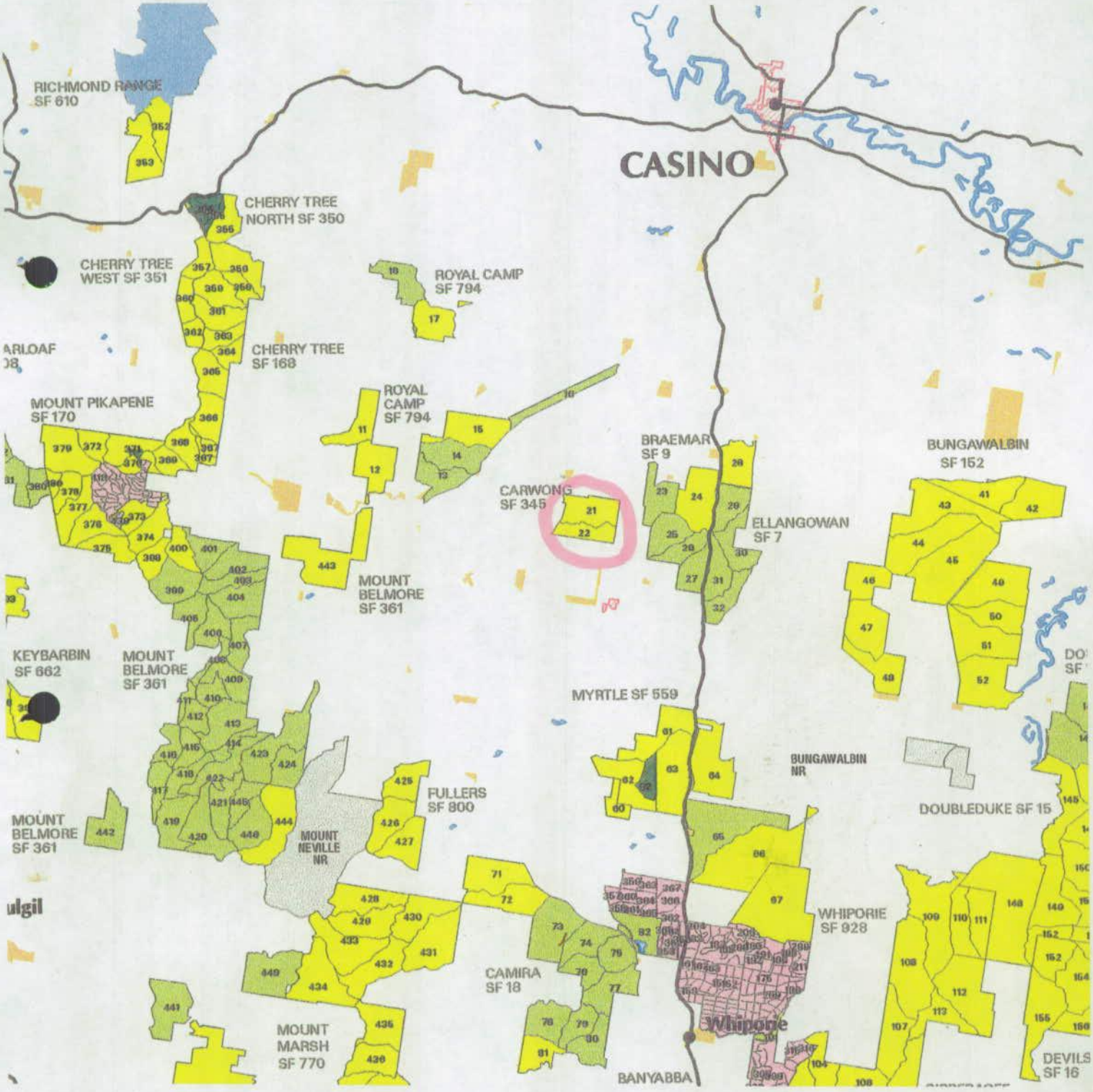
LOCALITY MAP

REGION : NORTHERN RIVERS
MA: CASINO
STATE FOREST: CARWONG No. 345
COMPARTMENT : 21 & 22



MAP REFERENCE : Iterim Forest Assessment Outcome

NORTH ⇑

SCALE 1 : 225,000 , (1 cm = 2500 metres)

