
POINT GREY
RESPONSE TO PUBLIC COMMENTS

for
Mallina Holdings Limited

Dames & Moore



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POINT GREY
RESPONSE TO PUBLIC COMMENTS

1.0 INTRODUCTION

Mallina Holdings Ltd proposes to develop an urban settlement at Point Grey, located on the shores of the Peel-Harvey Estuary in the Shire of Murray. Dames & Moore has prepared an Environmental Review and Management Programme (ERMP) on behalf of Mallina Holdings, in accordance with the requirements of the Environmental Protection Act, 1986. The ERMP was open for a 10 week public review period, during which time submissions were received from eight Government agencies and 26 members of the public. Copies of the Government submissions and a summary of issues raised by the public comments have been made available to Dames & Moore. This report represents a response to these submissions.

2.0 APPROACH

The approach taken in preparing this document has been to respond to each issue outlined in the "Summary of Issues Raised in Point Grey Submissions" prepared by the EPA (Section 3.0). This Summary includes most of the issues covered by the Government Submissions, however, in some cases a more detailed response to the Government Comments has been appropriate, and this is given in Section 4.0. The "Summary of Issues" document and each of the Government Submissions have been included as Appendix A and B respectively.

Cross-referencing to the ERMP has been used, and where appropriate, additional information has been supplied.

3.0 DISCUSSION OF POINTS RAISED IN SUBMISSIONS

3.1 IMPACT ON FLORA AND FAUNA

3.1.1 Flora and Fauna Surveys

A floral survey was carried out at Point Grey in 1980 (Brown, 1980). The results of this survey were reviewed and a search was conducted in the Western Australian Herbarium for recently collected data. These activities were followed by an on-site inspection. No rare or endangered species of vegetation were found.

The majority of the proposed development will take place on land cleared for agriculture. The foreshore margin will not be directly affected by the development with the exception of several locations that have been identified as suitable for boat launching facilities. As with any new urban project, some disturbance to vegetation is a consequence of development. These disturbances will be kept to a minimum for environmental and marketing purposes. It is predicted that the vegetation communities associated with the wetland complex south-east of Point Grey will be unaffected by proposed groundwater development of the Waroona Mound.

In view of the information available on the flora of the region and small areas of vegetation likely to be directly affected by the project, the data presented in the ERMP are regarded as adequate.

Similarly, the data presented on the fauna of Point Grey was compiled from existing sources, and supplemented by on-site inspections. The information gathered using this approach was adequate to assess the potential impact of the project on the faunal communities found at Point Grey.

3.1.2 Tuart Woodland

As described above, the area of natural vegetation that will be disturbed by the development will be limited to roads, firebreaks and housing sites. The proponent is committed to retain as much natural vegetation as possible. Direct impact to tuart woodland communities is therefore expected to be minimal.

3.1.3 Population Pressure

The ERMP recognises that an increase in the population of the area will result in a series of environmental impacts (Section 6.4, ERMP). Such pressures are an inevitable consequence of urbanisation. The management philosophy that will be adopted to minimise the environmental impact will be to restrict access by people to sensitive areas both spatially and temporally. Access to the foreshore and the Estuary will be confined to several locations that, with the aid of suitable management measures such as fencing, signs, walkways, etc., have physical attributes capable of supporting public usage. The proponent recognises that it has a responsibility in providing first order management measures of this type. Areas adjoining Point Grey that have been identified as either important water bird breeding areas or resting areas for trans-

equatorial migratory species, will have restricted access during crucial periods of the year. These temporal restrictions will be implemented by the on-site manager in collaboration with officers from CALM.

The proponent recognises the role of CALM, PIMA and other Government authorities in the management of reserves, and has made a commitment to co-operate wherever practicable.

3.1.4 Wetlands

Excluding the Peel-Harvey Estuary, the nearest wetland to Point Grey is Lake Mealup, which adjoins the southern boundary. Lake McLarty lies 1km to 2km to the south, whilst numerous ephemeral wetland areas are located further to the south-east (e.g. Nine Mile Lake, Goodale Sanctuary). These wetlands lie in an area that has been extensively modified by agricultural activities (clearing and draining) and therefore have been modified by local nutrient input and water drawdown.

The Point Grey development is not expected to have a direct impact on any of these wetlands systems (Sections 6.3.2, 6.4.6 and 6.4.7, ERMP).

Potential indirect impacts resulting from increased population in the area have been addressed in Section 3.3 of this report.

Groundwater drawdown will be carefully controlled to ensure that water levels in the nearby wetlands are not adversely affected. All wetlands identified above lie outside the catchment areas draining the Point Grey site, therefore, surface run-off is not expected to affect the hydrological or nutrient regime of the wetlands.

3.1.5 Trans-Equatorial Migratory Birds

It is recognised that the Peel-Harvey Estuary is an important conservation area for trans-equatorial migratory birds, however, the Point Grey development site is unlikely to form part of this habitat as it offers little in the way of feeding or roosting areas for water birds.

The proposed development indicates potential locations for boating facilities, however, the area that would be disturbed by these activities is regarded as insignificant when compared with the overall area of the Estuary (0.006% of the intertidal and shallow sub-tidal (<1.0m) area, Section 6.6.2, ERMP).

The potential impact of people disturbing the breeding and feeding habitats of water birds located near Point Grey is more significant. Austin and Robert Bays are extensive, very shallow and inaccessible by boat. Access on foot is also difficult due to the unconsolidated nature of the floor of the bay.

The management programme will include prohibiting access along the foreshores of these areas during periods of bird breeding and resting. These restrictions will be enforced by the site manager in consultation with CALM. Signs will be erected to indicate to the public the importance of the Estuary to trans-equatorial migratory birds. The signs will show the migration paths of selective bird species, and inform the public of the periods of restricted entry, and the reasons why such restrictions are needed.

3.1.6 Pest Control and Rubbish Dumping

The potential impacts of vehicles, horses, pets and rubbish dumping are discussed in Sections 6.4 and 7.2 of the ERMP.

3.1.7 Foreshore Vegetation

The proposal does not advocate the removal of fringing vegetation and filling of wetland margins. Rather, the proposal will provide a unique opportunity to create a continuous foreshore reserve that can be properly managed as a single entity in contrast to the existing unmanaged, fragmented system of reserves. Limited, resilient foreshore locations have been identified as having land capability suitable for boat launching facilities. The installation of such facilities may involve minor disturbance to the foreshore. Management of these areas will ensure that the overall environmental effect will be minimal (Section 7, ERMP).

The proponent proposes to cede approximately 100 ha of land to create foreshore reserve with a minimum width of 50m. This conforms with the PIMA general strategy on foreshores. In places, this width is considerably greater than 50m. CALM's endorsement of the creation of the continuous reserve is noted.

3.1.8 Fisheries

Discussions with Fisheries Department officers and local fishermen have indicated that most of the Estuary can be regarded as an important fish hatchery and juvenile nursery area. There appears to be no data to suggest that the water fringing Point Grey has any greater significance than other regions of the Estuary. Motor boat activity in the waters fringing Point Grey will be confined to clearly marked channels because of the physical constraints imposed by shallow water depths. Hence the disturbance to fish hatcheries will be minimal (Section 6.6, ERMP). In most cases, the majority of the Estuary in the vicinity of Point Grey is too shallow for boats, as stated earlier. Any effects resulting from the proposed Dawesville Channel is unlikely to alter this conclusion.

The general increase in population in the Mandurah/Bunbury strip will lead to an overall increase in pressure on the Estuary fishery. This is recognised by the Department of Fisheries, as indicated by their long-term objective to phase out professional fishing (Section 6.5.1, ERMP). These pressures are an inevitable result of the increase in population of Metropolitan Perth and the general urbanisation of the Mandurah/Murray regions. As such, they do not relate solely to the Point Grey Development, which simply offers alternative accommodation in the region.

3.1.9 Terrestrial and Aquatic Fauna

Issues relating to terrestrial fauna have been discussed in Section 3.1.1 above, and in Appendix A of the ERMP. Aquatic fauna have been discussed in Section 5.3 of the ERMP. The impact on this faunal group will be confined to dredging activities associated with the boat channels that may be constructed in the future. The ERMP has concluded that these activities will affect such a small area of the Estuary (about 5 ha) that further detailed discussion is not warranted.

3.2 WATER RESOURCES/WATER QUALITY

3.2.1 Public Water Demand Estimates

The public water demand figures used in the ERMP have been recalculated, and a conservative upper limit of $1.540 \times 10^6 \text{ m}^3$ per year defined. This calculation assumes a consumption rate of 1kL/day/service. The results are shown in Table 1.

TABLE 1
PUBLIC WATER SUPPLY DEMAND

LAND USE	POPULATION	EQUIVALENT SERVICES	AVERAGE ANNUAL ($10^6\text{m}^3/\text{y}$)
College	1,080	400	0.146
Large Leisure Living Lots	770	360	0.131
Residential	7,200	2,820	1.029
Tourist Nodes		595	0.217
Schools/Shops		45	0.016
TOTAL		4,220	1.54

There are no specific guidelines pertaining to equivalent services for Colleges. The figure used in Table 1 (400) is based on normal domestic equivalents and would therefore include an amount for garden watering which would most likely exceed the requirements for a campus. The average annual demand of $0.146 \times 10^6\text{m}^3$ for a college is therefore likely to be conservatively high.

The actual number of large leisure living lots is 300 (ERMP, p16), not 360 as stated in the Water Authority of Western Australia submission. The figure of 360 represents the additional 20% of water usage recommended by the Water Authority (1986) for special rural blocks. However, the Water Authority assumes such blocks range in size from 1 ha to 6 ha, whereas most of the Point Grey leisure living blocks range in size from 1 ha to 1.5 ha (Section 4.4, ERMP). (A small section in the low-lying north-east sector of Point Grey has blocks up to 5ha). Also, the leisure living blocks proposed for the development will be unable to establish large lawns and gardens due to restrictions on clearing native vegetation. A public education programme will be conducted to encourage the use of native species of vegetation, and this will lead to further reductions in water demand.

It is recognised that the Water Authority of Western Australia recommendations for water usage are based upon best available data. Some rates of consumption are subject to considerable revision as better data become available. The proponent will maintain close liason with the Water Authority when the detailed water exploration programme is implemented.

It is therefore concluded that the estimates of public water supply demand given in the ERMP are accurate.

3.2.2 Effects of Groundwater Abstraction from the Waroona Mound

The potential impact groundwater abstraction from the Waroona Mound may have on the wetlands in the region is recognised by the proponent; potential adverse effects are clearly defined in Section 6.3.1 of the ERMP.

Comprehensive desk and computer modelling studies have been performed to demonstrate that the required water supply can be abstracted from the Waroona Mound without impacting the wetlands. The ERMP demonstrates that, theoretically, the effects of drawdown can be confined to localised areas, many of which are presently extensively drained for agricultural purposes.

The proponent recognises that if detailed hydrogeological investigations fail to demonstrate the existence of a water supply in the Leederville Formation capable of meeting the total demands for the development, then a drilling/testing programme will need to be performed in the Waroona Mound to confirm the water supply estimates made for the Waroona Mound, and to validate the results of the computer modelling studies that indicate that the wetland areas associated with the Mound will not be adversely affected.

3.2.3 Management Strategy for Groundwater Use

The ERMP acknowledges that development of the Waroona Mound would require the proclamation of a Water Reserve under the Country Areas Water Supply Act, 1947-1979 for the purposes of protecting the quality of the groundwater resource for a public water supply (Section 6.3.2.3, ERMP).

3.2.4 Installation and Use of Private Bores

It is proposed to prohibit the installation and use of private bores at Point Grey by having the development site declared a "Groundwater Control Area" in accordance with the Country Areas Water Supply Act 1947-1979. Details are given in Section 7.2.3 of the ERMP.

3.2.5 Nutrient Management

Full details of the nutrient management programme are given in Section 7.3 of the ERMP.

3.2.6 Sewage Treatment Plant Effluent Quality

The proponent's engineer, Sinclair Knight & Partners has experience in constructing treatment plants capable of meeting the nominated water quality criteria (e.g. Zines et al. 1987).

3.2.7 Nutrient Contamination of Groundwater and the Estuary

The ERMP presents a comprehensive analysis of the expected nutrient loading associated with the proposed development, and presents considerable evidence to suggest that nutrient loadings will be less than could be expected if the area were used for agricultural practices (ERMP, Sections 6.2, 7.3 and Appendix F).

