Bore Completion Report
BORE 25383
HODGSON DOWNS
OUTSTATION

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Hydrogeologist
Water Resources Group
Darwin
March 1988
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DISTRIBUTION

Department of Aboriginal Affairs, Katherine 2
Manager, Hodgson Downs Station 1
Water Directorate Library, Darwin 2
Water Directorate Library, Alice Springs 1
Water Resources Group Bore Data File 1
Hydrogeology Branch, Darwin 3
AES Branch, Darwin 3
Manager, Hodgson Downs Station 1

137:HYGEO
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<thead>
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<th>Abbreviation</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>mm</td>
<td>millimetre</td>
</tr>
<tr>
<td>m</td>
<td>metre</td>
</tr>
<tr>
<td>m³/d</td>
<td>Cubic metre per day</td>
</tr>
<tr>
<td>L/s</td>
<td>Litre per second</td>
</tr>
<tr>
<td>L/c/d</td>
<td>Litre per capita per day</td>
</tr>
<tr>
<td>pH</td>
<td>Index of acidity or alkalinity</td>
</tr>
<tr>
<td>RN</td>
<td>Registered Number of the bore</td>
</tr>
<tr>
<td>AMG</td>
<td>Australian Map Grid</td>
</tr>
<tr>
<td>ID</td>
<td>Internal Diameter</td>
</tr>
<tr>
<td>Km</td>
<td>Kilometre</td>
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</tbody>
</table>
1. INTRODUCTION

The objective of this work was to construct at least one production bore to augment the present water supply for the community at the Hodgson Downs Outstation. The population of this Outstation is about 100.

The work was carried out on behalf of the Department of Aboriginal Affairs, Katherine. Preliminary hydrogeological study, interpretation of aerial photographs, hydrochemical study, and other relevant studies were carried out in the office. This followed by the reconnaissance in the field during June 1987, when two sites were selected and pegged inside the Excision boundary and one bore site was selected and pegged outside the Excision (on the Hodgson Downs Station property).

The area is situated about 0.5 Km from the Hodgson Downs Homestead. The area is accessible both from the north (Roper Highway) and from the south (Stuart Highway) via Nutwood Downs Station.

The area lies in the humid semi-monsoonal zone with a mean annual rainfall of 850 mm. Most of the rain falls between November and April. The area is hilly to the south and the west, and plains to the north and the east.

Previously, numerous bores were drilled in the Excision area with little success. Bore with yield up to 1 L/s, forked out when pumped only for a short period. At present, water supply from the existing bore is not adequate, so water is being pumped from the nearby lagoon also. Therefore, a new bore with reasonable water supply was needed in order to fulfill the total requirement of water for this community.
2. HYDROGEOLOGY

The area lies in the McArthur Basin and underlain by the Bessie Creek Sandstone of the Roper Group (Lower Proterozoic age). See Geological Map - Hodgson Downs, Sheet SD 53-14, 1:250 000 (Reference 2). Rock types consist of fine to coarse grained friable quartz sandstone. Numerous faults and fractures exist in this area and most of them have been drilled with little success. This could be due to tight fractures and faults. Therefore, it appears that the groundwater movement may be only through the selective geological structures and hence the groundwater potential in this area is very low despite the presence of geological structures.

Two bores 25381 and 25382 were drilled during October, 1987 within the Excision boundary of this Outstation and both bores were unsuccessful. However, the area outside this Outstation appeared to be more promising for the groundwater supply, therefore a proposal was put to the client (Department of Aboriginal Affairs, Katherine) to drill outside the Excision boundary (i.e. on Hodgson Downs Station Property) and if successful, then both parties would use this bore. This agreement was reached in writing (see the letter, attached). The third bore was then drilled on the Hodgson Downs Station property, close to the Lagoon. This was a successful bore and the yield, during the airlifting was 2.0 L/s. Hence, it was constructed. The test pump was carried out later, during November 1987.

