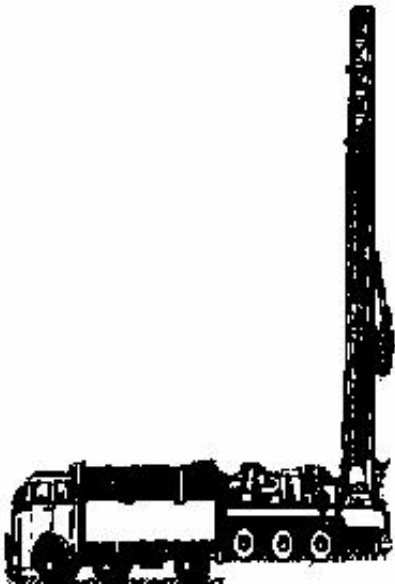


Having a Water Bore Drilled

Information for the Landholder



**Australian Drilling
Industry Association**



Drillers Qualifications Advisory Committee (DQAC) NT

HAVING A WATER BORE DRILLED

A Guide to what is involved.

**Produced by: The Australian Drilling Industry Association Limited
 & Driller's Qualification Advisory Committee (DQAC) NT**

Some Background

Water bores are constructed for a wide variety of end users, with many being involved for the first time.

This booklet is a guide as to the things to be aware of, and some of the pitfalls to be aware of.

There are three main phases in the construction of a water bore, having determined what it is to be used for:-

- Permits/licences required.
- Location of a suitable site, and
- Drilling, development and pumping tests.

The Use of the Bore

Australia is the driest continent in the world, and water is a vital natural resource that has to be protected. In the Northern Territory, groundwater (bore water) accounts for 90% of our water supplies.

In Australia, the taking and use of water from underground is strictly regulated and controlled by each State and Territory Government.

It is the responsibility of the land owner to understand and comply with the regulations in his particular State or Territory.

What permits and licences are required?

In the Territory, water bore drillers are required to be licensed under the NT Water Act and it is essential that you sight the driller's licence before he commences work.

Before you consider having a bore drilled, contact the Department of Natural Resources, Environment, The Arts and Sport on 89 993678 to ascertain whether your property is within a Water Control District. If your property is, you will need to obtain a Bore Construction Permit and employ a Northern Territory licensed driller. The Department can assist with bore site selection and information on existing bores on properties. Bore Construction Permits and names of licensed drillers can be found at www.nt.gov.au/nreta/water or contact the Department. Requirements specific to your bore will be outlined on your Bore Construction Permit. These requirements must be carried out by the driller. During and after completion, the bore will be inspected by Departmental staff to ensure that it meets health and construction standards.

The use of an unlicensed driller, and drilling without the appropriate bore permit can lead to untold damage to aquifers and the environment which can lead to prosecution of the driller and landowner.

Location of the Bore Site

It is the responsibility of the land owner to site the bore, and to ensure access is available to it.

If unsure, advice can be sought from a hydrogeological consultant or the government's hydrogeological services. This will reduce the probability of drilling "dry holes".

Your local driller can provide a wealth of information on bores already drilled in your area but even the most competent hydrogeologist or driller is not infallible; they can only be guided by the available evidence, which is often incomplete.

Nevertheless, proper scientific methods in locating groundwater are likely to be more successful than divining.

There are strict requirements regarding the proximity of the bore to septic systems, effluent trenches and waste disposal points. Also the location of telephone and power cables etc. must also be considered. Contact the Department of Natural Resources, Environment & the Arts on 89 993678 who will assist you with bore siting. The recommended minimum distance between bores is 70 metres to avoid reduced pumping rates and water levels.

Apart from the geological aspects of site selection and considerations such as distance from power, proximity to where the water is to be used, access to the area must be such that heavy equipment can reach the site, work without restriction and leave the site, bearing in mind that rarely is it possible to back over a bore.

Any restrictions must be advised to the driller when seeking quotations.

You should also advise the driller of the nearest supply of water, any charges for it, or difficulty getting to it.

If you are not sure of the facts, ask the driller to inspect the site (a fee may be charged for this inspection service).

Drilling, development and pumping tests.

The Bore Permit holder is not expected to know or be able to recommend the type of drilling equipment or design of the bore.

However any information on nearby bores, geological strata, water quality and levels is of immense value to the drilling contractor preparing a quotation.

In many instances a driller may recommend the drilling of a "pilot" or smaller diameter test hole from which he can interpret the results, before reaming the hole to a larger diameter and deciding on the final design/construction of the bore.

The driller may recommend the drilling of a bore by any of the following methods:-

These are guidelines only

Cable Tool Drilling:-

Generally slow but reliable in alluvials, gravels and softer rocks.

