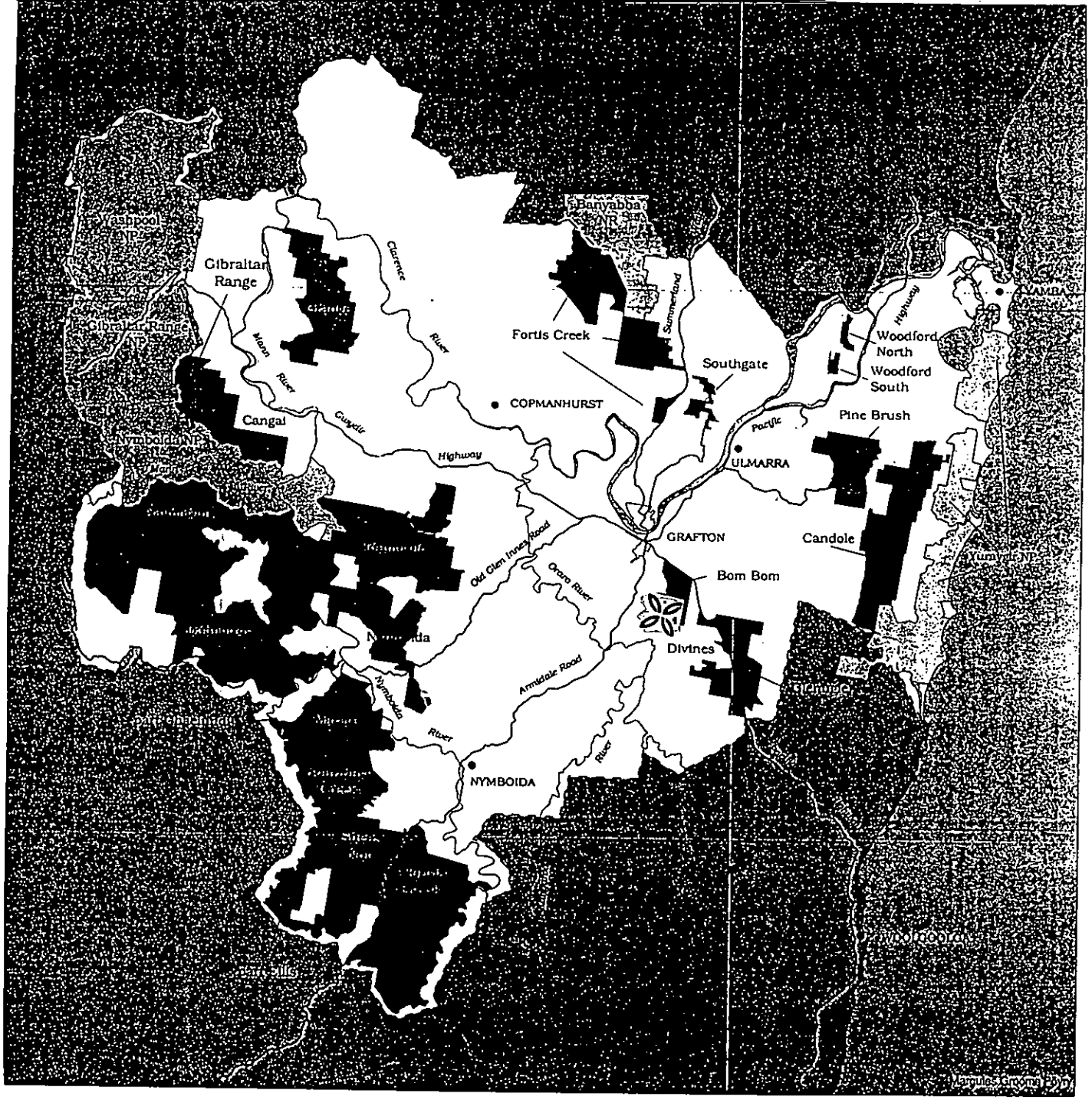
Divines

84

Grafton District
Northern Region

GRAFTON MANAGEMENT AREA



STATE FORESTS

NATIONAL PARKS

MANAGEMENT BOUNDARY

TOWNS

ROADS

RIVERS

0 20km N

LOCATION

COMPARTMENT 84

FIGURE 1.2

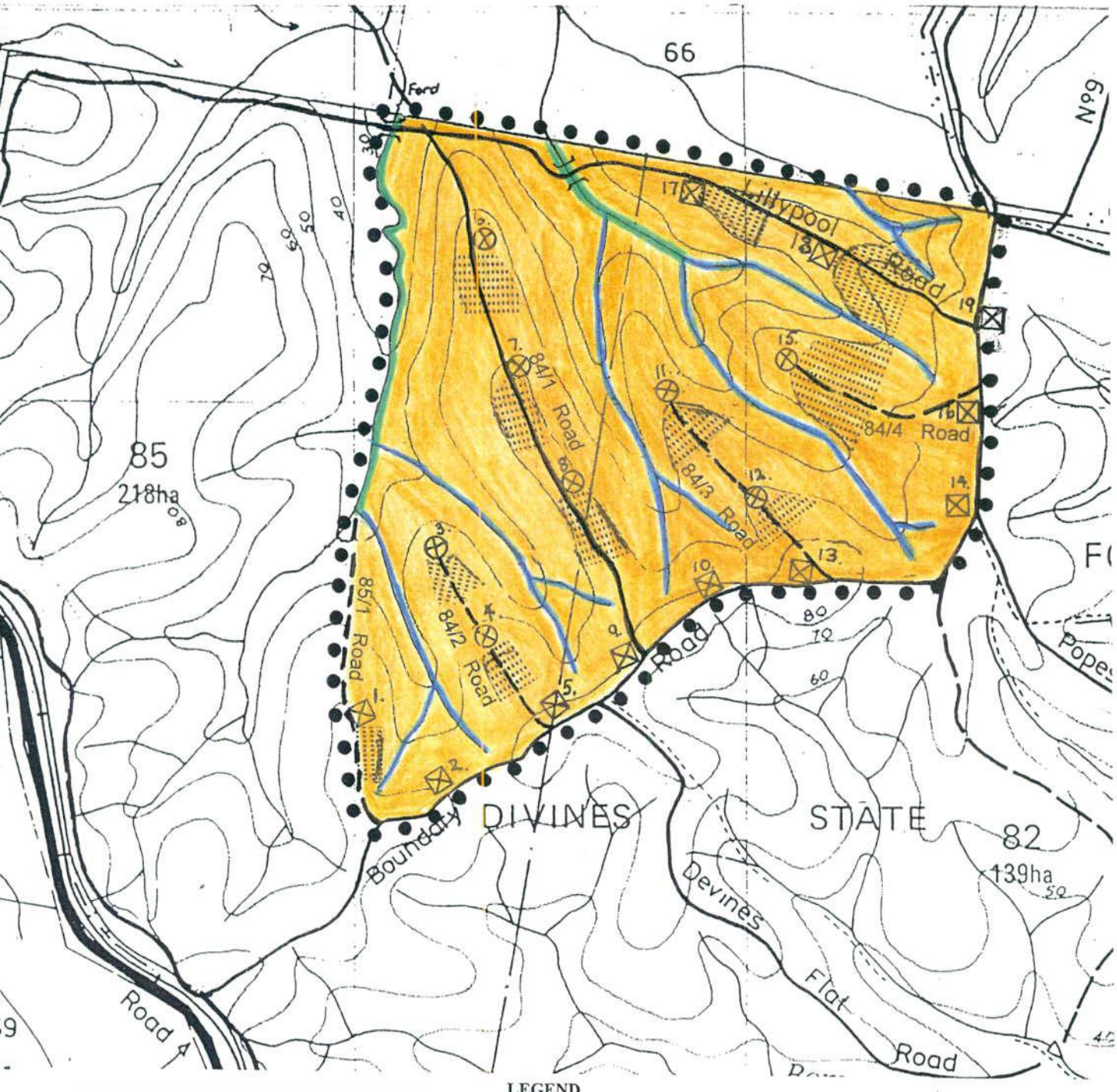
STATE FORESTS OF NSW

NORTHERN REGION - GRAFTON DISTRICT
HARVESTING PLAN - OPERATIONAL MAP

COMPARTMENT NUMBER ..84
DIVINES STATE FOREST

SCALE 1 : 15000 CONTOUR INTERVAL 10 m
0 0.5 1 km

G N



LEGEND

HARVEST AREA

Normal Prescriptions ..

Down-hill snigging .....

NON HARVEST AREA

Riparian Zone.....

DUMP SITES

Dry Weather .....

Wet Weather .....

BOUNDARIES

State Forest.....

Compartment .....

ROADS.....

Minor Roads.....

DRAINAGE FEATURES

Open Crossing .....

Filter Strip.....

Protection Strip.....

STATE FORESTS OF NSW

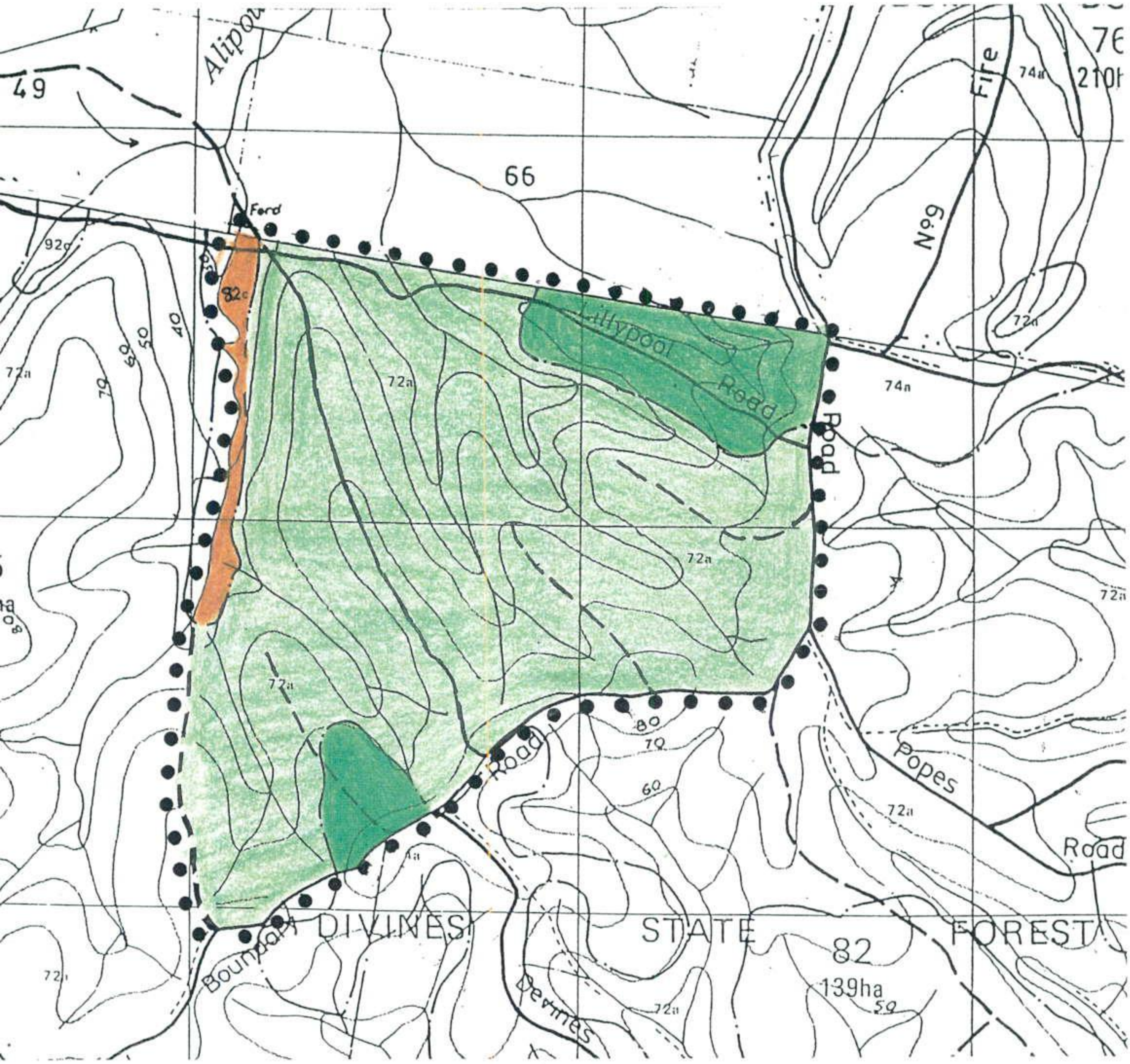
NORTHERN REGION - GRAFTON DISTRICT
HARVESTING PLAN - FOREST TYPE MAP

COMPARTMENT NUMBER ... 84
DIVINES STATE FOREST

SCALE 1 : 15000 CONTOUR INTERVAL 10 m

0 0.5 1 km

G N



LEGEND

BOUNDARIES		FOREST TYPES	
State Forest..........	: ——— :/———	74............	
Compartment.......	• • • •	72............	
Forest Type..........	——— • ———	82............	
ROADS	————		
Minor Roads.........	—— ——		

Harvesting Plan No GG 95/10/84

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	**84**
MANAGEMENT AREA	**Grafton**		
NORTH-EASTERN CORNER		**496600**	**6707500**
SOUTH-WESTERN CORNER		**494100**	**6705900**

Natural Features

General: The compartment contains near flat to undulating slopes. It is a series of relatively short side ridges that run north-west off a main ridge system.

