

APPENDIX 8

GROUNDWATER REPLENISHMENT REGULATORY FRAMEWORK

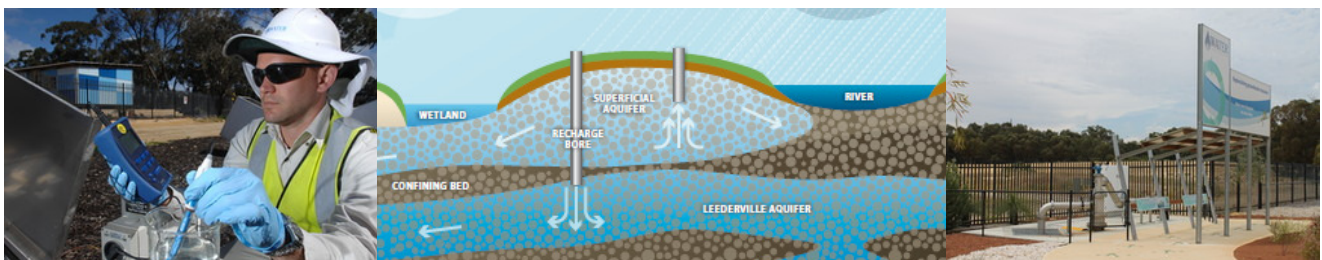
Groundwater Replenishment Regulatory Framework

December 2012

Prepared by the Groundwater Replenishment Trial
Interagency Working Group:



and



Revision History

Version	Prepared By	Date Issued	Issued to	Comments Received
Final Draft v1	Adrian Parker, Ruth Dowd, Richard Theobald, Clemencia Rodriguez, Nick Turner, Vanessa Moscovis and Tran Huynh	05/12/12	GWRT IAWG	Comments received from Alan Sands, Director Environmental Regulation.
Final Draft v1A	Tran Huynh	10/12/12	GWRT IAWG and Signatories for endorsement.	

Status

The Groundwater Replenishment Framework is "Draft" until all signatories have signed it off for final release.

A "Draft" document should not be used for any purpose other than to be reviewed with the intention of generating a "Final" version

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Endorsement

This document was developed by the Groundwater Replenishment Trial Interagency Working Group which consisted of:

1. **Department of Health** of 189 Royal Street, East Perth, Western Australia
2. **Department of Environment and Conservation**, of 168 St Georges Terrace, Perth, Western Australia
3. **Department of Water**, of 168 St Georges Terrace, Perth, Western Australia
4. **Water Corporation**, a statutory body corporate established under the Water Corporation Act 1995, of 629 Newcastle Street, Leederville, Western Australia

In endorsing this document, the Department of Health (DoH), Department of Environment and Conservation (DEC), Department of Water (DoW) and the Water Corporation agree to comply with the Groundwater Replenishment Regulatory Framework.

This document will be reviewed by the DoH, DEC, DoW and Water Corporation, five (5) yearly from the commencement date.

**Signed for
Department of Health**



Dr Tarun Weeramanthri
Executive Director
Public Health and Clinical Services Division

19th December, 2012

Date

**Signed for
Department of Environment and
Conservation**

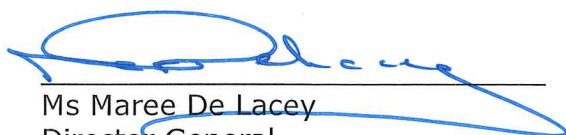


Mr Keiran McNamara
Director General

13 December 2012

Date

**Signed for
Department of Water**



Ms Maree De Lacey
Director General

17 December 2012

Date

**Signed for
Water Corporation**



Ms Sue Murphy
Chief Executive Officer

17 December 2012

Date

Definitions

Advance Water Recycling Plant (AWRP) is a multi-step treatment process which produces recycled water for the purpose of Groundwater Replenishment.

ANZECC Guidelines means the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000a).

Australian Guidelines for Water Recycling (AGWR) Guidelines means the Australian Guidelines for Water Recycling: Managing Health and Environmental Risk (Phase 1) (2006), the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Augmentation of Drinking Water Supplies (2008) and the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Managed Aquifer Recharge (2009) published by the National Health and Medical Research Council.

Commencement Date means the date on which the last party signs the GWR Regulatory Framework.

Drinking Water means water intended primarily for human consumption, which also has other domestic uses.

Environmental Values is the term applied to particular values or uses of the environment that are important for a healthy ecosystem or for public benefit, welfare, safety or health.

