# CHAPTER 3 EXISTING ENVIRONMENT

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# 3. EXISTING ENVIRONMENT

## 3.1 Terrestrial

Coffey Geosciences Pty Ltd conducted a preliminary geotechnical assessment of the Wood Centre site on 11 August 2000. This assessment comprised a desktop review of available information, a series of test pits and reconnaissance of the geology and geomorphology of the area (Coffey Geosciences, 2000; Appendix E).

Refer to Chapter 2 Figure 2 for an aerial view of the site.

### *3.1.1 Topography*

The proposed development is to be situated on a low ridge (100m altitude), roughly North-South in orientation. The low ridge is situated at the eastern end of the Weld Plains. The Huon River makes a significant bend around the ridge. The ridge lies on the north bank of the Huon River, opposite the confluence of the Arve and the Huon Rivers (Figure 1).

The slope on the ridge is gentle with local slopes up to 9 degrees. The edge of the ridge is embayed in places and slopes may steepen up to 14 degrees, for example where the site grades steeply down towards the Huon River. Around the eastern and southern edge of the ridge, an escarpment slope of about 28 to 32 degrees leads to the relatively narrow modern floodplain of the Huon River.

The slope is more gradual towards the Weld Plains to the west, and a valley with an intermittent creek to the northeast.

### *3.1.2 Geology and Soils*

The Geological Atlas 1:250,000 digital series Geology of the Southeast Tasmania produced by Mineral Resources Tasmania (1999 edition) shows the underlying bedrock geology to be Permian marine siltstones and sandstones.

A fluvio-glacial terrace escarpment encircles the ridge. The Pleistocene glacio-fluvial deposits are of cobble and boulder grade. This landform when located in the Weld Plains by Sharples was classified as “Representative at the State Level” and “Outstanding at the Regional level”. He considered them to be “vulnerable to degradation if disturbed by specific activities”. The terrace remnants are reported to be “..vulnerable to excavation; some quarrying has already taken place-features are still in good condition, but future quarrying should be monitored to ensure important features are preserved” (Sharples, 1994).

The light grey quartzite gravel has been quarried for road construction materials in the past.

In general, the proposed site is underlain by alluvial and glacio-fluvial deposits. The typical soils overlying these materials are as described in Table 12. Most of these units were determined to be suitable for use as fill on-site. The depth of each unit varies by sample site but average depths are given in the table.

**Table 12 Typical Soil Profile Description**

(Based on test pit investigations conducted by Coffey Geosciences Pty Ltd, 2000)

| Unit/ Horizon | Depth (m) | Soil / Geological Description |
|---|---|---|
| Unit 1 | 0.2 | Silty SAND to Sandy GRAVEL, dark grey to black, subrounded quartzite gravel, roots and rootlets, organic (The topsoil has a peaty characteristic and can be easily scraped and stored for landscaping and/or re-spreading). |
| Unit 2 | 0.3 | Sandy GRAVEL to Gravelly SAND, light grey to white, subrounded quartzite gravel, some cobbles. |
| Unit 3 | 0.1 | Silty GRAVEL to SAND, dark brown to black, subrounded quartzite gravel, sometimes cemented. |
| Unit 4 | 0.6 | Gravelly CLAY to Sandy GRAVEL, mottled yellow-orange-brown, subrounded quartzite gravel, trace cobbles. |
| Unit 5 | 0.2 | Silty CLAY to Sandy SILT, extremely weathered siltstone rock with soil-like properties. |
| Unit 6 | | SILTSTONE, orange - grey, distinctly weathered siltstone rock with rock mass defects. |

## 3.2 Climatology and Air Quality

*Climatology*

Two weather stations exist in the Huon Valley; Geeveston (Forestry Cemetery Road) and Grove Research Station. Although these sites are the closest ones that exist to the site and may provide indicative information, neither is likely to provide a true indication of rainfall, or localised wind direction and strength, as the site is situated further inland in a relatively mountainous area. The indicative climatology of the area is representative of a temperate climate (Table 13).

The highest rainfall is likely to be received during the months of April to December, while the temperature has the potential to be below zero in any month of the year except for January.

## Table 13 Climatological Summary for the Region

[Measured at meteorological stations at Geeveston (Forestry Cemetery Road) during the period 1971 to 2000, and Grove Research Station during the period 1952 to 2000]

| Parameter | Geeveston | Grove Research Station |
|---|---|---|
| Annual Mean Daily Max Temp (ºC) | 16.8 | 17.0 |
| Annual Mean Daily Min Temp (ºC) | 5.7 | 5.8 |
| Mean Days with Strong* Winds (days) | 14.4 | 12.7 |
| Annual Mean Daily Pan Evap (mm/month) | 2.4 | 2.7 |
| Annual Mean Number of Days with Snow (Days) | 3.3 | 4.5 |
| Annual Mean Number of Days with Frost (Days) | 25.5 | 64.9 |
| Annual Mean Number of Days with Fog (Days) | 7.3 | 29.2 |
| Mean Monthly Rainfall Range (mm/month) | 51.9 to 94.1 | 47.4 to 75.8 |
| Annual Mean Rainfall (mm/yr) | 881.4 | 754.7 |

*Strong winds are defined as > 30 km/h

The prevailing wind direction for the site can not be determined without on-site monitoring being undertaken, as the prevailing wind recorded at the Geeveston monitoring station was from the north west, while it was recorded as being from the south west at the Grove Research Station weather station.

The site is likely to experience a greater frequency of frosts and fog than either weather station location, as the site is located further inland. The steep slopes grade from the ridges towards the river, giving rise to a strong drainage of air.

The climatic conditions of the region can result in temperature inversions. The conditions are most likely to occur in wintertime when dense cloud formations may trap air emissions within the site. The inversion could potentially range from 50 to 100 m above the ground. Little meteorology data is available to determine the significance of the temperature inversion to atmospheric emissions.

*Air Quality*

There is no known background air quality information for the proposed site. This is due to the undeveloped nature of the region. Reference to maps, together with site inspection findings, indicate that the nearest residential occupation is over six kilometres from the site.

