

Kalamunda Road Realignment, Guildford Cemetery, South Guildford

Metropolitan Cemeteries Board

**Report and recommendations
of the Environmental Protection Authority**

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Summary and recommendations

This report provides the Environmental Protection Authority's (EPA's) advice to the Minister for the Environment on the proposal by the Metropolitan Cemeteries Board (MCB) to deviate the alignment of Kalamunda Road around the southern perimeter of the Guildford Cemetery.

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment 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.

Relevant environmental factors

In the EPA's opinion, the following are the environmental factors relevant to each component of this proposal:

- (a) vegetation communities;
- (b) specially protected (threatened) fauna; and
- (c) wetlands.

The EPA has also provided advice in relation to issues which the MCB was endeavouring to resolve, in part, through this proposal.

Conclusion

The EPA has considered the proposal by Metropolitan Cemeteries Board and concluded that the proposal as presented could not meet the EPA's objectives in relation to vegetation communities, specially protected (threatened) fauna, and wetlands, and thus should not be implemented.

At the same time, the EPA is cognisant of the difficulties experienced by the MCB and notes that assistance with the resolution of these issues is being addressed in part by a whole-of-Government approach (see Other Advice).

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister considers the report on the relevant environmental factors as set out in Section 3;
2. That the Minister notes that the EPA has concluded that the proposal as presented could not meet the EPA's objectives in relation to:
 - (a) vegetation communities;
 - (b) specially protected (threatened) fauna; and
 - (c) wetlands;and thus should not proceed.
3. That the Minister notes that the EPA has not included "conditions and procedures to which the proposal should be subject, if implemented" because the EPA holds the view that the proposal should not be implemented.
4. That the Minister notes the Other Advice in Section 4.
5. That the Minister not issue a statement that the proposal may be implemented.

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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 on the environmental factors relevant to the proposal by the Metropolitan Cemeteries Board, (the proponent - hereinafter referred to as MCB) to deviate the alignment of the section of Kalamunda Road through Guildford Cemetery (Figures 2 & 3).

The proposal as originally referred was to expand the Guildford Cemetery burial operations as well as to deviate Kalamunda Road west around the proposed cemetery expansion area, adjacent to the Perth Airport land (refer Figures 1 - 3). The proposal now being assessed comprises only the proposed road realignment, the route of which is entirely within Cemetery Board land.

The EPA set the level of assessment for the original proposal at Public Environmental Review (PER) on 29 December 1997. The primary factors considered by the EPA in determining this level of assessment were the potential impacts on regionally significant vegetation due to clearing, and the potential impacts on an area identified as potential habitat for the reintroduction of the Western Swamp Tortoise. In addition, the potential impact upon wetlands (identified as "conservation category") due to clearing and road construction is also considered to be a significant factor.

Further details of the proposal are presented in Section 2 of this Report. Section 3 discusses environmental factors relevant to the proposal. Section 4 provides Other Advice by the EPA. Section 5 presents the EPA's Conclusions and Section 6, the EPA's Recommendations.

People and organisations that made submissions are listed in Appendix 1; and references are listed in Appendix 2. Appendix 3 contains a summary of public submissions. The proponent chose not to respond to the summary of public submissions. The summary of public submissions is included as a matter of information only and does not form part of the EPA's report and recommendations. The EPA has considered issues arising from this process relating to identifying and assessing relevant environmental factors.

2. The proposal

Guildford Cemetery is a "C" Class Crown Reserve (number 21697) identified as Swan Location 12001 and zoned "Public Purpose" in the Metropolitan Region Scheme (MRS). The purpose of the 24 hectare reserve is "Cemetery" and it is vested in the MCB. The inter-denominational cemetery was established in 1890 and was maintained by the local community (most recently the Shire of Swan) until 1989 when the MCB took over the responsibility of maintaining the cemetery.

The MCB's original proposal was to:

- expand its burial activities in accordance with the Master Plan 1988 (Figure 3); and
- consolidate both portions of the Cemetery by deviating the western portion of Kalamunda Road so that the alignment is along the southern boundary of MCB's landholding and abutting Perth Airport land.

Kalamunda Road is a designated "Important Regional Road" in the MRS. The proposed route for the realignment of the road is entirely within MCB land, some of which was obtained through a land swap with the Federal Airport Corporation. It has been proposed that a 7.4 metre single carriage roadway be contained within a proposed 30 metre wide road reserve which would allow for future upgrading.

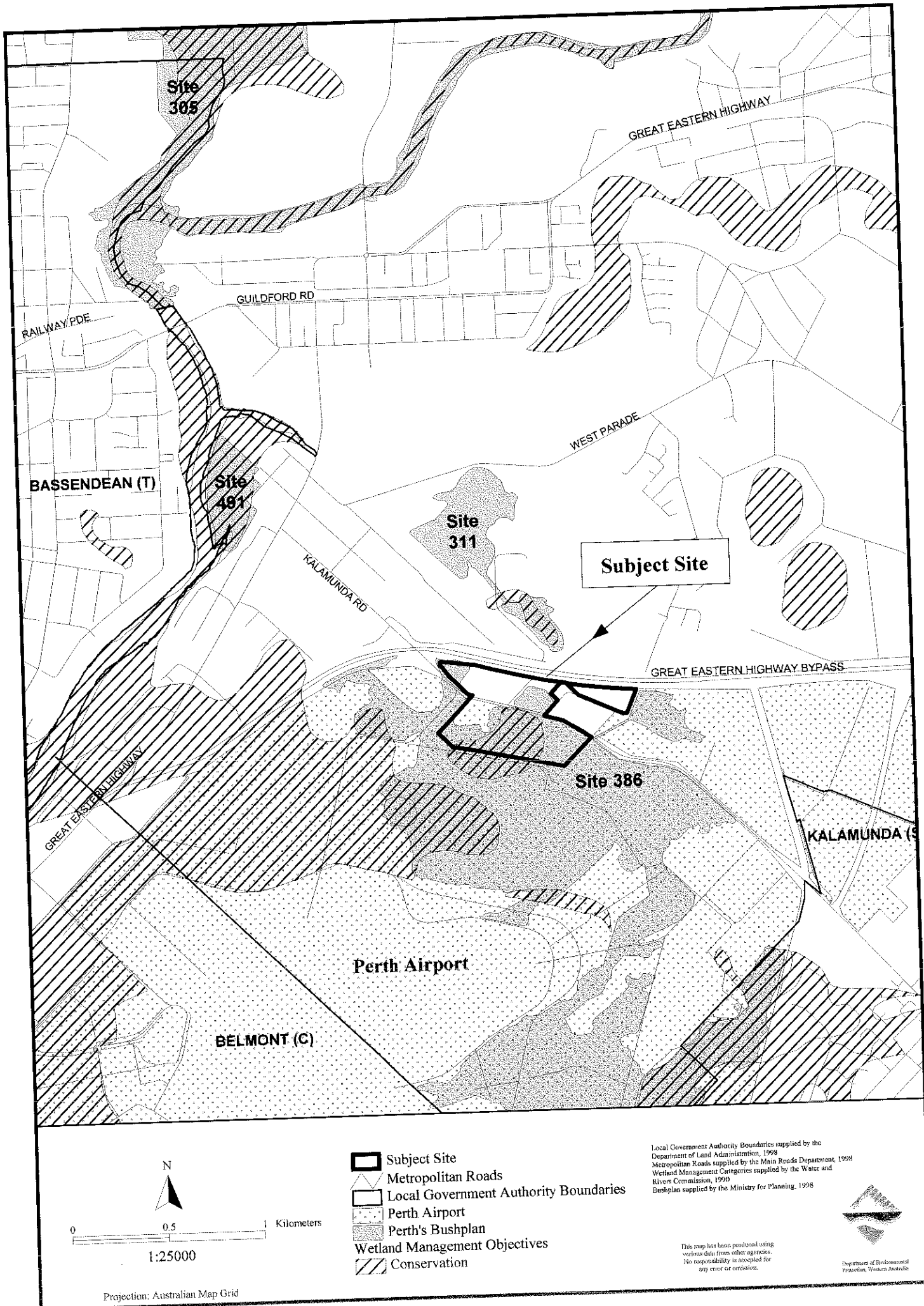


Figure 1. Location plan and Perth's Bushplan boundaries.

