

Tonkin Highway Extension from Mills Road West Gosnells to South Western Highway Mundijong

Main Roads Western Australia

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

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Summary and recommendations

Main Roads Western Australia (Main Roads WA), proposes to construct the Tonkin Highway Extension from Gosnells to Mundijong to link with South Western Highway in the vicinity of Jarrahdale Road. The highway will be six lanes wide from Mills Road West to Mundijong Road and four lanes from Mundijong Road to South Western Highway. This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal.

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

Relevant environmental factors

The EPA decided that the following environmental factors relevant to the proposal required detailed evaluation in the report:

- (a) Terrestrial Flora
 - Vegetation Complexes and Bush Forever sites;
 - Threatened Ecological Communities; and
 - Mundijong Road crossing;
- (b) Wetlands; and
- (c) Noise.

There were a number of other factors which were relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

Conclusion

The EPA has considered the proposal by Main Roads Western Australia to design and construct the Tonkin Highway Extension from Mills Road West in Gosnells to South Western Highway in Mundijong.

The proposal will impact on eight Bush Forever sites, two vegetation complexes with less than 10% of the original extent remaining in the Perth Metropolitan region and approximately 15 hectares of conservation category wetlands and has the potential to impact adversely on noise sensitive premises in the vicinity. The EPA is satisfied that Main Roads Western Australia has undertaken to adopt all practicable measures to minimise impacts from the road construction and to implement responsible mitigation strategies for impacts on wetlands and vegetation where impacts are unavoidable.

The EPA has concluded that it is unlikely that the EPA's objectives would be compromised provided there is satisfactory implementation by the proponent of the proponent's commitments and the recommended conditions set out in Appendix 4 and Section 4.

Recommendations

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

1. That the Minister notes that the proposal being assessed is for the design and construction of the Tonkin Highway Extension from Mills Road West in Gosnells to South Western Highway in Mundijong;
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4, including the proponent's commitments;
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Conditions

Having considered the proponent's commitments and the information provided in this report, the EPA considers the proponent had provided adequate commitments to manage the proposal without the need for additional environmental conditions, if the proposal is approved for implementation. Matters addressed in the conditions are that the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4.

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1. Introduction and Background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal by Main Roads Western Australia, to construct the extension of the Tonkin Highway from Mills Road West Gosnells to South Western Highway in Mundijong.

The Tonkin Highway currently extends from the Reid Highway in Malaga south past the domestic and international airports to the junction with Albany Highway in Gosnells as shown in Figure 1. The proposal to extend the highway commences at Mills Road West, close to the point it joins the Albany Highway, and ends at South Western Highway in the vicinity of Jarrahdale Road, just south of Mundijong.

The road will be six lanes wide from Mills Road West to Mundijong Road and four lanes from Mundijong Road largely within the current road reserve in the Metropolitan Region Scheme (MRS). The proposal is approximately 32 km in length and is depicted in Figure 2.

The proposed extension will be approximately the same length as the existing highway and is planned as a bypass to reduce the volume of heavy traffic in the urban areas of the south-east of the Perth Metropolitan Region.

The route of the highway traverses through relatively flat land which is mostly cleared. Most of the land is currently used for a variety of farming and rural purposes, however, there are significant areas zoned for urban purposes in Wungong, Byford and Mundijong which have not yet been developed as shown in Figure 3. The highway will be located adjacent to the western parts of those urban areas.

The land through which the proposal will pass has a high water table with surface water frequently present in the winter months.

The Tonkin Highway extension from Mills Road West to Ranford Road was reserved in the MRS in 1981 and the sections south to Mundijong Road were added in 1995 following the South East Corridor Stage A report and associated amendment. The EPA provided advice on the structure plan and associated amendment in Bulletin 798 in 1995.

Mundijong Road to the west of the proposed Tonkin Highway extension was assessed by the EPA in Bulletin 952 in its report *Metropolitan Region Scheme Amendment 991/33 – South West Districts Omnibus (No 3b)* in 1999.

The proposal to design and construct the Tonkin Highway Extension was referred to the EPA in December 2000 and a level of assessment was set at Public Environmental Review (PER) in order to ensure the proposal was appropriately designed, constructed and managed to meet the EPA's environmental objectives.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the environmental factors relevant to the proposal. The Conditions and Commitments to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 presents the EPA's conclusions and Section 6, the EPA's Recommendations.

Appendix 5 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process and which have been taken into account by the EPA appear in the report itself.

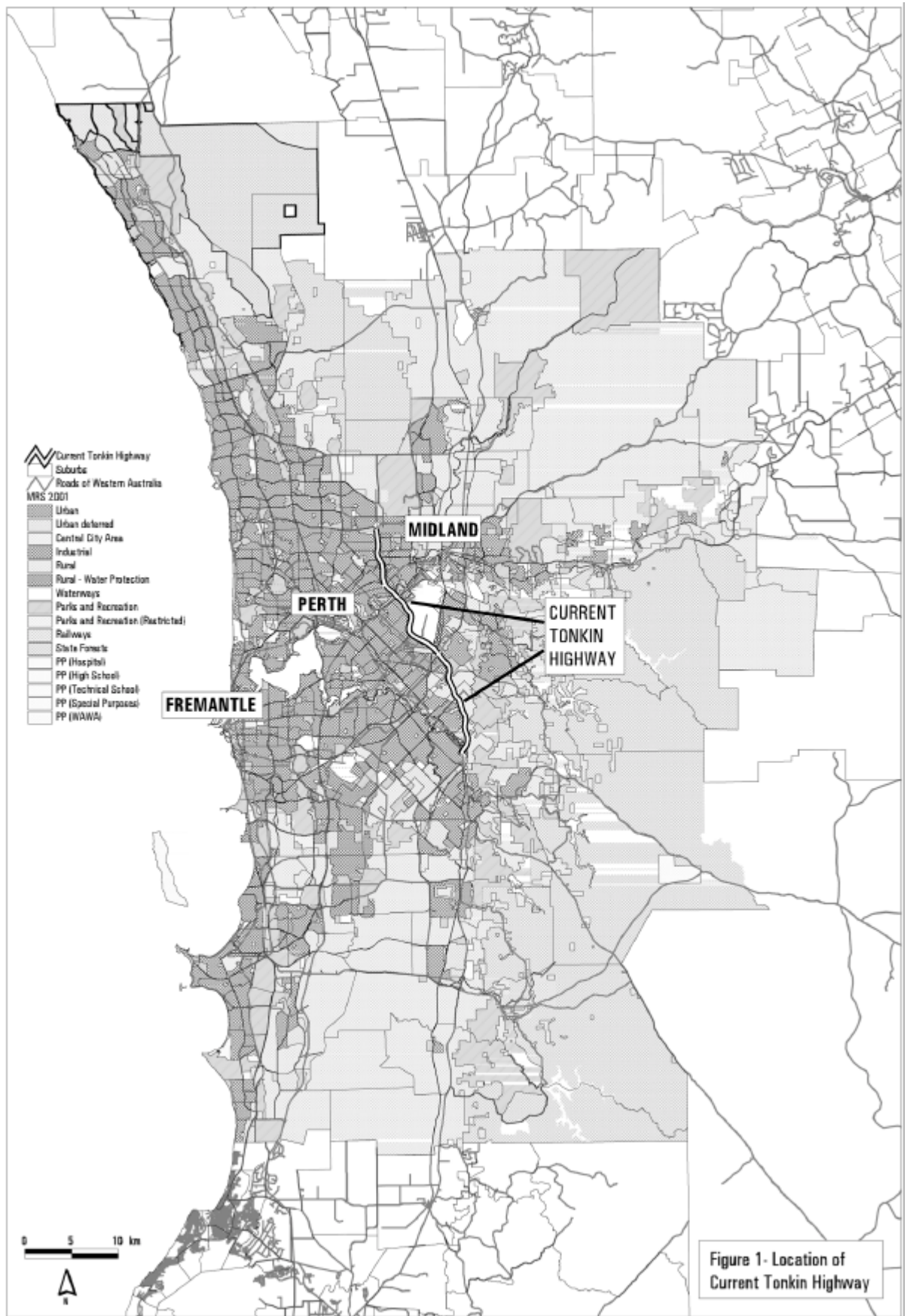


Figure 1: Location of current Tonkin Highway

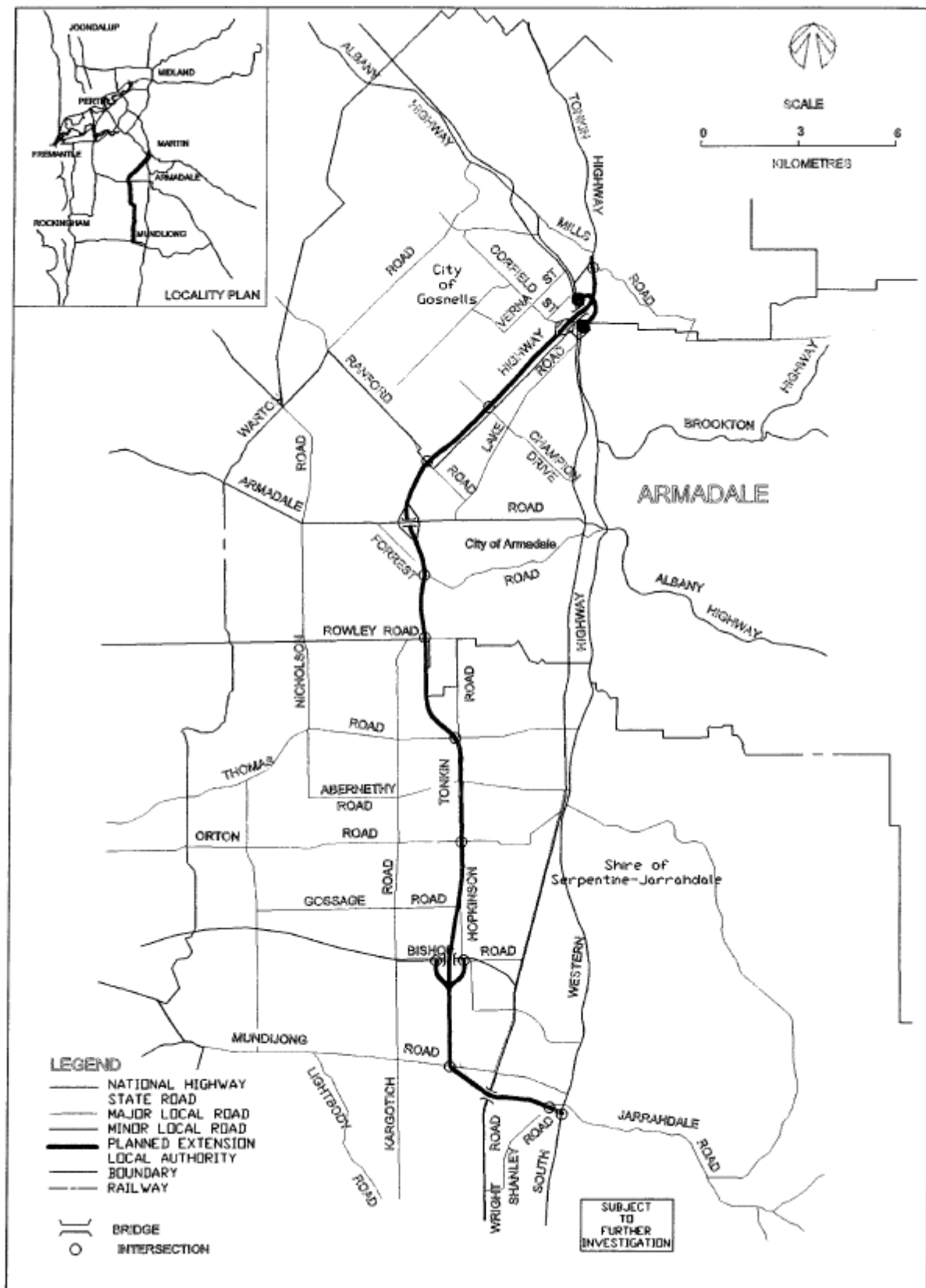


Figure 2 The proposed extension to the Tonkin Highway from Gosnells to Mundijong (Source: PER, Figure 3.1.1).

2. The proposal

The proposal is to design and construct the extension of the Tonkin Highway from Mills Road West to South Western Highway. The proposal is approximately 32 km in length and includes the design, construction and use of a highway of six lanes from Mills road West to Mundijong Road and four lanes from Mundijong road to South Western Highway within the footprint depicted in Figures 3 & 4.

The proposal includes construction of all road pavements, access roads, drainage basins, drains, medians, 'at grade' intersections, 'grade separated' interchanges, ramps, traffic signals, associated earth works, dual use paths, bridges, culverts, lighting, noise barriers, under passes, over passes, fencing, landscaping and signs. The road reserve is approximately 416 hectares in area, of which 260 hectares will be used for construction. The road area, including interchanges, will be approximately 190 hectares.

The road construction will largely be contained within the existing MRS reservation but will extend beyond to a minor extent in some areas. These extensions are not considered to have a significant environmental impact.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 3 of the PER (Western Infrastructure, 2001) and *Final Response to Submissions* (Western Infrastructure, 2001).

Table 1 – Summary of key proposal characteristics

Element	Description
Proposal Description	Design, construction and use of a highway of six lanes from Mills Road West to Mundijong Road and four lanes from Mundijong Road to South Western Highway (ultimate) within the footprint depicted on Figures 3 & 4. The proposal includes construction of all road pavements, access roads, drainage basins, drains, medians, 'at grade' intersections, 'grade separated' interchanges, ramps, traffic signals, associated earth works, dual use paths, bridges, culverts, lighting , noise barriers, under passes, over passes, fencing, landscaping and signs.
Length of proposal	Approximately 32 kilometres.
Area of road reserve	Approximately 416 hectares.
Typical cross section (3 lanes)	6 metres for drains, 33 metres for pavement and shoulder, 10 metres for median, 4.5 metres for dual use path or 53.5 metres total.
Typical cross section (2 lanes)	6 metres for drains, 25 metres for pavement, shoulder and verge, 4 metres for median, 3.5 metres for dual use path or 38.5 metres total.
Road area	Approximately 190 hectares (includes interchanges).
Area of construction	Approximately 260 hectares (includes batters and drainage basins).
Area to be revegetated	Approximately 250 hectares (includes batters and drainage basins).
Construction duration	The proposal will be constructed and upgraded in stages from Gosnells to Mundijong, lanes will be added over time and at grade intersections will be replaced with grade separated interchanges, as traffic demand increases. It is expected that construction will occur to Armadale Road by 2004 and to the South Western Highway by 2006.

Grade separated intersections and connections	Mills Road East and West *, Albany Highway, Corfield Street, Champion Drive *, Ranford Road, *, Armadale Road, Forrest Road*, Rowley Road*, Thomas Road*, Orton Road*, Bishop Road, Mundijong Road*(roundabout), Shanley Road* and South Western Highway*. * Initially at grade intersections.
Bridges	Canning River, two bridges Southern River, one bridge; and Wright Street one bridge.
General Standard of Design and Construction	Design Speed 80-100 km/hr Austroads and Main Roads Western Australian standards.
Construction material source	Road mostly constructed on fill. All materials sourced by Design and Construction contractor from approved sources (eg sands mines) and suppliers.

Since the release of the PER, a number of modifications to the proposal have been made by the proponent. These include:

The proponent advised modifications to the proposal in the final *Response to Submissions* (December 2001) report which have resulted from discussions with local government since the public review period. The proposal now includes the Corfield Street intersection which is not within the Controlled Access Highway (CAH) reservation in the MRS and now does not include the Champion Drive/Garden Street connections.

The proponent has also advised that it is intended that the ultimate connection from the east at Forrest Road will be a flyover, however, this proposal only seeks a temporary connection at grade on the eastern side at this stage. The ultimate connection will extend outside the road reserve and will require an amendment to the MRS. This amendment, when initiated, will require referral under Section 48A of the Environmental Protection Act 1986. There will be a cul-de-sac at Forrest Road to the west of the highway.

The potential impacts of the proposal initially predicted by the proponent in the PER document (Western Infrastructure, 2001) and their proposed management are summarised in Appendix 3.

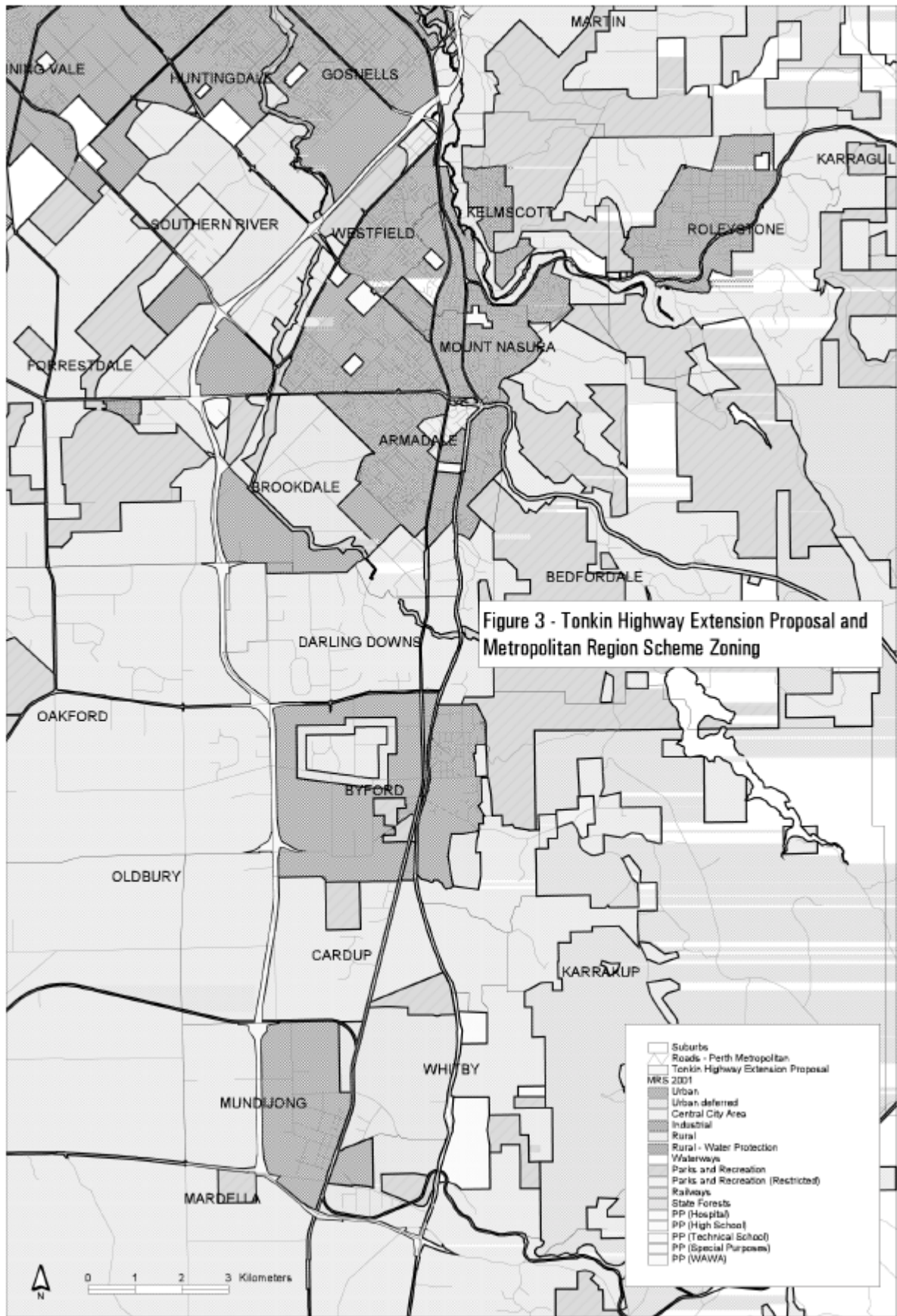


Figure 3: Tonkin Highway Extension Proposal and Metropolitan Region Scheme Zoning

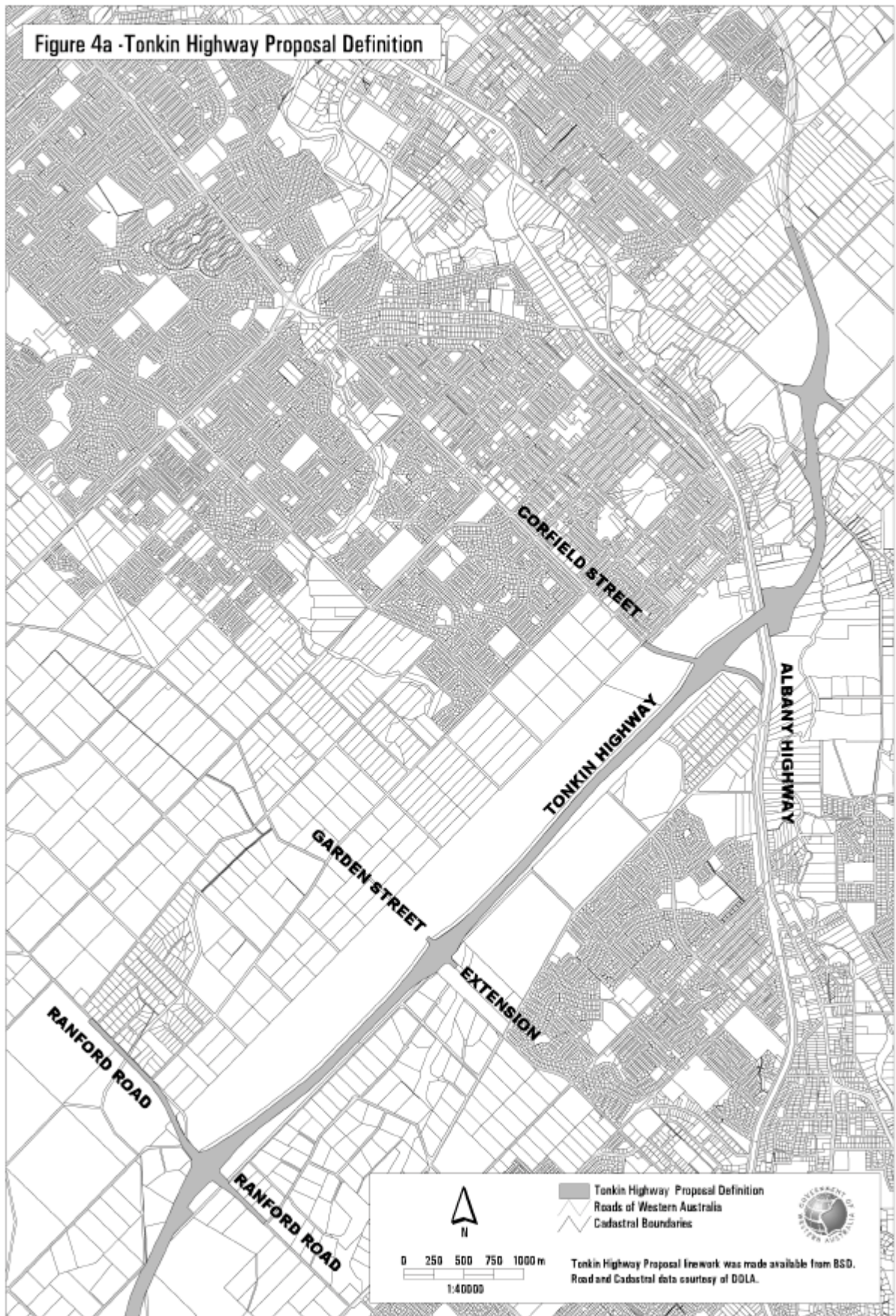


Figure 4a: *Tonkin Highway proposal definition*



Figure 4b: *Tonkin Highway proposal definition*

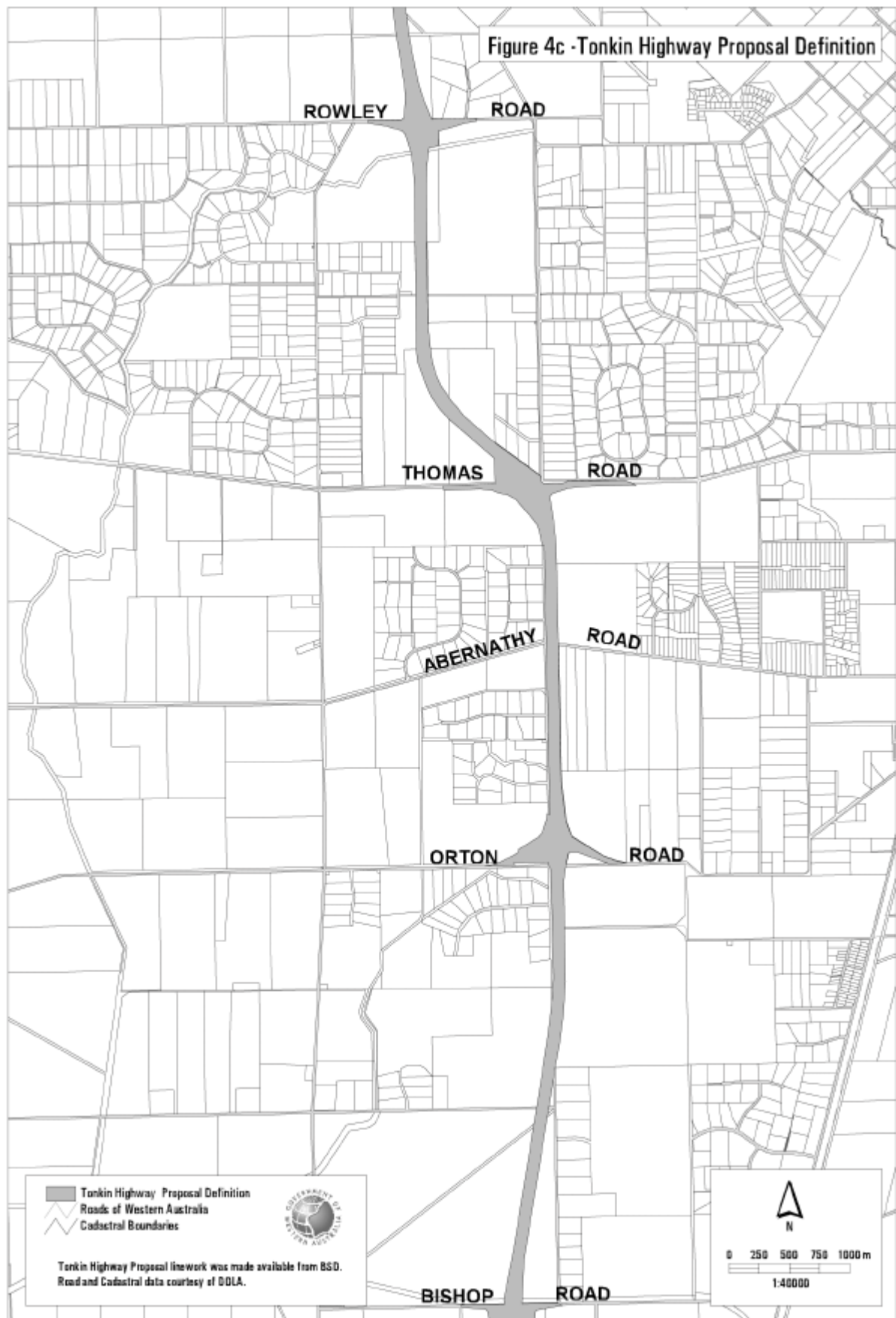


Figure 4c: Tonkin Highway proposal definition



Figure 4d: Tonkin Highway proposal definition

3. Relevant environmental factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal and the conditions and procedures, 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 selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as fauna, drainage, dust and visual amenity, are very relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

It is the EPA's opinion that the following environmental factors relevant to the proposal require detailed evaluation in this report:

- (a) Terrestrial Flora
 - Vegetation Complexes and Bush Forever sites;
 - Threatened Ecological Communities; and
 - Mundijong Road crossing;
- (b) Wetlands; and
- (c) Noise.

The above relevant factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the relevant environmental factors and their assessment are 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 Appendix 3.

3.1 Terrestrial Flora

3.1.1 Vegetation Complexes and Bush Forever sites

Description

The PER indicated the proposal will impact on approximately 34 ha of remnant vegetation located on the eastern side of the Swan Coastal Plain.

With respect to Bush Forever, the proposal will impact on 8 Bush Forever sites, and will directly impact on five of the sites which either cross or are adjacent to the road reserve. The total impact is expected to be approximately 8.21 hectares.

Submissions

Submissions making general comments on vegetation were made by CALM, the Shire of Serpentine-Jarrahdale and a conservation group. They pointed out that Bush Forever gave a clear indication that there is a presumption against clearing of vegetation complexes with less than 10% remaining in the Perth Metropolitan Region.

CALM commented that offsets or mitigation measures should meet a criterion of 'no net loss' of nature conservation values and that any bushland acquired under such offsets should be given appropriate management and protection. CALM also commented that offsets should not simply replace funds already targeted by WAPC to purchase Bush Forever sites. The City of Armadale also commented on the need to replace the Guildford and Forrestfield vegetation complexes in landscaping the road reserve and the difficulties this may present.

Submissions from CALM and members of the public suggested 'Principles of Bushland Mitigation' should be developed for bushland in the same way as that outlined in the PER for wetland mitigation.

Specific bushland sites were mentioned by CALM, the City of Armadale and members of the public. These included vegetation at Wright Lake, vegetated damplands south of Armadale Road, Cardup and Manjedal Brooks and Mundijong Road.

The City of Gosnells commented that there should be a mix of vigorous and slow-growing species used in revegetation to ensure long term success.

Weeds was raised in a number of submissions from CALM and conservation groups with recommendations on how they should be controlled and minimised, particularly through the use of seeds of local provenance. CALM and the Shire of Serpentine-Jarrahdale mentioned the desirability of establishing seed orchards for landscaping.

