



Australian Government

RIINHB411E Construct artesian (flowing) aquifer bores

Release: 1

RIINHB411E Construct artesian (flowing) aquifer bores

Modification History

Release	Comments
Release 1	This version first released with RII Resources and Infrastructure Industry Training Package Version 5.0.

Application

This unit describes the skills and knowledge required to construct artesian (flowing) aquifer bores. This includes designing, constructing and developing artesian aquifer bores, disinfecting bores and equipment and decommissioning bores.

This unit applies to those working in operational, supervisory or technical specialist roles. They generally perform tasks involving a broad range of varied activities most of which are complex and non-routine and are responsible for the quantity and quality of the output of others.

Licensing, legislative and certification requirements that apply to this unit can vary between states, territories, and Industry sectors. Users must check requirements with relevant body before applying the unit.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Plan and prepare for the construction of artesian (flowing) aquifer bores	1.1 Obtain, interpret and confirm work requirements 1.2 Access, interpret and apply artesian (flowing) aquifer bores construction documentation and confirm work activity is compliant 1.3 Identify hazards and environmental issues, assess the risks and implement control measures in line with workplace procedures 1.4 Select and wear personal protective equipment required for work activities 1.5 Communicate with other personnel at site according to work requirements and confirm briefings and handover details are communicated and received 1.6 Discuss scope of work with client and give technical advice, cost structure, workmanship warranty, quantity and quality of

ELEMENT	PERFORMANCE CRITERIA
	materials, construction standards and methods to be used and gain general agreement on drilling plan 1.7 Complete required reports and provide reports, samples and strata logs, pump and development test results to relevant authorities as required
2. Design bores for artesian aquifer systems	2.1 Determine required construction methods and drilling fluid program according to down-hole conditions and anticipated pressures 2.2 Design bore according to environmental and work requirements 2.3 Select a bore site that will prevent contamination and minimise interference with other bores 2.4 Select likely water entry mechanism from the formation to the bore including open hole, slotted casing screens, gravel packs 2.6 Calculate required artificial pack design parameters, and recommended annular thicknesses required 2.7 Undertake calculations to determine appropriate screen/slot design parameters, including for diameter, length, aperture size 2.8 Select required bore/surface casing types, size, strength and wall thicknesses for the anticipated ground/water quality and pressure conditions and any construction requirements 2.9 Confirm all necessary materials anticipated for the job are available and on site prior to commencement of construction phase
3. Construct bores in artesian aquifer system	3.1 Carry out any pre-start and start up procedures according to manufacturer specifications and workplace procedures 3.2 Select, slot, assemble and insert casing and screens suitable for the formations in which they are deployed 3.3 Select, mix and place grout or seal surface according to legislative and company requirements and manufacturer specifications 3.4 Construct bore according to legislative requirements and workplace procedures 3.5 Use, maintain, test and record nontoxic, removable drilling fluids and additives according to manufacturer specifications and environmental requirements 3.6 Maintain plumbness and alignment of the hole within the required limitations and carry out a plumbness test where required 3.7 Prepare for and recognise any symptoms of a formation kick and take action to control the bore 3.8 Collect, store, record, label and transport formation and water samples according to licensing requirements

ELEMENT	PERFORMANCE CRITERIA
	3.9 Arrange for geophysical logging tools to be run in bore if required 3.10 Determine aquifer formation grain size distribution from sieve analysis and interpret appropriate gravel pack and screen slot aperture dimensions for gravel packed wells 3.11 Select and place artificial pack materials 3.12 Remove drilling fluids from the bore to allow subsequent development 3.13 Maintain tool string inventories according to workplace procedures
4. Construct bore headworks	4.1 Construct headworks for bore including isolation valves to retain/control artesian flow and to permit independent testing of both pressure and flow without interference to reticulation system 4.2 Identify and protect headworks of the bore 4.3 Construct headworks to seal and cap the bore from surface water pollutants, environmental concerns and damage 4.4 Dispose of and neutralise wastewater or hazardous materials from site as required and complete restoration of the bore site camp facilities
5. Develop bore	4.1 Use development techniques with care to prevent collapsing of casing or screens 4.2 Undertake development until a continuous, clean supply of water is obtained according to site, contractual and regulatory requirements 4.3 Measure/calculate and record standing and drawdown water levels 4.4 Perform pump and/or development tests to estimate the sand content and sustainable yield of the bore
6. Disinfect/decontaminate bore and drilling equipment	6.1 Determine and monitor potential contaminants of drilling equipment 6.2 Disinfect and decontaminate bores and installed equipment constructed for potable supplies as required
7. Carry out bore maintenance and rehabilitation	7.1 Carry out and shutdown procedures and secure according to manufacturer specifications and workplace procedures 7.2 Undertake a process of diagnosis to determine likely cause of bore deterioration 7.3 Devise a rehabilitation program according to environmental requirements

ELEMENT	PERFORMANCE CRITERIA
8. Decommission artesian wells with flowing and/or non-flowing elements	8.1 Determine suitable decommissioning procedures and select required materials 8.2 Carry out the decommissioning (abandonment) of artesian aquifer bores 8.3 Place cement bridges at the top of the surface casing and at the surface casing shoe 8.4 Verify position/location of hole for future reference 8.5 Dispose of drill and other fluids safely according to environmental requirements and workplace procedures 8.6 Record entire decommissioning procedure and details of bore cementing according to workplace procedures 8.7 Complete bore completion report and submit to State/Territory Water Authority 8.8 Carry out housekeeping requirements according to workplace procedures

Foundation Skills

This section describes those language, literacy and numeracy and employment skills that are essential to performance.

SKILL	DESCRIPTION
Reading	Identifies and interprets information from workplace procedures, policies and documentation
Numeracy	- Identifies and comprehends relevant mathematical information in relation to constructing artesian (flowing) aquifer bores - Estimates, accurately measures and calculates quantities of fluid volumes, up hole velocity, flow rates, density and viscosity
Oral communication	Presents information to others involved in work activity using industry specific vocabulary

Unit Mapping Information

Supersedes and is equivalent to RIINHB411D Construct artesian (flowing) aquifer production bores.

Links

Companion Volume implementation guides is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=88a61002-9a21-4386-aaf8-69c76e675272>