Current air quality on the site is high as apart from forest and recreational activities no other human activities occur nearby. The site suffers the same inversion effect that the rest of the Huon Valley experiences but the airflow tends to be down river on such occasions.

## 3.3 Hydrology and Water Quality

### *3.3.1 Surface Water / Site Drainage*

The Huon River catchment is approximately 3,900 square kilometres and comprises 20 sub-catchments. The major tributaries of the Huon River are the Anne, Cracroft, Picton, Weld, Arve, Little Denison and Russell Rivers. The first four rivers listed join the Huon River upstream of the proposed development site and the confluence with the Arve River is immediately opposite the site.

The hydrology of the Huon River was modified in the 1970s when the construction of Scotts Peak Dam diverted the upper reaches of the river to the Gordon Stage 1 Power Scheme.

The Huon River headwaters drain the Arthur Range at an elevation of 1180 m. After approximately 30 km the river flows out of the Southwest National Park (World Heritage Area) and meanders through relatively undeveloped State forest for approximately 18 km, agricultural lands for approximately 15 km and finally terminates in D'Entrecasteaux Channel.

A Catchment Management Plan has been developed for the Huon River by the Huon Catchment Healthy Rivers Project Group (HCHRP, 1997). This plan is presently being revised. The aim of the Healthy Rivers Project is "...to protect the ecological balance of the Huon Catchment through sustainable use, development and management of natural resources" (HCHRP, 1997). As a new component of the catchment, the proposed development will strive to meet the objectives of the revised Huon Catchment Management Plan.

As indicated in Section 3.1.1, the site is situated on a low ridge that forms a significant meander in the Huon River channel. Some small intermittent creeks are sourced from the site. Some drainage lines flow west into Kings Creek, and the steeper areas to the north east of the site, drain directly into the Huon River. Due to the small and intermittent nature of these watercourses, there is no information available regarding their flows and water quality.

### *3.3.2 Huon River Hydrology*

The following information is based on daily flow data that was recorded on the Huon River upstream of Frying Pan Creek since 1970. Frying Pan Creek is situated approximately four kilometres downstream from the proposed development site.

The minimum, average and maximum flow rates of the Huon River at the proposed development site are predicted based on the flow rates measured on the Huon River at the Frying Pan Creek monitoring station. The measured and predicted flow rates are provided in Table 14. Predictions for flows in the vicinity of the proposed development site have been calculated by scaling the Frying Pan Creek monitoring station data to reflect the Huon River Catchment upstream of the proposed development site.

**Table 14 Recorded and Calculated Huon River Flows**

(As measured above Frying Pan Creek and at the Proposed Site)

| | Typical Months When Flows Occur | Recorded Frying Pan Creek Flow* ($m^3$/sec) | Conversion Factor | Calculated Huon River Flow at the Site | |
|---|---|---|---|---|---|
| | | | | ($m^3$/sec) | (ML/day) |
| Min Flow | Feb. and Mar. | 6 | 0.999 | 6 | 497 |
| Average Flow | - | 81 | 0.988 | 80 | 6,960 |
| Max Flow | August | 1,800 | 0.939 | 1,690 | 146,000 |

* Measured at the DPIWE Frying Pan Creek monitoring station during the period 1 January 1970 to 3 August 2000.

An Olympic size swimming pool holds a little more than 2.5ML. At minimum flow the Huon River at the site will fill about 200 Olympic size swimming pools a day, at maximum flow it will fill about 60,000 such pools a day. The average flow will fill about 2,700 such pools a day. The proposed maximum extraction of 0.09 $m^3$/sec (5 ML/day) is equal to the volume of 2 Olympic pools. This rate of extraction represents 1.5% in minimum flow conditions, 0.07% in average flows and 0.003% during maximum flows which it is considered will not impact on environmental flows in the Huon River.

### *3.3.3 Huon River Water Quality*

*Indicative Ambient Water Quality Near the Site*

Grab samples were collected from both the Arve River and Huon River in the vicinity of the proposed site on 28 September and 10 October 2000 to obtain an indication of the existing ambient water quality. These samples were collected using approved methodology and analysed by a NATA registered laboratory. However, the limited number of grab samples (2) makes the results fairly insignificant in view of the more comprehensive Huon Estuary Study. Where acceptable limits exist, the findings have been related to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 1992). Refer to Table 15 (refer also to the analysis results provided in Appendix F).

**Table 15 Huon River Water Quality Recorded Adjacent to the Site**

(measured at Wood Centre during sampling period September and October 2000; FT 2000)

| Analyte | Units | Draft ANZECC Guidelines 2000 for ecosystem protection unless otherwise stated | ANZECC Guidelines 1992 | Huon River Samples | |
|---|---|---|---|---|---|
| | | | | 28/09/00 | 10/10/00 |
| pH | | 6.5 - 8.0 (Lowland River) | 6.5 – 9.0 | 5.8 | 5.6 |
| Total Dissolved Solids, TDS | mg/L | 2400 (dairy cattle) | <5000 for livestock | 52 | 56 |
| Total Suspended Solids, TSS | mg/L | Refer to turbidity value | <10 | <10 | 18 |
| Turbidity | NTU | 6-50 (default trigger value SE Aus Lowland Rivers) | | | |
| Alkalinity $HCO_3$ | mg/L $CaCO_3$ | ≥ 20 (aquaculture) | - | 27 | 11 |
| Chloride | mg/L | Irrigation water - crop dependent | 400 | 11 | 13 |
| Nitrate | mg/L | 0.7 (toxicant) | - | <0.03 | <0.03 |
| NOx(Lowland Rivers) | mg N/L | 0.04(default trigger value SE Aus Lowland Rivers)) | | | |
| Sulphate | mg/L | < 50 (aquaculture) | - | 1.8 | 1.9 |

| Analyte | Units | Draft ANZECC Guidelines 2000 for ecosystem protection unless otherwise stated | ANZECC Guidelines 1992 | Huon River Samples | |
|---|---|---|---|---|---|
| | | | | 28/09/00 | 10/10/00 |
| Hardness | mg/L $CaCO_3$/ L | 20-100 (aquaculture)<br>>50 to minimise corrosion | 500 | 26.0 | 15.0 |
| Iron, Fe (Total) | µg/L | 300 (interim indicative working level but further data for Australian conditions is necessary)<br>200 (long term trigger value for irrigation) | 1000 | 281 | 664 |
| Calcium, Ca (Total) | mg/L | <1000 (stock water) | - | 5.20 | 2.65 |
| Potassium, K (Total) | mg/L | NA | - | 0.49 | 0.66 |
| Magnesium, Mg (Total) | mg/L | Insufficient information but some adverse effects occur between 500-1000 in stock water | <600 for livestock | 3.25 | 1.93 |
| Sodium, Na (Total) | mg/L | Irrigation water - crop dependent | - | 6.24 | 6.87 |
| Silica, Molybdate Reactive | mg/L | NA | - | 6.3 | 6.6 |