Mud Rotary:-

Softer formations, or deep bores.

Air Rotary:-

Hard rock bores.

Auger or Bucket:-

Shallow, large diameter bores in soft rock.

Jetting:-

Very shallow bores in sandy areas.

Bore Construction

The bore will be inspected by the Department of Natural Resources, Environment, The Arts and Sport, before and/or after the drilling to ensure the bore and its sitting meets the requirements of the Permit. The top of the bore should be encased by a concrete block at least one metre square wide, and sealed to the casing. The top of the casing should be 300 mm above the slab and/or any potential flood water level and sealed so that dirt, insects, reptiles, small animals and birds cannot get in. If you have stock or poultry, a five metre perimeter fence should be erected around the bore. Pumps and drives should be kept in good condition so that water leakage cannot carry contaminants (grease/oil etc) into the groundwater. All State and Territory Water Acts require the bore to be constructed in accordance with the *Minimum Construction Requirements for Water Bores in Australia*. The document can be found at www.iah.org.au/publications

The driller is required to collect a water sample and submit it to the department for analysis but not every sample is tested. It has been found that contaminants from the drilling process can produce false results and it is preferred that a water sample be taken after approximately one month of pumping so that any possible risk of contamination is reduced.

Construction Materials

Materials to be used in bore construction should be given due consideration.

uPVC casing is cheap, resistant to corrosion, but easily damaged by careless pump installation or service work.

mPVC. Under no circumstances can this product be used for casing in water bores.

Fibreglass Reinforced Plastic (FRP) is more expensive and stronger, but otherwise similar to uPVC.

Steel is the strongest, but is expensive and subject to corrosion in some areas. It is the material generally used in deep bores, to withstand construction and installation stresses.

Other materials such as cement-fibre pipe and stainless steel have additional advantages in some circumstances.

Bore Screens: If your water comes from a sand aquifer, a good quality bore screen is recommended. These can be expensive, but should be considered a long-term investment, as water recovery can be increased and pumping costs reduced over the life of the bore.

Screen which offer maximum open area reduce entrance velocities, thus reducing the problems of corrosion, encrustation, and sand pumping. Bores which have high quality bore screens installed, generally require less development.

Stainless steel wire wound screens are the most expensive.

Galvanised wire wound screens are cheaper but should only be used in non-corrosive waters.

Louvre or slotted casing and other forms of screening devices are cheaper but sometimes inhibit optimum water recovery.

Where sand is encountered, a gravel pack filter envelope may be recommended. This allows a screen with larger apertures to be used and better yields to be obtained.

Bacteria

Bacteria can enter a bore via poor sealing of the surface casing, improper capping when not in use, or the introduction of contaminants during the construction phase. A bore should be disinfected before commissioning.

Bore Testing

There are several simple tests you can reasonably ask the driller to perform at little or no cost to yourself. These are:-

Measurements of static water levels and
Yield estimation by bailing or airlift.

Very accurate results can only be provided at considerable cost, usually by conducting a pumping test.

Reasons for a pump test –

- a. To evaluate the performance of a bore in terms of its hydraulic characteristics;
- b. To determine a long term or design pumping rate and an optimum pump inlet setting; and
- c. To determine aquifer characteristics which are used to evaluate the groundwater resources of a particular area on a broad scale.

Ultimate yields can be estimated by performing constant and variable yield tests over a period of several hours pumping, whilst measuring drawdown closely.

The duration of a pump test varies according to the use of the bore. The duration for low usage such as general stock watering or household bore would need a 4 to 6 hour constant discharge test with 2 hours recovery. For medium to high use bores such as intensive stock watering, mining, irrigation, industrial and municipal supply, the bore would need a 24 to 160 hour constant discharge test with an 8 hour recovery. For aquifer investigation, the length of the constant discharge test would depend upon the nature of the investigation.

Hydrogeologists/pump testers can provide information on pump test results and suggest options on the operation of your bore.

Before drilling a bore you should have some idea of the pump diameter you may want to install. Before the driller leaves the site, ask him to run a “dummy/dolly” of similar diameter in the bore to demonstrate that the bore is straight enough to accept the pump.

References/licence

A driller should be able to provide references and produce a licence endorsed to cover the procedures necessary to complete your bore.

The bore owner, or their representative should be on site for a substantial amount of the construction period and be fully aware of each operation carried out on the bore.

Other Considerations

Drilling a bore is not a simple process. Differing geological formations encountered may provide difficulties even the most experienced driller could not anticipate.

Decisions he makes during drilling, which subsequently prove wrong, do not necessarily demonstrate malpractice or incompetence.

A perfectly drilled bore may not yield sufficient or large quantities of water. No water or a poor yield is an insufficient reason to withhold payment, unless the contract between both parties has such a clause included.

