Decision Report

Application for Works Approval

Division 3, Part V *Environmental Protection Act 1986*

Licence Number	W6162/2018/1
Applicant	Water Corporation
File Number	DER2018/001140
Premises	Home Island Wastewater Treatment Plant Part 103 Home Island Cocos (Keeling) Islands INDIAN OCEAN TERRITORIES WA 6799 Legal description - Part of Lot 1106 on Plan 30520 As defined in Schedule 1 of the Works Approval
Date of Report	5 October 2018
Status of Report	Final

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1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
Applicant	Water Corporation
Books	has the same meaning given to that term under the EP Act.
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
Decision Report	refers to this document.
Delegated Officer	an officer under section 20 of the EP Act.
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the *Public Sector Management Act 1994* and is responsible for the administration of the *Environmental Protection Act 1986* along with other legislation.
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of, and during this Review
Licence Holder/ Works Approval Holder	Water Corporation
m^3	cubic metres
NEPM	National Environmental Protection Measure
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA)

Occupier	has the same meaning given to that term under the EP Act.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report
Primary Activities	as defined in Table 3 of the Works Approval
Risk Event	As described in *Guidance Statement: Risk Assessment*
UDR	*Environmental Protection (Unauthorised Discharges) Regulations 2004* (WA)
WWTP	Home Island Wastewater Treatment Plant, prescribed premises L8335/2009/4.

2. Purpose and scope of assessment

A works approval application was received from Water Corporation on 3 July 2018 (via email) for an upgrade to the Home Island Wastewater Treatment Plant, as defined within licence L8335/2009/4, in accordance with the *Environmental Protection Act 1986* and subsidiary legislation.

The applicant is proposing to upgrade the plant by increasing the design capacity and changing the plant from an Intermittently Decanted Extended Aeration (IDEA) process to a continuous aeration process to improve capacity and performance of the plant.

The upgrade of the premises is being undertaken through funding allocation received from the Australian Commonwealth.

2.1 Application details

The proposed works and infrastructure to improve performance and increase the design capacity of the prescribed premises (L8335/2009/4) will include the following:

- Inlet works modified to improve screenings removal.
- Production/Design capacity increased to 200 cubic metres per day with current throughput treatment of approximately 82 cubic metres per day of wastewater.
- Operational modification from an intermittently decanted extended aeration system to continuous aeration system within the existing aeration tank. Continuous aeration will allow for better control of nitrate removal targets as influent loading changes.
- Three (3) new aerators to be installed.
- Disable the decanter function.
- Existing balance tank converted to a clarifier, which will improve solids removal.
- Two new double skinned Polyethylene balance tanks will be installed on site (approximate volume of each tank will be 20kL and 13kL). Both tanks will be installed on concrete hardstand and covered. This will improve effluent quality as algae growth is expected to be significantly reduced as the treated clear water will not be exposed to direct sunlight.
- Replacement of UV disinfection treatment equipment.
- Minor change to the location of sludge and effluent pumps.
- Improvements to existing switchboard and control systems.

The installation of new infrastructure identified for commissioning, prior to operation, includes:

- Inlet screening equipment.
- Three (3) new Aerators.
- Two (2) Polyethylene Balance Tanks (20kL and 13kL) with covers. To be hydrostatically tested prior to commissioning.

The applicant has identified that the upgrade will be undertaken over a three month duration period and will not result in any changes to the existing plant ocean discharge pipeline infrastructure.

Although the design capacity is being increased from 165 m^3/ day to 200 m^3/ day as a result of the upgrades, the daily production volumes for the premises are not anticipated to increase in the short to medium term. Currently the premises average dry weather inflow volume is approximately 100m^3/ day, and wet weather inflow volume is 165 m^3/day.

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received
Email: Application Submission – Works Approval Application – Cocos Home Island WWTP upgrades – L8335/2009/4 – Water Corporation received from Mark Erskine. Includes two attachments: • Works_Approval_Application_-_L8335_2009_4_Home_Island_WWTP_Imerim_Upgrades_2018_19_SIGNED.pdf; • Attachment 8 – WA_Application_Supporting_Information_-_Cocos_Home_Island_WWTP_FINAL.pdf.	03 July 2018
Email: RE: Application Submission – Works Approval Application Cocos Home Island WWTP Upgrades – L8335/2009/4 – Water Corporation from Danielle Scott. (Cut-off and commissioning process).	26 July 2018

3. Background

The Cocos (Keeling) Islands are a group of 27 coral islands located in the Indian Ocean. They are situated approximately 3,000 km north-west of Perth, 3,700 km west of Darwin and 900 km south-west of Christmas Island. Home Island Wastewater Treatment Plant (WWTP) is located on Part 103, part of Lot 1106 on Plan 30520 Home Island, Cocos (Keeling) Islands.