The indicative water quality recorded near the site is of high quality, reflecting the expected low inputs upstream associated with the limited human activity. The water was found to be slightly acidic, with suspended solids that were slightly above the ANZECC Guidelines for freshwater aquatic ecosystems, and elevated iron levels.

The water quality of the Huon River is discussed in more detail below with respect to findings of long term monitoring.

*Long Term Water Quality Monitoring*

As a component of the Huon Healthy Rivers Project, *The Huon Valley Water Quality Report 1996-2000* (Otley 2001) indicates that the quality of water in the western part of the Huon River catchment is better than the eastern portion due to the lack of human settlement in the West. The water quality is relative to the extent of change to the natural catchment, including vegetation clearance and soil disturbance, spread of foreign riparian vegetation species and presence of gravel roads, domestic animals and septic systems.

The Arve and Picton Rivers flow into the Huon River from the south and are the closest to the vicinity of the Wood Centre that have undergone regular water quality monitoring. Based on the water quality information, Otley suggests that the Arve and Picton Rivers are not significantly effected by present land uses and the current land and water management practices in place should be continued along with the current monitoring program.

The results indicate that preventative measures should be taken with regard to new development in the western region of the Huon catchment. Special attention to management of vegetation clearance, soil and riverbank erosion and most importantly gravel road drainage.

DPIWE maintains a monitoring station at Judbury on the Huon River (downstream of the proposed development site) and at Frying Pan Creek (downstream of the site). Water quality and flow data from both sites has been considered below with respect to the proposed development site.

The Judbury monitoring station formed part of a single point-in-time survey of the water quality of rivers in the Huon Catchment conducted by DPIWE. The purpose of the survey was to identify areas where water quality deterioration was occurring relative to the rest of the catchment (Department of Primary Industries and Fisheries, 1998). The Huon River at Judbury was found to be the best water quality of the rivers surveyed.

Subsequent data collected from these locations for the period December 1997 to December 2000 reflect the results provided in the survey (Table 16).

## Table 16 Huon River Long Term Water Quality Monitoring Results

(Measured at Judbury during the Sampling period February 1974 to 1997; DPIWE 1997; Forestry Tasmania 2000)

| | Temperature ($^oC$) | Conductivity (µS/cm) | Dissolved Oxygen (mg/L) | Turbidity NTU | pH |
|---|---|---|---|---|---|
| ANZECC Guidelines 1992* | <2$^o$C increase | 1,500 | >6 (>80-90% saturation) | <10% change seasonal mean concentration | 6.5-9.0 |
| ANZECC Guidelines 2000 Draft | - trigger value is 20$^{th}$percentile and 80$^{th}$percentile of the seasonal distribution of temp. data at the reference site<br>- the short-term change should be < 2 $^o$C. | 30-350 (SE Aus)<br>90 (Tasmania) | > 85 - < 110 % saturation (lowland rivers) | *6-50 (lowland rivers)*<br>- low risk trigger value is the 80$^{th}$%ile of the seasonal distribution of turbidity data at the reference site.<br>- <10% change in the euphotic depth | 6.5-8 (lowland rivers) |
| Sampling Period | 5/7/90-3/8/00 | 22/6/96-7/4/00 | 27/4/74-2/4/00 | 22/6/96-23/1/00 | 27/2/74-2/4/00 |
| Minimum | 4.21 | 0.0 | 7.3 | 1.0 | 6.3 |
| Average | 11.0 | 78.4 | 10.2 | 4.5 | 7.3 |
| Maximum | 24.0 | 215.1 | 13.2 | 91.8 | 8.3 |

* ANZECC Guidelines 1992 - Fresh and Marine Water Quality Guidelines

Note: Comparison of ANZECC trigger values and CSIRO results requires conversion from microM to mg.

Temperature

The relatively low water temperature of the Huon River at Judbury is maintained by input from higher altitude terrain. The temperature generally ranges between 8 and 13 $^o$C.

Conductivity

Conductivity of water is the measure of dissolved salts in the water. During dry periods conductivity generally reflects groundwater salinity levels. In high flows, after rain, conductivity is more indicative of dissolved material in run-off and surface drainage. The Huon River water has dissolved salt levels with a median less than 100 µS/cm. The National Guidelines (ANZECC 1992) recommend freshwater conductivity should not rise above 1,500 µS/cm.

Dissolved Oxygen

The level of dissolved oxygen (DO) in rivers significantly impacts the type of aquatic animals able to live in the river. The ANZECC Guidelines (1992) state that to maintain aquatic health, DO concentrations should not fall below 6 mg/L and that where possible DO should be measured at night when lowest levels occur. In the data provided by Forestry Tasmania (2000) only daytime readings were taken.

The DO of the Huon River at Judbury had a median of 10.18 mg/L and ranged between 7.30 and 13.20 mg/L. These concentrations are indicative of a healthy system however this is not conclusive as measurements were taken during daytime not night time.

Turbidity

Turbidity is a measure of the capacity of light to pass through water and generally reflects the amount of suspended material in the water. High turbidity values indicate higher levels of suspended matter and reduced light penetration, while low values indicate clear water. The pattern and magnitude of turbidity may be expected to change with river flow during events of different sizes. In addition, land use practices commonly contribute to sedimentation from soil and stream bank erosion.