3.2.8 Dredging

The concept plan for Point Grey nominates suggested locations for boat launching facilities. The site selection criteria for these locations concerned the proximity of potential launching sites to water depths greater than one metre. A probing survey was performed in four prospective locations. Suitable depths of unconsolidated material were encountered at three of the four locations, indicating that dredging operations would not present major difficulties, and it is expected that costs would not be prohibitive. No detailed costings for dredging works have been carried out.

Dredging operations under the existing tidal range would require excavations to a depth of -1.0m chart datum. This depth may have to be extended to -1.5m chart datum, if the Dawesville Channel is constructed (Section 6.6.2, ERMP). The approximate width of the proposed channels is 25m and the average length about 550m. The amount of spoil generated is therefore minimal, as is the area of substrate disturbed. The area disturbed by the dredging equals 5 ha, or 0.006% of the Estuary's total intertidal area (Section 6.6.2, ERMP). The impact is therefore regarded as negligible. Positive effects resulting from dredging including improved boating access to the southern regions of the Estuary and opportunities for creating offshore roosting sites for water birds from the dredge spoil.

The installation of boat launching facilities, including the dredging of access channels, will only be instigated following approval by the relevant government authorities such as PIMA and Marine & Harbours.

3.3 SOCIAL ISSUES

3.3.1 Existing Public Usage

Picnicking, crabbing and prawning activities do take place on the foreshore of Point Grey, however, with the exception of reserves on the foreshore fringe, most of the land above the high water mark is privately owned. Access to the foreshore can only be achieved via private property or boat. Illegal trespassing does occur and has led to rubbish dumping, vandalism, fires and shooting of wildlife.

3.3.2 Public Interest Groups

Public interest groups consulted included:

- o Lake Mealup Preservation Society,
- o Local aboriginal groups at Pinjarra, and
- o Professional Fishermen's Association.

3.3.3 Urban Expansion

The ERMP presents data that indicate that the population growth for the Shires of Mandurah, Waroona and Murray are 4.2, 2.4 and 2.2 times greater, respectively, than the statewide average. These population trends are supported by the number of housing commencements in these three Shires (Section 6.10, ERMP), thus demonstrating the existing rate of urban expansion near Mandurah, and the demand for additional land suitable for urban development. Such land within the Shire of Murray is limited. Much of the Shire is low lying farmland that is prone to flooding. Point Grey therefore offers considerable potential as it is elevated and has panoramic views over the Estuary.

The Point Grey development will be developed gradually over a fifty year period; the rate of development being dictated by market forces.

3.4 GENERAL ISSUES

3.4.1 Peel Harvey Environmental Management Strategy

The proponent is aware that a major study on the Peel - Harvey catchment is nearing completion, and that one of the recommendations of that study will be for the construction of the Dawesville Channel as a means for reducing the nutrient loading in the Estuary. The Point Grey ERMP has demonstrated that the nutrient load generated by the proposed development will be less than that generated by agricultural activities conducted on the site. It is predicted that the proposed development will contribute to a lower overall loading input to the Estuary.

The proponent would not favour a deferral of assessment for commercial reasons. Several additional proposals for college developments in Western Australia have been discussed since the Thomas Peel College was first publicised, and the proponent is keen to maintain its competitive advantage and implement its programme as soon as possible. The proponent is concerned that the catchment ERMP has taken well over a year to reach its present state, and that a decision on its recommendations may take a further 12 to 18 months. Such delays are considered commercially untenable.

3.4.2 Facilities

The proponent will make available areas of land suitable for the establishment of boat launching facilities, and associated car parks and toilets. Post and rail fences, signs, rubbish bins, and other first order management measures will be implemented by the proponent.

The proponent will also be responsible for the installation of the sewage treatment plant, however, the Water Authority will ultimately be responsible for the operation of this facility. A specific agreement defining a suitable take-over period, will be made between the proponent and the Water Authority.

Mallina Holdings are prepared to initiate a mosquito monitoring programme to define the extent of the problem, and propose appropriate management measures. It is intended that these measures would ultimately be the responsibility of the local authority, as in areas of metropolitan Perth affected by mosquitoes and midges.

The proponent is ceding a substantial area of land for incorporation into a continuous foreshore reserve. The proposed development has been carefully design to protect the foreshore quality by limiting access to specific locations capable of coping with the increased pressure of people. The proponent will liaise with the Shire of Murray, CALM and PIMA as necessary to facilitate adquate foreshore management (Section 7.6, ERMP).

Sporting facilities will be developed as the population of Point Grey becomes established. They will be developed in response to public demand, funded by rate payers and managed by the Shire of Murray. The exception will be the golf course, which will be privately developed.

3.4.3 Motor Boats and Launching Facilities

The ERMP describes three forms of potential impact that may result from the installation of boat launching facilities, namely: impacts to foreshores, impacts caused by dredging, and impacts resulting from the improved access to the eastern side of the Estuary (Section 6.6, ERMP).

The shallow water fringing Point Grey will ensure that boating activity near the foreshore will be confined to dredged channels, thus confining the direct impact of boating activity to selected locations. The shallow water margins will attenuate wave energy generated by the wash from leisure craft, and ensure that erosion along the foreshore of Point Grey resulting from boating activity, will not be significant.

This situation is unlikely to change if the water levels of the Estuary rise slightly as a result of the construction of the Dawesville Channel, since speed restrictions in the dredged areas servicing the boat launching facilities will be enforced, and the wave attenuation characteristics of the shallow water margins will not alter significantly.

Boat launching facilities associated with the Point Grey development will relieve some of the pressure on the facilities located near Mandurah, Yunderup and Dawesville.

3.4.4 Estuarine Vegetation

The proposal nominates four areas considered to be suitable for boat launching facilities. This will require the removal of small areas of foreshore vegetation for the installation of access roads to the boat ramps. Car parking areas etc. will be installed at carefully selected sites some distance inland from the foreshore. As such, unwarranted destruction of estuarine vegetation will not occur. Indeed, the proposal will result in a continuous reserve around the entire foreshore margin of Point Grey, which will result in a more secure form of foreshore reserve that will be easier to manage than the existing fragmented reserve system.

3.4.5 Shallow Water Flats

The Peel - Harvey Estuary has a surface area of approximately 130km², of which, 86km² (or 66%) is less than 1m deep (ERMP, Section 6.6). Despite this configuration, the Estuary is one of the most popular water-based recreation areas in the South West of the State. Point Grey is flanked by the intertidal areas of Robert and Austin Bays to the east, and the deeper Harvey Estuary to the west. The Robert and Austin Bay areas have been noted for their importance as wildlife areas, and therefore access by boats, sail boards, canoes etc. will be discouraged during selected periods of the year by the installation of signs along the foreshore (see Section 3.1.5 of this document).

In contrast, the Harvey Estuary is relatively deep and offers a suitable area for boating activity originating from Point Grey or the existing populated centres near Mandurah.

3.4.6 Multi-storey Development and Location of College Site

The proposed college has been designed as a split-level development. It will be set into the edge of a steep incline, and is planned not to be visually intrusive or dominant. The campus area will be well-vegetated with low growing species being used in the front of the college building to enhance the views from across the Estuary. The college will not be visually obtrusive.

The proponent sought to locate the college in a location that was relatively isolated from the day to day activities of local communities, but close enough for access to facilities such as shops etc. The college will cater for fee-paying students attending intensive short courses. The proponents' market research has indicated that nearby distractions would be undesirable for the type of student that will be encouraged to attend the college.

3.4.7 Agricultural Viability of the Shire of Murray

The agricultural activities presently carried out at Point Grey are not a commercially viable proposition. To become commercially viable, the activities would have to be intensified and this would probably require the clearing of natural vegetation, and a re-evaluation of the fertilizer application programme. Replacement of the existing agricultural activities at Point Grey has no relation to the long term viability of agriculture in the Shire of Murray.

3.4.8 Mosquitoes

The proponent's consultant has had further discussions with the Health Department since the submission of the ERMP to identify the requirements of a mosquito assessment and management programme that would be implemented during the 18 month construction period. This programme would:

- o confirm the existence of potential mosquito-breeding sites near to Point Grey, previously identified by the Health Department from aerial photographs,
- o identify the dominant mosquito species found in the area, and
- o identify appropriate physical (and if necessary, chemical) methods for controlling the mosquitoes, if they are found to be a significant problem.

3.4.9 System Six Recommendations

Point Grey adjoins five 'C' class reserves, and is proximate to numerous other conservation and recreation areas, (Section 5.2.2, ERMP). Some of these reserves are listed in the System Six document, however, the area encompassed by the Point Grey development is privately owned land, and as such, is not specifically referenced (Section 7.5.1, ERMP).

3.4.10 Boat Launching Sites

The boat launching facilities have been discussed in Section 3.4.3 of this document and Sections 6.5, 6.6 and 7.6.2 of the ERMP. From the information presented, it is evident that there is a demand for additional boat launching facilities. The Point Grey project nominates up to four such facilities which may be developed over the life of the project.

3.4.11 Reserve C27528

The Concept Plan for the development includes a foreshore reserve with a minimum width of 50m. This area will be ceded to the Crown. Management policy will be the responsibility of the vesting authority, and consequently, the issue of prohibiting recreation from reserve C27528 does not lie with the proponent.

3.4.12 Impact on Adjacent Reserves

This issue has been discussed in Section 3.1.3 of this document.

3.4.13 Reserve Areas

The areas of reserve and open space that will form part of Point Grey are as follows:-

Land to be ceded:

- o 40 ha at Point Grey itself,
- o 34 ha east of Thomas Peel College, and
- o 32 ha of foreshore reserves, ceded to provide a minimum width of 50m.

Existing Reserves adjoining Point Grey development site:

- o A2738 29.50 ha
- o C11718 4.05 ha
- o 27528 34.20 ha

Residual Foreshore Areas:

- o 40 ha, lying between the foreshore areas of private property (to be ceded) and the high water mark).

Total area is therefore 213 ha or 19.6% of the Point Grey site.

3.4.14 Impact on Robert and Austin Bays

This subject has been discussed in Sections 3.1.3 and 3.1.5 of this document.

3.4.15 Environmental Effects Associated with Urbanisation of Point Grey

Most of the issues raised in this section of the public submission have been discussed in the ERMP, as follows:

- o Fire: Sections 6.4.1, 7.2.1, ERMP
- o Exotic Weeds: Section 6.4.2, ERMP
- o Rubbish Dumping: Sections 6.4.8, 6.7 and 7.2.4, ERMP

- o Domestic and introduced animals: Sections 6.4.3, 7.5.3, ERMP
- o Traffic: Sections 6.4.5, 7.5.4, ERMP
- o Horses: Sections 6.4.3 and 13.0 of the ERMP indicate that horses will not be allowed on the Point Grey site, and describe how this ban will be implemented.

Other issues raised in the submissions are as follows:

- o Chemical spills from use of pesticides for mosquitoes: A mosquito management programme will be devised during the construction period of the project. This programme will be based on the results of an investigation that will identify potential breeding locations, and define appropriate management actions. These actions will give priority to physical management measures, however, they may include the use of approved chemicals. These will be used in accordance with Health Department recommendations. The potential risk of spills is not likely to be significant.
- o The use of garden pesticides by land owners is a natural consequence of urbanization.

3.4.16 Lake McLarty Sub-division

The proponent is aware that plans to sub-divide land near Lake McLarty for rural purposes have been discussed for many years. Details of such proposals have not been addressed in the ERMP because the proponent is not privy to formal submissions that have been lodged to the Shire of Murray or State government authorities.

3.4.17 Solid Waste Disposal

Social waste disposal has been discussed in Sections 4.8.1 and 6.7 of the ERMP.

Discussions with the Shire have indicated that the existing waste disposal facility is expected to meet the needs of the Shire for 7 to 11 years.

The proponent has made a commitment to provide a financial contribution to the Shire to enable a new waste disposal site to be identified and purchased well before the capacity of the existing facility has been reached.

This approach also allows the prospect of a regional disposal facility, serving the needs of adjacent Shires, to be considered as part of the long term strategy for waste disposal in the Peel - Harvey catchment.

3.4.18 Stormwater Disposal Facility

Stormwater drainage facilities have been discussed in detail in Section 4.8.5 of the ERMP. The proposed system conforms with conventional urban development, and incorporates specific features designed to avoid direct run-off to the Estuary.

