Pingrup townsite: drilling completion report

Louise Hopgood

Department of Agriculture, Western Australia. Rural Towns Program

Follow this and additional works at: http://researchlibrary.agric.wa.gov.au/rntr

Part of the Agriculture Commons, Natural Resources Management and Policy Commons, Soil Science Commons, and the Water Resource Management Commons

Recommended Citation

This report is brought to you for free and open access by Research Library. It has been accepted for inclusion in Resource Management Technical Reports by an authorized administrator of Research Library. For more information, please contact jennifer.heathcote@agric.wa.gov.au, sandra.papenfus@agric.wa.gov.au.
IMPORTANT DISCLAIMER

This document has been obtained from DAFWA’s research library website (researchlibrary.agric.wa.gov.au) which hosts DAFWA’s archival research publications. Although reasonable care was taken to make the information in the document accurate at the time it was first published, DAFWA does not make any representations or warranties about its accuracy, reliability, currency, completeness or suitability for any particular purpose. It may be out of date, inaccurate or misleading or conflict with current laws, polices or practices. DAFWA has not reviewed or revised the information before making the document available from its research library website. Before using the information, you should carefully evaluate its accuracy, currency, completeness and relevance for your purposes. We recommend you also search for more recent information on DAFWA’s research library website, DAFWA’s main website (https://www.agric.wa.gov.au) and other appropriate websites and sources.

Information in, or referred to in, documents on DAFWA’s research library website is not tailored to the circumstances of individual farms, people or businesses, and does not constitute legal, business, scientific, agricultural or farm management advice. We recommend before making any significant decisions, you obtain advice from appropriate professionals who have taken into account your individual circumstances and objectives.

The Chief Executive Officer of the Department of Agriculture and Food and the State of Western Australia and their employees and agents (collectively and individually referred to below as DAFWA) accept no liability whatsoever, by reason of negligence or otherwise, arising from any use or release of information in, or referred to in, this document, or any error, inaccuracy or omission in the information.
PINGRUP TOWNSITE:
DRILLING COMPLETION REPORT

Louise Hopgood

August 2005
Pingrup townsite:
drilling completion report

Louise Hopgood

August 2005
Disclaimer

The contents of this report were based on the best available information at the time of publication. It is based in part on various assumptions and predictions. Conditions may change over time and conclusions should be interpreted in the light of the latest information available.

For further information contact
Mr Mark Pridham
Rural Towns Program Manager
Department of Agriculture
Locked Bag 4
Bentley Delivery Centre WA 6953
Telephone (08) 9368 3333

© State of Western Australia 2005
Summary

Infill drilling was carried out in the townsite of Pingrup in April 2002.

Regolith below the town mostly consisted of green clay that acts as an aquitard. Depth to bedrock was 56 metres.

It was considered that groundwater pumping would not control shallow watertables and that the production bore (02PINPB2) should not be equipped. Instead, surface water management strategies should be put in place to help control salinity.

It was recommended that groundwater monitoring should continue at least four times a year for five to 10 years.
Contents

1. Introduction and background ................................................................. 5

2. Hydrogeology investigation ................................................................. 5
   2.1 Previous investigations ................................................................. 5
   2.2 Method – 2002 .............................................................................. 5
   2.3 Results ......................................................................................... 5
   2.4 Discussion ................................................................................... 6

3. Conclusions ....................................................................................... 7

4. References ....................................................................................... 7

5. Appendix 1 – Hydrogeological log ....................................................... 8
1. Introduction and background

This report describes a drilling investigation that took place in Pingrup to determine suitability of the site for installation of a production bore. The work was undertaken by the Rural Towns Program and was part of a larger investigation that covered nine towns in the wheatbelt of Western Australia during 2002.

This report supplements the *Groundwater study of the Pingrup townsite*, Resource Management Technical Report 220 (Addison 2001) and should be regarded as building on the understanding of the extent and nature of salinity in the Pingrup township.

2. Hydrogeology investigation

2.1 Previous investigations

The Rural Towns Program installed 24 monitoring bores by air-core drilling at 12 sites in Pingrup during June 2000. A production bore was installed near the Telecentre on the corner of Sanderson and Burston Streets. Production bore casing was installed to 13 metres but did not reach bedrock. Test pumping of the production bore took place in September 2000 but was abandoned as the bore ran out of water after one hour.

2.2 Method - 2002

A pilot hole was drilled to 56 metres deep near the Pingrup Telecentre in April 2002. The pilot hole was drilled using a reverse circulation drill rig with a 123 mm diameter air-core drill bit.

When the rig reached bedrock at 56 m the bore was air-lifted by injection of compressed air and yield estimated by recording the time it took to fill a 20-litre bucket.

Drill samples were collected via a cyclone and described over one metre intervals during drilling. A hydrogeological log was compiled and is presented in Appendix 1. Samples were retained at the Nyabing-Pingrup Landcare Centre.

2.3 Results

2.3.1 Profile description

Alluvial sediments overlie deeply weathered mafic volcanics. The sediments consist of alternating layers of sand and clay and are 14 metres deep. A narrow silcrete layers occurs 3 to 4.5 m below ground. This unit represents alluvial sediments that have been silicified by chemical precipitation of silica resulting from water movement through the profile.

