Government of Western Australia
Department of Water and Environmental Regulation

Decision Report

Application for Works Approval

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

Works Approval Number	W2986/2025/1
Applicant	Water Corporation
File number	APP-0029080
Premises	Cocos (West) Island Wastewater Treatment Plant West Island, Cocos (Keeling) Islands WA 6799 Legal description - Part of Lot 100 on Deposited Plan 18500 Certificate of Title Volume 2103 Folio 109 As defined by the premises map attached to the issued works approval
Date of report	30 April 2026
Decision	Works approval granted

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of the premises. As a result of this assessment, works approval W2986/2025/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) 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.

2.2 Application summary and overview of premises

On 28 May 2025, the applicant submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (WA)(CKI) (EP Act).

The application is to undertake construction works relating to the replacement of equipment and construction of infrastructure within the existing West Island Wastewater Treatment Plant, Cocos (Keeling) Islands, at the premises.

The premises relates to the category and assessed design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W2986/2025/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in works approval W2986/2025/1.

The premises is a currently Category 85: Sewage facility premises under the *Environmental Protection Regulations 1987*, holding registration R1841, issued on 13 January 2006, for a 53 kL/day treatment capacity. The 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 Ultraviolet (UV) radiation.

Treated wastewater is discharged to the Indian Ocean via the outfall pipeline approximately 400m offshore and at a depth of 10m. Sludge management is by manual wasting into covered drying beds.

Water Corporation is currently under a Service Delivery Arrangement with the Australian Government, which authorises the Water Corporation to operate the WWTP infrastructure on behalf of the Australian Government.

The application proposes that there will be no change to treatment capacity as a result of the proposed works. There will be, however, a temporary increase to treated effluent discharge from the premises for a proposed 2 to 3 year period to accommodate a temporary worker's camp associated with the runway upgrade on the Island. Wastewater from the camp will be treated by a standalone WWTP that will be operated and maintained by the camp facility contractors. The premises will receive this treated effluent for storage in the existing balance tank, and then disposed via the outfall pipeline.

As such, the treatment capacity and design capacity of the premises remains at 53 kL/day, with total disposal of the 2 waste streams project to be 70 kL/day for this temporary period. This total discharge volume remains within the Category 85 threshold.

Following completion of works and commissioning, the existing registration will continue to authorise the Category 85 activities.

The proposed works are for the purpose of improving the reliability and control of the plant, and to replace assets at the end of life, including:

- Installation of an inlet screening platform and mechanical screening sieve to remove rags and solids from the incoming flow. Existing inlet grinder (muncher) will remain as standby treatment.
- Replacement of the existing Sinkair aerators to new Xylem Jet Aerators.
- Existing Waste Activated Sludge (WAS) pumps reconfigured to become Returned Activated Sludge (RAS) pumps.
- Improvements to sludge drying, installing polymer dosing system for dewatering, construction of a slab for geobags and modifications to the existing sludge drying bed to accommodate five geobags.
- Three new prefabricated buildings installed including: new Motor Control Centre (MCC) switchroom, new control room and ablutions, new laboratory and polymer preparation room.
- Realignment of the Sydney Highway fence line to align with the premises boundary and lease.
- Decommissioning existing lab/control room office and storage shed.
- Realignment of the underground effluent pipeline to enable clearance from new site buildings.

2.3 Consideration of Water Quality Protection Note (WQPN) 25

The Australian Government, through the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) and DWER is proposing to proclaim protection areas (boundaries) for public drinking water sources, and a regulatory management system on the Cocos (Keeling) Islands (CKI) to support water security for the Islands.

Proclaiming drinking water source protection areas under the *Country Area Water Supply Act 1947* (WA)(CKI) (CAWS Act) will provide protection areas for public drinking water sources, and other groundwater resources (including freshwater contained within unpopulated islands). Figure 1 provides the proposed protection areas for public drinking water sources on West Island.