Catchment: Clarence River catchment. Alipou Creek, a tributary of the Clarence, runs north out of the forest.

Altitude range: 30m - 80m A.S.L.

Aspect: Generally north-westerly.

Topography: The compartment consists of wide flat ridges with slopes generally less than 10°.

Artificial Features

Roads: Boundary Road gives access through Divines SF and is located on the eastern and southern boundaries of Compartment 84.

Minor Roads: 4.3 km of minor roads give access to dump sites in the compartment.

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

Private property joins the northern boundary of the compartment. This boundary is fenced.

Riparian Habitat Zones exist 20 metres either side of streams (watercourses, drainage lines and drainage depressions) with catchments greater than 40 hectares. These are identified on the operational map.

Reference Grafton Management Area Environmental Impact Statement

2.2 FOREST MANAGEMENT AND SILVICULTURE

Description 3 Compartment Subdivision, Forest Types

Areas:

Gross Area of Compartment	198 ha
Riparian Habitat Zones	4 ha
Filter Strips	11 ha
Proposed for Logging	**183 ha**

Logging History:

The area has a long history of logging of varying intensities and has been silviculturally treated on a number of occasions. Compartment 84 was last logged during 1991 for poles and girders.

Forest Types:

Forest Types		Area (ha)
72	Spotted Gum - Grey Box	170.1
74	Spotted Gum - Ironbark/Grey Gum	23.9
82	Grey Box	4.0

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 over the major part of the compartment.
- Type 74 a dry type in two areas in the north-east section and near the southern corner of the compartment.
- Type 82 an open grassy type that occurs in a band along the western drainage line.

It is difficult to distinguish between Types 72 and 74 in the field (Grey Gum does not occur in the compartment) and with Grey Box occurring scattered over the whole of the Spotted Gum area it could all readily be typed as 72.

Overstory species

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

(b) Understory

The understory is typically dry and open (and mostly non-existent), being eucalypt regeneration and acacias with occasional forest oak and roughbark apple. Mock olive, coffee bush and muttonwood occur occasionally through the area.

(c) Ground-cover

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

(d) Rare or endangered 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 on the compartment.

(f) Exotic weeds

Lantana is scattered through the compartment. There are scattered plants of groundsel bush, noogoora burr, farmers friend and fire weed in the compartment.

(g) Regeneration and serial stages

The compartment carries 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

Compartment 84 has a long history of logging of varying intensities and it has 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 this stand over the next few cutting cycles to maintain stand vigour and increase growth rates. The whole of the compartment would now yield a range of log types.

The forest has been grazed more or less since European settlement in the 1840s, probably originally as part of *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 Compartment 84 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 Riparian Habitat Zones and filter strips on the compartment will remain in a relatively undisturbed state. Protection strips will be thinned under specific prescriptions with up to 50% canopy removal.

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 Compartment 84 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 or Threatened have been detected in this compartment 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 compartment.

Description 9 Protection of Plant Species

Not applicable to this compartment.

2.4 FAUNA PROTECTION

Description 10 Endangered and Protected Fauna Occurrence

(a) General

No Schedule 12 species have been detected in Compartment 84. Rufous Bettongs have been seen in adjacent areas. Schedule 12 species expected to occur in or in the vicinity of the compartment are;

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

References Grafton Management Area Environmental Impact Statement
SFNSW GIS Records

(b) Habitat Trees

Compartment 84 contains Dry Hardwood forest with xeromorphic understory. 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) 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

No areas of critical habitat for Schedule 12 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 Schedule 12 species that might be adversely impacted by forest management activities on Compartment 84 are stated below:

(a) Critical Weight Range Species

The only Critical Weight Range species likely to occur in Compartment 84 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 on the compartment and there are large hollow trees on it 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 SF.

(d) Square-tailed Kite

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

(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 large home range. Suitable areas occur on and adjacent to the compartment.

(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 compartment.

(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 western drainage line areas of the compartment might be suitable habitat.

(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 eucalyptus, eucalypt nectar and insects harvested beneath the loose bark of bark-shedding eucalypts. The lower sections of the compartment 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 western creek line areas in the compartment may be suitable habitat.

(k) Koala

Koalas feed on eucalypt leaves from a range of species and prefer higher nutrient areas. The lower elevated western section of the compartment might contain such 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 compartment would seem to be 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. Compartment 84 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 compartment would seem to be 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 forest 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

Compartment 84 is located in the north-west section of Divines SF 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 Divines area is about 1050 mm

The average rainfall erosivity - **R = 3200**

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

Compartment 84 is 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

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.

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, over reddish brown, strongly pedal, sometimes stony, light medium clay and bright yellow brown, pedal, usually stony, light medium clay subsoil layers.

The top soil layers are up to about 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 = 0.029 (Method B3)
K values B horizon = 0.030 (Method B3)

Texture

A horizon - clay loam, normal plastic.
B horizon - light medium clay, normal plastic.

Dispersibility (Method D1)

%clay A horizon	19%(inclusive of gravels)
%clay B horizon	43%(inclusive of gravels)
D% A horizon	28%
D% B horizon	48%
%dispersible soil A horizon	19/100x28/100x100 = **5.32**
%dispersible soil B horizon	43/100x48/100x100 = **20.64**

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

Reference Veness and Associates. Soils report Number VA1715C/01 of 27-11-95.

A copy of Report Number VA1715C/01 of 27-11-95 from J Veness is 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 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 on 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. The compartment is relatively flat and the harvesting should not often disturb the subsoil.

Existing erosion

A field inspection of the roads and drainage lines in the compartment revealed very little evidence of erosion. 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 (probably not connected to any harvesting) and some more or less permanent water holes have been formed.

(e) Landform

Slope

Slopes are generally convex or straight from the ridge tops down to the drainage lines. The compartment generally has slopes less than 10° with large areas near flat. Areas of slope classes are given in Table 1 below.

Table 1 - Slope Class Areas
(% compartment area)

0° - ≤5°	>5° - ≤10°	>10° - ≤15°
64	31	5

Terrain

The compartment basically consists of six broad, relatively flat secondary ridges with a number of short wide side ridges. The drainage lines are wide and near flat.

Drainage line condition

All drainage features within the net harvest area have been field inspected. Drainage features not marked on the operational map for protection are drainage depressions. Any unexpected drainage lines or watercourses identified during the operation must be protected in accordance with the Pollution Control Licence.

The drainage lines are in places 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 some evidence of cutting through bends during heavy rainfall events.

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

Aspect

The aspect is generally north-westerly (ranging from south-westerly to north-easterly).

Rockiness

Field inspection revealed no rock areas on the compartment and rockiness is not a consideration. 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.

(f) Hydrology

The compartment is in the Clarence River catchment. Alipou Creek runs north out of the forest and joins the Clarence River at Grafton. There are no prescribed streams, swamps or wetlands within the net harvest area.

No major water storages occur adjacent or down stream from the compartment.

Representative water monitoring sites

The representative water monitoring site is Chaelundi (Sandstone, rainfall 800 mm, annual rainfall erosivity 3300, slope 18°).

Reference Forest Planning Branch *Water quality monitoring program* **SFNSW** 1994

Previous harvesting

The forest was one of the original sources of hardwood timber in the Clarence area and was cut over and apparently had regenerated to some extent by the late 1800s. The compartment was intensively treated ("*ringbarked and mattocked*") in the period 1911-15. It was 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. Compartment 84 was last logged during 1991 for poles and girders. Erosion mitigation structures were constructed on snig tracks and some minor roads during the 1991 logging.

Upstream catchment water use

Production forestry - the upper catchments are wholly within Divines SF.

Downstream catchment water use

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

Domestic water use

There is no domestic water supply drawn from the Clarence below the Alipou 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.

Recovery time

Recovery will be relatively rapid with 100% live ground-cover being attained within 12 months. The tracks and minor roads utilised during the 1991 logging have revegetated except in places where soil has been scraped off to form erosion mitigation banks.

(h) Proposed Operation System

Use of existing roads

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

Boundary Road, which gives access to the compartment and runs along its eastern and south-eastern boundaries is crowned, effectively drained by mitres and is permanently maintained.

Approximately 4.3 km of minor roads give access to side ridges in the compartment. These roads are long established, crowned, effectively drained by mitres and are irregularly graded.

Some sections of the minor roads to dump sites in the compartment will be reopened for use during this harvesting by lowering crossfall banks constructed during the 1991 logging and the removal of a few pieces of fallen timber. This will be done by the logging machinery and will cause minimal disturbance to the pavements.

The pavements of all roads are consolidated by long time use and the verges are well grassed. None are likely to cause significant water pollution. There are no sections of road where ground slope exceeds 30° or where road grade exceeds 10°.

Use of existing drainage feature crossings

The road along the northern boundary of the compartment crosses two drainage lines as shown on the operational map. Both crossings are long established, open natural surface causeways that are in a stable condition with will vegetated batters. The approaches are currently drained by mitre drains that appear to be reasonably effective. The drainage will be improved by the construction of rollover drains following the completion of harvesting.

Road construction

There is no road construction required for the harvesting. There will be no need to establish borrow pits or gravel pits.

Construction of drainage feature crossings

There is no drainage feature crossing construction 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. The tractor will only be used in Compartment 84 in the event of a major breakdown of the skidder.

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, 3, 4, 6, 7, 8, 11, 12, 15, 17 and 18 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. The drainage line crossings are long established utilising natural gravel or flat grassy sites. Less than 10% of the snigging activity will be downhill.

Log dumps must be located in accordance with the operational map.

Post-harvest burning

In Compartment 84 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 overstory, understory and ground-cover plants will provide ground cover rehabilitation. Roads, log dumps and major snig tracks, associated batters, and drainage structures normally stabilise within twelve months provided crossfall and cross bank drainage is properly installed.

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. Details are in Table 2 below, the subsoil data having given lower slopes for the categories.

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

R = 3200
K = 0.029 **Topsoil (A horizon)** Method B3
K = 0.030 **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
0 - ≤4	1	40
over 4 - ≤20	2	60
over 20 - ≤30	3	N/A
Roads	3	N/A

The following factors for rainfall erosivity and soil erodibility also apply to road construction:
R = 3200 **K = 0.030**

(b) Dispersibility

%dispersible soil A horizon = 19/100x28/100x100 = **5.32** (Method D1)
%dispersible soil B horizon = 43/100x48/100x100 = **20.64** (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 Compartment 84.

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.

Part of an orienteering course is located in the compartment. It is marked by steel droppers.

Part 3 AUTHORISATION CONDITIONS

3.1 COMPLIANCE

(a) Area Identification

GRAFTON DISTRICT

Divines State Forest No. 25

Compartment 84

Grafton Management Area

(b) Third Party/Lessee or Other Interest

The compartment is within the area of Occupation 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 **"Code of Logging Practice Native Forests - State Forests and Other Crown Timber Lands"** - 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 "Code of Logging Practice Native Forests - State Forests and Other Crown -Timber Lands"**. 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).

Variations and other specified approvals detailed Condition 5.1(c), 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, and where relevant to the Pollution Control Licence, with prior approval from 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: D.G. Ryan Signature: D G Ryan

Title: Consulting Forester Date: 18 December, 1995

(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: 1st March, 1996

Signature: ..... District Forester Date: 21 Dec, 1995.

(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 - 36 attachments and the Operational, Forest Types and Locality maps marked and referenced to this Harvesting Plan. This is Harvesting Plan No. GG 95/10/84

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 95/10/84 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 will 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. Two horizontal lines also indicates a **protection strip**. **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, protection 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.