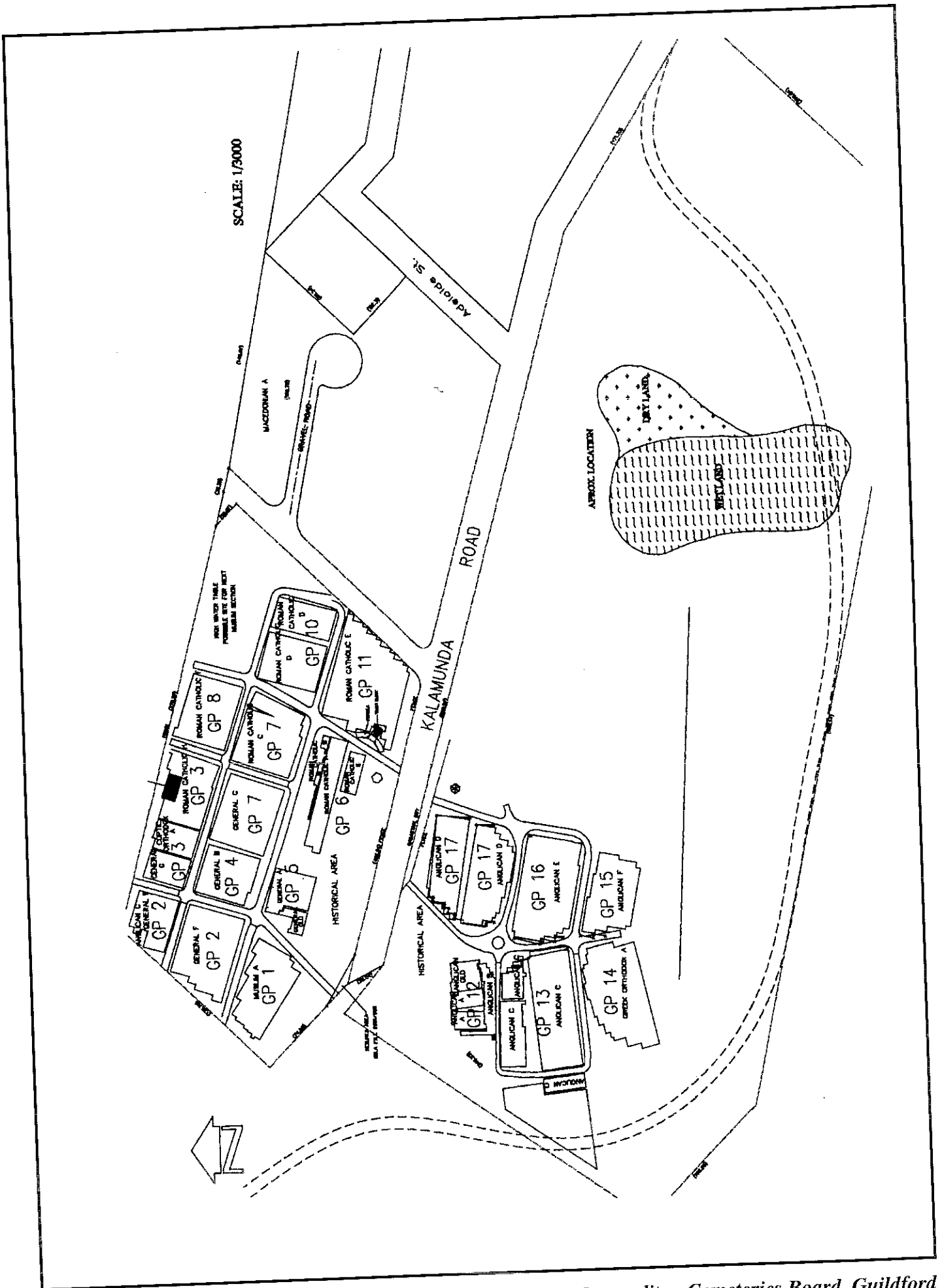


Figure 2. Guildford Cemetery Burial Location Plan (Source: Metropolitan Cemeteries Board, Guildford Cemetery, PER, 1998).

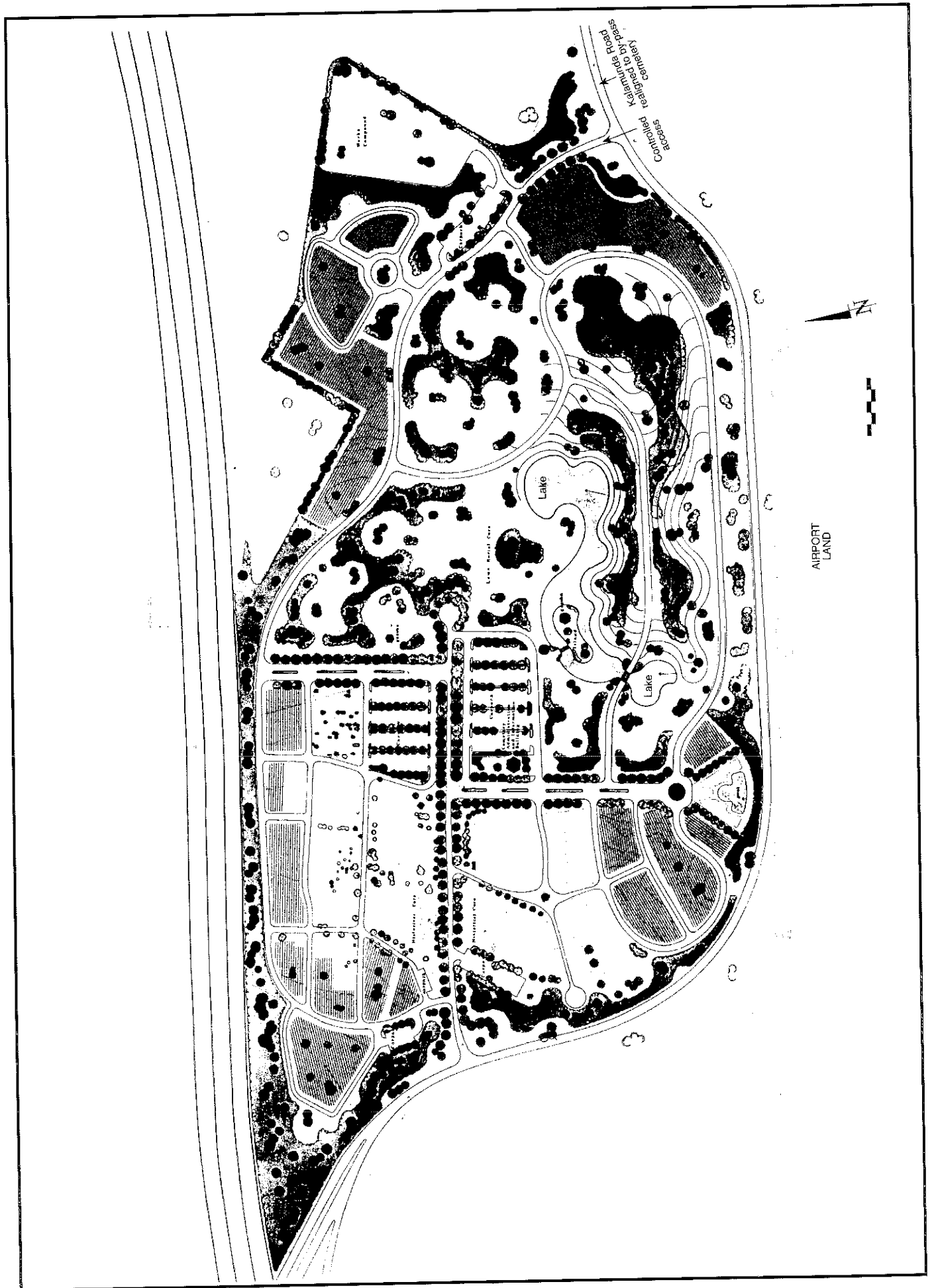


Figure 3. Guildford Cemetery Concept Plan. (Source: Metropolitan Cemeteries Board, Guildford Cemetery, PER, 1998.)

Since the release of the PER in September 1998, the MCB advised the EPA that, as a result of clearing of approximately 1.5 hectares during June 1998, they now have sufficient cleared land for Cemetery activities for the next five years or so. In addition, the MCB undertook "not to clear any environmentally sensitive land for Cemetery purposes pending outcomes from *Perth's Bushplan*" (Government of Western Australia, 1998a and b). Consequently, the Environmental Protection Authority (EPA) has resolved not to proceed with the assessment for the Cemetery expansion portion of the proposal. The proposal now being assessed comprises only the realignment of Kalamunda Road around the southern perimeter of the Guildford Cemetery.

A summary of the key characteristics of the modified proposal is presented in Table 1. A description of the proposal is provided in the PER (Metropolitan Cemeteries Board, 1998)

Table 1: Summary of key modified proposal characteristics

Element	Description
Land title	"C" Class Crown Reserve (number 21697)
Area of land holding	24 hectares
MRS zoning	"Public Purpose"
Status of road in MRS	"Important Regional Road"
Road reserve	30 metres
Road carriage	in the first instance, a 7.4 metre single carriage road

3. Relevant environmental factors

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

The identification process for the relevant factors is summarised in Table 2.

Having considered appropriate references, public and government submissions and the proponents response to submissions, in the EPA's opinion, the following are the environmental factors relevant to the proposal:

- (a) vegetation communities;
- (b) specially protected (threatened) fauna; and
- (c) wetlands.

Detail on the relevant environmental factors and their assessment is contained in Sections 3.1 - 3.3. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal.

The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

A summary of the assessment of the environmental factors is presented in Table 3.

3.1 Vegetation communities

Description

The proposed realignment of Kalamunda Road west has the potential to further fragment an area of regionally significant remnant vegetation.

Table 2: Identification of Relevant Environmental Factors

ENVIRONMENTAL FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
BIOPHYSICAL Vegetation communities	<p>Potential clearing of regionally significant remnant vegetation for expansion of Cemetery activities.</p> <p>Potential fragmentation of regionally significant remnant vegetation by Kalamunda Road realignment.</p>	<ul style="list-style-type: none"> • The Cemetery land is part of the same ecosystem as the Perth Airport land (System 6 Area M52), which is listed on the Register of the National Estate by the Australian Heritage Commission, so would undoubtedly also meet the criteria for National Estate listing. It would similarly classify for classification by the National Trust of Australia (WA). The proposal prevents consolidation of the Cemetery Land with the proposed Conservation Zone within the Perth Airport. The Cemetery bushland would significantly add to the value of the Conservation Zone. The size of the bushland remnant area, and the fact that it includes wetlands and transitions to wetlands, give it great ecological potential in the longer term. • The compromise proposal shown in the Concept Plan (which does not clearly specify locations) retains only 30% of the existing vegetation, and in small isolated patches rather than in large areas. This is totally unacceptable because it needs to be conserved in sufficient size to be sustainable. The proponent fails to appreciate the need to preserve large undisturbed tracts of bushland with as few edges as possible. A road through relatively undisturbed bushland would create new 'edge-effect' problems with greater weed invasion, greater fire risk, and greater rubbish dumping problems. • Remnant native bushland in the Perth Metropolitan area should be retained (except in exceptional or life-threatening circumstances) because it is irreplaceable, has outstanding biodiversity, heritage, recreational and scientific value to current and future generations, and contributes to moderating climate and air quality in Perth. • The bushland is an important wildlife habitat (see Fauna below), and large areas are needed for many native animals to survive in the long term. • The bushland provides a good buffer zone for the wetland ensuring that the wetland values are protected in the long term. • Preliminary vegetation clearing by the Metropolitan Cemeteries Board (and Shire of Swan) in early 1997 for the realignment of Kalamunda Road led to the setting of a formal assessment by the EPA. Around one and a half hectares was subsequently bulldozed and severely damaged, during the environmental review process. Neither was mentioned in the PER. The former should regenerate relatively easily (and is already growing back), but rehabilitation of the latter should also be attempted. The cleared parcel of bushland on the north side of Kalamunda Road was over one hectare and was valuable as a temporary refuge for fauna when the major block of vegetation to the south was subjected to bushfires. It is requested that the photographs of the clearing are made public by inclusion in the Report of Submissions. 	<p>Considered to be a relevant environmental factor</p>

