A tradeable rights instrument to reduce nutrient pollution in the Port waterways
A tradeable rights instrument to reduce nutrient pollution in the Port waterways: feasibility study

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Summary

The Port River estuary is located approximately 12 km north-west of Adelaide’s CBD. It has been the major shipping and industrial hub of Adelaide for the last 150 years. Two major metropolitan wastewater treatment plants have discharged treated effluent in the region. The estuary also receives stormwater runoff from a large combined residential, industrial and agricultural catchment over northern Adelaide. Pollution from these sources, particularly elevated levels of nutrients, has resulted in seagrass loss and excessive algal blooms in the waterway.

The Australian Government Department of the Environment and Heritage sponsors the national Coastal Catchments Initiative (CCI) program, which seeks to deliver significant reductions in nutrients in agreed hotspots. As a part of this program the EPA is developing a water quality improvement plan (WQIP) for the Port River waterways. The Port waterways WQIP uses community and industry consultation to set environmental objectives for nutrient levels in the waterway to be used as indicators for long-term water quality improvement. Point and diffuse sources of pollution can then be managed to achieve these objectives.

In October 2003 the EPA commenced a feasibility study into the cost benefit of establishing a tradeable rights/market based instrument to reduce nutrient pollution in the Port waterways from both point and diffuse sources around the catchment.

The study involved quantifying all industrial discharge sources and estimates of diffuse-source pollution in the waterways. Approximate costs for nutrient abatement strategies at a number of industries and several diffuse sources were determined. Environmental economic consultants BDA Group were engaged to undertake the economic analysis for tradeable discharge rights in the Port waterways. Cost differentials were assessed against several proven economic market based instrument models including formal nutrient offset schemes, bubble licensing and a hybrid model of negotiated licensing offsets.

In 2004 BDA Group produced three reports on the suitability and benefits of tradeable nutrient discharge rights to reduce nutrient pollution in the Port waterways catchment (Appendices 1, 2 & 3). These reports concluded that a tradeable nutrient discharge instrument would not be feasible at this time in the Port waterways for the following reasons:

Currently only 7% of the nitrogen pollution comes from diffuse sources. The remaining 93% is made up entirely from two sources: SA Water’s Bolivar wastewater treatment plant (WWTP), and Penrice’s soda ash production facility at Osborne.

Similarly, 82% of the total phosphorus load comes from the Bolivar WWTP. These factors limit the potential trading options to two parties, which severely restricts the potential market available.

There was also concern over the equity between the two potential trading partners. To date (2004), SA Water has spent an estimated $140m on nutrient abatement activities at the Bolivar WWTP, while Penrice has spent
approximately $8m on environmental improvement. Equal trading between these two parties based on current spending on environmental improvement may be seen to be inequitable.

SA Water are nearing the end of a major upgrade of their facilities to reduce the environmental harm caused by their nutrient emissions, whereas Penrice are still at the feasibility stage. In order for market based instruments to be of value, the major traders should be at or close to best available technology that is economically achievable (BATEA), and have all available improvements scoped, in order for them to be considered during negotiations.

The EPA is developing a three-dimensional water quality model and a diffuse-source pollution monitoring program as part of the WQIP for the Port waterways. When these programs have been completed they will provide more certainty on discharge sources and relative impacts, and information on where cost-effective reductions can be made. This information can then be used to review the cost differentials and potential trading partners in the waterway.
Introduction

The Port waterways

The Port River estuary is located to the north-west of Adelaide (refer to figure 1 for a map of the study area). The estuary is partitioned into two sections by the centrally located Torrens and Garden islands. The waterbody to the east is known as Barker Inlet and the waterway to the west is the Port River. The two waterways are linked by a shallow channel referred to as Eastern Passage.

Barker Inlet consists mainly of shallow tidal flats, fringed with mangroves and dissected by a network of tidal creeks. The Port River, by contrast, is a relatively narrow channel which is dredged to about 10 metres depth for shipping access to the Port Adelaide docks (EPA 2005).

For many years treated effluent from the Port Adelaide wastewater treatment plant (WWTP) had been discharged into the southern end of the Port River (this discharge ceased in December 2004). Currently, sea water from the artificial lakes constructed as part of the West Lakes development discharges into the Port River and, further north, significant nutrient loads are discharged into the river from the Penrice soda ash plant. The treated effluent from Adelaide’s largest WWTP at Bolivar discharges into the northern part of Barker Inlet. In addition, there are a number of smaller industrial discharges, as well as stormwater drains and intermittently flowing watercourses that discharge into the region, including Little Para River, Dry Creek and numerous wetland systems.