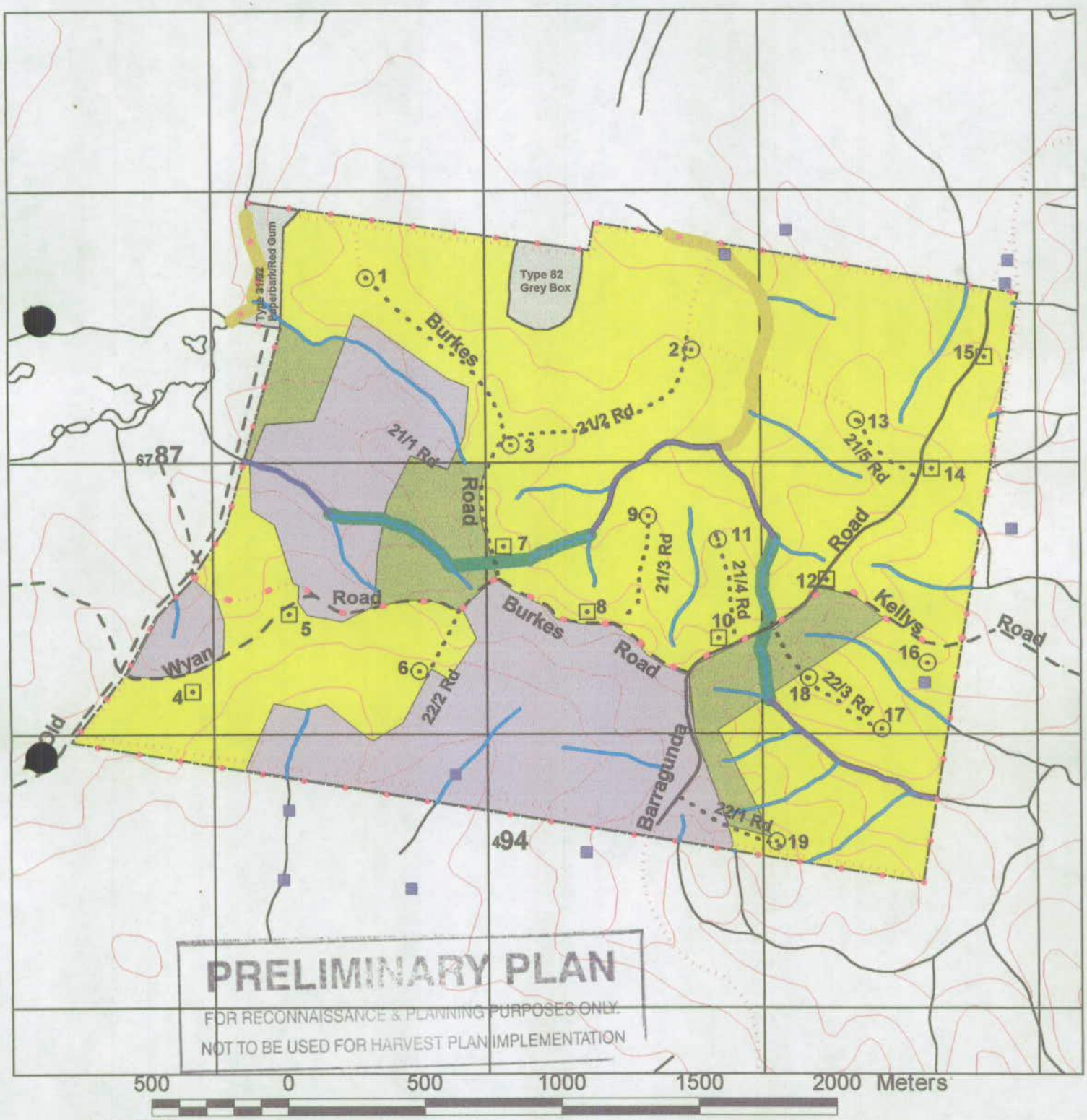
IDFA CPT.....YES..... ☐ Non IDFA CPT..... ☐

PRELIMINARY PLAN
FOR RECONNAISSANCE & PLANNING PURPOSES ONLY.
NOT TO BE USED FOR HARVEST PLAN IMPLEMENTATION

HARVEST PLAN OPERATIONAL MAP

COMPARTMENT 21 & 22
CARWONG STATE FOREST
RAPPVILLE-9439-I-N MAP SHEET
SCALE 1:20000 1/7/1998

STATE FORESTS



PRELIMINARY PLAN
FOR RECONNAISSANCE & PLANNING PURPOSES ONLY.
NOT TO BE USED FOR HARVEST PLAN IMPLEMENTATION

500 0 500 1000 1500 2000 Meters

BOUNDARIES
- State Forest Boundary
- Compartment Boundaries

ROADS
- Natural Surface
- Sealed or Gravelled
- Fire Trail - Road Closed
- Natural Surface - Reopen

NORMAL PRESCRIPTIONS
- Harvestable Area

NON HARVEST AREAS
- General
- Rare, Non-Commercial Forest Type Exclusion Zones
- Connection Corridor (40m Total Width)
- Koala High Use Exclusion Zone
- Eucalyptus glaucina Exclusion Zone

WATERCOURSES & DRAINAGE
- External Drainage
- 1st Order Stream - 15m Exclusion Either Side
- 2nd Order Stream - 20m Exclusion Either Side
- 3rd Order Stream - 40m Exclusion Either Side