ENVIRONMENTAL FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
BIOPHYSICAL			
Vegetation communities (continued)		<ul style="list-style-type: none"> The large site which has just been cleared should give the Cemeteries Board sufficient space and time to allow for a smooth transition to a new location. Government should be providing for more conservation and recreational land, including bushland, to enrich the souls of the living (voters), not for boxes and monuments for the mortal carcasses of the dead. Plants and animals which are under threat have a much longer history than the Cemetery, and they cannot be relocated. Any clearing of the vegetation would be a case of killing the living to bury the dead. 	
Specially Protected (Threatened) Fauna	<p>Potential loss of remnant vegetation and increase of nutrients in groundwater and wetlands may adversely impact upon the preferred potential habitat for the Western Swamp Tortoise.</p> <p>Clearing of remnant vegetation may adversely impact upon the Critically Endangered Guildford Springtail.</p>	<ul style="list-style-type: none"> The short necked or Western Swamp Tortoise (<i>Pseudemydura umbrina</i>) is Australia's most endangered vertebrate species. It is listed under 'Schedule 1 Part 1 - Species that are endangered' in the Commonwealth <i>Endangered Species Protection Act 1992</i>, declared as 'likely to become extinct or is rare' under the Western Australian <i>Wildlife Conservation Act 1950</i> (Section 14(2)(ba)), and is recognised as 'Critically Endangered' in the IUCN Red List Categories. The Western Swamp Tortoise's habitat comprises ephemeral swamps (dry from mid-summer to early autumn) and adjacent bushland, including Banksia woodland, where they aestivate in underground holes or under leaf litter. Home range sizes depend on habitat structure, but appear to be in the range of 20 to 150 hectares. The existing habitats in the Ellen Brook and Twin Swamps Nature Reserves already seem to be critically small for the long-term survival of the Tortoise population. Few areas of suitable habitat remain in the known area of its distribution which are large enough to allow the establishment, management and long-term survival of viable populations of this species. Kuchling and Burbidge (1996) identified the federal government land currently leased to the Westralia Airports Corporation and the adjacent seasonal swamp in the south-eastern portion of the proposed extension and development of Guildford Cemetery as the highest priority habitat, and it is the only area (apart from Ellen Brook and Twin Swamps Nature Reserves) currently earmarked for long-term conservation and reintroduction of the species. The wetland modifications proposed by the Metropolitan Cemeteries Board are unlikely to contribute in any reasonable way to the conservation and persistence of this critically endangered species. In addition, since habitat size is a major critical factor for their survival, the seasonal swamp in the Guildford Cemetery land should not be cut off from the adjacent habitat to the south and east (on the airport land) by the proposed deviation of Kalamunda Road. A large amount of money has been provided (by the Commonwealth Government) to bring the Western Swamp Tortoise back from the brink of extinction, and this will be wasted if there are insufficient viable translocation sites available for the 	Considered to be a relevant environmental factor

ENVIRONMENTAL FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
BIOPHYSICAL Specially Protected (Threatened) Fauna (continued)		<p>species. Ellen Brook and Twin Swamps Nature Reserves may not be able to support large enough populations of the animal, and the 'North Group' of wetlands (which includes that in the Guildford Cemetery, referred to as N4) is number one priority for potential translocation. The Cemetery land, together with the Airport Conservation Zone land, would provide a large relatively secluded and unfragmented area, which is critical in finding the appropriate habitat (Saunders et al., 1991).</p> <ul style="list-style-type: none"> • CALM's view is that, if Kalamunda Road is realigned as proposed, the site will be of little value for the proposed reintroduction of the Western Swamp Tortoise. The proposal should be modified so that the Cemetery land is contiguous to the Perth Airport land. • The proposed road would constitute a physical barrier between the wetland (N4) and the other contiguous wetlands in the Airport, and be a danger to this highly mobile species. • The Environmental Protection Policy for the reserves and their buffers for the Western Swamp Tortoise has not been completed, so the reserves remain at risk. The tortoise needs wetland and bushland habitat of the type which is present within the Guildford Cemetery and the proposal will jeopardise the chance of finding a suitable habitat which is large enough. Even partial development would have a severe impact on the wetland and upland habitat. • The proposal to create an artificial wetland as habitat for the endangered Western Swamp Tortoise is 'a foolish proposal' as it does not cater for the nature of the animal and the very specific habitat required. • The Guildford Springtail (<i>Australotomurus</i> sp. (SAM#122621)), which is known only from the Guildford Cemetery, was declared threatened under the <i>Wildlife Conservation Act 1950</i> (Government Gazette 14 July 1998) and has been ranked as Critically Endangered by CALM's Threatened Species Scientific Committee. This ranking has been endorsed by the Minister for the Environment. <p>CALM advises that very little information is available to date about the Guildford Springtail and CALM is yet to commence the Interim Recovery Plan, so it is recommended that until then no native vegetation within the Cemetery be cleared and that there be no mowing.</p> <ul style="list-style-type: none"> • CALM further advises that other threatened ecological communities may exist. The statement that the area of threatened ecological communities within the Cemetery is of little importance because of existence of bushland within Perth Airport has not been substantiated by field investigations. 	

ENVIRONMENTAL FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
BIOPHYSICAL			
Wetlands	<p>The proposed realignment of Kalamunda Road bisects and may consequently have adverse impacts upon the hydrology of a Conservation Category wetland.</p> <p>Potential clearing of remnant vegetation and expansion of Cemetery activities may impact upon groundwater quantity and quality creating adverse impacts upon the site's Conservation Category wetland.</p>	<ul style="list-style-type: none"> • Not identified as a relevant factor prior to advertising, so not addressed in the PER. • The proposed realignment of Kalamunda Road would significantly alter the hydrology and have a severe impact on the seasonal wetland. • The Water and Rivers Commission advise that the area proposed for extension of the Guildford Cemetery contains a significant wetland (dampland) which is well vegetated with only minor levels of weed invasion and following evaluation has been recommended for inclusion in the management category of "Conservation". It is estimated that only 16% of damplands between the Moore River and Mandurah remain vegetated (Hill A L, Semeniuk C A, Semeniuk V and Del Marco A, 1996. "Wetlands of the Swan Coastal Plain Volume 2 - Wetland Mapping Classification and Evaluation". Prepared for the Water and Rivers Commission and the Department of Environmental Protection, Perth). • The proposal will destroy a Conservation Management Category wetland (Water and Rivers Commission, August 1996) which would meet the general criteria for listing on the Ramsar Convention, in that it 'supports an appreciable assemblage of rare, vulnerable or endangered species' and 'it is of special value as the habitat of plants or animals at a critical stage of their biological cycle'. The wetland provides excellent habitat for a range of species including the uncommon Southern Brown Bandicoot. • The Water and Rivers Commission advises that excessive abstraction for irrigation purposes on the site may diminish groundwater resources in the vicinity and affect water levels in low lying wetlands, which are often an expression of local groundwater. The Metropolitan Cemeteries Board should make a commitment to assess and manage risks to groundwater quantity and the indirect impacts to surface water ecosystems. • The Conservation Management Category requires the wetland to be conserved, and it also needs an effective buffer zone, which could be provided by regionally significant bushland. • The proposal is contrary to Australia's international obligation to ensure the 'wise use' of wetlands. It also contravenes the Commonwealth and State Governments' Wetland Conservation Policies which commit to protection of biological diversity and maintain essential ecological processes and life support systems through prevention of further loss or degradation of wetlands and wetland types. • It makes no sense to fill in wetlands; 80% of wetlands on the coastal plain have already been lost; don't destroy this important one. • A wetland seems to be the most inappropriate place to be placing a cemetery! 	<p>Considered to be a relevant environmental factor</p>

ENVIRONMENTAL FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
POLLUTION			
Groundwater quality	The proposed expanded Cemetery area may adversely affect groundwater quality through increased concentrations of nutrients and organic material and depleted concentrations of dissolved oxygen.	<ul style="list-style-type: none"> • Not identified as a relevant factor prior to advertising, so not addressed in the PER. • The Water and Rivers Commission advises that cemeteries are known to pose a risk to groundwater quality. Groundwater in the vicinity of cemeteries may contain high concentrations of nutrient and organic material and depleted concentrations of dissolved oxygen. The impact of a cemetery on groundwater depends on the following factors: irrigation requirements; rainfall and evaporation; permeability of the soil; surface drainage; depth to groundwater; and fertiliser applications. Risk to groundwater quality should be assessed against the current and/or future beneficial uses(s) of the groundwater resource (and the potential for any discharges to surface water ecosystems). <p>The Metropolitan Cemeteries Board should make a commitment to assess and manage risks to groundwater quality (and the indirect impacts to surface water ecosystems).</p>	<p>Considered to be a relevant environmental factor for the proposed expansion of Cemetery activities, but not for the proposed realignment of Kalamunda Road.</p> <p>This factor does not require further EPA evaluation.</p>