3. WATER QUALITY

The water samples were taken both during the drilling and the test pumping. The chemical analysis of the bore water was carried out by the East Point Laboratory of the Water Directorate Group, Darwin. The result is given in the Table 1, and this indicates that the iron content slightly higher than the allowed limit and the pH value is slightly lower, but these can be adjusted with the suitable treatment. Otherwise the result shows that the water quality of the production bore is within the recommended guidelines for the drinking water as adopted by the Australian Water Resources Council/National Health and Medical Research Council (Ref. 1).
| BORE NUMBER | SODIUM, mg | POTASSIUM, mg | CALCIUM, mg | MAGNESIUM, mg | TOTAL HARDNESS AS CaCO₃, mg/L | TOTAL ALKALINITY AS CaCO₃, mg/L | IRON (TOTAL), mg/L | SILICA, SiO₂, mg/L | CHLORIDE, Cl⁻, mg/L | SULPHATE, SO₄²⁻, mg/L | NITRATE, NO₃⁻, mg/L | BICARBONATE, HCO₃⁻, mg/L | FLUORIDE, F⁻, mg/L | NACL (CALC FROM CHLORIDE), mg/L | PE | SPECIFIC CONDUCTIVITY (µS/cm) | TEMPERATURE (°C) | DOUG, DATE, DURING (°C) | CMIANTS |
|-------------|-----------|--------------|-------------|---------------|-------------------------------|---------------------------------|---------------------|--------------------|-------------------|-------------------|---------------------|---------------------|-------------------|--------------------------|---------|-------------------|----------------|------------------|---------------------|---------------------|
| 25383       | 5         | 2            | <1          | 1              | 9                             | 13                              | 5.6                 | 13                 | 2                 | 4                 | 1                  | 15                  | 0.1               | 4                        | 5.6       | 60                | 40                  | 13.11.87          |
4. WATER DEMAND

The water demand, based on 1200 L/c/d, for this Outstation is estimated to be about 120 m³/d out of which about 60 m³/d or more is being pumped from the existing bore and also from the lagoon. It is anticipated that the balance of this demand, which would be about 60 m³/d can be met with this bore, which can yield a maximum of 78 m³/d.

5. RESULTS

Location of the bore 25383 is AMG Co-ordinates 401550-8317150 Topographical Map - Hodgson, Sheet 5767, 1:100 000. The bore was constructed with 152 mm ID steel casing and 9 mm perforations from 46.7 m to 53.2 m, (see Attachment).

An eight hour test pump was carried out on this bore (25383) and the result indicates that the safe pumping rate of this bore is 0.9 L/s and the pump setting depth is 70 m. The maximum continuous pumping rate and the pump setting depth is based on the available hydraulic data, which is considered safe but not conservative (see attached Pump Test Result).

6. RECOMMENDATIONS

Following are the recommendations:-

- pump setting depth should be 70 m below the ground level for a pumping rate of 0.9 L/s.

- no absorption trench and septic tank should be constructed within 100 m radius of this bore.
REFERENCES


2. Explanatory Notes and Geological Map - Hodgson Downs, NT, Sheet SD 53-14, 1:250 000, Geological Series, Published by BMR Canberra, 1963.
Departement of Aboriginal Affairs,
Katherine N.T.

Dear Sir,

This is to certify that the management of Hodgson Downs Station has no objections to, and places no restrictions on water supplied to the Hodgson Downs aboriginal community. Water to be pumped from a bore on land belonging to Hodgson Downs Station.

It is also understood that Hodgson Downs Station will have access to the water supply. The drilling of bore and connection of water supply to aboriginal community will be at no cost to Hodgson Downs Station.

Yours faithfully,

[ Vivian C Chalk ]
Manager Hodgson Downs.
TEST REPORT — BORE RN.

Bore location: MINIYERI OUTSTATION
HODGSON DOWNS STATION

Client/owner: MINIYERI COMMUNITY

Client's reference: DOMESTIC

Purpose of supply: DOMESTIC

Map: 1:100 000 SHEET 5767

Grid reference: 401550-8317150

RECOMMENDATIONS

Pumping rate: 0.9 L/s

Purpose of supply: DOMESTIC

Grid reference: 401550-8317150

RECOMMENDATIONS

Pumping rate: 0.9 L/s. Pump setting: 70 m below ground level

General recommendations are given on the reverse side.

