

Relocation of the Cedric Street Wetland

**Department of Planning and Urban Development
City of Stirling
Westpoint Properties
J K Geneff Nominees
Mr P Baltovich
Fabray Pty Ltd
Mr Furfaro**

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

**Environmental Protection Authority
of Perth, Western Australia
Bulletin 658
November 1992**

THE PURPOSE OF THIS REPORT

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's recommendations.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then issues his decision about whether the proposal may or may not proceed. The Minister also announces the legally binding environmental conditions which might apply to any approval.

APPEALS

If you disagree with any of the contents of the assessment report or recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of \$10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

ADDRESS

Hon Minister for the Environment
12th Floor, Dumas House
2 Havelock Street
WEST PERTH WA 6005

CLOSING DATE

Your appeal (with the \$10 fee) must reach the Minister's office no later than 5.00 pm on 27 November 1992

Contents

	Page
Summary and recommendations	i
1 Background	1
2 The proposal	2
3 Public review	3
4 Environmental issues and their management	3
4.1 Swan Coastal Plain Lakes Environmental Protection Policy	4
4.2 Existing wetland values and management objectives	4
4.2.1 Social values	6
4.2.2 Ecological values	6
4.2.3 Hydrological values	7
4.3 Replacement of Cedric Street Wetland	8
5 References	8
 Figure	
1. Location of the Cedric Street Wetland	2
 Appendices	
1. Proponent's commitments on the proposal	
2. Issues raised during the public review period	
3. Proponents response to the issues raised during the public review period	
4. Advice from the Environmental Protection Authority to the Department of Planning and Urban Development regarding the draft Stirling Regional Centre Structure Plan	
5. Previous advice from the Environmental Protection Authority to the City of Stirling regarding the Cedric Street Wetland	
6. Previous advice from the Environmental Protection Authority to the Department of Planning and Urban Development regarding the Cedric Street Wetland	

Summary and recommendations

In December 1990, the Government of Western Australia released Metroplan - a planning strategy for the Perth metropolitan area. Included in this plan was a commitment to develop the Stirling Regional Centre, extending from Scarborough Beach Road in the south to the Stirling Rail Station and the City of Stirling municipal offices in the north. Development of this centre will entail the filling of the Cedric Street Wetland to accommodate the establishment of the 'core precinct'.

Approval to mine and fill a large portion of the Cedric Street Wetland was granted by the City of Stirling and Department of Planning and Urban Development in July/August 1991. The Environmental Protection Authority had previously offered informal advice to the City of Stirling and the Department of Planning and Urban Development advising that it was preferable to protect the lake. However, this advice was not binding.

The Cedric Street Wetland was not governed by regulations, introduced in March 1991, to protect wetlands while an Environmental Protection Policy for lakes was developed.

During subsequent field mapping, the Cedric Street Wetland was found to meet criteria for inclusion in the Swan Coastal Plain Lakes Environmental Protection Policy. That is, the lake contained more than 1000m² of surface water in the first week of summer. This mapping was conducted after development approvals were granted, but nonetheless the proponent's sought to replace the functions of the Cedric Street Wetland that would be lost as a consequence of the proposal.

The Cedric Street Wetland is described as a degraded, typha-dominated wetland that now contains water over some of the summer - possibly because of elevated groundwater and runoff following urbanisation of the catchment. The Cedric Street Wetland is currently subject to illegal dumping, invasion by weeds and exotic species (pampas grass, castor oil plants, etc), uncontrolled clearing and permitted (eg Mitchell Freeway) and non-permitted landfill. Despite such severe alterations to its natural state, the Cedric Street Wetland remains environmentally valuable - a testimony to the resilience of this lake, which in turn suggests that it is feasible to relocate/reconstruct the essential functions of this lake.

The proponents have proposed to relocate the ecological, hydrological and social functions of the Cedric Street Wetland to another, and as yet, unspecified location by creating a lake, or series of lakes, within the Stirling Regional Centre. It was this proposed relocation which was referred to the Environmental Protection Authority and is the subject of this report.

The proponents have stated that they will support the inclusion of a replacement lake, or series of lakes, into the Swan Coastal Plain Lakes Environmental Protection Policy schedule should they meet the selection criteria. The Environmental Protection Authority has recommended that the replacement lake/s should be designed to meet the Policy selection criteria. Specifically, that the replacement lake/s contain more than 1000m² of surface water in the first week of summer.

The proposed relocation of the Cedric Street Wetland is the first of its kind in Western Australia, though the principle of compensatory replacement of wetland habitat has been operating in the United States of America since 1982 (Owen and Jacobs, 1992). The project provides an opportunity to:

- obviate the pending loss of lake habitat due to mining and filling;
- replace the existing, degraded lake with one that is ecologically as good, or better, than the existing lake;
- improve upon the hydrological functions of the existing lake to further protect downstream water resources;
- consolidate the functional elements of a privately-vested, remnant lake system; and
- provide for the long-term management of the lake;

the costs of which shall be borne by the proponents.

The proponents have not identified the site or detailed design for the proposed replacement lake/s, but they have proposed to address these issues in a detailed Lake Relocation Plan. The Authority is satisfied that adequate sites exist within the development area to accommodate a lake relocation program.

The Environmental Protection Authority is satisfied that, if conducted in a technically competent manner, the proposed replacement of the Cedric Street Wetland would provide a range of ecological, recreational and hydrological functions that could either match, or exceed, those of the existing lake. Most importantly, the proposal offers a mechanism for the rehabilitation, protection and long-term management of habitat, which may otherwise be lost.

The Environmental Protection Authority is satisfied that the environmental issues associated with the proposed replacement of the Cedric Street Wetland values are manageable, provided the proponents adhere to their commitments and the EPA recommendations contained in this report. The Environmental Protection Authority has recommended that the proponents should seek community input when formulating an Environmental Management Plan (to include a Lake Relocation Plan and an Environmental Monitoring Plan).

Key issues

Several major issues were raised by the public and the EPA in response to the proposed relocation of the Cedric Street Wetland and these have been addressed either by the proponent or the EPA as follows:

"Wouldn't it be more reasonable (and cheaper) to retain and enhance the Cedric Street Wetland within the redevelopment rather than relocating it?"

- The proponents have assured the EPA that the functions of the Cedric Street Wetland can be economically relocated, such is the inherent value of the site and the importance of the 'core precinct' to the success of the Stirling Regional Centre redevelopment (the establishment of which is a Government of Western Australia commitment).

"Will the development result in a deterioration of nearby surface waters?"

- The EPA is satisfied that nearby watercourses can be adequately protected, particularly the Osborne Park Branch Drain and Herdsman Lake. The EPA also believes the nutrient removal ability of the Cedric Street Wetland can be adequately replaced, or substantially improved, by incorporating state-of-the-art lake design principles in the construction of the replacement habitat.

"Will the proponents nominate the replacement lake/s for inclusion into the Swan Coastal Plain Lakes Environmental Protection Policy?"

- The proponents have provided a commitment that they will support listing the replacement lake/s for inclusion in the Policy and the EPA has supported this with a recommendation requiring that criteria for inclusion be met by the replacement lake/s.

"Will the replacement lake/s be located within the Freeway Reserve?"

- The proponents have provided a commitment that they will not construct replacement lake/s within the Freeway Reserve, but rather, any lake/s in this reserve would be in addition to those relating to the replacement of the Cedric Street Wetland.

Recommendation 1

The Environmental Protection Authority concludes that the proposal to relocate the functions of the Cedric Street Wetland, as described in the CER and subsequently modified in the proponent's response to submissions, is manageable.

The Environmental Protection Authority therefore recommends relocation of the Cedric Street Wetland could proceed subject to the undertakings and commitments provided by the proponent (Appendices 1 and 3) and the recommendations in this report.

In reaching this conclusion, the Authority identified the following issues:

- protection and conservation of the Cedric Street Wetland;
- protection of a rare sedge species reported to occur in the area;
- the generally degraded nature and lack of management of the Cedric Street Wetland;
- the intended values and ongoing management of the replacement lake/s;
- protection of downstream water quality (particularly Herdsman Lake);
- definition and relocation of the values of the Cedric Street Wetland; and
- provisions for the long-term management of the lake.

The Environmental Protection Authority notes that these environmental factors have been addressed adequately by environmental management commitments given by the proponent, or by the Environmental Protection Authority's recommendations made in this report.

The proponents have provided a commitment that they will support listing the replacement lake/s for inclusion in the Swan Coastal Plain Lakes Environmental Protection Policy if they meet the appropriate selection criteria. Accordingly, the Authority makes the following recommendation:

Recommendation 2

The Environmental Protection Authority recommends that the proponents ensure that the replacement lake/s comply with the Swan Coastal Plain Lakes Environmental Protection Policy selection criteria and, upon construction, the replacement lake/s be nominated for inclusion in this Policy.

The proponents have provided a commitment to conduct a detailed survey and trapping exercise prior to construction in order to determine the possibility of the Southern Brown Bandicoot, or other native mammals, utilising the area (Appendix 1, commitment 4). A survey, conducted

some 5-10 years ago by a post-graduate student (Ian Lenski), documented the occurrence of a rare sedge species within the Cedric Street Wetland. No such species was identified during botanical surveys conducted in July this year. However, identification of individual sedge species can often only be determined with confidence during the spring/summer flowering period (advice received from Western Australian Herbarium). Should rare flora or fauna be present, details of its relocation should be addressed within an Environmental Management Plan.

Recommendation 3

The Environmental Protection Authority recommends that, prior to the commencement of any construction which may impact on the Cedric Street Wetland or its fringing vegetation, the proponents conduct a survey to determine the occurrence and distribution of rare sedges (especially those species identified by CALM as potentially occurring at this location) within the Cedric Street Wetland. To facilitate identification, this survey should be synchronised with sedge flowering and meet the requirements of the Environmental Protection Authority.

The proponents have suggested that the formulation and implementation of an Environmental Management Plan should be a condition of approval for the project (Appendix 3, section 1.17).

Recommendation 4

The Environmental Protection Authority recommends that, prior to the commencement of any construction which may impact on the Cedric Street Wetland or its fringing vegetation, the proponents prepare, with the benefit of community input, and submit an Environmental Management Plan (comprising a Lake Relocation Plan and a Lake Monitoring Plan), to meet the requirements of the Environmental Protection Authority.

The Lake Relocation Plan should be based on community input and include, but not necessarily be limited to, the following:

- siting, morphology and visual impact of replacement lake/s;
- ecological, hydrological and human use objectives of the replacement lake/s, and how these objectives are met through good design;
- detailed design plans, including habitat maps;
- detailed biological specifications, including flora and fauna selections and planting configurations;
- timing of transference of biological material from the Cedric Street Wetland; and
- likely seasonal water level regimes.

In addition, specific reference should be made to the distribution of rare plant and animal species occurring within the Cedric Street Wetland and details of their relocation.

1. Background

In December 1990, the Government of Western Australia released Metroplan - a planning strategy for the Perth metropolitan area. Included in this plan was a commitment to develop eight Regional Centres out of the largest of the existing suburban centres. One of the centres identified for redevelopment was the Stirling Regional Centre, extending from Scarborough Beach Road in the south to the Stirling Rail Station and the City of Stirling municipal offices in the north.

In June 1991, a draft structure plan for the Stirling Regional Centre was referred to the Environmental Protection Authority for advice. It was determined that the overall environmental impact of the proposal was not so severe as to require formal assessment by the Authority. Accordingly, the Environmental Protection Authority provided informal advice to the Department of Planning and Urban Development on environmental aspects of the project in September, 1991 (Appendix 4). This advice stated "...the study objectives make no reference to protecting environmentally significant sections of the existing environment. The remnants of Hertha Road Swamp and any other stands of native vegetation should be identified and options for their management discussed. Hertha Road Swamp is mostly highly modified, but some areas still exist with good stands of wetland vegetation. The final report should give more consideration to the management of this area with the view of retaining it as part of public open space".