FEATURES
- Dam

DUMP SITES OR LANDINGS
- Temporary Wet
- Temporary Dry

MN

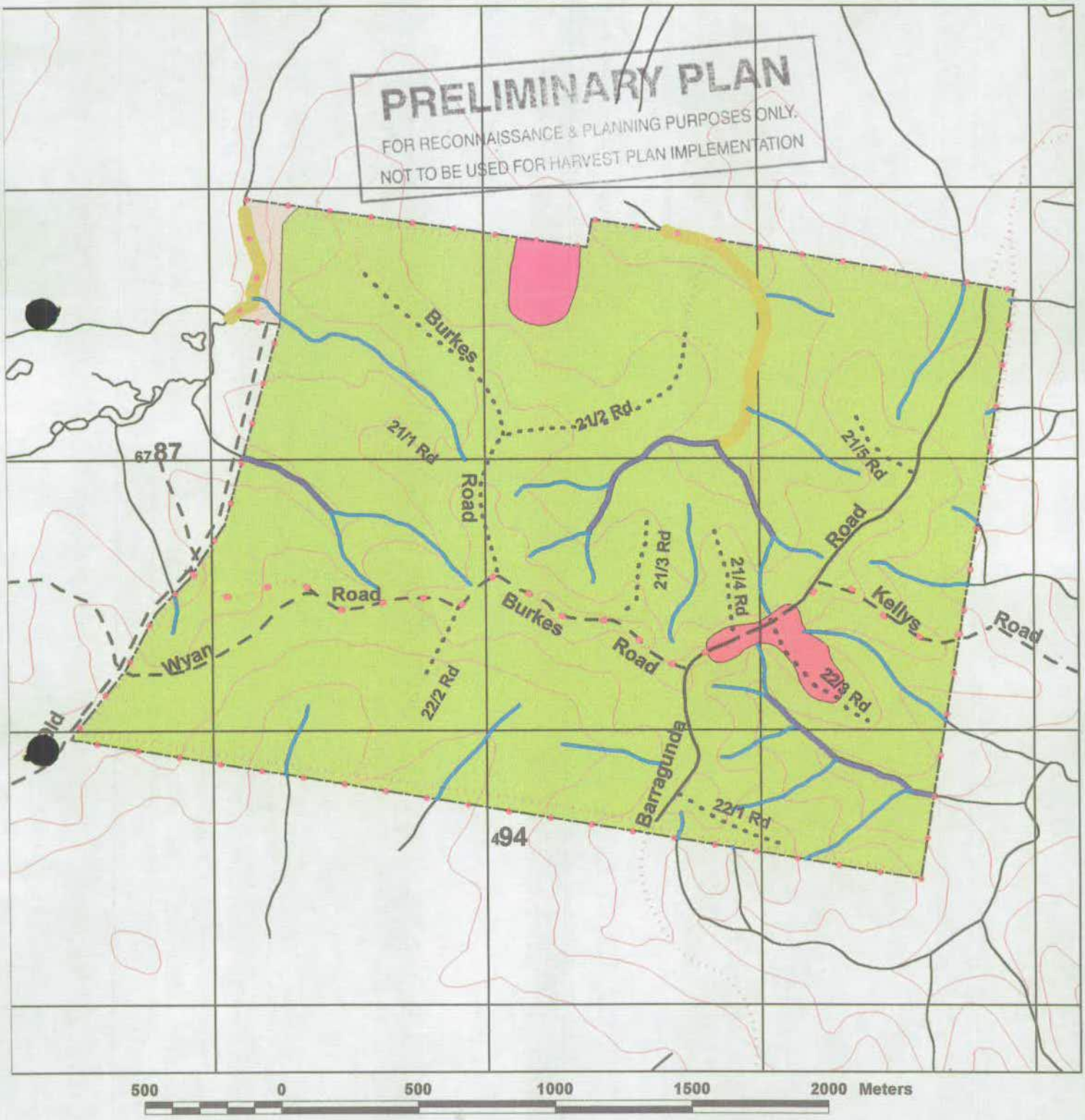
FOREST TYPES MAP

COMPARTMENT 21 & 22

CARWONG STATE FOREST

RAPPVILLE-9439-I-N MAP SHEET

SCALE 1:20,000



BOUNDARIES

Compartment Boundaries

FOREST TYPES

- Forest Type 65 - Forest Red Gum
- Forest Type 82 - Grey Box
- Forest Type 31/92 - Paperbark / (Forest Red Gum)
- Forest Type 70/72 - Spotted Gum / (Spotted Gum - Grey Box)

