



Application to replace expiring licence

Part V Division 3 of the *Environmental Protection Act 1986*

Licence Number	L8466/2010/3
Applicant	Water Corporation
ACN	28 033 434 917
File Number	2010/004862-1
Premises	Southern Seawater Desalination Plant BINNINGUP WA 6233 Lot 100 on Plan 70153 as depicted in Schedule 1 of the renewed licence.
Date of Report	16 December 2021
Decision	Licence granted

Jane Dalin
Senior Environmental Officer
Industry Regulation

An officer delegated by the CEO under section 20 of the EP Act

1. Application summary

On 18 October 2021, the Water Corporation (Licence Holder) applied to renew licence L8466/2010/2 as the licence is due to expire on 16 January 2022. The Premises is located at Lot 100 on Plan 70153 approximately 30km north of Bunbury. The licence currently relates to prescribed premises categories as described below in Table 1.

Table 1: Premises category description and production design capacity

Prescribed premises category description (Schedule 1, <i>Environmental Protection Regulations 1987</i>)	Assessed production capacity
Category 54A Water Desalination Plant: premises at which salt is extracted from water if – (a) Wastewater is discharged into marine waters; and (b) The discharged wastewater has a density greater than the average ambient density of the marine water at the discharge site.	120 Gigalitres per annual period
Category 61 Liquid waste facility: premises on which liquid waste produced on other premises (other than sewage waste) is stored, reprocessed, treated or irrigated	20 000 tonnes per annual period

The plant site lies mainly on the Quindalup Dune system of the southern Swan Coastal Plain, which is characterised by calcareous Safety Bay sand and forms a series of naturally stable and mobile parabolic dunes up to 40m in height. The eastern portion of the site is on a veneer of Cottesloe soil over Tamala limestone. Average annual rainfall at the site is approximately 850 mm.

The Southern Seawater Desalination Plant produces potable water utilising the process of Reverse Osmosis (RO) desalination. In the RO process, seawater is applied to a semi permeable membrane at high pressure, whereby a percentage of water but excluding the dissolved salts passes through the membrane. The remaining portion of water, containing virtually all of the salt in the effluent (brine) is discharged to the Indian Ocean via the marine outfall diffuser.

Discharge into the ocean occurs via a diffuser array, located approximately 600 m offshore and extending less than 1100 m offshore. The location of the diffuser array has been defined as a Low Ecological Protection Area (LEPA) for the purposes of allowing dilution of the desalination effluent. The LEPA extends for 50 m in each direction beyond the diffuser array and comprises a nominal area of 100 m x 600 m, or 6 ha. The diffuser array has been designed so that adequate dilutions of brine are achieved within a LEPA of an acceptable size.

For a more detailed process description please see Appendix 1 of this report for a copy of the original decision document for this licence.

2. Regulatory framework

The department has determined to undertake an administrative renewal of the licence and has not conducted a full review and risk assessment of emissions and discharges from the premises in line with the Department's *Work Instruction: Regulatory Services, COVID-19 licensing position* June 2021.

In replacing the licence, the department has considered and given due regard to its regulatory framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

The discharge of emissions to the marine environment are managed and regulated under Part IV of the Environmental Protection Act, in accordance with relevant standards through the ministerial conditions contained in Ministerial Statement 792, including the requirement to implement a Marine Environmental Monitoring Program.

3. Decision summary

Under the regulatory framework the Delegated Officer has determined to grant the licence L7236/1997/12 without conducting any additional assessment or risk assessment.

The replacement licence will be issued for 5 years and is consistent with the *Guidance Statement: Licence Duration 2016*.

In renewing the licence the Delegated Officer has determined to:

- update the format and appearance of the licence;
- revise licence conditions and consolidate existing pollution control conditions;
- correct clerical mistakes and unintentional errors; and
- transfer all existing regulatory controls and conditions to the renewed licence.
- Remove references to Category 61 and acceptance of brackish water.

As a result of this decision, a renewed Licence L8466/2010/3 has been granted subject to conditions set out in the attached licence and summarised below.

3.1 Summary of administrative changes

Section 62 of the EP Act provides general power to impose conditions on licences. All licences are issued with conditions as per *Guidance Statement – Setting Conditions* (October 2015) for the purposes of the EP Act to prevent, control, abate or mitigate pollution or environmental harm.

Table 2 summarises the transfer of all appropriate conditions from the expiring licence into the renewed licence including changes made to licence conditions where required and the rationale for changes made.

Table 2: Summary of changes from Expiring Licence to Renewed Licence

Licence condition or table number or reference	Summary - previous licence condition	Conversion notes	New licence condition or table number
Introduction	Preamble to Licence	Replaced with Introduction section	Interpretation
Category 61	Listed category on cover page of licence	Removed as no longer operating a category 61	none
1 Interpretation	Definitions of terms within the Licence	Moved to back of Licence, new relevant definitions added	Table 9 - Definitions
1.1.3	Relevant parts of standard	Condition replaced with a new definition in Table 9 "Australian Standard"	Table 9 - Definitions
1.1.4	Reference to guidelines and codes of practice	Condition replaced with a new definition in Table 9 "Guideline" and "Code of practice"	Table 9 - Definitions
1.1.5	Unauthorised emissions	Replaced with interpretation section	Interpretation
1.2.1	Pollution control and monitoring equipment maintenance	Moved to Table 1	Table 1
1.2.2	Hazardous spills	Renumbered only	Condition 2
1.3.1	Brackish water liquid waste	Removed -redundant condition, waste type no longer accepted	none
Table 1.3.1	Waste acceptance	Removed -redundant table, waste type no longer accepted	none
1.3.2	Containment infrastructure	Renumbered only	Condition 3
Table 1.3.2	Containment Infrastructure	Incorporated into Table 1	Table 1
2.1.1	Emission exceedances	Renumbered to Condition 4, removed reference to section 2 of licence	Condition 4
2.2.1	Point source emissions	Renumbered to Condition 5, replaced reference to Table 2.2.1 to Table 2	Condition 5
Table 2.2.1	Surface water emission points	Renumbered to Table 2. Replaced reference to W1 with Discharge Sample Point as W1 is not labelled in the map.	Table 2

