

## Information about this licence

Dictionary

Responsibilities of State Forests

Fees and annual return to be sent to the EPA

Public register and access to monitoring data

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## Administrative Conditions

1. What the licence authorises and regulates
2. Premises to which this licence applies - Scheduled forestry activities
3. Premises to which this licence applies – Non-Scheduled forestry activities
4. Objects of this licence
5. Pollution of waters

## Operating Conditions

6. Application of section

### **Part 1: Planning, Documenting, Varying and Authorising Scheduled and Non-Scheduled Forestry Activities**

#### **Division 1 – Planning Scheduled and Non-Scheduled Forestry Activities**

7. Application of Division
8. Definition of a summary of operations
9. Preparation of a summary of operations
10. Submission of a summary of operations
11. Operational planning
12. Documentation of operational planning

#### **Division 2 – Commencement of Scheduled and Non-Scheduled Forestry Activities**

13. Application of Division
14. Commencement of licence authority
15. Notification of commencement
16. Conditions applying to scheduled and non-scheduled forestry activities
17. Variation of site-specific conditions

- 18. Minor variation of site-specific conditions
- 19. Duty to notify

**Part 2: Cessation of Licence Authority**

- 20. Licence authority ceases to apply

**Monitoring Conditions**

- 21. Water quality monitoring
- 22. Research into the alternative management of filter strips

**Reporting Conditions**

**Part 1: Performance Monitoring and Auditing**

- 23. What documents and information must an Annual Return contain?
- 24. Period covered by an Annual Return
- 25. Deadline for an Annual Return
- 26. State Forests must retain a copy of an Annual Return
- 27. Certifying of Statement of Compliance and signing of Monitoring and Complaints Summary
- 28. Water quality monitoring reports
- 29. Water pollution hazard assessment model monitoring reports
- 30. Telephone complaints line
- 31. Complaints register
- 32. Compliance register
- 33. Operations register
- 34. Notification of environmental harm

**Part 2: Provision of and Access to Information**

- 35. Written reports
- 36. Records
- 37. Public inspections of documents

**General Conditions**

- 38. Scheduled and non-scheduled forestry activities must be carried out competently
- 39. Licences under *Forestry Act 1916*
- 40. Understanding of State Forests' employees and contractors
- 41. Field supervision of scheduled and non-scheduled forestry activities
- 42. Relationship of this licence to other documents
- 43. Responsible employees
- 44. Continuation of soil and water training

45. Soil assessor training

## Dictionary

## Attachments

<b>Schedule 1</b>	Forms to be used to notify the EPA, operational and location map requirements
<b>Schedule 2</b>	Factors to be taken into account when planning scheduled and non-scheduled forestry activities
<b>Schedule 3</b>	Methods for assessing the soil erosion and water pollution hazard associated with scheduled and non-scheduled forestry activities
<b>Schedule 4</b>	Operating conditions for scheduled and non-scheduled forestry activities
<b>Schedule 5</b>	Operating conditions for roads
<b>Schedule 6</b>	Information that must be recorded and maintained by State Forests
<b>Figure 1</b>	Land west of the Great Dividing Range
<b>Figure 2</b>	Schematic diagram of stream order

## Information about this licence

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### Dictionary

The licence contains a dictionary, which defines the terms used in the licence. It is found in the middle of the licence.

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### Responsibilities of State Forests

Separate to the requirements of this licence, the general obligations of State Forests are set out in the *Protection of the Environment Operations Act 1997* (“the Act”) and the Regulations made under the Act. These include obligations to:

- Ensure persons associated with State Forests comply with this licence, as set out in section 64 of the Act.
- Control the pollution of waters (see for example sections 120-123 of the Act).
- Report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

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### Fees and annual return to be sent to the EPA

The licence requires State Forests to forward to the EPA an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints).

The Annual Return must be submitted within 60 days after the end of each reporting period.

For each licence fee period you must pay an administrative fee.

See conditions 23 - 27 of this licence regarding the Annual Return requirements.

The EPA publication “A Guide to Licensing” contains information about how to calculate licence fees.

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### Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications
- licence conditions and variations
- statements of compliance

Monitoring data submitted to the EPA is available to the public.

## Administrative Conditions

### 1. What the licence authorises and regulates

- 1.1 This licence authorises the carrying out of the scheduled activity listed below for the premises specified in condition 2.1 of this licence:

“Scheduled forestry activities” carried out on State Forest or Crown-timber lands, being:

- (1) the cutting and removal of timber (being sawlog and pulplogs) from a compartment, where:
  - (a) at least 20% of the compartment has a slope greater than 18 degrees, and
  - (b) at least 30 timber stems (at least 40 cm in diameter at breast height) are cut and removed from each hectare of the compartment when averaged over the net harvestable area of the compartment, or
- (2) the construction of new access roads within a compartment for cutting and removal of timber as referred to in paragraph (1), or
- (3) the construction of new access roads for hauling timber from more than one compartment.

This item does not include any activity on a timber plantation and does not include any activity west of the Great Dividing Range (refer to Figure 1).

*[Note: The phrase "logging operations" has been replaced by the phrase "forestry activities". This amendment does not change the meaning or scope of the licence, but is simply to clarify that the licence covers a subset of the "forestry operations" referred to in the Forestry and National Park Estate Act 1998].*

- 1.2. This licence also controls the carrying out of the non-scheduled forestry activities listed below at the premises specified in condition 3.1 of this licence, for the purpose of regulating water pollution.

“Non-scheduled forestry activities” being the:

- (1) cutting and removal of timber; or
- (2) post-harvest burning associated with and following within 18 months of the cutting and removal of timber; or
- (3) construction of roads to enable or assist the cutting and removal of timber; or
- (4) maintenance or upgrading of roads, logged areas, log dumps, extraction tracks and snig tracks associated with the cutting and removal of timber except where the licence specifies otherwise.

*[Note: The phrase "logging operations" has been replaced by the phrase "forestry activities". This amendment does not change the meaning or scope of the licence, but is simply to clarify that the licence covers a subset of the "forestry operations" referred to in the Forestry and National Park Estate Act 1998].*

**2. Premises to which this licence applies – Scheduled Forestry Activities**

- 2.1. In respect of scheduled forestry activities, this licence applies in the Eden Region to premises that is notified as scheduled forestry activities under condition 7.2 of this licence.

**3. Premises to which this licence applies – Non-Scheduled Forestry Activities**

- 3.1. In respect of non-scheduled forestry activities, this licence applies to any premises that is notified as non-scheduled forestry activities under condition 7.3 of this licence:

- (a) any premises in the Eden Region that are notified as being premises on which non-scheduled forestry activities are being carried out and for which State Forests has forwarded to the EPA a written notice in accordance with conditions 7, 8, 9, and 10 of this licence and which has not been the subject of a notice in accordance with condition 20 of this licence; or
- (b) any premises in the Eden Region that have been notified by State Forests in accordance with conditions 30.1 - 32.3 of the 1998/99 licence or conditions 6, 7 and 8 of the 1999/2000 licence and which have not been the subject of a notice in accordance with condition 42.1 - 42.4 of the 1998/99 licence or condition 18 of the 1999/2000 licence.

**4. Objects of this licence**

- 4.1 The objects of this licence are to require practical measures to be taken to protect the aquatic environment from water pollution caused by forestry activities and to ensure monitoring of the effectiveness of the licence conditions in achieving the relevant environmental goals.

In formulating this licence, the environmental goals that have been adopted by the EPA for all forests in NSW are the *protection of aquatic ecosystems* and *primary contact recreation*.

These goals are defined in the "*Australian Water Quality Guidelines for Fresh and Marine Waters*" (Australian and New Zealand Environment and Conservation Council, 1992). The goals were identified as applying to all forested catchments in Australia by the Joint Australian and New Zealand Environment and Conservation Council - Ministerial Council for Forestry, Fisheries and Aquaculture National Forest Policy Statement Implementation Sub-Committee.

For areas where the quality of water extracted for agricultural water supply or for drinking water supply may be affected by forestry activities upstream, the EPA has adopted the criteria and indicators used in these environmental values as additional goals for protection.

**5. Pollution of waters**

- 5.1. Except as may be expressly provided in any other condition of this licence, State Forests must comply with Section 120 of the *Protection of the Environment Operations Act 1997*.

## **Appendix A – Eden Region**

*[Note: In this condition, the terms "pollution of waters" and "waters" have the same meaning as in the Protection of the Environment Operations Act 1997].*

## Operating Conditions

### 6. Application of Section

6.1 This section is divided into two parts, which contain conditions relating to the following:

Part 1: procedure for the planning, documentation, varying and authorising scheduled and non-scheduled forestry activities in accordance with this licence; and

Part 2: procedure for terminating the licence authority and operating conditions for scheduled and non-scheduled forestry activities under this licence.

#### **Part 1: Planning, Documenting, Varying and Authorising Scheduled and Non Scheduled Forestry Activities**

#### **Division 1 – Planning Scheduled and Non-Scheduled Forestry Activities**

### 7. Application of Division

7.1 This division applies to the scheduled or non-scheduled forestry activities referred to in the summary of operations.

#### **Application of division to authorise the carrying out of scheduled forestry activities**

7.2 For scheduled forestry activities that are referred to in condition 1.1 of this licence, State Forests must notify the EPA that it proposes to commence forestry activities. This notification must be in accordance with this Part. Forestry activities must not commence until a summary of operations has been submitted to the EPA in accordance with this Division.

#### **Application of division to authorise the carrying out of non-scheduled forestry activities**

7.3 For non-scheduled forestry activities that are not referred to in condition 1.1 of this licence, State Forests may notify the EPA that it proposes to commence forestry activities. Where State Forests notifies the EPA it must be in accordance with this Division.

### 8. Definition of a summary of operations

8.1 For the purposes of this Part, "summary of operations" means the following documents:

- (1) a notification of forestry activities prepared in accordance with Form 1 of Schedule 1 of this licence; and
- (2) an operational map prepared in accordance with Schedule 1 of this licence; and

- (3) a location map prepared in accordance with Schedule 1 of this licence.

## **9. Preparation of a summary of operations**

9.1 Prior to submitting a summary of operations, State Forests must ensure that:

- (a) the scheduled or non-scheduled forestry activities that are the subject of the summary of operations have been planned in accordance with condition 11 of this licence; and
- (b) this planning has been documented in accordance with condition 12 of this licence.

9.2 Each summary of operations must only apply to one compartment or roading area in which State Forests proposes to commence scheduled or non-scheduled forestry activities.

9.3 State Forests must ensure that:

- (a) the summary of operations does not contain any statement or information which is incorrect, false, misleading or incomplete; and
- (b) every statement and piece of information in the summary of operations is supported by the planning documentation as required by condition 12.1 of this licence; and
- (c) the procedure for obtaining information for the summary of operations is carried out in a competent manner and in accordance with the methods contained in schedules 2, 3, 4 and 5 of this licence; and
- (d) the summary of operations is signed by a State Forests' employee not below the rank of Regional Manager.

## **10. Submission of a summary of operations**

10.1 Each summary of operations must be faxed to the Manager of the Forestry Unit of the EPA at least one day prior to the date of commencement of the scheduled or non-scheduled forestry activities.

10.2 On the same or next working day State Forests must post to the Manager of the Forestry Unit of the EPA two copies of the summary of operations.

## **11. Operational planning**

11.1 Scheduled and non-scheduled forestry activities that are the subject of this Division must be planned in a site-specific manner, and site-specific conditions must be developed in accordance with the requirements of schedules 2, 3, 4 and 5 of this licence.

11.2 In planning scheduled and non-scheduled forestry activities, State Forests must:

- (a) take into account the matters identified in Schedule 2; and

## **Appendix A – Eden Region**

- (b) apply the soil erosion and water pollution hazard assessment model and identify the inherent hazard level of the compartment in accordance with Schedule 3; and
- (c) identify whether there is a mass movement hazard in the compartment or roading area in accordance with Schedule 3; and
- (d) identify whether there are any dispersible soils in the compartment or roading area in accordance with Schedule 3; and
- (e) identify the seasonal restrictions in accordance with Schedule 3; and
- (f) identify and adopt the suites of conditions contained within Schedule 4 which relate to each inherent hazard level, as well as those conditions in schedules 4 or 5 relating to or required to be developed for mass movement hazard, dispersible soils and seasonal restrictions; and
- (g) identify site-specific conditions applying to the scheduled and non-scheduled forestry activities in accordance with schedules 2, 3, 4 and 5 of this licence.

11.3 State Forests must ensure that only appropriately trained and competent people undertake the requirements of schedules 2, 3, 4 and 5 of this licence.

### **12. Documentation of operational planning**

12.1 State Forests must prepare planning documentation which demonstrates that the planning referred to in condition 11 has occurred, and which contains the site-specific conditions that will apply to scheduled or non-scheduled forestry activities.

12.2 The planning documentation must be kept on file at the Regional Office and must be provided to an authorised EPA officer upon request.

## **Division 2 - Commencement of Scheduled and Non-Scheduled Forestry Activities**

### **13. Application of division**

13.1 This Division applies to scheduled and non-scheduled forestry activities which have been planned in accordance with Division 1 of Part 1 of this section and for which a summary of operations has been submitted to the EPA under that Division.

### **14. Commencement of licence authority**

14.1 Licence authority for scheduled or non-scheduled forestry activities for which a summary of operations was submitted in accordance with Division 1 will commence from the date inserted in the "Date on which licence authority commences" on Form 1 of Schedule 1 of this licence.

14.2 State Forests must ensure that a copy of each completed summary of operations is placed in the operations register required by condition 33 of this licence, from the date upon which the scheduled and non-scheduled forestry activities commence. The summary of operations must include the actual date on which licence coverage commenced.

**15. Notification of commencement**

- 15.1 Within two weeks of commencing a scheduled or non-scheduled forestry activity in accordance with this Part, State Forests must notify the Manager of the Forestry Unit of the EPA in writing (by facsimile or mail) of the date of commencement of that operation.

**16. Conditions applying to scheduled and non-scheduled forestry activities**

- 16.1 Scheduled and non-scheduled forestry activities must comply with:
- (a) the conditions set out in schedules 4 and 5 of this licence; and
  - (b) the site-specific conditions set out in the planning documentation referred to in condition 12 of this licence.

**17. Variation of site-specific conditions**

- 17.1 If during a scheduled or non-scheduled forestry activity State Forests considers that any of the site-specific conditions set out in the planning documentation referred to in condition 12 should be varied, then a State Forests' officer not below the rank of Regional Manager must approve the variation in writing prior to it being implemented.
- 17.2 In considering whether to approve the variation, the approving officer must ensure that:
- (a) the variation will maintain or decrease the potential for water pollution; and
  - (b) the variation is consistent with schedules 4 and 5 of this licence; and
  - (c) the documentation required by condition 17.3 has been prepared and is kept on file at the State Forests' Regional Office.
- 17.3 State Forests must document the following information:
- (a) the condition which is proposed to be varied; and
  - (b) the physical area within the compartment or roading area in relation to which the variation is proposed; and
  - (c) the reasons why the variation is being proposed; and
  - (d) an explanation as to how the variation is expected to maintain or decrease the potential for water pollution.
- 17.4 State Forests must fax to the Manager of the Forestry Unit of the EPA on the day the variation is approved a revised version of the summary of operations, signed by the Regional Manager, which accurately reflects the variation that has been approved.
- 17.5 On the same or next working day State Forests must post to the Manager of the Forestry Unit of the EPA two copies of the revised summary of operations.

**18. Minor variation of site-specific conditions**

18.1 Notwithstanding condition 17, in carrying out scheduled or non-scheduled forestry activities State Forests may vary any site-specific condition set out in the planning documentation referred to in condition 12 if the condition variation:

- (a) is minor; and
- (b) is consistent with schedules 4 and 5; and
- (c) will result in the same or a decreased risk of water pollution than if the variation did not occur; and
- (d) does not relate to:
  - (i) the items listed in Form 1 of Schedule 1; or
  - (ii) the construction, upgrading or maintenance of road crossings of watercourses, drainage lines, swamps or wetlands or the road approaches within 30 metres of the crossings.