MN

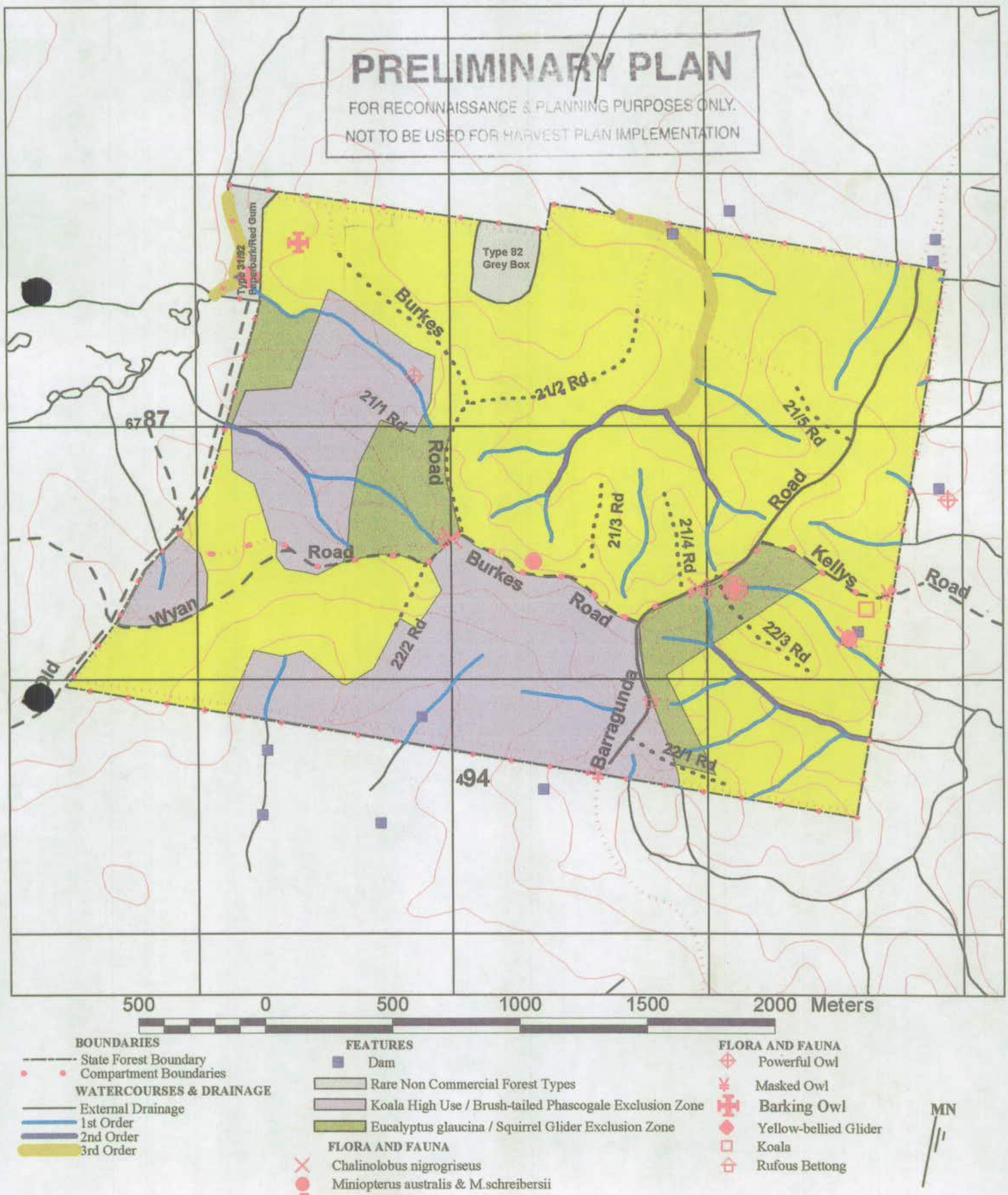
FLORA AND FAUNA DETECTION MAP

COMPARTMENT 21 & 22

CARWONG STATE FOREST

RAPPVILLE 9439-I-N MAP SHEET

SCALE 1:20000 23/7/1998



BOUNDARIES
- State Forest Boundary
- Compartment Boundaries

WATERCOURSES & DRAINAGE
- External Drainage
- 1st Order
- 2nd Order
- 3rd Order

FEATURES
- Dam
- Rare Non Commercial Forest Types
- Koala High Use / Brush-tailed Phascogale Exclusion Zone
- Eucalyptus glaucina / Squirrel Glider Exclusion Zone

FLORA AND FAUNA
- Chalinolobus nigrogriseus
- Miniopterus australis & M.schreibersii
- Squirrel Glider

FLORA AND FAUNA
- Powerful Owl
- Masked Owl
- Barking Owl
- Yellow-bellied Glider
- Koala
- Rufous Bettong

MN

STATE FORESTS OF NEW SOUTH WALES
NORTHERN RIVERS REGION
HARVESTING PLAN

1. AREA IDENTIFICATION

Region	**Northern Rivers**
Management Area	**Casino**
State Forest	**Carwong**
Compartment/s	**21 & 22**
Pricing area	**Casino Coastal**
Gross area	**600 ha**
Net area	**387 ha**
(Refer to Operational Map)	

2. DESCRIPTION OF PROPOSAL

A. Integrated harvesting of regrowth native forest:

1. Thin highly stocked regrowth stands from below.

B. Post harvesting burning and enrichment planting.

1. Post harvesting burning to reduce fine fuel loads and create suitable seedbeds may be carried out under prescribed conditions. A separate Burning Plan may be prepared.
2. Enrichment planting may be undertaken where required if resources are available, to achieve regeneration consistent with the existing forest types.

3. LEGAL CONDITIONS

Legislation relating to the operations on State Forests & Other Crown-timber Lands is detailed in Forest Practices Code, Part 2, Timber Harvesting In Native Forests (1995). In addition this operation must specifically comply with:

- Licence Conditions issued by State Forests under the Forestry Act (1916)
- Forest Practices Code, Part 2, Timber Harvesting In Native Forests (1995)
- Conditions For Use With Harvesting Plans Based on SEMGL (1993)
- Pollution Control Licence number 4017 issued by the Environmental Protection Authority
- NPWS Section 120 licence number TS006, Threatened Species Conservation Act (1995) and National Parks and Wildlife Act (1967)
- Regulatory and Public Information Committee Determinations (RaPIC).

4. SPECIAL REQUIREMENTS

There are no special requirements

5. FLORA AND FAUNA CONDITIONS

5.1 Pre-harvesting surveys

During the pre-harvest mark up the SFO must search for and record threatened species habitat features consistent with Prescription 10 of the NPWS s120 licence. This includes nest, den and roost sites, pellets and scats, latrine and den sites, crushed Oak cones, "v-notch" trees, skeletal remains, caves, tunnels and disused mineshafts and animal diggings.

5.2 Tree Retention

Regrowth Zone
Habitat trees: retain a minimum of 10 hollow bearing trees per 2 hectares where present.
Recruit trees: for each hollow bearing tree retained a recruitment tree must be retained.
(Prescription 1 of the NPWS Licence must apply)

Significant food resources: Stands dominated by Forest Oak should be protected from specified forestry activities, and Forest Oaks with more than 30 crushed cones beneath them must be retained. At least 4 mature (>40 cm dbh) winter-flowering eucalypt species per two hectares must be retained where they occur. Damage to mature banksias and grasstrees should be avoided during forestry operations. "V-notch" trees must be retained.

Felled heads must be flattened or removed from 5 metres of dead stags, retained habitat, recruit and food resource trees where safe to do so.

5.3 General non-harvest areas

Rare, Non-Commercial Forest Types: Harvesting must be excluded. (Prescription 35 of the NPWS Licence must apply).