Licence condition or table number or reference	Summary - previous licence condition	Conversion notes	New licence condition or table number
Condition 2.2.2	Monitoring of inputs/outputs	Renumbered to Condition 5, replaced reference to Table 2.2.2 to Table 3	Condition 6
Table 2.2.2	Process monitoring specifications	Renumbered to Table 3. Replaced reference to W1 with Discharge Sample Point as W1 is not labelled in the map.	Table 3
Condition 3.1.1	Calibration of monitoring equipment	Renumbered only	Condition 7
Condition 3.1.2	Discrepancies arising from calibration requirements	Renumbered only	Condition 8
Condition 3.1.3	Maintain sampling point	Renumbered only	Condition 9
Condition 3.2.1	Point source monitoring	Renumbered, changed reference to Table 3.2.1 to Table 4. Changed reference to W1 to Discharge Sample Point as W1 is not labelled in the map.	Condition 10
Table 3.2.1	Point source monitoring	Renumbered and changed reference to W1 to Discharge Sample Point as W1 is not labelled in the map.	Table 4
Condition 3.3.1	Monitoring of inputs and outputs	Renumbered and removed reference to Table 3.3.1 to Table 5.	Condition 11
Table 3.3.1	Monitoring of inputs and outputs	Renumbered to Table 5, removed reference to 'Brackish water from Denmark' and associated monitoring frequency as activity is redundant.	Table 5
Condition 4.1.1	Information and records	Renumbered and changed reference to 5.1.1(d) to 12(d). note this should have originally been 4.1.1(d) as there was no 5.1.1(d) within the licence	Condition 12
Condition 4.1.2	Persons in charge	Renumbered and slight rewording of condition	Condition 13
Condition 4.1.3	Annual Audit Compliance Report	Renumbered only	Condition 14
Condition 4.1.4	Complaints management system	Renumbered only	Condition 15
Condition 4.1.5	CEO reports related to Condition 6 of Ministerial Statement 792	Renumbered only	Condition 16
Condition 4.1.6	Chemical analysis results recorded	Renumbered only	Condition 17
Condition 4.2.1	Submission of Annual Environmental Report	Renumbered and changed reference to Table 4.2.1 to Table 6	Condition 18
Table 4.2.1	Annual Environmental Report	Renumbered only	Table 6
Condition 4.2.2	Previous monitoring results assessment	Renumbered only	Condition 19
Condition 4.2.3	Non Annual Environmental Reporting requirements	Renumbered and changed reference to Table 4.2.2 to Table 7	Condition 20
Table 4.2.2	Non Annual Environmental Reporting requirements	Renumbered only to Table 7	Table 7
Condition 4.3.1	Notification parameters	Renumbered and changed reference to Table 4.3.1 to Table 8	Condition 21
Table 4.3.1	Notification requirements	Renumbered to Table 8. Changed reference within table to condition 2.2.2 to Condition 5 and Table 3. Removed specifications to Part A and Part B. added new location of forms as N1 form no longer in use. Changed reference to condition	

Licence condition or table number or reference	Summary - previous licence condition	Conversion notes	New licence condition or table number
		3.1.2 to Condition 7.	
Schedule 2	Reporting and notification forms	<p>Removed as forms are no longer up to date. New forms are available at www.dwer.wa.gov.au</p> <p>Schedule 2 has been replaced with a coordinates table of the premises boundary. Coordinates are as provided by the Water Corporation as part of this renewal application.</p>	Schedule 2

4. Consultation

The draft replacement licence and this decision report were provided to the licence holder on 6 December 2021 for comment. The licence holder provided a response on 16 December 2021 with the following comments.

Table 3: Summary of Licence Holders comments

Licence condition or table number or reference	Requested amendment	DWER response
Condition 18	Change 63 days to 93 days consistent with similar licences	Changed to 93 days
Condition 21 (Table 8)	Request to remove reference to provide calibration report as soon as practicable as metres are regularly calibrated. Requested to be included in AER data instead.	Removed Table 8 reference to calibration report. Included reference to calibration data to be included within the AER data (now condition 18 Table 6)
Schedule 1	Update with latest maps as provided in application supporting information	Updated to latest maps provided as part of application.

5. Decision

The Delegated Officer has determined the risks to human health and the environment from the activities on the Premises, and as previously assessed by the Department have not materially changed. The Delegated Officer has determined to grant renewed licence L8466/2010/3 without conducting any additional risk assessment.

Appendix 1 – Original Decision Document

1.0 BACKGROUND

1.1 GENERAL COMPANY DESCRIPTION

The Water Corporation is a state government utility that exists to provide water and wastewater services to Perth and regional cities and towns in Western Australia. The Water Corporation operates licensed wastewater treatment plants at many locations in Western Australia and also operates the Perth Seawater Desalination Plant at Naval Base. The Water Corporation currently operates the Binningup Wastewater Treatment Plant under Registration R341/1992/1 at the site of the proposed SSDP.

The Water Corporation has an environmental policy available on its website and operates to an environmental management system certified under ISO 14001.

1.2 LOCATION OF PREMISES

The SSDP is located at Binningup in the Shire of Harvey, approximately 130 km south of Perth and 30 km north of Bunbury (Figure 1). The plant is located on the coastal plain within 300 m of the coastline. Lots 32 and 33 on Taranto Rd are reserved for 'Public Utilities' under the Greater Bunbury Regional Scheme (WAPC 2007) and are owned by the Water Corporation. The Binningup Wastewater Treatment Plant is located on these lots. Lot 100 on Taranto Road was the location of a disused limestone quarry. The nearest residence to the premises is approximately 300 m to the south-east.