Reference: Northern Region Tree Marking Code (1995)

4.3 Order of Working

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

Nineteen dump sites have been located and marked in the compartment, as indicated on the Operation Map. Dumps 1, 2, 5, 9, 10, 13, 14, 16, 17-19 have been designated as suitable for working when conditions are wet. While allowing for wet conditions, harvesting will commence on dump 1 and work progressively through to dump 18.

(b) Wet Weather Controls - Roads

During wet weather, the wet-weather controls set out in Section 7 of the Code of Logging Practice will apply. In particular, when it is raining and/or where runoff occurs from a road surface, haulage may not occur unless the road is a gravel or sealed road.

[COLP 7.2, PCL Sch 4 C 82]

(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. [COLP 7.2, PCL Sch 4 C 93]

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

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 (Jacobs, 1955) 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 shall 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 shall 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 shall 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 are to be employed to minimise damage to retained trees, to avoid hang ups and to maintain values of the Riparian Habitat Zones, filter strips, protection strips and buffer strips.

4.5 Flora Protection

(a) Rare or Endangered Species

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

(b) Rainforest Protection

There are no areas of rainforest in the compartment.

4.6 Fauna Protection

(a) Sightings of Fauna

No Schedule 12 species have been detected in Compartment 84. Rufous Bettong have been seen in adjacent areas. Schedule 12 species expected to occur in or in the vicinity of the compartment are;

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

Contractors and supervisory staff shall report any sightings of Schedule 12 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

Compartment 84 includes Dry Hardwood forest with xeromorphic understory. 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 understory shall be four trees per hectare. For the purpose of this prescription a xeromorphic understory 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 understory shall be six trees per hectare. For the purpose of this prescription a mesic understory 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 understory vegetation and on-ground logs.

(c) Non Harvest and Modified Harvest Areas

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 no harvesting machinery may enter Riparian Habitat Zones.
- felling and snigging shall be excluded from Riparian Habitat Zones.
- trees shall not be felled into Riparian Habitat Zones.
- trees shall not be damaged in Riparian Habitat Zones.

Refugia areas

No areas of critical habitat for Schedule 12 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 Schedule 12 species that might be adversely impacted on by forest management activities. Those relevant to Compartment 84 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.

The only Critical Weight Range species is likely to occur in Compartment 84 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 shall be made to minimise disturbance to mature seeding forest oaks throughout the logging area. 100 metre radius buffer zone shall 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 4

Red Goshawk

200 metre radius buffer zone shall 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 shall 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

200 metre radius buffer zone shall be established around each identified nest site and 100 metre radius buffer zone shall 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 7:

Stephen's Banded Snake and Pale-Headed Snake

100 metre radius buffer zone shall be established around 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 shall 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

Within 100 metres of identified V-notch scarred trees the following trees will be retained: known scarred trees, an additional 30 trees (>10 cm dbh) of the sap feed tree species: and a minimum of 15 bark shedding trees. Additionally within a 50 ha area surrounding a scarred tree or a sighting location of a Yellow-bellied Glider, an average of 10 trees (>10 cm dbh) of feed tree species and 5 mature bark shedding trees per hectare shall be retained. These trees may be located within unlogged remnants, but retained sap feed trees may not count as retained bark shedding trees.

Prescription 10:

Koala

100 metre radius buffer zone shall be established around each identified use tree. The extent of habitat use and preferred food trees within the 100 metre radius shall be assessed as detailed below.

If no further Koala evidence is found within 100 metres of the use tree a minimum of 5 Koala food trees shall be retained within the 100 metres. If regular activity is detected but less than 20% of the trees within 100 metres have faecal pellets underneath and no Koalas are observed, trees with evidence of regular Koala activity shall be retained; a minimum of 15 trees are to be retained within the 100 metres radius. If regular Koala activity is detected and more than one Koala is observed or more than 20% of trees within 100 metres radius have faecal pellets underneath, forestry operations, except low intensity prescribed burning, shall be excluded from the 100 metres radius and the Manager, Northern Zone of the NPWS shall be informed.

Prescription 11:

Yellow-bellied Sheath-tailed Bat

100 metre radius buffer zone shall 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 shall 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 metre radius buffer zone shall 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 shall 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 Compartment 84, based on the subsoil data, 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	40
over 4 - ≤20	2	60
over 20 - ≤30	3	N/A
Roads	3	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, Snig Tracks and Crossings

The marking and location of roads, log dumps, snig tracks and crossings in the field will be in accordance with condition 4.2 and the operational map approved by the EPA. The location of roads, drainage feature crossings and log dumps cannot be varied in the field without the prior written approval of the EPA.

(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 Code of Logging Practice. During wet weather, the wet weather controls for road usage and for snigging set out in section 7 of the Code of Logging Practice 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) When 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 1, 2, 5, 9, 10, 13, 14, 16, 17-19, as marked on the Operational Map, are suitable to be worked during wet weather periods.

(e) Existing Roads

Clearing of regrowth

A minimal amount of clearing will be required to open existing roads for use. This will involve lowering of crossbanks, and the removal of fallen timber and small regrowth trees from the roads for a width of 6 m.

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. Where required, rollover crossbanks will 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 should readily cater for 1 in 5 year storm events.

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

0 - ≤5	>5 - ≤10	over 10
100m	60m	40m

Rollover crossbanks must drain at natural surface level, or by way of installed plastic sheeting, onto undisturbed vegetation. Where undisturbed vegetation is not immediately accessible to the outfall, sediment trap fences must be installed across the outlet.

Rollover banks shall be retained in situ after the roads have been closed.

Crossing of drainage features

The drainage lines in the compartment are intermittent, in fact rarely run water, and were dry at the time of recent inspections.

The road along the northern boundary of the compartment crosses two drainage lines, as shown on the Operation Map. Both are open, long established, natural surface causeways, that are in a stable condition with well vegetated batters. The approaches to these causeways will be gravelled if pavements commence to deform during the logging. Drainage on the approaches to the crossings will be improved by the construction of rollover drains following logging. Any disturbed areas adjacent to these causeways shall be seeded with rye grass at the rate of 20 Kg/ha immediately following the logging, where considered necessary by the SFO.

Revegetation and rehabilitation

Revegetation of the minor roads following harvesting will be through natural regeneration. All crossbank rollover drains shall be left in working condition and crossfall (outfall) drainage reinstated.

Dispersible soils

It is not anticipated that subsoil will be exposed on the roads during the harvesting. If small sections of the subsoil are exposed, top soil from the road, or imported gravel must be spread over the road surface at the site and the cut and fill batters shall be seeded with rye grass at the rate of 20 Kg/ha.

(f) Road Construction

No road construction is required for the harvesting.

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

(Note that the slopes in the compartment are under 15 degrees and the limits listed below are not really relevant)

Maximum slope for harvesting ..... 30 degrees
Maximum slope for 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

(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. These zones have the same harvesting exclusion specifications as wildlife corridors.

Filter strips and protection strips must be retained along all watercourses and drainage lines within the net harvest area of Compartment 84 at minimum widths as stated in Table 5 below (note that SE/WP Category 3 (High) comes in at 20° and does not occur in the compartment). These minimum widths meet or exceed the requirements of the Pollution Control Licence.

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

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

The SFO must mark the Riparian Habitat Zones and protection strips (or filter strips if there are no protection strips) in the compartment progressively ahead of harvesting operations. The licensee or contractor shall be responsible for measuring off-sets to a filter strip from a protection strip as indicated by the SFO to determine the boundary of the filter strip adjacent to the protection strip. (See also 4.2, 5.2)

Contractors and operators shall be 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)

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

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

(j) Felling and Extraction from Filter Strips and Protection Strips

OPERATIONS WITHIN NATIVE FOREST 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 hand brushing of furrows and replacement of cover, so that concentrated water flow does not occur.

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

OPERATIONS WITHIN NATIVE FOREST PROTECTION STRIPS

Trees located in protection strips may be felled, but only if they can be directed out of the strip.

Where trees are felled out of protection strips in accordance with the previous condition above, State Forests must ensure that:

(a) a minimum of 50 per cent canopy cover is retained within the protection strip; and

(b) the retained canopy is evenly spread throughout the strip. Gaps and clusters of trees must not be created within the protection strip; and

(c) the tree is extracted from the strip in the direction of the line of the log;

(d) any furrows resulting from log removal are diverted at the edge of the protection strip, so that concentrated water flow is diverted onto undisturbed areas.

Crowns of trees may be felled into protection strips

Where crowns of trees are felled into protection strips in accordance with the previous condition above, State Forests must ensure that;

(a) logs are extracted from the protection strip in the direction of the line of the log; and

(b) any furrows resulting from tree removal are diverted at the edge of the protection strip, so that concentrated flow is diverted onto an undisturbed area.

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

(k) Extraction from Drainage Depression Buffer Strips

Soil disturbance in drainage depression buffer strips must be minimised by use of the following techniques:

- no snigging along drainage depressions.
- minimal use of blade.
- logs shall be approached in reverse gear.
- minimal change in direction while snigging logs out of drainage depressions.

(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.

Wherever practicable, snig tracks shall be located slightly off ridge-top to ensure free crossfall drainage. Side cut tracks must have crossfall drainage. It is not expected that construction of side-cuts will be required in this operation.

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 licensee/contractor 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° - ≤20°	2	8
over 20° - ≤30°	3	5

Where earth banks are required they must be constructed to a minimum unconsolidated effective height of 25 cm, with spacing in accordance with Table 7.

Table 7 - Maximum Earth Bank Spacing

Track Grade (degrees)	WPH Category		
	1 (0° - ≤4°)	2 (>4° - ≤20°)	3 (>20° - ≤30°)
0 - ≤5	200m	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. Crossbank construction, if required, must avoid exposing the dispersible sub-soil horizon wherever practicable. Crossbanks must be discharged into undisturbed vegetation or logging debris.

(m) Downhill Snigging

Limited downhill snigging will be required to dumps 1, 3, 4, 6, 7, 8, 11, 12, 15, 17 and 18.

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

- Crossfall drainage must be used where practicable.
- Where practicable the snigging pattern shall be uphill from the stump with the logs being bunched for the downhill portion of the snig onto a centrally located extraction track(s).
- Tracks approaching a log dump shall be located so as to direct water away from the dump immediately before reaching the dump.

(n) Snig Track Drainage Line Crossings

The drainage lines in the compartment only flow intermittently and were dry at the time of recent inspections, the only water in the compartment being in a few scattered holes.

All snig track drainage line crossings must be approved by the SFO before construction and shall be open causeways utilising the natural surface at the site. There should be little need to cross drainage lines and little need to modify the channel or banks of drainage lines that are crossed. Crossings must be rehabilitated after use, all loose material shall be removed from the channel, as far as practicable the crossing point shall be reshaped to its original condition and seeded with rye grass at the rate of 20 Kg/ha.

(o) Dispersible Soils

It is not anticipated that snigging will expose significantly dispersible sub-soil. To minimise the possibility, walkover extraction techniques will be utilised wherever practicable. If small lengths of sub-soil are exposed, top soil from the track construction must be spread over the track surface at the site and at the completion of use of the track, cut batters shall be seeded with rye grass 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 indicated on the Operational Map.

Before use, about 10 cm of topsoil must be stripped and stockpiled for subsequent respreading at the completion of operations. As the topsoil layers are about 30 cm deep, this will not result in exposure of the dispersible subsoil. If accidental exposure of the subsoil occurs, topsoil must be immediately respread over the disturbed area (note that the dump

surface will be built up with fine logging debris and consolidated to some extent by the movement of machinery).

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

At the completion of operations any debris at or near the edge of a dump shall be moved away from standing vegetation into the dump area. The topsoil shall be respread uniformly over the dump area which shall be left in a neat and stable condition.

(q) Prescribed Burning

Pre-logging burning

The will be no pre-logging burning associated with the harvesting of Compartment 84.

Post-logging burning

Post-logging burning of Compartment 84 will 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 will 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 will be 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 Compartment 84.

4.9 Modified Harvest Conditions

(a) 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 no harvesting machinery may enter Riparian Habitat Zones.
- felling and snigging shall be excluded from Riparian Habitat Zones.
- trees shall not be felled into Riparian Habitat Zones.
- trees shall not be damaged in Riparian Habitat Zones.

(b) Boundary Fences

Private property joins the northern boundary of the compartment. This boundary is fenced.

