R. Sippe

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# Guidance notes

## from Environmental Protection Authority reports 1971-1992, Western Australia

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# Contents



## Appendix

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# 1. Introduction

## 1.1 Environmental Protection Authority

The Environmental Protection Authority is an independent statutory authority responsible for providing the Government and community with advice on environmental matters. It operates under the Environmental Protection Act (1986).

The Authority seeks to ensure that the environment is protected and environmental values are not compromised. One important mechanism is environmental impact assessment of new projects.

## 1.2 Environmental impact assessment

Environmental impact assessment is the process used to evaluate the effects a proposed development will have on the environment. It determines which impacts are acceptable and which are not. It seeks to ensure that proposals for development are managed or controlled to be environmentally acceptable.

Environmental impact assessment is a relatively new discipline. It has evolved rapidly over the past 20 years and is now a complex and multi-disciplinary process. It considers environmental values and therefore must take into account changing community values and increasing knowledge. New issues emerge which require detailed consideration, while others become more manageable and therefore of less concern in the assessment process.

Environmental management and impact assessment must be flexible enough to respond to new information in order to provide a proper basis for decision making. As a result, the Authority's approach to impact assessment has evolved.

## 1.3 This report

This report provides an insight to how the Authority proceeds with the assessment of proposals and the basis on which recommendations are made.

Compiling this report required detailed research of the Authority's publications. During this exercise, it became evident that the Authority's approach has evolved over time, but its basic aims have either remained the same or been refined.

The principles contained in this report are a summary of the Authority's current position and should be a guide to anyone who deals with, or works for, the Authority. The guidance notes will not be used to pre-empt the assessment process. They are intended as a guide only and are likely to evolve in the future. New proposals may result in new factors being considered in the assessment process.

It is likely that new editions of this report will be published to illustrate this evolution of the Authority's approach, as it proceeds with its task of protecting the Western Australian environment.

## 1.4 Structure of this report

There are five sections following this introduction, each outlining a group of guidance notes relating to a particular environmental segment or function. Because the environment is a continuum, there is some overlap between the sections. This is necessary to prevent cross-referencing and to ensure each section is complete.

In each section, the general concept of the guidance notes is written in bold type. An explanatory text, often citing examples, then follows.

These notes were extracted from Authority publications and policies and refined through discussion with the Authority and by consulting Authority files and correspondence. The bibliography contains the publications and policies consulted in researching each group of guidance notes. Some of these refer to a case that set a precedent. Others are examples of a specific application of the idea. The list is included so that those interested may trace the source of a guidance note or an example of a situation in which it was applied. Where the text contains detailed reference to a specific assessment it is referenced in a footnote.

# 2. Environmental impact assessment process

## 2.1 Scope

**The scope of environmental impact assessment varies according to the regional context and characteristics of the proposal.**

The boundaries of environmental impact assessment are not always clear. Environmental assessment documents and submissions from the public raise a wide range of issues, often relating to lifestyle and economic considerations. Depending on the context, the Authority will make recommendations on a diverse range of issues and draw them to the attention of Government.

For example, the Authority may make recommendations on selected social factors. This is most likely for proposals in remote sites where regional planning and infrastructure are absent. By contrast, where proposals will be sited in planned and managed industrial areas separated from residential areas by buffers, the Authority may recommend on a narrower range of factors.

On occasions the Authority makes comments about other processes in Government and of community perceptions and need, where these have potential environmental impacts.

Social impacts are of increasing interest to the public and the Authority believes that these impacts should be managed and minimised.[1]

**Each new project with the potential for significant environmental impacts, or any amendment to an existing project such as to increase its environmental impact substantially, should be subject to environmental impact assessment. The form, content, timing and procedure of the assessment will be determined by the Authority.**

The EPA will usually assess the overall impact of a proposal in its initial assessment. In the case of some major developments, where some decisions are outstanding at the time of this initial assessment, further assessment of specific aspects of the project may be required as details become available.[2] Similarly, a staged assessment process may be used where a range of alternatives require assessment.

Where a project can be readily divided into stages, these may be assessed separately. For example, different stages of the Muchea mineral sands development were assessed separately.[3] In such a case, approval for one stage of a project should not be interpreted as pre-empting environmental impact assessment of future stages.

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[1]Bulletin 483
[2]Bulletin 331
[3]Bulletin 369

Approval of secondary stages may depend on satisfactory implementation of environmental obligations and management of the first stage. The environmental management performance of the proponent during the pilot stage of a project may be used as a criterion for evaluating environmental acceptability of the overall project.

Often design details are altered as a project proceeds. Where these changes are not substantial, or where they reduce the impact of the development, they will not usually require assessment. However, substantial changes to original proposals may need further assessment.

The proponent is responsible for demonstrating a project's environmental acceptability.

The onus of proof of environmental acceptability is on the proponent, rather than those who assess a project's environmental implications. The proponent must ensure adequate information is supplied to enable the EPA and the public to assess the likely impacts.

**Alternatives to a proposal should be considered as part of the environmental impact assessment process.**

It is important that a range of options is considered when a proposal is being planned and assessed. Consideration should be given to alternative sites for the location of a particular development. In choosing a site for an alumina refinery, for example, 14 alternatives were considered.[4]

Alternative means of achieving the same ends also should be considered, as in the case with the proposal to construct a dam and reservoir for Margaret River township's water supply.[5]

## 2.2 Public consultation

**Public consultation is an important part of the environmental impact assessment process. The EPA believes the public has the right to know, the right to be informed, and the right to comment on proposals.**

The EPA involves the public throughout the assessment process. It also encourages a high level of consultation between the proponent and the public, including the establishment of on-going community consultation and formal liaison.

On rare occasions, and due to specific circumstances, the EPA will not seek public submissions before making its recommendations. In the past this has occurred in situations where the EPA felt the evidence against a proposal was so overwhelming that there was little point in seeking public submissions.[6]

## 2.3 Regional assessment

**A proposed development should not be looked at in isolation from other *activities in the region*.**

The environmental impact of a development may depend on existing and proposed activities for the region, which should be considered during assessment.

