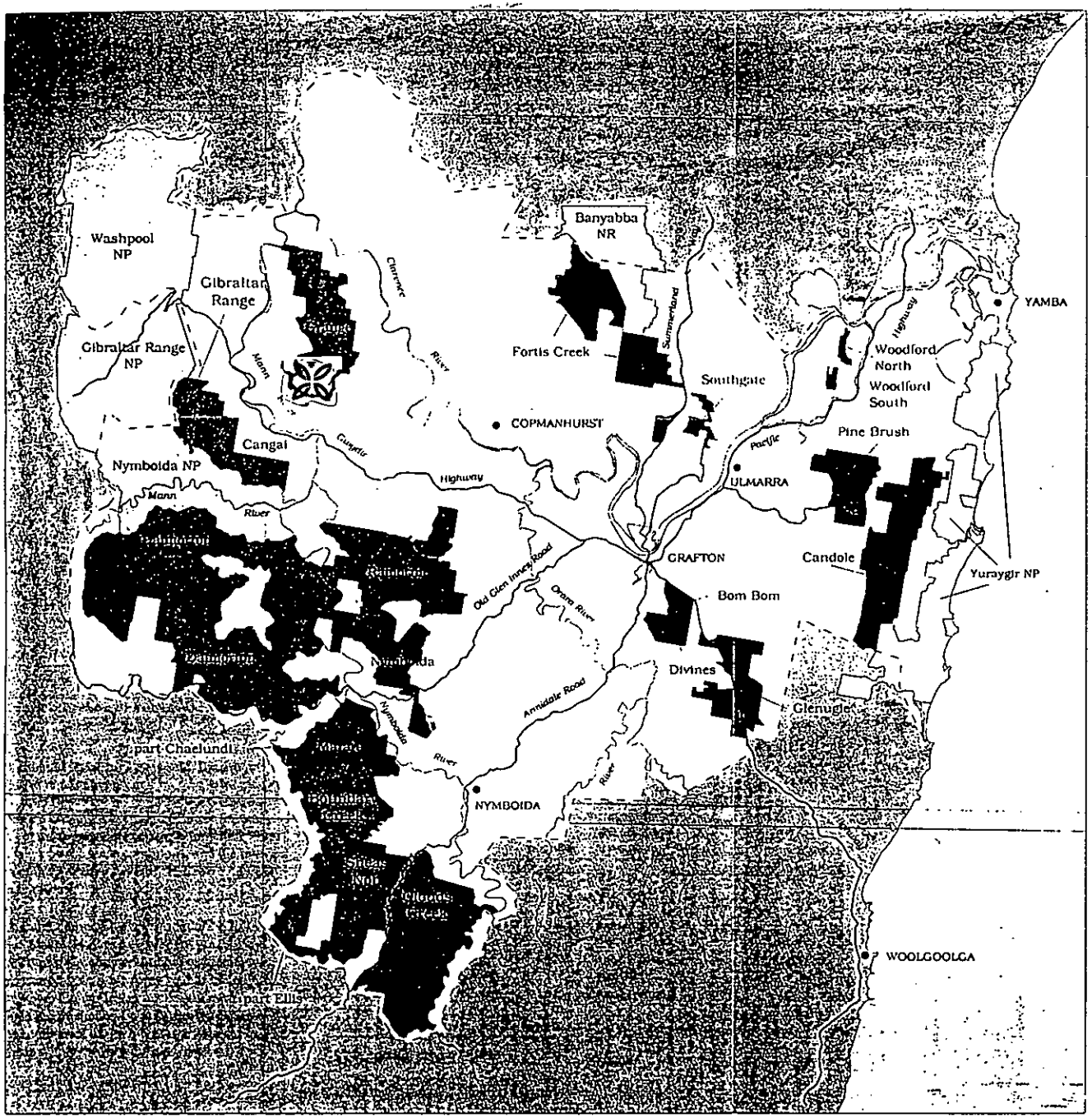
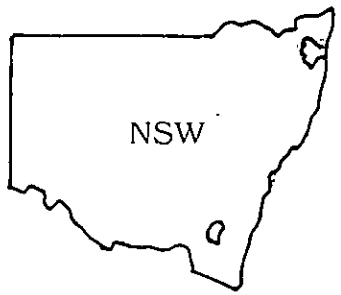
GRANGE

352

Grafton District
Northern Region



GRAFTON MANAGEMENT AREA



STATE FORESTS

NATIONAL PARKS

MANAGEMENT BOUNDARY

TOWNS

ROADS

RIVERS

0 20km N

LOCATION

COMPARTMENT 352

STATE FORESTS OF NSW
NORTHERN REGION - GRAFTON DISTRICT
HARVESTING PLAN OPERATIONAL MAP

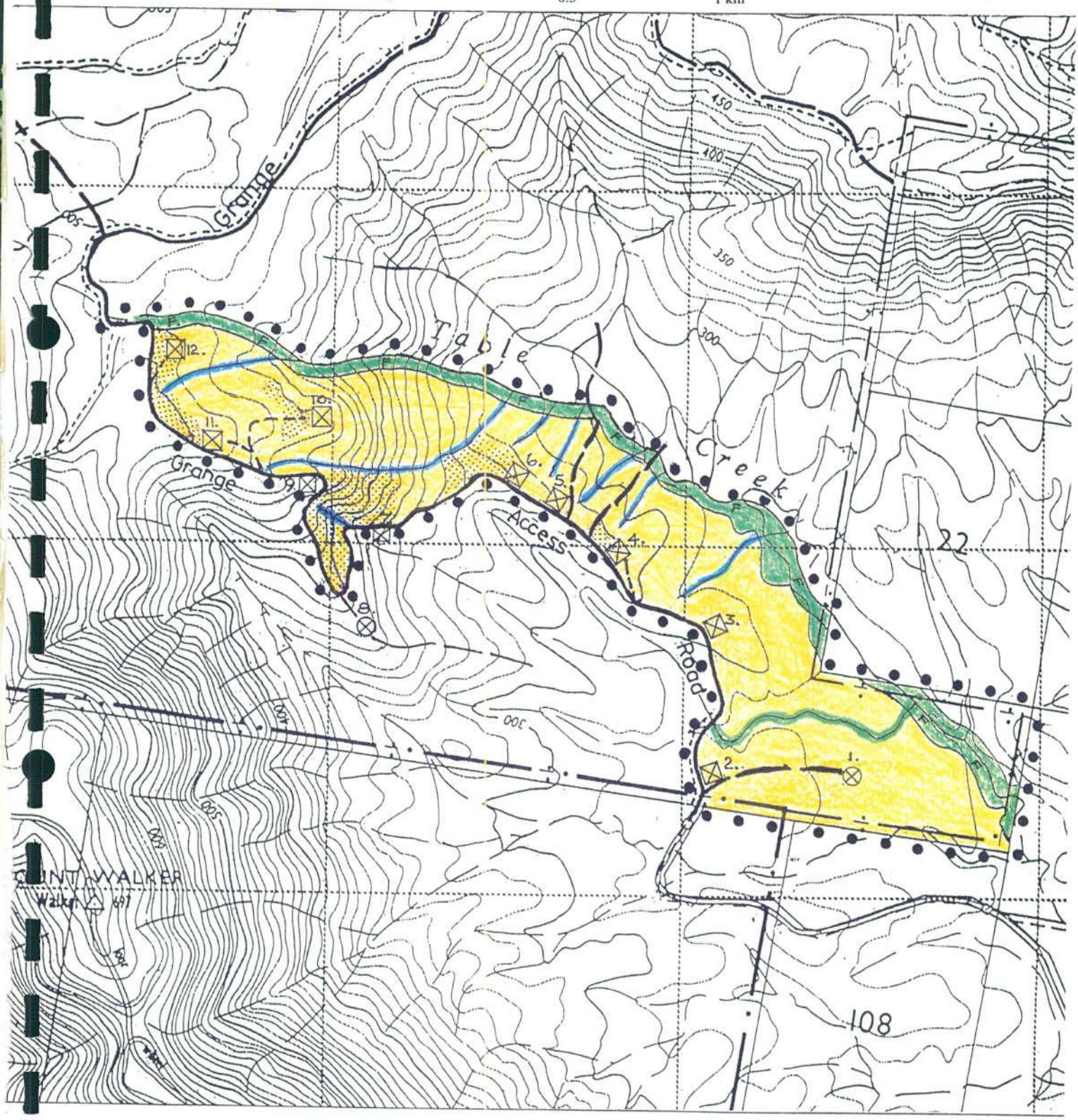
COMPARTMENT NUMBER **352**

GRANGE STATE FOREST

SCALE 1 : 15000 CONTOUR INTERVAL 10 m

GN

0 0.5 1 km



LEGEND

BOUNDARIES
State Forest
Compartment

ROADS
Gravelled
Minor Roads
To be Constructed

HARVEST AREA
Normal Prescriptions
Down-hill snigging

NON HARVEST AREA
Wildlife Corridor P.M.P.1.17
Riparian Zone

DUMP SITES
Dry Weather
Wet Weather

WATERCOURSES AND DRAINAGE LINES
Filter Strip
Filter Strip + Protection Strip

STATE FORESTS OF NSW
NORTHERN REGION - GRAFTON DISTRICT
HARVESTING PLAN FOREST TYPE MAP

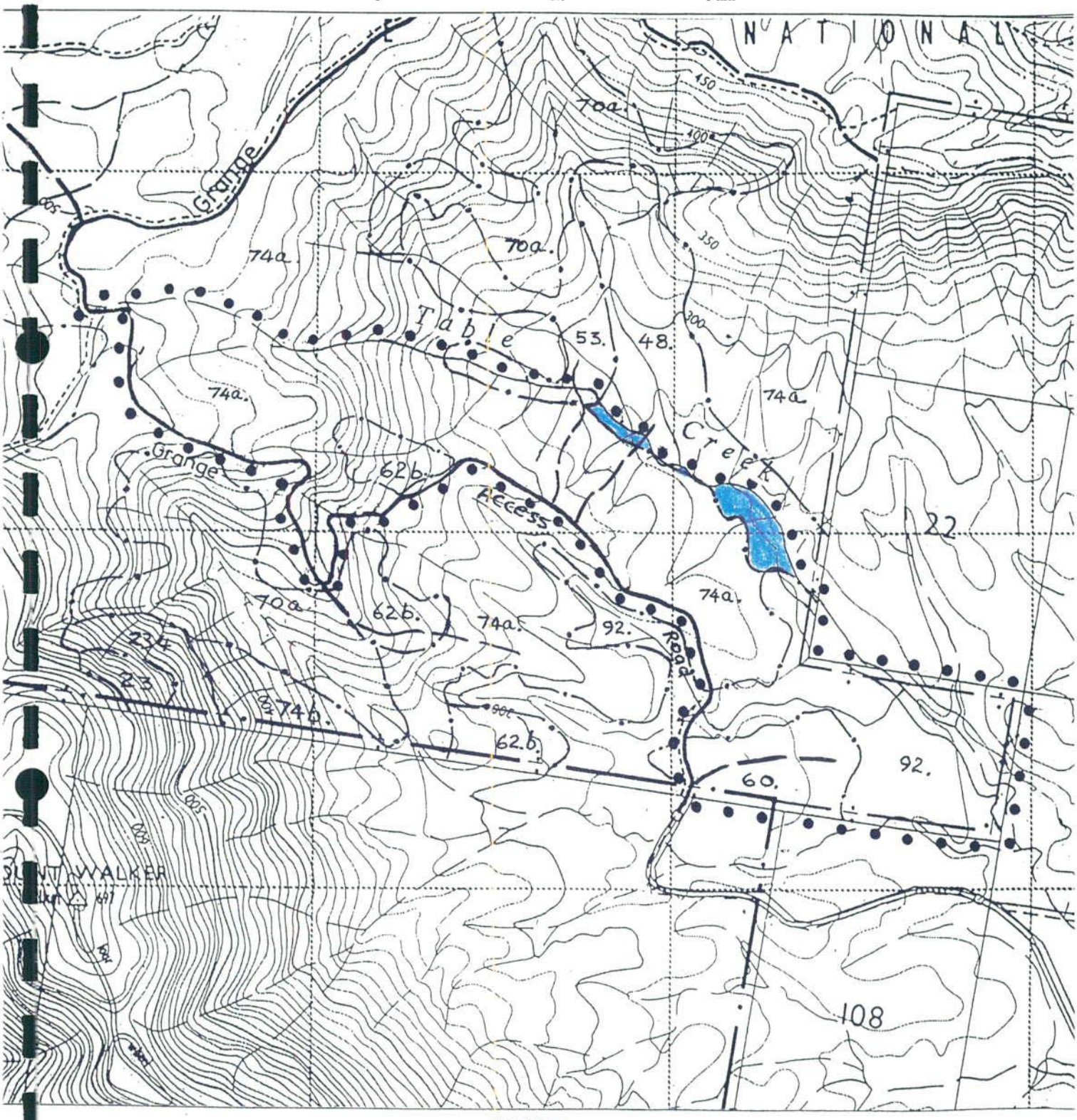
COMPARTMENT NUMBER **352**

GRANGE STATE FOREST

GN

SCALE 1 : 15000 CONTOUR INTERVAL 10 m

0 0.5 1 km



LEGEND

BOUNDARIES

State Forest.....

Forest Type.....

Compartment.....

ROADS

Gravelled.....

Minor Roads.....

FOREST TYPES

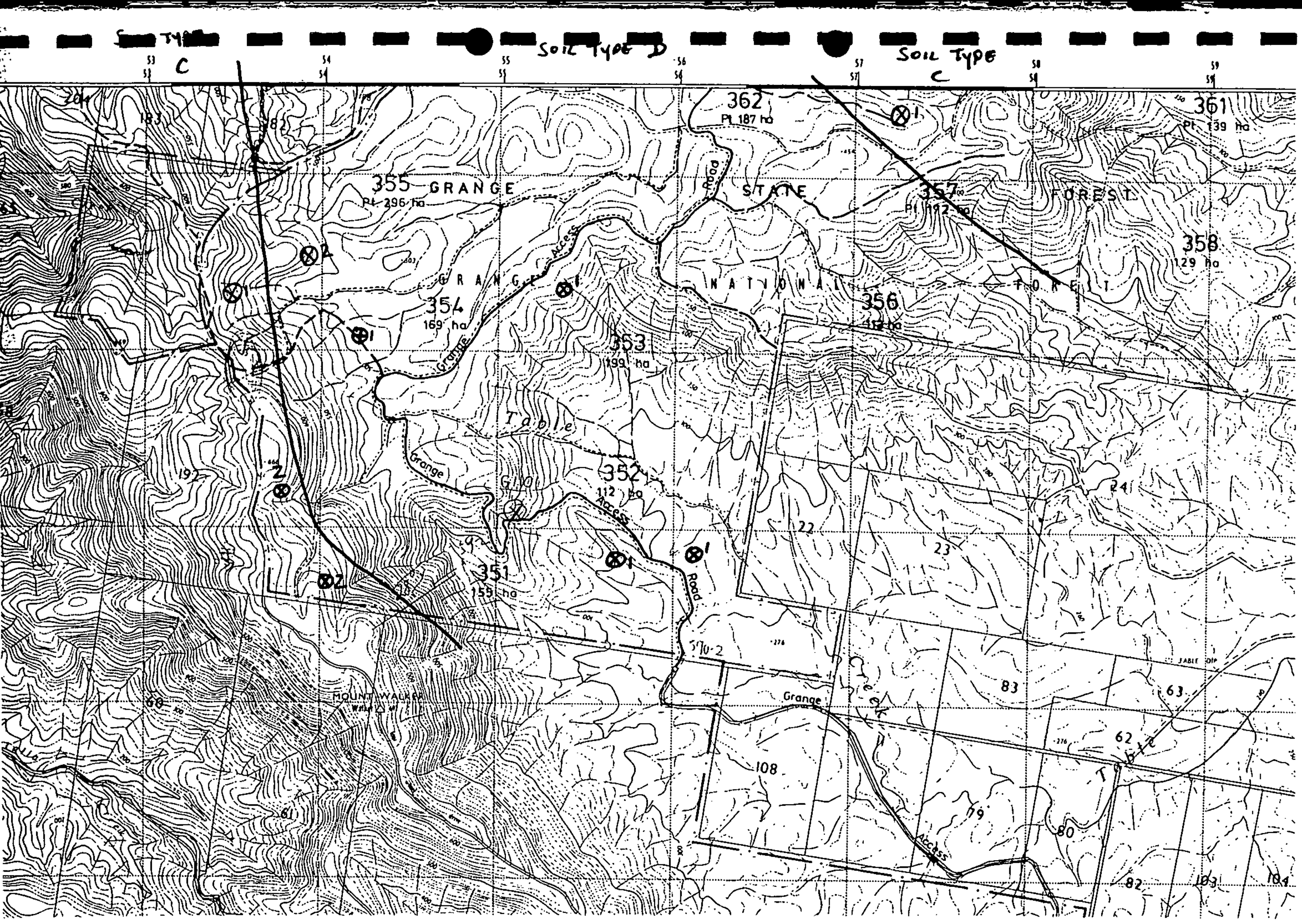
48..... 53.....