Without details describing the reasons why the proposed facilities are regarded as inappropriate for residential areas, further comment is not possible.

3.4.19 "Greenhouse Effect"

The possible effect of rising sea levels on the Point Grey development was not considered in the ERMP because it was felt that there is not sufficient scientific evidence to suggest conclusively, the magnitude of the change or the probability of occurrence. The EPA has since endorsed this view and has advised that the issue need not be considered (EPA, pers. comm.).

3.4.20 Tidal Flats

The only disturbance proposed for the tidal flats will be associated with the construction of the boat channels. This activity is not expected to increase the area of mosquito breeding habitat.

The proponent recognises the need to assess the location of potential mosquito breeding habitats, these matters have been discussed in Section 3.4.8 of this document.

3.4.21 Algae Growth

The ERMP has presented data that indicates that the development will result in a reduction in net phosphorus and nitrogen loading to the Point Grey site. This will result in an improvement in local groundwater quality and a reduction in nutrient transport by groundwater flow to the Estuary. All surface discharge will be contained within the development; no direct discharge of surface flow to the Estuary will occur (Sections 6.2 and 7.3).

3.4.22 Management Programme

The proponent has made a commitment to prepare an environmental management programme on approval of the project by the EPA. A detailed discussion of the environmental issues that will be incorporated within this programme, and the methods that will be used to ameliorate potential impacts, have been presented in Section 7 of the ERMP. A summary of commitments is given in Table 22 of the ERMP.

The proponent has undertaken to provide a substantial financial commitment to assist the Shire of Murray in the selection and purchase of a waste disposal site.

The proponent has also undertaken to cede approximately 100 ha of land to the Crown.

The proponent has therefore made several significant financial commitments, and does not perceive a need for further commitments until the project has been assessed by the Government.

3.5 DISCUSSION OF SUGGESTIONS RAISED IN SUBMISSIONS

3.5.1 Foreshore Reserves

The foreshore of Point Grey is presently privately owned, with the exception of reserves at Mealup and Stony Points, and a thin strip of land along the north eastern section of the property.

The proponent is advocating a foreshore reserve for the entire Point Grey peninsula, linking up the existing reserves, thereby allowing for the management of the entire area as a unit rather than a series of fragmented areas. The Concept Plan proposes a foreshore reserve with a minimum width of 50m, which conforms to PIMA policy. In some areas, natural features have resulted in this width being considerably greater. The overall concept proposed by the development has been endorsed in the CALM submission.

The proponent considers that it is unreasonable for a figure of 100m to be imposed upon the project, on the basis of experience in other States of Australia. (It is noted that no reference was provided to support this figure).

3.5.2 Power Supplies

It is recognised that underground power supplies are desirable for aesthetic reasons. It is envisaged that power supply to the site will be via a 22 kV overhead system; once on-site, supply to the large leisure living lots will be via an overhead system, while the higher density residential community is likely to be served by an underground system.

The visual intrusion of overhead lines serving the large leisure living lots will be minimal, because these lots will be mainly located in timbered country.

3.5.3 Reserves and Management

The status and management of reserves C2707 and C7502 is the responsibility of the vested authority and not the proponent. Mallina Holdings has indicated their willingness to co-operate in issues relating to the management of adjacent reserves, whenever this is practicable.

3.5.4 Roadside Vegetation Conservation Committee

The proponent recognises the existence and function of the Roadside Vegetation Conservation Committee and will hold discussions with relevant members of the group when decisions on road alignments are being finalised.

3.5.5 Regional Park

The Point Grey site is privately owned land. Any suggestions to convert the area into a regional park would require a substantial financial commitment by the Government.

3.5.6 Choice of Development

Any form of development at Point Grey will require the establishment of substantial services, partly due to the remoteness of the site, and partly because of the need to ensure that the development does not have significant, negative, environmental effects (aesthetics, nutrient management, water supply etc).

The capital costs of establishing these services and basic infrastructure are substantial and could not be supported commercially by low density leisure living lots over the entire property. The proponent has therefore sought to provide a blend of development options to optimize the land capability of the site, and ensure a commercial return on the venture.

3.5.7 Research on Reserves

The proponent is making a major contribution to the establishment of a foreshore reserve. Research related to the biology of the reserves is not regarded as being the responsibility of the proponent. Similarly, the amalgamation of reserves is the responsibility of the vesting authority, not the proponent. No reason is given for the suggestion that the land east of Reserve 2738 should be ceded by the proponent, and therefore no further comment can be made.

3.5.8 Boat Facilities East of Point Grey

The Concept Plan nominates sites for four boat launching facilities: three on the west side of Point Grey, and one on the east.

The eastern location is closest to Point Grey from Pinjarra and therefore, would be the most convenient site for people not residing at Point Grey, to launch their boats.

By confining all boat launching sites to the western foreshore, people travelling to Point Grey for the purposes of launching boats would have to pass through the developed area to gain access to the Estuary. This would result in extra unnecessary traffic within the developed area.

The preferred location for the eastern foreshore facility is close to the 0.5m and 1.0m depth contour (Figure 17, ERMP), and thus minimises the amount of dredging that would be required to gain access to suitable depth water.

All boat launching facilities will minimise disturbance to foreshore areas. Car parks and toilet facilities will be set back from the shoreline, and the only vehicle access will be directly to the launching ramp.

3.5.9 Waterbird Surveys

The proponent recognises the importance of some of the adjacent wetlands as waterbird habitats, and proposes to co-operate with CALM to restrict access to these sites during crucial periods of the year (i.e. breeding seasons). These issues have been discussed in Sections 3.1.3, 3.1.5 of this document.

The ERMP presents groundwater simulation data that indicate that water can be abstracted from the Waroona Mound without affecting wetlands.

The Waroona Mound corresponds to an area that has been extensively drained and cleared for agricultural activities. The existing lakes and swamps are remnants of a much larger system of wetlands that once extended over the Swan Coastal Plain. The proponent recognises the conservation value of these natural systems. The proposed groundwater abstraction programme in the ERMP demonstrates that draw-down effects will not have a detrimental effect on the hydrological regime of the neighbouring wetlands. The proposed programme will only be implemented following further detailed studies. A monitoring programme will also be implemented to confirm the results of the simulation studies. Monitoring of wetland birdlife will only be considered if these monitoring studies indicate that the draw-down influences the hydrological regime of the wetlands.

3.5.10 Botanical Surveys

Issues relating to botanical surveys have been discussed in Section 3.1.1 of this document.

3.5.11 Avalon Cave

Discussion have been held with the Western Australian Speleological Group (WASG) and the proponent acknowledges the need to install a gate to the cave to prevent vandalism and other forms of damage. The WASG will be consulted for further advice on the most appropriate gate for the cave, once approval for the project has been given.

3.5.12 Water Supplies from Dams

It would be uneconomical to pipe water from the Hills Dams.

3.5.13 Land Capability Study

The proponent commissioned Dames & Moore to perform a land capability study at Point Grey, prior to the preparation of an ERMP (Dames & Moore, 1986). This study was designed to take into account number of factors, including:

- o the potential environmental effect of increased nutrient levels in the nearby estuary that could result from the disposal of waste water effluents,
- o the need to define a development that comprised a combination of land uses that was commercially feasible,
- o the potential impact of development upon adjacent waterways and reserves,
- o the availability of suitable water supplies,
- o the Shire of Murray's indication that any development proposal would need to include a significant residential component, and
- o the relatively isolated location of the area.

A review process was adopted in recognition of the development constraints associated with the site. A preliminary development concept was formulated to guide the selection of assumptions necessary to perform the site capability analyses.

A number of conceptual development options was considered, each comprising a variety of land uses and land use configurations, and a range of population densities. The environmental goal was to formulate a proposal that would have less environmental impact than if the site were fully developed for agriculture, as would be permitted under the current zoning. The results of this evaluation process formed the basis for the ERMP.

3.5.14 Groundwater Assessment and Monitoring

Preliminary groundwater investigations were undertaken in 1986 as part of the pre-feasibility studies for the project. This programme of work is described in Appendix G of the ERMP. That section of the ERMP presents a series of recommendations for further exploration and monitoring work.

3.5.15 Sympathetic Development

See Section 3.5.13 of this document

4.0 GOVERNMENT SUBMISSIONS

4.1 CALM

4.1.1 Timing

The proponent is aware that the ERMP for Stage 2 of the Peel Inlet and Harvey Estuary Management Strategy is being prepared and that the conclusions may have implications for the proposed Point Grey Development. However, the following factors should be considered when calling for a moratorium on development at Point Grey:

- o The Point Grey ERMP has demonstrated that the proposal will lead to a reduction of nutrient loading to Point Grey when compared with existing agricultural activities. This conforms with the overall objective of the Government's management policy which is to reduce the nutrient loading to the Estuary.
- o The proponent was advised that the Stage 2 ERMP was due for release in early 1987. It now seems likely that the release date will be early 1988. Because of the complexity and political sensitivity of the issues, the proponent is concerned that a decision by Government on the Stage 2 ERMP may take equally as long, and this would jepodise the commercial viability of the College component of the proposal. Marketing studies have indicated that there is presently a demand for intermediate and tertiary education for overseas students, but substantial delays in the approval process for the Point Grey project may alter this situation considerably.
- o The catchment is currently undergoing development which includes:
 - agricultural pursuits such as grazing, feedlot establishments and piggeries.
 - intensive horticulture such as market gardens and avocado plantations.
 - residential developments, and
 - industrial development such as mining and mineral processing.

None of these developments has been subjected to deferral, pending the conclusion of the Peel Harvey Catchment ERMP, Stage 2, or the Government's response.

- o The proponent is concerned that the State Planning Commission's Mandurah and Districts Planning Study represents yet another Government sponsored investigation that will further delay town planning and development approvals. It is noted that the original Mandurah and Districts Planning Study Draft Report recognized the development potential of Point Grey. Five long-term objectives for the site were outlined in that Report, and these have been reproduced in Section 3.0 of the ERMP.

In conclusion, the timing of the development should not be deferred indefinitely, and should not be dependent on the probable implementation of one or more proposed catchment and estuary management alternatives.

4.1.2 Potential Impacts

The ERMP acknowledges that the project will create additional people pressure on the natural environment of the area. These issues are further discussed in Section 3.1.3 of this document.

The proponent's philosophy is that these pressures are an inevitable consequence of an increasing population, combined with the natural desire of people wanting to live near water and in areas that are aesthetically pleasing. With appropriate management procedures, the negative effects can be minimised, and the positive attributes enhanced. There are numerous examples of natural areas of bushland and wetlands located near to urbanised areas that are managed to absorb the effects of "people pressure". For example, Kings Park is located within a urban population that exceeds one million people. This park cannot be regarded as a pristine wilderness area, and its environmental quality has certainly been degraded since the early settlement of Perth, however, it's intrinsic and recreation value to the population of Perth is undisputed.

A similar analogy could be made for the Swan and Canning Estuary.

4.1.3 Commitments made by Developer

Foreshore Reserves

The ERMP clearly states that the proposed foreshore reserve will be a minimum of 50m wide, and that in some places, biological and physical features have resulted in this width being considerably greater (Section 4.6, 6.8 and 7.6, ERMP).

Planning Controls

The ERMP clearly states that planning controls will be implemented to prevent excessive clearing, farming, keeping of livestock etc. (Sections 6.4.3, 7.5.3 and 13.0 ERMP).

First Order Management Proposals

The proponent has made a commitment to provide first order management for the foreshores reserves, and has indicated a willingness to co-operate with CALM, PIMA and the Shire of Murray in on-going management. Issues relating to the provision of on-going financial assistance will be discussed at the appropriate time.

4.2 WESTERN AUSTRALIAN WATER AUTHORITY

4.2.1 Water Supply Development and Groundwater Management

Public Water Supplies

Public water demand estimates have been recalculated and presented in Section 3.2.1 of this document.

The ERMP acknowledges that a detailed ground water investigation will be required to demonstrate the capability of Leederville Formation (Appendix G, Section 6.0). Similarly, the capability of the Waroona Mound requires confirmation, but this will only be necessary if the capability of the Leederville Formation does not meet the long term demand requirements.