Land uses in this region include light and heavy industrial, commercial, residential (low and medium density) and agricultural (predominantly horticulture and market gardens).

The EPA’s ambient water quality monitoring of the Port River and Barker Inlet has indicated that nutrient concentrations are elevated across all sites in these waterways (EPA 1997; Wade 2002).

Coastal Catchments Initiative

As part of the Coastal Catchments Initiative (CCI), the Commonwealth Department of the Environment and Heritage has identified coastal water quality hotspots, including the Port River and its surrounding area—the Port waterways. The Federal Government, along with state and local governments and community and environmental groups, is investing in the development of water quality improvement plans that are consistent with the Framework for Marine and Estuarine Water Quality Protection.

The framework builds upon key elements of the National Water Quality Management Strategy (NWQMS) and national Principles for the Provision of Water for Ecosystems. This study has been undertaken in parallel with but under the umbrella of the Port Waterways Water Quality Improvement Plan (WQIP), which is being developed in response to the CCI.
The Port waterways WQIP uses community and industry consultation to set environmental objectives for nutrient levels in the waterway. These objectives are then used as aims for long-term water quality improvement. Industrial and diffuse source emissions can then be managed to achieve these objectives.

It was proposed that a tradeable rights instrument may provide appropriate tools for both industry and diffuse source catchments to reduce nutrient emission levels in a more cost effective manner in order to meet the targets allocated through the WQIP.

**Feasibility study**

In October 2003 the EPA commenced a feasibility study into the cost benefit of establishing a tradeable rights/market based instrument to reduce nutrient pollution in the Port waterways from both point and diffuse sources around the catchment.

The study involved quantifying all industrial discharge sources and estimates of diffuse-source pollution in the waterways. Approximate costs for nutrient abatement strategies at a number of industries and several diffuse sources were determined. Environmental economic consultants BDA Group were engaged to undertake the economic analysis for tradeable discharge rights in the Port waterways. Cost differentials were assessed against several proven economic market based instrument models including formal nutrient offset schemes, bubble licensing and a hybrid model of negotiated licensing offsets.

BDA Group produced three reports (Appendices 1, 2 and 3):

- Suitability and benefits of tradeable nutrient discharge rights to reduce nutrient pollution in the Port waterways catchment
- Suitability and benefits of tradeable nutrient discharge rights to reduce pollution in the Port waterways: Part 2 report—Instrument selection and policy framework
- Tradeable discharge rights to reduce nutrient pollution in the Port waterways catchment: Final report.
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Figure 1: Port waterways Water Quality Improvement Plan study area
Tradeable rights/market based instruments

Market based instruments such as pollution offsets are recognised as potentially valuable mechanisms for cost-effectively achieving pollutant reductions and ecologically sustainable development. Pollution offset programs provide a vehicle for shifting pollution management effort to those areas that can make the biggest net gain in reducing pollutant loads to receiving waters.

Market based instruments have been used successfully in other states of Australia to reduce nutrients entering waterways in a more cost-effective manner than conventional ‘command and control’ management styles.

Different types of instruments

A variety of proven market based instruments can be applied in different circumstances, depending on the size, frequency and types of pollution discharges, the potential market for discharge rights and the number of potential trading participants.

Bubble licensing

In a bubble licensing system, several large point sources enter into a self-contained trading scheme within a restricted area. Individual sources within the bubble can adjust their pollution loads as long as they do not exceed the aggregate discharge limit (or water quality target) (O’Sullivan 2002). The end result is a reduction in pollution at the cheapest cost.

This instrument is currently being used by three Sydney Water facilities on the Hawkesbury–Nepean River in New South Wales, managed by the NSW EPA. Their goal is to reduce nitrogen by 50% and phosphorus by 83% within 8 years.

Formal offset schemes

A formal offset trading scheme achieves cost-effective pollution reduction through allowing dischargers to reduce their pollution load by purchasing credits from an ‘offset bank’ in order to meet their allocation. The ‘offset bank’ can then sell credits to fund cost-effective abatement strategies at other sources. The net result is a lowering of the pollution load entering the waterway at a much reduced cost. In some cases buyers and sellers can act directly under the guidance of the ‘bank manager’.