For example, when it was proposed to construct a boat harbour at Point Picquet near Dunsborough, the Authority recommended that a regional plan be developed to identify the need for, and possible sites for, a harbour. This recommendation led to the Leeuwin-Naturaliste *Region Plan*.[7]

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[4]Bulletin 423
[5]Bulletin 518
[6]Bulletin 269
[7]Bulletin 217

Similarly, the Authority has previously recommended quarry operations on the Darling Scarp and Avon Valley be assessed regionally.[8]

Priority areas for development should be identified, giving consideration to issues such as land suitability and its potential for future developments.

Where regional plans have been prepared, or there are several agencies or agreements that influence management of an area, these need to be considered. Where impacts from a project have a direct adverse effect on an existing land-use, the developer may be asked to replace lost environmental values.

## 2.4 Risk assessment

**People should not be exposed to unacceptable levels of risks and hazards from a development.**

**Risk assessment within an area should be undertaken in the context of the whole area, including assessment of cumulative risks from existing or proposed developments.**

For this purpose, "hazard" describes a set of conditions that could lead to a harmful accident. "Risk" refers to the likelihood and consequences of a hazard.

In assessing risk to individuals, the following guidelines have been set by the Authority:

a) A risk to individuals in a residential area of one in a million per year is considered so low as to be acceptable to the Authority.

b) A risk level in "sensitive developments", such as schools, child care facilities and aged care housing developments, of between one half and one in a million per year is so small as to be acceptable to the Authority.

c) Risk levels from industrial facilities should not exceed a target of fifty in a million per year at the site boundary for each individual industry, and the cumulative risk level imposed upon an industry should not exceed a target of one hundred in a million per year.

d) A risk level for any non-industrial activity located in buffer zones between industrial facilities and residential zones of ten in a million per year or lower, is so small as to be acceptable to the Authority.[9]

Where risk is likely to be within one tenth of the risk guidelines an assessment of the risk may be required.

An assessment of the risk to the community from a hazardous industrial development should be undertaken as part of the environmental impact assessment.

Projects should be planned, designed and controlled so that risks and hazards are minimised and made acceptable. Contingency plans for accidental industrial spillages should be prepared. Facilities and emergency procedures for dealing with accidents should be able to effectively deal with "worst-case" situations.

Public access to areas of hazards should be restricted. Activities for which risk to the community needs to be assessed include the transport of dangerous goods and some types of industry. Some activities are considered by the Authority to be unacceptable due to the level of

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[8] Bulletin 194

[9] Bulletin 611

risk associated. For example, long-term storage of certain hazardous substances near people or in environmentally sensitive areas is not acceptable.[10]

# 3. Controlling environmental impacts

**The Authority believes that those who cause unacceptable damage to the environment should ensure it is rectified.**

The Authority believes that the responsibility for cleaning up damaged or polluted environments should lie with those that cause the damage. It is up to the developer to ensure that environmental impacts are made manageable. In upholding this general philosophy, the EPA has established a number of related principles.

## 3.1 Assimilative capacity and beneficial use

*(See also 3.2 Control of pollution and 6. Protecting the receiving environment)*

**The assimilative capacity of the environment should not be exceeded.**

**A project should be managed so that its environmental impact is minimised.**

**Beneficial uses of the environment should be protected.**

To ensure the long term protection of the environment, the release of contaminants into the environment should not exceed its capacity to assimilate them. Monitoring is necessary to ensure that contaminants are not causing unacceptable impacts.

Assessment of the assimilative capacity is dependent upon the condition and beneficial uses of the receiving environment.[11] If the assimilation involves an equilibrium level which is harmful to a beneficial use of that environment, then the assimilative capacity has effectively been exceeded.

When setting levels for emissions, the Authority specifies maximum levels, designed to protect the most sensitive part of the environment. For example, in Kwinana, levels for sulphur dioxide are set to protect people because people are more sensitive to it than are plants. In the Swan Valley, levels for fluoride emissions are set to protect plants, because plants are more sensitive to it than are people.[12] The total impact of emissions from all sources should be considered, including current emissions.

The Authority believes that in most situations, emissions should be as low as reasonably possible from each source, even though total emissions in an area may be well below the assimilative capacity.[13]

## 3.2 Control of pollution

*(See also 3.1 Assimilative capacity and beneficial use and 6. Protecting the receiving environment)*

**Discharge of contaminants to the environment should be controlled so that their environmental impacts are acceptable.**

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[10]Bulletin 297
[11]Bulletin 393
[12]Kwinana air quality Environmental Protection Policy
[13]Bulletin 501

**Reasonable and practicable measures should be taken to minimise the discharge of waste and the emission of noise, odour or electromagnetic radiation.**

**Impacts beyond a project site should not exceed environmental criteria designed to protect the surrounding environment.**

**Emissions of noise, dust and odour from developments should be controlled so that the environment, including the amenity of nearby residents, is sufficiently protected.**

Assessment of impacts should include consideration of emissions under abnormal operating conditions when emissions are likely to be worse than under normal operating conditions, eg when machinery is either not running efficiently or malfunctioning.

Steps that lead to a reduction in the number of point sources of potential pollution, such as consolidation of landfill sites,[14] should be encouraged.

Adverse impacts from developments should be confined to the project area — impacts beyond the development site should be made acceptable. In particular, this applies to impacts from dust, noise, air emissions and water pollutants.

Noise can cause significant environmental impacts from which people and the environment should be protected. Appropriate measures should be taken to ensure such protection. The Authority may set maximum noise levels to which the developer will be required to adhere. Recommendations may also be made regarding the means of complying with noise limits. This may include restricting hours of operation or specific recommendations such as the use of rubber-tyred vehicles.[15]

Where noise and dust cannot be adequately controlled, it may be necessary to relocate either the development or nearby residents in order to protect the residents from adverse impacts.[16]

There are a number of activities with the potential to harm the environment on which the Authority has made specific recommendations. These include recommendations on preventing accumulation of heavy metals in the environment[17] and faecal contamination of recreation waters.[18] Investigations on environmental impacts, including exposing people to pesticides, have led to recommendations that the harmful use of chemicals should be avoided.[19]

Proponents are normally responsible for monitoring contaminant levels and supplying the Authority with the results so that it can assess compliance to commitments and recommendations. The proponent is responsible for the site until its potential to cause pollution is eliminated.

