Perth Metropolitan Desalination Proposal

Water Corporation of Western Australia

Report and Recommendations
of the Environmental Protection Authority

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1. Introduction

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment and Heritage on the environmental factors relevant to a proposal by Water Corporation of Western Australia to develop a 30 gigalitres (GL) per annum desalination plant at Kwinana.

The EPA was advised of the proposal in April 2002, although that was based on the desalination plant being a possible water supply option under drought emergency circumstances. Based on the information provided, the EPA considered that while the proposal had the potential to have an effect on the environment, the proposal could be readily managed to meet the EPA's environmental objectives. Consequently it was notified in *The West Australian* newspaper on 13 May 2002 that, subject to preparation of a suitable Environmental Protection Statement (EPS) document, the EPA intended to set the level of assessment at EPS.

The link with emergency water supply options has been removed by the Water Corporation as a result of the improvement in dam storage levels following winter inflows during 2002.

The proponent has prepared the EPS which accompanies this report (Water Corporation, 2002). The EPA considers that the proposal described can be managed in an acceptable manner subject to the commitments to the proposal being legally binding.

The EPA therefore has determined under Section 40 (1) that the level of assessment for the proposal is EPS, and this report provides the EPA advice and recommendations in accordance with Section 44 (1).

2. The proposal

The proposal is described in detail in Section 4 of the proponent's "Perth Metropolitan Desalination Proposal" document (EPS). The proposal involves the construction and operation of a 30 GL desalination plant at one of two locations in the Kwinana Industrial Area. The alternative sites are at the Kwinana Power Station (KPS) or on the corner of Patterson and Office Roads, East Rockingham.

The key components of the proposal are:

- 100 Megalitres per day (ML/d) Reverse Osmosis desalination plant;
- seawater intake structure, incorporating submersible pumps, onshore fine screening and electrolytic chlorination;
- seawater supply pipeline (1.5-3.5 km) long, depending on the site;
- seawater return discharge pipeline through a diffuser array at both sites; and
- product water pipeline (up to 10 km long) to either the Tamworth or Thompson reservoirs;

Power for the Kwinana Power Station site would be drawn from the Western Power Grid while the East Rockingham site may require a dedicated 20 MW gas-fired power station.

The key characteristics of the alternative desalination proposals are indicated in the following table.

Table 1 Key characteristics of the proposal

Characteristic	East Rockingham site	Kwinana Power Station site
Location	Cnr Office and Patterson Roads	Kwinana Power Station
Capacity	30 GL/yr	30 GL/yr
Power requirement	20 MW	20 MW
Power Source	Gas turbine/gas Engine or Western Power Grid	Western Power Grid
Clearing of vegetation required	2-3 ha of degraded vegetation	Likely to be 2-3 ha of mostly completely degraded vegetation
Seawater intake	220 ML/d (average)	220 ML/d (average)
Seawater intake pipelines		
Location (indicative)	See Figure 1	See Figure 2
Length (indicative)	3.1 km	0.8 km[1]
Number	1	1
Diameter	1400 mm	1400 mm
Concentrated seawater discharge		
volume	120 ML/day	120 ML/day
Salinity and temperature	65,000 mg/L, less than 2 C above ambient	65,000 mg/L, less than 2 C above ambient
Location of outlet	In 8m depth of water offshore from CBH Grains terminal	In 8m depth of water offshore from KPS
Diffuser design	160m long, risers at 10 m spacings at 60^{o} from horizontal, riser ports 200 mm in diameter	160m long, risers at 10 m spacings at 60^{o} from horizontal, riser ports 200 mm in diameter
Product water pipeline		
Location (indicative)	See Figure 1	See Figure 2
Capacity	>100 ML/day	>100 ML/day
Length (indicative)	10 km	10 km
Number	1	1
Diameter	900 mm	900 mm
Destination	Tamworth Hill reservoir	Thompson Lake reservoir
Possible Power station	20 MW gas turbine or gas engine power station	Nil

[1] Potential for shared intake with power station

The key characteristics of a possible power plant at the East Rockingham site are indicated in Table 2.

Table 2 Indicative East Rockingham power station key characteristics

Characteristic	Gas turbine PS	Gas engine PS
Capacity	20 MW	20 MW
Fuel	Natural Gas	Natural gas
Cooling water	Seawater	Seawater
Plant	Two gas turbines	Five high efficiency reciprocating internal combustion engines
	One steam turbine	NA
Air emissions		
Nitrogen oxides	4.56 g/s at 12.53% O_2	6.56 g/s at 10.6% O_2
Greenhouse gases (CO_2)	117 524 tonnes per year at normal operating load	78 650 tonnes per year at normal operating load
Vegetation clearing required	0.5 ha degraded vegetation	0.5 ha degraded vegetation

