

Alkimos

Wastewater Treatment Plant – Public Environmental Review



Section Eight Environmental Management

Section Eight

Environmental Management

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8 Environmental Management

8.1 Proponent's Commitments

The Water Corporation has made commitments to implement or undertake various activities to ensure that any environmental impacts associated with the project are manageable. Table 8.1 summarises the commitments and their objectives.

The actions specified in Table 8.1 become binding on the Water Corporation under the Ministerial Conditions of Approval.

Within these commitments, a number of management plans are identified, collectively providing the suite of documentation underpinning the Water Corporation's management of the AWWTP, its buffer and the Alkimos Ocean Outlet.

8.2 Management Plans and Procedures

The Water Corporation will develop the following management plans to specify the actions necessary to effectively manage the AWWTP:

- Vegetation and Flora Management Plan;
- Fauna Management Plan; and
- Marine Monitoring and Management Plan.

To complete the Environmental Management suite, other monitoring and reporting procedures will be developed as part of the Water Corporation's standard operating procedures within its Quality Management System. These include:

- Construction management;
- Biosolids management;
- GHG emissions reporting;
- Odour monitoring and reporting;
- Community engagement; and
- Complaint/response register.

8.3 Alkimos Ocean Outlet Marine Monitoring and Management Plan

The Alkimos Ocean Outlet Marine Monitoring and Management Plan (AOOMMP) is based on identifying Environmental Values, establishing and spatially defining Environmental Quality Objectives (management goals) and the level of protection for ecosystem health (high, moderate or low) for marine waters in the vicinity of the Alkimos Ocean Outlet, and monitoring and managing to ensure the Environmental Quality Objectives are achieved and/or maintained in the long-term in the areas they have been designated. Environmental Quality Criteria will be set as benchmarks for monitoring, specifically to identify

when and where the Environmental Quality Objectives are being met or not.

The preliminary Alkimos Ocean Outlet Marine Monitoring and Management Plan for the discharge of treated wastewater from the Alkimos Wastewater Treatment Plant into the marine environment of the Alkimos Region is attached at Appendix A.

Components of the preliminary Alkimos Ocean Outlet Marine Monitoring and Management Plan are summarised below, along with the proposed key parameters that will be monitored and the proposed frequency of sampling. Selected environmental quality indicators will be measured through the monitoring programme and will be compared against the appropriate Environmental Quality Criteria.

The proposed Alkimos Ocean Outlet Marine Monitoring Plan is underpinned by a quality assurance/quality control programme to ensure consistency in field and laboratory procedures and to ensure that data collected are scientifically valid, comparable and adequate to meet the monitoring programme objectives.

The results, interpretations and recommendations of the Alkimos Ocean Outlet Marine Monitoring and Management Plan will be reported annually to the DOE and key stakeholders. Results will be interpreted with reference to relevant national, state and site-specific guidelines. Where appropriate, annual reporting will include a 'report card' style format.

All components of the Alkimos Ocean Outlet Marine Monitoring and Management Plan will be regularly reviewed to ensure that meaningful results are obtained, that the objectives are still appropriate and the programme is appropriate to the nature and magnitude of present and predicted impacts.

8.4 Summary of Environmental Management Commitments

Table 8.1 Summary of Proponents Commitments for AWWTP Proposal

Summary of Proponents Commitments for AWWTP Proposal - Principles of Environmental Protection				
Topic	Objective	Actions	Timing	Advice
Precautionary Principle	<ul style="list-style-type: none"> To avoid serious or irreversible damage to the environment; and To assess a risk-weighted consequence of proposed options. 	1. The Water Corporation will undertake the following measures to address the precautionary principle: <ul style="list-style-type: none"> provide a sustainability assessment and comparative analysis of the WWTP site options; design construct and operate the plant using best industry practice; ensure, as far as practicable, failure modes in the conveyancing and treatment system "fail safe"; prepare management plans for key environmental factors where appropriate; monitor review and report operational and environmental performance; and revise standard operating procedures and quality management systems and management plans in line with the findings of such reviews. 	During design, construction and operation.	Water Corporation, EPA
Intergenerational Equity	<ul style="list-style-type: none"> To ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. 	2. The Water Corporation will: <ul style="list-style-type: none"> reduce long term energy consumption through gravity conveyancing and TWW disposal to the ocean; reclaim and reuse wastewater as far as practicable; and build the wastewater system to achieve the lowest whole of life cost by reducing dependence on energy consumption and make provision for the recovery of energy from the treatment process. 	During design, construction and operation	Water Corporation
Valuation, pricing and Incentives	<ul style="list-style-type: none"> To ensure environmental factors have been included in the valuation of assets and services; To ensure that the "polluter pays" principle is applied in the containment, avoidance or abatement of pollution; To ensure the users of goods and services (including the use of natural resources and assets) pay for the full life cycle costs of their provision; and To ensure that the achievement of environmental goals be pursued in the most cost effective manner. 	3. The Water Corporation: <ul style="list-style-type: none"> has undertaken a whole of life economic assessment of the AWWTP as part of its Capital Investment Program. routinely funds the installation of new, pollution prevention technologies for WWTP systems as they emerge, and clean-up and repair of incidents as they occur; applies the tariffs for provision of wastewater treatment services as set by Government; will locate, design and install the wastewater treatment and conveyancing system according to best industry standards. 	During design, construction and operation.	Water Corporation

