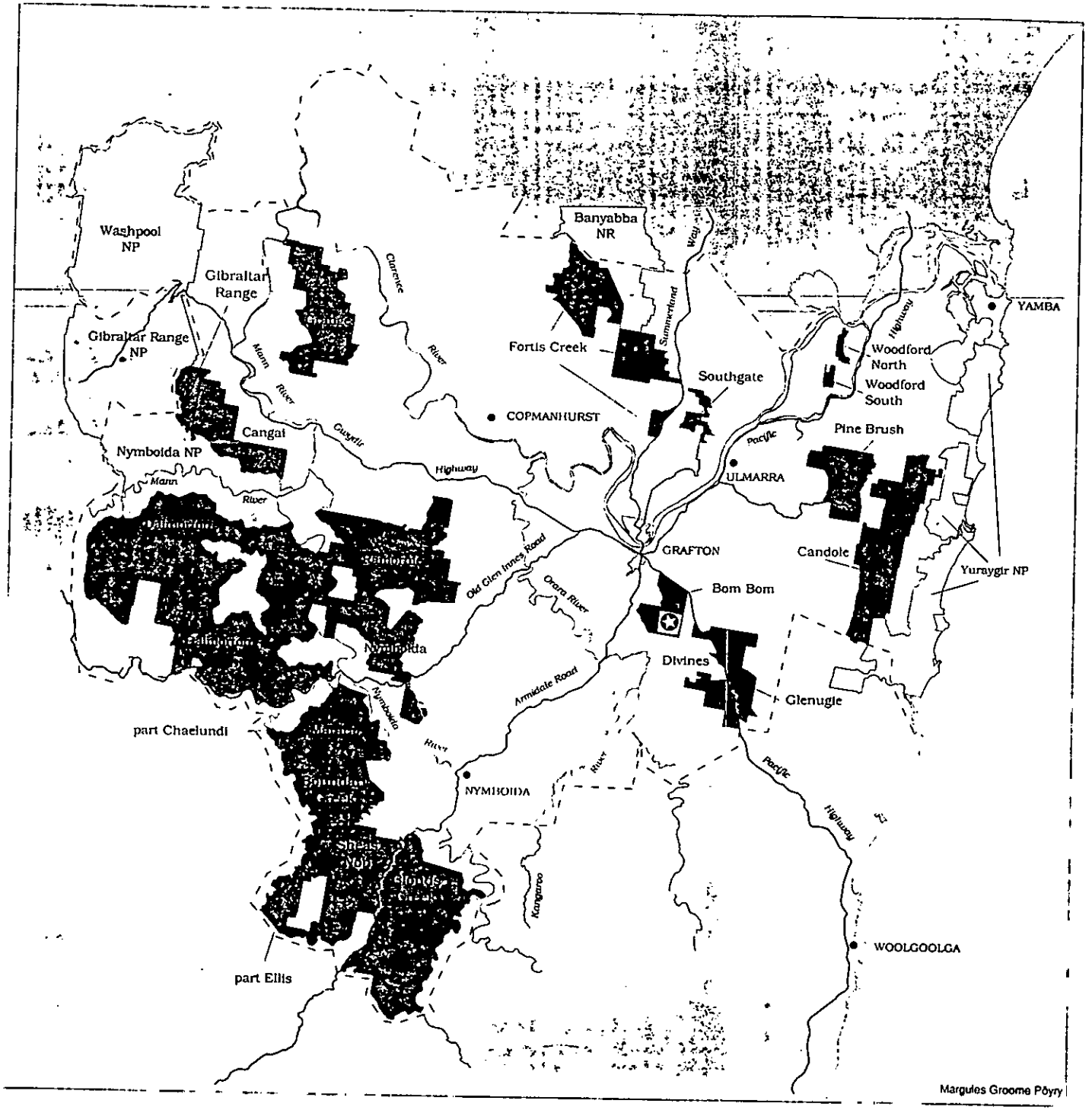
DIVINES
81 & 82

Grafton District
Northern Region



GRAFTON MANAGEMENT AREA

NSW

STATE FORESTS

NATIONAL PARKS

MANAGEMENT BOUNDARY

TOWNS

ROADS

RIVERS

0 20km N

LOCATION

✪ Compartments 81 and 82

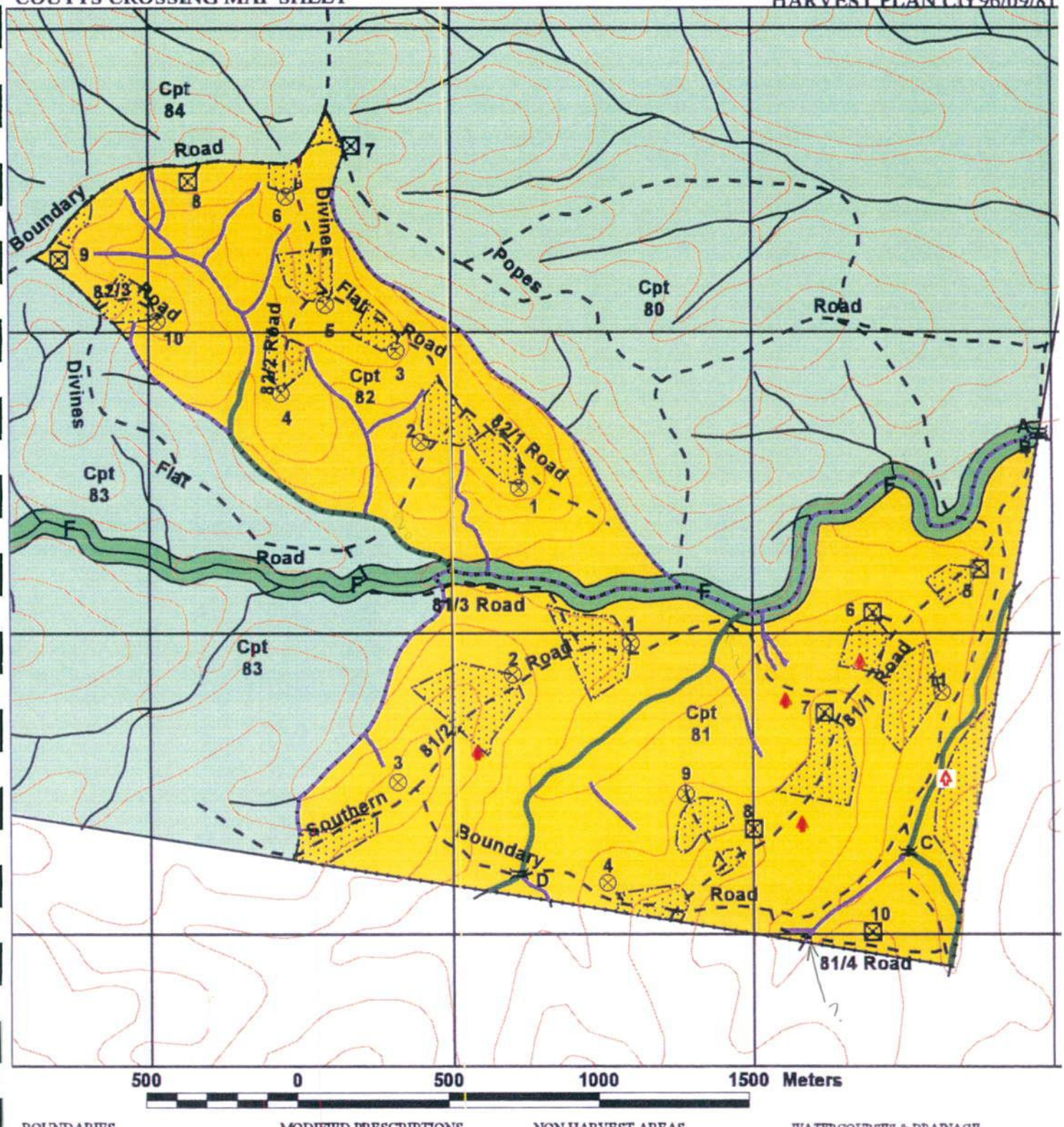
FIGURE 1.2

NORTHERN REGION - GRAFTON DISTRICT
HARVEST PLAN OPERATIONAL MAP
COMPARTMENTS 81 AND 82
DIVINES STATE FOREST

STATE FORESTS

SCALE 1:17000
COUTTS CROSSING MAP SHEET

08/10/1996
HARVEST PLAN CG 96/09/81



BOUNDARIES
- State Forest Boundary
- Compartment Boundaries

ROADS
- Natural Surface
- Sealed or Gravelled

NORMAL PRESCRIPTIONS
- Harvestable Area
- Downhill Snigging

MODIFIED PRESCRIPTIONS
- Yellow-bellied Glider Feed Tree
- Old Powerful Owl Roost Site

DUMP SITES OR LANDINGS
- Permanent Dry
- Permanent Wet

NON HARVEST AREAS
- Flora and Fauna Protection
- Riparian Habitat Zones
- General

WATERCOURSES & DRAINAGE
- Filter Strip
- Drainage Line
- Approved Crossings

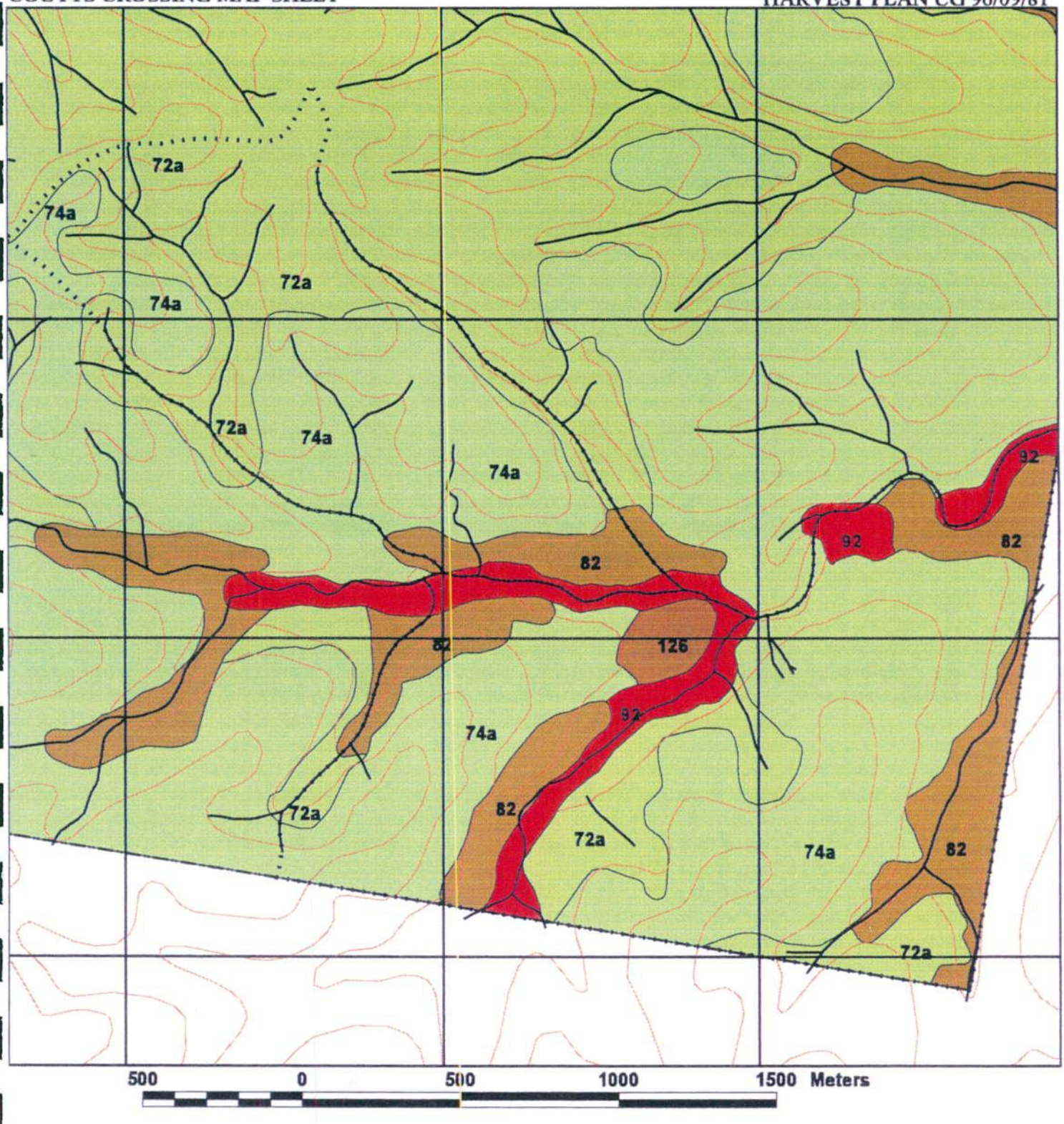
MN

NORTHERN REGION - GRAFTON DISTRICT
FOREST TYPES MAP
COMPARTMENTS 81 AND 82
DIVINES STATE FOREST

STATE FORESTS

SCALE 1:17000
COUTTS CROSSING MAP SHEET

08/10/1996
HARVEST PLAN CG 96/09/81



BOUNDARIES

Compartment Boundaries

FOREST TYPES

- 82 - Grey Box
- 92 - Forest Red Gum
- 126 - Stringybark - Bloodwood
- 74a - Spotted Gum - Grey Ironbark/Grey Gum
- 72a - Spotted Gum - Grey Box

MN

Harvesting Plan No GG 96/09/81

Contents

Part 2 FOREST MANAGEMENT & ENVIRONMENTAL CONSIDERATIONS

2.1 PHYSICAL FEATURES

Description 1 Physical Description of the Area

STATE FOREST	**Divines No 25**	DISTRICT	**Grafton**
REGION	**Northern**	COMPARTMENT	**81 and 82**
MANAGEMENT AREA	**Grafton**		
NORTH-EASTERN CORNER		**496597 / 6706741**	
SOUTH-WESTERN CORNER		**496478 / 6704255**	

Natural Features

General: The compartments contain near flat to undulating slopes. They are basically the lower sections of secondary ridges that run north-east and north off a main range system.

Catchment: Clarence River catchment. Bom Bom Creek, a tributary of the Clarence, is the northern boundary of compartment 81 and the southern boundary of compartment 82.

Altitude range: 20m - 80m above sea level.

Aspect: Compartment 81 is generally north-east and compartment 82 is generally south-west.

Topography: The compartments consist of wide flat ridges with slopes generally less than 10°.

Artificial Features

Roads: Boundary Road gives access through Divines State Forest and is located to the north-west of compartment 81 and forms the northern boundary of compartment 82. Access from Boundary Road to compartment 81 is via Popes Road. Southern Boundary Road runs through compartment 81 whilst Divines Flat Road runs through compartment 82.

Minor Roads: Four minor roads; 81/1, 81/2, 81/3 and 81/4 Roads in compartment 81 and three minor roads; 82/1, 82/2 and 82/3 Roads in compartment 82 give access to dump sites in the respective compartments.

Description 2 Special Warning of Critical Boundaries or Non-harvest Areas

Forest Type 92 (Forest Red Gum) is a deferred forest type under the DFA arrangements existing at the time of writing. Areas mapped as type 92 will not be harvested unless released from deferral.

A Special Emphasis Flora and Fauna Protection Zone (PMP 1.1.7 Wildlife Corridor, 40 m strip either side of the stream) exists along Bom Bom Creek on the northern boundary of

compartment 81 and the southern boundary of compartment 82, as indicated on the Operational Map.

Riparian Habitat Zones exist 20 metres either side of streams (watercourses, drainage lines and drainage depressions) with catchments greater than 40 hectares.

Private property joins the eastern and southern boundaries of compartment 81. These boundaries are surveyed and blazed with the yellow paint, and fenced. In places, the fence deviates from the surveyed boundary to miss gullies.

