Proposed realignment of West Coast Highway at south City Beach

City of Perth

Report and recommendations
of the Environmental Protection Authority

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Summary and recommendations

The West Coast Highway has a record of accidents in the vicinity of Challenger Parade in South City Beach. The local community has indicated distress at the frequency of accidents, both reported and unreported. To improve safety, the City of Perth and Main Roads have been investigating options for the realignment of the section of West Coast Highway between Rochdale Road and Helston Avenue.

This proposal has the potential to degrade the values recommended for conservation in the System 6 report published by the Authority in 1983, and reaffirmed in the Authority's Report and Recommendations on the proposed Knightsbridge subdivision. The regional values of the Bold Park area have been determined by the Authority as: the size of the M47 area, being comparable to Kings Park, is one of the largest remaining bushland remnants in the urban area of the coastal plain; the natural vegetation of the area is of comparatively high quality and includes areas of species at extremes of their known ecological range; the fauna, as with the vegetation, exhibit considerable diversity with bird species being particularly well represented; recreational use is based on regional rather then just local patrons; and because of the above, and the areas' location in the metropolitan area, its educational value is also rated highly. The proposed realignment of West Coast Highway also has the potential to affect the areas known as the Mount Claremont Bushland, and Swanbourne Beach and Rifle Range, which are also recommended for conservation by the System 6 report. Accordingly, the Environmental Protection Authority required Perth City Council to undertake a Public Environmental Review.

The Perth City Council's plan to manage the impacts arising from the realignment was developed in the Public Environmental Review which was released for public comment for a period of eight weeks ending on May 1, 1992.

Seven options for the realignment were presented in the Public Environmental Review. The impacts upon the System 6 areas recommended for conservation ranged from options with no environmental impact to options with severe environmental impacts. The major environmental issues identified through the environmental impact assessment process include protection of the large, contiguous and regionally important open space which provides habitat for highly diverse bird and reptile groups, impacts upon regionally significant Quindalup Dunes and the associated highly valued vegetation, including what is believed to be the natural geographic limits for peppermint trees (*Agonis flexuosa*) and Wembley wax (*Chamelaucium uncinatum*).

Two hundred and fifty nine (259) individual written public submissions were received by the Authority. Issues raised by the public tended to focus upon questioning the need for the proposed realignment, the analysis of the alternatives (in particular the validity of the matrix method used), protection of the values identified in the System 6 recommendations, and protection of the integrity of Bold Park landforms (especially the Quindalup Dune formation), view-scapes and quietness. Most of the public submissions indicated a preference for one alignment over others.

The Authority assessed the various options, indicating the environmental management required to make realignment environmentally acceptable, no assessment of safety has been made. The Authority considers Option A, as outlined in the Public Environmental Review, is environmentally acceptable since no additional construction activity is required. Furthermore, Options B, C and G can be managed in an environmentally acceptable fashion, provided the proponent agrees to the Authority's recommendations. In this suite of options, the West Coast Highway minimises disturbance of the Quindalup Dunes within Bold Park. Most of the affected Quindalup Dune area has been degraded by previous road works. Areas of highly valued vegetation would not be severely impacted under these realignment options. Similarly, by maintaining the integrity of the large size of Bold Park, the Authority considers that habitats for fauna and the parks' regional values will be maintained. Additionally, the remaining Quindalup Dunes could provide a buffer against visual impacts and noise from the highway.

Recommendation 1

The Environmental Protection Authority has concluded that Options A, B, C and G of the proposal to realign West Coast Highway at City Beach, as modified during the process of interaction between the proponent, the Environmental Protection Authority, the public and the government agencies that were consulted can be made environmentally acceptable.

In reaching its conclusion, the Environmental Protection Authority identified the main environmental factors requiring detailed consideration as:

- **implications for System 6 Recommendations M46 and M47;**
- **conservation of the regionally significant, and diverse flora and fauna associated with the Bold Park;**
- **protection of landscape values of Bold Park;**
- **management of Options B, C, or G to minimise disturbance of vegetation, including dieback protection procedures and impacts upon landform and visual amenity; and**
- **rehabilitation of the current alignment of West Coast Highway and lands alienated by the realignment.**

The Environmental Protection Authority considers that in respect of Options A, B, C and G, these environmental factors have been adequately addressed either by environmental management commitments given by the proponent or by the Environmental Protection Authority's recommendations in this report.

Accordingly, the Environmental Protection Authority recommends that realignment Options A, B, C, or G could proceed subject to the Environmental Protection Authority's recommendations in this assessment report and the proponent's commitments given in the Public Environmental Review (Appendix 4), which are not inconsistent with the Environmental Protection Authority's recommendations in this assessment report.

The Authority considers that options D, E and F for the realignment of West Coast Highway would impact severely upon the highly valued vegetation associated with the Quindalup Dunes and upon the fauna and human use values of Bold Park. Options D and F would destroy the dunes and the associated high quality vegetation, including some significant species. Option E will fragment Bold Park causing unacceptable threats to the maintenance of the rich and diverse reptile and bird fauna of Bold Park, and intrude upon the quietness and views of the bushland. The Authority considers these impacts to be environmentally unacceptable and avoidable.

Recommendation 2

The Environmental Protection Authority has concluded that Options D, E and F of the proposal to realign West Coast Highway at City Beach, cannot be made environmentally acceptable due to the nature and severity of impacts upon regional park values, and the highly valued flora, fauna and human use values of the area and recommends that these alignments should be refused.

Alignments which could be made environmentally acceptable, but which cut into the high dunes beside the City of Perth boundary in the Rifle Range area will result in a large scar to be visible from a number of points as part of the western view-scapes from Bold Park. It is important that visual impacts are considered in the planning and construction of the Highway alignment. Finalisation of construction details may mean alignments will be slightly modified.

In addition, the proponent has indicated commitment to develop environmental management and rehabilitation requirements in the Public Environmental Review document. Plans to meet these commitments should be prepared prior to the commencement of construction activities.

Recommendation 3

The Environmental Protection Authority recommends that the proponent should undertake the following:

3.1 Prior to the commencement of any site works for Option G, the proponent should conduct a study of the impacts upon landform and view-scape and implement the management requirements to minimise these impacts to meet the requirements of the Environmental Protection Authority.

3.2 Prior to the commencement of any site works for Options B, C, or G, the proponent should prepare a construction plan for the chosen realignment option, a rehabilitation plan for the site works and the current alignment, and dieback and fire management plans as indicated in the Public Environmental Review document.

3.3 The construction, rehabilitation and management plans developed by the City of Perth should meet the requirements of the Environmental Protection Authority on the advice of Department of Planning and Urban Development and Main Roads.

1. Introduction

The City of Perth has been investigating a number of options to improve the safety of West Coast Highway between Rochdale Road and Helston Avenue through City Beach. Surrounding this portion of West Coast Highway are two areas recommended for conservation by the Environmental Protection Authority in the System 6 report (Department of Conservation and Environment, 1983); Swanbourne Beach and Rifle Range (recommendation M46), and Bold Park (M47) [see Figure 1]. Bold Park as referred to in this report, is consistent with the area described under recommendation M47 of the System 6 report. Mount Claremont Bushland refers to the area of M46 east of the current alignment of West Coast Highway and bounded by Rochdale Road in the north and east.

The Perth City Council referred the proposal, to improve the safety of West Coast Highway, to the Environmental Protection Authority in May of 1990. The Authority decided to formally assess the proposal at the level of a Public Environmental Review. This decision was based upon the potential for most of the realignment options to impact upon the values identified in recommendations M46 and M47 of the System 6 report. The Authority issued guidelines in September of 1990 to assist the proponent in the preparation of the relevant documentation. The Public Environmental Review document was released for an eight week public review period which closed on 1 May 1992.

In assessing this proposal the Environmental Protection Authority will give advice on environmental issues alone. Determination of the appropriateness of any given option in regard to safety must be made by the Perth City Council, in consultation with Main Roads.

2. Background to the assessment

Over the period 1 January 1985 to 15 November 1990, 57 accidents have been reported on the section of West Coast Highway between Rochdale Road and Helston Avenue, City Beach (Dames and Moore, 1992). Two accidents over this period have been fatal. Most accidents have involved a single vehicle. Main Roads indicate that the design standard for this portion of the West Coast Highway, which includes an 'S' bend, is below that of the remainder of the Highway.

The Metropolitan Region Scheme includes a road reserve through the Bold Park area for the proposed Western Suburbs Highway. The Road Reserves Review Committee's Final Report in 1988 recommended that the road reserves for the proposed Western Suburbs Route which cross through Bold Park (M47) between Rochdale Road and Oceanic Drive, should be deleted from the Metropolitan Region Scheme. An alternative route was proposed, utilising existing sections of West Coast Highway, though recognising that minor realignments would be necessary.

Therefore, the proponent seeks to implement a route which satisfies the current requirements for safety improvements, as well as meeting the future needs for an alternative to the Western Suburbs Route.