1.2.1 Physical Environment

The plant site lies mainly on the Quindalup Dune system of the southern Swan Coastal Plain, which is characterised by calcareous Safety Bay sand and forms a series of naturally stable and mobile parabolic dunes up to 40m in height. The eastern portion of the site is on a veneer of Cottesloe soil over Tamala limestone. Average annual rainfall at the site is approximately 850 mm.

1.2.2 Water Resources

Surface Water

The northernmost extent of an un-named Conservation Category Wetland occurred on the plant site. Lot 8 contained approximately 2.06 ha of the 481.5 ha wetland which had been degraded as a result of past removal of vegetation, filling and drainage for agriculture. The layout of the plant was chosen so that only the northernmost 2 hectares of the wetland was impacted. A wetland mitigation and offset package was developed for this area as part of the Environmental Impact Assessment process.



Figure 1: Location of Southern Seawater Desalination Plant

Groundwater

The site is located within the Myalup Sub-Area of the South West Coastal Groundwater Area. The proposed plant site is not located within a Public Drinking Water Source Area. Groundwater is used for irrigation on properties to the south and east of the premises. Typical depth to groundwater is seasonally variable and less than 1 m at the site. Groundwater at the site is potentially contaminated with thermotolerant coliforms resulting from the nearby Binningup Wastewater Treatment Plant, and has also been found to contain elevated levels of metals including cadmium, iron, aluminium and zinc. Dewatering has occurred during construction and a groundwater cone of depression exists locally as a result. This cone of depression is expected to extend for approximately 600 – 850m and to dissipate fairly rapidly given the high transmissivity of sediments in the area. Dewatering for the purposes of construction occurred within a management plan written for the site (Acid Sulphate Soils and Dewatering Management Plan, November 2009, RPS Group) and a closure report has been provided to DEC consistent with the requirements of the works approval W4519/2009/1 as amended (Expansion Project – Acid Sulfate Soil and Dewatering Closure Report, March 2013, Water Corp).

Marine Water

The site is classified as the Leeuwin-Naturaliste Region of the IMCRA South-West Province, comprising warm temperate waters with enhanced benthic primary productivity and high species diversity. There are no Marine Nature Reserves, Marine Parks or Marine Management areas in the proposal area. There is a proposed Marine Conservation Area 8 km south of the proposed desalination plant. The potential impacts from the project on the proposed Marine Conservation Area have been addressed in the Environmental Impact Assessment process. A Foreshore Management Plan was required as a condition of Planning Approvals granted by the Western Australian Planning Commission.

1.2.3 Flora and Fauna

The project site lies within the Drummond Botanical Sub-district and has been described as the Quindalup Complex, comprising of two alliances – the strand and fore-dune alliance and the mobile and stable dune alliance. The footprint of the construction area for the plant targeted the area of coastal scrub and avoided those areas identified as having higher conservation values such as the Tuart and the Banksia-Peppermint Woodlands.

A flora survey conducted by 360 Environmental (2008) concluded that there was no Threatened Ecological Communities (TECs) located within the plant site. Four of the plant sites Floristic Community Types (FCTs) have been listed as Priority Ecological Communities (PECs). No Declared Rare Flora (DRF) was found on the plant site.

There are no species of threatened or priority fauna recorded at the site. Significant fauna species that may be present include Carnaby's and Baudin's cockatoos, forest red-tailed black cockatoos, chuditch, western ring-tailed possums and quenda. Impacts to fauna species have been considered under the *Environmental Protection and Biodiversity Conservation Act 1999* (Commonwealth).

1.2.4 Sensitive Receptors

Marine mammals including cetaceans and pinnipeds were identified as sensitive receptors during the construction phase of the project when blasting and underwater excavation was occurring. It is not expected that these species will be impacted by the project during operation. The nearest residence to the project is located approximately 300 m to the south-east.

1.3 PROCESS DESCRIPTION

The SSDP is a reverse osmosis seawater desalination plant with an ultimate designed operational capacity of 100 GL/annum. The process of seawater desalination includes seawater intake, screening and pumping, filtration and reverse osmosis, disposal of waste comprising solids and brine, and water potabilisation (Figure 2).

The SSDP was constructed in two stages. The first stage of construction allowed for the production of 50 GL per year of potable water, while the second stage of construction has resulted in capacity for the production of 100 GL per year.

Water treatment up to and including potabilisation occurs at the Binningup site. The other components of the project including the potable transfer water pipeline and Harvey summit tanks are not considered as prescribed premises and therefore not subject to this assessment. Significant emissions and discharges are not expected to occur at these locations.

1.3.1 Seawater Intake

The seawater intake station consists of:

- 2 intake towers approximately 500 m offshore with 50 mm bar screens;
- 2 inlet pipes, each 900 m long, from the intake towers to the seawater pump station 400 m inland; and
- onshore equipment to conduct shock chlorination of the inlet pipe.

1.3.2 Seawater Pump Station

The seawater pump station is an onshore facility that screens the incoming seawater from the offshore intake structure and pumps it through the downstream pre-treatment process. The main components of the intake pump station are:

- 6mm mesh intake screens and screenings disposal system to remove coarse solids from the incoming seawater and protect the seawater pumps;
- wet well to provide the seawater source of the seawater pumps;
- pump room which contains the seawater pumps and associated equipment, which pumps the water to pre-treatment; and
- surge vessels to protect the pipeline and pumps during sudden power loss situations.