Guarantees

It must be realised that no driller can guarantee the quantity or quality of water that may come from a bore that he has drilled. The driller is not responsible for water quality. Although the driller is required to submit a water sample to the Department of Natural Resources, Environment, The Arts and Sport, the owner should regularly have the water analysed by a recognised laboratory for chemical and biological quality for drinking purposes.

However, a driller should be prepared to offer a warranty on his workmanship, but you must recognise that improper installation of a pump by others may void any such warranty.

Bores can be easily damaged and should not be left uncapped, even momentarily.

You may be responsible for additional service charges if the driller is called back to check a bore which is not performing satisfactorily, for reasons not related to his workmanship.

You should consider the design of your bores carefully, as bores normally have a long life and increased drawdown in a bore, due to insufficient diameter, poor quality screens, or utilising shallow aquifers may lead to increased pumping costs in the long term.

A poorly designed or constructed bore could lead to excessive operational costs.

If you have any complaints about the manner in which your bore was drilled, discuss these with the driller first.

Your best guarantee is to use a driller who is a member of the Australian Drilling Industry Association.

Reports

Upon completion of drilling, construction, development or pumping test of a bore, the drilling contractor should provide the owner with a signed, detailed report, indicating:-

- the geological strata penetrated – in regular increments.
- a record of static water level measurements.
- a complete casing and screen location record, showing length, diameters and apertures for each section, plus details of any plugs or seals inserted in the bore.
- pumping test data, if required as part of the contract.

Upon completion of the bore, the driller is required to provide this information to the relevant authority on specific forms and within a specified period.

Underground Services

It is the landowner's responsibility to do the necessary checks to ensure that the bore site and other associated earth works are clear of underground services such as power cables, telephone, water etc.

Care should be taken as to the location of overhead power lines to ensure the siting of the bore allows sufficient clearance from the lines to the drilling machine.

Safety on site

The driller must inform the landowner of the OH&S requirements that apply in the immediate vicinity of the drilling operations. An exclusion barrier should be set up a safe distance from the operations to exclude the public or any person not involved in the operations. Persons should only enter this area under the specific guidance of the driller and must wear the appropriate personal protection.

The driller will discuss with the landowner the dangers of flying debris from the bore hole, the elevated noise levels from the machinery, the dangers of mud pits and drains and the most appropriate method to drain away silt and water from the bore.

Dispute Resolution

If a dispute does arise between the landowner and the driller, the land owner should approach the driller and attempt to resolve the issue. If a satisfactory resolution is not forthcoming the landowner may contact the Northern Territory Chapter of the Australian Drilling Industry Association outlining the dispute and receive advice on what action can be taken. If this fails the landowner may have to go through the small claims court to resolve the issue.

Australian Drilling Industry Association NT, President; Viv Oldfield, 08 89522966

Additional Information

Fact Sheets on water bores and water supplies can be obtained from offices of the Department of Natural Resources, Environment, the Arts & Sport

www.nt.gov.au/nreta/publications/natres/index.html

Titles include:

- Understanding Water Allocation Planning in the Northern Territory
- Beneficial Uses Declarations
- What Type of Fertigation Systems are Available?
- Groundwater Quality for Domestic Use
- What the Results of your Water Sample Mean
- Stormwater Management
- Guidelines to Clean Water
- NT Water Act
- Guide to Bores and Pumps
- Guide to Having a Water Bore Drilled
- Iron Fouling of Groundwater
- Groundwater – What is it and how much is there
- Looking after your Bore
- Rural Water Management
- Berry Springs
- What you can do to Prevent Groundwater Pollution
- Treatment and use of Water Bores after Flooding
- Groundwater Quality for Cattle
- Groundwater Quality for Domestic Use
- Alice Springs Town Basin
- Tennant Creek Water Resources

Need More Information?

If you need additional information, contact the water authorities listed below.

Northern Territory

Department of Natural Resources, Environment, the Arts and Sport
3 Goyder Building
P.O. Box 496, Palmerston, NT 0831
Phone: 89993647 or 89993678, Fax: 89994445

Information can also be obtained from the Australian Drilling Industry Association's Federal Office.

This information is provided by

The Australian Drilling Industry Association Limited (CAN 002772929)
PO Box 3020, Frankston East, Vic 3199
Phone: 03 9781 2229 Fax: 03 9781 2699
Email: adia@smart.net.au Web: www.adia.com.au

And

The Drillers Qualifications Advisory Committee (DQAC) NT
PO Box 496, Palmerston NT 0831
Tel: 08 8999 3660 or Mobile 0419 323 535 Fax: 08 8999 4445
Email: Teegan.colbert@nt.gov.au