In July 1991, the Environmental Protection Authority provided non-binding advice to the City of Stirling regarding an application to mine and fill a portion of the Cedric Street Wetland owned by Fabray Pty Ltd. The Environmental Protection Authority stated at this time that "...the Authority no longer conducts assessments at this level and considers that the proposal may be adequately managed by the proponent in consultation with the local government authority and other relevant agencies, within the context of environmental management policy. If significant areas of wetland vegetation remains, this should be protected from peat extraction, fill and subsequent development" (Appendix 5). The City of Stirling approved the development in late July, 1991, conditional upon Department of Planning and Urban Development approval.

In August 1991, the Environmental Protection Authority wrote to the Department of Planning and Urban Development expressing its concern that its advice to the City of Stirling relating to the protection of the wetland area had been misinterpreted and that the Authority was particularly concerned about the fate of the rush swamp between Cedric Street, Oswald Street and the Freeway Reserve (Cedric Street Wetland). The Authority reaffirmed its position by writing "...we do not support the destruction of the swamp through filling or other means. The Authority strongly recommends that the wetland is protected from destruction and that you seek further details from the proponent about such issues as drainage, landscape design and retention of the existing healthy overstorey on this site prior to approving the development application" (Appendix 6). The Department of Planning and Urban Development granted approval to mine and fill a large portion of the Cedric Street Wetland.

In September or October, 1991, most of the *Eucalyptus rudus* (Flooded Gum) which fringed the Cedric Street Wetland was felled.

In May 1992, a proposal to relocate the Cedric Street Wetland was referred to the Environmental Protection Authority for environmental impact assessment. The proponents indicated that the site of the Cedric Street Wetland was the preferred location of the 'core precinct' of the Stirling Regional Centre, the strategic location of which was crucial to the future success of the development. The proponents for the relocation of the Cedric Street Wetland included Fabray Pty Ltd, the Department of Planning and Urban Development and the City of Stirling. It is the proposed relocation of the Cedric Street Wetland that is the subject of this report.

2. The proposal

The proponents have proposed to relocate the ecological, hydrological and social functions of the Cedric Street Wetland.

The proponents have provided commitments that they will replace the ecological, hydrological and social functions of both the Cedric Street Wetland (Appendix 3, section 1.5) and the dampland to the south of the wetland (Appendix 1, commitment 19) within the boundaries of the proposed Stirling Regional Centre.

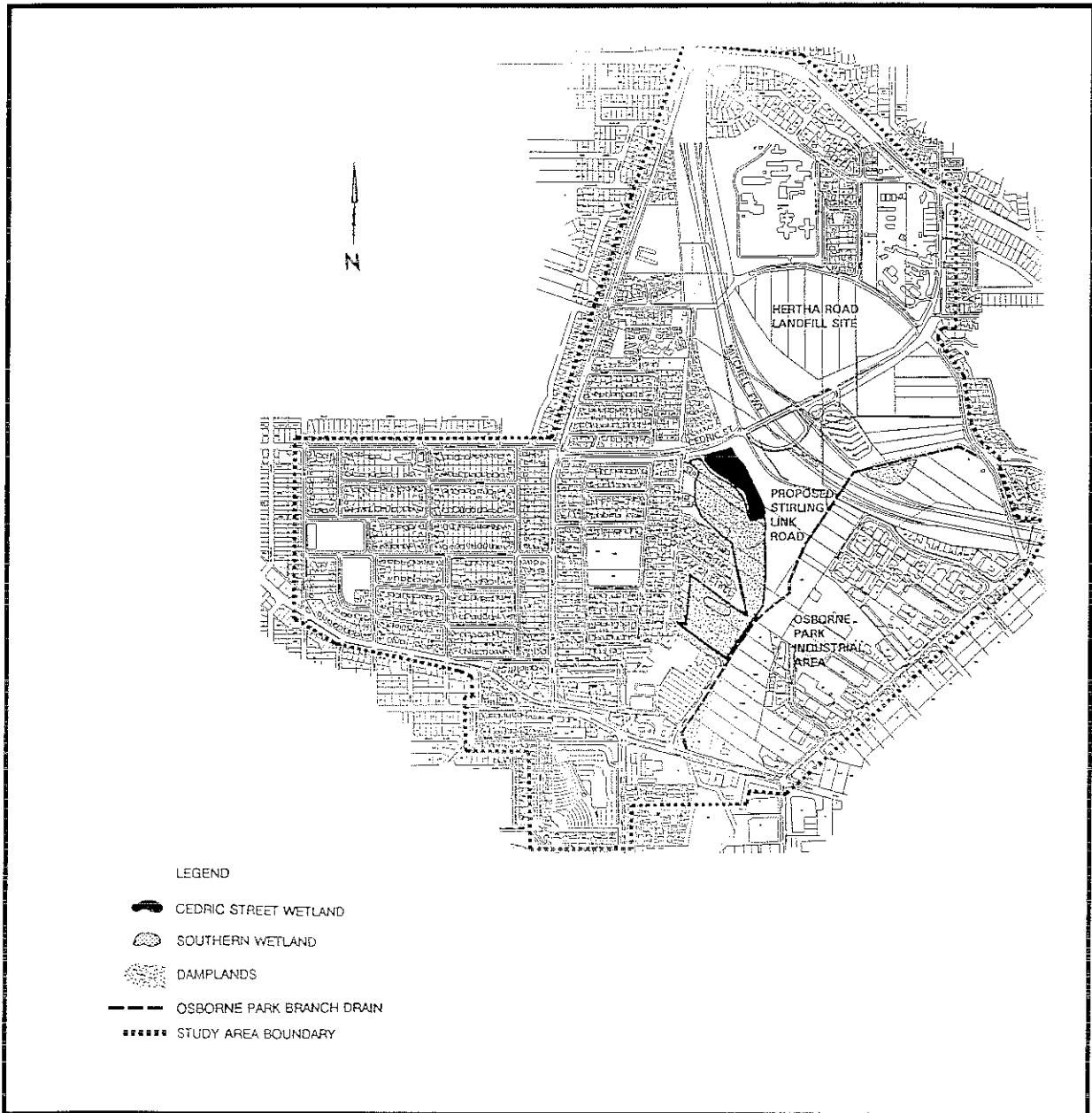


Figure 1: Location of the Cedric Street Wetland

3. Public review

During the public review of the CER, 9 submissions were received from members of the public, community groups and government agencies. A detailed summary of these submissions was sent to the proponents on 22 September, 1992 and is presented in Appendix 2. The proponent's responses to the issues and comments raised in the summary of submissions was received on 12 October, 1992 and is included in Appendix 3.

4. Environmental issues and their management

The main environmental issues considered by the Environmental Protection Authority are:

- protection and conservation of the existing lake;
- protection of a rare sedge species reported to occur in the area;
- the generally degraded nature and lack of management of the Cedric Street Wetland ;
- the intended values and ongoing management of the replacement lake/s;
- protection of downstream water quality (particularly Herdsman Lake);
- definition and relocation of the values of the Cedric Street Wetland; and
- provisions for the long-term management of the lake.

Based on the Environmental Protection Authority's assessment of the proposal, additional information provided in the public submissions, the proponents' responses to the public submissions and commitment provided by the proponents, the Authority recommends as follows:

Recommendation 1

The Environmental Protection Authority concludes that the proposal to relocate the functions of the Cedric Street Wetland, as described in the CER and subsequently modified in the proponent's response to submissions, is manageable.

The Environmental Protection Authority therefore recommends relocation of the Cedric Street Wetland could proceed subject to the undertakings and commitments provided by the proponent (Appendices 1 and 3) and the recommendations in this report.

The Environmental Protection Authority notes that these environmental factors have been addressed adequately by environmental management commitments given by the proponent, or by the Environmental Protection Authority's recommendations made in this report.

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

4.1 Swan Coastal Plain Wetlands Environmental Protection Policy

In March 1991, the Environmental Protection Authority released a draft Swan Coastal Plain Wetlands Environmental Protection Policy for public comment. Regulations were also gazetted at this time to ensure that the lakes proposed for protection in the draft Policy were afforded protection during the public submission period. The lakes protected by the regulations were identified on a set of publicly available maps released in association with the draft Policy.

The Cedric Street Wetland was not initially included in the draft Swan Coastal Plain Wetlands Environmental Protection Policy, as indicated by the associated maps (Miscellaneous Plan 1700), and is therefore not subject to the corresponding regulations.

As a result of public comments received on the draft Policy, it became apparent to the Environmental Protection Authority that the Cedric Street Wetland had been overlooked during compilation of the Policy maps (these maps are crucial to the application of the regulations and, upon ratification, the future application of the Policy). A site inspection by officers of the Environmental Protection Authority in December 1991, confirmed that this lake did in fact comply with the selection criteria and was duly included in a revised draft of the Policy - called the Swan Coastal Plain Lakes Environmental Protection Policy.

The Cedric Street Wetland is now included in maps associated with the draft Swan Coastal Plain Lakes Environmental Protection Policy. Filling of the Cedric Street Wetland for development was approved prior to formulation of this draft, which has no retrospective powers.

The proponents have stated that they will support the inclusion of a replacement lake, or series of lakes, into the Swan Coastal Plain Lakes Environmental Protection Policy schedule should these lakes meet the selection criteria. The Environmental Protection Authority has recommended that these replacement lakes should meet the following selection criteria:

- be greater than 1000m² in area; and
- be designed to contain water at the 1st of December,

in an average year.

Recommendation 2

The Environmental Protection Authority recommends that the proponents ensure that the replacement lake/s comply with the Swan Coastal Plain Lakes Environmental Protection Policy selection criteria and, upon construction, the replacement lake/s be nominated for inclusion in this Policy.

4.2 Existing values and management objectives

The Cedric Street Wetland was classified by the proponents, using "A guide to wetland management in Perth" (EPA Bulletin 374), as a multiple use lake (category 'M'); or a lake possessing few natural attributes and of limited human use. The Authority believes the proponents have under-estimated the passive recreational amenity and community involvement in these areas somewhat (especially birdwatching and walking). It is the Authority's assessment that the lake is category 'R'; or a lake that has been modified and does not have clearly recognised human uses. However, the general management objectives under these categories are the same. That is, uses may be permitted that involve significant alterations to the lake,

provided the lake function is retained within the development, or an equivalent area of lake of similar type is constructed or rehabilitated to fulfil equivalent functions.

4.2.1 Social values

Despite the appreciable level of disturbance and degradation of the Cedric Street Wetland, the lake provides valuable social functions, being particularly favoured for walking and birdwatching.

Peat extraction licences, administered by the City of Stirling, currently extend over about 50% of the Cedric Street Wetland. Although peat extraction is yet to occur, these licences remain in effect. Large-scale peat extraction would undoubtedly have a profound impact on the Cedric Street Wetland.

The visual amenity of the lake has been degraded through the recent felling of the *Eucalyptus rudus* (Flooded gum) fringe. The trees have shown considerable regrowth, but it is unlikely they will regain their prominence in the landscape in the short-term without adequate management. Importantly, the Osborne Park Branch Drain reserve supports stands of mature *Eucalyptus rudus*, underlying the Authority's belief that this area once formed part of a greater wetland system and may be a suitable location for the construction of a replacement lake.

The proponents have provided a commitment that they will re-establish the social functions of the existing Cedric Street Wetland (Appendix 3, section 1.5).

The Environmental Protection Authority is aware of community concern and apprehension regarding the proposed relocation of the Cedric Street Wetland. Accordingly, the Environmental Protection Authority suggests the Environmental Management Plan should be compiled using community input and be available for public comment.

4.2.2 Ecological values

The Cedric Street Wetland has been significantly degraded as a result of filling, associated with urbanisation and construction of the Mitchell Freeway, and was undoubtedly connected to nearby damplands prior to landuse modifications in the area. The lake has been invaded by weeds and exotic plant species (pampas grass, thistle, blackberry, castor oil plants, etc) and has been subjected to illegal dumping in the past (including car bodies). Despite these impacts, and a change in hydrological regime as a result of urbanisation, the Cedric Street Wetland still provides ecological and social functions. This is a testimony to the inherent resilience of this ecosystem and supports the Authority's belief that the functions of this lake could be readily recreated elsewhere.