Figure 1 East Rockingham Desalination Plant Site and Pipeline Routes

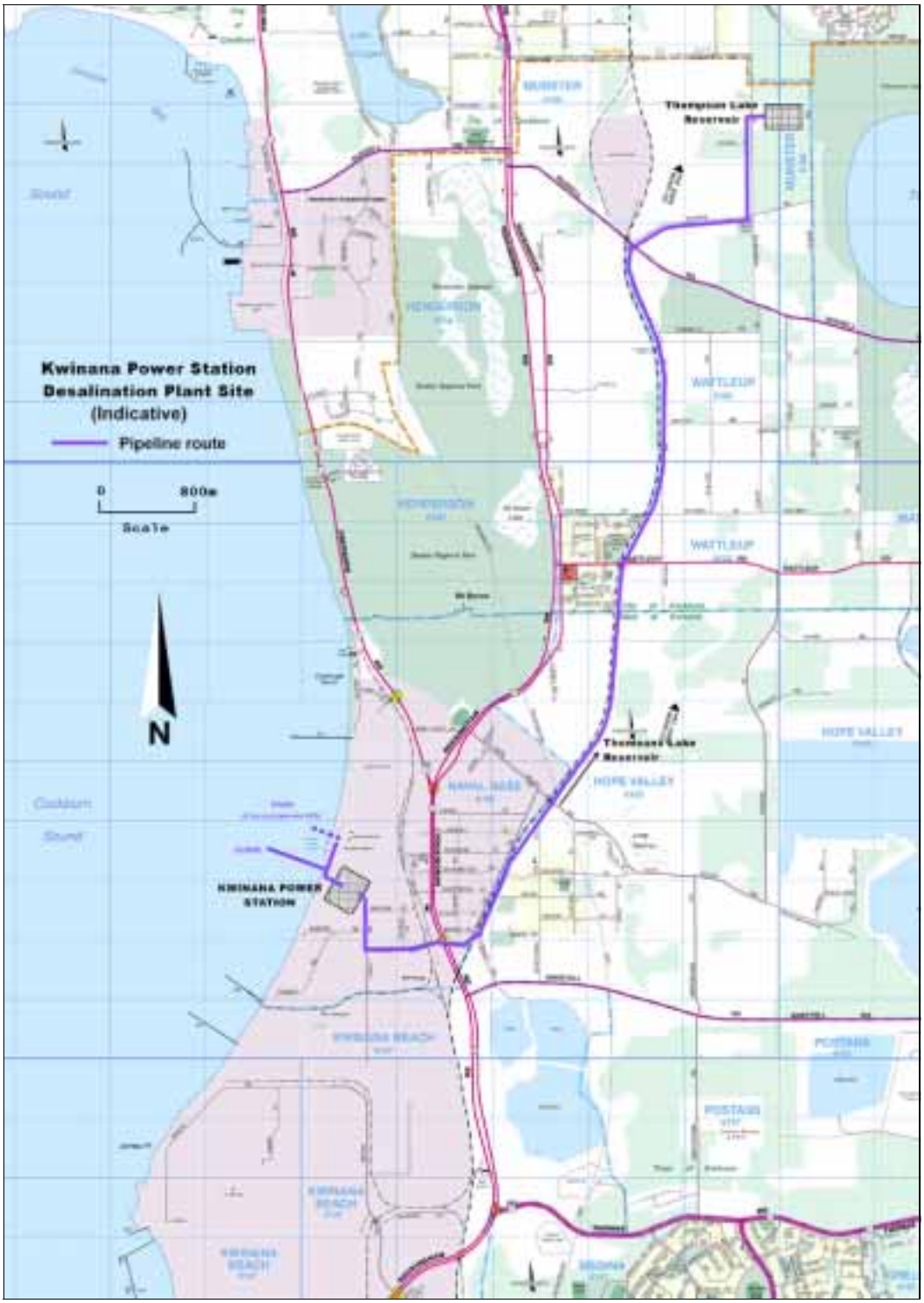

Figure 2 Kwinana Power Station Desalination Plant Site and Pipeline Routes

A copy of the EPS is available from the Water Corporation or on the Water Corporation's web site at www.watercorporation.com.au. A CD version of the EPS is enclosed with this report.

3. Consultation

During the preparation of the EPS, the proponent has undertaken consultation with government agencies and companies with a direct interest in the project and other key stakeholders. Those consulted by the Water Corporation were:

- Conservation Council of Western Australia (Inc)
- Cockburn Sound Management Council
- Water and Rivers Commission
- EPA Services Unit
- Kwinana Progress Association
- Naragebup Environmental Centre
- Recfish West
- Town of Kwinana
- City of Rockingham
- City of Cockburn
- Kwinana Industries Council

Consultation was also undertaken with the local community via a press release made to the local paper inviting comment. The organisations consulted by the Water Corporation, the comments received and the proponent's response are indicated in Appendix 2 of this report.

4. Relevant environmental factors

The summary of all of the environmental factors and their management is outlined in Table 4 of the Executive Summary in the EPS (Water Corporation 2002).

In the EPA's opinion the following are the environmental factors relevant to the proposal:

a) Marine water quality and biota;

b) Vegetation;

c) Atmospheric emissions (greenhouse and nitrogen oxides); and

d) Noise.

A number of other environmental issues were identified with the Water Corporation during the consultation process. The EPA considers that the Water Corporation has adequately addressed these issues in the EPS, and commitments have been given to ensure that these issues are managed effectively.

Unless otherwise indicated, the comments apply to both the East Rockingham site (Patterson & Office Roads) and the Kwinana Power Station site.

Marine water quality and biota.

The EPA's objectives for this factor are to:

- ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and marine uses by meeting statutory requirements and acceptable standards
- maintain the environmental values of the seabed and marine waters.

Intake and outfall structures for the East Rockingham site would be located from the Cooperative Bulk Handling (CBH) jetty while the intake and outfall would be separate from the existing KPS structures, although the possibility of co-discharge may be considered.

Bottom conditions at both the East Rockingham and KPS intake/outfall sites in Cockburn Sound comprise sandy substrate and are some distance from either seagrasses or reef.