Reference Grafton Management Area Environmental Impact Statement

2.2 FOREST MANAGEMENT AND SILVICULTURE

Description 3 Compartment Subdivision, Forest Types

Areas:	**cpt 81**	**cpt 82**
Gross Area of Compartment	251 ha	139 ha
Wildlife Corridor	10.2 ha	3.3 ha
Riparian Habitat Zones	10.9 ha	4.8 ha
Filter Strips	5.5 ha	11.3 ha
Deferred Forest Type (92)	25 ha	2.9 ha
Proposed for Logging	**199.4 ha**	**116.7 ha**

Logging History:

Compartments 81 and 82 were last logged in 1991 for poles and girders. The compartments were previously logged intensively up until the 1960's for poles, girders and sleeper material.

Forest Types:

Forest Types		Area (ha)	
		cpt 81	**cpt 82**
72	Spotted Gum - Grey Box	33	57.8
74	Spotted Gum - Ironbark/Grey Gum	142	69.5
82	Grey Box	46	8.8
92	Forest Red Gum	25	2.9
126	Stringybark - Bloodwood	5	nil

Reference For Commission NSW (1989). Research Note 17. *Forest Types in New South Wales*

Description 4 Broad Description of Vegetation

(a) Forest Types

- Type 72 a dry type that occurs in the mid section of compartment 81 and along the north-eastern and central sections of compartment 82, possibly on less exposed sites.

- Type 74 a dry type occurring over more than half of compartments 81 and 82, basically the flat ridge tops.

- Type 82 an open grassy type that occurs in bands along some of the drainage lines in the compartments.

- Type 92 an open grassy type occurring along drainage lines, replacing type 82 in places in the compartments.

- Type 126 a dry type occurring just above the Type 92 area on the lower section of compartment 81's western ridge.

It is difficult to distinguish between Types 72 and 74 in the field (only two Grey Gum have been located in compartment 81), with Grey Box occurring scattered over the whole of the Spotted Gum area.

Overstorey species

The overstorey species are Spotted Gum, Grey Box, Grey, Narrow-leaf and Red Ironbarks, Grey Gum, White Mahogany, Red Bloodwood, Forest Red Gum, Roughbarked Apple and White Stringybark.

(b) Understorey

The understorey is typically dry and open (and often non existent), being eucalypt regeneration and acacias with occasional forest oak and roughbark apple. Mock olive, coffee bush and muttonwood are scattered through the area. Some swamp oak, callistemons and melaleucas occur along the drainage lines towards the eastern boundary of compartment 81.

(c) Ground-cover

The ground cover is mainly native grasses, mostly kangaroo and bladey, and litter. A creeper (*Hardenbergia violacea*) also occurs and there are herbaceous species along the moister creek areas.

(d) Rare or threatened species

No occurrences of rare or threatened flora are recorded on the compartment and none were encountered during field inspections.

(e) Rainforest

There are no areas of rainforest in the compartments.

(f) Exotic weeds

Lantana is scattered through sections of the compartments. There are scattered plants of groundsel bush, nogoora bur, farmers friend and fire weed in the compartments.

(g) Regeneration and serial stages

The compartments carry a multi-age forest consisting of mature or maturing regrowth seemingly having resulted from harvesting and/or the impact of settlement during the later 1800s and early stand improvement treatment, and groups of younger regrowth of varying ages, the result of subsequent selective logging operations and stand treatments.

Description 5 Forest and Crop Condition

Compartments 81 and 82 have a long history of logging of varying intensities and have been silviculturally treated on a number of occasions. The forest was basically logged out by the turn of the century. The early logging and intense treatment of 1911/15 (ringbarking, grubbing, stacking and burning - apparently removing the last of the remnants of the original stand) induced growth responses on retained stems and allowed regeneration to become established and grow. Much of the current stand would result from that work. It is now mainly mature or maturing. Average growth rates would be low. There is a need to replace a large proportion of the stand over the next few cutting cycles to maintain stand vigour and increase growth rates. The whole of the compartments would now yield a range of log types.

The forest has been grazed more or less since European settlement in the 1840's, probably originally as part of the *Bushy Park* station and since Forest Reserve notification in 1881 by way of lease or permit. The area has been regularly burnt to maintain grazing capacity. There were cattle on compartments 81 and 82 at the time of recent inspections.

Description 6 Forest Management Activities

(a) Silviculture

The main silvicultural objectives are to:

- Maintain the natural forest in a healthy condition, with some areas in a relatively undisturbed state. This will include the provision of habitat trees and provide for their future replacement.
- Obtain adequate post-harvesting regeneration that is similar in species composition to that of the original forest.
- Provide for growth and development of regeneration.
- Produce multi-aged stands on a broader area basis.

The Wildlife Corridor, Riparian Habitat Zones and filter strips on the compartment will remain in a relatively undisturbed state.

Habitat trees will be retained to meet wildlife habitat requirements.

On the balance of the area selective logging techniques, including the Australian Group Selection system, will be implemented.

(b) Harvesting Method

The harvesting method proposed for the area is based on current accepted operational practices. It comprises:

- Chainsaw felling using directional felling techniques where required.
- Snigging of logs using a crawler tractor and/or a rubber tyred skidder.
- Debarking and loading of logs at the dump using an excavator or forklift.
- Transport of logs from the site using a jinker and prime mover.

A number of different log types will be produced by the harvesting. These will be segregated at the dumps and usually transported to different purchasers.

(c) Fire Management

Fire management is required to;

- limit damage to stands caused by wildfires
- ensure the establishment and survival of regeneration
- maintain wildlife habitat
- maintain hydrological conditions
- meet State Forests' obligations under the Bush Fires Act.

Fire management entails the quick response to wild fire occurrence to limit fire spread, and the maintenance of fine fuels at low levels, usually by burning under mild conditions, to decrease wild fire intensities. Activities are coordinated with other fire control agencies through the Ulmarra District Fire Plan.

In Compartments 81 and 82 bark and logging debris will be progressively spread through the logged area and/or accumulated in small heaps on the dump during the harvesting operation. Logging debris will be kept approximately 5 metres clear of identified habitat trees. Bark and logging debris will be burnt, and in the longer term fine fuels will be managed as detailed in the **Grafton District Fuel Management Plan 1993** and the **Ulmarra District Fire Plan**.

2.3 FLORA PROTECTION

Description 7 Presence of Protected or Endangered Plant Species

No species listed as Rare of Threatened have been detected in these compartments and none are expected to occur.

Reference Briggs, J.H. and Leigh J. H., 1988. Rare and Threatened Australian Plants, Aus NPWS
Grafton Management Area Environmental Impact Statement

Description 8 Presence of Rainforest

There are no areas of rainforest in the compartments.

Description 9 Protection of Plant Species

Not applicable to these compartments.

2.4 FAUNA PROTECTION

Description 10 Endangered and Protected Fauna Occurrence

(a) General

The Powerful Owl and Rufous Bettong have been detected in compartment 81, and there are old Yellow-bellied Glider V-notches on trees in this compartment. No Threatened species have been detected in compartment 82. Threatened species expected to occur in or in the vicinity of the compartments are;

Glossy Black Cockatoo	**Red Goshawk**	**Square-tailed Kite**
Swift Parrot	**Powerful Owl**	**Masked Owl**
Sooty Owl	**Stephen's Banded Snake**	**Yellow-bellied Glider**
Pale-headed Snake	**Brush-tailed Phascogale**	**Koala**
Rufous Bettong	**Common Planigale**	**Beccari's Mastiff Bat**
Yellow-bellied Sheath-tailed Bat		**Common Bent-wing Bat**
Hoary Bat	**Little Bent-wing Bat**	

References Grafton Management Area Environmental Impact Statement
SFNSW GIS Records

(b) Habitat Trees

Compartments 81 and 82 contains Dry Hardwood forest with xeromorphic understorey. Sufficient potential habitat and recruitment habitat trees exist in the net harvest area to allow for the retention of enough trees to meet prescription requirements.

(c) Wildlife Corridor

A designated Wildlife Corridor exists along Bom Bom Creek which forms the northern boundary of compartment 81 and the southern boundary of compartment 82, as shown on the Operational Map. The corridor is 40 metres wide either side of the creek.

(d) Riparian Habitat Zones

Riparian Habitat Zones exist 20 metres either side of streams (watercourses, drainage lines and drainage depressions) with catchments greater than 40 hectares.

(e) Refugia Areas

A Powerful Owl roost site has been located in compartment 81. The roost tree which is marked and had a buffer marked around it has blown over. Recent inspections have found no signs of the presence of the Owl. There will be no buffer established around the roost site, but a thorough search of gullies within 1.5 km of the site will be undertaken. No areas of critical habitat for Threatened Species have been located in the net harvest area and no refugia areas have been set aside.

Description 11 Species and Habitats Descriptions

Brief habitat descriptions for Threatened Species that might be adversely impacted by forest management activities on Compartments 81 and 82 are stated below:

(a) Critical Weight Range Species

The only Critical Weight Range species likely to occur in compartments 81 and 82 is the Rufous Bettong. Rufous Bettongs inhabit well grassed open forests and are commonly associated with Spotted Gum.

(b) Glossy Black Cockatoo

Glossy Black Cockatoos require stands containing species of Casuarina for food and large tree hollows for nesting in a range of hardwood forest types. Limited suitable Casuarina occur in the compartments and there are large trees in the compartments and nearby.

(c) Red Goshawk

Red Goshawks require large open woodland trees for nesting, often associated with riparian areas and swamps. Suitable habitat exists near to Divines State Forest.

(d) Square-tailed Kite

Square-tailed Kites prefer open forests and woodlands and may occasionally be seen over or near to the compartment.

(e) Swift Parrot

This parrot prefers open dry forests and woodlands with winter flowering eucalypts. It is nomadic, breeds in Tasmania and may occasionally be seen in or over the compartments.

(f) Powerful/Masked/Sooty Owls

These Owls inhabit forest margins and open areas, require large tree hollows for nesting, roost in large trees and require a home range. Suitable areas occur on and adjacent to the compartments.

(g) Stephen's Banded Snake and Pale-headed Snake

These snakes require tree hollows and old trunk scars. There is a scattering of suitable older trees through the compartments.

(h) Brush-tailed Phascogale

This species requires tree hollows for nesting and prefers open forest areas, foraging generally in large rough barked trees. The open eastern drainage line areas of the compartment might be suitable.

(i) Yellow-bellied Glider

Yellow-bellied Gliders require tree hollows for nesting, feed on eucalypt sap by cutting V-notches into the bark of certain eucalypts, eucalypt nectar and insects harvested beneath the loose bark of bark-shedding eucalypts. The lower eastern section of compartment 81 might be suitable habitat.

(j) Common Planigale

This species occurs in a wide range of habitats generally close to water or wet areas and requires some surface cover. The eastern creek lines in compartment 81 may be suitable habitat.

(k) Koala

Koalas feed on eucalypt leaves from a range of species and prefer higher nutrient areas. The lower elevated sections of the compartments are higher nutrient country.

(l) Yellow-bellied Sheath-tailed Bat

This bat roosts in tree hollows and occurs in a range of habitats including lower elevated dry forests. The compartments would seem suitable habitat though tree hollows might be limited.

(m) Beccari's Mastiff Bat

This bat roosts in tree hollows and appears to prefer open forests and woodlands. Compartments 81 and 82 and nearby areas would seem to be suitable habitat though tree hollows might be limited.

(n) Hoary Bat

This bat roosts in tree hollows and occurs in a range of habitats including open forests and woodlands. The compartments would seem suitable habitat though tree hollows might be limited.

(o) Little Bent-wing Bat/Common Bent-wing Bat

These bats roost in caves and similar structures and occur in most forests and woodland habitats.

References Grafton Management Area Environmental Impact Statement.
State Forests' Response to Submissions to the Grafton Environmental Impact Statement.

2.5 SOIL EROSION AND WATER POLLUTION CONTROL

Description 12 Site Soil and Water Data and Other Information

(a) Location

Compartments 81 and 82 are located in the south-eastern corner of Divines State Forest which in turn is located some 10 kilometres south of Grafton. See location map attached.

(b) Climate

Generally the climate in the Grafton area is sub-tropical with hot summers, mild winters and a distinct winter/spring dry season.

Rainfall

The average annual rainfall for the area is about 1050 mm

The annual rainfall erosivity - **R = 3300**

January to March is the wettest period while June to August is the driest period. Heavy rainfall events are common during summer and autumn. The monthly rainfall and monthly erosivity details are:

	J	F	M	A	M	J	J	A	S	O	N	D
Rainfall mm	186	107	97	39	40	97	47	51	41	121	87	106
Erosivity	608	544	384	132	64	96	64	64	192	224	352	480

Reference Rosewell C.J. & Turner J.B. (1992). *Rainfall Erosivity in New South Wales.* Technical Handbook No 11 (1st Edition), Soil Conservation Service of New South Wales.
Grafton Management Area Environmental Impact Statement.

Temperature

Mean maximum temperatures range from 30° in January/February down to about 20° in July/August. The mean minimum temperature range is from about 20° mid summer to around 5° July/August. These data give an indication that ground cover growth can be prolific during the warmer months but slows down considerably during the cooler drier winter periods and at times is basically nil.

(c) Geology

Compartments 81 and 82 are on the Grafton Formation, being lithic sandstone, siltstone, claystone clay-rich sedimentary deposits of Upper Jurassic-Cretaceous age.

Bedding planes

There are no obvious bedding or fracture planes in the area and no indications of mass movement.

References Veness & Associates (1994). Soils Report Grafton Environmental Impact Statement.

(d) Soils

The compartment is included in the Grafton Management Area EIS Study Soils Report carried out by Veness and Associates (published 1994). This study identifies Grafton Formation Unit soils as occurring in Compartments 81 and 82. Field inspection of the compartment indicate that the Grafton Formation unit soils do occur in the compartment.

Soil sampling of the area and soil testing has been carried out by J Veness of Veness & Associates Pty Ltd. Soil sample sites are indicated on the map included with the attached Soils Report. The attached letter from Veness & Associates describes the landform elements occurring within this and adjacent compartments, and the sampling for each element. Data from all samples covering landform elements within the compartments are used below.

Soil types

The soil derived from the Sediments is typed as Structured plastic clays or Yellow podsolic, Gleyed podsolic soils.

Description and profile

The soil is described as brown, pedal, slightly stony light clay and reddish brown, pedal, light clay topsoil layers to reddish brown, strongly pedal, sometimes stony, light medium clay and bright yellow brown, pedal, usually stony, light medium clay subsoil layers.

The topsoil layers are up to 30 cm in depth. The surface condition is described as either crusting hard-setting or friable with thin layer of decomposing plant litter and from 1 - 90% scattered stone fragments, which are usually ironstone.

References Veness & Associates (1994). Soils Report Grafton Environmental Impact Statement.

Erodibility

K values A horizon =0.035 (site 81/1/A; open depression) (Method B3)
K values B horizon =0.032 (site 82/2/B; ridge/crest) (Method B3)

Texture

A horizon - Fine Sandy Clay Loam
B horizon - Light Medium Clay

Dispersibility (Method D1) (site 82/2; ridge/crest)

%clay A horizon	10%(inclusive of gravels)
%clay B horizon	41%(inclusive of gravels)
D% A horizon	32%
D% B horizon	52%
%dispersible soil A horizon	10/100x32/100x100 = **3.20**
%dispersible soil B horizon	41/100x52/100x100 = **21.32**

The A horizon is not significantly dispersible.
The B horizon is significantly dispersible.

Reference Veness and Associates. Soils report Number VA1946A of 16th September, 1996 and letter of 17th September, 1996.

A copy of the above report and letter are attached.

Inherent fertility

The soils are relatively fertile compared generally with soils on State forests in the Grafton area, as is evident by the occurrence of the Red Gum and grass cover on the low elevated areas. The nearby private property is typical Clarence Valley open Red Gum/Apple woodland country. Much of the original stand in the forest would have been very open.

