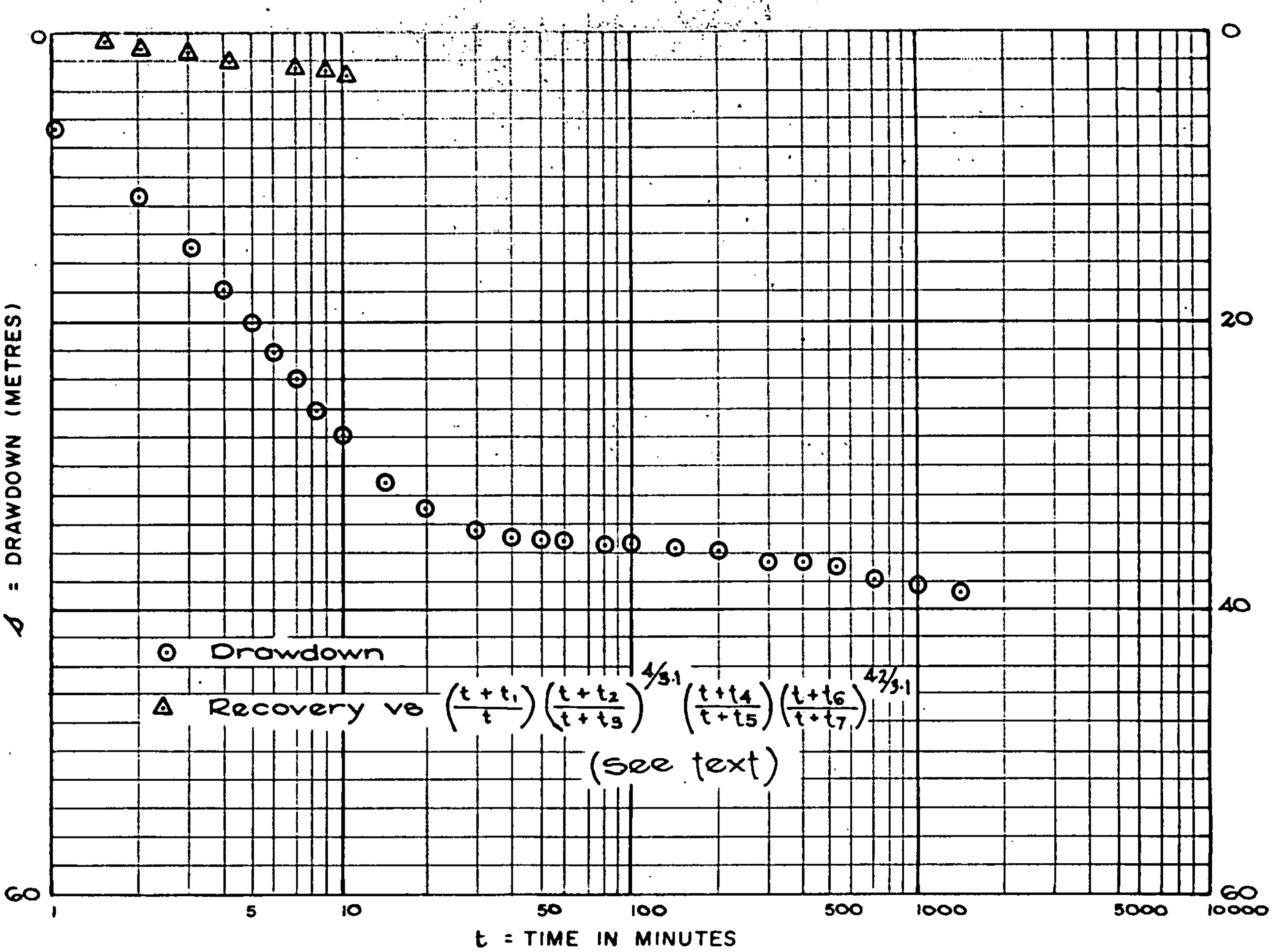
PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER

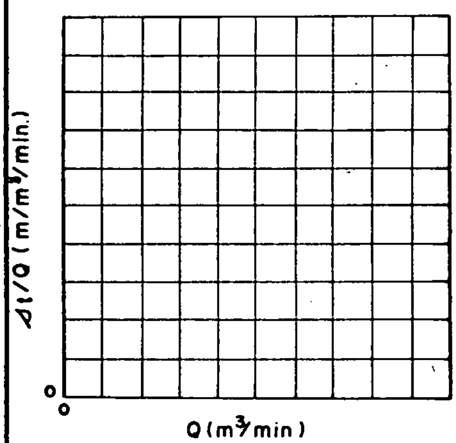
WELL No. 6235000WW00065

RESIDUAL DRAWDOWN v. $\sqrt{t} - \sqrt{t_1}$

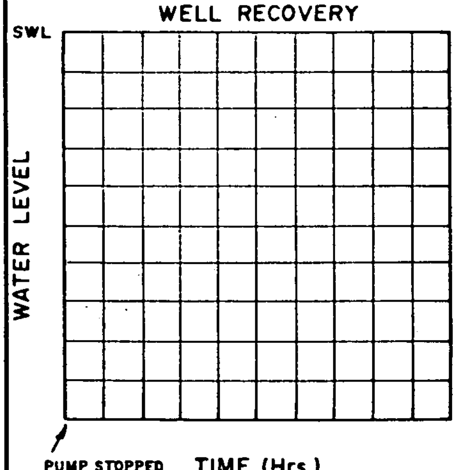
COMPILED R.R.	C.D.O. 30·9·86 DATE	
DRAWN R.H.	SCALE	
DATE Aug 1986	PLAN NUMBER S 18839	
CHECKED		