Groundwater Replenishment process by which secondary treated wastewater undergoes advanced treatment to produce water which meets Australian guidelines for Drinking Water prior to being recharged to an aquifer for later use as a Drinking Water source.

Groundwater Replenishment Regulatory Framework defines the approvals pathway required to develop, approve and provide ongoing regulation for a Groundwater Replenishment Scheme.

GWR MoU means the Groundwater Replenishment Memorandum of Understanding between the DoH and the Water Corporation.

GWRT MoU means the Groundwater Replenishment Trial Memorandum of Understanding between the Department of Health and the Water Corporation. *The GWRT MoU will be superseded by the GWR MoU.*

Interagency Working Group (IAWG) comprising of Departments of Health, Environment and Conservation and Water and the Water Corporation to oversee the Groundwater Replenishment Trial.

Point of recharge is where recycled water has met all the critical control points i.e., a step or procedure at which controls can be applied and a hazard can be prevented, eliminated or reduced to acceptable (critical) levels and is ready to be recharged to the aquifer.

Public Drinking Water Source Areas (PDWSA's) are underground pollution control areas, water reserves and catchment areas that have been identified as current or future sources of Drinking Water.

Recharge Management Zone (RMZ) defines the minimum distance between recharge of recycled water and abstraction of groundwater for public Drinking Water supplies.

Recycled Water in the case of GWR is produced by further treatment of secondary treated wastewater by the Advanced Water Recycling Plant (AWRP) to meet Drinking Water quality standards before being recharged into an aquifer.

Wastewater Catchment means the wastewater collection system that delivers inflows to wastewater treatment plants.

1 Introduction

Groundwater replenishment (GWR) is the process by which secondary treated wastewater undergoes advanced treatment to produce recycled water which meets Australian guidelines for Drinking Water prior to being recharged to an aquifer for later use as a Drinking Water source.

The Water Corporation intends on implementing Groundwater Replenishment to provide a public Drinking Water source for Perth, Western Australia.

The Water Corporation has been working with the Department of Health (DoH), Department of Environment and Conservation (DEC), Department of Water (DoW) to assess the viability of Groundwater Replenishment.

2 Background

Groundwater Replenishment was initially considered as a viable recycled water option for Western Australia in 2005. Successful GWR Schemes for Drinking Water sources (indirect potable reuse) occurred internationally, however, there was a lack of National and State guidance for the planning, design, commissioning, operation, use and regulation of these schemes.

Under Section 16(e) of the *Environmental Protection Act (1986)*, the Environmental Protection Authority (EPA) advises the Minister for the Environment on strategic environmental matters. Advice provided under Section 16(e) also guides the proponent on the type and extent of further work that will be required for environmental approval.

In 2005 the EPA assessed the potential for Groundwater Replenishment to be conducted in the Perth metropolitan area. The EPA supported further investigation of the approach on a staged basis "*starting with trials and projects of low risk*" (EPA, 2005).

Based on this advice, the Water Corporation developed the Groundwater Replenishment Trial. The DoH, DEC, DoW and the Water Corporation entered into a Groundwater Replenishment Trial Interagency Agreement in March 2007 (IAWG, 2007) and formed the Interagency Working Group (IAWG). The Objectives of this Agreement were to allow:

1. The Water Corporation to conduct the Groundwater Replenishment Trial to assess technical feasibility and gauge community support for Groundwater Replenishment; and
2. The DoH, DEC and DoW to review information from the Water Corporation's Groundwater Replenishment Trial in order to:
 - a) Develop a GWR Regulatory Framework.
 - b) Inform government policy relating to Groundwater Replenishment, specifically by addressing issues identified by the IAWG in April 2008 (IAWG, 2008).
 - c) Assess Groundwater Replenishment as a Drinking Water source for Perth, Western Australia.

By December 2012 the IAWG will have successfully achieved objectives 2a and 2b through the delivery of the GWR Regulatory Framework document and addressed the gaps in Policy and Regulation, which will have informed the GWR Regulatory Framework.

Assessment of Groundwater Replenishment as a Drinking Water source for Perth (Objectives 1 and 2c) will be complete in early 2013.

3 Scope of the Document

This document outlines the GWR Regulatory Framework.

It is important to note that Groundwater Replenishment will be used as a Drinking Water source. Therefore this document only addresses the indirect potable reuse of water and does not address any other use for recycled water.

This document is not intended and does not affect any of the statutory responsibilities of the DoH, DEC, DoW or the Water Corporation.