Depth to subsoils and bedrock

Subsoils are from around 30 cm, bedrock is at about 100 cm or much deeper and was not always reached by the sampling. The compartments are relatively flat and the harvesting should not often disturb the subsoil.

Existing erosion

There is some gullying along Bom Bom Creek and the major drainage lines in the compartments. There is also major erosion along the southern boundary of compartment 81, apparently associated with adjacent landuse, where drainage lines enter the forest from private property. These areas of the compartments will not be affected by the logging operations and will not deteriorate further as a result of the operations. All structures built during the most recent logging seem to be functioning. There is limited deposition of sand and fine gravel in some drainage lines. There is some hollowing out on the main creek lines and some more or less permanent water holes have been formed.

(e) Landform

Slope

Slopes are generally convex from the ridge tops down to the drainage lines. The whole of the compartments have slopes less than 10°. Absolute and percentage areas of slope classes are given in Tables 1a and 1b below.

Table 1a - Slope Class Areas cpt 81

Slope Class	0° - ≤5°	>5° - ≤10°	>10° - ≤15°	>15° - ≤20°	>20° - ≤25°	>25° - ≤30°	>30°
Area	224	27	1	nil	nil	nil	nil
% Area	89	10	1	0	0	0	0

Table 1b - Slope Class Areas cpt 82

Slope Class	0° - ≤5°	>5° - ≤10°	>10° - ≤15°	>15° - ≤20°	>20° - ≤25°	>25° - ≤30°	>30°
Area	102	36	2	nil	nil	nil	nil
% Area	73	26	1	0	0	0	0

Terrain

The compartments basically consist of the lower sections of broad, relatively flat secondary ridges with a number of short wide side ridges. The drainage lines are wide and near flat.

Drainage line condition

The drainage lines are incised in the higher areas of the compartment and then flatten out to become mostly broad and well grassed. There is limited deposition of sand and fine gravel. The channels tend to meander in the lower sections and there is evidence of cutting through bends during heavy rainfall events. Bom Bom Creek is protected by the Wildlife Corridor.

The flow in the streams is intermittent (in fact rarely run water) and the drainage lines and watercourses were dry, with the only water being in a few scattered holes after some heavy rainfalls, at the time of recent inspections.

Aspect

The aspect is generally north-east in compartment 81 and south-west in compartment 82.

Rockiness

There are no areas of rock on the compartments. The surface condition is described as either crusting hard-setting or friable with a thin layer of decomposing plant litter and from 1 - 90% of scattered stone fragments, which are usually ironstone.

(f) Hydrology

The compartments are in the Clarence River catchment. Both compartments drain into Bom Bom Creek, which runs north-east out of the forest and joins the Clarence River (as Deep Creek) at Ulmarra, about 10 km down river from Grafton. There are no prescribed streams, swamps or wetlands within the net harvest area.

No major water storages occur adjacent to or downstream from the compartments.

Verification of drainage lines

All drainage features verified during harvesting plan preparation as watercourses or drainage lines are shown on the harvesting plan Operational Map with filter strip protection (unless already protected by other harvesting exclusions). Other smaller drainage features which are not marked on the map must be inspected by the SFO during tree marking and given protection in accordance with the Pollution Control Licence.

Representative water monitoring sites

The representative water monitoring site is Chaelundi (Sandstone, Rainfall 800 mm)

Previous harvesting

The forest was one of the original sources of hardwood timber in the Clarence areas and was cut over and apparently had regenerated to some extent by the late 1800s. The compartments were extensively treated ("ringbarked and mattocked") in the period 1911-15. They were harvested more or less on an annual basis, mostly for poles, girders and sleeper material, from the 1920s to the 1960s and treated on a number of occasions. Compartments 81 and 82 were last logged during 1991 for poles and girders. Erosion mitigation structures were constructed on snig tracks and minor roads during the 1991 logging.

Upstream catchment water use

Cattle grazing - about 500 hectares of open freehold grazing country with native grasses and patches of timber. Watering is mostly by ground tanks.

Downstream catchment water use

Bom Bom Creek flows through grazing country before joining the Clarence River. There would be limited stock watering along its length before it becomes salty.

Domestic water use

There is no domestic water supply drawn from the Clarence below the Bom Bom Creek junction.

(g) Vegetation and Ground-Cover

Effect on ground-cover during operations

The harvest operations are expected to remove less than 20% of the overall ground cover of the net harvest area.

(h) Proposed Operation System

Use of existing roads

Existing roads have been evaluated for their potential to cause water pollution.

Boundary Road runs for 6.0 km through the forest and along the northern boundary of compartment 82 for 0.8 km. Popes Road gives access to compartment 81 and runs for 2.8 km to a long established minor road, Southern Boundary Road, which runs for 3.0 km and gives access within compartment 81 along the eastern and southern boundaries of the compartment. Divines Flat Road runs for 3.0 km with approximately half of this length running through compartment 82. These roads are crowned, effectively drained by table drains and mitres, are permanently maintained (Southern Boundary Road has been irregularly maintained), and are the main access roads to the compartments. It is expected that in compartment 81 only the road along the eastern boundary, Southern Boundary Road to Popes Road, will be used to exit the compartment during the logging operation. The width of the running surface of the roads is 6 m. The batters are stable and well vegetated. The average height of the cut and fill batters is approximately 40 cm and the maximum height of the cut and fill batters is about 1.0 m.

Routine maintenance, including grading and gravelling, may be required on Boundary Road and/or Southern Boundary Road during the operation. If required, this will be undertaken to ensure effective drainage on these roads. The operation would involve reforming the road

shape, opening of mitre and table drains, and spreading gravel where there is insufficient existing material to restore the pavement.

Minor roads, 81/1 (1.8 km), 81/2 (1.4 km), 81/3 (1.0 km) and 81/4 (0.7 km) Roads, give access to ridges in compartment 81, and 82/1 (0.6 km), 82/2 (0.4 km) and 82/3 (0.3 km) Roads give access to ridges in compartment 82. These will be reopened for use during the logging operations. The width of the running surfaces on these roads is 4-6 m. These roads are long established, crowned, effectively drained by table drains and mitres and are irregularly maintained open by grading. The maximum road grade within the compartments is 11° (for a distance of about 10 m), with the majority of the roads ranging between 0° and 4°.

The pavements of all the roads are consolidated by long use and the verges are well grassed. Sections have recently been graded. None of the existing roads are likely to cause significant water pollution.

Two small trees will be cleared off the road to dump 7 in compartment 81 and the radius of the curve on Southern Boundary Road right at the south-east corner of the compartment will be increased to allow traffic by log trucks. There will be no need to establish borrow pits or gravel pits.

Reopening will otherwise involve removal of fallen timber and regrowth from the road pavement and lowering crossfall banks constructed during the 1991 logging. This will be done by logging machinery and will cause minimal disturbance to the road pavements.

Use of existing drainage feature crossings

There are a number of drainage feature crossings in compartment 81, only four of which will be used during the operation (including one just outside the compartment boundary). Southern Boundary Road crosses Bom Bom Creek on the northern boundary and also crosses drainage features in the southern end of compartment 81. Crossings to be used are identified on the Operational Map

Crossing A is a drainage depression crossing immediately north of the crossing over Bom Bom Creek. On the northern approach to crossing A, the existing road breaks into two approaches for a short distance of approximately 40 m. Before the commencement of operations, the western approach will be closed and a crossbank will be constructed. There is 15 metres of box cut at the bottom of the hill on the eastern approach. A drainage structure will be constructed before the commencement of operations, and a sediment trap installed at the outlet.

Crossing B, over Bom Bom Creek, is a long established, stable, open, natural surface causeway. The stability of the crossing will be maintained during the course of the logging operation by placing a log on the underside of the crossing, backfilling with gravel and gravelling the approaches to the crossings.

Crossing C is a long established, stable, open, natural surface causeway. The stability will be maintained by placing a log on the underside. Gravel will be placed on the crossing and approaches if they begin to deform.

The northern approach to crossing C will require some minor work, consisting of the batters to be laid back in order to allow traffic by log trucks without damaging the existing batters. This will be required for a length of 5 metres with the batters not exceeding a height of 1 metre. The batters will be seeded with Japanese millet (or another suitable grass species) at the rate of 20 kg/ha.

Crossing D currently has a mitre drain diverting water from the road into the drainage line. A sediment trap will be installed at the outlet of this drain. Both the eastern and western approaches will have gravel placed on them and gravel will be spread over the crossing itself.

A dropdown structure (of sandbags and/or prefabricated fluming) will be placed on the underside of the crossing to minimise the amount of deposition into the drainage line. A dissipater will be placed at the outlet of the dropdown structure.

The approaches to all the crossings being used in this operation will need to be flattened to allow easier access by the logging trucks. Where the approaches do not have adequate drainage, outfall drainage will be reinstated or drainage structures will be installed to divert water onto undisturbed vegetation.

There are a number of other drainage feature crossings on 81/2 and 81/4 Roads. These crossings will not be used during the logging operations, however drainage will be constructed on the approaches to divert water onto undisturbed vegetation.

Disturbance to drainage lines and adjacent areas will be minimised during this work, and any disturbed areas will be seeded with Japanese millet (or other suitable species) at the rate of 20 kg/ha immediately after the operation.

Road construction

There is no road construction required for this operation.

Construction of drainage feature crossings

There is no construction of drainage feature crossings required for this operation.

Harvesting

The harvesting method proposed for the area is based on current accepted operational practices. It comprises:

- Chainsaw felling, using directional felling techniques where required.
- Snigging of logs using an articulated rubber tyred skidder and/or a crawler tractor.
- Debarking and loading of logs at the dump using an excavator or forklift.
- Transport of logs from the site using a jinker and prime mover.

The crawler tractor is used for construction work and snigging from steeper slopes including winching of logs and snigging larger logs. The rubber-tyred skidder is used on the flatter terrain, for snigging smaller logs and logs from steeper areas that have been bunched by the tractor.

Cover factor

The harvesting operations described above result in a cover factor (in accordance with PCL Sch 4, Part A, Table 2) of **C = 0.108**.

Location of log dumps

Log dumps are located on ridge tops to facilitate uphill snigging, as indicated on the operational map. There will be limited downhill snigging to dumps 1 - 9 and 11 in compartment 81 and dumps 1 - 7, 9 and 10 in compartment 82 to reduce snigging distances and take advantage of previously constructed log dumps, snig tracks and drainage line crossings. These snig tracks and drainage line crossings are stable. Less than 10% of the snigging activity will be downhill.

Log dumps will be located as indicated on the Operational Map.

Post-harvest burning

In Compartments 81 and 82 bark and logging debris will be progressively spread through the logged area during the harvesting operation and/or accumulated in small heaps on log dumps. Logging debris will be kept approximately 5 metres clear of identified habitat trees. Bark and logging debris will be burnt, and in the longer term fine fuels will be managed as detailed in the Grafton District Fuel Management Plan (1993) and the Ulmarra District Fire Plan.

Post-harvest rehabilitation

Natural regeneration and natural re-seeding of overstorey, understorey and ground-cover plants will provide ground cover rehabilitation. Supervision by the SFO and fortnightly check sheets will assess that road surfaces, batters and drainage structures are stable at the completion of operations and prior to the shifting of the contractor.

Description 13 Evaluation of Soil and Water Data

(a) Soil Erosion and Water Pollution Hazard Categories

Soil Erosion and Water Pollution Ratings (SE/WPR) have been assessed using SOILOSS 5.1. The Ratings have then been used to assess Soil Erosion and Water Pollution Categories (SE/WPC) for the net harvest area. The topsoil data from site 81/1 give lower slopes for the categories and have been used in the calculations. Details are in Table 2 below.

SE/WPR = R x K x LS x C (5.1) where:

R = 3300

K = 0.035 **Topsoil (A horizon)** Method B3

K = 0.032 **Subsoil (B horizon)** Method B3

S = As factored in SOILOSS 5.1

L = 20 metres

C = 0.108 Native forest harvesting "B" Table 2

P = 1.0

Table 2: Water Pollution Hazard Categories

Slope Ranges (Degrees)	Water Pollution Category	Indicative % of Net Harvest Area	
		cpt 81	cpt 82
0 - ≤4	1	80	70
>4 - ≤16	2	20	30
>16 - ≤30	3	N/A	N/A
Roads	3	N/A	N/A

The following factors for rainfall erosivity and soil erodibility also apply to road construction:

R = 3300 **K = 0.035**

(b) Dispersibility

%dispersible soil A horizon = 10/100x32/100x100 = **3.20** (Method D1)

%dispersible soil B horizon = 41/100x52/100x100 = **21.32** (Method D1)

The A horizon is not significantly dispersible.

The B horizon is significantly dispersible.

(c) Other Factors

There are no other soil erosion or water pollution factors which need to be considered in relation to the planned harvesting of Compartments 81 and 82.

References

Standard Erosion Mitigation Guidelines for Logging in New South Wales **Soil Conservation Service, CaLM, NSW 1993**

Rosewall C.J. SOILOSS A program to assist in the selection of management practices to reduce erosion

Soil Conservation Service Technical handbook No. 11 First Edition 1990, **2nd Edition** 1993.

2.6 FOREST ZONING AND SPECIAL ATTRIBUTES

Description 14 Forest Zoning and Special Attributes

(a) Research Plots

There are no research plots or long term inventory plots in the net harvest area.

(b) Special Attributes of the Area.

There are no special attributes associated with these compartments.

Part 3 AUTHORISATION CONDITIONS

3.1 COMPLIANCE

(a) Area Identification

GRAFTON DISTRICT

Divines State Forest No. 25

Compartments 81 and 82

Grafton Management Area

(b) Third Party/Lessee or Other Interest

The compartments are within the area of Occupational Permit No 11955 held by J. P. Lloyd for the purpose of grazing.

(c) Environmental Compliance Requirements

This Harvesting Plan is prepared by State Forests of New South Wales (State Forests) under the authority of the Forestry Act 1916. This Harvesting Plan is a condition of all Timber, Forest Products, Contractors and Operators Licences issued in connection with the timber harvesting operations described in the Plan.

All operations conducted under the authority of the Timber Licence and other Licences and Agreements issued for the area covered by this Harvesting Plan must comply with:

- Licence conditions issued by State Forests under the Forestry Act 1916.
- the **"Forest Practices Code Part 2 - Timber Harvesting in Native Forests"** - State Forests (1993).
- the **"Standard Erosion Mitigation Guidelines for Logging in New South Wales" (SEMGL 1993)** issued by the Soil Conservation Service of Department of Land & Water Conservation (LaWC).
- the conditions of **Pollution Control Licence No 4017** issued by the Environment Protection Authority under the Pollution Control Act 1970. Those general conditions which affect licensees are set out in Schedule "A" attached to every Timber, Contractors and Operators Licence.
- conditions attached to licences issued by the National Parks and Wildlife Service under the Endangered Fauna (Interim Protection) Act 1992 and the National Parks and Wildlife Act 1974 (NPW Act).
- conditions resulting from the determination of the **Grafton Management Area Environmental Impact Statement**.
- the silvicultural specifications as stated in the **Grafton Management Area Environmental Impact Statement** (as amended by Operational Circular 95/14 of 30/10/95).
- the schedule of specifications for the harvesting and utilisation of timber applicable to this operation, in this case:

- **Grafton/Coffs Harbour Compulsory Sawlog Specification Hardwood Sawlog Flat Rate Royalty Utilisation Standards**
- **Specification for Eucalypt Veneer Logs for Rotary Peeling**
- **Australian Standard AS2209 - 1979 (poles)**

- the Code of Procedure for the measurement of timber and other products applicable to this operation, in this case:
  - **Code of Procedure for the Measurement of Hardwood Logs and other Timber Products - Northern Region.**

Variations, additions or amendments to the above documents may be made by the responsible authorities at any time, and must be implemented immediately by the State Forests Licensee.