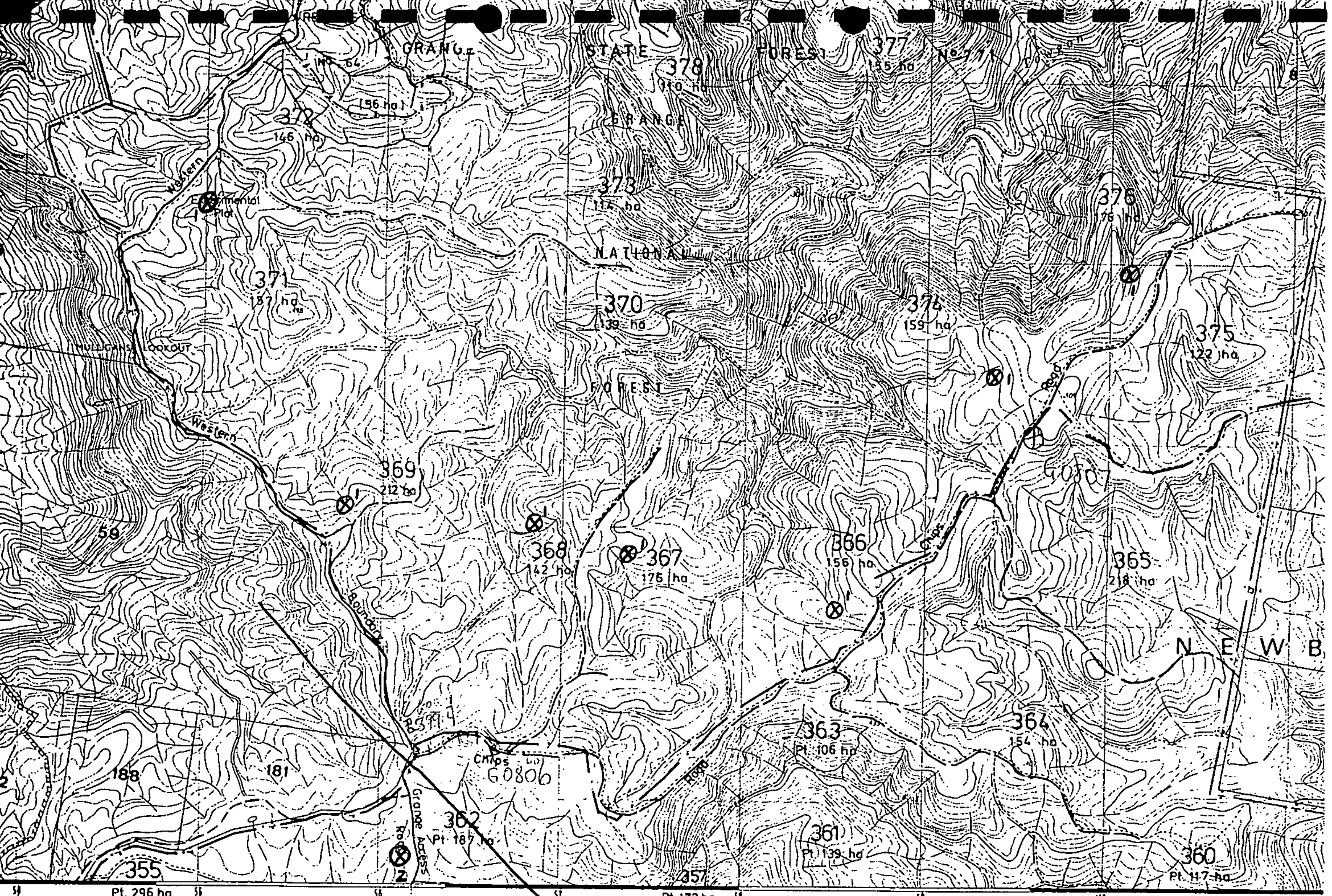
62a, 62b.....

60.....

74a.....

92.....


SOIL TYPE D
SOIL TYPE C
C
355 GRANGE
Pt 296 ha
STATE
357
Pt 192 ha
FOREST
362
Pt 187 ha
361
Pt 139 ha
358
129 ha
354
169 ha
GRANGE
NATIONAL
FOREST
356
353
199 ha
352
112 ha
351
155 ha
Table
Grange
Access
Road
MOUNT WALKER
Creek
Grange
Access
Table
22
23
24
83
63
62
108
79
80
82
103
104
60
61
192
183
201
182



SOIL TYPE D

SOIL TYPE C

Harvesting Plan No GG 95/01/352

Contents

Part 2 FOREST MANAGEMENT & ENVIRONMENTAL CONSIDERATIONS

2.1 PHYSICAL FEATURES

Description 1 Physical Description of the Area

STATE FOREST	**Grange No 771**	DISTRICT	**Grafton**
REGION	**Northern**	COMPARTMENT	**352**
MANAGEMENT AREA	**Grafton**		

Natural Features

General: The compartment contains undulating to moderate slopes with a steep area located in the mid western section. It is basically the northern face of a long secondary ridge running east off a main range system.

Catchment: Clarence River catchment. Table Creek runs along the major portion of the northern boundary of the compartment.

Altitude range: 265m - 490m A.S.L.

Aspect: Generally east to north-east.

Topography: The major part of the compartment varies from nearly flat to undulating with slopes upto 10°. The mid-western section is steeper with slopes around 20°.

Artificial Features

Roads: Grange Assess Road, the main access through the Forest runs along the major portion of the compartment's southern boundary.

Minor Roads: A minor road runs along the most southern side ridge in the compartment. Two other minor roads run across the compartment giving access to the area to the north. These two roads will not be used during this harvesting operation.

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

Private property joins the north, east and south boundaries of the eastern section of the compartment. These boundaries are fenced.

A Special Emphasis Flora and Fauna Protection Zone (PMP 1.1.7 Wildlife Corridor, 40m strip either side of the stream) exists along Table Creek, as indicated on the Operational Map. Table Creek is a prescribed stream.

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

Reference Grafton Management Area Environmental Impact Statement

2.2 FOREST MANAGEMENT AND SILVICULTURE

Description 3 Compartment Subdivision, Forest Types

Areas:

Gross Area of Compartment	112 ha
Wildlife Corridor	12 ha
Riparian Habitat Zones	3 ha
Filter Strips	5 ha
Proposed for Logging	92 ha

Forest Types:

Forest Types		Area (ha)
48	Flooded Gum	3.1
53	Brush Box	2.0
60	White Mahogany - Red Mahogany - Grey Ironbark - Grey Gum	12.2
62	Grey Gum - Grey Ironbark - White Mahogany	5.1
74a	Spotted Gum - Ironbark/Grey Gum >30m	63.1
92	Forest Red Gum	26.5

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

Description 4 Broad Description of Vegetation

(a) Forest Types

- Forest Types 48 and 53 are moist types restricted to the gully areas along Table Creek and are within the 40m Wildlife Corridor.
- Type 60, a moist type that occurs on the flat southern most ridge of the compartment.
- Type 62 a dry type on the steep, lower site quality mid western section of the area.
- Type 74a dominates the major part of the compartment. It is a dry type extending from ridge top to or near Table Creek.
- Type 92 an open grassy type that occurs on the lowest east section of the compartment in a broad band along Table Creek and a main tributary.

Overstory Story Species

The overstory species are Spotted Gum, Grey Ironbark, Grey Gum, White Mahogany, Grey Box, Red Mahogany, Tallowwood, Red Bloodwood, Brush Box, Sydney Blue Gum, Flooded Gum, Forest Red Gum, Round Leaf Gum and Roughbarked Apple.

(b) Understory

The understory on the steeper ridges and slopes is typically dry, being Eucalypt regeneration, Forest Oak, Cheese Tree, Backhousia scattered Grass Trees and other xerophytic shrubs. The moist areas also have Native Ginger, Tobacco Bush, Soft Tree Fern, Blechnum sp, Black Wattle, Tree Heath and Forest Oak, with the Oak being prominent on the Type 60 area. The Red Gum type is an open forest/woodland with a significant cover of grass.

(c) Ground-cover

The ground cover is mostly native grass, bracken and litter on the drier areas with the grass sward being well developed in the Red Gum area. Litter, ferns, vines and herbs, sedges and mosses occur on the moist areas.

(d) Rare or endangered species

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

(e) Rainforest

There are no rainforest areas on the compartment.

(f) Exotic weeds

Lantana is scattered through sections of the compartment and is relatively abundant in the Forest Type 60 area.

(g) Regeneration and serial stages

The compartment contains a multi-age forest consisting of a few remnants of the original stand, maturing regrowth seemingly resulted from the original harvesting and younger regrowth of varying ages, the result of numerous subsequent selective logging operations and some stand improvement treatment.

Description 5 Forest and Crop Condition

Compartment 352 has a long history of selective logging of varying intensities and it has been silviculturally treated. This has induced growth response to varying extents on retained stems and allowed some regeneration to become established. Mostly the gaps created have been insufficient in size for widespread regeneration development. The current stand is 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, originally as part of *Newbold Grange* station and since State Forest dedication by way of lease or permit. Grazing has seemingly been light in recent years and there is little evidence of it on compartment 352.

Description 6 Forest Management Activities

(a) Silviculture

The main silvicultural objectives are:

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

The Wildlife Corridor, 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 upto 50% canopy removal.

On the balance of the area harvesting will provide canopy gaps and ground disturbance to promote seedling regeneration leading to multi-age regrowth forest conditions. A minimum canopy gap size of 0.4 hectares is required in the forest types occurring on the compartment to achieve successful regeneration development. This corresponds an area approximately 60 metres in diameter.

To sustain regrowth forest development on a cyclic basis gap creation will aim at treating 25% of the net harvesting area this cutting cycle. The balance of the area will be lightly selectively thinned, retaining stems that have the potential of putting on positive net increment to the next cutting cycle. Sufficient stems will be retained to meet wildlife habitat requirements.

(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.
- Transport of logs from the site using a bogie 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 damaged to stands caused by wildfires
- ensure the establishment and survival of regeneration
- maintain wildlife habitat
- maintain hydrological conditions
- and to 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. In the Grange SF area activities are co-ordinated with other fire control agencies through the Nymboida District Fire Plan.

In Compartment 352 bark will be progressively spread through the logged area during the harvesting operation, logging debris will be kept 5 metres clear of identified habitat trees, areas of 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 **Nymboida District Fire Plan**.

2.3 FLORA PROTECTION

Description 7 Presence of Protected or Endangered Plant Species

No species listed 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 Rainforest areas in the compartment.

Description 9 Determination of Conditions

Not applicable.

2.4 FAUNA PROTECTION

Description 10 Endangered and Protected Fauna Occurrence

(a) General

No Schedule 12 species have been detected in Compartment 352. Schedule 12 species expected to occur in or in the vicinity of the compartment are:

Glossy Black Cockatoo	**Powerful Owl**	**Sooty Owl**
Masked Owl	**Stephen's Banded Snake**	**Pale-Headed Snake**
Spotted-tail Quoll	**Brush-tailed Phascogale**	**Yellow-bellied Glider**
Squirrel Glider	**Rufous Bettong**	**Red-legged Pademelon**
Common Planigale	**Koala**	**Long-nosed Potoroo**
Great Pipistrelle	**Golden-tipped Bat**	**Little Bent-wing Bat**
Common Bent-wing Bat	**Large-footed Mouse-eared Bat**	

References Grafton Management Area Environmental Impact Statement
SFNSW GIS Records

(b) Habitat Trees

Compartment 352 includes Dry Hardwood forest and Moist Hardwood forest with xeromorphic understorey and Moist Hardwood forest with mesic understorey. Sufficient potential habitat and recruitment habitat trees exist in the net harvest area to allow for the retention of enough trees to meet prescription requirements.

(c) Wildlife Corridor

A designated wildlife corridor exists along Table Creek as shown on the Operational map. The corridor is 40 metres wide on either side of the creek.

(d) Riparian Habitat Zones

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

(e) Refugia Areas

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 adversly impacted by forest management activities on Compartment 352 are stated below:

(a) Critical Weight Range Species

Critical Weight Range species likely to occur in Compartment 352 are the Rufous Bettong, Red-legged Pademelon, Long-nosed Potoroo and Spotted-tail Quoll. The Rufous Bettong inhabit well grassed open forests and is commonly associated with Spotted Gum. The Long nosed Potoroo prefers dense understory vegetation and will forage in open areas. The Red-legged Pademelon is dependent on dense cover for refuge and feeds in adjacent open areas. The Spotted-tail Quoll occurs in a variety of forest types favouring moister areas.

(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. Suitable Casuarina occur on the compartment and there are large hollow trees on it and nearby.

(c) Powerful/Masked/Sooty Owls

These Owls require large tree hollows for nesting, roost sites in large trees and require large home ranges. Suitable moist gully areas occur on and adjacent to the compartment in the wildlife corridor.

(d) Stephen's Banded Snake and Pale-Headed Snake

These snakes requires trees hollows and old trunk scares. There is a scattering of suitable older tree through the compartment.

(e) Brush-tailed Phascogale

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

(f) Yellow-bellied Glider

Yellow-bellied Gliders require tree hollows for nesting, feed on eucalypt sap by cutting V-notches into the bark of certain eucalypts, eucalypt nectar, and insects harvested beneath the loose bark of bark-shedding eucalypts. There are V-notch trees on areas adjacent to the compartment. The lower elevated eastern section of the compartment is higher nutrient country.

(g) Squirrel Glider

This species requires tree hollows for nesting, feeds in upper canopies on flowers and insects, and on sap from yellow-belly glider V notches.

(h) Koala

Koalas feed on eucalypt leaves from a range of species and prefer higher nutrient areas. The lower elevated eastern section of the compartment is higher nutrient country.

(I) Long-nosed Potoroo

This species prefers dense understory areas, will forage in open areas and builds a vegetation nest on the ground. There are broad flatter well grassed areas in the compartment with associated dense riparian areas.

(j) Golden-tipped Bat

This Bat roosts in moist forests, seemingly preferring dense vegetation. There are suitable moist gully areas in the wildlife corridor.

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

These Bats roosts in caves and similar structures and occur in most forest and woodland habitats.

(m) Large-footed Mouse-eared Bat

This Bat inhabits moist riparian forest areas and requires open water bodies for feeding (the recorded sighting on Grange should be checked).

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 352 is located on the south-east corner of Grange SF which in turn is located some 60 kilometres north-west of Grafton. See location map attached.

(b) Climate

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

Rainfall

The average annual rainfall for the area is about 1200 mm
The average rainfall erosivity - **R = 3000**

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 erosivity details are:

J	F	M	A	M	J	J	A	S	O	N	D
570	510	360	120	60	90	60	60	180	210	330	450

References 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.**

Temperature

Mean maximum temperatures range from over 30° in January/February down to about 20° in July/August. The mean minimum temperature range is from about 15° mid summer to around 0° 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 352 is on Granite of Carboniferous age that has intruded into Ordovician-Silurian Sediments.

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 types

The soil derived from the Granite is typed as Red podsolic (Northcote coding Gn 3.11; Dr 4.41).

Description and profile

The soil is described as brownish black to dark reddish brown, weakly to moderate pedal, sometimes stony sandy loam to sandy clay loam top soil, grading through sandy and stony clay loams layers to a reddish brown to light brown pedal very stony sandy light clay subsoil layer.

The top soil layers are up to about 70 cm in depth. The surface condition is described as loose with abundant stones and plant litter. Stones are rounded or angular and their size range is 2-200 mm.

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

Erodibility

K values A horizon = 0.024
K values B horizon = 0.021

Texture

A horizon	sandy loam or light sandy clay loam to clayey sand, normal plastic.
B horizon	sandy light clay, normal plastic.

Dispersibility

%clay A horizon 10%(inclusive of gravels)
%clay B horizon 38%(inclusive of gravels)
D% A horizon 36%
D% B horizon 27%
%dispersible soil A horizon 10/100x36/100x100 = 3.60
%dispersible soil B horizon 38/100x27/100x100 = 10.26
The A horizon is non-dispersible.
The B horizon is dispersible.

Reference Vessess and Associates. Soils report Number VA595a/01.

A copy of Report Number VA1595A/01 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 Red Gum and grass cover on the low elevated areas. The adjacent private property is typical Clarence valley open Red Gum/Apple woodland country.

Depth to subsoils and bedrock

Subsoils are from around 35 cm up to 70 cm, bedrock is at about 100 cm and possibly deeper on the flatter areas. The harvesting should not disturb the subsoil.

Existing erosion

There is very little evidence of erosion within the compartment. All structures built during the recent logging seem to be functioning. There is limited deposition of sand and fine gravel in some drainage lines. No evidence of erosion of dispersible sub-soils has been found.

(e) Landform

Slope

Slopes are generally convex from the ridge tops down to the limits of the net harvest area. The major portion of the compartment has slopes less than 10°. The mid western section of compartment, about 15% of the net area, has slopes 10°-20°. There are no slopes over 30° within the net harvest area.

Terrain

The compartment basically consists of one side of a long, broad, relatively flat secondary ridge with a number of short wide side ridges. There is a steeper area in the western section that rises about 120 metres to the main ridge. The most southerly part of the compartment is flat and is on a separate ridge.