As construction of the intake and outfall structures will involve burial of the pipelines, there will be disturbance to the substrate. This should be of short duration and is not expected to lead to significant issues.

The discharge of concentrated seawater (65 000 TDS) from the proposed desalination plant is the primary concern, due to its elevated salinity. The discharge would also be slightly higher in temperature, as a result of the high-pressure pumps in the desalination plan. In addition, a range of water treatment chemicals added during processing through the reverse osmosis plant would also be present in the discharge.

The acceptability of the discharge will be based on compliance with the Cockburn Sound EPP currently in preparation. The discharges at either site are intended to occur within the E3 - moderate level of ecosystem protection zone delineated in the draft Environmental Protection (Cockburn Sound) Policy 2001 (EPA 2001). As pointed out in the EPS, there are no specific criteria in relation to salinity in WA, although the National Water Quality Guidelines provide some suggestions as to an approach. By ensuring that the negatively buoyant discharge is rapidly mixed through the diffuser arrangement and that this mixing occurs within the E3 zone, compliance with the EPP is considered to be achievable.

Modelling undertaken for the Water Corporation on the basis of a dedicated outfall offshore at either of the proposed outfall sites indicates that the water quality objectives for the E2 and E3 zones in the EPP will be met (EPS, Figures 14 and 15, and Appendix 1). A mixing zone within the E3 zone of less than 100 m is expected to be applicable. With rapid dilution and vertical mixing from the diffuser, no deleterious impact on marine biota is expected. This includes the mussels being farmed adjacent to the CBH jetty, near the proposed outfall from the East Rockingham site.

Chemicals added to the seawater are not expected to lead to environmental impacts, due to pre-treatment prior to discharge and rapid mixing from the diffuser. However, the Consultative Environmental Management Plan (CEMP) will include additional investigations to confirm that there will be no significant effect on marine water quality.

The Water Corporation has made a commitment to prepare a water quality management plan as part of the CEMP. The water quality management plan would include:

- procedures to mitigate potential impacts of construction of the discharge pipeline;
- a monitoring program for TDS and temperature of water returned to the ocean;

- a contingency plan that examines the risk of contamination and procedures to mitigate any unanticipated impacts; and
- eco-toxicity testing of added chemicals in the high salinity seawater discharge (anti-scalants and biocides)

A commitment has also been made to locate and design the ocean outlet diffuser to ensure the discharge complies with the requirements of the Cockburn Sound Environmental Protection Policy.

Screening of the seawater intake incorporating current best practice in marine ecosystems should reduce the possible impact on marine biota. The design will be further reviewed through the CEMP.

On the basis of the modelling undertaken by the proponent and the commitments to water quality protection, including compliance with the Cockburn Sound EPP, the EPA considers that the proposal can be managed to meet the environmental objectives for marine water quality and biota, subject to the satisfactory implementation of the proponent's commitments.

Vegetation

The EPA's objective for this factor is to maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

While vegetation has already largely been cleared at the KPS site, the East Rockingham site has generally degraded vegetation representative of the Quindalup vegetation complex. Up to 4 ha could be cleared at the East Rockingham site.

Both sites are located on Quindalup soils. Mapping associated with Bush Forever indicates that about 48 per cent of the vegetation on Quindalup dunes remain as native vegetation complexes (Government of Western Australia 2000). The vegetation on the East Rockingham site has not been identified in Bush Forever as being regionally significant warranting protection. The loss of approximately 4 ha as part of development of that site is therefore not expected to be significant.

Of more significance is the vegetation along the portion of the potable pipeline route to Tamworth Hill Reservoir alongside Lake Cooloongup. The proposed route is located within the Mandurah Road reserve, which runs along and also bisects Bush Forever site 356, which includes Lake Cooloongup and Tamworth Hill. The current route is on the western side of Mandurah Road, potentially within the Bush Forever site. The EPA considers that it would be preferable for the pipeline to be located on the eastern side of the road for this part of the route.

The Water Corporation has made a commitment to prepare a Flora and Fauna Management Plan. This would be aimed at protecting vegetation, Declared Rare and Priority Flora and Fauna by conducting a survey of product pipeline routes to determine final alignments.

As part of that Plan , the Water Corporation indicates in the EPS that, if the plant were located on the East Rockingham site, the following measures would be implemented to control the impact on flora and fauna values:

- locating the plant in the most degraded areas of property and conserving areas of vegetation in better condition as far as practicable;
- locating the plant away from areas of woodland, which tend to have higher values for fauna, particularly birds; and
- locating the plant out of areas required to maintain bushland linkages/wildlife corridors.

In addition, the East Rockingham plant would be likely to be entirely located in an area of poor vegetation condition and that as much of the area of nearby Tuart woodland will be left as practicable.

Having considered conservation values of the vegetation potentially affected and the commitments made by the proponent, the EPA considers that the proposal can be managed to meet the environmental objective for vegetation, subject to the satisfactory implementation of the proponent's commitments.

Atmospheric emissions (greenhouse and nitrogen oxides)

The EPA's objectives for this factor are to:

- ensure that potential greenhouse gas emissions generated by the proposal are adequately addressed in the planning/ design and operation of projects and that
  - best practice is applied to maximise energy efficiency and minimise emissions;
  - comprehensive analysis is undertaken to identify and implement appropriate offsets; and
  - proponents undertake an ongoing program to monitor and report emissions and periodically assess opportunities to further reduce greenhouse gas emissions over time; and
- ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.

