HARVESTING PLAN
for
NORTHERN RIVERS REGION
CASINO MANAGEMENT AREA
EWINGAR STATE FOREST
COMPARTMENTS 604-608
HARVESTING PLAN NUMBER
CAS604-608

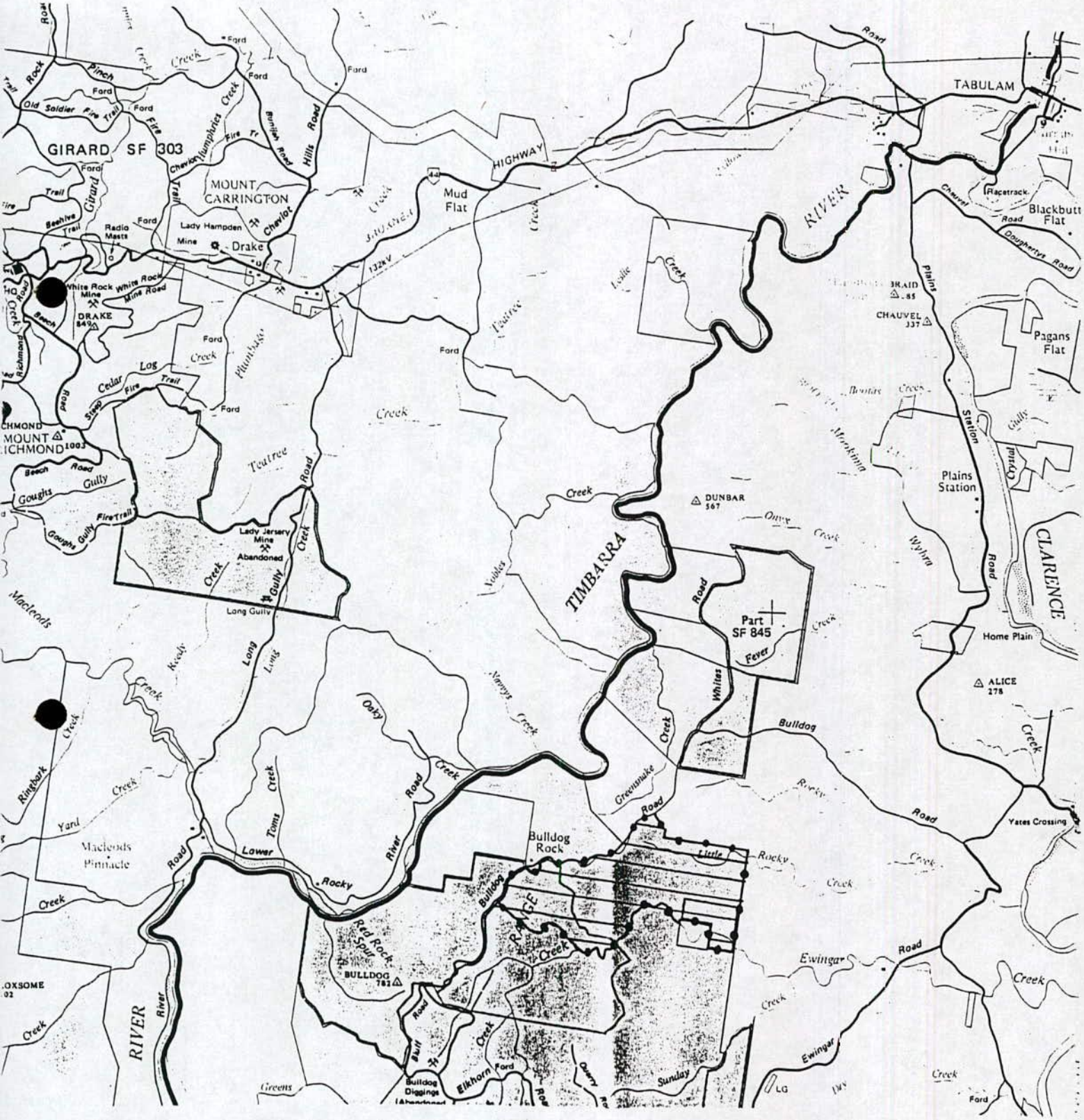
Harvesting Plan No CAS 604-608
EWINGAR STATE FOREST No. 845
COMPARTMENTS 604, 605, 606, 607 and 608
HARDWOOD DIVISION - NORTHERN RIVERS REGION

Contents

LOCALITY MAP

Compartments 604-608 Ewingar SF

Scale 1: 125 000



NORTERN RIVERS REGION - CASINO MANAGEMNET AREA

HARVEST PLAN OPERATIONAL MAP

COMPARTMENTS 604-608

EWINGAR STATE FOREST

BULLDOG ROCK MAP SHEET

HARVEST PLAN NUMBER CAS604-608

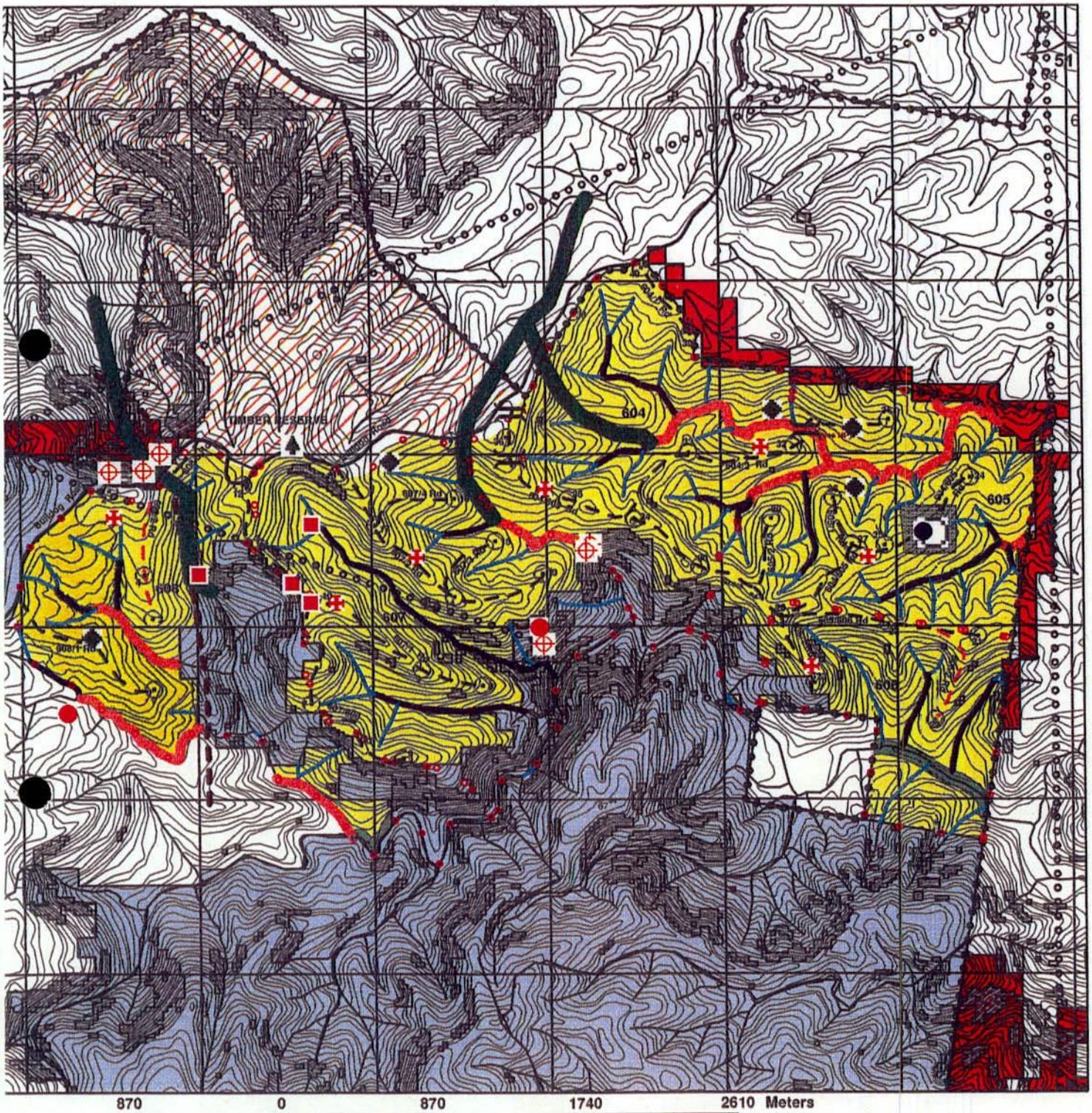
SCALE 1:32 000, DATE 28/01/98, V2

PRELIMINARY PLAN

FOR RECONNAISSANCE & PLANNING PURPOSES ONLY

NOT TO BE USED FOR HARVEST PLAN IMPLEMENTATION

STATE FORESTS



BOUNDARIES
- State Forest Boundary
- Compartment Boundaries

ROADS
- Natural Surface
- Sealed or Gravelled
- Four Wheel Drive
- Proposed Rd

NORMAL PRESCRIPTIONS
- Harvestable Area

NON HARVEST AREAS
- Flora and Fauna Protect
- Connection Corridor (80m)
- Slopes likely over 30 degrees
- Fauna Protection (Owl Habitat)
- Fauna Protection (Squirrel Glider Protection 8ha)
- Old Growth

DRAINAGE
- External Drainage
- 1st Order Stream (10m buffer)
- 2nd Order Stream (20m buffer)
- 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES
- Temporary Dry
- Temporary Wet
- Soil Sample
- Soil Boundary
- Approved Crossings

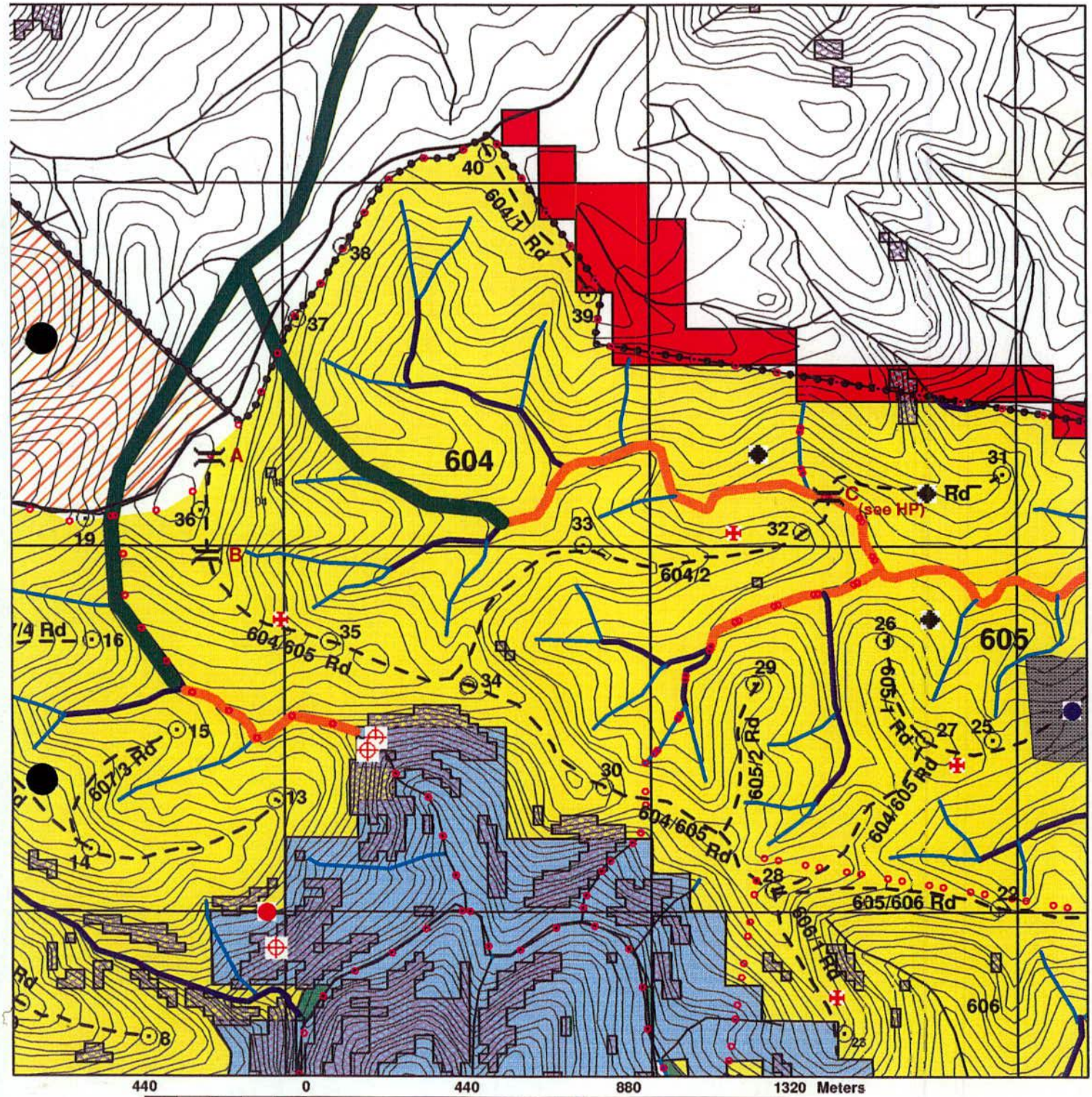
RECORDED SPECIES
- Sooty Owl
- Masked Owl
- V-notch Tree
- Squirrel Glider
- Squirrel Glider
- Glossy Black Cockatoo
- Masked Owl Nest Site

MN

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

NORTERN RIVERS REGION - CASINO MANAGEMNET AREA
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 604
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:15000, DATE 28/01/98, V2

STATE FORESTS



BOUNDARIES
- State Forest Boundary
- Compartment Boundaries

ROADS
- Natural Surface
- Sealed or Gravelled
- Four Wheel Drive
- Proposed Rd

NORMAL PRESCRIPTIONS
- Harvestable Area

NON HARVEST AREAS
- Flora and Fauna Protect
- Connection Corridor (80m)
- Slopes likely over 30 degrees
- Fauna Protection (Owl Habitat)
- Fauna Protection (Squirrel Glider Protection 8ha)
- Old Growth

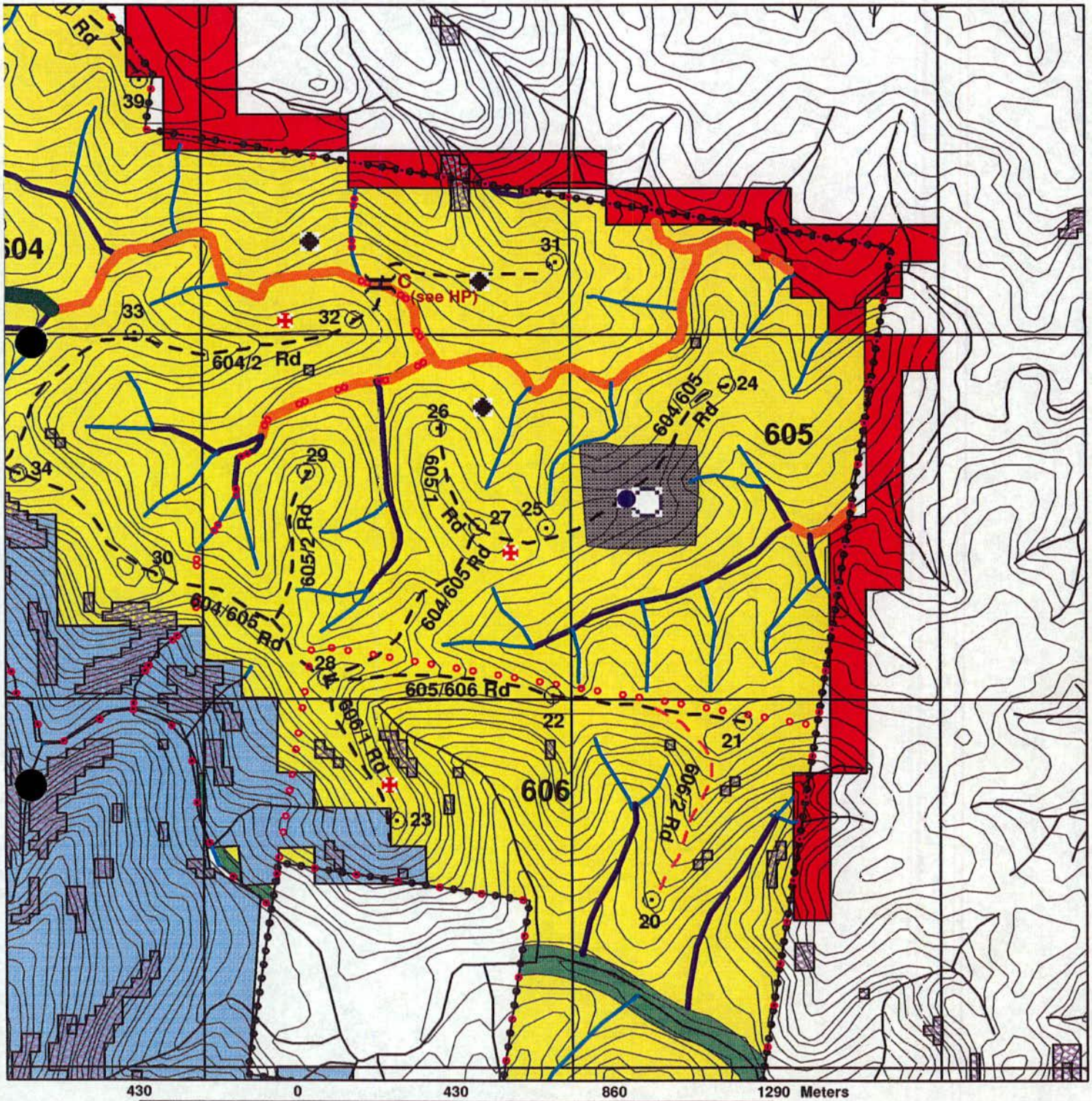
DRAINAGE
- External Drainage
- 1st Order Stream (10m buffer)
- 2nd Order Stream (20m buffer)
- 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES
- Temporary Dry
- Temporary Wet
- Soil Sample
- Soil Boundary
- Approved Crossings

RECORDED SPECIES
- Sooty Owl
- Masked Owl
- V-notch Tree
- Squirrel Glider
- Squirrel Glider
- Glossy Black Cockatoo
- Masked Owl Nest Site

MN

NORTERN RIVERS REGION - CASINO MANAGEMNET AREA
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 605
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:15000, DATE 28/01/98, V2



BOUNDARIES
- State Forest Boundary
- Compartment Boundaries

ROADS
- Natural Surface
- Sealed or Gravelled
- Four Wheel Drive
- Proposed Rd

NORMAL PRESCRIPTIONS
- Harvestable Area

NON HARVEST AREAS
- Flora and Fauna Protect
- Connection Corridor (80m)
- Slopes likely over 30 degrees
- Fauna Protection (Owl Habitat)
- Fauna Protection (Squirrel Glider Protection 8ha)
- Old Growth

DRAINAGE
- External Drainage
- 1st Order Stream (10m buffer)
- 2nd Order Stream (20m buffer)
- 3rd Order Stream (40m buffer)

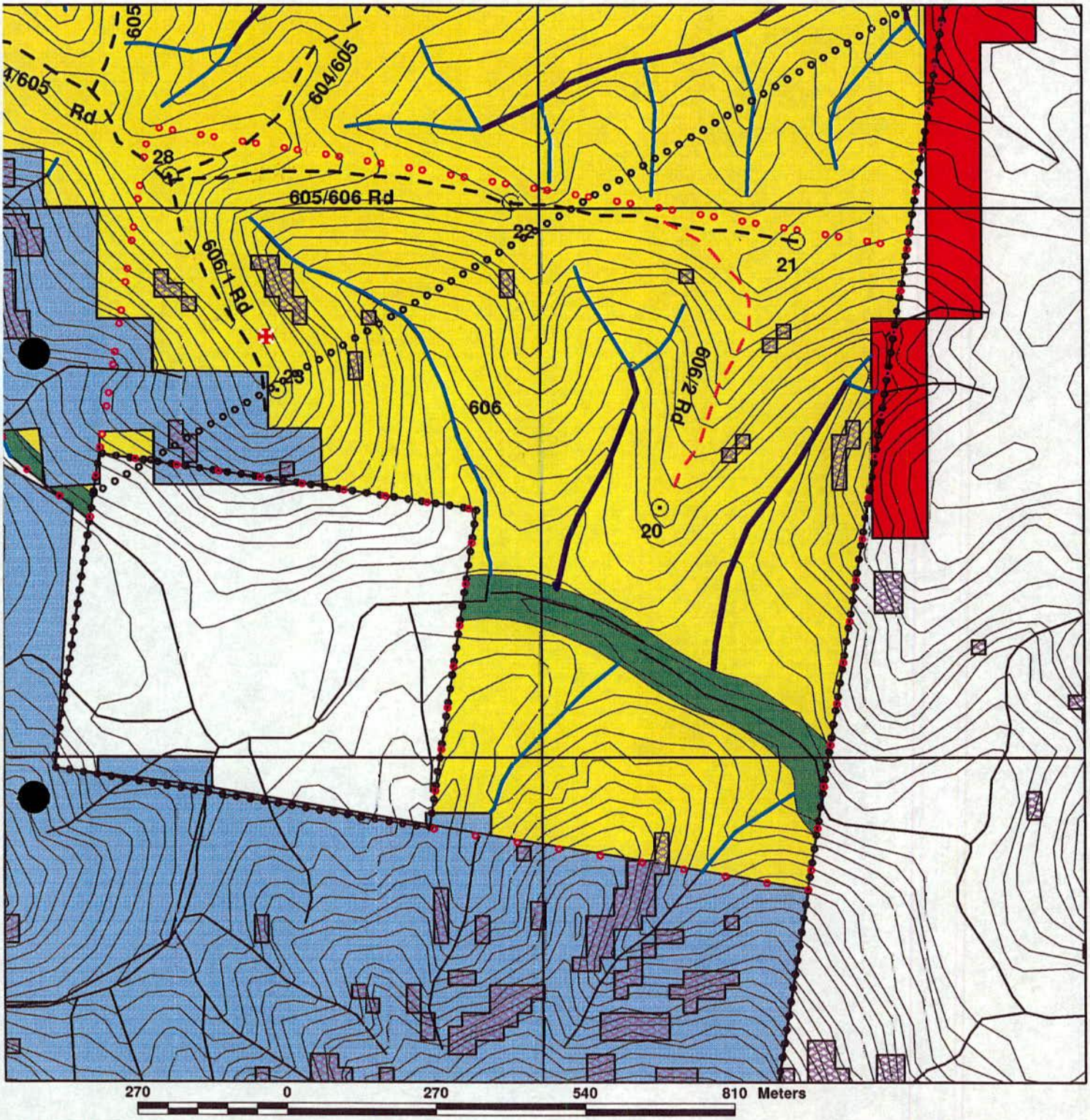
DUMP SITES OR FEATURES
- Temporary Dry
- Temporary Wet
- Soil Sample
- Soil Boundary
- Approved Crossings