The Water Authority indicates that they support the allocation of part of the resources of the Waroona Mound for public water supply. They raise the issue of intensive horticulture and other potential users of the Waroona Mound, however, the ERMP has demonstrated that such intensive agriculture/horticultural users are incompatible with the Government's objective of reducing the intensive use of fertilisers in the Peel-Harvey catchment, and discouraging industries that generate high nutrient outflows such as abattoirs and piggeries.

The proponent acknowledges the potential impact of draw-down on wetlands located within or near to the Waroona Mound (Section 6.3.2, ERMP).

Thomas Peel College Irrigation

The Water Authority believes that the water demand of 150,000m³/y for irrigation of 10ha is excessive, and that, based upon Department of Agriculture recommendations, 90,000m³/y would be adequate. On this basis, the Water Authority would be prepared to allocate this assessment for irrigation. This is regarded as acceptable.

The proponent has no disagreement with statements relating to the use of the Miami 1/80 bore, as detailed on page 3, paragraph 3 of the Water Authority's submission.

Golf Course Irrigation

During the early stages of development, the golf course water supply will be obtained from the Leederville Formation, at a rate that will be determined following further hydrogeological investigations. The proponent recognises that project approval will depend upon the need to demonstrate the existence of suitable supplies of water from either the Leederville Formation or the Waroona Mound.

Public Parks and Gardens

Comments relating to public parks and gardens conform with information presented in ERMP.

4.2.2 Sewage Collection and Treatment

Comments relating to sewage collection and treatment conform with the information presented in the ERMP.

4.3 PEEL INLET MANAGEMENT AUTHORITY

4.3.1 Timing

See Section 4.1.1 of this document

4.3.2 Costs to the State

The costs of establishing the infrastructure for the development is being provided by the proponent. The services have been designed to meet the stringent standards imposed by environmental constraints associated with developing the site. The proponent agrees that there will be increased costs associated with the establishment of foreshore facilities such as ramps, but argues that the demand for such facilities has been clearly demonstrated by the growing public usage of the Estuary, and will need to be installed at some time, irrespective of the proposed development.

The potential costs associated with the harvesting of macro-algae along the foreshore of Point Grey is unclear because there are no data to demonstrate that algae accumulates along the Point Grey section of the Estuary foreshore. Circumstantial evidence presented in the ERMP suggests that Point Grey may be one of the least affected areas of foreshore in the Estuary. Similarly, preliminary surveys of potential mosquito breeding habitats have demonstrated that Point Grey may be one of the least affected areas in the Mandurah region. Nevertheless the proponent recognises that this issue requires further investigation (Section 7.8, ERMP).

4.3.3 Stage 2 ERMP

See Section 4.1.1 of this document

4.3.4 Land Use Objectives

The proposed development will be sited on predominantly agricultural land. Large areas of foreshore will be reserved. Town Planning Controls will prohibit unnecessary clearing. The proposed Point Grey development shares PIMA's objective of maximum retention of native vegetation.

4.3.5 Specific Issues

Macro-algae

The proponent recognises the potential problems associated with macro-algae, and is committed to documenting the extent of the problem at Point Grey. This is regarded as an essential first step to management.

Boating facilities

The Point Grey Concept has nominated four sites that would be suitable for the establishment of boat launching facilities. The proponent may be prepared to develop the first facilities, however, it is envisaged that the dredging and maintenance of the access channels and the construction of the remaining facilities would be undertaken by the State and the Local Authority.

Water Supply

The water supply for the entire development will ideally be obtained from the Leederville aquifer, (Section 4.8.1 ERMP).

A preliminary exploration programme has already been carried out by the proponent's consultants to demonstrate the feasibility of extracting water from the Leederville Formation.

A detailed test/drilling programme will be undertaken in the early stages of development to verify the water supply. Should there be insufficient yield from the Leederville aquifer, makeup water, or even full development supply, can be provided by the Waroona Mound.

This conclusion is based on hydrogeological studies undertaken by the Water Authority and by hydrogeological and groundwater modelling studies undertaken by the proponent's consultants.

Mosquito Control

See Section 3.4.8 of this document.

Nutrients

The ERMP demonstrates that, given the current scientific understanding of biogeochemical cycling, the nutrient loadings associated with the development are acceptable when compared with other land uses in the catchment, and when considered in the context of the absorptive capacity of the soils. It is unrealistic to expect modelling studies to predict nutrient loadings path-ways beyond the 50 year period mentioned in the submission. The current understanding of the Peel-Harvey nutrient cycle is too basic to make such predictions.

Sewage Collection and Treatment

See Section 4.8.3 of the ERMP

Site Manager

It is not possible to determine how long a site manager will be required at Point Grey, since this will be determined by the rate of development of the urban areas and the ultimate involvement of the Shire of Murray.

4.4 DEPARTMENT OF HEALTH

The only issues discussed in the Department of Health submission relate to mosquitoes and the disposal treated sewage effluent, and mosquitoes. Sewage effluent disposal is discussed at length in the ERMP (Sections 4.8, 6.7 and 7.3). All disposal practices will conform with the National Health and Medical Research Council standards.

The proponent's consultant has discussed the issue of mosquitoes with Department of Health officers. The results of these discussions will form the basis of an investigation as outlined in Section 3.4.8 of this document.

4.5 DEPARTMENT OF MARINE AND HARBOURS

4.5.1 Boating Facilities

The proponent acknowledges the suggestions relating to the installation of boating facilities. It is envisaged that, during the early phases of the development, only one boat launching facility is likely to be required. However, during the latter stages of the development, additional facilities may be required. The Point Grey Concept includes provisions for this need.

Beaches suitable for windsurfing activities will be considered by the proponent.

The Departments' suggestion relating to navigation aids and channel dredging maintenance is noted.

4.5.2 Nutrient Loadings

See Section 4.1.1 of this document

4.5.3 Services

The preferred water supply source is the Leederville Formation. If hydrogeological investigations can demonstrate the existence of suitable supplies, then there will be no need to draw water from the Waroona Mound.

If, however, there is not a sufficient supply of water from the Leederville Formation, the Waroona Mound will be used to supplement supplies. This approach has been endorsed by the W.A. Water Authority.

The issue of land sterilisation is discussed in Section 6.3.2.3 of the ERMP.

The ERMP clearly states that a tertiary treatment facility will be installed (Section 4.8.3). The proponent is fully aware of the costs involved and has had detailed discussions with the Water Authority on this and many other issues. Nutrient loadings to the Estuary are not expected to increase.

4.6 MAIN ROADS DEPARTMENT

The comments raised in the Main Roads Department have been noted, and do not require any further discussion.

4.7 WESTERN AUSTRALIAN MUSEUM

The issue of fauna and flora surveys has been discussed in Section 3.1.1 of this document.

4.8 FISHERIES DEPARTMENT

The comments raised in the Fisheries Department submission have been noted, however, the issues raised do not require further comment.

4.9 WESTERN AUSTRALIAN DEPARTMENT OF AGRICULTURE

See Section 3.1.1 of this document

5.0 CONCLUSIONS

A detailed examination of the issues raised during the public review of the Point Grey ERMP has been undertaken. Approximately sixty issues were raised, and of these, approximately 50% were either irrelevant to the project, or resulted from poor reading of the document. Of the remainder, many dealt with issues that were acknowledged in the ERMP.

Of the 26 public submissions, 8 were from the Pinjarra/Mandurah region, and the remainder from the Metropolitan Region.

The overall conclusion is that none of the issues raised during the public review period were not covered in the ERMP. Some issues such as water supply and mosquitoes will require further investigation, once the project has been approved. Details of these studies will be discussed with the EPA following their assessment of the project and prior to the commencement of any construction activity.

6.0 REFERENCES

DAMES & MOORE (1986), Water Supply and Environmental Investigations for the Proposed Point Grey Development, Pinjarra, W.A. Report prepared for Feilman Planning Consultants, Dames & Moore Job No. 14932-001-071.

WATER AUTHORITY OF WESTERN AUSTRALIA (1986), Assumptions and Design Criteria for Water Supply Planning, Edition 1.

ZINES, D.O., TONKIN-HILL, S.K. & DAVIS, J.D. (1987), Phosphorus Removal for Existing Plants, Australian Water and Waste Water Association, 12th Federal Convention, Adelaide, March 23-27, 1987.

APPENDIX A

**SUMMARY OF ISSUES RAISED
IN POINT GREY SUBMISSIONS**

SUMMARY OF ISSUES RAISED IN POINT GREY SUBMISSIONS

SOCIAL ISSUES

- Detract from favourite spot for picnicing, crabbing and prawning.
- Project will lower the quality of life of Dawesville and Falcon residents.
- No indication that proponent contacted public interest groups as required in the EPA guidelines.
- No need for further urban expansion as there are already many vacant blocks in Mandurah area as a result of speculative land development.

IMPACT ON FLORA / FAUNA

- Inadequate floral and faunal surveys undertaken in the area.
- Unsuitable form of land use for tuart woodland and environmental impact will be difficult to monitor.
- Increase in population will lead to degradation of the area and have a destructive effect on estuarine ecology.
- Development of Point Grey is against the principle of protecting and conserving wetlands. Impact will be especially detrimental to 19 Mile Lake, McLarty Lake, Goodale Sanctuary, Austin Bay, Roberts Bay and Lake Mealup.
- Point Grey is a conservation area for water birds of international significance. It is a feeding and breeding ground for many waders including over twenty trans-equatorial migrant species, protected under the JAMBA Treaty. Development will disturb birds and reduce size of feeding area.
- Conservation area of Robert Bay for Great Crested Grebe, Banded Stilt and Red - Necked Avocet overlooked in ERMP.
- Pest control measures, water based recreation, off road vehicles, horses, dogs and dumping of rubbish will increase threat to water bird habitat. ERMP does not include discussion of measures that could be employed to protect wildlife against such impacts.
- Reserve C. 7502 is an important breeding site for Black Swans and Carrabungup Reserve (C. 2707) is an important breeding site for Cormorants. Human disturbance to these areas may lead to the death of many young birds.
- Removal of fringing and reed vegetation and filling of wetland margins will reduce breeding locality for many bird species.
- ~~50 m buffer zone gives inadequate protection for wetlands. At some locations wider reserves may be desirable to maintain biological, physical or geological features. An arbitrary, single width may be impracticable.~~
- ~~The extent of the foreshore reserve needs to be clarified. Area of foreshore which would be inundated in the event of a sea level change needs to be estimated.~~
- Important fish hatchery and nursing area. Motor boat activity will disturb sediment and have a detrimental impact on larvae and juveniles.
- Increased pressure on fish resources in the estuary.
- Insufficient discussion on impact on terrestrial and aquatic fauna in the ERMP.

- Project will have a big impact on terrestrial fauna in the area, in particular kangaroos and emus.
- ERMP fails to assess ecosystems in both a local and regional context.

WATER RESOURCES / WATER QUALITY

- Public water demand underestimated.
- Water supplies from the Waroona Mound are inadequate for the development.
- Insufficient study has been undertaken on the impact of use of the Waroona Mound through bores/groundwater extraction on the lowering of the water table. This will jeopardise fragile wetland ecosystems. Adverse effects of pumping need to be defined.
- Management strategy for groundwater use needs to be prepared and will require further investigation.
- Method which will be employed to restrict the installation of private bores is not detailed in the ERMP.
- Methodology for achieving stated targets of phosphorous and nitrogen discharges not detailed in ERMP.
- Achievement of effluent quality criteria claimed for sewage treatment plant is questionable based on the information given in the ERMP. Sewage scheme requires further detail
- Standards for water quality control and monitoring details need to be defined.
- Urban development and associated sewage treatment will exacerbate eutrophication problems in the estuary and contaminate groundwater.
- Dredging will be costly and have a detrimental impact on aquatic organisms.
- ERMP gives no indication of where solid waste or excess water disposal that cannot be used on the golf course is to be disposed of.

GENERAL

- Assessment of ERMP should be deferred until the Peel Harvey Environment Management Strategy ERMP is completed. This will be particularly important in terms of nutrient load assessment. Point Grey must be managed, developed and protected in a regional or statewide context.
- It is unclear in the ERMP as to who will pay for the provision of facilities i.e. toilets, jetties, foreshore maintenance, possible marina, sewage pump out facilities, mosquito control sporting facilities, and maintenance of boating channels.
- No details are given as to who will deepen boat channels by 0.5 m if Dawesville Channel proceeds, as promised in ERMP.
- Motor boats and launching facilities will have a detrimental impact on the estuary and foreshore (disturbance, exacerbate erosion, pollution from engine waste). Ecosystem is already stressed.
- Project will lead to the destruction of estuarine vegetation.
- Peninsula surrounded by shallow water flats is not readily suitable for water based recreation.
- Need for multistory development unjustified. It is an unsuitable site for a college and base for overseas students as the site is isolated, large areas of mud flats will be exposed over long periods of time, therefore unsightly etc. Idea of college for international students just an excuse for further development.