4186





WELL RECOVERY



STEP	Q (m³/min)	st=1	$\frac{st=1}{Q}$	st=10	$\frac{st=10}{Q}$	st=100	$\frac{st=100}{Q}$	Δs	$\frac{\Delta s}{Q}$	T*
	See table B-1									

* JACOB EQUATION : $T = \frac{0.183.\,Q}{\Delta s}$

STATE/UNIT No. 6235WW66

INTERVAL TESTED

From 106 m. to 130 m.

HOLE DEPTH 130 m.

AQUIFER See Fig. 4

From .... m. to .... m.

LENGTH OF TEST ....

DEPTH OF PUMP INTAKE .... m.

DEPTH OF WATER LEVEL

AT START OF TEST 23.2 m.

AVAILABLE DRAWDOWN .... m.

WELL EQUATION : $s = aQ + cQ^2 + b.Q.\log_{10} t$

OR $\frac{st}{Q} = a + cQ + b.\log_{10} t$

From $\frac{st}{Q}$ versus Q, a =

b =

c =

=

Therefore st = Q + Q^2 + $Q\log_{10} t$

Figure B-10

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER

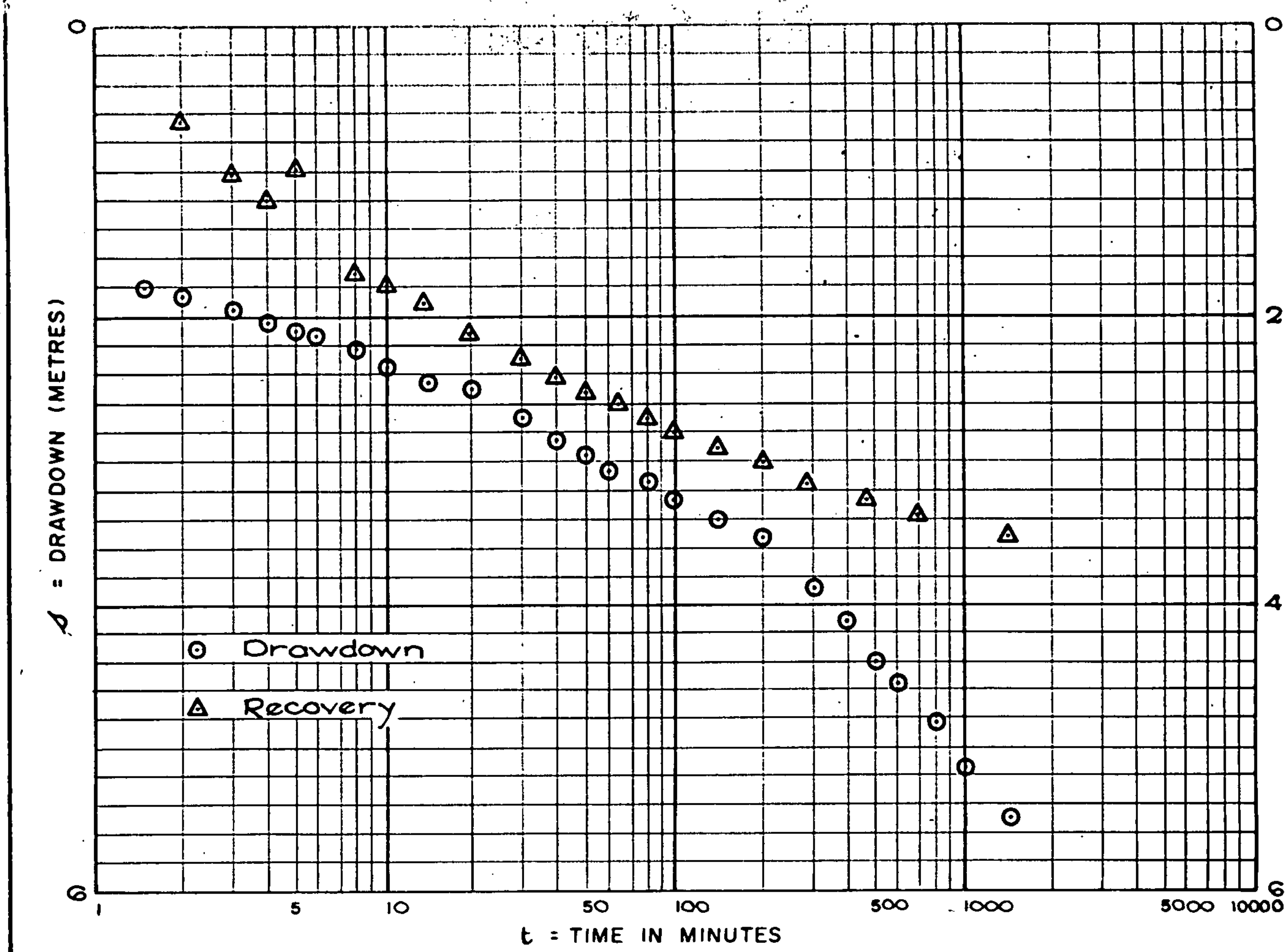