The Cedric Street Wetland is a typha-dominated wetland, with interspersed sedge and *Melaleuca* thickets. Dense stands of emergent vegetation and the occurrence of islands provides ideal habitat for shy terrestrial and avian fauna.

It is possible that a rare sedge may exist in the Cedric Street Wetland. However, it seems likely that the bullrushes (*Typha orientalis*), that are now found in abundance, may have out-competed this species (see Appendix 3, section 1.18). It is feasible the Southern Brown Bandicoot, although not found during recent winter surveys, may visit the area from other nearby wetlands (via the Osborne Park Branch Drain drainage reserve).

The proponents have provided a commitment that they will re-establish the ecological functions of the existing wetlands (Appendix 3, section 1.5), this will include relocating rare flora and fauna should surveys determine their presence. The Authority considers that a relocation strategy should be provided in a future Environmental Management Plan, dependent on the results of this survey.

The proponents have provided a commitment that they will conduct a detailed survey and trapping exercise in order to determine the possibility of the Southern Brown Bandicoot, or other native mammals, utilising the Cedric Street Wetland (Appendix 1, commitment 4; Appendix 3, section 1.28). Some doubt still exists as to the presence and distribution of the rare sedge species. Accordingly, the Environmental Protection Authority makes the following recommendation:

Recommendation 3

The Environmental Protection Authority recommends that, prior to the commencement of any construction which may impact on the Cedric Street Wetland or its fringing vegetation, the proponents conduct a survey to determine the occurrence and distribution of rare sedges (especially those species identified by CALM as potentially occurring at this location) within the Cedric Street Wetland. To facilitate identification, this survey should be synchronised with sedge flowering and meet the requirements of the Environmental Protection Authority.

4.2.3 Hydrological values

The Cedric Street Wetland currently serves to reduce flood levels in the nearby Osborne Park Branch Drain by retaining stormflows for release over a longer duration, thereby reducing peak flood levels. In addition, the lake retains contaminants entering it from the surrounding urban catchment. These contaminants include nitrogen, phosphorus, pesticides and some heavy metals. The efficiency of the lake in retaining these contaminants is unknown, however, contaminant retention is generally considered to be a function of retention time (Kulzer, 1989; USEPA, 1983). That is, the longer the inflowing waters are retained the greater the retention efficiency of the lake. The fact that there is no direct drainage of water from the lake to the Osborne Park Branch Drain suggests that the lake is likely to retain a significant proportion of the contaminants emanating from the urban catchment.

The proponents have provided a commitment that they will re-establish the hydrological functions of the Cedric Street Wetland (Appendix 3, section 1.5), the details of which will be required in a future Environmental Management Plan, if required by the Environmental Protection Authority.

Recommendation 4

The Environmental Protection Authority recommends that, prior to the commencement of any construction which may impact on the Cedric Street Wetland or its fringing vegetation, the proponents prepare, with the benefit of community input, and submit an Environmental Management Plan (comprising a Lake Relocation Plan and a Lake Monitoring Plan), to meet the requirements of the Environmental Protection Authority.

The Lake Relocation Plan should be based on community input and include, but not necessarily be limited to, the following:

- siting, morphology and visual impact of replacement wetland habitat;
- ecological, hydrological and human use objectives of the replacement lake/s, and how these objectives are met through good design;

- detailed design plans, including habitat maps;
- detailed biological specifications, including flora and fauna selections and planting configurations;
- timing of transference of biological material from the existing lake; and
- likely seasonal water level regimes.

In addition, specific reference should be made to the distribution of rare plant and animal species occurring within the Cedric Street Wetland and details of their relocation.

4.3 Replacement of the Cedric Street Wetland

Functional replacement vs areal replacement

The Environmental Protection Authority believes that, in this instance, replacement of wetland habitat should be conducted on a functional basis rather than on an areal basis. This is primarily because of the degraded nature of the existing wetland habitat and of the potential to construct a wetland that is smaller but offers similar, or more, key functions than the existing Cedric Street Wetland.

Dampland/wetland habitat associated with the Cedric Street Wetland

The proponents have provided a commitment that the functions of the wetland/dampland located to the south of the Cedric Street Wetland (Figure 1) would also be incorporated into the proposed replacement lake/s (Appendix 1, commitment 19).

Operational aspects of lake design, location, construction and monitoring

The proponents have provided a commitment that they will not construct replacement lakes within the Freeway Reserve, but rather, any lakes in this reserve would be in addition to that proposed (Appendix 3, section 1.5) and that the replacement lake/s would be located within the boundaries of the Stirling Regional Centre (Appendix 1, commitment 15).

The Environmental Protection Authority has recommended that the proponents prepare, submit and, upon approval, implement an Environmental Management Plan, which should include a Lake Relocation Plan and an Lake Monitoring Plan. This should be made available for public comment.

It is the Environmental Protection Authority's expectation that future monitoring data would provide the basis for any mid-course corrections that may be required during the maturation of the constructed lake/s.

Underlying objectives

It is important that the replacement lake provide functions that are similar to the existing Cedric Street Wetland. Consequently, human access to the replacement lake must be controlled and provision made for habitat suitable for shy terrestrial and avian fauna. Emphasis should be placed on the provision of passive recreational amenity and nodes of human access, as is presently the case. These considerations should be addressed in the Environmental Management Plan.

5. References

Department of Planning and Urban Development, City of Stirling and Urban Rail Office (1992). Stirling Regional Centre Indicative Development Plan - Draft.

Environmental Protection Authority (1990). A guide to wetland management in Perth. Bulletin No 374.

Kulzer, L (1989). Considerations for the use of wet ponds for water quality enhancement. Municipality of Metropolitan Seattle.

Owen, C R and Jacobs, H M (1992). Wetland protection as land-use planning: the impact of Section 404 in Wisconsin, USA. Environmental Management, vol. 16, No. 3. pp 345-353.

United States Environmental Protection Agency (1983). Results of the nationwide urban runoff program - Volume 1, Final Report. Report no PB84-185552.

Appendix 1

Proponent's commitments on the proposal

8. ENVIRONMENTAL COMMITMENTS

8.1 Environmental Management Plan (EMP)

The EMP will formulate the specific construction details of the wetland replacement proposal and identify the responsibilities and obligations of the proponent and long term wetland managers. The EMP will incorporate an extensive environmental monitoring programme designed to assess the ongoing performance of the wetland series system in terms of ecological, social and hydrological functions.

The environmental goals and objectives outlined in this CER will be incorporated into the EMP and provide the fundamental framework for its compilation.

8.2 Rationale and Objectives of Environmental Commitments

The rationale behind the formulation of environmental commitments for the proposed functional replacement of the Cedric Street Wetland is to provide necessary guidance on the management of potential environmental impacts. These commitments will feature strongly in a Environmental Management Plan (EMP) which will be compiled at a later date when the development parameters have been ascertained. The environmental commitments have been categorised into

- ▶ Pre-operational Environment;
- ▶ Operational Environment; and
- ▶ Post-operational Environment.

8.3 Pre-operational Environment

1. An extensive Environmental Management Plan (EMP) will be formulated when the development details and wetland construction variables have been rationalised.

Important aspects of the EMP include:

- (i) Wetland design;
- (ii) Precise siting of wetlands;
- (iii) Performance criteria;
- (iv) Performance monitoring;
- (v) Management and maintenance of replacement wetlands; and
- (vi) Corrections/contingency plans

The preparation of the Environmental Management Plan will be the responsibility of the proponents with final approval of the EMP by the EPA.

2. Detailed engineering surveys to assess groundwater and hydraulic levels.
3. Identification of vegetation species to be relocated from Cedric Street Wetland and investigations into feasible transplanting methods.
4. A detailed survey and trapping exercise to be undertaken in order to determine the possibility of the Southern Brown Bandicoot or other native mammals utilising the wetland environment.
5. Quantitative analysis on the adequacy of peat reserves necessary for wetland to be created.
6. Precise determination of most beneficial timing of earthworks and vegetation relocation/establishment as part of the wetland replacement proposal.
7. Clear definition of the number, siting, area and other aspects of wetland design.
8. Gain initial background information to assist in the formulation of the environmental monitoring programme.
9. Assess the flow rates and water levels of the Osborne Park Branch Drain which are expected to vary according to final land use proposed upstream.
10. Utilise cleared, low lying sites for wetland recreation which possess minimal potential impacts on remnant vegetation types such as the mature flooded gums in the southern portion of the development site.
11. Undertake necessary precautions that maximise the potential for environmental goals and functional objectives to be achieved.

12. Educate prospective companies, contractors and subcontractors involved in the construction and establishment of wetlands on the environmental goals and objectives of the proposal as outlined in the CER.
13. Undertake a public education process (newspapers, displays etc) to inform the community of the impending proposal and the regional role of the new wetlands in the environment. Public input regarding the design of the wetlands within the parameters and environmental goals will be considered.
14. Landscape Plans for those developments impacting upon the existing and proposed wetlands will be formulated. Implementation of the Landscape Plans will be the responsibility of the proponent. The Landscape Plans will be incorporated into the Environmental Management Plan and therefore will require satisfactory approval by the EPA.
15. The proponents to negotiate the siting of replacement wetlands within the Stirling Regional Centre.
16. Negotiate with MRD the location of replacement wetlands within the Freeway Reserve.
17. A water sensitive design approach will be encouraged for all development design which has the potential to impact on the proposed wetlands.
18. The proponents will be responsible for the management and maintenance of the proposed wetland series during the construction phase and for a further 2 years after practical completion of the wetland project. After this period, the City of Stirling will undertake the role of long term managers of the wetland system.
19. The functions performed by the Southern Wetland/dampland complex shall also be incorporated into the replacement functions of the wetland creation proposal.

8.4 Operational Environment

20. Construction of wetlands and establishment of habitats to be undertaken at most beneficial time taking into account seasonal influences.
21. Adopt excavation, engineering and revegetation practises that enhance the establishment of the newly created wetlands.
22. Monitor earthworks, drainage provisions and wetland storage capacities to ensure the Osborne Park Branch Drain will not be adversely affected by the proposal.
23. Segregate wetland excavation activities from the water course of the Osborne Park Branch Drain to mitigate water quality impacts such as increased turbidity and siltation of main drainage channel.
24. Maximise the establishment of native vegetation by adopting an intensive transplanting/planting/seeding operation for each wetland. This will minimise areas of open ground where Typha are likely to invade.
25. Further development ecosystem performance criteria to be incorporated into the environmental monitoring programme.
26. Restrict access to newly created wetlands by the provision of fencing. Where appropriate the fencing may become a permanent fixture providing it does not impede upon the various functional objectives contained in this CER.
27. Monitoring the water quality of the Osborne Park Branch Drain to assist in the effectiveness of nutrient/pollutant stripping functions of wetlands.
28. Ensure the long term managers of the wetland system (City of Stirling) are well informed on the environmental goals of the wetlands. Their active involvement in initial stages of wetland creation will greatly assist in the future management of the wetland environment.

36. The City of Stirling shall employ the use of street sweepers on wetland surface catchment roads in order to reduce sediments prior to the first flush of winter rains (eg March-April).

Appendix 2

Issues raised during the public review period

Appendix 2

Issues raised during the public review period

SUMMARY OF SUBMISSIONS MADE DURING THE PUBLIC REVIEW PERIOD

PROPONENT:	City of Stirling, Department of Planning and Urban Development, Westpoint Properties, J F Geneff Nominees, Mr P Baltovich, Fabray Pty Ltd and Mr Furfaro
PROPOSAL:	Relocation of the Cedric St Wetland
CLOSING DATE:	7th September 1992
NO OF SUBMISSIONS:	9

The following comments, issues and questions have been raised with the Environmental Protection Authority during the public review period.

