



Groundwater monitoring bores in development areas

Information for developers and consultants

Overview

The Department of Water and Environmental Regulation manages a large network of groundwater monitoring bores across the state. These bores are located in state forest, regional parks, crown land, road reserves and freehold land. They are used to assess the quantity and quality of the state's groundwater resources. It is inevitable that occasionally these bores will be in areas where new developments are proposed.

This document provides guidance on how to identify and manage department-owned groundwater monitoring bores in development areas. There will be one of four possible outcomes for each bore:

1. modify the development footprint to avoid disturbing the bore
2. modify the bore headworks (the protective part of the bore that is visible at ground level) to accommodate the bore within the development, for example by fitting a headwork that is flush with the ground
3. drill and install a replacement bore at an approved location and decommission the existing bore (once a relationship between groundwater levels of the old and new bores has been established)
4. decommission the bore (where the department considers the existing bore is not required).

This document outlines the process and information requirements associated with each of the above outcomes.

1. Bore identification

The department's monitoring bores have a wide variety of headworks, which fall into two broad categories: standpipes and flush mounts. Most of the department's bores are standpipes. These are usually between half and one metre tall, constructed of painted or galvanised steel, and are secured with a padlock. Many standpipes will have reflective tape and identification stickers on them. Flush mount headworks are level with the ground, and generally have circular steel lids and no identification stickers. A range of department-owned bores are shown in Figure 1 below.



Galvanised steel headworks



Painted steel headworks
(with ID stickers)



Painted steel headworks
(without ID stickers)



Flush mount headworks

*Figure 1:
Common bore
headworks.*

You can confirm whether the bore is owned by the department by checking our [Water Information Reporting system](#). You can also contact the groundwater assets team via email groundwaterassets@dwer.wa.gov.au or phone 1800 645 191.

Please provide the following information to allow us to correctly identify the bore:

- accurate location in the form of GPS co-ordinates (preferably Eastings and Northings) and/or the proximity of the bore to the nearest landmark or road intersection
- photographs of the bore that clearly show any reference numbers and identifying stickers

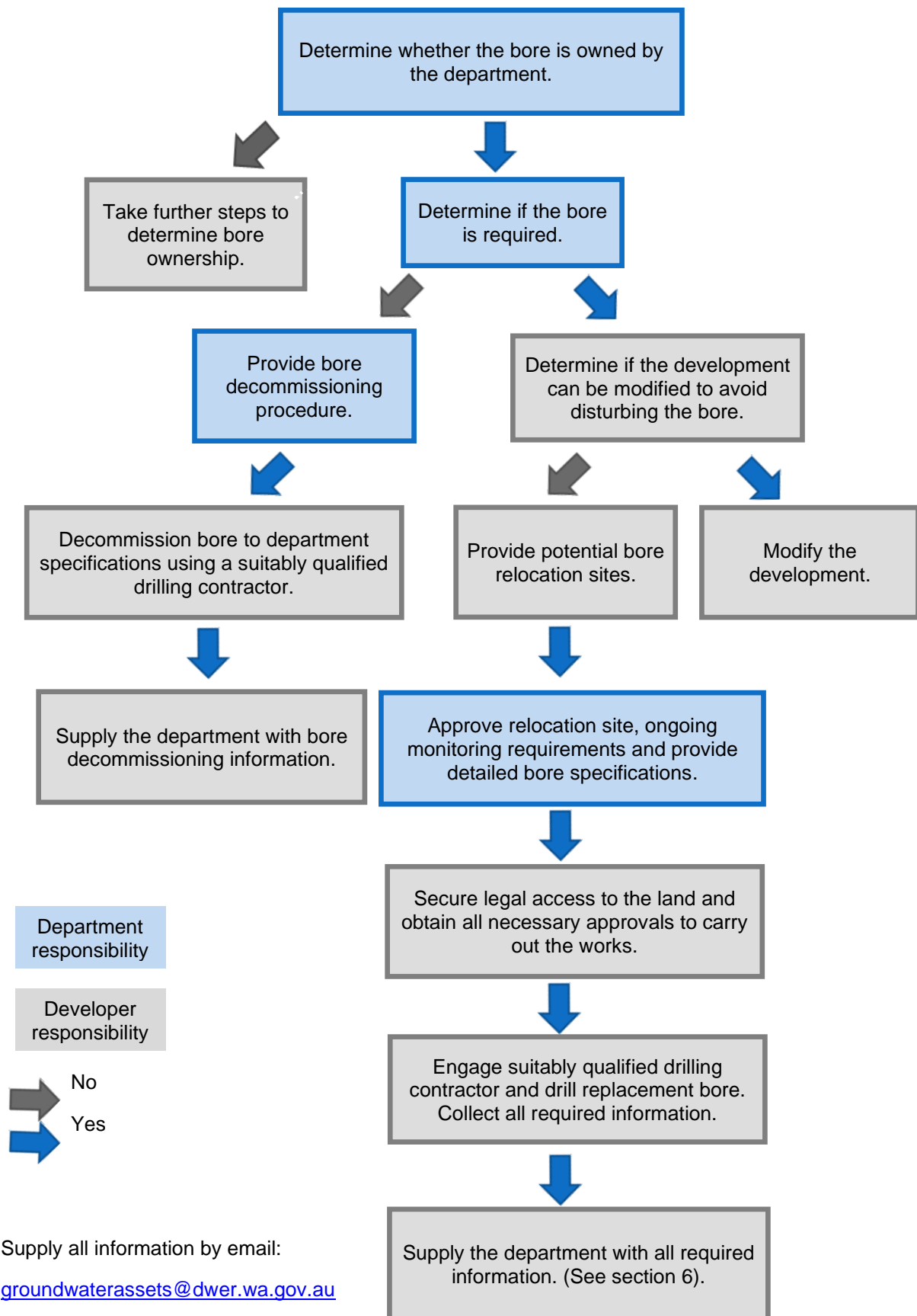
2. Managing department-owned groundwater monitoring bores

Once you have confirmed that the bore is owned by the department, provide information on your development, including details of the proposed work in the vicinity of the bore and plans showing the final development layout. This will help determine whether there is a possibility the bore can be retained with or without modifications to the development.

