Risdon Prison Redevelopment
Site Master Planning Project

Vegetation and Fauna Survey Report

Sarah Munks
Mark Wapstra
Karen Richards
Suzette Wood
Brian French

A Report for the Justice Department November 2001-11-21

Contents

Executive Summary

This report details an assessment of the flora and fauna values of the prison redevelopment site. The site is a 64ha private property block located on the Hobart and Richmond 1:25000 mapsheets at GR 276E 598N (approx centre point). The report highlights four main conservation issues which need to be considered in the planning phase of the redevelopment project. These are;

- The high occurrence of weeds on the property.
- The occurrence of the threatened plant *Carex tasmanicus* and the threatened eastern barred bandicoot.
- The flora and fauna value of Grasstree Hill rivulet and associated tributary and riparian areas.
- The occurrence of remnant *Grassy* E. viminalis *forest/woodland* of conservation value for both flora and fauna in Zone A (west of the dotted line).

The principles that should be observed in any redevelopment plan are;

1. Control of weed species in areas identified as having remnant flora and fauna conservation value (eg.,riparian areas and remnant grassy E.viminalis in Zone A).
2. Avoid destruction of any Carex tasmanicus
3. Avoid any increase in the road-kill toll of the eastern barred bandicoot.
4. Retention of remnant habitat for the eastern barred bandicoot and possible rehabilitation of remnant grassy woodland areas on the property.
5. Rehabilitation of riparian areas along Grasstree Hill rivulet and the associated tributary
6. Rehabilitation of *Grassy* E. viminalis *forest/woodland* community on the western slope in Zone A.

Recommendations include;

1. Further information on the control of weed species, and the requirements of the Act, should be obtained from officers of the Department of Primary Industries, Water and Environment
2. Seek advice from Threatened Species Unit Botanist regarding the conservation management of Carex tasmanicus if any redevelopment work, weed control work or riparian rehabilitation work is likely to impact on this species.
3. Seek advice from the Nature Conservation Branch, DPIWE when designing any new access roading to minimise impact on the eastern barred bandicoot population known to occur in the area.
4. Avoid removal of individual mature native trees, particularly those with hollows during the redevelopment work.
5. Seek advice from the relevant community organisations (Greening Australia, LandCare, BushCare and the Understorey Network) regarding the rehabilitation and conservation management of the riparian areas along Grasstree rivulet and associated tributary. Any attempt to rehabilitate these areas should focus primarily on eradication and ongoing control of the willows and other weed species. Then replanting and encouraging natural regeneration of the existing remnant riparian vegetation. A prison community Landcare group could be formed to implement this recommendation.
6. The conservation value of the *Grassy* E. viminalis *forest/woodland* community on the western slope in Zone A may be enhanced by the following:

- an appropriate grazing regime (e.g. autumn/winter grazing prior to the peak flowering period of most native grasses/herbs);
- an appropriate fire regime (e.g. periodic cool burning on about a 15 year cycle to allow natural successional to occur and to prevent dominance by introduced species)
- fencing (to prevent stock grazing but still allow native mammal/rabbit grazing);
- weed control (as required but several localised patches of species such as thistle, blackberry and sweet briar can be easily controlled).

Further advice on the management of this site can be sought from community environment groups such as Greening Australia, LandCare, BushCare and the Understorey Network.

Introduction

The infrastructure redevelopment of the 64ha prison property located at the corner of the East Derwent Highway and Grass Tree Hill road is currently in the planning phase. Various pieces of legislation recognise the need to take into account natural and cultural values during the planning of any such land development. These include the *Land Use and Planning Approvals Act*, the Tasmanian *Threatened Species Protection Act, 1995*, the *Forest Practices Act 1998* and the Commonwealth's *Environment Protection and Biodiversity Conservation Act, 1999*.

Preliminary research into the possible flora and fauna issues (by Ian Sansom) included responses from the Tasmanian Field Naturalists Club, the Threatened Species Unit, DIER and the Private Land Reserve Program, DIER (see Appendix 1). Possible values noted included the presence of the rare eucalypt, *E.risdonii* in the vicinity, the presence of the vulnerable inland *E.amygdalina* forest (black peppermint, RFA medium priority community), the presence of six threatened flora species within 2km radius of the prison and the presence of a vulnerable land snail, *Discocharopa vigens* listed on the Tasmanian *Threatened Species Protection Act* at Grass Tree Hill about 1.5km from the site. In addition, two botanical surveys of sections of the east Derwent Highway adjoining the Prison redevelopment site(North, 1992, 1994) recorded inland *E.amygdalina* and another native plant communities of conservation significance, *Eucalyptus ovata* grassy woodland. North (1994) also noted the presence of a threatened and unreserved wallaby grass, *Danthonia procera* and noted the presence of suitable habitat for the threatened hairstreak butterfly (*Pseudalamenus chlorinda*) . Colonies of this species are mostly confined to locations where mature white gums (*Eucalyptus viminalis*) co-exist with young silver wattles (*Acacia dealbata*).