- 1.1 There is no need for such a costly replacement of a wetland. The existing wetland could be readily rehabilitated and a modified Oswald Street route then used to delineate the wetland. It is cheaper to rehabilitate the existing wetland than to attempt to construct a series of smaller, landscaped, artificial drainage ponds.
- 1.2 The proposal does not conform with recent local and national initiatives, such as the City of Stirling Green Plan, the retention of remnant bushland, ecologically sustainable development and the maintenance of biodiversity.
- 1.3 Will the proponents nominate the replacement wetland/s for inclusion in the Environmental Protection (Swan Coastal Plain Wetlands) Policy?
- 1.4 Will the proponents provide a commitment to replace the Cedric Street Wetland on an ecological value basis?
- 1.5 Wetlands should not be created within the Freeway reserve because passive recreational functions (eg birdwatching and walking) and some ecological values (eg secretive habitat and bandicoot habitat) cannot be realistically located here.
- 1.6 The extent of the wetland is questioned. The area known as the Cedric Street Wetland has been addressed but not the associated wetlands (eg damplands) and the southern wetland. Whilst the reasons for confining the CER to the Cedric Street Wetland replacement issue is understood, it is considered that assessment should include the surrounding wetlands, in accordance with Bulletin 374. The EPA's Draft Environmental Policy (Lakes) Map for this wetland is fully supported.
- 1.7 The proposal is open-ended, as the CER says that the final land use is unknown. Should responsibility for meeting the environmental commitments outlined in this report change, there may be difficulty enforcing these commitments.

- 1.8 Clearly the need for the proposal comes from the wishes of private property owners to profit from land which is strategically placed, and which has been earmarked by the Department of Planning and Urban Development and the City of Stirling for a Regional Centre and Transfer Station. The stated need for the proposal assumes that this wetland should be exempted from the Draft Environmental Protection Policy 1992. This assumption is invalid.
- 1.9 The proposition that only by agreeing that some wetlands can be destroyed, is it possible to manage other wetlands and the water quality of these wetlands is refuted.
- 1.10 The Department of Planning and Urban Development has a responsibility to manage the water quality of Herdsman Lake to a satisfactory standard, and the suggestion that wetlands can be traded-off with the promise of better management of other wetlands is not acceptable. The water quality of Herdsman Lake should not be reliant on the approval of this, or any other proposal.
- 1.11 Where proponents are Companies, additional detail should be made available as to principal owners, particularly as the public are being asked to consider a proposal which will require considerable financial capacity. Should a company be unable to meet the environmental commitments, who should be responsible?
- 1.12 What is meant by the "retention of the Cedric Street Wetland in the EPA's Environmental Protection (Swan Coastal Plain Lakes) Policy, 1992" etc? As the Cedric Street Wetland was identified as having water in it in the first week of December, 1991, and it met the other criteria laid down, there should not be any arguments as to its inclusion on the map.

The arguments put forward questioning the inclusion of the Cedric Street Wetland are irrelevant. By the same token, the lack of rain in some areas on the Swan Coastal Plain may have meant important wetlands were omitted from the Policy. If wetlands met the criteria at the time, or have been included on Miscellaneous Plan 1700, there should be no questioning of their listing.

- 1.13 What measures will be taken to relocate rare sedge species and short-nosed bandicoots, if found at the site?
- 1.14 The statement that transplanting of mature paperbarks is possible is queried and further details, and instances of successful transplanting and the methods used should be cited.
- 1.15 How nutrients from the created wetlands would be removed on a regular basis needs to be detailed.
- 1.16 It appears that an obvious interest group who should have been consulted, ie the City of Stirling Wetlands Advisory Committee, was not. In addition, the Wetlands Conservation Society has no record of being consulted, and were not aware of the proposal.
- 1.17 Whilst the Environmental Commitments are quite comprehensive, there is concern about the capability and commitment of the proponents to prepare an Environmental Management Plan, and also that the proponents will have no further opportunity to be involved in the implementation of this plan.

Should approval be granted for this project, there would need to be full public involvement and consultation in order to find a suitable location and to develop an acceptable design for the replacement wetland.

1.18 The existence of a rare sedge within the Cedric Street Wetland appears to have been ignored. What species is reportedly present? Who documented its presence? When? Where is it located, specifically? Is it a schedule 1, 2 or 3 species? Where else does this species exist? Does it occur in any secured reserves? What protection will it receive if its presence is verified?

1.19 The determination of both the Cedric Street Wetland and Southern Wetland area as category M wetlands is contested. The human use questionnaire has been incorrectly determined for both areas. Specifically, the proponents have failed to identify active protection groups for these wetlands (question iv). These groups include the Wetlands Action Group for Stirling, City of Stirling Wetlands Advisory Committee, Gwelup Environmental Group, Habitat Herdsman and Wildflower Society of WA - Northern Suburbs Branch.

As a result of this oversight, the natural attributes scores for both wetlands remain unchanged. However, the human use scores for the Cedric Street Wetland and Southern Wetland are now 11 and 10 (not 6 and 5 as stated in Appendices 4 and 5 of the CER). Consequently, both wetlands are classified as transition category M/R. Now using the supplementary questionnaire, the documented occurrence of a rare sedge species (and the possibility of bandicoots) means that the Cedric Street Wetland is category R. The Southern Wetland will either be category M or R depending on the occurrence of the rare sedge or bandicoots in this area.

(Note: Field notes relating to surveys of both the Cedric Street Wetland and the Southern Wetland were included as part of this submission (dated February 16th, 1992) and were signed by representatives of three of the above groups).

1.20 There is a danger that landscape and social provision will be allowed to detract from the habitat value of any newly created wetland. There needs to be assurances to the contrary. Under no circumstances should grassed (and fertilized) parklands be permitted within the wetland reserve. This area should comprise local indigenous plant species only and should be sufficient to buffer the wetland from human incursion, except in those areas where limited access is desirable for birdwatching, etc (as currently exists).

1.21 Public access to a newly created wetland must be restricted in order to provide a safe refuge for wildlife, which the area proposes to attract.

1.22 Controversy over the management of the Cedric Street Wetland has existed for some time. Why didn't the Stirling Regional Centre Indicative Development Plan provide for its retention? It is quite apparent that it would be far better from an economic and ecological standpoint to rehabilitate and manage the existing wetland than to fill the Cedric Street Wetland and then create, revegetate and maintain a new area of wetland.

1.23 If it was felt that the existing wetland would interfere with peoples travel times/distances to the Stirling Rail Station why couldn't a boardwalk be constructed to link the core precinct with the station? This would have the added advantage that the wetland and its vegetation (including Flooded Gum regrowth) would provide a pleasant vista from the core precinct and also buffer this area from the visual, lighting and noise impacts of the Freeway.

1.24 The Stirling Regional Centre constitutes an impediment to the fundamental land use and existence of the wetland, not vice versa, it was there first!

- 1.25 It is predicted that within 2 years, if the proposal goes ahead, the new wetland will also be invaded by introduced flora (castor oil plants and pampas grass) as well, due mainly to the reluctance by anybody to take action over the largest weed pool in the metropolitan area - Osborne Park. What will the proponents do to control this seed source?
- 1.26 Breeding boxes are totally un-natural and undesirable, if the wetland is properly vegetated they will also be totally unnecessary.
- 1.27 The plant species listed by the Wetland Conservation Society were those suitable for regeneration of wetlands in the areas to which they are indigenous. They were never intended to be used outside their naturally occurring areas. Therefore *Agonis flexuosa* and *Allocasuarina obesa* are not acceptable in Osborne Park.
- 1.28 Detailed botanical and zoological surveys have not been conducted. One day, July 25th, 1992, does not constitute a detailed study. If the study had been detailed the proponents would know if the rare sedge species existed or bandicoots used the area.

The proponents have provided a commitment to undertake "detailed survey and trapping exercises in order to determine the presence of Southern Brown Bandicoots..." in preparing an Environmental Management Plan. Surely these surveys should have been conducted prior to writing the CER, as stipulated in the guidelines to the proponents issued by the Environmental Protection Authority (Appendix 2).

- 1.29 The projects listed in section 6.5.3 have little or no similarity to the proposed relocation of the Cedric Street Wetland, and are no indication of collective knowledge or success rate.
- 1.30 Replacement of the ecological values of the southern damplands has been overlooked.
- 1.31 The replacement proposal would see a new wetland squeezed between a major road (Oswald Street) and a Freeway off-ramp (Stirling Link Road) which would result in even poorer water quality (from traffic pollution) than experienced by the existing wetland. In addition, the proximity to these roads and the Freeway would greatly diminish the ecological and passive recreational values of any wetland located in this area.
- 1.32 It is stated that the Osborne Park Branch Drain is contaminated which, instead of using the Cedric Street Wetland (or its replacement) to strip nutrients from the drain, should be inspected with a view to reducing these materials at the source. The City of Bayswater is currently doing this with the Bayswater Integrated Catchment Management Plan for the clean-up of the Bayswater Main Drain. Could the City of Stirling instigate a similar programme for the Osborne Park Branch Drain?
- 1.33 Is the newly created wetland to be of the same size and function as the existing wetland?
- 1.34 The proposed use of the Osborne Park Main Drain for wetland construction does not discuss the implication of this use on the total capacity of the drain. Much of the drainage associated with the Cedric Street section of the Mitchell Freeway requires adequate flow in this drain to function effectively.

- 1.35 BSD Consultants indicate that four replacement wetlands are ear-marked for location within the road reserve proposed for the Mitchell Freeway when the Stirling Regional Centre is established. Main Roads Department does not have any objection to creating wetlands in the Freeway reserve provided they serve a function in the operation of the Freeway, such as compensating basins for road drainage. However, it is unlikely that any such basins created in the proposed Stirling Link Road and associated interchange with the proposed Mitchell Freeway will have sufficient capacity or surface area to provide a wetland habitat. The likelihood that they would meet any of the management criteria described in the CER is low.

In addition, Main Roads would be concerned if fauna, particularly birds and tortoises, were encouraged to use the wetlands as their presence and migration habits often lead to roadkills.

The issue of cost of management of created wetlands in the Freeway area also needs to be addressed as it is not normal practice for the cost and resources needed to manage wetlands in Main Roads reserve areas to be borne by other agencies or individuals.

The Main Roads Department considers that wetland creation should be developed within the Region Centre area rather than on land held by other land managers in the adjacent area.

- 1.36 From an environmental point of view, while this wetland may be degraded, it is the last in this area and is the last piece of natural vegetation in Innaloo. Only 3% of the whole of the City of Stirling is under natural vegetation and a good part of this is encompassed by the Star Swamp-Trigg Reserve and the remaining dune system.

Appendix 3

Proponents response to the issues raised during the public review period

**RELOCATION OF CEDRIC STREET
WETLAND
CONSULTATIVE ENVIRONMENTAL
REVIEW
RESPONSE TO SUBMISSIONS
RECEIVED DURING THE PUBLIC
REVIEW PERIOD**

Prepared For: Department of Planning and Urban Development
City of Stirling and Private Landowners

Prepared By: BSD Consultants Pty Ltd

October 1992

**RELOCATION OF CEDRIC STREET WETLAND
CONSULTATIVE ENVIRONMENTAL REVIEW
RESPONSE TO SUBMISSIONS MADE DURING THE
PUBLIC REVIEW PERIOD**

The EPA's summary of the comments and concerns on the CER have been individually dealt with to a level of detail which answers the various issues raised.

The format for the responses are as follows:

- (i) Summary of the submission received.
- (ii) Response and discussion to each submission.
- (iii) Recommendations to the EPA on each submission.

1.1 (i) SUMMARY OF SUBMISSION

There is no need for such a costly replacement of wetland. The existing wetland could be readily rehabilitated and a modified Oswald Street route then used to delineate the wetland. It is cheaper to rehabilitate the existing wetland than to attempt to construct a series of smaller, landscaped, artificial drainage ponds.