- Damage to this fence is to be avoided. Any damage caused shall be immediately repaired.

Also, the Forest itself is fenced and the gate at the entrance to the Forest on the northern boundary shall be locked overnight.

(c) Orienteering Course

The steel posts marking the orienteering course through the compartment shall not be disturbed. Any damage caused shall be immediately repaired.

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 Compartment 84

Estimated Yields are:

Compulsory Sawlogs 40 cm + ... 1000m³
Compulsory Sawlogs <40 cm 400m³
Salvage Sawlogs 100m³
Poles 200m³
Veneer Logs 50m³

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 will be:

The appointed Hardwood Marketing Foreman, Grafton District.

(b) Relieving SFOs

Relieving SFOs , if required will be:

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 drainage line crossing for snig tracks - for this plan area all crossings will be open causeways.

All approvals shall be noted on the harvesting plan.

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 shall be marked for extraction. (Also see Part 4.2)

Habitat trees and habitat recruitment trees for fauna protection

Habitat trees and habitat recruitment trees will 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 Riparian Habitat Zones shall be marked ahead of harvesting operations.

(b) Soil Erosion and Water Pollution Control

Marking of filter strips and protection strips

Riparian Habitat Zone prescriptions are equivalent to or greater than filter/protection strips and drainage line buffer strip requirements. There is no need for filter/protection strips and

drainage line buffer strips where they would be embedded in riparian habitat zones. Hence filter/protection strips shall only be marked in the field where they are not embedded in riparian habitat zones.

All drainage features within the net harvest area have been field inspected. Drainage features not marked on the operational map for protection are drainage depressions. Any unexpected drainage lines or watercourses identified during the operation must be protected in accordance with the Pollution Control Licence.

Filter strips, protection 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 protection strips (or filter strips if there are no protection strips) in the field progressively and prior to the commencement of operations in each section of the harvest area.

The SFO is responsible for ensuring that the licensee or contractor is correctly measuring off-sets to a filter strip (See also Part 4.7 (j)).

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)).

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 shall be followed.

(b) Fauna Reporting and Mitigation Prescriptions

Sightings of any Schedule 12 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.

(d) Sowing of Constructed Crossings

The SFO shall ensure that crossing approaches are seeded in accordance with Part 4.7 (e).

(e) Dispersible Soils Exposed During Road/Snig Track Construction

If small sections of subsoil are exposed during road/snig track construction/use the SFO shall ensure that top soil from the earthworks, or imported gravel, is spread over the road/track surface at the site and the cut and fill batters are seeded with rye grass at the rate of 20 Kg/ha immediately following construction/completion of use in accordance with Part 4.7 (e) and (o).

Condition 5.4 Pre- and Post-logging Burning

(a) Pre-logging Burning

There will be no pre-logging burning associated with the harvesting of Compartment 84.

(b) Post-logging Burning

Post-logging burning of Compartment 84 will 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 will be 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 Compartment 84.

Condition 5.6 Supervising Forest Officer's Acknowledgment

I acknowledge that I have received a copy of Harvesting Plan No GG 95/10/84 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

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 = 3200 Derived from $R = 89.31 \times {}^{2}I_{12}{}^{1.74}$

K = 0.030 Subsoil (B Horizon)

Derived from Laboratory Analysis of the B Horizon
B 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
<=6	Low	less than 40	50
>6 to <=25	Moderate	40 - 400	50
>25 to <=30	High	400 - 800	N/A
N/A	Extreme	greater than 800	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 D.G. RYAN Signature D.G. Ryan

Title Consulting Forester Date 18.12.95

District Approval (by District Forester)

Signature .....
District Forester

Date 21.12.95

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 the Water Pollution Categories and proportion of Dispersible Soil been calculated for the area?	Yes	2.5 13 (a) 2.5 12 (d)
	Method for soil sampling for K factor	yes	2.5 12 (d)
	Field sampling - sites?	yes	
	- lab analysis?	yes	
	- field analysis?	yes	
1b)	Site specific conditions	No	
4	Are areas >30° within the net harvest area	No	2.5 12 (e) Map
5	Are areas of WPC 4 within the net harvest area	No	2.5 13 (a)
6	Drainage feature protection, prescribe stream	Yes	4.7 (h) Map
7	Any major water storage?	No	2.5 12 (f)
8	Drainage depression buffer strips conditions	Yes	4.7 (h)
9.1 (c)	Filter strips on map?	Yes	Map
9.2	Protection strips on map?	Yes	Map
10	Prescriptions for marking/identifying in the field		
	-filter strips	Yes	5.2 (b)
	-protection strips	Yes	5.2 (b)
	-buffer strips	Yes	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)
47	Stabilisation of roads within 12 months	Yes	2.5 12 (h)
48	Are roads shown on map	Yes	Map
49	Road traverses area over 30°	No	2.5 12 (h)
50 (a), (b)	Maximum road grade 10°	Yes	4.7 (f)
51	Marking of roads in field	Yes	4.7 (f)
52	Minimising road clearing widths	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.
53	Road side clearing	No	2.5 12 (h)
57	Borrow or gravel pits	No	2.5 12 (h)
60	Batter stabilisation measures	Yes	4.7 (f)
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	Yes	4.7 (f)
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 crossing sites stable	Yes	4.7 (f)
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	Yes	4.7 (f)
81	Protection techniques for roads traversing dispersible soils	Yes	4.7 (f)
82	Wet weather restrictions for roads	Yes	4.3 (b)
83	Condition to cover non-completion of crossing stabilisation within 5 days - snig tracks	Yes	5.3 (c)
84	Techniques to leave crossing sites stable	Yes	4.7 (e)
85	Condition to cover non-removal of temporary crossing structures	Yes	5.3 (c)
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)

POLLUTION CONTROL LICENCE CONDITIONS CHECKLIST
PLAN PREPARATION - PCL Sch 2, Div 3

Condition Number	Condition Title/Enquiry	Entry Needed?	Plan Ref.
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 at 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

NOTES

District: Grafton (Devine's SF) **Compartment(s):** 84, 85 **REPORT NUMBER:** VA1715C/01 **Page** 1 **of** 1

Sample Number	Sample Type	Soil Type	Depth (cm)	Particle Size Analysis (%) clay	silt	fine sand	coarse sand	gravel	D%	Texture+	Structure*	Perm-eab-ility*	Organic Matter (%)	'K'#	D% x clay%
84/1/A	Topsoil	E	3-10	19(21)	29(32)	38(41)	6 (6)	8	28	CL	2	2	4.47	0.029	5.32
84/1/B	Subsoil	E	25-40	43(47)	23(25)	24(26)	2 (2)	8	48	LMC	3	5	1.89	0.030	20.64
85/1/A	Topsoil	E	2- 8	13(15)	36(42)	32(37)	5 (6)	14	17	CL	1	2	5.50	0.027	2.21
85/1/B	Subsoil	E	30-40	42(45)	24(25)	27(28)	2 (2)	5	16	LC	2	4	0.86	0.026	6.72

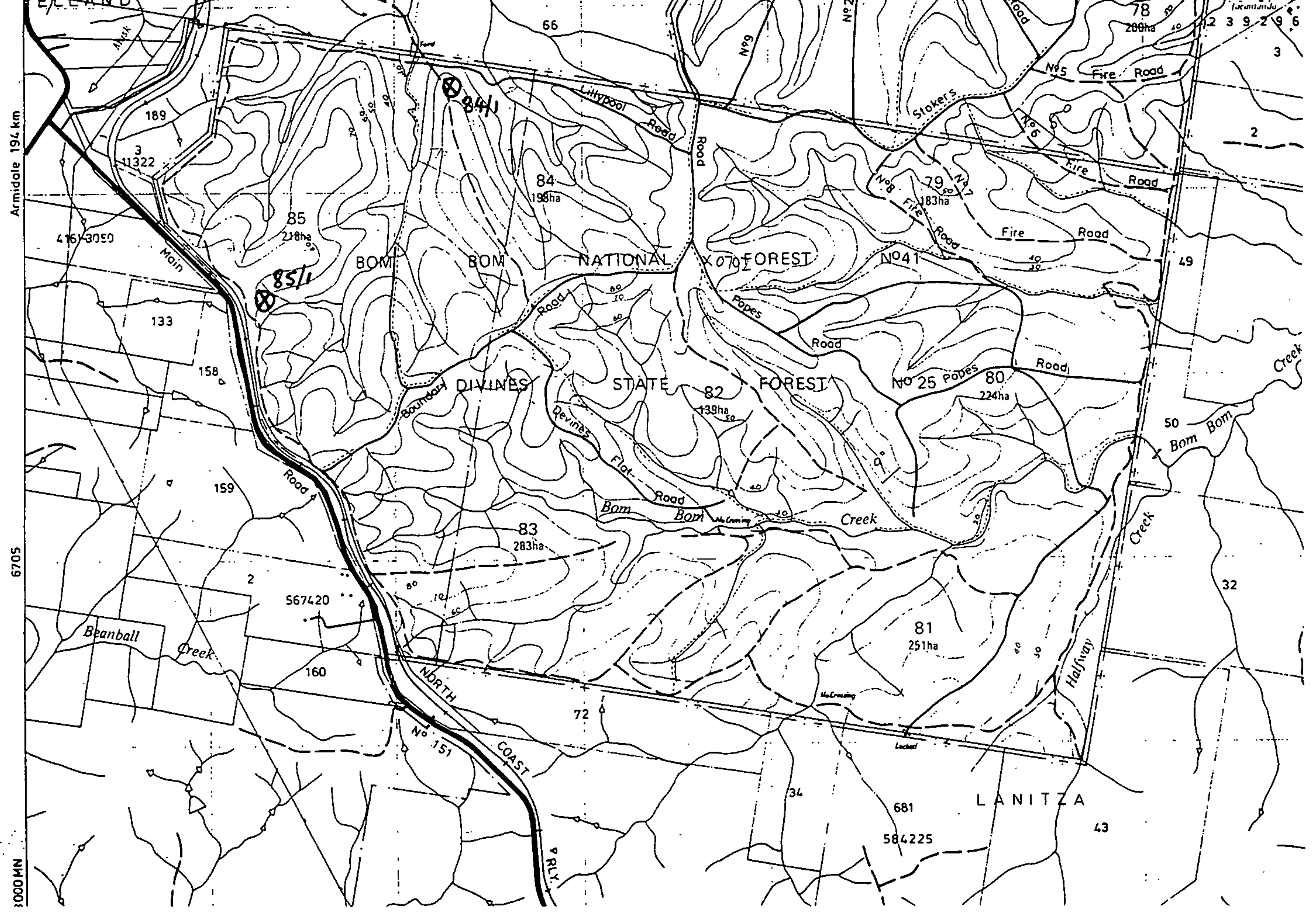
NOTES: PSA values are calculated inclusive of gravels. The values in brackets have been recalculated after excluding gravels
+ textures determined after Northcote (1979);
* structure and permeability classes are those to be used in SOILOSS;
# 'K' value has been determined using SOILOSS version 5.1

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
27th November, 1995


Armidale 194 km
6705
3000MN
189
3
11322
416l 3050
85
218ha
85/1
84/1
84
198ha
66
Lillypool
Road
Road
No 9
BOM
BOM
NATIONAL
FOREST
No 41
78
208ha
3
2
No 5
Fire
Road
Stokers
No 6
Fire
Road
No 8
Fire
Road
79
183ha
No 7
Fire
Road
49
Popes
Road
Road
No 25 Popes
80
224ha
Road
Creek
DIVINES
STATE
82
139ha
FOREST
Boundary
Devines
Flat
Road
Bom
Bom
Creek
83
283ha
50
Bom Bom
Creek
32
81
251ha
Halfway
133
158
159
Main
Road
2
567420
Beanball
Creek
160
NORTH
COAST
RLY.
No 151
72
34
681
584225
LANITZA
43

Attachment 2 (i)

HARVESTING PLANNING - IMPLEMENTATION OF 18.9.95 PROTOCOL

Job Sheet [Provisional - requires review]

District: GRAFTON Management Area: GRAFTON State Forest: DIVINES S.F.
Compartment No: 84

API ✓

Interpreter: P. FISHER Date Completed: 13/10/95

Results Summary (ocular estimate):

Candidate OGF	Whole Cpt	Net Loggable Area
Total	%	%
Polygons >25 ha	~~Yes~~/No	Yes/No
Contiguous areas >25 ha	~~Yes~~/No	Yes/No

Mapping Required? ~~Yes~~/No, and go to Unlogged Area assessment.