Drainage line condition

The drainage lines are mostly broad, well grassed and in good condition. There is limited deposition of sand and fine gravel. The creek that cuts across the southern section of the compartment is well vegetated. Table Creek is protected by the 40 metre wide wildlife corridor.

Aspect

The aspect is generally east and north-east.

Rockiness

There are no rock areas on the compartment and rockyness is not a consideration. The surface condition is described as loose with abundant stones and plant litter. Stones are rounded or angular and their size range is 2-200 mm.

(f) Hydrology

The compartment is in the Clarence River catchment. Table Creek runs south-east out of the forest and then north-east for about 12 kilometres to the Clarence River. Most of the drainage lines are short and flow directly into Table Creek. A larger creek, with a catchment >40 hectares, flows across the southern section of the compartment. Table Creek is a prescribe stream. There are no other 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.

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

Previous harvesting

The compartment is readily accessible to private property and was seemingly first harvested many years ago for girders and poles in association with the logging of the freehold areas following settlement. The compartment apparently has been a source of timber for local government and the local farming community for many years. It was extensively harvested during the 1940s and subsequently harvested selectively on a number of occasions upto to the 1980s. It was treated during the 1940s. Poles, girders and veneer logs were cut in a light selective logging during 1993/4. Erosion mitigation structures were constructed on snig tracks and minor roads during the 1993/94 logging.

Upstream catchment water use

Production forestry - the upstream catchment is wholly within Grange SF.

Downstream catchment water use

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

Domestic water use

The only domestic water supply drawn from the Clarence below the Table Creek junction is the Copmanhurst town supply. Table Creek would amount to only a fraction of a percent of the Clarence flow and would have no influence at all on the town supply. Copmanhurst is to transfer to the lower Clarence scheme, which sources its water higher up the Clarence catchment, during the next year or so.

(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 with 12 months. The tracks and minor roads utilised during the 1993/94 logging have revegetated except where soil has been scraped off to form erosion mitigation banks.

(h) Proposed operation system

Use of existing roads

The compartment is served by Grange Access Road, which is permanently maintained, and a 0.5 km minor road located on the southern most ridge. This 0.5 km road will be reopened for use during this harvesting operation. Also a 0.1 km minor road in the compartment to the south, that provides access to a log dump which will be used during this harvesting, will be reopened.

Road construction

0.4 km of minor roads will be constructed within the compartment to provide access to three dump sites, as indicated on the operational map. These roads will generally traverse ridge tops, with a minimal side-cut on one short section to access a spur at a safe working grade.

There will be no need to establish borrow pits or gravel pits for the construction of these roads. These roads will not traverse any side slopes exceeding 15°. No additional clearing outside the road formation will be required.

Road surface drainage will be outfall crossfall drainage where practicable, supplemented by rollover crossbank drainage to disperse infall table drain water.

There is one drainage feature crossing on these roads.

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 a crawler tractor and/or an articulated rubber tyred skidder.
- Debarking and loading of logs at the dump using an excavator.
- Transport of logs from the site using a bogie or tri-axle jinker and prime mover.

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

Cover factor

The harvesting operations described above result in a cover factor (in accordance with PCL Sch 2, Div 1, 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 4, 6, 7, 8 & 10. Less than 5% of the snigging activity will be downhill. Areas are indicated on the Operational Map.

Post-harvest burning

In Compartment 352 bark will be progressively spread through the logged area during the harvesting operation, logging debris will be kept 5 metres clear of identified habitat trees. Areas of 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 Nymboida District Fire Plan.

Post-harvest rehabilitation

Natural regeneration and natural re-seeding of overstory, understory and ground-cover species will provide ground cover rehabilitation. Roads, log dumps and major snig tracks and their associated batters and drainage structures normally stabilise within twelve months provided crossfall and cross bank drainage is properly installed. The extent of re-vegetation will be assessed during post-logging regeneration surveys.

Description 13 Evaluation of Soil and Water Data

(a) Soil Erosion and Water Pollution 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.

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

R = 3000
K = 0.024 **Topsoil (A horizon)** Method B3
K = 0.021 **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 1: Soil Erosion and Water Pollution Categories

Slope Ranges (Degrees)	SE/WP Category	Indicative % of Net Harvest Area
0 - 6	1 (Low)	70
over 6 - 28	2 (Moderate)	25
over 28	3 (High)	5
Roads	3(High)	N/A

The following factors for rainfall erosivity and soil erodibility also apply to road construction:
R = 3000 **K = 0.024**

(b) Dispersibility

%dispersible soil A horizon = **3.60**
%dispersible soil B horizon = **10.26**
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 352.

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.

No special attributes occur in the net harvest area.

Part 3 AUTHORISATION CONDITIONS

3.1 COMPLIANCE

(a) Area Identification

GRAFTON DISTRICT
Grange State Forest No. 771
Compartment 352
Grafton Management Area

(b) Third Party/Lessee or Other Interest

The compartment is within the area of Occupation Permit No 13556 held by Albarine Pty Ltd for the purpose of grazing. The lessee will be advised of the proposed harvesting.

(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 Department of Conservation and Land Management (CaLM) (now Soil Conservation Service of Department of Land & Water Conservation).
- the conditions of **Pollution 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. Where a Pollution Control Licence condition is more stringent than an equivalent in either of the other above mentioned documents, the Pollution Control Licence condition must prevail.
- conditions attached to any relevant licences issued by the National Parks and Wildlife Service under the Endangered Fauna (Interim Protection) Act 1992 and the National Parks and Wildlife Act 1967 (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**.
- 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 these Codes, instructions and conditions may be made and implemented at any time.

(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

Variations and other specified approvals to this Harvesting Plan may be made by the Supervising Forest Officer, where indicated in Condition. 5.1(c), 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. Such 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, extraction or environmental work is being undertaken within the area covered by this Harvesting Plan.

3.2 CERTIFICATION

(a) Plan Preparation (by Forester, Forest Assistant)

Prepared by: D. C. Ryan Signature: D C Ryan

Title: ..... Date: .20 July, 1995

(b) District Approval (by District Forester)

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).

(c) The date that operations will need to commence is: 7th August 1995

Signature: ..... District Forester Date: 20 July, 1995

(d) Receipt of external authority approvals

(To be completed by person who originally prepared the Plan who must attach the relevant amendments to the Plan.)

Table 2: 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 attached and the Operational Map and Appendices marked and referenced to this Harvesting Plan. This is Harvesting Plan No. GG 95/01/352

Signature: ..... District Forester Date: .....

(e) Date for commencement of operations: .....

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 95/01/352 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. Marking will generally be for extraction.

4.1 Harvesting Activity Description

The logging will be a selective harvesting operations in maturing and regrowth native hardwood forest.

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 the falling 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 areas.

Twelve dump sites have been marked in the compartment as indicated on the operation map. Dumps 1 and 8 shall not be worked on when wet weather constraints apply. Harvesting will commence on dumps 1 and 2, then move to dump 12 and work progressively back to dump 3.

(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, where runoff occurs from a road surface, haulage may not occur unless the road is a gravel or sealed road.
[see COLP 7.2, PCL Sch 2 Div 3 C 82]

(c) Wet weather controls - snigging

During wet weather, extraction tracks and 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. [see COLP 7.2, PCL Sch 2 Div 3 C 93]

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.

(b) Canopy gaps

Tree marking for removal shall be carried out by the SFO. Tree marking shall aim at creating **gaps** of minimum diameter of 60 metres over about 25% of the net harvest area. The location of these gaps shall be determined by the SFO in the field. Gaps shall not intrude into protection strips.

This degree of disturbance is essential to stimulate regeneration and promote its development in the compartment's forest types. Adequate wildlife habitat shall be retained in the **clusters** of selectively logged forest surrounding the gaps.

Tree marking within the gaps and clusters shall aim at:

Gaps

Removing all merchantable products with the intention of maximising the practical yield of log products with the highest economic end use.

Clusters

Retaining trees capable of net merchantable timber value increment for the 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.

Retaining trees for wildlife habitat purposes.

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.

Reference Grafton Management Area Environmental Impact Statement

(c) Harvesting debris

Harvesting debris within a gap shall be moved away from the edge of the gap.

Debris from the selective harvesting between canopy gaps shall be removed from the butts of retained habitat trees and future crop 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 produced by the harvesting shall be returned to the logging area and dispersed as far as practicable around the net harvest area.

(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 Wildlife Corridor, Riparian Habitat Zones, filter strips, protection strips and buffer strips.

4.5 Flora Protection

(a) Rare or endangered species

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

(b) Rainforest protection

There are no rainforest areas on the compartment.

4.6 Fauna Protection

(a) Sightings of fauna

No Schedule 12 species have been detected in Compartment 352. Schedule 12 species expected to occur in or in the vicinity of the compartment are;

Glossy Black Cockatoo	**Powerful Owl**	**Sooty Owl**
Masked Owl	**Stephen's Banded Snake**	**Pale-Headed Snake**
Spotted-tail Quoll	**Brush-tailed Phascogale**	**Yellow-bellied Glider**
Squirrel Glider	**Rufous Bettong**	**Red-legged Pademelon**
Common Planigale	**Koala**	**Long-nosed Potoroo**
Great Pipistrelle	**Golden-tipped Bat**	**Little Bent-wing Bat**
Common Bent-wing Bat	**Large-footed Mouse-eared 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 such species.

(b) Habitat trees

Compartment 352 includes Dry Hardwood forest and Moist Hardwood forest with xeromorphic understorey and Moist Hardwood forest with mesic understorey. Sufficient potential habitat and recruitment habitat trees exist in the net harvest area to allow for the retention of enough trees to meet prescription requirements.

Prescription 1:

Habitat Tree Retention

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

Habitat tree retention in Moist Hardwood forests with a mesic understorey shall be six trees per hectare. For the purpose of this prescription a mesic 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 the size of canopy gaps required 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. In gapping operations tree heads shall be moved towards the centre of gaps prior to burning.

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

Wildlife Corridor

A designated wildlife corridor exists along Table Creek as shown on the Operational Map. The corridor is 40 metres wide on either side of the creek.

- no harvesting machinery shall enter the Wildlife Corridor.
- felling and snigging shall be excluded from the Wildlife Corridor.
- trees shall not be felled into the Wildlife Corridor.
- trees shall not be damaged in the Wildlife Corridor.

Riparian Habitat Zones

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

- no harvesting machinery shall 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) <u>Species and mitigation prescriptions</u>

Mitigation prescriptions to be applied in Grafton Management Area have been determined for Schedule 12 species that might be adversly impacted on by forest management activities. Those relevant to Compartment 352 are stated below. The appropriate mitigation prescription shall be immediately applied when any of the listed animal 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 *Bushfires Act* 1949 overrides Section 99(1) of the *National Parks and Wildlife Act* 1991. Given this, the prescription should only be seen as a guide for managing the habitat of CRW fauna.

Critical Weight Range species likely to occur in Compartment 352 are the Rufous Bettong, Red-legged Pademelon, Long-nose Potoroo and Spotted-tail Quoll.

SFNSW are to ensure that 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 (i.e. those logs with a diameter greater than 40cm).

For the purpose of this prescription critical habitat for the Spotted-tail Quoll is defined as moist gullies, wet schlerophyll, rainforest and fallen logs with a diameter of greater than 40 cm. Critical habitat for Red-legged Pademelon is defined as moist gully vegetation and rainforest. 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

Harvesting operations shall avoid damage to Casuarina stands.

Prescription 4:

Powerful/Masked/Sooty Owls

200 metre radius buffer zones shall be established around each identified nest site and 100 metre radius buffer zones 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.

Prescription 5:

Stephen's Banded Snake and Pale-Headed Snake

100 metre radius buffer zones shall be established around each location site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded.

Prescription 6:

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.

Prescription 7:

Yellow-bellied Glider

Within 100 metres of identified V-notch scarred trees the following trees will be retained: known scared 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 8:

Squirrel Glider

200 metre radius buffer zones 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.

Prescription 9:

Koala

Trees with identifiable use by Koalas at the time of harvesting shall be retained. 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 Director General of the NPWS shall be informed.

Prescription 10:

Long-nosed Potoroo

100 metre radius buffer zone shall be established around each location site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded.

Prescription 11:

Golden-tipped 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.

Prescription 12:

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.

Prescription 13

Large-footed Mouse-eared Bat

100 metre radius buffer zones shall be established around each identified roost site and habitat area. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded.

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

Table 3 - Soil Erosion and Water Pollution Categories

Slope Ranges (Degrees)	SE/WP Category
0 - 6	1(Low)
over 6 - 28	2(Moderate)
over 28	3(High)
Roads	3(High)

(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.
- Transport of logs from the site using a bogie jinker and prime mover.

(c) Marking and location of roads, log dumps, snig tracks and crossings

The marking of roads, log dumps, snig tracks and crossings in the field will be in accordance with condition 4.2. Locations are indicated on the Operational Map.

(d) Wet Weather controls

Harvesting operations may be conducted throughout the year subject to the application of normal wet weather closure procedures as per Section 7 of the Code of Logging Practice. 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, and/or,

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

Dumps located along Grange Access Road, as marked on the Operational Map, are suitable to be worked during wet weather periods.

(e) Road Construction

Temporary minor roads totaling about 0.4 kilometres will be constructed to provide access to four dump sites.

Grade

Roads must be constructed within a maximum grade of 10°.

Survey

The centre lines of the roads shall be surveyed and marked in the field by the SFO prior to construction. Clearing and earthworks must not deviate from the marked line or its offsets.

Clearing

Clearing width for road construction must be minimal to fit the road formation.

Batters

The grade of constructed cut batters must not be steeper than 0.25H:1V and the grade of constructed fill batters must not be steeper than 1.1H:1V. All batters greater than 5 metres in length must be seeded with approved Rye grass at the rate of 20 Kg/ha on the completion of the road construction by the contractor/licensee. Fill batters under 5 metres in length may be left to revegetate through natural regeneration and ground-cover recovery.

Road Surface Drainage

Rollover crossbanks will be used to drain the roads on those sections where outfall crossover drainage is impractical. Where required rollover crossbanks will be spaced at 30 metre maximum intervals. The banks must have a minimum design vertical height from spillway to bank top of 40 cm.

Rollover crossbanks must drain onto undisturbed vegetation or where that 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 road to dump site 10 will traverse the very top of a drainage depression, as shown on the Operational Map. An open causeway will be constructed at the site. The causeway will remain in situ after the road has been closed. The causeway approaches shall be seeded by the licensee/contractor with rye grass at the rate of 20 Kg/ha immediately following construction.

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 the sub-soil will be exposed by road construction. If small sections of the sub-soil are exposed, top soil from the earthworks shall be spread over the road surface at the site and the cut and fill batters shall be seeded by the licensee/contractor with rye grass at the rate of 20 Kg/ha immediately following construction.

(f) Slope limits for the area

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

(g) Drainage feature protection

A Wildlife Corridor exists 40 metres either side of Table Creek. Table Creek is a prescribed stream and is protected by the Wildlife Corridor.

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 shall be retained along all watercourses and drainage lines within the net harvest area of compartment 352 at minimum widths as stated in Table 4 below. Note that SE/WP Category 3 (High) comes in at 29° and may not occur on the compartment.

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

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

The SFO shall mark Wildlife Corridors, Riparian Habitat Zones, filter strips/protection strips in the compartment progressively ahead of harvesting operations. Filter strips/protection will only be marked in the field when they are not embedded in the Wildlife Corridor or Riparian Habitat Zones, which have specifications equivalent to or greater than filter/protection strips.

The licensee or contractor shall be responsible for measuring off-sets to 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 4 - Filter Strip and Protection Strip Widths
(distance each side of stream)

SE/WP Category	CATCHMENT /SLOPE	Riparian Zone	Filter Strip	Protection Strip
1(Low)	<40 ha		5M	
1(Low)	>40 ha	20m		
2(Medium)	<40 ha <18° slope		10m	
2(Medium)	<40 ha >18°slope		10m	10m
2(Medium)	>40 ha	20m		
3(High) N/A	<40 ha <18° slope		10m	10m
3(High)	<40 ha >18° slope		15m	10m
3(High) N/A	>40 ha <18° slope	20m		5m
3(High)	>40 ha >18° slope	20m		10m

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

There shall be no felling in filter strips. Directional felling must be used to avoid felling of trees into filter strips.

Trees located in protection strips may be felled provided a minimum of 50% canopy cover is retained within the strip.

Trees which are marked for removal inside protection strips must only be felled if they can be directed out of the strip. Crowns of trees may be felled into protection strips.

Machinery must not enter filter or protection strips except to construct or use crossings.

Where trees are felled out of a protection strip or felled into a protection strip, logs must be extracted in the line of the log so as to minimise damage to vegetation and ground-cover.

Any furrows resulting from log removal from protection strips must be diverted at the edge of the strip by harvesting debris or earth.

(j) 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.

(k) Snig Tracks

It is preferable that wherever practicable walkover extraction techniques be used in preference to snig track construction.

Wherever practicable, snig tracks shall be located on ridges to ensure free crossfall drainage. Side cut tracks must have crossfall drainage.