(d) Environmental Planning & Assessment Act Requirements

In preparing this Harvesting Plan, the requirements of Part V of the EPA Act (as amended) and Section 92 of the NPW Act have been considered and Grafton Management Area Environmental Impact Statement (EIS) has been produced.

(e) Breaches and Infringements

Non-compliance with any condition or instruction set out in this Harvesting Plan will be dealt with in accordance with Section 4 of the **"Forest Practices Code Part 2 - Timber Harvesting in Native Forests"**. Serious breaches may lead to the issue of a penalty notice, licensee suspension or prosecution.

(f) Variations and Amendments to this Harvesting Plan

Conditions and requirements relating to the Pollution Control Licence cannot be varied in the field without the prior written approval of the EPA, other than those areas detailed in Condition 5.1 (c), or consistent with condition 24A of the Pollution Control Licence.

Variations and other specified approvals detailed Condition 5.1(c), or consistent with condition 24A of the Pollution Control Licence may be made by the Supervising Forest Officer to this Harvesting Plan, subject to the District Forester's counter approval.

Other approvals may only be made by the Supervising Forester and are also subject to the District Forester's counter approval. Major variations that relate to the conditions of the Pollution Control Licence, minor variations that would result in an increased risk of water pollution, or any variation relating tc drainage feature protection conditions can only be made with the prior written approval of the EPA.

All approvals must be recorded on a variation advice, attached as Part 6 to all operational copies of this Harvesting Plan.

This Plan must not be amended by a licensee or contractor.

(g) Harvesting Plan Availability

Copies of this Harvesting Plan must be held available by the contractor or bush supervisor at the site of timber-harvesting operations at all times that felling, snigging or environmental work is being undertaken within the area covered by this Harvesting Plan.

3.2 CERTIFICATION

(a) Plan Preparation

Prepared by: Angela Iliopoulos Signature: .....

Title: Forest Assistant Date: 18/10/96

(b) District Approval

I approve the issue of this Harvesting Plan subject to any amendments, endorsements or approvals that may be made following submission to the National Parks and Wildlife Service, the Environment Protection Authority and/or the Regulatory and Public Information Committee (constituted under the Timber Industry (Interim Protection) Act, 1993 as amended).

The date that operations will need to commence is: 25 NOV, 1996

Signature: ..... District Forester Date: 21 Oct, 1996

(c) Receipt of External Authority Approvals

(To be completed by the District Forester or a person nominated by the District Forester who must attach the relevant amendments to the Plan.)

Table 3: External Authority Approvals

Name of Authority	Date Received	Attached to Plan by
NPWS		
EPA		
RaPIC		
Other Authority		

I note approval of this Harvesting Plan from the above-mentioned authorities, together with the amendments they have required to be included in the Plan.

These amendments have been included in the final Plan. This Harvesting Plan comprises pages 1 - 43, attachments and the Operational, Forest Types and Locality maps marked and referenced to this Harvesting Plan. This is Harvesting Plan No. CG 96/09/81

Date for commencement of operations: .....

Signature: ..... Date: .....

District Forester

3.3 DISTRIBUTION

Recipient	Parts	Minimum Copies
Timber Licensee	1,3,4	1
Contractors	1,3,4	1
Operator(s) (where required)	1,3,4	
Supervising Forest Officer(s) [SFO(s)]	1 ,3-5, (2 optional)	1
Supervising Forester(s)	All	
District Forester	All	
District Office Register	All	
Compartment History File	All	1
Regional Office (optional)	All	
Community Groups		
Soil Conservationist (Forestry)	All	

Forest Planning Branch, Head Office, for distribution to:

Regulatory and Public Information Committee	All	3
National Parks And Wildlife Service	All	2
Environment Protection Authority	All	3
Department of Lands and Water Conservation (for harvesting in other Crown-timber lands)	All	1

3.4 INDUSTRY ENDORSEMENT

I endorse the harvesting plan on behalf of industry.

Signature: ..... Licence No.: ..... Date: .....

Position: ..... Company: .....

Signature: ..... Licence No.: ..... Date: .....

Position: ..... Company: .....

Signature: ..... Licence No.: ..... Date: .....

Position: ..... Company: .....

3.5 BUSH SUPERVISORS ACKNOWLEDGMENT

I acknowledge that I have received a copy of Harvesting Plan No GG 96/09/81 and that I understand the conditions of the Plan as explained to me by a State Forests officer.

Signature: ..... Licence No: ..... Date: .....

Position.....

Signature: ..... Licence No: ..... Date: .....

Position.....

Signature: ..... Licence No: ..... Date: .....

Position.....

Part 4 OPERATIONAL CONDITIONS

The Tree-marking Code shown in this Plan will be used to apply other Conditions of this Plan as required. All necessary tree-marking in the field must be carried out before and during the harvesting operation by the SFO. Product marking will generally be for extraction.

4.1 Harvesting Activity Description

The logging will be a selective harvesting operation in maturing and regrowth native hardwood forest. The products that will be harvested are sawlogs, poles and veneer logs.

4.2 Tree-marking Code and Harvest Regulation

Tree Marking Code

(a) **Trees to be removed**

Trees will be marked with a **dot**. Some trees may also be marked to produce a specific log type; **P** = Pole, **G** = girder, **V** = veneer log.

(b) **Trees to be retained**

Trees will be marked with a **horizontal line**. Some trees may be marked for a specific purpose; **H** = habitat tree, **R** = recruitment habitat tree.

(c) **Trees marked for information**

Two horizontal lines indicates that machinery is not permitted past the point but there may be trees to be felled. **Three horizontal lines** indicates that machinery and that felling is not permitted past the point. **F** = wildlife corridor, **Z** = riparian zone, "**5**", "**10**", "**15**", "**20**", or "**25**" = buffer or filter strip width as appropriate. **D** = dump site, **O** = compartment boundary.

Forest boundaries are marked by yellow painted **blazes** and/or **sawn stakes**.

Vertical line indicates location of a minor road or snig track. **Vertical lines with arrowheads** indicates an approved crossing.

X = cancellation mark

Reference: Northern Region Tree Marking Code (1995)

4.3 Order of Working

(a) **Wet Weather, Dry Weather and Intermediate Areas.**

11 dump sites have been located and marked in compartment 81 and 10 dumps sites in compartment 82, as indicated on the Operational Map. Dumps 5 - 8 and 10 in compartment 81 and dumps 7-9 in compartment 82 have been designated as suitable for working when conditions are wet. While allowing for wet conditions, harvesting will generally commence on dump 1 and work progressively through to dump 11 and dump 1 through to dump 10 in compartments 81 and 82 respectively.

The SFO is responsible for determining the order of working in the field.

(b) Wet Weather Controls - Roads

During wet weather, the wet-weather controls set out in Section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests) apply. In particular, when it is raining and/or where runoff occurs from a road surface, haulage must not occur unless the road is a gravel or sealed road.

[FPC Pt2 7.2, PCL Sch 4 C 85]

(c) Wet Weather Controls - Snigging

During wet weather, snig tracks must not be used where:

(i) there is runoff from the track surface, or;

(ii) there is a likelihood of significant rutting leading to turbid runoff from the track surface. [FPC Pt2 7.2, PCL Sch 4 C 96]

4.4 Silviculture

(a) General

The aim of the harvest is to promote growth on retained trees and to create conditions that will allow the establishment and growth of regeneration. Selective logging techniques, including the Australian Group Selection system where appropriate, shall be implemented.

(b) Tree Marking

Tree marking shall aim at:

Retaining trees capable of net merchantable timber value increment for cutting in future cutting cycles, except where:

a) the removal would result in more valuable increment on preferred retained trees (redistribution).

b) the tree has been or is likely to be significantly damaged during the course of harvesting operations.

c) the removal of a small group of merchantable trees would create favourable conditions for the establishment and growth of regeneration.

In general tree marking and supervision shall be directed towards:

1. Harvesting for the highest economic end use for which markets are available.

2. Ensuring maximum economic utilisation of all trees felled.

3. Minimising damage to the retained stand and minimising soil disturbance in excess of that required for successful regeneration establishment.

Tree marking for removal must be carried out by the SFO.

Reference Grafton Management Area Environmental Impact Statement
Jacobs (1955) Growth Habits of the Eucalypts. Forestry and Timber Bureau. Commonwealth Government Printer, Canberra.

(c) Harvesting Debris

Debris must be removed from within approximately 5 metres of the butts of retained habitat trees to minimise bark scorch during prescribed burning operations, or any wild fire.

Harvesting debris which is likely to impede the flow of water in road drainage structures must be removed from such structures every 2 days.

Bark and debris produced by the harvesting must be returned to the logging area and dispersed as far as practicable around the net harvest area and/or stacked in small heaps on log dumps.

(d) Directional Felling

Directional felling techniques must be employed to minimise damage to retained trees, to avoid hang ups and to maintain values of the Wildlife Corridor, Riparian Habitat Zones, filter strips and buffer strips.

Directional felling must also be used to avoid falling trees onto road batters.

4.5 Flora Protection

(a) Rare or Endangered Species

No occurrences of rare or threatened flora are recorded on the compartments and none were encountered during field inspections.

(b) Rainforest Protection

There are no areas of rainforest in the compartments.

4.6 Fauna Protection

(a) Sightings of Fauna

The Powerful Owl and Rufous Bettong have been detected in compartment 81, and there are also old Yellow-bellied Glider V-notches in this compartment. No Threatened species have been recorded in compartment 82. Threatened species expected to occur in or in the vicinity of the compartments are;

Glossy Black Cockatoo	**Red Goshawk**	**Square-tailed Kite**
Swift Parrot	**Powerful Owl**	**Masked Owl**
Sooty Owl	**Stephen's Banded Snake**	**Yellow-Bellied Glider**
Pale-Headed Snake	**Brush-tailed Phascogale**	**Koala**
Rufous Bettong	**Common Planigale**	**Beccari's Bat**
Yellow-bellied Sheath-tailed Bat		**Common Bent-wing Bat**
Hoary Bat	**Little Bent-wing Bat**	

Contractors and supervisory staff shall report any sightings of Threatened species to the District Marketing Forester. Such confirmed sightings or findings shall generate the application of the appropriate prescriptions to reduce the impact on the species.

(b) Habitat Trees

Compartments 81 and 82 include Dry Hardwood forest with xeromorphic understorey. Sufficient potential habitat and recruitment habitat trees exist in the net harvest area to allow for the retention of enough trees to meet prescription requirements.

Prescription 1:

Habitat Tree Retention

Habitat tree retention in Dry Hardwood and Moist Hardwood forests with a xeromorphic understorey shall be four trees per hectare. For the purpose of this prescription a xeromorphic understorey is considered to be one composed predominantly of grasses, heath and/or shrubs with sclerophyllous leaves.

Habitat tree retention in Moist Hardwood forests with a mesic understorey shall be six trees per hectare. For the purpose of this prescription a mesic understorey is considered to be one composed predominantly of moist elements such as vines, shrubs with mesophyllous leaves and/or species often found in Rainforest areas.

Habitat trees will be live hollow bearing trees. They are to be well spaced throughout the compartment being harvested, consistent with requirements for adequate regeneration and growth for the species of the forest types. Where the specified density of habitat trees is not present the existing density is to be retained. Sufficient recruitment habitat trees to sustain the retained density of habitat trees into perpetuity are also to be retained. Stags shall not be counted as habitat trees.

Habitat trees shall be marked by the SFO.

All practical precautions must be taken to avoid tree heads landing adjacent to identified habitat trees. Tree heads shall be removed from within approximately 5 metres of identified habitat trees. Tree heads shall be removed with minimum disturbance to understorey vegetation and on-ground logs.

(c) Non Harvest and Modified Harvest Areas

Wildlife Corridor

A designated Wildlife Corridor (PMP 1.1.7 - Flora and Fauna Protection) exists along Bom Bom Creek on the boundary between the two compartments, as shown on the Operational Map. The corridor is 40 metres wide on either side of the creek.

- harvesting machinery must not enter the Wildlife Corridor.
- felling and snigging must be excluded from the Wildlife Corridor.
- trees must not be felled into the Wildlife Corridor.
- trees must not be damaged in the Wildlife Corridor.

Riparian Habitat Zones

Riparian Habitat Zones exist 20 metres either side of streams (watercourses, drainage lines and drainage depressions) with catchments greater than 40 hectares.

- except to use crossings harvesting machinery must not enter Riparian Habitat Zones.
- felling and snigging must be excluded from Riparian Habitat Zones.
- trees must not be felled into Riparian Habitat Zones.
- trees must not be damaged in Riparian Habitat Zones.

Refugia areas

No areas of critical habitat for Threatened species have been located in the net harvest area and no refugia areas have been set aside.

(d) Species and Mitigation Prescriptions

Mitigation prescriptions to be applied in Grafton Management Area have been determined for Threatened species that might be adversely impacted on by forest management activities. Those relevant to Compartments 81 and 82 are stated below. The appropriate mitigation prescription shall be immediately applied when any of the listed species is sighted or critical habitat is located.

Prescription 2:

Preservation of Critical Weight Range species

In applying the following prescription it should be noted that the *Bush Fires Act* 1949 overrides Section 99 (1) of the *National Parks and Wildlife Act* 1974. That is, it is not an offence to undertake an activity which will take or kill any endangered fauna if that activity is authorised or required by a section 41A plan or authorised or required under the Bush Fires Act.

Given the above, the prescription should only be seen as a guide for managing the habitat of critical weight range (CWR) fauna.

Critical weight range species expected to occur in the compartments is the Rufous Bettong.

SFNSW are to ensure, to the fullest extent practicable, that any post-logging burning is to be carried out in such a manner that encroachment into critical habitat for those species listed above is prevented. This can be achieved by carrying out post-logging burning under weather and fuel conditions which minimises the chance of encroachment into critical habitat and minimises the destruction of large fallen logs (ie. those logs with a diameter greater than 40 cm).

For the purpose of this prescription critical habitat for the Rufous Bettong is defined as well grassed open forest and woodland, and large fallen logs of greater than 40 cm diameter.

Prescription 3

Glossy Black Cockatoo

All practical attempts must be made to minimise disturbance to mature feeding forest oaks throughout the logging area. On location of a nest tree the NPWS's Manager

Threatened Species, Northern Zone is to be informed and logging in the immediate area (ie within 100 metre radius) is to cease pending delineation of an appropriate buffer by a joint NPWS / SFNSW inspection of the area.

Prescription 4

Red Goshawk

200 metre radius buffer zone must be established around each identified nest site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded in the management area.

Prescription 5

Square Tailed Kite

200 metre radius buffer zone must be established around each identified nest site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded in the management area.

Prescription 6

Powerful/Masked/Sooty Owls

A search of gullies within 1.5 km of the old roost tree (indicated on the Operational Map) must be undertaken prior to harvesting for possible nest and roost sites. A 100 metre radius disturbance free zone must be established around each identified roost site, and a 200 m radius disturbance free zone around each identified nest site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded in the management area.

Prescription 7

Stephen's Banded Snake and Pale-headed Snake

100 metre buffer zone must be established round each identified location site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded in the management area.

Prescription 8

Brush-tailed Phascogale

200 metre radius buffer zone must be established around each identified nest site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded in the management area.

Prescription 9

Yellow-bellied Glider

Sites in compartment 81 where feed trees have already been identified are indicated on the Operational Map. All trees with V-notch markings must be retained.

The tree with the most recent V-notch markings or other incisions must be the centre tree of an area with 100 metres radius. Within this area the following trees will be retained: a minimum of 30 trees (>10cm dbh) of the sap feed tree species, and a minimum of 15 bark shedding trees.

Where there is more than one marked feed tree within the 100 metre radius, the additional feed trees may count as those feed trees to be retained.

Prescription 10

Koala

If a koala is observed during logging, numerous dung pellets (more than twenty below tree) are found, or less than twenty pellets of different sizes are found, logging will be excluded from within a 100 metre radius of the site and a survey undertaken.