Table 3: Summary of Assessment of Relevant Environmental Factors

Relevant Factor	EPA Environmental Objectives	EPA Assessment	EPA Advice
<p>Vegetation communities</p>	<p>Maintain the abundance, species diversity, geographic distribution and productivity of regionally significant vegetation communities.</p>	<ul style="list-style-type: none"> The EPA notes that the expansion of Guildford Cemetery activities no longer forms part of the proposal and is not the subject of this assessment. Protection of the regionally significant vegetation on the site will most likely be achieved through implementation of <i>Perth's Bushplan</i>. Construction of Kalamunda Road west along the proposed realignment would fragment and adversely affect remnant bushland which: <ul style="list-style-type: none"> forms an important part of a broader area of Perth Airport Bushland; is of regional significance; is one of the few remaining representatives of the intergrade between Bassendean Central and South and Southern River Vegetation Complexes; represents two 'threatened ecological communities' (floristic community types 20a and 20b); contains several species of priority taxa; and forms part of the potential habitat for the endangered Western Swamp Tortoise. The EPA notes that there are alternative options which would be suitable for the routing and/or traffic calming and road safety management of Kalamunda Road west. 	<p>The EPA notes:</p> <ul style="list-style-type: none"> that the regionally significant vegetation which may have suffered adverse impacts as a result of Guildford Cemetery expansion will be managed through implementation of <i>Perth's Bushplan</i>. the existence of other alternatives for the management of road safety in the vicinity of the Cemetery; and having particular regard to: <ul style="list-style-type: none"> the likely impact that the proposed road realignment will have on regionally significant vegetation; <p>it is the EPA's opinion that the objective for vegetation communities can not be met.</p>
<p>Specially Protected (Threatened) Fauna</p>	<p>Protect Specially Protected (Threatened) Fauna and Priority Fauna species and their habitats, consistent with the provisions of the <i>Wildlife Conservation Act 1950</i>.</p>	<ul style="list-style-type: none"> The existing habitats for the endangered Western Swamp Tortoise (<i>Pseudemydura umbrina</i>), namely Ellen Brook and Twin Swamps Nature Reserves, seem to be critically small for the long-term survival of the Tortoise population. The Guildford Cemetery land and the contiguous portion of the Westralia Airports Corporation land is the only area currently earmarked for the long-term, sustainable conservation and reintroduction of the species. Habitat size is a major critical factor, so there should not be any fragmentation of this highest priority potential habitat by cutting off the seasonal wetland in the Guildford Cemetery (and its necessary buffer zone) from the airport land. The endangered Guildford Springtail (<i>Australotomurus</i> sp.) is known only from the Guildford Cemetery and CALM has recommended that no native vegetation 	<p>The EPA notes the existence of other alternatives for the management of road safety in the vicinity of the Cemetery, and having particular regard to:</p> <ul style="list-style-type: none"> the likely impact that the proposed road realignment will have on the highest priority potential habitat for the endangered Western Swamp Tortoise; the likely impact that the proposed road realignment will have on the endangered Guildford Springtail; and the lack of sufficient survey work to establish the existence or otherwise of other possible threatened ecological

		<p>be cleared until an Interim Recovery Plan has been established.</p> <ul style="list-style-type: none"> • The existence or otherwise of other threatened ecological communities has not been established by adequate survey work. • The proposed realignment of Kalamunda Road west traverses a Conservation Category Wetland, and the road construction would affect the hydrology of the wetland which forms part of the potential habitat for the endangered Western Swamp Tortoise. • The proposed realignment would affect the habitat provided by the wetland for a range of other species. 	<p>communities; it is the EPA's opinion that the objective for specially protected (threatened) fauna can not be met.</p>
<p>Wetlands</p> <p>Maintain the integrity, functions and environmental values of wetlands.</p>			<p>The EPA notes the existence of other alternatives for the management of road safety in the vicinity of the Cemetery, and having particular regard to:</p> <ul style="list-style-type: none"> • the likely impact that the proposed road realignment will have on the hydrology of a Conservation Category Wetland; • the fragmentation of, and adverse impact upon, the wetland habitat; <p>it is the EPA's opinion that the objective for wetlands can not be met.</p>

The Guildford Cemetery bushland is of regional conservation value and contains plant communities and habitat that are poorly reserved and have a low proportion of their original distribution remaining uncleared (Figure 1). It forms part of Site 386 in *Perth's Bushplan* (Government of Western Australia, 1998a and b).

The bushland remnant is part of the broader area of the Perth Airport bushland which is an excellent example, both structurally and floristically, of the Bassendean Central and South and Southern River Vegetation Complex. The Guildford Cemetery remnant contains a mixture of wetlands and uplands in excellent to good condition that is typical of the interface of the Bassendean Dunes and the Pinjarra Plain, the zone between these two areas being mapped as the Southern River Vegetation Complex by Heddle *et al* (1980). Within the Perth Metropolitan Area 17% of this Southern River Vegetation Complex is considered to be uncleared in 1997 and 11% is proposed for some level of protection (Government of WA, 1998). The Guildford Cemetery remnant is one of the few areas representing the intergrade of these two complexes in the Perth Metropolitan Area.

The upland communities, dominated by combinations of Marri (*Eucalyptus calophylla*), Jarrah (*Eucalyptus marginata* subsp. *elegantella*), *Allocasuarina fraseriana*, *Banksia menziesii* and *Banksia attenuata*, have been determined as representing two 'threatened ecological communities' (floristic community type 20a, 20b after English and Blyth, 1997). Much of the vegetated area of the Guildford Cemetery bushland is wetland, identified as conservation category.

Several species found in the Guildford Cemetery bushland are priority taxa (Atkins, 1998), they are: *Stylidium longitubum* (priority 3), *Eucalyptus marginata* subsp. *elegantella* (priority 1) and *Tripterococcus paniculatus* (priority 1).

Submissions

Submissions addressed both the Guildford Cemetery expansion and the Kalamunda Road realignment. Only those relevant to the realignment are mentioned in this section (refer to Table 2 and Appendix 3 for further comments).

Submissions pointed out that preliminary vegetation clearing by the Metropolitan Cemeteries Board (and Shire of Swan) in early 1997 for the realignment of Kalamunda Road led to the setting of a formal assessment by the EPA. This clearing was not mentioned in the PER. The area is already growing back and should regenerate relatively easily. Additional clearing of about 1.5 hectares during June 1998 was not mentioned in the PER, but should have been.

Submissions noted that the Cemetery land is part of the same ecosystem as the Perth Airport land (System 6 Area M52), which is listed on the Register of the National Estate by the Australian Heritage Commission, so would undoubtedly also meet the criteria for National Estate listing. It was indicated that this site would similarly qualify for classification by the National Trust of Australia (WA). The proposal prevents consolidation of the Cemetery Land with the proposed Conservation Zone within the Perth Airport. The Cemetery bushland would significantly add to the value of the Conservation Zone. The size of the bushland remnant area, and the fact that it includes wetlands and transitions to wetlands, give it great ecological potential in the longer term.

Some submitters believed that the proponent failed to appreciate the need to preserve large undisturbed tracts of bushland with as few edges as possible. A road through relatively undisturbed bushland would create new 'edge-effect' problems with greater weed invasion, greater fire risk, and greater rubbish dumping problems. Large areas of wildlife habitat are needed for many native animals to survive in the long term.

Assessment

The area considered for assessment of this factor is the Swan Coastal Plain.

The EPA's environmental objective for this factor is to maintain the abundance, species diversity, geographic distribution and productivity of regionally significant vegetation communities.

The expansion of Guildford Cemetery activities no longer forms part of the proposal and is not the subject of this assessment. The regionally significant vegetation which would potentially have been cleared for the Cemetery expansion will most likely be protected through implementation of *Perth's Bushplan* (Government of Western Australia, 1998a and b).

Preliminary clearing of the proposed road diversion occurred in early 1997, to allow for preparatory survey work. This resulted in some dissection of the bushland, but regrowth is already occurring and it is believed that the damage can be rehabilitated.

Construction of Kalamunda Road west along the proposed realignment would seriously fragment bushland, part of which has already sustained minor fragmentation due to a small existing private track within the adjacent Perth Airport land. The cumulative impact of adding an important regional road parallel to the Airport track would be unacceptable. In addition to the 'barrier' which would be created by the realigned road, there would be adverse 'edge-effects' upon the remnant bushland which:

- is of regional significance;
- forms an important part of a broader area of Perth Airport Bushland;
- is one of the few remaining representatives of the intergrade between Bassendean Central and South and Southern River Vegetation Complexes;
- represents two 'threatened ecological communities' (floristic community types 20a and 20b);
- contains several species of priority taxa; and
- forms part of the potential habitat for the endangered Western Swamp Tortoise (see Section 3.2 below).

The EPA believes that the combined impacts are unacceptable.

It is noted that there are alternative options which would be suitable for the routing and/or traffic and road safety management of Kalamunda Road, particularly in the vicinity of the Guildford Cemetery (see Section 4).

Summary

Having particular regard to the:

- (a) likely adverse impact that the proposed road realignment will have on regionally significant vegetation;

it is the EPA's opinion that the proposal can **not** be managed to meet the EPA's environmental objective for vegetation communities.

3.2 Specially protected (threatened) fauna

Description

Potential loss of remnant vegetation and increase of nutrients in groundwater and wetlands may adversely impact upon the preferred potential habitat for the Western Swamp Tortoise, and clearing of remnant vegetation may adversely impact upon the critically endangered Guildford Springtail.

Western Swamp Tortoise

The short necked or Western Swamp Tortoise (*Pseudemydura umbrina*) is Australia's most endangered vertebrate species. It is listed under 'Schedule 1 Part 1 - Species that are endangered' in the Commonwealth *Endangered Species Protection Act 1992*, declared as 'likely to become extinct or is rare' under the Western Australian *Wildlife Conservation Act 1950*

(Section 14(2)(ba)), and is recognised as ‘Critically Endangered’ in the IUCN Red List Categories.

The Western Swamp Tortoise’s habitat comprises ephemeral swamps (dry from mid-summer to early autumn) and adjacent bushland, including Banksia woodland, where they aestivate (remain dormant during summer) in underground holes or under leaf litter. The Guildford Cemetery provides such a habitat.

Home range sizes depend on habitat structure, but appear to be in the range of 20 to 150 hectares.

Guildford Springtail

The Guildford Springtail (*Australotomurus* sp. (SAM#122621)), which is known only from the Guildford Cemetery, was declared threatened under the *Wildlife Conservation Act 1950* (Government Gazette 14 July 1998) and has been ranked as Critically Endangered by CALM’s Threatened Species Scientific Committee. This ranking has been endorsed by the Minister for the Environment.

Submissions

The Western Swamp Tortoise is Australia’s most endangered vertebrate species. Few areas of suitable habitat remain in the known area of the Tortoise’s distribution.