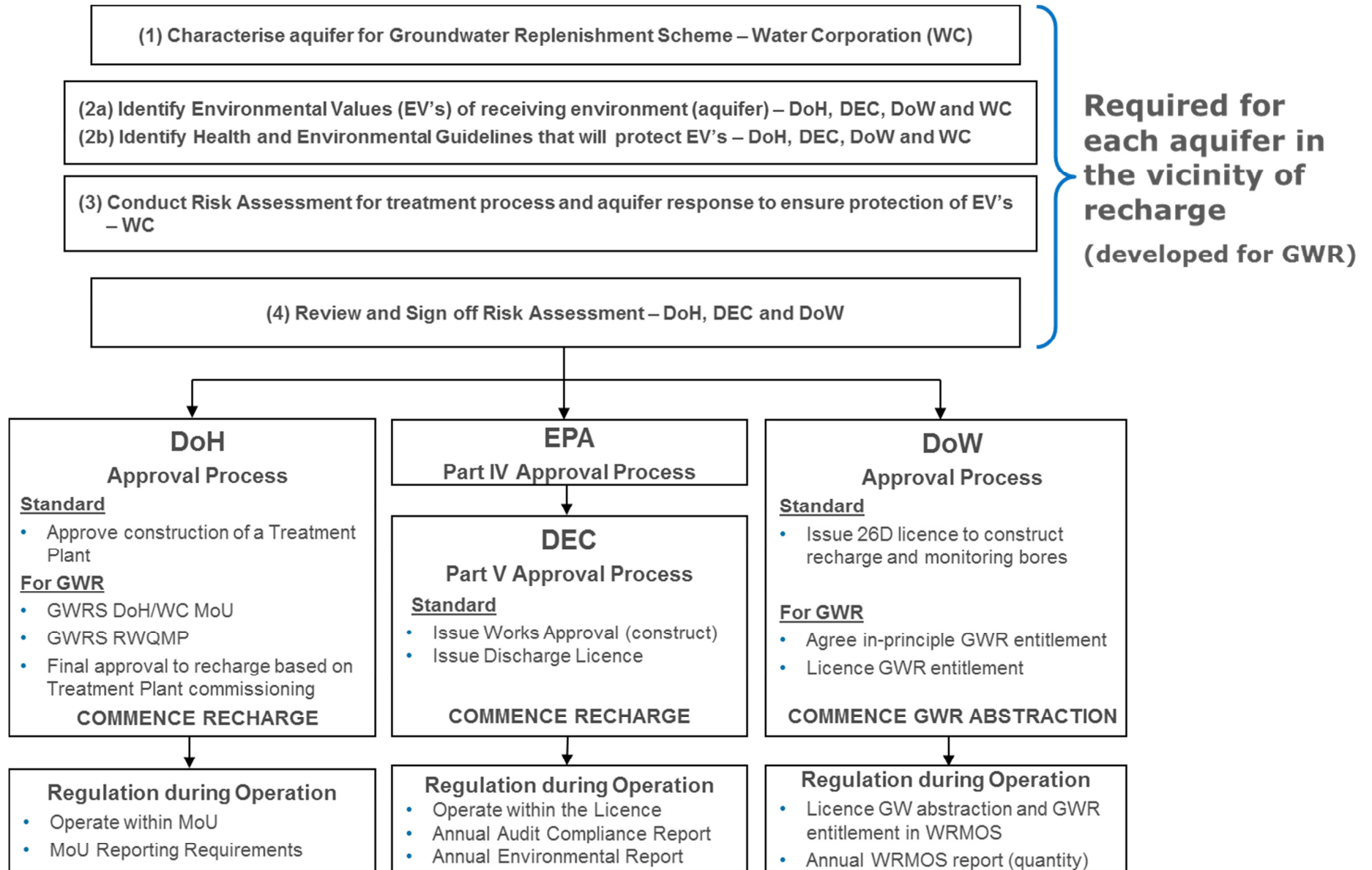
4 Purpose of the Regulatory Framework

The GWR Regulatory Framework defines the approvals pathway required to develop, approve commencement of recharge and provide ongoing regulation for a Groundwater Replenishment Scheme.

The GWR Regulatory Framework was developed utilising existing legislation, AGWR Guidelines and ANZECC Guidelines and a directive from the Western Australian Environmental Protection Authority (EPA) to implement a risk-based approach.

Figure 4-1 illustrates the GWR Regulatory Framework.

Figure 4-1: Groundwater Replenishment Framework



5 Roles and responsibilities

The government agencies that have a role in providing initial assessment, approval and ongoing regulation of a GWR Scheme are as follows:

5.1 Department of Health

The DoH is responsible for administering the legislation concerning health regulation in Western Australia under the *Health Act 1911*.