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Summary of Proponents Commitments for AWWTP Proposal - Principles of Environmental Protection				
Topic	Objective	Actions	Timing	Advice
Waste Minimisation	<ul style="list-style-type: none"> To take all reasonable and practicable measures to minimise the generation of waste and its discharge to the environment. 	<p>4. The Water Corporation will:</p> <ul style="list-style-type: none"> undertake several pilot projects (e.g. Managed Aquifer Recharge) to assess the viability a of re-use opportunities and implement them as soon as the technical, environmental, public health, political and societal acceptability is established. manage and monitor the reuse of Biosolids in accordance with the Western Australian Guidelines for Direct Land Application of Biosolids and Biosolids Products as required by Part V Environmental Licences. 	Ongoing	EPA, DoE, HDWA, Water Corporation
Conservation of Biodiversity and Ecological Integrity	<ul style="list-style-type: none"> To conserve biological diversity and ecological integrity. 	<p>5. The Water Corporation will, to the extent practicable, conserve high value floral communities and associations and their fauna habitats within the buffer zone of the AWWTP.</p> <p>6. The Water Corporation will prepare a Vegetation and Flora Management Plan and a Fauna Management Plan addressing:</p> <ul style="list-style-type: none"> topsoil and vegetation mulch management; prevention of the destruction of any of the four species of Priority Flora recorded in the project area; protection of high value fauna habitat; collection of provenance seed to be used in subsequent rehabilitation; management of weeds; controlling vehicular and public access; fire management ; and rehabilitation of high value disturbed land. <p>7. The Water Corporation will prepare a Marine Monitoring and Management Plan for the Alkimos Ocean Outlet addressing the:</p> <ul style="list-style-type: none"> monitoring of biota, sediment and water quality; management and mitigation strategies derived from a risk based assessment of the monitoring necessary to maintain acceptable environmental performance, and report findings periodically to relevant stakeholders. <p>The monitoring and management plans identified above are dealt with in more detail in the Environmental Management section below.</p>	During construction and operation	EPA, CALM and Water Corporation