Snigging along roads must only occur in order to avoid snig track construction and where approved by the SFO. Effective road drainage must be re-instated 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 watercourse, 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 temporally suspended in accordance with Table 5.

Table 5 - Drainage of Snig Tracks at Temporary Cessation of Operations

Slope boundaries	SE/WPC	No. Days
0° - 6°	1 (Low)	10
>6° - 28°	2 (Medium)	8
over 28°	3(High)	5

Where earth banks are required they must be constructed to a minimum unconsolidated effective height of 35 cm, with spacing in accordance with Table 6.

Table 6 - Maximum Earth Bank Spacing

Track Grade (degrees)	SE/WP Category		
	1 (0° - 6°)	2 (>6° - 28°)	3 (>28°)
0 - 5	200m	150m	100m
>5 - 10	150m	100m	60m
>10 - 15		60m	40m
>15 - 20		40m	25m
>20 - 25		30m	20m
>25			15m

The above spacing is the maximum 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.

(l) Downhill Snigging

Limited downhill snigging will be required to dumps 4, 6, 7, 8, 10, 11 and 12.

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

- Crossfall drainage must be used where practicable.
- The snigging pattern shall be uphill from the stump and bunching onto a centrally located down hill extraction track(s) where practicable.
- Tracks approaching log dumps shall be located so as to direct water away from the dump immediately before reaching the dump.

(M) Snig Track Drainage Line Crossings

All crossings shall be approved by the SFO before construction and shall be open causeways. Crossings must be rehabilitated after use, all loose material removed from the channel, the crossing point reshaped to its original condition as far as practicable and sown with rye grass at the rate of 20 Kg/ha.

(n) Dispersible Soils

It is not anticipated that snigging will expose 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 shall be spread over the track surface at the site and at the completion of the use of the track cut batters shall be seeded by the licensee/contractor with rye grass at the rate of 20 Kg/ha.

(o) 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, topsoil must be stripped and stockpiled for subsequent respreading at the completion of operations.

Dumps shall be constructed with outfall drainage.

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

(p) Prescribed Burning

Pre-logging Burning

The will be no pre-logging burning associated with the harvesting of compartment 352.

Post-logging Burning

Post-logging burning of compartment 352 shall be carried out in accordance with provisions and specifications of the Nymboida District Fire Plan and the Grafton District Fuel Management Plan.

Objectives

Post-logging burning objectives for compartment 352 are:

meet State Forests' obligations under the Bush Fires Act.

decrease fine fuel loads and generated 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.

reduce the possibility of wildfire burning through the compartment and entering and damaging adjacent forests and private property areas.

simplify and increase the efficiency and the safety of any wildfire control activity.

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 SFO 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 352.

4.9 Modified Harvest Conditions

(a) Special Emphasis Areas

Preferred Management Priority Classification: Special Emphasis Flora and Fauna Protection Zone 1.1.7 Wildlife Corridor, 40 metres either side of the stream, exists along Table Creek, as indicated on the Operational Map.

- no harvesting machinery shall enter the Wildlife Corridor.
- felling and snigging shall be excluded from the Wildlife Corridor.
- trees shall not be felled into the Wildlife Corridor.
- trees shall not be damaged in the Wildlife Corridor.

(b) Riparian Habitat Zones

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

- no harvesting machinery shall 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.

(c) Boundary fences

Private property joins the north, east and south boundaries of the eastern section of the compartment. These boundaries are fenced.

- Damage to these fences is to be avoided. 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 352

Estimated Yields are:

Compulsory Sawlogs 40 cm +	800m³ gross
Compulsory Sawlogs <40 cm	300m³ gross
Salvage Sawlogs	200m³ gross
Poles	20m³ gross
Veneer Logs	20m³ gross

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 scheduled 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)

Canopy Gaps for Regeneration

Canopy gaps for regeneration will be approximately 60 metres in diameter. Gaps shall not intrude into protection strips or filter strips. Tree marking should aim at creating sufficient gaps to occupy approximately 25% of the net harvest area. (Also see Part 4.4 (b)

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 the Wildlife Corridor and Riparian Habitat Zones shall be marked ahead of harvesting operations.

(b) Soil Erosion and Water Pollution Control

Marking of Filter Strips and Protection Strips

Wildlife Corridor and 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 the wildlife corridor or riparian habitat zones. Hence filter/protection strips shall only be marked in the field where they are not embedded in the wildlife corridor or riparian habitat zones.

Filter strips, protection strips and drainage line buffer strips shall be retained along all drainage features at the minimum widths as specified in Table 4 in Part 4.7 (g).

The SFO is responsible for marketing filter/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 protection strip (See also Part 4.7 (h)).

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 (h)).

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 Tree Marking

Reports of sightings of any Schedule 12 fauna as required in Part 4.6 (a) must be made to the District Marketing Forester within 24 hours of the sighting being made. 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 situ.

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 Road Batters

The SFO shall ensure that road batters and crossings approaches are seeded in accordance with Part 4.7 (e).

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

If small sections of the sub soil are exposed during road/snig track construction the SFO shall ensure that top soil from the earthworks is spread over the road/track surface at the site and the cut and fill batters are seeded by the licensee/contractor with rye grass at the rate of 20 Kg/ha immediately following construction in accordance with Part 4.7 (e) and (n).

Condition 5.4 Pre- and Post-logging Burning

(a) Pre-logging Burning

The will be no pre-logging burning associated with the harvesting of compartment 352.

(b) Post-logging Burning

Post-logging burning of compartment 352 will be carried out in accordance with provisions and specifications of the Nymboida District Fire Plan and the Grafton District Fuel Management Plan.

Ignition

The SFO will be responsible for ignition, subject to the requirements of the District Fuel Management Plan.

Condition 5.5 Other Instructions

There are no other instructions concerning the supervision of harvesting compartment 352.

Condition 5.6 Supervising Forest Officer's Acknowledgment

I acknowledge that I have received a copy of Harvesting Plan No GG 95/01/352 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

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

Condition Number	Condition Title/Enquiry	Entry Needed?	Plan Ref.
C42	Representative water monitoring site	Yes	2.5 12 (f)
	Have the Water Pollution Categories and proportion of Dispersible Soil been calculate 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 (g) Map
7	Any major water storage?	No	2.5 12 (f)
8	Drainage depression buffer strips conditions	Yes	4.7 (g)
9.1 (c)	Filter strips on map?	Yes	Map
9.2	Protection strips on map?	Yes	Map
10	Prescriptions for marketing/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 (j)
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 (e)
51	Marking of roads in field	Yes	4.7 (e)
52	Minimising road clearing widths	Yes	4.7 (e)
53	Road side clearing	No	2.5 12 (h)

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

Condition Number	Condition Title/Enquiry	Entry Needed?	Plan Ref.
57	Borrow or gravel pits	No	2.5 12 (h)
60	Batter stabilisation measures	Yes	4.7 (e)
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 (e)
74	Condition to cover non-removal of spoil from drainage features	Yes	5.3 (c)
76	Condition to cover non-completion of crossing stabilisation within 5 days - roads	Yes	5.3 (c)
77	Techniques to leave crossing sites stable	Yes	4.7 (e)
78	Techniques for stabilisation of roads that are no longer required	Yes	4.7 (e)
79	Evaluation of old roads	Yes	2.5 12 (h)
80	Road construction in dispersible soils	Yes	4.7 (e)
81	Protection techniques for roads traversing dispersible soils	Yes	4.7 (e)
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 (m) 5.1 (c)
	Specification of snig track crossing locations, types and capacity	Yes	4.7 (m)
	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 (k)
92	Condition for snigging along roads	Yes	4.7 (k)
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 (k)
	-diversion into stable surfaces	Yes	4.7 (k)
	-minimise unchecked flow into drainage features	Yes	4.7 (k)
	-divert water at minimum damage to structure	Yes	4.7 (k)
103	Minimum specification for bank height	Yes	4.7 (k)
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 (k)
109	Specifications for preventing concentrated water flow where downhill snigging is specified	Yes	4.7 (l)
112	Protection techniques for snig tracks on dispersible soils	Yes	4.7 (n)
119	Specifications for log dump location and drainage	Yes	4.7 (o)
120	Use of traxcavators and wheeled loaders in relation to wet weather	No	
125	Post-logging burning conditions	Yes	4.7 (p)
	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	???

NOTES

CLEARANCE CERTIFICATE

HARVESTING PLAN No; ..... **Dump No:** .....

.....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 (Section or Coupe) 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/landings/log stack 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 (Section, Coupe) just completed.

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 Planning Unit.

This clearance does not release the licensee/contractor from any obligation to undertake any remedial work if subsequent deficiencies 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 (Supervising Forest Officer).....(Date).....

District: Grafton **Compartment(s):** 351, 352, 353, 354 **REPORT NUMBER:** VA1595A/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*	Permeability*	'K'#	per cent dispersible soil (D% x clay%)
351/1/A	Topsoil	D	2- 8	10(10)	13(13)	32(33)	42(44)	3	27	SCL	3	4	0.026	2.70
351/1/B	Subsoil	D	30-40	41(42)	7 (7)	24(25)	25(26)	3	60	LMC	3	5	0.023	24.60
351/2/A	Topsoil	C	1- 8	24(26)	29(32)	35(38)	4 (4)	8	23	CL	1	3	0.006	5.52
351/2/B	Subsoil	C	28-35	37(38)	34(35)	25(26)	1 (1)	3	31	LC	1	4	0.027	11.47
352/1/A	Topsoil	D	2- 7	10(10)	9 (9)	34(35)	44(46)	3	36	SCL	3	4	0.024	3.60
352/1/B	Subsoil	D	35-45	38(45)	6 (7)	17(20)	24(28)	15	27	LC	3	5	0.021	10.26
353/1/A	Topsoil	D	2- 5	10(11)	13(14)	40(42)	31(33)	6	29	SCL	2	3	0.022	2.90
353/1/B	Subsoil	D	45-55	12(14)	18(20)	25(28)	34(38)	11	64	SC	3	5	0.044	7.68
354/1/A	Topsoil	D	2- 7	10(10)	18(18)	45(46)	26(26)	1	29	SCL	3	4	0.034	2.90
354/1/B	Subsoil	D	40-45	36(38)	6 (6)	23(24)	30(32)	5	42	LMC	3	5	0.023	15.12
354/2/A	Topsoil	C	2-10	24(24)	26(26)	40(41)	9 (9)	1	17	SiCL	1	3	0.005	4.08
354/2/B	Subsoil	C	30-35	36(37)	31(32)	27(28)	3 (3)	3	36	LC	2	4	0.031	12.96

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

District: Grafton **Compartment(s):** 355, 362, 366, 367, 368, 369, 371, 374, 376 **REPORT NUMBER:** VA1595B/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*	Permeability*	'K'#	per cent dispersible soil (D% x clay%)
355/1/A	Topsoil	C	2–10	9(10)	30(34)	42(49)	6 (7)	13	22	SiCL	1	3	0.011	1.98
355/1/B	Subsoil	C	25–35	9(11)	37(43)	27(32)	12(14)	15	48	FSCL	2	3	0.053	4.32
355/2/A	Topsoil	D	2– 6	22(22)	11(11)	35(36)	31(31)	1	15	SCL	2	3	0.016	3.30
355/2/B	Subsoil	D	55–60	17(19)	9(10)	30(33)	35(38)	9	71	SC	3	5	0.036	12.07
362/1/A	Topsoil	C	0–10	21(22)	16(16)	32(33)	28(29)	3	16	SiCL	1	3	0.020	3.36
362/1/B	Subsoil	C	25–30	32(33)	16(16)	24(24)	26(27)	2	34	LC	1	4	0.017	10.88
362/2/A	Topsoil	D	0–10	10(10)	12(13)	30(32)	43(45)	5	29	SCL	3	3	0.022	2.90
362/2/B	Subsoil	D	40–50	41(45)	6 (7)	20(22)	24(26)	9	23	LC	3	3	0.015	9.43
366/1/A	Topsoil	C	1–10	11(16)	15(22)	31(46)	11(16)	32	12	SiCL	1	3	0.010	1.32
366/1/B	Subsoil	C	35–40	24(28)	26(30)	21(25)	15(17)	14	19	SiC	1	4	0.028	4.56
367/1/A	Topsoil	C	2– 8	12(16)	24(33)	19(26)	18(25)	27	13	SiCL	1	3	0.009	1.56
367/1/B	Subsoil	C	35–40	11(23)	16(33)	9(19)	12(25)	52	25	LC	2	5	0.040	2.75
368/1/A	Topsoil	C	1– 8	11(17)	15(22)	22(33)	19(28)	33	19	SiCL	1	3	0.008	2.09
368/1/B	Subsoil	C	50–60	26(31)	23(27)	17(20)	19(22)	15	40	LC	1	4	0.022	10.40
369/1/A	Topsoil	C	2– 8	14(15)	48(51)	27(29)	5 (5)	6	34	SiCL	1	3	0.034^	4.76
369/1/B	Subsoil	C	25–30	23(24)	47(48)	22(23)	5 (5)	3	33	LC	2	4	0.047	7.59
371/1/A	Topsoil	C	2–10	21(25)	23(28)	31(37)	8(10)	17	19	SiCL	1	3	0.005	3.99
371/1/B	Subsoil	C	25–35	34(41)	18(22)	22(26)	9(11)	17	23	LMC	2	4	0.008	7.82
374/1/A	Topsoil	C	1–10	16(17)	34(37)	37(41)	5 (5)	8	14	SiCL	1	3	0.009	2.24
374/1/B	Subsoil	C	30–40	26(31)	35(42)	19(23)	4 (4)	16	23	SiC	2	4	0.038	5.98
376/1/A	Topsoil	C	2–10	7(10)	21(30)	30(43)	12(17)	30	17	SiCL	1	3	0.012	1.19
376/1/B	Subsoil	C	40–45	21(24)	26(30)	29(33)	12(13)	12	30	SiC	1	4	0.034	6.30

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; ^ As directed by the SOILOSS program, 'K' for 369/1/A was determined using the nomograph, due to the high proportion of fine sand. It is worth noting that this nomograph only permits the use of organic matter to a maximum of 4% while this layer's value is really 9.4%