The DoH's role is to:

- i. Minimise human exposure to environmental health hazards that pose or have the potential to pose a health risk.
- ii. Reduce the incidence and impact of communicable disease.
- iii. Guide, assess and approve all water recycling schemes to safeguard public health.

5.2 Department of Environment and Conservation

DEC is responsible for administering the legislation concerning environmental regulation in Western Australia under the *Environmental Protection Act 1986* (the EP Act). Under Part V of the EP Act, DEC regulates emissions and discharges from prescribed premises.

DEC will consider Groundwater Replenishment under Part V of the *EP Act*.

5.3 Department of Water

The DoW manages water quality issues by using powers provided through the *Metropolitan Water Supply, Sewerage and Drainage Act 1909 (WA)* and the *Country Areas Water Supply Act 1947 (WA)* and associated By-laws under these Acts.

The DoW also manages abstraction of groundwater under the *Rights in Water and Irrigation Act (RIWI Act) 1914*.

5.4 Water Corporation

The Water Corporation provides water services across Western Australia, under the *Water Corporation Act 1995* and administers the *Water Agencies (Powers) Act 1984*.

The Water Corporation will seek approval for construction and operation of future Groundwater Replenishment Schemes in accordance with this Groundwater Replenishment Regulatory Framework.

6 Definition of Recycled Water and Waste

Recycled water is usually treated wastewater which is further treated to varying qualities that is "fit for purpose" for its intended use. In the case of GWR, recycled water is produced by further treatment of secondary treated wastewater by an Advanced Water Recycling Plant (AWRP) to meet Drinking Water quality standards before being recharged into an aquifer.

Current legislation does not adequately define recycled water for the purposes of Groundwater Replenishment. The DoH, DEC, and DoW were required to consider the definition of recycled water produced by an AWRP for the purposes of Groundwater Replenishment as part of the Trial. The definitions are as follows:

Department of Health

The DoH considers *recycled water as "sewage" until it is appropriately treated to a level considered to be Drinking Water quality or above. The water passing through the AWRP is sewage up until the point of recharge.*

Department of Environment and Conservation

For the purposes of DEC's regulation of the AWRP and Groundwater Replenishment as a prescribed premises category 54, recycled water from the AWRP will always be considered to be treated sewage irrespective of the recycled water quality achieved.

The Trial has demonstrated that DEC is able to effectively manage the recharge of treated sewage from the Beenyup AWRP into the Leederville aquifer, by regulating the AWRP and confirming the specification of recycled water quality prior to it entering the recharge bore, so as to achieve the objectives and purposes of the EP Act.

In relation to the above circumstances, DEC has considered the extent to which 'matter', as referred to in the definition of 'waste' under section 3(1) of the EP Act - being in this case treated sewage (recycled water) arising from the Beenyup AWRP - ought to be regulated under the EP Act. DEC has concluded that recycled water meeting the Drinking Water specification ceases to be 'waste'.

An 'emission' under section 3(1) of the EP Act is defined to include a discharge of waste. Under section 56(1) of the EP Act, an occupier of prescribed premises who, among other things, causes an emission from the premises commits an offence unless having done so in accordance with a licence issued in relation to the premises. In view of DEC's conclusion above, the recharge of recycled water meeting the Drinking Water specification to groundwater does not meet the definition of an emission under the EP Act.

Department of Water

The DoW has taken advice from the DoH and consider *recycled water as "sewage" until it is appropriately treated to a level considered to be Drinking Water quality or above. The water passing through the AWRP is*

sewage up until the point of recharge. DoW will adopt this definition in the administration of their relevant acts, regulation and by-laws.

7 Purpose of the Recharge Management Zone

A Recharge Management Zone (RMZ) defines the minimum distance between recharge of recycled water and abstraction of groundwater for public Drinking Water supplies. It also defines the boundary at which groundwater must meet the water quality guidelines required to protect the identified environmental values. Environmental values are always preserved and the recharged water becomes part of the environment beyond the RMZ boundary.

The IAWG have agreed that a RMZ is a requirement of any GWR Scheme. They have defined that:

- A RMZ should be applied to all Groundwater Replenishment Schemes recharging into the confined aquifers in Perth.
- The RMZ boundary is a radial distance of 250m from the recharge bore for all confined aquifers at the Beenyup site, subject to final assessment of the Yarragadee aquifer.
- The principles for a groundwater monitoring plan within the RMZ. A groundwater monitoring plan should demonstrate protection of the environmental values of the receiving groundwater environment and be derived from the groundwater risk assessment ([section 8.1.3](#)).