Bush Forever was commented on by the Department of Planning and Infrastructure and the City of Armadale, with the former being a general comment that management measures had not been adequately addressed in the PER and the latter seeking clarification about a Bush Forever site at Champion Drive intersection.

CALM disagreed on the dieback management measures proposed in the PER and suggested that management measures and plans should be prepared for at least three dieback sites on the alignment.

Two conservation groups and CALM made submissions about Declared Rare and Priority Flora (DRF). In addition, a site inspection during the assessment by EPA Service Unit staff, Main Roads WA, Western Infrastructure and CALM identified another potential DRF species (*Tetraria australiensis*) in the area to be impacted by the Mundijong Road crossing.

Assessment

The area considered for assessment of this factor is the footprint of the highway as specified in Table 1 in the context of the Perth Metropolitan Region.

The EPA's environmental objective for this factor is to maintain the abundance, species diversity, geographic distribution and productivity of the vegetation, ensure that regionally significant flora and vegetation communities in Bush Forever sites are adequately protected and ensure that regionally significant flora and vegetation are adequately protected from the spread of weeds and diseases, including dieback.

The EPA's environmental objective for Declared Rare Flora, Priority Flora and other significant flora is to protect Declared Rare and Priority Flora, consistent with the provisions of the *Wildlife Conservation Act 1950* and to protect other flora of conservation significance.

3.1.1.1 Vegetation Complexes

The proposal is located in the eastern part of the Swan Coastal Plain and will impact directly on the Forrestfield, Southern River and Guildford vegetation complexes as shown in Figure 5. The impact is a total area of approximately 8 hectares of the Forrestfield complex, 22 hectares of Southern River complex and 4 hectares of Guildford complex.

The EPA position on proposals that would impact on vegetation complexes where less than 10% of the complex remains in the Perth Metropolitan Area (draft *Guidance Statement No 10*, Table 4) is that a formal assessment will be required. The PER is therefore in accordance with the Statement.

The document, *Bush Forever*(State of Western Australia, 2000) indicates the following:

VEGETATION COMPLEX	AREA PROPOSED FOR PROTECTION	AREA REMAINING IN SWAN COASTAL PLAIN	PROPOSAL IMPACT
Forrestfield	5%	9%	8 hectares (0.07%)
Southern River	10%	17%	22 hectares (0.07%)
Guildford	3%	6%	4 hectares (0.016%)

Clearly the vegetation complexes are not well represented in secure reserves and the small remaining area of each reflects the fact they are located on the eastern side of the Swan Coastal Plain.

The PER and the *Response to Submissions* report indicate that the potentially impacted area of 34 hectares is a worst case scenario as the area has been calculated for the entire road reserve and 16 % of the vegetation in the road reserve is believed to be not in good condition. Not all the vegetation will be removed with the construction of the road and careful design and landscaping will enable the retention of some of this bushland within the road reserve. Overall, the potential area of each complex affected by the proposal is very small.

Bush Forever examined the issue of road reserves and recognised that advanced road reserve planning had been completed for some sites. *Bush Forever, Appendix 3, Site Implementation Guidelines*, Practice Note 18 recommended that the approach which should be adopted is that:

Within land reserved in the MRS or TPS for roads or railway purposes, there shall be a presumption that the construction authority has a right to undertake the required works for transport and associated infrastructure.

The EPA endorsed Bush Forever in Bulletin 1007 recognising that roads would be constructed along the existing reserves provided bushland would be retained and protected where practicable, and that appropriate mitigation measures are adopted (see 3.1.1.3 below).

The EPA considers that the issue of vegetation complexes has been adequately addressed and can meet the EPA's objective for this factor, provided that all practicable measures are taken to minimise disturbance, and appropriate mitigation measures are adopted.

3.1.1.2 Bush Forever sites

The PER indicated the proposal will impact directly on five Bush Forever sites and indirectly on another three. The Champion Drive connection at Bush Forever Site 260 will not now be part of the proposal.

The sites with no impact are:

Site 255, Dallen Road Bushland, adjacent to on the south side of Southern River;

Site 260, Southern River Bushland, adjacent to Southern River on the south side is separated by a power line easement; and

Site 65, Abernethy Road Bushland which is separated from the proposal by a local road and road reserve.

The sites impacted are:

Site 246, the Canning River which will be affected by bridge construction to a maximum area of 1.42 hectares;

Site 345, Forrestdale Lake Bushland, of which 4.97 hectares will be the maximum area impacted;

Site 351, Cardup Brook Bushland, maximum impact will be approximately 0.28 hectares;

Site 360, Mundijong and Watkins Road Bushland, where the proposal has been modified to impact on a maximum of 0.2 hectares; and

Site 365, which is proposed to be bridged by the proposal.

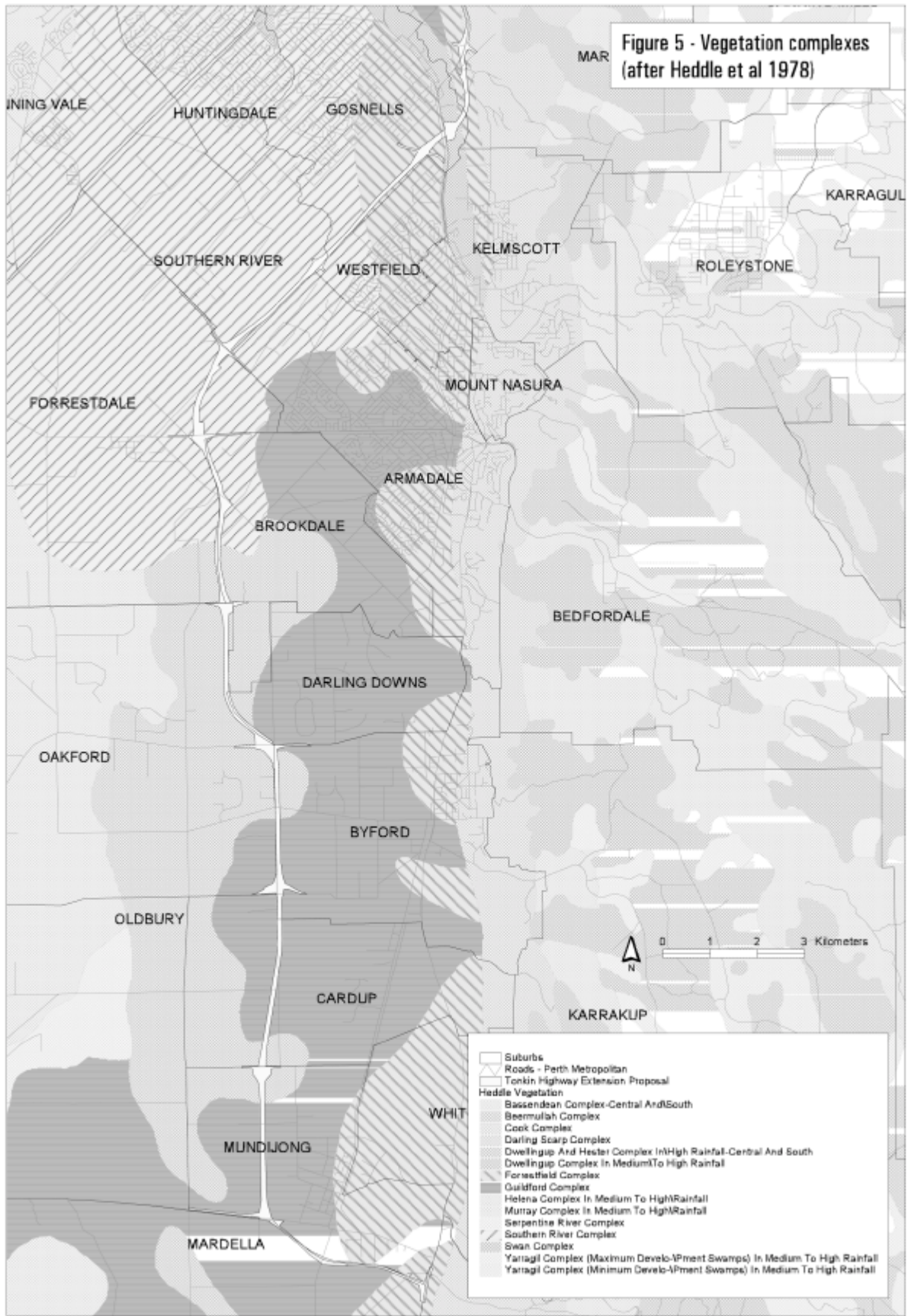


Figure 5 *Vegetation complexes (after Heddle et al 1978)*

Of those sites, the most significant impact will be at Site 345, part of which may contain threatened ecological communities and will be mitigated through the Vegetation Mitigation Strategy (see 3.1.1.3 below and Appendix 4) and at Site 360, which will also be mitigated through the same strategy. These mitigation measures include rehabilitation or acquisition of other suitable sites and the restoration of vegetation along Mundijong Road to Paterson Road.

3.1.1.3 Other matters raised in submissions

The proponent has recognised the difficulty in restoring the vegetation of specific complexes and will endeavour to carry out the Landscape and Revegetation Strategy Design Plan using local provenance species where possible.

With regard to the specific bushland sites mentioned, which include Bush Forever sites, the areas will all be mitigated through either the Vegetation Mitigation Strategy or the Wetland Mitigation Strategy.

With regard to weeds and seed banks, the proponent has advised the issues of weed invasion, local provenance and ongoing weed control is addressed in the PER and covered by several commitments. Main Roads WA will commence native seed collection from the road reserve in early 2002 so that an adequate seed bank is available for revegetation.

The proponent has given an undertaking to implement dieback management measures at the sites proposed by CALM through the Design and Construction Management Plan.

The 'taking' and protection of Declared Rare and Priority Flora will be addressed in the Design and Construction Environmental Management Plan. The potential DRF in the Mundijong Road crossing is addressed in Section 3.1.3.

The proponent has given a commitment to undertake a Landscape and Revegetation Strategy Design Plan, Design and Construction Environmental Management Plan and Vegetation Mitigation Strategy.

Summary

Having particular regard to the:

- (a) the potential area of vegetation affected;
- (b) the EPA's assessment in Bulletin 1007 relating to Bush Forever; and
- (c) the proponent's commitments;

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

3.1.2 Threatened Ecological Communities

Description

The PER identified 9 vegetation types within the road reserve and inferred the Floristic Community Types (FCT) within which they would fall based on the mapping methodology adopted by Gibson et al. These vegetation types are described in Table 5.1.1 of the PER.

Submissions

CALM pointed out it was possible that there could be other Threatened Ecological Communities (TECs) and additional sites where FCT 3a (Gibson et al 1994) might occur along the alignment, that the PER attributed FCT 10a to 'Vulnerable' Management status when in fact it falls into the Endangered Category and that the proposal might require referral to the Commonwealth for assessment.

Assessment

The area considered for assessment of this factor is the footprint of the highway as specified in Table 1 in the context of the Perth Metropolitan Region.

As part of the assessment, the EPA's Conservation Branch has investigated the issue of TECs more closely including site inspections and differs in the interpretation of some of the FCTs in the PER and therefore TECs.

The investigation used the methodology developed by English and Blyth (1997, 1999) which assigns threatened ecological communities to four categories viz, presumed totally destroyed, critically endangered, endangered and vulnerable.

The EPA Conservation Branch considers that the Banksia vegetation in the vicinity of Wright Lake (site 1, Figure 6a) is not FCT 23a *Central Banksia attenuata* and *Banksia menziesii* woodland which is well reserved and low risk management status, but is 20b *Eastern Banksia attenuata* and/or *Eucalyptus marginata* woodlands which is Endangered. This vegetation (approximately 4 hectares) will almost entirely be removed within the road reserve by the proposal. The rest of the vegetation outside the reserve is zoned Urban in the MRS and its retention is unlikely.

Vegetation at site 2 (Figure 6b), is linked to FCT 10a Shrublands on dry clay flats in Bush Forever site 345 and is in very good to excellent condition. Additionally, the EPA Conservation Branch believes that the roadside vegetation in the vicinity of Thomas Road intersection (site 3, figure 6c), which was not mapped in the final PER, is FCT 3a which is critically endangered. This vegetation will be entirely removed by the proposal as the interchange includes off ramps which will impact directly on it.

Roadside vegetation on the eastern side of Shanley Road (site 4, figure 6d) is believed to be FCT 3b *Corymbia calophylla* – *Eucalyptus marginata* woodlands on sandy clay soils/FCT 3c – *Corymbia calophylla* – *Xanthorrhoea preissii* woodlands and shrublands. FCT 3b is vulnerable and FCT 3c is Critically Endangered. There are a number of other small bushland sites along the alignment which probably contain TECs, however, they are also classified as wetlands and will therefore be mitigated through the Wetland Mitigation Strategy (see Section 3.2).

The EPA Conservation Branch believes that the significance of the impact on Threatened Ecological Communities was not fully recognised in the PER. The areas of vegetation are small and total approximately 8 hectares (sites 1-4, figure 6). They are not all in very good condition, however, some will be totally removed by the proposal. Sites 1, 2, & 4 are not associated with wetlands and will not be mitigated through the Wetland Mitigation Strategy.

The EPA guidelines for the proposal require that the proponent provide mitigation measures for the loss of significant vegetation. Threatened Ecological Communities would be regarded as significant vegetation which would not be lost if the proposal were not to proceed. There are opportunities along the highway route where mitigation measures could be provided for the loss of the TECs. Rehabilitation of Bush Forever site 345 is one example where this type of offset would be suitable. This area is very disturbed, contains many rare flora and could be consolidated to the west of the highway and rehabilitated. The construction works would permit the revegetation of this area potentially using some of the plants removed from the road reserve.

Main Roads WA has made a commitment to prepare a Vegetation Mitigation Strategy. This strategy will include measures to mitigate for the loss of dryland Threatened Ecological Communities impacted on by the proposal.

The EPA believes that the commitment to prepare a Vegetation Mitigation Strategy contains adequate measures to address the loss of the Threatened Ecological Communities and that the EPA's objectives for this issue can be met.

The proposal will require referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) because of the presence of threatened species. Main Roads WA has advised that part of the proposal (from Mills Road West to Thomas Road) has been referred and cleared pursuant to the EPBC Act. The remainder of the project has not yet been referred.

Summary

Having particular regard to the:

- (a) the advice of the EPA Conservation Branch;
- (b) the small area and relative condition of the affected vegetation; and
- (c) the proponent's commitments

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

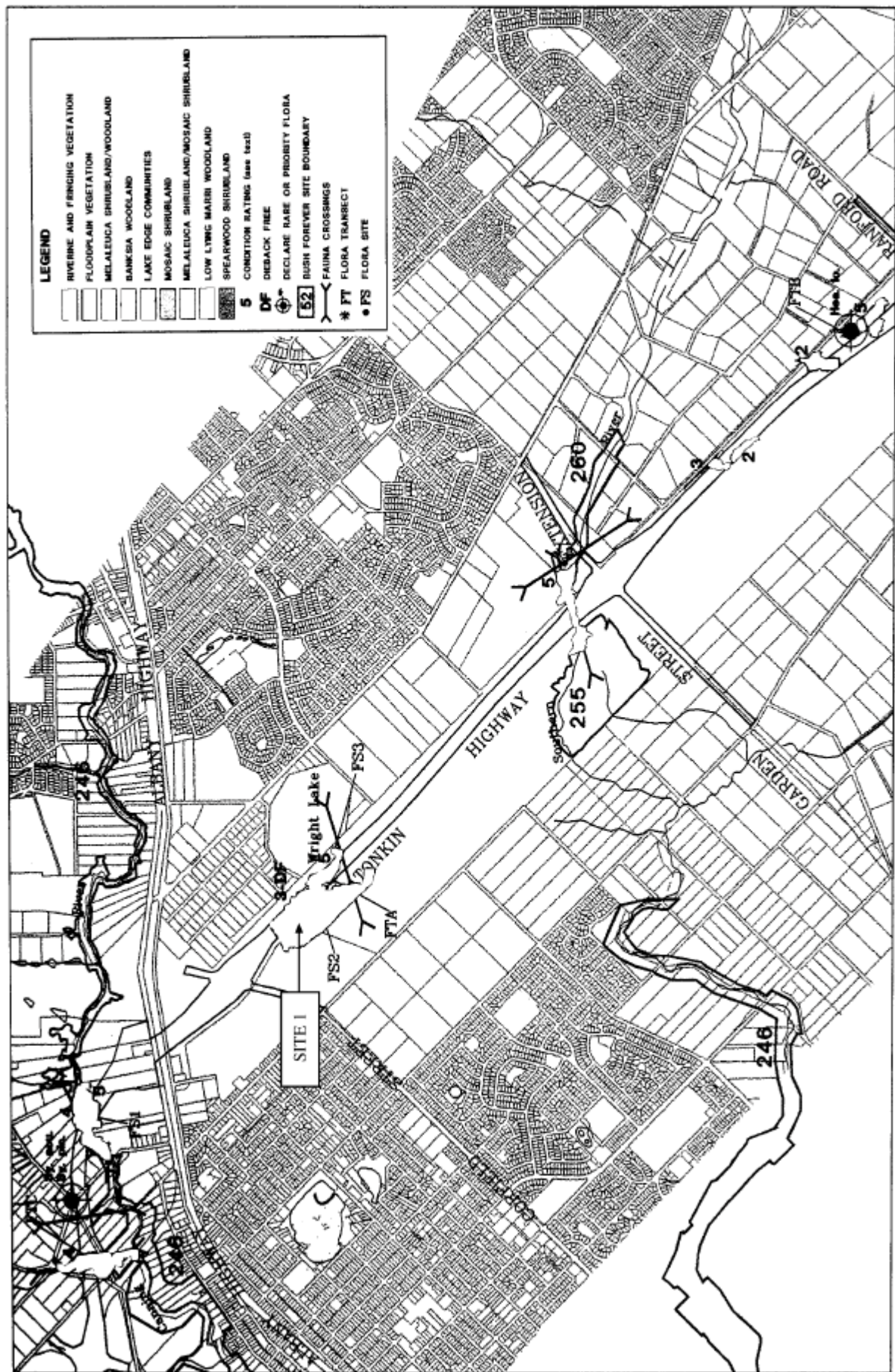


Figure 6a: Threatened Ecological Communities (Source: Tonkin Highway Extension PER BSD)

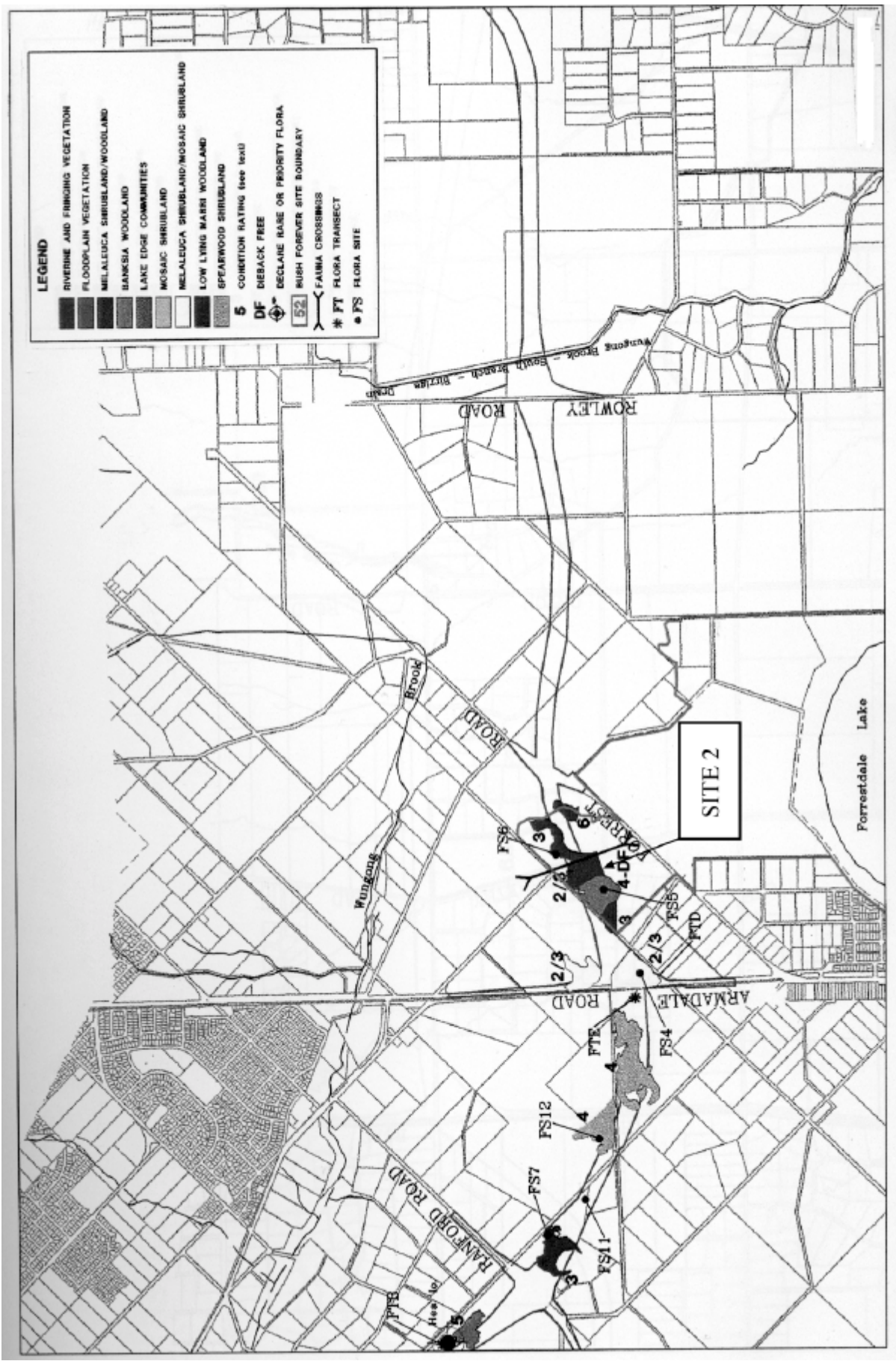


Figure 6b: Threatened Ecological Communities (Source: Tonkin Highway Extension PER BSD)

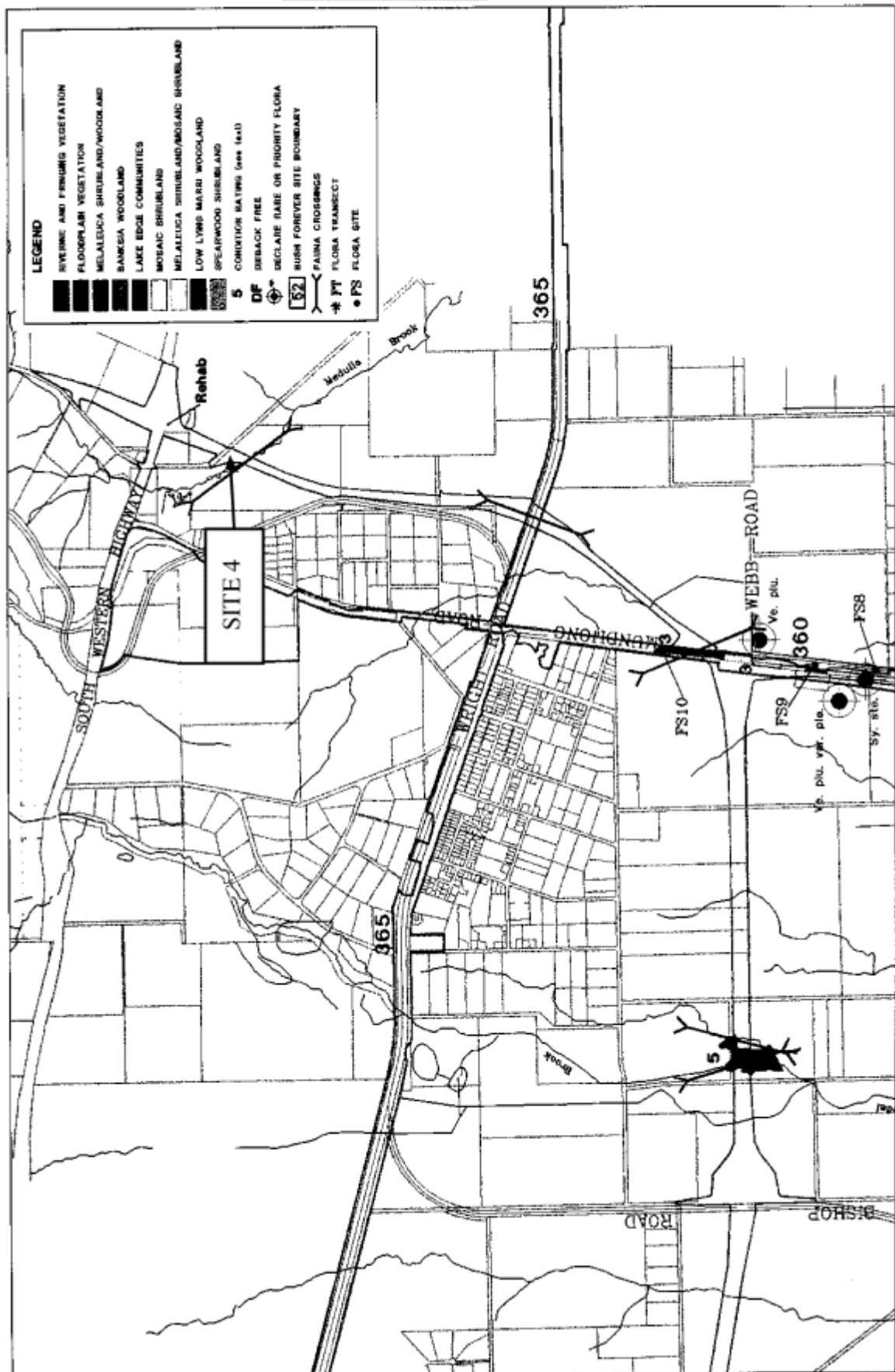


Figure 6d: Threatened Ecological Communities (Source: Tonkin Highway Extension PER BSD)

3.1.3 Mundijong Road Crossing

Description

Mundijong Road reserve has been recognised since the early 1990's as an important linear remnant vegetation link. It is a very narrow strip of vegetation along the southern side of Mundijong Road which is significant because of the extensive clearing on the eastern side of the Swan Coastal Plain and because it contains remnants of the various plant communities in this region.

The PER indicated the proposal would impact on the Mundijong Road reserve by clearing approximately 0.5 hectares of the Marri woodland community. The condition of the vegetation to be impacted was described as being significantly disturbed to completely degraded understorey with weeds. The proponent provided details of offsets for loss of this vegetation in the Mundijong Road Vegetation Mitigation Strategy.

Submissions

CALM's submission did not support the loss of vegetation at Mundijong Road outlined in the PER because of its significant conservation values which were identified as outstanding in terms of regionally significant bushland, threatened ecological communities, threatened flora, other significant flora, threatened fauna, significant regional linkage, Conservation Category wetlands, and contains plant communities representative of the eastern side of the Swan Coastal Plain.

CALM also considered the impacts of the upgrade of Mundijong, Webb and Watkins roads should also be assessed by the EPA before considering the current proposal and initially concluded that it could not support the section of the proposal south of Thomas Road. CALM submitted a number of detailed concerns about the proposed crossing of Mundijong Road, including an alternative junction for Mundijong Road and relocating the roundabout further north of the intersection.

Conservation groups and the Shire of Serpentine-Jarrahdale shared the concern about the proposed crossing of Mundijong Road in their submissions.

Assessment

The area considered for assessment of this factor is the footprint of the highway in the context of the Perth Metropolitan Region with specific reference to the crossing of Mundijong Road.

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

The EPA's environmental objective for Declared Rare Flora, Priority Flora and other significant flora is to protect Declared Rare and Priority Flora, consistent with the provisions of the *Wildlife Conservation Act 1950*, and to protect other flora of conservation significance.

The EPA guidelines also required a Mitigation Strategy to be prepared specifically for the Mundijong Road Interchange. The requirements were:

Vegetation Mitigation Strategy for the Mundijong Road Interchange

The proponent should prepare a Vegetation Mitigation Strategy to consider how the construction of the road will impact on bushland within the Mundijong Road interchange containing the Critically Endangered Vegetation Community.

The Vegetation Mitigation Strategy should consider:

- *The biological and environmental values of any vegetation to be impacted by the proposal within the Mundijong Road Critically Endangered Vegetation Community;*
- *The potential for the realignment of the road, avoid or minimise impacts on vegetation within the Mundijong Road Critically Endangered Vegetation Community;*
- *Measures to mitigate the loss of any biological and environmental values caused by the proposal.*

In considering the suitability of other vegetated land to mitigate the loss of any biological and environmental values caused by the proposal within the Mundijong Road Critically Endangered Vegetation Community:

- *Specific vegetation communities affected by the proposal;*
- *Specific vegetation communities on land proposed for acquisition to mitigate the loss of biological and environmental values caused by the proposal; and the*
- *Values and role of this vegetation in maintaining conservation values in the south-east Perth Metropolitan region.*

Mundijong Road was identified in the early 1990's as a significant roadside remnant in a series of reports and its value is reinforced in the *Bush Forever* report where it is recognised as Bush Forever Site 360. The Shire of Serpentine-Jarrahdale, in conjunction with local groups, has been carrying out weed control using Natural Heritage Trust funding and the vegetated strip is proposed to be set aside as a Nature Reserve to be vested with the Conservation Commission.

The EPA recognised the significance of the site when it required a mitigation strategy specifically for the loss of vegetation associated with the highway crossing of Mundijong Road.

With regard to the concerns of CALM concerning the impact on other roads in the vicinity, the EPA assessed the realignment of Mundijong Road between Lightbody Road and the Kwinana Freeway in Bulletin 952 as one of the proposals in the Metropolitan Region Scheme 991/33 – South West Districts Omnibus (No 3b). With regard to vegetation communities and Declared Rare and Priority Flora, the EPA noted in Bulletin 952 that, inter alia, "...the road widening will occur to the north of the existing road and that no significant remnant vegetation will be impacted by the road construction".