The survey must be undertaken according to the agreed coastal prescription for koalas. Tree felling will be excluded from within fifty metres of a high use area, or modified within intermediate areas.

Prescription 11

Yellow-bellied Sheath-tailed Bat

100 metre radius buffer zone must be established around each identified roost site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded in the management area.

Prescription 12

Beccari's Mastiff Bat

100 metre radius buffer zone must be established around each identified roost site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded in the management area.

Prescription 13

Hoary Bat

100 metres radius buffer zone must be established around each identified roost site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded in the management area.

Prescription 14

Little Bent-wing Bat/Common Bent-wing Bat

100 metre radius buffer zone must be established around each identified roost site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded in the management area.

References Environmental Impact Statement Grafton Management Area.
State Forests' Response to Submissions to the Grafton Environmental Impact Statement.

4.7 Soil Erosion and Water Pollution Control Conditions

(a) Soil Erosion and Water Pollution Categories

The calculated Soil Erosion and Water Pollution Categories for Compartments 81 and 82, based on the topsoil data from site 81/1, are detailed in Table 4 below.

Table 4 - Water Pollution Hazard Categories

Slope Ranges (Degrees)	Water Pollution Category	Indicative % of Net Harvest Area	
0 - ≤4	1	80	70
>4 - ≤16	2	20	30
>16 - ≤30	3	N/A	N/A
Roads	3	N/A	N/A

(b) Approved Timber Harvesting and Extraction Method

- Chainsaw felling, using directional felling techniques where required.
- Snigging of logs using a crawler tractor and/or a rubber tyred skidder.
- Debarking and loading of logs at the dump using an excavator or forklift.
- Transport of logs from the site using a jinker and prime mover.

(c) Marking and Location of Roads, Log Dumps, and Crossings

The marking and location of roads, log dumps, and crossings in the field must be in accordance with condition 4.2. The location of roads, drainage feature crossings and log dumps are indicated on the Operational Map.

(d) Wet Weather Controls

Harvesting operations may be conducted throughout the year subject to the application of normal wet weather closure procedures as per Section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests). During wet weather, the wet weather controls for road usage and for snigging set out in section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests) will apply. In particular, where:

i) runoff occurs from a road surface:

- haulage must cease on natural surface roads.

ii) there is runoff from a snig track surface:

- snig tracks must not be used.

(iii) there is a likelihood of significant rutting leading to turbid runoff from a snig track surface;

- snig tracks must not be used.

(iv) it is raining:

- operations must cease.

In any event, if:

rutting of a snig track is, or is likely to approach a maximum of 200 mm below the natural surface, measured over any 20 metre length of track, snig tracks must not be used.

Dumps 5 -8 and 10 in compartment 81, and dumps 7-9 in compartment 82 respectively, as marked on the Operational Map, are suitable to be worked during wet weather periods.

(e) Existing Roads

Clearing of regrowth

Reopening of existing roads will involve lowering of crossbanks and the removal of fallen timber and small regrowth trees from the road pavement and edges. This work must be kept to the minimum required to allow use of existing roads, and no more than 1 m width may be cleared from either side of the road pavement. Road batters must not be disturbed.

Two small trees are to be cleared off the road to dump 7 in compartment 81 and the radius of curve on the road right at the south-east corner of the compartment will be increased to allow traffic by log trucks. This work must be kept to the minimum necessary.

Road surface drainage

Rollover crossbanks may be required on some sections of the minor roads to log dumps where outfall drainage has not been established or is inadequate. Where required, rollover crossbanks must be spaced as stated in the Table below. The banks must have a minimum design consolidated vertical height from spillway to bank top of 20 cm. Such banks will convey the peak flow of a 1 in 5 year storm event (see calculations attached as Appendix 2).

Spacing of Rollover Crossbank Drainage
(grade of road - degrees)

0 - ≤5	>5 - ≤10	over 10
100m	60m	40m

Rollover crossbanks must drain onto undisturbed vegetation or logging slash wherever possible. Where it is necessary to convey runoff water over a fill batter greater than 1 m high, that has been disturbed by the operation or on which the soil is exposed, drop down structures constructed of rock or prefabricated fluming must be installed. Dissipaters must be installed at the bottom of drop down structures.

Road drainage must minimise the flow of unchecked water onto extraction tracks, snig tracks or log dumps. Where this cannot be achieved by outfall drainage, a rollover crossbank must be placed as close as possible to the track or dump, consistent with haulage practicalities, to minimise the catchment area above it.

While a road is in use for hauling timber, spoon drains may be used in preference to rollover banks, but must be converted to rollover banks on completion of operations in the area.

Crossing of drainage features

The following work must be completed on drainage feature crossings prior to the crossings being used for haulage. Crossings to be used are identified on the Operational Map.

The approaches to all crossings to be used will require some flattening. This must be kept to the minimum required to allow use by logging trucks.

Where there is not adequate drainage on the approach to any crossing, outfall drainage must be reinstated or a drainage structure must be installed. Consistent with haulage practicalities, this structure must be as close as possible to the crossing, but there should be at least 5 metres of undisturbed vegetation between the outlet of the structure and the drainage feature. Where there is insufficient undisturbed vegetation, a sediment trap must be installed at the outlet of the drainage structure.

Crossing A (drainage depression)

Where the northern approach to the crossing breaks into two for a short distance, the western section must be closed by construction of a crossbank of sufficient dimensions to prevent use by vehicles.

On the eastern section (which will be used), the approach is to be flattened. This must be kept to the minimum necessary to allow use by logging trucks. A drainage structure must be constructed at the bottom of the hill, and a sediment trap installed at the outlet.

Crossing B (Bom Bom Ck)

A log must be placed on the bottom side of the crossing. The crossing and the approaches must be gravelled.

Crossing C

The batters of the northern approach must be laid back no more than necessary to allow log trucks to pass without damaging batters. This is to be done over a distance of no more than five metres. The disturbed batters must be seeded with Japanese millet (or another suitable grass species) at the rate of 20 kg/ha.

A log must be placed on the bottom side of the crossing. If the pavement of the crossing and/or approaches begin to deform, it must be gravelled.

Crossing D

The approaches and crossing must be gravelled. Sandbags and/or prefabricated fluming must be placed on the bottom side of the crossing as a dropdown structure, and a dissipater installed at the outlet.

A sediment trap must be installed at the outlet of a mitre drain on the approach to the crossing currently diverting water into the drainage line.

Other crossings

There are a number of other drainage feature crossings on 81/2 and 81/4 Roads. These must not be used to haul timber. Where there is not adequate drainage on the approaches to these crossings, outfall drainage must be reinstated, or a drainage structure installed. This structure must be as close as possible to the crossing, but there should be at least 5 metres of undisturbed vegetation between the outlet of the structure and the drainage feature. Where there is insufficient undisturbed vegetation, a sediment trap must be installed at the outlet of the drainage structure.

Disturbed sites on any crossing or adjacent area must be seeded with Japanese millet (or other suitable species) at the rate of 20 kg/ha immediately after the operation.

These causeways will remain in situ after logging has been completed.

Road maintenance

Road maintenance must be undertaken if road drainage becomes ineffective, or the road pavement deforms to the extent that a potential safety hazard or risk to machinery develops. Effective road drainage, complying with the conditions of the Pollution Control Licence, must be reinstated.

Gravel must be spread on road sections where there is inadequate existing material to reform the road and maintain effective crossfall or crown profile.

Disturbance to cut batters and stable, vegetated table drains must be avoided.

The direction of grading must be away from crossings. When working in mitre drains, the machine must reverse down the drain and grade back onto the road where practicable. When reinstating outfall drainage, outside windrows must be graded back onto the road where practicable, not brushed off the side.

Spoil must not be deposited in filter strips. Any spoil from the operation accidentally deposited within a drainage line or watercourse must be removed withi minimal bed or bank disturbance unless removal will cause more damage than non-removal. Spoil so removed must be respread on the road pavement or deposited outside the filter strip.

Where there is less than 5 m of undisturbed vegetation between a drainage outlet and a drainage feature, a sediment trap (silt mesh or hay bales) must be installed.

The SFO is responsible for determining if any road maintenance is required. The work must be carried out by State Forests, or by contractors engaged by State Forests. The Grafton District Operations Foreman is responsible for supervision of the maintenance operation and must be present at all times. The Operations Foreman is also responsible for the installation of sediment traps.

Revegetation and rehabilitation

Revegetation of 81/1, 8/2, 81/3, 81/4, 82/1, 82/2 and 82/3 Roads following harvesting will be through natural regeneration. The minor roads in the compartments are to be closed and must be bedded down, all spoon drains converted to rollover crossbanks, and crossfall (outfall) drainage reinstated. A crossbank must be constructed at the entrance to each road to prevent vehicular traffic using the road.

Road surfaces, batters and drainage feature crossings must be left in a stable condition.

Dispersible soils

If the subsoil is exposed on the road surface, batters or table drains within 20 metres of the drainage feature crossings, top soil from the road, or imported gravel, must be spread over the road surface at the site. Where subsoil is exposed or cut and fill batters, the site must be seeded with Japanese millet (or other suitable species) at the rate of 20 kg/ha.

(f) Road Construction

There is no road construction required for the logging operations in the compartments.

Design

Not applicable for this logging operation

Grade

Not applicable for this logging operation.

Survey

Not applicable for this logging operation.

Clearing

Not applicable for this logging operation.

Batters

Not applicable for this logging operation.

Crossing of drainage features

Not applicable for this logging operation.

(g) Slope limits for the area

Maximum slope for harvesting	30 degrees
Maximum grade of snig track construction	30 degrees
Maximum side slope for snig track construction	30 degrees
Maximum road grade permitted	10 degrees
Maximum side slope for road construction	30 degrees without design

There are no mappable areas with slopes over 30°. The SFO is responsible for identifying areas with slopes over 30° in the field.

(h) Drainage Feature Protection

Riparian Habitat Zones exist 20 metres either side of watercourses, drainage lines and drainage depressions with catchments greater than 40 hectares. Bom Bom Creek is protected by a Wildlife Corridor 40 m either side of the creek.

Filter strips must be retained along all watercourses and drainage lines within the net harvest area of Compartments 81 and 82 at minimum widths (measured in the horizontal plane) as stated in Table 5 below. These minimum widths meet or exceed the requirements of the Pollution Control Licence.

Where a filter strip extends beyond the boundary of the catchment of the drainage feature that is the subject of the protection, then the filter strip may be terminated at the catchment boundary.

In addition buffer strips 5 metres wide must be maintained on either side of drainage depressions.

Table 5 - Filter Strip and Protection Strip Widths
(distance each side of stream)

Water Pollution Category	CATCHMENT /SLOPE	Riparian Zone	Filter Strip
1	<40 ha		5m
1	>40 ha	20m	
2	<40 ha		10m
2	>40 ha	20m	
3 N/A	<40 ha <18° slope		15m
3 N/A	<40 ha >18° slope		20m
3	>40 ha <18° slope	20m	
3 N/A	>40 ha >18° slope		30m

(i) Tree Marking Rules for Filter Strips and Buffer Strips

The SFO must mark the Wildlife Corridor, Riparian Habitat Zones and filter strips in the compartment progressively ahead of harvesting operations, except where there are no trees marked for removal within a tree length of the Wildlife Corridor, Riparian Habitat Zones or filter strips. (See also 4.2, 5.2)

Contractors and operators are responsible for identifying drainage depressions encountered in the field and taking appropriate action whilst operating within the buffer strip or crossing the drainage depression. (See also 5.2)

(j) Felling and Extraction from Filter Strips

Trees located in a filter strip must not be felled, except for the purposes of constructing an approved road, extraction or snig track crossing.

Trees must not be felled into filter strips.

Crowns, logs and substantial debris accidentally felled into filter strips must be removed with minimal disturbance to the groundcover and soil in the filter strip. Any disturbance caused must be remedied by reshaping of furrows and replacement of cover, so that concentrated water flow does not occur. Instances of trees being accidentally felled into filter strips must be documented on the SFOs copy of the harvesting plan, including the reasons for the accident and the remedial action taken.

Machinery must not enter a filter strip except for the construction and use of road, extraction track or snig track crossings.

(k) Extraction from Drainage Depression Buffer Strips

Machinery must not operate in buffer strips when the soil is saturated.

Soil exposure must be minimised and channelised flow must be prevented by use of the following techniques:

- no snigging along drainage depressions
- operating with the blade up at all times

- preventing skewing of machinery tracks (by approaching logs in reverse gear, and minimal changes in direction while snigging logs out of the buffer strip).

No earthworks can be undertaken within buffer strips except for the construction of road, extraction tracks or snig track crossings.

(l) Snig Tracks

It is preferable that, wherever practicable, walkover extraction techniques be used in preference to snig track construction. It is anticipated that all snigging in the compartment will be carried out by this method.

Snig tracks must not be located where they cannot be drained effectively. Wherever practicable, snig tracks shall be located slightly off ridge-top to ensure free crossfall drainage. Side cut tracks must have crossfall drainage.

Snigging along roads must only occur in order to avoid snig track construction and where approved by the SFO. Effective road drainage must be re-instated by the contractor/operator immediately at the completion of the snigging operation.

Snig tracks must be drained to minimise the flow of water along them and the flow of water directly into watercourses, drainage lines or onto roads and dumps. Drainage must be effected within 2 days of the completion of use, or where operations are to be temporarily suspended in accordance with Table 6.

Table 6 - Drainage of Snig Tracks at Temporary Cessation of Operations

Slope boundaries	WP Category	No. Days
0 - ≤4	1	10
>4 - ≤16	2	8
>16 - ≤30	3	5

Where earth banks are required they must be constructed to a minimum unconsolidated effective height of 35 cm, with spacing in accordance with Table 7.

Table 7 - Maximum Earth Bank Spacing

Track Grade (degrees)	WPH Category		
	1 (0° - ≤4°)	2 (>4° - ≤16°)	3 (>16° - ≤30°)
0 - ≤5	200 m	150m	100m
>5 - ≤10		100m	60m
>10 - ≤15		60m	40m
>15 - ≤20		40m	25m
>20 - ≤25			20m
>25			15m

The above spacings are the maximums and should be varied to utilise the most suitable outlet point. Crossbanks must be constructed at right angles to the direction of the snig track and must be discharged into undisturbed vegetation or logging debris.

(m) Downhill Snigging

Limited downhill snigging will be required to dumps 1-9 and 11 in compartment 81 and dumps 1 - 7, 9 and 10 in compartment 82.

The following techniques must be used where downhill snigging is used:

- Crossfall drainage must be used where practicable.

- Where practicable the snigging pattern must be uphill from the stump with the logs being bunched for the downhill portion of the snig onto a centrally located extraction track(s).

- Where possible, tracks must enter the log dump from the side or below. Where this is not possible, a crossbank must be in place immediately before a snig track enters the log dump at the end of each day's operation.

(n) Snig Track Drainage Line Crossings

All snig track watercourse and drainage line crossings must be approved by the SFO before construction and must be open causeways utilising the natural surface at the site. Crossings must be rehabilitated after use, and any harvesting debris inadvertently deposited during use must be removed from the channel. As far as practicable the crossing point must be reshaped to its original condition and seeded with Japanese millet or other suitable species at the rate of 20 Kg/ha.

(o) Dispersible Soils

It is not anticipated that snigging will expose significantly dispersible subsoil. To minimise the possibility, walkover extraction techniques will be utilised wherever practicable. If more than 30% of subsoil, measured over any 20m length of track, is exposed, topsoil or logging slash from the track construction must be spread over the track surface at the site. At the completion of use of the track, cut batters must be seeded with Japanese millet or other suitable species at the rate of 20 kg/ha.

(p) Log Dumps

Field location of log dumps must utilise the most level site available, consistent with the location marked in the field and indicated on the Operational Map.