## 3.3 Rehabilitation

**Project sites should be rehabilitated either at the completion of, or during, the project.**

**Rehabilitation should aim either to re-establish the former land-use or to establish another desirable land-use.**

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[14]Bulletin 596
[15]Bulletin 495
[16]Bulletin 601
[17]Bulletin 545
[18]Bulletin 442
[19]Bulletin 325

**The rehabilitated site should be monitored to establish the success of rehabilitation.**

At the completion of a project, the proponent must ensure appropriate ground rehabilitation is carried out. This will include leaving the site in a safe and rehabilitated condition. The proposed end use of the area will influence the rehabilitation programme.

The proponent is required to prepare a rehabilitation and decommissioning plan in an appropriate time frame.

The proponent will be required to rehabilitate areas damaged in the course of a project. This often requires an on-going commitment of resources. It has previously been considered appropriate in some cases to consider establishing a fund for rehabilitation. For example, in the Avon Valley (Toodyay) quarry development this was proposed as a possible solution to the problem of excavation sites being abandoned.[20]

The EPA recognises that, with technological change, the ability to rehabilitate certain areas changes and that it may be appropriate to try methods to assess the likely success of such operations. For example, future proposals for beach and primary dune mining will not be recommended until it has been demonstrated that successful rehabilitation can occur.[21] In areas of high conservation value, where there is uncertainty about rehabilitation success, recommendations may be made against development.[22]

In developing a rehabilitation programme, it is important to consider the end use of the land. Rehabilitation should ensure that beneficial use criteria are met and standards of performance should be enforced to ensure this. Areas should be monitored to ensure rehabilitation aims are achieved.

## 3.4 Global considerations

**Discharge to the environment of ozone-depleting substances should be minimised.**

Depletion of the ozone layer increases the amount of ultra-violet radiation reaching the surface of the earth and can harm the living environment. Discharge of substances that deplete the ozone layer should therefore be minimised. Ultimately, the goal is to completely phase out using ozone-depleting substances in the chemical and refrigerator industries.

**Greenhouse gas emissions should be minimised in accordance with national and international standards.**

Minimisation of Greenhouse gas emissions should be a factor in the assessment of some proposals. Where reasonable opportunities exist to reduce emissions of Greenhouse gases, the Authority will encourage them to be adopted.

The Authority has requested detailed consideration of Greenhouse gas emissions in the selection of energy generation and heavy transport options in some proposals. For example, in the Collie power station proposal, detailed consideration was given to future energy generating options, and recommendations were made on the environmental acceptability of various options.[23]

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[20]Bulletin 194
[21]Bulletin 335
[22]Bulletin 460
[23]Bulletin 472

Where considerable reductions in Greenhouse gas emissions can be readily achieved, they will be encouraged. For example, waste disposal sites should be managed to minimise emissions of the Greenhouse gas methane [24]

# 4. Natural resource management

## 4.1 Natural resource use

**Renewable natural resources should be used and managed so that options for future generations are maintained, ie. development should be sustainable.**

**Recycling and re-use of materials should be encouraged.**

The Authority seeks a balance between the responsibility for protecting the environment for future generations and the demand for the present generation to have access to resources to maintain a high standard of living. To this end, resources should be used to maximise benefits to the current generation without closing off options for the future.

Assessments of projects based on renewable natural resource use will examine whether the rate of use of the resource is matched by the rate of replacement. Reviews of the acceptability of logging in natural forests have considered conservation and public amenity values [25]

Recycling has many tangible benefits. Industry based on recycling and efficient use of resources should be encouraged [26]

Waste streams can often be reduced by recycling and re-use, giving a dual benefit. Valuable components of wastes should be considered for recycling. Recycling and reuse of industrial wastes and effluent should be investigated and encouraged

## 4.2 Land use

**Land-uses should be integrated and separated as appropriate to prevent significant environmental and social impacts.**

**Proposals that offer an opportunity to improve a degraded or poorly managed environment should be encouraged.**

Industry should be located such that it does not adversely impact surrounding land-uses and to ensure land is used to maximise benefits. This means that some activities will be acceptable in some areas but not in others.

For example, an industrial zone should contain only compatible uses. Activities in the zone should be controlled so that the possibility of future industrial development in the area is not compromised. It should be separated from residential areas and protected from incompatible land-use encroachments through planning processes and controls [27] Examples of the application of this include separation of mines and urban areas, industry and residential zones; integration of mines, water catchments, forestry

Hazardous industry and operations should be located so that risk to human populations and the environment is minimised. *(See 2.4 Risk assessment)*

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[24]Bulletin 505
[25]Bulletin 286
[26]Bulletin 550
[27]Bulletin 539

The EPA encourages proposals that make more efficient use of land which is already disturbed.[28] Opportunities that offer improved management of an area should be recognised and encouraged.

**Activities that lead to permanent and extensive land degradation should not be permitted.**

Land degradation is a serious environmental problem in WA's agricultural and pastoral regions. Land use should be controlled and managed so that it does not further degrade the environment. This may include prescribing against specific activities in specific areas, such as agricultural land release in salinity prone areas or major new land releases for pastoralism.[29]

In areas subject to soil erosion, and resultant water turbidity, management practices to reduce these impacts are recommended.

# 5. Conservation of the natural environment

## 5.1 Conservation by reservation

**An adequate and representative system of reserves should be set aside for the conservation of flora, fauna and landscape.**

**Such reserves should be properly managed and given security of tenure commensurate with their conservation value.**

**The integrity of such reserves should be maintained. Activities, both within reserves and adjacent to them, that adversely impact upon the conservation values of the reserve should not be allowed.**

Areas of high conservation value and regional significance are a finite resource and decisions that diminish those values reduce options for future generations. Decisions on proposals that conflict with, or have the potential to reduce, existing conservation values in these areas, should err on the side of caution and give priority to conservation.[30]

In 1972, the Authority initiated a study of the conservation values of Western Australia. It divided the state into 12 systems and made recommendations on conservation within each. This work led to the Red Books on conservation reserves in WA.

The EPA considers all Red Book recommended areas potentially significant for conservation and carefully scrutinizes any development which threatens those values.

Current activities of the general public and normal park management operations may be taken as a bench-mark against which to assess the impact of proposed activities.[31] Other activities that may adversely impact upon conservation reserves will be discouraged. For example, on one occasion the EPA recommended against a major transport corridor in a national park.[32] Similarly, the EPA considers off-shore drilling for oil exploration should not be permitted in marine parks.