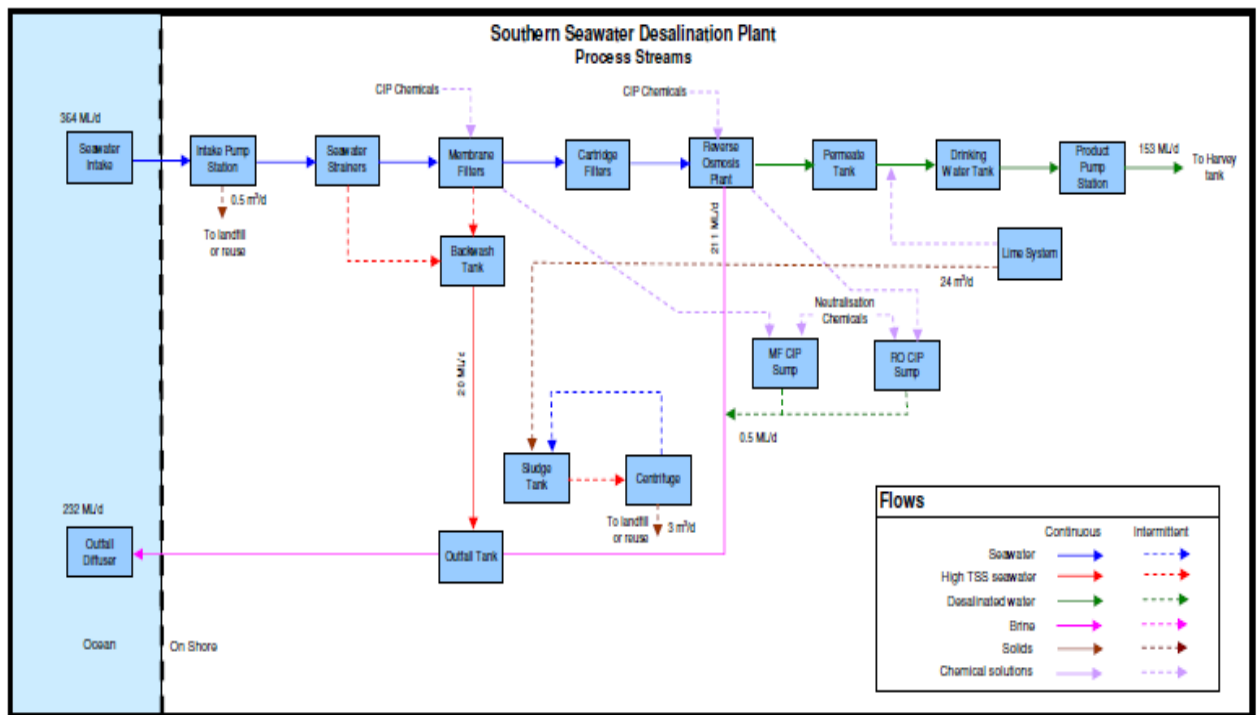


Figure 2: The Desalination Process

1.3.3 Pre-treatment

The pre-treatment system ensures that the quality of the feed water is suitable for the RO process. The main components of pre-treatment are:

- strainers to further remove solids from the seawater to clean the water to an acceptable level for micro-filtration;
- membrane filters to clean the seawater so it is suitable for RO; and
- Clean in Place (CIP) system to clean the membrane filters as required.

The original proposal for the SSDP included lamella filtration to remove solids from the seawater prior to RO and producing a waste stream of solid filter cake for disposal to landfill. The project was amended to include membrane filters at the pre-treatment stage, producing a stream of suspended solids in brine instead of solid filter cake.

1.3.4 Reverse Osmosis

The reverse osmosis system is the core technology in the overall desalination plant. The main components of the reverse osmosis system are:

- high pressure pumps to increase the pressure of the seawater to “push” water through the membrane;
- “First pass” membranes to remove salt and other impurities from the seawater. The membranes essentially ‘split’ the incoming water into 2 streams; permeate (clean water) and brine;
- energy recovery devices to recover energy remaining in the brine stream thereby reducing plant energy consumption;
- “Second pass” membranes to further improve water quality to the required standard; and
- Clean in Place (CIP) system to clean the membranes as required.

1.3.5 Potabilisation

The potabilisation system is used to stabilise permeate water and ensure water meets drinking water quality standards. The main components of the potabilisation include the:

- lime saturator and dosing system to stabilise the water;
- carbon dioxide dosing system to stabilise the water and reduce pH;
- fluorosilicic acid (FSA) dosing system to add fluoride to the water in accordance with statutory requirements; and
- chlorine dosing system to ensure final water quality.

1.3.6 Drinking Water Storage and Pumping

The main components of the drinking water storage and pumping system include the:

- drinking water storage tank to hold the water prior to pumping;
- drinking water pumps to pump the water into the Integrated Water Supply System (IWSS); and
- surge vessels to protect the IWSS pipeline during sudden power loss situations.

1.3.7 Wastewater Treatment and Discharge

The following streams are discharged from the desalination plant in normal operation:

- seawater intake screen washings;
- membrane backwash effluent from membrane filter;
- reverse osmosis plant concentrated brine stream;
- neutralised reverse osmosis plant chemical clean wastewater;
- neutralised membrane filter plant chemical clean wastewater; and
- reverse osmosis plant flushing wastewater.

Seawater screen washings and membrane backwash effluent contain suspended solids derived from the seawater intake. Solids removed by the screening system are transported to a licensed landfill site or reused in a sustainable manner.

Membrane backwash effluent is returned to the ocean via the brine discharge.

Reverse osmosis effluent is treated to remove suspended solids and discharged to the ocean via the brine discharge diffuser, so that the chemical concentrations are acceptable at the LEPA boundary in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

The wastewater is discharged via a 320m long brine diffuser pipe with 80 diffuser ports which begin 600m offshore and extend no more than 1 100 m offshore.

1.3.8 Solid Waste

Wastewater generated through the reverse osmosis plant and membrane filter CIP systems is treated to remove suspended solids, forming a solid waste stream. The average volume of solid waste is expected to be approximately 3m³/day although this will vary seasonally. The solid waste is stored on site in skip bins prior to being transported to landfill for disposal or reused off-site. The substitution of membrane filtration at the pre-treatment stage has reduced the expected volume of solid waste by approximately 90%. Opportunities for appropriate re-use of the material will depend on the characteristics and volumes of solid waste that is generated.