The Environmental Protection Authority has previously expressed a preference for the management of the M46 and M47 areas to be undertaken with a regional perspective (EPA, 1988). Whilst the Environmental Protection Authority has agreed to assess this current proposal as an individual project, a commitment has been secured from the City of Perth to undertake another Public Environmental Review aimed at preparing a land use and management structure plan for the portions of M46 and M47 which lie within the City of Perth. The City of Perth is currently preparing a second stage Public Environmental Review to meet this commitment.

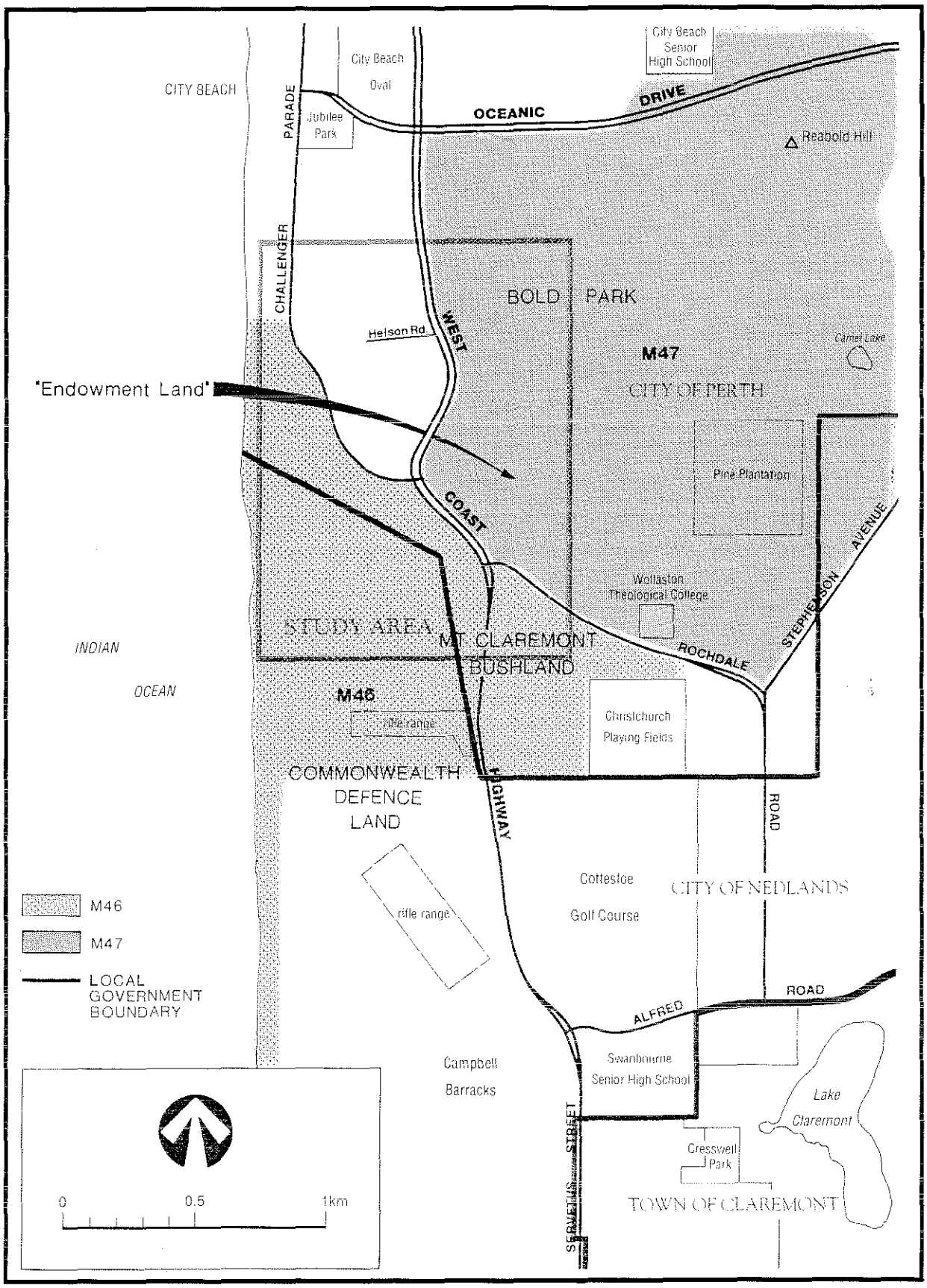

Figure 1: The project area and areas recommended for reservation by recommendations M46 and M47 of the System 6 report .

3. The proposal

The Public Environmental Review document detailed seven options for the realignment of West Coast Highway. The City of Perth and Main Roads had prepared four of these new alignments (Options D, E, F and G). The Friends of Bold Park commissioned Sinclair-Knight and Partners to prepare a fifth alternative (Option C). A further two options, which involved minimal realignment, were also considered (Option A and B). Figures 2 and 3 show each alignment, the conservation reserves recommended in the System 6 report and the relationship to the Quindalup Dune system remaining within the Bold Park area.

4. Review of public submissions

Comments were sought on the proposal from the public, community groups and Local and State Government authorities. The Public Environmental Review document prepared for the proposal was available for an eight week submission period ending on 1 May 1992.

Two hundred and fifty nine (259) individual written submissions were received, within the following categories:

- 246 submissions from the general public
- 11 submissions from groups and organisations
- 2 submissions from Local or State Government authorities.

A further 74 form submissions of two types, and a petition with 32 signatures were received.

There were several very substantial submissions from the public. The large response by the community and the considerable detail provided, especially on the analysis of alternatives and support for the System 6 recommendations were appreciated by the Environmental Protection Authority. The principle issues raised in public submissions are as follows:

- alternatives to realignment would be sufficient;
- defects in the matrix method used in the determination of the preferred option;
- conflicting opinions of the appropriateness and application of road design standards;
- regional significance of the Quindalup Dune landform and vegetation association;
- regional significance of peppermints (*Agonis flexuosa*) and Wembley wax (*Chamelaucium uncinatum*;
- protection of the vertebrate ground fauna;
- protection of regional park values of Bold Park;
- noise pollution and impacts upon the bushland view-scape of Bold Park; and
- impacts arising from construction activities. Particularly the potential for introduction of dieback disease and the additional destruction of vegetation arising from movement of machinery and stockpiling of brush and topsoil.

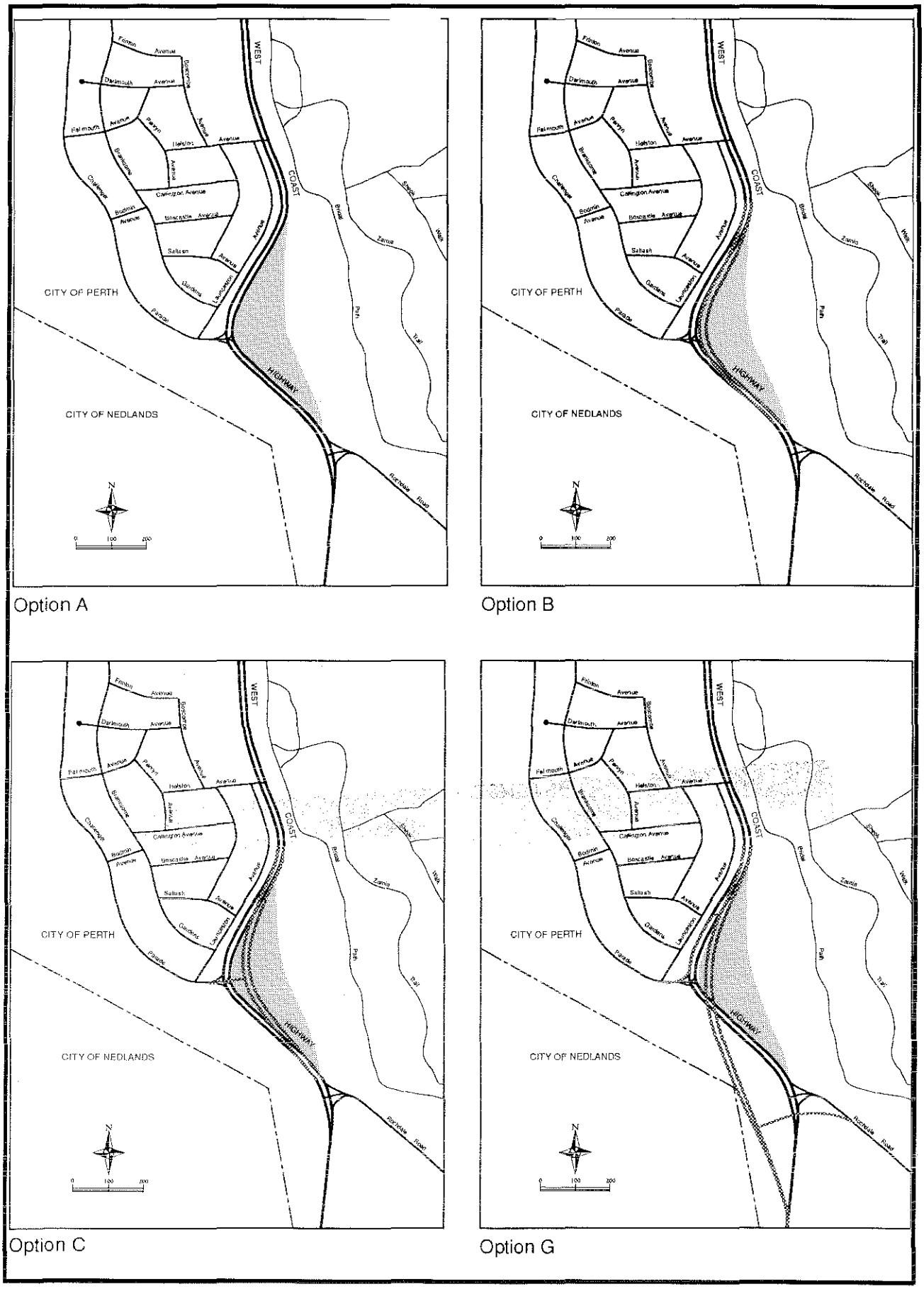

Figure 2: Proposed realignment options A, B, C and G.