A flora and fauna survey was requested by the Justice Department in early October 2001 to assess the presence of flora and fauna species and communities of high conservation significance to assist with the development of site planning guidelines for the redevelopment project. The agreed objectives of the survey were (see project brief, Appendix 2);

- To determine the vegetation, fauna species and communities on the site and in the vicinity,
- To identify the vegetation and fauna values (including threatened species) to be protected and/or conserved,
- To identify and detail any management issues,
- To recommend future development and management principles and measures,
- To make any appropriate detailed design and/or construction suggestions.

General Site Description

The study area is a 64ha private property block located on the Hobart and Richmond 1:25000 mapsheets at GR 276E 598N (approx centre point). The approximate altitude of the site is 90m and the area gets between 500 and 600mm of rainfall a year. The dominant geology is sedimentary sandstone over mudstone but Grasstree Hill rivulet will have dolerite influences from the surrounding hills (Tasmanian geological surveys, 1:250000, Mineral Resources of Tasmania).

The existing prison is sited to the east of the property (see Figure 1) and scattered buildings are found throughout the property. The rest of the property is predominantly cleared land which is utilised for grazing stock, however remnant patches of native

trees are still present For the purpose of this survey the property was divided into three zones according to habitat quality/characteristics (see Figure 2)..
A tributary flowing into Grasstree Hill rivulet runs down the eastern boundary of the property and Grasstree Hill rivulet flows along the southern boundary of the property (see Figure 2).
The slope to the north of the property is generally vegetated, however Grasstree Hill road seperates the prison grounds from this slope. The East Derwent Highway runs along the western boundary of the property with a rural residential area to the west of the road. There are scattered areas of remnant native vegetation to the south and south east of the property. Most of the eastern boundary adjoins the Risdon Vale housing estate.

Figure 1 Location of the property
Figure 2 Property map and zones surveyed.

Project Management

The approach taken in this project was based on that outlined in the NCB, brief for Flora and Fauna Consultants. An initial evaluation of the flora and fauna issues was carried out using existing databases, Forest Practices Board and DIPWE planning tools and a review of any previous survey reports or surveys conducted near or at the site.
A field survey was then undertaken to further determine the presence of flora and fauna of high conservation significance and their habitats and to determine any management issues.

Methods

Flora
Vascular Plant Species

The Parks and Wildlife GIS Web Server database (GTSpot) was interrogated to obtain records of vascular species from within the proposed development area. In addition, records from adjacent areas were also examined to determine the presence of any species with a priority for conservation.

A survey of the proposed development area was conducted by Mark Wapstra and Brian French on 20 November 2001 using standard vegetation sampling techniques used in Tasmania. A desktop assessment of maps (topography, existing vegetation maps, etc) and discussions with Sarah Munks (who had previously visited the site) helped determine the range of vegetation types requiring sampling.

Nine non-permanent plots were located in representative vegetation types within the proposed development area. Detailed information on vegetation structure and composition (vascular species only) were recorded. A running species list was used to record additional species observed outside the plots, particularly for disturbed sites such as pasture areas. For each plot, information was also collected on the condition of the vegetation, broad environmental variables (e.g. slope, aspect, etc), land use and disturbance history. Sites were located by GPS or by reference to topographic features.

Plant Communities

The Parks and Wildlife Service Web Server database was accessed to check plant community mapping by TasVeg2000 and the RFA Vegetation Map.

The vegetation of the site was allocated to plant communities using recognised definitions of plant communities used in Tasmania. Allocation of vegetation to a plant community was undertaken at two levels. At the broadest level, areas were allocated to community definitions used in the Regional Forest Agreement and Tasmanian Vegetation Mapping Strategy. At a finer level, areas were allocated to community definitions used in Kirkpatrick *et al*. 1995 (and references therein). The conservation status of each plant community was assessed using the same references.

Fauna

Existing Data Search

A list of fauna species likely to occur on the property was extracted from existing databases which contain locality data from a variety of sources (eg., GTSPOT, DPIWE, Birds Tasmania database). Locality data obtained included records within a 5 km radius of the property. Information on known localities or the occurrence of potential habitat on the property for fauna species listed in the schedules of the Tasmanian *Threatened Species Protection Act, 1995* was obtained from the Threatened Fauna Manual (FPB, 2001) and the Threatened Fauna Handbook (Bryant and Jackson, 1999). Information on the occurrence of road-kills in the area was obtained from the Nature Conservation Branch, DPIWE (N.Mooney, pers.comm.). Local naturalists were also consulted for anecdotal records.