(ii) RESPONSE TO SUBMISSION

Precinct 1 within the Stirling Regional Centre which contains the Cedric Street Wetland is considered to be the key precinct in terms of the success of the Stirling Regional Centre and its integration with the new Stirling Railway and Bus Transfer Station (presently under construction). The Cedric Street wetland directly abuts the Stirling Transfer/Railway Station and is therefore in a strategic location.

Metroplan, the State Government's planning strategy for metropolitan Perth for the next 30 years, has identified Stirling as one of a select number of centres targeted for major growth.

Major scale development in this location is considered essential to ensure the success of the Regional Centre.

Strong cycleway/pedestrian links are proposed between this precinct and all other Regional Centre precincts, and between the residential areas and the railway station. The pedestrian link will continue across the railway station and freeway to the civic precincts and office parks to the north east and be reinforced in an urban design context.

The major landuse nodes within this precinct will comprise a large high-rise office park in the north west corner with pod style buildings having high accessibility and exposure to both the station and the freeway.

South of the office park it is proposed to develop a major entertainment node which will contain uses such as a tavern/brassiere, alfresco restaurants and markets surrounding a central open piazza. Major 'people' attractions to this node such as cinemas and public amusement/leisure centres are considered essential as it is envisaged that this area will be focus of nightlife "Northbridge style" activity based on proximity to public transport and pedestrian links, and exposure to the freeway system. It will also offer limited support retail facilities for office workers in the adjoining office park to the north.

The importance of developing this area for appropriate uses, and to a scale development commensurate with a station side location, cannot be over-emphasised if the Stirling Regional Centre is to be secured. State Planning policy is clearly setting this direction and focus.

The Cedric Street Wetland is heavily degraded and largely in private ownership. As such, it is unlikely to attract the funds for the co-ordinated management approach necessary to rehabilitate the wetland in its present location. Rehabilitation of the degraded wetland in its present position would require extensive remedial work (ie deepening of water body, typha thinning, weed control, establishment of native vegetation) and compensatory measures to private landowners, all of which would be at the expense of the Government.

The proposed replacement of Cedric Street Wetland offers a good opportunity to recreate a series of wetlands with improved ecological, hydrological and social values at no expense to the Government.

(iii) RECOMMENDATION

That the submission be set aside as it has been clearly identified that:

- 1) there is a need to replace the wetland;
- 2) the existing wetland is badly degraded;
- 3) rehabilitation of the wetland in its present position is highly unlikely;
- 4) there appears no foundation or merit in modifying the Oswald Street route to delineate the wetland.

1.2 (i) SUMMARY OF SUBMISSION

The proposal does not conform with recent local and national initiatives, such as the City of Stirling Green Plan, the retention of remnant bushland, ecologically sustainable development and the maintenance of biodiversity.

(ii) RESPONSE TO SUBMISSION

The Cedric Street wetland is very degraded, possesses limited remnant bushland (apart from melaleuca thickets) and, as identified in the biological survey, has low floral and faunal species diversity.

The wetland replacement proposal goes beyond the maintenance of existing biodiversity with the provision of potentially superior ecological habitat designed to increase biodiversity. With this objective in mind it is envisaged that ecologically sustainable development will be achieved.

(iii) RECOMMENDATION

That the submission be set aside as the proposal provides the opportunity to create native bushland and potentially conforms with other initiatives referred to in the submission.

1.3 (i) **SUMMARY OF SUBMISSION**

Will the proponents nominate the replacement wetland/s for inclusion in the Environmental Protection (Swan Coastal Plain Wetlands) Policy?

(ii) **RESPONSE TO SUBMISSION**

If the replacement wetlands meet criteria for inclusion in the Lakes EPP, the proponents will support listing the alternative wetlands for protection.

(iii) **RECOMMENDATION**

That the submission be received and noted.

1.4 (i) **SUMMARY OF SUBMISSION**

Will the proponent provide commitment to replace the Cedric Street Wetland on a ecological value basis?

(ii) **RESPONSE TO SUBMISSION**

The commitment to replace the Cedric Street Wetland on an ecological basis is divided among Pre-operational environment commitments (ie the Environmental Management Plan, in addition to Commitment 11, 19) Operational environment commitments (20, 21, 25) and Post-operational environment commitments (31, 33, 34) as outlined in the CER.

(iii) **RECOMMENDATION**

That the submission be received and noted as the CER has adequately covered these concerns in various environmental commitments.

1.5 (i) **SUMMARY OF RESPONSE**

Wetlands should not be created within the Freeway reserve because passive recreational functions (eg. bird watching and walking) and some ecological values (eg. secretive habitat and bandicoot habitat) cannot be realistically located here.

(ii) RESPONSE TO SUBMISSION

The Cedric Street Wetland proposal has been designed so that the replacement ecological, social and hydrological functions will be totally achieved by those proposed wetlands outside the Freeway Reserve.

Wetlands proposed to be located within Freeway Reserves have not been included in the proposal to perform replacement functions, but rather, are additions to the wetland series.

(iii) RECOMMENDATION

That the submission be received and noted. Functions to be replaced and enhanced which are currently being performed by the Cedric Street Wetland will be catered for by those wetlands outside Freeway Reserves.

1.6 (i) SUMMARY OF SUBMISSIONS

The extent of the wetland is questioned. The area known as the Cedric Street Wetland has been addressed but not the associated wetlands (eg. damplands) and the southern wetland. Whilst the reasons for confining the CER to the Cedric Street Wetland replacement issue is understood, it is considered that assessment should include the surrounding wetlands, in accordance with Bulletin 374. The EPA's Draft Environmental Policy (Lakes) Map for this wetland is fully supported.

(ii) RESPONSE TO SUBMISSION

The extent of the wetland was determined by recent aerial photography and on-site inspections. An independent biological survey (Woodman and Associates) estimated a similar maximum water surface area (approximately 1 hectare) as calculated by BSD Consultants in the CER (page 15). This is considered an accurate estimate along with the predicted minimum surface water area for the wetland of 3000m².

The Southern Wetland/dampland complex has been briefly described in the CER (page 14 and 15), noting that they possess similar morphological characteristics to the Cedric Street Wetland (see also Semeniuk's classification, page 17). An Environmental Commitment to replace their function as part of this proposal has also been given (Pre-operational commitment No. 19).

Due to the similarity of the Cedric Street Wetland and nearby southern wetland/damplands, it is envisaged that the wetland environment of the site have been adequately addressed. An assessment using Bulletin 374 was undertaken and included in Appendix 5 of the CER.

(iii) RECOMMENDATION

That the submission be dismissed, and that it be recognised that the:

- 1) the extent of the wetland area; and
- 2) issues raised regarding the southern wetland/damplands

have been adequately addressed given that the assessment was based on the extent of available information and the scope of the CER (as outlined in EPA Guidelines, Appendix 2).

1.7 (i) SUMMARY OF SUBMISSION

The proposal is open-ended, as the CER says that the final land use is unknown. Should responsibility for meeting the environmental commitments outlined in this report change, there may be difficulty enforcing these commitments.

(ii) RESPONSE TO SUBMISSION

The final land use is reliant upon the finalisation of the Indicative Development Plan (IDP) for the Stirling Regional Centre. However the responsibility for meeting environmental commitments has been agreed to and delegated accordingly to be reinforced with the future preparation of the Environmental Management Plan (EMP).

(iii) RECOMMENDATION

That the submission be noted and that any uncertainty, regarding the responsibility of meeting environmental commitments, will be detailed in the EMP.

1.8 (i) SUMMARY OF SUBMISSION

Clearly the need for the proposal comes from the wishes of private property owners to profit from land which is strategically placed, and which has been earmarked by the Department of Planning and Urban Development and City of Stirling for a Regional Centre and Transfer Station. The stated need for the proposal assumes that this wetland should be exempted from the Draft Environmental Protection Policy 1992. This assumption is invalid.

(ii) RESPONSE TO SUBMISSION

This is largely an emotive statement which has little foundation or bearing on the environmental assessment of this proposal. Advice from the EPA required the proponent to investigate grounds for exempting the Cedric Street Wetland from the Draft EPP (EPA Guidelines, Appendix 2), this being an important component of the overall environmental assessment of the proposal. Nevertheless it is pointed out that the future landuse and development at the Stirling Region Centre has been dictated by Regional Policy. The Stirling Region Centre is a development of State and Metropolitan significance having the whole of Government support. It is untrue to say that it has been "developer lead".

(iii) RECOMMENDATION

That the submission be dismissed for the reasons outlined above.

1.9 (i) SUMMARY OF SUBMISSION

The proposition that only by agreeing that some wetlands can be destroyed, is it possible to manage other wetlands and the water quality of these wetlands is refuted.

(ii) RESPONSE TO SUBMISSION

The Cedric Street Wetland replacement proposal provides a mechanism for change of ownership of a wetland environment from a multiplicity of private landowners (who do not possess the knowledge or the will to manage the wetland), to the City of Stirling who is capable of actively managing the wetlands to agreed environmental commitments (outlined in the CER) and participating in the future preparation of an Environmental Management Plan (EMP).

It is envisaged that the water quality within the replacement wetlands (and the Osborne Park Branch Drain) will improve due to the various ecological, hydrological and engineering design characteristics. In order to assess the performance of the wetlands, a detailed environmental monitoring programme will be formulated as part of the EMP.

(iii) RECOMMENDATION

That the submission be dismissed as the CER proposal does not advocate that wetlands must be destroyed in order to create management solutions and water quality improvements for newly created wetlands.

1.10 (i) SUMMARY OF SUBMISSION

The Department of Planning and Urban Development has a responsibility to manage the water quality of Herdsman Lake to a satisfactory standard, and the suggestion that wetlands can be traded-off with the promise of better management of other wetlands is not acceptable. The water quality of Herdsman Lake should not be reliant on the approval of this, or any other proposal.

(ii) RESPONSE TO SUBMISSION

The environmental acceptability of this proposal is not dependent upon the potential downstream water quality benefits to the Herdsman Lake environment.

Rather, it is just one of the indirect benefits of creating a series of wetlands and improving the water quality of the Osborne Park Branch Drain.

(iii) RECOMMENDATION

That the submission be dismissed.

1.11 (i) SUMMARY OF SUBMISSION

Where proponents are Companies, additional detail should be made available as to principal owners, particularly as the public are being asked to consider a proposal which will require considerable financial capacity. Should a company be unable to meet the environmental commitments, who should be responsible?

(ii) RESPONSE TO SUBMISSION

The inclusion of additional detail of proponent companies is not specifically required in environmental assessments. Such information is usually available to any interested party by contacting the Corporate Affairs Department.

The proponent companies and landowners will be responsible for purchasing the areas of public land within the Stirling Regional Centre site in order to proceed with the development proposal. Approval measures and conditions to ensure the creation, management and long term maintenance of the wetland series will be closely scrutinised by the responsible authorities (ie EPA, DPUD, City of Stirling etc) before any proposal proceeds.

The Environmental management Plan (EMP), will be prepared at a later date prior to any construction taking place and will clearly define the various responsibilities, funding requirements and management details necessary for a successful replacement of the Cedric Street Wetlands. The EMP is also subject to assessment and approval by the EPA.

(iii) RECOMMENDATIONS

That the submission be noted and that the concerns raised will be dealt with by the relevant approval authorities and detailed at a later date in the EMP.

1.12 (i) SUMMARY OF SUBMISSION

What is meant by the "retention of Cedric Street Wetland in the EPA's Environmental Protection (Swan Coastal Plain Lakes) Policy, 1992" etc? As the Cedric Street Wetland was identified as having water in it in the first week of December, 1991, and it met the other criteria laid down, there should not be any arguments as to its inclusion on the map.

The arguments put forward questioning the inclusion of the Cedric Street wetland are irrelevant. By the same token, the lack of rain in some areas on the Swan Coastal Plain may have meant important wetlands were omitted from the Policy. If wetlands met the criteria at the time, or have been included on Miscellaneous Plan 1700, there should be no questioning of their listing.