The WWTP design capacity was originally assessed at 165 cubic meters per day, peak wet weather flow. Water Corporation have indicated that the plant capacity may be lower than the currently identified design capacity of the Premises and that a potential upgrade may be required. The WWTP services a relatively stable population of approximately 500 people located on Home Island (Cocos (Keeling) Islands), consisting of the Cocos Malay community. The average daily throughput for the plant is approximately 82 m^3/ day.

Currently, wastewater is treated to secondary standard via an Intermittently Decanted Extended Aeration (IDEA) process. Treated wastewater is decanted from the aeration tank to the balance tank before being disinfected by Ultra Violet (UV) radiation. Treated wastewater is discharged to the Indian Ocean via the outfall pipeline approximately 300 m off shore and at a depth of approximately 15 m. Sludge management is by manual wasting into covered drying beds. Dried sludge is then transferred to the Shire transfer station on Home Island (L8684/2012/1). Random, manual chlorination (tablets) treatment is undertaken for the control of algal growth within the balance tank

Ocean disposal of treated wastewater is the primary disposal option due to the location of the treatment plant adjacent to the Indian Ocean. The sensitivity and vulnerability of the groundwater excludes wastewater reuse as a disposal option on the Island.

The groundwater resource on Home Island consists of a series of freshwater lenses, directly recharged via rainfall infiltration. Home Island has two small lenses approximately 1-2 m below ground level. The main fresh water lens and the drinking water supply, is located to the south of the Island. A brackish water lens is located to the North within the vicinity of the plant. Two galleries draw water from the Northern Lens, with salinity reduced by Reverse Osmosis and then treated by UV disinfection. Periodic chlorination of the WWTP balance tank occurs for management of the algal growth.

Land use surrounding the WWTP is predominately industrial. Adjacent to the WWTP is the Shire landfill and the Powerhouse. The landfill and other industrial uses may contribute to nutrient levels in the groundwater or ocean within the vicinity of the WWTP.

The applicant has proposed an upgrade of the prescribed premises infrastructure due to issues identified with the management of nutrient, pathogen (*E. coli)* and contaminant levels (as identified within a 2013 review of the facility and further confirmed within the 2016/ 2017

Annual Environmental report submitted to DWER). The improvements and upgrades are considered to improve reliability/ consistency of the treatment process, and potentially reduce issues relating to the failure of UV treatment of the waste stream, prior to discharge to ocean outfall.

The proposed upgrades will be undertaken separate to the operation of the premises which will continue to function as normal until all infrastructure is constructed and commissioned. Once all aspects of the upgrade have been tested against manufacturers' specifications, the wastewaters will then be directed through the new infrastructure.

The primary emissions from the operation of the premises are considered to be emissions to surface water (ocean discharge), odour and leachates (sludge). No additional discharges or emissions are anticipated as a result of the proposed upgrade to the premises infrastructure.

Table 3 lists the prescribed premises categories that have been applied for.

Table 3: Prescribed Premises Categories in the Existing Licence

Classification of Premises	**Description**	***Approved Premises production or design capacity or throughput***
Category 54	Sewage facility premises – (a) on which sewage is treated (excluding septic tanks); or (b) from which treated sewage is discharged onto land or into waters.	200 cubic metres per day

4. Overview of Premises

4.1 Operational aspects

The applicant is proposing to convert the current IDEA plant to a continuous aeration process with the inclusion of the following infrastructure and with other additional upgrades to equipment in the management of pathogens, nutrients and contaminants:

- Installation of three new aerators.
- Conversion of the existing balance tank into a clarifier tank.
- Replace UV treatment plant.
- Improvement works to inlet screening, switchboard control systems, sludge pump and effluent pump.
- Disable the decanter function.
- Installation of two new covered polyethylene balance tanks (13kL and 20kL).