Site Survey

A field survey was undertaken on the morning of the 15.11.01 to determine the quality of habitat for fauna species identified as likely to occur from the existing data. Two transects, one in Zone A and one in Zone B were walked. The transect in Zone A started at GR 527963E 5259310N and ran in a 340degree direction. At every 50m all bird calls heard and identified were recorded and all birds sighted and identified were also recorded. An area of approximately 15m radius was also searched every 50m along the transect for scats and other indirect signs. All logs and stones were also turned and searched for snails and reptiles. Habitat characteristics were noted at each 50m plot along each quadrat to provide a qualitative description of fauna habitat quality, these included; degree of disturbance, evidence of tree removal, presence of downed logs, leaf litter cover, rock cover, presence of trees with hollows.

In addition to the transects walked in Zone A and B, bird calls and sightings and frog calls were noted during a walk along the tributary running down the eastern boundary of the property. The banks of Grass Tree Hill Rivulet were also walked on the northern boundary of the property and the condition of the riparian area as habitat for fauna was assessed. Birds sighted or heard in this riparian area were also recorded.

Aquatic Invertebrates

Another site visit was made on the 20.11.01 to assess the occurrence of in-stream fauna. This was undertaken to provide an indication of the condition of Grass Tree Hill rivulet and its associated tributary and the value of rehabilitating these watercourses.

Sampling for the collection of aquatic macroinvertebrates followed standard rapid assessment methods (Davies et al 1994).
Two methods were used to collect specimens at each site, with the exception of the Grasstree Hill Rivulet, Site 1 where only one method was used. At each location a kick sample (using a 250 μm mesh kick net) collecting benthic macroinvertebrates was taken over a distance of 10m, and a sweep sample collecting aquatic riparian invertebrates was also taken over a 10m distance. At Grasstree Hill Rivulet Site 1 only a sweep sample was taken due to stream size. The sweep sample gathered macroinvertebrates from littoral zone and water column within 1m of the bank whereas the kick sample method is used to obtain specialist invertebrates from the substrate.

Limitations and assumptions
In such short term surveys it should be noted that the information obtained may be limited by seasonality effects, species/area relationships and resource limitations. For example, it was not possible to provide a comprehensive terrestrial invertebrate species list for the property due to the limited time available for the survey. It was also not logistically possible to undertake the intensive small mammal trapping or nocturnal species surveys required to determine the presence of animals in this group. However, predictions could be made on species likely to occur in the habitats at the site from information obtained from existing databases and anecdotal records.

While the flora species list provided is comprehensive, it is not exhaustive. This is due to much of the area supporting mainly exotic vegetation (e.g. pasture) for which identification of some plants was undertaken only to generic level. While the time of year of the survey is considered suitable to record most species likely to be present, many species are short-lived annuals, or ephemeral species that respond to various forms of disturbance such as fire, and as such may be unrecorded at a particular time.

The species list provided represents the species recorded in areas surveyed. Additional species may be present in areas outside surveyed sites, particularly in vegetation supporting mainly exotic species. Every effort was made to locate sites that support species with a high priority for conservation.

Results

Flora

General comments

Pasture and other cleared areas (e.g. recreational sites such as ovals and golf courses) dominates most of the proposed development site, particularly north of the current location of the main prison compound. In addition, buildings (residential housing and prison compound structures), other infrastructure such as roads, tracks, dumps and the like, occupy large areas of the proposed development site. Some sections of the proposed development site support less disturbed vegetation but most areas can be considered highly modified by land use history. Drainage channels on the eastern and northern boundary of the site support remnant native vegetation that has been highly modified by clearing, planting of willow, stock grazing and dumping of rubbish. Large areas in the south of the site support open grassland (mainly exotic but some areas with a substantial native species component), grassy woodland and forest that has maintained at least some of the original character of the site. However these areas

of remnant woodland and forest have also been substantially disturbed by past practices such as clearing, stock grazing and dumping of rubbish.

Vegetation

Vascular Plant Species

Database searches did not result in any vascular flora species previously recorded from within the proposed development area. Several threatened species records are located along the East Derwent Highway (these are discussed in more detail below).

A total of 159 vascular species were recorded from the site. Of these, 86 are native species (including 3 endemic species) and 73 are exotic. A list of vascular plant species recorded from the surveyed area is provided in Appendix 2. Table 1 below provides more detail on the contribution of native and exotic species. It should be noted that many more exotic species are likely to be present in areas that were unsurveyed (e.g. dump sites, areas immediately adjacent to houses, pasture, etc) but it is considered unlikely that native species with a high priority for conservation are present in such areas. In addition, some species that are short-lived or highly seasonal in their flowering habits (e.g. some orchids, grasses and lilies) may not have been detected at this time of year.

Table 1 Numbers of native plant species and exotic plant species at the site.

Group	Native species		Exotic species	**Total**
	Endemic	Other		
Ferns and fern allies	0	1	0	**1**
Conifers	0	0	2	**2**
Monocotyledons		33	17	**50**
Dicotyledons	3	49	54	**106**
Total	**3**	**84**	**72**	**159**

Species of High Conservation Significance

One species listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was recorded.

