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REPORT ON WATER SUPPLY AT WAVE HILL, LIMBUNYA, WATERLOO
AND MISTAKE CREEK STATIONS; VICTORIA RIVER DISTRICT:
NORTHERN TERRITORY.

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REPORT ON WATER SUPPLY AT WAVE HILL, LIMBUNYA, WATERLOO AND
MISTAKE CREEK STATIONS, VICTORIA RIVER DISTRICT,
NORTHERN TERRITORY

INTRODUCTION

An examination of the water supply at three cattle stations in the Victoria River District was made during the period 29th August to 8th September, 1956 at the request of Australian Investment Agency Pty. Ltd. Wave Hill, Limbunya and Waterloo are the three stations. In addition, two sites for a new homestead at Mistake Creek Station were examined with regard to water supply.

In August-September, 1954, a number of sites for water bores were selected by H. B. Owen. The objects of the present examination were to assess the results of drilling of Owen's sites and to select additional sites in areas where watering points for cattle are urgently required.

The positions of all known bores drilled on the Stations are shown on Plates 1 and 2.

THE ROCK TYPES AND THEIR WATER-BEARING PROPERTIES.

The geology of the Victoria River District is given by D. M. Traves in Bulletin No. 27, Bureau of Mineral Resources. The main types of rock occurring in the area under consideration are briefly discussed below.

(a) Antrim Plateau Volcanics:

The best grasslands overlies volcanic rocks which cover a large portion of the area examined. The rocks consist of sub-horizontal flows of massive basalt and vesicular basalt with thin bands of interbedded sediments.

Boring for water in the basalt is very hazardous but cannot be avoided if supplies of underground water are to be provided in the good grasslands. Water may be stored in the basaltic rocks in several ways - in cracks, crevices and fissures in massive basalt; in the open spaces in vesicular basalt; in weathered and disintegrated basalt beneath the alluvium of a drainage channel; and in sediments occurring between successive flows of basalt. Usually, little information can be obtained about the basalt underlying areas where bore sites are required, and the depth of a bore controls the chances of obtaining a good supply of water.

The massive basalt is extremely hard to drill, and it will be necessary to use heavy drilling plants and efficient drillers to sink bores as deep as 400 feet in this hard rock. In most cases, bore sites which have been selected are confined to alluviated areas and are located as close to drainage channels as possible.

(b) Sedimentary Rocks:

These rocks consist of sandstone, limestone, shale and siltstone. The Victoria River Group of sediments underlies the Antrim Plateau Volcanics which have younger sediments overlying them in the eastern part of Wave Hill Station and several other areas.

Good supplies of water can be obtained from sandstone and limestone horizons but due attention must be paid to geological structures and local topography. In some

localities it may be necessary to drill through a considerable thickness of shale or siltstone before obtaining good supplies. The Police Station bore on Wave Hill Station penetrated 660 feet of shale before tapping an artesian supply in sandstone.

(c) Laterite:

Where there is extensive development of laterite on basalt, supplies of water may be obtained at a shallow depth from weathered basalt at the base of the laterite profile, if the water table does not fall below the weathered basalt during the dry season.

(d) Alluvium:

Useful supplies of water may be obtained from river gravels and sand. However, the water table may fall below the bottom of the alluvium during the dry season. A bore must be sunk deep enough to penetrate the saturated zone of the underlying rock, where the rock is weathered and traversed by water-bearing fissures.

It is considered preferable to sink wells at some of the bore sites selected near drainage channels if only small supplies of water are obtained from the bores. It may be necessary to put in a drive from a well, below the level of the water table and across the channel of the creek, in order to obtain an adequate water supply. This method would intercept that portion of the underflow that might otherwise pass downstream beyond the sphere of drainage of the well.

WAVE HILL STATION.

Available records of bores drilled on Wave Hill Station are summarized below:

Bore No.	Total Depth (feet)	Depth of Main Supply (feet)	Static Water Level (feet)	Yield (gals/hour)	Remarks
1	72		35	1200	
2	254		30	1200	
3	105		30	420	
3A	110			420	Beside 3
4	62		30	400	
5	62		30	300	} Homestead supply
5A	219		26	0-300	
5B	45			0-900	
6	198		30	300	
7	82		20	1000	
8	Approx. 100			-	
9	Approx. 600			Good	Hole collapsed
10	?			-	
11	73		23	?	
11A	?			-	Beside 11
12	71		35	720	
13	?			-	