Submissions noted that the Federal Government land currently leased to the Westralia Airports Corporation and the adjacent seasonal swamp in the south-eastern portion of the Guildford Cemetery have been identified as the highest priority habitat (Kuchling and Burbidge, 1996). It is the only area (apart from Ellen Brook and Twin Swamps Nature Reserves) currently earmarked for long-term conservation and reintroduction of the species.

CALM advised that habitat size is a critical factor for the survival of the species, so there should not be any fragmentation of this highest priority potential habitat by cutting off the seasonal swamp in the Guildford Cemetery land from the adjacent habitat to the south and east (on the airport land) by the proposed deviation of Kalamunda Road. CALM’s view is that, if Kalamunda Road is realigned as proposed, the Cemetery site will be of little value for the proposed reintroduction of the Western Swamp Tortoise.

The proposed road would constitute a physical barrier between the wetland (N4) and the other contiguous wetlands in the Airport, and be a danger to this highly mobile species.

Submitters believe that a large amount of money has been provided (by the Commonwealth Government) to bring the Western Swamp Tortoise back from the brink of extinction, and that this will be wasted if there are insufficient viable translocation sites available for the species. The Cemetery land, together with the Airport Conservation Zone land, would provide a large relatively secluded and unfragmented area, which is critical in finding the appropriate habitat (Saunders et al, 1991).

The EPA’s Environmental Protection Policy for the reserves and their buffers for the Western Swamp Tortoise has not been completed, so those making submissions fear that the reserves remain at risk. The tortoise needs wetland and bushland habitat of the type which is present within the Guildford Cemetery and the proposal will jeopardise the chance of finding a suitable habitat which is large enough. Even partial development would have a severe impact on the wetland and upland habitat.

The Critically Endangered Guildford Springtail (*Australotomurus* sp. (SAM#122621)), is known only from the Guildford Cemetery. CALM recommends that no native vegetation within the Cemetery be cleared because very little information is available to date about the Guildford Springtail and their Interim Recovery Plan has not yet commenced.

CALM further advises that other threatened ecological communities may exist.

Assessment

The area considered for assessment of this factor is the Swan Coastal Plain.

The EPA's environmental objective for this factor is to protect specially protected (threatened) fauna and priority fauna species and their habitats, consistent with the provisions of the *Wildlife Conservation Act 1950*.

Two threatened species have been identified, namely, the Western Swamp Tortoise and the Guildford Springtail.

The existing habitats for the endangered Western Swamp Tortoise (*Pseudemydura umbrina*), namely Ellen Brook and Twin Swamps Nature Reserves, seem to be critically small for the long-term survival of the Tortoise population. Few areas of suitable habitat which are large enough to allow the establishment, management and long-term survival of viable populations of this species remain in the known area of its distribution. The Guildford Cemetery land and the contiguous portion of the Westralia Airports Corporation land is the only area currently earmarked for the reintroduction of the species. As a potential area for the reintroduction of the Tortoise, the site is of the highest priority.

Given CALM's recommendation on the endangered Guildford Springtail (*Australotomurus* sp.), which is known only from the Guildford Cemetery, native vegetation should not be cleared prior to establishment of an Interim Recovery Plan.

Other threatened ecological communities may occur within the Cemetery, but their existence or otherwise has not been substantiated by adequate survey work and field investigations.

Summary

Having particular regard to the:

- (a) the likely impact that the proposed road realignment will have on the highest priority potential habitat for the endangered Western Swamp Tortoise;
- (b) the likely impact that the proposed road realignment will have on the endangered Guildford Springtail; and
- (c) the lack of sufficient survey work to establish the existence or otherwise of other possible threatened ecological communities;

it is the EPA's opinion that the proposal can **not** be managed to meet the EPA's environmental objective for specially protected (threatened) fauna.

3.3 Wetlands

Description

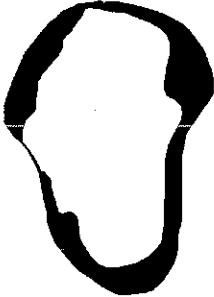


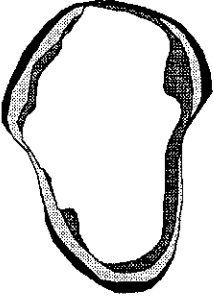

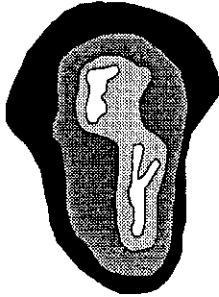
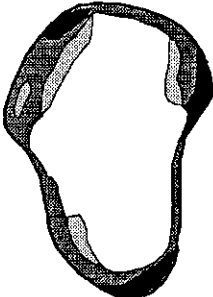

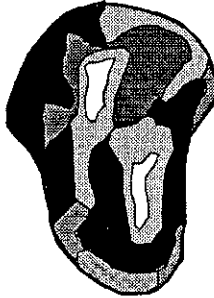
The proposed realignment of Kalamunda Road bisects and may consequently have adverse impacts upon the hydrology of a conservation category wetland.

The proposal includes modification of a regionally significant and outstanding "conservation category" seasonally waterlogged basin, namely Wetland 2034IISE No 66 (Figure 1 and Hill *et al*, 1996). The wetland is part of System 6 area M52. The wetland extends from Kalamunda Road in the north past the property boundary in the southwest, and is of greater extent than the proponents' approximation in the PER (Figure 2).

The wetland is in the top 11% of this wetland type and natural grouping. The wetland vegetation organisation and cover is 'maculiform', that is, it reflects the highest levels of wetland habitat interspersions and diversity (Figure 4). The vegetated wetland is surrounded by regionally significant upland vegetation, as described for Site 386 in *Perth's Bushplan* (Government of Western Australia, 1998a and b).

Submissions

Submissions addressed both the Guildford Cemetery expansion and the Kalamunda Road realignment. Only those relevant to the realignment are mentioned in this section (refer to Table 2 and Appendix 3 for further comments).

		VEGETATION COVER		
		PERIPHERAL	MOSAIC	COMPLETE
INTERNAL ORGANISATION OF VEGETATION	HOMOGENEOUS	<p>PERIFORM</p>  <p>length of interface: 1 complexity of interface: 1</p>	<p>PANIFORM</p>  <p>length of interface: 2 complexity of interface: 1</p>	<p>LATIFORM</p>  <p>length of interface: 1 complexity of interface: 1</p>
	ZONED	<p>ZONIFORM</p>  <p>length of interface: 3 complexity of interface: 2</p>	<p>GRADIFORM</p>  <p>length of interface: 2 complexity of interface: 3</p>	<p>CONCENTRIFORM</p>  <p>length of interface: 2 complexity of interface: 2</p>
	HETEROGENEOUS	<p>BACATAFORM</p>  <p>length of interface: 3 complexity of interface: 2</p>	<p>HETEROFORM</p>  <p>length of interface: 2 complexity of interface: 3</p>	<p>MACULIFORM</p>  <p>length of interface: 3 complexity of interface: 4</p>





KEY		Vegetation zones	
	Water, salina, or vegetation free zone		Assemblage 1
			Assemblage 2
			Assemblage 3

Figure 4. Relative length and complexity of wetland vegetation community interface (Source: Hill et al (1996) Wetlands of the Swan Coastal Plain and based on wetland classification system of Semeniuk et al. (1990).)

The WRC advised that the regionally significant “conservation category” wetland (dampland) is well vegetated with only minor levels of weed invasion. It is estimated that only 16% of damplands between the Moore River and Mandurah remain vegetated (Hill A L *et al*, 1996).

The WRC does not consider it appropriate to place a road through a regionally significant and outstanding conservation category wetland. Because the site has been identified as the preferred release site for the rare and endangered short necked tortoise, maintenance of adequate wetland buffers and habitat linkage to adjoining upland bushland is considered essential for the protection of these and other beneficial uses of this wetland. The WRC considers that the placing of roads should be outside both wetland boundaries and appropriate buffer zones of critical and secondary influence (200 metres). This is an environmentally sensitive water resources area, so best planning and management practices of water sensitive design (and WAPC development control policy DC6.3) should apply.

Other submissions stated that the inadequate protection of the areas’ wetland, as proposed in the PER, is not considered consistent with current best practice of water planning and management practices deemed appropriate for the area. The conservation management category requires the wetland to be conserved, and it also needs an effective buffer zone, which could be provided by regionally significant bushland.

The proposal will destroy a conservation category wetland which submitters believe would meet the general criteria for listing on the Ramsar Convention, in that it *‘supports an appreciable assemblage of rare, vulnerable or endangered species’* and *‘is of special value as the habitat of plants or animals at a critical stage of their biological cycle’*. It makes no sense to fill in wetlands; 80% of wetlands on the coastal plain have already been lost; don’t destroy this important one. The wetland also provides excellent habitat for a range of species including the uncommon Southern Brown Bandicoot.

Submissions stated that the proposal is contrary to Australia’s international obligation to ensure the ‘wise use’ of wetlands. It also contravenes the Commonwealth and State Governments’ Wetland Conservation Policies which commit to protection of biological diversity and maintain essential ecological processes and life support systems through prevention of further loss or degradation of wetlands and wetland types.

Assessment

The area considered for assessment of this factor is the Swan Coastal Plain.

The EPA’s environmental objective for this factor is to maintain the integrity, functions and environmental values of wetlands.

Preliminary clearing of the proposed road diversion occurred in early 1997, to allow for preparatory survey work. This encroached upon the wetland (of the dampland type). However, no significant damage occurred to the vegetated wetland and it can be rehabilitated.

The proposed realignment of Kalamunda Road west traverses the wetland, and the road construction would affect both the hydrology and the vegetation of the wetland which:

- has been identified as a “conservation category”, with an outstanding level of wetland habitat diversity; and
- forms part of the highest priority potential habitat for the endangered Western Swamp Tortoise.

The habitat provided by the wetland for a range of other species, some of which may be threatened, would also be affected by the proposed realignment.