Land use next to national parks should not adversely affect the national park.[33]

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[28]Bulletin 386
[29]Bulletin 269
[30]Report 13
[31]Bulletin 579
[32]Bulletin 485
[33]Bulletin 470

## 5.2 Conservation outside reserves

**Areas or features of conservation significance outside reserves should be protected.**

**Sites of ethnographic, cultural and historic significance should be protected.**

**Features of geological or geomorphological value should be protected.**

The requirements of conservation extend beyond reserve boundaries. Land in private ownership may have conservation and public amenity values and, similarly, public land outside the reserve system may have values and features worthy of conservation. It is desirable to protect these values. Protection does not always necessitate the public acquisition of private land. Various legislative means or management procedures may be applied [34]

Some areas are of such outstanding natural beauty that development of any kind is incongruous. For example, the EPA recommended against the construction of harbour facilities in a coastal area of high conservation value.[35]

For some activities, such as mineral exploration, specific guidelines have been developed to guide assessment of proposals in areas of various environmental sensitivities. Such guidelines may preclude some activities from certain areas. They may also include directing some activities, such as recreation, away from fragile environments.[36]

The Authority may recommend that sites of cultural or historic significance should be protected. Similarly, sites of archaeological, ethnographic,[37] geological or geomorphological[38] significance should be protected.

**There should be no significant direct or indirect impact on important biological communities and habitats.**

Certain biological communities and habitats have high conservation value and are worthy of protection. These include mangroves, waterbird habitat, corals, seagrass beds, and migratory shorebird habitat.

**Other important areas, whilst accommodating some impact, should be managed in such a way that the impact is minimised and not detrimental to the long term viability of the system.**

This has been applied to State Forests, coastal dunes, marine habitats, Banksia woodland, waterways margins and important waterbird nesting sites.

One of the most serious threats facing natural bush in WA is dieback disease. Spread of dieback disease should be prevented.

**Remnant native vegetation should be preserved.**

Remnant native vegetation, which often occurs on privately owned farm land, has many important values that should be carefully considered when assessing projects that will reduce it. The value of remnant vegetation is commensurate with its size, rarity and representativeness —

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[34]Report 13
[35]Bulletin 217
[36]Bulletin 549
[37]Bulletin 380
[38]Bulletin 398

they are relative values. Generally, representative examples on private land, that are in good condition, should be retained where feasible.

Retention of forests on farms is a better environmental alternative than clearing for non-sustainable reasons.[39] Similarly, there are benefits to be gained from re-establishment of vegetation on previously cleared land.

Projects should be designed such that clearing of vegetation is limited. Where clearing is necessary, proponents may be required to replace vegetation, both in quantity and value, during or at the completion of the project.[40]

**Rare and endangered species should be protected.**

Sometimes it is difficult to determine the impacts of construction or development on known populations of rare species. Steps should be taken to minimise the risk of disruption. In some cases this will involve specific changes to proposals to protect a particular rare or endangered species.[41]

# 6. Protecting the receiving environment

## 6.1 Ground and surface water

**Ground and surface waters are vital resources that need protection in perpetuity.**

**Pollution, nutrient enrichment and degradation of surface and ground waters should be avoided.**

**Beneficial uses, including environmental function, of ground and surface water should be protected.**

All development proposals and management of industrial, urban and rural land use in catchments should have regard for the capacity of the waterways to assimilate wastes, particularly nutrients. This principle was applied to the catchment of the Albany Harbours, to reverse the environmental degradation of the harbour water resulting from activities in the catchment.[42]

Groundwater resources currently used for public and domestic water supply, and also those that may be used for possible future extraction, should be protected. For example, the Jandakot groundwater mound resource should be protected and a conservative approach must be taken to ensure this. Similarly, it is vital that the Gnangara Mound is protected from any activity which may pollute or reduce it.

To prevent pollution of groundwater and disruption of beneficial uses, the following recommendations have been made:

- Landfill sites should be lined or located on sites where the soils naturally line the site.
- Nutrient application to land above groundwater mounds should be limited.
- Stormwater should be retained on site.
- Septic tank/leach drain systems should be appropriately located.

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[39] Bulletin 286
[40] Bulletin 603
[41] Bulletin 386
[42] Bulletin 442

- In general, the concept of urban development over declared groundwater areas is not supported.
- Service stations are inappropriate developments above some groundwater mounds.
- Native vegetation above groundwater mounds should be preserved where practicable.
- Best design principles for groundwater protection should be incorporated in urban development.
- There should be no adverse ground or surface water impacts beyond the boundary of a specific project.

Contamination of groundwater and alteration of groundwater levels may adversely affect surrounding vegetation and land uses. These impacts should be avoided. For example, the Authority has recommended that groundwater drawdown should be limited to the wet season, when vegetation in an adjacent national park is not dependent upon groundwater.[43] This report also recommended that the proponent reach an agreement with a local farmer in the event of groundwater drawdown adversely affecting stock watering.

## 6.2 Wetlands

**Wetlands, and the function of wetland systems, should be protected from long term impacts.**

**Beneficial uses of wetlands should be preserved by maintaining appropriate water quality.**

**New wetlands should be constructed to compensate for wetland functions lost in the course of a project.**

Since European settlement on the Swan Coastal Plain there has been widespread general loss of wetlands in the area. This increases the value of those that remain.

Maintenance of wetlands is important for a variety of reasons. They support a range of flora and fauna that requires conservation and are particularly valuable as waterfowl habitats. The environmental quality of wetlands provides an important indicator of environmental health.

There is a need to preserve a range of wetland types and thus their functions and biological associations. It is imperative that all significant developments on or around important wetlands are undertaken in an environmentally sensitive manner.

Where a development causes loss of valuable wetland functions, the Authority believes that new wetlands should be constructed to compensate.[44] Activities that have an unacceptable and irreversible impact on the function of valuable wetland systems should not be allowed.[45]

Beneficial uses of wetlands, such as recreation and wildlife habitat, require maintenance of water quality. Development on or near wetlands should allow for this.