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
22nd June, 1995

Harvesting Plan No GG 95/01/352

Contents

STATE FORESTS OF NSW
NORTHERN REGION - GRAFTON DISTRICT
HARVESTING PLAN OPERATIONAL MAP

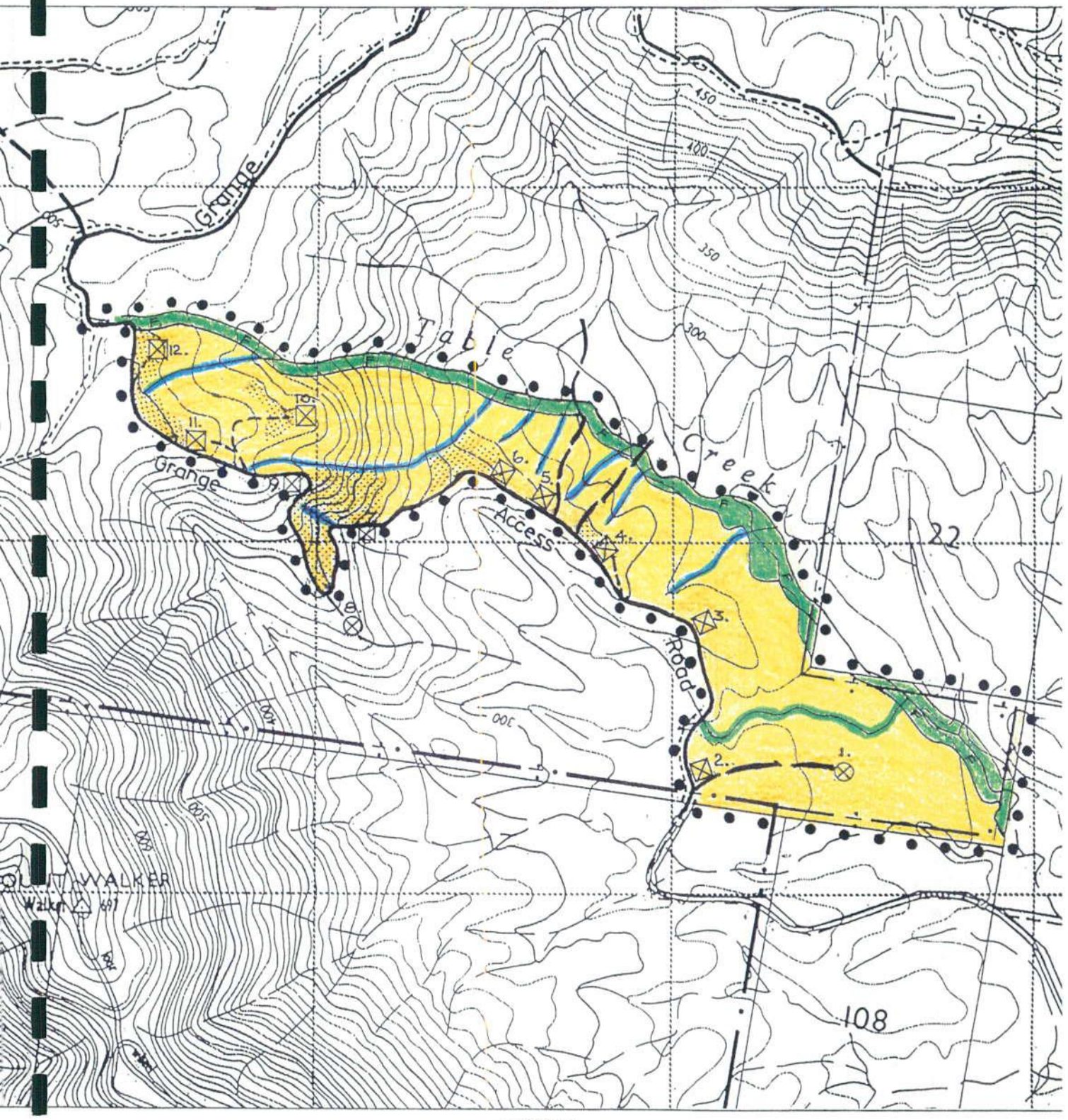
COMPARTMENT NUMBER **352**

GRANGE STATE FOREST

SCALE 1 : 15000 CONTOUR INTERVAL 10 m

GN

0 0.5 1 km



LEGEND

BOUNDARIES
State Forest
Compartment

ROADS
Gravelled
Minor Roads
To be Constructed

HARVEST AREA
Normal Prescriptions
Down-hill snigging

NON HARVEST AREA
Wildlife Corridor P.M.P.1.17
Riparian Zone

DUMP SITES
Dry Weather
Wet Weather

WATERCOURSES AND DRAINAGE LINES
Filter Strip
Filter Strip + Protection Strip

STATE FORESTS OF NSW
NORTHERN REGION - GRAFTON DISTRICT
HARVESTING PLAN FOREST TYPE MAP

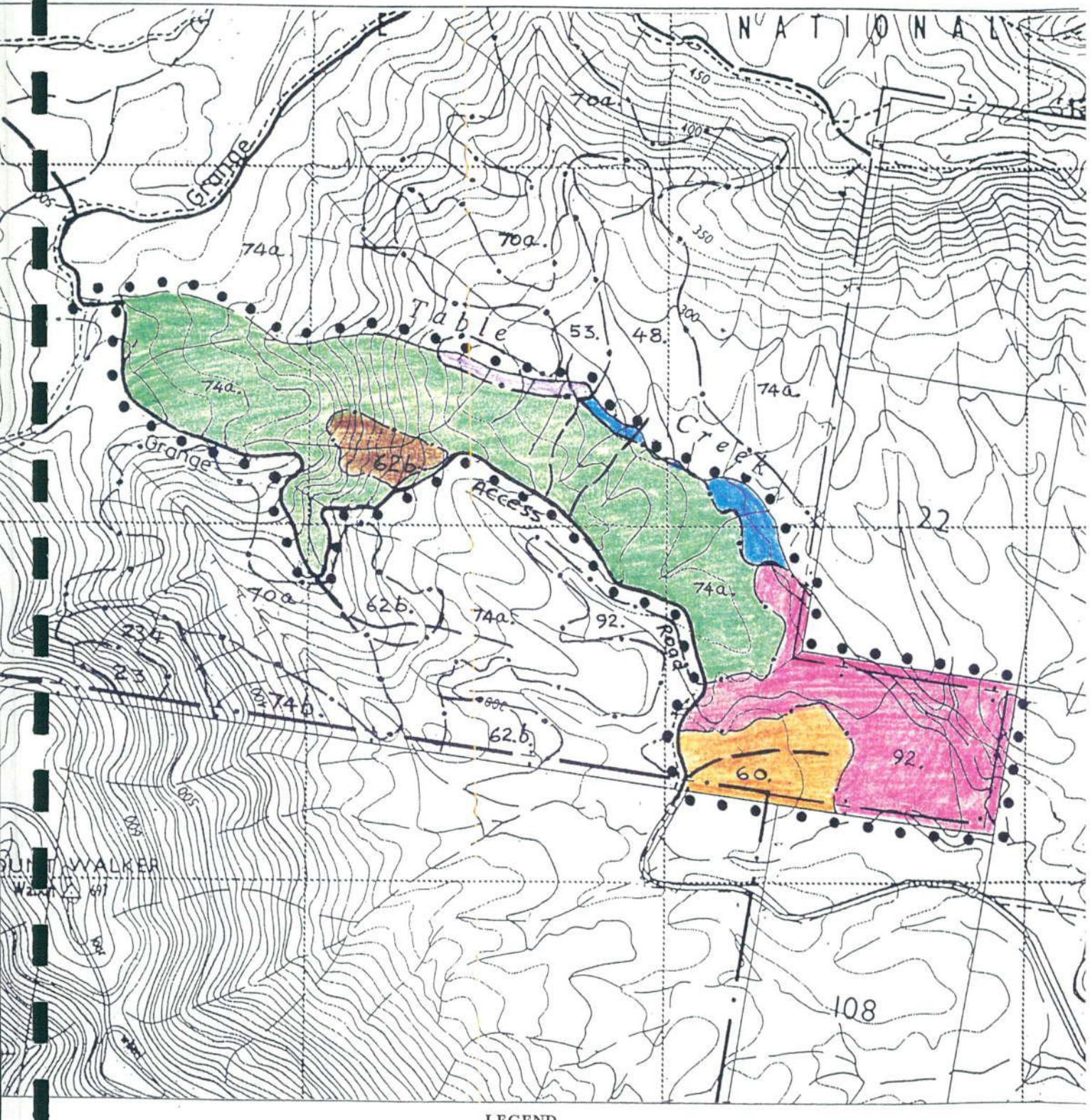
COMPARTMENT NUMBER **352**

GRANGE STATE FOREST

GN

SCALE 1 : 15000 CONTOUR INTERVAL 10 m

0 0.5 1 km



LEGEND

BOUNDARIES

State Forest..... Forest Type.....

Compartment.....

ROADS

Gravelled.....

Minor Roads.....

FOREST TYPES

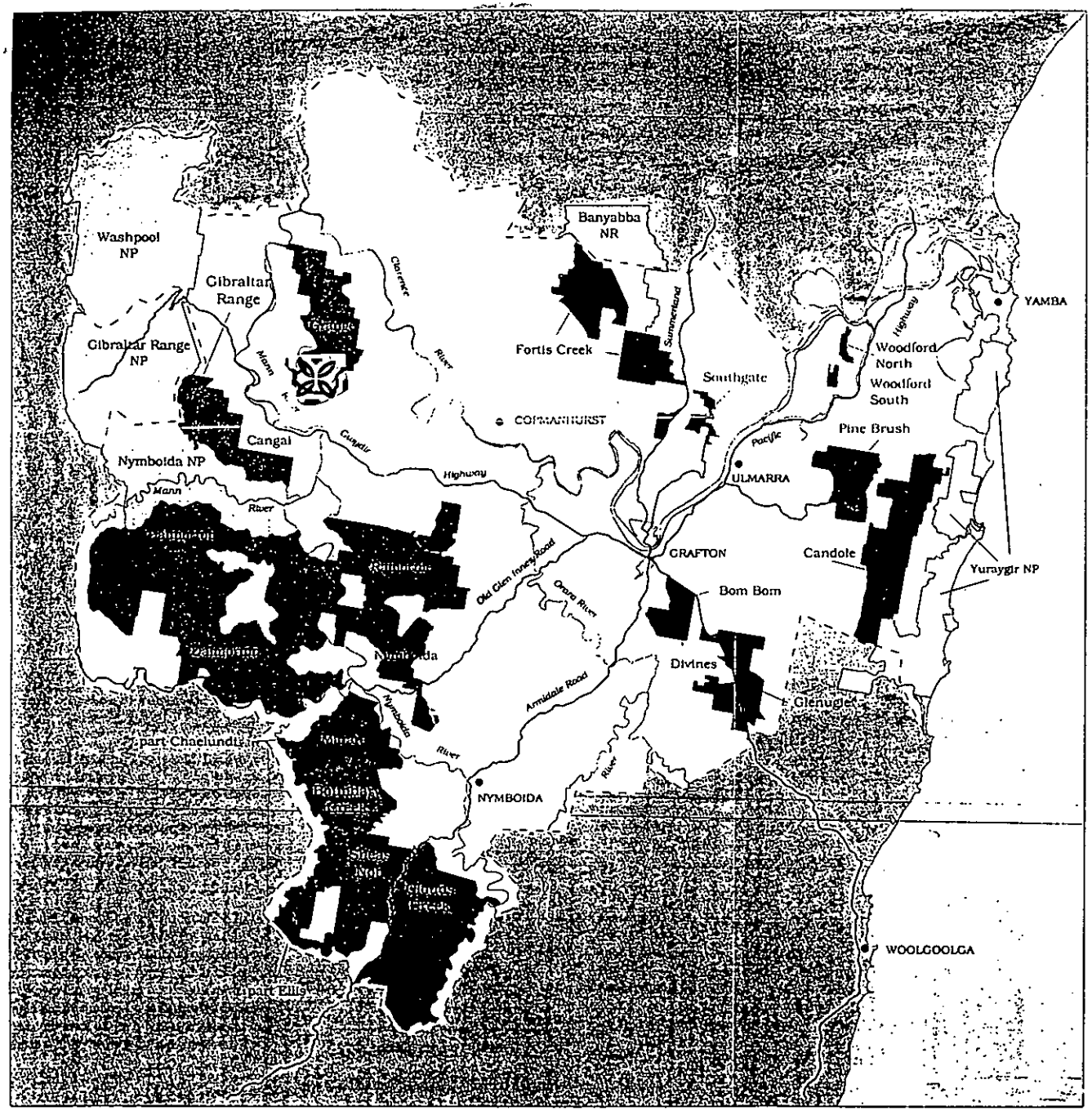
48..... 53.....

62a., 62b.....

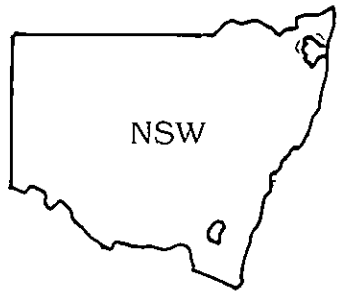
60.....

74a.....

92.....



GRAFTON MANAGEMENT AREA



STATE FORESTS

NATIONAL PARKS

MANAGEMENT BOUNDARY

TOWNS

ROADS

RIVERS

0 20km N

LOCATION

COMPARTMENT 352

Part 2 FOREST MANAGEMENT & ENVIRONMENTAL CONSIDERATIONS

2.1 PHYSICAL FEATURES

Description 1 Physical Description of the Area

STATE FOREST	**Grange No 771**	DISTRICT	**Grafton**
REGION	**Northern**	COMPARTMENT	**352**
MANAGEMENT AREA	**Grafton**		

Natural Features

General: The compartment contains undulating to moderate slopes with a steeper area located in the mid western section. It is basically the northern face of a long secondary ridge running east off a main range system.

Catchment: Clarence River catchment. Table Creek runs along the major portion of the northern boundary of the compartment.

Altitude range: 265m - 490m A.S.L.

Aspect: Generally east to north-east.

Topography: The major part of the compartment varies from nearly flat to undulating with slopes up to 10°. The mid-western section is steeper with slopes around 20°.

Artificial Features

Roads: Grange Road, the main access through the Forest runs along the major portion of the compartment's southern boundary.

Minor Roads: Five minor roads give access to side ridges in the Compartment. Two other minor roads run across the compartment giving access to the area to the north. These two roads will not be used during this harvesting operation.

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

Private property joins the north, east and south boundaries of the eastern section of the compartment. These boundaries are fenced.

A Special Emphasis Flora and Fauna Protection Zone (PMP 1.1.7 Wildlife Corridor, 40m strip either side of the stream) exists along Table Creek, as indicated on the Operational Map. Table Creek is a prescribed stream.

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

Reference Grafton Management Area Environmental Impact Statement

2.2 FOREST MANAGEMENT AND SILVICULTURE

Description 3 Compartment Subdivision, Forest Types

Areas:

Gross Area of Compartment	112 ha
Wildlife Corridor	12 ha
Riparian Habitat Zones	3 ha
Filter Strips	5 ha
Proposed for Logging	**92 ha**

Forest Types:

Forest Types		Area (ha)
48	Flooded Gum	3.1
53	Brush Box	2.0
60	White Mahogany - Red Mahogany - Grey Ironbark - Grey Gum	12.2
62	Grey Gum - Grey Ironbark - White Mahogany	5.1
74	Spotted Gum - Ironbark/Grey Gum	63.1
92	Forest Red Gum	26.5

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

Description 4 Broad Description of Vegetation

(a) Forest Types

- Forest Types 48 and 53 are moist types restricted to the gully areas along Table Creek and are within the 40m Wildlife Corridor.
- Type 60, a moist type that occurs on the flat southern most ridge of the compartment.
- Type 62 a dry type on the steep, lower site quality mid western section of the area.
- Type 74 dominates the major part of the compartment. It is a dry type extending from ridge top to or near Table Creek.
- Type 92 an open grassy type that occurs on the lowest east section of the compartment in a broad band along Table Creek and a main tributary.

Overstory species

The overstory species are Spotted Gum, Grey Ironbark, Grey Gum, White Mahogany, Grey Box, Red Mahogany, Tallowwood, Red Bloodwood, Brush Box, Sydney Blue Gum, Flooded Gum, Forest Red Gum, Round Leaf Gum and Roughbarked Apple.

(b) Understory

The understory on the steeper ridges and slopes is typically dry, being Eucalypt regeneration, Forest Oak, Cheese Tree, Backhousia, scattered Grass Trees and other xerophytic shrubs; Geebungs, Indigo, Hakeas and Native Cherry. The moist areas also have Native Ginger, Tobacco Bush, Soft Tree Fern, Blechnum sp, Black Wattle, Tree Heath and Forest Oak, with the Oak being prominent on the Type 60 area. The Red Gum type is an open forest/woodland with a significant cover of grass.

(c) Ground-cover

The ground cover is mostly native grass, bracken and litter on the drier areas with the grass sward being well developed in the Red Gum area. Litter, ferns, vines and herbs, sedges and mosses occur on the moist areas.

(d) Rare or endangered species

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

(e) Rainforest

There are no rainforest areas in the compartment.

(f) Exotic weeds

Lantana is scattered through sections of the compartment and is relatively abundant in the Forest Type 60 area.

(g) Regeneration and serial stages

The compartment contains a multi-age forest consisting of a few remnants of the original stand, maturing regrowth seemingly resulted from the original harvestings and heavy harvesting during the 1940s, and younger regrowth of varying ages, the result of numerous subsequent selective logging operations and some stand improvement treatment.

Description 5 Forest and Crop Condition

Compartment 352 has a long history of selective logging of varying intensities and it has been silviculturally treated. This has induced growth response to varying extents on retained stems and allowed some regeneration to become established. Mostly the gaps created have been insufficient in size for widespread regeneration development. The current stand is mainly mature or maturing with groups of younger regrowth. 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, originally as part of *Newbold Grange* station and since State Forest dedication by way of lease or permit. Grazing has seemingly been light in recent years. There cattle on Compartment 352 at the time of recent inspections.

Description 6 Forest Management Activities

(a) Silviculture

The main silvicultural objectives are to:

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

The Wildlife Corridor, Riparian Habitat Zones and filter strips on the compartment will remain in a relatively undisturbed state. Protection strips will be thinned under specific prescriptions with up to 50% canopy removal.

- Clusters of habitat trees will be retained to meet wildlife habitat requirements.

On the balance of the area, while taking patches of younger regrowth into consideration, harvesting will provide canopy gaps and ground disturbance to promote seedling regeneration leading to multi-age regrowth forest conditions. A minimum canopy gap size of 0.4 hectares is required in the forest types occurring on the compartment to achieve successful regeneration development. This corresponds to an area approximately 65 metres in diameter.

To sustain regrowth forest development on a cyclic basis gap creation will aim at treating a maximum of 25% of the net harvesting area this cutting cycle. The balance of the area will be lightly selectively thinned where required, retaining stems that have the potential of putting on positive net increment to the next cutting cycle.

(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 damaged to stands caused by wild fires
- ensure the establishment and survival of regeneration
- maintain wildlife habitat
- maintain hydrological conditions
- and to 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 co-ordinated with other fire control agencies through the Nymboida District Fire Plan.

In Compartment 352 bark and logging debris will be progressively spread through the logged area and/or accumulated in small heaps on log dumps during the harvesting operation, logging debris will be kept approximately 5 metres clear of identified habitat trees, areas of 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 **Nymboida District Fire Plan**.

2.3 FLORA PROTECTION

Description 7 Presence of Protected or Endangered Plant Species

No species listed Rare or Threatened have been detected in the 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 Rainforest areas in the compartment.

Description 9 Protection of Rainforest

Not applicable.