RECORDED SPECIES
- Sooty Owl
- Masked Owl
- V-notch Tree
- Squirrel Glider
- Squirrel Glider
- Glossy Black Cockatoo
- Masked Owl Nest Site

MN

NORTERN RIVERS REGION - CASINO MANAGEMNET AREA
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 606
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:10 000, DATE 28/01/98, V2

STATE FORESTS



BOUNDARIES
- State Forest Boundary
- Compartment Boundaries

ROADS
- Natural Surface
- Sealed or Gravelled
- Four Wheel Drive
- Proposed Rd

NORMAL PRESCRIPTIONS
- Harvestable Area

NON HARVEST AREAS
- Flora and Fauna Protect
- Connection Corridor (80m)
- Slopes likely over 30 degrees
- Fauna Protection (Owl Habitat)
- Fauna Protection (Squirrel Glider Protection 8ha)
- Old Growth

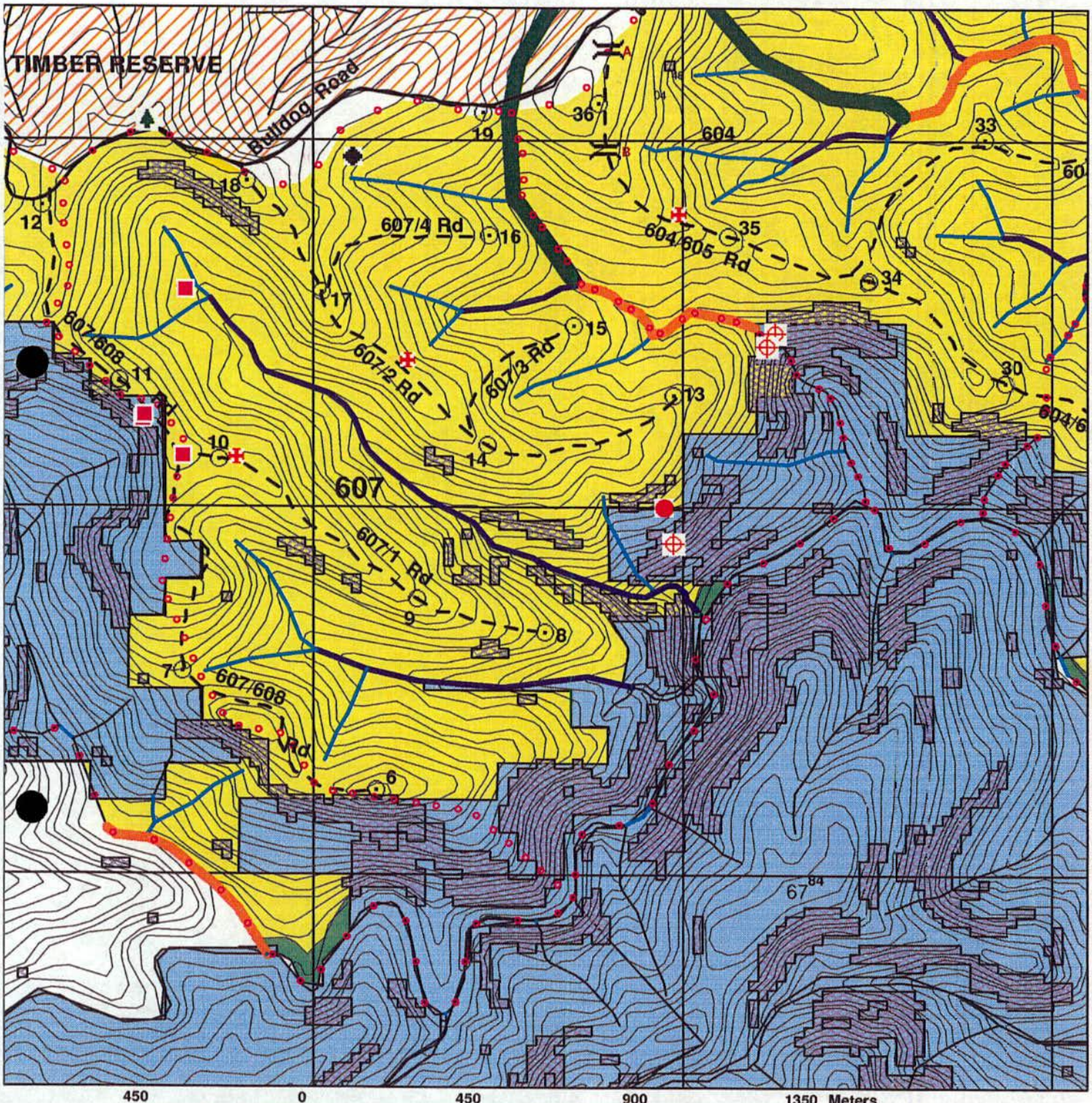
DRAINAGE
- External Drainage
- 1st Order Stream (10m buffer)
- 2nd Order Stream (20m buffer)
- 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES
- Temporary Dry
- Temporary Wet
- Soil Sample
- Soil Boundary
- Approved Crossings

RECORDED SPECIES
- Sooty Owl
- Masked Owl
- V-notch Tree
- Squirrel Glider
- Squirrel Glider
- Glossy Black Cockatoo
- Masked Owl Nest Site

MN

NORTERN RIVERS REGION - CASINO MANAGEMNET AREA
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 607
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:15000, DATE 28/01/98, V2



BOUNDARIES
- State Forest Boundary
- Compartment Boundaries

ROADS
- Natural Surface
- Sealed or Gravelled
- Four Wheel Drive
- Proposed Rd

NORMAL PRESCRIPTIONS
- Harvestable Area

NON HARVEST AREAS
- Flora and Fauna Protect
- Connection Corridor (80m)
- Slopes likely over 30 degrees
- Fauna Protection (Owl Habitat)
- Fauna Protection (Squirrel Glider Protection 8ha)
- Old Growth

DRAINAGE
- External Drainage
- 1st Order Stream (10m buffer)
- 2nd Order Stream (20m buffer)
- 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES
- Temporary Dry
- Temporary Wet
- Soil Sample
- Soil Boundary
- Approved Crossings

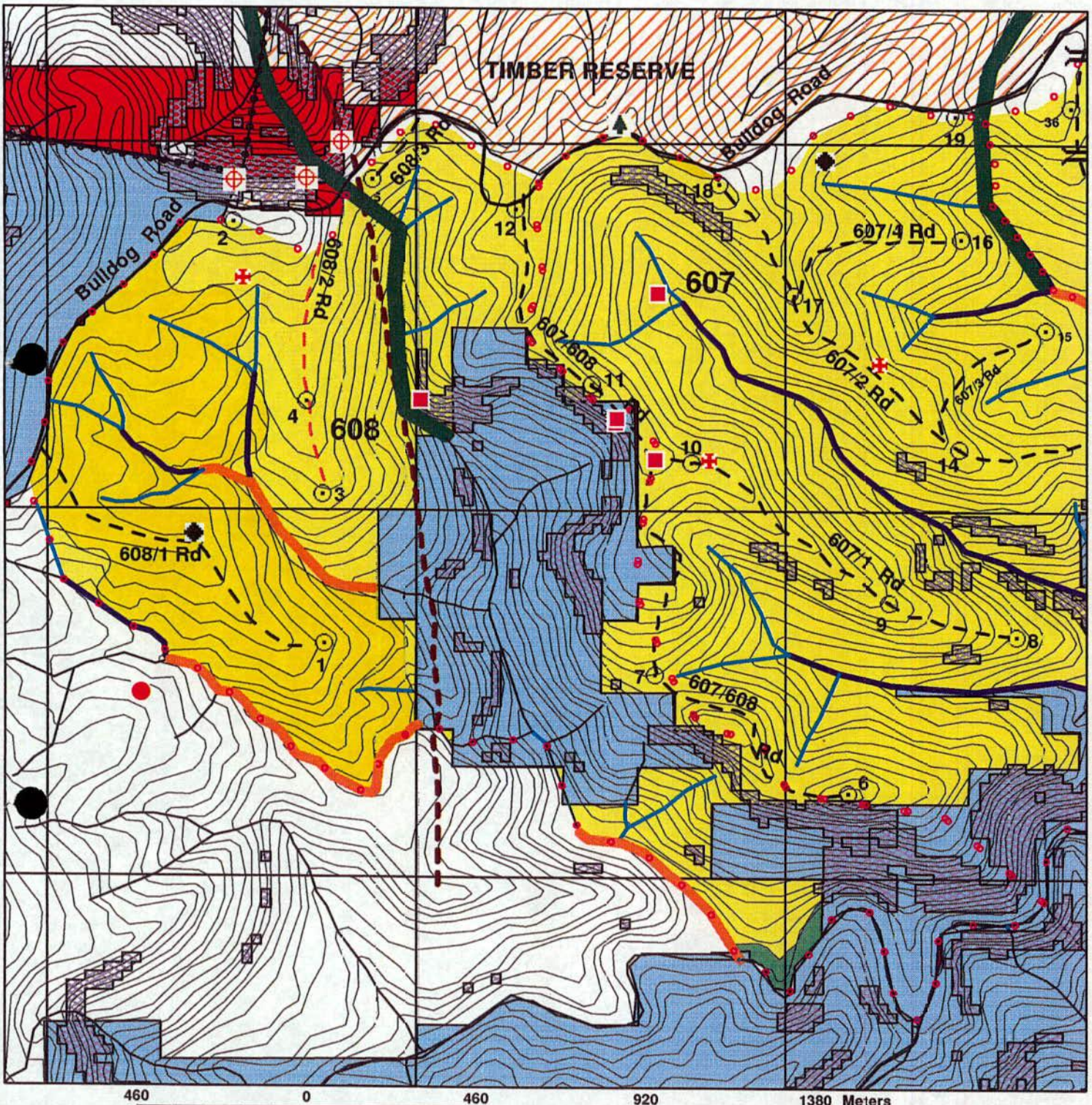
RECORDED SPECIES
- Sooty Owl
- Masked Owl
- V-notch Tree
- Squirrel Glider
- Squirrel Glider
- Glossy Black Cockatoo
- Masked Owl Nest Site

MN

NORTERN RIVERS REGION - CASINO MANAGEMNET AREA
HARVEST PLAN OPERATIONAL MAP
COMPARTMENT 608
EWINGAR STATE FOREST
BULLDOG ROCK MAP SHEET
HARVEST PLAN NUMBER CAS604-608
SCALE 1:15000, DATE 28/01/98, V2

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

STATE FORESTS



BOUNDARIES
- State Forest Boundary
- Compartment Boundaries

ROADS
- Natural Surface
- Sealed or Gravelled
- Four Wheel Drive
- Proposed Rd

NORMAL PRESCRIPTIONS
- Harvestable Area

NON HARVEST AREAS
- Flora and Fauna Protect
- Connection Corridor (80m)
- Slopes likely over 30 degrees
- Fauna Protection (Owl Habitat)
- Fauna Protection (Squirrel Glider Protection 8ha)
- Old Growth

DRAINAGE
- External Drainage
- 1st Order Stream (10m buffer)
- 2nd Order Stream (20m buffer)
- 3rd Order Stream (40m buffer)

DUMP SITES OR FEATURES
- Temporary Dry
- Temporary Wet
- Soil Sample
- Soil Boundary
- Approved Crossings

RECORDED SPECIES
- Sooty Owl
- Masked Owl
- V-notch Tree
- Squirrel Glider
- Squirrel Glider
- Glossy Black Cockatoo
- Masked Owl Nest Site

MN

NORTHERN RIVERS REGION - CASINO MANAGEMENT AREA

FOREST TYPES MAP

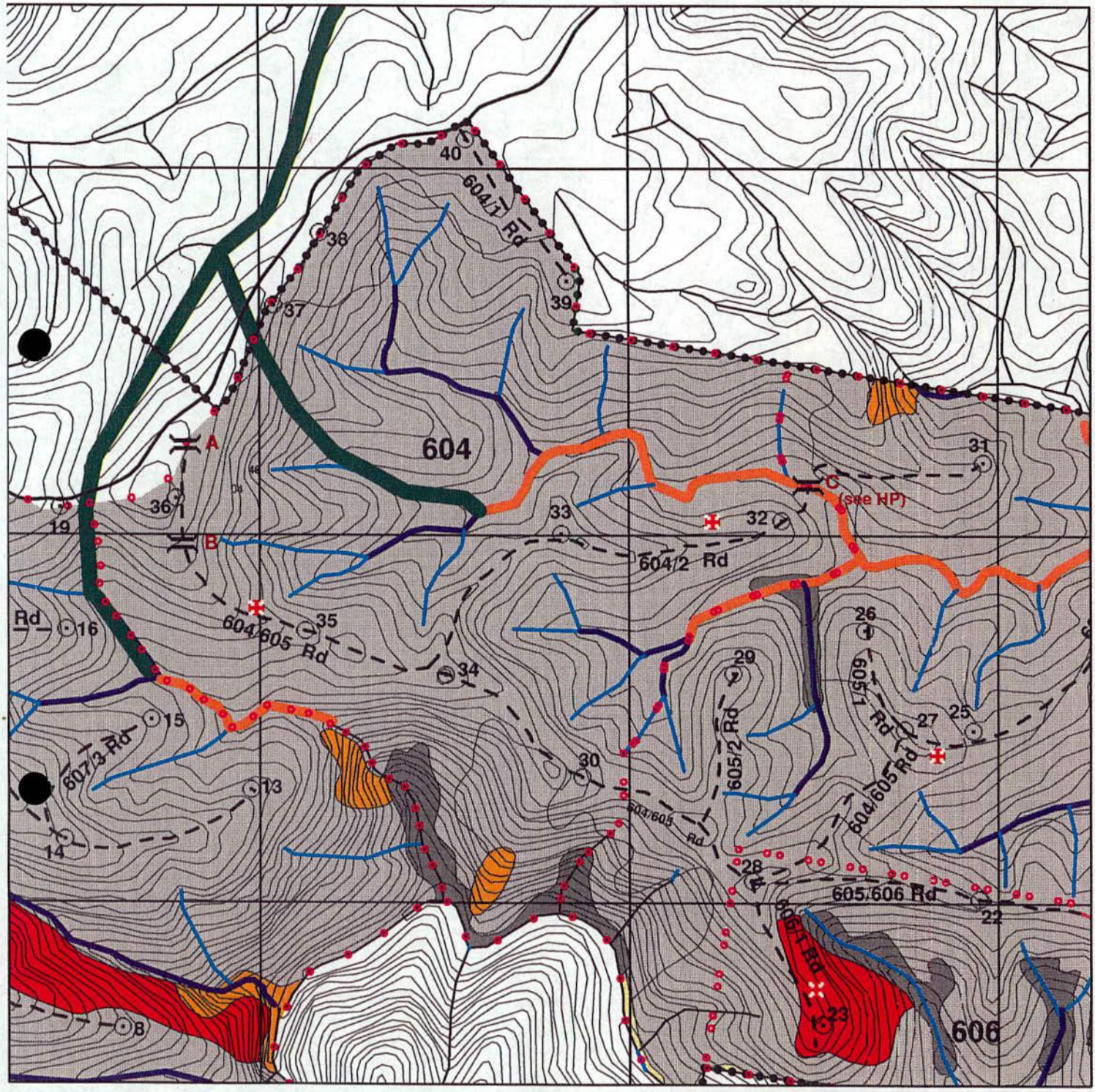
COMPARTMENT 604

EWINGAR STATE FOREST

BULLDOG MAP SHEET

HARVEST PLAN NUMBER CAS604-608

SCALE 1:15 000, DATE 28/01/98, V2



BOUNDARIES

- Compartment Boundaries
- State Forest Boundary

FOREST TYPES

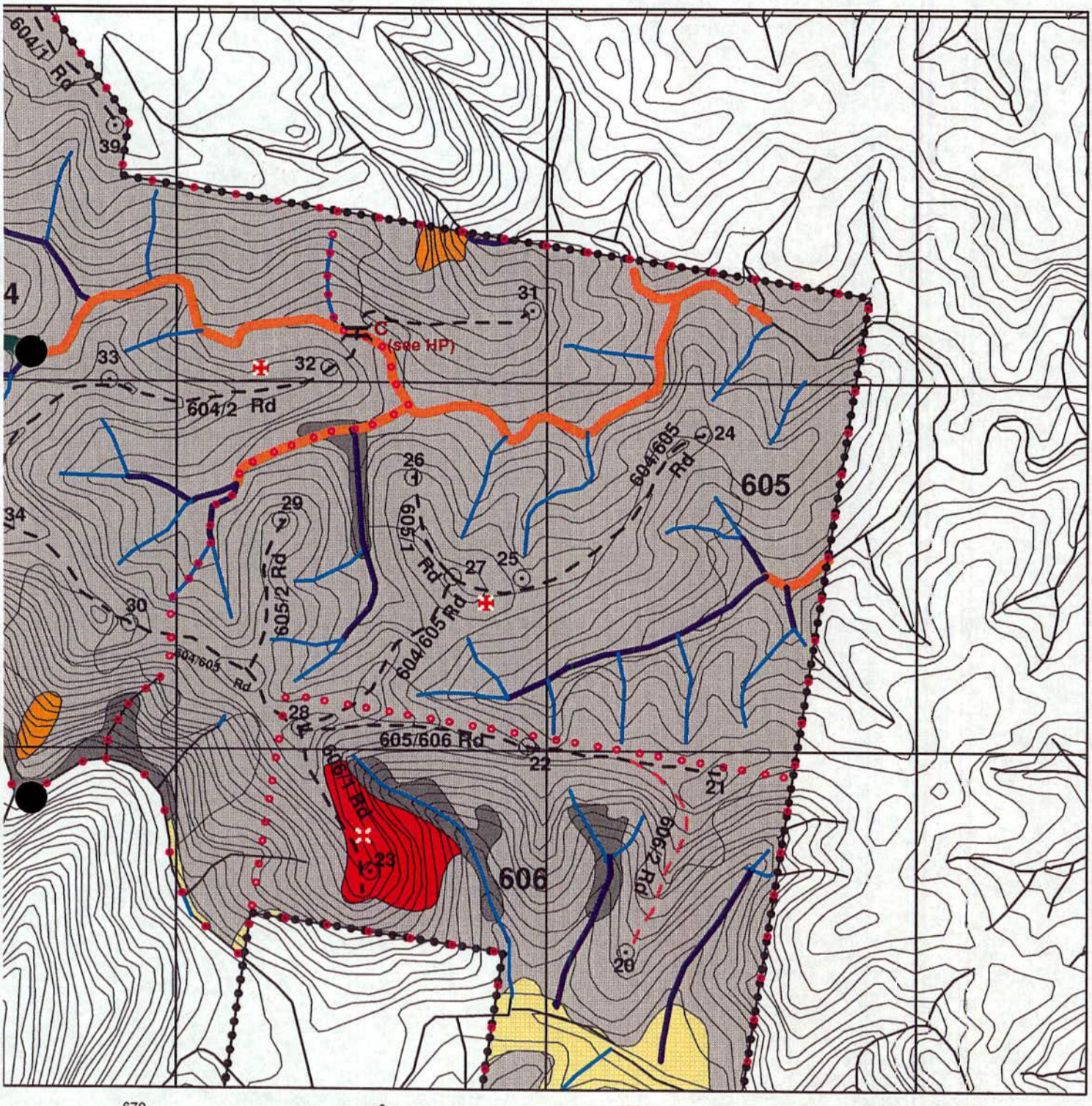
- Cleared / Partially Cleared (FT 220)
- Rock (FT 234)
- Brush Box (FT 53)
- Forest Red Gum (FT 92)
- Dry Blackbutt (FT 37)
- Grey Gum - Grey Ironbark - White Mahogany (FT 62)
- Spotted Gum-Iron Bark/Grey Gum (FT 74)

MN

NORTHERN RIVERS REGION - CASINO MANAGEMENT AREA

FOREST TYPES MAP
COMPARTMENT 605
EWINGAR STATE FOREST
BULLDOG MAP SHEET
HARVEST PLAN NUMBER CAS604-608

SCALE 1:15 000, DATE 28/01/98, V2



670 0 670 1340 Meters

BOUNDARIES

- Compartment Boundaries
- State Forest Boundary

FOREST TYPES

- Cleared / Partially Cleared (FT 220)
- Rock (FT 234)
- Brush Box (FT 53)
- Forest Red Gum (FT 92)
- Dry Blackbutt (FT 37)
- Grey Gum - Grey Ironbark - White Mahogany (FT 62)
- Spotted Gum-Iron Bark/Grey Gum (FT 74)

MN

NORTHERN RIVERS REGION - CASINO MANAGEMENT AREA

FOREST TYPES MAP
COMPARTMENT 606
EWINGAR STATE FOREST
BULLDOG MAP SHEET
HARVEST PLAN NUMBER CAS604-608

SCALE 1:10 000, DATE 28/01/98, V2

450 0 450 900 Meters

BOUNDARIES

- Compartment Boundaries
- State Forest Boundary

FOREST TYPES

- Cleared / Partially Cleared (FT 220)
- Rock (FT 234)
- Brush Box (FT 53)
- Forest Red Gum (FT 92)
- Dry Blackbutt (FT 37)
- Grey Gum - Grey Ironbark - White Mahogany (FT 62)
- Spotted Gum-Iron Bark/Grey Gum (FT 74)