- No assessment has been carried out of alternative sites for proposal.
- Choice of site will be detrimental to the long term agricultural viability of the Shire of Murray.
- Population will be continually bothered by mosquitos and will lead to the use of chemical mosquito control which will pollute the water.
- Development contrary to System Six Recommendations.
- No further development adjacent to the estuary should be allowed.
- Construction of 4 additional boat launching sites on shallow platforms is unwarranted. Two rather than 4 launching sites should be constructed, each with a 50 m wide channel.
- Reserve C. 27523 should not be available for recreation.
- Proposal will have an impact on and degrade adjacent reserves and conservation areas.
- Area of reserve within project area is misleading i.e. 13 % of area not 18% as stated in the ERMP.
- Influx of long term visitors and residents into restricted areas adjacent to reserves in Robert and Austin Bay will lead to a reduction in environmental values.
- Urbanisation of Point Grey will have the following impacts on the area :
 - . increase fire risks
 - . increase exotic weed invasion
 - . increase dumping of rubbish
 - . introduce vandalism
 - . introduce domestic animals
 - . increase feral animal population
 - . increase off-road vehicle use
 - . increase risk of chemical spills (e.g. through mosquito control)
 - . introduce pesticides
 - . introduce horse riding.

There is no adequate means of controlling these impacts.

- Assessment of the impact of other developments in the area (e.g. rural subdivision west of Lake McLarty) should also be considered. Assessment should not be made in isolation, but in a regional context.
- Solid waste disposal not adequately considered.
- Stormwater disposal facility not appropriate for residential area.
- Sites for roads and buildings should not be filled due to the possible rise in sea level as a result of the 'Greenhouse Effect'.
- Implications of possible changes of water level of estuary not adequately addressed. No figures are presented as to the extent of, for example, the predicted 0.2 m rise in sea level in the event of the Dawesville Channel being constructed.
- No consideration of the possible changes in sea level as a result of the Greenhouse Effect has been made.
- Development/disturbance on tidal flats and low lying areas will exacerbate mosquito problem by creating favourable breeding areas. Assessment of mosquito breeding locations and potential impact on Point Grey population needs to be undertaken. This report must meet the satisfaction of the Mosquito Control Review Committee (MCRC). Mosquito problem will become worse if the Dawesville Channel is constructed due to more frequent inundation of low lying foreshore areas.

- Algal growth in estuary/inlet will increase with nutrient run off.
- Urban development will lead to increased rate of subdivision.
- Management Programme - proponent does not demonstrate the manner in which potential environmental problems can be ameliorated. Proponent should include financial guarantees and bond money.
- Planning control measures should be imposed on leisure living lots to control excessive land clearing.
- Period of position of Site Manager as described in ERMP is not specified, yet management plan is to be implemented over 30 years.
- Project will lead to increased cost to the State for servicing, in particular macroalgae harvesting, boating facilities, mosquito control and foreshore facilities at a location with limited access.
- Macroalgae harvesting can only take place from the eastern side as shallow banks on the western side have numerous limestone outcrops making harvesting difficult with frontend loaders.

SUGGESTIONS

- Concept of a 50 m wide Regional Park around the estuary will not provide adequate protection for the estuary, in particular with respect to sea level changes. It should be 100 m wide as in other Australian States.
- Underground power lines should be installed so as not to detract from scenic value.
- Carrabungup Nature Reserve (C. 2707) and Reserve C. 7502 should be given greater conservation status as an 'A' Class reserve and fenced to protect water bird breeding colonies with 1.3 m high cyclone wire fencing.
- Roadside Vegetation Conservation Committee should be consulted to assist in the identification of 'Flora Roads' i.e. those areas having high conservation value.
- Pt. Grey area should be declared a park. This would have local amenity value and increase tourist potential in the area.
- Emphasis should be on holiday type accomodation, not small subdivided urban settlements.
- Concept of 'Special Residential Leisure Living' (Section 4.4, ERMP) should be applied to the entire area, apart from designated reserves. This would keep the population and associated impacts on the environment low.
- Proponent should establish a Trust to maintain and enhance reserves and provide funding to continue research relevant to the reserves.
- Reserve C. 7502 should be added to Reserve C. 2707.
- Area of land immediately east of Reserve A. 2738 (15 ha) (proposed 'Special Residential Living Allotment') should be ceded to the Crown by the proponent and become part of the nature reserve.
- No boat launching facilities should be constructed on the shoreline east of Point Grey.
- Design of boat launching facilities should be such that vehicle access to foreshores from launching ramps is not possible.
- Intensive ecological studies should be undertaken to assess the importance of wetlands in the area for waterbirds. Surveys should cover at least one breeding season (July - February).
- Proponent should be requested to fund comprehensive surveys of waterbird usage of the Waroona Mound wetlands to monitor the effects of water draw down. This survey should be conducted on a monthly basis for a minimum of three years.

- Botanical surveys should be undertaken prior to any development commencing to record presence of any rare or gazetted plant species.
 - Increase in population at Point Grey may increase tourist pressure (litter, vandalism etc.). Avalon Cave should have a locked gate to control access and be maintained by the Caves Access Committee.
 - Water should be piped in from existing dams rather than use shallow local aquifers.
 - Environmental Protection Authority should ensure Recommendation 50.4 of System Six Redbook be put into effect urgently.
 - Land capability study should be undertaken.
 - Groundwater monitoring should be instigated as soon as possible.
 - Sympathetic land development should take place at Point Grey which is compatible with local vegetation.
- Management costs to protect conservation areas should be met by the developer.

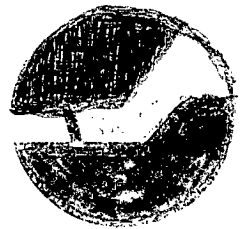
APPENDIX B

GOVERNMENT SUBMISSIONS

**DEPARTMENT OF CONSERVATION
AND LAND MANAGEMENT**

HEAD OFFICE
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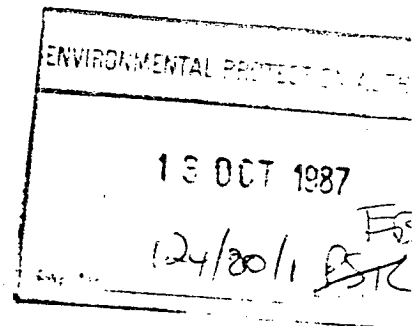
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The Chairman
Environmental Protection Authority
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Attention Mr P Skitmore

POINT GREY DEVELOPMENT - ENVIRONMENTAL REVIEW AND
MANAGEMENT PROGRAMME (ERMP)

Thank you for the opportunity to comment on this document.
The issues of concern to this department are of three broad
kinds:

- . the timing of the project in relation to other
planning around the Peel-Harvey Estuary;
- . the probable impact of the development on nature
conservation values around the Estuary;
- . commitments made by the developer.

1 Timing

The Peel-Harvey Estuary supports the largest commercial
fishery in the State, is the most important wetland for
waterbirds in the South West, and is arguably the most
important recreational and tourist resource outside Perth.
Thus, its management, development and protection require to
be put into regional or statewide context.

Currently the ERMP for stage 2 of the Peel Inlet and Harvey
Estuary Management Strategy has just been completed and an
approximately year-long review of the State Planning
Commission's Mandurah and District Planning Study is about
to start. In addition, the multi-agency Peel-Harvey
Conservation and Development Committee is nearing
completion of a review of how best to identify, and
coordinate the management of, areas with conservation value

around the Peel-Harvey Estuary. The reports of these "enquiries" will provide the necessary background to determine sustainable management of the Estuary and surrounding lands.

The proposed Point Grey project is a major development, with far reaching implications for the region, and for the management of the Estuary. The overview provided by the "enquiries" referred to above would be extremely valuable in assessing such implications. It is desirable that at least the Peel-Harvey Management Plan, with its recommendation of a catchment management plan for the Estuary, should be assessed and considered by Government prior to a decision being made on the Point Grey proposal.

2 Potential Impacts

Several matters likely to impinge on conservation and wildlife values around the Estuary appear to have received inadequate consideration in the ERMP.

- (i) The disturbance of wildlife, including wading birds, by direct "people pressure" and by increased numbers of domestic and feral cats and dogs, is understated in the ERMP. Such disturbance is a major management problem in virtually all conservation reserves abutting, or close to, large centres of human population. While these effects will be most marked on the closer reserves, they will also impinge to some extent upon important reserves such as Lake Meallup and Austin Bay. Roberts Bay, an important area for waterbirds but not part of any reserve, is likely to undergo a considerable increase in human disturbance.

On page 47 of the ERMP it is noted that some degradation of recreational sites is already occurring and is likely to continue regardless of developments at Point Grey. While this is true, the relevant point to be made is that a large resident population around Point Grey will greatly increase the pressure upon such sites, and the disturbance to waterbirds. This rapidly increased recreational pressure will place a considerably greater responsibility for intensive management upon managing authorities.

- (ii) One particular aspect of "people pressure" is the perceived need for the control of pest species of insects, especially mosquitoes and non-biting midges. Pest control methods, such as spraying with insecticides and various forms of drainage, may conflict with conservation values, especially if the source of the pest species is within existing or planned conservation reserves. Once a large human population is established, the political pressure for pest control can become irresistible, even though such control may be inimical to the factors for which a reserve is gazetted and managed, and even if gazettal of the reserve pre-dates the establishment of housing.

It is important that any sources of pest insects on existing or proposed conservation reserves be identified, and centres of human population sited so that pest problems from these reserves will be minimal. For instance, the Shire of Cockburn is now refusing to rezone land for urban development within one km of lakes likely to generate nuisance numbers of midges.

- (iii) The implications of possible changes in water level in the Estuary are treated in a rather cursory fashion. Discussion of the predicted rise of about 0.2m should the Dawesville Cut proceed concludes that there will be a limited effect upon foreshore reserves, and upon the period of inundation of low lying areas. However, no figures are presented as to the extent of this effect on shores of different slopes and elevations.

More importantly, no reference is made within the ERMP to the effects of possible changes in sea level resulting from the "Greenhouse Effect". This issue is the subject of considerable current research, notably by the CSIRO. The likelihood of at least some increase in sea level in the next 30-40 years, and continuing increases over the next 100 years, appears to be widely accepted by scientists involved in this work.

The ERMP should at least consider the best available information at present in terms of effects, and likelihood, of both best-case and worst-case outcomes. The additive nature of these changes to those resulting should the Dawesville Cut proceed should also be evaluated.

3. Commitments Made by Developer

- (i) Proposed foreshore reserves: There is no doubt that the linking of all recreation and conservation reserves around the Point Grey Peninsula, via a continuous foreshore reserve, is a desirable step. Further, the areas nominated by the developer to be ceded to the Crown will make a useful addition to the system of public open space around the Peel-Harvey Estuary. This Department also welcomes the commitment to a minimum width of 50 metres for foreshore reserves. However, in some places biological, physical or geological features may suggest that wider reserves are desirable - that is, an irregular boundary based on natural features may be preferable to an arbitrary single width of foreshore.

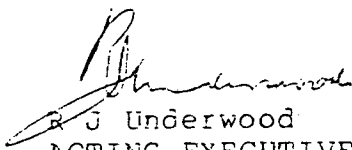
In addition, the issues raised in 2(iii) above regarding possible sea level changes need to be clarified so that the extent of inundation of foreshore reserves can be estimated for both best-case and worst-case outcomes. Only in this way can an appropriate "starting width" for foreshore reserves be evaluated satisfactorily so that long term needs will be met.

This Department would wish to be involved in further investigations and negotiations over the detail of foreshore reserves.

- (ii) Planning controls necessary to prevent excessive clearing, farming, keeping of livestock or commercial horticulture on the "leisure living lots" should be instituted as part of the rezoning process.