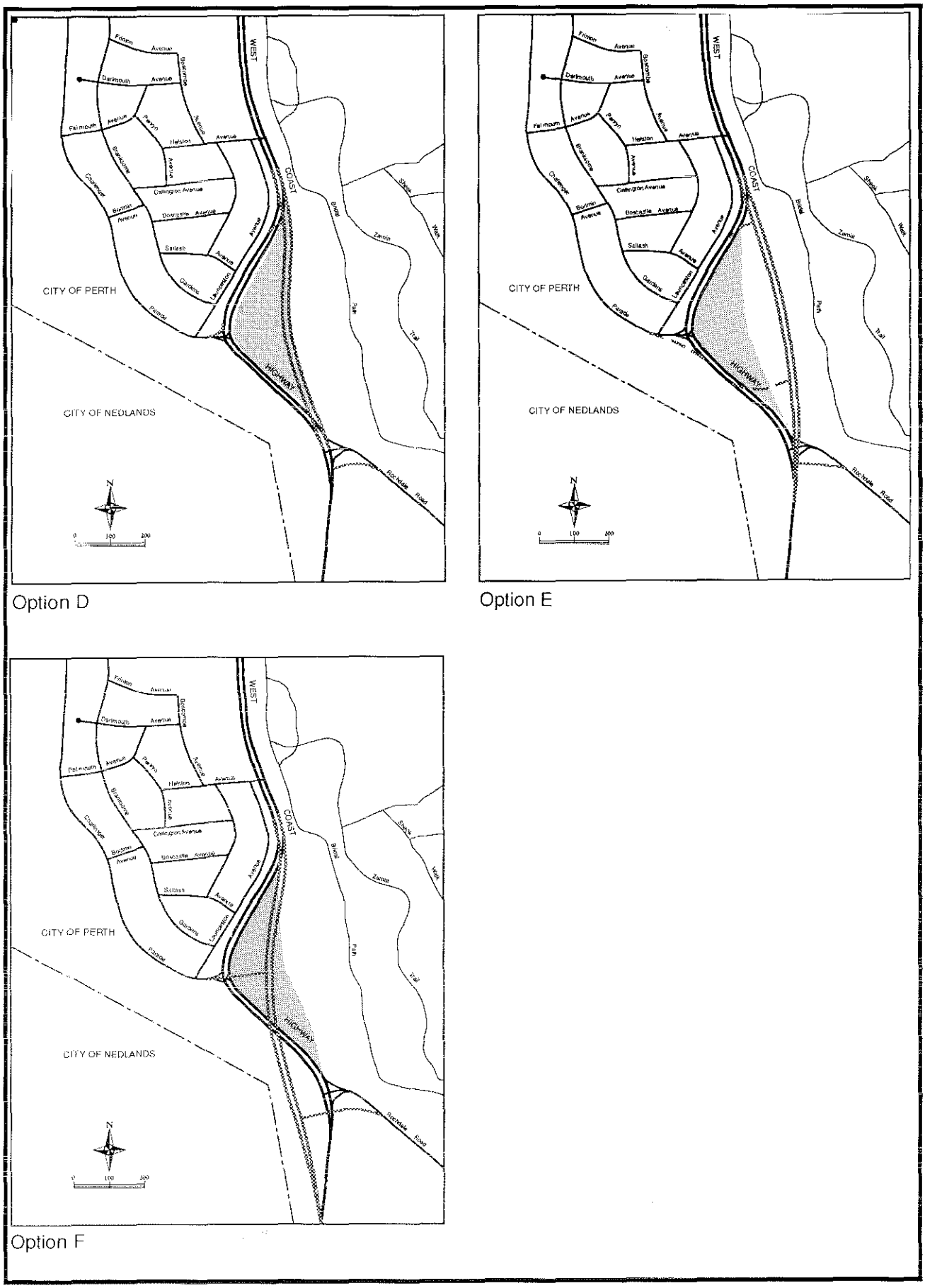

Figure 3: Proposed realignment options D, F and E.

The general issue raised most frequently, was the preservation of the integrity of Bold Park (System 6 recommendation M47). Many submissions expressed a strong preference for traffic calming to improve safety of this section of West Coast Highway.

Most submitters took the opportunity to indicate a preference for a particular alignment option. The following table describes the preferences stated within the public submissions.

Preferred Realignment Option*	Written Public Submission	Gov't Authority	Community Group	Form and Petition
A	39			
B	71		2	
Other preference, but will accept C	50		1	
C	83		4	74
D	20		2	1 petition of 32 signatures
E	2	1		
F				
G	1			
No preference indicated	9	1	2	

* Some submissions indicated a preference for a particular option, but also stated that Option C would be preferable to Option D if realignment had to occur. Such submissions have been double counted.

The Environmental Protection Authority's summary of the issues raised in public submissions were referred to the City of Perth for response (Appendix 1). The City of Perth has provided a response to these issues, which is included in this assessment report at Appendix 2. The Authority has given consideration to the submissions received, during the assessment process and in the preparation of this report.

5. Evaluation of alternatives

The Environmental Protection Authority has evaluated the impacts and the potential for environmental management measures to make each option environmentally acceptable. The Authority has not considered the relative road safety merits of these options. Evaluation of road safety remains the responsibility of the City of Perth, with advice from Main Roads and the Department of Planning and Urban Development.

5.1 Key issues

5.1.1 System 6 recommendations

The System 6 report highlighted the regionally significant values of the Swanbourne Beach and Rifle Range (recommendation M46), and Bold Park (M47) areas. The values of the Bold Park area were reaffirmed in the Authority's Report and Recommendations on the proposed Knightsbridge subdivision (EPA, 1988). These regional values of the Bold Park area have been determined by the Authority as: the size of the M47 area, being comparable to Kings Park, is one of the largest remaining bushland remnants in the urban area of the coastal plain; the natural vegetation of the area is of comparatively high quality and includes areas of species

at extremes of their known ecological range; the fauna, as with the vegetation, exhibit considerable diversity with bird species being particularly well represented; recreational use is based on regional rather then just local patrons; and because of the above, and the areas' location in the metropolitan area, its educational value is also rated highly. These areas represent open space of regional importance to the Perth metropolitan area because of their high conservation, recreation and education values. Moreover, there are few substantial areas of urban bushland remaining so close to Perth residential areas. The System 6 report recommends these areas be planned and managed as 'Regional Parks'.

5.1.2 Biological and physical features

In general, Bold Park has similar vegetation and floristics to Kings Park. However, Bold Park also contains vegetation associated with a freshwater wetland and wattle (*Acacia*) shrublands and limestone heaths (Keighery, Harvey and Keighery, 1990). In addition, the bird fauna is both rich and diverse, and the reptile fauna of Bold Park is far more diverse than that of Kings Park.

Because of its relatively large area, Bold Park provides essential habitats for resident and migratory bird species and a rich mixture of reptiles (How and Dell, 1990). During a survey of Bold Park by the Western Australian Museum, between 1986 and 1989, How and Dell (1990) recorded sixty one species of birds, 3 species of frogs and 29 species of reptiles. Bold Park and Mount Claremont Bushland contains several species of birds that are now threatened with local extinction (How and Dell, 1990). Together these areas also provide a corridor which links the coastal dune system with Bold Park and may be important for migration of some bird species (Wykes, 1990). The richness and diversity of the reptile fauna of Bold Park is the highest recorded for urban bushland in the Perth metropolitan area (How and Dell, 1990).

Sixteen significant species of flora have been identified in the Bold Park (M47) and Mount Claremont Bushland (M46) areas (Dames and Moore, 1992). Five of the significant species have been found in the project area, and nine of the others, or habitats for them, may occur (Dames and Moore, 1992).