MN

PRELIMINARY PLAN

FOR RECONNAISSANCE & PLANNING PURPOSES ONLY

NOT TO BE USED FOR HARVEST PLAN IMPLEMENTATION

NORTHERN RIVERS REGION - CASINO MANAGEMENT AREA

FOREST TYPES MAP

COMPARTMENT 607

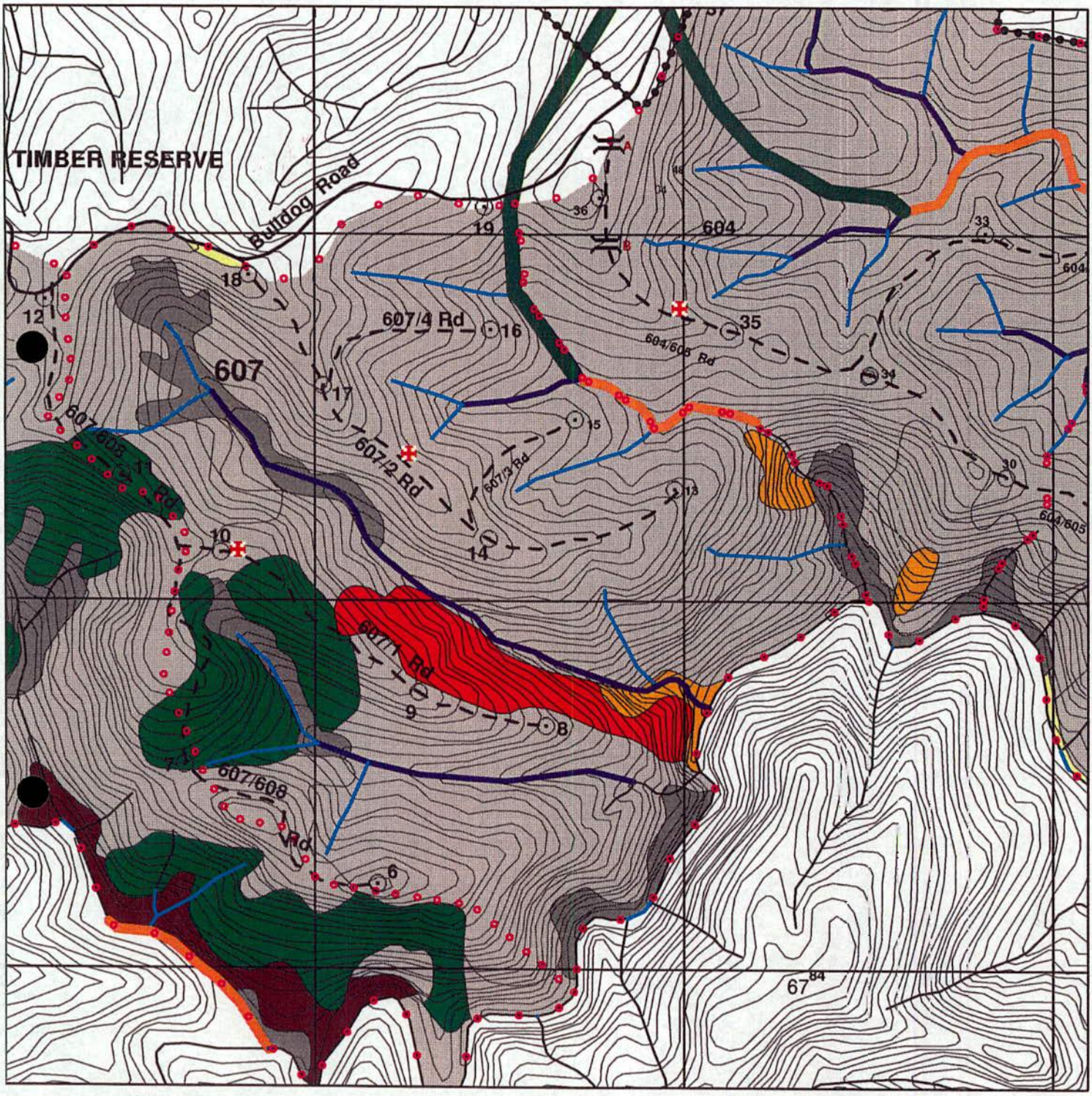
EWINGAR STATE FOREST

BULLDOG MAP SHEET

HARVEST PLAN NUMBER CAS604-608

SCALE 1:15 000, DATE 28/01/98, V2

STATE FORESTS



680 0 680 1360 Meters

BOUNDARIES

- Compartment Boundaries
- State Forest Boundary

FOREST TYPES

- Cleared / Partially Cleared (FT 220)
- Rock (FT 234)
- Brush Box (FT 53)
- Forest Red Gum (FT 92)
- Dry Blackbutt (FT 37)
- Grey Gum - Grey Ironbark - White Mahogany (FT 62)
- Spotted Gum-Iron Bark/Grey Gum (FT 74)

MN

NORTHERN RIVERS REGION - CASINO MANAGEMENT AREA

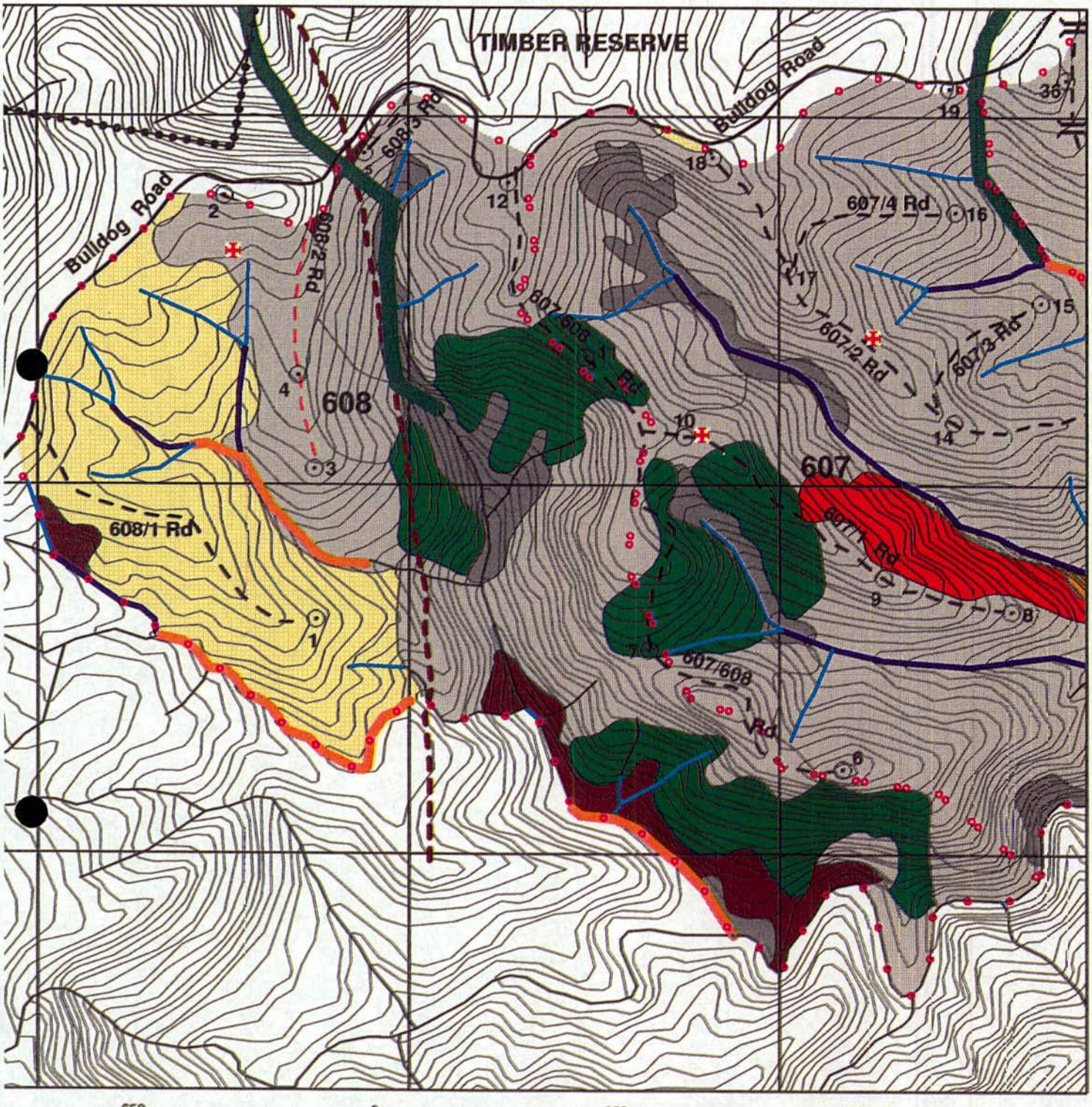
PRELIMINARY PLAN

FOR RECONNAISSANCE & PLANNING PURPOSES ONLY

NOT TO BE USED FOR HARVEST PLAN IMPLEMENTATION

FOREST TYPES MAP
COMPARTMENT 608
EWINGAR STATE FOREST
BULLDOG MAP SHEET
HARVEST PLAN NUMBER CAS604-608

SCALE 1:15 000, DATE 28/01/98, V2



BOUNDARIES

- Compartment Boundaries
- State Forest Boundary

FOREST TYPES

- Cleared / Partially Cleared (FT 220)
- Rock (FT 234)
- Brush Box (FT 53)
- Forest Red Gum (FT 92)
- Dry Blackbutt (FT 37)
- Grey Gum - Grey Ironbark - White Mahogany (FT 62)
- Spotted Gum-Iron Bark/Grey Gum (FT 74)

Part 2
FOREST MANAGEMENT & ENVIRONMENTAL CONSIDERATIONS

2.1 PHYSICAL FEATURES

Description 1 Physical Description of the Area

A Locality Map and Harvesting Operational Map (Part 1) are attached to this plan.

DIVISION **HARDWOOD**	REGION **Northern Rivers**
STATE FOREST	**Ewingar No 845**
COMPARTMENTS	**604 to 608**
NORTH-EASTERN CORNER	Bulldog Rock 1:25000 Sheet **450850E 6786250N**
SOUTH-WESTERN CORNER	Bulldog Rock 1:25000 Sheet **444950E 6785100N**

The harvest area is within the Northern Rivers Region of State Forests Hardwood Division. It is bounded to the west by State Forest, to the north west by Crown Lease, to the north and east and to the south by State Forest and a small island of Private Property.

Natural Features

General: Compartment 604 is bound to the north by Crown Lease and private property, to the south by Ewingar Creek and by a drainage line that forms part of its headwaters, to the west by Crown Lease and to the east by tributaries of the Little Rocky Creek headwaters, which also form the western boundary of compartment 605. The northern and eastern boundaries of 605 are private property, and the southern boundary is Ewingar Creek and cadastral lines that also form the northern and western boundary of compartment 606. The eastern boundary of 606 is private property and the southern boundary part private property and part State Forest.

The northern boundary of compartment 607 is Crown Lease, the eastern boundary with compartment 604 is a drainage line that forms part of the headwaters of Ewingar Creek, the southern and south eastern boundary is Ewingar Creek and the south western and western boundary is a ridgeline that also forms the eastern boundary of compartment 608. The southern boundary of 608 is Ewingar Creek and a drainage line that forms part of its headwaters and the western and northern boundaries are Crown Lease and private property.

Catchment: The harvest area is within the Clarence River catchment. Compartments 606, 607 and 608 and the southern sections of 604 and 605 drain in a southerly and south easterly direction into Ewingar Creek which forms the southern boundary of the harvest area. Ewingar Creek drains in an easterly direction out of the forest into the Clarence River approximately 10 kilometres east of the harvest area. The northern sections of compartments 604 and 605 drain in an easterly direction into Little Rocky Creek which also drains in an easterly direction into Rocky Creek and then the Clarence River approximately 10 kilometres east of the harvest area.

Altitude range: 180 metres above sea level along Ewingar Creek in compartment 606 to 630 metres asl along Bulldog Road on the northern boundaries of compartments 607 and 608.

Aspect: Generally easterly to south easterly over the whole of the harvest area.

Topography: The harvest area varies from undulating along sections of Bulldog Road and in the northern and central sections of compartments 604 and 605 to very steep on the southern falls into Ewingar Creek.

Artificial Features

Roads: The bitumen surface Bruxner Highway lies approximately 20 kilometres to the north of the harvest area. From the Bruxner Highway primary access to the harvest area is via the gravelled Baryulgil Road and then via the gravelled and natural surface Bulldog Road.

Minor Roads: From the Bulldog Road internal access to the harvest area is via a series of maintained and un-maintained Class IV and V harvesting roads.

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

(a) Private Property Boundaries

Private property forms the north western and northern boundary of compartment 604, the northern and eastern boundary of 605 and the eastern and part southern boundaries of 606. Private property boundaries are either fenced or marked with a yellow blaze.

(b) Non-Harvest Areas

Rare Non-commercial Forest Types

There are no rare non-commercial forest types within the harvest area.

Old Growth Forest

See Description 8(b).

Rainforest

No category A, B or C rainforest is recorded within the harvest area on Forest Type or BOGMP maps.

Riparian Buffers

Riparian Buffers exist on all drainage lines within the harvest area that are shown on the CMA 1:25000 map, unless the prescribed width of Filter Strips under the PCL or Wildlife Corridors under PMP 1.1.7 are greater.

Connection Corridors

Connection Corridors are 80 metres wide and are shown on the Operational Maps. One connects Little Rocky Creek in compartments 604 and 605 to Greensnake Creek in the Timbarra River catchment to the west of the harvest area. Another corridor connects Ewingar Creek with the Timbarra river via a drainage line that forms the boundary between compartments 604 and 607 and another connects Ewingar Creek with the Timbarra river via a drainage line in compartment 608. In addition the wildlife corridor and broad band of confirmed old growth along the northern side of Ewingar Creek will serve as another connection corridor. Specified forestry activities will be excluded from connection corridors, with the exception of road construction and maintenance where there is no other means of practical access.

Wildlife Corridor

A Wildlife Corridor (PMP 1.1.7 - Flora and Fauna Protection) exists 40 metres either side of Ewingar Creek. Sections of the corridor occurring outside exclusion areas are shown on the Operational map ie SE section of Cpt 606, SE boundary of Cpt 607 and southern boundary of Cpt 608. Specified forestry activities must be excluded from this corridor.

Sites of Cultural and Heritage Significance

There is an artefact site at Bulldog Rock (AMG 445400E, 6785850N). This site is on the northern side of Bulldog Road and outside the harvest area. It will not be impacted on by the operation. There are no other records or evidence of any cultural or heritage sites within the harvest area. Further inspections will be undertaken by the Casino Aboriginal Cultural Heritage Officer prior to operations commencing. In the event that further sites are detected appropriate measures will be taken to protect them after consultation with the relevant Land Council.

Conservation Protocols

Other non harvest areas to protect threatened flora and fauna habitat and the Conservation Protocol prescriptions to be applied are detailed in Conditions 4.5 of this plan.

Water Pollution Hazard Category (WPHC) 4 Areas

Water Pollution Hazard Category 4 areas must be determined and identified in the field by the Supervising Forest Officer using the Operational Maps as a guide. Indicative areas in excess of 30° are shown on the Operational Maps.

2.2 FOREST MANAGEMENT AND SILVICULTURE

Description 3 Compartment Subdivision, Forest Types

The gross and net areas of the five compartments by forest type are set out in Table 1 (to the nearest hectare).

Description 4 Broad Description of Vegetation

(a) Forest Types

The following forest types are present within the harvest area:

Commercial Forest Types

- Type 74 - *Spotted Gum-Ironbark/Grey Gum*. This forest type dominates the harvest area, occurring extensively in all five compartments, principally as type 74a, but also as 74b. It occupies approximately 852 hectares of the gross area (92% of the net harvest area), occurring over all landscape elements. White Mahogany, Tallowwood, Red Ironbark and Grey Box are common associated species, with scattered Blackbutt in the transition zone between this and the Blackbutt type.

- Type 37 - *Dry Blackbutt*. This type occurs as type 37a in compartments 607 and 608 where it occupies 61 hectares of the gross area (3% of the net harvest area). It is dominated by coastal Blackbutt, with associated species including Tallowwood, Bloodwood and White Mahogany. Where it adjoins type 74 Spotted Gum is found in the transition zone between the two types.

- Type 65 - *Forest Red Gum- Grey Gum/Grey Ironbark- Roughbarked Apple.* This type occurs over small areas in compartments 606 and 607 and occupies only 22 hectares of the gross area (2% of the net harvest area).

- Type 53 - *Brush Box.* Relatively small and isolated areas of this forest type occur in all 5 compartments within the harvest area, mainly associated with drainage features. It occupies 51 hectares of the gross area (2% of the net harvest area).

- Type 62 - *Grey Gum-Grey Ironbark-White Mahogany.* This type only occurs in the southern section of compartment 608 where it occupies only 15 hectares of the gross area (1% of the net harvest area).

Non-commercial Types

- Type 220 - *Cleared* The cleared area occupies approximately 96 hectares of the gross area in the western section of compartment 608 and the southern sections of compartments 605 and 606.

- Type 234 - *Rock* This type occupies only 7 hectares of the gross area, occurring as very small isolated outcrops in compartments 604, 605 and 607.

Overstorey species

The dominant overstorey species in the harvest area are Spotted Gum, Grey Ironbark, White Mahogany, Blackbutt, Grey Gum and Tallowwood.

Site height varies from 20 metres in the poorer quality stands to 30-35 metres in the better Spotted Gum and Blackbutt dominated stands.

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

(b) Understorey

The understorey within the majority of the harvest area is typically dry and open, made up largely of eucalypt regrowth, Acacias, scattered Forest Oak and occasionally ferns and grass trees. Scattered lantana also occurs in some areas. Vines, mesophytic shrubs and ferns occur closer to the moister gullies.

(c) Ground-cover

The ground cover is mostly characterised by a moderate leaf litter layer under native grasses.

(d) Rare or threatened species

See Description 7.

References Binns. D. *Flora Survey Report, Casino Management Area.* **Supporting Document No. 7, Casino Management Area EIS.** 1995.

Flora and Fauna Survey of Compartments 604 - 608, Ewingar State Forest. Robert M. Kooyman August 1997.

(e) Rare Non-commercial Forest Types

No rare non-commercial forest types exist within the harvest area.

Table 1

Area of plan by forest type and stand description

COMPARTMENT 604

FOREST TYPE	53	74a	74b	234	Total
Gross Cpt Area (ha)	5	198	27	1	**231**
Inaccessible and Drainage Protection (PCL)	2	1			**3**
Confirmed Old Growth	3	7	9	1	**20**
Riparian Buffers		27	1		**28**
Wildlife * /Connection Corridors		4			**4**
Net Cpt Area (ha)	**0**	**159**	**17**	**0**	**176**

COMPARTMENT 605

FOREST TYPE	53	74a	74b	220	234	Total
Gross Cpt Area (ha)	4	82	133	2	1	**222**
Inaccessible and Drainage Protection (PCL)	1				1	**2**
Confirmed Old Growth	2	9	17			**28**
Riparian Buffers	1	6	12			**19**
Wildlife * /Connection Corridors		4				**4**
Cleared pasture				2		**2**
Net Cpt Area (ha)	**0**	**63**	**104**	**0**	**0**	**167**

COMPARTMENT 606

FOREST TYPE	53	65	74a	74b	220	Total
Gross Cpt Area (ha)	7	8	73	13	22	**123**
Inaccessible and Drainage Protection (PCL)						
Confirmed Old Growth		1	6			**7**
Riparian Buffers	3		4			**7**
Wildlife/Connection Corridors			1			**1**
Cleared pasture					22	**22**
Net Cpt Area (ha)	**4**	**7**	**62**	**13**	**0**	**86**

COMPARTMENT 607

FOREST TYPE	37a	53	65	74a	74b	234	Total
Gross Cpt Area (ha)	21	21	14	199	14	5	**274**
Inaccessible and Drainage Protection (PCL)				2		3	**5**
Confirmed Old Growth		9	2	32	2	2	**47**
Riparian Buffers	1	6	2	10			**19**
Wildlife * /Connection Corridors							
Net Cpt Area (ha)	**20**	**6**	**10**	**155**	**12**	**0**	**203**

COMPARTMENT 608

FOREST TYPE	37a	53	62a	62b	74a	74b	220	Total
Gross Cpt Area (ha)	40	14	12	3	63	50	72	**254**
Inaccessible and Drainage Protection (PCL)	7		8		2	2		**19**
Confirmed Old Growth	30	11	3		8	37		**89**
Riparian Buffers	1	2	1		4	1		**9**
Wildlife * /Connection Corridors								
Cleared pasture							72	**72**
Net Cpt Area (ha)	**2**	**1**	**0**	**3**	**49**	**10**	**0**	**65**

* In compartments 604, 605, 607 and 608 the wildlife corridor along Ewingar Creek is embedded in the confirmed old growth forest.

(f) Rainforest

No rainforest exists in the harvest area.

(g) Old Growth Forest

See Descriptions 8(b) and Table 1 in Description 3.

(h) Exotic weeds

There is some scattered lantana through the compartments.

(i) Regeneration and seral stages

Most of the harvest area falls within the medium forest site quality. The compartments carry a multi-age forest consisting of a few remnants of the original stand and maturing regrowth resulting from the last logging in the early 1980's.

Description 5 Forest and Crop Condition

Logging records indicate that compartments 304 to 308 were last logged in 1980/81. Limited logging for veneer logs over small areas in the northern and southern sections of compartment 608 was undertaken in 1992.

These logging events have induced growth responses of 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 to moderate. There is a need to replace a proportion of the stands over the next few cutting cycles to maintain stand vigour and increase growth rates. The areas of younger regrowth shall be taken into consideration when carrying out this group selection activity. The compartments will now yield a range of log types.

The forest has a long history of grazing, and part of the harvest area is Crown Lease.

Description 6 Forest Management Activities

(a) Silviculture

The silvicultural prescriptions in the Casino Management Plan 1984 and the Silvicultural Workshop Notes prepared by the Silviculturist, Forest Planning Branch 1994 should generally be followed in determining silvicultural conditions.

On a net area basis the selective logging will be of a low intensity. It is estimated that in excess of 20% of the net harvest area, particularly the poorer quality stands on the shallow ridgetop soils, will not be impacted upon by the operation by virtue of their low or nil commercial value.

Otherwise the harvesting operation will aim at optimising the production of quota sawlogs, poles, veneer, ex-quota sawlogs and salvage. It is envisaged that the long-term timber production potential of the better site quality Spotted Gum stands will be improved as a result of harvesting activity.

A moratorium on gap and cluster silviculture techniques currently exists. For stands exhibiting mature trees with little or no advanced growth, application of the "Australian group selection" silviculture, as detailed in Jacob's (1955) is an acceptable logging technique during the period of review. It will include the "occasional formation of canopy gaps following the removal of small groups of trees by logging, provided that these gaps:"

(i) be randomly distributed rather than more or less regularly spaced;
(ii) be of a range of sizes that average about 40-50 metres diameter, rather than generally larger gaps averaging about 80 metres; and
(iii) a small amount of site preparation is allowable to encourage development of new regeneration. Site preparation can include;
- limited felling or tractor pushing of non-commercial trees;
- creation of an acceptable seed bed and reduce fire hazard by some heaping and burning of tree heads and logging debris;

(iv) full site preparation is not the aim, and preservation of some advanced growth and understorey vegetation is desirable.
(v) if necessary some enrichment planting of commercial tree species naturally occurring in the stand will take place.