If the overall nutrient load entering a waterway can be reduced from any source, the market seeks out the cheapest, which is generally the diffuse sources (as low as $5 per kg nitrogen) (BDA Group 2004a; O’Sullivan 2002). It is usually much more expensive to reduce pollution at heavily regulated point sources (such as WWTPs) because they already operate at a very high level of technological pollution control. There can be stipulations on trading, such as environmental equivalences, to ensure that what is reduced from diffuse sources is equal in environmental impact to what is discharged at point sources. For example, there may be a trading ratio where 3 kilograms of nitrogen reduced at diffuse sources is equal to 1 kilogram of nitrogen discharged at the point source. This allows for some uncertainty in relative conditions.
environmental impact and facilitates a net reduction in nutrients in the waterway.

A pilot offset scheme is currently under way in South Creek, New South Wales, to help control phosphorus and nitrogen loads from both point and diffuse sources in the surrounding catchment. Details of this scheme are available at www.epa.nsw.gov.au/greenoffsets/index.htm

**Negotiated licensing offsets**

Negotiated licensing offsets is a hybrid scheme investigated specifically through this program where there is limited scope for diffuse-source pollution abatement. It is principally a bubble licensing scheme but with some allowances for diffuse-source pollution abatement via offsets, where possible.

There are many other permutations of tradeable discharge rights schemes that were investigated for the Port waterways; however, they are outside the scope of this feasibility study report. For further details on all market-based instruments examined, refer to Appendices 1, 2 and 3 (BDA Group 2004a, 2004b, 2004c).
Methods

This feasibility study examined the potential benefits of using a trading instrument to achieve a target of 50% reduction in current total nutrient loads entering the Port waterways by 2010-11. This target is hypothetical for the purpose of the calculations in this report. An actual target will be developed through the completion of the WQIP and in consultation with industry, including negotiated timeframes for compliance.

Tradeable discharge rights in the Port waterways

This report summarises an investigation into the suitability of a nutrient offset scheme for the Port waterways to reduce nutrient pollution in the Port River and Barker Inlet. The investigation examined the likelihood of a potential market for nutrients in the region, sufficient buyers and sellers of nutrient credits, and a suitable variability in the cost of nutrient reduction from different sources to enable an offset and/or trading scheme to be effective.

If the market was deemed to be suitable then a conceptually robust offset program was to be developed to use a 'cap and trade' style nutrient offsetting and/or trading scheme to reduce nutrient pollution from both point and diffuse sources in the Port waterways.

Current situation in the Port River

The Port River is currently eutrophic (i.e. it has an excess of nitrogen and phosphorus). As a result, there are frequent algal blooms, seagrass loss, loss of mangroves and salt marshes, and a reduction in aesthetic values throughout the waterway. Current estimates suggest that up to 93% of all total nitrogen and 82% of phosphorous discharges into the Port waterways are from point sources (see figures 2 and 3).

Point sources

Until 2004 there were two wastewater treatment plant (WWTP) discharges entering the Port River waterway. One, in the northern region at Bolivar, discharged approximately 383 tonnes of nitrogen and 127 tonnes of phosphorus each year. The second, the Port Adelaide WWTP in the southern region, discharged 161 tonnes of nitrogen and 52 tonnes of phosphorus each year. The Port Adelaide WWTP discharge has now been diverted to the Bolivar WWTP, where it will be treated and discharged through the existing pipeline. This process was completed at the end of 2004. The combined Bolivar discharge will now contribute approximately 544 tonnes of nitrogen and 179 tonnes of phosphorus annually. This diversion has been factored into the calculations for discharges into the Port River. It is anticipated that in 2010-11, with ‘business as usual’ (BAU) and including the completion of the current environment improvement plans, Bolivar will discharge approximately 318 tonnes of nitrogen and 120 tonnes of phosphorus each year (see page 8 ‘Future loads’, page 11 'SA Water Bolivar WWTP').
Penrice Soda Products discharge approximately 1100 tonnes of nitrogen into the Port River each year. In 2010-11 under BAU, Penrice will be discharging approximately 800 tonnes of nitrogen each year into the Port waterways (see page 8 ‘Future loads’).

**Diffuse sources**

The main contributor to diffuse source nutrient pollution is the Northern Adelaide and Barossa (NAB) catchment, which comprises 93% of the land in the WQIP study boundary. This incorporates Smith and Adams creeks, Dry Creek and Little Para River. Actual data on this region is scarce but it is estimated that this catchment contributes approximately 110 tonnes of nitrogen and 28 tonnes of phosphorus each year into the Port waterways.