- (iii) The proponent's commitment to provide "first order" management measures to protect conservation reserves is welcomed. However, it should be recognised that the additional pressure placed upon CALM as a management agency by a rapid increase in human population near to conservation reserves, and by new areas of such reserves, is considerable. Thus, in regard to all new conservation reserves, and to those on which human pressures will greatly increase as a result of the development, this Department would expect the costs of any extra protection necessary to be met, or arranged to be met, by the developer. Such costs may be of a capital nature, including the construction of parking or picnic sites, fencing, walkways and signs, as well as ongoing costs resulting from extra supervision or servicing required.

I trust these comments will be of value in assessing the
ERMP, and have no objection to them being shown to other
persons or agencies.



R. J. Underwood
ACTING EXECUTIVE DIRECTOR

9 October 1987

JDB:SK

**WATER AUTHORITY
OF
WESTERN AUSTRALIA**



**WATER
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of Western Australia

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The Chairman
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(Attention: Mr P Skitmore)

POINT GREY DEVELOPMENT - ENVIRONMENTAL REVIEW AND MANAGEMENT PROGRAMME

The Environmental Review and Management Programme (ERMP) for the Point Grey Development has been reviewed in respect of issues relating to water supply development and groundwater management, and sewerage works. The following comments are provided for your assessment of the project.

(1) Water Supply Development and Groundwater Management

The ERMP proposes development of groundwater resources in the region for public water supplies, an 18 hole golf course, college grounds, and public parks and gardens.

i) Public Water Supplies

The ERMP estimates an ultimate public water supply requirement of $1.5 \times 10^6 \text{ m}^3$ per year for approximately 2 800 residential lots (700 - 1200 m^2) and 360 large leisure holdings (1 to 1.5 ha) within the project area. This demand may prove conservative in view of the size of the proposed lots and the recommendation that private bores be prohibited on these lots (later comments refer). Ultimate demand could rise to more than $2 \times 10^6 \text{ m}^3/\text{yr}$ and would need to be considered in more detail in the design stages of the project if it proceeds.

The ERMP indicates that part of this demand may be satisfied by draw from the Leederville Formation, an extensive confined aquifer underlying the region. At this stage there is limited information on the availability of fresh ($> 1000 \text{ mg/L}$) groundwater from the formation within this region, and a detailed groundwater investigation will be required to demonstrate the capability of this resource before the Water Authority will permit extensive use for the Point Grey Project.

- 2 -

The ERMP has identified the Waroona Mound, an unconfined groundwater aquifer about 20 km south east of the project site, as a feasible source of public water supply and on which approval for the project is sought. The Waroona Mound contains fresh groundwater throughout its thickness over about 120 km². Much of this area is underlain by clays and expected to be low yielding. About 41.5 km² is underlain by sands of the Guilford Formation providing suitable aquifer for wellfield development. This area is shown regionally at Figure 24 of the report and in more detail at Figure 16.

Groundwater availability in this area is expected to be between about 10% and 20% of rainfall. On this basis, the public water supply requirement for the project represent between 25% and 50% of the expected availability over this area. The resource is currently little used with the principal land use being low intensity water use agriculture such as grazing. Provided the land is not considered prime for intensive horticulture activities, then the Water Authority supports the allocation of part of the resource for public water supply use in the region, as proposed by the project. This will however, impinge on the future availability of groundwater for landowners in the area.

The wellfield will need to be located to ensure that the effects of pumping of water levels do not impact on any environmentally important features of the area. In this respect the Nine Mile lake and surrounding natural bushlands lies centrally within the defined potential wellfield area and may be subject to some influence. The ERMP does not define a preferred wellfield location within the area.

The ERMP indicates that all public water supply development works will be designed in accordance with Water Authority requirements so that they can ultimately be taken over by the Water Authority. This will be subject to discussion and negotiation with the developer and would need to be formalised before rezoning of the land proceeded.

The development of a wellfield on the Waroona Mound will require that an area covering, and extending up gradient with respect to groundwater flow, be proclaimed as a Water Reserve under the Country Areas Water Supply Act, 1947 for the purpose of protecting the quality of the groundwater resource for public water supplies. The regulations on land use activities imposed under this Act would not normally prevent the land from being used for agricultural, pastoral, grazing or dairying purposes but may restrict the use of the land for activities such as intensive horticulture, animal feed lots and piggeries.

The ERMP recommends that private household bores be prohibited within the Point Grey development site. While this places increased demands on the public water supply system, it is

- 3 -

considered that the limited fresh shallow groundwater beneath the site should be reserved for use for irrigation of public parks and gardens, and therefore the recommendation is supported. The project site will be proclaimed as a Groundwater Control Area as part of the planned extension of the Murray Groundwater Area in the near future thereby enabling implementation of this policy. The Water Authority will request as a condition of subdivision that prospective purchasers are made aware of this regulation.

(ii) Thomas Peel College Irrigation

The ERMP identifies a water demand of 150 000 m³/year for irrigation of 5 ha of recreation grounds and 5 ha of lawns on the 50 ha College site. Based on these areas and rates of irrigation recommended by the Department of Agriculture, the Water Authority would be prepared to allocate only up to 90 000 m³/yr for the College irrigation.

The report proposes that the irrigation requirements for the College will be drawn from the Leederville Formation through bore Miami 1/80 which is an investigation bore owned by the Water Authority on the site. Use of this bore for irrigation of the College ground will require approval from the Water Authority and will be subject to negotiation with the developer. At this stage the capacity of the Leederville Formation in the region has not been determined. Only limited fresh water aquifer was encountered in the bore 1/80. Use of the bore would be subject to monitoring of water levels and water quality, and if degradation of water quality occurred the quantity drawn, and hence the area irrigated, would need to be reduced.

(iii) Golf Course Irrigation

The ERMP identifies a water demand of 375 000 m³/yr for irrigation of an 18 hole golf course. Based on the proposed area for the course presented in the report, this demand appears realistic. Experience in the Perth region has, however, indicated water requirements of more than 600 000 m³/yr for some 18 hole golf courses.

The ERMP proposes that the golf course irrigation requirement be satisfied partly by draw from the Leederville Formation and partly by treated sewage effluent.

Use of the treated sewage effluent would be subject to any Health Department regulations relating to such activity. The ultimate treated sewage effluent for the project is estimated to be about 600 000 m³/yr. This is in excess of the projected golf course irrigation requirement and will need to be disposed of all year round. The report indicates that impervious holding ponds will be constructed for this purpose.

- 4 -

Until sufficient development has occurred to generate the required quantity of treated sewage effluent, it is proposed to utilise the Leederville Formation for irrigation of the golf course. This will require draw initially of some 300 000 m³/yr and averaging about 200 000 m³/yr for at least 20 years. The capacity of the Leederville Formation to support this draw has not been fully demonstrated. The Water Authority will not permit abstraction of this volume for the golf course without further investigation to support the draw. Alternatively an appropriate monitoring programme will need to be implemented together with demonstration of, and commitment to, development of alternative supplies if the Leederville Formation proves inadequate. Any allocation of water from the Leederville Formation for irrigation of the golf course will be subject to consideration of existing draws on the aquifer (e.g. Park Ridge and Dawseville Caravan Park) and potential future users.

The most likely alternative source of water should sufficient water not be available from the Leederville Formation, is the Waroona Mound, as proposed for development for the public water supply system.

Once the public water supply works have been handed over for operation by the Water Authority, the use of these works to provide irrigation water for the golf course would not be permitted without special agreement. The charge for water from the scheme would, however, probably make this option unviable. ~~The Water Authority will not support rezoning to permit development of the golf course without adequate demonstration of a viable source of water supply.~~

iv) Public Parks and Gardens Irrigation

The ERMP identifies an ultimate demand of 300 000 m³/yr for irrigation of 20 ha of public parks and gardens within the Point Grey site. Based on this area and rates of irrigation recommended by the Department of Agriculture, the Water Authority would be prepared to allocate only up to 175 000 m³/yr for this irrigation.

Based on information presented in the report the shallow groundwater resource beneath the site is unlikely to sustain a sufficient fresh groundwater supply for this purpose, and either the deeper Leederville Formation or the shallow resources to the east of the site will be required. In this respect, comments made in relation to irrigation requirements for the golf course also apply here.

2. Sewerage Collection and Treatment

The ERMP indicates that the sewerage system will be designed and constructed to the Water Authority's standards and eventually handed over to be operated by the Water Authority.

- 5 -

The report recommends that treated sewage effluent be disposed of by irrigation of the golf course and perhaps some parks and gardens. The ultimate effluent output exceeds the defined golf course requirements. It must be ensured that sufficient area is available to dispose of effluent all year round.

The Water Authority will only assume responsibility for operation of the scheme provided this manner of effluent disposal receives all necessary environmental and health approvals, or that an acceptable alternative disposal method is demonstrated and implemented by the developer.



H.B. VENTRISS
MANAGER, GROUNDWATER

September 23, 1987 KT:FC

(1131W)

PEEL INLET MANAGEMENT AUTHORITY

PEEL INLET MANAGEMENT AUTHORITY

YOUR REF

In reply please quote PC:VK:KGW:55.4.1

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5th October, 1987.

The Chairman,
Environmental Protection Authority,
1 Mount Street,
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ATTENTION: MR. P. SKITMORE

Dear Sir,

RE: PT. GREY DEVELOPMENT ENVIRONMENTAL REVIEW AND MANAGEMENT PROGRAMME.

A Overall, this Authority concludes that the development proposal at this time is premature and should not proceed. The reasons for this conclusion are summarised below and further background is provided in the body of the submission.

1. The development will result in increased costs to the State for servicing. In essence it is a small town introduced into a relatively remote area before normal services have been provided. In particular, as far as PIMA is concerned, there will be increased costs for macroalgal harvesting, boating facilities, mosquito control and foreshore facilities all at a location with difficult access.
2. Government has not yet made a decision on a management strategy for the Peel-Harvey system. In particular, the Stage 2 FRMP has not been released and no decision has been taken on constructing the Dawesville Channel. It would be premature to approve a major development at Pt. Grey while the effects of management decisions for Peel-Harvey, such as the Dawesville Channel, are unknown.
3. While it is recognised development opportunities exist on the eastern side of Peel-Harvey (and Pt. Grey is probably one of the best locations) PIMA's general philosophy is that conservation and preservation of vegetation should be the prime objectives for land use on the eastern margins. This philosophy is set out in PIMA's Management Programme and is repeated in part below.

B Peel Inlet Management Programme

In the Peel Inlet Management Programme (1982), general reference is made to the Pt. Grey area and the eastern shores. Relevant sections are included and form a philosophical basis for PIMA's submission.

1. Urban Communication - General Strategy

"Careful consideration to be given prior to approval of any development of the eastern side of the Peel and Harvey estuarine system south of the Yunderup Canals".

2. Environment - General Strategy.

"Eastern and southern sections of the Peel and Harvey estuaries now provide an opportunity to preserve the wildlife features of the area, while providing adequate areas for human activity elsewhere and keeping the two functions largely separate."

3. Foreshore Reserves - General Strategy.

"In the estuaries and the lower reaches of rivers where foreshore reserves are considered desirable a 50 metre minimum foreshore reserve should be sought".

4. Foreshore Reserves - Peel-Harvey Estuarine System - F20.

"The vacant Crown land adjacent to the waterway extending from reserve 2707 to the southern boundary lot 372 Harvey Estuary become a foreshore reserve vested in the Waterways Commission....."

5. Landscape Protection - General Strategy - L4.

"It is particularly important that the vegetation and trees on the environmental margin on the eastern side of the Harvey Estuary be preserved as a landscape protection zone as it provides the natural backdrop to the water views enjoyed by developments along the whole of the western shore, and to people using the eastern margin or water areas. Development of this area will be assessed on application to develop."

In summary, the philosophy of PIMA is that development should be concentrated on the western side of the Peel-Harvey system to allow the eastern side to be maintained for landscape protection and conservation. This would ensure the balance between development and conservation areas around the estuarine system. However, PIMA does acknowledge and accept that some development could occur on the eastern side, but it must be appropriate, carefully implemented and in a suitable timescale.

C. Specific Issues.

It is noted that the P. Grey area has been well documented and could be a basis for a suitable development in the future. However, there are a number of specific issues which have not been sufficiently treated or are unclear. These are discussed below as background to the conclusions reached by PIMA.

1. Macroalgae.

The PIMA does not currently harvest in the P. Grey area for three reasons:

- a) Limited nuisance to people because of the distance to the nearest residential areas.
- b) The area is generally too shallow for the harvesters to operate. The harvesters require a minimum depth of 0.5 metres.