Riparian buffers and Filter strips occur on all mapped drainage features. Trees must not be felled into or out of these areas, and machine access is prohibited except at authorised crossings. Where a tree is accidentally felled into these areas, then no part of that tree can be removed from the filter strip. (See also section 7.2 below.) (Prescription 3 of the NPWS s120 licence must apply)

Connection corridors Trees must not be felled into or out of these areas, and machine access is prohibited except at authorised crossings. (Prescription 4 of the NPWS s120 licence must apply)

No areas of **wetlands, heath, rocky outcrops, caves, tunneLs or disused mineshafts** have been found in the cpt. If any of these features are detected, prescriptions 5, 6, 7 and 8 of the NPWS s120 Licence must apply respectively.

5.4 Ground habitat protection

Reasonable measures should be taken to protect ground habitat during harvesting. (Prescription 11 of the NPWS s120 licence must apply).

5.5 Species-specific Threatened Fauna Prescriptions

Contractors and supervisory staff must immediately report any sightings of Schedule 1 and 2 species to the Regional Forest Planner, Northern Rivers Region. The Harvesting Plan must be amended to include additional prescriptions if necessary.

The following species have been recorded within or nearby the area and the associated prescriptions must be implemented:

Species	NPWS s120 licence prescription	Comment
Powerful Owl Masked Owl	13, 10	• Search gully lines and heads of gullies for roost and nest sites. • Apply 50m buffer around nest site, and 30m buffer around permanent roost site.
Squirrel Glider	15	
Yellow-bellied Glider	16, 10	• Search for "V" notch feed trees and retain all identified. • 15 additional feed trees retained within 100m radius of sap feed trees.
Threatened Frogs	18	• 10m exclusion buffer around all ponds and dams. (3 stripes)
Threatened Bats	19, 10	• Fruit bat roosting camps must be marked on HPOM. Micro bat roost trees to be inspected.
Chalinolobus nigrogriseus,	19(b), 10	• 50m buffer around roost sites harbouring more than 3 individuals. (3 stripes)
Koala	25a	• Search for scats when tree marking. • High Use Area – Exclusion of area. (3 stripes) No AGS in remaining cpt. 10 primary browse species retained per hectare in cpt. • No AGS in cpt. 10 primary browse species retained per hectare in cpt.

5.6 Species-specific Threatened Flora Prescriptions

Contractors and supervisory staff must immediately report any sightings of Schedule 1 and 2 species to the Regional Harvest Planner, Northern Rivers Region. The Harvesting Plan must be amended to include additional prescriptions if necessary.

The following species have been recorded within or nearby the area and the associated prescriptions must be implemented:

Species	NPWS s120 licence prescription	Comment
Eucalyptus glaucina	29	• 10m exclusion buffer around 50% of individuals. PLUS 10m modified harvesting with retention of >50% canopy.

6. SOILS AND WATER

6.1 Inherent Hazard category for each compartment

Two (2) for both compartments

6.2 Dispersible soil conditions

The soils in the compartments are significantly dispersible.

6.3 Slope limits

Maximum slope for harvesting	30 degrees
Maximum grade for snig track construction	25 degrees

6.4 Mass movement

No mass movement detected.

6.5 Seasonality

No seasonal constraints apply.

7. DRAINAGE FEATURES

7.1 Prescribed streams

There are no prescribed streams.

7.2 Drainage feature protection

The Operational map indicates the known mapped drainage features and protection feature widths. The minimum Filter Strip or Riparian Buffer width for each side of drainage features is described below (the widths include PCL and NPWS requirements).

	Inherent Hazard Level 2
Mapped stream order	Filter Strip or Riparian Buffer width each side of drainage feature (m)
Unmapped	10
First order	15
Second order	20
Third order (or greater)	40

Trees must not be felled into or out of Filter strips or Riparian Buffers, and machine access is prohibited except at authorised crossings. Where a tree is accidentally felled into a filter strip, then no part of that tree can be removed from the filter strip. Conditions 6-14, 18-21 of the Pollution Control Licence must apply (Filter strips).

5m wide buffer strips must be retained along all drainage depressions. Conditions 15,16, 37-39 of the Pollution Control Licence must apply (Buffer strips).

8. ROADS AND CROSSINGS

8.1 Road Construction

No road construction is required.

8.3 Crossing Construction

No crossing construction is required

8.4 Road Maintenance

Road maintenance details are contained in appendix 1.
Maintenance work to roads will be completed by a contractor prior to log haulage. Approval to undertake maintenance must be obtained from the SFO prior to commencement of each job.

Road drainage must be constructed at the time of road opening and must be maintained during the operation. All crossbanks on minor roads in the compartments must be reconstructed to allow safe movement of loaded log trucks and ensure effective road drainage is maintained.

8.5 Crossing maintenance

No crossing maintenance is required

8.6 Wet weather controls

Haulage is not permitted when there is runoff from the road surface. Loaded trucks and partially loaded trucks may complete their journey.

9. LOG DUMPS

9.1 Location

Field location of log dumps must utilise the most level site available, consistent with the location indicated on the Operational Map, and be as small as practicable.

9.2 Treatment

Inherent Hazard Level 2 Conditions 42, 43, 44, 46, 47, 49 of the PCL must apply (Log Dumps).