It is estimated that the Port Adelaide catchment discharges 7 tonnes of nitrogen and 3 tonnes of phosphorus into the Port waterways each year.

**Figure 2:** Current total nitrogen discharges into the Port waterways

**Figure 3:** Current total phosphorus discharges into the Port waterways
Other diffuse sources

Other nutrient contributors to the Port waterways are sediments, particularly in the southern reaches of the Port River. Work done by the EPA suggests that the net discharge of nitrogen from these sediments may be as high as 800 tonnes per year (Jenkins 2005).

Atmospheric deposition has also been considered; current estimates based on a similar study done in Moreton Bay (Ormerod & Pillsworth 1999) suggest that the total nitrogen contribution may be of the order of 25-45 tonnes per year.

Spillage of fertiliser contributes approximately 2 tonnes of nitrogen each year into the water around the wharves of Port Adelaide and it is estimated that runoff from fertiliser facilities contributes approximately 2 tonnes each year. The EPA is currently developing codes of practice for materials handling on wharves and for marinas and boating facilities. This is also a CCI project and should be completed by mid 2005.

It is estimated that recreational boating users contribute approximately 10 tonnes of nitrogen and 2 tonnes of phosphorous into the Port waterways each year.

There are two landfills within the WQIP boundary; Garden Island landfill was closed in 2002 and Wingfield landfill is currently in the process of closing. It is estimated that these facilities collectively discharge 3 tonnes of nitrogen into the waterway each year (EPA 2005).

Future loads and the WQIP target

Penrice Soda Products and SA Water’s Bolivar WWTP both have active environment improvement plans (EIPs) which bind them to agreed works to reduce pollution from their facilities over a specified time period; by 2010-11 both facilities will have completed their EIPs. The estimated discharges from all sources by 2010-11 are outlined in table 1.

As an initial target the WQIP proposed a 50% reduction in the total N & P loads to the estuary. The actual reduction required to meet the designated water quality objectives may be different from this figure and will be determined by modelling work which has yet to be completed.

| Source: BDA Group 2004a |
Potential impacts of nutrients in the Port waterways

A trading instrument such as a formal offset scheme has the capability to trade over a wide area, which may include different habitats, hydrodynamics and potential impacts from any discharges. In the Port waterways, several potential impacts need to be taken into consideration.

**Seagrass loss**

Seagrass is most prevalent in the northern segment/Barker Inlet region of the waterways. Other areas of the waterways are dredged to maintain shipping channels so seagrass is absent. Seagrass loss is occurring throughout the northern segment due to nutrient enrichment leading to epiphyte growth, increased turbidity and decreased light penetration.

**Algal blooms**

Nutrient enrichment contributes significantly to microalgal (phytoplankton) blooms in the Port waterways. There are occasional ‘red tides’ of toxic algae in the Port River, mostly in the southern and central segments, which have resulted in a permanent closure of shellfish harvesting for the whole river. Nutrient enrichment also contributes to the growth of macroalgae in the Port waterways. Macroalgae (*Ulva* spp. especially), which grows when conditions are favourable, can smother seagrass and mangroves. It often washes up on beaches where it decays, reintroducing nutrients via decay and causing significant odour issues for the surrounding community.

**Mangrove decline**

Mangrove decline is currently occurring across the whole Port waterways region. The most significant decline is in the northern region between Barker Inlet and Gawler Creek (EPA 2005).

**Loss of salt marshes**

There is a significant loss of salt marshes across the whole region, with the greatest loss between the Port River and Barker Inlet. Loss of salt marshes is mainly due to human encroachment through development and illegal dumping in salt-marsh areas (EPA 2005).

**Environmental equivalences**

The timing, chemical composition, frequency and location of discharges will also affect the impact of the discharges on the receiving environment. Environmental equivalences were considered in an attempt to quantify the relative impact of each discharge on the receiving habitats and on each potential outcome identified: seagrass loss, mangrove decline, salt marsh decline, macroalgal blooms, phytoplankton blooms and mosquito breeding.

For example, one aspect considered was timing of the nutrient discharge—pulsed winter-time stormwater/riverine discharges would have less impact than a constant industrial discharge, particularly through the warm summer months. This is due to winter discharges entering generally under lower light levels and into colder water and air temperatures, and in most cases bound
to organic or particulate matter. These are not prime conditions for algal growth when compared to more bioavailable discharges during summer (BDA Group 2004c).