The proposal will lead to greenhouse gas emissions either directly or indirectly. The East Rockingham proposal incorporates a 20 MW gas-fired power station dedicated to supplying energy to the plant. The KPS plant would be draw its energy requirements from the existing Western Power integrated system.

The estimated greenhouse gas emissions related to the desalination plant would be approximately 90 000 or 135 000 tonnes CO_2 equivalent per year for the East Rockingham option, depending on the power source, and approximately 180 000 tonnes CO_2 equivalent per year for the KPS option.

The EPA has recently considered and advised in Bulletin 1067 (EPA 2002) on issues associated with the expansion of the power generation capacity of Western Power. These include greenhouse gas emissions from the South West Interconnected System. The EPA noted in Bulletin 1067 that the emission rate from Western Power's grid is predicted to fall substantially within the next decade.

The Water Corporation has committed to preparing a Greenhouse Gas Management Plan that will meet the requirements of draft EPA Guidance 12, Minimising Greenhouse Gas Emissions

In relation to the discharge of nitrogen oxides (NOx), the Water Corporation has committed to comply with EPA Guidance 15, Emissions of Oxides of Nitrogen from Gas Turbines, for the

East Rockingham site power plant. The predicted maximum concentration of NOx is significantly below the relevant National Environmental Protection Measure.

Greenhouse and NOx emissions are not expected to be large. However, the contribution of NOx emissions to photochemical smog needs to be examined further. The CEMP, combined with EPA Guidance 12 and 15, will address atmospheric emissions from the proposal.

The Water Corporation has made a commitment to prepare a Greenhouse Gas Management Plan, as part of the CEMP, that will include:

- use of sources of renewable energy as far as is practicable
- calculation of the greenhouse gas emissions;
- specific measures to minimise the greenhouse gas emissions;
- monitoring of greenhouse gas emissions;
- estimation of the greenhouse gas efficiency in comparison with the efficiencies of other comparable projects producing a similar product;
- an analysis of the extent to which the proposal meets the requirements of the National Strategy using a combination of:
  - "no regrets" measures,
  - "beyond no regrets" measures,
  - land use change or forestry offsets, and
  - international flexibility mechanisms.

This approach is consistent with that encouraged by the EPA, especially in relation to reducing the greenhouse intensity of the energy supply, harnessing renewable energy and improving end use energy efficiency.

The EPA considers that the proposal can be managed to meet the environmental objectives for atmospheric emissions (greenhouse and nitrogen oxides), subject to the satisfactory implementation of the proponent's commitments.

Noise

The EPA's objective for this factor is to protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring the noise levels meet statutory requirements and acceptable standards.

The desalination plant at either site will generated noise, primarily from the high-pressure pumps associated with the reverse osmosis process. The power plant at the East Rockingham site would generate additional noise from that site.

Both sites are located within the Kwinana Industrial Area and the Water Corporation would reduce noise levels to comply with the *Environmental Protection (Noise) Regulations 1997* by a combination of shielding most noise sources by enclosure, equipment specification and other reduction techniques. Consistent with the current work by the Kwinana Industry Council, the design of the plant will need to achieve levels below the normally assigned levels. Initial investigations undertaken for the Water Corporation suggest that this will be achievable, following the examination of a range of noise reduction and management strategies in a Noise Management Plan

The Water Corporation has made a commitment to prepare a Noise Management Plan that includes detailed modelling of noise emissions from the desalination plant and a possible power plant as part of the East Rockingham option, and cumulative effects of emissions. Construction impacts would also be addressed in the Noise Management Plan.

The EPA considers that, on the basis of the commitment to prepare a Noise Management Plan, the proposal can be managed to meet the environmental objective for noise, subject to the satisfactory implementation of the proponent's commitment.

5. Conclusions

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

The EPA has concluded that the factor of marine water quality and biota can be managed to meet the EPA's objectives to:

- ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and marine uses by meeting statutory requirements and acceptable standards; and
- maintain the environmental values of the seabed and marine waters.

The proposed discharges will comply with the Cockburn Sound EPP. Marine water quality will be protected by ensuring that contaminants in the seawater discharge are minimised and that the rapid dilution at the outfall should mitigate the elevated salinity and temperature levels. Construction effects relating to the intake and outfall structures should be very limited in area and duration, and best practice design should avoid affects on biota.

The EPA has concluded that the factor of vegetation can be managed to meet the EPA's objective to maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge. The vegetation likely to be affected is generally not regionally significant, although part of the pipeline route to Tamworth Hill would need to be selected to avoid areas with regional value. A Flora Protection Plan will be prepared to minimise clearing requirements.

The EPA has concluded that the factor of atmospheric emissions (greenhouse and nitrogen oxides) can be managed to meet the EPA's objective to:

- ensure that potential greenhouse gas emissions generated by the proposal are adequately addressed in the planning/ design and operation of projects and that
  - best practice is applied to maximise energy efficiency and minimise emissions;
  - comprehensive analysis is undertaken to identify and implement appropriate offsets; and
  - proponents undertake an ongoing program to monitor and report emissions and periodically assess opportunities to further reduce greenhouse gas emissions over time; and
- ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.

The greenhouse gas and Nitrogen Oxide emissions related to the desalination proposal will be minimised through a combination of strategies, including meeting the requirements of draft EPA Guidance 12, Minimising Greenhouse Gas Emissions and EPA Guidance 15, Emissions of Oxides of Nitrogen from Gas Turbines.