The applicant has determined that the upgrades are required for the WWTP as the plant is *"considered to be heavily loaded, with stable treatment performance difficult to achieve due to the high and variable biological loading on the plant. This has resulted in poor sludge settling and the potential for solids to be washed over during decant. This can lead to high levels of suspended solids in the effluent, which may also cause a shielding affect leading to inadequate disinfection. Additionally, clear water held in the balance tank is prone to algae growth.*

Warm, sunny conditions on Cocos Island combined with high nutrient water contribute to contaminant growth in the balance tank."

Further this this, assessment of the plant was undertaken by Water Corporation's Infrastructure Design Branch in 2012/13 (Bagg, 2013) *by the applicant identified that:* the plant *"Is operating with higher inflow and loading than the treatment capacity. The treatment capacity of the Home Island WWTP has been re-rated to less than 70 m^3/day inflow capacity. The review identified that the Home Island WWTP upgrades are required to remediate asset deficiencies and improve both treatment performance and stability.*

Without plant upgrades it can be expected that the Home Island WWTP will continue to have unstable operation and is likely to result in non-compliance with license treatment conditions in the future."

The proposed upgrades to the plant are anticipated to increase the design capacity of the premises from 165 m^3/ day to 200 m^3/ day.

4.2 Infrastructure

The Home Island Wastewater Treatment Plant facility infrastructure, as it relates to Category 54 activities, is detailed in Table 4 and with reference to the Site Plan (attached in the Works Approval).

Table 4 lists all infrastructure associated with the prescribed premises category.

Table 4: Sewage facility Category 54 infrastructure

	Infrastructure	**Site Plan Reference**
	Prescribed Activity Category 54 – Sewage facility	
Primary infrastructure for the treatment of sewerage received from Home Island community		
1	1 x Aeration tank	As defined within application supporting documentation (See Table 2 within the Decision Report). As defined within the Active licence (L8335/2009/4).
2	1 x Balance/ decant (old) tank converted to clarifier tank	
3	UV Treatment Unit	
4	1 x inflow meter (M1)	
5	1 x outflow meter (M2)	
6	3 x Aerators	
7	Inlet screening	
8	2 x Balance tanks (covered, polyethylene – 20 kL & 13 kL)	
	Directly related activities	
Associated infrastructure that assists with the operation and management of the primary infrastructure		
1	Discharge pipeline to ocean outfall - 300 m (W1)	As defined within application supporting documentation (See Table 2 within the Decision Report). As defined within the Active licence (L8335/20109/4).
2	Sludge drying beds	
3	Sludge and effluent pumps	
4	Switchboard system	
	Other activities	

	Infrastructure	Site Plan Reference
1	Site office and laboratory	As defined within the Active licence (L8335/20109/4).

5. Legislative context

5.1 Other relevant approvals

5.1.1 Planning approvals

No additional planning approval is required for the proposed upgrades to a currently operational prescribed premises which is undertaking upgrades to the existing premises, in accordance with section 53 of the *Environmental Protection Act 1986*.

The applicant has confirmed that *"under Section 137 of the Water Services Act 2012, the Water Corporation is exempt from the requirement (under the Planning and Development Act 2005) to obtain development approvals for Public Water Works under a Local Planning Scheme."*

5.1.2 Federal Legislation

The prescribed premises is managed under Western Australian legislation, in accordance with the Australian Commonwealth Service Delivery Arrangement with the Department of Water and Environmental Regulation.

The Australian Commonwealth have allocated funding in 2018-19 to implement interim improvements to Cocos Home Island WWTP to improve capacity and performance.

5.2 Part V of the EP Act

5.2.1 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations.

The guidance statements which inform this assessment are:

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Decision Making (February 2017)*
- *Guidance Statement: Risk Assessments (February 2017)*

5.2.2 Works approval and licence history

Table 5 summarises the works approval and licence history for the premises.

Table 5: Works approval and licence history

Instrument	Issued	Nature and extent of works approval, licence or amendment
L8335/2009/3	24/02/2012	Licence re-issue
L8335/2009/4	05/02/2015	Licence reissue and amendment to REFIRE format
W6162/2018/1	04/10/2018	Works Approval to increase design capacity (200 kL) and

		undertake upgrades to the premises infrastructure.

5.2.3 Compliance inspections and compliance history

Compliance inspections are undertaken on an annual basis at Cocos (Keeling) Islands. The WWTP has been inspected every year for the last four years. No significant issues have been identified through the inspection process undertaken with the applicant. All issues raised had already been identified within the Annual Environmental Reports submitted to DWER.