A development timeline must be discussed with and agreed upon by the department. This timeline should include proposed times for any require bore construction and/or decommissioning work. The timeline should also include an agreed method to satisfy the monitoring requirements, outlined in section 5 of this document.

The following process describes the steps involved in managing department-owned bores in development areas. The parts of the process that are indicated as being the developer's responsibility are to be undertaken at the proponent's expense.

Process for managing department-owned bores in development areas



3. Responsibilities

This section provides an outline of the roles and responsibilities for the department and the developer during the different stages of the above process.

Department of Water and Environmental Regulation:

- Confirm if bores are department-owned assets.
- Determine if bores need to be retained or can be decommissioned.
- Approve alternative bore replacement site(s).
- Provide bore replacement and/or decommissioning procedures.
- Supply bore headworks, padlock, identification stickers and reflective tape.
- Confirm the bore(s) have been constructed and/or decommissioned in accordance with requirements.

The developer/consultant:

- Propose potential bore relocation sites.
- Advise the department's groundwater assets team, before commencement of any bore replacement and/or decommissioning, as we may choose to supervise the works.
- Secure legal access to the land where the bore replacement and/or decommissioning works are proposed.
- Obtain all necessary approvals for the works from local, Western Australian and Australian governments.
- Engage a suitably qualified drilling contractor (see section 4 below).
- Ensure the hole is logged (lithology and geology) by a qualified environmental scientist/geologist/hydrogeologist. If a lithology log cannot be obtained, a down-hole geophysical log (gamma and resistivity) will be required before bore construction starts to confirm suitable placement of screens.
- Ensure that the site is left in a neat and tidy condition to the satisfaction of the department and landholder.
- Engage a licensed surveyor to provide the elevation and location details requested in Appendix 1 and shown in Appendix 2.
- Provide all bore replacement and/or decommissioning information requested in section 6.
- Ensure all information for the new bore is submitted to the department in the templates provided in Appendix 1.

4. Driller licensing

It is mandatory that drillers undertaking any drilling and/or decommissioning works hold the relevant Australian Drilling Industry Association (ADIA) licence in accordance with the three licence classifications below:

- **Class 1:** This licence is restricted to drilling operations in non-flowing (sub-artesian) single aquifer systems.
- **Class 2:** This licence, in addition to operating in Class 1 conditions, permits operations in non-flowing (sub-artesian) multiple aquifer systems.

- **Class 3:** This licence, in addition to operating in Class 1 and Class 2 conditions, permits drilling operations in flowing (artesian) aquifer systems.

5. Bore monitoring requirements

To establish a relationship between the original and replacement bores, the water levels of both bores should be monitored on a monthly basis, for at least one year after the replacement bore is completed. A shorter timeframe may be negotiated with the department in certain circumstances, but a higher frequency of monitoring may be required in such cases.

6. The department's information requirements

You must provide information regarding the drilling and construction of a replacement bore and/or the decommissioning of an existing bore to the department via [email](#).

Bore decommissioning

The following information must be provided following bore decommissioning:

- decommissioning date
- name and licence details of drilling contractor
- details of casing perforation depth (if appropriate)
- cement plug setting depths
- grout volume pumped
- casing packer setting depth
- length of casing grouted.

Drilling and installation of replacement bore

When drilling and constructing a replacement monitoring bore, the template in Appendix 1 must be completed and sent via [email](#).

Appendix 1: Bore replacement information

Location and identification

Owner	Department of Water and Environmental Regulation (DWER)
Location description	
Purpose	Monitoring bore
DWER site reference	

Bore construction

Drilled by				
Drill method				
Drill date				
Drilled diameter		Total depth (mbgl)		
		Surface casing		
		Pilot/main hole		
Depth interval (mbgl)		Material Type (e.g. PVC, FRP, Stainless steel)	Diameter	
From	To		ID (mm)	OD (mm)

Annulus fill

Depth interval (mbgl)		Fill type (e.g. cement grout, steel surface casing, bentonite, gravel pack)	Cement (SG)
From	To		

Geological data

Sampling interval	Drill cutting samples at 1m intervals
Logged by	

Stratigraphic summary

Depth interval (mbgl)		Formation
From	To	

Hydrogeological summary

Date	
Aquifer screened	
Groundwater level	

Bore development

Bore development method	
Duration	
Flow rate	
Groundwater level	

Water quality

pH	
Conductivity ($\mu\text{s}/\text{cm}$)	
Temperature	

Depth interval (mbgl)		Lithology (e.g. clay, sand, limestone)	Lithology description (e.g. colour, grain size, sorting, sphericity, mineralogy and other observations)
From	To		
End of hole at _____ mbgl.			

Note: minimum accuracy requirements are ± 0.1 m (horizontal) and ± 0.003 m (vertical).

Appendix 2: Bore survey elevations

The picture below shows the vertical elevations that the department requires for each new monitoring bore, as requested in Appendix 1.