The recommended total suspended solids (TSS) is less than 10 % change seasonal mean concentration. The Huon River grab sample results at the site indicate that TSS was less than 10 mg/L and 18 mg/L. This may indicate that the spring change in TSS was less than 10% however the seasonal change cannot be conclusively determined from the results of 2 grab samples.

The Huon River at Judbury had a median turbidity of approximately 4.49 nephelometric turbidity units (NTU) and had a range of 90.81 NTU. These results demonstrate that the pattern and magnitude of turbidity probably changes with river flow during events of different sizes in the Huon River and may be affected by land use practices.

Field pH

When results of the samples taken adjacent to the site are compared to the ANZECC Guidelines (1992) it is determined that the pH of the Huon River and the Arve River is lower (more acidic) than recommended for the protection of aquatic ecosystems. However, the pH was measured in the lab and as such may have been affected by changes in temperature and the container environment.

The long-term study results for field pH are between 6.3 and 8.3, which are generally within the ANZECC Guidelines (1992) of 6.5 to 9.0. Based on these results, no

definitive conclusions regarding the results and the effect on the environment for aquatic biota can be reached because toxicity of several pollutants is affected by changes at pH in this 5 to 9 range.

Nutrients

The nutrient export load data for the Huon River as measured at Judbury during the 1996/97 DPIF survey and in the riverine environment during the Huon Estuary Study 1996/98 CSIRO (2000) is provided in Table 17.

**Table 17 Huon River Water Nutrient Export Load**

| Nutrients | ANZECC Guidelines 1992 (µg/L) | ANZECC Guidelines 2000 (µg/L) | 1996/97 Concentration (µg/L) DPIF | 1996-98 Concentration (µM) CSIRO |
|---|---|---|---|---|
| Total Ammonia ($NH_3/NH_4$) | | 910 | 10 | 0.05-0.14 |
| Nitrate and Nitrite (lowland rivers) | | 40 (default trigger value SE Aus Lowland Rivers) | N/A | <0.05-0.7 |
| Nitrite | | | | <0.03-0.06 |
| Total Nitrogen (TN) | 100-750 | 500 (default trigger value SE Aus Lowland Rivers) | 190 | 8.5-16 |
| Dissolved Reactive Phosphorous (DRP) | 15-30 | 20 (default trigger value SE Aus Lowland Rivers) | < 10 | <0.03-0.09 |
| Total Phosphorous (TP) | 10-100 | 50 (default trigger value SE Aus Lowland Rivers) | < 10 | <0.08-0.64 |

Based on this data, the estimated nutrient mass load of the Huon River upstream of Judbury was calculated to be more than 38 tonnes of phosphorous and 1,355 tonnes of nitrogen when measured over a 16 month period from June 1996 to October 1997 (DPIF, 1998). The levels of TN and TP are well within the recommended limits (ANZECC 1992).

### *3.3.4 Groundwater*

The twelve test pits undertaken by Coffey Geosciences as part of their geotechnical assessment of the site in August 2000 failed to intercept groundwater. These test pits were typically shallow (between 1 and 6 metres in depth) indicating that groundwater on-site is not typically close to the surface.

No other investigations to specifically locate groundwater have been undertaken at the site, nor in the immediate area.

A preliminary assessment of the hydrogeology of the site has been undertaken (Weldon, 2001: Appendix W). The assessment suggests that the development site, on a ridge, should be a re-charge area of groundwater. However, engineering logs indicate that there are natural materials in the soil profile that act as a barrier to infiltration. It is expected that most infiltration will move along the top of the natural barrier materials, which may not be continuous. Springs have not been observed around the outer slopes of the ridge but an inspection of the escarpment was undertaken only in the south where a road was constructed recently to provide access to the Huon River bridge crossing. The groundwater table beneath the ridge is expected to be relatively flat and, because of the presence of the Huon River, it is unlikely to be highly elevated.

## 3.4 Flora

The proposed development site was surveyed by Biological Consultants on three separate occasions (26/08/00, 2/12/00 and 13/01/01; Appendix G). The purpose of the surveys was to record the plant species and communities present on the proposed development site.

As part of an environmental assessment for the construction of the access road into the area, Ms Karen Ziegler (FT) conducted a botanical (quadrat sample) survey of the proposed development site on the 20$^{th}$ of February 2000. The data from this previous survey was included in this study.

Three main floral communities exist on-site, as shown in Figure 9. These floral communities are described and their importance noted with respect to the Regional Forest Agreement Community Code and Vegetation Management Strategy Code in Table 18.

The plateau, which constitutes the majority of the site is dominated by *Leptospermum glaucescens - Hibbertia procumbens* heathland growing on sand, or muck peats, that overlay a Permian quartzite bedrock (siliceous). The margin of the heathland and slopes at the top of the plateau are dominated by a heathy *Eucalyptus amygdalina* woodland and forest growing on a quartzite bedrock (siliceous). The forest

component is comparable to the Regional Forest Agreement community of *E. amygdalina* forest on sandstone (see also *Forest Botany Manual - Nature Conservation Region 10B* (Duncan and Johnson 1995)). Most disturbed areas of this community are regenerating back to heathland, with small intermittent copses of stunted *E. amygdalina* (approx. 15 ha). The lower slopes of the ridge are dominated by *Eucalyptus obliqua* forest with a midstorey of both wet and dry tree and shrub species depending on the proximity to the river and aspect. Refer to Appendix G for further information on the distribution of floral communities.

**Table 18 Floral Communities on Site and their Descriptions**

| Plant Communities | Regional Forest Agreement Community Code | Vegetation Management Strategy (2000) Code |
|---|---|---|
| *Leptospermum glaucescens - Hibbertia procumbens* heathland | Not applicable (non-forest community). | Lowland and intermediate heath (Hh). |
| Heathy *Eucalyptus amygdalina* open forest and woodland on sandstone | *Eucalyptus amygdalina* forest on sandstone (forest component) and non-forest (woodland component). | *Eucalyptus amygdalina* forest on sandstone and *E. amygdalina* woodland. |
| *Eucalyptus obliqua-Melaleuca squarrosa-Monotoca glauca* forest (OB0111*)* | *Eucalyptus obliqua* dry forest/*E. obliqua* wet forest | *Eucalyptus obliqua* dry forest/*E. obliqua* wet forest |

*Leptospermum glaucescens - Hibbertia procumbens* heathland and dry to wet *Eucalyptus obliqua* forest are adequately reserved within the Tasmanian reserve system (Kirkpatrick and Harris 1999; S. Harris pers. comm.).