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 buffers, connection corridors and filter strips in the compartments will remain in a relatively undisturbed state (refer Condition 4.5). Hollow-bearing and recruitment trees will be retained to meet wildlife habitat requirements (refer Condition 4.5).

(b) Harvesting Method

The harvesting method will be an integrated operation. The operation comprises:

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

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

(c) Fire Management

Fire management is required to;

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

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

Pre-logging burning is not required.

All post harvest burning must be carried out in accordance with condition 4.5 of this plan, the Casino District Fuel Management Plan 1995 and the Conservation Protocols.

2.3 FLORA PROTECTION

Description 7 Presence of Threatened or Endangered Plant Species

Pre-logging targeted flora surveys for ROTAP species and Schedule 1 and 2 species (TSC Act) were undertaken by Robert M Kooyman assisted by Andrew Benwell and the reports forwarded to the Northern Zone, NPWS. No occurrences of rare or threatened flora were recorded.

The report from Robert Kooyman has been forwarded to NPWS Northern Zone.

Description 8 Application of the Conservation Protocols, November 1996

(a) Rare Non-commercial Forest Types

There are no rare non-commercial forest types within the harvest area.

(b) Presence of Old Growth Forest

A total of approximately 205 hectares of candidate old growth forest has been identified within the harvest area from BOGMP maps. These areas were inspected in June and September 1997. Stump counts were conducted in an area of candidate old growth forest in compartment 607 and an area of 14.3 hectares was determined as not candidate old growth and will be available for harvesting. It was decided that due to slope and forest condition a stump count of the remaining candidate areas (approximately 191 hectares) would not be subject to harvesting operations and the BOGMP maps will be accepted.

BOGMP maps and the results of the stump count in compartment are attached to this plan. The candidate old growth areas are identified on the Operational Maps and the area by compartment and forest type is set out in Table 1. Boundaries have been modified to make field identification easier, without excluding any BOGMP candidate areas. These boundaries will be clearly marked in the field by the SFO.

Specified forestry activities, with the exception of the use of existing roads, will be excluded from these candidate old growth areas.

(c) Presence of Rainforest

There is no rainforest within the harvest area.

2.4 FAUNA PROTECTION

Description 9 Threatened and Endangered Fauna Occurrence

(a) GIS Records and Pre-logging Fauna Surveys

The harvest area was surveyed by Mr Robert Kooyman and other State Forests staff over ten days and nine nights, 19 August to 29 August 1997. Bat surveys were conducted over six nights. The results of these surveys have been forwarded to NPWS Northern Zone.

Based on these surveys, as well as State Forests GIS records, the following threatened fauna species (Schedules 1 and 2 of the Threatened Species Conservation Act 1995) have been recorded within 5 kilometres of the harvest area:

Table 2

Schedule 1 and 2 Species recorded within and within 5 kilometres of the harvest area

Common Name	Recorded location	Source of Records	AMG *
MAMMALS			
Brush-tailed Rock Wallaby	1 record approx 0.5 km west of cpt 608.	GIS	444500E 6784600N
	1 record approx 1.5 km north west of cpt 608	GIS	443150E 6786300N
	1 record approx 2 km south east of cpt 606	GIS	452200E 6782200N
	3 records adjacent to cpt 608	Pre-logging survey	445500E 6785900N
			445700E 6785900N
			445800E 6786000N
	2 records in cpt 607	Pre-logging survey	448225E 6785400N
			447975E 6784900N
	1 record on boundary cpts 604/607	Pre-logging survey	448250E 6785475N
Squirrel Glider	1 record in cpt 605	Pre-logging survey	450150E 6785550N
Yellow-bellied Glider	1 record approx 3 km south of cpt 608	GIS	445700E 6781300N
	7 records in cpt 607	Pre-logging survey	448150E 6785350N
			448100E 6785250N
			446450E 6785820N
			446680E 6785900N
			447950E 6785425N
			446850E 6785975N
			448770E 6784540N
	3 records in cpt 605	Pre-logging survey	450200E 6785300N
			450160E 6785575N
			450100E 6785700N
	3 records in cpt 608	Pre-logging survey	446200E 6785650N
			445800E 6785550N
			446200E 6785750N
	2 records in cpt 604	Pre-logging survey	449225E 6786100N
			448350E 6787050N
	1 record approx. 1km north of cpt 608	Pre-logging survey	445650E 6785950N
Koala	1 record approx 4.5 km south west of cpt 608	GIS	442500E 6780500N
	1 record on boundary of cpts 605/606	Pre-logging survey	449090E 6784975N
	1 record in cpt 605	Pre-logging survey	450200E 6785750N
	1 record 500 metres north cpt 608	Pre-logging survey	445700E 6785470N
Long-nosed Potoroo	1 records approx. 3km south west of cpt 608	Pre-logging survey	443460E 6782820N
Rufous Bettong	1 record in cpt 608	Pre-logging survey	445300E 6785700N
Tiger Quoll	1 record approx 4.5 km south of cpt 608	GIS	446300E 6779600N
	1 record approx 5 km south of cpt 608	GIS	446900E 6779100N
Parma Wallaby	1 record approx 4.5 kms south of cpt 608	GIS	445700E 6779950N
	1 record in cpt 607	Pre-logging survey	446320E 6785400N
	1 record near boundary of cpts 607/608	Pre-logging survey	446300E 6785820N
	1 record approx. 3.5 km south of cpt. 608	Pre-logging survey	444700E 6780740N
	2 records approx. 3 km south of cpt. 608	Pre-logging survey	446770E 6780550N
Little Bent wing Bat	Not recorded	Pre-logging survey	Not known
Golden-tipped Bat	1 record approx 4 km south of cpt 608	GIS	445800E 6779900N
	1 record approx 2.5 km south of cpt 608	GIS	445700E 6781300N

Table 2 (cont'd)

Schedule 1 and 2 Species recorded within and within 5 kilometres of the harvest area

Common Name	Recorded location	Source of Records	AMG *
BIRDS			
Sooty Owl	1 record approx 3.5 km south of cpt 608	GIS	445400E 6780900N
	2 records 3 and 4 km south west of cpt 608	GIS	443750E 6782000N
			443150E 6780850N
	3 records near boundary of cpts 607/608	Pre-logging survey	446000E 6785300N
			446540E 6785250N
	1 record in cpt 607	Pre-logging survey	446650E 6785600N
	2 records in cpt 608	Pre-logging survey	446650E 6785130N
Masked Owl	1 record near boundary of cpts 605/606	Pre-logging survey	445400E 6784925N
	1 record in cpt 607	Pre-logging survey	447100E 6785950N
	1 record in cpt 604	Pre-logging survey	449300E 6786250N
	3 records in cpt 605	Pre-logging survey	449750E 6785800N
			449750E 6786150N
			450200E 6785540N
Powerful Owl	1 record approx. 4.5 km south of cpt 608	GIS	445700E 6779950N
Glossy Black Cockatoo	1 record approx 4.5 km south of cpt 606	GIS	450550E 6779050N
	1 record approx. 5 km south of cpt 608		446900E 6779100N
	1 record approx. 3 km south of cpt 608		445700E 6781300N
	1 record in cpt 607	Pre-logging survey	447950E 6785000N
	1 record approx. 500m south of cpt 607	Pre-logging survey	448150E 6783650N
	1 record in cpt 608	Pre-logging survey	445030E 6785220N
	1 record in cpt 604	Pre-logging survey	448500E 6788700N
REPTILES			
Three-toed Snake-toothed Skink	1 record approx 4 km south of cpt 608	GIS	445400E 6779950N

* AMG's for GIS records are approximate because of the scale of the GIS map records.

(b) Pre-logging Fauna Surveys - Koalas

A pre-logging Koala survey was undertaken in August 1997 according to the methodology prescribed in the Conservation protocols. Transects were undertaken by four Northern Rivers Region staff. Transect location maps and data sheets are stored in the Compartment History Files. A summary of the results of the transects are attached to this plan as Appendix 2.

A total of 55 koala scats were located under a total of 11 trees over a total transect length of 8.25 kilometres and 825 trees searched. Koala usage of the compartments within the harvest area based on the results of the transects is set out in Table 3.

An asterisk survey was carried out in compartment 608 following the location of a travelling koala during a spot light survey. No scats were detected as a result of this survey but the compartment will be treated as an intermediate use area. Compartment 606 will also be treated as an intermediate use area despite the low number of scats. All other compartments are low use area.

Modified prescriptions for intermediate use areas identified in the transects and mapped on the Operational Maps are contained in Condition 4.5(d) of this plan.

Table 5

Location of Roost/Den and Feed Trees identified by Pre-Logging Surveys

	Recorded location	AMG Reference
Glossy Black Cockatoo feed tree	Compartment 607	448200E 6785200N
Glossy Black Cockatoo feed tree	Compartment 606	445250E 6784500N
Yellow-bellied Glider V notch tree	Just north of Cpt 607	446550E 6786050N
Glossy Black Cockatoo feed tree	Compartment 604	449380E 6785260N
Yellow-bellied Glider V notch tree	Compartment 604	448840E 6785350N
Masked Owl Roost/Nest	Compartment 605	450200E 6785540N

(c) Riparian Buffers, Connection Corridors and Wildlife Corridors

See Description 2(b)

Riparian buffers and connection corridors are shown on the Operational Maps where they are not embedded in old growth forest.

Specified forestry activities, with the exception of road construction and road maintenance where there is no other means of practical access, will be excluded from riparian buffers and connection corridors.

The wildlife corridor is also shown on the Operational Maps where it is not embedded in old growth forest. Specified forestry activities will be excluded from this corridor.

(d) Refugia Areas

Refugia areas are contained in Owl and Squirrel Glider habitat, wildlife corridors, connection corridors and riparian buffers.

(e) Reporting Procedures

It is necessary to report and record confirmed sightings of species listed in Schedules 1 and 2 of the Threatened Species Conservation Act 1995 to the NPWS through the appropriate channels (see Conditions 4.5 and 5.3).

2.5 SOIL EROSION AND WATER POLLUTION CONTROL

Description 11 Site Soil and Water Data and Other Information

(a) Location

Compartments 604, 605, 606, 607 and 608 comprise the north east section of Ewingar State Forest. Ewingar State Forest is located approximately 80 kilometres west of Casino. Refer to the 1:125,000 scale locality map and Operational Maps (Part 1) attached to this plan.

(b) Climate

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

Rainfall

The mean annual rainfall for the area in which the harvest area is located is 1107mm with a summer rainfall pattern. January to March is the wettest period and June to August the driest. Heavy rainfall events are common during summer and autumn.

The net harvest area just falls within rainfall distribution zone 2. The annual rainfall erosivity is **R = 2500.** The highest monthly rainfall erosivity values are 475 and 425 for January and February respectively. Erosivity values for all other months are below 400. Monthly erosivity values are set out in Table 6.

Table 6

Monthly Rainfall Erosivity Values - Compartments 604, 605, 606, 607 and 608

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly Erosivity	475	425	300	100	50	75	50	50	150	175	275	375

Generally weather conditions will allow harvesting operations to continue throughout the year subject to normal wet weather restrictions. Occasionally operations may be stopped altogether by periods of high rainfall.

References Rosewall C.J. & Turner J.B. *Rainfall Erosivity in New South Wales.* **Technical Handbook No. 11 (1st Edition), Soil Conservation Service of New South Wales** (1992)

Temperature

Mean maximum temperatures range from 30° in January/February down to about 20° in July/August. The mean minimum temperature range is from about 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.

(c) Geology

The soils of compartments 604, 605, 606, 607 and part 608 are developed on Drake Volcanics comprising acid to intermediate eruptives with minor interbedded sediments.

The soils of part compartment 608 are developed on Stanthorpe Adamellite comprising biotite adamellite.

References Veness and Associates Report Number VA2097C (24 August, 1997)

Veness & Asscciates (1994). Soils Report Casino Management Area Environmental Impact Statement

Bedding planes

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

(d) Soils

The harvest area is included in the Casino Management Area EIS Study Soils Report prepared by Veness and Associates (published 1994). This study identifies the soils within the harvest area as falling within either the Soil Mapping Unit D (Soils developed on Granitoids) or Soil Mapping Unit I (Soils developed on Volcanics).

Soil sampling of the harvest area, verification of soil units and determination of erodibility and dispersibility was carried out in August 1997 by J Veness, accredited Soil Scientist, of Veness & Associates Pty Ltd. A and B horizon samples were collected from eight (8) locations within the harvest

area, representing the range of landform units. The AMG locations of the sampling sites are set out in Table 7. The report from Veness & Associates is attached to this plan.
Erodibility (K factors) for topsoil and subsoil were determined using method B4 of the PCL, Sch 3 Part B. Dispersibility was determined using method D2 in the same schedule.

Soil types

The soils of Mapping Unit I (compartments 604, 605, 606, 607 and part 608) are Krasnozems, Yellow podzolic soils and Lithosols. The soils of Mapping Unit D (part compartment 608) are Chocolate soils.

Description and profile

The soils of Mapping Unit I are derived from the Drake Volcanics comprising of acid to intermediate eruptives with minor interbedded sediments. They are generally characterised by a thin organic layer or O horizon over a brownish black to dark brown, moderately structured, water repellent to porous, stony, fine sandy loam, clay loam or fine sandy clay loam topsoil layer or A horizon, over a dark reddish brown, brown to dull yellow orange, weakly to strongly structured, porous to dense, often very stony, clay loam, fine sandy clay loam, or light medium clay main subsoil or B2 horizon often over a strongly weathered parent material or C horizon.

The soils of Mapping Unit D are derived from Stanthorpe Adamellite which comprise of biotite adamellite. They are generally characterised by a thin organic layer or O horizon over a brownish black to very dark brown, strongly structured, water repellent to porous, bioturbated, light sandy clay loam or sandy clay loam topsoil layer or A, A1 horizon, sometimes over a dull reddish brown, unbleached, moderately structured, porous, light sandy clay loam lower topsoil or A2 horizon, always over a dark reddish brown to reddish brown, moderately structured, porous, stony, light clay main subsoil or B2 horizon. Weathered parent material or C horizon was not reached at depth.

References Veness and Associates Report Number VA2097C (24 August, 1997)..

Erodibility

The erodibility factor (K factor) for the harvest area was determined using method B4 in Schedule 3, Part B of the PCL. The default K factor of 0.06 was adopted for the whole of the harvest area.

Texture

Soil texture for the harvest area as indicated by the eight soil samples taken ranges as follows:

Mapping Unit I - **Topsoil**: fine sandy loam, clay loam. fine sandy clay loam.
Subsoil: clay loam. fine sandy clay loam, light medium clay.

Mapping Unit D - **Topsoil**: light sandy clay loam, sandy clay loam.
Subsoil: light clay.

Dispersibility

Soil dispersibility was determined using method D2 in PCL Sch 3. An Emerson Aggregate Test (EAT) was undertaken for the soil samples taken from the eight (8) sites throughout the harvest area. EAT classes for the soil samples are set out in Table 7.

Inherent fertility

The soils are generally of low to moderate fertility. The compartments generally carry a medium quality stand.

Table 7

Emerson Aggregate Test (EAT) Classes - Compartments 604 to 608

Soil Sample	Soil Mapping Unit	AMG (Bulldog Rock Sheet)	EAT Class Topsoil	EAT Class Subsoil
SS1 - Cpt 604	Drake Volcanics	448050E 6785800N	8	5
SS2 - Cpt 605	Drake Volcanics	449600E 6786150N	8	5
SS3 - Cpt 605	Drake Volcanics	449900E 6785450N	8	2(1)
SS4 - Cpt 606	Drake Volcanics	449750E 6784875N	8	2(1)
SS5 - Cpt 607	Drake Volcanics	447250E 6785650N	8	2(1)
SS6 - Cpt 607	Drake Volcanics	446800E 6785125N	8	2(1)
SS7 - Cpt 608	Stanthorpe Adamellites	445650E 6785775N	8	5
SS8 - Cpt 608	Stanthorpe Adamellites	445525E 6785600N	8	5

References Veness and Associates Report Number VA2097C (24 August, 1997)

Depth to subsoils and bedrock

Field sampling indicates that for Mapping Unit I topsoil depth varies from 9 - 24cm and subsoil depth is 20 - 70+ cm to weathered bedrock. Topsoil depth for Mapping Unit D varies from 23 - 26 cm and subsoil depth is 70+ cm to weathered bedrock.

Existing erosion

There is no evidence of significant existing erosion within the compartments. Field evaluation of existing logging tracks and snig tracks from past operations dating back to the 1980's and early 1990's show little sign of past or existing erosion despite the fact that drainage was not up to current standards. On some sections of road within the harvest area there has been wash and rutting of the pavement surface as a result of drainage failure and when these roads and tracks are re-used the relevant drainage measures outlined in Condition 4.6 must be implemented.

(e) Landform

Slope

The harvest area varies from undulating along sections of Bulldog Road and in the northern and central sections of compartments 604 and 605 to very steep on the southern falls into Ewingar Creek.

Indicative slope classes by percentage of the harvest area are set out in Table 8.

Table 8

Indicative Slope Classes - Compartments 604, 605, 606, 607 and 608

Slope	Indicative % of Harvest Area				
	Cpt 604	Cpt 605	Cpt 606	Cpt 607	Cpt 608
0° ≤ 10°	20%	25%	15%	15%	20%
>10° ≤ 20°	45%	45%	40%	35%	30%
>20° ≤ 30°	30%	28%	40%	45%	40%
>30° (WPHC4)	5%	2%	5%	5%	10%

Terrain

Bulldog Road lies on the Gibraltar Range and forms the watershed between Ewingar and Little Rocky Creeks to the east and the Timbarra river to the west. The harvest area generally consists of a series of ridges and drainage lines falling to the east and south east into these two creeks.

Elevation varies over the harvest area from 180 metres above sea level along Ewingar Creek in compartment 606 to 630 metres asl along Bulldog Road on the northern boundaries of compartments 607 and 608.

Aspect

Aspect is generally easterly to south easterly over the whole harvest area.

Rockiness

Field inspections indicate that there are no major rock outcrops in the compartments.

Previous harvesting

Logging records indicate that all five compartment were last logged during 1980 and 1981 and limited logging also occurred in compartment 608 in 1992/1993. Private property, State Forest and Leasehold land surrounds the harvest area, the timbered areas of which also have a long history of selective logging.

(f) Hydrology

The harvest area falls within the Clarence River catchment.

Little Rocky Creek rises in the western section of the harvest area within compartment 604 and flows in a generally easterly direction through compartment 605. The northern tributaries of Little Rocky Creek rise outside the harvest area and flow in a generally south easterly direction to join Little Rocky Creek within the eastern section of compartment 605. Part of the headwaters of Ewingar Creek rise within compartments 607 and 608 and the southern section of 604.

Little Rocky Creek drains into Rocky Creek and Rocky and Ewingar Creeks drain into the Clarence River approximately 10 kilometres east of the harvest area.

Apart from Ewingar Creek and Little Rocky Creek there are no other prescribed streams within the net harvest area. There are no swamps or wetlands within the net harvest area and no major water storages occur adjacent to or downstream of the harvest area.

Verification of drainage lines

All drainage features verified during harvesting plan preparation as watercourses or drainage lines are shown on the harvesting plan Operational Map with filter strip protection (PCL) or riparian buffers, connection corridors or wildlife corridors. Other smaller drainage features which are not marked on the map must be inspected by the SFO during tree marking and given protection in accordance with the Pollution Control Licence.

Drainage line condition

Drainage lines within the harvest area are in good condition and stable with well vegetated banks and beds. There are broad and shallow to moderately incised and sometimes on bedrock (sandstone). With the exception of Little Rocky and Ewingar Creeks all other drainage lines within the harvest area are un-named.

Little Rocky Creek rises in the central and northern section of compartment 604 and private property to the north. A series of short, intermittent drainage lines in compartment 604 and the northern section of 605 combine to form a permanent watercourse as the creek leaves the eastern boundary of 605, where it has a total catchment of approximately 440 hectares. A southern intermittent tributary formed by a series of short drainage lines in the southern section of compartment 605, all with catchments of less than 40 hectares, has a total catchment of approximately 75 hectares as it exits the eastern boundary.

Ewingar Creek has a catchment of approximately 2,450 hectares where it joins the harvest area on the southern boundary of compartment 608. Compartments 607 and 608 and the southern section of 604 form the north western headwaters of the creek. A series of short, intermittent drainage lines join to form a single drainage line on the boundary of compartments 604 and 607. This drainage line has a catchment of approximately 135 hectares where it flows into Ewingar Creek as a semi-permanent watercourse on the southern boundary of the harvest area. Two other drainage systems south of this and rising within compartment 607 are intermittent and have catchments of approximately 105 and 70 hectares respectively where they flow into Ewingar Creek.

In compartment 608 two intermittent drainage systems rising within the compartment and another system that forms an intermittent drainage line on the southern boundary join to form a semi-permanent watercourse which has a catchment of approximately 325 hectares where it flows into Ewingar Creek.

In compartment 606, a series of intermittent drainage lines flow directly into Ewingar Creek, which flows through the south eastern section of the compartment. These drainage lines have catchments of less than 40 hectares.

Ewingar Creek has a total catchment of approximately 3,600 hectares where it leaves the harvest area on the eastern boundary of compartment 606.

Representative water monitoring sites

The adequacy of the monitoring program is under review. A representative water quality monitoring site for this harvest area is yet to be determined.

Upstream catchment water use

There is no upstream catchment as Ewingar Creek and Little Rocky Creek have their headwaters in State Forest and forested private property.

Downstream catchment water use

Downstream Ewingar and Little Rocky Creeks may be used for limited stock watering. The Clarence River is used for recreation and commercial fishing.

Domestic water use

There would be no domestic water use from Ewingar and Little Rocky Creeks. The Clarence River supplies domestic water to residents of the Clarence valley.

(g) Vegetation and ground-cover

Effect on ground-cover during Operations

Harvesting operations are expected to remove less than 20% overall ground-cover over the net harvest area.

Recovery time

Recovery will be relatively rapid with 70% live ground-cover being attained within 12 months. The tracks and minor roads previously utilised have revegetated.

(h) Proposed Operation System

Use of existing roads

The harvest area is served by a fully maintained permanent road network as indicated on the Harvesting Plan Operational Maps and Locality Map.

The Bruxner Highway lies to the north of the harvest area. From the highway access to the harvest area is via the Baryulgil Road, is a Class II Shire maintained gravel road, across Yates Crossing to Plains Station Road, a bitumen Shire maintained road and then via Bulldog Road, a Class III gravel and natural surface road maintained by State Forests. From Bulldog Road Internal access to the harvest area is via a series of un-maintained Class V harvesting roads.