The Ministerial conditions for the realignment of Mundijong Road in Statement 546, are that “the Responsible Authority require the preparation of an Environmental Management Plan prior to the commencement of road construction which would include impacts and management of construction activities, stormwater drainage management, rehabilitation and revegetation strategies, maintenance and responsibilities for maintenance and implementation timing”. In this particular case, the Responsible Authority is the Western Australian Planning Commission (WAPC) and the road will be constructed by the Shire of Serpentine-Jarrahdale.

A CAH road reservation previously existed in the MRS between Mundijong in the east and Baldivis in the west called the Peel Deviation. The *South East Corridor Structure Plan* (MfP, 1994) indicated a change of zoning in the Mundijong area to urban and a realignment of the Peel Deviation to join South Western Highway further south than its current intersection. The EPA provided comment on the structure plan under Section 16 of the *Environmental Protection Act 1986* in Bulletin 798 (EPA, 1995). With regard to Threatened or Poorly Reserved Plant Communities requiring interim protection the EPA recommended that “road construction and batters must not impact on the Mundijong remnant bushland as shown on the maps showing the Threatened or Poorly Reserved Plant Communities Requiring Interim Protection” (recommendation 5).

Following consultation with CALM and other relevant government agencies, CALM now advises it agrees that the EPA has already assessed the proposals discussed above and that they do not form part of this assessment.

The EPA reiterates the advice from the previous assessment that the future upgrading of Mundijong Road and the construction of the Peel Deviation must not impact on remnant bushland. However, the EPA considers that the limited excision required for the Tonkin Highway will not excessively compromise the environmental values of this linear linkage provided all practical measures are taken to minimise the extent of excision and appropriate mitigation measures are adopted.

In this regard, Main Roads WA modified the proposal at Mundijong Road, as shown on Figures 7 and 8, as a result of the discussions with CALM and other relevant agencies. In discussions and site inspections of the proposed crossing of Mundijong Road, it was agreed that it was preferable to confine impacts to the FCT 3a “*Corymbia calophylla* – *Kingia australis* woodlands on heavy soils”, which is Critically Endangered, rather than the FCT 8/10 “Herb rich shrubland in clay pans/ Shrublands on dry clay flats”, which is Endangered. The reasons for this is that the TEC 8/10a is in better condition, contains DRF species, and could be impacted more heavily because it is a wetter site. Although there are other sections of Mundijong Road where the vegetation is more degraded, it is outside the Tonkin Highway road reservation and could not be accommodated because of urban zoning and existing development.

Main Roads WA has also agreed to modify the footprint of the crossing of Mundijong Road from approximately 0.5 hectare to 0.2 hectare. The proposed link from Mundijong Road south was moved to the north of Mundijong Road so that the vegetation is not impacted and the roundabout was moved further north and slightly further east to alter the angle of the cut and minimise the impact on the vegetation.

While carrying out the site inspections of the proposed new alignment through the road reserve of Mundijong Road, a new population of a DRF species *Tetraria australiensis* was located. The site inspection also revealed signs of Quenda diggings at the proposed crossing of Mundijong Road.

The EPA recommends that the area for the proposed crossing and within the immediate vicinity (approximately 50 – 80 metres either side of the cut) be surveyed to determine the extent and number of plants in this population. The proponent has agreed to carry out flora and fauna surveys of the Mundijong Road crossing and immediate vicinity to locate any listed species on the advice of CALM as part of the Vegetation Mitigation Strategy.

As discussed in Section 3.1, the proponent has agreed to undertake dieback management measures of the sites cited by CALM. This includes the Mundijong Road crossing.

In order to offset the loss of vegetation at Mundijong Road, Main Roads WA has given a commitment to work with local government and groups to contribute towards existing initiatives to restoring the Marri vegetation along Mundijong Road towards Paterson Road. This may include seed collection, weed control and revegetation. The measures will form part of the Vegetation Mitigation Strategy.

The proponent has also given a commitment to prepare the Vegetation Mitigation Strategy for Mundijong Road in consultation and cooperation with CALM, the Shire of Serpentine-Jarrahdale and local conservation groups.

Summary

Having particular regard to:

- (a) previous EPA assessments of Mundijong Road,
- (b) the small area of vegetation affected; and
- (c) the proponent's commitments,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

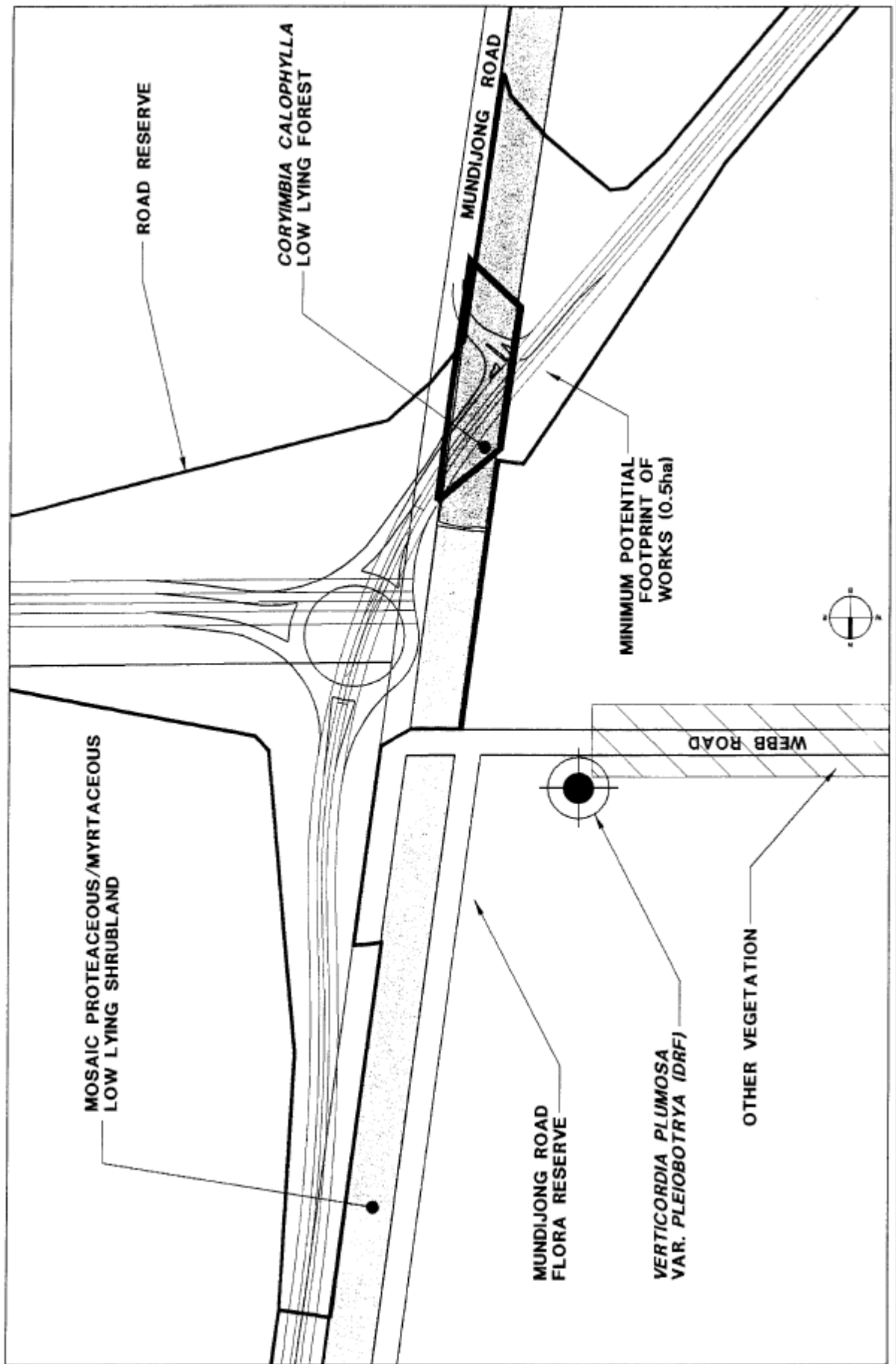


Figure 7: Mundijong Road crossing proposed in the PER

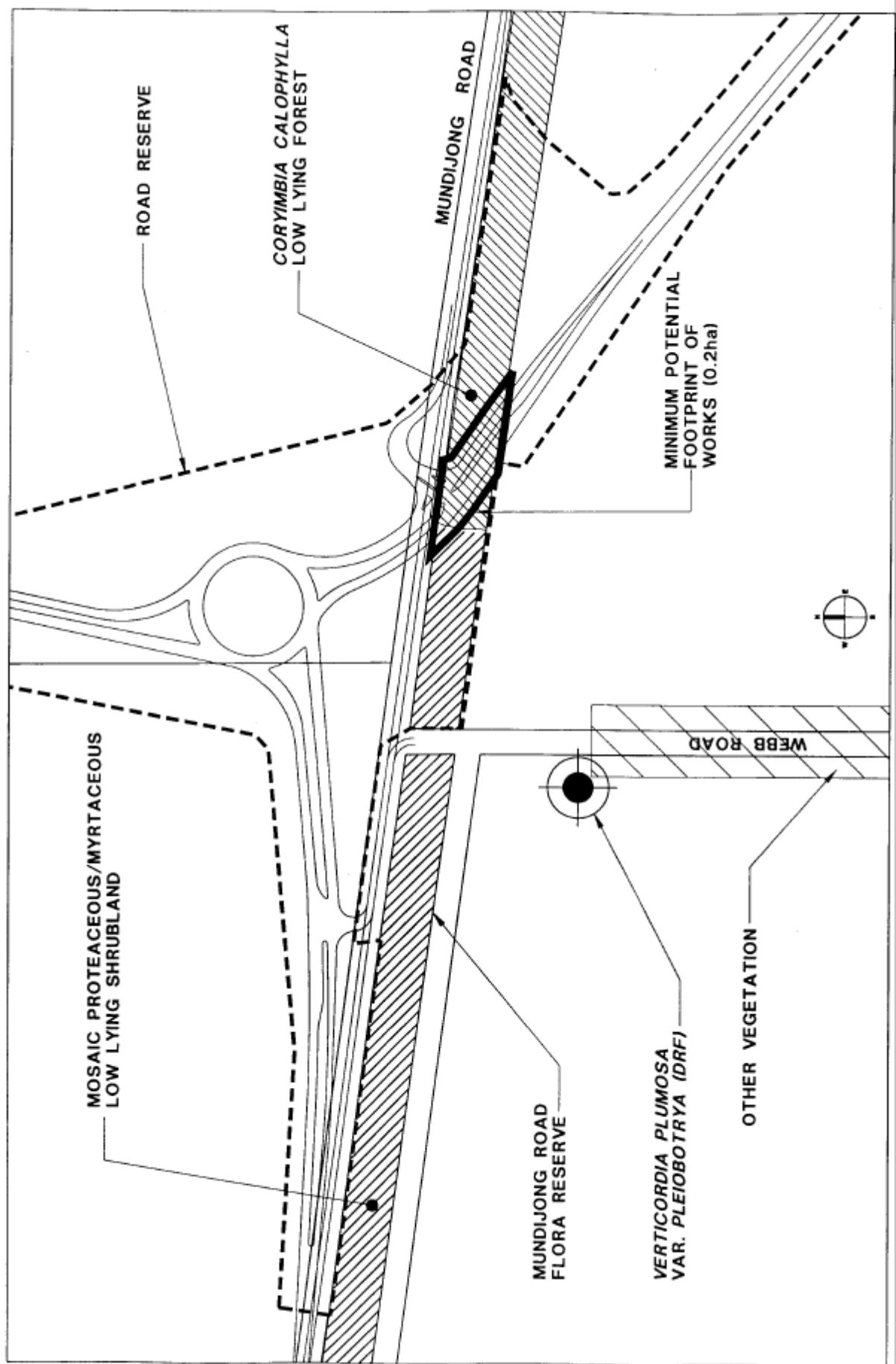


Figure 8: Modified Mundijong Road crossing

3.2 Wetlands

Description

The PER indicated the proposal would impact on a number of wetlands summarised as following:

Wetland Management Category	Maximum Area Impacted (hectares)
Conservation	15.13
Resource Enhancement	57.38
Multiple Use	260.74
TOTAL	330.25

The proponent prepared a Wetland Mitigation Strategy to mitigate against the loss of the wetlands according to the impact on each wetland category.

Submissions

Submissions from conservation groups questioned whether the proposal was in accordance with government policy for wetlands. They also questioned the effectiveness, timing, management and compensation measures of the Wetland Mitigation Strategy. A request was made to include watercourse wetlands into the strategy.

Wright Lake and the area at the junction of Armadale and Hanlin Roads, Forrestdale were mentioned specifically as important areas which will be lost as a result of the proposal.

Water & Rivers Commission (WRC) advised that the proponent had not followed the required protocol in re-evaluating the wetland categories, and questioned the part of the commitment regarding matching wetland attributes, functions and values between lost and acquired wetlands. This issue was also raised by conservation groups. Addressing the issue of adequate wetland buffers was also requested by WRC.

WRC raised a number of other detailed modifications to the Wetland Mitigation Strategy.

Replacing wetlands within an affected local authority was requested rather than within the south-east corridor as a whole.

WRC disagreed with the proposed use of created wetlands as drainage basins in intersections and along the alignment preferring instead there be a series of swales.

Assessment

The area considered for assessment of this factor is the footprint of the highway in the context of the Perth Metropolitan Region.

The EPA's environmental objective for this factor is to maintain the integrity, functions and environmental values of wetlands. The EPA guidelines also required the preparation of a Wetland Mitigation Strategy. The requirements were:

Wetland Mitigation Strategy

The proponent should develop a Wetland Mitigation Strategy for the purpose of providing mitigation (offsets) to adverse wetland impacts arising from the proposal.

It is expected that the strategy will be developed in consultation with the DEP and the Water & Rivers Commission.

The Wetland Mitigation Strategy should consider:

- *The biological and environmental values of wetlands to be impacted by the proposed highway as agreed by the Water & Rivers Commission;*
- *An appropriate mechanism for compensating losses for each wetland category; and*
- *Measures, including actions or acquisition of potential sites, to mitigate the loss of any biological and environmental values caused by the construction of the proposal.*

In considering the suitability of other wetlands to mitigate the loss of any biological and environmental values caused by the proposal, the EPA would be particularly cognisant of:

- *The specific category, or categories, of wetlands to be affected by the road construction;*
- *Vesting and proposed management of wetland areas proposed for acquisition to mitigate against the loss of any biological and environmental values caused by the road construction; and*
- *Values and role of these wetlands in maintaining conservation values in the south-east Perth Metropolitan region.*

The EPA released its Preliminary Statement No 4 *Environmental Protection of Wetlands and A Policy Framework for the Establishment of Wetland Banking Instruments in Western Australia* in June 2001 which outlined its position on wetlands. The Tonkin Highway extension utilised the principles contained in the two documents with the exception of a wetland bank as work has not advanced this to a workable stage yet.

The proponent has had a series of discussions and workshops with the EPA Service Unit and WRC staff in relation to the principles and approach to be applied to wetland mitigation for the project and there is now an agreed position on this matter. WRC recommended changes to the Wetland Mitigation Strategy flow diagram as shown in Figure 9 which outlines the process more precisely than the one in the PER. The EPA recommends the flow diagram be adopted as the approach through which the strategy will be developed.

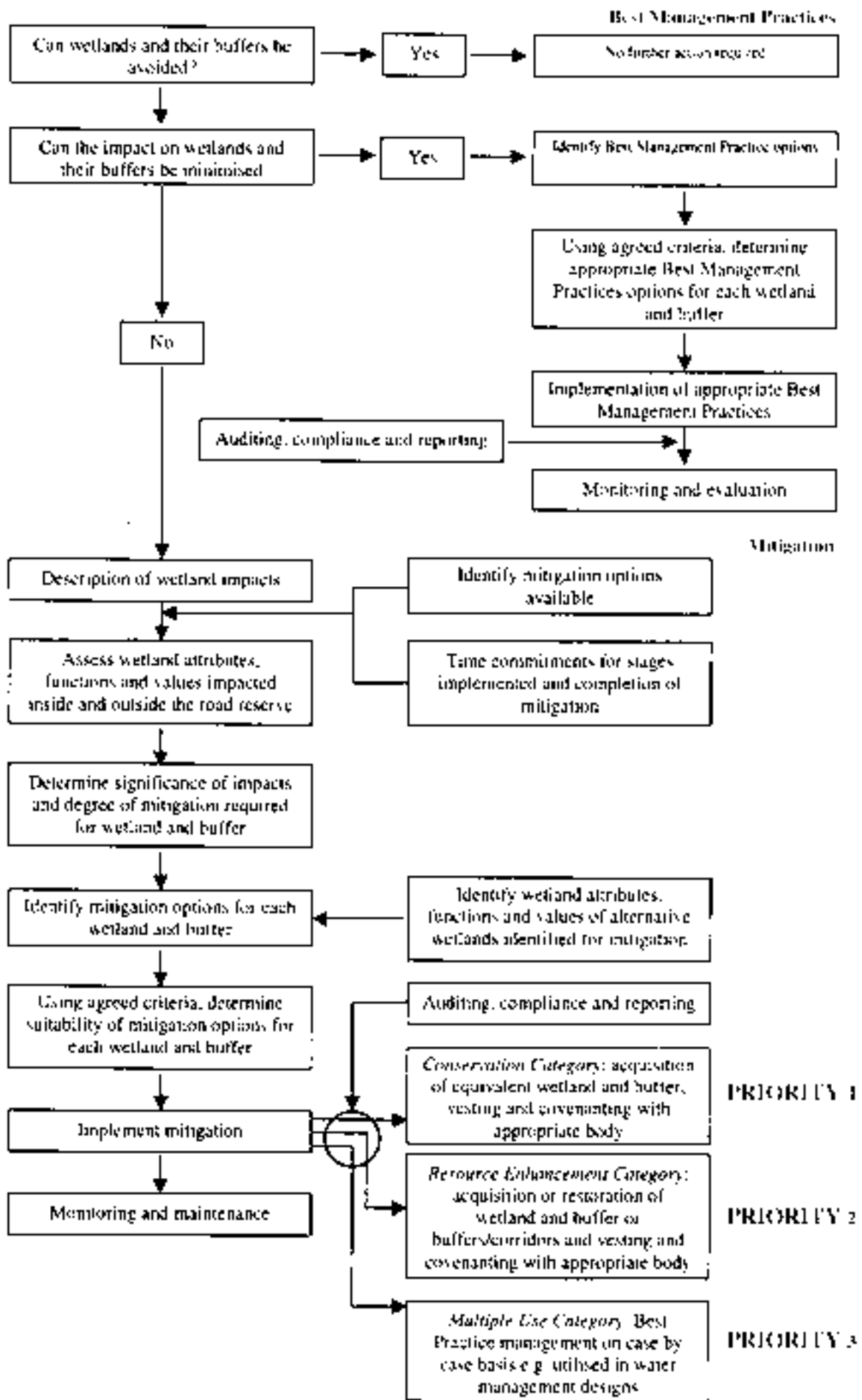


Figure 9: Wetland Mitigation Strategy

The Wetland Mitigation Strategy has established a number of broad principles to ensure the loss of wetlands will be adequately addressed in a timely and transparent way. These principles include:

- an impact on a wetland should be assessed in terms of the significance and degree of the impact and the functions and values of that wetland;
- the impact should be mitigated for depending on the category of wetland being impacted;
- a conservation category wetland can only be mitigated by acquisition of another equivalent wetland and buffer, vesting and covenanting with an appropriate management body;
- a resource enhancement category wetland can be mitigated by acquisition or restoration of wetland and buffer and or buffers/corridors and vesting and covenanting with an appropriate management body; and
- multiple use category wetland can be mitigated by Best Practice management on a case by case basis including water management designs.

The calculations for the areas of impacted wetlands included a re-evaluation of some of the wetland categories. WRC has a protocol in place for the categories to be re-evaluated and there is some minor disagreement between the proponent and the WRC as to whether the protocol has been properly adhered to. It will be necessary for the proponent to present the re-evaluation of the wetlands for confirmation through this mechanism as part of the Wetland Mitigation Strategy. It is not envisaged this will substantially alter the calculations of the various categories.

The WRC considers that, where a conservation category wetland is impacted either partially or wholly, the entire wetland should be mitigated against. This would be satisfactory if the wetland is minor, however, if the wetland is large, mitigation for the entire wetland may not be warranted. The EPA would expect, however, that all lost values and functions are mitigated for and the assessment of this loss needs to be undertaken in the context of the overall impact on individual wetlands as well as collectively.

Adequate buffers for management purposes were not considered in the PER and it is considered this should be included in the mitigation calculations. The proponent has given a commitment to address this matter in the Wetland Mitigation Strategy

It may not be possible to replace wetlands within the same local authority as this will depend on the number of wetlands fulfilling the criteria developed in the Mitigation Strategy being located in any given area. The strategy will endeavour to first find appropriate replacement wetlands in the south-east region, then the south-west region and then the broader metropolitan region.

The detailed modifications to the strategy requested by WRC can be addressed through the preparation of the strategy.

The EPA believes that the commitment to prepare a Wetland Mitigation Strategy contains adequate measures to address the impact on wetlands associated with the proposal and that the EPA's objectives for this issue can be met.

Summary

Having particular regard to:

- (a) the advice of Water & Rivers Commission, and
- (b) the proponent's commitments,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

3.3 Noise

Description

The construction and operation of the proposal has the potential to adversely impact on the amenity of existing and future noise sensitive premises in the vicinity of the highway.

Submissions

Two public submissions were received which requested further matters should be provided in the Noise Management Plan including liaison with the community and at least 4 weeks of public comment.

Concern was expressed at the lack of specific management actions identified for the Noise Management Plan and sought assurances this will be addressed.

The City of Armadale considered appropriate noise barriers should be implemented where areas are zoned Urban in the MRS.

Assessment

The area considered for assessment is the proposed highway and noise sensitive premises in its vicinity.

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

The PER modelled the noise impacts to meet a daytime and evening objective of 63 dB(A). The PER also examined a night time noise level of $L_{Aeq,Night}$ of 55 dB(A).

Staff of the EPA Service Unit have worked closely with the proponent to develop a position on how noise will be managed as part of the proposal. The Infrastructure Coordinating Committee Working Group on Noise of the Western Australian Planning Commission has concluded that an acceptable noise level of road impacts lies between 45 dB(A) and 55 dB(A) and the EPA believes that the Tonkin Highway should aim for this level for night.

Main Roads WA has given a commitment to prepare a Noise Management Plan which will examine the whole proposal to determine how noise impacts will be achieved for the various sections of the highway taking into consideration the topography, location of existing dwellings and noise management measures such as noise barriers and road surfaces.

The proponent has agreed to investigate and map existing dwellings within 500 metres of the proposal and to adopt best practicable measures to attain this noise level range. This will be achieved by using walls and appropriate road surface treatment, however, it may not be possible to reduce the levels sufficiently without acoustic treatment of the buildings.

Where areas are zoned for future development but not yet developed, the management of noise levels can be addressed as part of the urban design. Noise attenuation in the form of barriers would therefore not be the responsibility of the proponent to protect the amenity of future residents. It may, however, be possible to improve the road surface as road traffic increases. Main Roads WA will examine this as part of the Noise Management Plan (see below).

Main Roads WA has given a commitment to prepare and implement a Noise Management Plan which will include the following:

- Main Roads will undertake detailed noise modelling for the whole proposal taking into account topography, cadastral information, dwelling locations, road design (including elevation), road surfaces and traffic volumes;
- Main Roads WA will manage noise from the proposal such that existing residents are not exposed to a noise level above 55 dB(A) $L_{Aeq,Night}$;
- Main Roads WA will adopt a 'best practicable' approach such that a noise level below 55 dB(A) $L_{Aeq,Night}$ will be investigated and implemented;

Where future urban land has been zoned in the MRS Main Roads WA will allow land developers, where reasonable and appropriate, to construct noise management measures (noise walls or barriers) in the road reserve.

It is expected that, where the land is zoned urban in the MRS, land developers will be responsible through noise barriers, urban design and building construction for ensuring future residents are not exposed to a noise level above 55 dB(A) $L_{Aeq,Night}$.

The Noise Management Plan will be prepared on the advice of the DEP but will not be subject to further public scrutiny. The EPA believes there are adequate measures in the plan to ensure the amenity of current and future noise sensitive premises is not adversely affected.

Summary

Having particular regard to:

- (a) the proponent's commitments,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

4. Conditions and Commitments

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

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal and, following discussion with the proponent, the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject, if it is to be implemented.

4.1 Proponent's commitments

The proponent's commitments as set in the PER and subsequently modified, as shown in Appendix 4, should be made enforceable. These include:

1. Design and Construction Environmental Management Plan;
2. Landscape and Revegetation Strategy Plan;
3. Landscape and Revegetation Management Plan;
4. Vegetation Mitigation Strategy;
5. Fauna Crossings;
6. Wetland Mitigation Strategy;
7. Drainage Management Strategy; and
8. Noise Management Plan.

4.2 Recommended Conditions

Having considered the proponent's commitments and the information provided in this report, the EPA considers the proponent had provided adequate commitments to manage the proposal without the need for additional environmental conditions, if the proposal is approved for implementation. Matters addressed in the conditions are that the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4.

5. Conclusions

The EPA has considered the proposal by Main Roads Western Australia to design and construct the Tonkin Highway Extension from Mills Road West in Gosnells to South Western Highway in Mundijong.

The proposal will impact on eight Bush Forever sites, two vegetation complexes with less than 10% of the original extent remaining in the Perth Metropolitan region and approximately 15 hectares of conservation category wetlands and has the potential to impact adversely on noise sensitive premises in the vicinity. The EPA is satisfied that Main Roads Western Australia has undertaken to adopt all practicable measures to minimise impacts from the road construction and to implement responsible mitigation strategies for impacts on wetlands and vegetation where impacts are unavoidable.

The EPA has concluded that the proposal is capable of being managed in an environmentally acceptable manner such that it is most unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of its commitments.

6. Recommendations

Recommendations

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

1. That the Minister notes that the project being assessed is for the design and construction of the Tonkin Highway Extension from Mills Road West in Gosnells to South Western Highway in Mundijong.
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4, including the proponent's commitments;
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Appendix 1

List of submitters

Organisations:

Agriculture WA - Deputy Commissioner for Soil and Land Conservation
City of Armadale
City of Gosnells
Conservation Council of WA
Department of Conservation and Land Management
Department for Planning and Infrastructure
Epic Energy
Heritage Council
Palomino Reserve Catchment Group
Shire of Serpentine-Jarrahdale
Swan River Trust
Water and Rivers Commission
Western Power
Wetland Conservation Society
Wildflower Society of WA

Individual:

Dawson M and Gray C
Downsborough K
James D F
Sambrook J
Weeks T

Appendix 2

References

English V & Blyth J 1997, *Identifying and conserving threatened ecological communities (TECs) in the South West Botanical Province*, CALM, Perth.

Environmental Protection Authority 1995, *Draft South East Corridor Structure Plan; South East Corridor Metropolitan Region Scheme No 966/13; and Stormwater Management Strategy and plans for new urban development at Byford and Mundijong*, Bulletin 798, EPA, Perth.

Environmental Protection Authority 1999, *Metropolitan Region Scheme Amendment 991/33 – South West Districts Omnibus (No 3B)*, Bulletin 952, EPA, Perth.

Environmental Protection Authority 2001a, *A Policy Framework for the Establishment of Wetland Banking Instruments in Western Australia: draft for public comment*, the Authority, Perth.

Environmental Protection Authority 2001b, *Environmental Protection of Wetlands*, Preliminary Statement No 4, the Authority, Perth.

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Western Infrastructure 2001, *Tonkin Highway Extension: Public Environmental Review*, Western Infrastructure, Perth.