- c) PIMA does not currently have the resources to begin harvesting in the area and would require additional funds to efficiently harvest the area. Estimated figures are \$240,000 (1983 \$) for one Aquatic Weed Harvester, one Elevator, one Front End Loader and ongoing extra funding estimated at \$85,000 (1985/86 \$) per year for fuel, maintenance, contract cartage, lease repayments and labour. These figures do not allow for replacement costs which are expected every three years.

In recent years Waterways Commission officers have observed an increase in macroalgae accumulations in the Pt. Grey region, although this has not been quantified. It is predicted that with the Dawesville Cut, macroalgal growth in the northern section of the Harvey Estuary will increase (at least in the short term). This year (1987) the water quality in this section of the Harvey Estuary is better than previous years and an increase in the macroalgae standing crop has been observed (a half metre thick mat along the floor). The attached figure illustrates the increased macroalgal biomass occurring in the Harvey Estuary over the past two years.

It should also be noted that the use of the harvesters will be restricted to the eastern side of Pt. Grey. The shallow banks of the western side have numerous limestone outcrops, making use of the harvester impossible and use of the front end loaders very difficult.

2. Boating Facilities.

The ERMP does not clearly state whether the proponent is to be responsible for the ongoing maintenance of boating channels or if this responsibility is to be delegated to the State. The cost of maintenance could be extremely high. For example, the siltation in Yunderup Canals has been marked and is estimated to cost \$170,000 (DMH personal communication) to dredge to a navigable depth. If the boating channels are established and allowed to silt up to the same degree, then the cost of rectifying the problem will be high. Therefore, it is essential that ongoing maintenance is carried out.

The ongoing maintenance programme needs to include the harvesting of macroalgal accumulations in the channels. This will ensure that the rate of siltation is not increased. Removal of macroalgae from the channels is likely to involve the use of harvesters again incurring cost to the State (see previous discussion).

Another cost to the State, although probably minor, is the installation and maintenance of navigation aids for each boating channel. The ERMP does not state whether the proponent will install the aids and hand the responsibility of maintenance to the Department of Marine and Harbours or not.

The report indicates that if the Dawesville Cut proceeds, the boat channels will require deepening by 0.5 m, but it does not indicate whether the proponent will undertake to do this or whether the responsibility will be handed to the State (another cost).

No projection of the number of people from the Pt. Grey development who will use the ramp facilities is given. It is generally considered that there will be 80 boats/1,000 people, or in the Pt. Grey development 720 boats to utilise four boat ramps. The ERMP claims that the creation of these four new boat ramps will ease the pressure on existing ramps. However, it appears from the above data that this is not the case. Also,

it is questionable how many boat owners will travel to the Pt. Grey area to launch their boats when they will have passed several other ramps on the way.

Spoil disposal from dredged channels will require stabilisation if used to create bird roosting islands (stable slopes will be required) or used as fill around boat ramps on the foreshore.

3. Water Supply.

The proponent is prepared to monitor the wetlands in the Pt. Grey area to ensure there are no adverse effects of the drawing of groundwater. However, no contingency plan is presented in the event of water levels decreasing or any other adverse effects in the wetlands.

The water supply should be designed with the Water Authority of Western Australia and the supply proved before development is allowed to proceed. Issues of draw down and the impact of land sterilisation around the bore area have not been adequately dealt with.

4. Servicing.

Additional costs will be incurred by the Local Government Authority for servicing and maintenance of the development, although this is likely to be offset by the revenue received from rates.

5. Mosquito Control.

The methods used to control mosquitoes in the Pt. Grey area must be environmentally acceptable. It must be remembered that with any control programme complete eradication is not possible and therefore, a continuing level of nuisance should be expected and accepted.

The current situation is considered moderate by the Mosquito Control Review Committee because of the distance to residential areas. However, in the event of the Dawesville Cut proceeding, the mosquito problem in the area is likely to increase because of the more frequent inundation of low lying foreshore areas.

6. Nutrients.

The ERMP (Appendix F p. F17) states that an increase in the phosphorus concentration of the groundwater outflow is not expected with the proposed development. However, as indicated in Table 11 of that Appendix, by the year 50 an excess of 0.48 t/yr phosphorus will be discharged onto the golf course in the form of treated sewage effluent. The management plan in the ERMP looks at the loading for 50 years but it is after this period that a build-up of groundwater concentrations and increased load to the Peel-Harvey Estuarine System could be expected.

7. Sewage Collection and Treatment.

The ERMP gives no indication of where the solid waste or where excess water that cannot be used on the golf course will be disposed. The ERMP states that sewage treatment will be to tertiary level. Guarantees to this effect need to be made to ensure nutrient loading is minimal.


5.

8. Site Manager.

Table 22 (p. 146) under the heading 'Implementation of Management Commitments' states: "the proponent proposes to locate a site manager at Pt. Grey". However, the period of this position is not stated. The above table also states that the responsibilities of the Manager will include the implementation of the management plan. The ERMP states that the management plan is to be implemented over 30 years.

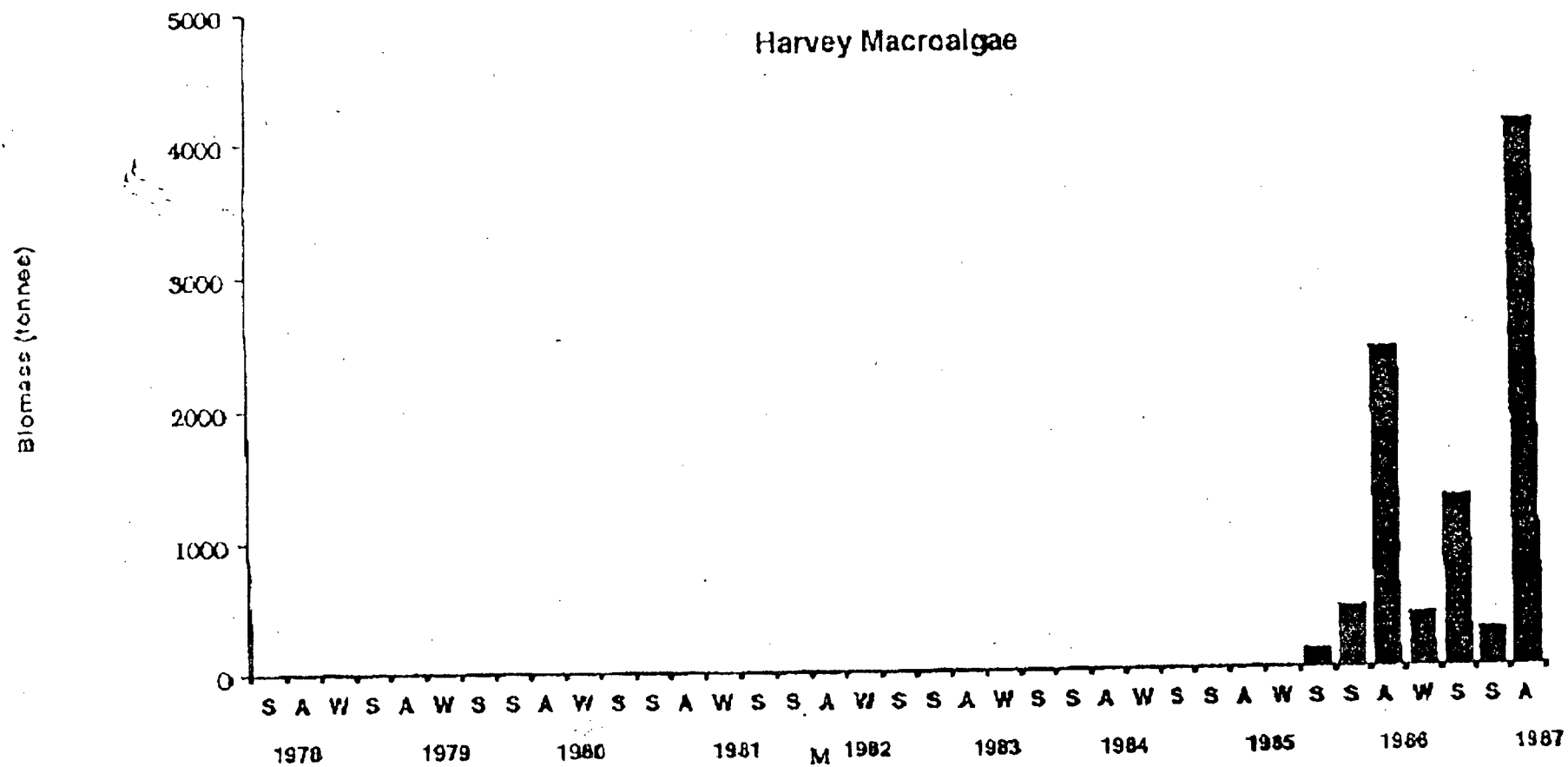
This submission may be quoted in full or in part by the Environmental Protection Authority in its assessment report.

Yours faithfully,



O.H. Tickey,
CHAIRMAN.

Enc.



**HEALTH DEPARTMENT
OF WESTERN AUSTRALIA**

HEALTH

Western Australia

Your ref 124/80
Our ref 8260/87 KB:GS
Enquiries Mr K Burns

Confirmation of letter
sent to you by
fax - 8/10/87.

The Chairman
Environmental Protection Authority
1 Mount Street
PERTH 6000

ATTENTION: Mr P Skitmore

ENVIRONMENTAL PROTECTION AUTHORITY	
23 SEP 1987	
File No. 124/80/1	Initials PSC

Dear Sir

POINT GREY DEVELOPMENT PROJECT - (ERMP)

I refer to your letter dated 8 July 1987.

The documentation as submitted has been examined by officers of my Department and I offer the following comments :

1. Sewage Treatment - Waste Water

All waste water from the sewage treatment process must meet the standard set by the National Health and Medical Research Council and be approved by the Executive Director, Public Health, before use on the golf course and recreation area.

2. Mosquito Control

2.1 The Point Grey area was not included in the extensive CEP study of mosquito breeding carried out in the Mandurah region throughout 1985, due to the lack of people in the area. However a limited inspection of the Point Grey area by officers of this Department and other members of the Mosquito Control Review Committee (MCRC) of the Waterways Commission revealed a significant saltmarsh mosquito breeding area adjacent to Point Grey. This breeding area consists of roadside ditches alongside the Carrabungup Road, where a man-made drain empties into Robert Bay, adjacent to the east side of Point Grey. These

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roadside ditches have been constructed such that brackish tidal water backs up into them via the abovementioned drain. This site was observed to contain high density (albeit localised) breeding of the viciously-biting and widely dispersing mosquito species Aedes camptorhynchus, which is the nuisance mosquito found in plague numbers throughout the Mandurah region.

- 2.2 Examination of aerial photographs of Point Grey and adjacent areas by Mr G Pearson of CALM (a member of the MCRC) revealed several areas of tidally inundated land likely to breed Aedes camptorhynchus mosquitoes. The closest of these sites to Point Grey is Stony Point, but other likely breeding sites include areas both south and north of Mealup Point and another area at Point Birch. In addition Lake Mealup is likely to be a source of Aedes camptorhynchus mosquitoes in winter and early spring. The known, but as yet unquantified, dispersal ability of this species over distances of several kilometres means that all the abovementioned likely breeding areas will require assessment as to whether and to what extent they produce biting adult Aedes camptorhynchus moving into the Point Grey area.
- 2.3 Various pieces of circumstantial evidence strongly suggest that Aedes camptorhynchus is a vector of Ross River virus, an arbovirus capable of causing a disease in humans which, although non-fatal, can be quite debilitating in many cases.
- 2.4 The stated intent of the Point Grey project proponents to monitor the extent of mosquito problems at Point Grey during the college construction phase of the project is noted with approval. Such monitoring is essential to the choice and application of appropriate mosquito control measures to ensure that nuisance and Ross River virus vector mosquito numbers are kept to a tolerable minimum.
- 2.5 If the Dawesville cut goes ahead as expected the effect on mosquito breeding is likely to be an increase in the frequency of the tidal saltmarsh breeding mosquitoes Aedes camptorhynchus and Aedes vigilax, especially during the warmer months of the year. Increased tidal amplitude resulting from the Dawesville cut may in fact mean that some low lying, shoreline areas which currently do not breed these mosquitoes at all will occasionally do so.