18.2 State Forests may only vary the condition if, before varying the condition, the following matters are recorded as part of the planning documentation referred to in condition 12:

- (a) the condition which State Forests will vary; and
- (b) the physical area within the compartment or roading area in relation to which the variation will occur.

**19. Duty to notify**

19.1 If State Forests finds that the information provided in any summary of operations is incorrect, false, misleading or incomplete, State Forests must notify the EPA in writing as soon as practicable and, in any event, no later than seven days after State Forests becomes aware that the information is incorrect, false, misleading or incomplete.

**Part 2: Cessation of Licence Authority**

**20. Licence authority ceases to apply**

20.1 Licence authority ceases to apply to land where State Forests has forwarded to the EPA a written notice using Form 2 of Schedule 1 of this licence.

20.2 This licence ceases to apply to land notified in this way from the date that Form 2 of Schedule 1 is signed by a State Forests' employee not below the rank of Regional Manager.

20.3 A copy of each form must be placed on the operations register required by condition 33 within five days of the form being signed.

- 20.4 Copies of each form must be forwarded to the Manager of the Forestry Unit of the EPA on the first day of each month for each compartment or roading area where licence coverage ceased during the preceding month.

## Monitoring Conditions

### 21. Water quality monitoring

- 21.1 State Forests must conduct water quality monitoring in accordance with conditions 43.1 to 46.5 inclusive of the 1998/99 licence.

*[Note: State Forests must sample suspended solids and turbidity only].*

- 21.2 The water quality monitoring program specified in conditions 44 to 46.5 inclusive of the 1998/99 licence must continue until State Forests is notified in writing by the EPA that the program may cease.
- 21.3 State Forests must develop a revised water quality monitoring program, in consultation with the EPA.
- 21.4 The water quality monitoring program specified in condition 21.3 must be provided to the EPA in writing as a document titled: "Water Quality Monitoring for Forestry Activities in State Forests: Phase 1" by 30 November 1999.
- 21.5 State Forests must receive written approval from the EPA before implementing the water quality monitoring program specified in condition 21.4 of this licence.
- 21.6 State Forests must commence the water quality monitoring program specified in condition 21.4 and approved under condition 21.5 on or before 7 February 2000.

### 22. Research into the alternative management of filter strips

- 22.1 State Forests may develop a research program to assess the impacts of altered management practices within and adjacent to filter strips on the effectiveness of filter strips.
- 22.2 Where State Forests develops a filter strip research program in accordance with condition 22.1 of this licence, State Forests must consult and negotiate with the EPA over the development of the program. The EPA must negotiate with State Forests any changes to methods prior to approval.
- 22.3 The filter strip research program specified in condition 22.1 must be submitted to the EPA in writing as a document titled: "An assessment on the effectiveness of filter strips subject to altered management practices within and adjacent to filter strips" for approval prior to commencement.

## Appendix A – Eden Region

- 22.4 The filter strip research program specified in condition 22.3 of this licence must include a representative sample of compartments statewide and provide, as a minimum, the following details:
- (a) a site-specific description of the compartments in which the filter strip research program is to be carried out; and
  - (b) identify the variations to harvesting and log extraction techniques to be assessed; and
  - (c) a 1:15 000 topographic map identifying the locations of the drainage lines; and
  - (d) itemised timeframe for the program; and
  - (e) methods to be used in analysing the results of the filter strip research program; and
  - (f) reporting requirements for the results of the filter strip research program.
- 22.5 All forestry activities carried out by State Forests associated with the filter strip research program specified in condition 22.3 must be conducted in accordance with the methods negotiated and approved by the EPA.
- 22.6 Site-specific locations identified in condition 22.4(a) and (c) of this licence will be exempt from conditions 17, 18, 19, 20 and 21 of Schedule 4 of this licence. No exemptions to these licence conditions will apply to other areas which are outside the drainage lines identified in condition 22.4(c) of this licence.
- 22.7 Any timber harvested from filter strips included in the trial is available to State Forests.
- 22.8 At the completion of the filter strip research program, State Forests must prepare a report on the results of the program to a protocol agreed to by the EPA.
- 22.9 The EPA may direct State Forests to provide written reports on any matter relating to the filter strip research program specified in this licence.

## Reporting Conditions

### Part 1: Performance Monitoring and Auditing

#### 23. What documents and information must an Annual Return contain?

23.1 State Forests must complete and supply to the EPA an Annual Return in the approved form comprising:

- (a) a Statement of Compliance;
- (b) an Operational & Complaints Summary; and
- (c) a Monitoring & Compliance Summary.

*[Note: Before the end of each reporting period, the EPA will provide State Forests with a copy of the form that must be completed and returned to the EPA].*

23.2 The report specified in condition 23.1(b) of this licence must:

- (a) contain summaries of all entries made in the complaints registers, compliance registers and operations registers required by conditions 31, 32 and 33 of this licence; and
- (b) contain summaries of improvements to or developments in best management practice carried out under this licence; and
- (c) examine and discuss the efficacy of the conditions of this licence in protecting water quality; and
- (d) respond to any information provided to State Forests by the EPA as a result of auditing activities, including details of the improvements to systems and practices that State Forests has made to ensure that any identified licence breaches are not repeated.

23.3 The report specified in condition 23.1(c) of this licence must contain a summary of:

#### *Monitoring conditions*

- (a) whether all monitoring required by this licence has been carried out; and
- (b) if all the monitoring has not been carried out, what monitoring has not been carried out and the reasons why the monitoring has not been carried out; and
- (c) whether all the monitoring data required to be reported to the EPA by this licence have been reported to the EPA; and
- (d) whether all the monitoring data were reported within the time specified by this licence; and
- (e) if all the monitoring data have not been reported to the EPA, or have not been reported within the time specified, the reasons why the monitoring data were not so reported; and

## Appendix A – Eden Region

- (f) whether all the monitoring data reported to the EPA were derived from monitoring carried out in accordance with this licence; and
- (g) if any of the monitoring data reported to the EPA were not derived from monitoring carried out in accordance with this licence, what monitoring data were not so derived and the reasons why the monitoring data were not so derived.

### *Compliance conditions*

- (h) whether every condition of this licence has been complied with; and
- (i) if one or more conditions have not been complied with, in relation to each such condition:
  - (i) the nature of the non-compliance; and
  - (ii) the reasons for the non-compliance; and
  - (iii) any action taken to prevent, control or mitigate the non-compliance; and
  - (iv) any action that has been or will be taken to prevent a recurrence of the non-compliance.

23.4 In providing details of non-compliances of conditions, State Forests must provide the information on a regional basis, as well as summarised for each division. The information must be provided in a standardised format for each State Forests' region.

## **24. Period covered by an Annual Return**

24.1 An Annual Return must be prepared in respect of each reporting, except as provided below.

*[Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period]*

24.2. Where this licence is revoked, State Forests must prepare an annual return in respect of the period commencing on the first day of the reporting period and ending on the date from which notice revoking the licence operates.

## **25. Deadline for an Annual Return**

25.1 The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period.

## **26. State Forests must retain a copy of an Annual Return**

26.1 State Forests must retain a copy of the annual return supplied to the EPA for a period of at least 4 years after the annual return was due to be supplied to the EPA.

**27. Certifying of Statement of Compliance and Signing of Monitoring and Complaints Summary**

- 27.1 Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by an employee of State Forests, not below the rank of Divisional Manager.

**28. Water quality monitoring reports**

- 28.1 Data collected as a result of water quality monitoring required by this licence must be submitted to the EPA in a standardised format approved by the EPA, including summaries of the data as required by the EPA.
- 28.2 Within three months of the cessation of the 1998/99 water quality monitoring program as specified in condition 21.2, State Forests must provide a written report to the EPA containing an interpretation of all the data.
- 28.3 Where State Forests has undertaken forestry activities in the representative areas in which water quality monitoring occurred as specified in conditions 44 to 45.5 inclusive of the 1998/99 licence, State Forests must submit a compliance audit report as required under conditions 46.1 to 46.5 of the 1998/99 licence.
- 28.4 The compliance audit report specified in condition 28.3 of this licence must be submitted to the EPA within 30 days of the audit being carried out. The report must be presented in a standardised format, agreed to by the EPA in writing, and must report all non-compliance with the licence conditions.
- 28.5 State Forests must provide written reports to the EPA regarding the water quality monitoring program as specified in the document outlined in condition 21.4 of this licence.
- 28.6 The EPA may direct State Forests to provide written reports on any matter relating to the water quality monitoring programs specified in this licence.

**29. Water pollution hazard assessment model monitoring reports**

- 29.1 State Forests must report in writing to the Manager of the Forestry Unit of the EPA on the program for monitoring and reviewing the soil erosion and water pollution hazard assessment model.
- 29.2 This reporting must be carried out in accordance with the documentation and methodology approved by the EPA in accordance with condition 47 of the 1998/1999 licence.

**30. Telephone complaints line**

## **Appendix A – Eden Region**

30.1 State Forests must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises, unless otherwise specified in the licence.

30.2 State Forests must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

### **31. Complaints register**

31.1 Each State Forests' Regional Office must keep a register of all complaints received by State Forests alleging water pollution which may have been caused by scheduled and non-scheduled forestry activities within that region, or alleging licence breaches which may have occurred during scheduled and non-scheduled forestry activities within that region.

31.2 The register must include details of the:

- (a) date and time of the complaint; and
- (b) method by which the complaint was lodged (telephone, letter, etc.); and
- (c) name, address, and telephone number of the complainant and/or a further contact person or, if no such details were provided, a note to that effect; and
- (d) name of the person receiving the complaint; and
- (e) precise location of the alleged pollution incident and/or licence breach; and
- (f) waters said to be polluted or potentially polluted; and
- (g) substance causing pollution or potential pollution and the amount in which it was present (if known); and
- (h) action taken by State Forests in relation to the complaint, including any follow-up contact with the complainant.

31.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

31.4 The record and complaints register must be produced to any authorised officer of the EPA who asks to see them.

### **32. Compliance register**

32.1 Each State Forests' Regional Office must keep a register of every incident of non-compliance with the conditions of this licence.

32.2 The register must include details of:

- (a) the date, time and duration of the non-compliance; and
- (b) the date upon which State Forests became aware of the non-compliance; and
- (c) the exact location of the non-compliance, either marked on the operational map or in the form of Australian Map Grid co-ordinates; and
- (d) the name of the person who caused the non-compliance; and

## Appendix A – Eden Region

- (e) the nature of the non-compliance; and
- (f) the reasons for the non-compliance; and
- (g) whether the non-compliance resulted in any environmental harm; and
- (h) any remedial action taken by State Forests or any other person in relation to the non-compliance and the dates upon which it was taken; and
- (i) any disciplinary action taken by State Forests against any of its contractors, employees, licensees or agents and the dates upon which it was taken; and
- (j) any measure taken or proposed to be taken to prevent or mitigate the recurrence of such a non-compliance.

32.3 The register must be filled in within 14 days of State Forests becoming aware of the non-compliance.

32.4 In this condition, "environmental harm" includes any direct or indirect alteration to the environment and, without limiting the generality of the foregoing, includes any act or omission that results in the pollution of any water, within the meaning of the *Protection of the Environment Operations Act 1997*.

### 33. Operations register

33.1 Each State Forests' Regional Office must keep a register of all scheduled and non-scheduled forestry activities undertaken within the region.

33.2 The register must include copies of all:

- (a) summaries of operations submitted to the EPA in accordance with Division 1 of Part 1 of Operating Conditions; and
- (b) variations to summaries of operations submitted to the EPA in accordance with Division 2 of Part 1 of Operating Conditions; and
- (c) notifications that licence coverage has ceased, submitted to the EPA in accordance with Part 2 of Operating Conditions.

### 34. Notification of environmental harm

*[Note: State Forests or its employees must notify the EPA of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act].*

34.1 Notifications must be made by telephoning the EPA's Pollution Line service on 131 555 or the Manager of the Forestry Unit.

34.2 State Forests must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

**Part 2: Provision of and Access to Information**

**35. Written Reports**

- 35.1 Where an authorised officer of the EPA suspects on reasonable grounds that where this licence applies to premises, an event has occurred at the premises and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.
- 35.2 State Forests must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.
- 35.3 The request may require a report which includes any or all of the following information:
- (a) the cause, time and duration of the event;
  - (b) the type, volume and concentration of every pollutant discharged as a result of the event;
  - (c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event; and
  - (d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
  - (e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
  - (f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event;
  - (g) any other relevant matters.
- 35.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by State Forests. State Forests must provide such further details to the EPA within the time specified in the request.

**36. Records**

- 36.1 All records, documentation and registers required by this licence must be kept for at least four years after the action or event took place, in respect of which the record has been created, or for four years after the last entry in the registers specified under Part 1 of this section.
- 36.2 All records, documentation and registers must be kept in a legible form and must be produced in a legible form to any authorised officer of the EPA officer upon request.
- 36.3 Copies of records, documentation and registers requested in writing by the EPA must be forwarded to the nominated EPA office within the time specified in the request.

**37. Public inspection of documents**

37.1 Copies of the following documents must be made available for inspection by any person at each State Forests' Regional Office responsible for land to which this licence applies:

- (a) this licence; and
- (b) the 1999/2000 licence; and
- (c) the 1998/99 licence; and
- (d) the Code of Logging Practice; and
- (e) the "Conditions For Use With Harvesting Plans, Based on SEMGL (1993)", July 1993, compiled by State Forests; and
- (f) all planning documentation relating to forestry activities, and copies of the summary of operation of each licensed operation which is the responsibility of the Regional Office; and
- (g) the latest annual return submitted to the EPA; and
- (h) the operations register.

37.2 Copies of all planning documentation for scheduled and non-scheduled forestry activities which are the responsibility of the Regional Office must be made available to any person for photocopying at a reasonable cost.

## General Conditions

### **38. Scheduled and non-scheduled forestry activities must be carried out competently**

- 38.1 Scheduled and non-scheduled forestry activities to which this licence applies must be carried out in a competent manner.

### **39. Licences under Forestry Act 1916**

- 39.1 All licences issued under the *Forestry Act 1916* or the *Forestry Regulation 1999*, which authorises the holder to carry out operations covered by this licence, must require the holder to comply with condition 16 of Part 1 of Operating Conditions of this licence, in the same way that State Forests must comply with that condition.
- 39.2 State Forests must monitor compliance with the conditions of this licence and be able to demonstrate that the monitoring has occurred.

### **40. Understanding of State Forests' employees and contractors**

- 40.1 State Forests must ensure that all employees, contractors, sub-contractors, agents or State Forests' licensees engaged in any aspect of scheduled and non-scheduled forestry activities authorised by this licence understand the general and site-specific conditions applying to the activity prior to their involvement in the activity.

### **41. Field supervision of scheduled and non-scheduled forestry activities**

- 41.1 State Forests must ensure that a State Forests' employee is present at each compartment or roading area for the purpose of ensuring compliance with this licence, for the equivalent of at least one full working day per week per operation, while scheduled and non-scheduled forestry activities are occurring under this licence.
- 41.2 State Forests must ensure through this and any other supervision that may be necessary that all employees, contractors, sub-contractors, agents or licensees comply with the conditions of this licence.
- 41.3 State Forests must record the name of the State Forests' employee who was present at each operation, and the dates and times upon which they were present.
- 41.4 State Forests must also record the items listed in Division 3 of Schedule 6 of this licence.

### **42. Relationship of this licence to other documents**

- 42.1 Where there is a conflict between the conditions of this licence and the documents with which this licence requires compliance, the conditions of this licence prevail.