The aquifer and bore can/cannot sustain higher pumping rates with deeper pump settings or for short periods in favourable seasons. Further advice can be obtained from: PAMA, WATER DIRECTORATE

(In all correspondence refer to the bore's RN number).

BORE DATA

Finished depth: 92.2 m

Completion date: 16.10.87

Test date: 13.11.87

Standing water level: 9.58 m on 13.11.87

Test rates: 0.9 L/s

Test duration: 8 hrs

Construction details:

<table>
<thead>
<tr>
<th>Interval (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 25.1</td>
<td>203 mm ID steel casing</td>
</tr>
<tr>
<td>0 - 46.7</td>
<td>152 mm ID steel casing</td>
</tr>
<tr>
<td>46.7 - 53.2</td>
<td>152 mm ID steel casing with 9 mm perforations</td>
</tr>
<tr>
<td>53.2 - 79.2</td>
<td>152 mm ID steel casing</td>
</tr>
<tr>
<td>79.2 - 85.7</td>
<td>152 mm ID steel casing with 9 mm perforations</td>
</tr>
<tr>
<td>85.7 - 92.2</td>
<td>152 mm ID steel casing</td>
</tr>
</tbody>
</table>

Notes:
1. Top of casing as constructed was 0.40 m above ground
2. All depths are measured from natural ground level
3. Test rates are not indicative of safe long term pumping rates.

WARNING: MINIMUM INTERNAL BORE DIAMETER IS 152 mm nominal size

COMMENTS

1. These recommendations are based on a constant discharge test at 0.9 L/s for 8 hours and assume that hydrological conditions remain constant.

2. Provisions to obtain water samples at the bore head should be incorporated in any reticulation.

WATER QUALITY

See water laboratory report (Analysis No. 87/88/0845)
RECOMMENDATIONS FOR FINISHING, OPERATING AND PROTECTING GROUNDWATER BORES

Attention to the following points will ensure a long and safe life for the bore supply and help prevent pollution of the groundwater resource.

1. Construct a concrete apron around the bore head to prevent surface flow, seepage and waste from entering the bore.

2. Seal the space between the casing and pump equipment to prevent entry of vermin, dirt and pollutants.

3. Maintain pumping equipment in good order to prevent pollution. Prevent spillage of fuel and oil on the ground around the bore. Store fertilizer and other chemicals at least 50 m away.

4. Keep stock away from the bore head. Discourage domestic activity at the bore. The first tap on the pipeline should not be less than 5 m from the bore head.

5. Pumping the bore at higher than recommended rates may fork the bore leading to instability or pump maintenance problems. Seek the professional advice of an hydrogeologist or groundwater engineer.

6. If the bore is no longer required, the casing is to be removed or securely capped and the bore backfilled with clayey material. A cement plug may be required in some instances.

In addition, please ensure that the BORE IDENTIFICATION TAG is retained securely at all times. The registered bore number is Water Resources Division's only reference to the scientific and engineering data on this bore, and hence important to WRD's further advice to bore owners.

BORE LOCATION MAP
DEPTH BORE GRAPHIC STRATA AQUIFERS
(m) CONSTRUCTION LOG DESCRIPTION (WATER STRUCK)

SAND: clayey, brownish yellow

CLAY: sandy, brownish yellow to CLAY.


SANDSTONE: white to dark grey, very fine, slightly micaceous.

SANDSTONE: greyish white and brownish, fine grained and ferrunginous.

SANDSTONE: light grey, fine grained with interbedded greenish grey and chocolate colour micaceous MUDSTONE, highly weathered.

SANDSTONE: silty, dark grey and micaceous SILTSTONE: dark grey, slightly weathered to fresh near bottom.

S.W.L 9.58m

GR.

0.4

L/s

0.66

L/s

0.8

L/s

SC 80

SC 83

1.0

L/s

2.0

L/s

SC 80

(Amp)

SC 83

1.5

L/s

9.58m

100

400mm

150mm I.D. steel casing

203mm I.D. steel casing


g


g


g


g

COMPOSITE LOG OF BORE  25383