The EPA has concluded that the factor of noise can be managed to meet the EPA's objective to protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring the noise levels meet statutory requirements and acceptable standards. Potential noise emissions from the desalination plant and possible East Rockingham power station will be investigated and mitigated to ensure that the proposal complies with the requirements of the Noise Regulations.

6. Recommendations

The EPA considers that the proponent has demonstrated, in the EPS document, that the proposal can be managed in an environmentally acceptable manner and provides the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister notes that the proposal being assessed is for Water Corporation of Western Australia to develop a 30 gigalitres (GL) per annum desalination plant at Kwinana.
2. That the Minister notes that the proposal has been assessed at an Environmental Protection Statement level, noting the nature of the environmental factors and the consultation already undertaken by the proponent.
3. That the Minister considers the report on the relevant environmental factors as set out in Section 4.
4. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions and proponent commitments as set out in Appendix 3.
5. That the Minister imposes the conditions and procedures recommended in Appendix 3 of this report.

Appendix 1

References

Environmental Protection Authority (2000). Guidance Statement for the Emissions of Oxides of Nitrogen from Gas Turbines, No. 15.

Environmental Protection Authority (2001). Draft Environmental Protection (Cockburn Sound) Policy 2001

Environmental Protection Authority (2002). *Strategic Planning for Future Power Generation – Pinjar Power Station Expansion, Kwinana/East Rockingham Power Station, Kemerton Power Station, New Bunbury Power Station, Collie Power Station Expansion*. EPA Bulletin 1067.

Government of Western Australia (2000). *Bush Forever*

Water Corporation of Western Australia (2002*). Perth Metropolitan Desalination Proposal Environmental Protection Statement*

Appendix 2

Desalination Proposal Consultation Programme

Key stakeholder	Consultation/s	Key Issues	Responses
EPA Services Unit DEP	On-going liaison and briefings	Provision of permanent reference point for temp. & salinity measurements	To be established as part of ongoing seawater monitoring program
		Concern with seawater return discharge	Potential impact and mitigation addressed here (Section 8.5.1)
		Warnbro / Comet Bay-Whitebait considerations	Not an issue for Cockburn Sound
		Geo-technical parameters	To be assessed
Conservation Council of Western Australia	Briefings and discussions	Effects on coastal processes	Potential impact and mitigation addressed here
		Site selection and consideration of alternatives	Many sites considered and selection process described in Section 3.3.
		Greenhouse gas emissions and efficiencies	Potential impact and mitigation addressed here (Section 10).
		Use of power from renewable energy sources	Potential for use described in Section 10).
		Concerns about Port Kennedy and Woodman Point sites.	Potential impacts assessed during site selection, Port Kennedy and Woodman Point sites are not likely to be pursued.
		Limit size of mixing zone	Small mixing zone required
		Dispersion of discharge	Riser design and circulation ensures rapid dispersion.
Cockburn Sound Management Council / Water and Rivers Commission	Initial briefing to Chairman and WRC representatives Presentation to Council	Impact on water and sediment quality of Sound	Considered negligible, Potential impact and mitigation addressed here (Section 8.5)
		Optimising mixing zone	Small mixing zone required
		Conforming to EPA Bulletin 907	Bulletin has been used as guide for assessing significance of impact
		Impact on fisheries	Considered negligible, addressed in Section 8.5.
		Discharge of biocides and risk of toxic discharges	Impact and mitigation regarding biocides addressed in Section 8.5.3. Low risk of toxic discharge.
		Social aspects	High level of consultation during development of Consultative Environmental Management Plan (CEMP) will ensure social aspects are addressed.
Kwinana Progress Association	Briefing and discussion on proposal	Locate the desalination plant in an agricultural area?	Associated costs and engineering factors preclude this option (Section 3.1)
		Effect of Global Olivine development on proposal	Not considered in detail due to uncertainty of development proceeding
		Dolphins, reef and fish breeding grounds in the vicinity of the KPS outfall	Low impact, addressed in Section 8.5.
		Effect on Barter Beach	Proposal will not affect use and amenity of beach.
		Impact on water quality of Sound	Considered negligible, potential impact and mitigation addressed in Section 8.5.
		Impact of Sound water quality on the operation of the plant	Considered by Water Corporation as important issue. Source protection plan required.
		Consideration of discharge from Point Peron.	Determined to be unfeasible
		Noise emissions	Manageable noise emissions, addressed in Section 12.5.
		Contamination of groundwater	Not considered key issue. Management of spills etc will be described in CEMP.
		Effect of or on proposed harbour	Not considered to preclude or be affected by harbour development