Carex tasmanica (curly sedge) is listed as Vulnerable on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The species is not listed as threatened in Tasmania.

The species was localised, associated with the creek bank, growing amongst largely exotic grasses along Grasstree Hill Rivulet at 527857mE 5260200mN. Approximately 6 plants were present. Such a site is typical for the species in Tasmania. It is considered unlikely that the species would be deleteriously impacted on by activities conducted some distance from the creek. The species' presence would need to be taken into account in the course of any rehabilitation activities but it is likely to persist in existing disturbed sites. Further information on this species is available in Leigh and Briggs (1992) and Gilfedder (1991).

Table 2 provides database records for other flora threatened species sites close to the prison (along the East Derwent Highway). Provided that any development activities are confined to within the currently fenced area, no impact on these sites is anticipated.

Table 2 Records of threatened flora species, near to the prison redevelopment site, from existing databases.

Species	**Common Name**	*Easting*	**Northing**	**Date**	**Observer**	**Status**[2]
Lepidium hyssopifolium	Basalt peppercress	527350	5259800	01/09/92	A. North	Endangered
Lepidium pseudotasmanicum	Shade peppercress	527350	5259800	01/09/92	A. North	Rare
Rytidosperma procerum[1]	Tall wallaby grass	527600	5259475	01/07/94	A. North	Rare
Rytidosperma procerum	Tall wallaby grass	527800	5259100	18/07/94	A. North	Rare

[1]Formerly known as *Danthonia procera*
[2]Status on Tasmanian *Threatened Species Protection Act 1995*

Plant Communities

The majority of vegetation on the site has been highly modified by past activities. Some areas support remnant vegetation in various forms of condition. The following broad vegetation types and comments on their composition, condition and conservation status were identified from the site.

Ornamental plantings

Large areas of the site are occupied by buildings and other infrastructure. These areas support mainly exotic species, often as ornamental/landscape plantings (e.g. rows of radiata and macrocarpa pines, hedge plantings of *Grevillea* species surrounding dump sites, garden plants, etc.). These areas are of no botanical conservation value.

Improved pasture and cropland (incorporating recreational sites)

Large areas of the site support improved pasture currently used for stock grazing and recreational activities (oval, golf course). These areas are of no botanical conservation value.

Shrubby E. ovata - E. viminalis *forest*

This community is represented by highly modified vegetation in the creekline on the eastern boundary of the site and along Grasstree Hill Rivulet on the northern boundary of the site. Along the eastern boundary, the creekline is almost entirely cleared and now supports very sparse *Eucalyptus amygdalina*, *Acacia mearnsii* and *Bursaria spinosa* over mainly exotic species such as blackberry, sweet briar and introduced grasses and herbs. A very small patch (about 10 trees) dominated by *Eucalyptus ovata* in the northern section of this creekline probably represents the type of vegetation present prior to clearing along the majority of this section of creekline.

Vegetation along Grasstree Hill Rivulet is dominated by willows with patches of remnant native vegetation dominated by *Eucalyptus viminalis*. Two main remnant patches are present that support *E. viminalis* with a mix of native and introduced

shrubs, grasses, sedges and herbs. Several invasive woody and herbaceous species are present. This creekline has been highly disturbed by stock trampling, and dumping of rubbish is evident in several areas. Of significance is the presence of a small population of the curly sedge *Carex tasmanica* (discussed previously). An attempt has been made at removal of willows but these are rapidly growing back and dominating the creekline. Most of the creekline is devoid of a native overstorey and is dominated by mainly introduced species. It is likely that the creekline once supported a mix of *Eucalyptus ovata* and *E. viminalis* over a grassy-sedgy-shrubby understorey.

Grassy E. viminalis *forest/woodland*

This community occupies most of the area south of the main area occupied by buildings. It is represented by forest in various conditions ranging from moderately good to poor. This community includes a broad range of more finely differentiated communities (Kirkpatrick *et al*. 1995). Vegetation on the east-facing slopes has close affinities to *Eucalyptus viminalis/Allocasuarina verticillata-Acacia mearnsii* grassy woodland which is considered poorly reserved in Tasmania (Kirkpatrick *et al.* 1995). Vegetation on the west-facing slopes has close affinities to *Eucalyptus viminalis/E. amygdalina-Dianella revolut*a grassy woodland and *Eucalyptus viminalis/E. amygdalina-Acaena echinata-Dichondra repens* grassy woodland, both of which are regarded as unreserved in Tasmania (Kirkpatrick *et al.* 1995).

Forest in the far southwest of the site is considered to be in the best condition and probably represents the type of forest that would have been present over much of this area of the site prior to disturbance. Areas on top of the hill are in poorer condition represented by mainly exotic grasses beneath a very sparse overstorey of *Eucalyptus viminalis* with several patches of weeds along with several tracks. Vegetation on the east-facing slopes is in variable condition but has a denser overstorey but there is a mix of exotic and native grasses with many weed species.