Continued

Bore No.	Total Depth (feet)	Depth of Main Supply (feet)	Static Water Level (feet)	Yield (gals/ hour)	Remarks
14	288	288	40	1800	
15	93		20	300	
16	85		20	600 ?	
17	155		30	750	
20	196			-	
21	298			-	
22	158			1500	
23	253			-	
24	744			-	
25	125			Good	
26	?			-	
27	60-70			-	
28	34			-	
29	74		17	1600	
30	60			-	Homestead supply
31	60			-	
32	65			40-160	
Police Station	701		Near surface	Good	
Bores sited by H. B. Owen in 1954					
WK (33)	38	36	12	270	To be deepened Abandoned - hard drilling
WA (34)	146	110		300	
WC (35)	200	191	120	1250	
WF (36)	200	above 173	104	1600	
WE (37)	217	217	112	960	
WG (38)	128	125	37	1100	
WB (39)	376			-	
WL (40)	49	27		-	Initially tested at 1100 g.p.h.

Bore Sites Previously Selected:

Sites WD, WH and WI are to be drilled in 1957. Site WO will not be used as the surrounding desert country is very poor for grazing purposes. Site WJ will not be used as this site becomes flooded after heavy rains.

At site WK a bore was drilled to a depth of 38 feet in fractured basalt. The initial supply of 800 g.p.h. dropped back to 270 g.p.h. on standing idle over the dry season of 1955. It is recommended that the bore be deepened to at least 100 feet. If a good supply of water is not obtained, a well should be sunk nearby and drives put in along the water-bearing fissures. It is essential to test this site thoroughly before looking elsewhere for a homestead water supply.

When the bore hole at Site WL was 35 feet deep, a 24 hour pumping test showed a yield of 1100 g.p.h.. The hole was deepened to 49 feet but the yield dropped to a few gallons per hour. The failure of this bore could be due to lack of water stored in the rock which is fractured basalt, or to blockage and filling of the openings in the fractures at the bore hole after the pumping test. It is recommended that further boring be carried out at an alternate site, WL', which is approximately half a mile north of bore WL and close to Elsey Creek. At site WL' a well may be a better proposition than a small diameter borehole.

New Bore Sites Selected:

Site WP is situated on the northern side of Ferguson Creek, on alluvium overlying fractured basalt. A well is recommended if the water supply struck in a bore is small.

Site WQ is located on Cattle Creek alluvium underlain by limestone and sandstone. This site is to replace bore WA which was abandoned due to hard drilling in basalt. Again a well is recommended, if necessary.

Site WR has been selected as a replacement for bore 3 where the yield has dropped to 420 g.p.h. The bore must be drilled to bedrock beneath the alluvium to ensure that the maximum possible yield is obtained.

Site WS is an alternative to site WN and is situated on alluvium which is underlain by fractured basalt. It is suggested that site WS be used first as drilling conditions there should be easier than at site WN.

LIMBUNYA STATION

Available records of bores drilled on Limbunya Station are summarised below:

Bore No.	Total Depth (feet)	Static Water Level (feet)	Yield (gals/hour)	Remarks
18	237	62	1000	
19	268		1450	
21	235		1800	
G.B. bore	668	333	700 ?	Old stock route bore - not equipped.
LB	92		-	Abandoned - hard drilling in basalt.

Site LB was abandoned on the recommendation of the writer. The drilling rate in the hard basalt was extremely slow, and a watering point at this location is not urgently required by the pastoralist. Drilling is now in progress at site LA.

Sites IC, LD, LE, LF, LG and LH, selected by H.B.Owen have yet to be drilled.

New Bore Sites Selected

Three sites for a water supply for a new homestead were selected by the writer in August 1955. Sites 1 and 2 have been renamed sites LI and LJ. Site 3 has been moved $\frac{1}{4}$ mile south to a location now called site LK. Site LK is considered to be the most favourable site and is very close to a suitable homestead location near the airstrip. Site LJ is an alternative, to be used if drilling of site LK is unsuccessful. At both of these sites, bores may have to be drilled to a depth of 300 feet or more to obtain a good supply of water. Site LI is not considered to be as favourable as

Sites LK or LJ and should only be used if absolutely necessary.

Sites LL and LM were selected as alternatives and the decision as to which one to drill first is left to the pastoralist. Site LL is located near the junction of two creeks and is on alluvium underlain by decomposed basalt. Site LM is on an old creek channel underlain by basalt. If the water supply obtained at either of these sites is too small to warrant equipping of the bore, a well should be sunk and driving carried out as described earlier in this report.

Site LN is situated near the northwestern edge of a black soil plain and a good water supply should be obtained from sandstone in the sediments underlying this site. It may be necessary to drill to a depth of at least 300-400 feet at this site.