(ii) RESPONSE TO SUBMISSION

The Environmental Protection (Swan Coastal Plain Lakes) Policy 1992 is a "DRAFT" document yet to be endorsed by the Minister and as such is subject to alteration. Since the production of the Miscellaneous Plan 1700, many other wetlands which previously met this criteria have been removed.

Miscellaneous Plan 1700 is also in draft format, and therefore subject to alteration. In fact, a completely new map will be drafted upon final approval of the Lakes EPP.

The EPA requested the proponent to detail grounds of exemption for the Cedric Street Wetland from the Draft Environmental Protection (Swan Coastal Plain Lakes) Policy (Appendix 2).

Furthermore provision exists in the Draft Lakes EPP which enables modifications to be considered via the formal assessment process. This is the process which is being following in this instance.

(iii) RECOMMENDATIONS

That the submission be dismissed based on the fact that the Environmental Protection (Swan Coastal Plain Lakes) Policy is currently a draft document yet to be given final approval and as such subject to alteration. Exemption from the subsidiary regulations (gazetted March 28, 1991) would however be required.

13.1 (i) SUMMARY OF SUBMISSIONS

What measures will be taken to relocate rare sedge species and short-nosed bandicoots, if found at the site?

(ii) RESPONSE TO SUBMISSION

As stated in Section 6.2 of the CER, methods of assessing the existence, captivity and relocation/translocation of rare species of flora and fauna will be detailed in the Environmental Management Plan (EMP) to be prepared prior to any wetland related development construction taking place. Essential components of the EMP include investigation into latest fauna trapping and flora transplantation techniques, wetland revegetation programme, relocation to most suitable habitat types, employment of fencing to protect faunal species and many other relevant details.

(iii) RECOMMENDATIONS

That the submission be noted and recognised for careful consideration in the preparation of the EMP.

1.14 (i) SUMMARY OF SUBMISSION

The statement that transplanting of mature paperbarks is possible is queried and further details, and instances of successful transplanting and the methods used should be cited.

(ii) RESPONSE TO SUBMISSION

Discussions with Perth based arboricultural experts (Arbor Centre Pty Ltd) suggest that the transplantation of mature paperbarks is indeed possible.

Utilising a tree-framing system, pioneered by the company, very high success rates in transplanting mature paperbarks have been achieved providing sufficient after care service is undertaken.

(iii) RECOMMENDATION

That the submission be dismissed.

1.15 (i) SUMMARY OF SUBMISSION

How nutrients from the created wetlands would be removed on a regular basis needs to be detailed.

(ii) RESPONSE TO SUBMISSIONS

Nutrient removal will be detailed in the EMP when the final design of wetland basins is determined. However, as nutrients associated with urban runoff tend to be predominantly particulate in nature (Section 5.5.4) and that sediment traps/basins would be positioned adjacent to wetlands (Section 6.4.2) it is likely that nutrients/pollutants would be largely contained within these structures.

A feature of the post-operational environment refers to periodic maintenance of the proposed sediment basins by the proponents (Environmental Commitment No. 35).

(iii) RECOMMENDATION

That the submission be acknowledged and detailed aspects of the sediment basin geometry, structure location and maintenance be undertaken as part of the Environmental Management Plan (EMP).

1.16 (i) SUMMARY OF SUBMISSION

It appears that an obvious interest group who should have been consulted, ie, the City of Stirling Wetlands Advisory Committee, was not. In addition, the Wetlands Conservation Society has no record of being consulted, and were not aware of the proposal.

(ii) RESPONSE TO SUBMISSION

It was presumed that the City of Stirling Wetlands Advisory Committee were represented at the various Council meetings discussing the progress of the proposal and were kept well informed. Should the Committee have believed that they had good advice to offer or required additional information then contact with the consultants could have been sought.

The Wetlands Conservation Society were informed about the proposal (telephone conversation 21/5/92) and advised that their draft document "A Guide to Wetland Management on the Swan Coastal Plain" was yet to be finalised and not available for a few weeks.

(iii) RECOMMENDATION

That the submission be noted and efforts be made to seek a greater degree interest group involvement during the formulation of the Environmental Management Plan (EMP).

1.17 (i) SUMMARY OF SUBMISSION

Whilst the Environmental Commitments are quite comprehensive, there is concern about the capability and commitment of the proponents to prepare an Environmental Management Plan, and also that the proponents will have no further opportunity to be involved in the implementation of this plan.

Should approval be granted for this project, there would need to be full public involvement and consultation in order to find a suitable location and to develop an acceptable design for the replacement wetland.

(ii) RESPONSE TO SUBMISSION

The formulation of an Environmental Management Plan (EMP) will be undertaken prior to any construction work, which may substantially affect the Cedric Street Wetland, being undertaken. The EMP will require assessment by the EPA and if found to be deficient will obviously not gain approval.

The proponents will be responsible for the formulation and implementation of the EMP. The implementation period ranges from the beginning of works until 2 years after the date of practical completion of the project. After this period the City of Stirling will take over the role of wetlands manager.

It is envisaged that the preparation of the EMP will require public involvement/consultation which is expected will be provided in the form of having a public submission period on the draft EMP.

(iii) RECOMMENDATIONS

That the submission be noted, and that the EPA recommend that the formulation and implementation of the EMP by the proponents (DPUD, City of Stirling and private landowners) become conditions of approval for this CER proposal.

1.18 (i) SUMMARY OF SUBMISSION

The existence of a rare sedge within the Cedric Street Wetland appears to have been ignored. What species is reportedly present? Who documented its presence? When? Where is it located, specifically? Is it a schedule 1, 2 or 3 species? Where else does this species exist? Does it occur in any secured reserves? What protection will it receive its presence is verified?

(ii) RESPONSE TO SUBMISSION

Notification of the rare sedge species was made informally by an EPA officer and subsequently investigated as part of the CER assessment.

The rare sedge was apparently recorded some 5 - 10 years ago during a survey of the Cedric Street Wetland by a student (Ian Lenski) undertaking a thesis project. A search of archival records of all Perth Universities failed to identify this person or his current whereabouts.

Correspondence requesting a rare flora search with reference to the possibility of a rare sedge species being present to CALM (9/6/92) revealed that "No populations of declared rare flora are known from this area".

However suggestions that the rare sedge may be one of a number of poorly known species

- ie. *Restio stenostachyus* (priority 3)
- Schoenus clandestinus* (priority 3)
- Schoenus capillifolius* (priority 2).

An independent biological survey of the wetland failed to identify any of these poorly known sedge species. A possible explanation for its absence may be due to the intense competition by *Typha* to invade the sedge habitat.

Environmental commitments clearly establishes the need for a revegetation programme as part of the Environmental Management Plan (EMP) which will investigate further into the existence and transplantation of rare plant species. If a rare or poorly known species is located, CALM will be notified and measures to ensure the successful transplantation and future protection of the species will be taken.

(iii) RECOMMENDATION

That the submission be noted and that the proponent has taken reasonable measures regarding the background, existence, identification and future investigation of rare flora associated with the Cedric Street Wetland.

1.19 (i) SUMMARY OF SUBMISSION

The determination of both the Cedric Street Wetland and Southern Wetland area as category M wetlands is contested. The human use questionnaire has been incorrectly determined for both areas. Specifically, the proponents have failed to identify active protection groups for these wetlands (question iv).

These groups include the Wetlands Action Group for Stirling, City of Stirling Wetlands Advisory Committee, Gwelup Environmental Group, Habitat Herdsman and Wildflower Society of WA - Northern Suburbs Branch.

As a result of this oversight, the natural attributes scores for both wetlands remain unchanged. However, the human use scores for the Cedric Street Wetland and Southern Wetland are now 11 and 10 (not 6 and 5 as stated in Appendices 4 and 5 of the CER). Consequently, both wetlands are classified as transition category M/R. Now using the supplementary questionnaire, the documented occurrence of a rare sedge species (and the possibility of bandicoots) means that the Cedric Street Wetland is category R.

The Southern Wetland will either be category M or R depending on the occurrence of the rare sedge or bandicoots in this area.

(Note: Field notes relating to surveys of both the Cedric Street Wetland and the Southern Wetland were included as part of this submission (dated February 16th, 1992) and were signed by representatives of three of the above groups).

(ii) RESPONSE TO SUBMISSION

The EPAs Bulletin 374 "A Guide to Wetland Management in Perth, 1990", with respect to the human use questionnaire relating to protection groups asks "Does the wetland have active protection groups?"

Experience gained in the assessment of many wetlands according to Bulletin 374 and discussions with officers at the EPA indicate that an active protection group is one involved in physically maintaining or rehabilitating the wetland in question (ie. removing rubbish, planting trees, educating public/landowners through signage or correspondence etc.). As far as the proponent is aware there was no evidence to suggest an active protection group was operating. An active protection group, through this process, differentiates itself from protection groups in general by undertaking active involvement.

Without this involvement it may be argued that all wetlands are protected under the broad umbrella of a variety of environmental protection groups, associations and societies when this is obviously not the case.

Notwithstanding this, a change in a wetlands management category from M - Multiple Use to R - Reserve Enhancement (if including active protection groups) has little relevance in terms of the environmental acceptability of this proposal as "no single wetland category is of greater importance than another" according to page 3 of Bulletin 374.

Furthermore, as stated in Bulletin 374, Category R wetlands may have a development recommended for approval provided:

- a) the wetland function is retained within the development;
- b) the equivalent area of wetland of a similar type is constructed or rehabilitated to fulfil equivalent functions.

The basis of CER environmental assessment is to demonstrate the feasibility of not only retaining these functions, but improving upon both natural and human use values of the wetland environment.

(iii) RECOMMENDATION

That the submission be noted and that the various protection groups may have an opportunity to play an active role in the recreation of wetlands as proposed for the Stirling Regional Centre.

1.20 (i) SUMMARY OF SUBMISSIONS

There is a danger that landscape and social provision will be allowed to detract from the habitat value of any newly created wetland. There needs to be assurances to the contrary. Under no circumstances should grassed (and fertilised) parklands be permitted within the wetland reserve.

This area should comprise local indigenous plant species only and should be sufficient to buffer the wetland from human incursion, except in those areas where limited access is desirable for bird watching etc. (as currently exists).

(ii) RESPONSE TO SUBMISSION

It is unrealistic to create a series of urban wetlands in a densely populated land use area without regard for landscape and social components. A compromise must be met with respect to the maximisation of habitat/nutrient stripping sites/vegetation buffers and the benefits of providing limited public access for passive recreation, education and aesthetic interest. The underlying objective of catering for both natural and human use is to ensure that the environment is not adversely impacted by the various uses of the wetlands. Detailed wetland design characteristics will be determined during the formulation of the Environmental Management Plan (EMP) to be approved by the EPA.

(iii) RECOMMENDATION

That the submission be noted and considered during the formulation of the EMP.

1.21 (i) **SUMMARY OF SUBMISSION**

Public access to a newly created wetland must be restricted in order to provide a safe refuge for wildlife, which the area proposed to attract.

(ii) **RESPONSE TO SUBMISSION**

Public access will be restricted to strategically located areas of the recreated wetlands. Fencing, adequate buffer zones and dense native vegetation types will provide safe refuge for wildlife.

(iii) **RECOMMENDATION**

That the submission be noted and incorporated into the EMP.

1.22 (i) **SUMMARY OF SUBMISSION**

Controversy over the management of the Cedric Street Wetland has existed for some time. Why didn't the Stirling Regional Centre Indicative Development Plan provide for its retention? It is quite apparent that it would be far better from an economic and ecological standpoint to rehabilitate and manage the existing wetland than to fill the Cedric Street Wetland and then create, revegetate and maintain a new area of wetland.

(ii) **RESPONSE TO SUBMISSION**

The Stirling Regional Centre Indicative Development Plan (IDP) did not provide for the retention of the Cedric Street Wetland for the following reasons:

- it is severely degraded;
- has minimal human use and natural values;
- is located in an area designated in the IDP as the "Core Precinct" which is proposed will take full advantage of the Stirling Transfer Station and associated development.