Haulage direction

Haulage will be east and south along Bulldog Road to Plains Station Road and the Baryulgil Road and then north to the Bruxner Highway or south along the Baryulgil Road.

Evaluation of existing roads to be used in this operation

Pursuant to Condition 82 the PCL, all existing roads, both permanently maintained and un-maintained, have been evaluated for use in this operation, including their drainage structures, drainage line crossings and potential to cause water pollution.

Permanently maintained roads within or bounding the harvest area to be used for this operation

All permanently maintained roads that are to be used for this operation are shown on the Operational Maps. Their condition is as follows:

Bulldog Road

• Type of road:	Class III.
• Length of road to be used for the operation:	5.2 kilometres.
• Type of pavement:	Gravelled and natural surface.
• Maximum road grade:	9°.
• Maximum sideslope:	20° (mainly ridgetop).
• Maximum width of running surface:	3-4 metres.
• Maximum clearing width either side of running surface:	2 to 3 metres.
• Maximum batter height:	2 metres.
• Maximum batter length:	300 metres.
• Existing road drainage:	Crossfall on ridgetop to table and mitre drains and outfall or infall on sidecut to table drains and mitre drains. Appropriate for the road grade and stable table and mitre drains. Drainage spacing complies with the PCL.
• Condition of road drainage outlets:	Well vegetated and stable.
• Condition of road batters:	Vegetated and stable.
• Drop down structures and dissipaters:	None and none required.
• Erosion of road formation:	The road pavement is rough in places.

Maintenance required by State Forests:

- Pre-operational grading.

Existing drainage feature crossing description - permanently maintained roads within or bounding the harvest area

There are no drainage feature crossings occurring on the permanently maintained road within or bounding the harvest area:

Un-maintained roads within or bounding the harvest area to be used for this operation

Un-maintained roads that are to be used in this operation are shown on the Operational Maps. All of these roads will be closed upon completion of use for this operation. Their description and condition is as follows:

604/1 Road (linking log dump 39 with Bulldog Road)

- Type of road: Class V.
- Length of road to be used for the operation: 400 metres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 5°.
- Maximum sideslope: 15°
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: <0.5 metres.
- Maximum batter length: 100 metres
- Existing road drainage: Outfall drainage on sidecut and crossfall on ridgetop to well grassed road verges supplemented by rollover drains. Appropriate for the road grade, stable rollovers and grassed road verges. Drainage spacing complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Nil.

Maintenance required by State Forests:

- Overgrown and requires re-opening. The SFO must mark the road line where it is difficult to pick up.

604/605 Road (linking log dumps 24 to 28, 30, 34 and 35 with Bulldog Road)

- Type of road: Class V.
- Length of road to be used for the operation: 3.7 kilometres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 9°.
- Maximum sideslope: 15°.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: < 1 metre.
- Maximum batter length: 300 metres

- Existing road drainage: Crossfall drainage on ridgetop and outfall on sidecut to well grassed road verges supplemented by rollover and spoon drains to mitre drains. Appropriate for the road grade, stable mitre and spoon drains and rollovers and grassed road verges. Drainage spacing complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Some minor wash and rutting of the pavement over short sections

Maintenance required by State Forests:
- Partly overgrown and requires re-opening and pre-operational grading.

604/2 Road (linking log dumps 31 to 33 with 604/605 Road)

- Type of road: Class V.
- Length of road to be used for the operation: 2 kilometres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 8°.
- Maximum sideslope: 15°.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: 1 metre.
- Maximum batter length: 300 metres
- Existing road drainage: Crossfall drainage on ridgetop and outfall on sidecut to well grassed road verges supplemented by rollover drains. Appropriate for the road grade, stable mitre and rollover drains and grassed road verges. Drainage spacing complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Some minor wash and rutting of the pavement over short sections

Maintenance required by State Forests:
- Partly overgrown and requires re-opening and pre-operational grading.
- Additional Comments: Despite an extensive search the section of this road east of log dump 32 was very difficult to locate. Previous harvesting plans indicate its location as shown on the Operational Map. If this section of road cannot be located by the SFO during pre-logging inspections or tree marking, it must be reconstructed consistent with the conditions for road construction in Condition 4.6(g) - see also description of drainage line crossings on un-maintained roads. The harvesting plan must be amended accordingly. **The harvesting plan must only be amended following approval of a relevant variation for this work by the EPA.**

605/1 and 605/2 Roads (linking log dumps 26 and 29 with 604/605 Road)

• Type of road:	Both Class V.
• Length of road to be used for the operation:	605/1 Road - 400 metres 605/2 Road - 350 metres
• Type of pavement:	Natural surface and natural gravel with grass cover.
• Maximum road grade:	605/1 Road - 5°. 605/2 Road - Ridgetop.
• Maximum sideslope:	10° on 605/1 Road.
• Maximum width of running surface:	3 metres.
• Maximum clearing width either side of running surface:	1 to 2 metres.
• Maximum batter height:	< 1 metre on 605/1 Road.
• Maximum batter length:	100 metres on 605/1 Road.
• Existing road drainage:	Outfall on sidecut and crossfall on ridgetop to well grassed road verges, supplemented by rollovers on 605/1 Road. Appropriate for the road grade and grassed road verges. Where rollovers are necessary, their spacing complies with the PCL.
• Condition of road drainage outlets:	Vegetated.
• Condition of road batters	Vegetated and stable.
• Drop down structures and dissipaters:	None and none required.
• Erosion of road formation:	Nil.

Maintenance required by State Forests:
- Both are overgrown and require re-opening.

605/606 Road (linking log dumps 21 and 22 to 604/605 Road)

• Type of road:	Class V.
• Length of road to be used for the operation:	1.2 kilometres.
• Type of pavement:	Natural surface and natural gravel with grass cover.
• Maximum road grade:	8°.
• Maximum sideslope:	15°.
• Maximum width of running surface:	3 metres.
• Maximum clearing width either side of running surface:	1 to 2 metres.
• Maximum batter height:	1.5 metres.
• Maximum batter length:	100 metres
• Existing road drainage:	Outfall drainage on sidecut and crossfall on ridgetop to well grassed road verges, supplemented by rollovers. Appropriate for the road grade and grassed road verges. Where rollovers are necessary, their spacing complies with the PCL.
• Condition of road drainage outlets:	Vegetated.
• Condition of road batters:	Vegetated and stable.
• Drop down structures and dissipaters:	None and none required.
• Erosion of road formation:	Some minor wash and rutting of the pavement over short sections.

Maintenance required by State Forests:
- Partly overgrown and requires re-opening. Pre-operational grading.

606/1 Road (linking log dump 23 with 604/605 and 605/606 Roads)

• Type of road:	Class V.
• Length of road to be used for the operation:	500 metres.
• Type of pavement:	Natural surface and natural gravel with grass cover.
• Maximum road grade:	8°.
• Maximum sideslope:	Ridgetop.
• Maximum width of running surface:	3 metres.
• Maximum clearing width either side of running surface:	1 to 2 metres.
• Maximum batter height:	N/A
• Maximum batter length:	N/A
• Existing road drainage:	Crossfall drainage to well grassed road verges. Appropriate for the road grade and complies with the PCL.
• Condition of road drainage outlets:	Vegetated.
• Condition of road batters:	Vegetated and stable.
• Drop down structures and dissipaters:	None and none required.
• Erosion of road formation:	Nil.

Maintenance required by State Forests:
- Partly overgrown and requires re-opening.

607/608 Road (linking log dumps 6, 7, and 11 with Bulldog Road)

• Type of road:	Class V.
• Length of road to be used for the operation:	2.1 kilometres.
• Type of pavement:	Natural surface and natural gravel with grass cover.
• Maximum road grade:	7°.
• Maximum sideslope:	25°.
• Maximum width of running surface:	3 metres.
• Maximum clearing width either side of running surface:	1 to 2 metres.
• Maximum batter height:	2 metres.
• Maximum batter length:	200 metres
• Existing road drainage:	Crossfall drainage to well grassed road verges on ridgetop and outfall to grassed road verges on sidecut. Appropriate for the road grade and complies with the PCL.
• Condition of road drainage outlets:	Vegetated.
• Condition of road batters:	Vegetated and stable.
• Drop down structures and dissipaters:	None and none required.

- Erosion of road formation: Nil.

Maintenance required by State Forests:
- Partly overgrown and requires re-opening.

607/1 Road (linking log dumps 8, 9 and 10 with 607/6078 Road)

- Type of road: Class V.
- Length of road to be used for the operation: 900 metres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 5°.
- Maximum sideslope: Ridgetop.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1-2 metres
- Maximum batter height: N/A.
- Maximum batter length: N/A.
- Existing road drainage: Crossfall drainage to well grassed road verges. Appropriate for the road grade and complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Nil.

Maintenance required by State Forests:
- Partly overgrown and needs re-opening.

607/2 Road (linking log dumps 13, 14 and 17 with Bulldog Road)

- Type of road: Class V.
- Length of road to be used for the operation: 1.6 kilometres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 10°.
- Maximum sideslope: 15°.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: 1 metre.
- Maximum batter length: 200 metres.
- Existing road drainage: Crossfall on ridgetop and outfall on sidecut to well grassed road verges supplemented by rollover and spoon drains to mitre drains. Appropriate for the road grade, stable mitre and spoon drains and rollovers and grassed road verges. Drainage spacing complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable.

- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Some wash and rutting of the pavement over short sections.

Maintenance required by State Forests:
- Partly overgrown and requires re-opening and pre-operational grading.

607/3 and 607/4 Roads (linking log dumps 15 and 16 with 607/2 Road)

- Type of road: Both Class V.
- Length of road to be used for the operation: Both 400 metres.
- Type of pavement: Both natural surface and natural gravel with grass cover.
- Maximum road grade: 7°.
- Maximum sideslope: 20°.
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 - 2 metres.
- Maximum batter height: 2 metres.
- Maximum batter length: 300 metres.
- Existing road drainage: Outfall drainage to well grassed road verges. Appropriate for the road grade and grassed road verges and complies with the PCL.
- Condition of road drainage outlets: Vegetated.
- Condition of road batters: Vegetated and stable
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: On both roads the pavement is washed and rutted.

Maintenance required by State Forests:
- Both roads overgrown and need re-opening and pre-operational grading.

608/1 and 608/3 Roads (linking log dumps 1 and 5 with Bulldog Road)

- Type of road: Both Class V.
- Length of road to be used for the operation: 608/1 Road - 900 metres
  608/3 Road - 250 metres.
- Type of pavement: Natural surface and natural gravel with grass cover.
- Maximum road grade: 7°.
- Maximum sideslope: 20° (608/1 Road is mostly on ridgetop).
- Maximum width of running surface: 3 metres.
- Maximum clearing width either side of running surface: 1 to 2 metres.
- Maximum batter height: < 2 metres.
- Maximum batter length: 250 metres.
- Existing road drainage: Crossfall drainage on ridgetop and outfall on sidecut to well grassed road verges, supplemented by rollovers on 608/3 Road. Appropriate for the road grade and grassed road verges. Where rollovers spacing complies with the PCL.
- Condition of road drainage outlets: Vegetated.

- Condition of road batters: Vegetated and stable.
- Drop down structures and dissipaters: None and none required.
- Erosion of road formation: Nil.

Maintenance required by State Forests:
- 608/3 Road is partly overgrown and requires re-opening. 608/1 Road is through cleared pasture

Drainage feature crossings on un-maintained roads

There are three drainage feature crossings on un-maintained roads within the harvest area. They are as follows:

- Location: 604/605 Road, **locations "A" and "B".**
- Type of drainage feature: Intermittent drainage depression.
- Type of crossing: Natural causeway.
- Type of pavement: Natural surface.
- Approach drainage: Both approaches outfall to well grassed road verges.
- Approach condition: Stable,
- Table drain checks: No table drains. Outfall to grassed road verges.
- Containment of fill: Natural ground surface.
- Structure stability: Stable.
- Bed and bank stability: Vegetated and stable.
- Sediment control: Vegetative cover on road verges, partially grassed road surface.
- Maintenance required by State Forests: Nil.

- Location: 604/2 Road, **location "C".**
- Type of drainage feature: Semi-permanent watercourse.

- Comments: This crossing could not be located, although indications on maps from previous harvesting plans shows that 604/2 Road crosses this drainage line. If the SFO is unable to locate this crossing during pre-logging inspections or tree marking, or it requires maintenance or replacement, the Forest Planner must determine what works are required, and a variation of the harvesting plan must be submitted to the EPA for approval. The harvesting plan must only be amended following approval of a relevant variation for this work by the EPA - refer also to condition 4.6(f).

Road construction

There are two (2) short sections of road that must be constructed for this operation. They are shown on the Operational Maps and are as follows:

1. 606/2 Road - approximately 400 metres of road, sidecut at first and then ridgetop, from 605/606 Road to access log dump 20; and

2. 608/2 Road - approximately 800 metres of road, sidecut at first and then ridgetop, from Bulldog Road to access log dumps 3 and 4.

The method of construction of these roads is set out in Condition 4.6(g) of this plan.

Description of new drainage feature crossings to be constructed

Unless a new drainage line crossing is required at **location "C"** on 604/2 Road (see above), no new drainage feature crossings are required to be constructed for this operation.

Location of log dumps

There are 40 log dumps in the harvest area, as indicated on the Operational Map. 10 dumps are located in compartment 604, 6 in compartment 605, 5 in compartment 606, 12 in compartment 607 and 7 in compartment 608. Wherever practicable log dumps are located on ridge tops to facilitate uphill snigging.

There will be limited downhill snigging to dumps 3, 4 and 7 in compartment 608, dumps 8 to 11, 13 to 17 and 19 in compartment 607, dumps 20, 21 and 23 in compartment 606, dumps 24 to 26, 29 and 31 in compartment 605 and dumps 32, 32 to 35 and 39 in compartment 604. This will reduce snigging distances and take advantage of previously constructed log dumps, snig tracks and drainage line crossings. These snig tracks and drainage line crossings are stable. Less than 40% of the snigging activity will be downhill.

Harvesting

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

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

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

Cover factor

The harvesting operations described above result in a cover factor (in accordance with PCL Sch 3, Part A, Table 2) of **C = 0.108**. Post harvest burning will be carried out.

Pre-harvest burning

There will be no pre-harvest burning.

Post-harvest burning

All post harvest burning must be carried out in accordance with condition 4.5 of this plan, the Casino District Fuel Management Plan 1995 and the Conservation Protocols.

Post-harvest rehabilitation

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

Description 12 Soil Erosion and Water Pollution Control - Evaluation of Soil and Water Data

(a) Soil Erosion and Water Pollution Hazard Categories

Soil Erosion and Water Pollution Hazard Ratings (SE/WPHR) 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 as follows:

SE/WPHR = R x K x LS x C where:

R = 2500	over the whole harvest area
K = 0.06	the default factor, method B4 of the PCL, Sch 3 Part B
S =	As factored in SOILOSS 5.1
L = 20 metres	
C = 0.108	Table 2 Native Thin - Post Harvest Burning,
P = 1.0	

Water Pollution Hazard Categories for the harvest area are set out in Table 9.

Table 9

Water Pollution Hazard Categories

Slope Ranges (Degrees)	Water Pollution Hazard Category	Indicative % of Harvest Area				
		cpt 604	cpt 605	cpt 606	cpt 607	cpt 608
0 ≤ 3°	1	10%	10%	5%	5%	5%
>3° ≤ 13°	2	35%	35%	30%	30%	30%
>13° ≤ 30°	3	50%	53%	60%	60%	60%
>30°	4	5%	2%	5%	5%	10%
Roads	3					

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

R = 2500 **K = 0.06**

(b) Dispersibility

Percent dispersible soil calculations are set out in Table 10. PDS% have been rounded to the nearest whole %.

Subsoils for one soil sample (SS6 in compartment 607) was determined as being dispersible and this has been applied over the whole of the harvest area.

Condition 4.6 contains prescriptions to protect dispersible soils.

References Veness and Associates Report Number VA2097C (24 August, 1997)

(c) Other Factors

There are no other factors which need to be considered in the planned harvesting of these compartments.

Table 10

Percent Dispersible Soil Values - Compartments 604, 605, 606, 607 and 608

Soil Sample	Horizon	EAT	Tested % Clay	Tested D%	PDS%
SS1 - Cpt 604	A Horizon	8	not required	not required	not required
	B Horizon	5	not required	not required	not required
SS2 - Cpt 605	A Horizon	8	not required	not required	not required
	B Horizon	5	not required	not required	not required
SS3 - Cpt 605	A Horizon	8	not required	not required	not required
	B Horizon	2(1)	10	75	8
SS4 - Cpt 606	A Horizon	8	not required	not required	not required
	B Horizon	2(1)	5	55	3
SS5 - Cpt 607	A Horizon	8	not required	not required	not required
	B Horizon	2(1)	9	46	4
SS6 - Cpt 607	A Horizon	8	not required	not required	not required
	B Horizon	2(1)	42	27	11
SS7 - Cpt 608	A Horizon	8	not required	not required	not required
	B Horizon	5	not required	not required	not required
SS8 - Cpt 608	A Horizon	8	not required	not required	not required
	B Horizon	5	not required	not required	not required

2.6 FOREST ZONING AND SPECIAL ATTRIBUTES

Description 13 Forest Zoning and Special Attributes

(a) Research Plots

There are no research plots located within the harvest area.

(b) Permanent Growth Plots

There are no inventory plots or Permanent Growth Plots located in the harvest area.

(c) Special Attributes of the Area.

A Wildlife Corridor (PMP 1.1.7 - Flora and Fauna Protection) exists 40 metres either side of Ewingar Creek. Sections of the corridor occurring outside exclusion areas are shown on the Operational map ie SE section of Cpt 606, SE boundary of Cpt 607 and southern boundary of Cpt 608. Specified forestry activities must be excluded from this corridor.

Subject to the non harvest areas set out in Description 2(a) and the Conservation Protocol and NPWS Section 120 Licence prescriptions set out in conditions 4.5 of this plan, the remainder of the harvest area has a Preferred Management Priority (PMP) zoning 1.1.1. Native Forest-General.

There are no other special attributes.

Part 3
AUTHORISATION CONDITIONS

3.1 COMPLIANCE

(a) Area Identification

HARDWOOD DIVISION
NORTHERN RIVERS REGION
Ewingar State Forest No. 845
Compartments 604, 605, 606, 607 and 608

(b) Third Party/Lessee or Other Interest

The harvest area is covered by Crown Lease No. 1912/2 held by Leonard Reuben Rail and Crown Lease No 1932/6 held by D. Middleton for the purpose of grazing. There are no other third party interests.

(c) Environmental Compliance Requirements

This Harvesting Plan is prepared under contract by Norfor Pty Ltd (A.C.N. 071 356 860) trading as Northern New South Wales Forestry Services for 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 for Native Forests - State Forests and Crown Timber Lands"** (1993).
- The **"Standard Erosion Mitigation Guidelines for Logging in New South Wales" (SEMGL 1993)** issued by the then Soil Conservation Service of Department of Land & Water Conservation (LaWC).
- The conditions of **Pollution Control Licence No 4017** issued by the Environment Protection Authority under the Pollution Control Act 1970. Those general conditions which affect licensees are set out in Schedule "A" attached to every Timber, Contractors and Operators Licence.
- Conditions attached to licences issued by the National Parks and Wildlife Service under the Threatened Species Conservation Act 1995 and the National Parks and Wildlife Act 1974 (NPW Act).
- Conditions resulting from the production of the **Casino Management Area Environmental Impact Statement.**
- The silvicultural specifications as stated in the **Casino Management Area Environmental Impact Statement** (as amended by Operational Circular 95/14 of 30/10/95).
- The schedule of specifications for the harvesting and utilisation of timber applicable to this operation, in this case, the **"Schedule of Compulsory Utilisation Limits for Casino District"**

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

- The **"Standing Instructions for Fire Prevention and Control in State Forests - Casino District".**

(d) Variations, Additions or Amendments

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, or consistent with variation 24A to the Pollution Control Licence.

(e) 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 the Casino Management Area Environmental Impact Statement (EIS) has been produced.

(f) 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 for Native Forests - State Forests and Crown Timber Lands".** Serious breaches may lead to the issue of a penalty notice, licensee suspension or prosecution.

(g) Variations and Amendments to this Harvesting Plan

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

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

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

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

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

(h) Harvesting Plan Availability

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

3.2 CERTIFICATION

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

Prepared by M.J. O'Neill Signature.....

Title Principal Consultant Forester, Norfor Pty (A.C.N. 071 356 860) trading as Northern NSW Forestry Services

Date 17th December, 1997

(b) Regional 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: 9 Febru., 1998

Signature: ..... Regional Planning Manager Date: 3 Febru., 1998

(c) Receipt of External Authority Approvals

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

Table 11

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 - , attachments and the Operational, Forest Types and Locality maps marked and referenced to this Harvesting Plan. This is Harvesting Plan CAS 604-608

Date for commencement of operations: .....

Signature: ..... Date: .....
Regional Planning Manager

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	
Regional Manager	All	
Regional 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	2
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 CAS 604 - 608 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

INDEX TO PART 4 - OPERATIONAL CONDITIONS

Condition 4.1 HARVESTING ACTIVITY DESCRIPTION

The operation will be a low intensity selective harvesting operation in maturing and regrowth native hardwood forest. The products that will be harvested are quota and ex-quota sawlogs, poles, girders and veneer logs.

Condition 4.2 TREE MARKING CODE AND HARVEST REGULATION

The tree-marking Code shown in this Plan must be used to apply other conditions of this plan as required. All necessary tree-marking in the field must be carried out before and during the harvesting operation by the Supervising Forest Officer. Unless otherwise stated in the Harvesting Plan, all tree marking will generally be for removal with all habitat trees and critical boundaries (including non harvest areas and filter strips) being marked within one tree length of a tree marked for removal. Red will be the prefferred tree marking colour.

Where the presence of dense undergrowth and lantana prevent tree marking in advance, the SFO may use harvesting machinery to provide access but must take all practical precautions to avoid entering exclusion areas. Where a critical boundary has been accidentally crossed, it should be noted in the Harvesting Plan and appropriate remedial action taken.