Excess stormwater from drainage contains nutrients and other pollutants that can severely damage wetlands. For this reason all drainage into wetlands should be minimised and managed. For example, in the Peel-Harvey catchment, extension of urban development should be conditional on successful demonstration that drainage criteria can be achieved.[46]

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[43]Bulletin 422
[44]Bulletin 439
[45]Bulletin 440
[46]Bulletin 552

## 6.3 Rivers, estuaries and catchments

**Rivers and estuaries should be kept ecologically sound and visibly healthy.**

**Increased discharge of nutrients into catchments or estuaries should be avoided.**

**Erosion, and resultant turbidity and sedimentation of water courses, should be avoided.**

Rivers, estuaries and catchments are special environments near which certain activities either should not be allowed or else require close monitoring to ensure their impacts are acceptable. To this end, the Authority has recommended against what it considers to be inappropriate developments in particular areas and set stringent controls on others.

Proposals to change the structure of waterways require the proponent to demonstrate not only that the change will have no adverse impacts, but also that it is ecologically desirable. The Authority has expressed its belief that the Swan River, for example, is a public trust rather than a resource to be used for individual gain and recommended that it should not be used as a quarry.[47]

The effect of contaminants, particularly nutrients, on waterways is well documented. Human settlement and related activities can produce a range of potential contaminants, including nutrients. To protect water quality, discharge of contaminants into waterways should be minimised. Activities with the potential to cause high nutrient run-off, such as intensive agricultural enterprises, should be excluded from potable water supply catchments.[48]

The Peel-Harvey estuarine system warrants special mention as it is badly degraded. The system shows signs of severe eutrophication (nutrient enrichment), which leads to excessive algal growth. The algae stifle the estuary in warmer weather, and its accumulation on the shores causes pollution and odour problems. It has been recommended that steps, including the following, be taken to control nutrients in the system include:

- Development should only proceed if managed to protect water quality in the catchment.
- New rural developments and land use zoning changes in the Peel-Harvey catchment should be evaluated on a catchment basis, with regard to the net effect of such changes on the phosphorus loads of water flowing into the estuary.
- Clearing of vegetation in the Peel-Harvey catchment should be discouraged.
- Water exchange between the Peel-Harvey Estuary and the ocean should be increased.[49]

Where a project requires vegetation near water courses to be cleared, steps should be taken to minimise sedimentation and turbidity of those water courses. In forests, zones of uncut forest should be left along rivers, streams and gullies to prevent contamination of the rivers.

## 6.4 Coastal environment

**The public should have access to the beach in perpetuity.**

The foreshore belongs to the community and access should be protected. Access should only be limited when it poses a direct health risk to the public.

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[47] Bulletin 462
[48] Bulletin 451
[49] Bulletin 551

**Climate change predictions should be taken into account when planning and managing coastal developments.**

Planning and management strategies for estuarine and coastal areas should take into account climate change factors, such as anticipated sea level changes [50]

## 6.5 Air

**Air quality should be maintained to ensure maintenance of beneficial uses.**

The discharge of atmospheric contaminants is a legitimate activity provided other beneficial uses are not compromised. However, it is important to set standards to ensure air quality is maintained [51]

When establishing air quality criteria, the intention should be to ensure the air people breathe is kept clean.

Hydrocarbon emissions and oxides of nitrogen, which are the precursors of photochemical smog, should be monitored and minimised within the Perth metropolitan air-shed [52]

In the past, recommendations to protect against impacts from air emissions have included reducing sulphur dioxide levels in previously contaminated areas (Kwinana and Kalgoorlie-Boulder) and specific recommendations on the installation and maintenance of pollution control equipment. Land use planning recommendations (such as the establishment of buffer zones) have also been used to protect sensitive parts of the environment from different emissions

[50] Bulletin 386
[51] Kwinana Air quality Environmental Protection Policy
[52] Bulletin 501

# Appendix 1

## References

## 2. Environmental impact assessment process

### 2.1 Scope

Bulletin 50, Wagerup Alumina Refinery Proposal, Alcoa of Australia Ltd, November 1978

Bulletin 194, Avon Valley (Toodyay) Quarry Development, Western Quarries Pty Ltd, May 1985

Bulletin 196, Proposed Sorrento Boat Harbour, Public Works Department, May 1985

Bulletin 200, Mindarie Keys, Smith Corporation Pty Ltd, July 1985

Bulletin 214, Proposed Aluminium Smelter - Kemerton, International Aluminium Consortium of WA, June 1985

Bulletin 304, Southern Sea Farms Pty Ld Aquaculture Proposal, Sandalwood By, November 1987

Bulletin 331, Proposed Integrated Petrochemical Complex at Kwinana, Petrochemical Industries Company Ltd, April 1988

Bulletin 369, Proposed Synthetic Rutile Plant at Muchea, Cooljarloo Joint Venture Pty Ltd, January 1989

Bulletin 392, Two Lakes Trout Farm, Pemberton, Marine Industries Ltd, July 1989.

Bulletin 402, Review of Environmental Impact Assessment Procedures, September 1989

Bulletin 423, Wagerup Alumina Refinery Expansion, Alcoa of Australia, December 1989

Bulletin 430, Boddington Gold Mine Project, Worsley Alumina Pty Ltd, April 1990

Bulletin 440, Carbon Products from Peat Project, Lake Muir Nature Reserve, July 1990

Bulletin 483, Heavy Minerals Mine - Beenup, Mineral Deposits Ltd, December 1990

Bulletin 485, Residential Rezoning, Subdivision and Development, Burns Beach, Stage 2 Burns Beach Property Trust, December 1990

Bulletin 509, Yakabindie Nickel Project - Change of Conditions due to Modification to Location of Facilities, March 1991

Bulletin 518, Ten Mile Brook Reservoir Margaret River Town Water Supply, Martin Ynema, May 1991

### 2.2 Public consultation

Bulletin 269, Agricultural Land Release Proposals - Shire of Manjimup, December 1986

Bulletin 303, Northern, Central and Southern Forest Region Management Plans, Department of Conservation and Land Management (for the National Parks and Nature Reserves Association), December 1987

Bulletin 483, Heavy Minerals Mine - Beenup, Mineral Deposits Ltd, December 1990

Bulletin 495, Proposed Solar Salt project at Onslow, Gulf Holdings Pty Ltd, February 1991.

Bulletin 545, Proposed Wet-blue Hide Tannery at Darkan, Deras (Australia) Pty Ltd, July 1991.