Other areas which now only breed saltmarsh mosquitoes during the cooler months of the year will probably do so during the warmer months of the year as well. Aedes vigilax is a known vector of Ross River virus.

It is clear that a population influx to the Point Grey area to the extent envisaged in this development project cannot be permitted without the undertaking of appropriate mosquito control measures to the satisfaction of the MCRC. A suitable control programme will need to be submitted by the developer for the approval of MCRC.

This Department is prepared to examine any proposed control measures by the developer and provide specialist entomological advice prior to the submission of any such programme. This would ensure the adoption of adequate mosquito monitoring at Point Grey and the development of an effective strategy for controlling the nuisance and disease vector mosquito problem likely to be found by such monitoring.

Thank you for the opportunity to assess this development project.

Yours faithfully



Richard Lugg
For EXECUTIVE DIRECTOR
PUBLIC HEALTH

21 September 1987
70921RL1

DEPARTMENT OF
MARINE AND HARBOURS

DEPARTMENT OF
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ENVIRONMENTAL PROTECTION AUTHORITY

24 SEP 1987

File No. 124/80/1 Initials PSL

**POINT GREY DEVELOPMENT
ENVIRONMENTAL REVIEW AND MANAGEMENT PROGRAMME**

Reference is made to your letter dated 8 July regarding the ERMP for the Point Grey development.

The documents have been examined as requested and I advise as follows.

1. Boating Facilities

The concept refers to the provision of four boat ramps each with a long channel 25 metres wide connecting to the deeper waters of Peel Inlet and Harvey Estuary. It is recommended that only two such boat launching facilities be provided and that each channel be 50 metres wide. An area of land should be set aside at each facility sufficient to satisfy the needs of 6 boat launching ramps, trailer parking and support services. It is suggested that the facility leading to Peel Inlet and the one adjacent to Reserve 11718 be retained.

Beaches suitable for windsurfing activities should also be identified and developed. This refers particularly to the foreshore along Harvey Estuary where the normal afternoon winds will be onshore.

The developer would need to provide navigation aids for the boating channels. They would be maintained by the Department. A means by which funds for channel dredging maintenance can be raised from within the development should be identified and made a condition of the development.

REGISTERED ✓

SUMMARISED ✓

ACKNOWLEDGED

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2. Nutrient Loadings

Although the nutrient loadings to Peel Inlet and Harvey Estuary were shown to be of the same order or less than those derived from farming activities on the land, the loadings from either activity may be unacceptable in the long term depending on the catchment area management strategies outlined in the Peel Inlet and Harvey Estuary Management Strategy ERMP which is soon to be released. It is considered that the Point Grey ERMP should be reviewed within the context of the Peel Inlet and Harvey Estuary Management Strategy ERMP.

3. Services

It is noted that the provision of services i.e. roads, water and sewerage is a major component of the development and therefore must be considered on a regional basis. For example as water for the development will be drawn from an area outside the developers land the matter of sterilisation of that land should be addressed further.

Further the treatment of sewerage effluent to tertiary level, as described in the ERMP and as required from nutrient loading considerations should be discussed further with the Water Authority of Western Australia as this is an expensive undertaking. The development should not be approved if it is going to increase the nutrient loadings of Peel Inlet and Harvey Estuary.

J. M. Jenkin

J M JENKIN
EXECUTIVE DIRECTOR *for*

21 September 1987 AJ

MAIN ROADS DEPARTMENT

MAIN ROADS DEPARTMENT

WATERLOO CRESCENT, EAST PERTH, WESTERN AUSTRALIA
GPO Box X2255 PERTH WA 6001 Phone 323 4111 Fax 323 4430 Telex AA 92894



Enquiries Mr Hackett on 323 4317

Our Ref 72/312-33

Your Ref

The Chairman
Environmental Protection Authority
1 Mount Street
PERTH WA 6000

ENVIRONMENTAL PROTECTION AUTHORITY	
24 SEP 1987	
File No. 124/8/1	Initials JG

POINT GREY DEVELOPMENT - ERMP

Please find attached copies of comments by the Divisional Engineer and Senior Engineer Planning.

Thank you for the opportunity to comment on this proposal.

J G O Hackett
SENIOR ENGINEER PLANNING

September 23 1987

Mr Gledhill

72/312-33

DIVISIONAL ENGINEER, BUNBURY

POINT GREY DEVELOPMENT
ENVIRONMENTAL REVIEW OF MANAGEMENT PROGRAMME

1. Please find enclosed a report on the above project forwarded by the Environmental Protection Authority for our information and comment.
2. Initial reaction is that traffic volumes generated by the project will necessitate improvements to the Armadale-Bunbury Road/Greenlands Road intersection at construction stage leading to the need for a second carriageway within 10-15 years, and also to a demand for Pinjarra Bypass to be constructed within that period.
3. The Environmental Officer has requested that comments should be received by August 27 1987 and it would be appreciated if your comments could be forwarded before that date.

J G O Hackett
SENIOR ENGINEER PLANNING

Per ... *J. Gledhill*

July 29 1987

COPY

MAIN ROADS DEPARTMENT

BUNBURY DIVISION Robertson Drive Bunbury 6230 Western Australia
Telephone (097) 25 4077 Facsimile (097) 25 4013 Telex AA 92656



Enquiries I Fennell
Our Ref BY 810/40
Your Ref 72/312 - 33

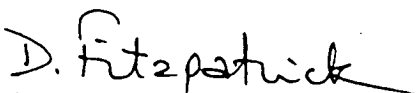
S.E. PLANNING, Main Roads Department, PERTH
Attention Mark Wheeler

POINT GREY DEVELOPMENT (ENVIRONMENTAL REVIEW OF MANAGEMENT PROGRAMME

1. Comments in item 2 of the Senior Engineer Planning's memo of July 29 1987 is agreed.
2. Improvements to the junction of Greenlands Road and Armadale - Bunbury Road (M2) should be kept to a minimum in view of the available suggestions and staging of the Pinjarra Bypass.
3. The approach of Greenlands Road is on a slight downgrade at an angle of 70° to the Armadale Bunbury Road which is 7.4 m wide and on a 2 000 m radius curve in an 80 kph speed zone.
4. The Pinjarra Cemetery on Reserve 8109 is located in the NW quadrant of the junction and its boundary fencing is approximately 6.0 m from the edge of seal on the Armadale - Bunbury Road. S.E.C. poles are approximately 3.6 m from edge of seal. Resumption in the Cemetery Reserve would not be acceptable therefore only very minimal pavement widening could be carried out on the inside of the 2 000 m radius curve.
5. The Pinjarra Trotting track is on the SW quadrant of the junction and does not offer any major restrictions to improvements. Tree d reserves exist on the NE quadrant and farm land on the SE quadrant.
6. Kerbed pavement nominally 13.4 m wide extents from the Pinjarra CBD to 470 m north of Greenlands Road.
7. Any widening works on the east side of Armadale Bunbury Road would require fill approx. 0.5 to 1.0 m deep and some clearing that would not be detrimental to the area.

8. Access track to the reserves to the east of M2 exist opposite Greenlands Road and would need to be relocated.

9. The cost of minimal improvements would be in the order of \$25 000 - \$30 000 excepting that some traffic movement delays may exist before the Pinjarra Bypass is built.

(
M D Fitzpatrick
DIVISIONAL ENGINEER

September 17 1987

(

WESTERN AUSTRALIAN
MUSEUM

Western
Australian

museum

Francis Street Perth
Western Australia 6000
Telephone (09) 328 4411

Date: 11 August 1987

Your Ref: 203/85

Our Ref:

Director
Environmental Protection Authority
1 Mount Street
PERTH WA 6000

Attention: R.A. Field
Director, Evaluation Division

Dear Sir

POINT GREY DEVELOPMENT - ERMP

I refer to your request for comment on the above.

Staff of our Division of Natural Science comment as follows:

1. Implanting a township of 9,000 people and associated support systems will have significant impact on this coastal plain peninsula.
2. The report considers water supply, effluent treatment and nutrient input to the estuary. However, impacts on the terrestrial and aquatic fauna are considered only from brief excursions, discussions and literature review. Whilst in general agreement with the documentation and extrapolations from these sources, very little relevant site data have been accumulated. This places in some doubt the value of the environmental management proposals aimed at conservation of the fauna.
3. We believe that more site-specific information on the fauna should have been provided to support management proposals, most of which it appears are to be provided by the Department of Conservation and Land Management and are not detailed in this report.

Yours faithfully

J.L. BANNISTER
Director

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SUMMARISED
ACKNOWLEDGED

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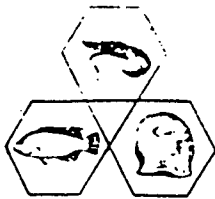
Branches:
Fremantle Museum
Finnerty Street, Fremantle
Western Australia, 6160

Western Australian
Maritime Museum
Cliff Street, Fremantle
Western Australia, 6160

Geraldton Museum
Marine Terrace,
P.O. Box 112, Geraldton
Western Australia, 6530

Albany Residency
Museum
Residency Road, Albany
Western Australia, 6330

FISHERIES DEPARTMENT



FISHERIES DEPARTMENT

Your Ref 124/80 PSK:jb
Our Ref
Enquiries

Director
Evaluation Division
Environmental Protection Authority
1 Mount Street
PERTH WA 6000

101 Adelaide Terrace Perth Western Australia 6000 Telephone (09) 325 5985	
Telegraphic Address	1237
Fishwa Perth	
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File No	124/80

ATTENTION P SKITMORE

POINT GREY DEVELOPMENT - ENVIRONMENTAL REVIEW AND MANAGEMENT PROGRAMME

The proposed development at Point Grey will add further pressures on the fish resources of the estuary, both from increased numbers of recreational fishermen and from increased boating activity.

Contrary to the statements in the first paragraphs of p xvii and p 108 cobble is a species sought by commercial fishermen since it gives the highest return per kilogram. Added competition for this species and for others, particularly prawns and crabs, could diminish the size of commercial catches in the estuary.

While a measure of the influence of increased boat numbers on commercial fishing cannot be given, there will be disruption to fish schools and commercial netting activity, pollution from engine wastes, and disturbance of sediments and waters in shallow areas where post-larvae and juveniles occur.

100 [Provided that the levels of nutrients applied to the land and entering the estuary are those estimated in the report, it is not expected that nutrients will have any significant effect upon an area already subject to considerable nutrient inflow from local farming practices.

Although the effects of individual developments on water quality and usage of the estuary may not be significant, the area should be considered in terms of its capacity to accommodate the increased population and pollution which will result from all developments.

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REGISTERED
EL MARISED
W WEDGIE

B.H. Bowen
DIRECTOR

4 August 1987
HC KLD

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Handwritten notes and signatures at the bottom right of the page.

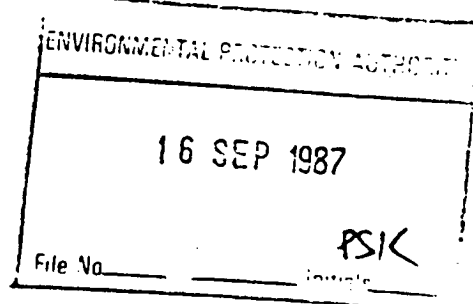
WESTERN AUSTRALIAN
DEPARTMENT OF AGRICULTURE

124 258 10
146 76 1 2
Lindbeck
September 15, 1987

Western Australian Department of Agriculture

BARON HAY COURT
1001 Perth 6161
Western Australia
Telephone (09) 364 3313

The Chairman
Environmental Protection Authority
1 Mount Street
PERTH WA 6000



ATTENTION: MR P. SKITMORE

POINT GREY DEVELOPMENT - ENVIRONMENTAL REVIEW AND MANAGEMENT PROGRAMME
(ERMP)

I refer to your letter dated July 8, 1987 which requested the Department of Agriculture to review and comment on the Point Grey ERMP. Officers of this Department have been consulted during the preparation of the ERMP. I do not have any specific comments on the document of concern to this Department.

However, I recommend that the assessment of this ERMP by the Environmental Protection Authority be deferred until the full assessment procedures for the Peel Inlet and Harvey Estuary Management Strategy ERMP have been completed. The assessment of nutrient loads for the estuary in this latter ERMP would have a strong bearing on your assessment of the Point Grey ERMP.

N. J. Halse

(N.J. Halse) per: *[Signature]*
DIRECTOR OF AGRICULTURE

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REGISTERED
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ACKNOWLEDGED

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