*Eucalyptus amygdalina* forest on sandstone is a high priority for conservation under the Regional Forest Agreement Private Land Reserve Program, but is not a priority for conservation on public land (e.g. State forest). There is no requirement for the forest or non-forest communities located within the boundary of the proposed development site to be reserved on public land (pers. comm. S Casey 2001).

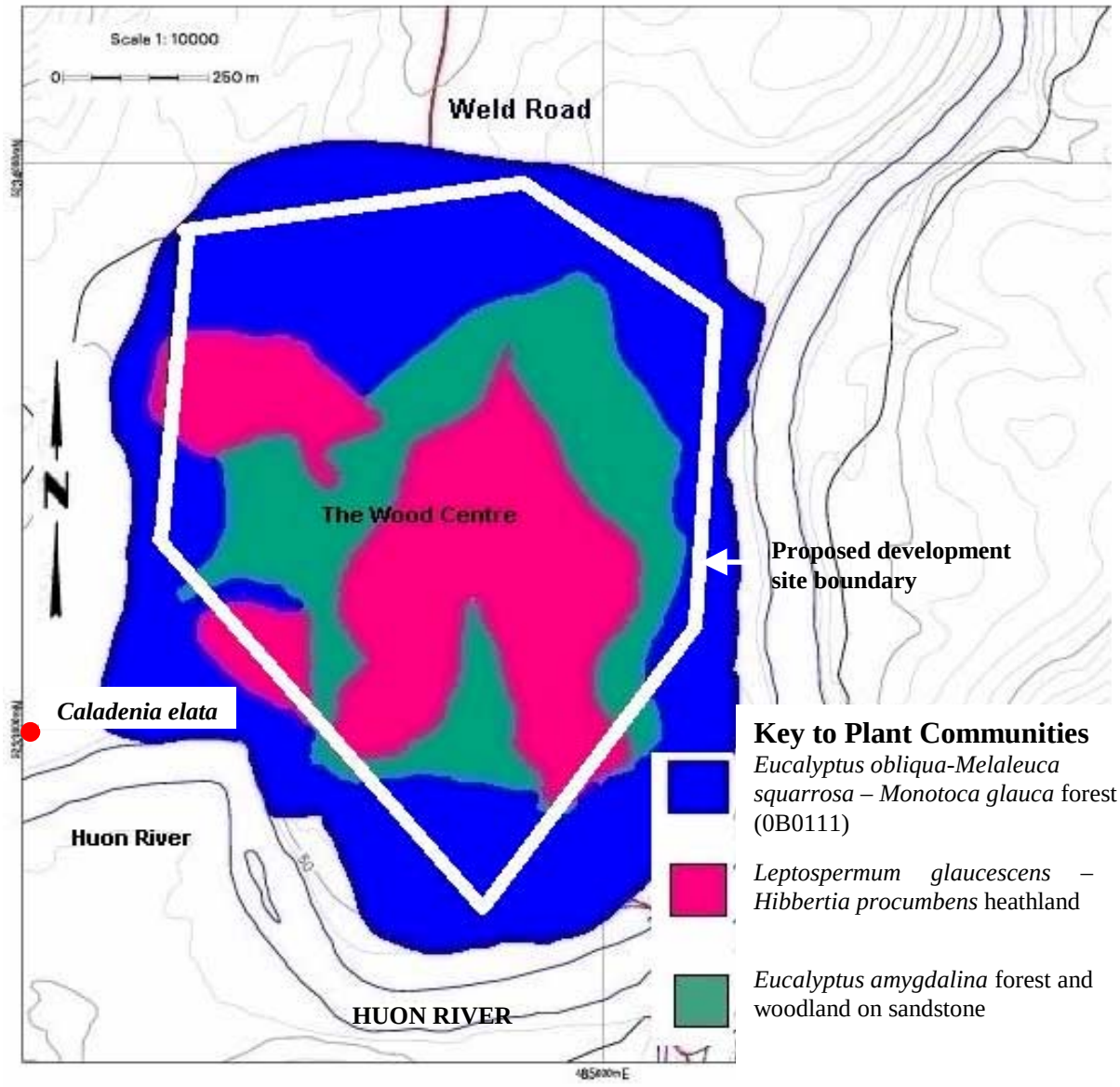
No plant species of local, statewide or national conservation significance were located on the site during the surveys. The initial survey indicated that the possibility remained that the orchid species *Caladenia alata* could occur on-site within the *Leptospermum glaucescens - Hibbertia procumbens* heathland and *E. amygdalina* forest and woodland on sandstone communities present within the boundary of the site. This species was previously listed as a Rare Schedule 5 species under the Tasmanian *Threatened Species Protection Act 1995* but was recently removed.

The follow-up survey of the proposed development site conducted on 2nd December 2000, again recorded no *Caladenia alata* plants within the boundary of the proposed development site. The species flowers in October therefore it may be present but due to its removal from the Rare Schedule 5 species list, it is not considered to require specific conservation protection.

The only orchid species recorded within the site's boundary was *Thelymitra cyanea* (veined sun orchid). Plants of this species were more abundant along the roadsides, cutlines and areas that had been disturbed by track maintenance and quarrying activities than in the undisturbed heathland vegetation. *Thelymitra cyanea* is not considered to be a rare and/or threatened species.

During construction of the new bridge *Westringia angustifolia* was identified at E485140 N523600. This site is located on the opposite side of the Huon River.

## Figure 9 Existing Vegetation



## 3.5 Fauna

The proposed development site was surveyed by Stephen Mallick (Fauna Consultant) on the 27th of August 2000 to record the faunal species and habitats present (Mallick, 2000; Appendix H).