In addition to defining the RMZ, the DoH, DEC, and DoW were required to consider their Agency's ongoing role in regulating the RMZ as an output of the Trial. This is summarised as follows:

Department of Health

DoH will regulate the RMZ within the GWR MoU. The DoH requires that the groundwater quality meets the Recycled Water Quality Parameters and Recycled Water Quality Indicators as defined in the GWR MoU at the RMZ boundary.

Department of Environment and Conservation

DEC has an interest in the RMZ in so far as it is the receiving environment for the discharge of treated sewage (recycled water) from the prescribed premises (AWRP).

DEC may require the on-going monitoring of groundwater quality within the RMZ, as part of licencing conditions. This is to ensure that the regulatory controls applied to the prescribed premises are effectively preventing pollution and environmental harm occurring as a result of the discharge of treated sewage (recycled water) and that the environmental values of the groundwater are being protected.

Department of Water

DoW have advised that the appropriate mechanism to manage groundwater quality is through the GWR MoU which is administered by the DoH.

The DoW's Operational Policy 1.01 – Managed aquifer recharge in Western Australia (DoW, 2011) makes reference to the establishment of “managed aquifer recharge management zones” (MAR management zones) to facilitate the management of groundwater quality and quantity in the vicinity of MAR schemes. These zones are used as an internal management tool by the DoW to ensure the location of MAR schemes is considered in the processing of other groundwater abstraction licence applications in the area.

The RMZ meets the DoW requirement for this internal management tool and will be mapped on the DoW's geographical information system (GIS) for internal use.

8 Groundwater Replenishment Regulatory Framework

The purpose of the GWR Regulatory framework is defined in [section 3](#).

8.1 Initial Assessment of a Groundwater Replenishment Scheme

The first four steps of the GWR Regulatory Framework involve collaboration between the DoH, DEC, DoW and Water Corporation to conduct an initial assessment of the GWR scheme prior to entering into each Agency's formal approval process.

This approach was developed for Groundwater Replenishment utilising a risk management approach recommended by the AGWR Guidelines ((NRMMC-EPHC-AHMC, 2006) (NRMMC-EPHC-NHRMC, 2008) (NRMMC-EPHC- NHRMC, 2009) and the ANZECC Guidelines (ANZECC and ARMCANZ, 2000a). This approach recognises and protects water quality to maintain or enhance an environment which will support an ecosystem or use for public benefit, welfare, safety or health.

The benefits of applying this approach are:

- To gain agreement between the three regulating agencies and the Water Corporation of the values of the receiving groundwater environment.
- To gain agreement between the three regulating agencies and the Water Corporation of the water quality guidelines that will protect the values of the receiving groundwater environment early in the development of the GWR scheme.

- Support the EPA's environmental impact assessment of the proposed GWR Scheme under Part IV for the EP Act 1986¹.

Prior to commencing the Initial Assessment of a Groundwater Replenishment Scheme, the Water Corporation must undertake Planning of a GWR scheme. Planning must consider the scale and location of the scheme and suitability of source water quality and the receiving groundwater environment.

This information can then be used to undertake the initial assessment.

8.1.1 Step One: Aquifer Characterisation

This step requires the Water Corporation to characterise the receiving groundwater environment such that appropriate environmental values can be defined.

Information used to characterise the aquifer can be derived from, but is not limited to, existing knowledge of groundwater systems and models that can predict pressure, fate and solute transport. Site investigations may also be carried out to inform this step. The extent of the investigations will depend on the amount of background knowledge that is available to the receiving groundwater environment at the vicinity of recharge.

The Water Corporation will obtain all approvals necessary to undertake site investigations.

Previous experience with the Groundwater Replenishment Trial, subsequent schemes and Table 4.2 in chapter 4 of the Australian Guidelines for Water Recycling: Managed Aquifer Recharge (Phase 2) (NRMMC-EPHC- NHRMC, 2009) will define the key issues to consider at this stage of project development.

8.1.2 Step Two: Environmental Values, Management Objectives and Water Quality Guidelines

This step involves:

1. Defining the Environmental Values (EV) for the receiving groundwater environment in the vicinity of recharge.
2. Establishing a set of broad management objectives for the relevant environmental values.
3. Determining appropriate water quality guidelines or criteria.

¹ The Water Corporation will refer all GWR Schemes to the EPA for assessment under Part IV of the EP Act.