WELL No. 623500OWW00066

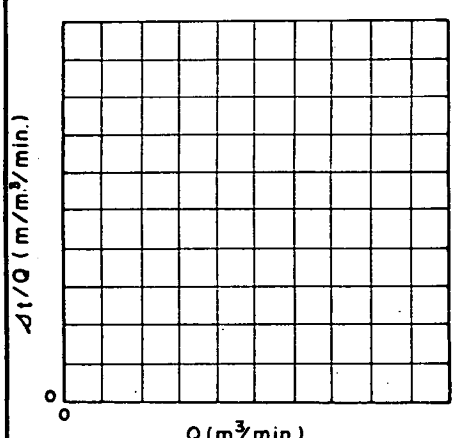
STEP DRAWDOWN TEST

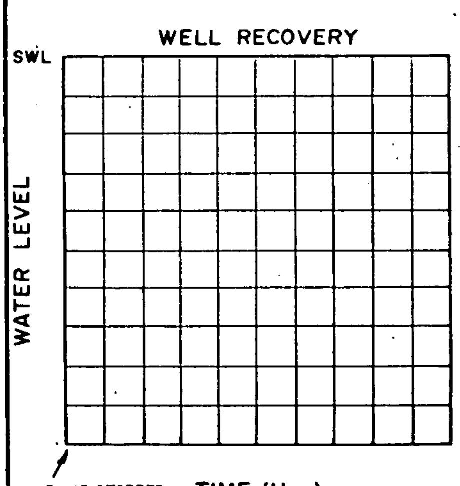
COMPILED R. Read	C.D.O 30.9.86 DATE	
DRAWN E. Calabio	SCALE ——	
DATE	PLAN NUMBER	
CHECKED	S 18840	

4186

ME 88







STEP	Q L/s	$\Delta t = 1$	$\frac{\Delta t=1}{Q}$	$\Delta t = 10$	$\frac{\Delta t=10}{Q}$	$\Delta t = 100$	$\frac{\Delta t=100}{Q}$	Δs	$\frac{\Delta s}{Q}$	T*
1	4·1									

* JACOB EQUATION : $T = \frac{0{\cdot}183.\,Q}{\Delta s}$

STATE/UNIT No. 6236WW52

INTERVAL TESTED

From 14 m. to 62 m.

HOLE DEPTH 62 m.

AQUIFER See Fig. 5

From .... m. to .... m.

LENGTH OF TEST 24hrs

DEPTH OF PUMP INTAKE .... m.

DEPTH OF WATER LEVEL

AT START OF TEST 9·04 m.

AVAILABLE DRAWDOWN .... m.