The desktop research determined that seven species of conservation significance are known, or are likely, to occur in the area of the proposed development. Refer to Table 19.

**Table 19 Significant Faunal Species Recorded On or Near the Site**

| Species (Common Name) | Listed | Listing | Identification |
|---|---|---|---|
| *Aquila audax fleayi* (Wedge-tailed Eagle) | TTSPA | Vulnerable | Record from region, potential habitat |
| | CESPA/ CEPBC Act | Endangered | - |
| *Lathamus discolor* (Swift Parrot) | TTSPA | Vulnerable | Potential (post-breeding) habitat |
| | CESPA/ CEPBC Act | Endangered | - |
| *Accipiter novaehollandiae* (Grey Goshawk) | TTSPA | Rare | Potential habitat |
| *Dasyurus maculatus* (Spotted-tailed Quoll) | CESPA/ CEPBC Act | Vulnerable | Potential habitat |
| | VAC | Requires Monitoring | - |
| *Dasyurus viverrinus* (Eastern Quoll) | VAC | Unknown Risk Status | Potential habitat |
| *Prototroctes maraena* (Australian Grayling) | TTSPA | Vulnerable | Potential habitat |
| *Lissotes menalcas* (Mt Mangana Stag Beetle) | TTSPA | Vulnerable | Record from region, potential habitat |

CESPA Commonwealth Endangered Species Protection Act 1992.

CEPBC Act Commonwealth Environment Protection and Biodiversity Conservation Act 1999

TTSPA Tasmanian Threatened Species Protection Act 1995.

VAC Vertebrate Advisory Committee 1994.

*Aquila audax fleayi* (Wedge-tailed Eagle)

The Tasmanian subspecies of the wedge-tailed eagle occurs in the general region; however, the nearest recorded nest-site is 8 to 9 km distant. There is tall forest on the slope to the east of the development site that could potentially be suitable for wedge-tailed eagles. However, the slope is very exposed to the prevailing westerlies and is considered unlikely to support a nest site.

*Lathamus discolor* (Swift Parrot)

The swift parrot has been recorded to the east of the proposed development site on coastal *E. globulus*, and may potentially utilise *E. obliqua* within the area as a post-breeding food supply.

*Accipiter novaehollandiae* (Grey Goshawk)

The grey goshawk nests in all types of wet forests, particularly along watercourses, although blackwood swamp forest and wet forest where blackwoods occur are the preferred habitat. No Grey Goshawk nests were observed during field surveys in the area of the Wood Centre (pers. comm. S. Mallick 2001).

*Dasyurus maculatus* (Spotted-tailed Quoll) & *Dasyurus viverrinus* (Eastern Quoll)

The spotted-tailed quoll (*Dasyurus maculatus*) is primarily a wet forest species that may also utilise woodland and heath, while the eastern quoll (*Dasyurus viverrinus*) is most common in areas with a mosaic of native forest/woodland and pasture. Both quoll species may occur in the area.

*Prototroctes maraena* (Australian Grayling)

The Australian Grayling occurs in the lower-middle reaches of rivers and streams in Tasmania. The species is likely to occur in the Huon River in the vicinity of the proposed development.

*Lissotes menalcas* (Mt Mangana Stag Beetle)

The Mt Mangana stag beetle is known to occur in the region. The species inhabits rotting logs on the floor of *E. obliqua, E. regnans* and *E. globulus* forest, so the wet *E. obliqua* forest could be suitable habitat for this species.

While it is possible that this species, may exist on, or within the vicinity of, the site; the survey found no evidence to suggest that the site contained critical habitat for this species.

## 3.6 Archaeology and Cultural Heritage

### *3.6.1 Aboriginal Heritage*

*Preliminary Site Survey*

A preliminary archaeological survey was undertaken by the Forest Practices Board to provide an indication of the potential for Aboriginal sites to be present (Appendix I). The survey located no sites and recorded that the site did not have a high potential for recovery of Aboriginal sites.

*Consultation and Tasmanian Aboriginal Site Index Search*

Discussions have been held with the Tasmanian Aboriginal Land Council (TALC), Aboriginal Heritage Unit (AHU) of the Department of Primary Industries, Water and Environment, and the South East Tasmanian Aboriginal Corporation (SETAC) regarding the proposed development and potential significance of the site with respect to Aboriginal cultural heritage.

The initial request for permission to undertake a survey of the site was refused due to SETAC and TALC's concern regarding general management of Aboriginal sites within forestry areas in the past. Upon further consultation, permission for access to the Tasmanian Aboriginal Site Index (TASI) was granted, with the following qualification:

> "That the (Forestry Tasmania) proposal not be endorsed and that we (TALC) do not endorse an Aboriginal heritage officer to conduct the survey."

A copy of correspondence from SETAC and TALC is attached in Appendix J.

A search of the TASI found no recorded sites within the proposed development area, or immediate vicinity. A site across the Huon River suggests that there was historical Aboriginal activity in the area.

An Aboriginal heritage officer conducted further consultation on behalf of FT with TALC and SETAC to identify their concerns. These concerns (as detailed in Appendix I) were in general, regarding broader forest and Aboriginal site management issues, and are beyond the scope of the DPEMP for this proposed development. These concerns are being addressed within FT's existing ongoing consultation process.

*Findings of the Site Survey*

A site survey was conducted by an Aboriginal heritage officer during the period 6 to 9$^{th}$ January 2001 (Scottney, 2001; Appendix K). No Aboriginal sites were located

during the survey which concentrated on disturbed areas, with visibility restricted to less than 5% by thick undergrowth over much of the site.

The abundance of cultural resources in the area, the ethnohistory for the area, and the local oral knowledge indicated that the project area was extremely rich with Aboriginal cultural values and had potential to be of significance.

The survey report indicated that the North West Bay region was within the territory of the South East Tribe (which possibly comprised up to 10 bands), with a total population of 400-500 people. Vegetation types noted to be present on-site have potential to have been Aboriginal cultural resources used as traditional food, a source of medicine, and/or fibre for building shelters and weaving baskets. Similarly, the types of mammals and birds that are likely to be present may have been a source of food (eg. possums, wallaby, wombat and echidna).