Environmental Values

'Environmental values' is the term applied to particular values or uses of the environment that are important for a healthy ecosystem or for public benefit, welfare, safety or health. The ANZECC Guidelines recognise six environmental values:

- Aquatic ecosystems
- Primary industries (irrigation and general water uses, stock Drinking Water, aquaculture and human consumers of aquatic foods)
- Recreation and aesthetics
- Drinking water resource
- Industrial water
- Cultural and spiritual value

The DoH, DEC, DoW and Water Corporation will convene to identify the EVs relevant to the receiving groundwater environment.

Management Objectives

The environmental management objectives reflect the desired state for EV's identified as relevant to the receiving groundwater environment, such as "maintain for current and future use".

The DoH, DEC, DoW and Water Corporation will convene to identify the management objectives for the relevant EV's.

Water Quality Guidelines

Associated with each environmental value are 'guidelines' or 'trigger values' for substances that might potentially impair water quality (e.g. pesticides, metals or nutrients). If these values are exceeded, they may be used to trigger an investigation or initiate a management response. Where two or more agreed environmental values apply to a water body, the more conservative, or stringent, of the associated guidelines should be selected as the water quality guideline.

Determining the EV's and associated water quality guidelines provides a clear pathway for assigning Agency responsibilities where multiple agencies can regulate a GWR Scheme. Water quality guidelines appropriate for the protection of EVs are described in Table 9.1.

Table 8-1: Water quality guidelines appropriate for the protection of EVs

Environmental Value	Water Quality Guideline that will protect the Environmental Value
Aquatic Ecosystems	DEC to establish water quality criteria ² which will be applied with assistance from DoW and DoH.
Primary Industries	Given the unrestricted access to potable (drinking) water for the purpose of primary industry, the Drinking Water Resource EV water quality guidelines will be applied.
Recreation and Aesthetics	DoH and DEC to establish water quality criteria ² with assistance from DoW.
Drinking Water Resource	<i>Recycled Water Quality Parameters and Recycled Water Quality Indicators</i> identified by the DoH and defined in the GWR MoU.
Industrial Water	Given the unrestricted access to potable (drinking) water for the use in industrial processes, the Drinking Water Resource EV water quality guidelines will be applied.
Cultural and spiritual values	No water quality guidelines are provided for this environmental value. Water Corporation to continue to engage with Indigenous stakeholders.

Representatives from the DoH, DEC, DoW and Water Corporation will convene to identify the water quality guidelines required to protect the relevant EV's.

8.1.3 Step Three: Risk Assessment

The Water Corporation will undertake a risk assessment from the wastewater catchment to the boundary of the Recharge Management Zone by applying the process described in the AGWR Guidelines to evaluate whether the GWR Scheme is able to protect the EVs. The risk assessment will consider whether the:

1. Management approaches in wastewater catchments are adequate to mitigate risks to feed quality for the treatment process.
2. Recycled water produced by the treatment process meets the required water quality guidelines at the point of recharge.
3. Potential aquifer risks to ensure that water quality continues to meet the water quality guidelines at the boundary of the Recharge Management Zone.

² Water quality guidelines may be derived from existing guidelines where appropriate.

8.1.4 Step Four: Agency Evaluation

The Water Corporation will present the GWR Scheme risk assessment to the Agencies, including risk mitigation strategies.

The DoH, DEC and DoW will evaluate and provide written advice regarding the acceptability of the risk assessment process and resultants risks.

8.2 Approvals Process

8.2.1 Environment Protection Authority

The Environment Protection Authority (EPA) undertakes the environmental impact assessment (EIA) of proposals and schemes referred to it under Part IV of the Environmental Protection Act 1986 (EP Act). EIA is a systematic and orderly evaluation of a proposal and its impact on the environment. This evaluation includes considering ways in which the proposal, if implemented, could avoid or reduce any impact on the environment.

Further details on submitting a proposal can be found on the [EPA website](#).

The Water Corporation will refer a proposal under Part IV of the EP Act for a GWR scheme to the EPA.

The EPA will make its decision on whether or not to assess a GWR Scheme based on the potential impact(s) to the environment. It will advise the Water Corporation and relevant Decision Making Authority (DMA) of its decision on whether or not to assess the GWR Scheme, once all requests for information have been met to the EPA's satisfaction.

If the EPA determines a formal level of assessment, the GWR Scheme project proposal will then be assessed by the EPA under Part IV of the EP Act and managed according to the Ministerial Conditions applied to it. Further approvals will also be required under Part V of the EP Act. If the EPA finds the proposal does not require assessment, the Part V approvals will still be required. Approvals under Part V are administered by the Department of Environment and Conservation.