Fauna

Mammals

Database searches revealed records of twenty four mammal species within a 5km radius of the property (See Appendix 3. GTSPOT, Nick Mooney pers.comm., Zoe Tanner pers. comm., Greg Hocking pers. comm.).
Indirect signs of four of these species were observed during the brief field survey (see Appendix 3). These included scats of the common ringtail possum, *Pseudocheirus peregrinus viverrinus* under trees in Zone B, scats of the Bennetts wallaby, *Macropus rufogriseus rufogriseus* and rabbits along the transects walked in Zone A and B and remains of the eastern barred bandicoot, *perameles gunni gunni* in Zone B and in the riparian zone of Grasstree Hill rivulet. Bandicoot diggings were also observed in Zone B.

Birds

Database searches revealed records of fifty-eight bird species within a 5km radius of the property (See Appendix 4. GTSPOT records, Nick Mooney pers.comm). Of these, thirty species including six of those endemic to Tasmania were also recorded during this survey (indicated on the Table in Appendix 4). Eighteen species were observed during the transect surveys (indicated on Table in Appendix 4) and the remainder were noted from calls heard during the transect surveys. The species identified from

calls more than likely included birds occupying bush adjacent to the property boundary.

Reptiles and amphibians
Records for twelve species of frogs and reptiles were identified from existing records. Five of these species were either observed or heard during this survey (see Table in Appendix 5). All of the frogs seen or heard during this survey occurred in the tributary and its surrounding riparian area running along the eastern boundary of the property.

Aquatic invertebrates
The fauna found in the streams was diverse considering the disturbance to the watercourses however no species of high conservation significance were identified (see Table in Appendix 6). The aquatic macroinvertebrate fauna recorded included a high number of oligochaetes and chironomids at each site sampled as well as the introduced *Physastra* molluscs. Damselflies were also common. Only one species of stonefly (plecoptera) and one mayfly (leptophlebia) were present.. The *Cloeon* sp. is the only unusual specimen but is known to be tolerant of polluted sites therefore does not have any conservation value (D.Wolfe, pers. comm.). Trichopterans and most mayflies were generally absent in the samples taken. Of the beetles the main group present are the dytiscids.
The tributary site fauna was more representative of dam fauna; there were large numbers of cladocera, ostracoda and copepods (all classed as zooplankton) as well as frogs, water beetles and hemiptera.

Terrestrial invertebrates
Only two anecdotal records of terrestrial invertebrates were collected during this survey. One was of the ***Bright copper Paralucia*** butterfly and one of the ***Aurifera.*** No hairstreak butterflies (*Pseudalamenus chlorinda*) or *Discocharopa vigens* were observed at the site during this survey.

Species of High Conservation Significance
Table 3 lists the fauna species of high conservation significance which may utilise the remnant grassy woodland areas on this property for foraging or refuge (FPB,2001). The Green and gold frog, *litoria raniformis* listed as Vulnerable of the Tasmanian,*Threatened Species Protection Act, 1995* is also listed as likely to occur in suitable habitat on the vicinity of this property. However, this species was not heard or seen during this survey in the most suitable habitat areas associated with the tributary on the eastern boundary.
There is no suitable nesting habitat for the two species of eagle on the property or within 500m of the prison redevelopment site. However, both species have been observed flying overhead (N.Mooney, J.Dean pers.comm) and may hunt in the area.
The dead remains of the eastern barred bandicoot, *perameles gunni gunni* were collected from Zone B and in the riparian zone of Grasstree Hill rivulet. Many road-killed eastern barred bandicoots have also been collected from the Grasstree Hill road adjacent to the property (N.Mooney pers. comm.).
Other species of conservation significance include the seven bird species recorded at the site during this survey which utilise trees hollows for refuge or nesting (see Table in Appendix 4.

Table 3 Fauna species of high conservation significance which may utilise areas on the property for foraging or refuge.
TSPA (Threatened Species Protection Act, 1995)
EPBCA (Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*)

Common Name	***Genus-Species***	**Status**
wedge-tailed eagle	*Aquila audax fleayi*	Vulnerable (TSPA) Endangered (EPBCA)
white-bellied sea-eagle	*Haliaeetus leucogaster*	Priority species under RFA
*eastern barred bandicoot	*Perameles gunnii*	Vulnerable (EPBCA)

***** Indirect signs observed during this survey.

Habitat Assessment
Habitat diversity for fauna was assessed as low in both Zone A and B with a generally low occurrence of downed logs and rock cover. Both areas had been heavily disturbed in the past with evidence of continued tree removal and little sign of regeneration. The least disturbed area with the most intact understorey was on the west facing slope in Zone A. Tree density was lowest in the area to the east of the dotted line in Zone A (see Fig 2). The occurrence of trees with hollows visible from the ground was generally low but was highest on the east facing slope in Zone B, although there were occasional mature trees with hollows along Grasstree hill rivulet..
The condition of the riparian area associated with the tributary running along the eastern boundary of the property fitted the 'very poor' category (Munks,1996) with very little native vegetation along its length. The riparian zone along Grasstree hill rivulet was in slightly better condition varying between 'poor' and 'fair' (Munks, 1996). However the vegetation was dominated by non-native species and where native trees were present much of the understorey and ground cover were dominated by weeds.