Key stakeholder	Consultation/s	Key Issues	Responses
Naragebup Environmental Centre	Briefing and discussion on proposal	Examination of re-use and recycling schemes	Water Corp investigating such projects. eg. Kwinana Industrial Water Re-use Scheme
		Industrial use of scheme water	Re-use scheme, desalinated water potential alternative source to dam water.
		Sourcing green power	Potential for use described in Section 10)
		Effect of desalination discharges	Considered low, potential impact and mitigation addressed in Section 8.5.
Recfish West	Briefing and discussion on proposal	Water Corp operations (ie water restrictions, policing of restrictions, allocations, education).	Practices under constant review. Use management addressed in Section 1.
		Dispersion of seawater return flow	Modelled by DAL (2002). Described in Section 8.5.1.
		Potential for riser to be fish attractor – public safety issues	Not significant environmental impact, will be addressed in CEMP.
		Impact on mussel farming	Will not affect industry, addressed in Section 8.5.
		Heavy metal accumulation	Negligible because of only 60-80% increase in concentration in return flow and immediate dispersion affects on discharge (Section 8.5.2)
		Risk of chemical release	Addressed in risk management section 13.
		Impact on fisheries	Considered negligible, addressed in Section 8.5.
		Intake of seawater – public safety	Low velocity intake and provision of suitable screens will prevent accidents.
Town of Kwinana	Briefing / feedback on areas of concern	Land zoning – appropriate use of land;	Zoning requirements adhered to.
		Maximising potential of land	Informal agreement with town officers that plant was suitable use of land
		Risk management	Addressed in Section 13.
		Cumulative emissions (Kwinana airshed)	Considered manageable
		Cumulative noise	Not considered to add significantly to local noise environment, but to be further studied as part of CEMP (see Section 12.5)
		Impact on Cockburn Sound water quality and biota	Low impact, addressed in Section 8.5.
City of Rockingham	Briefing / feedback on areas of concern	Cumulative noise	Not considered to add significantly to local noise environment, but to be further studied as part of CEMP (see Section 12.5)
		Visual amenity	Plant appearance not considered to detract from local urban industrial environment. Will be managed as part of CEMP,
		Intake suction – effects on fisheries	Negligible effect on fisheries, potential for impact and mitigation addressed in Section 8.5.4.
		Sufficient consultation with relevant groups and MPs	Targeted consultation during EPS and wide ranging consultation during preparation of CEMP considered sufficient.
City of Cockburn (issues mostly concerned possibility of Woodman Point WWTP site, and site is no longer being considered for placement of desalination plant)	Briefing / feedback on areas of concern	Consistency with planning/zoning	Use of Woodman Point site for desalination plant consistent with MRS and Cockburn Sound Town Planning Scheme 2 zoning.
		Noise emissions	Manageable noise emissions, addressed in Section 12.5.
		Visual amenity	Plant appearance not considered to detract from local urban industrial environment. Will be managed as part of CEMP,
		Effect on current buffer around Woodman Point WWTP	Woodman Point is not being considered for placement of desalination plant.

Key stakeholder	Consultation/s	Key Issues	Responses
		Plant and intake/outfall locations	Preliminary locations shown (see Figure 8). Final location subject to geotechnical and marine survey.
		Impact on local values, natural/aesthetic value of area, Lake Coogee environment	Woodman Point is not being considered for placement of desalination plant.
Kwinana Industries Council	Briefing and discussion	Cumulative noise	Not considered to add significantly to local noise environment, but to be further studied as part of CEMP (see Section 12.5)

Appendix 3

Recommended Environmental Conditions

and Proponent's Commitments

STATEMENT No.

RECOMMENDED CONDITIONS AND PROCEDURES

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

PERTH METROPOLITAN DESALINATION PROPOSAL

Proposal: The construction and operation of a seawater desalination plant at a site in the Kwinana/East Rockingham area, and associated seawater intake, concentrated seawater discharge pipelines, and product pipeline to Tamworth or Thompson Reservoir, as documented in Schedule 1 of this Statement.

Proponent: Water Corporation

Proponent Address: 629 Newcastle St, LEEDERVILLE WA 6007

Assessment Number: 1454

Report of the Environmental Protection Authority: Bulletin 1070

The proposal referred to above may be implemented subject to the following conditions and procedures:

Procedural Conditions

1 Implementation and Changes

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.

1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.

1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is not substantial, the proponent may implement those changes upon receipt of written advice.

2 Proponent Commitments

2-1 The proponent shall implement the consolidated environmental management commitments documented in schedule 2 of this statement.

2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of the conditions in this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment and Heritage under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment and Heritage has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.

3-3 The nominated proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

4-1 The proponent shall provide evidence to the Minister for the Environment and Heritage within five years of the date of this statement that the proposal has been substantially commenced or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment and Heritage will determine any dispute as to whether the proposal has been substantially commenced.

4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment and Heritage, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

- The environmental factors of the proposal have not changed significantly;
- new, significant environmental issues have not arisen; and
- all relevant government authorities have been consulted.

Note: The Minister for the Environment and Heritage may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

Environmental Conditions

5 Compliance Audit and Performance Review

5-1 The proponent shall prepare an audit program in consultation with and submit compliance reports to the Department of Environmental Protection which address:

- the implementation of the proposal as defined in schedule 1 of this statement;
- evidence of compliance with the conditions and commitments; and
- the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans related to the conditions, procedures and commitments contained in this statement.

Usually, the Department of Environmental Protection prepares an audit table which can be utilised by the proponent, if required, to prepare an audit program to ensure that the proposal is implemented as required. The Chief Executive Officer is responsible for the preparation of written advice to the proponent, which is signed off by either the Minister or, under an endorsed condition clearance process, a delegate within the Environmental Protection Authority or the Department of Environmental Protection that the requirements have been met.

5-2 The proponent shall submit a performance review report every five years after the start of the operations phase to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority, which addresses:

- the major environmental issues associated with the project: the targets for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those targets;
- the level of progress in the achievement of sound environmental performance, including industry bench marking, and the use of best available technology where practicable;
- significant improvements gained in environmental management, including the use of external peer reviews;
- stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and
- the proposed environmental targets over the next five years, including improvements in technology and management processes.