Because of the dispersible subsoil on the area, topsoil must not be stripped and stockpiled.

Dumps must be constructed with outfall drainage and must be kept drained during use and at the completion of operations.

Upon completion of operations any debris at or near the edge of a dump must be moved away from standing vegetation into the dump area. The log dump surface must be left in a stable condition by using one of the following techniques or a combination thereof:

- retaining at least 70% ground cover of existing vegetation;
- retaining a 70% cover of logging slash
- retaining a 70% cover of at least 5 cm of topsoil;

Where these techniques are not adequate to ensure stability of the dump surface, must be seeded with Japanese millet or other suitable species, at the rate of 20 kg/ha.

(q) Prescribed Burning

Pre-logging burning

The is no pre-logging burning associated with the harvesting of Compartments 81 and 82.

Post-logging burning

Post-logging burning of Compartments 81 and 82 must be carried out in accordance with provisions and specifications of the Ulmarra District Fire Plan and the Grafton District Fuel Management Plan.

Objectives

Post-logging burning objectives for the compartment are:

- to meet State Forests' obligations under the Bush Fires Act.
- to decrease fine fuel loads and logging debris under prescribed conditions to decrease the intensity of any wildfire that might occur in the compartment and hence, decrease associated damage to regeneration and retained stems.
- to reduce the possibility of wildfire burning through the compartment and entering and damaging adjacent forests and private property areas.
- to simplify and increase the efficiency and the safety of any wildfire control activity.
- to promote good seedbed conditions for regeneration.

Ignition

Burning must be undertaken by the lighting of individual heaps of harvesting slash and debris under conditions that will enable the fires to be contained within the compartment.

The Grafton District Operations Foreman is responsible for ignition, subject to the requirements of the Grafton District Fuel Management Plan.

Preferred season to burn

February to August.

4.8 Research and Inventory Plots

There are no research or inventory plots in compartments 81 and 82.

4.9 Modified Harvest Conditions

(a) Wildlife Corridor

A designated Wildlife Corridor (PMP 1.1.7 - Flora and Fauna Protection) exists along Bom Bom Creek forming the northern and southern boundary of compartments 81 and 82 respectively, as shown on the Operational Map. The corridor is 40 metres wide on either side of the creek.

- harvesting machinery must not enter the Wildlife Corridor.
- felling and snigging must be excluded from the Wildlife Corridor.
- trees must not be felled into the Wildlife Corridor.
- trees must not be damaged in the Wildlife Corridor.

(b) Riparian Habitat Zones

Riparian Habitat Zones, 20 metres either side of the stream, exist on all watercourses, drainage lines and drainage depressions with catchments greater than 40 hectares.

- except to use crossings harvesting machinery must not enter Riparian Habitat Zones.
- felling and snigging must be excluded from Riparian Habitat Zones.
- trees must not be felled into Riparian Habitat Zones.
- trees must not be damaged in Riparian Habitat Zones.

(c) Other

Private Property joins the eastern and southern boundaries of compartment 81. These boundaries are fences and have been surveyed and blazed with yellow paint. Damage to these fences is to avoided. Any damage caused shall be immediately repaired.

The forest itself is fenced and the gate at the entrance to the Forest on the northern boundary must be left shut at all times.

4.10 Specification of Type of Products to be Removed.

Compulsory Sawlogs	See **Grafton/Coffs Harbour Compulsory Sawlog Specification Hardwood Sawlog Flat Rate Royalty Utilisation Standards**.
Salvage Sawlogs	See **Grafton/Coffs Harbour Compulsory Sawlog Specification Hardwood Sawlog Flat Rate Royalty Utilisation Standards**.
Poles	See **Australian Standard AS2209 - 1979 (poles)**
Veneer Logs	See **Specification for Eucalypt Veneer Logs for Rotary Peeling**.

Yield Information for Compartments 81 and 82

Estimated Yields are:

Compulsory Sawlogs 40 cm +	1400 m^3
Compulsory Sawlogs <40 cm	600 m^3
Salvage Sawlogs	100 m^3
Poles	300 m^3
Veneer Logs	50 m^3

Part 5 CONDITIONS FOR SUPERVISING FOREST OFFICERS (SFOs)

Condition 5.1 SFO Authority to Supervise Harvesting Operations

(a) General

The Supervising Forest Officer responsible for the direct field supervision of this harvesting operation, including tree-marking, log measuring and/or log check measurement, safety, implementation of wet weather controls, and monitoring and reporting generally is: .

The appointed Hardwood Marketing Foreman, Grafton District.

(b) Relieving SFOs

Relieving SFOs, if required are:

The Forest Assistant, Marketing, Grafton District.

The Marketing Forester, Grafton District.

(c) SFOs Authority

The SFO has the authority to approve:

- the blading off of natural surface roads provided that damage will be minimal and the removed material is recoverable for respreading.
- downhill snigging routes where provided for in the Harvest Plan.
- use of natural surface roads for snig track crossings or as snig tracks to dumps provided restoration of the road for wheeled traffic is undertaken as necessary and use of the road significantly reduces soil disturbance.
- the exact location and type of watercourse and drainage line crossings for snig tracks - for this plan area all crossings must be open causeways.

All approvals must be noted on the harvesting plan and approval slips submitted to the office every fortnight. The location of drainage line crossings must be marked on the Operational Map.

Condition 5.2 Tree Marking and Other Harvesting Control Requirements

(a) Tree Marking for Forest Management and Silviculture

The Northern Region Tree Marking Code will apply to the harvesting operation. All trees to be removed must be marked for extraction. (Also see Part 4.2)

Habitat trees and habitat recruitment trees for fauna protection

Habitat trees and habitat recruitment trees must be marked for retention by the SFO according to Prescription 1 in Part 4.6 (b).

Non-harvest areas and modified harvest areas

The boundaries of Wildlife Corridor and Riparian Habitat Zones must be marked ahead of harvesting operations, unless there is no tree marked for removal within a tree length of these areas.

(b) Soil Erosion and Water Pollution Control

Marking of filter strips

In most cases, Wildlife Corridor and Riparian Habitat Zone prescriptions are equivalent to or greater than filter strip and buffer strip requirements. There is no need for filter strips and buffer strips where they would be embedded in Riparian Habitat Zones. Hence filter strips shall only be marked in the field where they are not embedded in Riparian Habitat Zones.

Similarly, there is no need to mark Riparian Habitat Zones where they would be embedded within filter strips (ie in Water Pollution Category 3, over 18°).

All drainage features must be inspected by the SFO during the harvesting operation in conjunction with tree marking and protected in accordance with the Pollution Control Licence. Where practicable, any variation between the actual drainage feature found in the field and that shown on the harvest plan Operational Map should be marked on the SFO's copy of the map for future reference.

Filter strips and drainage line buffer strips must be retained along all drainage features at the minimum widths as specified in Table 5 in Part 4.7 (i).

The SFO is responsible for marking filter strips in the field progressively and prior to the commencement of operations in each section of the harvest area. Wildlife Corridors, Riparian Habitat Zones and filter strips need not be marked where there is no tree marked for removal within a tree length of the area.

Drainage depression buffer strips

The SFO is responsible for ensuring that contractors and operators are detecting drainage depressions in the field and taking appropriate protective precautions within the buffer strip area whilst operating in the buffer strip or crossing the drainage depression. (See also Part 4.7 (k)).

Slopes over 30°

There are no mappable areas with slopes over 30°. The SFO is responsible for identifying slopes over 30° in the field.

Road drainage

The SFO must ensure that all drainage structures on existing roads are in accordance with Parts 4.7 (e).

Drainage feature crossings

The Grafton District Operations Foreman is responsible for ensuring that road crossings and approaches are drained, seeded and gravelled in accordance with Section 4.7 (e), and that sediment traps are installed where required.

The SFO is responsible for seeding snig track crossings in accordance with Section 4.7 (n).

Dispersible Soils

The SFO must ensure that areas where the dispersible subsoil is exposed are protected in accordance with Parts 4.7 (e) and (o)

The SFO must ensure that adequate cover is maintained on the log dump in accordance with part 4.7 (p).

Condition 5.3 Monitoring and Reporting

(a) Daily and Fortnightly Reporting

The standard District procedures for daily and fortnightly reporting on the conduct of operations must be followed.

(b) Fauna Reporting and Mitigation Prescriptions

Sightings of any Threatened fauna must be reported to the District Marketing Forester within 24 hours of the sighting being made, as required in Part 4.6 (a). For any of the animal species listed in Part 4.6 (d) the stated mitigation prescriptions shall be immediately applied.

(c) Soil Erosion and Water Pollution Control Conditions

The SFO must report the following matters and record their location if necessary on the SFO's copy of the Harvesting Plan Operational Map, or the recording map attached to the Plan for that purpose:

- any accidental felling into filter strips and remedial action taken.
- any approval to leave soil from road and track construction in drainage lines or watercourses where attempts at removal would have resulted in excessive damage.
- any approval to defer stabilisation works at a drainage feature crossing beyond five days.
- any approval to leave a snig track drainage feature crossing structure in place and the reason for it to be left in place.
- any instances where effective cross bank drainage of a snig track is not effected within two days of completion of snigging from the area served by the track.

Post Harvest Rehabilitation

Supervision by the SFO and fortnightly check sheets must assess that road surfaces, batters and drainage structures are stable at the completion of operations and prior to the shifting of the contractor.

Condition 5.4 Pre- and Post-logging Burning

(a) Pre-logging Burning

There is no pre-logging burning associated with the harvesting of Compartments 81 and 82.

(b) Post-logging Burning

Post-logging burning of Compartments 81 and 82 must be carried out in accordance with provisions and specifications of the Ulmarra District Fire Plan and the Grafton District Fuel Management Plan.

Ignition

The Grafton District Operations Foreman is responsible for ignition, subject to the requirements of the Grafton District Fuel Management Plan.

Condition 5.5 Other Instructions

There are no other instructions concerning the supervision of harvesting Compartments 81 and 82.

Condition 5.6 Supervising Forest Officer's Acknowledgment

I acknowledge that I have received a copy of Harvesting Plan No GG 96/09/81 and that I have been briefed on the conditions of the Plan and understand the supervision and operational control requirements as explained to me by the District Marketing Forester.

Signature: ..... Date: .....

Position: .....

Supervising Forest Officer

Signature: ..... Date: .....

Position: .....

Relieving Supervising Forest Officer

ATTACHMENTS
CLEARANCE CERTIFICATE

HARVESTING PLAN No. ..... **Compartment:.....**

.....STATE FOREST.....DISTRICT

To M.....Supervising Forest Officer

I request approval for me to move my logging crew and all associated machinery from the above mentioned area to the next Compartment in accordance with Section 3.5 of the Code of Logging Practice.

I certify that:

(a) all permanent roads, trails and mitre drains have been cleared of harvesting debris;
(b) butt damage to retained trees has been kept to acceptable limits;
(c) all trees marked for removal have been felled;
(d) utilisation limits have been satisfactorily met;
(e) stump heights conform to requirements;
(f) all hanging trees have been felled and brought down;
(g) all log dump sites have been satisfactorily restored as required;
(h) harvesting debris is not accumulated around retained trees;
(I) all accumulated litter has been disposed of properly;
(j) all filter, protection and buffer strip requirements have been complied with;
(k) all snig track, extraction track and temporary logging road drainage has been installed satisfactorily and other required rehabilitation work has been completed;
(l) all necessary repairs to damaged roads, signs, fences and other structures have been carried out.

I believe that I have met all my obligations under the conditions of the Timber Licence, the Pollution Control Licence, and/or any licence issued under Section 120 of the National Parks and Wildlife Act, which apply to the Compartment just completed, as stated in this Harvesting Plan.

Signature.....Licence No.....Date .....
Contractor/licensee

As a result of inspections of the logging operations made in accordance with this Harvesting Plan, I am satisfied that, to the best of my knowledge, the licensee/contractor responsible for this harvesting operation has satisfactorily completed all work and approval is given for her/him to remove her/his machinery and equipment and leave the area/commence operations in another Compartment. (Compartment .....).

This clearance does not release the licensee/contractor from any obligation to undertake any remedial work if subsequent deficiencies are shown to result from inadequate practices during the harvesting operation, which are found during any inspections of the area made within 12 months of the date of this post-harvesting inspection.

Last inspection was made on .....(Date)

Signed: .....(Date).....
Supervising Forest Officer

Notes

Appendix 1: Erosion Hazard Assessment - Soil Type "E" Grafton Formation

(a) Soil Erosion Hazard Classes

Soil Erosion Hazard Ratings (SEHR) have been assessed using SOILOSS High. The rating has then been used to assess Soil Erosion Hazard (SEH) classes for the net harvest area.

SEHR = R x K x LS x C x P where

R = 3300 Derived from $R = 89.31 \times {}^{2}I_{12}{}^{1.74}$

K = 0.035 Topsoil (A Horizon)

Derived from Laboratory Analysis of the A Horizon

A Horizon has been adopted as it gives lower slopes for the erosion classes.

S As factored in SOILOSS High

L = 10 metres

C = 0.45

Derived from 0.45 SEMGL standard

P = 1.0

Slope Ranges (Degrees)	Erosion Hazard Class	Where SEHR is	Indicative % of Net Harvest Area cpt 81	cpt 82
0<=5	Low	less than 40	80	73
5> to <=23	Moderate	40 - 400	20	27
23> to <=30	High	400 - 800	N/A	N/A
>30	Extreme	greater than 800	N/A	N/A

(b) Special Conditions

No special conditions, other than the following, are required as the conditions for use with Harvesting Plans, Schedule 4, of the EPA Pollution Control Licence (PCL) for 1995/96, are adequate to address the erosion and pollution risk.

(Conditions derived above are to be inserted into the Harvest Plan at Condition 4.7 Soil Erosion and Water Pollution Control, (d) Wet Weather Controls - Seasonal Operations and Safeguards and (k) Extraction Tracks and Snig Tracks, when necessary.)

Preparation (by Forester, Forest Assistant)

Prepared by Angela Ilopoulos Signature .....

Title Forest Assistant Date 18.10.96

District Approval (by District Forester)

Signature .....