Discussion and Conclusions

Flora
The site is characterised by a high number of species regarded as "declared weeds" within the meaning of the Weed Management Act 1999. As such, all reasonable measures to control the impact and spread of these species should be taken. Several localised occurrences of weeds occur in remnant vegetation (see next section for further detail) and are considered relatively easy to control. Infestations of exotic species along Grasstree Hill Rivulet (mainly willows but also blackberry and many invasive herbaceous species) are considered more difficult to control due to their extent. Further information on the control of weed species, and the requirements of the Act, should be obtained from officers of the Department of Primary Industries, Water and Environment.
One species, *Carex tasmanica* (curly sedge), listed as Vulnerable on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was recorded at the site. This species is not listed as threatened in Tasmania, therefore advice on the management of this species needs to be sought from Environment Australia (Commonwealth Government). The species was localised, associated with the creek bank, growing amongst largely exotic grasses along Grasstree Hill Rivulet

at 527857mE 5260200mN. Approximately 6 plants were present. Such a site is typical for the species in Tasmania. It is considered unlikely that the species would be deleteriously impacted on by activities conducted some distance from the creek and it is likely to persist in existing disturbed sites. However, the species' presence would need to be taken into account in the course of any riparian rehabilitation activities. Further information on this species is available in Leigh and Briggs (1992) and Gilfedder (1991). Database records indicated additional sites for other threatened flora species along the East Derwent Highway (see approximate locations on Figure 2). However, provided that any development activities are confined to within the boundary of the property, no impact on these sites is anticipated.

The *Shrubby* E. ovata - E. viminalis *forest* community, represented by highly modified vegetation in the creekline on the eastern boundary of the site and along Grasstree Hill Rivulet, has been identified as requiring protection on public land wherever prudent and feasible (RFA 1997). The forest, however, at this site is considered of negligible value for conservation management in its current condition. However, the site is considered suitable for rehabilitation works to enhance the conservation value of the forest along the creeklines. Advice on such activities can be sought from various community environment groups such as Greening Australia, LandCare, BushCare and the Understorey Network.

The *Grassy* E. viminalis *forest/woodland* community also found at this site has also been identified as requiring protection on public land wherever prudent and feasible (RFA 1997). At least some of the remnant woodland fitting this community is considered suitable for conservation management. The southwest corner (see Figure 2, west of the dotted line in Zone A) , west of the main track and bounded by the existing fences has the richest diversity of native herbs and grasses and a range of overstorey densities. Grazing by stock has had an impact on the community, reducing species diversity and there are localised occurrences of weeds (most of which could be relatively easily controlled). It is recommended that this area be considered suitable for conservation management. The conservation value of the site may be enhanced by the following:

- an appropriate grazing regime (e.g. autumn/winter grazing prior to the peak flowering period of most native grasses/herbs);
- an appropriate fire regime (e.g. periodic cool burning on about a 15 year cycle to allow natural successional to occur and to prevent dominance by introduced species)
- fencing (to prevent stock grazing but still allow native mammal/rabbit grazing);
- weed control (as required but several localised patches of species such as thistle, blackberry and sweet briar can be easily controlled).

Further advice on the management of this site can be sought from community environment groups such as Greening Australia, LandCare, BushCare and the Understorey Network.

Vegetation on the east-facing slopes (Figure 2, Zone B) is of a lower value for conservation management having been more highly modified and possessing more weeds. Vegetation over the top of the hill is considered of marginal value for conservation management as it supports mainly exotic species (Figure 2, east of

dotted line Zone A). However, given the high priority for conservation of this community, further advice would need to be sought from DPIWE.

Fauna

In general the diversity of fauna within the groups assessed and recorded during this brief survey on this property was not as low as was expected in such a heavily disturbed, residential area. However, this was probably due to the close proximity of intact native woodland and forest to the north, west and south.

One native marsupials of high conservation significance, the eastern barred bandicoot, *Perameles gunni* was recorded in the area during the survey and from existing records. This species is listed as vulnerable on the Commonwealth Environmental Act. Once common throughout south-eastern Australia, this species is now close to extinction on the mainland. Although it is still relatively abundant in parts of Tasmania its numbers are relatively low and fragmented in the drier midlands. Populations found in the midlands tend to occur in and around small townships but over the vast tracts of rural land between these small populations the bandicoot has now disappeared. This disappearance appears to be related to the widespread clearing of native grasslands and grassy woodlands in the midlands. Eastern barred bandicoots feed in open areas on soil invertebrates but they also require some form of ground cover for use as nesting sites and as a refuge from predators. Native saggs, sedges and tussock grasses provide the main source of cover in native grasslands. The introduced weeds along the riparian areas on this prison property probably provides some cover for the bandicoots. However the more intact understorey and groundcover noted above on the west facing slope in Zone A probably most closely represents remnant natural habitat for the eastern barred bandicoot. As such it is considered to have high conservation value for this species and should be managed and protected for both fauna and flora values.