Summary

Having particular regard to the:

- (a) likely impact that the proposed Kalamunda Road west realignment would have on the hydrology of a conservation category wetland; and

(b) the fragmentation of, and adverse impact upon, the vegetated wetland habitat;

it is the EPA's opinion that the proposal can **not** be managed to meet the EPA's environmental objective for wetlands.

4. Other Advice

The EPA is cognisant of, and sympathetic to, the difficulties experienced by the MCB in:

- providing land for burial purposes; and
- resolving safety issues arising from the current design and location of Kalamunda Road west through Guildford Cemetery.

Although the EPA has no statutory role which would enable it to assist with the resolution of these issues, it fully supports the involvement of the agencies with which the statutory power does reside.

With respect to land required for burial purposes, this is a broad issue which needs to be resolved on a regional basis for all of MCB's landholdings throughout the Perth Metropolitan Region. It is anticipated that an appropriate negotiated outcome will be achieved through implementation of *Perth's Bushplan*. Furthermore, the Western Australian Planning Commission (WAPC) plans to initiate a long term whole-of-Government approach to identify key strategic cemetery sites. The EPA understands that the Ministry for Planning (MfP), on behalf of the WAPC, is currently scoping the availability of suitable land which is not as environmentally constrained as the current site.

A number of options have been proposed to resolve the safety issues of Kalamunda Road west as it passes through Guildford Cemetery. Options include other alignments (on land outside the MCB's ownership and control) or use of traffic management measures on the current alignment. However, this is also an issue which is best resolved on a regional basis, because the road is an "Important Regional Road". It may well transpire that the above-mentioned *Perth's Bushplan* negotiated outcome for expansion of Cemetery activities will altogether negate the need for any realignment. In any event, a study of the entire length of Kalamunda Road is currently being undertaken by the MfP, in consultation with Main Roads Western Australia and the Shires of Kalamunda and Swan, and this should adequately address the MCB's difficulties.

5. Conclusions

The EPA has considered the proposal by Metropolitan Cemeteries Board and concluded that the proposal as presented could not meet the EPA's objectives in relation to vegetation communities, specially protected (threatened) fauna, and wetlands, and thus should not proceed.

At the same time, the EPA is cognisant of the difficulties experienced by the MCB and notes that assistance with the resolution of these issues is being tackled in part by a whole-of-Government approach (see Other Advice).

6. Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister considers the report on the relevant environmental factors as set out in Section 3;
2. That the Minister notes that the EPA has concluded that the proposal as presented could not meet the EPA's objectives in relation to:
 - (a) vegetation communities;
 - (b) specially protected (threatened) fauna; and

(c) wetlands;

and thus should not proceed.

3. That the Minister notes that the EPA has not included “conditions and procedures to which the proposal should be subject, if implemented” because the EPA holds the view that the proposal should not be implemented.
4. That the Minister notes the Other Advice in Section 4.
5. That the Minister not issue a statement that the proposal may be implemented.

Appendix 1

List of submitters

Organisations:

Fourteen submissions were from the following organisations:

- Bassendean Preservation Group Inc
- Chelonia Enterprises;
- Conservation Council of Western Australia Inc;
- Department of Conservation and Land Management;
- Department of Environmental Protection;
- Foothills Wetlands Preservation Society;
- Kalamunda Bicycle User Group;
- Nature Reserves Preservation Group Incorporated;
- Urban Bushland Council WA Inc;
- Water and Rivers Commission;
- Waterbird Conservation Group Inc;
- Wetlands Conservation Society (Inc);
- Wildflower Society of Western Australia (Inc); and
- Wildflower Society of WA Inc (Murdoch Branch).

Individual:

Nine submissions were received from individuals, as follows:

- M Campbell;
- E Dove;
- A Herlihy;
- D F James;
- K McLean;
- J Payne;
- D Perret;
- K Tullis;
- N J and E J Woolfrey.

Appendix 2

References

- ANCA (1993). *The Action Plan for Australian Reptiles*. ANCA, Canberra.
- Burbidge, A A and Kuchling, G (1994). *Western Swamp Tortoise Recovery Plan*. Western Australian Wildlife Management Program No. 11, CALM, Perth.
- Commonwealth Government (January 1997). *Wetlands Policy of the Commonwealth Government of Australia*. Canberra.
- English, V J and Blyth, J (1997). *Identifying and Conserving Threatened Ecological communities in the south West Botanical Province*. Project Number N702, Final Report to Environment Australia, Department of Conservation and Land Management, Perth.
- Government of Western Australia (1997). *Wetlands Conservation Policy for Western Australia*. Prepared by Department of Conservation and Land Management and Water and Rivers Commission, Perth.
- Government of Western Australia (1998a and b). *Perth's Bushplan, Volume 1 and Volume 2*. Volume 1 (1998a) published by the Western Australian Planning Commission and Volume 2 (1998b) published by the Department of Environmental Protection, Perth.
- Hill, A L, Semeniuk C A, Semeniuk, V and Del Marco, A (1996). *Wetlands of the Swan Coastal Plain*. Water and Rivers Commission and Department of Environmental Protection, Perth.
- How, R A (1995). *Objection Assessment of Fauna Values for Perth Airport*. Prepared for the Australian Heritage Commission.
- IUCN (1994). *IUCN Red List categories*. Prepared by the IUCN Species Survival Commission, approved at 40th meeting of IUCN Council, 30 November 1994, Gland, Switzerland.
- Kuchling, G and Burbidge, A A (1996). *Survey of the Western Swamp Tortoise and its habitat at the Perth Airport*. Report to the Federal Airports Corporation and the Australian Nature Conservation Agency, Chelonia Enterprises, Perth.
- Metropolitan Cemeteries Board (1998). *Guildford Cemetery Public Environmental Review*. Perth.
- Saunders, D A, Hobbs, R J and Margules, C R (1991). "Biological consequences of ecosystem fragmentation: a review" in *Conservation Biology*, Volume 5(1), pp. 18-32.
- Tingay, Alan and Associates (1994a). *The Flora and Vegetation of Perth Airport*. Perth.
- Tingay, Alan and Associates (1994b). *Report of a Fauna Survey of the Perth Airport*. Perth.
- Trudgen, Malcolm (1995). *Objection Assessment for Perth Airport, flora values and advice on the flora values of bushland not currently listed*. Prepared for the Australian Heritage Commission.

Appendix 3

Summary of Public Submissions

SUMMARY OF ISSUES RAISED IN SUBMISSIONS

GUILDFORD CEMETERY DEVELOPMENT & EXPANSION & REALIGNMENT OF KALAMUNDA ROAD, SOUTH GUILDFORD (1182)

METROPOLITAN CEMETERIES BOARD

PUBLIC ENVIRONMENTAL REVIEW

Overview

The Metropolitan Cemeteries Board proposes to expand the cemetery operations at the Guildford Cemetery site and to deviate Kalamunda Road west around the proposed expansion area adjacent to the Perth Airport. The proposed realignment route is entirely within Cemetery Board land, some of which was obtained through a land swap with the Federal Airport Corporation.

The proposal will result in the clearing of an area of Regionally Significant Bushland (Floristic Community Types 20a and 20b), and impact on a Conservation Category Wetland which is in good condition and has also been identified as part of the potential habitat for the endangered Western Swamp Tortoise. Preliminary clearing of the proposed road diversion has occurred, to allow for preliminary survey work. This has resulted in some dissection of the bush, but it is believed that this damage can be rehabilitated. No significant damage has occurred to the wetland (of the dampland type), but the proposed realignment will pass through the middle of the Conservation Category Wetland. The proposed expansion of the cemetery is likely to result in the partial excavation of the wetland within the cemetery site to provide a permanent water area.

The Environmental Protection Authority (EPA) set the level of assessment for the proposal at Public Environmental Review (PER) on 29 December 1997. The primary factors considered by the EPA in determining this level of assessment are the potential impacts on regionally significant vegetation due to clearing, and the potential impacts on an area identified as potential Western Swamp Tortoise habitat.

The public submission period for the PER (Assessment No. 1182) commenced on 3 October 1998 for a period of four weeks, ending on 30 October 1998. A total of 23 submissions was received by the EPA, all of which opposed the proposal.

Fourteen submissions were from the following organisations:

- Bassendean Preservation Group Inc
- Chelonia Enterprises;
- Conservation Council of Western Australia Inc;
- Department of Conservation and Land Management;
- Department of Environmental Protection;
- Foothills Wetlands Preservation Society;

- Kalamunda Bicycle User Group;
- Nature Reserves Preservation Group Incorporated;
- Urban Bushland Council WA Inc;
- Water and Rivers Commission;
- Waterbird Conservation Group Inc;
- Wetlands Conservation Society (Inc);
- Wildflower Society of Western Australia (Inc); and
- Wildflower Society of WA Inc (Murdoch Branch).

Nine submissions were received from individuals, as follows:

- M Campbell;
- E Dove;
- A Herlihy;
- D F James;
- K McLean;
- J Payne;
- D Perret;
- K Tullis;
- N J and E J Woolfrey.

The submissions led to the identification of two additional factors, namely the potential impacts upon wetlands (identified as Conservation Category) due to clearing and road construction, and the potential impacts upon groundwater quality due to clearing and extension of cemetery activities.

The proponent is asked to address all issues and questions raised by these submissions, as summarised below, to demonstrate how the relevant EPA objectives will be achieved.