2.4 FAUNA PROTECTION

Description 10 Endangered and Protected Fauna Occurrence

(a) General

No Schedule 12 species have been detected in Compartment 352. Schedule 12 species expected to occur in or in the vicinity of the compartment are:

Glossy Black Cockatoo	**Powerful Owl**	**Sooty Owl**
Masked Owl	**Stephen's Banded Snake**	**Pale-Headed Snake**
Spotted-tail Quoll	**Brush-tailed Phascogale**	**Yellow-bellied Glider**
Squirrel Glider	**Rufous Bettong**	**Red-legged Pademelon**
Common Planigale	**Koala**	**Long-nosed Potoroo**
Great Pipistrelle	**Golden-tipped Bat**	**Little Bent-wing Bat**
Common Bent-wing Bat	**Large-footed Mouse-eared Bat**	

References — Grafton Management Area Environmental Impact Statement
SFNSW GIS Records

(b) Habitat Trees

Compartment 352 includes Dry Hardwood forest and Moist Hardwood forest with xeromorphic understorey and Moist Hardwood forest with mesic understorey. Sufficient potential habitat and recruitment habitat trees exist in the net harvest area to allow for the retention of enough trees to meet prescription requirements.

(c) Wildlife Corridor

A designated wildlife corridor exists along Table Creek as shown on the Operational map. The corridor is 40 metres wide on either side of the creek.

(d) Riparian Habitat Zones

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

(e) Refugia Areas

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 352 are stated below:

(a) Critical Weight Range Species

Critical Weight Range species likely to occur in Compartment 352 are the Rufous Bettong, Red-legged Pademelon, Long-nosed Potoroo and Spotted-tail Quoll. Rufous Bettongs inhabit well grassed open forests and are commonly associated with Spotted Gum. Long nosed Potoroos prefer dense understory vegetation and will forage in open areas. Red-legged Pademelons are dependent on dense cover for refuge and will feed in adjacent open areas. Spotted-tail Quolls occur in a variety of forest types favouring moister areas.

(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. Suitable Casuarina occur on the compartment and there are large hollow trees on it and nearby.

(c) Powerful/Masked/Sooty Owls

These Owls require large tree hollows for nesting, roost sites in large trees and require large home ranges. Suitable moist gully areas occur on and adjacent to the compartment.

(d) Stephen's Banded Snake and Pale-Headed Snake

These snakes requires tree hollows and old trunk scares. There is a scattering of suitable older trees through the compartment.

(e) Brush-tailed Phascogale

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

(f) Yellow-bellied Glider

Yellow-bellied Gliders require tree hollows for nesting, feed on eucalypt sap by cutting V-notches into the bark of certain eucalypts, eucalypt nectar, and insects harvested beneath the loose bark of bark-shedding eucalypts. There are V-notch trees on areas adjacent to the compartment. The lower elevated eastern section of the compartment is higher nutrient country.

(g) Squirrel Glider

This species requires tree hollows for nesting, feeds in upper canopies on flowers and insects, and on sap from yellow-belly glider V-notches.

(h) Koala

Koalas feed on eucalypt leaves from a range of species and prefer higher nutrient areas. The lower elevated eastern section of the compartment might be suitable but the higher nutrient country in the private property further east is more likely to be.

(l) Long-nosed Potoroo

This species prefers dense understory areas, will forage in open areas and builds a vegetation nest on the ground. There are broad flatter well grassed areas in the compartment with associated dense riparian areas.

(j) Golden-tipped Bat

This Bat roosts in moist forests, seemingly preferring dense vegetation. There are suitable moist gully areas in the wildlife corridor.

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

These Bats roosts in caves and similar structures and occur in most forest and woodland habitats.

(m) Large-footed Mouse-eared Bat

This Bat inhabits moist riparian forest areas and requires open water bodies for feeding.

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 352 is located on the south-east corner of Grange SF which in turn is located some 60 kilometres north-west of Grafton. See location map attached.

(b) Climate

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

Rainfall

The average annual rainfall for the area is about 1200 mm
The average rainfall erosivity - **R = 3000**

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 erosivity details are:

J	F	M	A	M	J	J	A	S	O	N	D
570	510	360	120	60	90	60	60	180	210	330	450

References 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.

Temperature

Mean maximum temperatures range from over 30° in January/February down to about 20° in July/August. The mean minimum temperature range is from about 15° mid summer to around 0° 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 352 is on Granite of Carboniferous age that has intruded into Ordovician-Silurian Metasediments.

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 Veness Soils Report.

Soil types

The soil derived from the Granite is typed as Red podsolic.

Description and profile

The soil is described as brownish black to dark reddish brown, weakly to moderate pedal, sometimes stony sandy loam to sandy clay loam topsoil, grading through sandy and stony clay loams layers to a reddish brown to light brown pedal, very stony sandy light clay subsoil layer.

The topsoil layers are up to about 70 cm in depth. The surface condition is described as loose with abundant stones and plant litter. Stones are rounded or angular and their size range is 2-200 mm.

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

Erodibility

K values A horizon = 0.024
K values B horizon = 0.021

Texture

A horizon	sandy clay loam, normal plastic.
B horizon	light clay, normal plastic.

Dispersibility

%clay A horizon 10%(inclusive of gravels)
%clay B horizon 38%(inclusive of gravels)
D% A horizon 36%
D% B horizon 27%
%dispersible soil A horizon 10/100x36/100x100 = **3.60**
%dispersible soil B horizon 38/100x27/100x100 = **10.26**
The A horizon is not significantly dispersible.
The B horizon is significantly dispersible.

Reference Vessess and Associates. Soils Report Number VA1595A/01.

A copy of Report Number VA1595A/01 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 Red Gum and grass cover on the low elevated areas. The adjacent 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 35 cm up to 70 cm, bedrock is at about 100 cm and possibly deeper on the flatter areas. The harvesting should not disturb the subsoil.

Existing erosion

There is very little evidence of erosion within the compartment. All structures built during the recent logging seem to be functioning. There is limited deposition of sand and fine gravel in some drainage lines. No evidence of erosion of dispersible sub-soils has been found.

(e) Landform

Slope

Slopes are generally convex from the ridge tops down to the limits of the net harvest area. The major portion of the compartment has slopes less than 10°. The mid western section of compartment, about 15% of the net area, has slopes 10°-20°. There are no slopes over 30° within the net harvest area. Areas of slope classes are given in Table 1 below.

Table 1 - Slope Class Areas
(hectares)

0° - <=5°	>5° - <=10°	>10° - <=15°	>15° - <=20°	>20° - <=25°
59	29	10	9	5

Terrain

The compartment basically consists of one side of a long, broad, relatively flat secondary ridge with a number of short wide side ridges. There is a steeper area in the western section that rises about 120 metres to the main ridge. The most southerly part of the compartment is flat and is on a separate ridge.

Drainage line condition

The drainage lines are in good condition. They are mostly broad and well grassed with some being deeply incised on the steeper areas of the compartment. There is limited deposition of sand and fine gravel. The creek that cuts across the southern section of the compartment is well vegetated. Table Creek is protected by the 40 metre wide wildlife corridor.

The flow in the streams is intermittent and the drainage lines were dry at the time of recent inspections except for some larger holes in Table Creek.

Aspect

The aspect is generally east and north-east.

Rockiness

There are no rock areas on the compartment and rockiness is not a consideration. The surface condition is described as loose with abundant stones and plant litter. Stones are rounded or angular and their size range is 2-200 mm.

(f) Hydrology

The compartment is in the Clarence River catchment. Table Creek runs south-east out of the forest and then north-east for about 12 kilometres to the Clarence River. Most of the drainage lines are short and flow directly into Table Creek. A larger creek, with a catchment over 40 hectares, flows across the southern section of the compartment. Table Creek is a prescribe stream. There are no other 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 Middle Brother (Granite, Rainfall 1200 mm +).

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

Previous harvesting

The compartment is readily accessible to private property and was seemingly first harvested many years ago for girders and poles in association with the logging of the freehold areas following settlement. The compartment apparently has been a source of timber for local government and the local farming community for many years. It was extensively harvested during the 1940s following the construction of the original surveyed access road through the forest and subsequently harvested selectively on a number of occasions up to the 1980s. It was treated during the 1940s. Poles, girders and veneer logs were cut in a light selective logging during 1993/4. Erosion mitigation structures were constructed on snig tracks and minor roads during the 1993/94 logging.

Upstream catchment water use

Production forestry - all but a small part of the upstream catchment is within Grange SF. The private property part of the catchment is forested and has been harvested on a number of occasions.

Downstream catchment water use

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

Domestic water use

The only domestic water supply drawn from the Clarence below the Table Creek junction is the Copmanhurst town supply. Table Creek would amount to only a fraction of a percent of the Clarence flow and would have no influence at all on the town supply. Copmanhurst is to transfer to the lower Clarence scheme, which sources its water higher up the Clarence catchment, during the next year or so.

(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 with 12 months. The tracks and minor roads utilised during the 1993/94 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.

Grange Road, which runs along the compartment's south-western boundary, is a fully designed road with concrete pipes in side-cuts and drainage lines, mitre drains on ridge tops and a consolidated gravelled pavement. This road is stable, with batters and drainage outlets well vegetated. It is regularly maintained.

About 1 km of minor roads give access to side ridges and dump sites in the compartment. Also a 0.1 km minor road in the compartment to the south, provides access to a log dump which will be used during this harvesting. These roads are stable, have cross-fall drainage on side-cuts, mitre drains on ridge-tops, with batters and drainage outlets well vegetated. The minor roads will be reopened for use during the proposed harvesting by lowering some crossfall banks constructed during the 1993/94 logging and removal of fallen timber and scrub regrowth. This will be done by the logging machinery and will cause minimal disturbance to the pavements. None of the existing roads are likely to cause significant water pollution.

Road construction

Short sections of some minor roads to dump sites will be straightened to improve alignment and drainage, and to decrease pollution potential. This will be done by the logging machinery and will cause minimal disturbance.

There will be no need to establish borrow pits or gravel pits.

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 a crawler tractor and/or an articulated 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. .

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

Cover factor

The harvesting operations described above result in a cover factor (in accordance with PCL Sch 3, 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 4, 6, 7, 8, 10, 11 and 12 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 utilise natural gravel, rock or flat grassy sites. Less than 5% of the snigging activity will be downhill. Areas are indicated on the Operational Map.

Post-harvest burning

In Compartment 352 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. Areas of 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 Nymboida District Fire Plan.

Post-harvest rehabilitation

Natural regeneration and natural re-seeding of overstory, understory and ground-cover species will provide ground cover rehabilitation. Roads, log dumps and major snig tracks and their associated batters and drainage structures normally stabilise within twelve months provided crossfall and cross bank drainage is properly installed. The extent of re-vegetation will be assessed during post-logging regeneration surveys.

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 Hazard Categories (SE/WPHC) for the net harvest area. Details are in Table 2 below, the topsoil data having given lower slopes for the categories.

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

R = 3000
K = 0.024 **Topsoil (A horizon)** Method B3
K = 0.021 **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)	WPH Category	Indicative % of Net Harvest Area
0 - <=6	1	60
>6 - <=28	2	40
>28 - <=30	3	N/A
Roads	3	N/A

The following factors for rainfall erosivity and soil erodibility also apply to road construction:
R = 3000 **K = 0.024**

(b) Dispersibility

%dispersible soil A horizon = **3.60**
%dispersible soil B horizon = **10.26**
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 352.

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.

No special attributes occur in the net harvest area.

Part 3 AUTHORISATION

3.1 COMPLIANCE

(a) Area Identification

GRAFTON DISTRICT
Grange State Forest No. 771
Compartment 352
Grafton Management Area

(b) Third Party/Lessee or Other Interest

The compartment is within the area of Occupation Permit No 13556 held by Albarine Pty Ltd 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 the Department of Land and Water Conservation (LaWC).
- the conditions of **Pollution 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 1967 (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**.
- 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 prepared.

(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 prior written approval of the EPA, other than those areas detailed in condition 5.1(c).

Variations and other specified approvals detailed in 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, extraction 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: .....

Title: Consulting Forester Date: 24th August 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: 18th September 1995

Signature: .....District Forester Date: 24th August 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 Type and Location maps marked and referenced to this Harvesting Plan. This is Harvesting Plan No. GG 95/01/351

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 95/01/352 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.

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 are 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 Areas.

Twelve dump sites have been located and marked in the compartment as indicated on the Operation Map. Dumps 2 - 7 and 9 - 12 have been designated as suitable for working when conditions are wet. Apart from meeting wet weather requirements, harvesting will commence on dump 1 and work progressively through to dump 12.

(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, 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, extraction tracks and 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]

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.

(b) Canopy Gaps

Tree marking for removal shall be carried out by the SFO. Tree marking shall aim at creating **gaps** with a maximum diameter of 70 metres over about 25% of the net harvest area. The location of these gaps shall be determined by the SFO in the field.

- Gaps shall not be located on slopes greater than 25 degrees.
- Gaps shall not intrude into protection or buffer strips.
- Logging debris shall be moved away from the edges of gaps, approximately 5 metres into the gap area.
- Some follow up felling of unmerchantable trees within gaps, using chainsaws, may be required.

No additional ground disturbance to that achieved by the logging is required to stimulate regeneration and promote its development in the compartment's forest types. No additional soil erosion or water pollution control measures, to those specified for the logging, are required in the gaps. Adequate wildlife habitat shall be retained in the **clusters** of undisturbed forest and in the selectively logged forest surrounding the gaps.

(c) Tree Marking

Tree marking within the gaps and clusters shall aim at:

Gaps

Removing all merchantable products with the intention of maximising the practical yield of log products with the highest economic end use.

Interstitial Areas

Retaining trees capable of net merchantable timber value increment for the 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.

Clusters

Retaining trees for wildlife habitat purposes.

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.

Reference Grafton Management Area Environmental Impact Statement

(d) Harvesting Debris

Harvesting debris within a gap shall be moved approximately 5 metres away from the edge of the gap.

Debris from the selective harvesting between canopy gaps 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 or stacked in small heaps on log dumps.

(e) 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 Wildlife Corridor, 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 rainforest areas on the compartment.

4.6 Fauna Protection

(a) Sightings of Fauna

No Schedule 12 species have been detected in Compartment 352. Schedule 12 species expected to occur in or in the vicinity of the compartment are;

Glossy Black Cockatoo	**Powerful Owl**	**Sooty Owl**
Masked Owl	**Stephen's Banded Snake**	**Pale-Headed Snake**
Spotted-tail Quoll	**Brush-tailed Phascogale**	**Yellow-bellied Glider**
Squirrel Glider	**Rufous Bettong**	**Red-legged Pademelon**
Common Planigale	**Koala**	**Long-nosed Potoroo**
Great Pipistrelle	**Golden-tipped Bat**	**Little Bent-wing Bat**
Common Bent-wing Bat	**Large-footed Mouse-eared 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 such species.

(b) Habitat Trees

Compartment 352 includes Dry Hardwood forest and Moist Hardwood forest with xeromorphic understorey and Moist Hardwood forest with mesic understorey. Sufficient potential habitat and recruitment habitat trees exist in the net harvest area to allow for the retention of enough trees to meet prescription requirements.

Prescription 1:

Habitat Tree Retention

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

Habitat tree retention in Moist Hardwood forests with a mesic understorey shall be six trees per hectare. For the purpose of this prescription a mesic 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 the size of canopy gaps required 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.

In gapping operations, logging debris shall be moved approximately 5 metres away from the edge of the gap.

(c) Non Harvest and Modified Harvest Areas

Wildlife corridor

A designated wildlife corridor exists along Table Creek, as shown on the Operational Map. The corridor is 40 metres wide on either side of the creek.

- no harvesting machinery shall enter the Wildlife Corridor.
- felling and snigging shall be excluded from the Wildlife Corridor.
- trees shall not be felled into the Wildlife Corridor.
- trees shall not be damaged in the Wildlife Corridor.

Riparian habitat zones

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

- except to use crossings no harvesting machinery shall 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 352 are stated below. The appropriate mitigation prescription shall be immediately applied when any of the listed animal 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* 1991. Given this, the prescription should only be seen as a guide for managing the habitat of CRW fauna.

Critical Weight Range species likely to occur in Compartment 352 are the Rufous Bettong, Red-legged Pademelon, Long-nose Potoroo and Spotted-tail Quoll.

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 Spotted-tail Quoll is defined as moist gullies, wet sclerophyll, rainforest and fallen logs with a diameter of greater than 40 cm. Critical habitat for Red-legged Pademelon is defined as moist gully vegetation and rainforest. 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

Harvesting operations shall avoid damage to Casuarina stands.

Prescription 4:

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 5:

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 6:

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 7:

Yellow-bellied Glider

Within 100 metres of identified V-notch scarred trees the following trees will be retained: known scared 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 8:

Squirrel Glider

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:

Koala

Trees with identifiable use by Koalas at the time of harvesting shall be retained. 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 Director General of the NPWS shall be informed.

Prescription 10:

Long-nosed Potoroo

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 11:

Golden-tipped 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:

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.

Prescription 13

Large-footed Mouse-eared Bat

100 metre radius buffer zones shall be established around each identified roost site and habitat area. 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 Hazard Categories

The calculated Soil Erosion and Water Pollution Hazard Categories for Compartment 352, based on topsoil data, are detailed in Table 4 below.