Relatively few numbers of the bird species known to occur within 5km of the property were observed at the site during this survey. However this was expected considering the limitations of the survey method and the predominantly cleared nature of the property and small areas of relatively degraded habitats on the site. The dominant bird species observed at the site (rather than those heard in the adjacent bush) were those commonly associated with disturbed woodland eg., the noisy minor and those which prefer open country and cleared landscapes for foraging eg., the welcome swallow. However, some birds which utilise tree hollows for refuge or nesting were also recorded at the site. Such species are considered to be most affected by clearing of forests and woodland through the loss of mature trees with hollows. Hollow dependent fauna as a group are recognised in the Tasmanian Regional Forest Agreement as priority fauna requiring conservation action to ensure retention of trees with hollows in areas subject to disturbance. Few trees with hollows were noted in the remnant woodland and riparian vegetation areas during this study. However, patches of bush adjacent to the property probably contained such trees. Retention and rehabilitation of the existing remnant woodland areas within the property boundary identified above as having conservation value for flora (Zone A and riparian areas) would assist in retention of any remnant trees with hollows and would increase the diversity of bird life on the property.

Although the threatened wedge-tailed eagle and the white-bellied sea eagle may hunt in the area their presence is not considered a conservation issue that needs to be taken into account in this development plan. The known nests for these species is over ? away from the property and the disturbed nature of the surrounding area makes it highly unlikely that there is suitable nesting habitat within 500m of the property.

As expected the aquatic macroinvertebrates found during this survey were representative of 'pollution tolerant' aquatic fauna (Chessman,1995). The high number of oligochaetes and chironomids as well as the presence of the introduced *Physastra* molluscs often reflects a degraded system. The Isopods present are generalists (found in the Murray and other degraded catchments). The one species of stonefly (plecoptera) and one mayfly (leptophlebia) present are the pollution tolerant species and the *Cloeon* sp. is the only unusual specimen but is known to be tolerant of polluted sites therefore does not have any conservation value (D.Wolfe, pers. comm.). The absence of Trichopterans and most mayflies usually means moderate to high stream degradation.
The main difference between the streams sampled is the distinction between still water /slow flowing water species (tributary) and the 'flowing water' specialists (Grasstree Hill rivulet). The fauna was diverse in both despite the disturbance to the watercourses and although no species of high conservation significance were identified these watercourses do have fauna conservation value in this generally cleared and disturbed landscape. Records from existing databases suggest that both the platypus and the water rat may utilise the watercourses in the area and a relatively high number of frog species were recorded during this survey. Conservation management of the riparian areas (ie., removal of weeds and regeneration of the native vegetation) would not only enhance habitat for the macro-invertebrates in the streams but also would increase habitat quality for their predators the fish, platypus and water rats. Rehabilitation of these watercourses is to be encouraged as part of the redevelopment of this site.

Conclusions and Recommendations
This assessment of the flora and fauna values of this prison site has highlighted four main conservation issues which need to be considered in the planning phase of this redevelopment project. These are;

- The high occurrence of weeds on the property.
- The occurrence of the threatened plant *Carex tasmanicus* and the threatened eastern barred bandicoot.
- The flora and fauna value of Grasstree Hill rivulet and associated tributary and riparian areas.
- The occurrence of remnant *Grassy* E. viminalis *forest/woodland* of conservation value for both flora and fauna in Zone A (west of the dotted line).

The principles that should be observed in any redevelopment plan are;

7. Control of weed species in areas identified as having remnant flora and fauna conservation value (eg.,riparian areas and remnant grassy E.viminalis in Zone A).
8. Avoid destruction of any Carex tasmanicus
9. Avoid any increase in the road-kill toll of the eastern barred bandicoot.
10. Retention of remnant habitat for the eastern barred bandicoot and possible rehabilitation of remnant grassy woodland areas on the property.

11. Rehabilitation of riparian areas along Grasstree Hill rivulet and the associated tributary
12. Rehabilitation of *Grassy* E. viminalis *forest/woodland* community on the western slope in Zone A.