### 2.3 Regional assessment

Bulletin 194, Avon Valley (Toodyay) Quarry Development, Western Quarries Pty Ltd, May 1985

Bulletin 214, Proposed Aluminium Smelter - Kemerton, International Aluminium Consortium of WA, June 1985

Bulletin 217, Dunsborough Boat Harbour Proposal, Public Works Department, September 1985

Bulletin 422, Heavy Minerals Mine at Jangardup, Cable Sands (WA) Pty Ltd, January 1990

Bulletin 483, Heavy Minerals Mine - Beenup, Mineral Deposits Ltd, December 1990

Bulletin 506, Leslie Salt Project, Expansion of Ponds, Port Hedland, Leslie Salt, March 1991

Bulletin 509, Yakabindie Nickel Project - Change of Conditions due to Modification to Location of Facilities, March 1991

Bulletin 549, Estuary Deepening at Cox Bay, Falcon, Meiyu Australia Pty Ltd, July 1991

### 2.5 Risk assessment

Bulletin 69, Woodside Petroleum Development Pty, Ltd, North West Shelf Development Project, September 1979

Bulletin 216, Proposed Chlor-Alkali Plant, CSBP & Farmers Pty Ltd, September 1985

Bulletin 257, Proposed LPG Extraction Plant, Wesfarmers Kleenheat gas Pty Ltd, April 1986

Bulletin 278, Environmental Protection Authority Guidelines, Risks and Hazards of Industrial Developments on Residential Areas in WA, May 1987

Bulletin 284, Proposed Transport of Sodium Cyanide Solution by Rail, July 1987

Bulletin 297, Western Australian PCB Incineration Facility Near Koolyanobbing, Health Department of WA, September 1987.

Bulletin 331, Proposed Integrated Petrochemical Complex at Kwinana, Petrochemical Industries Company Ltd, April 1988

Bulletin 443, Ammonium Nitrate Importation Through the Port of Esperance, ICI Australia Operations Pty Ltd, August 1990

Bulletin 480, Industrial Rezoning, Subdivision and Development, Henderson, December 1990

Bulletin 611, Criteria for the Assessment of Risk from Industry, EPA Guidelines, February 1992

## 3. Controlling environmental impacts

### 3.1 Assimilative capacity and beneficial use

Bulletin 393, Proposed Beenyup Wastewater Treatment Plant and Ocean Outfall Duplication into Marmion Marine Park, February 1990

Bulletin 442, Recommendation of the Environmental Protection Authority in Relation to the Environmental Problems of the Albany Harbours, August 1990

Bulletin 457, Wastewater Treatment Plant, Augusta, Water Authority of WA, November 1990

Bulletin 501, Proposed Power Supply; Expansion of Pinjar Turbine Power Station, State Energy Commission of WA, March 1991

Revised Draft Environmental Protection (Kwinana) (Atmospheric Waste) Policy, November 1991

### 3.2 Pollution

Bulletin 53, Report and Recommendations by the Yeelirie Uranium Project, January 1979

Bulletin 257, Propose LPG Extraction Plant, Wesfarmers Kleenheat Gas, Pty Ltd, April 1986

Bulletin 325, Heptachlor - Use for the Control of Argentine Ants, A Public Discussion Paper, March 1988

Bulletin 331, Proposed Integrated Petrochemical Complex at Kwinana, Petrochemical Industries Company Ltd, April 1988

Bulletin 352, Proposed Rare Earth Treatment Plant, Pinjarra, Rhone Poulenc Chimie Australia Ltd, September 1988

Bulletin 369, Proposed Synthetic Rutile Plant at Muchea, Cooljarloo Joint Venture Pty Ltd, January 1988

Bulletin 371, South Jandakot Drainage Management Plan and Beeliar Compensating Channel, Report of the Technical Advisory Group to the EPA, March 1989

Bulletin 410, Proposed Synthetic Rutile Plant Expansion, Narngulu Industrial Estate, Geraldton, December 1989

Bulletin 442, Recommendations of the Environmental Protection Authority in Relation to the Environmental Problems of the Albany Harbours, August 1990

Bulletin 480, Industrial Rezoning, Subdivision and Development, Henderson, City of Cockburn, December 1990

Bulletin 495, Proposed Solar Salt Project at Onslow, Gulf Holdings Pty Ltd, February 1991

Bulletin 545, Proposed Wet-Blue Hide Tannery at Darkan, Deras (Australia) Ltd, July 1991

Bulletin 596, Proposed Refuse Disposal Site, Lot 2170, Millar Road, Baldivis, City of Rockingham November 1991

Bulletin 601, Premier Coal Mine Expansion, Collie, Western Collieries Ltd, December 1991

### 3.3 Rehabilitation

Bulletin 114, Cape Peron Ocean Outlet,Metropolitan Water Supply, Sewerage and Drainage Board, May 1982

Bulletin 194, Avon Valley (Toodyay) Quarry Development, Western Quarries Pty Ltd, May 1985

Bulletin 257, Proposed LPG Extraction Plant, Wesfarmers Kleenheat Gas Pty Ltd, April 1986.

Bulletin 335, Minninup Sand Mining Proposal, Westralian Sands Ltd, June 1988

Bulletin 423, Wagerup Alumina Refinery Expansion, Alcoa of Australia Ltd, January 1990

Bulletin 444, Yakabindie Nickel Project, Dominion Mining Ltd, August 1990

Bulletin 448, Dampier Solar Salt Field Enhancement, Dampier Salt (Operations) Pty Ltd, October 1990

Bulletin 460, Coal Mining and Power Generation near Mt Lesueur, December 1990

Bulletin 495, Proposed Solar Salt Project at Onslow, Gulf Holdings, Pty Ltd, February 1991

Bulletin 506, Leslie Salt Project, Expansion of Ponds, Port Hedland, Leslie Salt, March 1991.

Bulletin 542, Shark Bay Salt, Pond Expansion, Useless Inlet, Shark Bay Salt Joint Venture, June 1991

Bulletin 601, Premier Coal Mine Expansion, Collie, Western Collieries Ltd, December 1991

Bulletin 605, Mineral Sands Mine, Dardanup, ISK Minerals Pty Ltd, December 1991

### 3.4 Global considerations

Bulletin 423, Wagerup Alumina Refinery Expansion, December 1989

Bulletin 472, Proposed Collie Power Station,SECWA, November 1990

Bulletin 483, Heavy Minerals Mine - Beenup, December 1990

Bulletin 505, Proposed Waste Disposal Site ant Narngulu, Shire of Greenough and City of Geraldton, March 1991

Bulletin 550, Straw Pulp and Paper Mill, Moora, July 1991

Environmental Protection (Ozone-Depleting Substances) Policy, December 1989

## 4. Resource management

### 4.1 Resource use

EPA Annual Report, 1977-78

Bulletin 50, Wagerup Alumina Refinery Proposal, Alcoa of Australia Ltd, November 1978

Bulletin 114, Cape Peron Ocean Outlet, Metropolitan Water Supply, Sewerage and Drainage Board, May 1982.