Table 4 - Water Pollution Hazard Categories

Slope Ranges (Degrees)	WPH Category
0 - <=6	1
>6 - <=28	2
>28 - <=30	3
Roads	3

(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 of roads, log dumps, snig tracks and crossings in the field will be in accordance with condition 4.2. Locations of roads and dumps are indicated on the Operational Map.

(d) Wet Weather Controls

Harvesting operations may be conducted throughout the year subject to the application of normal wet weather closure procedures as per Section 7 of the 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.

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 located along Grange Road, as marked on the Operational Map, are suitable to be worked during wet weather periods.

(e) Road Construction

No road construction is required for the harvesting. Short sections of existing minor roads to dump sites will be moved to improve locations.

Grade

The realigned minor roads must be within a maximum grade of 10°.

Survey

The centre lines of the short realignments of the minor roads to dump sites have been marked in the field. Clearing and earthworks must not deviate from the marked lines.

Clearing

Clearing width for minor road realignments must be minimal to fit the road formation.

Batters

Not applicable for this logging operation.

Road surface drainage

Rollover crossbanks may be required on some sections of minor roads 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 unconsolidated vertical height from spillway to bank top of 35 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.

Grange Road crosses a number of drainage lines utilising long established, stable structures. The roads giving access into the compartment do not cross any drainage features.

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 the subsoil will be exposed on the roads during the harvesting. If small sections of subsoil are exposed, top soil from the road, or imported gravel, shall 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) Slope limits for the area

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

(g) Drainage Feature Protection

A Wildlife Corridor exists 40 metres either side of Table Creek. Table Creek is a prescribed stream and is protected by the Wildlife Corridor.

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 shall be retained along all watercourses and drainage lines within the net harvest area of compartment 352 at minimum widths as stated in Table 5 below (note that SE/WP Category 3 (High) comes in at 29° and may not occur on the compartment).

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

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

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

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

The SFO shall mark Wildlife Corridors, Riparian Habitat Zones and filter strips in the compartment progressively ahead of harvesting operations

The licensee or contractor shall be responsible for measuring off-sets to a protection strip as indicated by the SFO to determine the boundary of the protection strip adjacent to the filter 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)

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

There shall be no felling in filter strips. Directional felling must be used to avoid felling of trees into filter strips.

Trees located in protection strips may be felled provided a minimum of 50% canopy cover is retained within the strip.

Trees which are marked for removal inside protection strips must only be felled if they can be directed out of the strip. Crowns of trees may be felled into protection strips.

Machinery must not enter filter or protection strips except to construct or use crossings.

Where trees are felled out of a protection strip or felled into a protection strip, logs must be extracted in the line of the log so as to minimise damage to vegetation and ground-cover.

Any furrows resulting from log removal from protection strips must be diverted at the edge of the strip by harvesting debris or earth.

(j) 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.

(k) Snig Tracks

It is preferable that wherever practicable walkover extraction techniques be used in preference to snig track construction.

Wherever practicable, snig tracks shall be located slightly off ridge-top to ensure free crossfall drainage. Side cut tracks must have crossfall drainage.

Snigging along roads must only occur in order to avoid snig track construction and where approved by the SFO. Effective road drainage must be re-instated by the 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 watercourse, 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 temporally suspended in accordance with Table 6.

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

Slope boundaries	WP Category	No. Days
0° - 6°	1	10
>6° - <=28°	2	8
>28° - <=30°	3	5

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

Table 7 - Maximum Earth Bank Spacing

Track Grade (degrees)	WP Category		
	1 (0° - <=6°)	2 (>6° - <=28°)	3 (>28° - <=30°)
0 - <=5	200m	150m	100m
>5 - <=10	150m	100m	60m
>10 - <=15		60m	40m
>15 - <=20		40m	25m
>20 - <=25		30m	20m
>25		25m	15m

The above spacing is the maximum and should be varied to utilise the most suitable outlet point. Crossbank construction, if required, must avoid exposing the dispersible subsoil horizon wherever practicable. Crossbanks must be discharged into undisturbed vegetation or logging debris.

(l) Downhill Snigging

Limited downhill snigging will be required to dumps 4, 6, 7, 8, 10, 11 and 12.

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

- Crossfall drainage must be used where practicable.
- Where practical 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 log dumps shall be located so as to direct water away from the dump immediately before reaching the dump.

(M) Snig Track Drainage Line Crossings

The drainage lines in the compartment only flow intermittently and were dry at the time of recent inspections. All snig track drainage line crossings shall 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 or to modify the channel or banks of the 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.

(n) 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 shall be spread over the track surface at the site and at the completion of the use of the track cut batters shall be seeded with rye grass at the rate of 20 Kg/ha.

(o) 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, topsoil must be stripped and stockpiled for subsequent respreading at the completion of operations.

Dumps shall be constructed with outfall drainage.

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 spread uniformly over the dump area which shall be left in a neat stable condition.

(p) Prescribed Burning

Pre-logging burning

The will be no pre-logging burning associated with the harvesting of Compartment 352.

Post-logging burning

Post-logging burning of Compartment 352 shall be carried out in accordance with provisions and specifications of the Nymboida District Fire Plan and the Grafton District Fuel Management Plan.

Objectives

Post-logging burning objectives for Compartment 352 are:

- to meet State Forests' obligations under the Bush Fires Act.

- to decrease fine fuel loads and generated 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 352.

4.9 Modified Harvest Conditions

(a) Special Emphasis Areas

Preferred Management Priority Classification: Special Emphasis Flora and Fauna Protection, Zone 1.1.7 Wildlife Corridor, 40 metres either side of the stream, exists along Table Creek, as indicated on the Operational Map.

- no harvesting machinery shall enter the Wildlife Corridor.
- felling and snigging shall be excluded from the Wildlife Corridor.
- trees shall not be felled into the Wildlife Corridor.
- trees shall not be damaged in the Wildlife Corridor.

(b) Riparian Habitat Zones

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

- no harvesting machinery shall 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.

(c) Boundary Fences

Private property joins the north, east and south boundaries of the eastern section of the compartment. These boundaries are fenced.

- Damage to these fences is to be avoided. 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 Utillsation 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 352

Estimated Yields are:

Compulsory Sawlogs 40 cm +	800m³ gross
Compulsory Sawlogs <40 cm	300m³ gross
Salvage Sawlogs	200m³ gross
Poles	20m³ gross
Veneer Logs	20m³ gross

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 scheduled 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)

Canopy gaps for regeneration

Canopy gaps for regeneration will be approximately 65 metres in diameter. Gaps shall not intrude into protection or buffer strips. Tree marking should aim at creating sufficient gaps to occupy approximately 25% of the net harvest area. (Also see Part 4.4 (b)

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 the Wildlife Corridor and Riparian Habitat Zones shall be marked ahead of harvesting operations.

(b) Soil Erosion and Water Pollution Control

Marking of filter strips and protection strips

Wildlife Corridor and 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 the wildlife corridor or riparian habitat zones. Hence, filter/protection strips shall only be marked in the field where they are not embedded in the wildlife corridor or riparian habitat zones.

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

The SFO is responsible for marketing filter 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 protection strip (See also Part 4.7 (h)).

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 (h)).

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 Tree Marking

Reports of sightings of any Schedule 12 fauna as required in Part 4.6 (a) must be made to the District Marketing Forester within 24 hours of the sighting being made. 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 situ.

- 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 crossings approaches are seeded in accordance with Part 4.7 (e).

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

If small sections of the 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/use in accordance with Part 4.7 (e) and (n).

Condition 5.4 Pre- and Post-logging Burning

(a) Pre-logging Burning

The will be no pre-logging burning associated with the harvesting of Compartment 352.

(b) Post-logging Burning

Post-logging burning of Compartment 352 will be carried out in accordance with provisions and specifications of the Nymboida 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 District Fuel Management Plan.

Condition 5.5 Other Instructions

There are no other instructions concerning the supervision of harvesting Compartment 352.

Condition 5.6 Supervising Forest Officer's Acknowledgment

I acknowledge that I have received a copy of Harvesting Plan No GG 95/01/352 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 (Section, Coupe) 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 "D" Granite

(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 = 3000 Derived from $R = 89.31 \times {}^{2}I_{12}{}^{1.74}$

K = 0.024 Topsoil (A Horizon)

Derived from Laboratory Analysis of the A Horizon
A horizon has been adopted as it gives lower slopes for the erosion classes.

S As factored in SOILOSS High
L = 10 metres
C = 0.45
Derived from 0.45 SEMGL standard

P = 1.0

Slope Rangers (Degrees)	Erosion Hazard Class	Where SEHR is	Indicative % of Net Harvest Area
<=7	Low	less than 40	60
>7 to <=30	Moderate	40 - 400	40
N/A	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.

(a) In areas of high erosion hazard, the grades of snig tracks and extraction tracks must not exceed 25°.

(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. C. RYAN Signature D.C. Ryan

Title Consulting Forester Date 24th August 1995

District Approval (by District Forester)

Signature .....
Date 24/8/95
Acting District Forester

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 calculate 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 (g) Map
7	Any major water storage?	No	2.5 12 (f)
8	Drainage depression buffer strips conditions	Yes	4.7 (g)
9.1 (c)	Filter strips on map?	Yes	Map
9.2	Protection strips on map?	Yes	Map
10	Prescriptions for marketing/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 (j)
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 (e)
51	Marking of roads in field	Yes	4.7 (e)
52	Minimising road clearing widths	Yes	4.7 (e)
53	Road side clearing	No	2.5 12 (h)

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

Condition Number	Condition Title/Enquiry	Entry Needed?	Plan Ref.
57	Borrow or gravel pits	No	2.5 12 (h)
60	Batter stabilisation measures	Yes	4.7 (e)
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 (e)
74	Condition to cover non-removal of spoil from drainage features	Yes	5.3 (c)
76	Condition to cover non-completion of crossing stabilisation within 5 days - roads	Yes	5.3 (c)
77	Techniques to leave crossing sites stable	Yes	4.7 (e)
78	Techniques for stabilisation of roads that are no longer required	Yes	4.7 (e)
79	Evaluation of old roads	Yes	2.5 12 (h)
80	Road construction in dispersible soils	Yes	4.7 (e)
81	Protection techniques for roads traversing dispersible soils	Yes	4.7 (e)
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 (m) 5.1 (c)
	Specification of snig track crossing locations, types and capacity	Yes	4.7 (m)
	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 (k)
92	Condition for snigging along roads	Yes	4.7 (k)
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 (k)
	-diversion into stable surfaces	Yes	4.7 (k)
	-minimise unchecked flow into drainage features	Yes	4.7 (k)
	-divert water at minimum damage to structure	Yes	4.7 (k)
103	Minimum specification for bank height	Yes	4.7 (k)
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 (k)
109	Specifications for preventing concentrated water flow where downhill snigging is specified	Yes	4.7 (l)
112	Protection techniques for snig tracks on dispersible soils	Yes	4.7 (n)
119	Specifications for log dump location and drainage	Yes	4.7 (o)
120	Use of traxcavators and wheeled loaders in relation to wet weather	No	
125	Post-logging burning conditions	Yes	4.7 (p)
	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	???

District: Grafton **Compartment(s):** 351, 352, 353, 354 **REPORT NUMBER:** VA1595A/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*	Permeability*	'K'#	per cent dispersible soil (D% x clay%)
351/1/A	Topsoil	D	2- 8	10(10)	13(13)	32(33)	42(44)	3	27	SCL	3	4	0.026	2.70
351/1/B	Subsoil	D	30-40	41(42)	7 (7)	24(25)	25(26)	3	60	LMC	3	5	0.023	24.60
351/2/A	Topsoil	C	1- 8	24(26)	29(32)	35(38)	4 (4)	8	23	CL	1	3	0.006	5.52
351/2/B	Subsoil	C	28-35	37(38)	34(35)	25(26)	1 (1)	3	31	LC	1	4	0.027	11.47
352/1/A	Topsoil	D	2- 7	10(10)	9 (9)	34(35)	44(46)	3	36	SCL	3	4	0.024	3.60
352/1/B	Subsoil	D	35-45	38(45)	6 (7)	17(20)	24(28)	15	27	LC	3	5	0.021	10.26
353/1/A	Topsoil	D	2- 5	10(11)	13(14)	40(42)	31(33)	6	29	SCL	2	3	0.022	2.90
353/1/B	Subsoil	D	45-55	12(14)	18(20)	25(28)	34(38)	11	64	SC	3	5	0.044	7.68
354/1/A	Topsoil	D	2- 7	10(10)	18(18)	45(46)	26(26)	1	29	SCL	3	4	0.034	2.90
354/1/B	Subsoil	D	40-45	36(38)	6 (6)	23(24)	30(32)	5	42	LMC	3	5	0.023	15.12
354/2/A	Topsoil	C	2-10	24(24)	26(26)	40(41)	9 (9)	1	17	SiCL	1	3	0.005	4.08
354/2/B	Subsoil	C	30-35	36(37)	31(32)	27(28)	3 (3)	3	36	LC	2	4	0.031	12.96

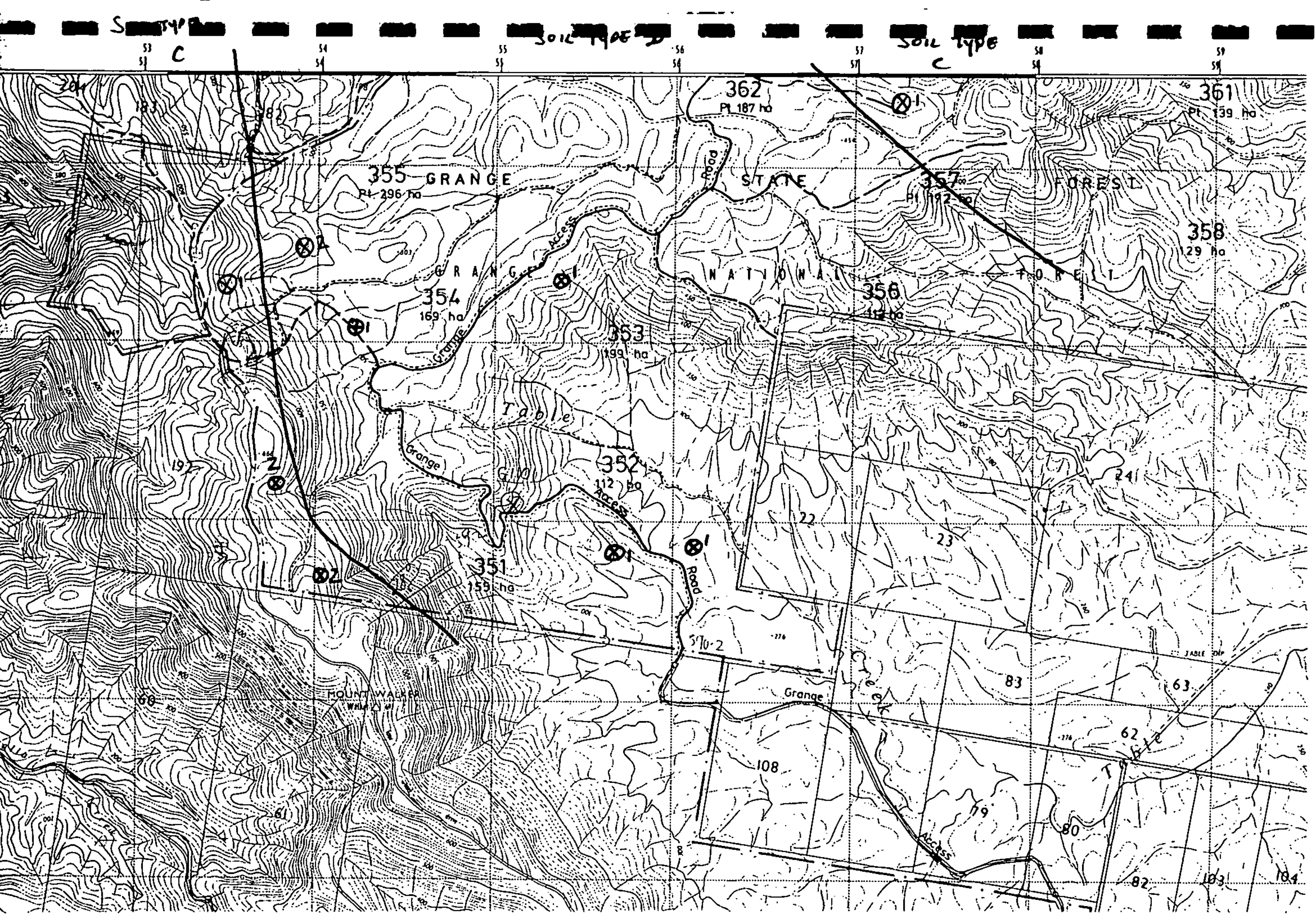
NOTES: PSA values are calculated inclusive of gravels. The values in brackets have been recalculated after excluding gravels
+ textures determined after Northcote (1979)
* structure and permeability classes are those to be used in SOILOSS
'K' value has been determined using SOILOSS version 5.1

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


SOIL TYPE
C
SOIL TYPE D
SOIL TYPE
C
355 GRANGE
Pt 296 ha
354
169 ha
353
199 ha
352
112 ha
351
155 ha
362
Pt 187 ha
361
Pt 139 ha
358
129 ha
356
STATE
FOREST
GRANGE NATIONAL FOREST
Table
Grange Access
Grange Access Road
Grange
Creek
Table
MOUNT WALKER
22
23
24
83
63
62
108
79
80
82
103
104
60
61
192
183
182
204

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EPA

Dr H Drielsma

Managing Director
State Forests of NSW
Locked Bag 23
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: 600000D1

Your Reference: FPB 70846

8 September 1995

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

WHEREAS -

(a) FORESTRY COMMISSION OF NSW trading as STATE FORESTS OF NSW is the holder of licence number 004017 in respect of premises situated on 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 varies the licence as set out below.