Figure 1: Proposed water reserves and protection zones

WQPN 25: Land use compatibility tables for public drinking water source areas (DWER, August 2021) provides guidance on land uses and activities within public drinking water source areas (PDWSAs) to protect drinking water quality and public health. The department's policy on development in PDWSAs is a presumption against the intensification of land uses. This is because more intense land uses increase the risk that the drinking water will become contaminated. Although the primary goal is to avoid contamination of PDWSAs, the department also needs to consider land uses, activities and zonings that were present before the PDWSA was declared, or that are required to support population growth, housing, jobs and essential infrastructure or industry. So, there may be times when these risks cannot be avoided. In such cases, the risks need to be minimised or managed. However, wherever possible, DWER has a responsibility to prevent an increase in the base level of risk.

The premises is currently not located within a PDWSA. However, as discussed above, the premises is located within a proposed Priority 3 (P3) PDWSA.

Table 2 of WQPN 25 specifies that wastewater treatment plants are a compatible land use within P3 areas, with conditions 13, 22, 24 and 28. The conditions are as follows:

Condition 13: The department does not support this activity within protection zones (WHPZs and RPZs) unless special circumstances apply.

Condition 22: Where organic materials and/or turbid wastewaters are stored, adequate bunding should prevent the escape of potential contaminants (such as pathogens and nutrients) into the environment, including planning for contingencies such as storms and floods.

Condition 24: Hydrocarbons, chemicals and other toxic or hazardous substances should be stored so there is no discernible risk of contamination of groundwater or surface water. This should include effective secondary barriers to contain the system, such as doublewalled tanks and bunding. Restrictions apply for storage tanks as explained in WQPN 56: Tanks for fuel and chemical storage near sensitive water resources. A contingency plan for managing and responding to spills should be in place, as per WQPN 10: Contaminant spills – emergency response plan.

Condition 28: This land use/activity may require assessment by this department under the *Environmental Protection Act 1986*. For a list of activities see the schedule 1 of the *Environmental Protection Regulations 1987*.

The Delegated Officer has considered the above guidance as part of the risk assessment outlined in Section 3.

3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk Assessments* (DWER 2020).

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.

3.1 Source-pathways and receptors

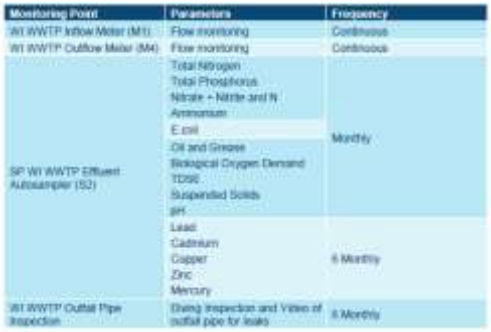
3.1.1 *Emissions and controls*

The key emissions and associated actual or likely pathway during premises construction and operation which have been considered in this decision report are detailed in Table 1 below.

Table 1 1 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 1: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction and installation of new infrastructure	Air / windborne pathway	- Construction and commissioning emissions will be managed through a standard construction environmental management plan (CEMP).
Noise	Construction and installation of new infrastructure	Air / windborne pathway	- Construction and commissioning emissions will be managed through a standard construction environmental *management plan (CEMP).* - Works will be conducted in accordance with the *Environmental Protection (Noise) Regulations 1997* (WA)(CKI). - Construction will be undertaken during the hours of 6am-6pm 7 days per week, (noting Sundays would likely require approval of noise management plan from Local Government). - Vehicles and equipment will be fitted with appropriate noise controls.
Odour	Interruption of treatment process to upgrade/install new equipment/infrastructure	Air / windborne pathway	- No disruption to operations will occur during the upgrade.
Spills of hydrocarbons from vehicles and equipment	Installation of wastewater infrastructure	Overland flow and infiltration to soil and groundwater	- *Environmental Protection (Unauthorised Discharges) Regulations 2004* (WA)(CKI) apply.
Commissioning and Operation			
Odour	Operation of infrastructure Receipt, processing and treatment of wastewater, and the discharge of wastewater	Air / windborne pathway	- No disruption to operations will occur during the upgrade. - No changes to effluent quality is expected as an outcome of these works.
Loss of containment	Wastewater discharge to the environment	Overland flow and infiltration to soil and groundwater	- Leachate from the drying bed/geobag system will return to the existing leachate pump station and be pumped back to the Aeration Tank as per current operation.
Wastewater discharge to	Discharge of treated wastewater	Direct discharge	- The premises will continue to discharge treated wastewater into the marine