Bulletin 270, State Conservation Strategy, January 1987

Bulletin 286, McLean Forest Project, McLean Consolidated Pty Ltd, June 1987.

Bulletin 329, The West Australian Woodchip Industry, WACAP, July 1988

Bulletin 470, Landfill: Non-organic (dry) Waste Disposal Site, Nowergup, November 1990

Bulletin 523, Feed Flexibility Project - BP Refinery, BP (Kwinana) Pty Ltd, June 1991

Bulletin 550, Straw Pulp and Paper Mill, Moora, Moora Pulp and Paper Company, July 1991.

### 4.2 Land use

Bulletin 50, Wagerup Alumina Refinery Proposal by Alcoa of Australia Ltd, November 1978

Bulletin 139, Argyle Diamond Project, January 1983.

Bulletin 257, Proposed LPG Extraction Plant, Wesfarmers Kleenheat Gas Pty Ltd, April 1986

Bulletin 269, Agricultural Land Release Proposals, Shire of Manjimup, December 1986

Bulletin 324, Proposed Development at McCabe Street, Mosman Park, Landbank, April 1988

Bulletin 386, Port Geographe, Interstruct Pty Ltd: Naturaliste Development Pty Ltd, May 1989.

Bulletin 423, Wagerup Alumina Refinery Expansion, Alcoa of Australia Ltd, December 1989

Bulletin 448, Dampier Solar Salt Field Enhancement, Dampier Salt (Operations) Pty Ltd,October 1990

Bulletin 470, Landfill: Non-organic (dry) waste Disposal Site, Nowergup, November 1990

Bulletin 475, Yangebup Road Realignment, City of Cockburn, November 1990.

Bulletin 484, Special Use rezoning, Baragup, Shire of Murray, December 1990

Bulletin 539, Fimiston Project Stage 11 - Mine and Waste Dumps, Kalgoorlie Consolidated Gold Mines Pty Ltd, July 1991

Bulletin 541, Extension to Yunderup Canals Estate, Peel Waterways Pty Ltd, June 1991

## 5. Conservation of the natural environment

### 5.1 Conservation by reservation

Report 13, Conservation Reserves for WA, The Darling System - System 6, Part I: General Principles and Recommendations, October 1983

Bulletin 362, New Proposal for Knightsbridge Estate, Stephenson Avenue, City Beach, January 1989

Bulletin 398, Port Kennedy Regional Recreation Centre, September 1989

Bulletin 453, Amalgamation of Lots, Gnangara (System 6 Recommendation M8), November 1990

Bulletin 460, Coal Mining and Power Generation near Mt Lesueur, December 1990

Bulletin 470, Landfill: Non-organic (Dry) Waste Disposal Site, Nowergup, November 1990

Bulletin 475, Yangebup Road Realignment, City of Cockburn, November 1990

Bulletin 480, Industrial Rezoning, Subdivision and Development, Henderson, December 1990

Bulletin 485, Residential Rezoning, Subdivision and Development, Burns Beach, Stage 2, December 1990

Bulletin 489, Tailings Pond Rehabilitation Project and Effluent Management System Upgrade, Baldivis, January 1991

Bulletin 579, Application for Exploration Licence 74/135, Ravensthorpe Range, Outokumpu Exploration Australia Pty Ltd, September 1991

## 5.2 Conservation outside reserves

Report 13, Conservation Reserves for WA. The Darling System - System 6, Part I: General Principles and Recommendations, October 1983

Bulletin 217, Dunsborough Boat Harbour Proposal, Public Works Department, September 1985

Bulletin 286, McLean Forest Project, McLean Consolidated Pty Ltd, June 1987

Bulletin 303, Northern, Central and Southern Forest Region Management Plans, Department of CALM, December 1987

Bulletin 304, Southern Sea Farms Pty Ltd Aquaculture Proposal, Sandalwood Bay, November 1987

Bulletin 329, The West Australian Woodchip Industry,WA Chip and Pulp Co. Ltd, July 1988

Bulletin 338, Proposed Harvey - Kwinana 330 kV Transmission Line, SECWA, July 1988

Bulletin 347, Proposed Northcliffe to Windy Harbour 22kV Distribution Line, SECWA, August 1988

Bulletin 369, Agricultural Land Release Proposals - Shire of Manjimup, December 1986

Bulletin 380, Eastern Corridor Major Roads Study, March 1989

Bulletin 386, Port Geographe, Interstruct Pty Ltd: Naturaliste Development Pty Ltd, May 1989

Bulletin 398, Port Kennedy Regional Recreation Centre, September 1989

Bulletin 439, Landfill for Future Widening of the Mitchell Freeway at Lake Monger, Main Roads Department, June 1990

Bulletin 460, Coal Mining and Power Generation Near Mount Lesueur, December 1990

Bulletin 492, Special Rural Rezoning, Subdivision and Development, Banjup, December 1990.

Bulletin 495, Proposed Solar Salt Project at Onslow, February 1991

Bulletin 497, Bunbury Port, Inner Harbour Extension, March 1991

Bulletin 498, Coral Coast Marina, Residential Subdivision and Quarry Exmouth, March 1991

Bulletin 503, Carnarvon Harbour and Channel Dredging, March 1991

Bulletin 506, Leslie Salt Project, Expansion of Ponds, Port Hedland, March 1991

Bulletin 516, Special Residential Rezoning, Subdivision and Development, Jandakot, April 1991

Bulletin 518, Ten Mile Brook Reservoir Margaret River Town Water Supply, WAWA, May 1991

Bulletin 538, A Proposal to Change Government Conditions Regarding Industrial Effluent Discharge into Princess Royal Harbour, July 1991

Bulletin 549, Estuary Deepening Cox Bay, Falcon, July 1991

Bulletin 568, Extractive Industry - Lot 242 Corio Road, Pinjarra, August 1991

Bulletin 603, Beenup Power Supply, SECWA, December 1991

# 6. Protecting the receiving environment

## 6.1 Ground and surface water

Bulletin 216, Proposed Chlor-Alkali Plant, September 1985

Bulletin 277, Thomsons Lake Urban Structure Study and South Jandakot Development Water Resources Management Plan, May 1987

Bulletin 388, Thomsons Lake Urban Structure and South Jandakot Development Water Resources Management Plan, Ministerial Condition 2, May 1989

Bulletin 404, Environmental Protection Authority Comments on Planning for the Future of the Perth Metropolitan Region, September 1989.