TREE-MARKING CODE

RETAINED TREES	
Trees not to be removed or damaged	Single horizontal stripe
Boundary not to be crossed by harvesting equipment	Two horizontal stripes
Areas where disturbance by harvesting is allowed but machinery access is prohibited	Two horizontal stripes
Line not to be crossed or disturbed by fallers or harvesting machinery at any time	Three horizontal stripes
Private property boundary	Three horizontal stripes or Yellow blaze
National Park or Flora Reserve boundary	Three horizontal stripes
Riparian Buffers/Filter Strips	Three horizontal stripes
Drainage depression buffer strip	Not marked
Wildlife refugia/wildlife corridor/connection corridor	Three horizontal stripes
Other no entry areas for current operation	Three horizontal stripes
Retained hollow-bearing tree	"H" underlined
Retained recruitment tree	"R" underlined
TREES TO BE REMOVED	
Individual tree	Dot
Directional felling mark	Arrow in the direction of fall
Tree jacking mark	"J" & arrow in direction of fall
Tree to be removed at dump	"D" with a dot
Tree to be removed during road line/snig track alignment	Vertical stripe with a dot
Cancellation mark	"X"
TREES MARKED FOR INFORMATION	
Compartment boundary	"O"
Perimeter of canopy gaps	Vertical stripe
Slope angle indication (for operators guidance)	A number in a circle
Approved dump sites	"D"
Road line	Vertical stripe

Condition 4.3 ORDER OF WORKING

(a) Wet Weather, Dry Weather and Intermediate Areas

There are 40 log dumps designated for the harvest area as indicated on the Operational Maps. Harvesting should commence at dump 1 and thereafter dumps must be worked in numerical sequence, unless otherwise authorised by the Supervising Forest Officer.

Log dumps 2 and 5 in compartment 608, 18 and 19 in compartment 607 and 36, 37, 38 and 40 in compartment 604 are to be retained for use in wet weather.

(b) Wet weather controls -Roads

During wet weather, the wet-weather controls set out in Section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests) must apply. In particular:

- Where runoff occurs from a road surface, haulage must not occur unless the road is a gravel or sealed road.

(c) Wet weather controls - Snigging

Snig tracks must not be used where there is runoff from the track surface or there is a likelihood of significant rutting leading to turbid runoff from the track surface.

Condition 4.4 SILVICULTURE

(a) General

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

A moratorium on gap and cluster silviculture techniques currently exists. For stands exhibiting mature trees with little or no advanced growth, application of the "Australian Group Selection" silviculture, as detailed in Jacob's (1955) is an acceptable logging technique during the period of review. It will include the "occasional formation of canopy gaps following the removal of small groups of trees by logging, provided that these gaps:"

(i) be randomly distributed rather than more or less regularly spaced;
(ii) be of a range of sizes that average about 40-50 metres diameter, rather than generally larger gaps averaging about 80 metres; and
(iii) a small amount of site preparation is allowable to encourage development of new regeneration. Site preparation can include;
  - limited felling or tractor pushing of non-commercial trees;
  - creation of an acceptable seed bed and reduce fire hazard by some heaping and burning of tree heads and logging debris;

(iv)full site preparation is not the aim, and preservation of some advanced growth and understorey vegetation is desirable.
(v) if necessary some enrichment planting of commercial tree species naturally occurring in the stand will take place.

(b) Tree Marking

Tree marking must aim at:

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

a) the removal would result in more valuable increment on preferred retained trees (redistribution).
b) the tree has been or is likely to be significantly damaged during the course of harvesting operations.
c) the removal of a small group of merchantable trees would create favourable conditions for the establishment and growth of regeneration.

In general tree marking and supervision must be directed towards:

1. Harvesting for the highest economic end use for which markets are available.
2. Ensuring maximum economic utilisation of all trees felled.
3. Minimising damage to the retained stand and minimising soil disturbance in excess of that required for successful regeneration establishment.

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

(c) Harvesting Debris

Debris from selective harvesting must be removed, or flattened, within 5 metres of the butts of marked hollow-bearing and recruitment trees, dead stags, feed trees and trees within exclusion areas.

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

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

(d) Directional Felling

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

Condition 4.5 FLORA AND FAUNA PROTECTION

(a) Variation to NPWS Section 120 License TS006

The compartments within this harvest area are included in State Forests Plan of Operations for January-June 1998 and the prescriptions contained in the Section 120 license variation apply. The SFO must have a copy of the license variation at the operation site.

(b) Definitions

Specified Forestry Activities: Timber harvesting (including all forms of silviculture), construction and operation of log dumps, cutting of posts, collection of firewood, gravel extraction, harvesting of tea tree oil, road construction (including tracks, fire trails and snig tracks), prescribed burning that is not undertaken in accordance with the provisions of the *Rural Fires Act 1997*, grazing that is not undertaken with the provisions of the *Rural Fires Act 1997* (to the extent controlled by SFNSW) and military activities (to the extent controlled by SFNSW).

Critical Weight Range Vertebrates (CWRV): In this licence, CWRV refers to the following threatened species: Albert's Lyrebird, Bush Hen, Bush Thick-knee, Rufous Scrub-bird, Eastern Bristlebird, Black-striped Wallaby, Brush-tailed Phascogale, Common Planigale, Tiger Quoll, Southern Brown Bandicoot, Rufous Bettong, Long-nosed Potoroo, Long-footed Potoroo, Parma Wallaby, Red-legged Pademelon, Brush-tailed Rock Wallaby, Hastings River Mouse, Smoky Mouse and White-footed Dunnart.

Net logging area: The gross area less PMP exclusion areas, riparian buffers and connection corridors, rainforest protocol exclusions, old growth forest protocol exclusions and rare non-commercial forest type exclusions.

Prescribed burning: Any burning in state forests deliberately undertaken according to prescribed procedures pursuant to the *Bushfires Act 1949*.

SEPP 14: State Environment Planning Policy No. 14 - Wetlands

Streams: Streams as shown on the relevant topographic map as published by the Central Mapping Authority at a scale of 1:25:000. A first order stream is defined as that part of a stream between its point of origin and the first order junction with another stream, whereupon it becomes a second order or higher stream. A third order stream commences at the junction of two second order streams.

Conservation Protocols: The document titled "Conservation Protocols for Timber Harvesting on State Forests for the duration of the IFA decision" (NPWS and SFNSW 29 November 1996).

(c) General Prescriptions

Prescription 1: Rainforest Protocol

No rainforest exists within the harvest area.

Prescription 2: Old Growth Protocol

See Description 8(b) and Table 1 in Description 3.

A total of approximately 191 hectares of old growth forest has been identified within the harvest area from BOGMP maps and stump counts. It is shown on the Operational Maps and the areas by compartment and forest type are set out in Table 1, Description 3. The boundaries have been modified to make field identification easier.

The old-growth boundary should be marked by the SFO with two horizontal stripes (boundary not to be crossed by machinery). Harvesting machinery may cross the boundary along an existing road or snig track identified and shown on the Harvesting Plan to access areas on the other side of the old-growth.

Trees inside the marked old-growth boundary are not to be removed or damaged.

Trees may be felled into the old-growth however all trees inside the marked old-growth boundary are to be given the same protection as marked hollow bearing trees: harvesting and post logging burning must aim to minimise damage to hollow-bearing trees, recrutiment trees and dead stags. The potential for damage should be minimised by techniques of directional felling. Felled heads should be flattened or removed from 5 metres of all trees inside the old-growth boundary.

Prescription 3: Rare, Non-Commercial Forest Types Protocol

No rare non-commercial forest type or IDFA forest types are present within the harvest area.

Prescription 4: Tree Retention

The harvest area is located within the "Non Regrowth Zone" as defined by the Conservation Protocols. The following prescriptions apply and their application must be recorded on the compartment history maps:

Hollow-bearing tree retention

a) A minimum of ten hollow-bearing trees must be retained per two hectares. Where this density is not available, ten trees must be selected from trees with diameters within the largest 30% of the stand.
b) Retained, hollow-bearing trees must be selected from trees with diameters within the largest 30% of the stand and be live trees with good crown development.
c) Retained hollow-bearing trees should represent the range of species that occurs in the area.
d) Trees retained outside the net logging area (see definition at end of licence) must not be counted as hollow-bearing trees.
e) Hollow-bearing trees must be scattered throughout the net logging area.
f) Hollow-bearing trees must be marked for retention.

Recruitment tree retention

a) A minimum of ten recruitment trees must be retained per two hectares.
b) Retained recruitment trees must show potential for developing into hollow-bearing trees with good crown development. Trees in the mature and intermediate growth stages should be retained as recruitment trees.
c) Retained recruitment trees should represent the range of species that occurs in the area.
d) Trees retained outside the net logging area must not be counted as recruitment trees.
e) Recruitment trees must be scattered throughout the net logging area.
f) Recruitment trees must be marked for retention.

Dead stag retention

a) Dead stags must be retained in areas outside the net harvesting area, visual protection strips, and elsewhere where it is safe to do so.
b) Dead stags must not be counted as hollow-bearing trees or recruitment trees.

Protection of hollow bearing trees, recruitment trees and dead stags

Specified forestry activities and post-logging burning must aim to minimise damage to hollow-bearing trees, recruitment trees and dead stags. The potential for damage should be minimised by techniques of directional felling. Felled heads must be flattened or removed from 5m of stems retained to meet this prescription.

Prescription 5: Significant Food Resources

a) Stands where *Allocasuarina* species dominate the canopy should be protected from specified forestry activities. Where more than 30 crushed cones have been found beneath individuals of *Allocasuarina* species, indicating intensive use by the Glossy Black Cockatoo, the tree must be retained.

b) At least 4 mature (>40cm dbh) winter flowering eucalypt species per two hectares must be retained where they occur. Where retained hollow-bearing or recruitment trees meet these requirements, the hollow-bearing and recruitment trees can be counted as food trees.

c) Damage to mature banksias and *Xanthorrhoea* spp. should be avoided during forestry operations.

d) All trees with "V-notch" incisions or other incisions made by the Yellow-bellied Glider must be retained. Where retained hollow-bearing or recruitment trees meet these requirements, the hollow-bearing and recruitment trees can be counted as food trees.

e) Specified forestry activities and post-logging burning must aim to minimise damage to retained feed- trees. The potential for damage should be minimised by techniques of directional felling. Felled heads must be flattened or removed from within 5 metres of stems retained to meet this prescription.

Prescription 6: Riparian Buffers

a) Riparian buffers must be at least 10 metres wide on each side of all first orders streams, and at least 20 metres wide on each side of all second order streams. For at least 80% of third and higher order streams in a Management Area, riparian buffers must be at least 40 metres wide on each side of the stream. The remaining 20% will have a buffer of 20 metres or greater on each side.
b) These buffers must be mapped on the Harvesting Plan Operational Map and clearly recorded in Harvesting Plans. The buffer widths must be clearly indicated on the Harvesting Plan Operational Map.
c) Specified forestry activities, with the exception of road construction and road maintenance where there is no other practical means of access, must be excluded from Riparian Buffers. Road construction and road maintenance through riparian buffers should avoid sites where threatened species have been recorded.
d) All practical precautions should be taken to avoid felling trees into Riparian Buffer zones.

Prescription 7: Connection Corridors

See Description 2(b).

There are three connection corridors 80m wide as shown on the Operational Maps. Specified forestry activities must be excluded from connection corridors, with the exception of road construction and road maintenance where there is no other practical means of access.

All practical precautions should be taken to avoid felling trees into these corridors.

Prescription 8: Wetlands

There are no wetlands within the harvest area.

Prescription 9: Heath

There are no areas of heath within the harvest area.

Prescription 10: Rocky Outcrops

There was no evidence of significant areas of rocky outcrops during field inspections of the harvest area. However there are areas of forest type 234 - Rock within the harvest area. If rocky outcrops are found by the SFO during pre-logging inspections or tree marking, the following prescriptions must be applied:

- Rocky outcrops are defined as areas characterised by a high proportion of exposed rock or boulders relative to the surrounding area, OR, areas with skeletal soils, supporting heath or

shrub communities (sometimes with occasional emergent trees). These sites can occur where the geology varies from the surrounding area (eg. rhyolite outcrops).

- A buffer zone at least 20m wide must be established around all rocky outcrops more than 0.1ha and less than 0.5ha surface area.
- A buffer zone at least 40m wide must be established around all rocky outcrops greater than 0.5ha surface area.
- Specified forestry activities must be excluded from within the buffer. All precautions should be taken to avoid felling trees into this buffer zone.
- Rocky outcrops must be mapped and clearly recorded in Harvesting Plans. Where the scale of the Harvesting Plan Operational Map precludes accurate mapping of the boundary of rocky outcrops the location of the rocky outcrop must be clearly indicated on the Harvesting Plan Operational Map.

Prescription 11: Caves, Tunnels and Disused Mineshafts

No mineshafts or caves were detected during pre-logging flora and fauna surveys. If these features are detected by the SFO during pre-logging inspections or tree marking, the following prescription must be applied:

a) All caves, tunnels and disused mineshafts (with the exclusion of open pits of less than 3m in depth) must be protected by a buffer zone at least 50m wide. Where the NPWS is satisfied that adequate surveys for threatened cave-dependent bats have been undertaken and no Schedule 1 or 2 cave-dependant bats or evidence of Schedule 1 or 2 cave-dependant bats have been recorded, these buffer zones may be reduced to 10m radius. Specified forestry activities must be excluded from these buffer zones.
b) All known threatened microchiropteran bat maternity and hibernation sites must be protected by a 50m buffer zone. Specified forestry activities must not be conducted within this buffer zone. Within 50 to 100m of the site a maximum of 50% canopy reduction can occur.
c) Caves, tunnels and disused mineshafts and their buffer zones must be mapped and clearly recorded in Harvesting Plans. Where the scale of the Harvesting Plan Operational Map precludes accurate mapping of these features, the location of the feature must be clearly indicated on the Harvesting Plan Operational Map.

Prescription 12: Burning

When fulfilling their responsibilities under the *Rural Fires Act 1997*, SFNSW should take account of the following principles.

a) Prescribed burning regimes should take account of wildlife history and reflect the ecological requirements of any threatened species, or their habitat, known or likely to occur in the area. Burning should be varied by season, intensity and interval.
b) Prescribed burning should be conducted in a manner which promotes and maintains an understorey mosaic which includes significant areas of dense understorey vegetation, particularly within the habitat of CWRV.
c) In areas where intervals between fires are less than five years, prescribed burning should be conducted in a manner that minimises the impact on understorey vegetation and large fallen logs (> 40 cm dbh and 5m in length).

Prescription 13: Pre-logging site inspections

a) Persons conducting pre-logging and pre-roading site inspections must search for and record the following threatened species habitat features:

    i) nest, den and roost sites (especially raptor and owl nest and roosts, and nests and dens of threatened hollow-dependent species);
    ii) owl pellets, distinctive scats (eg. Tiger Quoll, Koala and Brush-tailed Rock Wallaby scats), a sample of predator scats and distinctive tracks (eg. Tiger Quoll);
    iii) latrine and den sites of the Tiger Quoll;

iv) crushed cones beneath *Allocasuarina* spp;
v) yellow-bellied glider "v-notch" trees and trees with other incisions made by Yellow-bellied Gliders;
vi) skeletal remains;
vii) caves, tunnels and disused mineshafts;
viii) diggings made by potoroos and bandicoots.

b) Records of these features must be provided to the relevant NPWS Zone Office within ten working days of the completion of the survey reports.

Prescription 14: Ground Habitat Protection

SFNSW should take reasonable measures to protect ground habitat (understorey, ground cover, large logs on the forest floor) from specified forestry activities.

Prescription 15: Other Conditions

a) Rural Fires Act
Notwithstanding any of the above conditions, SFNSW may carry out activities necessary for its compliance with the provisions of the Rural Fires Act 1997

b) Notification
Where any of the conditions of this licence requires a matter to be notified to the NPWS, approved by the NPWS or some other action by the NPWS, then NPWS means the Manager of the NPWS Northern Zone or his delegate.

c) Cumulative Effect
In the event that the cumulative of the Prescriptions of this letter leads to more than a 20% reduction in the net logging area in, or significantly compromises the silvicultural objectives for this compartment, SFNSW may seek a review of the Prescriptions. The NPWS must consult with the relevant Harvesting Advisory Board as necessary prior to completion of any such review.

(d) Species-specific Threatened Fauna Prescriptions - GIS and Pre-logging Survey Records

Based on GIS data and pre-logging surveys the following Schedule 1 and 2 Fauna (Threatened Species Act 1995) have been recorded within or within 5 kilometres of the harvest area.

MAMMALS	BIRDS	REPTILES
Brush-tailed Rock Wallaby	Sooty Owl	Three-toed Snake-toothed Skink
Squirrel Glider	Powerful Owl	
Yellow-bellied Glider	Masked Owl	
Koala	Glossy Black Cockatoo	
Long-nosed Potoroo		
Rufous Bettong		
Tiger Quoll		
Parma Wallaby		
Little Bent-wing Bat		
Golden-tipped Bat		

The location of these records are set out in Table 2, Description 9.

Prescription TS1: Powerful Owl and Masked Owl

Where there is a Powerful Owl, or Masked Owl record, or both in the compartment or within 2km of the compartment boundary, the following must apply:

a) Pre-logging surveys for roost and nest sites along gully lines and heads of gullies must be conducted within 50m of the net logging area.
b) Specified forestry activities must be excluded from within 50m of a Powerful Owl or Masked Owl nest site, and from within 30m of a permanent roost site. (A permanent roost site is defined as a roost that shows evidence of more than one visit/use) unless specifically authorised by NPWS.
c) The location of nest or roost sites must be indicated on Harvesting Plan Operational Maps.
d) Northern Rivers Region has an agreed owl reservation protocol with NPWS for Ewingar State Forest.
e) Potential habitat that has been retained to meet this protocol is shown on the Operational Maps. by way of the Owl Landscape Map attached to this plan.
f) Specified forestry activities must be excluded from the retained potential habitat.
g) Where information indicates that an abundance of more than one Greater Glider per hectare exists within 2km of a Powerful Owl record, eight habitat trees per hectare should be retained within the net logging area.

Prescription TS2: Sooty Owl

Where a record of a Sooty Owl exists in the compartment or within 2km of the compartment boundary, the following must apply:

a) Pre-logging surveys for roost and nest sites along gully lines and heads of gullies must be conducted within 50m of the net logging area.
b) Specified forestry activities must be excluded from within 50m of a Sooty Owl nest site, and from within 30m of a permanent roost site. (A permanent roost site is defined as a roost that shows evidence of more than one visit/use) unless specifically authorised by NPWS.
c) The location of nest or roost sites must be indicated on Harvesting Plan Operation Map.

Prescription TS3: Squirrel Glider

Where a record of a Squirrel Glider exists in a compartment or within 400m of the compartment boundary, the following must apply.

a) Logging must be excluded from an 8ha area centred on Squirrel Glider records. This 8ha area should cover gully, midslope and ridgetop areas where possible.
b) Areas of habitat retained to meet this prescription must be identified and mapped in the Harvesting Plan Operational Map as excluded from harvesting.
c) When 10 of these areas, separated by 2km or more, are retained over a two year period in any one SFNSW Management Area, SFNSW may apply to the NPWS for a review of this prescription.

Prescription TS4: Yellow-bellied Glider

a) Persons conducting pre-logging and pre-roading surveys and site inspections must search for Yellow-bellied Glider sap feed trees (ie. "v-notch" trees and trees with other incisions made by Yellow-bellied Glider).
b) All Yellow-bellied Glider sap feed trees must be retained. Within a 100m radius of retained sap feed trees, and records of the Yellow-bellied Glider, 15 additional feed trees must be retained. The additional retained feed trees should be of the same species as the identified sap feed tree, or trees that shed their bark in long strips, eg species from Blue, Flooded, Grey, Red and White Gum groups, or both. The retained feed trees must be >30cm dbh where available.
c) A 50m buffer must be established around all Yellow-bellied Glider den sites. Logging must be excluded from this buffer. The location of known den site and den sites located during harvesting operations must be indicated on the Harvesting Plan operational Maps.

Prescription TS5: Critical Weight Range Vertebrates (CWRV) - Tiger Quoll, Parma Wallaby, Long-nosed Potoroo and Brush-tailed Rock Wallaby

For the purposes of this prescription, the following habitat is thought to be critical for these species:

- Parma Wallaby - rainforest, rainforest ecotones and wet sclerophyll forest with an understorey containing rainforest species;
- Tiger Quoll - moist gullies, wet sclerophyll forest, rainforest and fallen logs with a diameter greater than 40cm;
- Brush-tailed Rock Wallaby - rocky scarps with wet and dry eucalypt forests adjacent to grassland and steep rocky terrain.
- Long-nosed Potoroo - Diverse habitat utilising open areas for foraging and dense ground cover/understorey for shelter and protection. Often associated with gullies and forest ecotones.

The following **general prescriptions** will apply:

Where a record exists of a CWRV, as defined in Condition 4.5(b) of this plan, in the compartment or within 2km of the compartment boundary (or a Tiger Quoll record within 5km), the following must apply.

a) A 20m buffer must be established around all areas of rainforest Category A and Category B (as defined in the Rainforest Protocol) within the compartment. Machinery must not enter this buffer. Trees may be felled out of and into the buffer. Trees must not be felled out of or into the rainforest. *(NOTE: There is no rainforest within the harvest area).*
b) Commercial and private firewood licences should specify that fallen hollow logs over 40cm diameter should not be removed.
c) Feral predator surveys should be conducted after harvesting operations using day light or nocturnal techniques or both. Species specific control measures should be undertaken to remove feral predators as required and reasonable, using the results of the surveys to justify the action taken.
d) Results of feral predator surveys must be provided to the NPWS Northern Zone office.
e) The area covered by fuel reduction burns should not exceed 75% of the net logging area in any one compartment.
f) Grazing regimes should aim to minimise adverse impacts on CWRV species.

In addition to the above, the following species-specific conditions must be applied.

Tiger Quoll

a) Where there is a record (observation, latrine, den site, hair analysis) of Tiger Quoll in the compartment or within five kilometres of the compartment boundary the exclusion zones listed below must be established. Placement of these exclusion zones should take into account the location of Tiger Quoll records.

    i) maternal den sites exclusion zone: 12ha exclusion with link to riparian buffers.
    ii) permanent den sites exclusion zone: 3.5ha exclusion with link to riparian buffers.
    iii) latrine sites exclusion zone: 12ha exclusion.

The location of these exclusion zones must be mapped on the Harvesting Plan Operational Map.

Long-nosed Potoroo

a) Where there is a record of a Long-nosed Potoroo in the compartment or within two kilometres of the compartment boundary harvesting and burning must be excluded from a five metre buffer around six trees per hectare. These six trees can include trees retained under General Prescriptions 4 and 5.