Emission	Sources	Potential pathways	Proposed controls
the environment		through an ocean outfall	environment though the existing outfall pipeline. No changes to effluent quality is expected as an outcome of these works. - The applicant will continue to implement their existing monitoring program. 
Noise	Operation of infrastructure Receipt, processing and treatment of wastewater, and the discharge of wastewater	Air / windborne pathway	- Vehicles and equipment will be fitted with appropriate noise controls. - All plant, equipment and vehicles will be regularly inspected and maintained.

3.1.2 *Receptors*

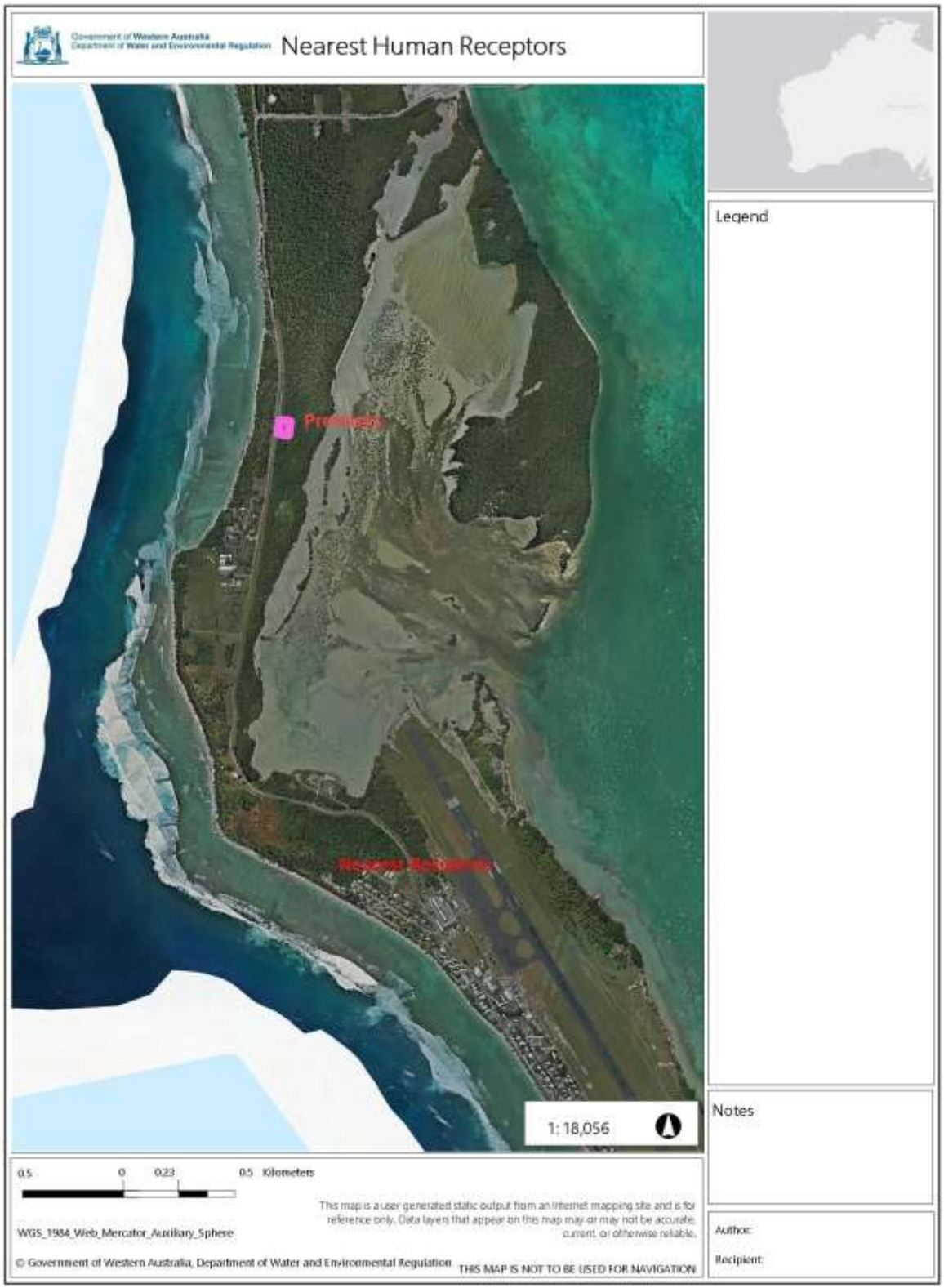
In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the applicant's employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 2 and Figure 2 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental Siting* (DWER 2020)).