WELL EQUATION : $s = aQ + cQ^2 + b.Q.\log_{10} t$

OR $\frac{s}{Q} = a + cQ + b.\log_{10} t$

From $\frac{\Delta t}{Q}$ versus Q, a =

b =

c =

=

Therefore Δt = Q + Q^2 + $Q\log_{10} t$

Figure B-11

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER

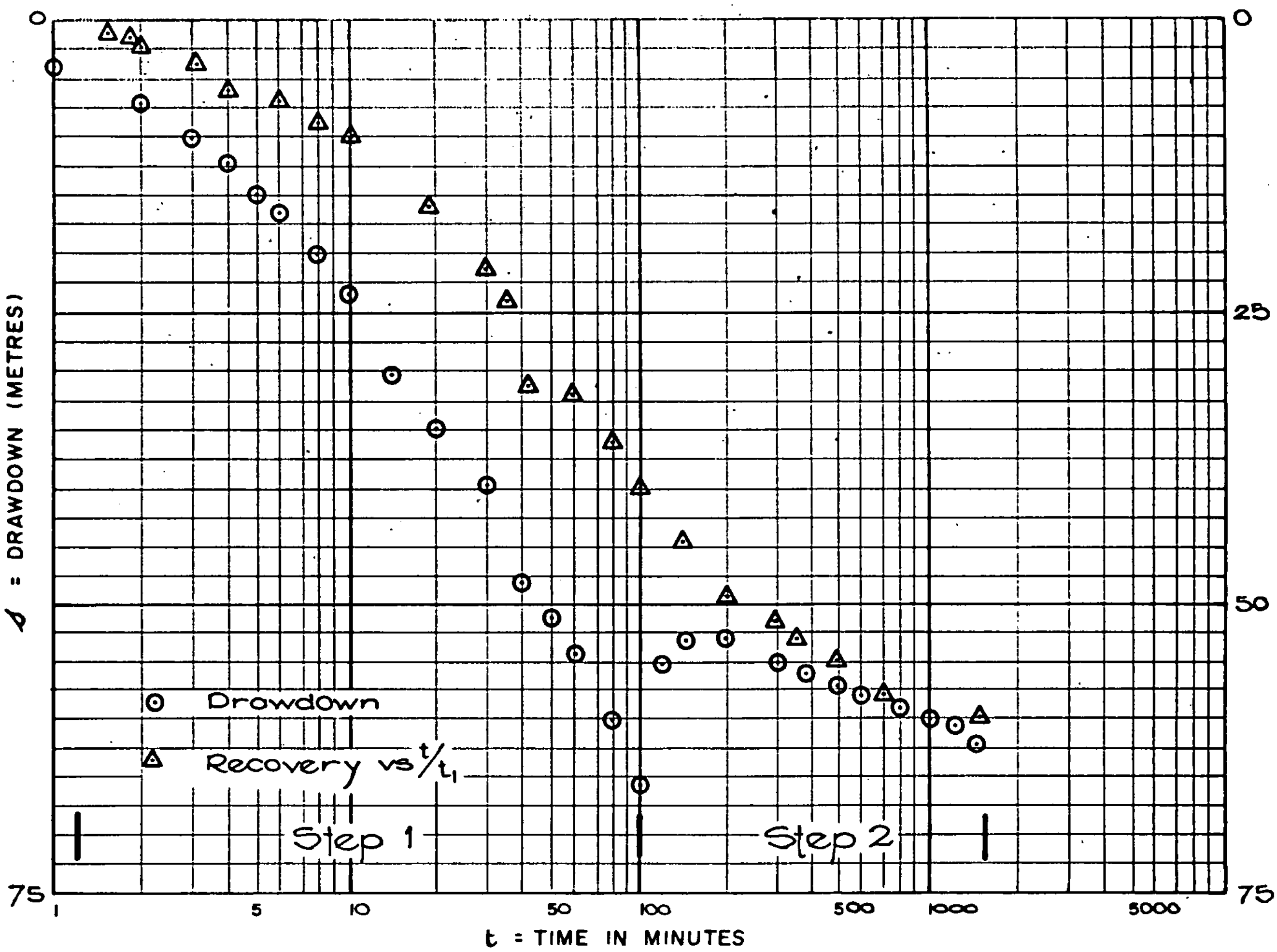
WELL No. 6236000WW00052

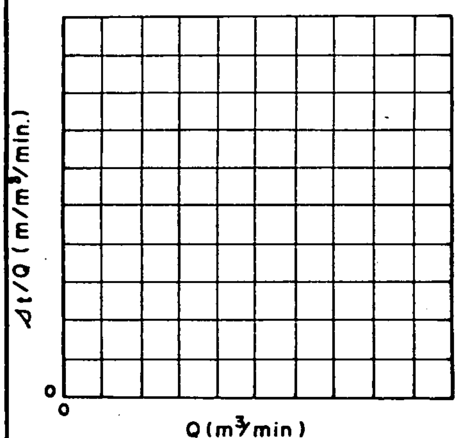
STEP DRAWDOWN TEST

COMPILED R. Read	C.D.O. 30·9·86 DATE
DRAWN E. Calabio	SCALE —
DATE	PLAN NUMBER
CHECKED	S 18841

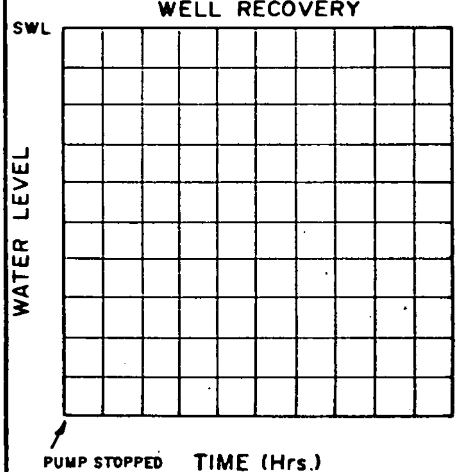
418G

MF 88





WELL RECOVERY



STEP	Q L/s	Δs t=1	Δs t=1 / Q	Δs t=10	Δs t=10 / Q	Δs t=100	Δs t=100 / Q	Δs	Δs/Q	T*
1	2									
2	1·4									

* JACOB EQUATION : $T = \frac{0{\cdot}183.\,Q}{\Delta s}$

STATE/UNIT No. 6236WW53

INTERVAL TESTED

From 105 m. to 199 m.

HOLE DEPTH 199 m.

AQUIFER See Fig. 6

From ____ m. to ____ m.

LENGTH OF TEST 1437 min.

DEPTH OF PUMP INTAKE ____ m.

DEPTH OF WATER LEVEL

AT START OF TEST 21·5 m. T.O.C.