Non-compliances have been defined annually within the submitted Annual Audit Compliance Reports and have been predominantly in relation to equipment failure (e.g. UV treatment unit, PLC system).

No significant compliance issues or risks have been identified through inspections or reports submitted to DWER.

5.2.4 Clearing

No clearing is proposed as part of the infrastructure upgrade at the prescribed premises.

6. Modelling and monitoring data

The monitoring and modelling data submitted in the most recent AER (2016/ 2017) confirmed the following relating to surface and groundwater at the premises.

6.1 Monitoring of emissions to surface water and groundwater

The marine surveys have identified a positive outcome of no impact relating to the ocean outfall from the premises operation, under current circumstances/ processes.

Monitoring of surface water and groundwater is undertaken at specified monitoring locations, and undertaken on an annual basis, analysed by the applicant and submitted through to DWER for review.

7. Assessment of operator

Water Corporation is a statutory entity and was established by Section 4(1) of the *Water Corporations Act 1995* (WC Act). The Corporation is a body corporate (Section 4 of the WC Act) and as such does not have an ASIC company extract.

The applicant holds a Service Delivery Arrangement with the Australian Government (IOT) for the overview and management of relevant Indian Ocean Territory prescribed premises.

8. Consultation

The applicant has confirmed, within Section 4 of the application supporting documentation, that consultation has been undertaken with the Department of Infrastructure, Regional Development and Cities in relation to the proposed application.

9. Location and siting

9.1 Siting context

The WWTP is located on Home Island which forms part of the Cocos (Keeling) Islands. The Cocos (Keeling) Islands are group of 27 coral islands located in the Indian Ocean. They are situated approximately 3,000 km north-west of Perth 3,700 km west of Darwin and 900 km

south-west of Christmas Island.

9.2 Residential and sensitive Premises

The distances to residential and sensitive receptors are detailed in Table 6.

Table 6: Receptors and distance from activity boundary

Sensitive Land Uses	Distance from Prescribed Activity
Residential Premises	*Approximately 400 m south of the prescribed premises boundary*

9.3 Specified ecosystems

Specified ecosystems are areas of high conservation value and special significance that may be impacted as a result of activities at or Emissions and Discharges from the Premises. The distances to specified ecosystems are shown in Table 7. Table 7 also identifies the distances to other relevant ecosystem values which do not fit the definition of a specified ecosystem.

The table has also been modified to align with the *Guidance Statement: Environmental Siting.*

Table 7: Environmental values

Specified ecosystems	**Distance from the Premises**
Pulu Keeling National Park (North Keeling Island)	*Approximately 30 km north of Cocos Home Island*
Indian Ocean	*Approximately 300 m to ocean outfall via pipeline*
Biological component	**Distance from the Premises**
Threatened/Priority Flora	*Located on the southern and eastern boundary of the Prescribed Premises*

9.4 Groundwater and surface water sources

The primary groundwater resources on Home Island is located directly below the community residential area with another set of more brackish lenses located in the north of the island (DoW, October 2008).

The distances to groundwater and water sources are shown in Table 8.

Table 8: Groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental value
Groundwater	*Depth to groundwater encountered at approximately 1 m – 2 m (based on information within works approval application supporting documentation). Variation driven by tidal influence and seasonal variation.* *Monitoring and abstraction bores located within 1km of Premises (based on available GIS dataset – WIN Groundwater Sites).*	*Water is used for potable or industrial use.* *Groundwater system linked to marine ecosystem with freshwater lenses strongly influenced by tidal action.* *Northern water lenses redraw is treated through a reverse osmosis plant for additional water supply to the island.*

9.5 Soil type

The geology of the Cocos (Keeling) Islands has been described by Woodroffe & Falkland (1997) who determined the atoll geology as consisting of coral sediments overlaying a volcanic seamount.

The 27 islands which form the Cocos (Keeling) Islands form a discontinuous landmass known as the 'Vening Meinesz' seamounts that continue towards Christmas Island.

Table 9 details soil types and characteristics relevant to the assessment.

Table 9: Soil and sub-soil characteristics

Groundwater and water sources	Distance from Premises	Environmental Value
Soil type classification: *Coral shingle and sands overlaying limestone.*	*At and across the entire atoll.*	*Highly porous soils, assisting with the recharge of freshwater lenses through rainfall events.*

9.6 Meteorology

9.6.1 Wind direction and strength

The Islands are strongly influenced by south east trade winds for the majority of the year and are influenced by regular tropical cyclones (DoW, 2008).