Prescription TS6: Threatened Bats

Where there is a record of a threatened bat in the compartment or within 5km of the compartment boundary the following must apply:

a) If threatened fruit-bats are detected during pre-harvest inspections, the full extent of the roosting camp must be identified on the Harvesting Plan Operational Map.
b) Likely microchiropteran bat roost trees should be inspected prior to operations commencing within 100m of such trees. Likely roost trees are dead stags greater than 100cm cbh; or large trees with accessible base hollows.
c) Post-logging burning should plan for no more than 75% coverage of the gross harvesting area in areas where threatened bats have been detected.
d) In addition to the above the following species specific prescriptions must be applied where the species has been recorded in the compartment or within 50 metres of the compartment, or in the case of *Kerivoula papuensis* within 200 metres of the compartment. If these species have been recorded within 5 kilometres of the compartment boundary an appropriate survey for the species must be conducted within the compartment:

Golden-tipped Bat

a) A 40 metre wide buffer must be established on both sides for 200 metres upstream and 200 metres downstream of the stream closest to the record of the species. Specified forestry activities must be excluded from these buffers.
b) These buffers must be marked on the Harvesting Plan Operational Map.

Little Bent-wing Bat

a) Where there is a record of this species in the compartment or within five kilometres of the compartment, SFNSW and NPWS must develop a management strategy for forests around known maternity and hibernation sites of the species.

Prescription TS7: Glossy Black Cockatoo

a) A 50 metre radius buffer must be established around all Glossy Black Cockatoo nest sites. Specified forestry activities must be excluded from this buffer. The buffer must be mapped on the Harvesting Plan Operational Map.

b) When ten Glossy Black Cockatoo nest buffers are retained over a two year period in any one SFNSW Management Area, SFNSW may apply to the NPWS for a review of this prescription.

Prescription TS8: Koala

A pre-logging Koala survey was undertaken in August 1997 according to the methodology prescribed in the Conservation Protocols. Transect location maps and data sheets are stored in the Compartment History Files. A summary of the results of the transects are attached to this plan as Appendix 2.

The pre-logging Koala survey has indicated that for the purposes of this plan:

- compartments 604, 605 and 607 are low use compartments;
- compartments 606 and 608 are intermediate use compartments; and
- there are no high use areas.

The Koala Prescription for North Coast Forests is attached to this plan as Appendix 3.

The following prescriptions apply to this harvest area:

(a) Dialogue with Contractors

The SFO must ensure continued dialogue with contractors at both the tree marking and operational phase to ensure knowledge and attitude is compatible with compliance with this prescription on all compartments. The SFO must ensure that contractors are aware of any exclusion zones, including tree marking rules, for the protection of individual Koalas or Koala habitat.

(b) Detection of a Koala or Koalas during tree marking or logging operations

Individual Koalas will be protected from tree felling operations wherever detected. A tree containing a Koala will not be felled or damaged while the Koala is known to be in the tree.

If a Koala is observed during marking or logging (in an area that has not previously been found to be a high use area), numerous dung pellets (more than twenty below a tree) are found, or where less than twenty pellets of two markedly disparate sizes (medium plus about half sized) are found the following procedure will be followed:

- The SFO must clearly mark a 50 metre exclusion area around the detection site.
- Walk transects will be initiated consisting of eight transects in the cardinal and sub-cardinal directions, and centred on the observation, to determine the extent of any high use area that may occur. The sampling will be at the same rate as the transect method described in the Koala Prescription for North Coast Forests, with primary and then secondary browse species as targets for dung searches. For this harvest area primary browse species include Tallowwood, Grey Gum, Forest Red Gum and Swamp Mahogany. Secondary browse species include larger Forest Oak and Broad-leaved Paperbark. Brush Box, Turpentine, Rough-barked Apple and Bloodwood may be incidental browse species.
- These transects shall be carried out for at least 100 metres beyond any delineation of a high use area. Where the person undertaking the transects is satisfied that Koala habitat is present they may choose to forego the interior parts of the transects and commence survey near what they consider to be the edge of the high use area.
- Any high use area boundary found will be checked by inspection around the perimeter defined by the transects. The results of this inspection will be recorded as a concise narrative on the data sheet and mapped to an Amendment to the Harvesting Plan.
- The results and maps will be promptly forwarded to NPWS (see Reporting Section).
- All tree felling will be modified within intermediate use areas (see (c) below).

(c) Intermediate Use - Compartments 606 and 608

Within these compartments the following prescriptions will apply:

- Ten primary browse species (or secondary browse species if primary species are unavailable) will be retained per hectare.
- Retained trees may include hollow-bearing or recruitment trees if they meet the browse requirements.
- Retained trees must be clearly marked for retention by the SFO.
- Gap creation for silvicultural purposes will not occur in preferred forest types.

(e) Other General Prescriptions

- Isolated individual trees with more than 20 dung pellets beneath shall be marked for retention and logging debris shall be removed at least 10 metres from their base.

- During tree marking, primary browse trees should be briefly scanned for Koalas and Koala pellets (see next section for description of required action if a koala is detected).
- Post-logging burning - As far as practicable post logging fire is to be kept out of the area reserved from logging for the protection of Koala habitat.

Prescription TS9: Three-toed Snake-toothed Skink

The general prescription contained within Condition 4.5(c) will adequately protect this species should it occur in the harvest area.

(e) Species-specific Threatened Fauna Prescriptions - Fauna likely to be present

The following species *have not* been recorded within or within 5 kilometres of the harvest area. However pre-logging surveys indicated that habitat suitable for these species could be expected to occur within the harvest area:

MAMMALS	BIRDS
Black-striped Wallaby	Square tailed Kite
Brush tailed Phascogale	Red Goshawk
Red-legged Pademelon	Bush Thick-knee
Eastern Little Mastiff Bat	Regent Honeyeater
Common Bent-wing Bat	Swift Parrot

Sightings during pre-logging inspections, tree marking or logging will trigger the following prescriptions.

Prescription TS10: Black-striped Wallaby

The application of Standard Environmental prescriptions for Critical Weight Range Vertebrates must be applied if a reporting of this species occurs during tree marking or logging.

Prescription TS11: Red-legged Pademelon

The application of Standard Environmental prescriptions for Critical Weight Range Vertebrates must be applied if a reporting of this species occurs during tree marking or logging.

Prescription TS12: Brush-tailed Phascogale

The application of Standard Environmental prescriptions for Critical Weight Range Vertebrates must be applied if a reporting of this species occurs during tree marking or logging.

Prescription TS13: Bush Thick-knee

The application of Standard Environmental prescriptions for Critical Weight Range Vertebrates must be applied. In addition the following species specific prescriptions must be implemented:

a) A 20m buffer must be established around all Bush Thick-knee nest sites.
b) Specified forestry activities must be excluded from this buffer. The location of these nest sites must be indicated on the Harvesting Plan Operational Map.

Prescription TS14: Square-tailed Kite

Prescriptions for this species have not been agreed upon. Any sightings must be immediately reported to Regional Office.

Prescription TS15: Red Goshawk

Prescriptions for this species have not been agreed upon. Any sightings must be immediately reported to Northern Rivers Regional Office.

Prescription TS16: Regent Honeyeater

The application of the general prescriptions in Condition 4.5(c) of this plan should adequately protect this species

Prescription TS17: Swift Parrot

Where this species is detected, harvesting must be temporarily excluded from flowering eucalypts.

Prescription TS18: Common Bent-wing Bat

See Prescription TS6.

Prescription TS19: Eastern Little Mastiff Bat

See the general prescription for threatened bats under Prescription TS6. In addition, the following species specific prescription must be applied:

a) Should this species be recorded a provision of a 50 metre exclusion zone around any known roost sites harbouring more than 3 individuals of the species. Specified forestry activities must be excluded from these buffers.
b) These buffers must be mapped on the Harvesting Plan Operational Map.

(f) Wildlife Corridor

A Wildlife Corridor (PMP 1.1.7 - Flora and Fauna Protection) exists 40 metres either side of Ewingar Creek. Sections of the corridor occurring outside exclusion areas are shown on the Operational map ie SE section of Cpt 606, SE boundary of Cpt 607 and southern boundary of Cpt 608. Specified forestry activities must be excluded from this corridor.

(g) Reporting Procedures

Contractors and supervisory staff must immediately report any sightings of threatened species to the Regional Planning Manager. Such confirmed sightings or findings will generate the application of the appropriate prescriptions under the conservation protocols to reduce the impact on the species. This plan must be amended to include the prescriptions if necessary.

Condition 4.6 SOIL EROSION AND WATER POLLUTION CONTROL CONDITIONS

(a) Soil Erosion and Water Pollution Categories

The calculated Soil Erosion and Water Pollution Categories for compartments 604, 605, 606, 607 and 608 are detailed in Table 12.

Table 12

Water Pollution Hazard Categories

Slope Ranges (Degrees)	Water Pollution Hazard Category	Indicative % of Harvest Area				
		cpt 604	cpt 605	cpt 606	cpt 607	cpt 608
$0 \leq 3°$	1	10%	10%	5%	5%	5%
$>3° \leq 13°$	2	35%	35%	30%	30%	30%
$>13° \leq 30°$	3	50%	53%	60%	60%	60%
$>30°$	4	5%	2%	5%	5%	10%
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, Drainage Feature Crossings, Log Dumps and Soil and Water Pollution Control Measures

The marking and field location of roads, log dumps and drainage feature crossings in the field must be in accordance with Conditions 4.2 and 4.6 of this plan. The location of roads, drainage feature crossings and log dumps are indicated on the Operational Maps.

The marking of soil protection and water pollution control measures in the field must be in accordance with Conditions 4.2 and 4.6. Their location is indicated on the Operational Map. The final and precise location of such features must only be determined by the Supervising Forest Officer.

(d) Wet Weather Controls

Harvesting operations may be conducted throughout the year subject to the application of normal wet weather closure procedures as per Section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests).

During wet weather, the wet weather controls for road usage and for snigging set out in section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests) must apply. In particular:

- where runoff occurs from a road surface haulage must cease on natural surface roads;
- where there is runoff from a snig track surface snig tracks must not be used;
- where there is a likelihood of significant rutting leading to turbid runoff from a snig track surface snig tracks must not be used;
- when it is raining operations must cease.

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

There are no log dumps allocated for use in wet weather in this harvest area.

(e) Dispersible Soils - General Prescription

The subsoil for one soil sample (SS6 - Compartment 607) was determined as being dispersible and this has been applied for all soils within the harvest area.

The following measures must be undertaken to ensure the protection of dispersible soils:

- road construction and crossbank construction must avoid exposing the subsoil wherever practicable;
- no more than 30% of the dispersible subsoil, measured over any 20 metre length of track, must be exposed on extraction tracks or snig tracks. This must be achieved by:

    i) maintaining topsoil cover, and
    ii) using wherever possible logging slash and walkover extraction techniques.

Site Specific measures for the protection of dispersible subsoils in road maintenance, road construction, snig track construction, road and track drainage, log dumps and replacement and repair of drainage feature crossings are specified in Conditions 4.6(f), (g), (m), (o) and (p).

(f) Existing Roads

Responsibility for Road Maintenance

All road maintenance or gravelling will be undertaken by State Forests or its contractors and not as part of the harvesting contractor's requirements.

Conditions relating to the opening and/or maintenance of existing roads are contained in Attachment 2 page 63.

(g) Road Construction

Responsibility for Road Maintenance

Conditions relating to road construction are contained in Attachment 2 page 63.

(h) Slope limits for the area

Table 13 sets out the slope limits for the harvest area:

Table 13

Slope Limits for Compartments 604 to 608

Activity	Maximum Slope
Maximum slope for ground based harvesting	30 degrees
Maximum grade of snig tracks	25 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

The SFO is responsible for identifying and marking slopes over 30° in the field. The SFO must advise the operator where these slopes occur.

(i) Drainage Feature Protection

Wildlife Corridors

See Condition 4.5(f).

Riparian Buffers and Connection Corridors - Conservation Protocols

For riparian buffers see Prescription 6, Condition 4.5(c).

For connection corridors see Prescription 7, Condition 4.5(c).

Filter and Drainage Depression Buffer Strips - Pollution Control Licence

Filter strips are shown on the Operational Maps. Where they are not embedded in wildlife corridors, connection corridors or riparian buffers, filter strips must be retained along all drainage lines within the harvest area at minimum widths as set out in Table 14.

Table 14

Minimum Widths of Filter Strips where they are not embedded in wildlife corridors, connection corridors or riparian buffers

Protection	Water Pollution Hazard category							
	1 (0° ≤ 3°)		2 (>3° ≤ 13°)		3 (>13° ≤ 30°)			
					< 18 degrees *		> 18 degrees *	
	< 40 ha	> 40 ha	< 40 ha	> 40 ha	< 40 ha	> 40 ha	< 40 ha	> 40 ha
Filter Strip Width	5m	10m	10m	15m	15m	20m	20m	30m

* Refers to the ground slope within the filter strip.

Where a riparian buffer is wider than the filter strip width specified above, the filter strip width will be extended to the width of the riparian buffer.

In addition drainage depression buffer strips of 5 metres width either side of the drainage depression must be retained on both sides of all drainage depressions.

The width of filter strips and drainage depression buffer strips must be measured on the horizontal plane.

(j) Tree Marking Rules for Riparian Buffers, Filter Strips and Buffer Strips

The SFO must mark the riparian buffers and filter strips in the compartment progressively ahead of harvesting operations. Riparian buffers and filter strips need not be marked where there is no tree marked for removal within a tree length of the riparian buffer or filter strip.

Where the presence of dense undergrowth and lantana prevent tree marking in advance, the SFO may use harvesting machinery to provide access but must take all practical precautions to avoid entering exclusion areas. Where a critical boundary has been accidentally crossed, it should be noted in the Harvesting Plan and appropriate remedial action taken.

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

(k) Felling and Extraction from Filter Strips

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

Trees must not be felled into filter strips.

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

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

(l) Felling and Extraction within Drainage Depression Buffer Strips

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

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

- the use of walkover extraction techniques wherever possible; and
- no snigging along drainage depressions; and
- operating with the blade up at all times; and
- preventing skewing of machinery tracks (by approaching logs in reverse gear, and minimal changes in direction while snigging logs out of the buffer strip).

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

(m) Extraction and the Use of Snig Tracks

Wherever practicable, walkover extraction techniques must be used in preference to snig track construction.

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

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

Snig tracks must be drained to minimise the flow of water along them and the flow of water directly into watercourses, drainage lines or onto roads and dumps. Drainage must be effected within 2 days of the completion of use, or where operations are to be temporarily suspended in accordance with Table 15.

Table 15

Drainage of Snig Tracks at Temporary Cessation of Operations

Slope boundaries	WPH Category	No. Days
0° ≤ 3°	1	10
>3° ≤ 13°	2	8
>13° ≤ 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 16. Cross-banks must be constructed at right angles to the direction of the snig track.

Table 16

Maximum Earth Bank Spacing

Track Grade (degrees)	WPH Category		
	1 (0° ≤ 3°)	2 (>3°≤ 13°)	3 (>13° ≤ 30°)
0 ≤ 5	200 m	150m	100m
>5 ≤ 10		100m	60m
>10 ≤ 15		60m	40m
>15 ≤ 20			25m
>20 ≤ 25			20m
>25 ≤ 30			15m

The above spacings are the maximums and should be varied to utilise the most suitable outlet point.

Crossbanks must be discharged into undisturbed vegetation or logging debris. Snig tracks leading directly into watercourses and drainage lines, or onto roads and log dumps, must be drained to minimise the catchment area immediately above the drainage feature, road or dump.

Blading off of snig tracks is not permitted.

Dispersible Soil Protection - Construction and Use of Snig Tracks

Where more than 30% of subsoil is exposed on any 20 metres length of snig track the exposed subsoil must be covered with logging debris or windrowed topsoil. If this is not practical the exposed subsoil must be immediately seeded with rye grass or other suitable species (by the SFO) at a rate of 20kg per hectare or no more than 5 days following completion of extraction.

(n) Downhill Snigging

Limited downhill snigging is required to dumps 3, 4 and 7 in compartment 608, dumps 8 to 11, 13 to 17 and 19 in compartment 607, dumps 20, 21 and 23 in compartment 606, dumps 24 to 26, 29 and 31 in compartment 605 and dumps 30, 32 to 35 and 39 in compartment 604.

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

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

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

(o) Snig Track Drainage Line Crossings

- All snig track watercourse and drainage line crossings must be approved by the SFO before construction and must be open causeways utilising the natural surface at the site.
- Crossings must be rehabilitated after use, and any harvesting debris inadvertently deposited during use must be removed from the channel.
- Stabilisation work at crossing approaches must be completed within five (5) days of crossing construction. As far as practicable the crossing point must be reshaped to its original condition and seeded with rye grass or another suitable species (by the SFO) at the rate of 20 Kg/ha.

(p) Log Dumps

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

To protect **dispersible subsoils** topsoil must not be stripped from the log dump site.

Dumps must be constructed with outfall drainage and must be kept drained during use and at the completion of operations. Runoff must be dispersed onto stable surfaces, and not discharged directly onto watercourses or drainage lines or onto snig tracks.

At the completion of operations any debris at or near the edge of a dump must be moved away from standing vegetation into the dump area. The topsoil must be respread uniformly over at least 70% of the dump area to a depth of at least 5 cm. The dump must be left in a neat and stable condition.

Dispersible Soil protection - Log Dumps

Where dispersible soils are exposed during dump use they must be immediately seeded with rye grass or other suitable species (by the SFO) at the rate of 20kg per hectare or within 5 days of completion of log dump use.

(q) Prescribed Burning

Pre-logging burning

There must be no pre-logging burning associated with the harvesting of compartments 604 to 608.

Post-logging burning

Post-logging burning of Compartments 604 to 608 must be carried out in accordance with provisions and specifications of the Casino District Fuel Management Plan and consistent with the requirements of the Conservation Protocols.

Objectives

Post-logging burning objectives for the compartment are:

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

- to promote good seedbed conditions for regeneration.

Ignition

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

Preferred season to burn

February to August.

Condition 4.7 RESEARCH AND INVENTORY PLOTS

There are no research or inventory plots located within the harvest area.

Condition 4.8 MODIFIED HARVEST CONDITIONS

(a) Riparian Buffers and Connection Corridors

See Prescriptions 6 and 7, Condition 4.5(c).

(b) Wildlife Corridor

See Condition 4.5(f).

(c) Old Growth Forest

See Prescription 2, Condition 4.5(c).

(d) Sites of Cultural and Heritage Significance

The artefact site at Bulldog Rock (AMG 445400E, 6785850N) is on the northern side of Bulldog Road and outside the harvest area. It will not be impacted on by the operation and no special conditions are proposed. There are no other records or evidence of any cultural or heritage sites within the harvest area.

Further inspections will be undertaken by the Casino Aboriginal Cultural Heritage Officer prior to operations commencing. In the event that further sites are located the local Aboriginal Land Council must be consulted and appropriate measures taken to protect the sites.

(e) Other (eg boundary fences)

There are a number of permanently maintained fences around the boundary of the harvest area. In addition the erection of temporary fences by the lessee may occur from time to time. Damage to fences must be avoided. Any damage caused must be immediately repaired.

Condition 4.9 SPECIFICATION OF TYPE OF PRODUCTS TO BE REMOVED

Product 1	Quota sawlogs	See "Casino District schedule of compulsory utilisation limits for sawlogs"
Product 2	Ex-quota sawlogs	See "Casino District schedule of compulsory utilisation limits for sawlogs"
Product 3	Veneer Logs	- Approved State Forests specification for eucalypt veneer logs - Minimum log length 4.2m and minimum utilisable length 2.1m - Minimum small end diameter under bark 30cm
Product 4	Poles and Girders	- Conforming with AS 2209 for poles and suitable for current orders

Yield Information for Compartments 604 to 608

Estimated Yields are:

Compulsory Sawlogs 40 cm +	2,000 cubic metres gross
Compulsory Sawlogs <40 cm	500 cubic metres gross
Salvage Sawlog	500 cubic metres gross
Poles	100 cubic metres gross
Veneer Logs	Negligible

No analysis of volumes by species or size classes is available.

Part 5
CONDITIONS FOR SUPERVISING FOREST OFFICERS (SFOs)

Condition 5.1 SFO'S 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, monitoring, approved variations to the harvesting plan and reporting generally is:

The Casino Hardwood Marketing Foreman, Northern Rivers Region.

(b) Relieving SFOs

Relieving SFOs, if required, are:

The Casino Marketing Foreman, Northern Rivers Region ,
The Acting Casino Marketing Foreman, Northern Rivers Region ,
The Harvest Planning Forester, Northern Rivers Region,

(c) SFO's authority

The SFO has 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 must be open causeways;
- the sowing of roads, snig tracks, drainage line crossings and relief culverts where dispersible subsoils are exposed or where seeding is otherwise required; and
- the closure of natural surface causeways when excessive rutting or excessive powdering has occurred.

All approvals must be noted on a Harvesting Plan Variation Form and copies attached to the relevant master copies of the Harvesting Plan.

Condition 5.2 TREE MARKING AND OTHER HARVESTING CONTROL REQUIREMENTS

(a) Tree Marking for Forest Management and Silviculture

Normal Regional practices for tree-marking, as detailed in condition 4.2, must apply.

Flora and Fauna Protection

See Conditions 4.2 and 4.5.

Marking of hollow-bearing and recruitment trees

Hollow-bearing and recruitment trees must be marked for retention by the SFO according to Prescription 4 in Condition 4.5(c).

Marking of Roost/Den trees and Feed Trees

Den, Roost and feed trees must be marked for retention by the SFO according to Condition 4.5

Non-harvest areas and modified harvest areas

The boundaries of old growth forest, wildlife corridors, connection corridors, riparian buffers and filter strips must be marked ahead of harvesting operations.

Old Growth, wildlife corridors, connection corridors, riparian buffers and filter strips need not be marked where there is no tree marked for removal within a tree length of the corridor, buffer or filter strip.

(b) Soil Erosion and Water Pollution Control

Road Construction/maintenance

The SFO is responsible for identifying those sections of permanently maintained road within the harvest area and described in Description 10(h) and Attachment 2 that require routine road maintenance.

The Casino Operations Foreman is responsible for supervision of road construction/maintenance operations and construction or repair of drainage feature crossings, and must ensure that such operations are in accordance with conditions specified in Attachment 2.

Marking of filter strips and drainage depression buffer strips

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

Filter strips, connection corridors and riparian buffer strips must be retained along all drainage features at the minimum widths as specified on the Operational Maps.

The SFO must mark the riparian buffers and filter strips in the compartment progressively ahead of harvesting operations. Riparian buffers and filter strips need not be marked where there is no tree marked for removal within a tree length of the riparian buffer or filter strip.

Similarly, where filter strip requirements exceed riparian buffers there is no need to mark riparian buffers.