**43. Responsible employees**

- 43.1 State Forests must authorise at least two of its senior employees to:
- (a) speak on behalf of State Forests; and
  - (b) provide any information or document required under this licence.
- 43.2 State Forests must authorise those persons, and inform the Manager of the Forestry Unit of the EPA, of the names and telephone numbers of those authorised persons by 30 April of each year.
- 43.3 State Forests must inform the Manager of the Forestry Unit of the EPA of any change in the information provided under condition 43.2 within 14 days of the change.
- 43.4 Any person authorised under this condition by State Forests must be readily contactable on the person's nominated telephone number during regular working hours.

**44. Continuation of soil and water training**

- 44.1 State Forests must continue to develop the soil and water training program for operators, supervisors and planners, development of which commenced during the 1994/95 licence period and in accordance with the 1994/95 licences, to the point where Vocational Education and Training Accreditation Board (VETAB) accreditation has been obtained.
- 44.2 The operators' course, supervisors' course and planners' course must be provided on a regular basis and at least once a year by a training organisation approved in writing by the EPA.
- 44.3 State Forests must advise the EPA in writing of the date on which each course is finalised and is first formally offered by a training organisation.

**45. Soil assessor training**

- 45.1 State Forests must ensure that persons verifying soil regolith and detecting dispersible soils in accordance with Schedule 3 are trained and competent to do so.
- 45.2 Soil assessors must have gained accreditation in writing from the EPA before carrying out any soil regolith or dispersibility assessments.

## Dictionary

**"aggregate"** means a unit of soil structure consisting of primary soil particles held together by cohesive forces or by secondary soil materials such as iron oxides, silica or organic matter;

**"air-dry aggregate"** means the state of dryness of a soil aggregate at equilibrium with the water content in the surrounding atmosphere. The actual water content will depend upon the relative humidity and temperature of the surrounding atmosphere;

**"armour"** means to provide a protective surface that is resistant to erosion or displacement by machinery or vehicles;

**"Australian Map Grid"** means the 13 digit map coordinates (6 digit Eastings and 7 digit Northings) provided on a 1:25 000 or 1:50 000 map sheet produced by Land Information Centre (formerly Central Mapping Authority);

**"batter"** means an earth slope formed by the placing of fill material or by cutting into the natural hillside;

**"batter drain"** means a constructed and stabilised drain to carry runoff down a batter without scouring or erosion;

**"batter stabilisation"** means the provision of adequate vegetative, structural or mechanical measures to control erosion from batters. Measures may include the provision of catch drains, topsoiling, seeding, mulching, geofabrics, benching, use of batter drains or use of retaining walls or other engineering structures;

**"bench"** means a strip of relatively flat earth or rock breaking the continuity of a slope;

**"best management practice"** means practices that have been developed to prevent or minimise pollution and to protect the environment. They are often applied to non-point sources of pollution where there is need to define a range of practices that need to be applied to prevent degradation of the environment;

**"blading off"** means the removal of surface soil from a snig track or road in wet conditions in order to expose a drier or firmer surface for use by machinery;

**"borrow pit"** means an excavation which does not form part of the road, from which fill material is extracted for road construction, upgrading or maintenance;

**"bridge"** means a structure designed to carry a road over a drainage feature by spanning it;

**"buffer strip"** means a strip along each side of a drainage depression in which soil disturbance during forestry activities must be prevented to the greatest extent practicable;

**"catch drain"** means a diversion drain excavated on the high side of the batter, embankment or road to intercept and divert surface runoff water before it reaches the batter, embankment or road;

**"causeway"** means a natural or man made crossing which enables vehicles to ford a drainage feature. The pavement of a causeway may consist of gravel, rock, bitumen or concrete, or of a stable natural surface;

**"Code of Logging Practice"** means:

- a) in the case of plantations harvesting, "Forest Practices Code: Part 1: Timber Harvesting in State Forests Plantations", prepared by State Forests, July 1995;
- b) in the case of native forests, the "Forest Practices Code: Part 2: Timber harvesting in Native Forests, State Forests and Crown-timber Lands" prepared by State Forests, February 1999;
- c) in the case of plantation establishment, "Forest Practices Code: Part 3: Plantation Establishment and Maintenance" prepared by State Forests, July 1997; and
- d) in the case of roads and fire trail construction and maintenance, "Forest Practices Code: Part 4 - Forest Roads and Fire Trails" prepared by State Forests, February 1999.

**"compartment"** means an area of forest designated for forestry management purposes, principally for the cutting and removal of timber. A compartment is an area of forest identified by a compartment number and a State Forests name. Compartment boundaries are delineated on State Forests' Geographic Information System (GIS).

**"concentrated water flow"** means the discharge of water from a structure across a surface in a manner other than a sheet of water, up to the peak discharge from a storm event of less than or equal to the required design specification for that structure. Concentrated water flow is evidenced by rivulets, rills, gullies or streams of water, or the eroded areas where rivulets, rills, gullies or streams of water have flowed.

**"constructed snig tracks"** means snig tracks that have had some form of machinery preparation prior to use, ranging from removal of leaf litter to the benching in of tracks around steep ground slopes;

**"construction"** means the act of building, erecting or installing;

**"coupe"** means a sub-unit of a compartment and the basic harvesting unit in the Eden Management Area (EMA);

## Appendix A – Eden Region

**"crossbank"** means a hump of earth constructed across an extraction track, snig track, log dump or road to baulk the flow of water so that it can be diverted;

**"crossing structure"** means a structure designed to allow the crossing of a drainage feature. Crossing structures are bridges, causeways, and culverts;

**"crown timber land"** means lands for which the Forestry Commission of New South Wales has responsibility under the *Forestry Act 1916*, including State Forests, Flora Reserves, Timber Reserves, unoccupied Crown Lands, lands held in specified Crown tenures and Purchase tenure which have timber rights reserved;

**"culvert"** means one or more adjacent enclosed conduits for conveying a drainage feature underneath a road formation;

**"deposition"** means the laying down of solid material which has been eroded and transported from a distant part of the land surface;

**"directional felling "** means the felling of a tree in such a way that it falls in a pre-determined direction. This is achieved by cutting the tree at a particular angle;

**"dispersibility"** means the behaviour of a soil material, whereby soil aggregates break down and separate into their constituent particles in water, due to deflocculation.

**"dispersible soils"** means soils which have been classified class 2, 3 or 4 as determined using the methodology specified in Module 3 of Schedule 3 of this licence;

**"dispersion"** means the process whereby soil aggregates break down and separate into their constituent particles in water, due to deflocculation;

**"disturbed area"** means an area which is susceptible to erosion because the vegetative soil cover has been removed or altered. The disturbance may be accompanied by the mixing or removal of some soil horizons;

**"drainage depression"** means a level to gently inclined shallow, open depression with a smoothly concave cross-section, rising to moderately inclined hillslopes;

**"drainage feature"** means a drainage depression, drainage line, major water storage, watercourse, swamp or wetland;

**"drainage line"** means a channel down which surface water naturally concentrates and flows. Drainage lines exhibit one or a combination of the following features which distinguish them from drainage depressions:

## Appendix A – Eden Region

- a) evidence of active erosion or deposition - e.g., gravel, pebble, rock, sand bed, scour hole, nick points; or
- b) an incised channel of more than 30 centimetres depth with defined bed and banks;

**"drop-down structure"** means a non-erodable channel or hydrologic structure that discharges water over a fill batter. Drop-down structures may be constructed of gabion baskets, rock mattresses, precast concrete segments, geotextiles or half round sections of plastic, corrugated or concrete pipes. An energy dissipater must be used in conjunction with a drop-down structure.

**"earthworks"** means mechanical soil movement and disturbance. This may include the construction, upgrading and maintenance of log dumps, roads, drainage feature crossings, snig tracks and extraction tracks;

**"Eden Region"** means the State forests and other Crown-timber lands (excluding plantations) within the Eden Region shown on Map 1 to the New South Wales Eden Region Forest Agreement granted on 5 March 1999;

**"effective bank height"** means the minimum height of a crossbank above the outlet;

**"energy dissipater"** means a device in the base of a channel or running water that dissipates the energy of the flow. The dissipater reduces the velocity and depth by spreading the water flow over a larger area. Energy dissipaters may be constructed from rocks, logs, steel baffles and concrete blocks;

**"environmental goals"** means the environmental goals referred to in condition 2 (Objects of this licence);

**"EPA"** means the Environment Protection Authority;

**"erosion"** means wearing away of the land by running water, rainfall, wind, ice or geomorphological agent, including but not limited to processes such as detachment, entrainment, suspension, transportation and mass movement, at a rate accelerated due to forestry activities;

**"excavator"** means a tracked machine which moves earth by means of a bucket or other implement mounted on an hydraulically operated boom;

**"existing roads"** means roads which were in existence prior to the commencement of a forestry activity;

**"extraction"** means a route for transport of logs from the point of felling to the log dump or log landing;

**"extraction track"** means a track along which forwarding machinery travels;

**"felling"** means the process of cutting down standing trees;

**"fill"** means a previously excavated material that is used to raise the surface of an area to a specified level;

**"filter strip"** means a strip of vegetation or groundcover along each side of a watercourse or drainage line retained for the purposes of:

- a) retarding the lateral flow of runoff and facilitating its infiltration into the soil, thereby causing deposition and filtration of transported material, and reducing sediment movement into the stream; and
- b) retarding sediment movement into the stream by minimising ground disturbance which may reduce infiltration and concentrate water; and
- c) reducing the risk of erosion of the channel and bank;

**"forestry licence"** means any licence issued by State Forests under the *Forestry Act 1916* or the *Forestry Regulation 1999* which authorises the holder to carry out any forestry activities covered by this licence;

**"forwarding"** means the carrying of logs by vehicles from the point of felling to the log dump in such a manner that the logs are fully supported off the ground;

**"full supply level"** means the maximum level to which water is normally stored, not including any temporary surcharge due to flooding effects;

**"geotextile"** means a product used as a soil reinforcement agent and as a filter medium. It is made of synthetic or natural fibres manufactured in a woven or loose non-woven manner to form a blanket-like product;

**"grade"** means a unit of slope measured from a horizontal plane (measured in degrees);

**"gravel"** means a natural occurring mixture of coarse mineral particles larger than 2.0 mm and smaller than 75 mm in diameter. Gravel is placed on the surface of a road to increase the load bearing capacity of a natural surface;

**"gravel pit"** means a pit formed by extraction of gravel for the purposes of road construction, upgrading or maintenance;

**"gross area"** means the total area of land within a compartment or roading area, before exclusion areas are removed (in hectares);

**"ground-based harvesting"** means felling of trees where those trees will be extracted from the compartment using:

- (a) a dozer, skidder or forwarder; or
- (b) a winch attached to a dozer or skidder.

## Appendix A – Eden Region

**"groundcover"** means material which covers the ground surface and has the effect of reducing erosion. Groundcover may include existing vegetation, leaf litter, tree debris, gravel, rock, straw, mulch, geotextiles, erosion control mats, jute mesh and coconut mesh;

**"groundslope"** means the angle of inclination of the ground surface from the horizontal expressed in degrees;

**"gully"** means an open incised channel with a depth of >0.3 metres and characterised by moderately to very gently inclined floor and steep walls. For the purpose of this licence, a gully is a type of drainage line;

**"gully stuffer"** means a type of crossing for a road or snig track or extraction track across a drainage feature. It is formed by filling the drainage feature with trees, debris, spoil, soil, rock or other material to the level of the road or track;

**"harvesting"** means the cutting and removal of forest products;

**"haulage operations"** means the removal and transport of timber products from, the point of loading within the compartment or roading area by machinery or truck along a road;

**"infall drainage"** means a drainage method for a section of road located in steep side slope terrain where the whole surface is in-sloped against the natural surface side-slope;

**"inherent soil erosion and water pollution hazard"** means the potential for soil erosion and water pollution to occur in an area as a result of forestry activities, and takes into account rainfall erosivity, soil erodibility (and dispersibility), slope, mass movement, existing erosion, groundcover and intensity of forestry activities. Inherent soil erosion and water pollution hazard is determined in accordance with Schedule 3;

**"log dam"** has the same meaning as "gully stuffer";

**"log dump"** means areas where forest products are assembled for processing and sorting of logs prior to loading onto a truck;

**"logging debris"** means tree debris resulting from a forestry activity;

**"log landing"** has the same meaning as "log dump";

**"machinery"** means all mechanical equipment used in the forest except chainsaws;

**"major water storage"** means a dam constructed for public irrigation or the supply of town water;

**"mass movement"** means the downslope movement greater than 10 cubic metres of soil regolith, where gravity is the primary force and where no transporting medium such as wind, flowing water, or

## Appendix A – Eden Region

ice are involved. The key factors which affect mass movement are slope angle, material strength, vegetal cover and site drainage. This may include, but is not limited to earth slumps, translational slides and earth flows;

**"mitre drain"** means a drain used to conduct runoff water from the shoulders of a road to a disposal area away from the road alignment. Often it is the extension of a table drain away from the road surface;

**"mulch"** means a natural or artificial layer of plant residue or other material covering the land surface that conserves moisture, holds soil in place, aids in establishing plant cover and minimises temperature fluctuations;

**"natural surface road"** means a road that is unsealed or not gravelled;

**"net harvestable area"** means the portion of a compartment available for forestry activities. The net harvestable area does not include any exclusion areas within the compartment;

**"1998/99 licence"** means the licence dated 11 April 1998 issued by the EPA to State Forests in respect of logging operations;

**"1998/99 licence period"** means the period of the licence from 11 April 1998 to 10 April 1999;

**"1999/2000 licence"** means the licence dated 11 April 1999 issued by the EPA to State Forests in respect of forestry activities;

**"1999/2000 licence period"** means the period of the licence from 11 April 1999;

**"old roads"** means roads which were in existence prior to the commencement of a forestry activity;

**"outfall drainage"** means drainage which occurs when the surface of a road, snig track or extraction track has cross slope causing water to flow across and off the surface. This flow of water is away from and not into the hillside;

**"outlet"** means the point at which water discharges from a:

- a) river, creek or other flowline; or
- b) lake; or
- c) tidal basin or drainage depression; or
- d) pipe, channel, dam, or other hydrologic structure;

**"peak flow"** means the maximum flow which occurs during a flood of a specified average recurrence interval. (Refer to Part C of Schedule 2 of this licence);

**"permanent extraction track crossing"** means a crossing or crossing structure that is retained at the completion of harvesting;

**"permanent snig track crossing"** means a crossing or crossing structure that is retained at the completion of harvesting;

**"pollution of waters"** has the same meaning as in the *Protection of the Environment Operations 1997*;

**"post-harvest burning"** means burning associated with the cutting and removal of timber which is carried out within 18 months of the timber being cut and removed;

**"pulplug"** means logs suitable for the manufacture of reconstituted products including paper and panel board;

**"rainfall erosivity"** means a measure of the ability of rainfall to cause erosion;

**"rehabilitate"** means to return an area of land or a road or track surface to a stable condition. This may involve reshaping the land, spreading topsoil, constructing banks, revegetating or employing a combination of these;

**"relief pipe"** means a pipe used to direct water from a table drain and under the road;

**"reporting period"** means the period of 12 months after the issue of the licence, and each subsequent period of 12 months;

**"revegetate"** means to establish an effective vegetative groundcover by either natural regeneration or sowing with a seed and fertiliser mixture;

**"rill"** means a form of erosion that is characterised by small channels up to 0.3 metres deep which have cut into the surface of a slope;

**"road"** means any route used for the vehicular access to, and the transport of logs from, the point of loading within the compartment or roading area;

**"road drainage"** means a structure designed to direct water along, across or underneath a road, and includes catch drains, mitre drains, relief pipes, rollover banks, spoon drains, and table drains;

**"road prism"** means that part of the road from the inflexion point at the toe of the fill batter to the inflexion point at the top edge of the cut batter. Where there is no cut or fill batter as part of the road, then the road prism is to be taken from the outside edge of the table drain on either side of the road;

**"roading area"** means land which is disturbed by the construction of access roads necessary to enable or assist the cutting and removal of timber;

**"rollover crossbank"** means a crossbank constructed with a smooth cross-section and gentle batters, and which is well compacted to allow permanent vehicular trafficability;

## Appendix A – Eden Region

**"rollover drain"** has the same meaning as "rollover crossbank";

**"runoff"** means that portion of the precipitation falling on a catchment area that flows from the catchment past a specified point;

**"saprolite"** means part of the weathered soil regolith profile. It is characterised by the preservation of structures that are present in the unweathered rock material;

**"saturated soil"** means the physical condition of a soil in which no more moisture can be absorbed or accepted. Saturated soils are subjected to compaction, rutting or displacement by machinery and vehicles;

**"sawlog"** means logs suitable for processing through a sawmill into solid timber products;

**"sedimentation"** means the process of sediment deposition.

**"sediment control measures"** means a measure or practice that is used to mitigate, reduce or prevent the amount of sediment in runoff waters;

**"sediment trap"** means a structure designed to mitigate, reduce or prevent the amount of soil that is being transported by runoff;

**"SEMGL"** means the "Standard Erosion Mitigation Guidelines for Logging in New South Wales" prepared by the Department of Conservation and Land Management, 5 March 1993 version;

**"silt fence"** means a fabric or mesh placed in the path of runoff which acts as a filter to reduce and detain sediment from runoff waters;

**"slaking"** means the partial breakdown of soil aggregates in water due to the swelling of clay and the expulsion of air from pore spaces.