AVAILABLE DRAWDOWN ____ m.

WELL EQUATION : $s = aQ + cQ^2 + b.Q.\log_{10} t$

OR $\frac{s_t}{Q} = a + cQ + b.\log_{10} t$

From $\frac{s_t}{Q}$ versus Q, a =

b =

c =

=

Therefore s_t = Q + Q^2 + $Q\log_{10} t$

Figure B-12

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER

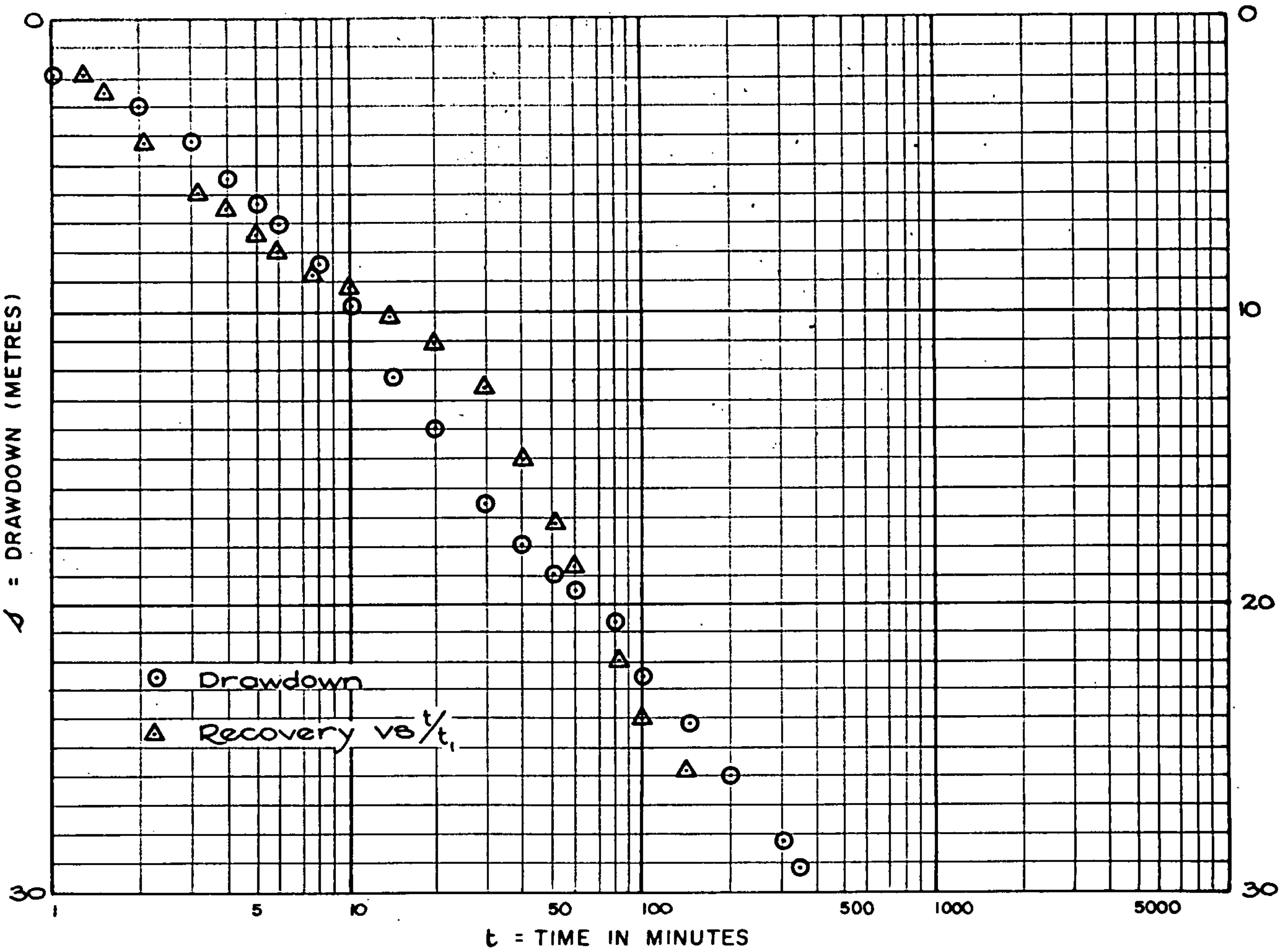
WELL No. 6236000WW00053

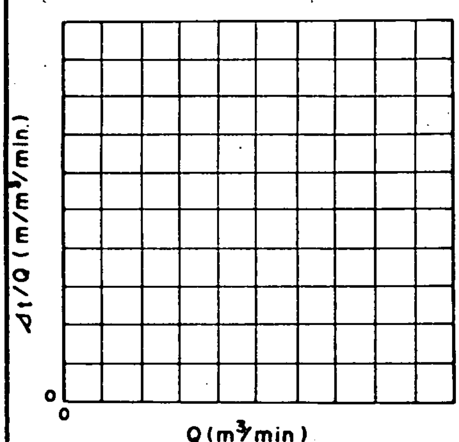
STEP DRAWDOWN TEST

COMPILED R. Read	C.D.O	30·9·86 DATE	
DRAWN E. Calabio	SCALE		
DATE	PLAN NUMBER		
CHECKED	S 18842		

4186

MF 88





STEP	Q L/s	δt=1	δt=1 / Q	δt=10	δt=10 / Q	δt=100	δt=100 / Q	Δδ	Δδ / Q	T*
1	1.0									

* JACOB EQUATION : $T = \frac{0.183 . Q}{\Delta \delta}$

STATE / UNIT No. 6236WW54

LENGTH OF TEST 415 min.