1.4 REGULATORY CONTEXT

1.4.1 Part IV Environmental Protection Act 1986, Environmental Impact Assessment

The SSDP was referred under section 38 of the *Environmental Protection Act 1986* ('the Act') to the Western Australian Environmental Protection Authority (EPA) in July 2007. The level of assessment was set at Public Environmental Review (PER) with a six week public comment period on 30th July 2007. The project referral consisted of three components: the desalination plant, transfer pipeline and the Harvey Summit Tanks. The EPA's report (#1302) contains the assessment and recommendations. Ministerial Statement 792 was released on the 6th October 2008 and subsequently appealed. The Appeals Convenor report was finalised on 22 April 2009.

The key environmental factors that were evaluated by the EPA in report 1302 are:

- 1 water quality and marine biota;
- 2 terrestrial fauna;
- 3 terrestrial vegetation and wetlands; and
- 4 greenhouse gas emissions.

There are 12 Ministerial conditions (Ministerial Statement 792) associated with the current environmental approval. These include;

- 1 implementation of the proposal;
- 2 proponent nomination and contact details;
- 3 time limit for authorisation;
- 4 compliance reporting;
- 5 performance review and reporting;
- 6 water quality and marine biota;
- 7 marine mammals;
- 8 terrestrial fauna;
- 9 terrestrial flora and vegetation;
- 10 wetlands;
- 11 greenhouse gas emissions; and
- 12 closure and final rehabilitation.

The Proponent is required to prepare management plans and reports consistent with Ministerial Statement 792. These include the:

- 1 Compliance Assessment Plan for Statement 792;
- 2 Compliance Assessment Report for the Ministerial Conditions 792;
- 3 Performance Review Reports in the 2nd, 4th and 6th years;
- 4 Marine Environmental Monitoring Program to measure discharge impacts;
- 5 Report on Marine Mammal observations during construction of seawater pipelines;
- 6 native fauna management reports;
- 7 Vegetation, Declared Rare and Priority Flora and Fauna Habitat Management plan;
- 8 Post and Pre construction Flora and Fauna Management Plan;
- 9 Rehabilitation Monitoring Performance Annual report;
- 10 preparation and implementation of an "Offset Implementation Strategy";
- 11 Greenhouse Gas Management strategy; and
- 12 Desalination Plant Closure Plan in the event the plant closes.

A variation to the Desalination plant process was assessed and approved by the EPA on 8 December 2009. This variation covered a change from solids filtration using lamella filtration producing filter cake solids to membrane based filtration producing a stream of backwash discharged via the brine outfall.

The discharge of emissions to the marine environment are managed and regulated in accordance with relevant standards through the ministerial conditions contained in Ministerial Statement 792, including the requirement to prepare and implement a Marine Environmental Monitoring Program.

1.4.2 Part V Environmental Protection Act 1986, Environmental Management

Desalination plants are included in Schedule 1, Part 1 of the Environmental Protection Regulations 1987, therefore the construction and operation of the plant require a works approval and licence, consecutively, under Part V of the Act. Construction of the SSDP was undertaken under works approval number W4519/2009/1, which was issued on 12 June 2009 and amended on 4 February 2010. An application for licence was received on 12th July 2010. Documents prepared by the proponent included a Construction Environmental Management Framework (CEMF), Operational Environmental Management Framework (OEMF) and an Acid Soils Sulphate Soil and Dewatering Management Plan (November 2009). The documents deal with the emissions and discharges during the construction and operational phase of the project.

DER Policy Position/Guidance Statements relevant to the SSDP proposal:

- Limits and Targets for Prescribed Premises Policy (April, 2006);
- Regulatory Monitoring Requirements for Prescribed Premises (April, 2006); and
- Works Approvals, Licenses and conditions for prescribed premises (May 2006).

EP Regulations relevant to the Binningup SSDP proposal:

- Environmental Protection Regulations 1987;
- Environmental Protection (Noise) Regulations 1997 (Noise Regs);
- Environmental Protection (Unauthorised Discharges) 2004 (UD Regs);
- Environmental Protection (Controlled Waste) Regulations 2004 (CW Regs); and
- Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regs).

1.4.3 Other Decision Making Authorities' Legislation

The construction and operation of the SSDP is subject to regulation under a number of other pieces of state and Commonwealth legislation (Table 2)..

Table 2: Diagrammatic Depiction of the variation to the Desalination Process

State Legislation	Administering Agency
<i>Water Services Licensing Act 1995</i>	Economic Regulatory Authority
<i>Aboriginal Heritage Act 1972</i>	Department of Indigenous Affairs
<i>Aboriginal Communities Act 1979</i>	Department of Indigenous Affairs
<i>Aboriginal Affairs Planning Authority Act 1972</i>	Department of Indigenous Affairs
<i>Contaminated Sites Act 2003</i>	Department of Environment Regulation
<i>Conservation and Land Management Act 1984</i>	Department of Environment Regulation
<i>Dangerous Goods Safety Act 2004</i>	Department of Consumer and Employment Protection
<i>Heritage of Western Australia Act 1990</i>	Heritage Council of Western Australia

State Legislation	Administering Agency
<i>Land Administration (Amendments) Act 1997</i>	Department of Land Information
<i>Local Government Act 1995</i>	Local Government
<i>Marine and Harbours Act 1981</i>	Department of Planning and Infrastructure
<i>Rights in Water and Irrigation Act 1914</i>	Department of Water
<i>Soil and Land Conservation Act 1945</i>	Department of Agriculture and Food
<i>Town Planning & Development Act 1928</i>	Western Australian Planning Commission
<i>Wildlife Conservation Act 1950</i>	Department of Environment and Conservation
Commonwealth Legislation	Administering Agency
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	Department of Sustainability, Environment, Water, Population and Communities
<i>Australian Heritage Council Act 2003</i>	
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	
<i>Environment Protection and Biodiversity Conservation Amendment (Wildlife Protection) Act 2001</i>	
<i>Historic Shipwrecks Act 1976</i>	
<i>Native Title Act 1993</i>	National Native Title Tribunal

Note: This list is not considered to be exhaustive.