**"slash"** means tree debris resulting from a forestry activity;

**"snigging"** means the pulling of logs, either wholly on the ground or partly supported from the point of felling to the log dump. Wheeled or tracked vehicles are used for this purpose;

**"snig track"** means a track along which snigging equipment travels;

**"soil erodibility"** means the susceptibility of a soil to erosion due to rainfall and the surface runoff of water;

**"soil regolith"** means the mantle of the earth and soil, including rocks and sediments altered or formed by land surface processes;

## Appendix A – Eden Region

**"soil stabilisation"** means the provision of vegetative, structural or mechanical measures to prevent or control erosion by providing an energy-absorbent or energy resistant barrier on the soil surface;

**"spoil"** means excess soil, rock or other material excavated during forestry activities;

**"spoon drain"** means a drain with a semi-circular cross-section and which has no associated ridge of soil. Its capacity is solely defined by the excavated channel dimensions;

**"stable"** means the physical condition of a parcel of land or flowline which experiences no appreciable soil erosion, or sedimentation, and is protected from erosive agents. "Stable" also means a soil conservation or hydraulic structure which is functioning effectively and is not adversely affected by erosive agents;

**"stable outlet"** means an outlet which is protected from erosion, up to peak discharge of water flow from a storm event of less than or equal to the design specification of the structure;

**"State Forests"** means the Forestry Commission of New South Wales;

**"State Forests' licensee"** means the holder of any licence issued by State Forests under the *Forestry Act 1916* and the *Forestry Regulation 1999* which authorises the holder to carry out any forestry activity covered by this licence;

**"substantial debris"** means logging debris greater than 100 millimetres in diameter and three metres in length;

**"swamp"** has the same meaning as "wetland";

**"table drain"** means the side drain of a road adjacent to the shoulders of the road;

**"temporary extraction track crossing"** means a crossing or crossing structure that is removed at the completion of harvesting;

**"temporary snig track crossing"** means a crossing or crossing structure that is removed at the completion of harvesting;

**"timber"** means sawlog, pulplog, pole, pile or girders;

**"toe"** means the bottom intersection line of two slope planes, that is the toe of a fill is the line formed by the intersection of a fill batter with the natural ground surface;

**"topsoiling"** means the application of topsoil to exposed or eroded areas, including batters and earthworks, to encourage the rapid growth of vegetation over them, for the purpose of soil stabilisation against erosion.

## Appendix A – Eden Region

**"track drainage structure"** means any structure designed to direct water across an extraction track or snig track surface. These may include crossbanks, hay bales or sand bags;

**"trackscavator"** means a self-propelled, tracked tractor, commonly fitted with log forks, used for snagging and loading logs;

**"tree"** means a perennial plant with a self-supporting woody main stem or trunk which usually develops woody branches, and includes a sapling, shrub or scrub;

**"upgrading"** means the act of improving or replacing;

**"walk-over"** means timber extraction or snagging without removing or unduly disturbing the existing natural groundcover; that is, where no snig track construction or blading off is required or performed;

**"watercourse"** means a channel, having a distinct bed and banks, down which surface water flows on a permanent or semi-permanent basis;

**"wetland"** means a vegetated depression with a permanent, seasonal or intermittent water table at or slightly above the floor of the depression. The vegetation type in a wetland typically indicates a wetter micro-environment than the surrounding country;

**"windrow"** means an accumulation or mound of soil material on the edge of a road or snig track formed by the spillage from the edge of a blade or other similar machine during earthmoving operations;

**"windthrow"** means trees blown over by wind. Windthrow occurs naturally in native forests, but often follows harvesting operations which open up the forest, allowing more wind to penetrate.

**SCHEDULE 1**

**(Conditions 8; 14; 18; 20)**

**Part A: Forms to be used to notify the EPA**

**Form 1:** Summary of operations prepared in accordance with condition 9 and submitted in accordance with condition 10.

**Form 2:** Notification of cessation of licence authority for scheduled and non-scheduled forestry activities in accordance with condition 20.

**Part B: Operational map requirements**

**Part C: Location map requirements**

**Part A - FORM**

**SUMMARY OF OPERATIONS FOR SCHEDULED AND  
NON-SCHEDULED FORESTRY ACTIVITIES**

**1. General Information**

State Forest: \_\_\_\_\_ Compartment: \_\_\_\_\_

State Forest Region: \_\_\_\_\_ State Forest No: \_\_\_\_\_

Total Area: \_\_\_\_\_ (ha) Net Harvest Area: \_\_\_\_\_ (ha)

Operation Type: \_\_\_\_\_

Date on which licence authority  
commences: \_\_\_\_\_  
\_\_\_\_\_ \*

\*(not to be filled in until operation commences)

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**SOIL EROSION AND WATER POLLUTION HAZARD ASSESSMENT**

**2. Inherent Hazard Level**

Slope Class (degrees)	% Total Compartment
0-10	%
10-20	%
20-25	%
25-30	%
30+	%

Inherent Hazard Level: \_\_\_\_\_ Soil Regolith Class(es): \_\_\_\_\_

## Appendix A – Eden Region

Rainfall Zone: \_\_\_\_\_ Rainfall Erosivity: \_\_\_\_\_

Soil Regolith verified by: \_\_\_\_\_

Seasonality Restrictions apply: \_\_\_\_\_ Yes/No

### 3. Dispersible Soil Assessment

Dispersible soil present within the compartment: \_\_\_\_\_ Yes/No

Dispersible soil identified by: \_\_\_\_\_

### 4. Mass Movement

Mass movement hazard within the compartment (actual or potential): \_\_\_\_\_ Yes/No

Mass movement identified by: \_\_\_\_\_

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## SITE-SPECIFIC OPERATIONAL CONDITIONS

### 5. Road Construction

Length of new roads to be constructed: \_\_\_\_\_ m

Length of new roads to be constructed with a grade greater than 10°: \_\_\_\_\_ m

Length of new roads to be constructed on a ground slope greater than 30°: \_\_\_\_\_ m

### 6. Existing Roads

Length of existing roads to be maintained/upgraded/re-opened: \_\_\_\_\_ m

## Appendix A – Eden Region

Length of existing roads with a grade greater than 10°: \_\_\_\_\_m

Length of existing roads with a ground slope greater than 30°: \_\_\_\_\_m

### 7. Road Drainage Feature Crossings to be Constructed

Number of new drainage line, watercourse, swamp and wetland road crossings to be constructed: \_\_\_\_\_

Number of new drainage line, watercourse, swamp and wetland road crossings where the road cannot be drained with a crossbank, mitre drain, relief pipe or spoon drain within 30 metres on either side of the crossing: \_\_\_\_\_

### 8. Existing Roads Drainage Feature Crossings

Number of existing drainage line, watercourse, swamp and wetland road crossings to be used: \_\_\_\_\_

Number of existing drainage line, watercourse, swamp and wetland road crossings proposed for maintenance or upgrading: \_\_\_\_\_

Number of existing drainage line, watercourse, swamp and wetland crossings where the road cannot be drained with a crossbank, mitre drain, relief pipe or spoon drain within 30 metres on either side of the crossing: \_\_\_\_\_

### 9. Snig & Extraction Tracks

Estimated number of snig track & extraction track crossings of watercourses and drainage lines: \_\_\_\_\_

Is sidecut snig track construction proposed (greater than 1m in height): Yes/No

### 10. Borrow Pits & Gravel Pits

Number of borrow pits or gravel pits to be used: \_\_\_\_\_

### 11. Post-harvest Burning

Is post-harvest burning proposed: Yes/No

## Appendix A – Eden Region

Preferred season of burn and method of ignition: \_\_\_\_\_

### 12. Compliance

I certify that this is a true and accurate record of this proposed scheduled or non-scheduled forestry activity and that the following requirements have been fulfilled:

- a) the planning of this proposed scheduled or non-scheduled forestry activity has been undertaken in accordance with Schedule 2 of the Environment Protection Licence;
- b) the site assessments for dispersibility, mass movement and the determination of the inherent hazard level have been undertaken in accordance with Schedule 3 of the Environment Protection Licence; and
- c) site-specific prescriptions have been identified and developed in accordance with Schedules 2, 3, 4, 5 and 6 of the Environment Protection Licence.

**Regional Manager's Name:** \_\_\_\_\_  
(Block letters)

**Regional Manager's Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Part A - Form 2**

**NOTIFICATION FOR THE CESSATION OF LICENCE AUTHORITY FOR  
SCHEDULED OR NON-SCHEDULED FORESTRY ACTIVITIES**

On behalf of State Forests I hereby notify the EPA that the licence authority ceases to apply to the land identified below:

**State Forest:**\_\_\_\_\_

**Compartment:**\_\_\_\_\_

**State Forests' Region:**\_\_\_\_\_

**Operation Type:**\_\_\_\_\_

**Commencement date of licence authority:**\_\_\_\_\_

**Description of roading area (if applicable):**\_\_\_\_\_

\_\_\_\_\_

**Regional Manager's Name:**\_\_\_\_\_

(Block letters)

**Regional Manager's Signature:**\_\_\_\_\_

## Appendix A – Eden Region

Date licence authority ceases: \_\_\_\_\_

**Part B**

**OPERATIONAL MAP REQUIREMENTS**

**(Condition 8)**

**Information to be provided on the harvesting or  
roading operational map**

The following environmental and operational factors must be presented by State Forests on an operational map for each compartment or roading area, as required by conditions 8 and 9 of this licence. The harvesting or roading operational map must be presented at a map scale of 1:15 000 or larger.

**A. Operational Area**

- A1. net harvest area;
- A2. non-harvest area;
- A3. areas of inherent hazard level 4 (indicative boundary);
- A4. compartment or roading area boundaries;
- A5. coupe boundaries (if applicable);
- A6. State Forests boundary (if applicable);
- A7. areas of plantation (only applicable to areas of mixed native forest and plantation operations);
- A8. areas of mass movement hazard.

**B. Drainage Feature Protection**

- B1. location of watercourses and drainage lines as marked on a 1:25 000 topographic map;
- B2. filter strip widths for all identified watercourses and drainage lines within the compartment or roading area;
- B3. location of swamps and wetlands as identified on a 1:25 000 topographic map (as supplied by the Land Information Centre).

**C. Roads**

Only the roads marked on the operational map are covered by the requirements of this licence. Roads not identified on the operational map are not covered by the requirements of the licence. The operational map must clearly differentiate between existing and new roads to be constructed.

## **Appendix A – Eden Region**

- C1. location of existing roads:
  - natural surface roads;
  - sealed or gravelled roads;
  - four wheel drive/fire trails;
- C2. location of new roads to be constructed:
  - natural surface roads;
  - sealed or gravelled roads;
- C3. names of major roads;
- C4. names of minor roads (where applicable).

### **D. Drainage Feature Crossings by Roads**

- D1. location of drainage line, watercourse, swamp or wetland road crossings.  
(All crossings must be labelled or coded on the operational map so that the descriptions are consistent with the planning documentation)

### **E. Log Dumps & Log Landings**

- E1. location of log dumps (including the numbering of log dumps);
- E2. location of log landings or, alternatively, areas along roads where log landings are not to be permitted;
- E3. location of gravelled loading bays (if applicable).

### **F. Other Factors**

- F1. map scale;
- F2. Australian Map Grid coordinates (eastings and northings);
- F3. contour lines;
- F4. name and location of significant landmarks (if applicable);
- F5. map title (including the name and number of compartment or roading area);
- F6. topographic map sheet name and number.

## **Part C**

### **LOCATION MAP REQUIREMENTS**

**(Condition 8)**

## **Appendix A – Eden Region**

### **Information to be presented on the location map**

State Forests must provide a map that clearly identifies the location of the compartment or roading area, in relation to its surrounding region. This map must show the roads that are to be used to access the compartment or roading area.

## **SCHEDULE 2**

(Conditions 9; 11; Schedules 1, 3, 4 & 5)

### **Factors to be taken into account when planning scheduled and non-scheduled forestry activities**

#### **Part A: Information to be assessed during the pre-operational planning and assessment of scheduled and non-scheduled forestry activities**

The following environmental and operational factors must be assessed by State Forests during the planning of forestry activities in each compartment or roading area, as required by conditions 9 and 11 of this licence. State Forests must be able to demonstrate the manner in which the relevant factors were considered during the pre-operational planning process, and must identify special site-specific conditions to mitigate against water pollution associated with scheduled or non-scheduled forestry activities. This planning documentation, including the special site-specific conditions that have been developed to mitigate against water pollution must be kept on file in the Regional Office.

### **ENVIRONMENTAL FEATURES**

#### **A. Climate**

- A1. rainfall characteristics for the proposed area of operations, including average annual rainfall and distribution;
- A2. temperature range, including maxima and minima; and
- A3. annual rainfall erosivity and maximum monthly rainfall erosivity values.

#### **B. Geology**

- B1. dominant rock types (occurrence and distribution); and
- B2. bedding planes.

#### **C. Soil Regolith**

- C1. distribution of soil regolith types;
- C2. soil regolith characteristics;
- C3. nutrient status of the soil regolith;
- C4. presence and distribution of dispersible soil material; and
- C5. location of soil or regolith boundaries (mapped at the same scale as the operational map).

#### **D. Landform**

- D1. total area (ha) for each of the slope classes as specified in the inherent hazard matrices in module 1 of Schedule 3;
- D2. aspect;
- D3. rockiness and rock outcrops;
- D4. mass movement or areas of potential mass movement hazard (occurrence and distribution marked on a map at the same scale as the operational map) as determined in accordance with module 2 of Schedule 3;
- D5. areas of inherent hazard level 4;
- D6. form, extent and location of any historical or existing erosion;
  - gully erosion;
  - sheet and rill erosion; and
- D7. topographic position.

**E. Hydrology**

- E1. location of drainage lines, watercourses, swamps and wetlands;
- E2. drainage pattern and density;
- E3. stream order as determined according to the methodology specified in part B of this Schedule;
- E4. stability of drainage lines and watercourses;
- E5. catchments to which drainage features within the compartment or roading area flow, including the delineation of catchment boundaries; and
- E6. forestry activities which were carried out in the last two years or are proposed to occur in the next two years in the catchment (both immediate and larger catchments). This must be documented on a map by locating the compartments and indicating the type of forestry activities that occurred or are proposed to occur.

**F. Vegetation and Groundcover Management**

- F1. forest type; and
- F2. condition of existing vegetation and ground cover
  - forest litter,
  - existing logging slash,
  - seasonal conditions; and
  - impacts by recent fires.