INTERVAL TESTED

From .... m. to .... m.

DEPTH OF PUMP INTAKE .... m.

DEPTH OF WATER LEVEL AT START OF TEST 17.26 m.

HOLE DEPTH 152 m.

AVAILABLE DRAWDOWN .... m.

AQUIFER

From 17 m. to 152 m.

WELL EQUATION : $\delta = aQ + cQ^2 + b.Q.\log_{10}t$

OR $\frac{\delta t}{Q} = a + cQ + b.\log_{10}t$

From $\frac{\delta t}{Q}$ versus Q, a =

b =

c =

=

Therefore δt = Q + Q^2 + $Q\log_{10}t$

WELL RECOVERY

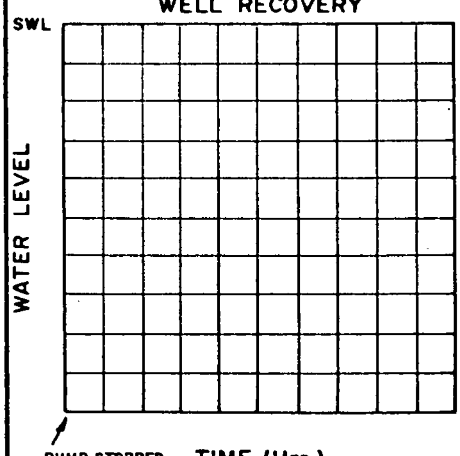


Figure B-13

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER

WELL No. 6236000WW00054

STEP DRAWDOWN TEST

COMPILED R. Read	C.D.O	DATE 30.8.86
DRAWN E. Calabio	SCALE —	
DATE	PLAN NUMBER	
CHECKED	S 18843	

4186

ME 88

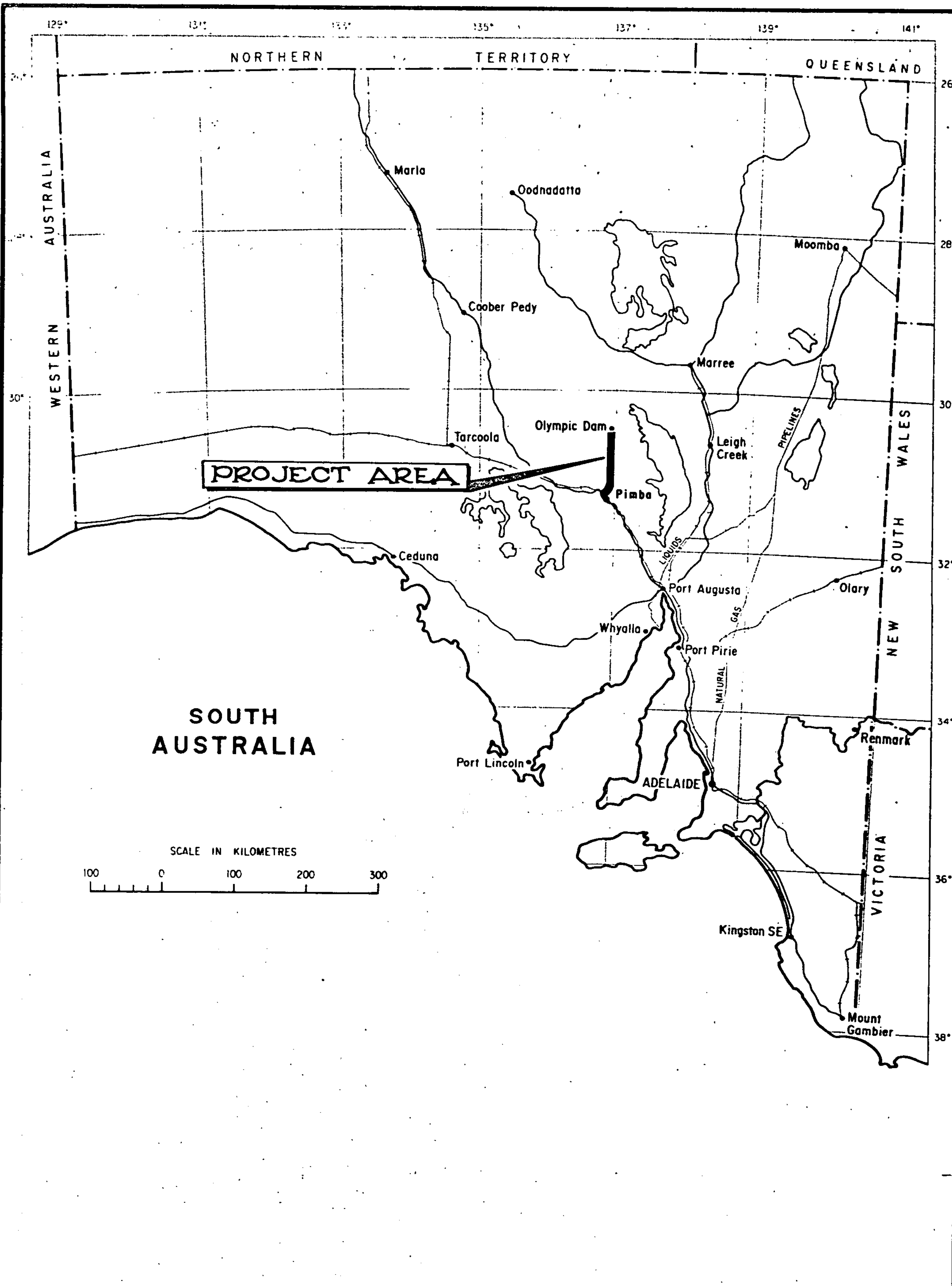


FIG. 1

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER

LOCALITY PLAN

COMPILED R. Read	C.D.O. DATE 30·9·86
DRAWN E. Calabio	SCALE As shown
DATE Aug. 1986	PLAN NUMBER
CHECKED	S 18829