Photo overlay(s) signed and stored with HP ~~Yes~~/No.

Comments: The net loggable area of the above compartment(s) contain (or initiate) no contiguous forest areas greater than 25 ha which contain <10% CCP of regrowth forests.

MAPPING

Mapper: Date Completed:

Candidate OGF	Net Loggable Area No.	Net Loggable Area Area
Polygons >25 ha (incl. contiguous areas)		

Stump Count Field Sample Areas

Area No.	Size (ha)	No. Points (min. 4)
1		
2		
3		
4		
5		

Comments:

Attachment 2 (ff)

STUMP COUNT

Assessor: Date Completed:

Area No.	Av. Largest Tree Diam.	Av. Stump No./ha	OGF Exclusion Area (Yes/No)
1			
2			
3			
4			
5			

Comments (eg stand history):

UNLOGGED AREA

Assessor: LEONIE WALSH Date Completed: 18/12/95

[For the net loggable area outside any polygons mapped as A or tA, B or tB, C or tC assess if there are any tracts >25 ha (including contiguous parts of NLAs in adjoining compartments) via:

- API (no evidence of roads, tracks, dumps, or say obvious young regen.).

and/or • Logging records

and/or • Field observation.]

Unlogged Area(s) Present? ~~Yes~~/No, and end exercise

Unlogged Area(s) Mapped? Yes

Comments:

CERTIFIED MAIL
K 986539

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. 795 5000
Facsimile .02. 795 5002

Our Reference: 600000/D15/Not. Nos. 002610
Your Reference:

5 March, 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, 1996.

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 the licence by further amending the harvesting plan for Compartments 309, 310, 311, 312 & 313, Nambucca State Forest No. 543, (prepared by State Forests of NSW, and received by the EPA on 14 November 1995, as amended by Notices under section 17D(3) of the Pollution Control Act 1970 issued by the EPA on 8 December 1995 and 16 February 1996) by:

a) inserting the attached additional harvesting plan operational map received by the EPA on 1 March 1996 and certified by Geoff Noonan.

2. 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:

"Compartment Description

Compartments 8, 9, 10, 11 & 12
Moogem State Forest No. 614 and
Gibraltar Range State Forest No. 352

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 18.
3	Greater than 18 and less than or equal to 30.
4	Not applicable.

Proportion of dispersible soils: A horizon 3.6%
B horizon 5.8%

Special Conditions

Special conditions are those conditions contained in the harvesting plan for Compartments 8, 9, 10, 11 & 12, Moogem State Forest No. 614 and Gibraltar Range State Forest No. 352, prepared by State Forests of NSW, received by the EPA on 19 December 1995, and as amended by:

1. addendum 1 received by the EPA on 18 January 1996; and

2. addendum 2 received by the EPA on 4 March 1996.

Waters Quality Monitoring Site

Butterleaf State Forest

Date of licence variation

5 March 1996."

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

"Compartment Description

Compartment 84
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 20.
3	Not applicable.
4	Not applicable.

Proportion of dispersible soils: Soil Sample 1: A horizon 5.32%
B horizon 20.64%
Soil Sample 2: A horizon 3.51%
B horizon 8.50%
Soil Sample 2: A horizon 0.95%
B horizon 20.36%

Special Conditions

Special conditions are those conditions contained in the harvesting plan for Compartment 84, Divines State Forest No. 25, prepared by State Forests of NSW, received by the EPA on 18 January 1996, and as amended by:

1. addendums 1 and 2 received by the EPA on 1 March 1996; and

2. addendum 3 received by the EPA on 4 March 1996.

Waters Quality monitoring Site

Chaelundi State Forest

Date of licence variation

5 March 1996."

********** F I L E C O P Y **********

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

"**Compartment Description**

Compartment 85
Divines State Forest No. 25

Water Pollution Hazard Categories

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 3.
2	Greater than 3 and less than or equal to 14.
3	Greater than 14 and less than or equal to 30.
4	Not applicable.

Proportion of dispersible soils: Soil Sample 1: A horizon 2.21%
B horizon 6.72%
Soil Sample 2: A horizon 5.67%
B horizon 33.44%
Soil Sample 3: A horizon 3.96%
B horizon 22.48%

Special Conditions

Special conditions are those conditions contained in the harvesting plan for Compartment 85, Divines State Forest No. 25, prepared by State Forests of NSW, received by the EPA on 18 January 1996, and as amended by:

1. addendums 1 and 2 received by the EPA on 1 March 1996; and

2. addendum 3 received by the EPA on 4 March 1996.

Waters Quality monitoring Site

Chaelundi State Forest

Date of licence variation

5 March 1996."

********** F I L E C O P Y **********

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

"**Compartment Description**

Compartment 284
Tuggolo State Forest No. 312

Water Pollution Hazard Categories

Tuggolo Soil Unit

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 5.
2	Greater than 5 and less than or equal to 23.
3	Not applicable.
4	Not applicable.

Proportion of dispersible soils: A horizon: less than 10%
B horizon: 18%

Tomalla Soil Unit

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 7.
2	Greater than 7 and less than or equal to 30.
3	Not applicable.
4	Not applicable.

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

********** F I L E C O P Y **********

Special Conditions

Special conditions are those conditions contained in the harvesting plan for Compartment 284, Tuggolo State Forest No. 312, prepared by State Forests of NSW, received by the EPA on 19 January 1996, and as amended by:

1. addendum 1 received by the EPA on 27 February 1996; and

2. addendum 2 received by the EPA on 1 March 1996.

Waters Quality monitoring Site

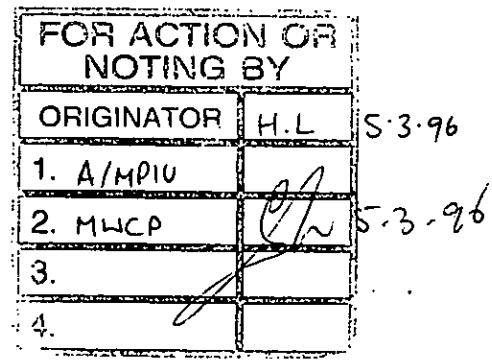
Riamukka State Forest

Date of licence variation

5 March 1996."

NEIL SHEPHERD
Director-General

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



Previous Register #29

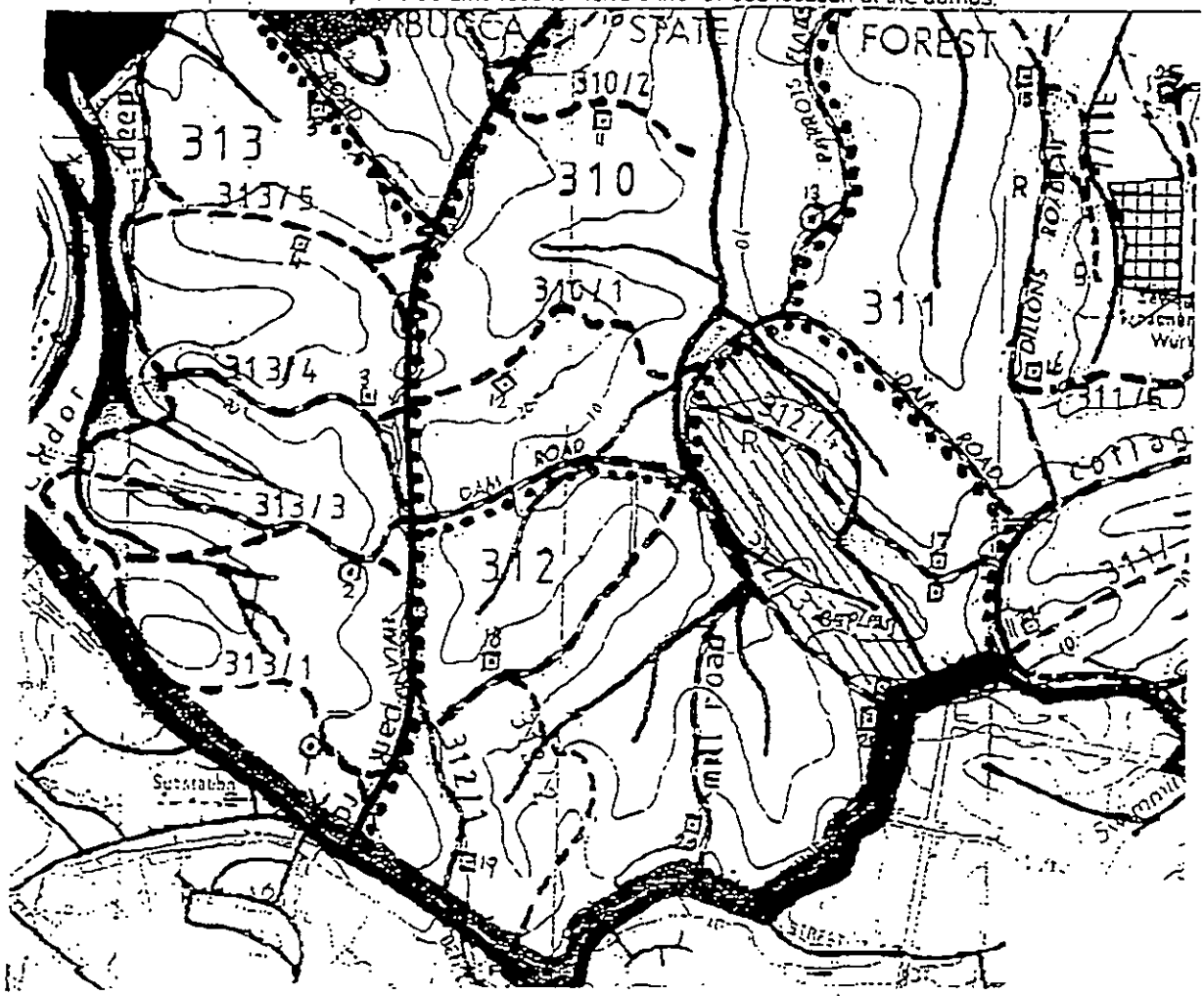
URUNGA DISTRICT
HARVESTING PLAN AMENDMENT
Nambucca State Forest Cpt 312

Harvesting Plan Amendment No NR-URN-96/21

Harvesting Plan approved by EPA on 8/12/95

Further fieldwork in this compartment has indicated the need to move the location of dumps 17 and 21 by approximately 100 metres each, to move further away from a drainage depression and to avoid young regrowth respectively.

The operational map is to be amended to indicate the revised location of the dumps.



Prepared by	Simon Hemer	Signature:	Simon Hemer
Title	Forester	Date	1/3/96
Approved by	Steve Rayson	Signature:	S Rayson
Title	District Forester	Date	1/3/96

S Rayson 5.3.96

SUBMM41-7868-KG

FACSIMILE TRANSMISSION

To	Dr. Neil Shepherd, Environment Protection Authority P O Box 1135 CHATSWOOD NSW 2057		
Attention	Mr Geoff Noonan Catchments Branch	**Date**	5 March 1996
Your Fax		**Our Fax**	(02) 9980 7042
From	Kris Gounder Forest Planning Branch	**Phone**	(02) 9980 4217 (015) 271 625
No of Pages	1 (including this cover page)		

STATE FORESTS

State Forests of
New South Wales
Building 2
423 Pennant Hills Road
Pennant Hills NSW
2120
Phone (02) 980 4100

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

In terms of Clause 13(b) of the Pollution Control Regulations, State Forests of New South Wales hereby notifies you that no appeal will be made against EPA's decision to vary Licence No. 4017 on 5 March 1996 to include the following areas:

Compartment No.	State Forest	Management Area
309,310,311,312 & 313	Nambucca	Urunga
8,9,10,11 & 12	Moogem & Gibraltar Range	Glen Innes
84 & 85	Divines	Grafton
284	Tuggolo	Walcha

for A. HOWE
Manager
Forest Planning Branch

For State Forests Use Only (Page 1 of 8)

District Forester Urunga, Glen Innes, Grafton & Walcha

As required under the above legislation we advised EPA about our intention not to appeal against this Licence amendment **on 5 March 1996.** Accordingly you may start logging these compartments **on 7 March 1996.**

Manager, Forest Planning Branch

HARVEST PLAN DESK AUDIT CHECKLIST

Register No: 530 Date Received: 18 / 1 /1996

State Forest: DIVINES Compartment/Age Class: 84

District: GRAFTON State Forest No: 25

Region: NORTHERN Harvest/~~Thinning~~:

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

WATER POLLUTION HAZARD CATEGORY

Factor	*Provided* Yes	No	*Relevant* Yes	No	*Comment*
R	✓		✓		R = 3200
K	✓				K = 0.03
S					as factored by SOILOSS 5.1
L					L = 20 M
C	✓		✓		C = 0.108

Soil Sampling personnel named and approved: Veness (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: _____

	% Cpt	Slope (°)	Catchment Size
WPHC 1	40	0 – ≤ 4°	
WPHC 2	60	>4° – ≤ 20°	
WPHC 3			
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: SS1

A Horizon % D: 28 x % C: 19 / 100 = 5.32%
B Horizon % D: 48 x % C: 43 / 100 = 20.64%

Soil Unit 2: (if applicable) SS2

A Horizon % D: _____ x % C: _____ / 100 = 3.51%
B Horizon % D: _____ x % C: _____ / 100 = 8.50%

Soil Unit 3: (if applicable) SS3

A Horizon % D: _____ x % C: _____ / 100 = 0.95%
B Horizon % D: _____ x % C: _____ / 100 = 20.36%

REPRESENTATIVE WATER MONITORING

Representative Water Monitoring Site: Chaelundi State Forest

Annual rainfall: >800mm. Geology: Sedimentary

Forest Type: _____

HARVEST PLAN DESK AUDIT CHECKLIST

Condition	Condition	Comply	Comment
1 b	**Site Specific conditions** Attached site specific conditions to harvesting plan	N/a	
6	**Minimum protection widths for drainage line in native forests** Any prescribed streams, swamps and wetlands	N/a	
7	Any major water storages present	N/a	
9 (1 c)	Minimum protection widths Show filter strips on harvesting plan map	Yes	
9 (2)	Show protection strips on harvesting plan map	Yes N/A	
10	Prescriptions for marking F, P, and B strips in the field	Yes	p28. No protection strips in this operation.
20	**Operations within Native Forest Protection strips** Person responsible for identifying P strips in the field	Yes	p28 despite none in operation.
22	**Operations within Native Forest Buffer strips** Person responsible for identifying P strips in the field	Yes	p29
24	Specifications of techniques for minimising soil exposure and that any disturbance will cause no channelised flow in buffer strip	Yes	p30
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)	N/a	
33	**Operations within Native Plantation Buffer strips** (as per 22 and 24)	N/a	

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	N/a	
46	**Operations within Softwood Plantation Buffer Strips** (as per 22 and 24)	N/a	
47	**Road design, construction and maintenance** Specify techniques for the road design, construction and maintenance	Yes	p27
48	Proposed road locations are shown on harvesting plan map	Yes	Map
49	Maximum slopes for road construction Specify techniques for road stabilisation within 6 months of construction for roads built on slopes > 30 °	N/a	
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	Yes	p27 Nat. Regen
57	**Borrow Pits and Gravel Pits** Specify techniques for 1. construction of stable batters 2. stabilisation at the completion of operations	N/a	

Condition	Condition	Comply	Comment
60	**Road Batters** Specify road batter stabilisation techniques	Yes	p12. Nat. Reg.
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.	p27	Changes requested.
71	**Crossing of drainage features** Specify location and type of crossings at drainage features	Yes	Map; p12
78	**Road no longer required** Specify techniques to be used to stabilise roads that are no longer used	Yes	
81	**Dispersible Soil** Specify techniques used to protect roads and dispose of spoil that is dispersible	Yes	p27
89	Snig Track Construction Specify criteria for ensuring that snig tracks are located and constructed where they can be drained effectively	Yes	p30

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	Yes	p27 - 8
109	**Downhill snigging** Specify measures to prevent concentrated water flow where downhill snigging occurs	Yes	p28
112	**Snig Tracks and Dispersible Soil** Specify measures to protect dispersible soils	Yes	p 31
115	**Log Dumps** Specify location of log dumps on harvesting plan map	Yes	
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	Yes	31 - 2

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	Yes	32

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

****
********** User's Name **********
****

SOIL LOSS ESTIMATION

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:

==========

Estimation prepared for : DIVINES 84
Date : 18-01-1996 Time : 10:40 Report Number : 1

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

Rainfall Erosivity:	Rainfall Zone: 1	R = 3200
Soil Erodibility :	User supplied	K = 0.030
Topography	:**Slope: 4.0ø** 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 = 7.7 t/ha**

==========

Estimation prepared for : DIVINES 84
Date : 18-01-1996 Time : 10:40 Report Number : 2

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

Rainfall Erosivity:	Rainfall Zone: 1	R = 3200
Soil Erodibility :	User supplied	K = 0.030
Topography	:Slope: 20.0ø Slope Length: 20 m	LxS = 4.698
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 = 49 t/ha**

Maximum Slope $< 20°$ for this Crop.

==========

Estimation prepared for : DIVINES 84
Date : 18-01-1996 Time : 10:40 Report Number : 3

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

Rainfall Erosivity:	Rainfall Zone: 1	R = 3200
Soil Erodibility :	User supplied	K = 0.030
Topography	:**Slope: 30.0ø** 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 = 69 t/ha**

District: Grafton (Devine's SF) **Compartment(s):** 84, 85 **REPORT NUMBER: VA1715B/02**

Sample Number	Sample Type	Soil Type	Soil Colour	Horizon Depth (cm)	L'form Element	Sample Depth (cm)	Particle Size Analysis (%) clay	silt	fine sand	coarse sand	gravel	D%	Text+	Str*	Per*	Organic Matter (%)	K#	D% x clay%
84/1/A	Topsoil	E	5YR 2/3	9	Ridge	3-10	19(21)	29(32)	38(41)	6 (6)	8	28	CL	2	2	1.47	0.029	5.32
84/1/B	Subsoil	E	5YR 3/6	70+	"	25-40	43(47)	23(25)	24(26)	2 (2)	8	48	LMC	3	5	1.89	0.030	20.64
84/2/A	Topsoil	E	7.5YR 4/3	13	Simple	2- 6	13(15)	30(35)	37(43)	6 (7)	14	27	CL	1	2	7.74	0.014	3.51
84/2/B	Subsoil	E	5YR 5/8	70+	slope	25-35	50(53)	20(21)	23(24)	2 (2)	5	17	LMC	1	4	0.69	0.015	8.50
84/3/A	Topsoil	E	10YR 3/3	13	Open	2- 5	5 (9)	38(34)	26(49)	4 (8)	47	19	CL	1	2	0.94	0.017	0.95
84/3/B	Subsoil	E	10YR 5/4	84+	deprsn	30-40	48(49)	23(23)	26(26)	2 (2)	1	42	LMC	2	5	1.55	0.024	20.16
85/1/A	Topsoil	E	7.5YR 3/3	13	Simple	2- 8	13(15)	36(42)	32(37)	5 (6)	14	17	CL	1	2	5.50	0.027	2.21
85/1/B	Subsoil	E	5YR 4/8	70+	slope	30-40	42(45)	24(25)	27(28)	2 (2)	5	16	LC	2	4	0.86	0.026	6.72
85/2/A	Topsoil	E	10YR 4/4	28	Open	5-10	27	17	54	2	0	21	LC	2	5	3.44	0.037	5.67
85/2/B	Subsoil	E	10YR 4/3	70+	depsn	44-55	38	29	33	0	0	88	LMC	3	6	1.89	0.042	33.44
85/3/A	Topsoil	E	7.5YR 3/3	7	Ridge	2- 5	18(22)	27(33)	34(41)	3 (4)	18	22	LC	1	4	7.05	0.020	3.96
85/3/B	Subsoil	E	5YR 4/6	70+	"	30-40	52(53)	17(17)	26(27)	3 (3)	2	24	MC	2	6	1.03	0.024	12.48

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

The landform elements occurring within this study area have been identified by Ruth and Jim Veness of Veness & Associates.

All of this area occurs on the Grafton Formation sediments.

Each profile was examined to a minimum depth of 700 mm.

These data have been determined on soil samples collected by Ruth and Jim Veness of Veness & Associates. The location of each sampling site has been recorded on the attached map.

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.

The soil layers as described in Veness (1994) which were found in the above sites include layers 1 (A, A1), 3 (A2), 4 (B2) and 5 (B3).

Jim Veness
(Managing Director)
VENESS & ASSOCIATES Pty Limited
3rd March, 1996

609
NORTH
1/3/96

Addendum 2
Previous Register# 530

My understanding of these methods is that

- Method B2 can be used where the soil map is at a scale smaller than 1:100 000, and that, upon verification, the K factor and the per cent clay values presented with the map can be used for the specific soil unit

- Method B3 is to be used where no soil survey information is available. In this case, following textures, K is to be determined from Table 2 in SOILOSS

The Grafton GIS soils mapping, undertaken by Veness & Associates, was carried out at a scale of 1:125 000.

On all harvesting plan samples handled by Veness & Associates, the following procedure to determine 'K' has been used:

- each soil sample is textured (after Northcote, 1979)
- each soil sample is analysed in the laboratory to determine both Particle Size Analysis and Dispersion Percentage
- the organic matter of each soil sample is determined
[the above analyses are undertaken using the methods required by EPA]
- for each soil sample, structure and permeability are determined
- the value of 'K' is determined using SOILOSS version 5.1 for each soil sample. As required by the SOILOSS program, the values for clay, silt, fine sand, coarse sand, gravel, organic matter, soil structure and soil permeability are taken as those being determined above.

Consequently, the K factor for each soil sample is determined through laboratory derived values. This methodology exceeds, and is more valid than, the determination of K using either Method B2 or B3.

• Proportion of Dispersible Clay

The PDS value, determined for each of the soil samples handled by Veness & Associates, is calculated using laboratory derived dispersion percentage and per cent clay values.

In summary, it appears that the methodology used exceeds some of the requirements stipulated by the EPA. More importantly, while these methods have been used, their execution and the collection of soil data in the field has not been given the kudos it deserves, primarily because it has not been presented.

To overcome this, it is proposed that a methodology be presented with each future batch of samples, together with a list of data collected. If you need to discuss any of the above, please get back to me.

Yours faithfully,

Jim Veness

Divines 84

609
NORTH
1/3/96

Previous
Register
#530

Dumps 1, 2, 5, 9, 10, 13, 14, 16, 17-19, as marked on the Operational Map, are suitable to be worked during wet weather periods.

(e) Existing Roads

Clearing of regrowth

A minimal amount of clearing will be required to open existing roads for use. This will involve lowering of crossbanks; and the removal of fallen timber and small regrowth trees from the roads for a width of 6 m.

Road surface drainage

The primary drainage used is outfall. Supplementary rollover crossbanks are being utilised to ensure that water is diverted off the road on some sections of the minor roads to log dumps where outfall drainage has not been fully established. Where required, rollover crossbanks will 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 must convey the peak flow of a 1:5 year storm event.

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

0 - =<5	>5 - =<10	>= 10
100 m	55 m	<50 m

Rollover crossbanks must drain at natural surface level, or by way of installed plastic sheeting, onto undisturbed vegetation. Where undisturbed vegetation is not immediately accessible to the outfall, sediment trap fences must be installed across the outlet.

Rollover banks shall be retained in situ after the roads have been closed.

Crossing of drainage features

The drainage lines in the compartment are intermittent, in fact rarely run water, and were dry at the time of recent inspections.

The road along the northern boundary of the compartment crosses two drainage lines, as shown on the Operation Map. Both are open, long established, natural surface causeways, that are in a stable condition with well vegetated batters. The approaches to these causeways must be gravelled if pavements commence to deform during the logging. Drainage on the approaches to the crossings will be improved by the construction of rollover drains following logging. Any disturbed areas adjacent to these causeways must be seeded with rye grass by the SFO at the rate of 20 Kg/ha immediately following the harvesting operations.

Revegetation and rehabilitation

Revegetation of the minor roads following harvesting will be through natural regeneration. All crossbank rollover drains must be left in working condition and crossfall (outfall) drainage reinstated.

Dispersible soils

It is not anticipated that subsoil will be exposed on the roads during the harvesting. If the subsoil is exposed, top soil from the road, or imported gravel must be spread over the road surface at the site and the cut and fill batters must be seeded with rye grass at the rate of 20 Kg/ha.

(f) Road Construction

No road construction is required for the harvesting.

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

(Note that the slopes in the compartment are under 15 degrees and the limits listed below are not really relevant)

Maximum slope for harvesting ..... 30 degrees
Maximum slope for 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

(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. These zones have the same harvesting exclusion specifications as wildlife corridors.