9.6.2 Rainfall

The average annual rainfall is approximately 1,950 mm (Ecowise Environmental, 2007).

10. Risk assessment

10.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 11.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Tables 10 and 11 below.

Table 5. Identification of emissions, pathway and receptors during construction

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**		
Category 54 - Construction, positioning and mobilisation of infrastructure	*Vehicle movements on unsealed access roads*	*Noise*	*No residences or other sensitive receptors in close proximity.*	*Air / wind dispersion*	*None*	*No*	*No receptor present*
		Dust			*None*	*No*	*No receptor present*
	Construction of new plant infrastructure	*Noise*			*None*	*No*	*No receptor present*
		Dust			*None*	*No*	*No receptor present*
	Commissioning of new infrastructure (abnormal operation)	*Leachates/ wastewater*	*Groundwater* *Surface water (Indian ocean)*	*Infiltration via soil profile*	*Impact to aquatic ecosystems and contamination of surrounding land*	*Yes*	*See Section 10.4*

Table 6: Identification of emissions, pathway and receptors during operation

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**		
Category 54 – Sewage facility	*Treatment of sewage*	*Odour*	*No residences or other sensitive receptors in close proximity.*	*Air / wind dispersion*	*None*	*No*	*No receptor present. Odour has already been assessed and considered within the active licence with appropriate regulatory controls in place.*
	Sewage pipes and holding tanks (Rupture of pipes / overtopping of holding tanks resulting in sewage discharge to land)	*Leachates/ wastewater*	*Vegetation adjacent to discharge area.* *Soil.* *Surface water (Indian Ocean).*	*Direct discharge* *Infiltration via soil profile*	*Soil contamination inhibiting vegetation growth and survival.* *Surface water contamination and impact on aquatic fauna and flora*	*Yes*	*See section 10.4*
	Sludge drying beds	*Gaseous emissions (from decomposition of putrescible waste)*	*No residences or other sensitive receptors in close proximity (400 m south)*	*Air / wind dispersion*	*None*	*No*	*No receptor present*

10.2 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 12 below.

Table 7: Risk rating matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 13 below.

Table 8: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	• **onsite impacts**: catastrophic • **offsite impacts local scale**: high level or above • **offsite impacts wider scale:** mid-level or above • Mid to long-term or permanent impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are significantly exceeded	• Loss of life • **Adverse health effects:** high level or ongoing medical treatment • Specific Consequence Criteria (for public health) are significantly exceeded • **Local scale impacts:** permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	• **onsite impacts**: high level • **offsite impacts local scale**: mid-level • **offsite impacts wider scale**: low level • Short-term impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are exceeded	• **Adverse health effects:** mid-level or frequent medical treatment • Specific Consequence Criteria (for public health) are exceeded • **Local scale impacts**: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	• **onsite impacts**: mid-level • **offsite impacts local scale**: low level • **offsite impacts wider scale**: minimal • Specific Consequence Criteria (for environment) are at risk of not being met	• **Adverse health effects:** low level or occasional medical treatment • Specific Consequence Criteria (for public health) are at risk of not being met • **Local scale impacts:** mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	• **onsite impacts**: low level • **offsite impacts local scale**: minimal • **offsite impacts wider scale**: not detectable • Specific Consequence Criteria (for environment) likely to be met	• Specific Consequence Criteria (for public health) are likely to be met • **Local scale impacts:** low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	• **onsite impact**: minimal • Specific Consequence Criteria (for environment) met	• **Local scale**: minimal to amenity • Specific Consequence Criteria (for public health) met

^ Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting.*

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines.*

"onsite" means within the Prescribed Premises boundary.

10.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment table 14 below:

Table 9: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

10.4 Risk Assessment – Leachate/ wastewater emissions

10.4.1 Description of leachates/ wastewater emissions

Construction and operation

The WWTP contains nutrient rich wastewater, pathogens and contaminants as a result of sewerage collection from the residential and industrial premises located within Home Island.

10.4.2 Identification and general characterisation of emission

Potential discharges from the accidental rupture of hoses, pipelines or damage caused to holding tanks which may result in leaks or spills occurring from the WWTP and associated infrastructure (sludge drying beds), or from vehicles used in the construction of the new infrastructure.