Table 2: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	**Distance from prescribed activity**
Residential Premises	Approximately 3 km south of the premises
Environmental receptors	**Distance from prescribed activity**
Underlying groundwater	Approximately 1-2m below ground level. Refer section 2.3
Indian Ocean	Approximately 80 m

Figure 2: Distance to sensitive receptors



3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the delegated officer considers the applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 3.

Works approval W2986/2025/1 that accompanies this decision report authorises construction and commissioning. The conditions in the issued works approval, as outlined in Table 3 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 3: Risk assessment of potential emissions and discharges from the premises during construction, commissioning and operation

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Construction								
Construction and installation of new infrastructure	Dust	Air / windborne pathway causing impacts to health and amenity	Residences 3 km to the south	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	Condition 13 **Conditions 1 and 2**	The delegated officer considers dust emissions are effectively regulated by the general provisions of the EP Act.
	Noise			Refer to Section 3.1	C = Minor L = Unlikely **Medium Risk**	Y	Condition 13 **Conditions 1 and 2**	The delegated officer considers noise emissions are effectively regulated by the *Environmental Protection (Noise) Regulations 1997*.
Interruption of treatment process to upgrade/install new equipment/infrastructure	Odour	Air / windborne pathway causing impacts to health and amenity	Residences 3 km to the south	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	Condition 13 **Conditions 1 and 2**	The delegated officer considers that the operational and regulatory controls provide adequate mitigation of potential odour impacts to nearby sensitive receptors.
Installation of wastewater infrastructure	Spills of hydrocarbons from vehicles and equipment	Overland flow and infiltration to soil and groundwater causing ecosystem disturbance	Groundwater 1-2 mbgl	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Condition 13	The delegated officer considers that the operational and regulatory controls provide adequate mitigation of potential hydrocarbon spills.
Commissioning and Operation								
Operation of infrastructure Receipt, processing and treatment of wastewater, and the discharge of wastewater	Odour	Air / windborne pathway causing impacts to health and amenity	Residences 3 km to the south	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Conditions 3 to 7 and 13	The submission of an Environmental Compliance Report under condition 4 will allow the department to verify the effectiveness of infrastructure controls relating to leachate management, which assists in mitigating

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
								odour emissions. The delegated officer considers that the operational and regulatory controls provide adequate mitigation of potential odour impacts to nearby sensitive receptors.
Loss of containment	Wastewater discharge to the environment	Overland flow and infiltration to soil and groundwater causing ecosystem disturbance	Groundwater 1-2 mbgl	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Conditions 3 to 5	The delegated officer considers that the operational and regulatory controls provide adequate mitigation of potential containment loss.
Discharge of treated wastewater	Wastewater discharge to the environment	Direct discharge through an ocean outfall causing ecosystem disturbance	Indian Ocean 400 m offshore	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	Conditions 3 to 10 **Conditions 11 and 12**	Refer to section 3.3.
Operation of infrastructure	Noise	Air / windborne pathway causing impacts to health and amenity	Residences 3 km to the south	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	13	The delegated officer considers noise emissions are effectively regulated by the *Environmental Protection (Noise) Regulations 1997*.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk Assessments* (DWER 2020).