SUMMARY OF ISSUES	
ENV. FACTOR	EPA OBJECTIVE
BIOPHYSICAL	
Vegetation	
<p>Vegetation</p> <p>Maintain the abundance, species diversity, geographic distribution and productivity of regionally significant vegetation communities</p>	<ul style="list-style-type: none"> • The EPA is requested to refer to <i>Perth's Bushplan</i> information to substantiate the significance of the bushland. It is difficult for the public to participate in the consultation process because the PER provided only minimal information on the flora, and the scientific information is held by the DEP, MFP, WRC and CALM as part of <i>Perth's Bushplan</i>, which was not publicly released before close of submissions. The proposal would destroy regionally significant bushland (Floristic Community Type 20a - <i>Banksia attenuata</i> woodlands over species rich shrublands) which has been nominated by a community group (Friends of Perth Airport Bushland) for inclusion in draft <i>Perth's Bushplan</i> and is worthy of protection. The numerous assurances about <i>Perth's Bushplan</i> should not be flagrantly broken. • The Department of Environmental Protection (DEP) advises that the area's remnant bushland is of excellent to good condition and comprises the following specific conservation attributes: <ul style="list-style-type: none"> - three Priority taxa <i>Eucalyptus marginata</i> subsp. <i>elegantella</i> (Priority 1), (<i>Styliidium longitubum</i> (Priority 3) and <i>Tripterooccus paniculatus</i>; - two threatened ecological communities' (after English and Blyth 1997) (Endangered Floristic Community Types 20a and 20b); - contains a mixture of wetland and upland vegetation; - part of a broader area (including the Perth Airport Bushland) which provides an excellent example (structurally and floristically) of the Bassendean Central and Southern River Vegetation Complexes and in addition contains an intergrade between the two (one of the few representatives of this transition in the Perth Metropolitan region); and - identification as suitable bushland habitat for the Western Swamp Tortoise. • It is significant that the transition between the Guildford Vegetation Complex and the Southern River Vegetation Complex has been mapped as occurring on the site (<i>Perth Environment Project(PEP) 1994</i>). <i>PEP</i> also concluded that all remaining Guildford Vegetation Complex sites would have to be conserved to achieve a satisfactory target (less than 10% remains), and that the Southern River Vegetation Complex was greatly under-conserved in the metropolitan area. In terms of its ecological value, <i>PEP</i> rated the bushland within the proposed development area as being in the top 5% of sites in the Perth metropolitan region. The vegetation is in good to excellent condition. A massive emergence of the fire-responsive native grass, <i>Stipa</i>, after a fire 4 years ago is one indication that the area has not undergone major disturbance. This is supported by aerial photography from 1953. • Another feature of the area is the transition in floristic community types from up-slope Eucalypt and <i>Banksia</i> woodland vegetation to down-slope seasonal wetland Melaleuca and heath vegetation. Natural transitions are rare in urban bushland remnants because of their inadequate size or partial clearing.

SUMMARY OF ISSUES

ENV. FACTOR	EPA OBJECTIVE	
	<ul style="list-style-type: none"> • The Cemetery land is part of the same ecosystem as the Perth Airport land (System 6 Area M52), which is listed on the Register of the National Estate by the Australian Heritage Commission, so would undoubtedly also meet the criteria for National Estate listing. It would similarly classify for classification by the National Trust of Australia (WA). The proposal prevents consolidation of the Cemetery Land with the proposed Conservation Zone within the Perth Airport. The Cemetery bushland would significantly add to the value of the Conservation Zone. The size of the bushland remnant area, and the fact that it includes wetlands and transitions to wetlands, give it great ecological potential in the longer term. • The compromise proposal shown in the Concept Plan (which does not clearly specify locations) retains only 30% of the existing vegetation, and in small isolated patches rather than in large areas. This is totally unacceptable because it needs to be conserved in sufficient size to be sustainable. The proponent fails to appreciate the need to preserve large undisturbed tracts of bushland with as few edges as possible. A road through relatively undisturbed bushland would create new 'edge-effect' problems with greater weed invasion, greater fire risk, and greater rubbish dumping problems. • Remnant native bushland in the Perth Metropolitan area should be retained (except in exceptional or life-threatening circumstances) because it is irreplaceable, has outstanding biodiversity, heritage, recreational and scientific value to current and future generations, and contributes to moderating climate and air quality in Perth. • The bushland is an important wildlife habitat (see Fauna below), and large areas are needed for many native animals to survive in the long term. • The bushland provides a good buffer zone for the wetland ensuring that the wetland values are protected in the long term. • Preliminary vegetation clearing by the Metropolitan Cemeteries Board (and Shire of Swan) in early 1997 for the realignment of Kalamunda Road led to the setting of a formal assessment by the EPA. Around one and a half hectares was subsequently bulldozed and severely damaged, during the environmental review process. Neither was mentioned in the PER. The former should regenerate relatively easily (and is already growing back), but rehabilitation of the latter should also be attempted. The cleared parcel of bushland on the north side of Kalamunda Road was over one hectare and was valuable as a temporary refuge for fauna when the major block of vegetation to the south was subjected to bushfires. It is requested that the photographs of the clearing are made public by inclusion in the Report of Submissions. • The large site which has just been cleared should give the Cemeteries Board sufficient space and time to allow for a smooth transition to a new location. • Government should be providing for more conservation and recreational land, including bushland, to enrich the souls of the living (voters), not for boxes and monuments for the mortal carcasses of the dead. Plants and animals which are under threat have a much longer history than the Cemetery, and they cannot be relocated. Any clearing of the vegetation would be a case of killing the living to bury the dead. 	

ENV. FACTOR		EPA OBJECTIVE		SUMMARY OF ISSUES	
Terrestrial Fauna					
Declared rare fauna	Protect Specially Protected (Threatened) Fauna and Priority Fauna species and their habitats, consistent with the provisions of the Wildlife Conservation Act 1950.	<p>The short necked or Western Swamp Tortoise (<i>Pseudemydura umbrina</i>) is Australia's most endangered vertebrate species. It is listed under 'Schedule 1 Part 1 - Species that are endangered' in the Commonwealth <i>Endangered Species Protection Act 1992</i>, declared as 'likely to become extinct or is rare' under the <i>Western Australian Wildlife Conservation Act 1950</i> (Section 14(2)(ba)), and is recognised as 'Critically Endangered' in the IUCN Red List Categories.</p> <p>The Western Swamp Tortoise's habitat comprises ephemeral swamps (dry from mid-summer to early autumn) and adjacent bushland, including <i>Banksia</i> woodland, where they aestivate in underground holes or under leaf litter. Home range sizes depend on habitat structure, but appear to be in the range of 20 to 150 ha. The existing Ellen Brook Nature Reserve (35 ha) already seems to be critically small for the long-term survival of the Tortoise population. Few areas of suitable habitat remain in the known area of its distribution which are large enough to allow the establishment, management and long-term survival of viable populations of this species.</p> <p>Kuchling and Burbidge (1996) identified the federal government land currently leased to the Westralia Airports Corporation and the adjacent seasonal swamp in the south-eastern portion of the proposed extension and development of Guildford Cemetery as the highest priority habitat, and it is the only area (apart from Ellen Brook and Twin Swamps Nature Reserves) currently earmarked for long-term conservation and reintroduction of the species. The wetland modifications proposed by the Metropolitan Cemeteries Board are unlikely to contribute in any reasonable way to the conservation and persistence of this critically endangered species. In addition, since habitat size is a major critical factor for their survival, the seasonal swamp in the Guildford Cemetery land should not be cut off from the adjacent habitat to the south and east (on the airport land) by the proposed deviation of Kalamunda Road.</p> <ul style="list-style-type: none"> • A large amount of money has been provided (by the Commonwealth Government) to bring the Western Swamp Tortoise back from the brink of extinction, and this will be wasted if there are insufficient viable translocation sites available for the species. Ellen Brook and Twin Swamps Nature Reserves may not be able to support large enough populations of the animal, and the 'North Group' of wetlands (which includes that in the Guildford Cemetery, referred to as N4) is number one priority for potential translocation. The Cemetery land, together with the Airport Conservation Zone land, would provide a large relatively secluded and unfragmented area, which is critical in finding the appropriate habitat (Saunders et al, 1991). • CALM's view is that, if Kalamunda Road is realigned as proposed, the site will be of little value for the proposed re-introduction of the Western Swamp Tortoise. The proposal should be modified so that the Cemetery land is contiguous to the Perth Airport land. • The proposed road would constitute a physical barrier between the wetland (N4) and the other contiguous wetlands in the Airport, and be a danger to this highly mobile species. 			

ENV. FACTOR	EPA OBJECTIVE	SUMMARY OF ISSUES
Declared rare fauna (continued)		<ul style="list-style-type: none"> • The Environmental Protection Policy for the reserves and their buffers for the Western Swamp Tortoise has not been completed, so the reserves remain at risk. The tortoise needs wetland and bushland habitat of the type which is present within the Guildford Cemetery and the proposal will jeopardise the chance of finding a suitable habitat which is large enough. Even partial development would have a severe impact on the wetland and upland habitat. • The proposal to create an artificial wetland as habitat for the endangered Western Swamp Tortoise is 'a foolish proposal' as it does not cater for the nature of the animal and the very specific habitat required. • The Guildford Springtail (<i>Australotomurus</i> sp. (SAM#122621)), which is known only from the Guildford Cemetery, was declared threatened under the <i>Wildlife Conservation Act 1950</i> (Government Gazette 14 July 1998) and has been ranked as Critically Endangered by CALM's Threatened Species Scientific Committee. This ranking has been endorsed by the Minister for the Environment. <p>CALM advises that very little information is available to date about the Guildford Springtail and CALM is yet to commence the Interim Recovery Plan, so it is recommended that until then no native vegetation within the Cemetery be cleared and that there be no mowing.</p> <ul style="list-style-type: none"> • CALM further advises that other threatened ecological communities may exist. The statement that the area of threatened ecological communities within the Cemetery is of little importance because of existence of bushland within Perth Airport has not been substantiated by field investigations.