**OPERATIONAL SYSTEMS**

**G. New Road Construction (including major realignment work)**

- G1. length of new road to be constructed;
- G2. maximum width of road prism;
- G3. maximum width of clearing on either side of road prism;
- G4. maximum ground slope of land to be used for road construction;
- G5. maximum site-specific road grade;
- G6. length of road which will exceed 10 degrees;
- G7. distance between road drainage structures for roads that exceed 10 degrees grade;
- G8. spacing of road drainage structures to be installed;
- G9. type of sediment trapping or soil erosion and sediment control devices to be used during road construction;
- G10. maximum height of cut and fill batters to be constructed;
- G11. maximum length of cut and fill batters to be constructed;
- G12. type of drop-down structures and dissipators to be used over fill batters;
- G13. site-specific design and stabilisation techniques to be used on any roading to be constructed on ground slopes exceeding 30 degrees;
- G14. site-specific design and soil stabilisation techniques to be used on any roading to be constructed on areas that, or are likely to have a mass movement hazard;
- G15. site-specific details for the disposal of dispersible spoil material from road construction;
- G16. site-specific soil stabilisation techniques of disturbed areas;
- G17. site-specific soil erosion and sediment control techniques;
- G18. stabilisation assessment intervals; and
- G19. proximity of road to nearest drainage feature.

**H. Existing Roads**

- H1. form, extent and location of any historical or existing erosion;
- H2. total length of existing roads to be used in forestry activities, including the length of roads which are passable and not passable prior to forestry activities;
- H3. length of roads to be re-opened (reshaped/reformed);

## Appendix A – Eden Region

- H4. length of road to be gravelled;
- H5. length of existing road to subject to maintenance works prior to operations;
- H6. type of road maintenance;
- H7. maximum width of existing running surface;
- H8. maximum width of clearing on either side of the road prism;
- H9. maximum road grade;
- H10. maximum ground slope on existing roads;
- H11. type of road drainage structures;
- H12. spacing of existing road drainage structures;
- H13. maximum height of cut and fill batters;
- H14. maximum length of cut and fill batters;
- H15. condition of existing cut and fill batters;
- H16. condition of existing drop-down structures;
- H17. site-specific stabilisation techniques to be used on any road on ground slope exceeding 30 degrees;
- H18. site-specific design and stabilisation techniques to be used on roads constructed on areas that, or are likely to have a mass movement hazard;
- H19. site-specific soil erosion and sediment control techniques;
- H20. future plans for the road (ie roads to be retained or closed); and
- H21. site-specific details on roads to be re-opened:
  - level of disturbance on cut and fill batters;
  - length of road re-alignment;
  - lowering of road grade; and
  - placement/disposal of spoil material.

### I. Construction of new drainage feature crossings

- I1. types of drainage feature crossings;
- I2. location of drainage feature crossings to be constructed (shown on operational map);
- I3. maximum width of drainage feature crossings including areas adjacent to crossings that will be disturbed by construction activities;
- I4. site-specific techniques to be used to prevent the deposition of spoil material into the drainage feature during construction (including sediment control structures);
- I5. approach reforming to be undertaken:
  - road drainage within 30 metres of the drainage feature;
  - distance to nearest drainage structures from the drainage feature;
  - outlet control of nearest drainage structure; and
  - table-drain checking devices;
- I6. reshaping of the bed and banks that will be required;
- I7. site-specific soil stabilisation techniques within 20 metres of drainage feature crossing;
- I8. permanence of water flow;
- I9. site-specific techniques to provide temporary protection of construction area from approach drainage;
- I10. site-specific soil erosion and sediment control techniques; and
- I11. site-specific techniques to dispose of excess spoil material.

### Culvert

- I12. method by which culverts will be installed/removed;
- I13. site-specific techniques to be used to prevent spoil entering the drainage feature when removing culverts;
- I14. site-specific techniques to be used to stabilise fill material around inlets and outlets of pipes;
- I15. site-specific techniques to be used to stabilise outlet discharge areas; and
- I16. site-specific techniques to be used to prevent road pavement material from entering the drainage feature.

## **Bridge**

- I17. site-specific techniques to be used to stabilise the banks from table drain discharge; and
- I18. site-specific techniques to be used to prevent road pavement material from entering the drainage feature.

## **Causeway**

- I19. site-specific techniques to be used to protect the bed and banks of the drainage feature.

## **J. Existing Drainage Feature Crossings**

- J1. type of existing drainage feature crossings;
- J2. location of existing drainage feature crossings (shown on operational map);
- J3. approach reforming to be undertaken:
  - road drainage within 30 metres of the drainage feature;
  - distance to the nearest drainage structures from the drainage feature;
  - distance to the nearest drainage structures;
  - outlet control of the nearest drainage structure;
  - table-drain checking devices;
- J4. type of pavement surface to be used on the drainage feature crossing;
- J5. reshaping of the bed and banks that will be required;
- J6. site-specific soil stabilisation techniques within 20 metres of drainage feature crossing;
- J7. site-specific soil erosion and sediment control techniques; and
- J8. site-specific techniques to dispose of excess spoil material.

## **Existing culvert crossings**

- J9. method by which existing culverts will be removed;
- J10. site-specific techniques to be used to prevent spoil entering the drainage feature when removing culverts;
- J11. site-specific techniques to be used to stabilise fill material around inlets and outlets of pipes;
- J12. site-specific techniques to be used to stabilise outlet discharge areas; and
- J13. site-specific techniques to be used to prevent road pavement material from entering the drainage feature.

## **Existing bridges crossings**

- J14. site-specific techniques to be used to stabilise the banks from table drain discharge; and
- J15. site-specific techniques to be used to prevent road pavement material from entering the drainage feature.

## **Existing causeway crossings**

- J16. site-specific techniques to be used to protect the bed and banks of the drainage feature; and
- J17. type and stability of running surface on causeway crossings.

## **K. Borrow Pits & Gravel Pits**

- K1. location of borrow pits or gravel pits;
- K2. site-specific techniques to stabilise borrow pits or gravel pits;
- K3. proximity of borrow pits or gravel pits to drainage features; and
- K4. site-specific techniques to drain borrow pits or gravel pits.

**L. Harvesting Factors**

- L1. volume of timber per hectare to be removed;
- L2. gross area of the compartment or roading areas (hectares);
- L3. net available area of the compartment or roading areas (hectares);
- L4. net harvestable area of the compartment or roading areas (hectares);
- L5. per cent canopy retention;
- L6. felling method (manual or machine);
- L7. extraction method (eg crawler tractor, wheeled skidder, forwarder, etc);
- L8. areas within the compartment where ground based harvesting must not occur; and
- L9. seasonality restrictions on forestry activities as specified in module 4 of Schedule 3 of this licence.

**M. Log Dumps & Log Landings**

- M1. location of log dumps;
- M2. location along roads where log landings are not permitted (if applicable); and
- M3. loading method.

**N. Post-logging Burning**

- N1. seasonal timing of the burn; and
- N2. method of ignition.

State Forests must assess the interaction of the attributes listed above. The interpretation process must concentrate on those factors most relevant to mitigating soil erosion and water pollution associated with the proposed forestry activity. Operational and environmental factors that must be considered:

- inherent soil erosion and water pollution hazard;
- periods of high rainfall erosivity;
- season of poorest ground cover recovery;
- rock bedding planes limiting side-cut roads and side-cut snig track construction;
- mass movement hazard;
- rocky outcrops;
- dispersible soils;
- areas of inherent hazard level 4;
- extraction method;
- sensitive areas; and
- soil compaction.

State Forests must develop site-specific conditions for the each compartment or roading area, following the above site-specific assessment. Special site-specific conditions must deal with:

- crossing of drainage features by roads;
- crossing of drainage features by snig tracks and extraction tracks;
- roading construction, upgrading and maintenance operations;
- road drainage within 30 metres of drainage feature crossings;
- ground cover management for soil erosion and sediment control;
- filter strips and buffer strips;
- snig or timber extraction tracks;
- log dumps and log landings;

## **Appendix A – Eden Region**

- borrow pits and gravel pits;
- soil stabilisation techniques;
- seasonality restrictions;
- soil erosion and sediment controls; and
- post-harvest burning.

**Part B: Determination of Stream Order for Drainage Feature Protection**

The determination of stream order must be undertaken by State Forests during the pre-operational planning of scheduled or non-scheduled forestry activities in each compartment or roading area, as required by condition 7 of Schedule 4 of this licence. Stream order must be determined according to the methodology outlined below.

1. A first order stream is defined as that part of a drainage system between its point of origin and the first junction with another stream. A second order stream commences at the junction of two first order streams. A third order system commences at the junction of two second order streams. A schematic diagram of stream order is provided in Figure 2 of this licence.
2. Downstream from the junction of two streams of different stream order, the higher stream order is maintained.
3. The determination of stream order must commence from the catchment boundary, even if that is outside the compartment or roading area.
4. For the purpose of this licence, all streams that have a stream order greater than third order must be given, as a minimum, the same level of drainage feature protection as third order streams.
5. Stream order must be derived from the drainage network provided on the relevant topographic map(s) for the proposed compartment or roading area, from a 1:25 000 map sheet produced by the Land Information Centre (formerly the Central Mapping Authority). Where a 1:25 000 topographic map sheet is not available for the compartment or roading area, then the best available scale map sheet produced by the Land Information Centre must be used.

## Part C: Design Methods for Crossings and Drainage Structures

### 1. Design of bridges, culverts and causeways

Design calculations used to determine the peak discharge for the specified recurrence intervals relating to the design of bridges, causeways or culverts, must be undertaken in accordance with the "Modified McArthur rational method" as specified in the State Forests' roading manual (Forestry Commission, 1983). This design methodology must only be applied to catchments less than 1000 hectares.

Where State Forests chooses to use an alternative method for calculating the peak discharge for the specified recurrence intervals required by this licence for bridges, causeways or culverts, State Forests must have the prior written approval of the EPA.

### 2. Design of road and snig track drainage structures

Design calculations used to determine the design capacity for the specified recurrence interval relating to road and snig/extraction track drainage structures must be undertaken in accordance with the following methodology:

The design calculation to determine the capacity of road and snig/extraction track drainage structures is a two stage calculation.

- i) Determine the peak discharge (Q) using the "*Rational Method*" described in "Australian Rainfall and Runoff" (1987, page 293). The rational method uses the equation:

$$Q = C.I.A/360 \quad \dots(1)$$

where

Q	=	peak discharge (cubic metres/second)
C	=	runoff coefficient (set at 0.85)
I	=	rainfall intensity (mm/hr)
A	=	catchment area (ha)

Note: The rainfall intensity (I) factor to be used in this equation must be derived using the "*Kinematic Wave Equation*" provided in "Australian Rainfall and Runoff" (1987, page 300).

- ii) Once the peak discharge (Q) has been calculated, State Forests must use the "*Manning's Equation*" to determine the minimum depth of water flow in the drainage structure. The "*Manning's Equation*" is provided in equation 2:

$$Q = 1/n.A.R^{2/3}.S^{1/2} \quad \dots(2)$$

where

Q	=	flow (cubic metres/second)
n	=	roughness coefficient (derived from Australian Rainfall and Runoff, 1987)
A	=	cross sectional area of flow (m <sup>2</sup> )
R	=	hydraulic radius
S	=	channels slope (m/m)

Where State Forests chooses to use an alternative method for calculating the peak discharge for the specified recurrence intervals required by this licence for road and snig/extraction track drainage structures, State Forests must have the prior written approval of the EPA.

### **SCHEDULE 3**

**(Conditions 9; 11; 45; Dictionary; Schedules 1, 2, 4, 5 & 6)**

#### **Methods for assessing the soil erosion and water pollution hazard associated with scheduled and non-scheduled forestry activities**

##### **OBJECTIVES**

For the purpose of this licence, "soil erosion and water pollution hazard" is a relative measure of the potential for soil erosion and water pollution to occur in a forested area in which scheduled or non-scheduled forestry activities are proposed to be carried out. Determining the soil erosion and water pollution hazard involves assessing the intensity and extent of the factors that contribute to the hazard. The objective of this assessment procedure is to ensure that the appropriate management practices and site-specific conditions are in place to control and mitigate the hazard associated with scheduled or non-scheduled forestry activities covered by this licence.

This schedule specifies the methods and procedures that must be used to assign soil erosion and water pollution hazard prior to the commencement of forestry activities. The data requirements, data sources, and the calculation of soil erosion and water pollution hazard are provided. Methods and data sources not specified in this schedule are not permitted to be used in determining the soil erosion and water pollution hazard.

Three site and soil assessment protocols and one seasonality assessment are required by this Schedule, and have been developed for assessing the inherent sensitivity of a compartment or roading area to soil erosion and water pollution processes. The four modules are:

- (a) inherent soil erosion and water pollution assessment (Module 1);
- (b) mass movement assessment (Module 2);
- (c) dispersibility assessment (Module 3); and
- (d) seasonality (Module 4).

State Forests must apply all four assessment modules during the pre-operational planning phase which precedes the commencement of forestry activities, as required by conditions 9 and 11 of the licence. These modules include a definition of what is being assessed, the type of assessment required, the standard of expertise and the reporting requirements.

In carrying out the requirements of this schedule, State Forests must take a conservative approach in assessing or updating a compartment or roading area for the inherent soil erosion and water pollution hazard, mass movement, dispersibility and seasonality.

## **Module 1:**                    **Inherent Soil Erosion & Water Pollution Hazard**

This assessment module must be used to determine the inherent soil erosion and water pollution hazard assessment for all harvesting operations covered by this licence. This assessment module applies only to the general harvest area and is not applicable to roading operations.

### **1.1.**                    **Introduction**

Soil erosion and water pollution hazard assessment is a process by which the relative hazard of a particular forestry activity is determined on the basis of the following three interrelated factors:

- (a) rainfall erosivity, which is a measure of rainfall intensity (energy);
- (b) slope, measured in degrees; and
- (c) soil regolith stability, which is an indication of the likelihood that the soil and/or underlying rock will erode and be delivered to receiving waters.

Soil and regolith stability is divided into two key components:

- (a) soil regolith cohesion; and
- (b) soil regolith sediment delivery potential.

Soil regolith cohesion refers to the soil regolith's ability to resist deformation and/or detachment by the forces of erosion, principally water, wind or gravity. The level of regolith cohesion is directly influenced by the intrinsic properties of the material's matrix strength and density. For example, a coherent regolith can withstand high bearing loads or resist shearing, whereas non-coherent materials may have low strength, poor trafficability and be easily disturbed or displaced by machinery (Murphy *et al.*, 1998).

Soil and regolith sediment delivery potential refers to the soil regolith's potential to produce fine grained sediment, in the form of silt and clay, that can be transported and delivered to receiving waters. This soil regolith approach incorporates both soil and regolith cohesion and sediment delivery potential and reflects the nature of the two concepts of soil erosion and water pollution (Murphy *et al.*, 1998).

State Forests must take a conservative approach in categorising the inherent soil erosion and water pollution hazard of a compartment.

### **1.2.**                    **Definitions**

For the purpose of this assessment module, the following terms are defined as follows:

**"approved soil assessor"** means a person who has undertaken a training program in soil and regolith assessment, identification and management and who has demonstrated competency at the completion of the program, to the satisfaction of the Environment Protection Authority (EPA) for the purposes of this module. Before being eligible to undertake the training program, the person must be able to demonstrate competency in soil survey procedures to the satisfaction of the EPA;

**"gross area"** means the total area of land within a compartment or roading area, before exclusion areas are removed (in hectares);

**"net harvestable area"** means the portion of a compartment available for forestry activities (in hectares). This does not include any exclusion areas within the compartment;

**"soil regolith"** means the mantle of earth and rock, including rocks and sediment altered or formed by land surface processes. Regolith may be either saprolite or sediment.

"**saprolite**" means part of the weathered soil regolith profile. It is characterised by the preservation of structures that are present in the unweathered rock material.