Whilst the project area is relatively similar to other portions of the recommended reserves (M46 and M47), a number of significant differences do exist. The project area encompasses what is believed to be the natural northern geographic limit of peppermints (*Agonis flexuosa*) and the southern geographic limit of Wembley wax (*Chamelaucium uncinatum*). These two species are rare within Bold Park outside of the defined project area. Similarly, the wattle (*Acacia rostellifera*) shrubland of the project area is the largest within Bold Park. Other significant species of the project area affected by realignment include the pea *Jacksonia sericea* , and *Eucalyptus 'petrensis'*.

In addition, the Sheoak, *Allocasuarina lehmanniana*, (at or near the southern limit of its distribution) and the Rottnest Island Pine, *Callitris preissii*, (rare in the metropolitan area), are located within the stable dunes of the Mount Claremont Bushland, which may be affected by realignment of the Rochdale Road intersection. These species have not been found within Bold Park.

Quindalup Dunes also occur in the project area. The Quindalup Dunes are the most recently formed of the Swan Coastal Plain dune systems. Much of this dune system is under pressure for development of coastal housing. A diverse array of vegetation formations are associated with varied geomorphology and geological features within the Quindalup Dunes (Semenuik, Cresswell and Wurm, 1989). The Quindalup Dune system is poorly represented in conservation reserves. The nearest secured 'regional' reserves incorporating Quindalup Dunes are at Nambung National Park near Cervantes and Yalgorup National Park south of Mandurah.

5.1.3 Landscape values and noise

The Public Environmental Review document provides a limited description of the landscape values of the proposed reserve areas. A number of the alignments would appear to have significant impacts upon landscape values. The topography of the south-western corner of

Bold Park, Mount Claremont Bushland and the Rifle Range include high dunes. At present the Quindalup Dunes in the south western corner of Bold Park provides a buffer which dampens road noise and excludes views of the highway from the users of Bold Park. Destruction of the Quindalup Dunes in Bold Park, or alignment of the highway east of this dune, will impact upon the view-scapes from Bold Park and will increase noise within the park. Alignments which cut into the high dunes beside the City of Perth boundary in the Rifle Range area will result in a large scar which would be visible from a number of points as part of the western view-scapes from Bold Park.

5.2 Evaluation of alignment options

5.2.1 Option A

Option A retains the current alignment, but improves signs indicating the hazardous section of road. No additional environmental impacts are anticipated to arise from this option. The Authority considers this option to be environmentally acceptable.

5.2.2 Options B, C and G

In this suite of options, the alignment of West Coast Highway would be moved only slightly onto the western edge of the Quindalup Dunes within Bold Park (Figure 2). Most of the affected Quindalup Dunes area has been degraded by previous road works. In addition, the Highway will remain outside of the bushland view-scape from Bold Park. Noise impacts to Bold Park should not increase markedly because of buffering from dunes east of the alignment. Additional road works are required to realign Rochdale Road through the Mount Claremont Bush portion of M46. However, the affected area is largely degraded at present.

Option B would require minor encroachment upon the Quindalup Dunes in Bold Park necessitating the removal of 1.2 hectares of vegetation. However, a large portion of the affected area is already degraded. To improve safety, construction of an earth bund (14 m base 2 m height) has been proposed which will provide a barrier between West Coast Highway and the South City Beach residential zone. An earth bund would have an adverse visual impact for nearby residents and road users. However, management initiatives such as rehabilitation of the current alignment and landscaping of the earth bund, could make this alternative environmentally acceptable.

Option C was commissioned by the Friends of Bold Park and prepared by Sinclair-Knight and Partners. The alignment is designed to meet the National Association of Australian State Road Authorities' guidelines for a design speed of 90 km/hr. Whilst this option requires the removal of 2.8 hectares of vegetation from the Quindalup Dunes of Bold Park, much of the high value vegetation is retained. The alienation of 4 hectares of land from the proposed Bold Park reserve would also be required; much of the affected 4 hectares has been degraded by previous road works. Rehabilitation of existing road alignments could reduce impacts upon the environmental values of the area. Configuration of the access roads should ensure that all vegetated areas are rehabilitated to link into the two reserve systems.

Option G aligns West Coast Highway beside the City of Perth boundary within the Rifle Range area (M46) and then through the degraded western portion of the Quindalup Dunes in Bold Park (M47) (Figure 2). This alignment meets the requirements of Main Roads (see Appendix 3). Almost 6.4 hectares of vegetation will be removed but, vegetation losses would be restricted to areas of M46 which are already degraded, or have lower regional value than areas within M47. A large scar would be created by earthworks required to re-contour two 42 metre dunes in the Rifle Range area along-side the City of Perth boundary. Stone pitching could be used to stabilise the affected dune area, pockets of vegetation could be used to reduce the visual impact.

The Authority considers that the impacts from alignment options B, C and G, upon the values recommended for conservation by recommendations M46 and M47 in the System 6 report, are potentially manageable and these alignments can be made environmentally acceptable.

5.2.3 Options D, E and F

These options for the realignment of West Coast Highway would impact far more severely upon the highly valued vegetation associated with the Quindalup Dunes in the M47 recommended reserve (Figure 3) and upon the fauna and human use values of Bold Park.

Options D and F would result in destruction of a large portion of the Quindalup Dunes and associated high quality vegetation. Destruction of the Quindalup Dunes, which includes some significant species (including peppermint, Wembley wax and the large community of wattle *Acacia rostellifera*) is considered to be environmentally unacceptable and avoidable within the context of alternative options which are acceptable to Main Roads. Impacts upon vegetation caused by cutting off a large portion of Bold Park, as required by Option E, could be reduced through linking the severed portion with the Swanbourne Beach and Rifle Range areas, creating a reserve which also provides continuous public access from Perry Lakes to the coast. However, extensive rehabilitation, ongoing monitoring and management would be required to link these two areas. Unfortunately, as previous road works have led to deterioration of the vegetation next to the Highway and feeder roads, substantial effort would be required to rehabilitate the vegetation associations. Additionally, weed removal and summer irrigation would be an ongoing requirement to ensure that rehabilitation efforts were successful.

Option E would severely impact upon the value of Bold Park as a large reserve, causing unacceptable threats to the maintenance of the rich and diverse reptile and bird fauna of Bold Park, and intrude upon the quietness and views of the bushland. Whilst rehabilitation has the potential to restore vegetation, realignment as indicated in Option E would cause severe disturbance to fauna which is reliant upon the substantial area of continuous bushland to maintain sustainable populations. Breaks in habitat such as roads, constitute barriers to the distribution and movement of fauna (Barnett, How and Humphreys, 1978). The high volume of traffic carried by West Coast Highway will restrict fauna movement between the reserves. Even an underpass would constitute a physical difference in the landform leading to the formation of an identifiable social boundary and restrict movement of native fauna. The Environmental Protection Authority considers it unlikely that rehabilitation could redress the significant impacts to the highly valued fauna of Bold Park, caused by severing land from the ecological refuge of the park.

Locating the Highway through the Quindalup Dunes in Bold Park, as in Options D and F, or further east, as required for Option E, would severely impact upon the landforms, views, quietness and seclusion of Bold Park. It is apparent from the Public Environmental Review document and submissions that the public consider Bold Park to be the entire area recommended for reservation by recommendation M47 of the System 6 report. Whilst it may be possible to link the alienated portions of Bold Park with the Swanbourne Beach and Rifle Range (using an underpass), there would be substantial and unacceptable impacts, upon the human use values identified above, which could not be adequately managed.

The Environmental Protection Authority considers that Options D, E and F would have significant impacts upon the regional park values, and the highly valued flora, fauna and human use values of this area. No strategies have been developed during the environmental impact assessment process which will adequately manage these impacts. In addition, alternative alignment options acceptable to Main Roads (Appendix 3) avoid these severe impacts.

6. Conclusions and recommendations

The Environmental Protection Authority has considered the alternative alignments presented by the proponent's in the Public Environmental Review document, submissions from the public and the proponents response to these issues. The Authority will not make any

recommendations in regard to issues of safety. Such decisions are the responsibility of the Perth City Council, with advice from Main Roads. Therefore, the Authority restricts its advice to purely environmental issues.

Alignment options D, E and F will result in unacceptable environmental impacts which are unlikely to be overcome through management. The Authority considers that Option A is environmentally acceptable, and that with the appropriate environmental management, alignment options B, C and G, can also be made environmentally acceptable.

Recommendation 1

The Environmental Protection Authority has concluded that Options A, B, C and G of the proposal to realign West Coast Highway at City Beach, as modified during the process of interaction between the proponent, the Environmental Protection Authority, the public and the government agencies that were consulted can be made environmentally acceptable.

In reaching its conclusion, the Environmental Protection Authority identified the main environmental factors requiring detailed consideration as:

- **implications for System 6 Recommendations M46 and M47;**
- **conservation of the regionally significant, and diverse flora and fauna associated with the Bold Park;**
- **protection of landscape values of Bold Park;**
- **management of Options B, C, or G to minimise disturbance of vegetation, including dieback protection procedures and impacts upon landform and visual amenity; and**
- **rehabilitation of the current alignment of West Coast Highway and lands alienated by the realignment.**

The Environmental Protection Authority considers that in respect of Options A, B, C and G, these environmental factors have been adequately addressed either by environmental management commitments given by the proponent or by the Environmental Protection Authority's recommendations in this report.