Filter strips must be retained along all watercourses and drainage lines within the net harvest area of Compartment 84 at minimum widths as stated in Table 5 below (note that SEWP Category 3 (High) comes in at 20° and does not occur in the compartment). These minimum widths meet or exceed the requirements of the Pollution Control Licence.

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

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

The SFO must mark the Riparian Habitat Zones and filter strips in the compartment progressively ahead of harvesting operations. (See also 4.2, 5.2)

Contractors and operators shall be 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)

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

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

(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 hand brushing of furrows and replacement of cover, so that concentrated water flow does not occur.

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

Soil disturbance in drainage depression buffer strips must be minimised by use of the following techniques:

- no snigging along drainage depressions.
- minimal use of blade.
- logs shall be approached in reverse gear.
- minimal change in direction while snigging logs out of drainage depressions.

(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.

Wherever practicable, snig tracks shall be located slightly off ridge-top to ensure free crossfall drainage. Side cut tracks must have crossfall drainage. It is not expected that construction of side-cuts will be required in this operation.

Snigging along roads must only occur in order to avoid snig track construction and where approved by the SHO. Effective road drainage must be re-instated by the licensee/contractor 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° - ≤20°	2	8
over 20° - ≤30°	3	5

Where earth banks are required they must be constructed to a minimum unconsolidated effective height of 25 cm, with spacing in accordance with Table 7.

Table 7 - Maximum Earth Bank Spacing

Track Grade (degrees)	WPH Category		
	1 (0° - ≤4°)	2 (>4° - ≤20°)	3 (>20° - ≤30°)
0 - ≤5	200m	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. Crossbank construction, if required, must avoid exposing the dispersible sub-soil horizon wherever practicable. Crossbanks must be discharged into undisturbed vegetation or logging debris.

(m) Downhill Snigging

Limited downhill snigging will be required to dumps 1, 3, 4, 6, 7, 8, 11, 12, 15, 17 and 18.

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

- Crossfall drainage must be used where practicable.
- Where practicable the snigging pattern shall be uphill from the stump with the logs being bunched for the downhill portion of the snig onto a centrally located extraction track(s).
- Tracks approaching a log dump shall be located so as to direct water away from the dump immediately before reaching the dump.

(n) Snig Track Drainage Line Crossings

The drainage lines in the compartment only flow intermittently and were dry at the time of recent inspections, the only water in the compartment being in a few scattered holes.

All snig track drainage line crossings must be approved by the SFO before construction and shall be open causeways utilising the natural surface at the site. There should be little need to cross drainage lines and little need to modify the channel or banks of drainage lines that are crossed. Crossings must be rehabilitated after use, all loose material shall be removed from the channel, as far as practicable the crossing point shall be reshaped to its original condition and seeded with rye grass at the rate of 20 Kg/ha.

(o) Dispersible Soils

It is not anticipated that snigging will expose significantly dispersible sub-soil. To minimise the possibility, walkover extraction techniques will be utilised wherever practicable. If small lengths of sub-soil are exposed, top soil from the track construction must be spread over the track surface at the site and at the completion of use of the track, cut batters must be seeded with rye grass at the rate of 20 Kg/ha. Where dispersible subsoil is exposed during cross bank construction, the cross bank must be seeded with rye grass 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 indicated on the Operational Map.

Before use, about 10 cm of topsoil must be stripped and stockpiled for subsequent respreading at the completion of operations. As the topsoil layers are about 30 cm deep, this will not result in exposure of the dispersible subsoil. If accidental exposure of the subsoil occurs, topsoil must be immediately respread over the disturbed area (note that the dump surface will be built up with fine logging debris and consolidated to some extent by the movement of machinery).

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

At the completion of operations any debris at or near the edge of a dump shall be moved away from standing vegetation into the dump area. The topsoil shall be respread uniformly over the dump area which shall be left in a neat and stable condition.

(q) Prescribed Burning

Pre-logging burning

The will be no pre-logging burning associated with the harvesting of Compartment 84.

Post-logging burning

Post-logging burning of Compartment 84 will 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 will 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 will be 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 Compartment 84.

4.9 Modified Harvest Conditions

(a) 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 no harvesting machinery may enter Riparian Habitat Zones.
- felling and snigging shall be excluded from Riparian Habitat Zones.
- trees shall not be felled into Riparian Habitat Zones.
- trees shall not be damaged in Riparian Habitat Zones.

(b) Boundary Fences

Private property joins the northern boundary of the compartment. This boundary is fenced.

- Damage to this fence is to be avoided. Any damage caused shall be immediately repaired.

Also, the Forest itself is fenced and the gate at the entrance to the Forest on the northern boundary shall be locked overnight.

(c) Orienteering Course

The steel posts marking the orienteering course through the compartment shall not be disturbed. Any damage caused shall be immediately repaired.

4.10 Specification of Types 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 Compartment 84

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.

All drainage features within the net harvest area have been field inspected. Drainage features not marked on the operational map for protection are drainage depressions. Any unexpected drainage lines or watercourses identified during the operation must be protected in accordance with the Pollution Control Licence.

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.

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)).

Condition 53 - Monitoring and Reporting

(a) Daily and Fortnightly Reporting

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

(b) Fauna Reporting and Mitigation Prescriptions

Sightings of any Schedule 12 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.

(d) Sowing of Constructed Crossings

The SFO must ensure that crossing approaches are seeded in accordance with Part 4.7 (e).

LAND & WATER CONSERVATION

TO: Bob Williams

FROM: Kel Christiansen

DATE: 29/2/96

SUBJECT: Rollover Crossbank Design

Bob,

I have done some design calculations to determine whether it is valid to use 0.2m as a minimum height for rollover crossbanks at Grafton.

The calculations consist of two components. The first is determination of peak discharge. This has been done using the Kinematic Wave Equation (AR&R, Urban Stormwater Drainage, page 300). A Roughness Coefficient, n, of 0.0275 has been used in this equation. Catchment Areas, (A), are taken as being Road Length x Road Width (5m assumed) and catchment discharge calculated from Q=C.I.A/360 where a Runoff Coefficient, C, of 0.85 (ie 85% runoff) has been adopted. I have attached a printout of these calculations for a variety of bank spacings and road grades. A worst case scenario is assumed i.e. 180m bank spacing on a 15° grade road. The result is a peak discharge of 0.036 cubic metres/second (5 year recurrence interval).

The second component of the bank design is calculation of bank dimensions. This has been done using the Design Manual for Soil Conservation Works, Soil Conservation Service Technical Manual No. 5 (Section 2.5, Bank Design). The design was based on a trapezoidal channel shape. The following bank dimensions were used in the calculations.

Flow Rate (Peak Discharge) = 0.036 cubic metres/second
Bottom Width (B) = 0.5m
Batter Grade (Z) = 3:1
Roughness Coefficient (n) for the channel = 0.0275
Channel Slope = 1%
Velocity = 0.6m/second

The calculations result in a depth of flow of 0.08m. Accordingly, it is considered that a bank height of 0.2 metres is sufficient to convey a 1 in 5 year flow. The extra 0.12 m of bank height is required to provide freeboard and to allow for bank settlement. Note that 0.2m relates to

compacted bank height. Flatter batters or increased bottom width will decrease depth of flow.

The above figures have been derived for Grafton. Other calculations may need to be done for higher rainfall areas, e.g. closer to Dorrigo, however the differences would not be expected to be significant.

I hope this information is of use to you. Don't hesitate to contact me if you have any further queries.

Regards,

K. P. Christiansen

Kel Christiansen

*** FOREST ROADS STORM RUNOFF ***

LOCATION:GRAFTON
ARI= 5 years I(1 hr,ARI)= 47.6 mm/hr Rough. Coeff.= .027
Runoff Co-efficient= .85

ROAD LENGTH metres	SLOPE Deg.	STORM Tc Min.	I mm/hr	DISCHARGE Cumecs	VELOCITY m/sec
10	5.0	0.8	202.7	0.002	0.21
20	5.0	1.2	196.7	0.005	0.28
30	5.0	1.6	191.9	0.007	0.32
40	5.0	1.9	187.9	0.009	0.36
50	5.0	2.1	184.4	0.011	0.39
60	5.0	2.4	181.3	0.013	0.42
70	5.0	2.7	178.4	0.015	0.44
80	5.0	2.9	175.7	0.017	0.46
90	5.0	3.1	173.2	0.018	0.48
100	5.0	3.3	170.9	0.020	0.50
10	10.0	0.6	208.0	0.002	0.26
20	10.0	1.0	200.2	0.005	0.34
30	10.0	1.2	196.2	0.007	0.40
40	10.0	1.5	192.7	0.009	0.45
50	10.0	1.7	189.6	0.011	0.49
60	10.0	1.9	187.1	0.013	0.52
70	10.0	2.1	184.7	0.015	0.55
80	10.0	2.3	182.4	0.017	0.58
90	10.0	2.5	180.3	0.019	0.60
100	10.0	2.7	178.3	0.021	0.63
10	15.0	0.6	206.2	0.002	0.30
20	15.0	0.9	201.9	0.005	0.39
30	15.0	1.1	198.3	0.007	0.46
40	15.0	1.3	195.3	0.009	0.51
50	15.0	1.5	192.7	0.011	0.55
60	15.0	1.7	190.3	0.013	0.59
70	15.0	1.9	188.0	0.016	0.63
80	15.0	2.0	186.0	0.018	0.66
90	15.0	2.2	184.1	0.020	0.69
100	15.0	2.3	182.2	0.022	0.72
10	20.0	0.5	207.0	0.002	0.33
20	20.0	0.8	203.0	0.005	0.43
30	20.0	1.0	199.7	0.007	0.50
40	20.0	1.2	197.0	0.009	0.56
50	20.0	1.4	194.6	0.011	0.61
60	20.0	1.5	192.3	0.014	0.65
70	20.0	1.7	190.2	0.016	0.69
80	20.0	1.8	188.3	0.018	0.73
90	20.0	2.0	186.5	0.020	0.76
100	20.0	2.1	184.8	0.022	0.79
10	25.0	0.5	207.6	0.002	0.35
20	25.0	0.7	203.8	0.005	0.46
30	25.0	0.9	200.2	0.007	0.54
40	25.0	1.1	196.2	0.009	0.61
50	25.0	1.3	195.9	0.012	0.66
60	25.0	1.4	193.6	0.014	0.71
70	25.0	1.6	191.9	0.016	0.75
80	25.0	1.7	190.1	0.018	0.79
90	25.0	1.8	188.4	0.020	0.82

*** FOREST ROADS STORM RUNOFF ***

LOCATION: GRAFTON

ARI= 5 years I(1 hr,ARI)= 47.6 mm/hr Rough. Coeff.= .0275

Runoff Co-efficient= .85

ROAD LENGTH metres	SLOPE Deg.	STORM Tc Min.	I mm/hr	DISCHARGE Cumecs	VELOCITY m/sec
100	5.0	3.4	170.4	0.020	0.49
110	5.0	3.6	168.3	0.022	0.51
120	5.0	3.8	166.2	0.024	0.52
130	5.0	4.0	164.2	0.025	0.54
140	5.0	4.2	162.3	0.027	0.55
150	5.0	4.4	160.5	0.028	0.57
160	5.0	4.6	158.8	0.030	0.58
170	5.0	4.8	157.1	0.032	0.59
180	5.0	5.0	155.5	0.033	0.60
100	10.0	2.7	177.8	0.021	0.62
110	10.0	2.9	176.0	0.023	0.64
120	10.0	3.0	174.2	0.025	0.66
130	10.0	3.2	172.4	0.026	0.68
140	10.0	3.4	170.8	0.028	0.70
150	10.0	3.5	169.2	0.030	0.71
160	10.0	3.7	167.7	0.032	0.73
170	10.0	3.8	166.2	0.033	0.74
180	10.0	4.0	164.8	0.035	0.76
100	15.0	2.4	181.7	0.021	0.71
110	15.0	2.5	180.2	0.023	0.73
120	15.0	2.7	178.5	0.025	0.75
130	15.0	2.8	176.9	0.027	0.78
140	15.0	2.9	175.3	0.029	0.80
150	15.0	3.1	174.0	0.031	0.82
160	15.0	3.2	172.5	0.033	0.83
170	15.0	3.3	171.2	0.034	0.85
180	15.0	3.4	169.8	0.036	0.87
100	20.0	2.1	184.4	0.022	0.78
110	20.0	2.3	182.9	0.024	0.81
120	20.0	2.4	181.4	0.026	0.83
130	20.0	2.5	179.9	0.028	0.86
140	20.0	2.7	178.5	0.030	0.88
150	20.0	2.8	177.1	0.031	0.90
160	20.0	2.9	175.8	0.033	0.92
170	20.0	3.0	174.6	0.035	0.94
180	20.0	3.1	173.3	0.037	0.96
100	25.0	2.0	186.4	0.022	0.84
110	25.0	2.1	185.0	0.024	0.87
120	25.0	2.2	183.5	0.026	0.90
130	25.0	2.3	182.1	0.028	0.93
140	25.0	2.4	180.8	0.030	0.95
150	25.0	2.6	179.5	0.032	0.98
160	25.0	2.7	178.3	0.034	1.00
170	25.0	2.8	177.1	0.036	1.02
180	25.0	2.9	175.9	0.037	1.04

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Mr A J Howe
Manager - Forest Planning Branch
State Forests of NSW
Locked Bag 23
Pennant Hills NSW 2120

600000D1

FPB 70846

16 February 1996

Dear Mr Howe,

I refer to State Forests' application received by the EPA on 18 January 1996 to vary the Pollution Control Licence for the Northern Region, in relation to the harvesting plan listed below:

Compartment	State Forest	District
84	Divines	Grafton

The EPA is unable to determine your application based on the information you supplied. The additional information needed is detailed in the attachments to this letter. You are advised that under the requirements of Condition 20, Division 1 of the Pollution Control Licence, the EPA considers that the 41 days review period, commences on the receipt of the information sought. Once this information is provided, your application will be determined.