### **1.3. Data Sources for Inherent Soil Erosion & Water Pollution Hazard**

The soil erosion and water pollution hazard assessment must be carried out using only the following data sets:

DATA TYPE	DATA DESCRIPTION	DATA SOURCE
Compartment Boundary Data	State Forests' GIS compartment layer	State Forests' GIS as supplied to the EPA.
Slope Class	State Forests' GIS slope layer	Land Information Centre (LIC) 25 x 25m grid cell
Rainfall Erosivity	Table of rainfall erosivity and zone by compartment	State Forests' GIS as supplied to the EPA (1998)
Soil Regolith Stability	Soil Regolith Stability Classification for State Forests in Eastern New South Wales (1998)	Murphy, C; Fogarty, P; and Ryan, P. ISSN 1324-6860

The use of alternative data sets to derive the inherent soil erosion and water pollution hazard must not occur without the prior written approval of the EPA.

#### **Updating Data Sources**

State Forests may only make amendments, changes or additions to the data sources used in this assessment module, according to the following procedures:

- a. State Forests is not permitted to make any amendments, changes or additions to the slope information held in the State Forests GIS without the prior written approval of the EPA;
- b. State Forests is not permitted to make any amendments, changes or additions to the Table of rainfall erosivity for each State Forests' compartment, as specified in table 1.3 of this licence, without the prior written approval of the EPA;
- c. Where State Forests make any amendments, changes or additions to the compartment boundary information, then State Forests must advise the EPA of any such amendment or change within 21 days and provide the modified GIS layer to the EPA; and
- d. State Forests is not permitted to make any amendments, changes or additions to the soil regolith information held in the State Forests' GIS without the prior written approval of the EPA.

Where State Forests requires any amendments, changes or additions to the soil regolith information, then it must bring its case forward for any such amendment or change on a six monthly basis to the EPA and DLWC.

### Inherent hazard matrix table

The data sources identified above are combined using the inherent hazard tables. There are eight different inherent hazard tables, based on the forest type, harvesting intensity and extraction method, as follows:

1. Native forest logging with greater than or equal to 50% canopy removal within the net harvestable area (dozer/skidder extraction);
2. Native forest logging with less than 50% canopy removal within the net harvestable area (dozer/skidder extraction);
3. Native forest thinning (forwarder extraction).

## Appendix A – Eden Region

### Native forest logging with greater than or equal to 50% canopy removal within the net harvestable area (Dozer/Skidder extraction)

Average Annual R-factor	Slope Class (Degrees)									
	0<10		10<20		20<25		25<30		30+	
0-2000	1	1	1	2	1	2	2	2	4	4
	1	2	2	2	2	2	2	2	4	4
2000-3000	1	1	1	2	1	2	2	2	4	4
	1	2	2	2	2	2	2	4	4	4
3000-4000	1	2	2	2	2	2	2	2	4	4
	1	2	2	2	2	4	4	4	4	4
4000-5000	1	2	2	2	2	2	2	4	4	4
	2	2	2	2	4	4	4	4	4	4
5000-6000	2	2	2	2	2	2	2	4	4	4
	2	2	2	4	4	4	4	4	4	4
6000+	2	2	2	2	2	4	4	4	4	4
	2	2	4	4	4	4	4	4	4	4

**Key:**

**Level 1:** Low soil erosion and water pollution hazard;

**Level 2:** High soil erosion and water pollution hazard;

**Level 3:** Very high soil erosion and water pollution hazard;

**Level 4:** Extreme soil erosion and water pollution hazard - scheduled or non-scheduled forestry activities prohibited for this proposed method of timber harvesting and extraction.

## Appendix A – Eden Region

### Native forest logging with less than 50% canopy removal within the net harvestable area (Dozer/Skidder extraction)

Average Annual R-factor	Slope Class (Degrees)									
	0<10		10<20		20<25		25<30		30+	
0-2000	1	1	1	2	1	2	1	2	4	4
	1	2	1	2	2	2	2	2	4	4
2000-3000	1	1	1	2	1	2	2	2	4	4
	1	2	2	2	2	2	2	2	4	4
3000-4000	1	2	2	2	2	2	2	2	4	4
	1	2	2	2	2	2	2	4	4	4
4000-5000	1	2	2	2	2	2	2	3	4	4
	1	2	2	2	2	3	3	4	4	4
5000-6000	1	2	2	2	2	2	2	3	4	4
	2	2	2	3	2	3	3	4	4	4
6000+	2	2	2	2	2	3	3	4	4	4
	2	2	2	3	3	3	4	4	4	4

**Key:**

**Level 1:** Low soil erosion and water pollution hazard;

**Level 2:** High soil erosion and water pollution hazard;

**Level 3:** Very high soil erosion and water pollution hazard;

**Level 4:** Extreme soil erosion and water pollution hazard - scheduled or non-scheduled forestry activities prohibited for this proposed method of timber harvesting and extraction.

**Native Forest Thinning Operation**

Average Annual R-factor	Slope Class (Degrees)									
	0<10		10<20		20<25		25<30		30+	
0-2000	1	1	1	1	1	1	1	2	4	4
	1	1	1	1	1	1	2	2	4	4
2000-3000	1	1	1	1	1	1	2	2	4	4
	1	1	1	1	1	2	2	2	4	4
3000-4000	1	1	1	1	1	1	2	2	4	4
	1	1	1	2	1	2	2	2	4	4
4000-5000	1	1	1	1	1	2	2	2	4	4
	1	1	1	2	2	2	2	2	4	4
5000-6000	1	1	1	1	2	2	2	2	4	4
	1	1	1	2	2	2	2	4	4	4
6000+	1	1	2	2	2	2	2	2	4	4
	1	1	2	2	2	2	2	4	4	4

**Key:**

**Level 1:** Low soil erosion and water pollution hazard;

**Level 2:** High soil erosion and water pollution hazard;

**Level 3:** Very high soil erosion and water pollution hazard;

**Level 4:** Extreme soil erosion and water pollution hazard - scheduled or non-scheduled forestry activities prohibited for this proposed method of timber harvesting and extraction.

Where a combination of harvesting or extraction methods or techniques is proposed to be used within one compartment, then State Forests must use the most conservative inherent hazard matrix table in determining the inherent hazard level.

Where Australian Group Selection procedures are applied to a compartment, so that more than 25% of the net harvestable area is subject to this silvicultural procedure, then State Forests must assume that the harvesting operation for the compartment will result in a greater than 50% canopy removal within the net harvestable area.

#### **1.4. Soil Erosion & Water Pollution Hazard Assessment Procedure**

The soil erosion and water pollution hazard assessment procedure must be carried out separately for each individual compartment. Compartments must not be amalgamated for the purpose of determining the inherent soil erosion and water pollution hazard.

Information on slope, rainfall intensity and soil regolith class for each compartment must only be taken from the data sources specified in section 1.3 of this schedule.

#### **STEP 1: Determine soil regolith class of a compartment**

The following methodology must be used to verify the soil regolith class within the compartment.

- a. An approved soil assessor must determine which soil regolith class(es) are present within the compartment, using State Forests' geographical information system (GIS) layer, as specified in section 1.3 of this schedule.

Where there is no existing soil regolith information held in State Forests' GIS, then the approved soil assessor must undertake a site and soil assessment of the compartment. The approved soil assessor must undertake this site and soil investigation using all field inspections, investigations and testing procedures that are necessary to determine all soil regolith class(es) present within the compartment.

- b. The same approved soil assessor must verify that the soil regolith class(es) specified in the GIS layer are consistent with the soil regolith that actually occurs within the compartment, and must mark any soil regolith boundaries on a map at the same scale as the operational map.
- c. The approved soil assessor must undertake this verification using all field inspections, investigations and testing procedures that are necessary to confirm that the soil regolith in the compartment is consistent with that presented by the GIS layer.
- d. The approved soil assessor must document all field inspections and investigations that he/she made and the tests that he/she performed to verify the soil regolith class(es). The approved soil assessor must also document the results of those investigations, inspections and tests and the reasons why he/she was able to reach the conclusion made about the soil regolith.
- e. Where the soil regolith class(es) is not consistent with the information specified in the GIS layer, the approved soil assessor must undertake a field investigation of the compartment to determine the soil regolith class(es).
- f. All investigations of soil regolith must be undertaken using the classification scheme specified in "Soil Regolith Classification for State Forests in Eastern New South Wales" (Murphy *et al.*, 1998).
- g. The approved soil assessor must document the field investigation that he/she made in accordance with points (e) and (f), the results of that investigation, and the reasons why

## Appendix A – Eden Region

he/she classified the soil regolith class(es).

- h. In all field inspections and investigations referred to in points (a) to (g), the approved soil assessor must take a conservative approach. The level of investigation, inspection and testing required is to be determined by the approved soil assessor, based on their professional judgement.
- i. If it is found by the EPA that the approved soil assessor has conducted the verification and classification of soil regolith negligently, or has demonstrated a lack of competency, or has not applied a conservative approach, then the EPA may choose to dis-approve the approved soil assessor. In such cases, the approved soil assessor will cease to be approved from the date specified in writing by the EPA and will no longer be accepted for conducting work in accordance with this schedule.
- j. The approved soil assessor must certify in writing that he/she has conducted all necessary investigations, inspections and tests to verify and (if required) determine the soil regolith class(es), in accordance with this schedule and giving regard to the most sensitive soil regolith within the proposed net harvestable area.
- k. All documentation referred to in points (a) to (j) above, must be kept on the compartment file at the Regional Office.

### STEP 2: Applying the inherent hazard tables

The combination of slope class, rainfall intensity and regolith class from the inherent hazard tables is used to determine the overall inherent hazard level.

- a. Using State Forests' geographic information system (GIS) slope layer (25 x 25 m), determine the percentage of the gross area of the compartment that falls into the slope classes given in the inherent hazard matrices for the proposed operation type.
- b. Select the appropriate inherent hazard table applicable to the proposed forestry activity (based on the forest type, harvesting intensity and extraction method).
- c. Determine the rainfall erosivity value for the compartment by referring to the table referenced in section 1.3 of this module.
- d. Using the rainfall erosivity (R factor) value for the proposed compartment, locate the row on the inherent hazard table that is applicable for the compartment.

*(For example, if the rainfall erosivity factor for the compartment is 2734, use the row labelled 2000-3000).*

- e. Using the soil regolith class provided in writing by the approved soil assessor for the proposed compartment, identify the inherent hazard levels that correspond to the slope classes, and hence the percentage of the gross area of the compartment classified as inherent hazard levels 1, 2, 3 or 4.

### STEP 3: Identification of areas of inherent hazard level 4

- a. The combination of slope class, rainfall intensity and soil regolith class(es) from the inherent hazard table is used to determine the overall inherent hazard level and areas of logging exclusion. All slope classes that have been identified as inherent hazard level 4 within the compartment must be excluded from scheduled or non-scheduled forestry activities.

## Appendix A – Eden Region

- b. Where 90% or more of the gross area of the compartment is inherent hazard level 4, then all of the compartment must be classified inherent hazard level 4 for that particular forest type, harvesting intensity and extraction method.
- c. Where less than 90% of the gross area of the compartment is inherent hazard level 4, then all logging activities must be excluded from the slope classes in which inherent hazard level 4 is applicable. This exclusion applies regardless of the application of step 4.

### **STEP 4: Determination of net harvestable area**

The following procedure must be used to determine the net harvestable area for the compartment:

- a. After removing the areas within the compartment of inherent hazard level 4, State Forests must remove all other exclusion areas known at the time of pre-operational planning from the compartment, with the exception of filter strips. These exclusion areas may include, but are not restricted to the following:
  - (a) riparian buffers;
  - (b) fauna and flora buffers;
  - (c) flora reserves; and
  - (d) cultural heritage.

The remaining area within the compartment is known as the net harvestable area (actual area on the ground that is proposed to be harvested).

- b. The net harvestable area must be documented as part of the pre-operational planning and assessment in accordance with Schedule 2 of this licence. These areas must not be changed or recalculated once the forestry activity commences.

### **STEP 5: Determination of inherent hazard level for the net harvestable area**

The following procedure must be used to determine the inherent hazard level for the net harvestable area from the percentage breakdown of the various inherent hazard levels throughout the compartment. Only one hazard level must be determined for the net harvestable area for each compartment.

- a. State Forests must identify the percentage of the net harvestable area within each of the inherent hazard levels 1, 2 and 3.
- b. Where the whole of the net harvestable area is contained within one inherent hazard level, then that level must apply to the compartment.
- c. Where 20% or more of the net harvestable area is classified as inherent hazard level 3, then all of the net harvestable area must be assigned inherent hazard level 3.
- d. Where less than 20% of the net harvestable area is classified as inherent hazard level 3, then State Forests must proceed to step (e).
- e. Where 40% or more of the net harvestable area is classified as inherent hazard level 2 or a combination of inherent hazard levels 2 and 3, then all of the net harvestable area must be assigned inherent hazard level 2.
- f. Where less than 20% of the net harvestable area is classified as inherent hazard level 3 and less than 40% of the net harvestable area is classified as inherent hazard level 2, or a combination of inherent hazard levels 2 and 3, then State Forests must proceed to step (g).

## **Appendix A – Eden Region**

- g. Where 60% or more the net harvestable area is classified as inherent hazard level 1, then all of the net harvestable area must be assigned inherent hazard level 1.

## **Module 2:**                    **Mass Movement Assessment**

This assessment module must be used to determine the mass movement hazard for scheduled or non-scheduled forestry activities that involve the:

- i)            the maintenance or upgrading of existing roads;
- ii)          the construction of new roads; or
- iii)        the use of side-cut snig tracks that have batters greater than one metre in height.

### **2.1.**                    **Introduction**

A careful evaluation of the mass movement hazard in any proposed forestry activity is critical for good forest resource management. Megahan (1972) and Swanson *et al.*, (1972) have shown that the existence of mass movement activity in forest environments can have a major impact on water quality and site productivity.

Management-induced mass movement is most effectively handled in the planning phase by providing appropriate management direction and prescriptions for activities taking place on land units which have a mass movement hazard. Mass movement processes are very different from water erosion processes. For this reason, soil material resulting from management-induced mass movement is considered separately to that resulting from soil erosion and subsequent processes identified in modules 1 and 3 of this Schedule.

Mass movement comprises erosional processes in which gravity is the primary force acting to dislodge and transport land surface materials. The dynamics of the process are a function of the gravitational stress acting on the land surface and the resistance of the soil and rock to displacement. There are two broad categories of mass movement: movement of colluvial materials down steep slopes, and the movement of deep subsoils on slopes of various gradients.

This assessment module requires an evaluation of the relative stability of the proposed compartment or roading area, using soils, geological, topographic and vegetative indicators from reports, aerial photographs and field observations. Mass movement is rarely the function of a single event or environmental factor, but usually a combination of a number of important factors. Evaluation of these characteristics within the compartment or roading area and within the general catchment area must ensure that the appropriate site-specific management prescriptions are employed to mitigate the impacts of mass movement hazard.

### **2.2.**                    **Definitions**

For the purposes of this assessment module, mass movement is defined as follows:

**"mass movement"** means the downslope movement greater than 10 cubic metres of soil regolith, where gravity is the primary force and where no transporting medium such as wind, flowing water, or ice are involved. The key factors which affect mass movement are slope angle, material strength, vegetal cover and site drainage. This may include, but is not limited to earth slumps, translational slides and earth flows;

**"suitably qualified person"** means a person who has experience or qualifications, or both which means that they are able to carry out the requirements of this module in a competent and professional manner. A suitably qualified person would also preferably, but not necessarily, have experience in or knowledge of the geographic area or the type of landscape(s) being investigated.

### **2.3. Assessment Procedure for Mass Movement**

This section of the assessment module specifies the procedure that must be used to identify areas of existing or potential mass movement, prior to the commencement of scheduled or non-scheduled forestry activities. This approach uses field assessment at the compartment or roading area scale and consideration of existing information regarding mass movement hazard at a broader scale. This process must be supplemented with air photograph interpretation (API) for the areas where State Forests needs to confirm whether there is an existing or potential mass movement hazard. The basis of the approach taken in this assessment module is to undertake a qualitative evaluation of the landscape, both with the proposed area of operations and the surrounding landscape and geological units to identify indicators of slope instability.