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Summary of Proponents Commitments for AWWTP Proposal – Environmental Management - Marine				
Topic	Objective	Actions	Timing	Advice
Alkimos Marine Monitoring and Management Plan	<ul style="list-style-type: none"> To ensure the marine environment is protected. 	8. The Water Corporation will prepare and implement an Alkimos Marine Monitoring and Management Plan.	Prior to commencement of discharge to the marine environment at Alkimos.	EPA DoE
	<ul style="list-style-type: none"> To ensure consistency in field and laboratory procedures; and To ensure that data collected are scientifically valid, comparable and adequate to meet the monitoring programme objectives. 	9. The results, interpretations and recommendations of the Alkimos Ocean Outlet Marine Monitoring and Management Plan will be reported annually to the Department of Environment and key stakeholders. Results will be interpreted with reference to relevant national, state and site-specific guidelines. Where appropriate, annual reporting will include a 'report card' style format. 10. All components of the Alkimos Ocean Outlet Marine Monitoring and Management Plan will be regularly reviewed to ensure that meaningful results are obtained, that the objectives are still appropriate and the programme is appropriate to the nature and magnitude of present and predicted impacts.	Annually or triggered by events or trend in data.	EPA DoE
	<ul style="list-style-type: none"> To monitor for treated wastewater characterisation, and respond to potentially significant impacts to marine flora and fauna from discharges from AOO. 	11. The following indicators will be reported:: <ul style="list-style-type: none"> Physical-chemical characteristics Bacteria Nutrient Metals Surfactants Pesticides and herbicides Organics 	<ul style="list-style-type: none"> 6-monthly 6-monthly 6-monthly Annually 6-monthly 3 yearly 3 yearly 	EPA DoE
	<ul style="list-style-type: none"> To undertake initial dilution modelling and calculation of near-field dilutions. 	12. Determine the near-field behaviour of treated wastewater plume and near-field dilutions.	At least annually.	EPA DOE
	<ul style="list-style-type: none"> To undertake ecotoxicological tests. 	13. Undertake chronic toxicity tests on a suite of 5 test species of marine organisms representing at least 4 different taxonomic groups and covering 3 trophic levels.	Once within 12 months of commencement of discharge of treated wastewater and following any significant change in operations or exceedence of toxicant trigger levels.	EPA DoE
	<ul style="list-style-type: none"> To undertake water quality monitoring. 	14. Conduct water quality surveys to monitor: <ul style="list-style-type: none"> Nutrients Primary Productivity Bacteria 	One summer (Dec.-March) synoptic survey per annum. Four seasonal surveys per annum.	EPA DoE
	<ul style="list-style-type: none"> To undertake phytoplankton monitoring. 	15. Undertake water quality surveys to monitor: <ul style="list-style-type: none"> Presence and abundance potentially toxic phytoplankton species Phytoplankton cell count 	Four seasonal surveys per annum.	EPA DoE
	<ul style="list-style-type: none"> To undertake periphyton monitoring. 	16. Undertake periphyton monitoring to determine periphyton growth (as measured by chlorophyll-a, b and c content).	Annually (summer)	EPA DoE

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Summary of Proponents Commitments for AWWTP Proposal – Environmental Management - Marine				
Topic	Objective	Actions	Timing	Advice
	<ul style="list-style-type: none"> To undertake sediment quality monitoring. 	17. Undertake sediment quality monitoring to determine: <ul style="list-style-type: none"> Grain-size distribution Nutrients Total organic carbon Organic matter content Carbonate content Metals Pesticides and herbicides Organics 	Five yearly, with the first survey within 12-18 months of commencement of operations.	EPA DoE
	<ul style="list-style-type: none"> To undertake sentinel mussel monitoring. 	18. Undertake sentinel mussel monitoring to determine biological uptake of: <ul style="list-style-type: none"> Metals Pesticides and herbicides Organics 	Five yearly, with the first survey with 12-18 months of commencement of operations.	EPA DoE
Marine Environmental Values	<ul style="list-style-type: none"> To protect the marine ecosystems. 	19. In the event that the EPA's high protection Environmental Quality Criteria are exceeded in the water designated as requiring high protection, specific investigations will be conducted in consultation with the DoE into the risk presented by it to ecological processes and any measures necessary to mitigate those risks.	During operation.	EPA
	<ul style="list-style-type: none"> To determine the toxicity of TWW on marine biota. 	20. Undertake Whole Effluent Toxicity (WET) testing generally following the principles contained in the USEPA, APHA and ASTM protocols in accordance with the protocols set out in ANZECC/ARMCANZ (2000), once initially and following any significant change to operations.	During operation.	EPA DoE
Marine Management and Monitoring	<ul style="list-style-type: none"> To prepare and implement a Monitoring and Management Plan. 	21. Sampling, analysis and interpretation will be undertaken to quickly detect any emerging issues and management control processes will be quickly implemented to resolve the issue. The management plan will be developed in accordance with: <ul style="list-style-type: none"> Manual of Standard Operating Procedures (SOP) An approved monitoring and management programme consistent with EQMF Coastal Water Study and PLOOM program 'Environmental Quality Management Framework' (EQMF) 	Before operation.	EPA DoE
	<ul style="list-style-type: none"> To develop draft Environmental Quality Criteria (EQC) for waters adjacent to the proposed Alkimos Ocean Outlet. 	22. The Water Corporation will undertake comparison of the water quality parameters with the appropriate ANZECC/ARMCANZ (2000) Guidelines for fresh and Marine Water Quality and the Revised Environmental Quality Criteria Reference Document (Cockburn Sound), Environmental Protection Authority (2004)	During Operation	EPA DoE
	<ul style="list-style-type: none"> To develop and delineate zones of protection. 	23. The Water Corporation will identify the environmental values that are to be protected in the nearshore waters surrounding the outlet and in cooperation with the EPA determine the spatial designation of the environmental values i.e. low, medium and high protection zones, which will be used to underpin the interpretation of the ecological consequences of the proposal.	Before and During Operation	EPA DoE
	<ul style="list-style-type: none"> To protect the marine ecosystem. 	24. The Water Corporation will monitor nitrogen concentrations (as ammonia and nitrate+nitrite) at the marine water quality monitoring sites.	During Operation	EPA DoE