These strategic planning and other environmental and social issues for proposing to relocate the Cedric Street Wetland are explained throughout the CER.

The economic aspects of rehabilitating the Cedric Street Wetland as opposed to relocating its function has been previously discussed in response to Submission 1.1. From an ecological point of view, it is considered most feasible to relocate the wetland due to its low species diversity (both flora and fauna), extent of Typha invasion, current management status (ie unmanaged) and likely success rates involved in revegetation of newly created sites. It is envisaged that a greater variety of habitat types in replacement wetlands justify the proposal on ecological grounds.

(iii) RECOMMENDATION

That the submission be set aside for the above reasons.

1.23 (i) SUMMARY OF SUBMISSION

If it was felt that the existing wetland would interfere with peoples travel times/distances to the Stirling Rail Station why couldn't a boardwalk be constructed to link the core precinct with the station? This would have the added advantage that the wetland and its vegetation (including Flooded Gum regrowth) would provide a pleasant vista from the core precinct and also buffer this area from the visual, lighting and noise impacts of the Freeway.

(ii) RESPONSE TO SUBMISSION

A boardwalk across the wetland would need to be of sufficient capacity to accommodate the expected patronage to transport services. The construction of a suitable structure would potentially cause significant environmental impacts (prolonged disturbance of wild life, disruption of existing hydrological regime and water balance, long term maintenance requirements). The notion of a pleasant vista including flooded gum regrowth, is questioned. As a result of extensive lopping most regrowth of flooded gums consisted of epicormic regeneration which is considered undesirable from a safety point of view.

The epicormic shoots are poorly attached to the main trunk of the tree and as they grow can become easily detached when subject to wind shear. The resultant falling limbs clearly constitutes a safety problem.

The buffer area created around the newly created wetlands will provide sufficient screening from light and noise associated with urban land uses.

(iii) RECOMMENDATION

That the submission be set aside given the objectives of the CER and the long term environmental and social impacts associated with a large boardwalk connection constructed over the wetland.

1.24 (i) SUMMARY OF SUBMISSION

The Stirling Regional Centre constitutes an impediment to the fundamental land use of the wetland, not vice versa, it was there first!

(ii) RESPONSE TO SUBMISSION

Past and present land use around the Cedric Street Wetland (market gardening, urbanisation, industrial development, landfill site) are responsible for the degraded state of the wetland. The Stirling Regional Centre creates an opportunity to provide a managed wetland environment with increased natural and human use values.

(iii) RECOMMENDATION

That the submission be dismissed for the above reasons.

1.25 (i) SUMMARY OF SUBMISSION

It is predicted that within 2 years, if the proposal goes ahead, a new wetland will also be invaded by introduced flora (castor oil plants and pampas grass) as well, due mainly to the reluctance by anybody to take action over the largest weed pool in the metropolitan area - Osborne Park. What will the proponents do to control this seed source?

(ii) RESPONSE TO SUBMISSION

It is argued that recreated wetlands will not be invaded by introduced flora to the extent inferred as the density of revegetated native species will discourage the establishment of weeds. In any event, most weed species occurring throughout the area are easily identifiable and removed by manual means at a juvenile stage before additional seed setting is possible.

The proponents (ie City of Stirling) generally control weed invasion on Council owned land. A large proportion of the weed problem may be attributable to private and State Government owned land of which the Council has no control over.

(iii) RECOMMENDATION

That the submission be noted and that the revegetation programme examine weed control as part of the Environmental Management Plan (EMP).

1.26 (i) SUMMARY OF SUBMISSION

Breeding boxes are totally un-natural and undesirable, if the wetland is properly vegetated they will also be totally unnecessary.

(ii) RESPONSE TO SUBMISSION

Breeding boxes and hollow logs were suggested by the EPA in order to provide a degree of privacy and refuge for birds as the vegetation becomes established. In the longer term it is agreed that breeding boxes will not be necessary as the natural vegetation will adequately fulfil this role.

(iii) RECOMMENDATION

That the submission be noted.

1.27 (i) SUMMARY OF SUBMISSION

The plant species listed by the Wetland Conservation Society were those suitable for regeneration of wetlands in the areas to which they are indigenous. They were never intended to be used outside their naturally occurring areas.

*Therefore *Agonis flexuosa* and *Allocasuarina obesa* are not acceptable in Osborne Park.*

(ii) RESPONSE TO SUMMARY

The plant species listed by the Wetlands Conservation Society were intended to provide a guide to revegetation of wetland areas. Details on precise species selection will be dealt with as part of the Environmental Management Plan's revegetation programme to be approved by the EPA.

(iii) RECOMMENDATION

That the submission be acknowledged and considered in more detail in the EMP.

1.28 (i) SUMMARY OF SUBMISSION

Detailed botanical and zoological surveys have not been conducted. One day, July 25th, 1992 does not constitute a detailed study. If the study had been detailed the proponents would know if the rare sedge species existed or bandicoots used the area.

The proponents have provided a commitment to undertake "detailed survey and trapping exercises in order to determine the presence of Southern Brown Bandicoots" in preparing an Environmental Management Plan. Surely these surveys should have been conducted prior to writing the CER, as stipulated in the guidelines to the proponents issued by the Environmental Protection Authority (Appendix 2).

(ii) RESPONSE TO THE SUBMISSION

The botanical and zoological surveys were consistent with the scope of the CER. There is no guarantee that a more detailed study would determine the possible existence of a rare sedge species given seasonal considerations such as depth/extent of water, proliferation of Typha and sedge flowering/seeding period.

In consideration of the Southern Brown Bandicoot, a trapping exercise , as part of this CER, to positively identify the existence of this species may not be of any real benefit given that the development of the area may not occur for some years. This view is supported by CALM's Wildlife Research Centre who also indicated that an intensive trapping exercise appropriately timed with the development of the area (ie the Environmental Management Plan phase) would be of most value.

It is important to note that the advantage of documenting the possible existence of these species (as done in the CER) is that it provides the foundation to undertake additional study, if required, to determine the status of rare, endangered or geographically restricted flora and fauna.

As outlined in the environmental commitments and proposed in the Environmental Management Plan (EMP) such studies will be undertaken. The timing of these studies will more appropriately coincide closely with the development of the Stirling Regional Centre site. This enables a greater degree of accuracy with respect to assessing the potential impacts of the development on flora and fauna.

(iii) RECOMMENDATION

That the submission be noted and detailed surveys be undertaken as outlined in the environmental commitments.

1.29 (i) SUMMARY OF SUBMISSION

The projects listed in section 6.5.3 have little or no similarity to the proposed relocation of the Cedric Street Wetland, and are no indication of collective knowledge or success rate.

(ii) RESPONSE TO SUBMISSION

All the wetland projects listed including the Cedric Street Wetland Coastal Plain and are either wetland recreation (Wellard, Frederick Baldwin, Capel) or rehabilitation projects.

The proponent believes the principles and methodology behind the various projects can be successfully applied or adapted toward any Swan Coastal Plan wetland relocation/rehabilitation proposal.

Furthermore, the managers of the projects (Alcoa, AMC Mineral Sands Ltd. Wetlands Conservation Society) are widely recognised as leading authorities and have been responsible for imparting extensive knowledge throughout the development of their respective wetland projects.

(iii) RECOMMENDATION

That the submission be dismissed for the above reasons.

1.30 (i) SUMMARY OF SUBMISSION

Replacement of the ecological values of the southern damplands has been overlooked.

(ii) RESPONSE TO SUBMISSION

The Southern wetland/damplands have been briefly described in the CER (pages 14 and 15) noting that they possess similar morphological/ecological characteristics to the Cedric Street Wetland. An environmental commitment to replace their functions (ecological, social and hydrological) as part of this proposal has also been given (Pre-operational Commitment No. 19).

(iii) RECOMMENDATION

That the submission be set aside as reference to the southern dampland was made together will an environmental commitment to replace its functions.

1.31 (i) SUMMARY OF SUBMISSION

The replacement proposal would see a new wetland squeezed between a major road (Oswald Street) and a Freeway off-ramp (Stirling Link Road) which would result in even poorer water quality (from traffic pollution) than experienced by the existing wetland.

In addition, the proximity to these roads and the Freeway would greatly diminish the ecological and passive recreational values of any wetland located in this area.

(ii) RESPONSE TO SUBMISSION

Due to area restrictions and the existing alignment of the Osborne Park Branch Drain it is difficult to locate wetlands within the Stirling Regional Centre site without being impacted upon in some degree by surrounding roads.

The environmental impacts of traffic pollution (presumably CO, hydrocarbons, lead etc) are expected to have negligible effects on the proposed wetlands. The fringing wetland vegetation will provide a suitable buffer to mitigate the transfer of airborne pollutants into the wetland waterbody.

In addition, the "flow through" system associated with the existing drain ensures adequate water exchange between the wetlands and drain, thus reducing the cumulative effects of potentially residual pollutants.

Those wetlands created in the Freeway and road reserves are not expected to play an ecological or passive recreation role as part of this proposal. All of the Cedric Street Wetlands replacement functions are designed to be fulfilled by wetlands not included in the Freeway reserves.

It is considered that the wetlands created in the road reserves are an addition to the replacement functions and their location, design and primary function will be determined by Main Roads.

(iii) RECOMMENDATION

That the submission be acknowledged subject to the above comments.

1.32 (i) SUMMARY OF SUBMISSION

It is stated that the Osborne Park Branch Drain is contaminated which, instead of using the Cedric Street Wetland (or its replacement) to strip nutrients from the drain, the drain should be inspected with a view to reducing these materials at the source. The City of Bayswater is currently doing this with the Bayswater Integrated Catchment Management Plan for the clean-up of the Bayswater Main Drain. Could the City of Stirling instigate a similar programme for the Osborne Park Branch Drain?

(ii) RESPONSE TO SUBMISSION

The source of the majority of contaminants in the Osborne Park Branch Drain have been identified as originating from the catchment area associated with the Balcatta and Stirling swamps. These areas were historically used as a landfill site and market gardens.

The City of Stirling is proposing to review its Town Planning Scheme (TPS) and is investigating the potential for infill residential development within the Osborne Park Drain catchment area.

Discussions with the City of Stirling indicate that a Catchment Management Plan will form an integral part of the TPS review.

In addition, Water Authority of Western Australia (WAWA) are presently undertaking a land use study of the catchment in order to assess the existing and future capacity of the Drain.

It is considered that a combination of nutrient stripping wetlands and the implementation of nutrient reduction strategies, as determined by an Integrated Catchment Management Plan, will provide the best opportunity for improving Drain water quality.

(iii) RECOMMENDATION

That the submission be acknowledged and measures to initiate a Catchment Management Plan be encouraged.

1.33 (i) SUMMARY OF SUBMISSION

Is the newly created wetland to be of the same size and function as the existing wetland?

(ii) RESPONSE TO SUBMISSION

It is proposed that the newly created wetland series will collectively be of similar size to the Cedric Street Wetland in terms of surface water area.

The exact size of the wetland replacement series is not known at this stage and will be determined during the formulation of the Environmental Management Plan (EMP).

The replacement of those wetland functions identified in the CER will however result in the creation of a greater variety of habitat types capable of being utilised by a more diverse range of flora and fauna. This also represents a much improved ecological function when compared with that presently existing at the Cedric Street Wetland. In addition, the CER's inventory of functional objectives for the hydrological and social environment outlines strategies and methods for replacing, and in most cases, improving upon these values.

(iii) RECOMMENDATIONS

That the submission be noted and the EMP consider in greater detail the exact size and shape of the replacement wetlands.

1.34 (i) **SUMMARY OF SUBMISSION**

The proposed use of the Osborne Park Main Drain for wetland construction does not discuss the implication of this use on the total capacity of the drain. Much of the drainage associated with the Cedric Street section of the Mitchell Freeway requires adequate flow in this drain to function effectively.