State Forests must undertake steps 1 and 2 of this module in all cases in which this assessment module applies. Once the application of steps 1 and 2 have been completed, the following steps apply:

- i) where the investigation and results from steps 1 and 2 indicates that there is no existing or potential mass movement hazard, then State Forests is not required to do any further assessment for mass movement; or
- ii) where the investigation and results from both steps 1 and 2 indicates that there is an existing or potential mass movement hazard, then State Forests must proceed to section 2.4 of this module; or
- iii) where the investigation and results from steps 1 and 2 are in conflict with each other, then State Forests must undertake API to establish if the geological and landscape units have a mass movement hazard, in accordance with the requirements of step 3 of this assessment module.

#### **STEP 1: Consideration of existing information**

State Forests must consider all existing information which is relevant to mass movement within the geological unit or State forest within which scheduled or non-scheduled forestry activities are proposed. This information could include, but is not restricted to:

- i) published reports and surveys;  
(For example, such published reports and surveys may include, but are not restricted to:
  - local investigations or studies of mass movement;
  - soil conservation reports and technical notes;
  - DLWC soil landscape map series);
- ii) consultation with the local Department of Land and Water Conservation (DLWC) office; and
- iii) historical evidence, either in the form of internal reports or file notes, or as anecdotal evidence.

State Forests must retain copies of all information or advice obtained in accordance with this section of the module on file at the Regional Office.

#### **STEP 2: Field Assessment**

The purpose of the field assessment is to determine if there is evidence of existing or potential mass movement within the proposed area of scheduled or non-scheduled forestry activities. The field

## Appendix A – Eden Region

assessment of the compartment or roading area must be carried out by a suitably qualified and competent person. It is State Forests' responsibility to ensure, and be able to demonstrate that the person who carries out the field assessment is competent and qualified to do so.

The following procedure must be used to identify mass movement or areas of potential mass movement:

- a. State Forests must undertake a field survey of each compartment or roading area and determine if any mass movement is present or likely to occur.
- b. The field survey and investigation must include, but is not restricted to existing roads, side-cut snig tracks, gravel pits, quarries, major excavations and cleared slopes.
- c. Evidence of mass movement or potential mass movement includes, but is not restricted to:
  - recent or revegetated scars, where more than 10 cubic metres of soil has slipped or moved downslope;
  - slumped or slipped road batters;
  - bedding planes which dip at an angle parallelling the ground surface;
  - mixed or buried soil profiles;
  - hummocky terrain;
  - bent or split timber; and
  - springs at the toe of the slope.

Evidence of mass movement or potential mass movement within the compartment or roading area must be documented by the person carrying out the investigation and held on the compartment or roading area file at the Regional Office.

- d. The person carrying out the field assessment must certify that he/she has carried out the assessment in a competent manner and in accordance with the requirements of the licence.

State Forests must retain details of the field assessment on file at the Regional Office, including all field notes and the name of the person who undertook the assessment.

### **STEP 3: Air Photo Interpretation (API)**

If after completing steps 1 and 2, there is conflict in the findings between these two steps, then State Forests must undertake API to establish if the geological and landscape units have a mass movement hazard.

The purpose of this assessment procedure is to determine whether there is evidence of mass movement hazard or slope instability on land within the compartment or roading area, or on areas outside the compartment or roading area that have similar geological and geomorphological characteristics. In determining the areas of existing or potential mass movement, State Forests must take a conservative approach; that is, a potentially unstable area which shows no signs of actual mass movement but is similar in other aspects to nearby unstable areas, must be considered to have a mass movement hazard.

API must only be undertaken by persons with experience and competency in this technique. It is State Forests' responsibility to ensure, and to be able to demonstrate that the person undertaking the API assessment is suitably qualified and competent.

The following procedure must be adopted to identify areas of potential or actual mass movement using API:

- a. API must be undertaken on the largest scale of photographs available for the total extent of

## Appendix A – Eden Region

each geological unit which occurs within the compartment or roading area. API must be undertaken on the most recent series held by State Forests unless older photographs held by State Forests have a better resolution;

- b. API must be undertaken on the entire geological unit, which may include tenures outside State forest;
- c. Areas of the landscape within the geological unit that show evidence of mass movement must be identified and mapped. Evidence of mass movement includes those described in part C of step 2 of this section; and
- d. State Forests must retain notes and information relating to the API work on file at the Regional Office, including the name and qualifications of the person who carried out the API work.

### **2.4. Operations on Land with a Mass Movement Hazard**

The purpose of this section is to ensure that appropriate site-specific conditions and prescriptions are developed to mitigate against potential or actual mass movement hazard. Where State Forests has identified, using the procedures in section 2.3 of this module, that a potential or actual mass movement hazard exists, then expert advice must be sought. This advice must be provided by a person who is suitably qualified to assess and recommend mitigative measures for mass movement and slope instability. State Forests must obtain from the suitably qualified person detailed written advice about whether the operation should proceed, and if so, provide details about the site-specific conditions and mitigative techniques that must be applied. The development of site-specific conditions and mitigative techniques must ensure that mass movement is prevented to the greatest extent practicable. State Forests must retain a copy of this advice on file at the Regional Office, including the recommendation to proceed with the operation and any special site-specific conditions that have been developed.

It is State Forests' responsibility to ensure and be able to demonstrate, that the person who develops the mitigative measures is suitably qualified and competent to do so. The assessment of whether to proceed, and the development of mitigative measures, must be applied to but is not restricted to the following:

- road construction;
- road upgrading and maintenance;
- road drainage design and management;
- road batter stabilisation;
- seasonal or weather restrictions;
- exclusion area from forestry activities;
- side-cut snig track construction techniques;
- side-cut snig track drainage;
- side-cut snig track batter stabilisation;
- harvesting restrictions and prescriptions; and
- proximity of unstable areas to drainage features .

The suitably qualified person undertaking this assessment module must conduct all necessary investigations and inspections to verify and determine if there is an existing or potential mass movement hazard, in accordance with this schedule. All persons undertaking this assessment module must take a conservative approach in assessing the existing or potential mass movement.

### **Module 3: Soil Dispersibility Assessment**

This assessment module must be used to determine the dispersibility hazard for scheduled or non-scheduled forestry activities covered by this licence. This assessment module applies to roading and harvesting operations.

#### **3.1. Introduction**

The stability of the fine earth fraction of a soil aggregate when subjected to mechanical disturbance and/or wetting has the potential for significant on-site (surface crusting) and off-site impacts (water quality).

The interaction in water of the clay sized particles in aggregates can largely determine the structural stability of the soil. When an unstable soil becomes wet, the fine particles react as individuals and are readily eroded from the profile. Because of their fine nature, once they are entrained they tend to remain in suspension and this can cause serious turbidity problems in waterways for considerable periods following storm events.

The determination of dispersibility with this assessment module is based upon the dispersibility methodology used in SOILpak (NSW Agriculture, 1994). The actual methodology that must be followed for the purposes of this licence is detailed below in Section 3.3. State Forests must take a conservative approach in assessing dispersibility.

#### **3.2. Definitions**

For the purpose of this assessment module, the following terms are defined as follows:

**"aggregate"** means a unit of soil structure consisting of primary soil particles held together by cohesive forces or by secondary soil materials such as iron oxides, silica or organic matter;

**"approved soil assessor"** means a person who has undertaken a training program in the identification of dispersible soils using the SOILpak method and who has demonstrated competency at the completion of the program, to the satisfaction of the Environment Protection Authority (EPA) for the purposes of this schedule. Before being eligible to undertake the training program, the person must be able to demonstrate competency in soil survey procedures to the satisfaction of the EPA;

**"air-dry aggregate"** means the state of dryness of a soil aggregate at equilibrium with the water content in the surrounding atmosphere. The actual water content will depend upon the relative humidity and temperature of the surrounding atmosphere;

**"dispersibility"** means the behaviour of a soil material, whereby soil aggregates break down and separate into their constituent particles in water, due to deflocculation.

**"dispersion"** means the process whereby soil aggregates break down and separate into their constituent particles in water, due to deflocculation;

**"slaking"** means the partial breakdown of soil aggregates in water due to the swelling of clay and the expulsion of air from pore spaces.

**"slight dispersion"** means the partial breakdown of soil aggregates in water, where there is partial dispersion with less than 50% of the aggregate affected (see Craze and Hamilton, 1991 - page 159);

**"strong dispersion"** means the partial breakdown of soil aggregates in water, where there is partial dispersion with more than 50% of the aggregate affected (see Craze and Hamilton, 1991 - page 159); and

**"complete dispersion"** means total breakdown of the aggregate into its constituent particles (clay, silt and sand), leaving only the sand grains.

### **3.3. Detection of Dispersible Soils**

The following methodology must be used to identify dispersible soils within the compartment or roading area.

- a. An approved soil assessor must identify the distribution and extent of dispersible soils within the compartment or roading area and mark the boundary on a map at the same scale as the operational map.
- b. The approved soil assessor must identify these soils using all field inspections, investigations and soil dispersibility testing procedures that are necessary.
- c. The approved soil assessor must document all field inspections and investigations that he/she made and the results of soil dispersibility testing that he/she performed to identify dispersible soils within the compartment or roading area.
- d. Where the approved soil assessor chooses to use a soil test to confirm the presence of dispersible soils, the only test which will be accepted by the licence is the testing procedure outlined in Section 3.4 of this schedule. No other tests are allowed.
- e. In all field inspections, investigations and testing carried out in accordance with points (a) to (d), the approved soil assessor must take a conservative approach. The level of investigation, inspection and testing is to be determined by the approved soil assessor based on their professional judgement.
- f. If it is found by the EPA that the approved soil assessor has conducted the dispersibility identification negligently, or has demonstrated a lack of competency, or has failed to identify dispersible soils that are present, or has not applied a conservative approach, then the EPA may choose to dis-approve the approved soil assessor. In such cases, the approved soil assessor will cease to be approved from the date specified in writing by the EPA and will no longer be accepted for conducting work in accordance with this schedule.
- g. The approved soil assessor must certify in writing that he/she has conducted all necessary investigations, inspections and tests to identify dispersible soils within the compartment or roading area, in accordance with this schedule.
- h. All documentation referred to in points (a) to (g) above, must be kept on the compartment or roading area file at the Regional Office.

### **3.4. Soil Dispersibility Testing Method**

If the approved soil assessor chooses to undertake soil dispersibility testing to identify or confirm the presence of dispersible soil within the compartment or roading area, then only the following method can be used.

#### **STEP 1: Method**

- a. Select three air-dry aggregates from each layer of the soil at whichever site is being tested;
- b. Place approximately 75 millilitres of deionised water in a clean, wide-bottomed container. Place the three aggregates in the container of deionised water, spaced equally around the side. The deionised water must completely cover the aggregate. Do not stir, or otherwise disturb; and

## Appendix A – Eden Region

- c. Record the degree to which the soil aggregates have dispersed and/or slaked at 10 minutes and 2 hours from when they were placed into the water.

### **STEP 2:        Dispersibility rating**

- a. Once the behaviour of the soil aggregates has been recorded in accordance with step 1, determine the dispersion rating, as follows:

Score <b>0</b>	for no dispersion within 2 hours;
Score <b>1</b>	for slight dispersion within 2 hours;
Score <b>2</b>	for slight dispersion within 10 minutes or complete dispersion within 2 hours;
Score <b>3</b>	for strong dispersion within 10 minutes or complete dispersion within 2 hours; or
Score <b>4</b>	for complete dispersion within 10 minutes.

- b. Soil aggregates that score a dispersibility rating of 2, 3 or 4 are deemed to be dispersible for the purpose of this schedule.
- c. Where the three soil aggregates react differently, then State Forests must adopt the most conservative dispersibility rating.
- d. Where the approved soil assessor has deemed that the soil regolith within a compartment is dispersible, then State Forests must ensure that the relevant conditions of Schedules 4 and 5 must be applied to all scheduled or non-scheduled forestry activities in the compartment or roading area.

## **Module 4:**                **Seasonality**

This assessment module must be used to determine whether seasonal limitations on the timing and maximum ground slope of operations apply to scheduled or non-scheduled forestry activities covered by this licence, including roading and harvesting operations.

### **4.1.**                **Introduction**

The appropriate timing of forestry activities is an effective management practice that can be used to mitigate the on-site and off-site impacts of forestry activities from periods of high intensity rainfall.

The determination of seasonality is a combination of the annual average rainfall erosivity, the distribution of this rainfall erosivity throughout the year and the soil regolith class(es) present within the compartment or roading area.

The implementation of seasonality restrictions is triggered by the combination of inherent hazard level and annual average rainfall erosivity where:

- the proposed compartment has been classified as inherent hazard level 3 and has an average annual rainfall erosivity between 4000-6000; or
- the annual average rainfall erosivity is greater than 6000, regardless of the inherent hazard level of the compartment.

Each of these two broad classes is further subdivided on the basis of three broad rainfall erosivity zones.

In determining the seasonality restriction required by this licence, State Forests must take a conservative approach.

### **4.2.**                **Definitions**

**"rainfall erosivity"** means a measure of the ability of rainfall to cause erosion and must be determined using the data source referred to in section 1.3 of Module 1 of this schedule;

**"rainfall zone"** means the areas of land within New South Wales that have the same seasonal distribution of rainfall erosivity and must be determined from the table referred to in section 1.3 of Module 1 of this schedule; and

**"seasonality"** means the management practice used to determine the timing of forestry activities based on the seasonal variation of rainfall erosivity, spatial distribution of rainfall and soil regolith stability.

### **4.3.**                **Assessment Procedure for Seasonality**

This section of the assessment module specifies the procedure that must be used to identify forestry activities in which seasonality prescriptions must be applied.

#### **STEP 1:                Requirements for seasonality determination**

- a. Determine the rainfall zone and the average annual rainfall erosivity for the proposed compartment or roading area from the table specified in section 1.3 of Module 1 of this schedule.

Where the seasonality restrictions are to be determined for a length of road, State Forests must use the most conservative (highest) value from the compartments adjacent to that road.

## Appendix A – Eden Region

- b. Using the methodology given in section 1.4 of Module 1 of this schedule, determine the soil regolith class(es) within the proposed compartment. Where the seasonality determination is being carried out for a roading area then State Forests must either verify the soil regolith class in accordance with section 1.4 of Module 1 of this schedule, or must accept as a default that the soil regolith class is 2, 3 or 4.
- c. Using the methodology given in section 1.4 of Module 1 of this schedule determine the inherent hazard level of the proposed compartment or roading area.
- d. Proceed to step 2:
  - i) where a forestry activity is proposed to be carried out in a compartment that has been classified as inherent hazard level 3 which has an annual rainfall erosivity value between 4000 and 6000; or
  - ii) where a new road is to be constructed on ground slopes greater than 30 degrees and where the annual rainfall erosivity value is between 4000 and 6000.
- or
- e. Proceed to step 3:
  - i) where a forestry activity (including new road construction) is proposed to be carried out in a compartment or roading area that has an annual average rainfall erosivity greater than 6000.

### **STEP 2: Identifying seasonality restrictions for forestry activities in a compartment identified as inherent hazard level 3 and for new road construction on ground slopes greater than 30 degrees**

- a. For a compartment that has been classified as inherent hazard level 3 with an average annual rainfall erosivity between 4000 and 6000 in rainfall zone 1 - 3, forestry activities are not permitted within the compartment during the periods specified in Table 1 (inclusive).
- b. New roads which are proposed to be constructed on ground slopes greater than 30 degrees and which have an annual erosivity value of between 4000 and 6000, must not be constructed during the periods specified in Table 1.