1. Insert 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 351
Grange State Forest No.771

Water Pollution Hazard Category:

Granite Soils

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than 6
2	Greater than or equal to 6 and less than or equal to 25
3	Greater than 25 and less than or equal to 30
4	Not applicable

Proportion of dispersible soils A horizon: 2.70%
Proportion of dispersible soils B horizon: 24.60%

Metasediment Soils

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than 6
2	Greater than or equal to 6 and less than or equal to 24
3	Greater than 24 and less than or equal to 30
4	Not applicable

Proportion of dispersible soils A horizon: 5.52%
Proportion of dispersible soils B horizon: 11.47%

Special Conditions:

Special conditions are those conditions in the harvesting plan for Compartment 351, Grange State Forest prepared by State Forests of NSW, and received by the EPA on 1 August 1995, as amended by addendum 1 received by the EPA on 6 September 1995.

Water Quality Monitoring Site:

Middle Brother State Forest

Date of licence variation:

8 September 1995."

2. Insert 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 352
Grange State Forest No.771

Water Pollution Hazard Category:

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 6
2	Greater than 6 and less than or equal to 28
3	Greater than 28 and less than or equal to 30
4	Not applicable

Proportion of dispersible soils A horizon: 3.60%
Proportion of dispersible soils B horizon: 10.26%

Special Conditions:

Special conditions are those conditions in the harvesting plan for Compartment 352, Grange State Forest prepared by State Forests of NSW, and received by the EPA on 1 August 1995, as amended by addendum 1 received by the EPA on 6 September 1995.

Water Quality Monitoring Site:

Middle Brother State Forest

Date of licence variation:

8 September 1995."

3. Insert 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 61
Nullum State Forest No.356

Water Pollution Hazard Category:

Nightcap Soil Landscape

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 3
2	Greater than 3 and less than or equal to 13
3	Greater than 13 and less than or equal to 30
4	Not applicable.

Proportion of dispersible soils A horizon: 6.9%
Proportion of dispersible soils B horizon: 5.1%

Minyon Soil Landscape

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 6
2	Greater than 6 and less than or equal to 30
3	Not applicable.
4	Not applicable.

Proportion of dispersible soils A horizon: 2.4%
Proportion of dispersible soils B horizon: 2.3%

Special Conditions:

Special conditions are those conditions in the harvesting plan for Compartment 61, Nullum State Forest prepared by State Forests of NSW, and received by the EPA on 29 August 1995, as amended by addendum 1 received by the EPA on 8 September 1995.

Water Quality Monitoring Site:

Middle Brother State Forest

Date of licence variation:

8 September 1995."

4. Insert 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 529
Wild Cattle Creek State Forest No. 488

Water Pollution Hazard Category:

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 1 (burning allowed).
2	Greater than 1 and less than or equal to 8 (burning allowed).
3	Greater than 8 and less than or equal to 22 (burning allowed). Greater than 22 and less than or equal to 30 (burning not allowed).
4	Not applicable.

Proportion of dispersible soils A horizon: 5.55% (soil sample 1), 3.96% (soil sample 2), 5.46% (soil sample 3)
Proportion of dispersible soils B horizon: 1.28% (soil sample 1), 5.40% (soil sample 2), 6.56% (soil sample 3)

Special Conditions:

Special conditions are those conditions in the harvesting plan for Compartment 529, Wild Cattle Creek State Forest, prepared by State Forests of NSW, and received by the EPA on 8 August 1995, as amended by:

- addendum 1 received by the EPA on 17 August 1995; and

-omitting the sections under the headings *"Ignition"* and *"Preferred season of burn"* on page 39, and inserting in their place the following statements:

"Burning must not be undertaken on slopes of greater than 22 degrees.

This must be achieved by restricting ignition to top disposal burning only in weather conditions that minimise running fire. Burning must be done by ground lighting of individual tree heads or heaps of harvesting slash and debris.

The SFO must be responsible for ignition, subject to the fire-safety and undertaken following requirements of approved compartment burning plans and the District Fuel Management Plan.

NOTE: The EPA's Waters and Catchments Branch in Bankstown must be notified within 7 days after the burn is lit. The EPA's regional office and Waters and Catchments Branch in Bankstown must be notified within 24 hours if the burn escapes onto slopes greater than 22 degrees, and the following steps must be undertaken to ensure rapid regeneration of the area:

On slopes greater than 22 degrees, burnt areas (other than drained snig tracks and roads) with less than 70% ground cover in terms of unburnt litter, retained vegetation or rock must be seeded with rye grass at the rate of 20 kg/ha or millet at the rate of 20 kg/ha (whether rye grass is used or millet is used will depend on the season) and fertiliser is to be applied at the rate recommended by the Soil Conservationist. This must be completed as soon as practicable after the burn.

Burning must only occur in the period April to October inclusive."

Water Quality Monitoring Site:

Orara East State Forest

Date of licence variation:

8 September 1995."

NEIL SHEPHERD
Director-General

Per.....
GEOFF NOONAN
Manager, Waters and Catchments Policy
(by Authorisation)

FOR ACTION / NOTING BY	
ORIGINATOR	4/9/95
1. A/MWCPP	JR 8/9/95
2. MWCP	8/9/95
3.	
4.	

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**	8 September 1995
Your Fax		**Our Fax**	(02) 980 7042
From	Kris Gounder Forest Planning Branch	**Phone**	(02) 980 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 08 September 1995 to include the following areas:

Compartments	Sate Forest	Management Area
351	Grange	Grafton
352	Grange	Grafton
61	Nullum	Murwillumbah
529	Wild Cattle Creek	Dorrigo

for A. HOWE
Manager
Forest Planning Branch

For State Forests Use Only (Page 1 of 9)

District Forester Grafton, Casino, Dorrigo

As required under the above legislation we advised EPA about our intention not to appeal against this Licence amendment **on 08 September 1995**. Accordingly you may start logging these compartments **on 10 September 1995**.

Manager, Forest Planning Branch

HARVEST PLAN DESK AUDIT CHECK LIST

Register No._____ Date Received ___/___/___

State Forest Grange Compartment/~~Age Class~~ 352
District Grafton Region Northern
Native Forest/~~Native Plantation/Softwood Plantation~~* Harvest/~~Thin~~*
* Delete inappropriate

WATER POLLUTION HAZARD CATEGORY (WPHC) AND PROPORTION DISPERSIBLE SOIL (PDS)

Factor	Provided		Relevant Method used		Comments
	Yes	No	Yes	No	
R	✓		✓		3000 p. 13.
K	✓		✓		0.024 p. 9.
S	✓		✓		Soiloss
L	✓		✓		20m
C	✓		✓		0. 108. p. 12
PDS	✓		✓		10.26% B. p. 9.

Sampling personnel named and approved Yes/~~No~~ Jim Venes.

CALCULATION OF WATER POLLUTION HAZARD CATEGORIES

1. Calculations provided Yes/~~No~~
2. Verified against Soiloss Yes/~~No~~
3. Appropriate WPHCs assigned ~~Yes~~/No
4. Slopes associated with WPHC provided Yes/~~No~~
5. % Cpt per WPHC provided Yes/~~No~~

Fill in the table below

Harvesting Plan

Category	Y/N	% Cpt	Slopes	Catchment Size
WPHC 1	✓	70	0-6.	—
WPHC 2	✓	25	over 6 -28	—
WPHC 3	✓	5	over 28 + roads.	—
WPHC 4	—	—	—	—

DRAFT

HARVEST PLAN DESK AUDIT CHECKLIST

Cond No.	Condition	Comply Yes/No	Comments
1 b	**Site specific conditions** Attach site specific conditions to HP		None
6	**Minimum protection widths for drainage in native forests** Any prescribed streams, swamps and wetlands present detailed	Yes	None P.1c.
7	Any major water storage present detailed	Yes	Non P.10.
9 1c	**Minimum protection widths** Show filter(F)strips on HP	Yes.	
9 2	Show protection(P) strips on HP	Yes.	
10	Prescriptions for marking F,P & B strips in field	Yes	P.18.
20	**Operation within Native Forest protection strips** Person responsible for identifying P strip in the field	Yes	P.26 Sta.
22	**Operation in Native Forest buffer strips** Person responsible for identifying B strips in the field	Yes	P.26 Contract.
24	Specification of techniques for minimising soil exposure and that any disturbance will no cause channelised flow in buffer strips	Yes	P.27.
25	**Minimum protection widths for drainge features in native plantations** as per 6 and 7	—	—
32	**Operations within Native Plantation Protection strips** as per 20	—	—
1	**Operations within Native Plantation buffer strips** as per 22 and 24	—	—

Variation = P.15.
Canopy Gaps.

34	**Minimum protection widths for drainage features in softwood plantations** as per 6 and 7	—	—
40	Operation in Softwwod Plantation Filter Strips Person responsible for determining 5 metre machinery exclusion zone in plantation F strip	—	—
46	Operations within Softwood Plantation buffer strips as per 22 and 24	—	—
47	**Road, design, construction and maintenance** Specify techniques for the road design, construction and maintenance that ensures that road surfaces, batters and drainage structures are stable in 12 months of construction for 1:10 year storm event.	Yes	P. 24. & 25.
48	Proposed road locations are shown on HP	Yes	Map.
49	**Maximum slopes for road construction** Specify techniques for road stabilisation within 6 months of construction for roads built on slopes > 30°	Yes	Max slope for road 15° No slopes > 30°. P. 10.
53	**Road Clearing** Specify techniques for clearing areas adjacent to roads with minimal disturbance to groundcover and topsoil and with 70 % groundcover attained in 12 months.	Yes	None P. 12
57	**Borrow pits and Gravel pits** Specify techniques for 1.construction of stable batters for gravel and borrow pits 2.stnbilising gravel and borrow pits at the completion of operations	Yes	None P. 12.
60	**Road Batters** Specify road batter stabilisation tecniques	Yes	Page 24. & 25.

* Web will respray of roads consist of. p. 11. Please confirm
* Resting depth. P. 24.

63	**Road drainage** Specify road drainage structures to be used and techiques for 1. conveying peak flow in 1:5 year event 2. diverting water onto stable surface 3. minimising unchecked flow of water from table drains directly to watercourses and drainage lines, snig tracks, extraction tracks and log dumps 4. discharging onto surfaces or structures which provide efficient sediment trapping	No	30m interval p 25 Sediment trap fences (p.25)
71	**Crossing of drainage features** Specify location and type of crossings at drainage features	No.	condition 80 p25 define "open causeway"
78	**Roads no longer required** Specify techniques to be used to stabilise roads that are no longer required	Yes	P. 25
81	**Dipersible Soil** Specify techniques used to protect roads and dispose of spoil that is dispersible	No.	Needs to be specified
89	**Snig Track construction** Specify criteria for ensuring that snig tracks are located and constructed where they can be drained effectively	Yes	P. 28
99	**Drainage of extraction tracks and snig tracks** Specify techniques to 1. convey peak flow in a 1:2 year storm event 2. divert water onto stable surfaces 3. minimise unchecked flow directly into watercourses, drainage lines, roads and log dumps 4.divert water at a velocity which minimises damage to the structure	Yes	P. 28.
109	Specify measures to prevent concentrated water flow where down hillsnigging occurs	No.	P. 28. Reword.
112	**Extraction tracks and snig tracks and dispersible Soils** Specify measures to protect dispersible soils if present	Yes	P. 29.

115	**Log dumps** Specify location of log dumps	Yes	Map
119	Specify techniques for 1.drainage of log dumps during and at completion of operations so that runoff is dispersed onto stable surfaces and not discharged directly into water courses etc 2. log dump being left in a stable condition at the completion of operations	Yes	P.29.
125	**Burning** Specify key and strategic and operational details including 1. objective of burn 2. method of ignition 3. preferred season of burn	Yes	P.29-30.

WATER POLLUTION HAZARD CATEGORIES

State Forest Grange

Compartment/~~Age Class~~ 352

WPHC	SLOPES (harvesting plan)	SLOPES (EPA derived)
1	0 - 6	0° - ≤ 6°
2	6 - 28	> 6° - ≤ 28°
3	> 28 + rocks	> 28° - ≤ 30° + rocks.
4	—	

6 = 9.2

28 = 49.

Representative Water Quality Monitoring Site Checklist

	Rep. Water Qual. Mon. Site	Compartment/ Age Class	Comments
Location	Chaelundi	Granger 352	
Geology	Sedimentary	Granite	No.
Harvesting Method	Selective	Selective	✓
Forest Type	Dry	Dry & wet	✓
Slope	gen 10-20°	gen <10°. (15% 10-20°)	✓

Other comments:

FAXED 1/8/95

Request for Additional Information on Harvesting Plan for Grange State Forest, Compartment 352.

1 August 1995

The EPA acknowledges the effort that has gone into producing this harvesting plan. A number of points, however, require clarification. It is not possible to approve the plan on the basis of the information provided, and the plan is accordingly rejected. A new updated plan will need to be submitted or amendments to the existing plan submitted, along with a request for the old plan to be reconsidered with the amendments.

The points requiring clarification are as follows:

- Description 2.5 (f) "Representative Water Monitoring Sites" - The EPA is unable to accept Chaelundi as the representative water quality monitoring site due to the different geology at the site. The EPA requests that an alternate site be nominated in the harvesting plan.

- Condition 12 (h) "Use of Existing Roads", The EPA requests confirmation that the drainage and stability of existing roads and crossing structures conforms to the pollution control licence conditions. In addition, the EPA requests further explanation of what reopening of existing roads will involve.

- The EPA requests that State Forests amend Conditions 3.1 (c), last sentence, and 3.1 (f), (page 15) to reflect that the conditions and requirements of the pollution control licence cannot be varied in the field without prior written approval of the EPA.

- Condition 4.4 (b), "Canopy Gaps", page 19 - The EPA considers that the canopy gapping conditions contain insufficient detail. In particular, the plan does not specify the following:

  - maximum slope limit;
  - maximum gap size;
  - the method of gap creation;
  - the maximum level of soil disturbance to be created in gaps;
  - soil erosion and water pollution control measures that may be required.

  The EPA requests that the harvesting plan be amended to include conditions which address these points.

- Condition 4.7 (d) "Wet Weather Controls", page 24 - The EPA requests that this section be amended to read:

  " 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:

  (i) where runoff occurs from a road surface, haulage must cease on natural surface roads;

  (ii) where runoff occurs from a snig track surface, snig tracks must not be

used;
(iii) where there is a likelihood of significant rutting leading to turbid runoff from a snig track surface, snig tracks must not be used.

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."

- Condition 4.7 (e), "Road Surface Drainage", page 25, states that "where required, rollover crossbanks will be spaced at 30 metre maximum intervals.". The EPA recognises that State Forests probably adopted this spacing as a worst case, to simplify the requirements for contractors. This spacing, however, will result in a much greater number of crossbanks on roads at the lower end of the slope range. It is suggested that crossbank spacing be reconsidered to avoid unnecessary soil disturbance.

- Condition 4.7 (e), "Road Surface Drainage", page 25 - The EPA requests further information regarding techniques to be used to prevent erosion of fill batters at cross bank outlets, particularly where longer batter lengths are involved. The sediment trap fences proposed to be installed will trap sediment at the bank outlet but unprotected fill batters below the outlet will still be vulnerable to erosion until revegetation has occurred.

- Condition 4.7 (e), "Crossing of Drainage Features", page 25 - The EPA requests a definition of "open causeway", including construction techniques.

- Condition 4.7 (e) "Road Construction" - The EPA requests that the type of non-dispersible surface to be used to protect the road surface, batters and table drains within 20m of crossings, and methods of depositing dispersible spoil, be specified in the harvesting plan (refer to conditions 80 and 81).

- Condition 4.7 (l), Downhill Snigging", page 28 - The EPA considers the wording under the second bullet point to be unclear, and suggests it be amended slightly to clarify the intent of the condition.

Thankyou

- Description 13 (a) "Soil Erosion and Water Pollution Hazard Categories", Table 1, page 13, Table 3, page 24, and Tables 5 and 6, page 28 - Cut-off slopes for the various Water Pollution Hazard Categories have been incorrectly stated. The EPA has calculated Water Pollution Hazard Categories as follows:

WPHC	SLOPE RANGE
1	0°- ≤ 6°
2	>3°- ≤ 28°
3	>28°- ≤ 30 ° (and roads)

This does not need to be formally adjusted by State Forests - the EPA can make the amendment to the harvesting plan using the notice to vary the licence.