(ii) **RESPONSE TO SUBMISSION**

As stated in the functional objectives for the hydrological environment (Section 6.4.1) the replacement wetlands will "maintain the current drainage and flood control functions of the Osborne Park Branch Drain". Also, the replacement wetlands will be "off-line" to the main Drain (see plan 7) and therefore not adversely affect the drain flow capacities. In fact, the wetlands will provide additional storage area which will improve upon the overall function of the drain in terms of capacity, flow rates and nutrient assimilation.

During the Environmental Management Plan (EMP) phase of the proposal, detailed consultation with WAWA, Main Roads and the City of Stirling will be undertaken to ensure the hydrological function of the Osborne Park Branch Drain will be maintained and, if possible, enhanced.

(iii) **RECOMMENDATION**

That the submission be noted and dealt with as part of the EMP.

1.35 (i) **SUMMARY OF SUBMISSION**

BSD Consultants indicate that four replacement wetlands are ear-marked for location within the road reserve proposed for the Mitchell Freeway when the Stirling Regional Centre is established.

Main Roads Department does not have any objection to creating wetlands in the Freeway reserve provided they serve a function in the operation of the Freeway, such as compensating basins for road drainage.

However, it is unlikely that any such basins created in the proposed Stirling Link Road and associated interchange with the proposed Mitchell Freeway will have sufficient capacity or surface area to provide a wetland habitat. The likelihood that they would meet any of the management criteria described in the CER is low.

In addition, Main Roads would be concerned if fauna, particularly birds and tortoises, were encouraged to use the wetlands as their presence and migration habits often lead to roadkills.

The issue of cost of management of created wetlands in the Freeway area also needs to be addressed as it is not normal practice for the cost and resources needed to manage wetlands in Main Roads reserve areas to be borne by other agencies or individuals.

(ii) RESPONSE TO SUBMISSION

The dimensions and location of the proposed replacement wetlands are conceptual at this stage to be determined at a later date.

Until final approval of the Stirling Regional Centres Indicative Development Plan has been gained and the formulation of the Environmental Management plan (EMP) follows at a time closer to the development of the land, the precise location of the proposed wetlands will not be known.

Due to area constraints and the alignment of the Osborne Park Branch Drain, it is possible that 2 or 3 of the wetlands may fall within the Freeway/Stirling Link Road Reserves. The proponent also understands that the function of wetlands contained within any road reserve is primarily for road drainage purposes.

For this reason, all of the wetland functions (ecological, hydrological and social) have been designed to be replaced/recreated in land under the control of the proponents (ie. land vested in DPUD, City of Stirling or owned by private landowners), and as such, it is not necessary for those wetlands proposed in road reserves to fulfil these functions. The proponent agrees that the road reserve wetlands are unlikely to meet all the criteria for fully functional wetlands. The rationale behind road reserve wetlands was largely based on the fact that the open drain already features prominently in the road reserve and additional wetlands to compliment those proposed in the CER could be provided by simply broadening the existing drains.

The larger wetlands proposed within the Stirling Regional Centre area possess safer accessibility for fauna with significantly greater buffer zones and fringing vegetation. The abundance of vegetation effectively shelters and protects the wetlands inhabitants and provides a focal point easily identifiable which takes into account the migratory habits of birds. Aquatic migratory species, such as tortoises, fish and gilgies are capable of utilising the drain for wetland access. The construction of strategically aligned fences to discourage wildlife exposure to road hazards will be undertaken as part of the EMP. This will be done in close liaison with CALM and the EPA.

The idea of proposing wetlands within the Freeway area is at this stage considered an option that requires more investigation, examination and consultation with Main Roads which will form an integral component of the EMP. The issue of location, costs and wetland management requirements will all be dealt with appropriately when the final road layout, transport infrastructure and Stirling Regional Centre Development details are more accurately defined.

(iii) RECOMMENDATION

That the submission be received and that all concerns, with respect to wetland location in road reserves, be dealt with during the EMP phase prior to development of the Stirling Regional Centre.

1.36 (i) SUMMARY OF SUBMISSION

From an environmental point of view, while this wetland may be degraded, it is the last in this area and is the last piece of natural vegetation in Innaloo. Only 3% of the whole of the City of Stirling is under natural vegetation and a good part of this is encompassed by the Star Swamp-Trigg Reserve and the remaining dune system.

(ii) RESPONSE TO SUBMISSION

This proposal does not advocate the removal of the Cedric Street Wetland, but rather the relocation of its function to a number of more appropriate sites. As described in the biological assessment of the CER (Appendix 1) the wetland currently possesses minimal "natural" vegetation and what does exist of value can be successfully translocated or re-established.

Evidenced by the lack of management under the existing multiplicity of landowners, the threat of losing vegetation types of value within the wetland environment remains high. This proposal aims to establish a series of wetlands containing vegetation types to be managed for conservation purposes in perpetuity by the local authority. In this way there will be no net loss of wetlands in the area, rather, a more accessible wetland resource that can be more effectively used by a greater diversity of wildlife and the community in general.

(iii) RECOMMENDATION

That the submission be noted and that it be recognised that this proposal can potentially create a more valuable native vegetation environment within the proposed Stirling Regional Centre site.

Appendix 4

**Advice from the Environmental Protection Authority to the
Department of Planning and Urban Development regarding the
draft Stirling Regional Centre Structure Plan**



Chief Executive
Department of Planning and Urban Development
469-489 Wellington Street
PERTH WA 6000

Your ref: 808/2/20/6 PV2
Our ref: TP 91.76 47084
Enquiries: Mr Garry Middle

ATTENTION: Nick Leong

DRAFT STIRLING REGIONAL CENTRE STRUCTURE PLAN

I write in response to the above draft plan and offer the following interim comments.

Greenhouse considerations

In general, the objectives of increasing urban densities and planning the Centre's development so that access to public transport is made easy are supported. Efficient planning of this kind is essential if emissions of Greenhouse gases are to be reduced.

The existing environment

The study objectives make no reference to protecting environmentally significant sections of the existing environment. The remnants of Hertha Road Swamp and any other stands of native vegetation should be identified and options for their management discussed.

Hertha Road Swamp

Hertha Road Swamp, as mentioned in the report, is mostly highly modified, but some areas still exist with good stands of wetland vegetation. The final report should give more consideration to the management of this area with the view of retaining it as part of public open space. Wetlands are important aspects of Perth's environment, and a separate management plan should be produced for this wetland area. The Authority's Bulletin 374 should be applied to this wetland to provide management guidelines, and an assessment should be made as to whether this wetland would be covered by the Authority's Swan Coastal Plain Wetland Environmental Protection Policy. Officers of the Authority can advise the Department on both of these matters.

Drainage into Herdsman Lake

Drainage from this proposed development is of concern, as it is planned to use the existing drainage system to handle the extra stormwater. This system drains into

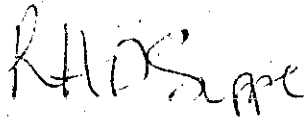
Environmental
Protection Authority

1 Mount Street Perth
Western Australia 6000
Telephone (09) 222 7000
Facsimile (09) 322 1598

Herdsmen Lake, a wetland already under serious threat because of water quality problems. Herdsmen Lake is protected under the Authority's Swan Coastal Plain Wetland Environmental Protection Policy, and additional direct drainage into it is not permitted under the conditions of that policy. Additional basins/artificial wetlands should be built to provide nutrient stripping of the drainage water before it enters Herdsmen Lake. A detailed drainage plan should be produced with the aim of improving the quality of water in the Lake.

Finally, while the Authority has informally assessed this draft Structure Plan, the last three issues discussed above need further clarification. The Hertha Road Swamp issue has already been the subject of discussions and correspondence between Mr Nick Leong of the Department and Mr John Sutton of the Authority. Ongoing discussions at officer level should address the above concerns so that the final plan addresses the environmental issues to the satisfaction of the Authority.

Yours sincerely



R A D Sippe
DIRECTOR
EVALUATIONS DIVISION

23 September 1991

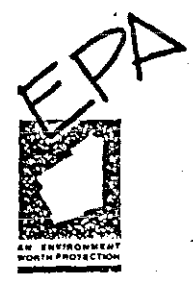
StiriCentReg DPUD1 260991 GMI

Appendix 5

**Previous advice from the Environmental Protection Authority to
the City of Stirling regarding the Cedric Street Wetland**

Attachment 1.

ENTERED



Town Clerk
City of Stirling
Civic Place
STIRLING WA 6021

Your ref: 7.4.3.20/8470
Our ref: 227/74/JUL91
Enquiries: Garry Middle
cm 48030

ATTENTION: Mr Gardner

Dear Sir/

REMOVAL OF PEAT AND FILL
LOTS 852, 45, 123, 2, 85 OSWALD STREET/TWYFORD PLACE
INNALOO

I refer to your correspondence dated 3 July 1991 regarding the above development.

The Authority no longer conducts assessment at this level as it considers that the environmental impacts associated with the proposal may be adequately managed by the proponent in consultation with Local Authority and the relevant agencies, within the context of environmental management policy.

In particular, it is the Authority's view that the two major environmental issues here are the wetland and the nature of the fill. While the presence of peat is indicative of a wetland, it is not one recognised by the Authority's Environmental Protection Policy and is likely to be very degraded. However, if significant areas of wetland vegetation remains, this should be protected from peat extraction, fill and subsequent development. The fill should be clean and free of pollutants.

The Authority will be pleased to provide advice on any further developments at a policy and regional planning level.

Yours faithfully

Frank Batini
A/DIRECTOR
EVALUATION DIVISION

12 July 1991

peat/fillinnaloo120791cju

Environmental
Protection Authority
1 Mount Street Perth
Western Australia 6000
Telephone (08) 223 7500

Appendix 6

Previous advice from the Environmental Protection Authority to the Department of Planning and Urban Development regarding the Cedric Street Wetland



Executive Director
DEPARTMENT OF PLANNING
AND URBAN DEVELOPMENT

Your ref:
Our ref: 227/74/AUG91
Enquiries: J SUTTON

ATTENTION: NICK LEON

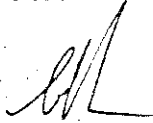
**DEVELOPMENT APPROVAL LOTS 852, 45, 123, 2, 85 OSWALD
STREET - TWYFORD PLACE, INNALOO**

I refer to the proposed development at the above location. You may be aware that the Environmental Protection Authority provided the City of Stirling with advice on wetland management issues on this site in July 1991 (see attached 1). This advice indicated that the Authority no longer conducts assessment at this level and that the environmental impacts of the proposal should be managed by the local government authority and relevant agencies in the context of an environmental management plan. In addition we recommended that if significant areas of wetland vegetation remain, they should be protected from peat extraction, fill and subsequent development.

The EPA has recently become aware that the City of Stirling approved this development on 30 July 1991 setting a number of conditions including the proposal be forwarded to the Department of Planning and Urban Development for consideration and that a site survey be conducted with a view of retaining trees adjacent to the drain.

The Authority is concerned that our advice relating to the protection of the wetland area on this site has been misinterpreted. We are particularly concerned about the fate of the rush swamp between Cedric Street, Oswald Street and the freeway road reserve (see attached 2). This wetland has conservation value and is reported to contain rare sedge species and the Authority is considering adding it to the wetland inventory in our Draft Environmental Protection Policy for Wetlands on the Swan Coastal Plain. As such we do not support the destruction of the swamp through filling or other means.

The Authority strongly recommends that your department ensures that the wetland is protected from destruction and that you seek further details from the proponent about such issues as drainage, landscape design and retention of the existing healthy overstorey on this site drainage prior to approving the development application. We have no objection to the development of the greater part of the property in line with the views set out in our letter of 12th July 91 to the City of Stirling. However, every opportunity should be taken to seek an aesthetically tasteful development with reasonable wetland area protection.



C C Sanders
DIRECTOR
ENVIRONMENTAL INVESTIGATIONS DIVISION

27-August 1991

cc City of Stirling

RUSH 220891 ISU:cf