The project was referred to the then Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) for assessment under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) on 3 February 2009 till 17 March 2009. Approval under this Act was granted 24 June 2009 (#2008/4173) and the proposed variation to the desalination process approved on 23 September 2009.

1.4.4 Local Government Authority

The SSDP was constructed in the Shire of Harvey and Development Approval was granted 26th May 2009, conditioning the following matters;

- lighting to meet Australian standards;
- provision of traffic management and road construction plans;
- provision of a revegetation management plan;
- Taranto Road reinstatement;
- provision of acoustic barrier construction timeframes; and
- provision of land planning rezoning and advice to planning authorities.

2.0 STAKEHOLDER AND COMMUNITY CONSULTATION

SUBMISSIONS RECEIVED DURING 21 DAY PUBLIC COMMENT PERIOD

The first Application for Licence details for this facility was advertised in the West Australian newspaper on 26th July 2010 as a means of advising stakeholders and to seek public comments. No submissions were received. A copy of the application for licence was posted to two parties who had identified themselves as stakeholders during the works approval process. No submissions were received from identified stakeholders. Copies of the amended licence will be sent to these two interested parties for comment.

During the works approval assessment and issue process, four submissions were received. The matters raised in submissions include;

- the potential health risks of carcinogenic substances [trihalomethanes (THM's)] not defined;
- the adequacy of the studies completed is questionable;
- that the risk of hyper saline plume was undefined – the chance of hyper saline plume drift into intake infrastructure and plume modelling not sufficient for all weather conditions;
- the risk of contamination by toxic chemicals are not explained, the potential impact of flocculant chemicals in brine discharge not addressed and not all chemicals in the process are disclosed by the applicant;
- the adequacy of oxygen level comparison with Kwinana Desalination plant is questionable;
- the impact on rare and endangered species, impacts on marine and terrestrial wildlife and numbers of fish killed by intake not adequately addressed;
- the impacts of dewatering on land and terrestrial ecosystems not studied in the acid sulphate soils and dewatering management plans;
- the impacts to Binningup residents not considered as inadequate community consultation and engagement was undertaken;
- the plant design the use of membrane filters not finalised;
- noise modelling is insufficient;
- no details on renewable energy sources;
- an independent peer review was not undertaken; and
- an aboriginal heritage survey was not undertaken.

The matters raised were considered in the works approval assessment and have also been considered in this assessment where relevant.

During the PER process for the SSCP, the Water Corporation developed and implemented a comprehensive consultation and communication program with identified stakeholder groups that included;

- local advertising of community events and information on the project;
- participation in local events;
- holding community forums and workshops;
- the distribution of community newsletters;
- media relations;
- stakeholder and community tours;
- presentations and briefings; and
- the distribution of brochures and fact sheets.

3.0 EMISSIONS AND DISCHARGES RISK ASSESSMENT

DER considers that conditions should focus on regulating emissions and discharges of significance. Where appropriate, emissions and discharges which are not significant should be managed and regulated by other legislative tools or management mechanisms.

The following section assesses the environmental risk of potential emissions from the SSDP. In order to determine the site's appropriate environmental regulation, an emissions and discharges risk assessment was conducted of the SSDP using the environmental risk matrix outlined in Appendix B. The results of this are summarised in Table 3.

Table 3: Risk assessment and regulatory response summary table.

Risk factor	Significance of emissions	Socio-Political Context of Each Regulated Emission	Risk Assessment	DER Regulation (EP Act - Part V)	EAR Reference	Other management (legislation, tools, agencies)
Air emissions (point source)	1 – no point source air emissions	No – point source air emissions	E – no regulation	LIC – no conditions	N/A	UD Regs; PER; Operational Environmental Management Framework
Dust emissions	1 – lime silos are fitted with bag filters; plant is on a hardstand and roads are sealed; emissions of dust likely to be below 20% of NEPM under normal and worst case operating conditions	Medium – level of community interest or concern 3; relative proximity Nearby	E – no regulation, other management mechanisms	LIC – no conditions	N/A	PER; Operational Environmental Management Framework
Odour emissions	2 – filter cake sludge (refer to solid/liquid waste)	Medium – level of community interest or concern 3; relative proximity Nearby	D – licence conditions (monitoring/reporting)	LIC– conditions (monitoring/reporting)	Appendix A Section 1.2	PER; Operational Environmental Management Framework
Noise emissions	2 – 12 m earth noise bund around plant; noise levels likely to be 20-50% of Noise Regs	Medium – level of community interest or concern 3; relative proximity Nearby	E – no regulation, other management mechanisms	LIC– no conditions	N/A	Noise Regs
Light emissions	1 – design controls to street lighting levels	Medium – level of community interest or concern 3; relative proximity Nearby	E – no regulation, other management mechanisms	LIC– no conditions	N/A	PER

Discharges to water	3 – discharge of brine to ocean may result in stratification of marine waters for water quality parameters including salinity and derived conditions of dissolved oxygen, temperature, and density; discharge under normal and worst case operating conditions are expected to be 65 – 95% of the standard (for salinity)	Medium – level of community interest or concern 3; relative proximity Nearby	B – licence condition (targets + EMPs – short timeframes)	LIC – conditions	Appendix A Section 1.1	UD Regs; PER; Operational Environmental Management Framework; Ministerial Statement 0792
Discharges to land	1 – no discharges to land (refer to solid/liquid waste)	Medium – level of community interest or concern 3; relative proximity Nearby	E – no regulation, other management mechanisms	LIC– no conditions	N/A	UD Regs; PER; Operational Environmental Management Framework
Solid / liquid wastes	2 – solid sludge comprised of organic materials, flocculants and thickening agents may generate odour; will be stored in bins and disposed of to licensed landfill or reused in accordance with the waste classification	Medium – level of community interest or concern 3; relative proximity Nearby	D – licence conditions (monitoring/reporting)	LIC – conditions (monitoring/reporting)	Appendix A Section 1.2	CW Regs, PER, Operational Environmental Management Framework
Hydrocarbon/ chemical storage	1 – controlled volumes of substances will be stored within regulated facilities to minimise risk of spills	Medium – level of community interest or concern 3; relative proximity Nearby	E – no regulation, other management mechanisms	LIC– no conditions	N/A	Dangerous Goods storage licence and relevant legislation (DMP), PER, Operational Environmental Management Framework
Contaminated site identification	1 – no significant contamination	Medium – level of community interest or concern 3; relative proximity Nearby	E – no regulation, other management mechanisms	LIC– no conditions	N/A	<i>Contaminated Sites Act 2003</i> (DEC),