Below the alluvial and colluvial sediments, to a depth of 50 m, drilling intersected deeply weathered mafic volcanic material which was green brown, talcy in parts and
included intervals with nodules of white material. Drilling intersected clay with fragments of fractured mafic volcanic bedrock to 53 m and then fractured mafic volcanic bedrock to 56 m at blade refusal. Bedrock may form part of a greenstone enclave similar to those described by Chin and Brakel (1986).

2.3.2 Groundwater data

An air-lifted groundwater yield of 2 litres per second (173 kL/d) was achieved during drilling within fractured mafic volcanics above bedrock. This yield occurred between 54.5 and 56 m below ground. Green clay that dominates to 53 m acts as an aquitard, water was not observed until drilling reached 53 m.

2.4 Discussion

A production bore was not constructed at the site for the following reasons:

1. Green clay that dominates to 53 m acts as an aquitard, and water was not observed until 53 m below ground. Pumpable quantities of water (approximately 2 litres per second yield) were only intercepted between 54.5 and 56 m below surface. Any production bore installed was likely to suffer large well losses.

2. Swelling properties of the green clay were such that drilling contractors advised that it was unlikely drill casing could be installed to 54.5 m, the minimum required to intercept the pumpable aquifer. This was despite contractors having previous knowledge of the profile and making allowances by carrying a large drill bit and heavy-duty drilling muds.

3. Monitoring has shown a groundwater system with a consistent downward hydraulic head. This means that pumping from the deep aquifer may have limited effect on shallow watertables.
3 Conclusions

The site at the Landcare office and Telecentre is not suitable for a production bore. Pingrup should concentrate on surface water management to alleviate any damage to infrastructure from the shallow groundwater system in town.

4 References


Appendix 1. Hydrogeological log

<table>
<thead>
<tr>
<th>Depth</th>
<th>Symbol</th>
<th>Description</th>
<th>Hydrogeology</th>
<th>Well Completion Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Fill/Soil</td>
<td>Light brown soil and fill.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Alluvium / Colluvium</td>
<td>Orange brown gravelly clay, Fe pisoliths &lt; 5 mm, trace quartz &lt; 1 mm.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Silcrete</td>
<td>Brown silcrete and clayey sand.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Alluvium / Colluvium</td>
<td>Red clayey sand, moderate subrounded quartz &lt; 1 mm.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Alluvium / Colluvium</td>
<td>Light brown clayey sand, moderate subrounded quartz &lt; 1 mm.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Alluvium / Colluvium</td>
<td>Brown yellow clayey sand, moderate subrounded quartz &lt; 1 mm.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Alluvium / Colluvium</td>
<td>Red sandy clay.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Alluvium / Colluvium</td>
<td>Orange brown clay, trace quartz crystals.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Saprolite Clay (weathered mafic volcanic)</td>
<td>Green grey clay, moderate bai.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Saprolite Clay (weathered mafic volcanic)</td>
<td>Green grey clay, trace white nodules = 2 mm.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Saprolite Clay (weathered mafic volcanic)</td>
<td>Dark green brown clay, bai.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Saprolite Clay (weathered mafic volcanic)</td>
<td>Green brown clay.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Saprolite Clay (weathered mafic volcanic)</td>
<td>Green brown clay, minor bai.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Saprolite Clay (weathered mafic volcanic)</td>
<td>Green brown clay, moderate while brown nodules, Fe altered &lt; 2 mm.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Saprolite Clay (weathered mafic volcanic)</td>
<td>Green brown clay, minor bai.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Depth Drilled (m): 56 | Casing Type: No casing installed |
| Drill Method: RC, aircore 123 mm drill bit | Screen (m): |
| Depth to Water (m): |
| Estimated Yield (L/s): 2 | Casing Total Length (m): |

...continued next page
**Borehole: 02PINPB2**

**Project:** Rural Towns Program  
**Location:** Pingrup Town - Telecentre  
**Hydrologist:** Louise Hopgood  
**Date:** 29 April 2002

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Symbol</th>
<th>Description</th>
<th>Hydrogeology</th>
<th>Well Completion Details</th>
</tr>
</thead>
</table>
| 29        |        | Saprolite Clay (weathered mafic volcanic)  
Dark green brown clay, minor talc, minor Fe altered white nodules < 3 mm. | | |
| 30        |        | Saprolite Clay (weathered mafic volcanic)  
Dark green clay, minor talc. | | |
| 32        |        | Saprolite Clay (weathered mafic volcanic)  
Dark green clay, moderate white angular fragments < 10 mm. | | |
| 35        |        | Saprolite Clay (weathered mafic volcanic)  
Dark green clay (no talc). | | |
| 36        |        | Saprolite Clay / Saprock (mafic volcanic)  
Dark green clay with minor fragments of moderately weathered dark green medium grained mafic volcanic. | | |
| 38        |        | Saprock (mafic volcanic)  
Dark green fine grained mafic to felsic broken up bedrock and dark green clay. | | |
| 40        |        | Mafic Volcanic Bedrock  
Dark green fine grained fractured mafic volcanic bedrock, trace pyrite along fracture plane. | | |

40 - 43 m: water injection required for sample return

43 - 51 m: no water at rod change

51 - 56 m: minor water at rod change

54.5 - 56 m: high yield estimated at 2 L/sec

**Depth Drilled (m):** 56  
**Casing Type:** No casing installed  
**Drill Method:** RC, aircore 123 mm drill bit  
**Screen (m):**  
**Depth to Water (m):**  
**Casing Total Length (m):**  
**Estimated Yield (L/s):** 2