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Appendix 3

Summary of identification of relevant environmental factors

Summary of Identification of Relevant Environmental Factors

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
BIOPHYSICAL			
Terrestrial Flora Vegetation	Maintain the abundance, species diversity, geographic distribution and productivity of vegetation	<p>The Department of Conservation and Land Management expressed concern that vegetation complexes with <10% remaining, and which Bush Forever states there is a general presumption against clearing, would be lost.</p> <p>Two submissions mentioned the loss of Banksia woodland at Wright Lake. This vegetation has been documented as having conservation values.</p> <p>Submissions from CALM and other members of the public expect mitigation measures should be carried out for loss of native vegetation in same way as wetland loss will be mitigated against.</p> <p>The crossing of Mundijong Road was the subject of a number of submissions from members of the public, conservation groups, CALM and the DEP. The issues relate to the loss of 0.5 – 1.11 ha of Community Type 3a which is considered to be Critically Endangered. Mundijong Road is also Bush Forever site 360.</p> <p>The submissions expressed concern at the destruction or degradation of the BF site which has outstanding nature conservation values in terms of regionally significant bushland, threatened ecological communities, threatened flora, significant flora, and plant communities representative of the eastern side of the Swan Coastal Plain.</p> <p>Following negotiations with CALM, the submission was modified to reflect changes to the design of the Mundijong Road crossing prepared by the proponent.</p>	<p>Vegetation communities is considered to be a relevant environmental factor.</p> <p>Mundijong Road crossing is also considered to be a relevant environmental factor.</p>
Terrestrial Flora Bush Forever	Maintain the abundance, species diversity, geographic distribution and productivity of vegetation	The Bush Forever site of major concern in submissions was Site 360 (Mundijong Road), however, a number identified concern that the proposal would impact on other Bush Forever sites and opposed to any development which would cause adverse impacts to those sites.	Bush Forever is considered to be a relevant environmental factor.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
Terrestrial Flora Weeds and diseases, including dieback	Maintain the abundance, species diversity, geographic distribution and productivity of vegetation	<p>CALM expressed concern that weed species in the area are aggressive primary colonisers and are wind dispersed. CALM recommends a number of measures to minimise those effects.</p> <p>CALM also expressed concern that seed requirements would place significant pressure on small remnants and recommended seed orchards be established.</p> <p>CALM disagreed strongly with the suggestion that dieback management hygiene measures were required for one area only. CALM suggested 3 sites which they regard as dieback free and of high conservation value.</p>	Weeds and diseases, including dieback, is considered to be a relevant environmental factor.
Terrestrial Flora Declared Rare Flora, Priority Flora and other significant flora	Maintain the abundance, species diversity, geographic distribution and productivity of vegetation	<p>CALM advised it must be notified of any need to take Declared Rare or Priority which may be impacted by the proposal.</p> <p>A field inspection revealed the possible presence of a DRF species was noted. The proponent has given an undertaking to confirm the presence of any DRF and liaise with CALM if any are located.</p>	Declared Rare Flora, Priority Flora and other significant flora, is considered to be a relevant environmental factor.
Terrestrial Fauna including Specially Protected (Threatened) Fauna	Maintain the species abundance, diversity and geographical distribution of fauna Protect Specially Protected (Threatened) Fauna and Priority Fauna species and their habitats, consistent with the provisions of the <i>Wildlife Conservation Act 1950</i> and the <i>Environment Protection and Biodiversity Act 1999</i> .	<p>A number of submissions questioned the adequacy of the fauna underpasses in terms of the dimensions and the ability of fauna to escape predators.</p> <p>CALM considered the proposed fauna underpasses to be adequate.</p> <p>Other submissions commented on fencing at fauna crossings, bridges as fauna crossings, exclusion fencing to limit fauna deaths during construction, storage of materials for reintroduction as fauna habitat and signs to raise awareness of native fauna in the road reserve.</p> <p>Main Roads WA has indicated it would welcome any comments from local government and other with regard to the fauna underpasses and evasion of fauna while constructing the proposal. They have also indicated they will address the matter of storage of material in the relevant management plan and may erect signs where there is significant fauna habitat.</p>	Terrestrial fauna including Specially Protected (Threatened) Fauna, is considered to be a relevant environmental factor.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
Wetlands	Maintain the integrity, functions and environmental values of wetlands.	<p>Water & Rivers Commission commented that the re-evaluation of some of the wetlands had not followed their protocol, that the proponent had not adequately addressed the potential impact of removing parts of wetlands and were critical of elements of the Wetland Mitigation Strategy. They submitted an amended flow diagram to illustrate the desired concept of the strategy.</p> <p>Public submissions commented on specific areas of wetlands near Wright Lake and the junction of Hanlin and Armadale Roads.</p> <p>Other public submissions commented on the Wetland Mitigation Strategy and the necessity for protection of wetlands as an utmost priority in the design of the project.</p> <p>Main Roads WA has given a commitment to implementing the Wetland Mitigation Strategy which has been developed in consultation with the WRC. Modifications have been made to the strategy during the assessment process.</p>	Wetlands is considered to be a relevant environmental factor.
Watercourses and rivers	Maintain the integrity, functions and environmental values of watercourses and rivers.	<p>Three submissions were received on this factor, one regarding including the Canning River in the Wetland Mitigation Strategy and the second relating to barriers to natural flow. The third submission requested matters be included in the Drainage Management Strategy.</p> <p>These matters are considered minor and manageable.</p>	Watercourses and rivers is not considered to be a relevant environmental factor.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Air Gases	Ensure that gaseous emissions do not adversely affect the environment or health, welfare and amenity of nearby land users by meeting the statutory requirements (including Section 51 of the <i>Environmental Protection Act 1986</i>) and acceptable standards. Ensure consistency with the <i>Ambient Air Quality NEPM 1998</i> so that gaseous emissions, both individually and cumulatively, meet appropriate criteria and do not cause environmental or human health problems; and discharge of gaseous emissions is minimised.	One submission put forward the view that Main Roads WA should have projected future traffic figures to enable the prediction of future impacts on air quality. The proponent has responded that the PER demonstrated that NEPM air quality standards could be met using predicted traffic volumes and air quality measurements carried out within 50 metres of the roadside.	Air gases is not considered to be a relevant environmental factor.
Water Surface water quality - contamination with pollutants in road runoff	Ensure that the beneficial uses of surface water can be maintained, consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA, 1993).	The Swan River Trust and the WRC advised the proposed stormwater management strategy was not acceptable and should be modified to comply with the principles of Water Sensitive Urban Design and the approach should include source control and a 'treatment train' rather than detention basins. Main Roads WA has given a commitment to amend the Drainage Management Strategy in accordance with the submission. Swan River Trust advised of the need to include oil interceptors and oil traps to minimise the risk of a significant oil spill entering the Canning and Southern Rivers. Main Roads WA has given a commitment to address this matter in the Drainage Management Strategy.	Surface water quality is considered to be a relevant environmental factor.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		<p>One submission advised drainage basins should not be located over contaminated sites with a suggestion that one basin might be located over such a site. Main Roads WA will minimise the use of drainage basins in the proposal and will address this issue in the Design and Construction Environmental Management Plan.</p> <p>One submission appointed out that monitoring of the groundwater around the rivers should be carried out during construction. The proponent has already prepared a 5 year water quality monitoring program as part of the commitment to prepare the Drainage Management Strategy.</p>	
Non-chemical emissions Noise and vibration	Protect the amenity of residents from noise and vibration impacts resulting from activities associated with the construction and operation of the proposal by ensuring that noise and vibration levels meet statutory requirements and acceptable standards.	<p>Two public submissions were received which requested further matters should be provided in the Noise Management Plan including liaison with the community and at least 4 weeks of public comment.</p> <p>Concern was expressed at the lack of specific management actions identified for the Noise Management Plan and sought assurances this will be addressed.</p> <p>The City of Armadale considered appropriate noise barriers should be implemented where areas are zoned Urban in the MRS.</p> <p>The proponent has developed the principles of a Noise Management Plan in full consultation with the EPA Service Unit and DEP. The matters identified in the submissions will be addressed in this plan.</p> <p>No submissions were received on the factor of vibration.</p>	Noise is considered to be a relevant environmental factor.
Non-chemical emissions Dust	Not identified as a factor in the guidelines	<p>Two public submissions expressed concern about dust, one stating that dust is already a problem especially in the area between Railway Avenue and Wright Lake and that this increase with construction activities.</p> <p>The other submission suggested specific measures to deal with this issue.</p> <p>The proponent has given a commitment to prepare a Design and Construction Environmental Management Plan which will address this issue.</p>	Dust is considered to be a relevant environmental factor.
Contaminated sites	Ensure that the proposal does not impact on any contaminated sites	No submissions were received on this issue.	Contaminated sites is not considered to be a relevant environmental factor.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
Public risk and safety	Ensure that risk is managed to meet the EPA's criteria for individual fatality risk off-site and the Department of Minerals and Energy's requirements in respect of public safety.	No submissions were received on this issue.	Public risk and safety is not considered to be a relevant environmental factor.
SOCIAL SURROUNDINGS			
Aesthetic Visual Amenity	Ensure that visual amenity of the area is not significantly affected by implementation of the proposal.	<p>Three public submissions were received about screening of works in Eileen Street Gosnells through mature Sheoaks to screen the view and minimise noise impacts; highway lighting and additions to the Landscape, Revegetation and Amenity Strategy Plan.</p> <p>The City of Gosnells expressed a wish that the Highway should be treated as the 'Gateway' to the City where it crosses Albany Highway.</p> <p>Main Roads has advised it will address these concerns through consultation with local government and the community in preparing road design and the Landscape, Revegetation and Amenity Strategy Plan.</p>	Visual Amenity is considered to be a relevant environmental factor.
Traffic Local Traffic Management	Maintain safe and effective local traffic flow on the local road network arising from the proposal dissecting the existing network and interrupting existing traffic patterns.	<p>Two submissions were received regarding the connection from Webb Road to Mundijong Road and an overpass at Abernethy Road requested by the Shire of Serpentine-Jarrahdale.</p> <p>Main Roads WA has advised the ultimate connection from Webb Road has not been determined yet and it would be premature to depict this.</p> <p>Main Roads WA has also advised a fly over cannot be justified based on the number of vehicles. The proponent does not intend to provide an at grade intersection but is continuing discussions with the Shire of Serpentine-Jarrahdale on this issue.</p>	Local Traffic Management is not considered to be a relevant environmental factor.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
Culture Aboriginal culture and heritage	Ensure that changes to the biological and physical environment resulting from the proposal do not adversely affect cultural associations with the area. Ensure that the proposal complies with the requirements of the <i>Aboriginal Heritage Act 1972</i> .	The Aboriginal Affairs Department advised an application in relation to the project was considered by the Aboriginal Cultural Material Committee and, provided conditions resulting from the Minister's decision in relation to that application are implemented, the Department is satisfied any aspects relevant to Aboriginal heritage will have been satisfactorily addressed.	Aboriginal culture and heritage is not considered to be a relevant environmental factor.
European culture and heritage	Ensure that changes to the biological and physical environment resulting from the proposal do not adversely affect cultural associations with the area. Ensure that the proposal complies with the <i>Heritage of Western Australia Act 1990</i> .	The Heritage Council expressed concern that some places on various heritage registers may be affected by the proposal. Main Roads WA has advised there will be no direct impacts on significant European heritage buildings and any potential impacts and management will be addressed through the Design and Construction Environmental Management Plan.	European culture and heritage is not considered to be a relevant environmental factor.

Appendix 4

Proponent's Consolidated Commitments

RECOMMENDED CONDITIONS AND PROCEDURES

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

CONSTRUCTION AND USE OF THE TONKIN HIGHWAY EXTENSION FROM MILLS
ROAD WEST, GOSNELLS TO SOUTH WESTERN HIGHWAY, MUNDIJONG

Proposal: The design, construction and use of the Tonkin Highway extension from Mills Road in Gosnells to South Western Highway in Mundijong, as documented in schedule 1 of this statement.

Proponent: Main Roads Western Australia

Proponent Address: PO Box 6202, PERTH WA 6892

Assessment Number: 1367

Report of the Environmental Protection Authority: Bulletin 1043

Procedural conditions

1 Implementation and Changes

- 1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.
- 1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.
- 1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is not substantial, the proponent may implement those changes upon receipt of written advice.

2 Proponent Commitments

- 2-1 The proponent shall implement the environmental management commitments documented in schedule 2 of this statement.
- 2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of the conditions in this statement.

3 Proponent Nomination and Contact Details

- 3-1 The proponent for the time being nominated by the Minister for the Environment and Heritage under section 38(6) or (7) of the Environmental Protection Act 1986 is responsible for the implementation of the proposal until such time as the Minister for the Environment and Heritage has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.
- 3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.
- 3-3 The nominated proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

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

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

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

- 4-3 The application shall demonstrate that:

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

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

Environmental conditions

5 Compliance Audit and Performance Review

- 5-1 The proponent shall prepare an audit program in consultation with and submit compliance reports to the Department of Environmental Protection which address:
- the implementation of the proposal as defined in schedule 1 of this statement;
 - evidence of compliance with the conditions and commitments; and

- the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the Environmental Protection Act 1986, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement. Usually, the Department of Environmental Protection prepares an audit table that can be utilised by the proponent, if required, to prepare an audit program to ensure the proposal is implemented as required. The Chief Executive Officer is responsible for the preparation of written advice to the proponent, which is signed off by either the Minister or, under an endorsed condition clearance process, a delegate within the Environmental Protection Authority or the Department of Environmental Protection that the requirements have been met.

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

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

Schedule 1

The Proposal (Assessment No. 1367)

The proposal is to design, construct and use the extension of the Tonkin Highway from Mills Road West to South Western Highway. The highway is approximately 32 km in length and includes the design, construction and use of a highway of six lanes from Mills road West to Mundijong Road and four lanes from Mundijong road to South Western Highway within the footprint depicted in Figures 1 & 2.

The road construction will largely be contained within the existing Metropolitan Region Scheme reservation but will extend beyond to a minor extent in some areas.

Table 1: Key Characteristics of Approved Proposal

Element	Description
Proposal Description	Design, construction and use of a highway of six lanes from Mills Road West to Mundijong Road and four lanes from Mundijong Road to South Western Highway (ultimate) within the 'footprint' depicted on Figures 1 & 2. The proposal includes construction of all road pavements, access roads, drainage basins, drains, medians, 'at grade' intersections, 'grade separated' interchanges, ramps, traffic signals, associated earth works, dual use paths, bridges, culverts, lighting, noise barriers, under passes, over passes, fencing, landscaping and signs.
Length of highway	Approximately 32 kilometres.
Area of road reserve	Approximately 416 hectares.
Typical cross-section (3 lanes)	6 metres for drains, 33 metres for pavement and shoulder, 10 metres for median, 4.5 metres for dual use path (53.5 metres total).
Typical cross-section (2 lanes)	6 metres for drains, 25 metres for pavement, shoulder and verge, 4 metres for median, 3.5 metres for dual use path (38.5 metres total).
Road area	Approximately 190 hectares (includes interchanges).
Area of construction	Approximately 260 hectares (includes batters and drainage basins).
Area to be revegetated	Approximately 250 hectares (includes batters and drainage basins).

Element	Description
Construction duration	The highway will be constructed and upgraded in stages from Gosnells to Mundijong. Lanes will be added over time and at grade intersections will be replaced with grade separated interchanges, as traffic demand increases. It is expected that construction will occur to Armadale Road by 2004 and to the South Western Highway by 2006.
Grade separated intersections and connections	Mills Road East and West *, Albany Highway, Corfield Street, Champion Drive *, Ranford Road, *, Armadale Road, Forrest Road*, Rowley Road*, Thomas Road*, Orton Road*, Bishop Road, Mundijong Road*(roundabout), Shanley Road* and South Western Highway*. * Initially 'at grade' intersections.
Bridges	Canning River, two bridges Southern River, one bridge; and Wright Street one bridge.
General Standard of Design and Construction	Design Speed 80-100 km/hr Austroads and Main Roads Western Australian standards.
Construction material source	Road mostly constructed on fill. All materials sourced by Design and Construction contractor from approved sources (eg sand mines) and suppliers.

Definitions

'Footprint': the actual area which will be used for the highway

'At grade'intersection: an intersection with both roads on the same level.

Figures Attached

Figure 1: Locality of the Tonkin Highway extension within the south-east Metropolitan region.

Figure 2: (sheets a-d) Footprint of the proposed extension.

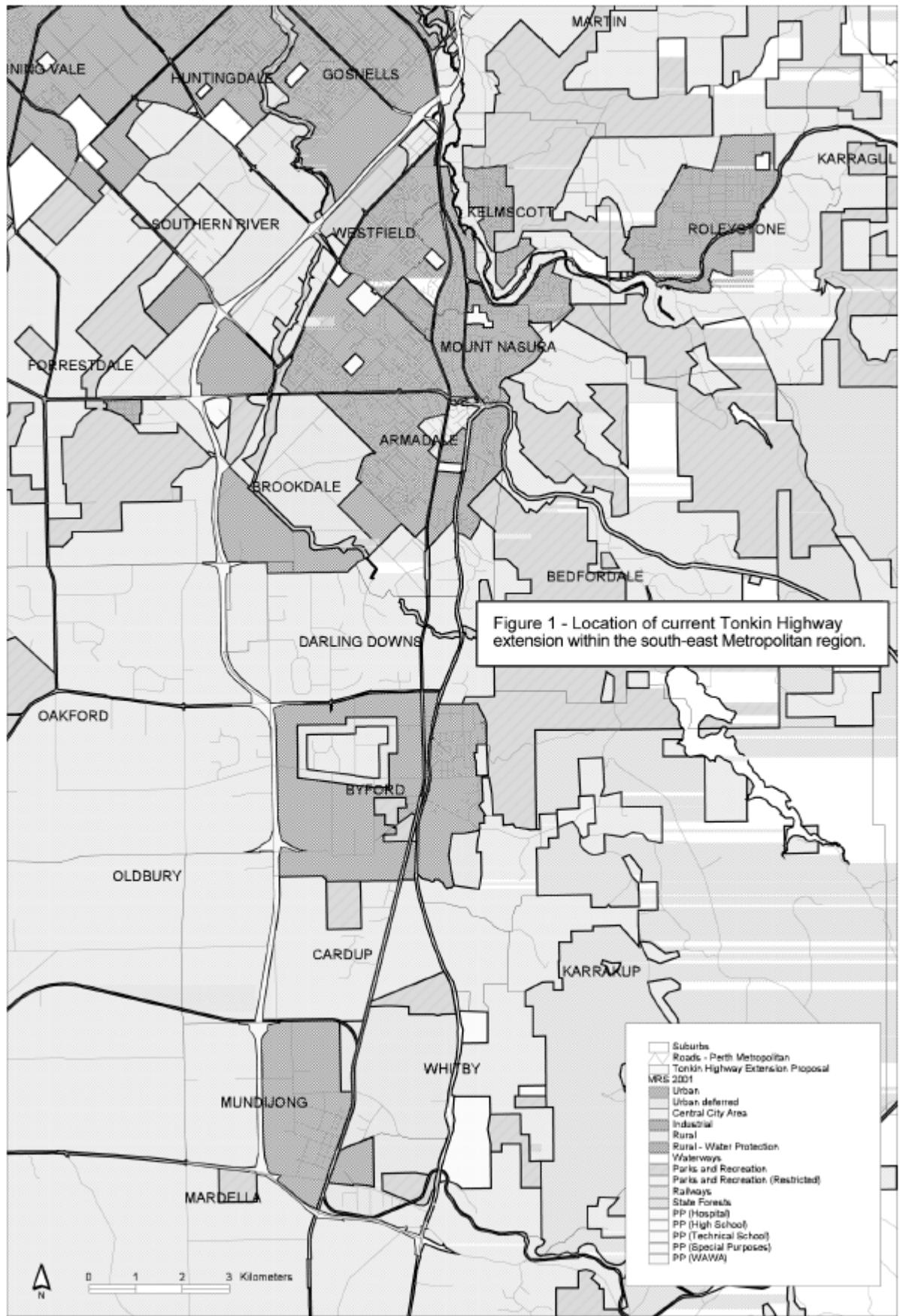


Figure 1: Location of current Tonkin Highway extension within the south-east Metropolitan region.

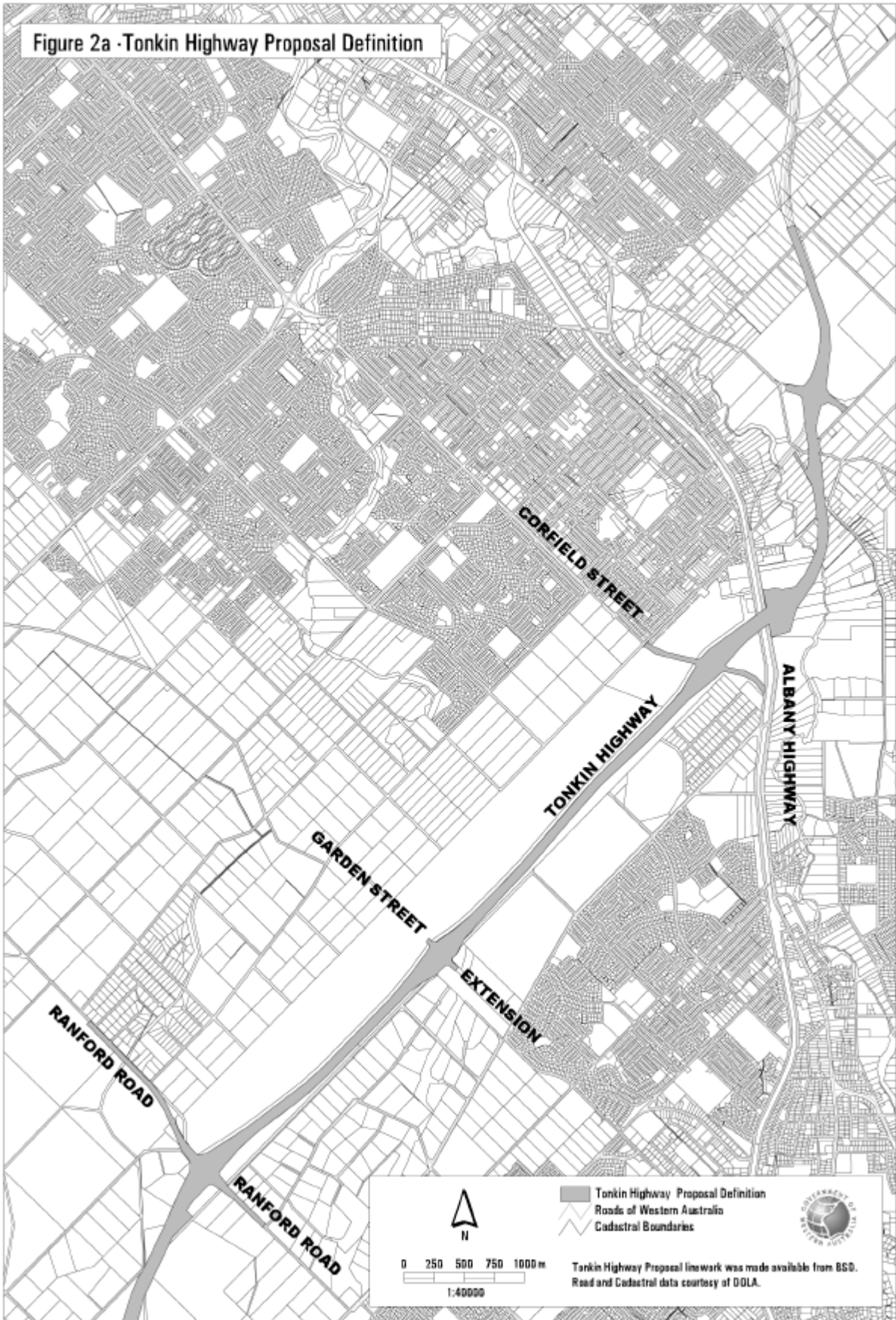


Figure 2a: Footprint of the proposed extension.



Figure 2b: Footprint of the proposed extension.

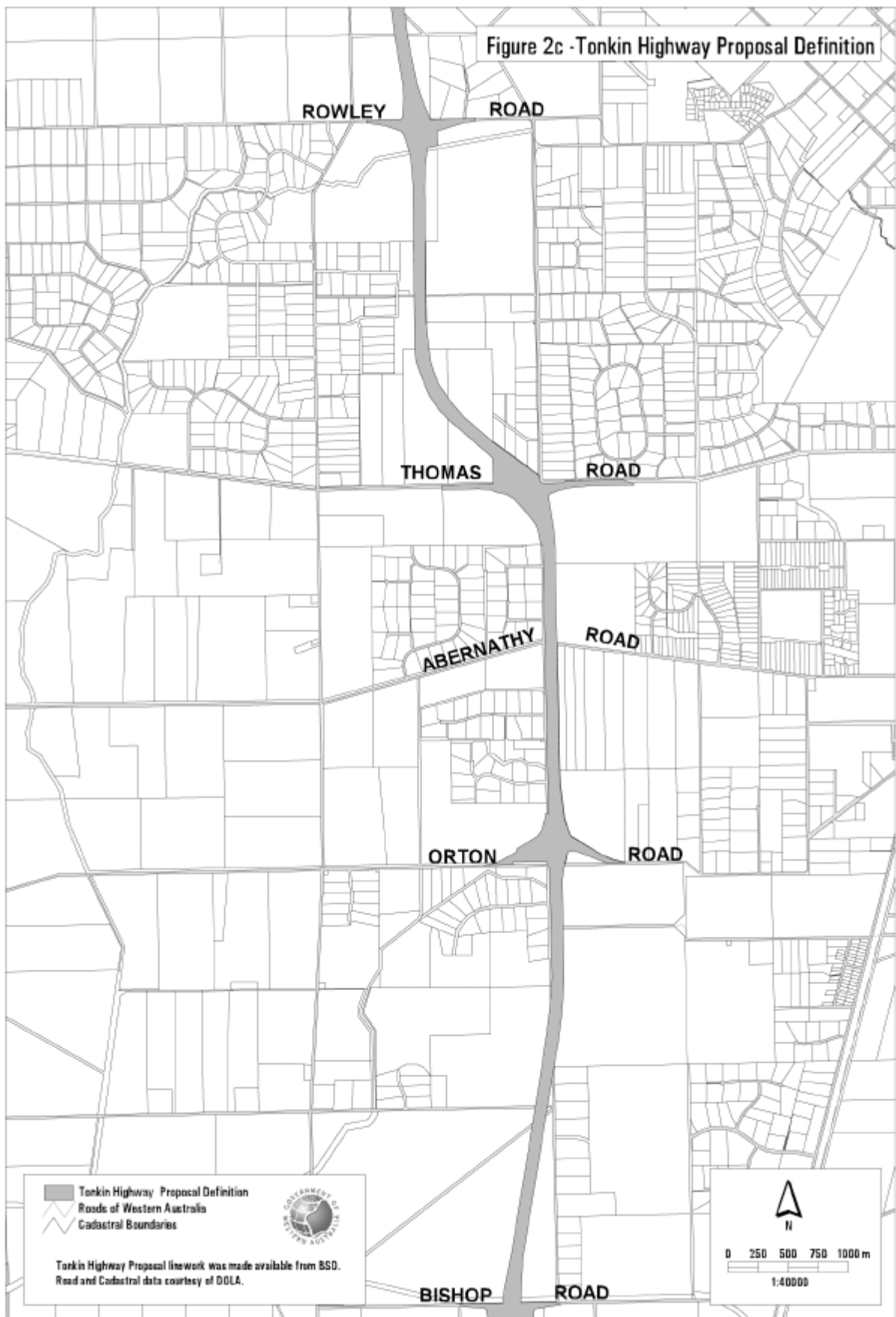


Figure 2c: Footprint of the proposed extension

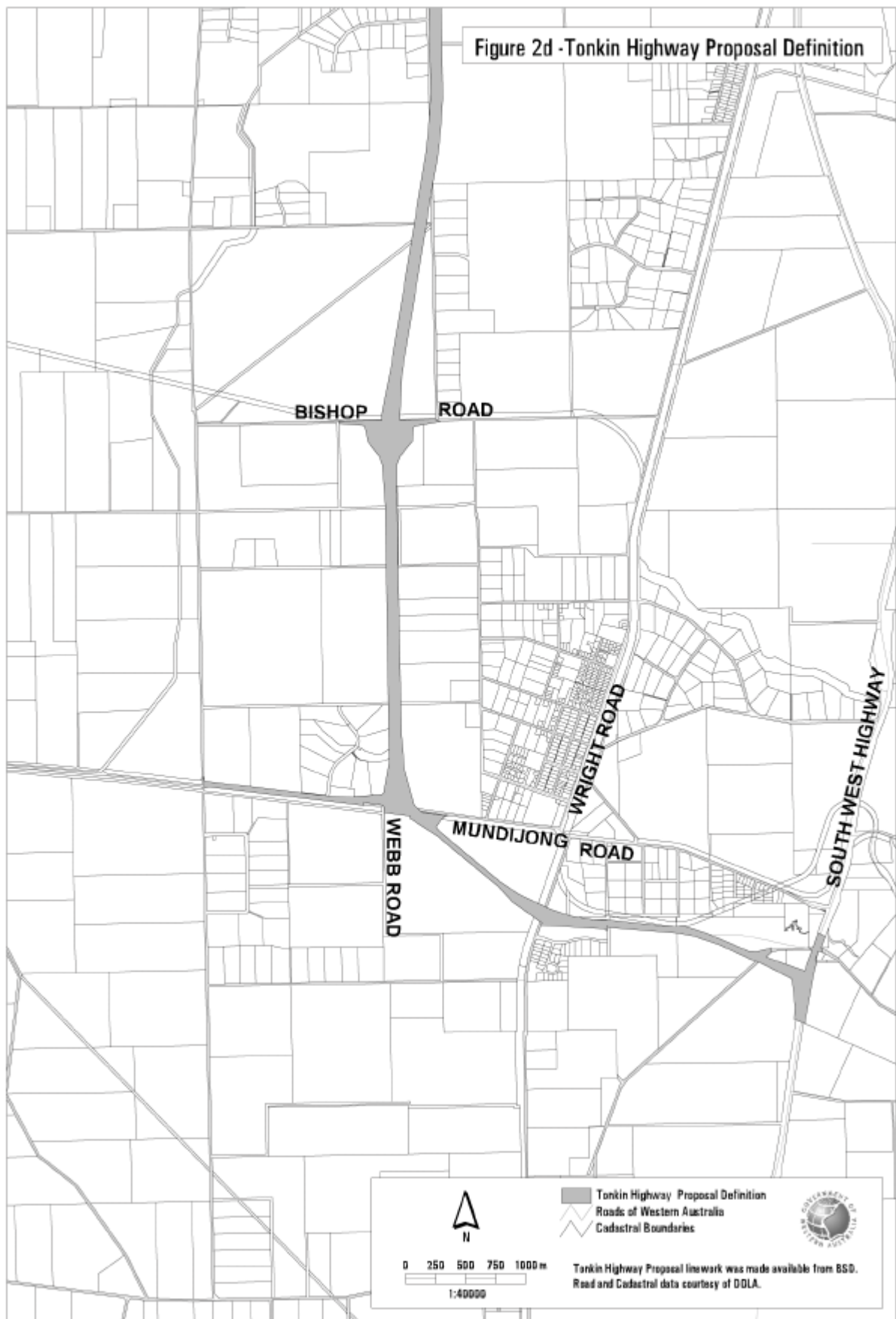


Figure 2d: Footprint of the proposed extension.