8.2.2 Department of Environment and Conservation

8.2.2.1 Works Approval

To meet the requirements of Part V of the EP Act, Water Corporation is required to undertake any work or construction in relation to an AWRP and GWR scheme (that will cause the premises to become or capable of being a prescribed premises) in accordance with a works approval issued by DEC.

Water Corporation will be required to make an application for a works approval to DEC and provide supporting information to allow DEC to determine whether all necessary measures to protect the environment will be taken to ensure emissions and discharges from the prescribed premises do not present an unacceptable risk.

A key area of interest for DEC will be the treatment processes and process controls including measurement, critical control and feedback systems that will be used to manage the performance of the AWRP and GWR process, to the extent that they impact on recycled water quality and emissions and discharges from the Premises.

DEC assesses works approval applications in accordance with all relevant principles and objectives of the EP Act and will, where a decision is made to issue a works approval, impose conditions on the works approval in accordance with Section 62A of the EP Act, to prevent, control, abate or mitigate pollution or environmental harm.

Following completion of the works authorised by the works approval, Water Corporation will be required to submit a compliance document to DEC. This compliance document is required to verify that the works have been completed in accordance with the conditions of works approval and that commissioning has demonstrated that the AWRP is operating to its design specification. Section 57 (3)(b) of the EP Act, prevents DEC issuing a licence where works have not been completed as per the conditions of a works approval.

8.2.2.2 Licence

Water Corporation will require a licence under Part V of the EP Act to operate an AWRP and GWR scheme. DEC will impose conditions on any licence issued in accordance with Section 62A of the EP Act, to prevent, control, abate or mitigate pollution or environmental harm.

The extent to which DEC may impose conditions on Part V licences for GWR Schemes will depend on the circumstances and facts of each GWR proposal. For most schemes, conditions relating to the specification of the treated sewage (recycled water quality) and monitoring of the receiving groundwater are likely to be appropriate.

8.2.3 Department of Health

The following requirements must be addressed by the Water Corporation in gaining approval for a GWR Scheme.

8.2.3.1 Approve construction of a Treatment Plant

According to the *Health Act* 1911, recycled water is considered to be sewage, until such time it appropriately treated to a level considered to be Drinking Water quality or above. Therefore, an Advanced Water Recycling Plant (AWRP) is considered to be an infrastructure

which treats sewage and *requires an application to construct or install an apparatus for the treatment of sewage* in accordance with the *Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974*.

8.2.3.2 Memorandum of Understanding

The DoH will enter into a Memorandum of Understanding (MoU) with the Water Corporation to describe requirements for water quality, monitoring, review, notification, compliance and audit. A MoU enables the DoH to assess and scrutinise recycled water quality to ensure protection of public health and the Drinking Water resource.

8.2.3.3 Recycled Water Quality Management Plan

The Recycled Water Quality Management Plan is designed to manage recycled water quality from catchment to tap by incorporating an integrated quality assurance framework. A 12 element risk management framework for the management of recycled water quality describes a process for developing and implementing preventative risk management systems for recycled water use. This management framework is referenced in the AGWR Guidelines.

A GWR Scheme will be managed through the implementation of a Recycled Water Quality Management Plan. The Plan together with details of a monitoring plan for the Scheme must be endorsed by the DoH prior to commencing recharge.

8.2.3.4 Treatment Plant Commissioning

The DoH will review AWRP commissioning data prior to providing final approval to commence recharge.

8.2.4 Department of Water

The DoW have developed a new policy, *Operational Policy 1.01 – Managed aquifer recharge in Western Australia* (DoW, 2011) to aid the approval of socially and environmentally acceptable managed Aquifer Recharge (MAR) proposals under the *RIWI Act 1914*. Policy 1.01 was utilised to provide guidance in the development of the following DoW approvals required for a GWR Scheme:

8.2.4.1 26D licence to construct recharge and monitoring bores
Construction of recharge bores will need to be licensed under Section 26D of the *RIWI Act 1914*. The license when issued will contain terms and conditions specific to the construction requirements of the bore. The Water Corporation must apply for a 26D licence prior to commencing construction.

8.2.4.2 In-principle GWR entitlement

As noted in Section 6.2 of the DoW Operational Policy 1.01, *water that is recharged into the natural groundwater system is vested in the Crown (i.e. when the recharge water enters the groundwater*

system, the proponent does not retain ownership of that water). Therefore the proponent of a GWR Scheme has the same rights as other licence holders and must apply for a licence to recover the recharge water. Typically, DoW will grant licence entitlement to abstract water to the proponent undertaking recharge operations.