Further survey of the site after removal of vegetation was determined to be necessary for identifying the presence or absence of Aboriginal sites.

### *3.6.2 European Heritage*

Timber harvesting has been a part of the Huon Valley's history for over 180 years with wood production growing side by side with recreation and tourism over the last few decades. The predominant resources of the area were and remain its forests and waterways (Forestry Tasmania, 2001; Appendix L).

The timber industry supported the other enterprises in the area including whaling, prospecting, fur farming, vegetable and fruit growing, and farming. By 1850 (during the gold rush), timber was exported to Victoria. As industrialisation made inroads automation of the industry evolved. European exploration and settlement of the area started in the early 1800s. Experimental planting of fruit proved successful and export of fruit began in 1840.

A survey of the site and discussions with locals indicate there are no significant remains of European cultural activity at the Wood Centre site that need to be addressed. A small family spot mill was operated near the northern boundary of the site by the Watson family in the 1940s and 50s, but this area will not be disturbed by the development.

There are the remains of two sawmills (McMullen's Leithbridge Sawmill, the McMullen's Bermuda Road Mill) and a connecting tramway (McMullens Leithbridge Tramway) about 8 kilometres east of the Wood Centre site. These sites were built in the 1930s and have been rated as low to medium significance by Parry Kostoglou in his "Historic Timber Getting in the Southern Forests – Statements of Site Significance and Management Recommendations" (Forest Research Council, 1996).

McMullen's sawmill was probably Franklin's largest sawmill in c.1932. It was situated at the end of New Road and is believed to have closed by about 1954. Historical remains of the operation comprise a sawmill shed, tramway and mill skids.

## 3.7 Ambient Noise

The Wood Centre is the first major development of this type within the State forest in the Huon Valley and Tasmania. Consequently, true background noise levels are obtainable that are not inflated by the presence of other industrial noise in the area. Noise measurements (15 minute statistical analysis) were taken during the day and night and are recorded in Table 20.

**Table 20 Results of 15 Minute Statistical Noise Analysis (dB(A))**

| Time | $L_N$ | $L_{40}$ | $L_{90}$ | $L_{eq}$ |
|---|---|---|---|---|
| 1435 h | 51.3 | 47.3 | 36.8 | 44.0 |
| 1830 h | 41.0 | 39.8 | 36.5 | 38.3 |

In Table 20, $L_N$ is the noise level exceeded for N% of the sampling time. $L_{90}$ is a description of the background noise levels encountered. $L_{10}$ is a description of the fluctuating higher noise levels. $L_{eq}$ is the equivalent 'A' weighted noise level. For example, a fluctuating noise having an $L_{eq}$ = 38.3 has the same acoustic energy as a steady noise of 38.3 dB(A). A brief explanation of noise and noise measurement is provided in Appendix M.

Results of rural and semi-rural noise surveys in Tasmania over the past 18 years indicate that the day time rural background ($L_{90}$) noise levels are higher than the noise levels recorded in semi-rural areas. Rural areas are not always tranquil, there are watering systems, tractors, distant sawmills and quarries. Furthermore, the ambient noise in forest and wooded rural areas depends on the wind speed interaction with vegetation and fauna especially birds, frogs and insects. The background noise levels can vary from 20 dB(A) on a still night without insect noise, to over 50 dB(A) during moderate winds. At night, the rural and semi-rural noise climate are similar, with a mean background $L_{90}$ level of about 32 dB(A) (Terts, 2001; Appendix N).

The proposed development will result in a change and probably an increase in the existing ambient noise level in the immediate vicinity of the site. The nearest residence is situated approximately six kilometres away, near the junction of Denison and Weld Roads. Significant topographic and vegetation barriers are present between the site and the residences in the area. The site's location and proposed mitigation

measures will ensure that the noise sources should not be perceived at nuisance noise levels and be cause for complaint. A detailed assessment of the potential noise impacts of each of the proposed developments is provided in Chapters 6, 7, 8, 9 and 10 and cumulative noise impacts in Chapter 5.

## 3.8 Hazard Issues

Potential natural hazards that may need to be considered when developing the site include flooding, fire, landslip and erosion.

The site is situated on the top of a ridge and should not be subject to flooding as it is well drained. The potential impact and management of flooding will not be considered further.

Blackened tree trunks observed on-site are evidence of historic bushfires. The heath community is also likely to be evidence of regular or recent bushfire. Fire management will be a significant consideration, given the evidence of fire in the region, and the development of the wood processing operation in an isolated and predominantly forest area.

During the geotechnical assessment of the site, an old landslide feature was observed in a road cutting below the proposed location for the power station. Construction of the road was thought to have exposed some of the tension cracks associated with the movement (Coffey Geosciences, 2000).

As noted in Section 3.1.2, the sandy gravel, and glacio-fluvial gravel sub surface layers of the soil profile have erosive potential. When constructing batters in these materials batter slopes of 1.5:1 (H:V), or flatter are recommended.

Development of the site will need to consider the possible landslip potential on steeper areas of the site and the potential for erosion of the quartzite soils when exposed, or destabilised.

Limited activity has been undertaken on-site, with the exception of localised quarrying, so there has been limited potential for contamination of soil, or water, on-site. No obvious site contamination has been noted during site inspections.

## 3.9 Visual

The site is situated on top of a low ridge within State forest, and has been partially modified in several areas by quarrying activities and associated vehicle tracks. An upgraded road formation visible in Plate 1 was constructed in early 2000. No readily accessible vantage points are situated within the vicinity of the site (ie. on public

roads, accessible by vehicles). Access to the area is possible only along the Weld Road.

Architecture of the site will be developed to ensure buildings have similar visual elements. Choice of building and roof colours will be made to minimise contrast with the surrounding vegetation.

Large areas such as processing yards and product storage spaces have the potential to appear visually intrusive due to the white gravel that naturally occurs in the area. (Figure 2). Existing native vegetation will be retained to the maximum extent possible in development of the site. Where the site is disturbed and vegetation buffers can be established, these will be undertaken in accordance with the landscape master plan for the site (see Chapter 5).