During the commissioning phase and subsequent operation of the new infrastructure, a design or construction fault may result in abnormal discharge of leachates/ wastewater from the plant.

10.4.3 Description of potential adverse impact from the emission

The discharge of untreated or partially treated wastewater or leachates to ground may impact groundwater and surface water resources, aquatic ecosystems and native vegetation. Localised soil contamination may occur as a result of the discharge, causing nutrient enrichment and die off of terrestrial flora, and aquatic fauna and flora.

10.4.4 Applicant controls

This assessment has reviewed the controls set out in Table 15 below.

Table 10: Applicant's proposed controls for leachates/ wastewater emissions

Site infrastructure	Description	Operation details	Reference to issued licence plan
Controls for leachates/ waste emissions			
Wastewater Treatment Plant and new infrastructure	*Holdings tanks, pipe works and pumps.*	*Holding tanks constructed of double layered, polyethelene or concrete with bunding. Pipework and pumps are sealed and leak tested in accordance with manufacturer's specifications.*	*Application supporting documentation (See Table 2).*
	New infrastructure (tanks, pipeworks)	*Tested through commissioning phase against design and manufacturers specifications (Hydrostatic testing).* *Tanks installed on concrete hardstand.* *Primary inflow will not be redirected through the new infrastructure until adequate testing and compliance has been achieved against design and manufacturer's specifications.*	
Sludge drying beds	*Holding capacity limit*	*54 m^3 (at any given time)* *Enclosed within covered, low permeability bunded, hardstand area.*	
Groundwater monitoring bores	*Monitoring bore 4E*	*Monitoring of any potential impacts from the WWTP on groundwater. Sea water is used as the primary drinking water source for Home Island through the use of a reverse osmosis process.*	*Application supporting documentation, section 2 (See Table 2).*

10.4.5 Key findings

The Delegated Officer has reviewed the information regarding leachate/ wastewater emissions and has found:

1. *Leachate/ wastewater emissions is only considered likely to occur under abnormal operations, in small volume and to be contained within a relatively localised area.*

2. *No leachate emissions are anticipated to be discharged to land, surface water or groundwater as a result of normal operation. Discharge of treated wastewater is only permitted under the existing Licence L8335/2009/4 via ocean outfall pipeline.*

10.4.6 Consequence

If leachates/ wastewater emissions occur under construction, then the Delegated Officer has determined that the impact of potential pollution or contamination occurring will be low level onsite impact with minimal environmental consequences off-site. Therefore, the Delegated Officer considers the consequence of leachate/ wastewater emissions to be **minor**.

10.4.7 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of *leachate/ wastewater emissions* occurring at some time to be **possible**.

10.4.8 Overall rating of leachate/ wastewater emissions

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 12) and determined that the overall rating for the risk of leachate/ wastewater emissions is **medium**.

10.5 Summary of acceptability and treatment of Risk Events

A summary of the risk assessment and the acceptability or unacceptability of the risk events set out above, with the appropriate treatment and control, are set out in Table 16 below. Controls are described further in section 11.

Table 11: Risk assessment summary

	Description of Risk Event			**Applicant controls**	**Risk rating**	**Acceptability with controls (conditions on instrument)**
	Emission	**Source**	**Pathway/ Receptor (Impact)**			
1.	*Leachate/ wastewater emissions*	*Holding tanks, pipe works and sludge drying beds.*	*Direct discharge to land resulting in infiltration to groundwater (1-2 mBGL) and subsequent surface water (Indian ocean).* *Potential to impact aquatic flora and fauna and cause nutrification of localised soil profile.*	*See Table15*	Minor consequence Possible likelihood **Medium Risk**	Acceptable subject to regulatory controls

11. Regulatory controls

A summary of regulatory controls determined to be appropriate for the Risk Event is set out in Table 17. The risks are set out in the assessment in section 10 and the controls are detailed in this section. DWER will determine controls having regard to the adequacy of controls proposed by the Applicant. The conditions of the Works Approval will be set to give effect to the determined regulatory controls.