Where the presence of dense undergrowth and lantana prevent tree marking in advance, the SFO may use harvesting machinery to provide access but must take all practical precautions to avoid entering exclusion areas. Where a critical boundary has been accidentally crossed, it should be noted in the Harvesting Plan and appropriate remedial action taken.

Drainage depression buffer strips

Drainage depression buffer strips will not be marked. Contractors and operators are responsible for detecting drainage depressions encountered in the field.

The SFO is responsible for ensuring that contractors and operators are taking appropriate protective precautions within the buffer strip area whilst operating or traversing the drainage depression (See also Condition 4.6(l)).

Slope limits

Water pollution hazard categories will be identified in the field using a clinometer.

The SFO is responsible for identifying and marking in the field areas with slopes greater than 30^0 where harvesting is not permitted.

Condition 5.3 MONITORING AND REPORTING

(a) Daily and Fortnightly Reporting

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

(b) Fauna Reporting and Mitigation Prescriptions

Reports of sightings of any Threatened fauna must be made to the Regional Planning Manager within 24 hours of the sighting being made, as required in Condition 4.5(g). For any of the animal species listed in Condition 4.5 the stated mitigation prescriptions shall be immediately applied.

(c) Soil Erosion and Water Pollution Control Conditions

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

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

(d) Dispersible Soils - roads, snig tracks, road and track batters and drainage feature crossings and approaches

The SFO must evaluate the stability of the following:

- all existing and constructed roads and snig tracks used in the operation;
- disturbed road edges and batters;
- all road drainage structures, including table drains, mitre drains, rollover and spoon drains; and
- all road and snig track drainage line crossings and their approaches.

If dispersible subsoil has been exposed, or stabilisation of any of these features is required, they must be immediately seeded by the SFO with rye grass or other suitable species at the rate of 20kg per hectare or within 5 days of construction, maintenance or completion of the operation in that part of the harvest area.

The satisfactory completion of sowing operations must be recorded in the fortnightly report.

(e) Post Harvest Rehabilitation

The Supervising Forest Officer must evaluate newly constructed roads, snig tracks, road batters, drainage structures, drainage line crossing and relief culvert approaches for stability. If required crossing or culvert approaches must be seeded by the contractor with rye grass at the rate of 20kg per hectare within 5 days of the completion of construction. Sowing is required where the SFO does not consider that groundcover will attain 70% within 12 months. The satisfactory completion of sowing operations must be recorded in the fortnightly report.

The SFO must ensure that minor roads are bedded down and closed in accordance with Condition 4.6 (f).

Condition 5.4 PRE- AND POST-LOGGING BURNING

(a) Pre-logging Burning

There must be no pre-logging burning associated with the harvesting of Compartments 604 to 608.

(b) Post-logging Burning

Post-logging burning of Compartments 604, 605, 606, 607 and 608 must be carried out in accordance with provisions and specifications of the Casino District Fuel Management Plan.

Ignition

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

Burning must be undertaken by restricting ignition to top disposal burning 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.

Slope Limits for burning.

There are no slope limits for burning in these compartments.

Other considerations

Wherever practical the requirements for the protection of threatened flora and fauna as outlined in Condition 4.5 must be taken into account during the planning and carrying out of post harvest burning.

Recording of burning activities

All post-logging burning activities must be recorded on the Day of the Burn Checklist on a daily basis and reported on the Post-Burning Checklist.

Where a post-logging burn has intruded into a filter strip or non harvest area, caused significant cambial damage to retained trees or exposed more than 15% of soil on undisturbed areas, the SFO must assess the potential for increased water pollution and if necessary put in place additional control measures.

The EPA must be notified within 7 days of the lighting of the burn, with details of location, remedial measures instituted and a copy of the post-burn checklist.

Condition 5.5 OTHER INSTRUCTIONS

There are no other instructions.

Condition 5.6 SUPERVISING FOREST OFFICER'S ACKNOWLEDGMENT

I acknowledge that I have received a copy of Harvesting Plan No CAS 604 - 608 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 Regional Planning Manager.

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

Position: .....
Supervising Forest Officer

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

Position: .....
Relieving Supervising Forestry Officer

ATTACHMENT 1
CLEARANCE CERTIFICATE

HARVESTING PLAN No. CAS604-608 **Compartments 604 to 608**

EWINGAR STATE FOREST **NORTHERN RIVERS REGION**

To M.....Supervising Forest Officer

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

I certify that:

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

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

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

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

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

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

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

ATTACHMENT 2
CONDITIONS FOR OPERATIONS SFO'S

(a) Existing Roads

Responsibility for Road Maintenance

All road maintenance or gravelling will be undertaken by State Forests or its contractors and not as part of the harvesting contractor's requirements.

Permanently maintained roads to be used in the operation

Bulldog Road is the only permanently maintained road in the harvest area. Pre-operational grading must be carried out to:

- restore the road surface so that drainage is functioning;
- clean and restore table drains and mitre drains and ensure that drainage spacing is consistent with spacings shown in Table 17; and
- in consultation with the Operations Foreman Casino ensure that any table drain scour is repaired through the use of silt barrier techniques (hay bales or sediment trap fencing).
- any **dispersible subsoil** exposed on the pavement or in table or mitre drains must immediately be seeded with rye grass or other suitable species (by the SFO) at the rate of 20kg per hectare or no more than 5 days following grading.

Drainage feature crossings on permanently maintained roads to be used in the operation

There are no drainage feature crossings on the permanently maintained roads to be used within the harvest area.

Existing Un-maintained Roads to be used in this operation

None of the existing un-maintained roads are likely to cause significant water pollution. They are partly overgrown and must be re-opened using either a grader, skidder or tractor up to D7 size.

Re-opening will involve the removal of fallen trees and small regrowth trees from the road pavement and edges. This work must be kept to the minimum required to allow use of existing roads.

In addition pre-operational grading must be undertaken on the following roads to restore the road pavement and drainage:

- 604/605 Road;
- 604/2 Road;
- 605/606 Road;
- 607/2 Road;
- 607/3 Road; and
- 607/4 Road.

Pre-operational grading must be carried out consistent with the instructions for maintained roads.

Debris from re-opening roads

Tree Debris resulting from the re-opening of roads must be disposed of:

- outside drainage features and clear of drainage structures; and
- outside of filter strips; and
- where burning will cause only minimal damage to adjacent vegetation; and
- outside the toe of fill batters.

Clearing

Maximum clearing beyond the pavement must not exceed 3 metres. Edge clearing must aim at retaining at least 70% top cover of at least 5 centimetres of topsoil to facilitate natural establishment of groundcover. Where this cannot be achieved debris must be used as a groundcover.

Road Batters

Existing road batters have revegetated and must not be disturbed other than over very short distances to improve sight distance for safety reasons. Any regrowth trees in batters with a dbh greater than 15 centimetres must be hand fallen rather than removed by blade.

Road surface drainage

Rollover crossbanks must be used to drain roads on those sections where outfall drainage has not been established. Where required rollover crossbanks must be spaced as per Table 17 below. Rollover banks must have a minimum design consolidated vertical height from spillway to bank top of 25 cm.

Table 17

Spacing of Rollover Crossbank Drainage

Road Grade (degrees)	Maximum spacing
0 - ≤5	100m
>5 - ≤10	60m
>10 - ≤15	40m

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

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

During the conduct of the operation, spoon drains may be used in preference to rollover banks, but must be converted to rollover banks on completion of the operation.

Road drainage work must be undertaken with minimal soil disturbance.

Crossing of drainage features

There are three drainage feature crossings on un-maintained roads within the harvest area.

The crossings at locations "A" and "B" on 604/605 Road (see Operational Maps) are stable and do not require maintenance.

The section of 604/2 Road east of log dump 32 and the crossing at location "C" could not be located during field inspections. However previous harvesting plans indicate that this road and crossing were used. The SFO must undertake a thorough inspection of the area around the crossing location and mark the exact location of the crossing site on the Operational map. If the original crossing cannot be located, or is located and requires maintenance or replacement, the SFO must consult with the Forest Planner to determine the most appropriate structure (a causeway with sill log or a concrete pipe culvert).

The SFO must have approved by the EPA a request for variation of the harvesting plan, detailing the work to be carried out at crossing (c). Once the variation has been approved by the EPA, the maintenance, upgrade work can commence.

Following approval, the work must be undertaken as follows:

1. Excavation of the road surface must be minimised consistent with the requirement to provide a stable surface onto which a concrete pipe culvert or rock and gravel for a causeway will be placed. Where excavation is required it must be carried out using an excavator, grader or skidder.

2. Consistent with the requirement to ensure that the culvert or causeway is properly installed, there must be minimal disturbance to the bank and bed of the drainage line on either side of the crossing. Where disturbance has occurred, reshaping of the bank and bed must be undertaken and the disturbed site immediately seeded with rye grass or other suitable species (by the SFO) at a rate of 20kg per hectare or no more than 5 days following construction.
3. Material removed during excavation must be placed on the road side at least 20 metres away from the drainage line crossing for removal by truck at the completion of work. Spoil from the excavation must not be placed in riparian buffers or filter strips.
4. **If a concrete pipe culvert is to be installed:**
   - excavated fill that is to be used to cover the culvert must be stockpiled on the approaches to the crossing for subsequent spreading over the structure; and
   - topsoil, where possible, must be stockpiled separately for use in covering the crossing approaches.
5. **If a causeway is to be constructed:**
   - loose rock and gravel must be spread over the causeway site using dump trucks and an excavator, grader or skidder to a depth that ensures that truck traffic will not break through to the pre-existing natural surface;
   - a sill log must be placed on the outlet side of the causeway and parallel to the road to contain the rock and gravel;
   - a rock mattress must be placed on the bottom side of the sill log to dissipate water; and
   - the gravel and rock on the road surface within the causeway must be compacted using the grader or skidder to a standard suitable for truck traffic.
6. If the works are likely to take more than one (1) day, temporary rollover drains must be constructed across the road each side of the crossing site and as close as practicable to the crossing site at the completion of each days work. Outlets of the temporary structures must drain onto vegetated surfaces and not directly into the drainage lines.
7. The approaches to the crossing must be reformed using a grader. Table drains must be repaired and mitre drains must be installed at the closest practical point to the crossing, with water diverted onto stable, vegetated surfaces. Where this is not possible a structure (sediment fence) must be installed across the mitre drain outlet to inhibit turbid runoff.

8. Where **dispersible subsoil** has been exposed in the table and mitre drains the exposed surfaces must immediately be seeded with rye grass or other suitable species (by the SFO) at the rate of 20kg per hectare or no more than 5 days following construction.
9. Any exposed **dispersible subsoil** on the road approaches to the crossing must be gravelled immediately or no more than 5 days following construction.
10. The stability of the crossing must be assessed at weekly intervals during the logging operation and again within one month of the completion of operations.

Operational maintenance of natural surface causeways

The SFO must monitor the condition of natural surface causeways during and upon completion of the operation to ensure that stability is maintained. The pavement of natural surface causeways must be maintained by grading or back blading where the pavement commences to deform. The SFO must determine and advise the contractor of causeway closure for haulage when excessive rutting or excessive powdering occurs.

Revegetation and rehabilitation

Batters on existing roads that have been disturbed to improve site distance for safety reasons must be evaluated by the SFO to determine if they will revegetate adequately through natural regeneration or if sowing is required. If sowing is required batters must be seeded with rye grass or other suitable species (by the SFO) at the rate of 20kg per hectare within 5 days.

Otherwise revegetation of these roads following harvesting will be through natural regeneration. The roads are to be closed and must be bedded down, all spoon drains converted to rollover banks consistent with the spacings in Table 17, and crossfall (outfall) drainage reinstated. A crossbank must be constructed at the entrance to each road to prevent vehicular traffic using the road.

Where rollover drains do not drain onto stable vegetated surfaces, sediment trap fences must be installed across the outlet.

Patch gravelling

Patch gravelling to improve all weather access may be carried out where necessary as determined by the SFO in response to exposure of the road sub-grade or inclement weather conditions during the operation.

Borrow pits and gravel pits

No borrow pits or gravel pits within this planning unit are required for this operation.

Dispersible soils

Where dispersible subsoil is exposed during the re-opening of these roads or during construction of rollover banks or mitre drains, exposed subsoil must be sown immediately with rye grass or other suitable species (by the SFO) at the rate of 20kg per hectare or no more than 5 days following re-opening.

(b) Road Construction

There are two (2) short sections of road that must be constructed for this operation. They are as follows:

1. 606/2 Road - approximately 400 metres of road, sidecut at first and then ridgetop, from 605/606 Road to access log dump 20; and

2. 608/2 Road - approximately 800 metres of road, sidecut at first and then ridgetop, from Bulldog Road to access log dumps 3 and 4.

In addition the section of 604/2 Road east of log dump 32 was very difficult to locate during field inspections. Previous harvesting plans indicate its location as shown on the Operational Map. The SFO must conduct a thorough search of the area on which the road is marked on the map. **If the road cannot be located or requires re-construction, or a new road is to be constructed, the SFO must inform the Planning Forester. An application for variation of the harvesting plan must be submitted to and approved by the EPA, prior to any amendment of the harvesting plan or work proceeding on a new road in this location.**

Road construction (including re-construction of the section of 604/2 Road east of log dump 32 if required) must be undertaken according to the following specifications:

Design

The maximum width of the running surface must be 4 metres and the maximum clearing width either side of the running surface must be 2 metres.

Grade

The roads must be constructed with a maximum grade of 10^0.

Survey

The centre lines of the roads must be surveyed to grade line standard and marked in the field. Clearing and earthworks must not deviate from the marked lines.

Clearing

The total clearing width for construction of the roads must not exceed 8 metres. Edge clearing must aim for maximum retention of groundcover with retention of at least 70% topsoil. Debris must be used as a groundcover on sites where these targets are not met.

Tree Debris resulting from road construction must be disposed of:

- outside drainage features and clear of drainage structures; and
- outside of filter strips; and
- where burning will cause only minimal damage to adjacent vegetation; and
- outside the toe of fill batters.

Batters

Batters must be laid back at a 1:1 ratio for this operation, and be no more than 1.5 m deep. The maximum length of cut batter must be 350 m.

Where water diverted by a drainage structure discharges onto a batter greater than 1 metre in height, a drop down structure and dissipater must be used.

Road Surface Drainage

Drainage must be outfall drainage and must be constructed before the operations commence. Rollover crossbanks must be used on those sections of road where outfall drainage is impracticable. Where required the maximum spacing of crossbanks must be in accordance with Table 17.

Rollover crossbanks must drain onto undisturbed vegetation or where not immediately accessible to the outfall, sediment trap fences must be installed across the outlet. Rollover banks must be retained in situ after the road has been closed.

Where a table drain or concentrated water flow continues directly into a drainage feature, areas of bare soil on the banks of the feature must be stabilised. Stabilisation techniques can include the sowing of grass seed to increase ground cover; installation of drop down structures and dissipater; re-design of outlets to reduce water velocity; and installation of sediment catching devices.

During the conduct of the operation, spoon drains may be used in preference to rollover banks, but must be converted to rollover banks on completion of the operation.

Drainage Line Crossings

If the drainage line crossing at location "C" is located by the SFO and requires maintenance or replacement, or if a new crossing has to be constructed, the works must be undertaken consistent with the guidelines in Attachment 2 (a) for drainage line crossings on un-maintained roads.

Patch gravelling

Patch gravelling to improve all weather access may be carried out where necessary as determined by the SFO in response to exposure of the road sub-grade or inclement weather conditions during the operation.

Borrow pits and gravel pits

No borrow pits or gravel pits within this planning unit are required for this operation.

Revegetation and Rehabilitation of constructed roads

Revegetation of constructed roads following harvesting will be through natural regeneration.

These roads are to be closed and must be bedded down, all spoon drains converted to rollover banks at spacings consistent with Table 17, and crossfall (outfall) drainage reinstated. A crossbank must be constructed at the entrance to each road to prevent vehicular traffic using the road.

Where rollover drains do not drain onto stable vegetated surfaces, sediment trap fences must be installed across the outlet.

Dispersible Soil Protection - Road Construction

Where dispersible subsoil is exposed during road construction, including the installation of road drainage and construction of cut batters, exposed subsoil must be sown immediately with rye grass or other suitable species (by the SFO) at the rate of 20kg per hectare or no more than 5 days following re-opening.

ATTACHMENT 3

Log Dump Usage Record - Compartments 604 to 608, Ewingar State Forest

Cpt	Dump No.	Date Started	Date Ceased	Date Started	Date Ceased	Date Started	Date Ceased
604	30						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
605	24						
	25						
	26						
	27						
	29						
	31						
606	20						
	21						
	22						
	23						
	28						
607	6						
	8						
	9						
	10						
	11						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
608	1						
	2						
	3						
	4						
	5						
	7						
	12						

The SFO should record each log dump start/cease date for each contractor operation. An operation is considered to have ceased when no activity occurs on a log dump in three working days.

USE A NEW SHEET FOR EACH CONTRACTOR

Notes

APPENDIX 2

APPLICATION OF KOALA PROTOCOL

Pre-logging Koala transects were undertaken by four Northern Rivers Region staff from 18th to 28th August 1997. Actual transect location maps and data sheets are stored in the Compartment History Files and summarised below. 55 koala scats were located under a total of 11 trees over a total transect length of 8.25 kilometres and 825 trees searched. Despite low numbers of scats compartment 606 was an **intermediate use** compartment as 2 trees in a 100 metre segment had scats. In compartment 608 a travelling koala was located during a spot light survey. This triggered an asterisk survey but no scats were found. State Forests will treat compartment 608 as an **intermediate use** compartment. Other compartments are **low use** despite the presence of preferred feed trees.

Transect	Length	Bearing	Tree Species	Trees searched	Scats	Comments (tree species by scat number)
608/1	650m	180°	TWD, WM, RG	65	0	
607/2	1100m	115°	BWD, WM, BBT	110	8	WM 40-60 (3) TWD 40-60 (2) IBK 20-40 (2)
607/3	900m	90°	TWD, IBK, RG	90	5 old	RG 20-40 (2) TWD 20-40 (3)
606/4	450m	160°	IBK, WM, RG	45	22	RG 20-40 (8) - 6 old TWD 20-40 (1) - 2 very old
606/5	450m	50°	WM, TWD, RG	45	7	TWD 20-40 (7)
605/6	1000m	25°	IBK, GG, WM	100	1	WM 40-60 (1)
605/7	600m	150°	IBK, WM, GG	60	0	
605/8	400m	240°	IBK, WM, GG	40	0	
604/9	1500m	180°	WM, TWD, IBK	150	12	TWD 20-40 (8) SG 10-20 (4)
604/10	400m	290°	WM, IBK, GG	40	0	
608/star transect	800m		GG, TWD, WM	80	0	
Total	**8250m**			**826**	**55**	**11 trees**

Koala usage of the compartments within the harvest area based on the results of the transects is summarised below:

Compartment	Koala Use
604	Low use
605	Low use
606	Intermediate use
607	Low use
608	Intermediate use

AMENDMENTS TO PLAN AS REQUIRED BY

APPENDIX 1

EROSION HAZARD ASSESSMENT

Compartments 604 to 608, Ewingar State Forest

Soil Erosion Hazard Ratings 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 = 2500	for the whole of the harvest area;
K = 0.060	the default K value;
S	as factored in SLHIGH;
L = 10 metres;	
C = 0.45	derived from 0.45 SEMGL standard;
P = 1.	

The Soil Erosion Hazard Classes for compartments 604 to 608 are as follows:

Table 1

SEHC's - Compartments 604 to 608

Slope Range (degrees)	Erosion Hazard Class	Where SEHR is:	Indicative % of Net Harvest Area
$0° \leq 4°$	Low	less than 40	10%
$> 4° \leq 19°$	Moderate	40 - 400	40%
$> 19° \leq 30°$	High	400 - 800	45%
$> 30°$	Extreme	greater than 800	5%

No special conditions are required as the conditions for use with Harvesting Plans in Schedule 4 of the EPA Pollution Control Licence (PCL) are adequate to address the erosion and pollution risk.

1. Harvesting is not permitted on slopes in excess of 30°.

2. In areas of high erosion hazard the grade of snig and extraction tracks must not exceed 25°.

Preparation

Prepared by: M.J. O'Neill Signature: .....

Title: Contract Forester Date: 17th December 1997
Norfor Pty Ltd (A.C.N. 071 356 860)
T/as Northern NSW Forestry Services

Regional Approval

Approved by: Signature: .....

Title: **Regional Planning Manager** **Date:** 3/2/98

Environmental Impact Statement Compartment Level Check

Harvesting Plan No. CAS 604 - 608, 17 December 1997
Compartments 604 to 608, Ewingar State Forest, Northern Rivers Region

An environmental impact statement (EIS) describing activities proposed by State Forests in the Casino Management Area was obtained by State Forests in November 1995.

The EIS was obtained in recognition that some of those activities may have a significant effect on the environment. Chapter 4 of the EIS details the proposed activities. Measures to mitigate the impacts, such as harvesting prescriptions, are included in the proposed activities and are described in Chapter 19 of the EIS.

The proposed harvesting operations described in the harvesting plan, including conditions to mitigate the effects of the operations on the environment, are part of the activities generally described in the EIS. In addition to the information contained in the EIS, site specific information concerning the environment of the area covered by this harvesting plan have been gathered as follows:

- Soils information from soil sampling and laboratory analysis. Information on the process is contained in section 2.5 of the harvesting plan and soil test results are attached to the plan as an appendix. Included in this process and documented in the harvesting plan is an evaluation of the soils in the field and descriptions of the relevant erosion evident in the compartments.
- Flora and Fauna information from records held in State Forests and National Parks and Wildlife Service data bases, supplemented by pre-logging flora and fauna surveys and incidental observations. This is covered in sections 2.3 and 2.4 of the harvesting plan.
- Based on pre logging surveys and GIS information appropriate mitigative prescriptions based on the *Conservation Protocols for timber harvesting on State Forests for the duration of the IFA decision, November 1996* have been incorporated into the plan in Condition 4.5.
- Maps of Aboriginal sites in the vicinity and NPWS data were checked.
- The history of silviculture and stand information from compartment history records and information gathered during harvest planning field trips. This is covered in section 2.2 of the harvesting plan.

On review of the EIS and further site specific information obtained, it is concluded that the harvesting operations described in this plan will not have , nor are likely to have a significant effect on the environment which has not already been taken into account in the EIS itself.

Preparation

Prepared by	M.J. O'Neill	Signature.....
Title	Principal Consultant Forester,	Norfor Pty Ltd (A.C.N. 071 356 860) trading as Northern NSW Forestry Services
Date	17th December, 1997.	

Regional Approval

Signature..... Date..... 3/2/98

Regional Planning Manager