After flowing through relatively flat areas of the Arve Plains, the Huon River enters steeper country about ½ km west of the site. The section of river that flows around the site is generally in steeply banked terrain. The buffer areas around the site mean that the tree line at the top of the banks will not be disturbed.

The only feature of the site that may become visible from the Huon River is the top few metres of the Power Station stack. For the most part, river users in the vicinity of the Wood Centre will experience a natural riparian forest buffer on the steep banks adjacent to the Wood Centre and will pass under the new bridge.

Potential areas that may overlook the site are described below see Figure 10.

Top of Barn Back

There is a FT road near the top of Barn Back ridge, but it is not frequented by the public. From this perspective (looking south - south east) the site will be most visible with the Sawmill visible on the lower level and the Power Station, Wood Fibre Mill and Merchandising Yard on the upper level.

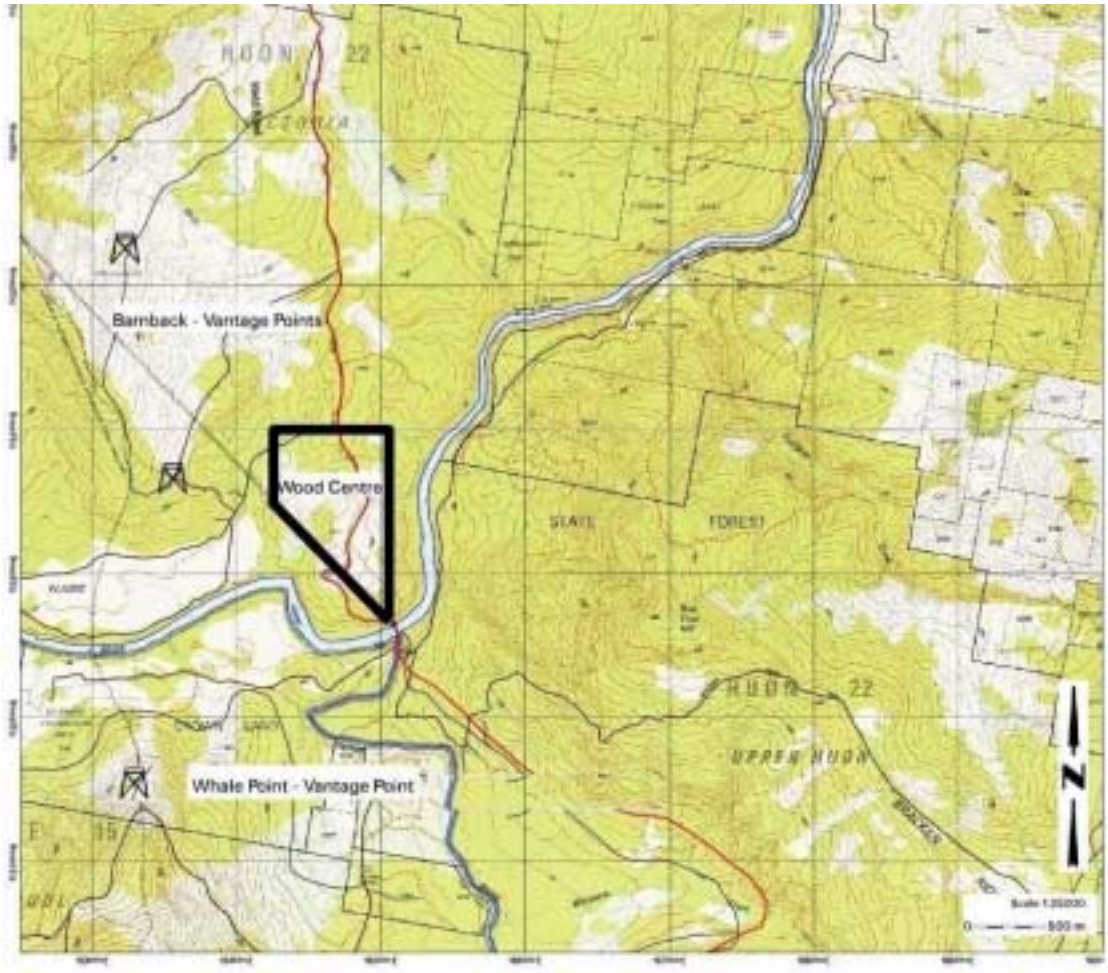
Section (200 m) of Bermuda Road

A view of the site looking west is gained from a 200 m section of this road. However regrowth of trees in the felled coupe beside the road will block this view within five years.

Hartz Mountain looking North

This view from Hartz Mountain looking north already overlooks human activities. The Wood Centre buildings are unlikely to be distinguishable due to the distance (over 15km) and elevation of the viewing point.

**Figure 10 Potential Vantage Points in the Vicinity**




Edwards Road (now bypassed)

This is a FT road on the south bank of the Huon River. Whale Point on the road overlooks the site from about a 100 m elevation differential and a distance of 1km (Plate 1). A new lower level connection link has been recently constructed, so it is unlikely that public traffic will continue to use the upper link. The key site elements that will be seen include the Power Station and main entrance. None of the other site buildings are likely to be highly visible from this view due to the natural vegetation that will be retained around them.

**Plate 1 View from Edwards Road**


Views from the Huon River

River users in the vicinity of the proposed Wood Centre will experience a natural riparian forest buffer adjacent to the Wood Centre. Depending on the height of the Power Station stack relative to the tree heights, the stack is the only component of the Wood Centre that may be visible from the river. The river users will pass under the new bridge that crosses the Huon River adjacent to the Wood Centre and there is potential for this becoming a new access point for river users.

In general, public viewing areas of the site are limited.

Tahune Forest Reserve

As mentioned in Chapter 2, the Tahune Forest Airwalk tourism development is located approximately nine kilometres upstream of the proposed Wood Centre. There is no direct line of sight from the reserve to the Wood Centre and the access road (Arve Road from Geeveston) does not have viewpoints to the Wood Centre.