10. EXTRACTION TRACKS

10.1 Technique

It is preferable that, wherever practicable, walkover extraction techniques be used in preference to snig track construction. Conditions 54-57 of the Pollution Control Licence must apply (Snig tracks and extraction tracks)

10.2 Snig tracks

Snig tracks must be drained according to the maximum spacings below:

Track Grade (degrees)	Spacing
0 - ≤5	100m
>5 - ≤10	60m
>10 - ≤15	40m
>15 - ≤20	25m
>20 - ≤25	20m
>25	15m

Conditions 86-96 of the Pollution Control Licence must apply (Drainage of extraction tracks)

10.3 Drainage feature crossings

Temporary snig track drainage line crossings may be required on mapped or un-mapped drainage features.

All crossings must be temporary causeways and authorised by the SFO. Conditions 58-73, 82-84 of the PCL must apply (Snig tracks - crossings)

Due to the presence of dispersible subsoils Condition 85 of the Pollution Control Licence must apply (Dispersible soils - snig tracks).

10.4 Downhill snigging

No downhill snigging is required

10.5 Wet Weather

All snigging and extraction must cease when it is physically raining or water is running in extraction tracks or they are likely to be significantly rutted. Condition 97 of the Pollution Control Licence must apply (Wet weather-extraction tracks).

11. PRODUCT SPECIFICATIONS AND ACCOUNTING

All timber products must be graded and accounted for prior to their departure from the dump. The documents detailed in the table below specify the relevant procedures which must be followed:

Product Type	Grading Specifications
Sawlogs	Northern Rivers Region Compulsory Sawlog Specification (Hardwood Sawlog Flat Rate Royalty) Utilisation Standards.
Poles	Australian Standard AS2209 - 1979
Girders	Specifications for Girders - Northern Region.
Veneer Logs	Specification for Eucalypt Veneer Logs for Rotary Peeling.

12. YIELD ESTIMATES

Compulsory sawlogs Thinnings logs Salvage sawlogs Poles TOTAL	2 – 10 m^3/ha	1385m^3 500m^3 1000m^3 100m^3 2985m^3

13. CERTIFICATION

Plan Preparation
Prepared by:

Signature: _____ Date: 28/7/98.
Position: FOREST PLANNER

Interim Regional Approval
Endorsed by:

Signature: Karel Zgavlik Date: 28-7-98
Position: REGIONAL FOREST PLANNER

Approved by:

Signature: _____ Date: _____
Position: REGIONAL MANAGER

Receipt of external authority approvals

Name of Authority	Date Received	Incorporated in to Plan by
RaPIC		
NPWS		
HAB		

Final Regional Approval

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.

Signature: _____ Date: _____
Position: REGIONAL MANAGER

14. SFO ACKNOWLEDGEMENT (SFO Plan copy)

I acknowledge that I have received a copy of the Harvesting Plan for Compartments 21 & 22 Carwong State Forest 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 Forest Planner or his/her delegate.

Signature: _____ Date: _____
Position: Supervising Forest Officer

Signature: _____ Date: _____
Position: Relieving Supervising Forest Officer

15. HARVESTING CONTRACTOR ACKNOWLEDGEMENT (SFO Plan copy)

I acknowledge that I have received a copy of the Harvesting Plan for Compartments 21 & 22 Carwong State Forest and that I understand the conditions of the Plan as explained to me by a State Forests officer.

Signature: _____

Licence No: _____

Date: _____

Position: _____
Principle Contractor/Other (explain)

Appendix 1 - Roading Plan

Existing roads – assessment based on expected use during logging

Road Name	Barragunda
Months of exclusion	Nil
Road traverses zones of mass movement risk?	No
Road traverses dispersible regolith type?	Yes
Type of road maintenance	Reinstate Drainage, Grade in patches where pavement deforming.
Max width of ground clearing either side of prism (see question below table if > 3 metres)	3m
Work to batter is necessary?	No
Location and/or techniques for either the placement or disposal of any spoil material	Incorporate into road surface.
Recommended soil stabilisation techniques of disturbed areas to encourage groundcover	Seeding
Any other recommended soil erosion techniques	No
Are new drainage structures required?	Yes
- recommended type of new drainage structures	Mitre drains
Recommended sediment control techniques for drainage structure outlets (see cond 11 sch5 PCL)	Vegetation
New drop down structures are necessary?	No
New dissipaters necessary at base of drop down	No
Future plans for the road?	Retain

Road Name	Kellys Road
Months of exclusion	Nil
Road traverses zones of mass movement risk?	No
Road traverses dispersible regolith type?	Yes
Type of road maintenance	Grade and Drain
Max width of ground clearing either side of prism (see question below table if > 3 metres)	2m
Work to batter is necessary?	No
Location and/or techniques for either the placement or disposal of any spoil material	Incorporate into road surface
Recommended soil stabilisation techniques of disturbed areas to encourage groundcover	Seeding
Any other recommended soil erosion techniques	No
Are new drainage structures required?	Yes
- recommended type of new drainage structures	Mitre drains
Recommended sediment control techniques for drainage structure outlets (see cond 11 sch5 PCL)	Vegetation
New drop down structures are necessary?	No
New dissipaters necessary at base of drop down	No
Future plans for the road?	Retain

DRAFT

Road Name	Burkes
Months of exclusion	No
Road traverses zones of mass movement risk?	No
Road traverses dispersible regolith type?	Yes
Type of road maintenance	Grade and drain
Max width of ground clearing either side of prism (see question below table if > 3 metres)	3m
Work to batter is necessary?	No
Location and/or techniques for either the placement or disposal of any spoil material	Incorporate into road surface.
Recommended soil stabilisation techniques of disturbed areas to encourage groundcover	Seeding
Any other recommended soil erosion techniques	No
Are new drainage structures required?	Yes
- recommended type of new drainage structures	Mitre drains
Recommended sediment control techniques for drainage structure outlets (see cond 11 sch5 PCL)	Vegetation
New drop down structures are necessary?	No
New dissipaters necessary at base of drop down	No
Future plans for the road?	Close