Proponent's Environmental Management Commitments

February 2002

***TONKIN HIGHWAY EXTENSION FROM MILLS
ROAD WEST, GOSNELLS TO SOUTH WESTERN
HIGHWAY, MUNDIJONG***

(Assessment No. 1367)

Main Roads Western Australia

TONKIN HIGHWAY EXTENSION FROM MILLS ROAD WEST, GOSNELLS TO SOUTH WESTERN HIGHWAY, MUNDIJONG (ASSESSMENT NO 1367)

	Topic	Action	Objective	Timing	Advice
1.	Design and Construction Environmental Management Plan	<p>Prepare a Design and Construction Environmental Management Plan which addresses:</p> <ul style="list-style-type: none"> • measures to limit clearing (eg. exclusion fencing & retaining walls at Mundijong Road); • environmentally significant areas; • protection of Declared Rare & Priority flora (e.g. <i>Tetraria australiensis</i>–Mundijong Road); • hygiene measures to minimise the spread of diseases (ie. dieback – Area 1 (north of Wright Lake), Areas 4 (~400m south of Armadale Road) and 5 (Mundijong Road) and weeds; • water quality, erosion and sedimentation control; • construction noise and vibration; • Aboriginal and European heritage; • Property condition surveys; • dust management; • fire management; • registers of waste materials/contamination, monitoring and site audit sheets; • movement, storage and refuelling of machinery during construction; • storage and handling procedures for all construction materials and hazardous chemicals; • hazardous spill contingency plan; • contamination contingency plan; • potential contamination at Pt. Lot 19 Manning Road & Lot 1 Shanley Road; • dewatering and water supply; • description of environmental standards, safeguards & emergency responses; • schedules for corrective action and verifications; • licensing requirements and approvals; • management structure and reporting; • community liaison; • environmental briefing/training/induction of personnel; • monitoring; and • progress and compliance reporting. 	<p>Ensure that construction (direct and indirect) impacts are minimised on flora, fauna, wetlands, significant flora, Bush Forever sites, surface and groundwater quality, nearby residents and buildings, Aboriginal and European heritage sites.</p>	<p>Prior to site preparation work commencing.</p>	

	Topic	Action	Objective	Timing	Advice
2.	Design and Construction Environmental Management Plan	Implement the Design and Construction Environmental Management Plan required by Commitment 1.	Achieve the objectives of Commitment 1.	During construction.	
3.	Landscape and Revegetation Strategy Plan	Prepare a Landscape and Revegetation Strategy Plan which addresses: <ul style="list-style-type: none"> • visual amenity and wetland creation & enhancement; • plant/seed source and propagation methods; • fertilisation and irrigation if appropriate/required; • topsoil management and compaction; • mulching and soil stabilisation; • weed control; • soil and plant source material hygiene; • timing and implementation schedule; • monitoring and completion criteria; • landscaping maintenance; and • progress and compliance reporting. 	Minimise impact on vegetation, fauna, significant flora, Bush Forever sites, wetlands, water quality and visual amenity. Provide linkages, habitat and impact mitigation.	Prior to site preparation work commencing.	
4.	Landscape & Revegetation Management Plan	Prepare a Landscape and Revegetation Management Plan consistent with Commitment 3.	Provide greater detail consistent with the objectives in Commitment 3.	During design & site preparation works but before construction of each stage(s).	
5.	Landscape & Revegetation Management Plan	Implement the Landscape and Revegetation Management Plan required by Commitment 4.	Achieve the objectives of Commitment 3.	During construction.	
6.	Vegetation Mitigation Strategy	Prepare a Vegetation Mitigation Strategy to offset the loss of vegetation on the southern side of Mundijong Road and dryland Threatened Ecological Communities along the highway. The Strategy will address: <ul style="list-style-type: none"> • weed control; • access control; • interface and edge effects with Tonkin Highway; • rehabilitation of old materials dump area near the rail crossing; • conduct flora and fauna surveys of the Mundijong Road crossing area to locate any 	Minimise impacts on vegetation along Mundijong Road and comply with the Wildlife Conservation Act 1950. Mitigate for the loss of vegetation at Mundijong Road and dryland Threatened Ecological Communities along the proposal.	Submit for approval prior to 31 December 2002.	CALM (for Mundijong Road Crossing)

	Topic	Action	Objective	Timing	Advice
		<p>listed species;</p> <ul style="list-style-type: none"> restoration of Marri vegetation along Mundijong Road (eastwards to Paterson Road) rehabilitation or acquisition of other suitable sites to mitigate dryland Threatened Ecological Communities (eg. Bush Forever site 345); professional seed collection for inclusion in future restoration programs in the Marri Woodland Community; and provision of educational or informative signage. 			
7.	Vegetation Mitigation Strategy	Implement the Vegetation Mitigation Strategy referred to in Commitment 6.	Achieve the objectives of Commitment 6.	Progressively and within 12 months of vegetation being lost/impacted or as soon as practicable.	
8.	Fauna crossings	Provide fauna crossings.	Minimise impact on fauna.	During construction.	
9.	Wetland Mitigation Strategy	<p>Prepare a Wetland Mitigation Strategy in consultation with key stakeholders, including community and conservation groups which addresses:</p> <ul style="list-style-type: none"> assessment of values and functions lost and gained; details of wetlands to be acquired; specific areas/lots for wetlands enhancement and creation; vesting and long term management responsibility of wetlands outside the road reserve; landscaping and revegetation; drainage management; monitoring and maintenance; and compliance reporting. 	Minimise impacts on wetlands to achieve no net loss of values & functions.	During design & site preparation work.	WRC
10.	Wetland Mitigation Strategy	Implement the Wetland Mitigation Strategy referred to in Commitment 9.	Achieve the objectives of Commitment 9.	Progressively and within 3 to 4 years of particular wetlands being lost/impacted or as soon as practicable.	
11.	Drainage Management Strategy	<p>Prepare a Drainage Management Strategy which addresses:</p> <ul style="list-style-type: none"> an assessment of the expected stormwater treatment efficiency of the drainage system and justification that the system incorporates all of the principles of current best practice (i.e. source control and treatment train approach); landscaping and amelioration (eg. red mud); and a five year water quality monitoring program. 	Minimise impacts on surface and groundwater quality from storm water and vehicle accidents.	Prior to construction of drainage infrastructure.	WRC

	Topic	Action	Objective	Timing	Advice
12.	Drainage Management Strategy	Implement the Drainage Management Strategy required by Commitment 11.	Achieve the objectives of Commitment 11.	During construction of drainage infrastructure.	
13.	Noise Management Plan	<p>Prepare a Noise Management Plan which addresses:</p> <ul style="list-style-type: none"> • design issues; • noise modelling for the whole highway taking into account topography, cadastral information, dwelling locations, road design (including elevation), road surfaces and traffic volumes location of noise sensitive premises; • noise criteria (including intersections); • noise management measures; • implementation timing of noise management measures; • visual amenity/impact of noise barriers • monitoring; and • compliance reporting. 	Minimise noise impact on sensitive premises.	Prior to design.	DEP
14.	Noise Management Plan	<p>Implement the Noise Management Plan required by Commitment 13 in accordance with the following:</p> <ul style="list-style-type: none"> • Manage noise from the highway such that existing residents are not exposed to a noise level above 55 dB(A) LAeq,Night. • Adopt a 'best practicable' approach such that a noise level below 55 dB(A) LAeq,Night will be investigated and implemented. (Note: 'practicable' as defined by the Environmental Protection Act) • Where future urban land has been zoned in the MRS allow land developers, where reasonable and appropriate to construct noise management measures (noise walls or barriers) in the road reserve. 	Achieve the objectives of Commitment 13.	During construction.	DEP

Abbreviations

CALM: Department of Conservation and Land Management

DEP: Department of Environmental Protection

MRS: Metropolitan Region Scheme

WRC: Water and Rivers Commission

Note: Site preparation includes surveying and preliminary earthworks.

Construction includes final earthworks, bridges, road base and asphalt, drainage features, noise barriers and paths.

Appendix 5

Summary of Submissions and Proponent's Response to Submissions

Tonkin Highway Extension Public Environmental Review

RESPONSE TO SUBMISSIONS

EPA Assessment 1367

Prepared for: **Main Roads Western Australia**

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December 2001

DOCUMENT ISSUE AUTHORISATION

Issue	Rev	Date	Description	Checked By	Approved By
1	1	7/11/01	Draft Response to Submissions	JDH	ASV
1	2	10/12/01	Draft Response to Submissions	JDH	ASV
1	3	12/12/01	Final Response to Submissions		

The information contained in this document is solely for the use of the client identified for the purpose for which it has been prepared. It is not intended to be used by any third party and no responsibility is undertaken to any third party.

Western Infrastructure

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1 INTRODUCTION

The Guidelines issued by the Environmental Protection Authority (EPA) for the preparation of the Public Environmental Review (PER) identified a number of environmental factors. The PER was prepared on behalf of Main Roads Western Australia to address the environmental issues identified by the EPA.

2 SUBMISSION RECEIVED

A total of 20 submissions with environmental issues were received. A break down of the submitters are provided below:

- 4 submissions were from the members of the public;
- 4 were from conservation organisations;
- 3 were from the local government; and
- 9 were from State government departments or service providers.

The EPA has summarised the submissions into points (Arial italic font). Main Roads has provided a response to each point (Times New Roman font) as follows.

3 GENERAL COMMENTS IN SUBMISSIONS

3.1 ENVIRONMENTAL IMPACT ASSESSMENT

10. Although the route for the Tonkin Highway extension is gazetted in the Metropolitan Region Scheme this occurred prior to requirements for full environmental scrutiny. It is appropriate that the current proposal, including the proposed route, be subject to full environmental scrutiny to ensure all current government objectives are met, including ecologically sustainable development.

Response:

The whole proposal is being subject to a formal environmental impact assessment by the EPA, pursuant to Part IV of the Environmental Protection Act and the setting of legally binding environmental conditions and commitments by the Minister for the Environment.

3.2 ENVIRONMENTAL MANAGEMENT PLANS

11. The commitments provided in the PER do not provide any detail on what will be done and where to manage issues including noise, vibration, clearing, revegetation, final contours, visual amenity, pedestrian access, and societal risk. The commitments should be expanded to include:

- *provision for public review and input (including at least four weeks for public review);*
- *advice from the relevant local governments traversed by the section of the proposal to ensure local issues are adequately addressed;*

- *provision for affected utility providers and State agencies to provide detailed input;*
- *objectives including minimising impacts on visual amenity; and*
- *a specific commitment that a landscape and rehabilitation plan will be needed to ensure the riverine environment of the Southern and Canning Rivers is returned to a satisfactory state.*

Response:

The PER is not in itself a document designed to provide specific management detail regarding each environmental issue. The PER is designed to demonstrate to the EPA that there are no fatal flaws, that each environmental issue can be adequately managed and best endeavors have been made to minimise and avoid environmental impacts. An assessment of environmental acceptability is made against established environmental standards or criteria, Government policy and established EPA positions.

The PER provides legally binding commitments which set out the specific matters that various plans and strategies need to address. These must be prepared and implemented to the satisfaction of the Minister for the Environment. Preparation of the plans and strategies will involve consultation with all relevant stakeholders and will address local issues, utility providers, visual amenity and riverine environs, as outline in the PER. Given the relatively low significance of the environmental issues and low number public submissions on the PER Main Roads does not believe further formal public consultation on these plans and strategies will be of value and will unnecessarily contribute to project delay.

12. The PER describes a process but not the eventual constructed form of the proposal in detail. If the proposal had a smaller footprint much of this detail would likely be provided in the PER, however given the large scale of the project many issues are only addressed to a conceptual level at this stage. The proponent should provide a commitment to ensure adequate involvement of the local community that will be directly affected by the proposal be included in the detailed design phase to ensure local detailed issues are adequately addressed. This may include consideration of the formation of a consultative working group to provide all local governments, key State agencies and local residents. The local issues include disturbance to nearby residents during construction for up to two years, provision for adequate access and amenity.

Response:

The formal environmental impact assessment process is not necessarily an appropriate mechanism to address detail design and disturbance to nearby residents during construction. Nevertheless, Main Roads has made a commitment to prepare and implement a Design and Construction Environmental Management Plan which will address issues relevant to local disturbance (see objective of Commitment 1). Like other major road projects Main Roads will carry out a public communication strategy with all parties that may be involved, or affected by the proposal. Main Roads and the Design and Construction contractor will employ public relations agency to provide a single point of contact.

13. Additional issues that should be addressed in the management plans include:

- *procedures for works near the Dampier to Bunbury High Pressure Gas Transmission Pipeline and high voltage overhead power lines, including related contingency plans in the event of an incident;*
- *maintaining pedestrian access and local amenity during and after construction works;*

- *community liaison;*
- *timing for all construction activities to ensure minimal disruption to residents and the environment; and*
- *existing environmental condition surveys prior to works (in addition to the property condition surveys already proposed).*

Response:

While a number of these points are standard to Main Roads project construction procedures, as outlined in the PER, Main Roads agrees to include them as issues to address in the Design and Construction Environmental Management Plan. The PER contains a detailed description of the existing environmental conditions.

14. *CALM requests the opportunity to review and provide detailed comment on the Vegetation Mitigation Strategy for Mundijong Road, the Design and Construction Environmental Management Plan, and Landscape and Revegetation Strategy Plan as the PER does not have the detail to make informed comment.*

Response:

Preparation of strategies and plans will involve consultation and involvement with all relevant stakeholders. Main Roads will ensure CALM is consulted with in preparation of the Vegetation Mitigation Strategy for Mundijong Road, the Design and Construction Environmental Management Plan, and Landscape and Revegetation Strategy Plan.

15. *It is recommended that the EPA consider discussion by the proponent, the Government's sustainability unit and/or an independent adviser on how the proposal fits into the goals of ecologically sustainable development as part of its consideration of the proposal.*

Response:

The role of the EPA is to assess the environmental acceptability of a proposal and advise the Minister for the Environment accordingly. In themselves, economic and social matters (costs and benefits) should not be considered by the EPA in determining if a proposal is ultimately environmental acceptable. It is therefore appropriate for the Government (Cabinet) to determine if the proposal fits into the Government's goals for ecologically sustainable development.

16. *If it is intended that ongoing environmental management be undertaken (for up to 8 years) this should be clearly stated in the PER.*

Response:

There is no specific commitment for ongoing environmental management (up to 8 years). Main Roads is however committed to ensure that environmental objectives are met. To that extent Main Roads will undertake environmental monitoring and maintenance for as long as is practically and reasonably necessary to ensure that each environmental objectives are sustainably met. Where appropriate management measures will be modified or alternatives sought to ensure environmental compliance.

17. Consideration of issues including clearing, protection of DR&PF, visual amenity, wetland creation/enhancement and drainage should be considered at the Detailed Design stage of the project rather than the later times as advocated in the PER.

Response:

Main Roads will implement all the environmental commitments. This will ensure all that these matters are considered and addressed during detailed design and construction.

3.3 OTHER

18. Why does the Key Characteristics Table say the proposal includes two Canning River bridges?

Response:

The proposal will cross the Canning River and a bridge crossing maybe required at a significant creek, which flows into the Canning River, south of Mills Road West

10. Western Power has no objections to the proposal however the proponent is reminded that further details regarding the proposed route must be forwarded to WPC for assessment at least six months prior to commencement of works.

Response:

Main Roads notes this submission point and will commence liaison with WPC as soon as possible.

11. Page vii Traffic - Local Traffic Management paragraph 2 - ...(10 years after opening)...should read 12 years?

Response:

The PER should read 12 years.

12. Note that Corfield Street, Gosnells is currently being upgraded and as part of these works will be extended to link with Seaforth Avenue.

Response:

Further clarification on the proposal definition is provided in **Section 6.0**.

13. *The proponent should clarify the extent of the proposal. Figure 3.1.2 of the PER includes the Champion Drive/Garden Street extension however other sections of the PER (Table 5.2.1, Figure 5.1.1) seem to indicate that this area is not part of the proposal.*

Response:

Further clarification on the proposal definition is provided in **Section 6.0**.

14. *The practice of using 'borrow pits' should be prohibited. These pits, once excavated are often filled with rubbish from the site, creating mini rubbish dumps in the road reserve and surrounds. It is also common for site rubbish to be buried at completion of the project. This uncontrolled dumping of waste is unacceptable.*

Response:

This point will be addressed in the Design and Construction Environmental Management Plan.

15. *It is of concern that Main Roads are still using jarrah split posts. Fencing material for this project should be sourced from plantation timber or alternate material.*

Response:

If reasonable and practical Main Roads will require that the Design and Construction contractor to use plantation timber. However, this will depend on the requirements of the adjoining land owners.

16. *To facilitate the protection of the environment throughout this project an agreed, set induction process should be developed for all workers on the project. The level of information provided would vary, with supervisors and managers required to acquire a thorough understanding of the environmental obligations of the project and thus able to impart the importance of this to the employees. Likewise subcontractors entering the site would be required to undergo the induction, just as safety inductions are currently held. This approach would lead to a more knowledgeable workforce better able, and more willing to comply with the environmental conditions of the project.*

Response:

This point will be addressed in the Design and Construction Environmental Management Plan.

17. *The final acquittal of the project should be dependent on fulfillment of all environmental conditions including satisfactory revegetation of the road reserve. It should not be deemed satisfactory for the original contractors to divert this responsibility to a third party. Likewise penalties should be incurred where environmental conditions for the project have not been met, or alternatively a bonus system apply for exemplary execution of aspects of the project relating to the environment.*

Response:

Main Roads will be the proponent for the project at all times and therefore responsible for full compliance with all environmental commitments and conditions at all times. Main Roads will seek clearance and demonstrate that all conditions and commitments have been complied with, to the satisfaction of the Minister for the Environment.

18. *The Conservation Council requests that documentation relating to the project be made available as requested. It is particularly important that the EMP is available from the outset of the project to facilitate a cooperative working relationship between the Council and Main Roads.*

Response:

Main Roads will provide a copy of various management plans as requested by the Conservation Council.

19. *During previous projects of this nature it has been of great benefit to Main Roads and the relevant contractors to have access to a nominated individual from the Conservation Council to facilitate communication with the Council and expedite issues of potential conflict. This position involves extensive commitment to be on site and involved throughout the project. It has previously been suggested that this position should attract a commensurate remuneration for the valuable contribution to the project. This matter should be considered at this point in the project development.*

Response:

Main Roads supports the principle of this suggestion provided the consultation is site specific and the individual(s) or conservation group has valuable local expertise or knowledge that can not be provided by appropriate professional contractors. Any remuneration would be on the basis of reimbursing disbursement costs only.

4 JUSTIFICATION FOR THE PROPOSED UPGRADE

1. *Growing heavy freight movements is cited as a reason for the upgrade. Why can't the South West Highway be upgraded to accommodate the freight movements and carry local traffic from a point much farther to the north than is current proposed rather than creating a new parallel Highway all the way to Mundijong?*

Response:

The South Eastern metropolitan corridor is currently located on the major freight route between Perth Metro area and South West and Great Southern regions. This freight route incorporates the Albany & South Western highways. The South Western Highway passes through the existing urban areas of Armadale and Byford and is used to meet the needs of local residents and regional traffic including freight vehicles.

Connection from the existing Tonkin Highway to South Western Highway is via Albany Highway. Currently 30,000 vehicles per day use this section of Albany Hwy through Gosnells, Kelmscott & Armadale, while 17,000 vehicles per day use the South Western Highway. Future growth in urban development, traffic volumes and road freight will put further demand on the existing road network and will increase the amount of conflict between local & regional traffic movements through Gosnells, Kelmscott, Armadale, Byford and Mundijong.

Unless addressed this conflict will lead to increased traffic congestion, travel times, noise, pollution and result in reduced road safety and residential amenity on the existing road network. The Tonkin Highway Extension provides the best solution by addressing the growing traffic problems and future transport

needs of the corridor by providing an efficient bypass of the current and future urban development of Gosnells, Kelmscott, Armadale, Byford and Mundijong.

Future industrial development and urban revitalization in the wider South East metropolitan corridor is reliant upon an integrated and efficient transport system for the provision of strategic links to regional transport routes and local communities.

Upgrading the South Western Highway to freeway standard will have a major impact on current development options and will have similar if not greater environmental impacts.

- 2. The continued completion of roads such as the Tonkin Highway extension through areas such as Byford and Mundijong is not consistent with attempts to meet the Kyoto Agreement on Climate Change or respond to the continued unstable expansion of Perth's urban fringe. An urban capacity study by the Ministry for Planning (refer Planning News. July 2001. 3(6):p1) has identified a substantial surplus of dwelling potential within land already developed with houses (~100,000) and on vacant residential land (~300,000). In addition the Future Perth project as part of the Metropolitan Development Program is currently looking at the Perth Urban growth boundary.*

On this basis any justification for extending the Tonkin Highway so far to the south is flawed. Upgrading of existing infrastructure would be a more appropriate and environmentally sound option to be pursuing.

Response:

Development (including Tonkin Highway) within the South East corridor has undergone extensive planning over many years. Initiatives include Metroplan, South East Corridor Structure Plan, State Planning Strategy and Southern River/Forrestdale/Brookdale/Wungong District Structure Plan (WAPC Jan 2001). The reality is Perth is a growing city. The South East corridor will accommodate substantial development in future years. Building a road hierarchy to provide transport between and within landuses is fundamental to orderly and proper planning. Tonkin Highway is major road link servicing current and future development.

Tonkin Highway is a controlled access highway and is designed to maintain traffic flow to a reasonable and safe speed. If the Tonkin Highway Extension is not constructed all vehicles (including regional freight trucks) will continue to utilise existing roads, including local roads in urbanised areas. . This suggested alternative option can only exacerbate local and regional air quality, increase road accidents and trauma, decrease urban amenity and increase greenhouse gas emissions.

The Government is implementing a range of strategies to address regional air quality issues through the Perth Air Quality Management Plan, State Planning Strategy, Metropolitan Transport Strategy, community education programs (eg. Smogbusters) and changes to vehicle emission limits (Australian Design Rules (37/01)).

- 3. The benefits associated with the proposed Tonkin Highway extension option have not been clearly demonstrated to outweigh the adverse environmental and other impacts, that the proposed route is*

superior to alternative routes (or doing nothing), and the proposed route meets basic sustainable development principles.

Future traffic and freight levels for the Gosnells, Kelmscott, Armadale, Byford and Mundijong areas with and without the proposal should be considered as part of the justification for the proposal. The possibility that freight movements in the Kenwick-Brookton Highway area will continue to use these routes in preference to the Tonkin Highway should also be examined to clearly demonstrate the environmental impacts without the proposal are greater than those of and with the proposed extension to the Tonkin Highway. Finalisation of the proposal ahead of completion of overall freight usage and planning studies for the Perth metropolitan area is premature.

Response:

The EPA Guidelines do not require the proponent to demonstrate that the environmental, social and economic ‘benefits’ of the proposal ‘outweigh’ the adverse environmental impacts. The PER is designed to demonstrate to the EPA that there are no fatal flaws, that each environmental issue can be adequately managed and best endeavors have been made to minimise and avoid environmental impacts. An assessment of environmental acceptability is made against established environmental standards or criteria, Government policy and established EPA positions. Notwithstanding this when the commitments relating to vegetation and wetlands are considered together, as they should be, it is clear that the level of ‘offset’ or mitigation for ‘nature conservation values’ is well in excess of the maximum possible values that will be impacted and to that extent it is reasonable to conclude that there will be net environmental gain as a result of the proposal.

Landuse and transport planning in the region occurred for several decades. During this time numerous studies, plans and strategies have identified the need for the proposal, these include:

- South East Corridor Stage A Report;
- South East Corridor Structure Plan;
- Metroplan;
- Heritage Country Integrated Land Transport Strategy;
- South East Corridor Transport Study;
- Armadale Road Strategic Access Study;
- South River, Forrestdale, Brookdale, Wungong District Structure Plan;
- Metropolitan Transport Strategy; and
- State Planning Strategy.

The Department of Planning and Infrastructure is coordinating the Freight Network Review, which is expected to be complete in 6 months. As outlined in the PER and in this study so far Albany Highway, where it runs through Armadale and Kelmscott has been identified as a problem area. There is no reason to suggest, in light of all the previous reports, that this Review would question the need for the Tonkin Highway Extension. Also Tonkin Highway is proposed to be part of a high wide load route for movement of very large loads from Kenwick to Kwinana. Permit (heavy) vehicles may therefore be forced to use Tonkin Highway.

4. *The construction of an interchange at Corfield street is opposed due to:*

- *large volumes of through-traffic being directed into the residential heart of Gosnells;*
- *the interchange effectively cutting Gosnells into two parts north-east and south-west of Corfield Street; and*
- *effects on the three existing schools on Corfield Street, Wirrabirra, Munchins and Seaforth Streets.*

Response:

Construction of the Corfield Street interchange is supported by the City of Gosnells and City of Armadale. It will provide permeability within the local road network and provide direct access for local residents onto and off the Tonkin Highway. On the contrary the proposal without Corfield Street will provide a greater 'barrier' (east-west) to the local community than with it, hence the support from local governments. Corfield is classified as an "Other Regional Road" in the MRS therefore planned as a regional route with associated traffic volumes. The City of Gosnells has already commenced construction of a dual carriageway for Corfield Street to the west of Tonkin Highway.

Construction of the proposal will provide an opportunity for the removal of road/rail level crossings at Lake and Verna Streets, which are recognised as dangerous 'black spots'.

5. *Alternative options for the Corfield Street interchange that would provide solutions to future transport needs for residents within the south-east corridor that should be considered are:*

- *bridging of Corfield Street over Tonkin Highway (without interchange); and*
- *construction of a tramway along the western perimeter of Westfield, Kelmscott and Armadale (using the eastern side of the Tonkin Highway easement) then proceeding over the Highway (at the proposed Corfield Street interchange) and along the median strips of Corfield Street and Spencer Road to the proposed spur line station at Thornlie.*

Response:

The suggestions are noted. While not directly relevant to the PER the various connection options (including no connection) at Corfield Street have been the subject of extensive discussion and negotiation between Main Roads, City of Gosnells and City of Armadale. The proposed connection has been agreed between these parties and is considered to represent the most satisfactory outcome from a local and regional transport perspective.

5 SUBMISSIONS RELATING TO EPA FACTORS

The submissions made on the Tonkin Highway Extension PER were categorised according to the EPA factors as listed in the previous sections. The comments made in the submissions are as follows.

5.1 BIOPHYSICAL

5.1.1 TERRESTRIAL FLORA

5.1.1.1 Vegetation communities

1. *The Bush Forever (Government of WA 2000) reports indicated quite clearly that there is a general presumption against clearing of vegetation complexes of which less than 10% remains. These complexes are generally on the eastern side of the Swan Coastal Plain. A significant proportion of the 34.2ha of remnant vegetation proposed for clearing in the PER is on the eastern side of the Swan Coastal Plain including vegetation in the Forrestfield Complex (currently 5% protected) and Guildford Complex (currently 3% protected). The impact of any further loss of these vegetation complexes by road construction has not been adequately addresses in the PER, nor does the PER discuss any offsets for the loss of significant vegetation as required in the EPA Guidelines for the proposal.*

Response:

Bush Forever provides the policy and implementation framework for the protection of regionally significant bushland in 495 'sites' covering 51,200 hectares and 26 vegetation complexes in the Perth Metropolitan Region. Bush Forever was prepared with the full cooperation of the Ministry for Planning, DEP, CALM and Water and Rivers Commission (WRC). Bush Forever was endorsed by Cabinet and released by the Minister for Planning, Minister for the Environment and Minister for Water Resources.

The EPA strongly endorsed Bush Forever as a sound approach to conserving and maintaining examples of much of the city's rich natural biological heritage. The EPA recognised that Negotiated Planning Solutions would be required in relation to some sites, particularly areas subject to existing zoning and or development approvals (EPA Bulletin 1007, January 2001).

While Bush Forever does establish a general presumption against clearing of vegetation complexes with less than 10% remaining this position if taken in isolation could provide a misleading perspective from which to assess and consider the impact of the proposal on vegetation. Therefore in responding to this point it is important to place this 'general presumption' in context with the rest of Bush Forever.

Bush Forever has the following 'Policy Objectives':

- *"To meet the needs and aspirations of the community of Western Australia for the appropriate protection and management of bushland of regional significance in the Swan Coastal Plain portion of the Perth Metropolitan Region.*
- *To establish a conservation system that is, as far as is achievable, comprehensive, adequate and representative of the ecological communities of the region.*

- *To achieve the protection of Bush Forever Sites through a collective and shared responsibility on the part of government, landowners and the community.*
- *To secure partnerships between landowners, government and the community in conservation management through government and community advice, assistance and incentives.*
- *To establish a range of measures that will enable the recommendations of Bush Forever for the protection of regionally significant bushland to be implemented by 2010.*
- *To bring greater certainty to the processes of land use planning and environmental approvals by the early identification and protection of areas of regionally significant bushland.”*

Bush Forever ‘Policy Measures for Implementation’ include:

- *“Bush Forever is released by the Government of Western Australia as an endorsed policy to guide decision-making to achieve the protection and management of Bush Forever Sites through the implementation mechanisms identified in the plan.*
- *This policy statement and the detailed site implementation recommendations, objectives, Guidelines, Practice Notes and actions of Bush Forever will form the basis for implementation and the assessment of any action that might affect a Bush Forever Site, including planning and environmental decisions and for making statutory changes necessary for its implementation.*
- *All new planning and development strategies, development proposals and operational activities should seek to avoid, wherever possible, any adverse impacts on regionally significant bushland identified in Bush Forever consistent with the site implementation recommendation.*
- *There will be a general presumption against clearing bushland containing threatened ecological communities or representation of vegetation complexes of which less than 10 per cent currently remains on the Swan Coastal Plain portion of the Perth Metropolitan Region (generally involving vegetation complexes of the eastern side of the Swan Coastal Plain - refer Map 1 and 2).”*

Also it should be noted that all remnant vegetation on the eastern side of the coast plain is not in Bush Forever sites and therefore while the presumption may exist it should not be assumed that all vegetation on the eastern side of the coastal plain will be protected/retained/conserved as a matter of Government policy. Consistent with the ‘Policy Measures for Implementation’ (1-3) how this presumption should be implemented is practically outlined in the ‘Site Implementation Guidelines And Practice Notes’ and ‘Site Implementation Recommendations’. It was from this perspective and the EPA Guidelines that the PER addressed the loss of vegetation, proposed management commitments and concluded the proposal could meet the EPA’s objectives.