Accordingly, the Environmental Protection Authority recommends that realignment Options A, B, C, or G could proceed subject to the Environmental Protection Authority's recommendations in this assessment report and the proponent's commitments given in the Public Environmental Review (Appendix 4), which are not inconsistent with the Environmental Protection Authority's recommendations in this assessment report.

Recommendation 2

The Environmental Protection Authority has concluded that Options D, E and F of the proposal to realign West Coast Highway at City Beach, cannot be made environmentally acceptable due to the nature and severity of impacts upon regional park values, and the highly valued flora, fauna and human use values of the area and recommends that these alignments should be refused.

6.1 Management of construction activities

Alignments which cut into the high dunes beside the City of Perth boundary in the Rifle Range area will result in a large scar to be visible from a number of points as part of the western view-scapes from Bold Park. The Public Environmental Review has not provided sufficient assessment of the potential for visual impact or management of these impacts upon the views

from Bold Park. It is important that visual impacts are considered in the planning and construction of the Highway alignment.

In the Public Environmental Review document the proponent has indicated a commitment to develop environmental management and rehabilitation requirements (see Appendix 4). Plans to meet these commitments should be prepared prior to the commencement of construction activities.

Recommendation 3

The Environmental Protection Authority recommends that the proponent should undertake the following:

3.1 Prior to the commencement of any site works for Option G, the proponent should conduct a study of the impacts upon landform and view-scape and implement the management requirements to minimise these impacts to meet the requirements of the Environmental Protection Authority.

3.2 Prior to the commencement of any site works for Options B, C, or G, the proponent should prepare a construction plan for the chosen realignment option, a rehabilitation plan for the site works and the current alignment, and dieback and fire management plans as indicated in the Public Environmental Review document.

3.3 The construction, rehabilitation and management plans developed by the City of Perth should meet the requirements of the Environmental Protection Authority on the advice of Department of Planning and Urban Development and Main Roads.

The Authority's experience is that it is common for details of a proposal to alter through the detailed design and construction phase. In many cases alterations are not environmentally significant or have a positive effect on the environmental performance of the project. The Authority believes that such non-substantial changes, and especially those which improve environmental performance and protection, should be provided for.

The Authority believes that any approval for the proposal based on this assessment should be limited to five years. Accordingly, if the proposal has not been substantially commenced within five years of the date of this report, then such approval should lapse. After that time, further consideration of the proposal should occur only following a new referral to the Authority.

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Appendix 1

Summary of submissions

Proposed Realignment of the West Coast Highway, City Beach, City of Perth (Assessment Number 407); Public Environmental Review.

1 Need for Realignment.

1.1 The need for the realignment of West Coast Highway has not been demonstrated on the basis of safety concerns. This section of road is 911th on the list of accident bad spots for Western Australia's roads. Whilst it is clear that there are concerns in regard to public safety, and that action must be taken by Main Roads and the Perth City Council to improve the problem of recurring accidents, re-alignment of the road is not necessary.

1.2 Traffic calming is all that is required to reduce the accident rate and improve the safety of the curve. Examples such as installing safety barriers, reduced speed limits, greater Policing of speed, use of the multi-nova camera, speed sensitive electronic warning signs, changing the 'road curve' signs to 'S-bend' and 'hazard' warning signs, altered road surface texture, speed humps, closing the southern entry to Challenger Pde and installing traffic control lights at Rochdale Road should be trialed prior to excising portions of Bold Park.

1.3 The current 80 km hr^{-1} speed limit in the 1.6 km section between Alfred and Rochdale Roads encourages drivers to go faster when confronted by the divided road section after Rochdale Road; regardless of the lower speed limit (70 km hr^{-1}) and the road curve sign. Accidents in the northbound lane would be reduced if the allowable speed was reduced to 70 km hr^{-1} between Alfred and Rochdale Roads.

1.4 Since minor modifications were made to the Challenger Parade junction in the latter part of 1989 the accident rate has fallen by approximately 30 %. What are the accident statistics since modifications were made to the signposting? What effect have these alterations had on the accident rate over the longer term to May 1992? Have the large increase in accidents since July 1986 occurred in the northbound lane?

2 Evaluation of Alternatives

2.1 Inclusion of economic and cost criteria are irrelevant in the context of environmental impact assessment. These issues should be given due consideration elsewhere in the decision-making process.

2.2 The reduction in noise to nearby residents is not an issue as these houses were built after the road was established This factor cannot be invoked as a criteria for assessing the environmental impacts of this proposal.

2.3 The textual descriptions of the impacts of the alternatives do not bear any relationship to the data provided in Table D1.

2.4 Methodological Inconsistencies Related to the Matrix Analysis of Alternative Options.

2.4.1 The assumption that safety, environmental and social concerns are given equal weighting in the comparison of options (Table D1) is clearly false. A sensitivity analysis indicates that a change of 1 point in the raw score for safety will yield a change of 0.20 in the final normalised score. In comparison a 1 point change in the raw score in either of the other categories will result in only a 0.02 change in the final normalised score where the assigned weight has the highest value of 3, and correspondingly less for lower weights. The minimum meaningful difference in the final normalised score is equal to the maximum sensitivity value brought about by a change of 1 point in the assigned scores. For example option D has a difference in the normalised score of less than one-third of the maximum sensitivity value. Therefore,

using the analysis in Table D1 to chose the 'preferred' option is invalid. Furthermore, there is only a 6.2 % difference between the highest and lowest of the final normalised scores for Options A, B, C and D. Such a small difference is meaningless.

2.4.2 The issues of Safety, Pollution and Conservation have been double counted by their inclusion in both the Social Category as well as the Environmental and Safety Categories.

2.4.3 There appears to be a discrepancy between attitudes defined by written responses to the public consultation programme and the scores assigned to safety in the Community Attitudes section. It can be shown that only 8 % of written responses are indicating a desire for realignment of this section of road (Table 4): The responses of 'Accidents Occur at Bend' (6), 'Bad Engineering Cause of Accidents' (3), 'Intersections are a Problem' (3) and 'Realignment Must be Undertaken' (3) can be interpreted as community desire for realignment of the road. This cohort of 15 cases is only 8 % of the total 196 responses recorded.

2.4.4 How were scores for the Safety category assigned when there is no apparent or referred analysis by a road design engineer? An increase in radius from 290 metres (Option C) to 400 metres (Option D) results in an increase of the curve speed value of only 5 km hr^{-1} from 90 to 95 km hr^{-1}. Therefore, the difference in the weighted values assigned to these options in the Safety category is unjustified.

2.4.5 The responses detailed in Table 4 indicate that the community preference is for traffic management and other alternatives to realignment of the road. The major topics which have drawn response through the Public Consultation Programme are in relation to the impacts upon the Bold Park environment (Table 4).

2.4.6 It is ecologically unsound to split the vertebrates into three groups in the analysis whilst lumping the invertebrates in a single group. Similarly, it is incongruous that scores in the 'Implications for System 6' category showed no direct relationship to the amount of area to be annexed by the various Options.

2.4.7 Since, plant associations are usually taken as the ecological proxy of habitat types, it is illogical that they should receive different scores and weightings.

2.5 Road Design Standards

2.5.1 The explanation provided by Main Roads for a 400 m minimum radius for this type of road (Appendix E) is insufficient. The relationship between standards and guidelines is outlined in the Austroads (formerly NAASRA) 'Guide Policy for Geometric Design of Major Urban Roads'. The main thrust of this is to justify situations where lower design standards than those given in the Guide Policy may be adopted. The MRD letter (Appendix E) does not provide any evidence to suggest that the minimum design standard proposed (400 m minimum curve radius) is justified in lieu of the 'desirable standard' (280 m minimum curve radius) shown in Table 4 of the Austroads Guide Policy for the desirable design speed of 80 km hr^{-1}.

2.5.2 For the recent connection of Servetus Street to West Coast Highway, the minimum radius used on three curves is 290 metres (design speed 90 km hr^{-1}). This design standard is applied immediately South of the current project area. Furthermore, a 290 m curve radius is used on the through carriage-way of the Mitchell Freeway north of the Narrows Bridge, where the design speed is 80 km hr^{-1}. Why is this standard insufficient for the project area, where the speed limit is 70 km hr^{-1}?

2.5.3 There is no written report from road design engineers giving justification for the realignment. Furthermore, the consultants do not appear to have liaised with Main

Roads' Urban Road Design Section. It is inappropriate that the MRD's Traffic Management Branch is providing advice in regard to the 'design standards'.

2.5.4 What mechanisms were used to establish the 'safety standards which are required by the Community' which are referred to, but not detailed in the letter from Main Roads?

2.5.5 The 'proposed option' does not meet the MRD standard for a 400 m minimum curve radius on the curve through the intersection with Rochdale Road intersection at the southern end of the proposed project. Furthermore, the proposed option has not been stated as the 'preferred option' of either Main Roads or the Perth City Council.