Road Name	Wyan Road
Months of exclusion	Nil
Road traverses zones of mass movement risk?	No
Road traverses dispersible regolith type?	Yes
Type of road maintenance	Grade and drain
Max width of ground clearing either side of prism (see question below table if > 3 metres)	3m
Work to batter is necessary?	No
Location and/or techniques for either the placement or disposal of any spoil material	Incorporate into road surface.
Recommended soil stabilisation techniques of disturbed areas to encourage groundcover	Seeding
Any other recommended soil erosion techniques	No
Are new drainage structures required?	Yes
- recommended type of new drainage structures	Mitre drains, outfall
Recommended sediment control techniques for drainage structure outlets (see cond 11 sch5 PCL)	Vegetation
New drop down structures are necessary?	No
New dissipaters necessary at base of drop down	No
Future plans for the road?	Retain

Road Name	22/1 Road
Months of exclusion	Nil
Road traverses zones of mass movement risk?	No
Road traverses dispersible regolith type?	Yes
Type of road maintenance	Grade, drain and reopen.
Max width of ground clearing either side of prism (see question below table if > 3 metres)	2m
Work to batter is necessary?	No
Location and/or techniques for either the placement or disposal of any spoil material	Incorporate into road surface
Recommended soil stabilisation techniques of disturbed areas to encourage groundcover	Seeding
Any other recommended soil erosion techniques	No
Are new drainage structures required?	Yes
- recommended type of new drainage structures	Mitre drains
Recommended sediment control techniques for drainage structure outlets (see cond 11 sch5 PCL)	Vegetation
New drop down structures are necessary?	No
New dissipaters necessary at base of drop down	No
Future plans for the road?	Close

Road Name	22/2 Road
Months of exclusion	Nil
Road traverses zones of mass movement risk?	No
Road traverses dispersible regolith type?	Yes
Type of road maintenance	Grade and drain.
Max width of ground clearing either side of prism (see question below table if > 3 metres)	2m
Work to batter is necessary?	No
Location and/or techniques for either the placement or disposal of any spoil material	Incorporate into road surface.
Recommended soil stabilisation techniques of disturbed areas to encourage groundcover	Seeding
Any other recommended soil erosion techniques	No
Are new drainage structures required?	Yes
- recommended type of new drainage structures	Mitre drains
Recommended sediment control techniques for drainage structure outlets (see cond 11 sch5 PCL)	Vegetation
New drop down structures are necessary?	No
New dissipaters necessary at base of drop down	No
Future plans for the road?	Close

DRAFT

Road Name	22/3 Road
Months of exclusion	Nil
Road traverses zones of mass movement risk?	No
Road traverses dispersible regolith type?	Yes
Type of road maintenance	Grade, drain and reopen
Max width of ground clearing either side of prism (see question below table if > 3 metres)	2m
Work to batter is necessary?	No
- form of batter work	
- extent of batter work	
- location of batter work	
Location and/or techniques for either the placement or disposal of any spoil material	Incorporate into road
Recommended soil stabilisation techniques of disturbed areas to encourage groundcover	Seeding
Any other recommended soil erosion techniques	No
Are new drainage structures required?	Yes
- recommended type of new drainage structures	Mitre drains
Recommended sediment control techniques for drainage structure outlets (see cond 11 sch5 PCL)	Vegetation
New drop down structures are necessary?	No
- recommended type of new drop down structures	
New dissipaters necessary at base of drop down	No
- recommended type of new dissipaters	
Future plans for the road?	Close

Road Name	21/2 Road
Months of exclusion	Nil
Road traverses zones of mass movement risk?	No
Road traverses dispersible regolith type?	No
Type of road maintenance	Grade and drain, clear off debris.
Max width of ground clearing either side of prism (see question below table if > 3 metres)	2m
Work to batter is necessary?	No
Location and/or techniques for either the placement or disposal of any spoil material	Incorporate into road surface.
Recommended soil stabilisation techniques of disturbed areas to encourage groundcover	Seeding
Any other recommended soil erosion techniques	No
Are new drainage structures required?	Yes
- recommended type of new drainage structures	Mitre drains
Recommended sediment control techniques for drainage structure outlets (see cond 11 sch5 PCL)	Vegetation
New drop down structures are necessary?	No
New dissipaters necessary at base of drop down	No
Future plans for the road?	Close

Road Name	21/3 Road
Months of exclusion	Nil
Road traverses zones of mass movement risk?	No
Road traverses dispersible regolith type?	Yes
Type of road maintenance	Grade and drain. Reopen
Max width of ground clearing either side of prism (see question below table if > 3 metres)	2m
Work to batter is necessary?	No
Location and/or techniques for either the placement or disposal of any spoil material	Incorporate into road surface.
Recommended soil stabilisation techniques of disturbed areas to encourage groundcover	Seeding
Any other recommended soil erosion techniques	No
Are new drainage structures required?	Yes
- recommended type of new drainage structures	Mitre drains, Outfall
Recommended sediment control techniques for drainage structure outlets (see cond 11 sch5 PCL)	Vegetation
New drop down structures are necessary?	No
New dissipaters necessary at base of drop down	No
Future plans for the road?	Close