Table 12: Summary of regulatory controls to be applied

		Controls **(references are to sections below, setting out details of controls)**		
		11.1.1 Infrastructure and equipment	**11.1.2 Specified actions**	**11.1.3 Monitoring**
Risk Items (see risk analysis in section 10)	**1. leachate/ wastewater emissions**	•	•	•

11.1 Works Approval controls

11.1.1 Infrastructure and equipment

The following environmental controls, infrastructure and equipment should be maintained and operated onsite for leachate/ wastewater management during construction:

- Placement of all infrastructure and equipment on hardstands;
- All holding tanks to be double skinned or bunded, and impermeable;
- All pipework to be appropriately sealed and hydrostatically tested prior to full operation;
- Commissioning of all upgrade infrastructure and equipment to be undertaken to comply with design and manufacturer's specifications, with certification of hydrostatic testing prior to full operation.

11.1.2 Specified actions

The following environmental controls, infrastructure and equipment should be maintained and operated onsite for leachate/ wastewater management:

11.1.3 Monitoring

The applicant will continue to undertake monitoring requirements of groundwater and surface water within the vicinity of the premises in accordance with existing regulatory controls defined within the existing licence L8335/2009/4. No additional monitoring controls are proposed within the works approval as identified issues have already been adequately addressed for ongoing monitoring by the Licence Holder.

12. Determination of Works Approval conditions

The conditions in the issued Works Approval in Attachment 1 have been determined in accordance with the *Guidance Statement: Setting Conditions*.

Table 18 provides a summary of the conditions to be applied to this works approval.

Table 18: Summary of conditions to be applied

Condition Ref	Grounds
Infrastructure and Equipment Conditions 1 to 4	These conditions are valid, risk-based and contain appropriate controls.
Emissions Conditions 5 to 6	This condition is valid, risk-based and consistent with the EP Act.
Record-keeping Conditions 7 to 8	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.

DWER notes that it may review the appropriateness and adequacy of controls at any time and that, following a review, DWER may initiate amendments to the works approval under the EP Act.

13. Applicant's comments

The Licence Holder was provided with the draft Decision Report and draft issued Works Approval on 5 September 2018. The Licence Holder provided comments which are summarised, along with DWER's response, in *Appendix 2*.

14. Conclusion

This assessment of the risks of activities on the Premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this Decision Report (summarised in Appendix 1).

Based on this assessment, it has been determined that the Issued Works Approval will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Stephen Checker

Digitally signed by Stephen Checker
Date: 2018.10.05 16:19:39 +08'00'

Steve Checker
MANAGER, WASTE INDUSTRIES
REGULATORY SERVICES

Delegated Officer under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

	Document title	In text ref	Availability
1.	Licence L8335/2009/4 – Home Island Wastewater Treatment Plant	L8335/2009/4	accessed at www.dwer.wa.gov.au
2.	Email: Application Submission – Works Approval Application – Cocos Home Island WWTP upgrades – L8335/2009/4 – Water Corporation received from Mark Erskine. Includes two attachments: • Works_Approval_Application_-_L8335_2009_4_Home_Island_WWTP_Imerim_Upgrades_2018_19_SIGNED.pdf; • Attachment 8 – WA_Application_Supporting_Information_-_Cocos_Home_Island_WWTP_FINAL.pdf.	3 July 2018	DWER records (A1704965)
3.	Email: RE: Application Submission – Works Approval Application – Cocos Home Island WWTP upgrades – L8335/2009/4 – Water Corporation received from Danielle Scott, 26 July 2018.	Cut-off and commissioning plan.	DWER records (A1706284)
4.	REPORT: Water resource management review. Indian Ocean Territories (Christmas and Cocos (Keeling) Islands), Department of Water, October 2008.	W5201/2012/1	DWER records (A438273)
5.	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	DER 2015a	accessed at www.dwer.wa.gov.au
6.	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	DER 2015b	

7.	DER, November 2016. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.	DER 2016b	
8.	DER, November 2016. *Guidance Statement: Decision Making*. Department of Environment Regulation, Perth.	DER 2016c	

Appendix 2: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of Licence Holder comment	DWER response
Condition 2: Table 2 line 5- Decanter system	Minor change to remove the word "decommission". The decanter will be available, but not in use. It will remain installed and available for bypass maintenance, during maintenance on the clarifier in the future.	Removed
Condition 2: Table 2 line 7- Switchboard control system	Please remove the word aeration from this line	Removed
Condition 2: Table 2 line 8- Sludge and effluent pumps	Removal of the word hardstand since the effluent pump will be located within the new balance tank and not on a hardstand.	Removed
Condition 7	Please include definition for "Books"	Provided in Table 1- Definitions

Attachment 1: Works Approval W6162/2018/1