Site LO is on low ground two miles east of Stirling Creek and is in an area of sandstone, limestone and siltstone. The sediments dip at 40° to the north and a good supply of water should be obtained from the sandstone at a relatively shallow depth, i.e. not greater than 300 feet.

WATERLOO STATION

Available records of bores drilled on Waterloo Station are summarised below:

Bore No.	Total Depth (feet)	Depth of Main Supply (feet)	Yield (gals/hour)	Remarks
1	57		Small	
1A	40		200	Beside 1
2	53		300	
3A	47		300	
4	143		200	
5	48		300	
6	34		-	
7	151		-	Homestead supply
8	40		100	
9	105		-	
10	64		-	
WAC(11)	328	172	450	
WaB(12)	115		-	

Pumping tests should be carried out at bore WaC to determine whether there is sufficient water supply to warrant equipping this bore. Sites WaA, WaD and WaE were selected by H.B.Owen in 1954 but have not been drilled up to date.

New Bore Sites Selected:

The bore records show that no bore has yielded a satisfactory water supply on Waterloo Station. Practically the whole of the station is underlain by Antrim Plateau Volcanics. If only a small supply is found at the new sites selected by the writer, it is recommended that wells be sunk with drives under the stream channels, if necessary.

Site WaF was selected as an alternative to Owen's site WaE as it is much more accessible to cattle and is preferable to the pastoralist as a watering point. Site WaF is situated on a broad alluvial flat underlain by sandstone.

Site WaG is located on an old channel of Moonlight

Creek near its junction with Revolver Creek. Site WaH is an alternative to WaG. It is on Moonlight Creek, 2 miles downstream from WaG and just upstream from a marked constriction in the river valley. It is considered that site WaH has a better chance of yielding a good water supply.

The water supply for the homestead at Waterloo is very small. In order to increase the supply, site WaI was chosen in a low depression, 600-700 yards north of the homestead. The depression appears to be an old channel of Waterloo Creek and is well timbered by black titree scrub. If a water supply at a rate of 500 gallons per hour can be obtained at WaI, it will greatly augment the present poor supply.

MISTAKE CREEK STATION

In 1954 H.B.Owen selected six bore sites on Mistake Creek and five of these sites were drilled. Results of the drilling are summarised below:

Bore No.	Total Depth (feet)	Depth of main Supply (feet)	Yield (gals/hour)	Remarks
OtA	130	119	1500	
OtB	360	208	650	
OtC	98		-	Abandoned - hard drilling in basalt
OtD	134	90	1440	
OtE	191	165	1800	

The old homestead at Mistake Creek is on flat ground close to the Negri River. This area was flooded after the heavy rains early in 1956. It has been decided to build a new homestead on higher ground beyond the limits of any flooding.

Two locations were shown to the writer by Mr. W. Hamill, manager of the station, as being suitable sites for the new homestead. Both sites were approved as being good bore sites and have been named OtG and OtH. A bore at either site will penetrate shale and limestone which dip gently to the southwest towards the centre of a sedimentary basin called the Hardman Basin. It is emphasised that any bore in this area should be continued through the shale until limestone is struck where supplies of good quality water should be present.

ACKNOWLEDGMENTS

The writer was accompanied throughout the tour of Wave Hill, Limbunya and Waterloo Stations by Mr. P. Morris of Australian Investment Agency Pty. Ltd. Grateful acknowledgment is made of the assistance and hospitality given to the writer by Mr. Morris and the managers of the stations.

All the new sites selected by the writer were seen by Mr. Morris except those on Mistake Creek, which were chosen by Mr. Hamill and approved by the writer.

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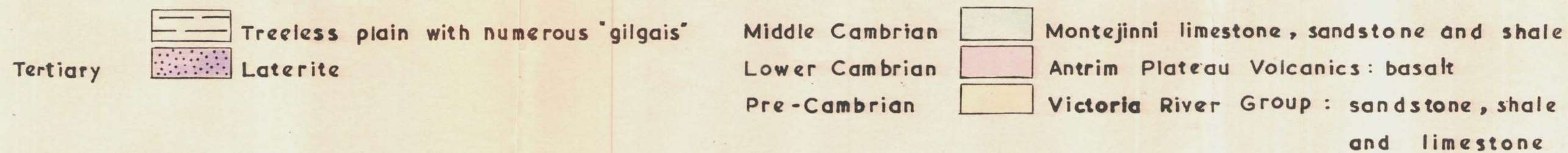
(N. J. MACKAY)
Senior Resident Geologist

Resident Geologist's Office,
 Darwin, N.T.
 12th November, 1956.