Recommendations include;

7. Further information on the control of weed species, and the requirements of the Act, should be obtained from officers of the Department of Primary Industries, Water and Environment
8. Seek advice from Threatened Species Unit Botanist regarding the conservation management of Carex tasmanicus if any redevelopment work, weed control work or riparian rehabilitation work is likely to impact on this species.
9. Seek advice from the Nature Conservation Branch, DPIWE when designing any new access roading to minimise impact on the eastern barred bandicoot population known to occur in the area.
10. Avoid removal of individual mature native trees, particularly those with hollows during the redevelopment work.
11. Seek advice from the relevant community organisations (Greening Australia, LandCare, BushCare and the Understorey Network) regarding the rehabilitation and conservation management of the riparian areas along Grasstree rivulet and associated tributary. Any attempt to rehabilitate these areas should focus primarily on eradication and ongoing control of the willows and other weed species. Then replanting and encouraging natural regeneration of the existing remnant riparian vegetation. A prison community Landcare group could be formed to implement this recommendation.
12. The conservation value of the *Grassy* E. viminalis *forest/woodland* community on the western slope in Zone A may be enhanced by the following:
    - an appropriate grazing regime (e.g. autumn/winter grazing prior to the peak flowering period of most native grasses/herbs);
    - an appropriate fire regime (e.g. periodic cool burning on about a 15 year cycle to allow natural successional to occur and to prevent dominance by introduced species)
    - fencing (to prevent stock grazing but still allow native mammal/rabbit grazing);
    - weed control (as required but several localised patches of species such as thistle, blackberry and sweet briar can be easily controlled).

    Further advice on the management of this site can be sought from community environment groups such as Greening Australia, LandCare, BushCare and the Understorey Network.

Acknowledgments

Ian Sansom is thanked for instigating this survey and supplying background information. Sally Bryant, Nick Mooney and Zoe Tanner are thanked for assisting with fauna species lists. Kylie Dillon assisted in the preparation of this report. Fred Duncan assisted with plant identification and made useful comments on the draft report.

References

Buchanan, A.M. (editor) (1999). *A Census of the Vascular Plants of Tasmania & Index to The Student's Flora of Tasmania Third Edition*. Tasmanian Herbarium Occasional Publication No. 6, Tasmanian Museum and Art Gallery, Hobart.

Chessman, B.C. (1995) Rapid assessment of rivers using macroinvertebrates; A procedure based on habitat-specific sampling, family level identification and a biotic index. *Australian Journal of Ecology*, 20,122-129.

Davies et al (1994) National River Processes and Management Program. Monitoring River Health Initiative. River Bioassessment Manual.

Forest Practices Board (2001) Threatened Fauna Manual for Production Forests.

Gilfedder, L. (1991). Carex tasmanica *Flora Recovery Plan: Management Phase*. Department of Parks, Wildlife and Heritage.

Kirkpatrick, J.B., Barker, P., Brown, M.J., Harris, S. and Mackie, R. (1995). *The Reservation Status of Tasmanian vascular plant communities.* Wildlife Scientific Report 95/4. Parks and Wildlife Service, Tasmania.

Leigh, J.H. and Briggs, J.D. (1992). *Threatened Australian Plants: Overview and Case Studies.* Australian National Parks and Wildlife Service, Canberra.

Munks, S.A. (Ed.) (1996) A guide to riparian vegetation and its management. Department of Primary Industry and Fisheries,Tasmania,Australia.

North A.J (1992) East Derwent Highway. Shones Corner Roundabout. Botanical Survey. A report to the Department of Roads and Transport.

North A.J (1994) East Derwent Highway. Pipers Road to Shone Corner. Botanical Survey. A Report to the Department of Transport and Works.

Parks and Wildlife Service Web Server *http://www.gisparks.tas.gov.au/* Accessed 21/11/01 for fauna and flora records and vegetation mapping.

RFA (1997). *Tasmanian Regional Forest Agreement between the Commonwealth of Australia and the State of Tasmania.*

Watts, D (1999) Field guide to tasmanian birds. New Holland Publishers, Australia.

Watts D (1993) Tasmanian mammals – A field guide. Peregrine Press, Australia.

Appendix 1 Project Brief

Background

A vegetation and fauna survey of a 64 ha property located at the corner of the East Derwent Highway and Grass Tree Hill Road is required. The aims of the project required by the contractor (as per e-mail of 4.10,01 from Ian Sansom) :

- To determine the vegetation and fauna species and communities on the site and the vicinity,
- To identify vegetation and fauna values to be protected and/or conserved,
- To identify and detail management issues,
- To recommend future development and management principles and measures,
- To make any appropriate detailed design and/or construction suggestions.

The project needs to be completed by 27 November 2001.

Proposed Process and Approach

The approach required by NCB, DPIWE would be followed (see attached). An initial evaluation of the fauna and flora issues would be carried out using existing databases, FPB planning tools and a review of any previous reports or surveys conducted at the site.

A field survey would be undertaken to further determine the presence of flora and fauna and their habitats identified in the evaluation.

A report will be prepared which will include the items detailed in section 10. of the attached brief and any other information specifically required by the employer.

Timeframe

November 6th	**Initial fauna and flora evaluation of the site (database search, literature review etc)**
November 13th	**Site survey**
November 20th	**Final Report**