3 Ecosystem Concerns

3.1 The Regional significance of the Quindalup Dune system and its associated vegetation has been overlooked. The only other Metropolitan example of this vegetation association and landform are to be found at Woodman Point. The project area for Option D will have extreme impacts upon this regionally significant ecosystem. It is therefore important that this issue is properly addressed in this Public Environmental Review.

3.2 Whilst the significance of *Agonis flexuosa, Chamelaucium uncinatum* and *Acacia rostellifera* have been enunciated in the local context of Bold Park (*i.e.* they are rare elsewhere other than the project area), their significance is under-stated in overall terms. *C. uncinatum* is at the southern most extent of its range, has a unique form (commonly referred to as Wembley wax) and is not well represented naturally elsewhere in the Metropolitan Region. The project area is also at or near the northern limit for *A. flexuosa*. The Regional significance of these flora has not been clarified in the Public Environmental Review. Option D has a much greater impact upon these species than option C which is also designed to meet the safety standards of the Austroads 'Guide Policy for Geometric Design of Major Urban Roads'.

3.3 The project area has the richest ground vertebrate community within M47. In addition, page 27 of the PER states that "(t)he richness and diversity of the herpatofauna of Bold Park is the highest recorded for urban bushland in the Perth metropolitan area". Therefore, the project area also has regional significance for the ground vertebrate fauna. Alternative alignments of the road (such as Option C) will not impact so severely upon these valued ecosystem components.

3.4 The effect of the proposed underpass upon the ecology of Bold Park is not given any consideration. An underpass will provide domestic and feral animals access to the Bold Park. The busy roads which enclose the Park have previously formed a barrier to such movement.

4. Socio-Cultural Environment

4.1 Since Option D will cut through a 30 m dune, the road noise will be significantly greater within the Park than with Option C; where the road passes to the West of the 30 m dune, buffering Bold Park from traffic noise and also enclosing the views within the Park. The impacts upon landscape amenity and recreation values do not appear to have considered this major difference. The fact that the realigned road will be less visible to some residents may be a fortuitous by-product, but it is not the expressed reason for the realignment and in a community sense, is not as important as the increased impacts upon Bold Park.

4.2 No contour information has been provided for the entire project area. However, it is suggested that the realignment of Rochdale Road will pass through a dune approximately 30 m high in the M46 area which is equal to the height of the Quindalup

dune in the M47 area to the south. There has not been an adequate assessment of the visual impacts arising from this proposal.

4.3 The PER has not considered the significance of System 6 areas M46 and M47 as a Regional Park. User surveys have indicated that visitors/users of the area are drawn from across the metropolitan area.

5. Appearance, Landscaping and Rehabilitation Works.

5.1 On page 14 of the PER the issue of whether or not to reduce the width of the embankment using stone pitching is raised. It would be preferable to use stone pitching to minimise the width of the batters rather than destroy important sensitive vegetation. In addition, it is possible to create vegetation pockets within the stone pitching.

5.2 Vegetation clearance should be minimised during the construction phase. Access tracks should be located within the road reserve or outside the project area. Clearing limits should be marked out by the Perth City Council once the accurate road designs have been completed.

Appendix 2

Proponent's response to submissions

REPLY TO SUBMISSIONS
PROPOSED REALIGNMENT OF WEST COAST HIGHWAY, CITY BEACH, CITY OF PERTH
EPA ASSESSMENT NUMBER 407

The following reply to submissions is the combined City of Perth, Main Roads Department and Dames & Moore response to the summary comments provided by the Environmental Protection Authority (EPA). The EPA comment number and question is stated, followed by the reply.

1. NEED FOR REALIGNMENT

1.1 The need for the realignment of West Coast Highway has not been demonstrated on the basis of safety concerns. This section of road is 911th on the list of accident bad spots for Western Australia's roads. Whilst it is clear that there are concerns in regard to public safety, and that action must be taken by the Main Roads Department and the Perth City Council to improve the problem of recurring accidents, realignment of the road is not necessary.

Reply - Main Roads Department

The intersection ranking alone does not give a true indication of the actual accidents on this section of West Coast Highway. The accidents on the section of carriageway 200 metres north and south of Challenger Parade are not included in the overall accident listings (only the intersection itself is ranked).

For example the 200 metre section of West Coast Highway north and south of Challenger Parade in the period January 1985 to December 1991 recorded the following accidents:

- 2 fatal
- 14 injury
- 22 major property damage
- 8 various others.

Included in this total were 27 accidents (59%) involving a single vehicle leaving the roadway and hitting roadside objects. These accidents involve driver difficulties to recognise and negotiate the existing bend.

Main Roads would strongly argue that the realignment is necessary to address the continuing accident trend.

1.2 Traffic calming is all that is required to reduce the accident rate and improve the safety of the curve. Examples such as installing safety barriers, reduced speed limits, greater policing of speed, use of the Multi-nova camera, speed sensitive electronic warning signs, changing the "road curve" signs to "S-bend" and "hazard" warning signs, altered road surface texture, speed humps, closing the southern entry to Challenger Parade and installing traffic control lights at Rochdale Road should be trialled prior to excising portions of Bold Park.

Reply - Main Roads Department

Traffic calming treatment such as speed humps and slow points are particularly suited to residential streets, but are inappropriate to primary roads like West Coast Highway.

Experience has shown that posting lower speed limits, road surface texture, static or electronic hazard warning signs will not result in a significant lower operating speed given the existing road environment.

Traffic signals at Rochdale Road cannot be justified, as the prime function of signals is to allocate the right of way. In fact some signal installations result in an increase of accidents.

The Police do not have the resources to provide a constant presence to enforce lower operating speeds.

Safety barriers would reduce the severity of damage but not the number of accidents themselves.

1.3 The current 80km/hr^{-1} speed limit in the 1.6km section between Alfred and Rochdale Roads encourages drivers to go faster when confronted by the divided road section after Rochdale Road; regardless of the lower speed limit (70km/hr^{-1}) and the road curve sign. Accidents in the northbound lane would be reduced if the allowable speed was reduced to 70km/hr^{-1} between Alfred and Rochdale Roads.

Reply - Main Roads Department

Posting a lower speed limit on this section of carriageway will not result in lower operating speeds. Experience has shown that a change in the road environment is necessary to induce lower operating speeds.

A reduction of 10km/h in the posted speed limit in all probability would not result in an accident level acceptable to the community, as most drivers would continue to operate at about the 80km/h region.

Given the existing road environment, the present 80km/h limit is considered appropriate.

1.4 Since minor modifications were made to the Challenger Parade junction in the latter part of 1989 the accident rate has fallen by approximately 30%. What are the accident statistics since modifications were made to the signposting? What effect have these alterations had on the accident rate over the longer term to May 1992? Have the large increase in accidents since July 1986 occurred in the northbound lane?

Reply - Main Roads Department

Modifications to the sign posting were made in July-August 1989 on the northbound carriageway.

Taking a 2.5 year period before/after on the section of carriageway 200 metres north and south of Challenger Parade shows the following accident numbers:

- o before 17
- o after 25
- o % change + 47.

In the period of July 1989 to May 1992 the following accidents have been recorded:

- o 7 injury
- o 13 major property damage.

Included in the above are, 14 single vehicle accidents leaving the carriageway and 12 accidents within a 10 metre distance of Challenger Parade.

Since 1986 this 400 metre section of carriageway has recorded the following accidents:

Year	*Northbound*	*Total (North and South)*
1986	2	3
1987	3	4
1988	6	7
1989	10	13
1990	5	10
1991	2	8
1992*	1	2

That is: 29 accidents northbound (62%)
18 accidents southbound (38%)
* 47 accidents in total (up to May 1992).

2. EVALUATION OF ALTERNATIVES

2.1 Inclusion of economic and cost criteria are irrelevant in the context of environmental impact assessment. These issues should be given due consideration elsewhere in the decision-making process.

Reply - Dames & Moore and City of Perth

To the contrary, we believe the inclusion of some economic and cost criteria in the assessment is essential. Environmentally highly desirable options which would cost the ratepayer a great deal would be unacceptable, as would inexpensive options with a high environmental impact. It should also be noted that the Public Environmental Review (PER) states quite clearly (Section 8.0) that the most acceptable option may not be the least expensive.

2.2 The reduction in noise to nearby residents is not an issue as these houses were built after the road was established. This factor cannot be invoked as a criteria for assessing the environmental impacts of this proposal.

Reply - Dames & Moore

There is some doubt as to whether the nearby residents would agree with this statement. Further, traffic volumes along the West Coast Highway have increased over recent years, and will continue to increase. The most appropriate time to address the noise issue is now.

2.3 The textual descriptions of the impacts of the alternatives do not bear any relationship to the data provided in Table D1.

Reply - Dames & Moore

The textual descriptions attempt to summarise in a few words the outcome of the weighted-score analysis presented in Appendix D. The information has been checked and is believed to be a fair representation of the results.