Note 2: Proposed applicant controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

3.3 Detailed risk assessment marine ecosystem impacts

Given the potential impacts to the marine ecosystem, the application and accompanying supporting documentation was referred to the department's Marine Ecosystems Branch (MEB), Science and Planning, for technical advice.

The department is confident that the Operational Marine Environmental Management Plan (OMEMP), supported by the dispersion modelling, supports that there will be no significant change in the treated wastewater constituents surfacing with the plume via the ocean outfall during construction. The discharge volume is minimal, and the end-of-pipe limits are appropriate to a WWTP of similar size (once the *E. coli* upper limit has been revised). Dispersion modelling clearly predicts adequate dilution at the outfall, as expected, based on the bathymetry of the site and the local hydrodynamics.

The OMEMP provides a concise monitoring and management plan for the premises discharge. Monitoring is mostly focused on the Home Island WWTP, but Water Corporation also undertake voluntary marine environmental surveys for the West Island WWTP. Voluntary monitoring of the receiving environment at West Island is currently conducted 5 yearly and coincides with Home Island monitoring.

Considering the minimal discharge volume of <100 m^3/day, it is acknowledged that implementing a Low Ecological Protection Area (LEPA) would not be appropriate, but this requires that in-pipe limits should meet High Ecological Protection Area (HEPA) criteria.

Best practice is to derive the environmental quality criteria (EQC) for the HEPA as per the *Technical Guidance: Protecting the Quality of Western Australia's Marine Environment* (EPA, 2016) and apply these to assess wastewater quality prior to discharge.

As the current premises is registered and effluent discharge is minimal, there is no baseline monitoring program in place, and local EQCs have not been derived for the surrounding marine environment.

Taking into account the above, the department has considered the 'trigger values' proposed in Table 4 of the OMEMP in the absence of derived EQCs. The target concentrations in the OMEMP were found to be comparable to other small WWTP licences in Western Australia and considers the proposed target concentrations appropriate (with the exception of *E. coli*), provided that the discharge volume does not increase significantly in the future, beyond the proposed construction work.

3.3.1 *E. coli*

As identified in *Technical Guidance: Protecting the Quality of Western Australia's Marine Environment* (EPA, 2016), the upper limit for *E. coli* should be aligned at ≤ 14 CFU/100ml, based on the limit for primary and secondary contact recreation in the Environmental Quality Criteria Reference Document for Cockburn Sound.

The primary means of addressing *E.coli* at the premises is through the use of UV disinfection, which is an existing component of the WWTP. The WWTP experiences diurnal and seasonal variations, which during normal operations can slightly increase the effluent suspended solids. The disinfection system is also fed from an open tank subject to growth including algae and biofilms. Whilst variations from biological factors are typically accommodated within the design parameters of the UV system, higher turbidity reduces transmissivity, and suspended solids can shield microorganisms from UV exposure, reducing disinfection rates. During these operating fluctuations, whilst suspended solids will be within the expected design treatment range of <20 mg/L, the UV disinfection effectiveness may be slightly reduced, resulting in a slightly elevated *E.coli* (i.e. above the above 14 CFU/100ml).

The department reviewed the *Cocos (Keeling) Islands Outfall Monitoring 2025 West Island Supplementary Report* (TLA Environmental, September 2025) to ascertain the potential impacts of the periods of elevated *E. coli*.

The WWTP outfall discharges through a pipe 400 m offshore into 14 m water depth (adjacent to a drop-off of ~1000 m water depth) and is approximately 250 m from the nearest swimming (surfing) beaches to the north and south. Secondary contact activities (boating, fishing) occur near the outfall infrequently and are highly dependent on sea and weather conditions.