4.0 GENERAL SUMMARY AND COMMENTS

This EAR assesses the operation of the SSDP at Binningup in the Shire of Harvey. The SSDP draws seawater from the Indian Ocean, treats it through reverse osmosis and discharges the desalination effluent, together with trace amounts of other chemicals, back to the Indian Ocean through a diffuser designed to achieve significant mixing within 50 m on either side of the diffuser. The proponent has developed an Operational Environmental Management Framework (OEMF). The environmental impact of the project has been formally assessed at the level of PER under Part IV of the Act, and the project authorised under Ministerial Statement 792. The regulation of emissions and discharges during the construction of the plant has been considered through a Works Approval (W4519/2009/1). The works approval required that a compliance certificate was submitted to DEC at the completion of works and prior to the commissioning of the plant. Both the first stage (50 GL) and second stage of construction (another 50 GL) have been completed so that the plant now has a capacity of 100 GL. This EAR has assessed the operation of both stages of the desalination plant, and recommends that the licence is amended to permit the operation of both stages with a total production of 100 GL of potable water per year.

The two key operational environmental emissions or discharges are marine discharges and solid wastes. The strategies identified in the proponent's OEMF, the PER and Ministerial Statement 792 are currently considered adequate to monitor, manage and mitigate impacts from planned marine discharges. The intent of the management strategies is to define a Low Ecological Protection Area (LEPA) and to ensure that the discharge does not result in reduced dissolved oxygen content, or a plume of water with a significant increase in salinity, density, turbidity or concentration of contaminants beyond the area defined as the LEPA. Licence conditions focus on ensuring that the proponent's commitments are applied in an enforceable manner. The licence also limits the production of potable water and waste from the plant to the design capacity, with an allowance for acceptable variation of 20%. Additional standard licence conditions are required to ensure that information is communicated to DER.

The premises has been classified as "medium priority" in accordance with DER's licensing priority management framework. A licence will be issued for a period of three years. At least one inspection will occur during the period of the licence. The site is also subject to the general provisions of the Act and the Environmental Protection (Unauthorised Discharges) Regulations 2004.

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APPENDIX A: EMISSIONS AND DISCHARGES OF SIGNIFICANCE

1.1 DISCHARGES TO WATER

When operating at full capacity, the SSDP discharges approximately 150 GL per year of desalination effluent. The desalination effluent consists of brine with a salinity of approximately 65 000 mg/L, which has a significantly higher density than the marine water at the site of the discharge into the ocean (with a salinity of approximately

35 000 mg/L). This effluent also contains residues of substances used in the water treatment process. These substances include coagulants, antiscalant, biocides, by-products and other cleaning and neutralising agents. The pH of the desalination effluent ranges from 7 to 9, and the temperature is approximately 2°C warmer than background levels. At worst case, the desalination effluent has dissolved oxygen levels between 2 and 2.5 mg/L lower than background levels (which are typically 6.5 – 8.5 mg/L). The desalination effluent contains suspended solids at levels of 1.04 – 1.2% of background levels after a dilution of 68 times.

Discharge into the ocean occurs via a diffuser array, located approximately 600 m offshore and extending less than 1100 m offshore. The location of the diffuser array has been defined as a Low Ecological Protection Area (LEPA) for the purposes of allowing dilution of the desalination effluent. The LEPA extends for 50 m in each direction beyond the diffuser array and comprises a nominal area of 100 m x 600 m, or 6 ha. The diffuser array has been designed so that adequate dilutions of brine are achieved within a LEPA of an acceptable size. Industry-derived formulas were used to calculate the dilution behaviour of the discharge plume based on observations at the Perth Seawater Desalination Plant at Naval Base.

The Ministerial Conditions associated with the project require substantial monitoring of discharge plume characteristics including whole effluent toxicity testing. The Marine Environmental Monitoring Program required by the Ministerial Conditions includes key environmental quality objectives and criteria, and requires the establishment of environmental quality trigger levels in accordance with the methodology specified in the relevant Australian and New Zealand Guidelines for Fresh and Marine Water Quality (the ANZECC/ARMCANZ Guidelines 2000). The requirements of this monitoring program are considered adequate and appropriate to monitor for the impacts of discharges to water.

DISCHARGES TO WATER RISK ASSESSMENT

The risk of discharges to water during operation has been determined in accordance with the criteria set out in Appendix B of this report. The measure of significance of discharges to water was determined to be 3, based on estimates that discharge of brine to marine waters would result in water quality parameters being approximately 65 – 95% of the standard under normal and worst case operating conditions. The socio-political context of discharges to water was determined to be Medium, based on a judgement that the level of community interest or concern was 3, and the relative proximity of interested parties was Nearby. The resulting measure of emissions risk is B and the resulting regulatory action is 'licence condition (setting targets + EMPs + short timeframes).

RECOMMENDED STRATEGY FOR MANAGING DISCHARGES TO WATER

The issue of water discharges will be managed under the *Environmental Protection Act 1986* by another authority (in this case the Office of the EPA). Licence conditions are required to ensure that the desalination effluent or brine is discharged only via the constructed pipeline into the defined Low Ecological Protection Area, and that the results of monitoring conditions imposed by the Office of the EPA, and the Marine Environmental Monitoring Program are reported to DER for assessment.