District Forester

Date 21 Octo 1996

POLLUTION CONTROL LICENCE CONDITIONS CHECKLIST

PLAN PREPARATION - PCL Sch 2, Div 3

Condition Number	Condition Title/Enquiry	Entry Needed?	Plan Ref.
C18	Representative water monitoring site	Yes	2.5 12 (f)
	Have Water Pollution Categories and proportion of Dispersible soil been calculated for the area?	Yes	2.5 13(a) 2.5 12(d)
	Method of soil sampling for K factor	Yes	2.5 12(d)
	Field sampling - sites? - lab analysis? - field analysis?	Yes Yes Yes	2.5 12(d) Soil report
1b)	Site specific conditions	Yes	2.5 13(c) 4.7 (e)
4	Are areas >30° within the net harvest area	No	
5	Are areas of WPC 4 within the net harvest area	No	
5A	SFO to mark areas over 30° or WPC 4	Yes	4.7(g)
5B	Areas over 30° and WPC 4 marked on map	Yes	Map
6	Drainage feature protection, prescribed streams	Yes	4.7 (h) Map
7	Any major water storage?	No	
8, 22A, 23	Drainage depression buffer strips conditions	Yes	4.7 (h)
9.1 (c)	Filter strips on map?	Yes	Map
10	Prescriptions for marking/identifying in the field -filter strips - -buffer strips	 Yes Yes	 5.2 (b) 5.2 (b)
13	Reporting accidental felling into filter strips	Yes	5.3 (c)
14, 20, 22	See 10		
24	Specify techniques in buffer strips	Yes	4.7 (k)
47A,B 48B	Stabilisation of roads	Yes	
48A	Are roads shown on map	Yes	Map
49	Road traverses area over 30°	No	
50 (a), (b)	Maximum road grade 10°	Yes	4.7(f)

POLLUTION CONTROL LICENCE CONDITIONS CHECKLIST

PLAN PREPARATION - PCL Sch 2, Div 3

Condition Number	Condition Title/Enquiry	Entry Needed?	Plan Ref.
51	Marking of roads to be constructed in field	No	
52	Minimising clearing widths for construction	No	
53	Road side clearing conditions	No	
57	Borrow or gravel pits conditions	No	
60	Batter stabilisation measures	No	
63	Road drainage techniques	Yes	4.7 (e)
64	Road drainage spacing	Yes	4.7 (e)
65	Roadside windrows	No	
66	Removal of harvesting debris from structures	Yes	4.4 (c)
67	Blading-off of roads	Yes	5.1 (c)
71	Location of drainage feature crossings on roads	Yes	4.7 (e)
74	Condition to cover non-removal of spoil from drainage features	Yes	5.3 (c)
76	Condition to cover non-completion of crossing stabilisation within 5 days - roads	Yes	5.3 (c)
77	Techniques to leave road crossing sites stable	Yes	4.7 (e)
78	Techniques for stabilisation of roads that are no longer required	Yes	4.7 (e)
79	Evaluation of old roads	Yes	2.5 12(h)
80	Road construction in dispersible soils	No	
81	Protection techniques for roads traversing dispersible soils	Yes	4.7 (e and f)
82	Wet weather restrictions for roads	Yes	4.3 (b)
83	Condition to cover non-completion of snig track crossing stabilisation within 5 days - snig tracks	Yes	5.3 (c)
84	Techniques to leave snig track crossing sites stable	Yes	4.7 (n)
85	Condition to cover non-removal of temporary crossing structures on snig tracks	Yes	5.3 (c)

POLLUTION CONTROL LICENCE CONDITIONS CHECKLIST

PLAN PREPARATION - PCL Sch 2, Div 3

Condition Number	Condition Title/Enquiry	Entry Needed?	Plan Ref.
86	Crossing of drainage features other than drainage depressions by snig tracks	Yes	4.7 (n) 5.1 (c)
	Specification of snig track crossing locations, types and capacity	Yes	4.7 (n)
	Condition for SFO approvals for crossings	Yes	5.1 (c)
	Conditions for non-removal of soil from drainage features	Yes	5.3 (c)
89	Location and effective drainage of snig tracks	Yes	4.7 (l)
92	Condition for snigging along roads	Yes	4.7 (l)
93	Conditions for wet weather restrictions for use of snig tracks	Yes	4.3 (c)
99	Specifications for drainage of snig tracks include:		
	-capacity for peak flow in a 1:2 year storm event	Yes	4.7 (l)
	-diversion into stable surfaces	Yes	4.7 (l)
	-minimise unchecked flow into drainage features	Yes	4.7 (l)
	-divert water with minimum damage to structure	Yes	4.7 (l)
103	Minimum specification for bank height	Yes	4.7 (l)
105	Condition for non-drainage of snig tracks 2 days after use has ceased	Yes	5.3 (c)
107	Condition for drainage at temporary cessation of use	Yes	4.7 (l)
109	Specifications for preventing concentrated water flow where downhill snigging is specified	Yes	4.7 (m)
112	Protection techniques for snig tracks on dispersible soils	Yes	4.7 (o)
119	Specifications for log dump location and drainage	Yes	4.7 (p)
120	Use of traxcavators and wheeled loaders in relation to wet weather	No	
125	Post-logging burning conditions	Yes	4.7 (q)
	Other conditions listed in Sch 2 Div 3 that need to be included as alert conditions in this plan	None	
	Are any appendices required	Yes	app

HARVESTING PROTOCOL ATTACHMENT

Cpts 81 and 82, Divines State Forest

API

A copy of the Broad Old Growth Mapping Project line work for compartments 81, 82 and 83 has been obtained from NPWS Northern Zone and is attached. There are no polygons of candidate old growth greater than 25 ha within the net harvest area of compartments 81 and 82. A Wildlife Corridor (PMP 1.1.7) runs through the single polygon tagged tcy in compartments 82 and 83.

UNLOGGED AREA

Assessor:	Leonie Walsh	Date completed:	7 October 1996
Sources:	Historical records Field observation		

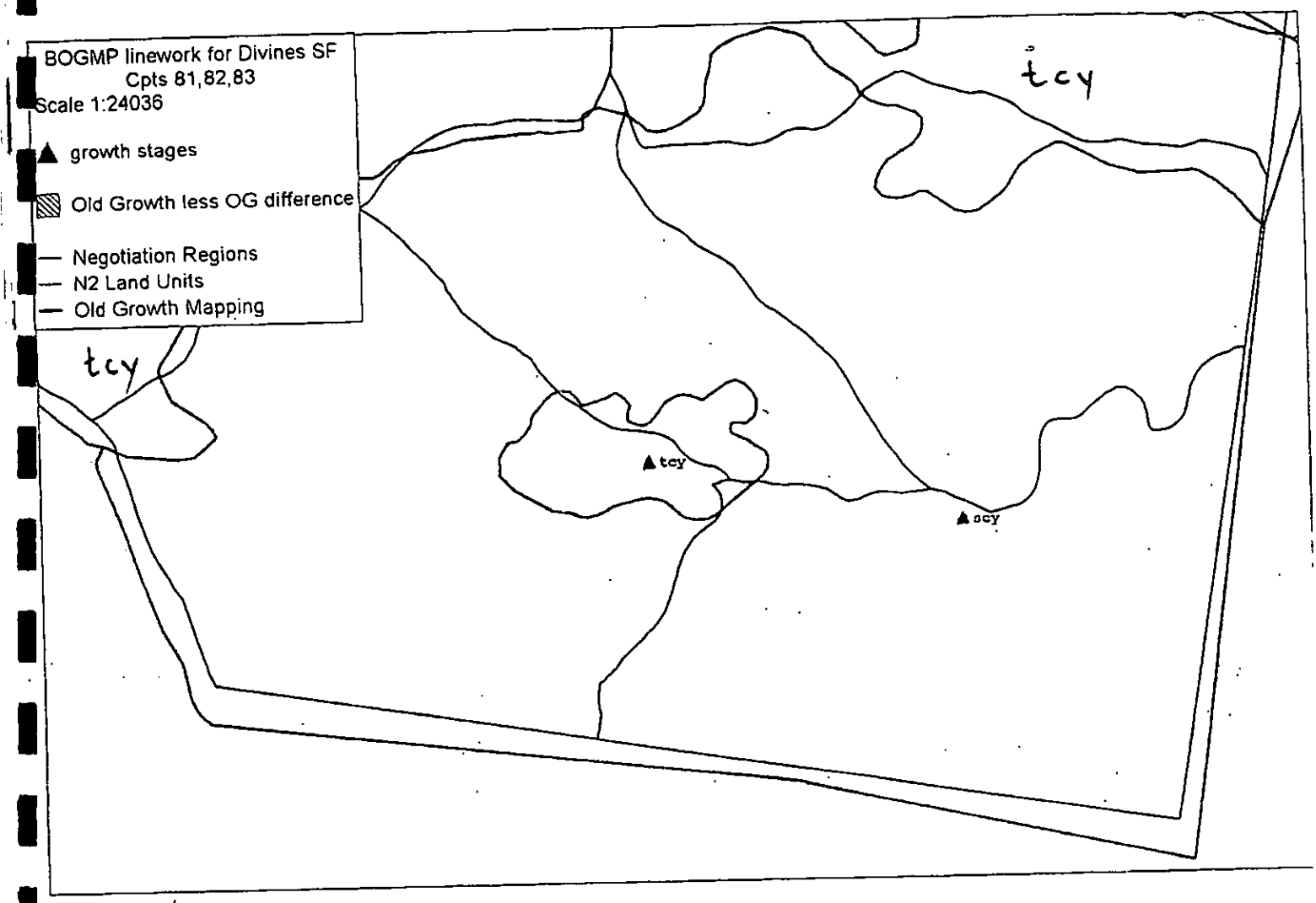
Unlogged areas >25 ha NLA present? No

Prepared by:

L A Walsh
Marketing Forester
Date: 22/10/96

Approved by:

for R J Williams
District Forester 22/10/96


BOGMP linework for Divines SF
Cpts 81,82,83
Scale 1:24036
growth stages
Old Growth less OG difference
Negotiation Regions
N2 Land Units
Old Growth Mapping
tcy
tcy
tcy
tcy

VENESS & ASSOCIATES

ACN 003 419 958 Pty Limited

10 Dutton Crescent
COFFS HARBOUR NSW 2450
Telephone: (066) 52 7692
Facsimile: (066) 52 8232

17th September, 1996

Attn: Leonie Walsh
State Forests of NSW
PO Box 366
GRAFTON NSW 2460

Dear Leonie,

Re: soil testing / harvesting plan - Devines SF

Attached please find the results of the soil testing program undertaken on samples from compartments 81, 82 and 83 within Devines State Forest.

You would be aware that Veness & Associates undertook the soil survey work associated with the Grafton Forestry EIS. All of Devines SF was classed as comprising Soil Mapping Unit E - soils formed on Grafton Formation which consists of lithic sandstone, siltstone, claystone and minor coal.

These three compartments in Devines SF were originally sampled by Veness & Associates for harvesting plan purposes in July, 1995 which was prior to the EPA's requirement to locate one sampling site approximately every 100 hectares. This early work generated samples from sites 81/1, 82/1 and 83/1.

These three compartments cover an area of approximately 673 hectares which requires a minimum of six to seven sampling sites.

The landform elements occurring within each compartment were mapped from the ten metre contour map and these elements were field checked during the soil sampling program. The results of this mapping are presented on the attached map which indicates that within each compartment, there are three landform elements mainly ridge/crest, simple slope and open depression.

Additional sampling was undertaken by Veness & Associates on 25/8/96.

Combined, the two sampling programs resulted in seven sampling sites: two sites were located within the ridge/crest landform element, three sites within the simple slope element and two sites within the open depression element.

At each site, both the A and B horizons were sampled and analysed for PSA and D% while values for 'K' and D% x clay% were calculated. The results of these analyses are presented on the attached report 1946A. The attached map also indicates the location of the sampling sites.

Yours faithfully,

Jim Veness

District: Grafton (Devine's SF) **Compartment(s):** 81, 82, 83 **REPORT NUMBER:** VA1946A **Page** 1 **of** 1

Sample Number	Sample Type	L'form Elmnt	Sample Depth (cm)	Particle Size Analysis (%) clay	silt	fine sand	coarse sand	gravel	D%	Texture+	Organic Matter (%)	Structure*	Permeability*	'K'#	per cent dispble soil D%xclay%
81/1/A	Topsoil	Open	0- 5	12(16)	16(21)	39(52)	8(11)	25	25	FSCL	4.80	2	3	0.035	3.00
81/1/B	Subsoil	dep'n	10-25	44(49)	14(16)	24(27)	7 (8)	11	25	LC	0.46	2	4	0.019	11.00
81/2/A	Topsoil	Simple	4-10	15(16)	29(31)	43(46)	7 (7)	6	39	SiCL	5.16	2	3	0.033	5.85
81/2/B	Subsoil	slope	30-44	45(46)	23(23)	26(27)	4 (4)	2	20	LMC	1.55	3	5	0.030	9.00
82/1/A	Topsoil	Simple	0-10	15(17)	25(29)	36(42)	10(12)	14	20	SiCL	4.80	1	2	0.024	3.00
82/1/B	Subsoil	slope	15-30	45(49)	28(30)	17(18)	3 (3)	7	40	LMC	0.46	2	4	0.024	18.00
82/2/A	Topsoil	Ridge/	2- 8	10(10)	27(28)	56(59)	3 (3)	4	32	SiCL	9.12	3	3	0.021	3.20
82/2/B	Subsoil	crest	18-25	41(42)	24(24)	33(33)	1 (1)	1	52	LMC	2.75	3	5	0.032	21.32
83/1/A	Topsoil	Ridge/	0-10	23(27)	25(30)	33(39)	3 (4)	16	23	CL	4.80	1	2	0.019	5.29
83/1/B	Subsoil	crest	10-20	44(46)	26(27)	24(25)	2 (2)	4	30	LMC	0.46	2	4	0.026	13.20
83/2/A	Topsoil	Open	2-10	17(17)	28(28)	51(52)	3 (3)	1	11	LC	6.36	2	4	0.031	1.87
83/2/B	Subsoil	dep'n	35-50	38(39)	18(19)	39(40)	2 (2)	3	42	LMC	9.29	2	4	0.010	15.96
83/3/A	Topsoil	Simple	2- 6	15(19)	27(34)	32(40)	6 (7)	20	23	LC	9.46	3	4	0.022	3.90
83/3/B	Subsoil	slope	25-45	41(42)	24(24)	32(32)	2 (2)	1	26	LMC	3.10	3	4	0.028	10.66

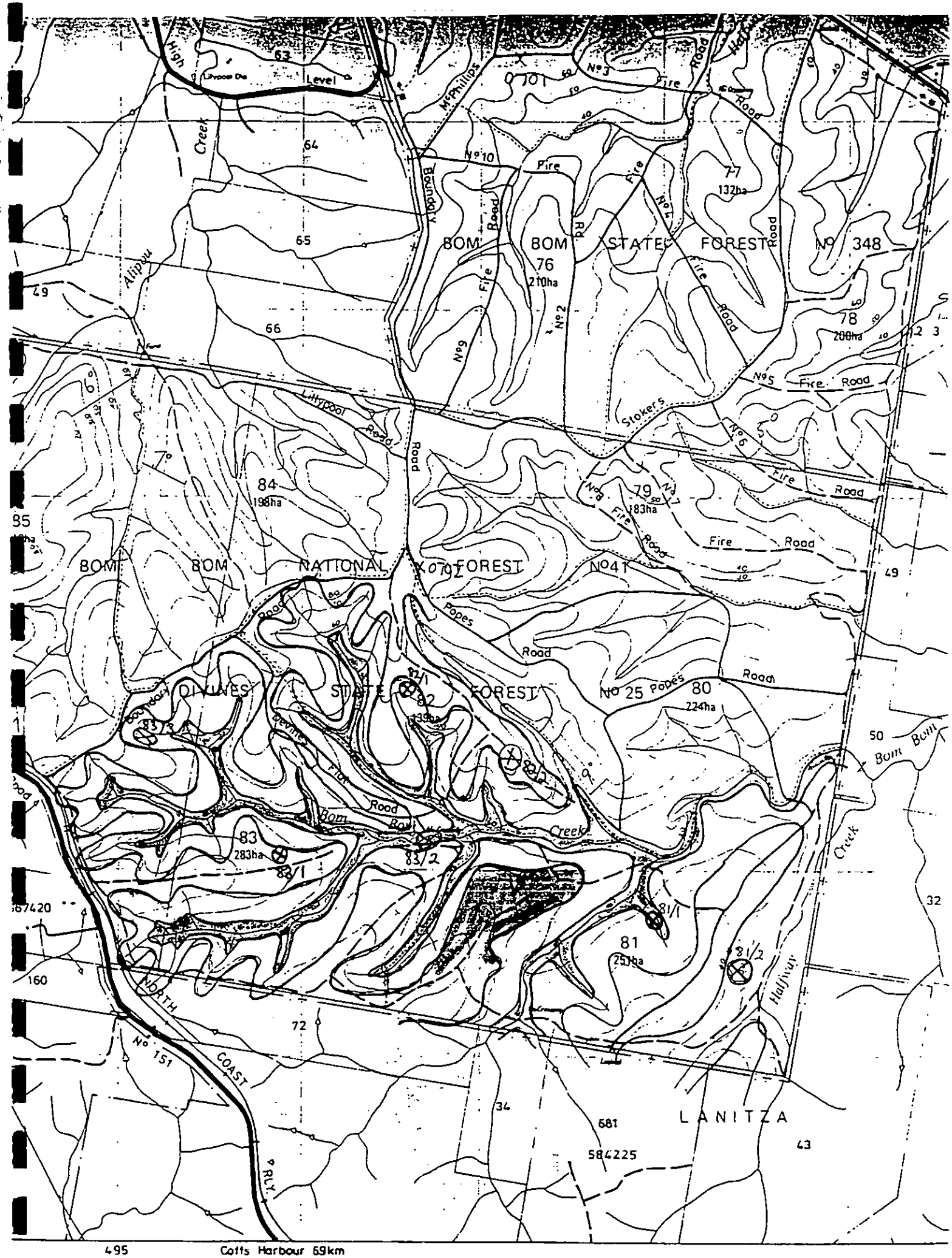
NOTES: PSA values are calculated inclusive of gravels. The values in brackets have been recalculated after excluding gravels
+ textures determined after Northcote (1979);
* structure and permeability classes are those to be used in SOILOSS;
# 'K' value has been determined using SOILOSS version 5.1

These data have been determined on soil samples collected by Veness & Associates.