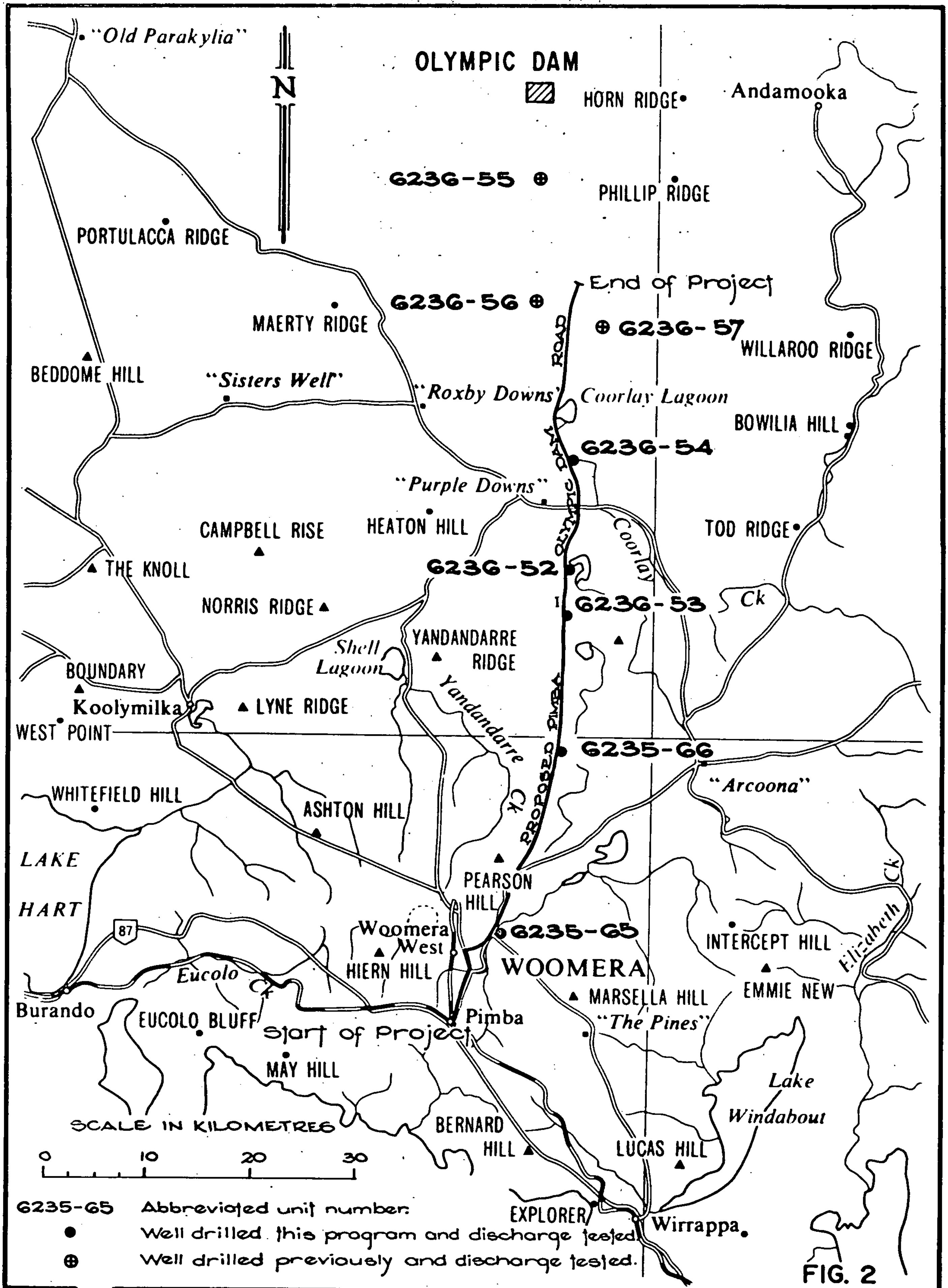


FIG. 2

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER
LOCATION OF WELLS

COMPILED R. Read	C.D.O.	DATE 30.9.86
DRAWN E. Calabio	SCALE 1:500 000	
DATE Aug.'86	PLAN NUMBER	S 18830
CHECKED		

4186

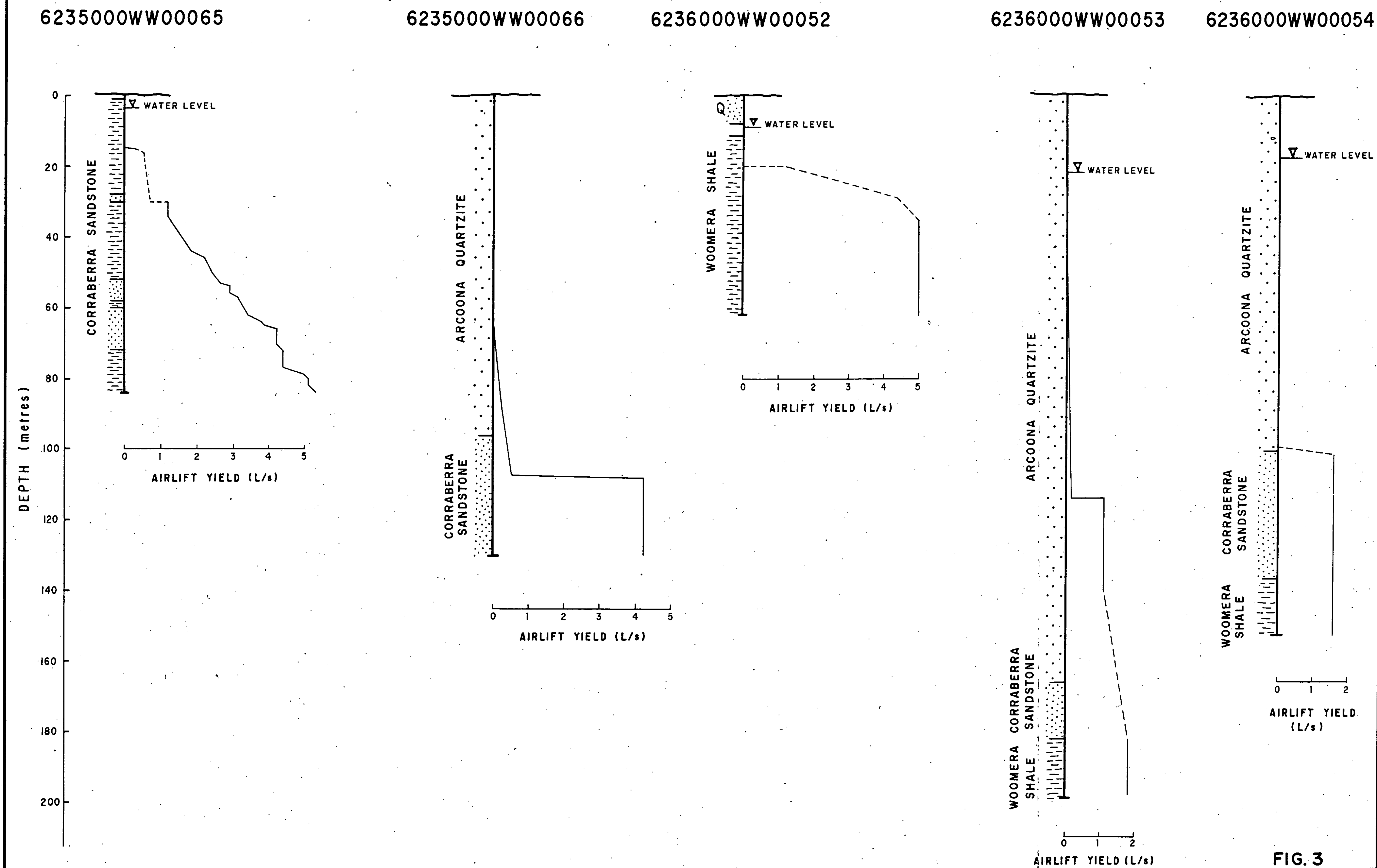


FIG. 3

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

PIMBA TO OLYMPIC DAM ROAD
DRILLING FOR CONSTRUCTION WATER
WELL Nos. 6235-65,66 & 6236-52,53,54
DEPTH YIELD GRAPHS

COMPILED R.R.	C.D.O.	DATE 30-9-86
DRAWN R.H.	SCALE As shown	
DATE Aug 1986	PLAN NUMBER 86-476	
CHECKED		

4186