The recommended licence conditions are:

1. The licensee shall only dispose of desalination effluent through the ocean outfall diffuser within the Low Ecological Protection Area as depicted in the Attachment to licence.
2. The licensee is required to submit to the Director a copy of the reports required in each element of Condition 6 of Ministerial Statement 792, in accordance with the time frame specified in each element of Condition 6 of Ministerial Statement 792.

1.2 SOLID/LIQUID WASTE

When operating at full capacity, the SSDP will produce approximately 5 m³/day of solid waste product. The solid waste product is composed of fine solid material that was suspended within seawater intake and deposited onto reverse osmosis membranes or precipitated within the lime clarification. Solids are collected via the Clean-In-Place (CIP) system at the membrane filters and reverse osmosis plant, suspended or dissolved by the recirculating chemical solution that is periodically applied to the filters. The CIP effluent is collected in the CIP sumps, directed to the sludge tank, and dewatered via centrifuge. The dewatered waste is collected and stored in bins prior to transport off-site for either disposal to licensed landfill or re-use in a manner consistent with the waste classification. The sludge is comprised of organic material filtered from seawater, as well as residual amounts of substances used in the water treatment process. These substances include coagulants, antiscalant, biocides, by-products and other cleaning and neutralising agents. The Marine Environmental Monitoring Program (SSWA, October 2009) states that sludge containing residual amounts of biocide will be retained within the CIP effluent sump 'for a long period to facilitate decomposition and minimise potential risks of the parent compound and degradation products entering the receiving environment' (p22). The likely concentrations of biocidal compounds in the CIP effluent sump and in the filter cake waste has not been quantified, and nor has the time required to ensure that these amounts have decomposed into substances that do not have biocidal activity. A study on the potential for solid waste to generate odour or sludge leachate to be contained has been completed and considered for landfill disposal or reuse application.

SOLID/LIQUID WASTE RISK ASSESSMENT

The risk of solid waste discharge during operation has been determined in accordance with the criteria set out in Appendix B of this report. The measure of significance of solid waste discharge was determined to be 2, based on an estimate that concentrations of substances in solid waste would be approximately those of Class III landfill material under both normal and worst case operating conditions. The socio-political context of solid waste discharge was determined to be Medium, based on a judgement that the level of community interest or concern was 3, and the relative proximity of interested parties was Nearby. The resulting measure of emissions risk is D and the resulting regulatory action is 'licence condition (monitoring/reporting)'.

RECOMMENDED STRATEGY FOR MANAGING SOLID/LIQUID WASTES

The issue of solid wastes is a matter that is suitable for licence condition. Conditions are required to ensure that the volume of liquid waste produced at the site is consistent with the environmental impact assessment that was undertaken. Conditions are required to ensure that the quality and quantity of solid waste is determined prior to disposal so that the appropriate disposal option is selected. Conditions are also required to ensure that the solid waste does not generate odour and leachate while it is stored on site prior to disposal off site.

The recommended licence conditions are:

1. The licensee shall ensure that the production of potable water does not exceed 120 GL per year and the volume of desalination effluent discharged through the ocean outfall diffuser does not exceed 170 GL per year.
2. The licensee shall retain all process solid waste on the premises within impervious containers (with the exception of the seawater intake screening collection baskets) prior to disposal off-site to a licensed landfill or re-use in a manner consistent with the waste classification.
3. The licensee shall record the volume of all process solid waste removed from the premises each calendar month.
4. The licensee shall record the results of any chemical analysis conducted on process solid waste produced on the premises.

(i) During the operation of the licensed premises, procedures and infrastructure for handling and storing process solid waste at the premises will be inspected in order to assess the risks of odour, leachate and potential for contamination of surface and ground water from spills.

APPENDIX B: EMISSIONS AND DISCHARGES RISK ASSESSMENT MATRIX

Table 4: Measures of Significance of Emissions

Emissions as a percentage of the relevant emission or ambient standard		Worst Case Operating Conditions (95 th Percentile)			
		>100%	50 – 100%	20 – 50%	<20%*
Normal Operating Conditions (50 th Percentile)	>100%	5	N/A	N/A	N/A
	50 – 100%	4	3	N/A	N/A
	20 – 50%	4	3	2	N/A
	<20%*	3	3	2	1

*For reliable technology, this figure could increase to 30%

Table 5: Socio-Political Context of Each Regulated Emission

		Relative proximity of the interested party with regards to the emission				
		Immediately Adjacent	Adjacent	Nearby	Distant	Isolated
Level of Community Interest or Concern*	5	High	High	Medium High	Medium	Low
	4	High	High	Medium High	Medium	Low
	3	Medium High	Medium High	Medium	Low	No
	2	Low	Low	Low	Low	No
	1	No	No	No	No	No

Note: These examples are not exclusive and professional judgement is needed to evaluate each specific case

*This is determined by DER using the DER “Officer’s Guide to Emissions and Discharges Risk Assessment” May 2006.

Table 6: Emissions Risk Reduction Matrix

		Significance of Emissions				
		5	4	3	2	1
Socio-Political Context	High	A	A	B	C	D
	Medium High	A	A	B	C	D
	Medium	A	B	B	D	E
	Low	A	B	C	D	E
	No	B	C	D	E	E

PRIORITY MATRIX ACTION DESCRIPTORS

A = Do not allow (fix)

B = licence condition (setting limits + EMPs - short timeframes)(setting targets optional)

(ii) C = licence condition (setting targets + EMPs - longer timeframes)

D= EIPs, other management mechanisms/licence conditions (monitoring/reporting)/other regulatory tools

E = No regulation, other management mechanisms

Note: The above matrix is taken from the DER Officer's Guide to Emissions and Discharges Risk Assessment May 2006.