The laboratory methods used are those required by EPA in its documentation relating to Harvesting Plans.

The data presented on this page have been calculated and determined by me.

Jim Veness
(Managing Director)
VENESS & ASSOCIATES Pty Limited
16th September, 1996



Coffs Harbour 69km

Parishes of Clarenza Elland & Lanitza County of Clarence

COFFS HARBOUR FORESTRY REGION

1:25000

EPA

CERTIFIED MAIL

RB450037037

FORESTRY COMMISSION OF NSW
LOCKED BAG 23 P.O.
PENNANT HILLS NSW 2120

Environment
Protection
Authority
New South Wales

Civic Tower
Cnr of Jacobs Street
and Rickard Road
Locked Bag 1502
Bankstown
NSW 2200

Telephone .02. 9795 5000
Facsimile .02. 9795 5002

Our Reference: 600000/D72/Not. Nos. 003625

Your Reference:

11 December, 1996

NOTICE UNDER SECTION 17D(3)
OF THE POLLUTION CONTROL ACT 1970

WHEREAS -

(a) FORESTRY COMMISSION OF NSW is the holder of licence number 004017 in respect of premises situated at LAND IN THE NORTHERN REGION, - which expires on 7 August, 1997.

TAKE NOTICE THAT -

In accordance with the powers vested in the Environment Protection Authority (EPA) under Section 17D(3) of the Pollution Control Act 1970, the EPA with respect to licence number 004017 from the date of this Notice hereby:-

1. Varies this licence by inserting the following compartment descriptions, corresponding water pollution hazard categories, special conditions, representative water quality monitoring site, and date of licence variation into Schedule 1:

"**Compartments Description**

Compartments 81 & 82
Divines State Forest No. 25

Water Pollution Hazard Categories

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 4.
2	Greater than 4 and less than or equal to 16.
3	Greater than 16 and less than or equal to 30
4	Not applicable.

Proportion of dispersible soils: A horizon less than 10%
B horizon greater than 10%

Special Conditions

Special conditions are those conditions contained in the harvesting plan for Compartments 81 & 82, Divines State Forest No. 25, prepared by State Forests of NSW, received by the EPA on 30 October 1996.

Water Quality Monitoring Site

To be determined

Date of licence variation

11 December 1996."

NEIL SHEPHERD
Director-General

Per .....
Geoff Noonan
Manager - Waters &
Catchments Policy
WATERS AND CATCHMENTS
(by Authorisation)

FOR ACTION OR NOTING BY		
ORIGINATOR		11.12.96
1. MWCP		11.12.96
2.		
3.		
4.		

HARVEST PLAN DESK AUDIT CHECKLIST

Register No: 1017 Date Received: 30/10/1996

State Forest: DIVINES Compartment/~~Age Class~~: 81, 82

District: CRAFTON State Forest No: 25

Region: NORTHERN Harvest/~~Thinning~~:

Forest Type: Native Forest/~~Native Plantation~~/~~Softwood Plantation~~* (delete)

WATER POLLUTION HAZARD CATEGORY

Factor	*Provided*		*Relevant*		*Comment*
	Yes	*No*	*Yes*	*No*	
R					R = 3300
K					K = .035
S					as factored by SOILOSS 5.1
L					L = 20 M
C					C = .108

Soil Sampling personnel named and approved: _____ (Yes/No)

CALCULATION OF WATER POLLUTION HAZARD CATEGORIES

1. Calculation provided — ~~YES~~/NO
2. Verified against SOILOSS — YES/~~NO~~
3. Appropriate WPHC assigned — YES/~~NO~~
4. Slopes associated with WPHC — YES/~~NO~~
5. % Compartment per WPHC — YES/~~NO~~

Soil Unit 1: _____

	81 % Cpt	82	Slope (°)	Catchment Size
WPHC 1	80	70	0-4	
WPHC 2	20	30	5-16	
WPHC 3			17-30	
WPHC 4				

Soil Unit 2: _____(if applicable)

	% Cpt	Slope (°)	Catchment Size
WPHC 1			
WPHC 2			
WPHC 3			
WPHC 4			

Soil Unit 3: _____(if applicable)

	% Cpt	Slope (°)	Catchment Size
WPHC 1			
WPHC 2			
WPHC 3			
WPHC 4			

PROPORTION DISPERSIBLE SOIL

Soil Unit 1:

A Horizon % D: _____ x % C: _____ / 100 = 3.2 %
B Horizon % D: _____ x % C: _____ / 100 = 21.32 %

Soil Unit 2: (if applicable)

A Horizon % D: _____ x % C: _____ / 100 = _____
B Horizon % D: _____ x % C: _____ / 100 = _____

Soil Unit 3: (if applicable)

A Horizon % D: _____ x % C: _____ / 100 = _____
B Horizon % D: _____ x % C: _____ / 100 = _____

REPRESENTATIVE WATER MONITORING

Representative Water Monitoring Site: To Be Determined. State Forest

Annual rainfall: _____ Geology: _____

Forest Type: _____

HARVEST PLAN DESK AUDIT CHECKLIST

Condition	Condition	Comply	Comment
1 b	**Site Specific conditions** Attached site specific conditions to harvesting plan		
6	**Minimum protection widths for drainage line in native forests** Any prescribed streams, swamps and wetlands	N/L	Pg 12
7	Any major water storages present	N/L	Pg 12
9 (1 c)	Minimum protection widths Show filter strips on harvesting plan map	Y	Map.
~~9 (2)~~	~~Show protection strips on harvesting plan map~~		
10	Prescriptions for marking F, P, and B strips in the field	Y	Pg 35
20	**Operations within Native Forest Protection strips** Person responsible for identifying F strips in the field	Y	Pg 35
22	**Operations within Native Forest Buffer strips** Person responsible for identifying B strips in the field	Y	Pg 35
24	Specifications of techniques for minimising soil exposure and that any disturbance will cause no channelised flow in buffer strip	Y	Pg 35/36.
25	**Minimum protection widths for drainage feature in native plantations** (as per 6 and 7)	N/A	
32	**Operations within Native Plantation Protection strips** (as per 20)	↓	
33	**Operations within Native Plantation Buffer strips** (as per 22 and 24)	↓	

Condition	Condition	Comply	Comment
34	**Minimum protection widths for drainage feature in Softwoods Plantations** (as per 6 and 7)	N/A	
40	**Operations within Softwood Plantation Filter Strips** Person responsible for determining 5 metre machinery zone		
46	**Operations within Softwood Plantation Buffer Strips** (as per 22 and 24)	V	
47	**Road design, construction and maintenance** Specify techniques for the road design, construction and maintenance	Y	Pg 14, 15,
48	Proposed road locations are shown on harvesting plan map	Y	Map.
49	Maximum slopes for road construction Specify techniques for road stabilisation within 6 months of construction for roads built on slopes > 30 °	NIL	Pg 15
53	**Road Clearing** Specify techniques for clearing areas adjacent to roads with minimal disturbance to groundcover and topsoil and with 70% groundcover attained with 12 months	NIL	Pg 31
57	**Borrow Pits and Gravel Pits** Specify techniques for 1. construction of stable batters 2. stabilisation at the completion of operations	NIL	Pg 14

Condition	Condition	Comply	Comment
60	**Road Batters** Specify road batter stabilisation techniques	Y	Pg 33, Pg 31
63	**Road Drainage** Specify road drainage structures to be used and techniques for: 1. conveying peak flow in 1:5 year event 2. diverting water onto stable surfaces 3. minimising unchecked flow of water from table drains directly to watercourses and drainage lines, snig tracks and log dumps 4. discharging onto surface or structure which provide efficient sediment trapping	✓ ✓ ✓ ✓	Pg 31 31 Pg 31 Pg 31
71	**Crossing of drainage features** Specify location and type of crossings at drainage features	✓	Pg 18
78	**Road no longer required** Specify techniques to be used to stabilise roads that are no longer used	✓	Pg 31
81	**Dispersible Soil** Specify techniques used to protect roads and dispose of spoil that is dispersible	NIL	CONSTRUCTION. However page 33 covers this.
89	Snig Track Construction Specify criteria for ensuring that snig tracks are located and constructed where they can be drained effectively	Y	Pg 36

Condition	Condition	Comply	Comment
99	**Snig Track Drainage** Specify techniques to: 1. conveying peak flow in 1:2 year storm event 2. diverting water onto stable surfaces 3. minimising unchecked flow directly to watercourses and drainage lines, snig tracks and log dumps 4. divert water at a velocity which minimises damage to the structure	✓ ✓ ✓ ✓	Pg 36 36
109	**Downhill snigging** Specify measures to prevent concentrated water flow where downhill snigging occurs	Y	Pg 37
112	**Snig Tracks and Dispersible Soil** Specify measures to protect dispersible soils	Y	Pg 37
115	**Log Dumps** Specify location of log dumps on harvesting plan map	Y	Map
119	**Specify techniques for:** 1. drainage of log dumps during and at completion of operation 2. Log dumps being left in a stable condition at the completion of operations	Y	Pg 37.

Condition	Condition	Comply	Comment
125	**Burning** Specify key and strategic and operational details of burning: 1. Objective of burn 2. Method of ignition 3. Preferred season of burn	✓	Pg 38

Additional Harvesting Plan Requirements

1. Appropriate Variation Conditions (Condition 3 of the Harvesting Plan) Yes/~~No~~
2. Appropriate SFO Authority Conditions (Condition 5 of the Harvesting Plan) Yes/No
3. Canopy Gapping Conditions ~~Yes~~/No

****

********** ENVIRONMENT PROTECTION AUTHORITY **********

****

SOIL LOSS ESTIMATION

Environment
Protection
Authority
New South Wales

Civic Tower
Cnr of Jacobs Street
and Rickard Road
Locked Bag 1502
Bankstown
NSW 2200

Telephone .02. 9795 5000
Facsimile .02. 9795 5002

The computer program, SOILOSS, uses the procedures of the Universal Soil Loss Equation (USLE) to predict the average annual soil loss due to sheet and rill erosion. It is based on extensive research in the United States and by the Soil Conservation Service in New South Wales.

The following report was prepared by SOILOSS:

Our Reference:

Your Reference:

Estimation prepared for : DIVINES.81
Date : 28-11-1996 Time : 13:59 Report Number : 1

$$A = R \times K \times L \times S \times P \times C$$

Rainfall Erosivity: Rainfall Zone: 2 R = 3300
Soil Erodibility : User supplied K = 0.035
Topography :Slope: 4.0° Slope Length: 20 m LxS = 0.747
Support Practice : No cultivation (P = 1) P = 1.000
Management :
Rotation :
Cultivations :
Stubble Mgmt : - User Supplied C = 0.1080

Long-term average annual soil loss: A = 9.3 t/ha

Soil Loss Targets :

There is very little information to indicate target levels of soil loss for Australian soils. The following are suggested as a guide:

Very deep and fertile soils	<10 t/ha.a
Moderately deep and fertile soils	<5 t/ha.a
Shallow or infertile soils	<1 t/ha.a

Management Options :

To reduce soil loss from 9.3 to 5 t/ha.a the options are :
* Reduce C to 0.0580

****

****
********** ENVIRONMENT PROTECTION AUTHORITY **********
****

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The following report was prepared by SOILOSS:

Your Reference:

==========

===

Estimation prepared for : DIVINES.81
Date : 28-11-1996 Time : 14:00 Report Number : 2

$$A = R \times K \times L \times S \times P \times C$$

Rainfall Erosivity: Rainfall Zone: 2 R = 3300
Soil Erodibility : User supplied K = 0.035
Topography :Slope: 16.0° Slope Length: 20 m LxS = 3.768
Support Practice : No cultivation (P = 1) P = 1.000
Management :
Rotation :
Cultivations :
Stubble Mgmt : - User Supplied C = 0.1080

Long-term average annual soil loss: A = 47 t/ha

Soil Loss Targets :

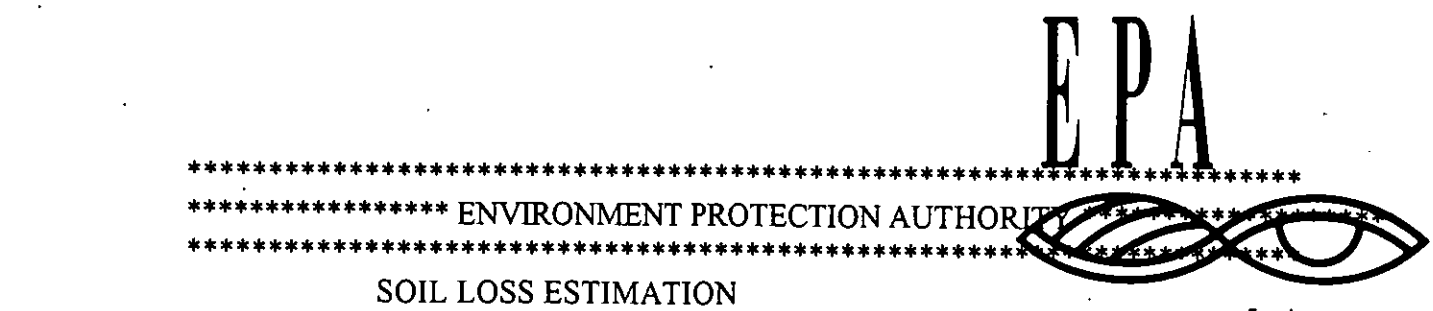
There is very little information to indicate target levels of soil loss for Australian soils. The following are suggested as a guide:

Very deep and fertile soils	<10 t/ha.a
Moderately deep and fertile soils	<5 t/ha.a
Shallow or infertile soils	<1 t/ha.a

Management Options :

To reduce soil loss from 47 to 10 t/ha.a the options are :
* Reduce C to 0.0230

****



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The computer program, SOILOSS, uses the procedures of the Universal Soil Loss Equation (USLE) to predict the average annual soil loss due to sheet and rill erosion. It is based on extensive research in the United States and by the Soil Conservation Service in New South Wales.

The following report was prepared by SOILOSS:

Your Reference:

Estimation prepared for : DIVINES.81
Date : 28-11-1996 Time : 14:00 Report Number : 3

A = R x K x L x S x P x C

Rainfall Erosivity: Rainfall Zone: 2 R = 3300
Soil Erodibility : User supplied K = 0.035
Topography :Slope: 30.0° Slope Length: 20 m LxS = 6.639
Support Practice : No cultivation (P = 1) P = 1.000
Management :
Rotation :
Cultivations :
Stubble Mgmt : - User Supplied C = 0.1080

Long-term average annual soil loss: A = 83 t/ha

Soil Loss Targets :

There is very little information to indicate target levels of soil loss for Australian soils. The following are suggested as a guide:

Very deep and fertile soils <10 t/ha.a
Moderately deep and fertile soils <5 t/ha.a
Shallow or infertile soils <1 t/ha.a

Management Options :

To reduce soil loss from 83 to 10 t/ha.a the options are :
* Reduce C to 0.0130.

****