Bulletin 422, Heavy Minerals Mine at Jangardup, January 1990

Bulletin 428, Proposed Turf Farm, Liddelow Road, Banjup, June 1990.

Bulletin 429, Thomsons Lake Urban Development Revised South Jandakot Drainage Management Plan Ministerial Condition 2, March 1990

Bulletin 442, Recommendation of the Environmental Protection Authority in Relation to the Environmental Problems of the Albany Harbours, August 1990

Bulletin 454, Waste Disposal, Banjup, November 1990

Bulletin 464, Proposed Service Station and Store, Mariginiup, November 1990

Bulletin 459, Rezoning Application, Pinjarra, November 1990.

Bulletin 491, Special Rural Rezoning, Subdivision and Development, Banjup, December 1990

Bulletin 492, Special Rural Rezoning, Subdivision and Development, Banjup, December 1990

Bulletin 496, Special Rural Subdivision and Development Lot 30 Hope Valley Road Wandi, March 1991

Bulletin 516, Special Residential Rezoning, Subdivision and Development, Lot 1 Lakes Way, Jandakot, April 1991

Bulletin 544, Proposed Marron Farm at Landsdale, July 1991

Bulletin 551, Town Planning Scheme No 2 - Amendment No 15, Lot 125 Doyley Road and Lot 16 Orton Road, Byford, August 1991

(Bulletins 552 - 567 include the same discussion on the Peel-Harvey Estuary and uphold the same principles as 551).

Draft Environmental Protection (Gnangara Mound Crown land groundwater) Policy, November 1991

## 6.2 Wetlands

Bulletin 371, South Jandakot Drainage Management Plan and Beeliar Compensating Channel, March 1989

Bulletin 374, A Guide to Identifying Wetland Management Objectives in the Perth Metropolitan Area, December 1990.

Bulletin 388, Thomsons Lake Urban Structure and South Jandakot Development Water Resources Management Plan, Ministerial Condition 2, May 1989.

Bulletin 439, Landfill for Future Widening of the Mitchell Freeway at Lake Monger, June 1990.

Bulletin 440, Carbon Products from Peat Project, Lake Muir Nature Reserve, July 1990

Bulletin 480, Industrial Rezoning, Subdivision and Development, Henderson, December 1990

Bulletin 497, Bunbury Port, Inner Harbour Extension, March 1991.

Bulletin 587, Jandakot Groundwater Scheme Stage 2, October 1991

Draft Environmental Protection (Swan Coastal Plain Wetlands) Policy, March 1991

Bulletin 551, Town Planning Scheme No 2 - Amendment No 15, Lot 125 Doyley Road and Lot 16 Orton Road, Byford, August 1991

(Bulletins 552 - 567 include the same discussion on the Peel-Harvey Estuary and uphold the same principles as 551)

## 6.3 Rivers, estuaries and catchments

Bulletin 243, Peel Inlet and Harvey Estuary Management Strategy, December 1985

Bulletin 303, Northern, Central and Southern Forest Region Management Plans, Department of CALM, December 1987

Bulletin 338, Proposed Harvey - Kwinana 330kV Transmission Line, SECWA, July 1988

Bulletin 357, Landuse Development Mundaring - Waste Management, Proposed Redevelopment of the Town Centre, September 1988

Bulletin 428, Proposed Turf Farm, Liddelow Road, Banjup, June 1990

Bulletin 451, Deer Farm, Glen Forest, November 1990

Bulletin 455, Industrial Subdivision, Mandurah, November 1990

Bulletin 456, Marron Farm, Baldivis, November 1990.

Bulletin 458, Rezoning Application, Ravenswood, November 1990

Bulletin 459, Rezoning Application, Pinjarra,November 1990

Bulletin 462, Riverside Gardens (west) Dredging and Landfill, King William Street,Bayswater, August 1991

Bulletin 478, Residential Development, Peel-Harvey, December 1990

Bulletin 551, Town Planning Scheme No. 2 - Amendment No 15, Lot 125 Doyley Road and Lot 16 Orton Road, Byford, August 1991

(Bulletins 552 - 567 include the same discussion on the Peel-Harvey Estuary and uphold the same principles as 551)

## 6.4 Marine and coastal environment

Bulletin 114, Cape Peron Ocean Outlet, May 1982

Bulletin 200, Mindarie Keys, Smith Corporation Pty Ltd, July 1985

Bulletin 267, Pelican Point Country Club and Resort, Bunbury, October 1986

Bulletin 363, Peel Inlet - Harvey Estuary Management Strategy, Stage 2 ERMP, November 1988

Bulletin 386, Port Geographe, Interstruct Pty Ltd: Naturaliste Development Pty Ltd, May 1989

Bulletin 495, Proposed Solar Salt Project at Onslow, Gulf Holdings Pty Ltd, February 1991

Bulletin 498, Coral Coast Marina, Residential Subdivision and Quarry, Exmouth, March 1991

Bulletin 500, Eglinton Beach Resort, March 1991

## 6.5 Air

Bulletin 214, Proposed Aluminium Smelter - Kemerton, June 1985

Bulletin 396, Gidgi Gold Roaster Proposed Phase II Expansion, August 1989

Bulletin 410, Proposed Synthetic Rutile Plant Expansion Narngulu Industrial Estate, Geraldton, December 1989

Bulletin 501, Proposed Power Supply; Expansion of Pinjar Turbine Power Station, SECWA, March 1991

Bulletin 522, Caltex North Fremantle Terminal Extension, May 1991

Bulletin 523, Feed Flexibility Project - BP Refinery, BP (Kwinana) Pty Ltd, June 1991

Revised Draft Environmental Protection (Kwinana) (Atmospheric Waste) Policy, November 1991