Worst-case scenario modelling, where current speeds are in the 5th percentile (0.05 m/s), calculates initial dilution rates of ~20-fold were achieved upon reaching the surface (within ~4 m down-current of the discharge point). Further dilution to ~52-fold was indicated due to buoyancy spreading over ~130 m downstream of the discharge. When the concentration of *E. coli* in the discharge was assumed to be 150 CFU/100ml, the predicted concentration at the surface (~4 m from the discharge pipe) was <7.4 CPU/100ml under worst-case conditions. The *Environmental quality criteria Reference Document for Cockburn* Sound (EPA, 2017) does not include a recommended Environmental quality guideline (EQG) for Seafood safe for eating using *E. coli* concentrations in water (only in fish flesh). The EQG for faecal pathogens is 14 CFU/100ml and may be used as an approximate. Modelling of the worst-case scenario predicts the concentration of E. coli within 4 m of the outfall will be approximately half of this EQG trigger value.

Tidal currents at the outfall site are oriented parallel to the shore/reef. Although swell waves are directed onshore, the vertical mixing (from orbital velocities) generated by the swell waves are sufficient to mix down to the depth of the outfall pipe, contributing to the dilution occurring at the outfall.

Key Findings:

1. All proposed target concentrations, except *E.coli*, are deemed acceptable to be applied as trigger values at the end of the discharge pipe (after the effluent has been treated). This conclusion is based on the following information: the discharge volume from the West Island WWTP is minimal, including the additional effluent during construction, and the concentrations proposed are:
   (i) not significantly different to the current WWTP discharge
   (ii) aligned with other small WWTP licences in terms of discharge concentrations and volumes, and
   (iii) are not set to increase into the future, beyond the construction period.
2. According to the *State Environmental (Cockburn Sound) Policy Standard Operating Procedures* (2005) '*Enterococci are a preferred indicator organism for marine waters, where recent studies have shown that Enterococci concentrations in marine waters correlate much more strongly with illness rates than thermotolerant faecal coliform concentrations (e.g. E. coli*).' The department recommends that the applicant considers monitoring *Enterococci* in addition to *E. coli.*
3. The department recommends continuation of the voluntary in situ marine environmental surveys, and consideration by the applicant to collect sufficient baseline data to establish EQCs for the HEPA for potential future use should this be deemed necessary.
4. The submission of an Environmental Commissioning Report under condition 11 will allow the department to verify the effectiveness of infrastructure controls relating to treated wastewater quality and discharge dispersion.

5. As the discharge is diluted to acceptable levels within 4 m of the outfall, the risk of *E. coli* affecting humans through recreation or swimming, or bioaccumulation in harvested shellfish, is considered low. The delegated officer considers there is a low risk of environmental impacts to benthic marine communities associated with the wastewater discharge.

4. Consultation

Table 4 provides a summary of the consultation undertaken by the department.

Table 4: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website	None received	N/A
Applicant was provided with draft documents on 16 February 2026	Refer to Appendix 1	Refer to Appendix 1

5. Conclusion

Based on the assessment in this decision report, the delegated officer has determined that a works approval will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.

Appendix 1: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of applicant's comment	Department's response
3	Water Corporation appreciates the standard nature of the conditions; however notes wastewater treatment plant is already existing, and the proposed improvements to the existing plant will not improve quality or capacity.	The condition has been amended to reflect the continued operation of WWTP as opposed to the construction/installation of new items of infrastructure.
4	Each component of the Works Approval is being commissioned in discrete works packages and will be commissioned individually, and not as a whole. The components of work are not dependant or related and may be completed with several months between each item depending on contractor availability as well as flight and accommodation availability. Installed items are effectively operational at the time of construction as the plant is existing and already producing Treated Wastewater. We are concerned that we may not be able to provide individual reports and compliance certificates before the items are commissioned and operational. Water Corporation is proposing to continue to operate during installation of components into the WWTP and at the completion of all the items in Condition 3, provide a compliance report covering all items.	The condition has been amended to require the ECR to be submitted within 60 calendar days of all works being completed.