As outlined in the PER, how impacts on regionally significant vegetation in road reserves, including Mundijong Road, should be considered/managed is outlined in Appendix 3 (Site Implementation Guidelines – Practice Notes) of Bush Forever and more specifically ‘Practice Note 18: Road and Railway Reserves’. Practice Note 18 states the following:

“Objectives

To encourage the protection, where practical, of bushland and corridor values along existing

road/railway reserves and to give due consideration to bushland protection in the design and location of future roads/railways.

Application

Roadside and railway verges are valuable habitats in their own right and often contain a significant portion of an area's biodiversity. By their linear form they act as valuable ecological corridors for wildlife and plant species. They can also link larger conservation areas. They can also provide a seed source, contain declared rare flora, provide a valuable windbreak for stock and crops and limit wind erosion, and have important landcare and farm productivity implications. Road and Railway verges are commonly the sole surviving remnants of local vegetation types in heavily cleared areas.

However, the primary purpose of road and railway reserves is to accommodate the State's vital transport infrastructure. Apart from providing for a road/railway, road and railway reserves also perform a number of other key functions, including public transport transitways, cycleways, walkways and utility service corridors.

Some Bush Forever Sites include land that has already been identified for regional and local road and railway reserves. Bush Forever acknowledges that these areas are constrained to varying degrees depending on the stage to which the planning and implementation has proceeded and recommends the following approaches:

Existing Road/Railway Reserves

- Where no feasible alternative exists for a revision of the road/railway reserves, the responsible authority or the local government in consultation with other government agencies, will seek to ensure that the future design and management of the road/railway reserve will minimise the impact on areas recommended for protection.*
- Within land reserved in the MRS or local TPS for roads or railway purposes, there shall be a presumption that the construction authority has a right to undertake the required works for transport and associated infrastructure."*

As outlined in the PER every effort has been made to minimise, avoid and manage environmental impacts on vegetation. This has occurred during alignment planning and definition studies, as part of the reservation in the MRS, during this formal environmental impact assessment process and ultimately (as committed) during design, construction and operation of the proposal. On this basis the PER has been prepared from the perspective that the construction authority (Main Roads) has a right to undertake the required works for transport and associated infrastructure. Main Roads believes that this approach is consistent with Bush Forever and therefore CALM, DEP and EPA should not oppose the proposal.

The PER has comprehensively documented all vegetation from a condition, species, complex and community level. The impact on vegetation and wetlands has been accurately documented and the management proposed is consistent with the EPA Guidelines and Bush Forever. Furthermore based on Practice Note 18 it is implicit that the impact on vegetation, including Mundijong Road is environmentally acceptable.

With regard to a Vegetation Mitigation Strategy the following points should be appreciated:

- Bush Forever, the EPA, CALM and DEP does not have a specific policy position requiring vegetation mitigation for the loss of regionally or locally significant vegetation; and
- The EPA Guidelines required a Vegetation Mitigation Strategy for the Mundijong Road interchange, given the recognised significance of the vegetation.

Notwithstanding this, Main Roads has committed to preparing and implementing a Landscape and Revegetation Strategy Plan and Design and Construction Environmental Management Plan, which apart from minimising the impact on Bush Forever sites, will most likely lead to an increase in the area and condition of native vegetation along the road reserve as a result of the proposal. For example, Main Roads will soon commence landscape works for the Kwinana Freeway Extension and the estimated native seed requirement is 1,200 kilograms. Landscaping and revegetation initiatives will provide additional habitat variation in an area where existing remnants of native vegetation are small, mostly isolated and reduced in diversity. The vegetation enhancement along the Mundijong Road reserve and landscaping a revegetation will also complement and enhance the Wetland Mitigation Strategy.

Importantly whether Main Roads has or hasn't been required to mitigate for the loss of vegetation or 'nature conservation values' the following facts, as outlined in the PER should be appreciated. The proposal will impact a maximum 34.22ha of vegetation of which 28.66ha is in good condition, the area coinciding with the whole road reserve. The practical reality is that this impact will be reduced during road design and implementation of the Design and Construction Environmental Management Plan. Main Roads has committed to landscape and revegetate approximately 250ha using local provenance native species, almost 10 times the maximum area of vegetation proposed to be impacted. Secondly all the vegetation, with the exception of the Banksia Woodland at Wright Lake is vegetation mapped as wetland dependant vegetation and therefore will be mitigated for as part of the Wetland Mitigation Strategy. Therefore when the commitments relating to vegetation and wetlands are considered together, as they should be, it is clear that the level of 'offset' or mitigation for 'nature conservation values' is well in excess of the maximum possible values that will be impacted and to that extent it is reasonable to conclude that there will be net environmental gain as a result of the proposal.

In conclusion Main Roads believes that vegetation has been very comprehensively addressed, from a local regional and policy context, and the mitigation/offset proposed is consistent with the EPA Guidelines and sets an industry benchmark.

- 2. As it stands the proposal would require the clearing of 0.5-1.11 ha of Community Type 3a (in Bush Forever Site 360) which is considered critically endangered (English and Blyth, 1997) and listed as endangered under the Commonwealth Environment Protection and Biodiversity Conservation Act (1999). The PER describes this vegetation as being in good condition with the basic structure retained. A minimum of 0.5ha of Marri woodland would be affected should the interchange as shown in Figure 5.1.2 of the PER be adopted and the 'vegetation enhancement program' implemented. Additional impacts associated with weed infestation, dieback and altered groundwater levels would*

further degrade the vegetation if the proposal goes ahead in its current form as clearly illustrated by the degraded nature of some sections of the Mundijong Road reserve.

More information on the specific management measures for the protection of the threatened community and how the strategy will be implemented should be provided as required by the EPA Guidelines for the proposal. The proposal should not be supported with the current level of detailed information.

Response:

The vegetation along Mundijong Road has and will most likely be subject to ongoing degradation pressures, whether the proposal proceeds or not. The vegetation is subject to uncontrolled access, fires, litter, weed invasion (from the existing road and surrounding rural properties) and dieback. The road reserve containing the vegetation already contains a rural drain. It is also reasonable to conclude that the surface and ground water hydrology of the whole area has been significantly changed following large scale rural clearing and drainage infrastructure. While the PER describes the vegetation as being in 'very good' condition (Figure 5.1.1) it has been previously described as having significantly disturbed to completely degraded understorey (Keighery et. al. 1996).

Notwithstanding this the submission provides no evidence to suggest that the proposal will cause further degradation of the vegetation from weed invasion, dieback and altered groundwater levels. Nevertheless several of the commitments in the PER (1, 3, 4, 6 and 11) will ensure weeds are managed. As outlined in the PER, field investigations suggest that the vegetation east of Webb Road is already severely infected with dieback. The proposal will largely occur on cleared land and all stormwater will be locally infiltrated therefore no alteration to the groundwater regime is anticipated.

The PER is not in itself a document designed to provide specific management detail regarding each environmental issue. The PER is designed to demonstrate to the EPA that there are no fatal flaws, that each environmental issue can be adequately managed and best endeavors have been made to minimise and avoid environmental impacts. Where there is doubt that a proponent can not practically and economically manage an environmental impact it would be reasonable that they provide further information before the EPA provides its 'report and recommendations'. However, in this case Main Roads believes that it has provided sufficient information to demonstrate that all environmental impacts can be managed to an acceptable level.

The PER provides legally binding commitments which set out the specific matters that various plans and strategies need to address. These must be prepared and implemented to the satisfaction of the Minister for the Environment. Preparation of the plans and strategies will involve consultation with all relevant stakeholders.

- 3. The severing of the Mundijong Road vegetation corridor representing the loss of a catena of remnant vegetation across the Swan Coastal Plain is unacceptable. The verge vegetation has been recognised since the early 1990's as being regionally significant in a series of reports (Shire of Serpentine-Jarrahdale 1992, Keighery and Trudgen 1992, Keighery and Keighery 1992, Keighery et al 1995, Keighery 1996, Keighery et al 1997) and as a Threatened Ecological Community by the EPA since 1994.*

Bush Forever site 360 has outstanding nature conservation values in terms of regionally significant bushland, threatened ecological communities, threatened flora, other significant flora, threatened fauna, significant regional linkage, Conservation Category Wetlands, and contains plant communities representative of the eastern side of the Swan Coastal Plain. Due to these characteristics this site has become an icon site for conservation organisations, the local community and environmental agencies.

Environmental degradation or destruction of this site's nature conservation values cannot be supported.

Response:

Main Roads does not dispute the environmental values of the Mundijong Road reserve as a natural 'artifact' representing changes in vegetation across parts of the coastal plain. However, from a sustainable biophysical and ecological systems perspective the environmental values of the vegetation (reserve) should not be overstated. It should also be appreciated the vegetation corridor is not continuous from the coast to the Darling plateau.

The PER has comprehensively documented all vegetation from a condition, species, complex and community level. The impact of vegetation has been accurately documented and the management proposed is consistent with the EPA Guidelines and Bush Forever. Furthermore, based on Practice Note 18 it is implicit that the impact on vegetation, including Mundijong Road is environmentally acceptable.

On this basis the PER has been prepared from the perspective that the construction authority (Main Roads) has a right to undertake the required works for transport and associated infrastructure. Main Roads believes that this approach is consistent with Bush Forever and therefore CALM DEP and EPA should not oppose the proposal.

Main Roads has held discussions with CALM and DEP in an attempt to minimise the impact of the proposal on the vegetation at Mundijong Road. After considering a range of alternatives and inspecting the site it has been agreed that:

- the proposal could be supported provided every attempt was made to avoid and minimise impacts on this important vegetation;
- the road should impact the *Corymbia calophylla* low lying forest rather than the mosaic proteaceous/myrtaceous low lying shrubland, which is the proposed alignment direction;
- the area of *Corymbia calophylla* low lying forest being impacted was more degraded than other areas further east;
- the connection from Tonkin Highway south onto Mundijong Road (as depicted on Figure 5.1.2 of the PER) should connect on the northern side of Mundijong Road (**Figure 1**). This change will reduce the actual area of impact from 5,000 m² to 1,952m² or approximately 60%; and
- the area of impact and edge effects can be minimised through the use of retaining walls.

Given the proposal might only involve the clearing of 0.2 ha of vegetation and taking into account the implementation of the proposed Vegetation Mitigation Strategy Main Roads believes that overall environmental values of the Mundijong Road vegetation will not be diminished. It should also be noted that the preliminary road design used to determine the road reserve would have resulted in 12,200m²

being impacted. In summary the PER process has resulted in the least possible impact having reduced the initial area of impact six fold.

- 4. It should be noted that the weed species present in the area of the project are typically aggressive primary colonisers and wind dispersed meaning that although weed control is proposed in the Landscape and Revegetation Strategy/Management Plan weed infestation into adjacent remnant vegetation is likely to occur.*

To minimise these effects of weeds and other impacts on adjacent vegetation the following measures should be implemented:

- all fill should be weed and dieback free (although finding weed free topsoil is recognised to be problematic);*
- all seed for revegetation should be of local provenance, be collected from plants growing in the same community and position in the landscape within a reasonable distance of the area being vegetated (tens to 200m only); and*
- the active management as proposed by the proponent should be implemented and extended to encompass the road reserve along the entire length of the newly constructed road including follow-up management, monitoring and mitigation for a sufficient time to ensure the majority of weed seed stored in the ground is no longer viable.*

Response:

This submission point is noted. The issues of weed invasion, local provenance and ongoing weed control is addressed in the PER and covered by several commitments. Main Roads is committed to achieve the intent of these points however it should be noted that sufficient local seed and weed free fill may be difficult to source. To this end Main Roads will shortly commence collecting native seed from within the road reserve.

- 5. If the seed requirement for the Tonkin Highway is similar to the estimated 1,200kg of seed for the Kwinana Freeway this material would not be available on the eastern side of the Swan Coastal Plain without placing significant pressure on small remnants and threatening species by trampling, weed introduction or spread of dieback. Seed orchards should be established on the Kwinana Freeway or on degraded sites on the eastern side of the Swan Coastal Plain to provide adequate seed for the landscaping programs necessary for this proposal.*

Response:

This submission point is noted. Main Roads will be assessing seed availability and yield in 2001/02.

- 6. The proposed 'Vegetation Mitigation Strategy' for the southern side of Mundijong Road is supported however the timing for implementation is not clear. The timing for implementation of this Strategy should be made clear in the commitment.*

Response:

The Strategy will be implemented in conjunction with construction at Mundijong Road. As outlined in the PER it is expected that construction to South Western Highway will occur by 2006. Main Roads has

revised the commitment table so that the Vegetation Mitigation Strategy will be prepared and submitted prior to 31 December 2002, as agreed with CALM and the DEP.

- 7. No strategy is mentioned in the PER to address the loss of Banksia woodland at Wright Lake. This particular area is well documented in "A Survey of Remnant Vegetation in the City of Gosnells west of the Darling Scarp" by Trudgen and Keighery (1995). Although this site does not appear in Bush Forever its value is high and should be protected.*

Response:

Bush Forever provides the policy and implementation framework for the protection of regionally significant bushland in 495 'sites' covering 51,200 hectares and 26 vegetation complexes. Bush Forever was prepared with the full cooperation of the Ministry for Planning, DEP, CALM and WRC. Bush Forever was endorsed by Cabinet and released by the Minister for Planning, Minister for the Environment and Minister for Water Resources. This Banksia woodland is not included in Bush Forever and therefore is regarded as locally significant. There is no government policy or position that requires this vegetation to be protected. Also the same Banksia woodland to the west of the Tonkin Highway is zoned for urban purposes and is very unlikely to be protected, particularly given it has not been included in Bush Forever.

The PER has comprehensively documented all vegetation from a condition, species, complex and community level. The impact of vegetation has been accurately documented and the management proposed is consistent with the EPA Guidelines and Bush Forever. Furthermore based on Practice Note 18 it is implicit that loss of this vegetation is environmentally acceptable.

CALM and DEP does not have a policy position requiring the preparation and implementation of a Vegetation Mitigation Strategy for the loss of regionally or locally significant vegetation. The EPA Guidelines required a Vegetation Mitigation Strategy for the Mundijong Road interchange, given the recognised significance of the vegetation.

- 8. The PER does not adequately describe the management measures that will be implemented during design and construction of the road to minimise the potential impacts on the areas recommended for protection by Bush Forever (sites 246, 345, 351, 360 and 365 directly and sites 255, 260 and 65 indirectly).*

Response:

The PER is not in itself a document design to provide specific management detail regarding each environmental issue. The PER is designed to demonstrate to the EPA that there are no fatal flaws, that each environmental issue can be adequately managed and best endeavors have been made to minimise and avoid environmental impacts. Where there is doubt that a proponent can not practically and economically manage an environmental impact it would be reasonable that they provide further information before the EPA provides its 'report and recommendations'. However, in this case Main Roads believes that it has provide sufficient information to demonstrate that all environmental impacts can be managed to an acceptable level.

The PER provides legally binding commitments which set out the specific matters that various plans and strategies need to address. These must be prepared and implemented to the satisfaction of the Minister for the Environment. Preparation of the plans and strategies will involve consultation with all relevant stakeholders.

9. *It is possible that Community Type 20b (endangered), 3b (vulnerable), 3c (Critically endangered) and additional occurrences of 3a also occur along the alignment. The occurrence of other possible Threatened Ecological Communities needs to be clarified on the ground and possible impacts investigated, documented and mitigated.*

Response:

A comprehensive flora and vegetation survey was undertaken between 22-30 September 1998 and detailed in *Tonkin Highway Extension - Mundijong Road Re-alignment: Vegetation, Flora and Fauna Assessment Survey* (Ecologia, 1998). Sampling sites were chosen by means of aerial photographs and field observations so that the array of vegetation types were represented. Vegetation type, life-form strata, percentage cover, surface soil type, litter cover and disturbance details were recorded at 12 sites using 10 X 10 metre quadrats. Additional, opportunistic collections were made along the length of the road reserve and adjacent land. Vegetation mapping was through aerial photo interpretation. Remnant vegetation has since been more accurately (+/- 100m²) remapped (May 2001) and is consistent with remnants mapped in Bush Forever. This recent mapping used aerial photography combined with ground verification of vegetation types and current condition. This survey is regarded as being consistent with EPA Position Statement No.3, *General Requirements of Terrestrial Biological Surveys*. The threshold of vegetation mapping is consistent with that used to produce Perth's Bushplan (WAPC, 1998) and Bush Forever (WAPC, 2000).

The PER acknowledged that there are a number of small scattered remnants of Marri with little or no understorey (parkland cleared) along the alignment. These are either so small and/or degraded that they have not been mapped on Figure 5.1.1 or in Bush Forever. Better examples occur between Thomas and Orton Road, in the vicinity of Forrest Road and in the rail/road reserve south of Mundijong townsite.

Main Roads is satisfied that the PER has comprehensively documented all vegetation from a condition, species, complex and community level. The impact of vegetation has been accurately documented and the management proposed is adequate and consistent with the EPA Guidelines and Bush Forever. Main Roads believes that further investigation and 'clarification' is unwarranted, that investigations to date have been undertaken to a very high standard and provides a high degree of scientific certainty.

10. *Table 5.1.1 does not include the CALM threat category for threatened ecological communities including Community 10a - Endangered and Community 3a - Critically Endangered.*

Response:

Table 5.1.1 does reflect 3a as a Critically Endangered Threatened Ecological Community however describes 10a as Vulnerable (Gibson et. al., 1994) which according to English and Blyth (1997) should be Endangered.

11. Note that some WA threatened ecological communities are also protected under the Commonwealth EPBC Act and possible impacts would need to be referred to the Commonwealth for assessment.

Response:

This submission point is noted.

12. CALM would expect the same assurances as given to mitigate against impacts on wetlands under the 'Wetland Mitigation Strategy' to apply to impacted native vegetation associated with the following sites:

- vegetated dampland between Garden Street and Ranford Road;
- vegetated damplands south of Armadale Road joining BF site 345;
- Cardup and Manjedal Brooks; and
- Mundijong Road.

Response:

Wetlands (containing vegetation) in the submission point will be addressed in the Wetland Mitigation Strategy. Most of the vegetation impacted by the proposal is mapped as wetland and therefore by default the Wetland Mitigation Strategy will also be a 'vegetation mitigation strategy'.

13. Main Roads offsets or mitigation measures should meet a criterion of 'no net loss' of nature conservation values for this project. Any bushland acquired from the eastern side of the Swan Coastal Plain to meet this criterion, as well as those areas already acquired, should be managed to rehabilitate them and protect them from weeds, access, drainage and service corridors.

Response:

Bush Forever provides the policy and implementation framework for the protection of regionally significant bushland in 495 'sites' covering 51,200 hectares and 26 vegetation complexes. Bush Forever was prepared with the full cooperation of the Ministry for Planning, DEP, CALM and WRC.

The PER has comprehensively documented all vegetation from a condition, species, complex and community level. The impact of vegetation has been accurately documented and the management proposed is consistent with the EPA Guidelines and Bush Forever. Furthermore based on Practice Note 18 it is implicit that loss of this vegetation is environmentally acceptable.

CALM, DEP and EPA does not have a policy position requiring the preparation and implementation of mitigation measures to demonstrate a criterion of 'no net loss' for nature conservation values. Nevertheless as part of this formal environmental assessment the EPA has required Main Roads to prepare a Vegetation Mitigation Strategy for the Mundijong Road interchange and Wetland Mitigation Strategy for all wetlands impacted by the proposal. Main Roads has agreed to prepare and implement these strategies and to that extent believes that the proposal can meet the EPA objectives for these environmental factors and constitutes a 'no net loss' outcome.

Notwithstanding this, Main Roads has committed to preparing and implementing a Landscape and Revegetation Strategy Plan and Design and Construction Environmental Management Plan, which apart from minimising the impact on Bush Forever sites, will most likely lead to an increase in the area and condition of native vegetation along the road reserve as a result of the proposal. For example, Main Roads will soon commence landscape works for the Kwinana Freeway Extension and the estimated native seed requirement is 1,200 kilograms. Landscaping and revegetation initiatives will provide additional habitat variation in an area where existing remnants of native vegetation are small, mostly isolated and reduced in diversity. The vegetation enhancement along the Mundijong Road reserve and landscaping a revegetation will also complement and enhance the Wetland Mitigation Strategy.

Importantly whether Main Roads has or hasn't been required to mitigate for the loss of vegetation or 'nature conservation values' the following facts, as outlined in the PER should be appreciated. The proposal will impact a maximum 34.22ha of vegetation of which 28.66ha is in good condition, the area coinciding with the whole road reserve. The practical reality is that this impact will be reduced during road design and implementation of the Design and Construction Environmental Management Plan. Main Roads has committed to landscape and revegetate approximately 250ha using local provenance native species, almost 10 times the maximum area of vegetation proposed to be impacted. Secondly all the vegetation, with the exception of the Banksia Woodland at Wright Lake is vegetation mapped as wetland dependant vegetation and therefore will be mitigated for as part of the Wetland Mitigation Strategy. Therefore when the commitments relating to vegetation and wetlands are considered together, as they should be, it is clear that the level of 'offset' or mitigation for 'nature conservation values' is well in excess of the maximum possible values that will be impacted and to that extent it is reasonable to conclude that there will be net environmental gain as a result of the proposal.

14. Offsets should compliment and not simply replace funds already targeted by WAPC to acquire priority Bush Plan sites.

Response:

Main Roads does not propose to acquire any Bush Forever sites as part of this proposal. As outlined in the PER Main Roads accepts that acquisition of wetlands outside the road reserve is the only mechanism to replace Conservation category wetlands. Main Roads will conduct wetland acquisition in accordance with the principles outlined in Section 5.6.5.1.1 of the PER.

15. A similar set of 'Principles of Bushland Mitigation' should be prepared that are just as comprehensive as those outlined in the PER for wetland mitigation should also be prepared.

Response:

Importantly whether Main Roads has or hasn't been required to mitigate for the loss of vegetation or 'nature conservation values' the following facts, as outlined in the PER should be appreciated. The proposal will impact a maximum 34.22ha of vegetation of which 28.66ha is in good condition, the area coinciding with the whole road reserve. The practical reality is that this impact will be reduced during road design and implementation of the Design and Construction Environmental Management Plan. Main

Roads has committed to landscape and revegetate approximately 250ha using local provenance native species, almost 10 times the maximum area of vegetation proposed to be impacted. Secondly all the vegetation, with the exception of the Banksia Woodland at Wright Lake is vegetation mapped as wetland dependant vegetation and therefore will be mitigated for as part of the Wetland Mitigation Strategy. Therefore when the commitments relating to vegetation and wetlands are considered together, as they should be, it is clear that the level of 'offset' or mitigation for 'nature conservation values' is well in excess of the maximum possible values that will be impacted and to that extent it is reasonable to conclude that there will be net environmental gain as a result of the proposal.

16. *Maximum protection should be afforded to the following sites. Where full protection is not possible the affected vegetation should be used for mitigation of adjoining bushland and appropriate offsets for this impact to be provided:*

- *Wright Lake edge vegetation and relatively intact, dieback free Banksia woodland to the west;*
- *patches of interesting damplands around Garden Street intersection and just south;*
- *the Banksia woodland (dieback free according to the PER) and damplands just south of Armadale Road and associated Bush Forever site 345 section B should be avoided if possible by pushing construction to the east;*
- *roadside vegetation at Thomas Road intersection; and*
- *Mundijong Road.*

Response:

Bush Forever provides the policy and implementation framework for the protection of regionally significant bushland in 495 'sites' covering 51,200 hectares and 26 vegetation complexes. Bush Forever was prepared with the full cooperation of the Ministry for Planning, DEP, CALM and WRC. Bush Forever was endorsed by Cabinet and released by the Minister for Planning, Minister for the Environment and Minister for Water Resources. In January 2001, the EPA released Bulletin 1007, which provides its advice to the Minister for the Environment on Bush Forever. The EPA strongly endorsed Bush Forever, recognised the proposition of negotiated planning solutions and made no statement regarding vegetation replacement or offsets. Similarly no mention of replacement or offsets was made in draft EPA Guidance Statement 10 (January 2001 - Level of assessment for proposals affecting bushland areas within the System 6 and the southern Swan Coastal Plain Region).

Bush Forever does require the preparation and implementation of a Vegetation Mitigation Strategy for the loss of regionally or locally significant vegetation. The EPA Guidelines required a Vegetation Mitigation Strategy for the Mundijong Road interchange, given the recognised significance of the vegetation.

The PER has comprehensively documented all vegetation from a condition, species, complex and community level. The impact of vegetation has been accurately documented and the management proposed is consistent with the EPA Guidelines and Bush Forever. Furthermore based on Practice Note 18 it is implicit that loss of this vegetation is environmentally acceptable.

Notwithstanding this, Main Roads has committed to preparing and implementing a Landscape and Revegetation Strategy Plan and Design and Construction Environmental Management Plan, which apart from minimising the impact on Bush Forever sites, will most likely lead to an increase in the area and condition of native vegetation along the road reserve as a result of the proposal. Landscaping and revegetation initiatives will provide additional habitat variation in an area where existing remnants of native vegetation are small, mostly isolated and reduced in diversity. It is important to note that vegetation enhancement along the Mundijong Road reserve is proposed (Section 5.1.5.1 of the PER) which will also be complemented by enhancement and creation opportunities proposed in the Wetland Mitigation Strategy.

Importantly whether Main Roads has or hasn't been required to mitigate for the loss of vegetation or 'nature conservation values' the following facts, as outlined in the PER should be appreciated. The proposal will impact a maximum 34.22ha of vegetation of which 28.66ha is in good condition, the area coinciding with the whole road reserve. The practical reality is that this impact will be reduced during road design and implementation of the Design and Construction Environmental Management Plan. Main Roads has committed to landscape and revegetate approximately 250ha using local provenance native species, almost 10 times the maximum area of vegetation proposed to be impacted. Secondly all the vegetation, with the exception of the Banksia Woodland at Wright Lake is vegetation mapped as wetland dependant vegetation and therefore will be mitigated for as part of the Wetland Mitigation Strategy. Therefore when the commitments relating to vegetation and wetlands are considered together, as they should be, it is clear that the level of 'offset' or mitigation for 'nature conservation values' is well in excess of the maximum possible values that will be impacted and to that extent it is reasonable to conclude that there will be net environmental gain as a result of the proposal.

17. The EPA should not approve the current proposal and associated impacts on vegetation within the Mundijong Road verge (particularly Bush Forever site 360) without first assessing the impact of the whole of Mundijong Road bushland from all three developments currently being driven by the single proponent (Main Roads WA) in the same assessment process.

These proposals include Tonkin Highway extension and upgrade of Mundijong, Webb and Watkins Roads. The recommendation that the Mundijong, Webb and Watkins Roads proposals be assessed separately is strongly opposed by CALM.

CALM cannot support the southern section (south of Thomas Road) of the proposed Tonkin Highway extension without a full environmental assessment of the Mundijong and Watkins Road Bushland (Bush Forever Site 360) being prepared by the proponent for the increased traffic volumes generated by Tonkin Highway and the upgrade of Mundijong and Watkins Roads.

Response:

Main Roads agrees with the sentiment that the EPA should assess a proposal, in so far as practically possible in its entirety. Despite the proposal only initially being built to Armadale Road, Main Roads chose to refer the whole alignment to South Western Highway so the EPA could consider all the environmental impacts in complete context.

As outlined in the PER there has been little consideration and no decision regarding any potential changes to Webb Road, therefore its inclusion in the PER is regarded as premature. The widening of Mundijong Road (northwards) has previously been considered by the EPA, pursuant to Section 48A of the Environmental Protection Act (EPA Bulletin 952, Metropolitan Region Scheme Amendment 991/33 - South West Districts Omnibus No.3b).

The current process is a 'full environmental assessment' and the PER has been prepared by the proponent in accordance with the Guidelines issued by the EPA, these Guidelines were made available to CALM in draft for comment.

18. CALM's specific issues of concern associated with this proposal at Mundijong Road are:

- *permanent establishment of a barrier severing the continuous corridor of remnant vegetation across the Swan Coastal Plain;*
- *the need to inspect and confirm the status of disturbance of vegetation along Mundijong Road;*
- *destruction of 0.5 ha of a Critically Endangered TEC and 1.32 ha of plant communities on the eastern side of the Swan Coastal Plain (probably also TECs) that actually appear to be in good to excellent condition (not highly degraded as suggested by the PER);*
- *the absence of investigations to determine if there are any threatened, priority or significant flora impacted by the proposed development at Mundijong Road;*
- *destruction of Quenda habitat and linkage;*
- *question as to the validity of the circumstantial conclusion that the vegetation is dieback infected as a similar conclusion that the site is dieback free could also be made; and*
- *the absence of specific detail on vegetation mitigation measures that have been negotiated and agreed.*

Response:

CALM's concerns are noted and for the most part have been identified and addressed in the PER. With regard to each point the following response is provided:

- If the proposal is constructed the establishment of a barrier is unavoidable. The vegetation adjacent Mundijong Road is not continuous across the coastal plain (from coast to Darling Plateau). A significant proportion is completely cleared or totally degraded, and there are numerous north south roads which form 'barriers';
- CALM had two months during the public consultation period to inspect the area of impact;
- The PER describes the vegetation impacted at Mundijong Road as being in good condition (Table 5.1.6 and Figure 5.1.1);
- The PER has comprehensively investigated and documented all vegetation impacted by the proposal, including Mundijong Road from a condition, species, complex and community level. The impact of vegetation has been accurately documented and the management proposed is consistent with the EPA Guidelines and Bush Forever;
- Based on the adjacent landuses (Mundijong Road to the north and paddock to the south), the small size and narrowness (30 metres) of the vegetation, the vegetation type (open woodland) and

presence of predators (cats and foxes) it is questionable that vegetation impacted contains a viable Quenda population. . Nevertheless, Main Roads will provide a fauna crossing at Mundijong Road.;

- The general area is very low lying, is seasonally waterlogged and the road reserve where the vegetation is located contains an excavated drain. The potential vectors which would have transported the fungus into the road reserve vegetation over many years are numerous. It is not circumstantial that the area is dieback infected, as outlined in the PER *Phytophthora cinnamomi* has been found in the vegetation. Given this evidence it would be unreasonable to suggest the area is dieback free. Notwithstanding this Main Roads is committed to employing hygiene procedures consistent notion that this vegetation (Area 5) might be dieback free; and
- A detailed Vegetation Mitigation Strategy for Mundijong road will be prepared in consultation and cooperation with the Shire of Serpentine Jarrahdale, local conservation groups and CALM.