Road Name	21/4 Road
Months of exclusion	Nil
Road traverses zones of mass movement risk?	No
Road traverses dispersible regolith type?	Yes
Type of road maintenance	Grade, drain and reopen.
Max width of ground clearing either side of prism (see question below table if > 3 metres)	2m
Work to batter is necessary?	No
Location and/or techniques for either the placement or disposal of any spoil material	Incorporate into road surface
Recommended soil stabilisation techniques of disturbed areas to encourage groundcover	Seeding
Any other recommended soil erosion techniques	No
Are new drainage structures required?	Yes
- recommended type of new drainage structures	Mitre drains
Recommended sediment control techniques for drainage structure outlets (see cond 11 sch5 PCL)	Vegetation
New drop down structures are necessary?	No
New dissipaters necessary at base of drop down	No
Future plans for the road?	Close

Road Name	21/5 Road
Months of exclusion	Nil
Road traverses zones of mass movement risk?	No
Road traverses dispersible regolith type?	Yes
Type of road maintenance	Grade, drain and reopen.
Max width of ground clearing either side of prism (see question below table if > 3 metres)	2m
Work to batter is necessary?	No
Location and/or techniques for either the placement or disposal of any spoil material	Incorporate into road surface.
Recommended soil stabilisation techniques of disturbed areas to encourage groundcover	Seeding
Any other recommended soil erosion techniques	No
Are new drainage structures required?	Yes
- recommended type of new drainage structures	Mitre drains
Recommended sediment control techniques for drainage structure outlets (see cond 11 sch5 PCL)	Vegetation
New drop down structures are necessary?	No
New dissipaters necessary at base of drop down	No
Future plans for the road?	Close

Where clearing is proposed to exceed 3 metres either side of the road prism, the following techniques are proposed [please tick the most appropriate technique(s) for this road operation]:

- ☐ Retaining at least 70% ground cover within the cleared area;
- ☐ Retaining or respreading slash and logging debris over at least 70% of the cleared area;
- ☐ Retaining or respreading a minimum of 5 centimetres of topsoil, sown with appropriate grasses in order to achieve 70% ground cover over the cleared area;
- ☐ Providing artificial ground cover, in order to achieve 70% ground cover within the cleared area, using geotextile, mulch or erosion control mats.

Construction of new drainage feature crossings NIL

Borrow pits and gravel pits

Borrow pits exist or proposed within the compartment? No

Gravel pits exist or proposed within the compartment? No

Work required

Existing Roads

- Before the use of the roads for harvesting commences scattered fallen timber, shrub regrowth and litter must be cleared from the pavements and in places cut by hand off cut batters of about $$$ km of minor roads in the compartments. The debris must be swept off the road shoulders, while retaining ground cover, onto lower edge, with minimal disturbance to batters. Debris must not be pushed into filter strips.
- Before the use of the roads for harvesting commences rilled pavement sections must be reformed by routine maintenance grading or the logging tractor.
- Spreading of imported gravel and/or grading may be required on limited sections of roads to maintain the pavement during the proposed harvesting.

Road surface drainage

- Rollover crossbanks may be required on some sections of the roads where outfall drainage has not been established and concentrated water flow is likely to exceed the distances of Table 1 below.
- Where required, crossbanks must be located, constructed and maintained in such a way that they will:

a) must have a minimum design consolidated vertical height from spillway to bank top of 25 cm; and

b) minimise the unchecked flow of water from the road onto extraction tracks, snig tracks or log dumps, by constructing a drain that reduces the catchment area onto the site; and

c) not discharge water from table drains directly into watercourses, drainage lines, wetlands or swamps, by draining the road at the first opportunity from the drainage feature and at least within the spacings of Table 1

d) divert water onto stable surfaces capable of handling concentrated water flow and which provide for efficient sediment trapping by using one of the following techniques, or combinations thereof:

1) diverting flow onto undisturbed vegetation;

2) diverting flow onto slash and logging debris;

3) installing natural or artificial sediment barriers below drainage structures.

Table 1: **Maximum distance of water flow or potential water flow along road surfaces and table drains (metres).**

Road grade (degrees)	Maximum Distance (metres)
1	200
2	175
3	150
4	125
5	100
6	90
7	80
8	70
9	65
10	60
11	55
12	50
13	45
14	40
15	40

- Where water diverted by a drainage structure discharges onto a batter greater than one metre in height, a jute mesh drop down structure and rock dissipater must be used.
- Where required, drop down structures of jute mesh matting must be placed and secured into dished out, smoothed and seeded fill surface.
- Dissipaters consisting of rock must be placed at the foot of drop down structures and locked together so as they will not be shifted by high water flow.
- Rollover banks must be retained in situ after the roads have been closed.
- The SFO must ensure that road drainage is consistent with Table 1.

Crossing of drainage features

- There are $$$ long established causeways on 4x4 trails in the compartments. Harvesting traffic must not use these causeways. The approaches to these causeways are well grassed and should not be disturbed.
- Imported rock must be placed on the causeways if the pavement commences to deform during the supervision of the harvesting and any disturbed areas adjacent to the causeways must be seeded with rye grass, or Japanese Millet, depending on season, within five days by the SFO at the rate of 20 Kg/ha.

Revegetation and rehabilitation

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

Dispersible soils

The soils in the compartments are significantly dispersible. It is not anticipated that significantly dispersible subsoil will be exposed on roads during the harvesting. If small sections of significantly dispersible subsoil are exposed, topsoil from the road, or imported gravel must be spread over the road surface at the site and germination matting spread over any cut and fill batters.