2.4 METHODOLOGICAL INCONSISTENCIES RELATED TO THE MATRIX ANALYSIS OF ALTERNATIVE OPTIONS

2.4.1 The assumption that safety, environmental and social concerns are given equal weighting in the comparison of options (Table D1) is clearly false. A sensitivity analysis indicates that a change of 1 point in the raw score for safety will yield a change of 0.20 in the final normalised score. In comparison a 1 point change in the raw score in either of the other categories will result in only a 0.02 change in the final normalised score where the assigned weight has the highest value of 3, and correspondingly less for lower weights. The minimum meaningful difference in the final normalised score is equal to the maximum sensitivity value. Therefore, using the analysis in Table D1 to choose the "preferred" option is invalid. Furthermore, there is only a 6.2% difference between the highest and lowest of the final normalised scores for Options A, B, C and D. Such a small difference is meaningless.

Reply - Dames & Moore

(a) The statistical procedure of giving equal weighting to safety, environmental and social issues relies on two aspects:

- o there are members of the community who put undue emphasis on each of the three issues, depending on their personal views. The statistical procedure attempts to overcome this bias by considering all three to be important; and
- o because the number of criteria within each of these issues varies, a "normalising" process is required to remove bias caused by the methodology and which bears no relationship to actual impacts.

(b) A sensitivity analysis conducted during the study showed that there was not a lot to choose statistically between options. This is indicated in Section 8.0 of the PER. Each option tendered to score high on one aspect and low on another. However, based on the information available and discussed in Section 3.3 of the Public Environmental Review (PER) it was concluded that Option D provided the best possible compromise, albeit not ideal.

2.4.2 The issues of Safety, Pollution and Conservation have been double counted by their inclusion in both the Social Category as well as the Environmental and Safety Categories.

Reply - Dames & Moore

It is unclear as to exactly what this comment means. As far as can be seen, no items has been double counted. As an example, with respect to air pollution, this:

- does not appear in the environmental category;
- is evaluated in respect to impact on residents, recreationists and flora in the social category; and
- community attitudes to it (as opposed to its impacts) in the community attitudes category.

2.4.3 There appears to be a discrepancy between attitudes defined by written responses to the public consultation programme and the scores assigned to safety in the Community Attitudes section. It can be shown that only 8% of written responses are indicating a design for realignment of this section of road (Table 4): The responses of "Accidents Occur at Bend" (6), "Bad Engineering Cause of Accidents" (3), "Intersections are a Problem" (3) and "Realignment Must be Undertaken" (3) can be interpreted as community desire for realignment of the road. This cohort of 15 cases is only 8% of the total 196 responses recorded.

Reply - Dames & Moore

This comment is based on a misinterpretation of Table 4 of the PER. The table does not give a measure of number of complainants, or the strength of that complaint. Table 4 gives the frequency at which issues were raised. Thus, theoretically, a single respondent could have raised all the issues listed. To describe "cohorts" of responses is, thus, invalid.

The importance of safety as an issue was drawn from the information that:

- o the section of road under review is below design standard (Section 2.1);
- o unsatisfactory accident statistics (Section 2.2 and Appendix C); and
- o concerns raised by local residents and Government authorities (Sections 2.2 and 5.2.3).

2.4.4 How were scores for the Safety category assigned when there is no apparent or referred analysis by a road design engineer? An increase in radius from 290 metres (Option C) to 400 metres (Option D) results in an increase of the curve speed value of only $5km/hr^{-1}$ from 90 to $95km/hr^{-1}$. Therefore, the difference in the weighted values assigned to these options in the Safety category is unjustified.

Reply - Main Roads Department

Essentially comments made in 2.5 address this issue. The difference in curve speed values is not the only criteria as other factors (e.g. intersections) are involved. Given these other factors, the weighted score values assigned are not considered to be inconsistent.

2.4.5 The responses detailed in Table 4 indicate that the community preference is for traffic management and other alternatives to realignment of the road. The major topics which have drawn response through the Public Consultation Programme are in relation to the impacts upon the Bold Park environment (Table 4).

Reply - Dames & Moore and Main Roads Department

Agree - traffic management is seen by the public as more desirable than realignment. However, attempts to improve traffic management have not been successful (Main Roads Department - pers. comm.).

2.4.6 It is ecologically unsound to split the vertebrates into three groups in the analysis whilst lumping the invertebrates in a single group. Similarly, it is incongruous that scores in the "Implications for System 6" category showed no direct relationship to the amount of area to be annexed by the various Options.

Reply - Dames & Moore

(a) The principle adopted was to make maximum use of the available data. There is sufficient information available on the vertebrates to make some comparisons, whereas information at this level is not available for invertebrates. However, it is equally important that invertebrates are not ignored.

(b) The area to be annexed to System Six land by the various options was considered, as were losses to System Six land as a result of the various options.

2.4.7 Since plant associations are usually taken as the ecological proxy of habitat types, it is illogical that they should receive different scores and weightings.

Reply - Dames & Moore

To the contrary, the habitat evaluation included consideration of vegetation height, stratification, canopy cover, species richness and other aspects not distinguishable in a classification based purely on association type.

2.5 ROAD DESIGN STANDARDS

2.5.1 The explanation provided by Main Roads Department for a 400m minimum radius for this type of road (Appendix E) is insufficient. The relationship between standards and guidelines is outlined in the Austroads (formerly NAASRA) "Guide Policy for Geometric Design of Major Urban Roads". The main thrust of this is to justify situations where lower design standards than those given in the Guide Policy may be adopted. The MRD letter (Appendix E) does not provide any evidence to suggest that the minimum design standard proposed (400m minimum curve radius) is justified in lieu of the "desirable standard" (280m minimum curve radius) shown in Table 4 of the Austroads Guide Policy for the desirable design speed of 80km/hr^{-1}.

Reply - Main Roads Department

The 400 metre radius was chosen as the minimum for this section of West Coast Highway to cater for the intersections with Rochdale Road and Challenger Drive on the outside of the curves.

The superelevation required on radii less than 400 metres would give an unacceptable adverse crossfall for the turning movements on and off the Highway at the intersections.

The 280 metre minimum radius would be acceptable for a design speed of 80km/h if there were no intersections on the back of the curve, provided that other general design standards were maintained.

2.5.2 For the recent connection of Servetus Street to West Coast Highway, the minimum radius used on three curves is 290 metres (design speed 90km/hr^{-1}). This design standard is applied immediately south of the current project area. Furthermore, a 290m curve radius is used on the through carriage-way of the Mitchell freeway north of the Narrows Bridge, where the design speed is 80km/hr^{-1}. Why is this standard insufficient for the project area, where the speed limit is 70km/hr^{-1}?

Reply - Main Roads Department

It is not appropriate to compare these curves with the freeway as the freeway does not have intersections.

The curves used to tie West Coast Highway into Servetus Street near Alfred Road are appropriate due to the lower speed environment along Servetus Street (residential).

The existing 290 metre radius at Rochdale Road was seen as a temporary tie in (assuming Stephenson Highway would ultimately realign this section) and in fact at present, it alerts northbound traffic to the tighter radii ahead.

One of the intentions of redesigning the section is to remove the 70km/h advisory speed limit that currently exists at the intersection with Challenger Parade. This will provide a consistent safe travel speed along West Coast Highway.

2.5.3 There is no written report from road design engineers giving justification for the realignment. Furthermore, the consultants do not appear to have liaised with the Main Roads Department's Urban Road design Section. It is inappropriate that the MRD's Traffic Management Branch is providing advice in regard to the "design standards".

Reply - Main Roads Department

Road design standards are common to the separate sections within Main Roads and Traffic Branch can reliably provide information on the standards.

2.5.4 What mechanisms were used to establish the "safety standards which are required by the community" which are referred to, but not detailed in the letter from the Main Roads Department?

Reply - Main Roads Department

The standards used in road design aim to provide a transport route that is safe for the community. These standards have been developed over many years through analysis and testing various aspects of road design and by monitoring accident statistics.

2.5.5 The "proposed option" does not meet the MRD standard for a 400m minimum curve radius on the curve through the intersections with Rochdale Road intersection at the southern end of the proposed project. Furthermore, the proposed option has not been stated as the "preferred option" of either the Main Roads Department or the Perth City Council.

Reply - Main Roads Department and City of Perth

With some modification and the ultimate dualling, a 400 metre radius should be achievable. However, it is difficult to illustrate on small-scale plans such as those in the PER.

3. ECOSYSTEM CONCERNS

3.1 The regional significance of the Quindalup Dune system and its associated vegetation has been overlooked. The only other metropolitan example of this vegetation association and landform is to be found at Woodman Point. The project area for Option D will have extreme impacts upon this regionally significant ecosystem. It is therefore important that this issue is properly addressed in this Public Environmental Review.

Reply - Dames & Moore

(a) The importance of the Quindalup Dune system was not overlooked; it is dealt with in Sections 5.1.2, 5.1.5 and 7.1.1. The presence of the Quindalup Association at Woodman Point is noted in Section 5.1.2.