19. CALM strongly supports an alternative junction of Mundijong Road and Tonkin Highway that would leave Mundijong Road between Wright Road and the Tonkin Highway as a cul-de-sac for local traffic only. Alternate access to Mundijong town centre could be provided via Wright Road and adjacent to the railway line.

Response:

This alternative is noted and will be discussed with the Shire of Serpentine Jarrahdale. Nevertheless Mundijong Road will still need to be realigned to the south so it connects with the South Western Highway (as proposed) and therefore will still impact vegetation along Mundijong Road. Further increasing traffic on the existing Mundijong/Watkins Road east of the proposed roundabout will exacerbate a known 'black spot' area. It should also be noted that there will be no connection from the proposal onto Wright Road and the proposed roundabout represents a significant improvement on previous road designs which would have seen a significantly greater impact on the Mundijong Road vegetation.

20. The upgrade of Mundijong Road west of Tonkin Highway should be wholly north of the existing road reserve.

Response:

Beyond connections to the roundabout, the proposal does not involve upgrading Mundijong Road to the east or west

21. The concept of locating a roundabout out of the Mundijong Road bushland is supported. However the need for a major intersection will increase pressure on Mundijong Road and an alignment for an alternative road at least 300m away from the current road reserve should be investigated. Such an alignment would minimise traffic on Mundijong Road, reduce the need for upgrade of Mundijong Road and allowing Tonkin Highway to be constructed without the need for a roundabout or spur roads affecting vegetation along Mundijong Road.

Response:

Beyond connections to the roundabout, the proposal does not involve upgrading Mundijong Road to the east or west. Nevertheless Mundijong Road will still need to be realigned to the south so it connects with the South Western Highway (as proposed) and therefore will still impact vegetation along Mundijong Road. Once realigned to the south and connecting to the South Western Highway vehicles numbers will be reduced on the existing Mundijong Road east of the Tonkin Highway.

22. *Page 17, para 1 - The statement that the 'adjacent [Banksia woodland] area which supports the large remnant of similar vegetation is unlikely to persist in the long term' does not consider that the City of Gosnells would seek to optimise conservation of this important remnant within Public Open space provisions within any future subdivision proposal.*

Response:

Inclusion in POS was considered. Given the size of the remnant it still remains unlikely that it could be accommodated within the mandatory 10% public open space provision, which must also accommodate active recreation requirements. Furthermore the vegetation is located on an upland area and would most likely be used for cut to fill in lower poorly drained areas.

23. *An emphasis on vigorous colonising native species is generally supported however the species mix should also include a mix of slower-growing, longer-lived species for long term revegetation success. A focus on vigorous colonising species will see rapid growth but, with the associated shorter life span, this initial success would give way to longer-term impoverishment of the revegetated areas.*

Response:

This point is noted and appreciated.

24. *A Bush Forever site at the Champion Drive intersection was not included for consideration in the PER. This site should be considered as part of the assessment process.*

Response:

Further clarification on the proposal definition is provided in **Section 6.0**.

25. *Commitment 3 should be modified to address the need replicate the Guildford and Forrestfield vegetation complexes in landscaping within the road reserve in areas where such complexes previously occurred. It is recognised that there are difficulties in achieving this requirement however given the poor remaining representation of these complexes on the Swan Coastal Plain there should be no 'net loss' of these vegetation complexes.*

Response:

As far as practically possible commitment 3 will endeavor to sustainably landscape and revegetate the road reserve using local provenance herb, shrub and tree species. The road will be constructed on significant fill, which may be imported from another region. Therefore the soils and topography of those areas to be landscaped may have little relationship to that normally associated with the Guildford and

Forrestfield vegetation complexes. In the first instance the objective will achieve at least a replacement of native vegetation by area and condition.

26. *Commitment 6 in the PER should be amended to require Main Roads WA consult with CALM, Roadside Care Volunteers and other key stakeholders when determining works to be carried out between Paterson Street and the Tonkin Highway.*

Response:

A detailed Vegetation Mitigation Strategy for Mundijong road (from the roundabout eastwards to Paterson Road) will be prepared in consultation and cooperation with the Shire of Serpentine Jarrahdale, local conservation groups and CALM.

27. *Areas of revegetation within the road reserve should be established as future seed orchards from which authorised groups may be permitted to collect future seed stock.*

Response:

Main Roads does not oppose the principle of this proposition.

28. *Minimising the clearing of native vegetation should be a priority consideration during the design of this project. The design needs to be such that the extent of all clearing can be clearly identified and justified as necessary for final road pavement construction before the commencement of each stage of the project. This should be verifiable on ground with the location of pegs and design drawings available for inspection. Identification of replacement sites should occur prior to commencement of the project.*

Response:

This point will be adequately addressed through the preparation and implementation of the Design and Construction Environmental Management Plan.

29. *Throughout the project the following strategies should be utilised:*

- *Stockpiling of topsoil suitable for use in revegetation areas;*
- *Mulching of cleared vegetation to be used on site for landscaping and revegetation, with retention of some material as fauna habitat (eg. hollow logs);*
- *Propagation of seed and plant material derived from local species to be used in revegetation;*
- *Ongoing revegetation of all disturbed areas such that coverage is achieved according to an agreed time frame and assessed for quality (presence of local species, variety of species, absence of weed species) and quantity. Assessment of the success of this process should involve on ground verification as well as aerial assessment. The onus for revegetation should remain with the proponent until such time as the required level of revegetation has been achieved; and*
- *Fill (sand) for site works should not be accessed at the expense of nearby vegetation.*

Response:

These points will be adequately addressed through the preparation and implementation of the Design and Construction Environmental Management Plan, Landscape and Revegetation Strategy Plan and Landscape and Revegetation Management Plan.

30. *The Deputy Commissioner for Soil and Land Conservation is satisfied with the commitments in the PER with respect to erosion control measures and vegetation clearing. He has no objections to the proposal on the grounds of land degradation.*

Response:

This submission point is noted.

5.1.1.2 Declared Rare and Priority Flora

1. *Although there are no DR&PF identified within the road reserve a number of species exist in the immediate vicinity. Synaphea acutiloba and S.pinnata, in particular, have been identified close to the edge of the proposal at Connell Road and may be directly impacted during construction.*

Indirect impacts DR&PF due to weed infestation, deback and altered hydrological regimes as a result of the proposed works are also a definite threat to DR&PF in the vicinity of the proposal.

What measures can be implemented and assurances provided to ensure these DR&PF are not adversely affected by the proposal.

Response:

This point will be adequately addressed through the preparation and implementation of the Design and Construction Environmental Management Plan. Specific management for each species is addressed in Section 5.4.5 of the PER.

2. *CALM must be notified of any need to take Declared Rare or Priority species well in advance of operations.*

Response:

This submission point is noted and acknowledged. During a field inspection attended by Western Infrastructure, Main Roads, CALM and DEP a possible DRF species (*Tetralia australiensis*) was identified and may be impacted by the proposal. Well in advance of any disturbance Main Roads will confirm this species presence (survey the extent and number of plants) and if necessary liaise with CALM regarding management actions and seek approval from the Minister for the Environment to 'take' this flora, pursuant to the Wildlife and Conservation Act.

3. *Additional traffic and infrastructure on Mundijong Road has the potential to have adverse impacts on DR&PF, other significant taxa populations and Threatened Ecological Communities along the Mundijong Road verge. These issues need to be addressed as part of the assessment process.*

Response:

This point will be adequately addressed through the preparation and implementation of the Design and Construction Environmental Management Plan. Specific management for each species is addressed in Section 5.4.5 of the PER.

- 4. The protection of DRF and Priority species must be considered as an absolute constraint on the design and construction of this project. The areas containing these species should be fenced using minimally invasive fencing techniques so as not to damage surrounding vegetation. The areas should then be appropriately signed. Merely pegging the areas is not sufficient to ensure the protection of these species. Damage to these areas should invoke penalties under the contract to highlight the importance of protecting these areas. Under no circumstances should DRF or priority species be disturbed to facilitate the construction process outside the road pavement area. Destruction of DRF for construction of temporary by pass roads as occurred in the construction of the Beeliar Drive/Kwinana Freeway intersection is totally unacceptable and in all cases alternatives must be used.*

Response:

This point will be adequately addressed through the preparation and implementation of the Design and Construction Environmental Management Plan. Specific management for each species is addressed in Section 5.4.5 of the PER. Main Roads accepts the suggestion that populations should be fenced and sign posted.

5.1.2 DIEBACK

- 1. CALM strongly disagrees with the PER conclusion that dieback management measures are not necessary except for Area 2. Full dieback hygiene must be used during construction on sections adjoining or approaching dieback free adjacent bushland. Dieback management measures and plans should be prepared for at least the three dieback free and high conservation sites on the alignment (Banksia woodland near Wright Lake, south of Armadale Road associated with Bushplan Site 345, and the Mundijong Road intersection).*

Response:

Area 2 and the general area is very low lying, is seasonally waterlogged and the road reserve where the vegetation is located contains an excavated drain. The potential vectors which would have transported the fungus into the road reserve vegetation, over many years are numerous. It is not circumstantial that the area is dieback infected, as outlined in the PER *Phytophthora cinnamomi* has been found in the vegetation. Given this evidence it would be unreasonable to suggest the area is dieback free and therefore 'full dieback hygiene' is required.. Notwithstanding this Main Roads is committed to employing hygiene procedure consistent notion that Areas 2 (Armadale Road) and 5 (Mundijong Road) might be dieback free.

Dieback management at Area 2 and 5 will be implemented through the Design and Construction Environmental Management Plan.

5.1.3 TERRESTRIAL FAUNA

1. *The fauna crossing south of Armadale Road for Bush Forever site 345 needs to cater for medium to large animals. This crossing point is a major point of connectivity between Bush Forever sites that are proposed to be linked through the City of Armadale's western boundary and links proposed to the east connecting the proposed Golf Course and the Southern River through to the Darling Scarp. Commitment 8 should also be modified accordingly.*

Response:

The proposed specification for fauna crossings is outlined in Appendix C of the PER. The design has taken into account fauna which are likely to use crossings, based on studies of fauna utilisation. The crossings are regarded as current best practice.

2. *Design of fauna crossings should be in consultation with the relevant local government.*

Response:

The proposed specification for fauna crossings is outlined in Appendix C of the PER. The design has taken into account fauna which are likely to use crossings, based on studies of fauna utilisation. The crossings are regarded as current best practice. Main Roads would welcome comments from any local government and/or CALM on how the design can be modified to better facilitate fauna utilisation.

3. *Fauna underpasses are proposed for the Mundijong Road intersection to ensure access provided by the vegetation corridor is not severed however vegetation and hence habitat is still lost. The CALM Priority 4 species Southern Brown Bandicoot (*Soodon obesulus*) has been recorded in this remnant and road deaths from increased road traffic are likely to pose a significant threat to the Bandicoot's survival in this area. A recovery team should be established to prepare a recovery plan for the Type 3a vegetation community in Bush Forever Site 360 as recommended by English and Blyth (1997) which would also serve to protect fauna resident in this vegetation.*

Response:

Vehicle numbers on the existing Mundijong Road east of Tonkin Highway are not expected to increase as a result of the proposal and may actually decrease as a result of the proposal. While the Southern Brown Bandicoot has been recorded in the Mundijong vegetation it is regarded as marginal habitat in terms of its condition and size.

A detailed Vegetation Mitigation Strategy for Mundijong road will be prepared in consultation and cooperation with the Shire of Serpentine Jarrahdale, local conservation groups and CALM.

4. *CALM considers the proposed fauna links (section 5.5.5.3) to provide Fauna crossings at locations shown in Figure 5.1.1 and according to the set principles to be adequate in terms of location and number.*

Response:

This submission point is noted.

5. *Specific fauna populations in the direct path of the road, which may benefit from relocation should be identified and appropriately relocated.*

Response:

No impacts on fauna are anticipated to the extent that a trapping and relocation program is required.

6. *Exclusion fencing at areas of regular fauna movement should be constructed prior to introduction of heavy machinery to limit the deaths during the construction process.*

Response:

Impacts to fauna, over and above that which may occur during habitat clearing is not expected to be significant. While most of the land either side of the proposal is cleared the incidence of fauna road kills from slow moving construction vehicles is regarded as rare.

7. *Every effort should be made to ensure that fauna has an opportunity to evade the initial clearing and construction.*

Response:

This point is noted and Main Roads would welcome any suggestions to facilitate fauna 'evasion'.

8. *Fencing at areas identified as fauna crossings should be constructed to standards to exclude small native mammals, not stock grade fencing as has occurred at areas along the Kwinana Freeway extension.*

Response:

The proposed specification for fauna crossings and fencing is outlined in Appendix C of the PER. The design has taken into account fauna which are likely to use crossings, based on studies of fauna utilisation. The crossings are regarded as current best practice. CALM has advised that it considers the location and specification of fauna crossings to be adequate.

9. *Fauna underpasses should be 2000mm x 2000mm. The size of the underpass is not just dictated by the size of the animals expected to utilise the tunnel but must also allow for native animals to safely enter and proceed along the tunnel whilst evading predators such as foxes and feral cats. For this reason vegetation leading into the tunnels and cover within the underpasses is also vital.*

Response:

The proposed specification for fauna crossings and fencing is outlined in Appendix C of the PER. The design has taken into account fauna which are likely to use crossings, based on studies of fauna utilisation. The crossings are regarded as current best practice. CALM has advised that it considers the location and specification of fauna crossings to be adequate.

10. *Bridges over the roadway do not necessarily act as safe fauna crossings. Fauna crossing an open bridge is vulnerable to attack from predatory birds as well as feral predators. The lack of protective cover leading to and over a bridge would accentuate this problem. Appropriate fauna underpasses should be constructed at these points if significant fauna movement is anticipated.*

Response:

All the evidence regarding fauna utilisation would suggest that bridges would provide equal or better use, compared to underpasses.

11. *During clearing a proportion of material should be retained and stored for reintroduction to the area as fauna habitat.*

Response:

These points will be adequately addressed through the preparation and implementation of the Design and Construction Environmental Management Plan, Landscape and Revegetation Strategy Plan and Landscape and Revegetation Management Plan.

12. *Signs should be erected to raise public awareness of the presence of native fauna in the road reserve.*

Response:

Where significant fauna habitat is on either side of the road, to the extent fauna may pose a risk, it may be appropriate to erect signs.

5.1.4 WETLANDS

5.1.4.1 Wetlands – Basin and Flat Wetlands

1. *The Wetland Conservation Policy for Western Australia (Government of WA, 1997) aims to 'prevent the further loss or degradation of wetlands and wetland types, and promote wetland conservation, creation and restoration'. The Tonkin Highway will involve the clearing of a possible 333.25ha of wetland including 248.5ha of Palusplain wetlands in the Keysbrook, Mungala and Bennet Brook Suites. This development does not appear consistent with the stated government policy.*

Response:

Main Road believes that the proposal is consistent with Government policy and the commitment to prepare a Wetland Mitigation Strategy represents an industry benchmark. Without restating Section 5.6.5 of the PER the principles of wetland mitigation committed to by Main Roads include impact avoidance, 'no net loss', acquisition outside the road reserve, enhancement, creation and monitoring. The preparation and implementation of a Landscape and Revegetation Strategy Plan and Landscape and Revegetation Management Plan will also compliment wetland mitigation.

The extent of valuable wetland habitat should not be misunderstood. Of the 333.25 hectares 318.12 (95%) is either Multiple Use (cleared rural paddock) and Resource Enhancement (cleared or largely

degraded) category wetland. A maximum of 15.13 hectares of Conservation category wetland will be impacted.

Importantly the following facts, as outlined in the PER should be appreciated. The proposal will impact a maximum 34.22ha of vegetation of which 28.66ha is in good condition, the area coinciding with the whole road reserve. The practical reality is that this impact will be reduced during road design and implementation of the Design and Construction Environmental Management Plan. Main Roads has committed to landscape and revegetate approximately 250ha using local provenance native species, almost 10 times the maximum area of vegetation proposed to be impacted. Secondly all the vegetation, with the exception of the Banksia Woodland at Wright Lake is vegetation mapped as wetland dependant vegetation and therefore will be mitigated for as part of the Wetland Mitigation Strategy. Therefore when the commitments relating to vegetation and wetlands are considered together, as they should be, it is clear that the level of 'offset' or mitigation for 'nature conservation values' is well in excess of the maximum possible values that will be impacted and to that extent it is reasonable to conclude that there will be net environmental gain as a result of the proposal.

2. *Minor local perturbations of road changes, such as road runoff, localised lowering of groundwater and changes to nutrient levels contribute to the cumulative stresses on vegetation and can have a catastrophic effect on the survival of native vegetation (particularly Banksia woodlands). Development adjacent to or through remnant vegetation or wetlands is not supported.*

Response:

There is no evidence to suggest that the proposal will cause significant localised changes in groundwater and nutrient levels to the extent that catastrophic effects on adjacent vegetation would be expected. There is wealth of evidence to suggest that roadside vegetation, despite the construction of an adjacent road can have and maintain significant environmental values. Road drainage will be infiltrate within the road reserve consistent with the requirements of the WRC.

3. *Up to 15.13ha of Conservation Category Wetland will be lost or cleared due to implementation of this proposal. The areas of most significance include:*
 - *Canning and Southern Rivers*
 - *Cardup and Manjedal Brooks*
 - *a vegetated portion of the Allen/Forrest Roads dampland south of Armadale Road; and*
 - *crossing of Mundijong Road.*

The 'Wetland Mitigation Strategy' outlined in the PER aims for 'no net loss' of wetland value and function although a significant proportion of the affected wetlands are on the eastern side of the Swan Coastal Plain. The presence of the affected wetlands on the eastern side of the Swan Coastal Plain indicates their potential importance for conservation purposes is significant. These impacts cannot be adequately mitigated by the strategy outlined in the PER. The natural wetlands should be conserved consistent with the Bush Forever reports and EPA Preliminary Position Policy No.4.

Response:

The PER in itself does not contain or detail the Wetland Mitigation Strategy and to that extent it might be problematic to conclude that the proposed Strategy won't adequately mitigate wetland impacts. An initial assessment of wetlands which may be suitable for acquisition, enhancement and creation would suggest that wetland impacts can more the adequately be mitigated for.

The extent of valuable wetland habitat should not be misunderstood. Of the 333.25 hectares 318.12 (95%) is either Multiple Use (cleared rural paddock) and Resource Enhancement (cleared or largely degraded) category wetland. A maximum of 15.13 hectares of Conservation category wetland will be impacted.

Preparation of the Wetland Mitigation Strategy will involve consultation and involvement with all relevant stakeholders. The Strategy will need to be prepared and implemented to the satisfaction of the Minister for the Environment.

Importantly the following facts, as outlined in the PER should be appreciated. The proposal will impact a maximum 34.22ha of vegetation of which 28.66ha is in good condition, the area coinciding with the whole road reserve. The practical reality is that this impact will be reduced during road design and implementation of the Design and Construction Environmental Management Plan. Main Roads has committed to landscape and revegetate approximately 250ha using local provenance native species, almost 10 times the maximum area of vegetation proposed to be impacted. Secondly all the vegetation, with the exception of the Banksia Woodland at Wright Lake is vegetation mapped as wetland dependant vegetation and therefore will be mitigated for as part of the Wetland Mitigation Strategy. Therefore when the commitments relating to vegetation and wetlands are considered together, as they should be, it is clear that the level of 'offset' or mitigation for 'nature conservation values' is well in excess of the maximum possible values that will be impacted and to that extent it is reasonable to conclude that there will be net environmental gain as a result of the proposal.

- 4. The Tonkin Highway proposal will impact directly on 0.06ha of fringing vegetation of Wright Lake and fragment the wetland from surrounding privately owned rural lots presently supporting remnant vegetation. The edge of Wright Lake is seasonally inundated and comprises dense sedgeland dominated by *Schoenoplectus littoralis* with sparse *Baumea juncea*. The Lake itself is likely to be permanent and support a wide variety of waterbird species dependant on the seasonal variation in water levels. The fringing vegetation is likely to be suitable habitat for frog species such as *Crinia glaueti* and *Litoria adelaidensis* as well as resident populations of the Southern Brown Bandicoot (*Isodon obesulus*) and water rat (*Hydromys chrysogaster*).*

Impacts of this nature on Wright Lake due to construction of the Tonkin Highway are not consistent with the EPA Preliminary Position Policy No.4.

Response:

The fringing vegetation impacted by the proposal is described in Section 5.1.3.2.5 of the PER and does not comprise dense sedgeland dominated by *Schoenoplectus littoralis* with sparse *Baumea juncea* and is very unlikely to be suitable habitat for frog species such as *Crinia glaueti* and *Litoria adelaidensis* as well as resident populations of the Southern Brown Bandicoot (*Isodon obesulus*) and water rat (*Hydromys chrysogaster*). The Lake is seasonally dry and not permanently wet.

5. *The 'Wetland Mitigation Strategy' should be prepared before the road is constructed with wetlands acquired 'up-front' or equivalent money put aside by the proponent to acquire the equivalent area at a later date. A commitment to this effect should be required (and included in the Ministerial Statement) to replace the existing commitment that suggests the Strategy will be developed and implemented within 3 or 4 years of particular wetlands being lost or as soon as practically possible.*

Response:

The commitment (10) does not 'suggest' that the Strategy will be developed and implemented within 3 or 4 years of particular wetlands being lost or as soon as practically possible. The Commitment is legally binding and to that extent Main Roads will progressively mitigate for wetlands within 3 to 4 years of a particular wetland(s) being lost/impacted or as soon as practically possible.

The Wetland Mitigation Strategy will be prepared and approved by the Minister for the Environment before the road is constructed.

Implementation of the Strategy will commence once it has been approved by the Minister for the Environment, however it should be appreciated that final implementation of the Strategy will involve the identification, acquisition, zoning/reservation, vesting and management of land containing wetlands in accordance with Section 5.6.1.1(6.) of the PER and to that extent the exact time required is unknown. Nevertheless it is anticipated and reasonable to suggest that this process may take up to 3 to 4 years.

6. *The vegetation at the junction of Armadale and Hanlin Road, Forrestdale will be completely lost with implementation of the project (Wetland Plan Id 22D and Flora Site 4). This vegetation includes a Conservation Category wetland. The vegetation species listing in the PER appears incomplete. What is the complete species listing for this location?*

Response:

The observations made in this submission point are correct, however the species list for flora site 4 is complete.

7. *Agreement on the management measures included in the 'Wetland Mitigation Strategy' should be reached during the Detailed Design phase of the project and included in the detailed design.*

Response:

The Wetland Mitigation Strategy will be prepared during design and site preparation works. Where appropriate any mitigation measures relevant to design will be included in the detailed road design.

8. *There should be full compensation for all 333 ha of wetlands destroyed and not only for the Conservation Category Wetlands as all the wetlands have important wildlife habitat values.*

Response:

All wetlands impacted by the proposal will be mitigated for. This will occur through the preparation and implementation of a Wetland Mitigation Strategy, on advice from the WRC and approved by the Minister for the Environment.

9. *Where there are small gaps in information provided for re-evaluations that need to be addressed this information must adhere to the WRC approved protocol (see Attachment 2 of the WRC submission). For example, the aerial photographs are not of an adequate resolution and a single on-ground photograph is inadequate.*

Response:

There is no information gap regarding the wetland re-evaluations. The wetland re-evaluation was done consistent with EPA Bulletin 686 and in consultation with WRC. WRC staff reviewed the re-evaluation work done as part of the PER. With regard to the PER it is the responsibility of the proponent to scientifically assess and describe the existing environment and there is no incumbent responsibility to have this confirmed or verified by government agencies.

While Main Roads notes the informal policy outlined in attachment 2 of the WRC submission it should however be appreciated that the three wetlands re-evaluated as part of the PER preparation are at an obvious and gross level either errors in digitisation and/or GIS database.

BSD Consultants received a correspondence from the DEP of 5 July 2001 which states *“I have received advice from the Water and Rivers Commission (WRC) with regard to the section on the wetland re-evaluation. The comments below are as follows:”*

With regard to wetland 5P (Part 2133 IV NM-27) the WRC stated: *“The Commission agrees with the finding that the area is upland”*.

With regard to wetland 8D (Part 2033 I NE – 169) the WRC stated: *“The contour data shows that at least part of this area is at the same elevation as Wright Lake. This indicates that not all of the area is upland. The Commission requires further evidence be submitted in support of the current assessment.”* For the preparation of the PER the site was re-inspected and evidence provided in the PER. Furthermore it should be noted that Wright Lake is at approximately 23mAHD which rises relatively sharply to west (up Bassendean sands) to 26-28mAHD.

With regard to wetland 13D (Part 2033 I NE-151) the WRC stated: *“The Commission agrees with the finding that the area is multiple use (M) category”*.

10. *Impacts beyond that where a wetland is directly intersected by the road reserve must also be considered by the proponent.*

Response:

As outlined in the PER the assessment of wetland impact is a maximum and should be regarded as worst case/overestimate. To this extent it is believed that the assessment of impact and proposed mitigation

inherently takes into account edge effects and fragmentation. With or without detailed design it is somewhat difficult to specifically assess the effect fragmentation and edge effects will have on each wetland. Nevertheless where the proposal intersects wetlands to the extent that it may form a hydrological barrier and/or prevent fauna movement bridges culverts and fauna crossings are proposed, for example Canning and Southern Rivers, Cardup Brook, Manjedal Brook, Medulla Brook, Mundijong Road and Wright Road.

11. *The Wetland Mitigation Strategy commitments require clarification. More detailed commitments on how the strategy will meet the requirement of matching wetland attributes, functions and values between lost and acquired wetlands are necessary. The discussion incorporates many of the required issues however a commitment to ensure all of these components are incorporated into the final Strategy is also required. A separate Wetland Mitigation Strategy document should be completed to the satisfaction of the DEP and WRC. 'Restoration' should also be considered as part of the Strategy.*

The specific requirements of this document are provided in the WRC submission.

Response:

Section 5.6.5.2 of the PER addresses this point, that is:

"5.6.5.2 Commitment

Prepare a Wetland Mitigation Strategy in consultation with key stakeholders, including community and conservation groups, prior to commencement of construction. The Wetland Mitigation Strategy will demonstrate a 'no net loss' response to mitigate the impacts on wetlands caused by the proposal. The Wetland Mitigation Strategy will address:

- *assessment of values and functions lost and gained;*
- *details of wetlands to be acquired;*
- *specific areas/lots for wetlands enhancement and creation;*
- *vesting and long term management responsibility of wetlands acquired outside the road reserve;*
- *landscaping and revegetation;*
- *drainage management;*
- *monitoring and maintenance; and*
- *compliance reporting.*

Main Roads will progressively implement the Wetland Mitigation Strategy as the proposal is constructed, to the extent that mitigation occurs within 3 to 4 years of particular wetlands being lost/impacted or as soon as practically possible."

Table ES 1 states that the Wetland Mitigation Strategy will be prepared on advice of the WRC and approved by the Minister for the Environment.

The PER was prepared on the basis that ‘enhancement’ and ‘restoration’ can be used interchangeably. Main Roads has no objections to using the term ‘restoration’ in the Wetland Mitigation Strategy.

12. *The last sentence of the first paragraph in section 5.6.3.1 is incorrect. WRC did not make this in-principle agreement. WRC only provided in-principle agreement that the proposed re-evaluations may proceed consistent with the Commission’s approved re-evaluation protocol.*

Response:

Main Roads maintains that WRC staff reviewed the re-evaluation work done as part of the PER, provided in-principle agreement. The letter from the DEP of 5 July confirms, for the most part, WRC acceptance of the wetland re-evaluation.

13. *WRC requests that the proponent provides justification as to why wetlands whose management category was re-evaluated to a higher category in the draft PER were not included in the final PER document.*

Response:

BSD Consultants received a correspondence from the DEP of 5 July 2001 which states “*I have received advice from the Water and Rivers Commission (WRC) with regard to the section on the wetland re-evaluation. The comments below are as follows:*”

With regard to wetland (Part 2033 I SE 136-v2) the WRC stated: “*Wetland 136-v2 is part of wetland 136, a wetland with poorly defined boundaries, and should be assessed as a vegetated unit under Part IIB.*” Using Part IIB instead of Part IIA, which was used in the initial draft of the PER meant that the wetland classification remained the same (multiple use category).

14. *WRC requests an explanation for the discrepancy between the total area calculations of wetlands within the road reserve in the draft and final PERs.*

Response:

In preparing the PER calculations to determine the total area of wetlands impacted by the proposal was undertaken several times. Changes occurred due to minor drafting errors, changes to wetland categories and slight changes to the proposal due to variation in mapping coordinates.