GEOLOGICAL MAP OF PART OF WAVE HILL STATION VICTORIA RIVER DISTRICT

PLATE I

REFERENCE

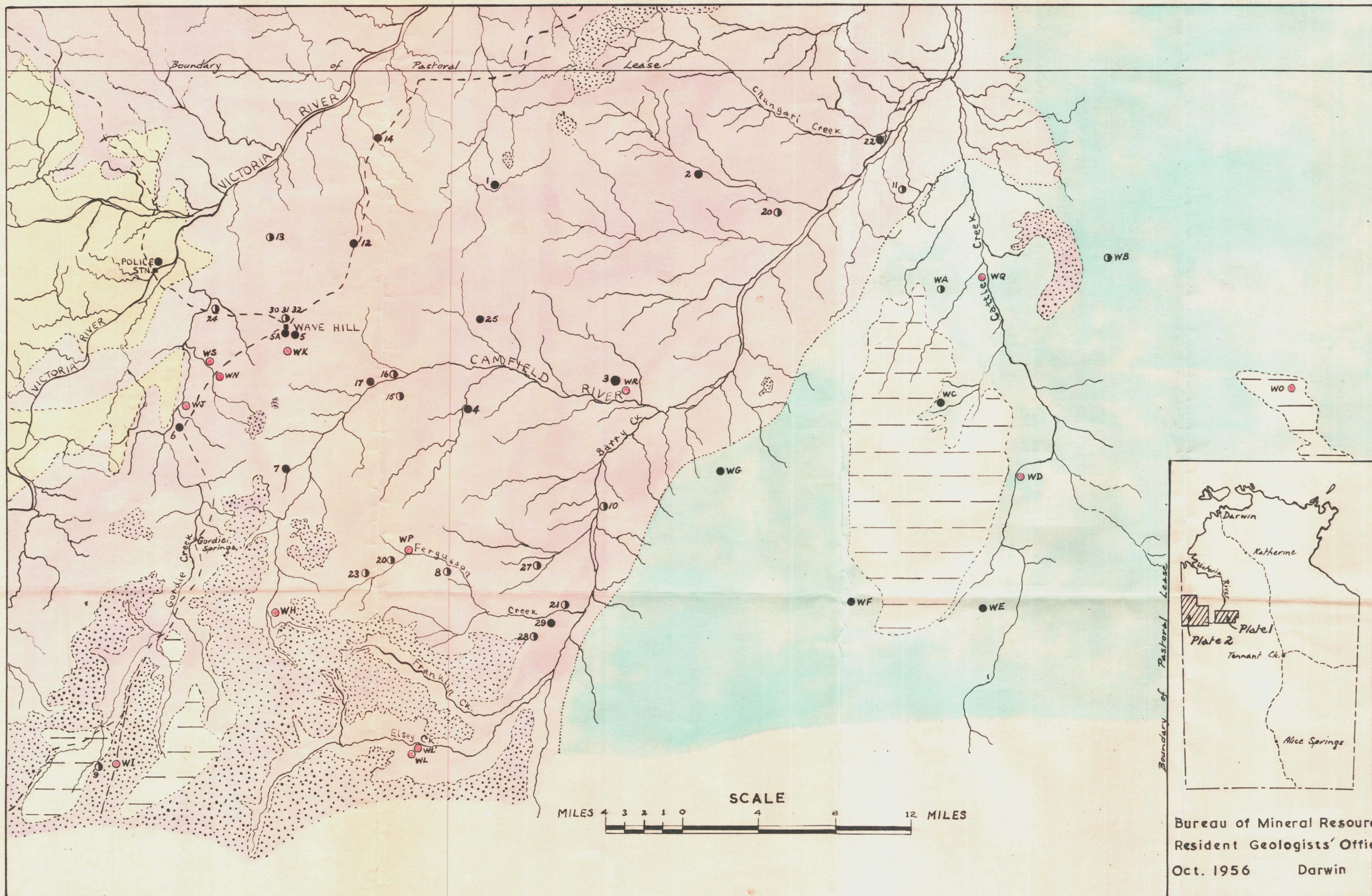


● Existing bore

○ Dud bore

○ Proposed bore


Site WM is approx. 65 miles by road west from Wave Hill Homestead.



ROSEWOOD

WATERLOO

Bureau of Mineral Resources
Resident Geologists' Office
Darwin Oct. 1956



INVERWAY

MISTAKE CREEK

LIMBUNYA

INVERWAY

VICTORIA RIVER