Yours sincerely

GEOFF NOONAN
Manager, Waters and Catchments Policy

FOR ACTION OR NOTING BY		
ORIGINATOR	H.L	16.2.96
1. A/HWCP		
2. HWCP		16/2/96
3.		
4.		

Request for Additional Information on Harvesting Plan for Divines State Forest, Compartment 84.

16 February 1996

The points requiring clarification on this harvest plan are as follows:

- The EPA is unclear whether the K factor has been determined using method B2 or B3. The plan states that method B3 was used, yet the Grafton EIS soils report is referred to several times, which would imply method B2. In either case, the EPA does not consider that sufficient soils information has been provided to satisfy the licence.

For method B2, the soils information submitted by State Forests does not indicate which soil layers, described by Veness (1994) are present within the net harvest area. The soil scientist's report does not make any reference to soil colour or other relevant information to aid the verification of specific soil units.

For compartment 84 the soils information submitted by State Forests does not indicate which soil layers, described by Veness (1994) are present within the net harvest area. The soil scientist's report does not make any reference to soil colour or other relevant information to aid the verification of specific soil units.

To use Method B3 of the pollution control licence, the EPA requires that State Forests provide detailed site-specific evidence that the distribution of soil types within the proposed net harvest area has been determined and where appropriate sampled.

There appear to be two approaches that could be followed to improve the plan:

Option 1 (Default values)

State Forests could adopt the default soil values in Method B4 and D4 of the pollution control licence. That is, State Forests could adopt a soil erodibility value of K = 0.06 and could assume the proportion of dispersible soils (PDS) to be greater than 10%. This option would mean that additional conditions for dispersible soil would have to be included in the harvesting plan and used in the field, and that the water pollution hazard categories would be as follows:

SLOPE	WPHC
$0 \leq 2^{\circ}$	1
$>2 \leq 10^{\circ}$	2
$>10 \leq 30^{\circ}$	3

Option 2 (PCL B3 Method)

Where no soil survey information is available or field verification of a soils report shows that the soil materials do not correspond with the information in the soils report, then State Forests appears to have two options. State Forests could commission an "*EPA qualified soil scientist*" to undertake a field investigation of the compartment to determine the distribution of soil materials within the compartment, or where an "*EPA qualified soil scientist*" is unavailable to undertake a field assessment of soils, State Forests' could collect soil samples from the range of landform elements on the range of geological units within the net harvest area and obtain a laboratory determination of erodibility and dispersibility.

A. Soils Investigation by an "EPA qualified soil scientist"

The following procedure must be used by the "*EPA qualified soil scientist*" in assessing the soils in the net harvest area.

1. The "*EPA qualified soil scientist*" must identify the entire range of landform elements on each geological unit present within the net harvest area;

2. The "*EPA qualified soil scientist*" must examine the soil profile in the field, to a depth of 700 mm and/or bedrock, whichever is the shallower for each landform element on each geological unit;

3. The "*EPA qualified soil scientist*" must examine the A and B horizon for each landform element on each geological unit within the net harvest area.

The "*EPA qualified soil scientist*" must provide the following information as an attachment to the harvesting plan:

1. The name of the person that examined and sampled the soil material within the net harvest area;

2. All locations of all soil sample and observation sites used within the net harvest area. The location of these sites must be recorded on a map at the same scale as the harvesting plan map;

3. For each soil profile examined the following must be provided:

    - grid reference;
    - geology type;
    - depth of the A and B horizon;
    - texture of the A and B horizon;
    - colour of the A and B horizon;
    - landform element; and
    - the precise sampling depth for each soil

sample (if relevant).

The "*EPA qualified soil scientist*" has a range of options to determine the erodibility and dispersibility of the soil material within the net harvest area, once the soil samples have been examined and/or collected in the field.

K Factor Determination

Soil erodibility (K factor) can be determined via a number of methods; these are as follows:

1. By a NATA registered laboratory on both the A and B horizon for each landform element on each geological unit;

or

2. By obtaining a field texture and then assigning the appropriate K factor for that particular soil texture group by referring to Table 2 ("*Estimating USLE K factors from soil texture*") in the SOILOSS handbook (Rosewell, 1993). K factor determination must be undertaken on both the A and B horizon for each landform element on each geological unit.

The attachment to the harvesting plan must clearly state which option was used, the laboratory or person that performed the analysis, and the result for each sample or soil layer.

Proportion of dispersible soil

The proportion of dispersible soil is determined by multiplying the per cent clay by the dispersion percentage of the soil.

$$\mathbf{PDS = \%D \times \% C}$$

The determination for the proportion of dispersible soil can be determined via a number of methods; these are as follows:

1. The dispersion percentage and the per cent clay can be determined by a NATA registered laboratory on both the A and B horizon for each landform element on each geological unit.

or

2. The "*EPA qualified soil scientist*" can undertake a field assessment of aggregate stability according to Method D3 of the pollution control licence.

The proportion of dispersible soil must be determined for both the A and B horizon for

each landform element on each geological unit present with the compartment.

The attachment to the harvesting plan must clearly state which option was used, the laboratory that performed the analysis, and the laboratory result from each sample.

B. Soils Sampling undertaken by State Forests'

State Forests may choose to sample the range of soil materials within the net harvest area and send the samples to a NATA registered laboratory for a laboratory determination of erodibility and dispersibility. The following procedure must be followed in collecting these samples:

1. State Forests' must identify the entire range of landform elements on each geological unit present within the net harvest area;

2. State Forests' must examine the soil profile in the field, to a depth of 700 mm and/or bedrock, whichever is the shallower for each landform element on each geological unit;

3. State Forests' must sample the A and B horizon for each landform element on each geological unit within the net harvest area.

If this option is to be used, State Forests must provide the following information as an attachment to the harvesting plan:

1. The name of the person that examined and sampled the soil material within the compartment;

2. All locations of all soil sample sites used within the net harvest area. The location of these sites must be recorded on a map at the same scale as the harvesting plan map;

3. For each soil profile examined, State Forests must provide the following:

    - grid reference;
    - geology type;
    - depth of the A and B horizon;
    - landform element; and
    - the precise sampling depth for each soil sample.

State Forests has a range of options to determine the erodibility and dispersibility of the soil material within the net harvest area, once the soil samples have been

collected in the field.

K Factor Determination

Soil erodibility (K factor) can be determined via a number of methods; these are as follows:

1. By a NATA registered laboratory;

or

2. By obtaining a texture analysis from the NATA registered laboratory and then assigning the appropriate K factor for that particular soil texture group by referring to Table 2 ("*Estimating USLE K factors from soil texture*") in the SOILOSS handbook (Rosewell, 1993). K factor determination must be undertaken on both the A and B horizon for each landform element on each geological unit.

The attachment to the harvesting plan must clearly state which option was used, the laboratory that performed the analysis, and the laboratory result from each sample.

Proportion of dispersible soil

The proportion of dispersible soil is determined by multiplying the per cent clay by the dispersion percentage of the soil.

$$\mathbf{PDS = \%D \times \% C}$$

State Forests' must obtain a laboratory determination for the dispersion percentage for each sample from a NATA registered laboratory. The derivation of the per cent clay may be obtained from a laboratory determined particle size analysis or a laboratory derived texture determination. The estimated per cent of clay from the laboratory derived texture determination must be assigned in accordance with Method D3 (I) (*Field assessment of texture*) of the pollution control licence.

The proportion of dispersible soil must be determined for both the A and B horizon for each landform element on each geological unit present within the net harvest area.

The attachment to the harvesting plan must clearly state which option was used, the laboratory that performed the analysis, and the laboratory result from each sample.

Additional points requiring clarification in the Harvesting Plan are as follows:

- The EPA requests that all references to Protection Strips be removed from this Harvest Plan. Harvest Plans are to be site specific documents, this

harvest plan makes specific reference that there are to be no Protection Strips within this harvesting operation due to the use of Riparian Zones.

- Condition 4.7(e), page 27, under the section "Road Surface Drainage" - the EPA requests the calculations undertaken to specify the consolidated spillway to bank top height to be 20cm. To effectively drain *snig tracks*, according to Condition 103 of the Pollution Control Licence, consolidated bank heights must be 25cm unless calculated to be less. The relevant condition for road surface drainage, however, is condition 61 which states that crossbanks must be designed to adequately convey the peak flow of a 1:5yr event (not the 1:2yr event specified in condition 103).

- Condition 4.7(e), page 27, under the section "Road Surface Drainage" - the EPA requests that the sentence that reads "Such banks should readily cater for 1:5year storm events" be omitted and replaced by "Such banks must convey the peak flow of a 1:5year storm event."

- Condition 4.7(e), page 27, under the section "Road Surface Drainage" - the EPA requests that the table "Spacing of Rollover Crossbank Drainage" be amended according to Figure 1, Schedule 4. The table should then read as follows

0 - =<5	>5 - =< 10	>= 10
100m	55m	<50m

- Condition 4.7(e), page 27, under the section *"Crossing of Drainage Features"* - the EPA requests that the sentence that reads "The approaches to these causeways **will** be gravelled if pavements commence to deform during the logging" be omitted and replaced by "The approaches to these causeways **must** be gravelled if pavements commence to deform during logging operations."

- Condition 4.7(e), page 27, under the section *"Crossing of Drainage Features"* - the EPA requests that the sentence that reads "Any disturbed areas adjacent to these causeways **shall** be seeded with rye grass at the rate of 20kg/ha immediately following the logging, **where considered necessary** by the SFO." be omitted and replaced by "Any disturbed areas adjacent to these causeways **must** be seeded with rye grass by the SFO at the rate of 20kg/ha immediately following the harvesting operations."

- Condition 4.7(e), page 27, under the section *"Revegetation and rehabilitation"* - the EPA requests that the sentence that reads "All crossbank rollover drains **shall** be left in working order..." be omitted and replaced by "All crossbank rollover drains **must** be left in working order..."

- Condition 4.7(e), page 27, under the section *"Dispersible soils"* - the EPA

requests that the sentence that reads "If small sections of the subsoil are exposed, top soil from the road, or imported gravel must be spread over the road surface at the site and the cut and fill batters **shall** be seeded with rye grass at the rate of 20 kg/ha" be omitted and replaced by "If the subsoil is exposed, top soil from the road, or imported gravel must be spread over the road surface at the site and the cut and fill batters **must** be seeded with rye grass at the rate of 20 kg/ha."

- Condition 4.7(o), page 31, under the section "*Dispersible subsoils*" - the EPA requests additional information regarding ameliorative measures that will be undertaken if the dispersible subsoil is exposed during crossbank construction.

- Condition 5.3(d), page 36, under the section "*Sowing of Constructed Crossings*" - the EPA requests that the sentence that reads "The SFO **shall** ensure that crossing approaches are seeded in accordance with 4.7 (e)." be omitted and replaced by "The SFO **must** ensure that crossing approaches are seeded in accordance with 4.7(e)."