Procedures

1 Where a condition states “to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority”, the Chief Executive Officer of the Department of Environmental Protection will obtain that advice for the preparation of written advice to the proponent.

2 The Environmental Protection Authority may seek advice from other agencies, as required, in order to provide its advice to the Chief Executive Officer of the Department of Environmental Protection.

Notes

1 The Minister for the Environment and Heritage will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environmental Protection over the fulfilment of the requirements of the conditions.

2 The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

Schedule 1

The Proposal (Assessment No. 1454)

The construction and operation of a seawater desalination plant at a site in the Kwinana/Rockingham area, and associated seawater intake, concentrated seawater discharge pipelines, and product pipeline to Tamworth or Thompson Reservoir, as specified in the key characteristics table below.

The location of the plant and indicative product water pipeline alignments are shown in Figures 1 and 2 respectively (attached).

Table 1 Summary of key desalination proposal characteristics

Characteristic	East Rockingham site	Kwinana Power Station site
Location	Cnr Office and Patterson Roads	Kwinana Power Station
Capacity	30 GL/yr	30 GL/yr
Power requirement	20 MW	20 MW
Power Source	Gas turbine/gas Engine or Western Power Grid	Western Power Grid
Clearing of vegetation required	2-3 ha of degraded vegetation	Likely to be 2-3 ha of mostly completely degraded vegetation
Seawater intake	220 ML/d (average)	220 ML/d (average)
Seawater intake pipelines		
Location (indicative)	See Figure 1	See Figure 2
Length (indicative)	3.1 km	0.8 km[1]
Number	1	1
Diameter	1400 mm	1400 mm
Concentrated seawater discharge		
volume	120 ML/day	120 ML/day
Salinity and temperature	65,000 mg/L, less than 2^0C above ambient	65,000 mg/L, less than 2^0C above ambient
Location of outlet	In 8m depth of water offshore from CBH Grains terminal	In 8m depth of water offshore from KPS
Diffuser design	160m long, risers at 10 m spacings at 60^o from horizontal, riser ports 200 mm in diameter	160m long, risers at 10 m spacings at 60^o from horizontal, riser ports 200 mm in diameter
Product water pipeline		
Location (indicative)	See Figure 1	See Figure 2
Capacity	>100 ML/day	>100 ML/day
Length (indicative)	10 km	10 km
Number	1	1
Diameter	900 mm	900 mm
Destination	Tamworth Hill reservoir	Thompson Lake reservoir
Possible Power station	20 MW gas turbine or gas engine power station	Nil

[1] Potential for shared intake with power station

Table 2 Summary of key power station characteristics at the East Rockingham site

Characteristic	Gas turbine PS	Gas engine PS
Capacity	20 MW	20 MW
Fuel	Natural Gas	Natural gas
Cooling water	Seawater	Seawater
Plant	Two gas turbines	Five high efficiency reciprocating internal combustion engines
	One steam turbine	NA
Air emissions		
Nitrogen oxides	4.56 g/s at 12.53% O_2	6.56 g/s at 10.6% O_2
Greenhouse gases (CO_2)	117 524 tonnes per year at normal operating load	78 650 tonnes per year at normal operating load
Vegetation clearing required	0.5 ha degraded vegetation	0.5 ha degraded vegetation

Abbreviations

GL/yr	gigalitres/year
g/s	grams/second
ha	hectare
km	kilometre
mg/L	milligram/litre
mm	millimetre
ML/d	Megalitres/day
MW	megawatt