ENV. FACTOR	EPA OBJECTIVE	SUMMARY OF ISSUES
Wetlands	Maintain the integrity, functions and environmental values of wetlands	<ul style="list-style-type: none"> • Not identified as a relevant factor prior to advertising, so not addressed in the PER. • The proposed realignment of Kalamunda Road would significantly alter the hydrology and have a severe impact on the seasonal wetland. • The Water and Rivers Commission advise that the area proposed for extension of the Guildford Cemetery contains a significant wetland (dampland) which is well vegetated with only minor levels of weed invasion and following evaluation has been recommended for inclusion in the management category of "Conservation". It is estimated that only 16% of damplands between the Moore River and Mandurah remain vegetated (Hill A L, Semeniuk C A, Semeniuk V and Del Marco A, 1996. "Wetlands of the Swan Coastal Plain Volume 2 - Wetland Mapping Classification and Evaluation". Prepared for the Water and Rivers Commission and the Department of Environmental Protection, Perth). • The proposal will destroy a Conservation Management Category wetland (Water and Rivers Commission, August 1996) which would meet the general criteria for listing on the Ramsar Convention, in that it 'supports an appreciable assemblage of rare, vulnerable or endangered species' and 'it is of special value as the habitat of plants or animals at a critical stage of their biological cycle'. The wetland provides excellent habitat for a range of species including the uncommon Southern Brown Bandicoot. • The Conservation Management Category requires the wetland to be conserved, and it also needs an effective buffer zone, which could be provided by regionally significant bushland. • The proposal is contrary to Australia's international obligation to ensure the 'wise use' of wetlands. It also contravenes the Commonwealth and State Governments' Wetland Conservation Policies which commit to protection of biological diversity and maintain essential ecological processes and life support systems through prevention of further loss or degradation of wetlands and wetland types. • It makes no sense to fill in wetlands; 80% of wetlands on the coastal plain have already been lost; don't destroy this important one. • A wetland seems to be the most inappropriate place to be placing a cemetery!

ENV. FACTOR	EPA OBJECTIVE	SUMMARY OF ISSUES
POLLUTION MANAGEMENT		
Water quality		
Groundwater quality	<p>Maintain or improve the quality of groundwater to ensure that existing and potential uses, including ecosystem maintenance are protected, consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA, 1993)</p>	<ul style="list-style-type: none"> • Not identified as a relevant factor prior to advertising, so not addressed in the PER. • The Water and Rivers Commission advises that excessive abstraction for irrigation purposes on the site may diminish groundwater resources in the vicinity and affect water levels in low lying wetlands, which are often an expression of local groundwater. Therefore any adverse affects on groundwater quantity and quality would potentially adversely affect surface water quality and ecosystems. <p>Cemeteries are known to pose a risk to groundwater quality. Groundwater in the vicinity of cemeteries may contain high concentration of nutrient and organic material and depleted concentrations of dissolved oxygen. The impact of a cemetery on groundwater depends on the following factors: irrigation requirements; rainfall and evaporation; permeability of the soil; surface drainage; depth to groundwater; and fertiliser applications. Risk to groundwater quality should be assessed against the current and/or future beneficial uses(s) of the groundwater resource (and the potential for any discharges to surface water ecosystems).</p> <p>The Metropolitan Cemeteries Board should make a commitment to assess and manage risks to groundwater quantity and quality (and the indirect impacts to surface water ecosystems).</p>

Other Issues

Biodiversity

- If biodiversity values are considered fully, no development could be approved for the area.

Fauna

- The area is rich in reptiles, amphibians, bandicoots and bird species.
- The DEP advises that the area would be expected to have a rich fauna as studies in the adjacent Perth Airport bushlands have identified 8 frog species (typical assemblage of the eastern side of the Plain); 87 bird species (7 of which are uncommon on the Plain, only two other areas match the species richness in the Perth Metropolitan Area; in the top 6% for breeding species); 22 reptiles; Echidna (*Tachyglossus aculeatus*) and large populations of Quenda (*Isoodon obesulus*) in similar habitat assemblages.
- The proposal will cause the loss of uncommon and rare fauna. In the absence of detail in the PER, data from the adjacent Perth Airport was used. The avifaunal species richness of Perth Airport is only matched by Whiteman Park and Bold Park in the Metropolitan region. Eighty two species of birds were recorded, including four species of the robin and whistler family, some of which are uncommon. The area ranks in the top six percent of wetlands on the Swan Coastal Plain for breeding species. The endangered Freckled Duck (*Stictonetta naevosa*) has been recorded as breeding at nearby Munday Swamp.
- The Southern Brown Bandicoot, or quenda, has declined over the years and the Cemetery land is a home for these threatened creatures; a native Spotted Cat was killed near the site proposed for expansion, and the EPA should note the importance of finding this species outside the 'hills' area. Mammals recorded in the locality are the Echidna (*Tachyglossus aculeatus*) and a Chuditch (*Dasyurus geoffroii*). Large native animals require a large amount of contiguous bushland.
- The following uncommon species are present in the area: the Turtle Frog (*Myobatrachus gouldii*); Gould's Snake (*Rhinoplocephalus gouldii*); Skink (*Ctenopus impar*); the Crowned Snake (*Notechis coronatus*); Fraser's Legless Lizard (*Delma fraseri*); Black Racehorse Goanna (*Varanus tristis*); Black-naped Snake (*Simoselaps bimaculata*); Quenda (*Isoodon obesulus*); Gould's Monitor and the Black-tailed Monitor. The Black-headed Monitor only occurs in the north-eastern area of M52, in the vicinity of the Cemetery, so most likely occurs in the Cemetery too.

Alternative site/options

- The Cemetery Board should be looking for land which has been cleared, and the Commonwealth and State Governments should provide the Board with some assistance. There is cleared land nearby that the State Government could acquire for the Metropolitan Cemeteries Board. The Golf Course may be open to negotiation. The present Cemetery would be enhanced if the bushland was conserved and cared for.
- The State Government should allocate an appropriate area of cleared land elsewhere in the southeast corridor to meet cemetery needs. A functioning cemetery must eventually reach some spatial limit and even if Guildford Cemetery were to be expanded, there would still come a time when its operations would cease due to a lack of available space and then families with relatives and friends interred at a cemetery cannot be interred at that same place.
- It was stated the MCP needs 100 ha to make a viable cemetery, so it seems that a land grab of 76 ha is proposed. If the cemetery is not of a viable size, it should be closed and maintained as a heritage site in the same way as the East Perth Cemetery.
- An alternative site should be found because the nearby rendering plants (Fertals et al in Hazelmere) lead to unacceptable odours at the Cemetery, which reduces the amenity for visitors.
- There is a well recorded trend away from burial in Australia and worldwide. The proponent's assertion that there is a community mandate to develop cemeteries is entirely misplaced and not based on community aspirations.

- There is no indication that space saving options within the Cemetery have been considered. These would obviate the need for expansion in the short term.

Perth Airport Conservation Zone

- The Perth Airport bushland and wetlands, adjacent to this area, are listed on the Register of the National Estate by the Australian Heritage Commission.
- Development would adversely impact upon the proposed Conservation Zone within the Perth Airport.

Aboriginal people

- Aboriginal people have lived in and adjacent to this area for many years.

Planning related issues

- Burial is now an unacceptable waste of land and a promoter of urban sprawl. The Government is supposedly increasing urban density and improving public transport to make best use of land and protect the environment (including air quality), but unless something is done, we could face a future situation where living residents need to travel an hour or more to work past hectares of cemeteries full of dead bodies. Allocating new land to the dead within 20 km of the CBD makes a mockery of these Government objectives.
- The proposed realignment route for Kalamunda Road is 'round about' and goes against all modern notions of good transport planning. If the realignment is needed (and that's not certain) it could go north and link with the Great Eastern Highway Bypass. If Main Roads WA want to minimise the number of traffic lights they could remove the old Kalamunda Road lights and allow traffic from Kalamunda Road South, Guildford, to use the Old Great Eastern Highway to access the Great Eastern Highway Bypass.
- The proposed realignment of Kalamunda Road must be questioned as to whether it can support the current speed of through traffic, because the shown radius of the bend at the eastern end appears to be too small. Among alternatives are (a) the downgrading of Kalamunda Road so that it becomes just an access road to the Cemetery and transferring its through transport function to the Great Eastern Highway and Roe Highway; (b) cessation of burials on the southern side of Kalamunda Road and acquisition of the West Aviat Golf Course and intervening establishments over time to form a large Cemetery on the northern side of Kalamunda Road and (c) pursuing a different realignment of Kalamunda Road to the north of the Cemetery.
- The realignment lengthens Kalamunda Road considerably, and adds some fairly sharp bends to it. Shorter routes should be considered. Kalamunda Road runs parallel to the Great Eastern Highway Bypass for some distance and it would seem sensible to it to enter the Bypass further eastward instead of disturbing the Cemetery.
- The State Government's Perth Bicycle Network Plan is a major Government initiative aimed at encouraging alternative forms of transport to car use, with attendant benefits of social amenity and air quality. Kalamunda Road provides cyclists from Maida Vale, Forrestfield, High Wycombe and Kalamunda with a direct link to a Principal Shared Path in the rail corridor between Perth and Midland, so any realignment or alteration should be discussed with Bikewest to ensure adequate provision is made for bicycling safety and amenity.

Unacceptable standard of the PER

- With so little detail having been presented, it can only be assumed that the proponent has no real confidence that the projects under review will proceed. It can only be assumed that the EPA's decision to accept the PER had the same rationale. If the developments were to proceed, the form and content of the released PER would become a major issue for conservation groups to pursue.
- The PER fails to meet the EPA's guidelines and is not of an acceptable standard in any respect. It does not address the environmental issues and is grossly inadequate. So little information was provided that

it is difficult for the public to comment. If the area is not reserved in *Perth's Bushplan*, various conservation groups have reserved the right to respond further to the proposal.

- Community groups made up of volunteers should not have to make up for the PER's shortcomings by gathering environmental information that it should have contained.
- The PER lacks description of the existing site and its environmental attributes, detailed description of the projects envisaged, discussion of the likely environmental impacts of the proposals and discussion of how the impact of the proposal will be managed. The EPA's decision to release the document could create a regrettable precedent. Given that the site's bushland is 'regionally significant' and should be protected, the proponent should have been told at an early stage that the project could not be made acceptable.
- There is no vegetation map and no attempt appears to have been made to survey the area for threatened or restricted plants and animal, for birds or for ecological communities. Descriptions of the natural environment are inadequate.
- Overall the PER shows little environmental understanding. The proponent's obvious lack of environmental understanding places serious doubt on the proponent's ability to meet even the most rudimentary environmental commitment.
- If the proponent had followed the DEP guidelines it would have become apparent it was not possible for the proposal to meet the EPA's environmental objectives.