Details of the environmental equivalences for each major discharge in the Port waterways are provided in Appendix 3 (BDA Group 2004c); however, the process of assigning equivalences is quite subjective and is under refinement using a three-dimensional water quality model being developed by the EPA.

An estimate of relative impact can be used to calculate trading ratios, which allow for the equivalence of discharges during a trade. For example, 1 kg of discharge from 'source A' may have more relative impact than an equivalent amount from 'source B'. The higher impact may be due to a difference in the chemical composition of the discharge or the sensitivity of the receiving environment at the discharge site. In order to make this trade equitable a trading ratio can be used in the trading rules such that 1 kg at source A equals 3 kg at source B. This calculation can also include an uncertainty factor, which helps to facilitate a net reduction in nutrient concentrations across the waterway.
Cost of nutrient abatement

In order to assess the likelihood of trading between two sources there must be a large difference in the cost of nutrient abatement. This means that nutrient reduction can be achieved cheaply at one source compared to the other, which is the aim of a trading instrument. To estimate cost differentials the major point source facilities in the Port waterways were consulted, and previous spending on nutrient reduction and the amount of reduction achieved for the money spent were investigated.

In some situations abatement options are not known and may be speculative, requiring further developmental work. In these cases, timeframes for reaching target reductions will become important, as will flexibility provisions within the instrument design. Flexibility in instrument design and negotiated timeframes will allow the untested abatement options to be properly researched and potentially modified, and will not affect reaching the target level.

There is also significant uncertainty about abatement costs for some point and diffuse sources. It will take time to refine the estimates used in this report, which will allow greater precision in estimating potential gains from the use of a market based instrument. However, this issue is less important to the actual instrument design than resolving issues relating to the environmental equivalence of discharges and load quantities from diffuse, new and uncertain sources (BDA Group 2004b).

SA Water Bolivar WWTP

The EPA and SA Water have established an EIP for nutrient reduction at Bolivar WWTP—SA Water aimed to reduce nitrogen by 80%, from 1600 tonnes per year down to 318 tonnes per year by 2003–04. To achieve this, Bolivar installed an activated sludge plant at a cost of $110m and also set up the Virginia Pipeline Scheme (VPS) to provide treated effluent to irrigators at a cost of $30m. This resulted in a measured nitrogen reduction to 380 tonnes per year in 2002–03. The total cost of nitrogen reduction to date (2004) is $140m or $115,000 per tonne.

The diversion of the Port Adelaide WWTP effluent to Bolivar means that Bolivar’s discharge will increase to approximately 544 tonnes in 2004–05. It is anticipated that increased use of the VPS will reduce loads gradually over time to around 318 tonnes in 2010–11. However, if the VPS uptake does not reach the estimated 50% of treated effluent, Bolivar could introduce additional treatment to reduce nitrogen from 380 to 318 tonnes per year at an estimated cost of $30m (or $480,000 per tonne).

Other options for nutrient abatement at Bolivar include treatment to A grade quality water for pumping to the Adelaide parklands. This option was previously considered in the context of the Glenelg WWTP, where the estimated cost was $15m. If the market was confirmed and supply and distribution costs were met by the users, this could reduce nutrients by another 65 tonnes per year at a cost of $200,000 per tonne. However, these estimates should be treated with caution as they are based on the Glenelg WWTP rather than Bolivar (SKM 2000).
The cost of nitrogen reduction at Bolivar has been estimated at $200,000 per tonne. For further details see Appendices 1 and 3 (BDA Group 2004a, 2004c).

Penrice Soda Products

Penrice Soda Products have an EIP in place and currently have spent $2.5m on cleaner production. This relates to a nitrogen reduction of 200 tonnes at a cost of $12,500 per tonne. The second stage of their EIP is an investigation of current technology to reduce nitrogen further. Penrice is at the very early stage of investigations and no cost estimate is available but it is likely to be significantly more than what has already been spent. Options include air/vapour exchange via cooling towers and microbiological solutions.

Therefore, for the purpose of this investigation a range of $12,500–$125,000 per tonne has been used in calculations (BDA Group 2004a).

Diffuse sources

The Northern Adelaide and Barossa Catchment Water Management Board (CWMB) and the Torrens and Patawalonga CWMB are both currently implementing pollution prevention schemes to reduce pollution entering the waterway at business sources throughout the catchment. There are also areas of wetlands that significantly reduce nutrients in riverine discharges in the catchment.