Figure 1 Perth Metropolitan Desalination Proposal Locations – East Rockingham

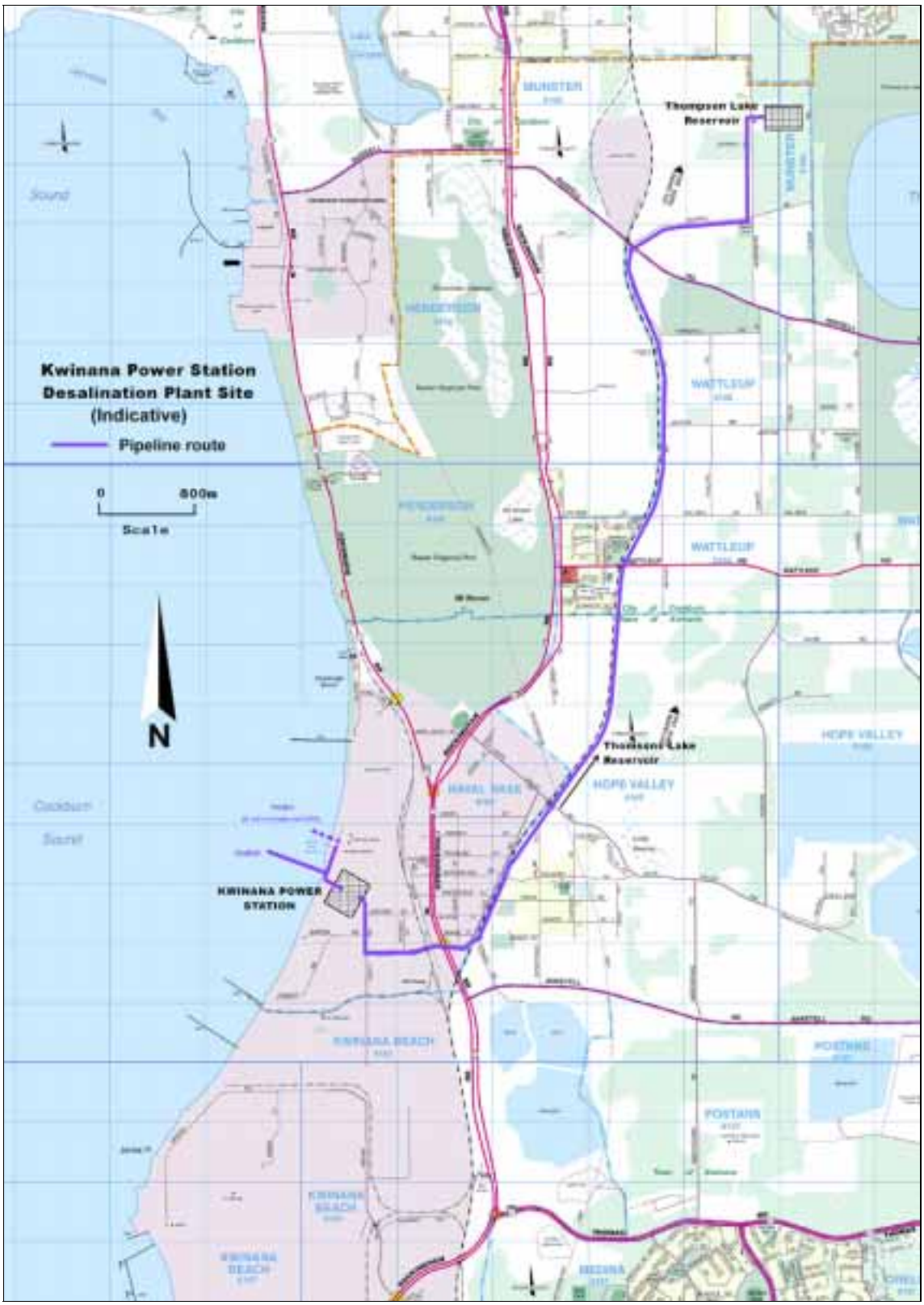

Figure 2 Perth Metropolitan Desalination Proposal Locations – Kwinana Power Station

Schedule 2

Proponent's Environmental Management Commitments – Perth Metropolitan Desalination Proposal (Assessment No. 1454)

No	Commitment	Objective	Action	Timing	Advice

1	Consultative Environmental Management Plan (CEMP)	To minimise environmental impacts from implementation of the proposal	Prepare a CEMP which addresses the following;
			• Water Quality Management Plan to include:
			  • procedures to mitigate potential impacts of construction of the discharge pipeline;
			  • a monitoring program for TDS and temperature of water returned to the ocean;
			  • a contingency plan that examines the risk of contamination and procedures to mitigate any unanticipated impacts; and
			  • eco-toxicity testing of added chemicals in the high salinity seawater discharge (anti-scalants and biocides)
			• Flora and Fauna Management Plan to include:
			  • locating the plant and pipelines to minimise clearing and effects on conservation values;
			  • mitigating impacts on Priority Flora;
			  • Dieback management measures; and
			  • weed control measures.
			• Greenhouse gas management plan as part of CEMP that will include:
			  • use of renewable energy as far as is practicable
			  • calculation of the greenhouse gas emissions;
			  • specific measures to minimise the greenhouse gas emissions;
			  • monitoring of greenhouse gas emissions;
			  • estimation of the greenhouse gas efficiency in comparison with the efficiencies of other comparable projects producing a similar product;
			  • an analysis of the extent to which the proposal meets the requirements of the National Strategy using a combination of:
			  – "no regrets" measures,
			  – "beyond no regrets" measures,
			  – land use change or forestry offsets, and
			  – international flexibility mechanisms.
			• Demonstration that Nitrogen Oxides emissions from a dedicated power plant at East Rockingham will comply with EPA Guidance 15 and the relevant NEPM.
			• Noise Management Plan that includes detailed modelling of noise emissions and cumulative affect of emissions.
			• Hazardous Materials Management Plan to minimise public risk from materials associated with the plant.
			• A contingency that includes an archaeological monitoring program in case Aboriginal heritage sites are discovered during construction
				Within four months following a decision to construct	

2	Ocean outlet for seawater return	Achieve compliance with Cockburn Sound EPP	Locate and design the ocean outlet diffuser to ensure the discharge complies with the requirements of the Cockburn Sound Environmental Protection Policy	Prior to construction	
3	CEMP	Achieve objectives of Commitment 1	Implement CEMP	Before during and following construction	WRC CALM

No	Commitment	Objective	Action	Timing	Advice
4	Vegetation, Declared Rare and Priority Flora and Fauna Habitat	Protect vegetation, Declared Rare and Priority Flora and Fauna	Conduct a survey of product pipeline routes to determine final alignments to avoid areas identified by CALM or Department of Environmental Protection. Conduct detailed survey for Rare and Priority Flora, to contribute to the Flora and Fauna Management Plan.	Spring season before construction commences	CALM
5	Aboriginal heritage	Address heritage issues	Consult with regional and local Aboriginal organisations and conduct site inspections to determine issues	Before and during construction	
6	Aboriginal heritage	Address impact issues	Submit a section 18 application to develop into Cockburn Sound to the Aboriginal Cultural Materials Committee	Before construction	