3.2 Whilst the significance of *Agonis flexuosa, Chamelaucium uncinatum* and *Acacia rostellifera* have been enunciated in the local context of Bold Park (i.e. they are rare elsewhere [in Bold Park] other than the project area), their significance is under-stated in overall terms. *C. uncinatum* is at the southernmost extent of its range, has a unique form (commonly referred to as Wembley Wax) and is not well represented naturally elsewhere in the Metropolitan Region. The project area is also at or near the northern limit for *A. flexuosa.* The regional significance of these flora has not been clarified in the Public Environmental Review. Option D has a much greater impact upon these species than Option C which is also designed to meet the safety standards of the Austroads "Guide Policy for Geometric Design of Major Urban Roads".

Reply - Dames & Moore

The issues raised in the comment are all discussed in the PER, including an indication of the regional significance of the three species listed. The conservation value of the area was, in fact, considered a primary issue in the evaluation process, and is a major thrust of the PER.

3.3 The project area has the richest ground vertebrate community within M47. In addition, page 27 of the PER states that "(t)he richness and diversity of the herpetofauna of Bold park is the highest recorded for urban bushland in the Perth metropolitan area". Therefore, the project area also has regional significance for the ground vertebrate fauna. Alternative alignments of the road (such as Option C) will not impact so severely upon these valued ecosystem components.

Reply - Dames & Moore

There is no disagreement with this statement.

3.4 The effect of the proposed underpass upon the ecology of Bold Park is not given any consideration. An underpass will provide domestic and feral animals access to the Bold Park. The busy roads which enclose the park have previously formed a barrier to such movement.

Reply - Dames & Moore

Bold Park already contains an abundance of feral animals and is frequently used by the public for exercising domestic animals. It is clear that the roads have not formed a barrier.

4. SOCIO-CULTURAL ENVIRONMENT

4.1 Since Option D will cut through a 30m dune, the road noise will be significantly greater within the park than with Option C; where the road passes to the west of the park. The impacts upon landscape amenity and recreation values do not appear to have considered this major difference. The fact that the realigned road will be less visible to some residents may be a fortuitous by-product, but it is not the expressed reason for the realignment and in a community sense, is not as important as the increased impacts upon Bold Park.

Reply - Dames & Moore

The comment fails to evaluate all points of view. Thus, Option D may increase noise within the park, but it would decrease it at residences along the highway.

The reason for the realignment is public safety (both motorists and residents). The impacts on Bold Park caused by the proposal are recognised and every attempt has been made to reduce those impacts.

4.2 No contour information has been provided for the entire project area. However, it is suggested that the realignment of Rochdale Road will pass through a dune approximately 30m high in the M46 area which is equal to the height of the Quindalup Dune in the M46 area to the south. There has not been an adequate assessment of the visual impacts arising from this proposal.

Reply - Dames & Moore

(a) Contour information is presented on Figure 6.

(b) The realignment of Rochdale Road is relatively minor and would accommodate visual impacts in its design.

4.3 The PER has not considered the significance of System 6 areas M46 and M47 as a Regional Park. User surveys have indicated that visitors/users of the area are drawn from across the metropolitan area.

Reply - Dames & Moore

The significance of M46 and M47 was indicated in Sections 4.5, 4.7, 5.1.2, 5.1.5, 5.3, 7.1.1 and 7.3.

5. APPEARANCE, LANDSCAPING AND REHABILITATION WORKS

5.1 On page 14 of the PER the issue of whether or not to reduce the width of the embankment using stone pitching is raised. It would be preferable to use stone pitching to minimise the width of the batters rather than destroy important sensitive vegetation. In addition, it is possible to create vegetation pockets within the stone pitching.

Reply - Dames & Moore

Attention to such details is a normal part of Main Roads Department embankment design. The PER is designed to evaluate public views on the project in principle. Minor detail such as provision of pockets within embankments would be dealt with during the design phase.

5.2 Vegetation clearance should be minimised during the construction phase. Access tracks should be located within the road reserve or outside the project area. Clearing limits should be marked out by the Perth City Council once the accurate road designs have been completed.

Reply - Dames & Moore

Agree - all these aspects have already been incorporated.

Appendix 3

Submission from Main Roads

MAIN ROADS DEPARTMENT

WATERLOO CRESCENT, EAST PERTH, WESTERN AUSTRALIA.
PO Box 6202 EAST PERTH WA 6004 Phone (09) 323 4111 Fax (09) 323 4430

Enquiries Mr Hendry on 323 4631

Our Ref 72-394-54

Your Ref

The Chairman
Environmental Protection Authority
38 Mounts Bay Road
PERTH WA 6000

ATTENTION: MR NICHOLAS WIMBUSH

PROPOSED RE-ALIGNMENT OF THE WEST COAST HIGHWAY AT CITY BEACH
COMMENT ON PUBLIC ENVIRONMENTAL REVIEW

Main Roads wish to make the following comments on the above Public Environmental Review.

1. Main Roads preferred option from an engineering point of view remains Option E. However, it is recognised that this option will have a significant negative impact on the environment. Therefore an option that satisfies safety requirements with less environmental impact is considered appropriate.

2. Main Roads considers that Option G may be the least environmentally sensitive of the options proposed while still meeting engineering standards. This option does not alienate land as rehabilitation of the existing roadway will allow it to be linked into M46 and M47 lands. The impacts of Option G warrant further investigation.

3. The preferred option (Option D) shown on Figure 6 will not comply with the Main Roads requirements of a design standard based on a 400 m minimum radius outlined in Appendix E. This is because radii will have to be reduced below the minimum requirement of 400 m in order to accommodate transition curves on the proposed alignment. A design complying with Main Roads requirements can be accommodated by making minor adjustments to the proposed alignment.

4. No comment can be made on the vertical alignment of the preferred option as a profile is not provided.

5. Figure 6 shows an inconsistency between the cross section and the plan which could be misleading.

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6. It has been recommended by the Road Reserves Review that the reserve for Stephenson Highway between Rochdale Road and Oceanic Drive (shown on Figure 8) be removed from the Metropolitan Region Scheme. Also recommended is reclassification of the section of West Coast Highway between Rochdale Road and Oceanic Drive. Thus it is considered that the proposed realignment compliments future planning for the road network in the area provided that design standard requirements are met.

7. In Appendix D, comparison of options, Option D was chosen as the preferred alternative on the basis of the lowest overall score. However, the range of overall scores indicates that Options A B C and D are very similar, with only 6.2% difference between the highest and lowest scores in this group. It is suggested that the choice of Option D is not conclusive and that the sensitivity of the scoring process to changes in weightings and normalisation is investigated or documented if this work has already been carried out.

8. In Appendix D an apparent discrepancy exists between the score allocated to Option E for safety in the community attitudes section of the Social Assessment Category and the score allocated in the Safety Category. Alteration of these scores could bring the Option E score within 5% of the score of the preferred option.

These comments may be fully or partially utilised or included in your assessment report.

B A Clarke
DIRECTOR METROPOLITAN OPERATIONS

May 7 1992

Appendix 4

Proponents commitments

9.0 COMMITMENTS

The City of Perth, as proponent, will fulfil the following commitments as part of the proposal.

1. System Six Areas.

   1.1 Within 12 months of the release of the Public Environmental Review for the realignment of West Coast Highway, City Beach, plan a study on the management of long-term issues affecting System Six Recommendation Areas M46 and M47.

   1.2 Subsequent to 1.1, and within 12 months of the release of the Public Environmental Review for the realignment of the West Coast Highway, City Beach implement the approved study and report on its findings.

2. Construction Plan.

   2.1 Prior to any site works, prepare a Construction Plan for the realignment. The Plan will provide designs, specifications and locations and include, but not necessarily be limited to:

   - management of vehicular movement in vegetation adjacent to the easement and cut and fill areas;
   - management of disturbance to landforms and vegetation;
   - erosion and dust control;
   - pedestrian underpass (subject to public support); and
   - induction of all personnel employed on the project in environmental management methods.

   2.2 Subsequent to 2.1, implement the approved Construction Plan.

3. Rehabilitation Plan.

3.1 Prior to any site works, prepare a Rehabilitation Plan for the realignment and the old road alignment. The Plan will provide designs, specifications and locations and include, but not necessarily be limited to:

- o criteria for successful rehabilitation;
- o use of cleared vegetation for mulch;
- o topsoil removal, stockpiling and replacement;
- o direct seeding, planting and use of hydromulching;
- o replanting of local species from seed collected from M46 and M47;
- o road verge planting; and
- o use of fertilisers.

3.2 Subsequent to 3.1, implement the approved Rehabilitation Plan.

4. Dieback Management Plan.

4.1 Dieback hygiene procedures as recommended by the Department of Conservation and Land Management will be implemented to control the spread of dieback disease and weeds along the route.

5. Fire Management Plan.

5.1 The City of Perth's Fire Management Programme will be adopted subject to advice by the EPA. Weeds and grasses on verges will be controlled to reduce fire hazards.