To increase nutrient abatement from diffuse sources in the Port waterways, costings of wetland expansion, grassed swale construction, gross pollutant trap installation, runoff detention and improvements in riparian vegetation were assessed. These options were only low to moderately cost-effective for nutrient removal, ranging from $10 to $80,000 per tonne nitrogen per year (BDA Group 2004a).

These options are highly dependent on actual nitrogen runoff (which is very low) from the relevant areas (figures 2 & 3) and the availability and price of land required for abatement.

Many other options of nutrient pollution abatement were costed including dredging of sediments, and details are provided in Appendix 1 (BDA Group 2004a).
Outcomes of the feasibility study

The key outcomes of the feasibility study are as follows:

- SA Water’s Bolivar WWTP contributes 82% of the total phosphorus discharge into the Port waterways. This severely limits any trading options with phosphorus.
- Two sources contribute 93% of the total nitrogen discharge into the Port waterways: Penrice Soda Products 62%, and Bolivar WWTP 31%.
- Diffuse sources generally have less impact than point source discharges due to the timing, frequency and composition of discharges.
- Diffuse sources only contribute 7% of the total nitrogen discharge, which means that the more cost-effective abatement measures at diffuse sources will not generate sufficient nutrient reduction to meet the WQIP target.
- Nutrient release from sediments is a significant source of diffuse nutrient pollution in the estuary. It is estimated that up to 800 tonnes of nitrogen are released from sediments each year (Jenkins 2005).
- The cost of reducing nitrogen discharge at Bolivar WWTP is estimated at approximately $200,000 per tonne of nitrogen. The cost of reducing nitrogen discharge at Penrice is estimated to be between $12,500 and $125,000 per tonne of nitrogen; however, it is likely to be in the higher part of this range.
- Consultation with both Penrice and SA Water indicated that both would be cautiously interested in participating in a tradeable rights instrument scheme.
- Significant community consultation would be required before any trading instrument could be set up for the Port waterways.

One of the conditions of participation in an offset scheme is that a nutrient reduction activity cannot be funded where a participant would otherwise be required to carry out abatement options under environment or planning legislation. Currently, both SA Water Bolivar and Penrice Soda Products are undertaking environment improvement plans (EIP) under the Environment Protection Act 1993. These programs are expected to be completed within 2–3 years. However, once completed it is expected that neither will fully comply with the Environment Protection (Water Quality) Policy 2003.

The costing information available shows that there is not a large cost differential between the two main sources; there is also significant uncertainty about future costs of nutrient abatement. Cost estimates will be refined when the companies are at a point where they have firmed details on processes available to reduce nutrient discharge levels.

Additional concerns have been raised about a publicly owned company such as SA Water funding environmental improvement at a privately owned facility such as Penrice Soda Products. This may present perception concerns from the public and other industries outside the trading scheme.
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This feasibility study has shown that trading is currently not feasible in the current environment in the short to medium term.

The future of a tradeable nutrient discharge rights instrument in the Port waterways

It is anticipated that with the increased scientific knowledge to be gained from completion of the water quality model (and the WQIP), the implementation of current EIPs at SA Water and Penrice, and more certainty in cost differentials, the outcomes of this study may be reviewed in the future.
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Sinclair Knight Merz (SKM) 2000, *Feasibility study for extending reuse of treated effluent from Glenelg Wastewater Treatment Plant and harvesting stormwater*, Report to the South Australian Water Corporation.

Appendix 1: Suitability and benefits of tradeable nutrient discharge rights to reduce nutrient pollution in the Port waterways catchment (Part 1)—BDA Group

This report was prepared by consultants for the Environment Protection Authority (EPA) and the views expressed do not necessarily reflect those of the EPA. The EPA cannot guarantee the accuracy of the report, and does not accept liability for any loss or damage incurred as a result of relying on its accuracy.
Appendix 2: Suitability and benefits of tradeable nutrient discharge rights to reduce pollution in the Port waterways (Part 2 Report: instrument selection and policy framework)—BDA Group

This report was prepared by consultants for the Environment Protection Authority (EPA) and the views expressed do not necessarily reflect those of the EPA. The EPA cannot guarantee the accuracy of the report, and does not accept liability for any loss or damage incurred as a result of relying on its accuracy.
Appendix 3: Tradeable discharge rights to reduce nutrient pollution in the Port waterways catchment (Final report)—BDA Group

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