The DoW have granted the Water Corporation a 1:1 recharge and recovery ratio of a GWR Scheme (i.e., 7 GL/yr, Stage 1). An annual licence to recoup GWR recharged water is outlined below.

8.2.4.3 Licence GWR entitlement

The DoW manages annual groundwater abstraction via a five (5) yearly Water Resource Management Operating Strategy (WRMOS) for the Integrated Water Supply Scheme (IWSS) (Water Corporation, 2012). The process by which GWR water is recouped aligns with established operating procedures detailed in the IWSS WRMOS.

Prior to the commencement of each water year, the Water Corporation will submit a 5C application to abstract water that will specify the anticipated groundwater abstraction and proposed location (including GWR water). As the licence will be issued for a limited tenure, an addendum to the IWSS WRMOS will be prepared.

The GWR entitlement of the 5C licence will be based on the forecast recharge for that year. The location of abstraction will be determined in accordance with the operating rules for groundwater abstraction that include the environmental sensitivity principles described in the IWSS WRMOS.

Matters relating to water quality can be submitted as an addendum to the IWSS WRMOS, once the results of the Trial have been analysed against the identified environmental values within the defined management zone and the level of protection achieved.

8.2.4.4 Permission and exemption of By-Laws under the EP Act
The DoW is responsible for protecting Public Drinking Water Source Areas (PDWSA's) under the *Metropolitan Water Supply, Sewerage and Drainage (MWSSD) Act 1909*. There is currently no differentiation with regards to recharging into an unconfined or confined PDWSA and therefore, all associated By-laws under the *MWSSD Act 1909* apply.

Specifically, there are two By-laws under *MWSSD Act 1909* that relate to the approval of a GWR Scheme proposal. These By-laws are administered by the DoW, and are as follows;

By-law 5.4.6

In a pollution area or a part of a pollution area, a person shall not dispose of or discharge onto or into the ground, or into any lake, swamp or drain industrial wastes, chemicals, radioactive material, petroleum or petroleum products, polluted water, or refuse unless that person has been granted permission in writing by the Commission to do so.

By-law 5.4.7

A person shall not discharge into any well or observation well any chemical, industrial waste, treated or untreated sewage, effluent or other matter which in the opinion of the Commission may pollute the underground water.

Based on the definition of recycled water ([section 6](#)), GWR recycled water is not considered to be *polluted water, or refuse or untreated sewage, effluent or other matter* pertaining to the above By-laws. The DoW will not require the administration of these Bylaws for the approval of a GWR Scheme. Therefore, the Water Corporation will not be required to seek permission or exemption from these By-laws for a GWR Scheme.

8.3 Regulating an Operational Scheme

8.3.1 Department of Health

The DoH provides protection of public and the Drinking Water resource by regulating the recycled water quality in a GWR Scheme. This is managed via a GWR MoU ([section 8.2.3.2](#)).

The Health Advisory Committee, consisting of the DoH and Water Corporation was established for the GWR Trial and will remain in place after the Trial. The Committee, chaired by the Water Corporation, meets monthly to review treatment performance and recycled water quality to ensure protection of public health and the Drinking Water resource. Both organisations are committed to the ongoing work of this Committee to ensure safe Recycled Water.

8.3.2 Department of Environment and Conservation

Water Corporation must manage, operate, monitor, report and undertake any relevant actions in relation to an operational GWR scheme in accordance with the conditions of the EP Act licence. The licence will require Water Corporation to produce an Annual Audit Compliance Report (AACR) that sets out the extent to which licence conditions have been complied with over the previous year and an Annual Environmental Report (AER). The licence will require the AER to include information relating to any complaints and/or incidents at the premises together with a summary of relevant process/operational data, monitoring data and an assessment of monitoring results against any targets or limits in the licence.

DEC will regulate operational GWR Schemes through a series of inspections and audits and by the review and assessment of AACRs, AERs and other submissions that may be required by the licence.

8.3.3 Department of Water

The DoW will manage the annual groundwater recharge and abstraction quantities via the IWSS WRMOS. The GWR abstraction will be negotiated annually in addition to a baseline groundwater allocation.

For water accounting purposes, the Water Corporation will add water replenishment volumes to standard monthly and annual reporting. The overall "banked" volume will also be reported. This is the cumulative difference between recharge and abstraction calculated over the life of the scheme.

9 Conclusion

The IAWG have developed the GWR Regulatory Framework which defines the initial assessments pathway required to develop, approve commencement of recharge and provide ongoing regulation for a Groundwater Replenishment Scheme.

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