15. *WRC has provided the following general comments on various issues in the wetland sections of the PER:*

- *useful to include Wetland Identification Numbers for each wetland*
- *Table 5.6.5 refers to wetland suites not types*
- *Table 5.6.6 should include a breakdown of the area of wetland types impacted*
- *the key terms used in the sections must be defined and perhaps referenced back to the EPA’s draft policy on wetland mitigation*

- *creations is not appropriate for mitigating impacts on Conservation or Resource Enhancement wetlands*
- *wetland buffers must be addressed as part of the Wetland Mitigation Strategy; and*
- *Refer to the flow chart provided s attachment 4 of the WRC submission for a corrected version of the Wetland Mitigation Hierarchy in section 5.6.5.1.2 of the PER*

Response:

These general comments are noted and will be addressed during the preparation of the Wetland Mitigation Strategy, which will be prepared on advice of the WRC and approved by the Minister for the Environment.

16. The use of the term Enhancement in the context of section 5.6.5.1.3 of the PER is inappropriate. For example, revegetation and enhancement of areas of Wright Lake as part of the rowing course development is not consistent with the objectives of the mitigation strategy. Even more so because Wright Lake is already part of another development proposal (Champion Lakes).

Response:

Main Roads maintains that enhancement/restoration of degraded wetlands is a legitimate wetland mitigation mechanism.

17. Restored and enhanced wetlands must be protected through appropriate vesting and/or covenanting.

Response:

Where appropriate and acceptable to the stakeholder who might ultimately be responsible for wetland management vesting and/or covenanting will be considered. Until the Wetland Mitigation Strategy is prepared it would be premature to prescriptive on this matter.

18. Any wetlands acquired as part of a Wetland Mitigation Strategy must ensure the 'entire wetland area' is acquired and protected. Acquisition based solely on cadastral boundaries and which may lead to only part of a wetland being purchased and protected is unacceptable.

Response:

This submission is noted. As also outlined in the PER (Section 5.6.5.1.1) wetlands should also include linkages, corridors, buffers and be adjacent existing reserves.

19. Any replacement wetlands under the 'Wetland Mitigation Strategy' should be within the same local government as the wetland they are replacing.

Response:

This submission point is noted, however it may not be practically possible. As also outlined in the PER (Section 5.6.5.1.1) wetlands should be located in the south-east region, then the south-west region and then the broader metropolitan region.

20. *As the section of the Southern/Wungong River that the Palomino Reserve Catchment Group (PRCG) is working with is very close to the proposed Tonkin Highway extension there maybe a chance to work with the PRCG as a pilot program to implement Wetland Banking.*

Response:

This submission point is noted and will be considered during the preparation of the Wetland Mitigation Strategy.

21. *While only a small proportion of affected wetland is designated as Conservation Category the loss of this area of total wetland is unacceptable. With only 20% of the original wetlands of the Swan Coastal Plain remaining it is essential that every effort is made to protect remaining areas. As with upland vegetation it must be emphasised that the protection of wetlands is of utmost priority to be considered in the design of this project. Where disruption of wetland is unavoidable mitigation should involve rehabilitation of remnants of wetland remaining from the construction process as well as replacement of wetland as per the Wetland Mitigation Strategy.*

Response:

Main Road believes that the proposal is consistent with Government policy and the commitment to prepare a Wetland Mitigation Strategy represents a industry benchmark. Without restating Section 5.6.5 of the PER the principles of wetland mitigation committed to by Main Roads include impact avoidance, 'no net loss', acquisition outside the road reserve, enhancement, creation and monitoring. The preparation and implementation of a Landscape and Revegetation Strategy Plan and Landscape and Revegetation Management Plan will also compliment wetland mitigation.

The extent of valuable wetland habitat should not be misunderstood. Of the 333.25 hectares 318.12 (95%) is either Multiple Use (cleared rural paddock) and Resource Enhancement (cleared or largely degraded) category wetland. A maximum of 15.13 hectares of Conservation category wetland will be impacted and of this area only the wetland at Armadale has not been subject to substantial degradation.

Importantly the following facts, as outlined in the PER should be appreciated. The proposal will impact a maximum 34.22ha of vegetation of which 28.66ha is in good condition, the area coinciding with the whole road reserve. The practical reality is that this impact will be reduced during road design and implementation of the Design and Construction Environmental Management Plan. Main Roads has committed to landscape and revegetate approximately 250ha using local provenance native species, almost 10 times the maximum area of vegetation proposed to be impacted. Secondly all the vegetation, with the exception of the Banksia Woodland at Wright Lake is vegetation mapped as wetland dependant vegetation and therefore will be mitigated for as part of the Wetland Mitigation Strategy. Therefore when the commitments relating to vegetation and wetlands are considered together, as they should be, it is clear that the level of 'offset' or mitigation for 'nature conservation values' is well in excess of the maximum possible values that will be impacted and to that extent it is reasonable to conclude that there will be net environmental gain as a result of the proposal.

5.1.4.2 Wetlands - Water Courses and Rivers

1. *The Drainage Management Strategy should include:*

- *liaison with the community*
- *timing for construction activities*
- *site specific actions described in detail (particularly near the Canning River)*
- *stormwater quality and flow management criteria to be adopted*
- *maintenance requirements*
- *contingency plans*
- *provision for at least 4 weeks of public comment; and*
- *provision for comment/approval by affected local governments.*

Response:

The Drainage Management Strategy will be prepared in consultation with all relevant stakeholders, including local governments. The Strategy will be prepared on advice of the WRC and approved by the Minister for the Environment. Given the relatively low significance of this issue and low number public submissions on the PER Main Roads does not believe further formal public consultation on this Strategy will be of value and will unnecessarily cause project delay.

2. *The proposed 'Wetland Mitigation Strategy' should be expanded to include watercourse wetlands such as the Canning River.*

Response:

The assessment of wetland impact does include water courses and rivers and therefore these areas will be mitigated for as part of the Wetland Mitigation Strategy.

3. *The highway will form a barrier to natural flood flows however the PER does not address how the proposal will impact flood flows or how any such impact will be mitigated.*

Response:

As outlined in the PER it is not proposed that existing flows will be diverted, dammed or altered at any stage. Bridges will be designed to accommodate the 1:100 year flood level and culverts will be sized based on the 1:20 year storm event, a standard which is equal or better than infrastructure in the locality.

5.2 POLLUTION MANAGEMENT

5.2.1 WATER - SURFACE WATER QUALITY

1. *The suggested stormwater system is not acceptable to the Swan River Trust nor the Water and Rivers Commission and should be modified to comply with the principles of Water Sensitive Urban Design.*

While specific requirements are further detailed in the WRC submission the approach should be one of source control and a 'treatment train' rather than detention basins and include:

- *non-kerbed roads*
- *linear vegetated swales along verges or in the medians*
- *use of natural contours, swales and low points to store flood waters; and*
- *minimal clearing*

Response:

Main Roads accepts this submission point and will modify the drainage scheme in accordance with the requirements of the WRC, which will be documented in the Drainage Management Strategy.

- 2. While pollution traps are alluded to there should be a definite commitment to use oil interceptors and oil traps to minimise the risk of a significant oil spill entering the Canning or Southern Rivers. There must be facility to isolate a given detention basin to prevent flow of highly contaminated spills into natural water systems. Although detention basins need to be of sufficient size to capture the runoff from extreme storm events and potential hazardous spills the size should not be excessive. The requirement for construction of drainage should not be used as an excuse to source fill -sand from the site.*

Response:

As outlined in the PER stormwater will not enter existing waterways or drains without treatment within the road reserve to remove pollutants. In accordance with WRC requirements the Drainage Management Strategy will address and if necessary provide drainage features to capture major hazardous spills.

- 3. The 'Drainage Management Strategy' should be renamed a 'Water Management Strategy'. This Strategy should be reviewed in detail with the WRC and approved prior to commencement of any on-ground works for the proposal. The WRC submission includes specific recommendations on the content of the Strategy.*

Response:

This submission point is noted and will be discussed with WRC during the preparation of the Drainage/Water Management Strategy. The Drainage Management Strategy will be prepared in consultation with WRC and approved by the Minister for the Environment.

- 4. Drainage basins should not be located over contaminated sites. It appears that drainage basin T9 (see Fig 6.2.1) is over contaminated site A5 (see Fig 6.4.1), an area previously used for disposal of sewage wastes.*

Response:

It is possible that the proposal may ultimately not involve numerous drainage basins. Even so T9 is not specifically located over an area where treated effluent was disposed of. This basin will be constructed on/in fill. Notwithstanding this the issue will be considered and addressed as part of the Design and Construction Environmental Management Plan.

5.2.2 WATER - GROUNDWATER QUALITY

1. *Some monitoring of the groundwater around the rivers would be appropriate during construction in order that any impacts can be identified and addressed.*

Response:

Main Roads has committed to preparing a Drainage Management Strategy which includes a 5 year water quality monitoring program. This program has already been prepared and includes monitoring of groundwater around rivers.

5.2.3 DUST

1. *Dust is already a problem, especially in the area between Railway Avenue and Wright Lake (and particularly in the vicinity of Eileen Street, Gosnells), and this is likely to become more so with construction activities occurring. Construction will include the movement of large quantities of fill and exposure of a significant work area likely to result in dust and sand becoming airborne. What assurances can be provided that dust will be adequately managed?*

Response:

This issues will be addressed through the preparation and implementation of the Design and Construction Environmental Management Plan, which will be prepared in consultation with all relevant stakeholders and approved by the Minister for the Environment.

2. *Problems have occurred during previous projects when there has been disregard of the effects of dust generated during construction. In particular the extension of the Kwinana Freeway at the intersection of Ennis Street and Safety Bay Road. Defined dust control measures to avoid this problem recurring should include:*
 - *Construction of covered fencing to protect susceptible areas*
 - *Provision in the contract for work to be suspended when prevailing weather and road building conditions cause intolerable dust generation; and*
 - *Monitoring of dust conditions surrounding the site.*

Response:

The suggested management measures are appreciated. These and other dust management measure will be addressed through the preparation and implementation of the Design and Construction Environmental Management Plan, which will be prepared in consultation with all relevant stakeholders and approved by the Minister for the Environment.

5.2.4 NOISE

1. *The Noise Management Strategy should include:*

- *liaison with the community*
- *timing for construction activities*
- *site specific actions described in detail*
- *existing conditions surveys*
- *contingency plans should compliance criteria be exceeded*
- *provision for at least 4 weeks of public comment; and*
- *provision for comment/approval by affected local governments.*

Response:

The Noise Management Plan will be prepared in consultation with all relevant stakeholders, including local governments. The Plan will be prepared on advice of the DEP and approved by the Minister for the Environment. Given the relatively low significance of this issue and low number of public submissions on the PER Main Roads does not believe further formal public consultation on this Plan will be of value and will unnecessarily cause project delay. The Plan will address construction timing, existing noise conditions, compliance monitoring and contingency plans.

2. *While the PER acknowledges that noise and vibration will require specific management and some alternatives and a process for addressing the management of noise have been discussed no specific management actions have been identified. What assurances can the proponent provide to nearby residents that these issues will be adequately managed in the design to cater for operational noise (based on current and potential future development of adjacent areas) and during construction to cater for construction noise.*

Response:

Main Roads has committed to prepare and implement a Noise Management Plan in consultation with all relevant stakeholders, including local governments. The Plan will be prepared and implemented on advice of the DEP and approved by the Minister for the Environment. Construction noise will be addressed through the preparation and implementation of a Design and Construction Environmental Management Plan, likewise this will need to be approved by the Minister for the Environment.

3. *The City of Armadale considers that the project should implement appropriate noise barriers between Forrest Road and Rowley Road where the Metropolitan Region Scheme identified current Urban Zone and shortly to be zoned Residential in the Armadale Town Planning Scheme. Additional similar areas are identified in the Southern River Forrestdale Brookdale Wungong District Structure Plan and should be similarly treated (south of Rowley Road and north of Armadale Road).*

All such facilities should be constructed as part of the initial construction works in order to protect future residents as well as existing residents in these areas.

Response:

Main Roads will manage noise to a level agreed with the DEP and documented in the approved Noise Management Plan to protect the amenity and health of current residents. Where the road is already constructed and a land owner wishes to build a dwelling or subdivide their land for residential purposes it

is their responsibility to implement management measures (on their property) such that the amenity and health of future residents is protected. Main Roads disagrees with the suggestion that it should manage noise in rural areas to a urban level which may ultimately not be developed for urban purposes for another 10-40 years, if at all. It has always been the responsibility of developers who wish to create a more sensitive land use to avoid (not develop with buffers) or manage (construct noise walls) impacts from adjacent land uses.

Main Roads and the DEP have had a number of meetings to establish the principles under which the Noise Management Plan will be prepared, specifically:

- i.) Main Roads will undertake detailed noise modelling for the whole proposal taking into account topography, cadastral information, dwelling locations, road design (including elevation), road surfaces and traffic volumes.
- ii.) Main Roads will manage noise from the proposal such that existing residents are not exposed to a noise level above 55 dB(A) $L_{Aeq,Night}$.
- iii.) Main Roads will adopt a 'best practicable' approach such that a noise level below 55 dB(A) $L_{Aeq,Night}$ will be investigated and implemented. (.Note: 'practicable' as defined by the Environmental Protection Act)
- iv.) Where future urban land has been zoned in the MRS land developers will be responsible, through noise barriers, urban design and building construction for ensuring future residents are not exposed to a noise level above 55 dB(A) $L_{Aeq,Night}$.
- v.) Where future urban land has been zoned in the MRS Main Roads will allow land developers, where reasonable and appropriate to construct noise management measures (noise walls or barriers) in the road reserve.

5.2.5 GASES

1. *Main Roads WA should have projected traffic figures that would enable the prediction of future impacts on air quality.*

Response:

As outlined in the PER the proposal is predicted to have an average of around 25,000 vehicles per day (vpd) by the year 2021, ranging from 12,000 vpd from South Western Highway at Jarrahdale Road to 50,000 vpd between Armadale and Rowley Roads.

Main Roads has carried out air quality measurements within 50 metres of the roadside using a mobile laboratory at the following roads with equal or high number of vehicles than the proposal:

- Curtin Avenue Cottesloe (Main Roads, 1998); and
- Roe Highway (GHD, 1999).

In summary these studies found that the pollution levels, which can be attributed to motor vehicle emissions are well below National Environmental Protection Measure (NEPM) goals for pollution limits. As such it is anticipated that the NEPM air quality standards will be met along the proposal.

5.3 SOCIAL SURROUNDINGS

5.3.1 VISUAL AMENITY

1. *The proposed works in the vicinity of Eileen Street, Gosnells should be screened by a 'mini-forest' of mature Sheoaks upon completion to screen the highway from the view of residents in the area and minimise noise impacts.*

Response:

This suggestion will be considered during the preparation of the Landscape and Revegetation Strategy Plan and Landscape and Revegetation Management Plan.

2. *There is concern that highway lighting will be such that it will have a negative affect on the amenity of the residents and fauna due to bright lighting being in operation all night. What assurances can Main Roads WA provide that this issue has been adequately addressed?*

Response:

Main Roads has no significant complaint history regarding highway lighting from nearby residents or comments from conservation agencies or groups regarding impacts on fauna. If there is specific concern of resident(s) Main Roads will use it best endeavors to practically and reasonably resolve these concerns.

3. *A new commitment, or revised commitment relating to the Landscape, Revegetation and Amenity Strategy Plan, should be provided to ensure not only revegetation but also contouring and provision of pathways and other local amenity facilities are adequately provided for either within the Road Reserve or in adjacent off site locations if amenity cannot be adequately replaced through works within the road reserve. Specific issues that should be incorporated include:*

- *detailed identification of both on and off site landscaping, amenity and revegetation measures*
- *facilities such as bike ways, paths and fencing*
- *final contours, including emulation of natural contours in areas of high visual amenity*
- *providing priority for local visual amenity rather than road user visual amenity*
- *liaison with the community*
- *existing environmental condition surveys*
- *no net loss of environmental values and functions*
- *provision for comment/approval from relevant local governments and state agencies; and*
- *current/future pedestrian/cyclist access along Southern River beneath traffic bridge(s) is maintained/facilitated.*

Response:

Main Roads is maintaining a constant two-way communication strategy with local governments and the community. Issues such as dual use paths, fencing, pedestrian access, permeability and road design are and will be discussed and negotiated during the approvals, design and construction phases. If there is a specific concern of resident(s) or local government, Main Roads will use its best endeavours to practically and reasonably resolve these concerns. This approach reflects standard operational procedures and on this basis Main Roads does not believe it is appropriate or necessary to have a specific or revised commitment.

- 4. The crossing of Albany Highway should be treated as the 'gateway' to the City of Gosnells. It is highly desirable if elevations showing the likely appearance of this section of the highway could be produced to ensure that concerns over the visual impact of the Tonkin Highway are addressed.*

Response:

Main Roads would be happy to provide drawings depicting the preliminary road design across Albany Highway.

- 5. It is requested that the Webb Road to Mundijong Road connection be added to Figure 5.12 in the report as no connection between the two roads is shown.*

Response:

At this stage the ultimate connection of Webb Road to Mundijong Road (if appropriate) has not been investigated and as such to depict a connection would be premature.

- 6. A vehicle overpass for the Tonkin Highway at Abernethy Road should be constructed to provide an east-west link avoiding severance to the community on the western side of the Highway.*

Response:

As outlined in Section 7.2.5.1.3 of the PER, Main Roads is currently liaising with the Shire of Serpentine Jarrahdale to resolve this matter. Main Roads does not propose to provide an at grade connection because it will almost be impossible to remove access in the future once provided, and a fly over (grade separated connection) can not be justified based on the number of vehicles.

5.3.2 CULTURE AND HERITAGE - EUROPEAN

- 1. The Heritage Council of Western Australia is concerned that some places that are present on various heritage registers may be affected by the proposal. Complete listings of the heritage listings from the databases outlined below are provided with those places on roads crossed by the proposed route highlighted*

- Register of Heritage Places;*
- Data Base;*

- *Anglican Church Inventory;*
- *Classified by the National Trust;*
- *Heritage Council of WA Assessment Program;*
- *Heritage Council of WA Assessment Program (below threshold);*
- *Municipal Directory;*
- *Register of the National Estate;*
- *Roman Catholic Church Inventory;*
- *State Government Inventory;*
- *Statewide Hotel Survey;*
- *Statewide Large Timber Structures Survey;*
- *Statewide War Memorial Survey; and*
- *Uniting Church Inventory.*

Response:

As outlined in the PER there will be no direct impacts on significant European heritage buildings. There are however a number of buildings within 500 metres of the proposal. Potential impacts and management on these buildings will be addressed through the Design and Construction Environmental Management Plan.

6 DEFINITION OF THE PROPOSAL

The PER illustrated the proposal in Figure 3.1.1 and 3.1.2 and outlines the 'Key Characteristics' in Table 3.2.1 (page 4).

Figure 3.1.2 did indicate a 'footprint' for the proposal that could suggest the proposal includes development outside Controlled Access Highway (CAH) reservation as defined in the Metropolitan Region Scheme and referred to in the Key Characteristics table. Specifically the realigned Mundijong Road, Champion Drive and Corfield Street connections are not part of the 'red' CAH reservation.

Figure 3.1.2 also shows some sections of the 'foot print' which are in the CAH reservation, however are not part of the proposal. More specifically where the Tonkin Highway Extension terminates at a connection with South Western Highway in the vicinity of Jarrahdale Road, a link further east is shown. This link is not incorporated into the proposal and the CAH will terminate at a T intersection with the South Western Highway.

Furthermore during the PER process Main Roads has been holding discussions with the various local governments regarding some minor changes to the proposal and what should be included or excluded. Following these discussions Main Roads now seeks to clarify the definition of the proposal.

Corfield Street

The proposal will include the Corfield Street connection, as depicted on **Figure 1, Sheet 1** of this report.

From an environmental perspective this area is almost completely cleared and grazed (Figure 3.1.2, Sheet 1 of the PER). The area has already been included in the wetland impact assessment. No Aboriginal archeological or ethnographic sites will be impacted. Noise impacts on residents east of the Tonkin Highway will be considered as part of the Noise Management Plan and based on the information provided in the PER would seem manageable. There appears no implications for Bush Forever, contaminated sites, visual amenity, European heritage, water courses and rivers, fauna, and public risk and safety.

Champion Drive / Garden Street

The proposal does not include the Champion Drive/Garden Street connection to the west or from the Highway east to Lake Street.

Forrest Road

Forrest Road was in the ultimate proposed to be a fly over without a connection to Tonkin Highway. Following negotiations with the City of Armadale it has now been agreed to provide an interim and full connection from the east only. Initially an at grade intersection will be constructed and is included as part of this proposal. The full grade separated interchange will require an amendment to the MRS, which will be referred to the EPA pursuant to Section 48A of the Environmental Protection Act.

Summary

Considering these matters Main Roads submits **Figure 1** as an illustration of the proposal and the following revised Key Characteristics Table (**Table 1**) and revised Proponent Commitments table (**Table 2**).

TABLE 1 Key Characteristics Table

Element	Description
Proposal Description	Design, construction and use of a highway of six lanes from Mills Road West to Mundijong Road and four Lanes from Mundijong Road to South Western Highway (ultimate) within the footprint depicted on Figure 1 . The proposal includes construction of all road pavements, access roads, drainage basis, drains, medians, 'at grade' intersections, 'grade separated' interchanges, ramps, traffic signals, associated earth works, dual use paths, bridges, culverts, lighting, noise barriers, under passes, over passes, fencing, landscaping and signs.
Length of proposal	32 kilometres
Approximate area of road reserve	416 hectares
Typical cross section (3 lanes)	6 metres for drains, 33 metres for pavement and shoulder, 10 metres for median, 4.5 metres for dual use path or 53.5 metres total.
Typical Cross section (2 lanes)	6 metres for drains, 25 metres for pavement, shoulder and verge, 4 metres for median, 3.5 metres for dual use path or 38.5 metres total.
Approximate road area	190 hectares (Includes interchanges)
Approximate area of construction	260 hectares. (Includes batters and drainage basins)
Approximate area to be revegetated.	250 hectares. (Includes batters and drainage basins)
Construction Duration	The proposal will be constructed and upgraded in stages from Gosnells to Mundijong, lanes will be added over time and at grade intersections will be replaced with grade separated interchanges, as traffic demand increases. It is expected that construction will occur to Armadale Road by 2004 and to the South Western Highway by 2006.
Grade separated interchanges and connections.	Mills Road East and West*, Albany Highway, Corfield Street, Champion Drive*, Ranford Road*, Armadale Road, Forrest Road*, Rowley Road*, Thomas Road*, Orton Road*, Bishop Road, Mundijong Road* (roundabout), Shanley Road* and South Western Highway*. * Initially at grade intersections
Bridges	Canning River, two bridges; Southern River, one bridge; and Wright Street one bridge.
General Standard of Design and Construction	Design Speed 80-110 km/h. Austroads and Main Road Western Australian standards.
Construction materials source	Road mostly constructed on fill. All materials sourced by Design and Construction contractor from approved sources (eg. sands mines) and suppliers.

TABLE 2 Proponent Commitments

	Topic	Action	Objective	Timing	Advice
1.	Design and Construction Environmental Management Plan	<p>Prepare a Design and Construction Environmental Management Plan which addresses:</p> <ul style="list-style-type: none"> • measures to limit clearing (eg. exclusion fencing & retaining walls at Mundijong Road); • environmentally significant areas; • protection of Declared Rare & Priority flora (Tetraria australiensis–Mundijong Road); • hygiene measures to minimise the spread of diseases (ie. dieback – Areas 2 (Armadale Road) and 5 (Mundijong Road) and weeds; • water quality, erosion and sedimentation control; • construction noise and vibration; • Aboriginal and European heritage; • Property condition surveys; • dust management; • fire management; • registers of waste materials/contamination, monitoring and site audit sheets; • movement, storage and refueling of machinery during construction; • storage and handling procedures for all construction materials and hazardous chemicals; • hazardous spill contingency plan; • contamination contingency plan; • potential contamination at Pt. Lot 19 Manning Road & Lot 1 Shanley Road; • dewatering and water supply; • description of environmental standards, safeguards & emergency responses; • schedules for corrective action and verifications; • licensing requirements and approvals; • management structure and reporting; • community liaison; • environmental briefing/training/induction of personnel; • monitoring; and • progress and compliance reporting. 	<p>Ensure that construction (direct and indirect) impacts are minimised on flora, fauna, wetlands, significant flora, Bush Forever sites, surface and groundwater quality, nearby residents and buildings, Aboriginal and European heritage sites.</p>	<p>Prior to site preparation work commencing.</p>	

	Topic	Action	Objective	Timing	Advice
2.	Design & Construction Environmental Management Plan	Implement the Design & Construction Environmental Management Plan required by Commitment 1.	Achieve the objectives of Commitment 1.	During construction.	
3.	Landscape & Revegetation Strategy Plan	Prepare a Landscape & Revegetation Strategy Plan which addresses: <ul style="list-style-type: none"> • visual amenity & wetland creation & enhancement; • plant/seed source & propagation methods; • fertilisation & irrigation if appropriate/required; • topsoil management & compaction; • mulching & soil stabilisation; • weed control; • soil & plant source material hygiene; • timing & implementation schedule; • monitoring and completion criteria; • landscaping maintenance; and • progress & compliance reporting. 	Minimise impact on vegetation, fauna, significant flora, Bush Forever sites, wetlands, water quality & visual amenity. Provide linkages, habitat & impact mitigation.	Prior to site preparation work commencing.	
4.	Landscape & Revegetation Management Plan	Prepare a Landscape & Revegetation Management Plan consistent with Commitment 3.	Provide greater detail consistent with the objectives in Commitment 3.	During design & site preparation works but before construction of each stage(s).	
5.	Landscape & Revegetation Management Plan	Implement the Landscape & Revegetation Management Plan required by Commitment 4.	Achieve the objectives of Commitment 3.	During construction.	
6.	Vegetation Mitigation Strategy	Prepare a Vegetation Mitigation Strategy for the loss of vegetation on the southern side of Mundijong Road which addresses: <ul style="list-style-type: none"> • weed control; • access control; • interface and edge effects with Tonkin Highway; • rehabilitation of old materials dump area near the rail crossing; • revegetation; • professional seed collection for inclusion in future revegetation programs in the Marri Woodland Community; and • provision of educational or informative signage. 	Minimise impacts on vegetation along Mundijong Road. Achieve no net loss by enhancing the vegetation (Marri Woodland Community) eastwards to Paterson Road.	Submit for approval prior to 31 December 2002.	

	Topic	Action	Objective	Timing	Advice
7.	Vegetation Mitigation Strategy	Implement the Vegetation Mitigation Strategy in Commitment 6.	Achieve the objectives of Commitment 6.	Progressively and within 12 months of vegetation being lost/impacted or as soon as practically possible	
8.	Fauna crossings	Provide fauna crossings.	Minimise impact on fauna.	During construction.	
9.	Wetland Mitigation Strategy	Prepare a Wetland Mitigation Strategy in consultation with key stakeholders, including community and conservation groups which addresses: <ul style="list-style-type: none"> • assessment of values and functions lost and gained; • details of wetlands to be acquired; • specific areas/lots for wetlands enhancement and creation; • vesting and long term management responsibility of wetlands outside the road reserve; • landscaping and revegetation; • drainage management; • monitoring and maintenance; and • compliance reporting. 	Minimise impacts on wetlands to achieve no net loss of values & functions.	During design & site preparation work.	WRC
10.	Wetland Mitigation Strategy	Implement the Wetland Mitigation Strategy in Commitment 9.	Achieve the objectives of Commitment 9.	Progressively and within 3 to 4 years of particular wetlands being lost/impacted or as soon as practically possible	
11.	Drainage Management Strategy	Prepare a Drainage Management Strategy which addresses: <ul style="list-style-type: none"> • an assessment of the expected stormwater treatment efficiency of the drainage system & justification that the system incorporates all of the principles of current best practice; • detention times for road runoff provided by the detention basins; • the permanent detention volume, extended detention volume & total detention volume in relation to the statistical time interval between storm events & the statistical magnitude of storm events; • the drainage basin landscaping & amelioration (eg. red mud); and • a five year water quality monitoring program. 	Minimise impacts on surface & groundwater quality from storm water & vehicle accidents.	Prior to construction of drainage infrastructure.	WRC

	Topic	Action	Objective	Timing	Advice
12.	Drainage Management Strategy	Implement the Drainage Management Strategy required by Commitment 11.	Achieve the objectives of Commitment 11.	During construction of drainage infrastructure.	
13.	Noise Management Plan	Prepare a Noise Management Plan which addresses: <ul style="list-style-type: none"> • design issues; • noise modelling for the whole proposal taking into account topography, cadastral information, dwelling locations, road design (including elevation), road surfaces and traffic volumes location of noise sensitive premises; • proposed noise criteria (including intersections); • noise management measures; • implementation timing of noise management measures; • visual amenity/impact of noise barriers • monitoring; and • compliance reporting. 	Minimise noise impact on sensitive premises.	Prior to design.	DEP
14.	Noise Management Plan	Implement the Noise Management Plan required by Commitment 13 in accordance with the following: <ul style="list-style-type: none"> • Manage noise from the proposal such that existing residents are not exposed to a noise level above 55 dB(A) $L_{Aeq,Night}$. • Adopt a ‘best practicable’ approach such that a noise level below 55 dB(A) $L_{Aeq,Night}$ will be investigated and implemented. (.Note: ‘practicable’ as defined by the Environmental Protection Act) • Where future urban land has been zoned in the MRS allow land developers, where reasonable and appropriate to construct noise management measures (noise walls or barriers) in the road reserve. 	Achieve the objectives of Commitment 13.	During construction.	DEP

Note: Site preparation includes surveying and preliminary earthworks.

Construction includes final earthworks, bridges, road base and asphalt, drainage features, noise barriers and paths.