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Summary of Proponents Commitments for AWWTP Proposal – Environmental Management - Terrestrial				
Topic	Objective	Actions	Timing	Advice
Terrestrial Flora and Fauna	<ul style="list-style-type: none"> To minimise the impacts on the abundance, species diversity, geographic distribution and productivity of vegetation units; To minimise the possible impacts of development upon fauna species and their habitats and preserve regional biodiversity. 	25. The Water Corporation will prepare a Vegetation and Flora Management Plan and a Fauna Management Plan addressing: <ul style="list-style-type: none"> topsoil and vegetation mulch management; prevention of the destruction of any of the four species of Priority Flora recorded in the project area; protection of high value fauna habitat; collection of provenance seed to be used in subsequent rehabilitation; management of weeds; controlling vehicular and public access; fire management ; and rehabilitation of high value disturbed land. 	Before Construction Phase	EPA DoE CALM
Geoheritage	<ul style="list-style-type: none"> To minimise impact on identified geoheritage values and their associated flora and fauna communities within the buffer of the AWWTP and augment any conservation values identified within the Metropolitan Region Scheme. 	26. The Water Corporation will, as far as practicable, <ul style="list-style-type: none"> conserve the geoheritage values within the AWWTP buffer; and augment any conservation values identified within the Metropolitan Region Scheme. 	During construction and operation	EPA, CALM
Greenhouse Gases (GHG)	<ul style="list-style-type: none"> To minimise energy consumption To minimise GHG emissions to as low as reasonably practicable. 	27. The Water Corporation will: <ul style="list-style-type: none"> install a gravity wastewater system to minimise energy consumption from pumping; reduce methane emissions and site energy requirements by recovering biogas to generate electricity as is practicable given the chosen treatment technologies, as economies of scale make this viable in the future; assess and report GHG emissions to the Australian Greenhouse Office (AGO) and State Authorities. This will also include a periodic assessment to review opportunities to further improve energy efficiency and reduce greenhouse gas emissions over time. 	During operation	AGO, Dept Premier and Cabinet Greenhouse Office
Biosolids	<ul style="list-style-type: none"> To reuse biosolids for agricultural and horticultural purposes. 	28. The Water Corporation will: <ul style="list-style-type: none"> reuse bio-solids in accordance with the Western Australian Guidelines for Direct Land Application of Biosolids and Biosolids Products as required by Part V environmental licences 	Prior to and during construction and during ongoing operations	DoE HDWA
Odour	<ul style="list-style-type: none"> To minimise odour emissions; To segregate recipients from odour sources; and To protect the health, welfare and amenity of people and land-uses in proximity to the AWWTP. 	29. The Water Corporation will manage odours from the WWTP by: <ul style="list-style-type: none"> siting and designing the AWWTP to minimise the odour impacts from the plant on surrounding land-uses as far as practicable, using best practice odour emission control design and operation; delineating and managing an odour buffer zone and permitting only compatible land-uses within the buffer, through Water Corporation ownership and control of the buffer; and achieving agreed odour criteria within the odour buffer. 	During operation	DoE EPA

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Summary of Proponents Commitments for AWWTP Proposal – Environmental Management - Social

Topic	Objective	Actions	Timing	Advice
Community Engagement	<ul style="list-style-type: none"> To ensure that the public and relevant stakeholders have open access to information regarding the environmental performance of the AWWTP and Alkimos Ocean Outlet; and To provide a mechanism to address any significant issues arising from stakeholders 	30. To incorporate into the Water Corporation's Customer Service Program a community engagement plan to: <ul style="list-style-type: none"> address awareness and understanding of the project; ensure that reports on AWWTP environmental performance are readily available to the public; ensure that the results of the monitoring are readily available to the public; and provide a complaints/response process to address matters arising from the project in accordance with the Water Corporation's Corporate Environmental Management System. 	During Environmental Impact Assessment period.	EPA Stakeholders
Aboriginal Heritage	<ul style="list-style-type: none"> To comply with the provisions of the Aboriginal Heritage Act (AHA). 	31. The Water Corporation will undertake appropriate liaison and surveys with the relevant Aboriginal groups, anthropologists to the satisfaction of the Department of Indigenous Affairs.	Prior to Construction	DIA EPA