**Table 1: Seasonality restrictions for forestry activities in a compartment identified as inherent hazard level 3 and for new road construction on ground slopes greater than 30 degrees in rainfall erosivity zones 1 - 3 (inclusive).**

Annual Average Rainfall Erosivity	Rainfall Erosivity Zone 1 & 3	Rainfall Erosivity Zone 2
Greater than 4000 and less than or equal to 6000	1 January to 31 March	1 December to 31 March

### **STEP 3: Identifying seasonality restrictions for forestry activities in planning units and roading areas that occur in areas that have an average annual rainfall erosivity of greater than 6000**

- a. For a compartment or roading area that has an average annual rainfall erosivity greater than 6000 in rainfall zone 1 or 3, forestry activities are not permitted on the specified ground slopes during the prescribed periods (inclusive) in Table 2.

**Table 2: Seasonality and slope restrictions for a compartment or roading area with an**

**average annual rainfall erosivity greater than 6000 in rainfall erosivity zone 1 or 3.**

<b>Annual Average Rainfall Erosivity</b>	<b>Soil Regolith Stability Class 1</b>	<b>Soil Regolith Stability Class 2, 3 or 4</b>
Greater than 6000 and less than or equal to 8000	Greater than or equal to 25 degrees 1 January to 31 March	Greater than or equal to 20 degrees 1 December to 30 April
Greater than 8000	Greater than or equal to 25 degrees 1 October to 31 March	Greater than or equal to 20 degrees 1 October to 31 May

- b. For a compartment or roading area that has an average annual rainfall erosivity greater than 6000 in rainfall zone 2, forestry activities are not permitted on the specified ground slopes during the prescribed periods (inclusive) in Table 3.

**Table 3: Seasonality and slope restrictions for a compartment or roading area with an average annual rainfall erosivity greater than 6000 in rainfall erosivity zone 2.**

<b>Annual Average Rainfall Erosivity</b>	<b>Soil Regolith Stability Class 1</b>	<b>Soil Regolith Stability Class 2, 3 or 4</b>
Greater than 6000 and less than or equal to 8000	Greater than or equal to 25 degrees 1 December to 31 March	Greater than or equal to 20 degrees 1 December to 30 April
Greater than 8000	Greater than or equal to 25 degrees 1 October to 31 March	Greater than or equal to 20 degrees 1 October to 31 May

## **SCHEDULE 4**

**(Conditions 9; 11; 16; 17; 18; 22; Schedules 1, 2, 3, & 6)**

### **Operating conditions for scheduled and non-scheduled forestry activities**

The following conditions must be complied with in undertaking all forestry activities commenced during this licence period and permitted by this licence. Note that the environmental outcomes specified in this schedule must be complied with and that the italicised notes are guidance only. Compliance with the guidance notes may not necessarily achieve the required environmental outcomes, and site-specific techniques must be developed and applied.

#### **A. SITE-SPECIFIC CONDITIONS**

1. If prior to, or during forestry activities, it becomes apparent that the conditions of this licence are not capable of achieving the objectives of this licence, State Forests must:
  - a) formulate additional special site-specific conditions aimed at achieving the objectives of this licence; and
  - b) place the site-specific conditions determined in 1(a) of this Schedule on file at the Regional Office and produce them on request to an EPA officer.
2. Site-specific techniques to achieve the conditions of Schedule 4 must be identified during the planning process. These site-specific techniques must be documented and placed on file at the Regional Office prior to the commencement of forestry activities, and produced on request to an EPA officer.

#### **B. MAXIMUM SLOPE LIMITS**

3. No harvesting is permitted on land mapped as inherent hazard level 4 in accordance with Module 1 of Schedule 3 of this licence. Where there is an area of unmapped inherent hazard level 4 land within the net harvestable area, trees may be felled and the logs subsequently extracted by winching, provided that this unmapped areas is:
  - a) no larger than 50 metres by 50 metres in extent; and
  - b) no larger than 2500 square metres; and
  - c) not contiguous with any other inherent hazard level 4 land, either within the compartment or adjoining it.

Where harvesting operations occur within this unmapped area of inherent hazard level 4, the following restrictions must be applied:

- a) machinery must not enter this area; and
- b) harvesting operations must only be conducted in months where the monthly erosivity value is less than 300; and
- c) the water flow or potential water flow does not occur along the log furrow surface for a distance exceeding 10 metres; and
- d) State Forests must achieve 70% groundcover on all disturbed areas within five days of the completion of felling of trees in the area. This level of groundcover must not be achieved by:
  - i) the respreading or retaining of slash or logging debris; or
  - ii) the spreading of topsoil and seed; and
- e) the area must be clearly identified on the operational map prior to the felling of trees in the area.

## C. SEASONALITY RESTRICTIONS

4. For land classified as inherent hazard level 3 with an average annual rainfall erosivity between 4000 and 6000, no forestry activities are permitted within the compartment during the periods specified in Module 4 of Schedule 3 of this licence.
5. For a compartment or roading area that has an average rainfall erosivity greater than 6000, no forestry activities are permitted on the specified ground slopes for the periods specified in Module 4 of Schedule 3 of this licence.

## D. PROTECTION OF DRAINAGE FEATURES

### DRAINAGE FEATURE PROTECTION FOR NATIVE FORESTS

6. Filter strips must be retained along all drainage lines, prescribed streams and watercourses and must have a minimum width in accordance with Table 1.

**Table 1: Minimum filter strip width for mapped and unmapped drainage lines, prescribed streams and watercourses in native forests (metres - measured along the ground surface).**

Stream Order	Inherent Hazard Level 1	Inherent Hazard Level 2	Inherent Hazard Level 3
Unmapped	10	10	15
1st order	10	15	20
2nd order	15	20	25
3rd order or greater	20	25	30

7. The determination of stream order for the purposes of Table 1 must be carried in accordance with Part B of Schedule 2 of this licence.
8. Filter strips must be retained around all wetlands and swamps and must have a minimum width in accordance with Table 2.

**Table 2: Minimum filter strip width for mapped and unmapped wetlands and swamps in native forests (metres - measures along the ground surface).**

Total Area of Wetlands or Swamps (ha)		
	0.01 - 0.5 ha	Greater than 0.5 ha
Wetlands or Swamps	10	40

9. Filter strips must be retained around all major water storages and must have a minimum width of 100 metres.
10. Notwithstanding condition 9 of this Schedule, State Forests may carry out forestry activities within 100 metres of the top water level of Blowering Dam on the Tumut River.
11. The width of filter strips on watercourses, prescribed streams and drainage lines must be measured from the top of the bank of the incised channel or, where there is no defined bank, from the edge of the channel.

## Appendix A – Eden Region

12. The width of filter strips on wetlands and swamps must be measured from the edge of the current saturated zone or from the outer edge of where the vegetation type indicates a wetter micro-environment than the surrounding country, whichever is larger.
13. The area of wetlands and swamps must be measured from the edge of the current saturated zone or from the outer edge of where the vegetation type indicates a wetter micro-environment than the surrounding country, whichever is larger.
14. Where a filter strip extends beyond the boundary of the catchment of the drainage feature that is the subject of the filter strip then the filter strip may be terminated at the catchment boundary.
15. Buffer strips must be retained along all drainage depressions and must have a minimum width of five metres.
16. The width of buffer strips on drainage depressions must be measured from the apparent centre of the drainage depression.

### OPERATIONS WITHIN NATIVE FOREST FILTER STRIPS

17. Trees located in a filter strip must not be felled, except for the purposes of constructing a road, extraction track or snig track crossing.
18. Trees must not be felled into filter strips.
19. Where a tree is felled into a filter strip, then no part of that tree can be removed from the filter strip.

*(Note: The EPA does not intend to take proceedings where State Forests can demonstrate that the tree was accidentally felled into the filter strip. The tree will not be considered to have been accidentally felled if the felling is a result of poor judgement on the part of the faller).*

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

### OPERATIONS WITHIN BUFFER STRIPS FOR NATIVE FORESTS

21. Machinery must not operate in buffer strips when the soil is saturated.
22. Machinery operating within buffer strips must:
  - a) use walkover techniques wherever possible;
  - b) prevent to the greatest extent practicable the skewing of machinery tracks;
  - c) operate with blade up at all times except when conducting earthworks in accordance with condition 23 of this schedule; and
  - d) not snig along drainage depressions.

23. Earthworks must not be undertaken within buffer strips except for the construction of a road, extraction track or snig track crossing.

### E. BORROW PITS AND GRAVEL PITS

24. Runoff from borrow pits and gravel pits must not be discharged into drainage features.
25. Borrow pits and gravel pits must be located outside filter strips.

## **F. LOG DUMPS**

26. Runoff from log dumps must not be discharged into drainage features.

## **LOCATION**

27. Log dumps must be located outside filter strips and buffer strips.
28. For land classified as inherent hazard level 2, log dumps must be located at least 10 metres from the boundary of a filter strip, unless the construction of the log dump at least 10 metres from the boundary of the filter strip would result in additional excavation compared to a log dump located closer to the filter strip.
29. For land classified as inherent hazard level 3, log dumps must be located at least 20 metres from the boundary of a filter strip, unless the construction of the log dump at least 20 metres from the boundary of the filter strip would result in additional excavation compared to a log dump located closer to the filter strip.

## **DEBRIS MANAGEMENT**

30. Debris from log dumps must be located outside filter strips and buffer strips.
31. For land classified as inherent hazard level 2, debris from log dumps must be located at least 5 metres from the boundary of filter strips.
32. For land classified as inherent hazard level 3, debris from log dumps must be located at least 15 metres from the boundary of filter strips.

## **WET WEATHER RESTRICTIONS**

33. Forwarders, excavators and truck mounted loaders may be used as stationary loaders when there is runoff from the log dump. All other machinery on the log dump must remain stationary when there is runoff from the log dump surface. This condition does not apply to gravelled log dumps.

## **G. BURNING**

34. Post-harvest burning must be carried out in a manner that avoids burning the filter strip to the greatest extent practicable. Deliberate or negligent burning of filter strips must not occur.
35. Where a post-harvest burn has intruded into a filter strip, State Forests must put in place soil erosion and sediment control measures within 5 days to prevent water pollution.
36. For land classified as inherent hazard level 2 or 3, post-harvest burning must not be carried out during or within one month prior to those months of the year with an average monthly rainfall erosivity of greater than 1100.
37. For land classified as inherent hazard level 2 or 3, post-harvest burning carried out during those months of the year with an average monthly rainfall erosivity of 900 to 1100 inclusive must use a ground burning (top disposal) method only.

## **H. SNIG TRACKS AND EXTRACTION TRACKS**

38. Spoil from snig track or extraction track construction, upgrading or maintenance must not be placed in watercourses, drainage lines, prescribed streams, swamps or wetlands.

## Appendix A – Eden Region

39. Spoil from snig track or extraction tracks construction, upgrading or maintenance must not be placed in filter strips or buffer strips.
40. Blading-off on snig tracks or extraction tracks is not permitted.
41. For land classified as inherent hazard level 2 or 3, the grade of snig tracks must not exceed 25 degrees except to:
  - a) negotiate poorly drained land, rock outcrops or unstable soils; or
  - b) to take advantage of favourable terrain, such as to reach a geologically stable bench or saddle; or
  - c) to take advantage of soil which is more suitable for snig track construction and drainage.

### EXTRACTION TRACK AND SNIG TRACK CROSSING OF DRAINAGE FEATURES

42. Snig tracks or extraction tracks must not cross wetlands or swamps.
43. For land classified as inherent hazard level 3, snig tracks or extraction tracks must not cross watercourses.
44. For land classified as inherent hazard level 3, drainage lines must only be crossed using permanent snig track or extraction track crossing structures.
45. The location and type of drainage line and watercourse crossings must be approved by State Forests and marked in the field prior to crossing construction.
46. Drainage features must be crossed using stable structures comprising either causeways, culverts or bridges. Log dams and gully stuffers must not be constructed.
47. Notwithstanding condition 46 of this schedule, existing log dams and gully stuffers may be used where the stability of the structure can be ensured for the duration of the forestry activity. A suitably qualified person must assess the stability of the structure prior to the commencement of forestry activities.
48. The stability of existing log dams or gully stuffers must be inspected twice weekly during forestry activities. Where an existing log dam or gully stuffer becomes unstable, State Forests must replace the crossing structure within five days.
49. Where existing log dams or gully stuffers are used during forestry activities, State Forests must ensure that the crossing structure is stable at the completion of operations at that crossing.
50. Drainage feature crossings must be designed, constructed, upgraded and maintained to wholly convey a peak flow from a 1:5 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2.
51. Drainage feature crossings must be designed, constructed, upgraded and maintained to withstand the peak flow from a 1:10 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2.
52. Clearing associated with crossing construction, maintenance and upgrading must be undertaken at, or as close as practicable to, right angles to the water flow unless an angled approach reduces ground and soil disturbance.
53. Drainage feature crossing construction, maintenance and upgrading must be undertaken in a manner which prevents disturbance to the bed and banks of the drainage feature to the

## Appendix A – Eden Region

greatest extent practicable.

54. Disturbed areas resulting from drainage feature crossing construction, upgrading or maintenance must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.
55. The construction, upgrading and maintenance of drainage feature crossings must restrict disturbance of vegetation and groundcover in the filter strip or buffer strip to a maximum length of 3 metres upstream and downstream of the crossing. Where clearing beyond 3 metres is necessary during construction, upgrading and maintenance of drainage feature crossings, State Forests may approve additional clearing, and must document the approval and the reasons why it was necessary. This documentation must be kept on file at the Regional Office.
56. Soil erosion and sediment control measures must be employed and maintained during drainage feature crossing construction, maintenance and upgrading operations that takes more than one day to complete. Soil erosion and sediment control measures must be:
  - a) properly installed, constructed and maintained;
  - b) prevent to the greatest extent practicable the flow from the extraction track or snig track entering the disturbed areas; and
  - c) prevent to the greatest extent practicable the deposition of spoil into the drainage feature.
57. Soil stabilisation must be undertaken to all disturbed areas within 20 metres either side of snig track or extraction track crossing of watercourses or drainage lines. This does not include the track surface or track drainage structures within 20 metres either side of the watercourse or drainage line. Soil stabilisation must be completed within five days of crossing construction, upgrading and maintenance operations.

### BRIDGES

58. Soil stabilisation measures must be used to protect bridge embankments from table drain discharge. This must be completed within five days of construction, upgrading and maintenance operations at that crossing.
59. Where soil or gravel is used as the pavement for the bridge surface, structures must be installed to prevent soil or gravel from entering the drainage feature. Soil or gravel deposited within the drainage feature must be removed. Removal of soil or gravel must be undertaken in a manner which prevents disturbance to the bed and bank of the drainage feature to the greatest extent practicable.
60. Disturbed areas resulting from the removal of soil or gravel from the drainage feature must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.

## CULVERTS

61. Fill material, including soil or gravel, placed on pipes and used as the crossing surface must not be placed upstream of the culvert inlet or in the downstream flowpath of the culvert outlet.
62. Soil stabilisation measures must be used to protect the upstream and downstream fill batters surrounding the culvert pipe(s). This must be completed within five days of crossing construction and maintenance operations.
63. Pipe outlets must discharge onto a stable surface capable of handling concentrated water flow. Scouring at the pipe outlet must not undermine the crossing structure or initiate gully erosion.
64. Culvert recovery and removal of associated soil fill must be undertaken in a manner which prevents disturbance to the bed and banks of the drainage feature to the greatest extent practicable.
65. Where a culvert is removed, the disturbed areas within the drainage feature must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.

## CAUSEWAYS

66. The bed and banks of causeway crossings must consist of a stable surface or be constructed of an erosion resistant material.

## TEMPORARY EXTRACTION TRACK AND SNIG TRACK CROSSINGS

67. Temporary crossings must be immediately removed at the completion of their use. Removal of temporary crossings must prevent disturbance to the greatest extent practicable to the bed and banks of the drainage line or watercourse.
68. Where a temporary crossing is removed, the crossings must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.

## DISPERSIBLE SOILS

69. Where snig track or extraction track crossings of drainage lines or watercourses are constructed, upgraded or maintained in dispersible soils, State Forests must achieve at least 70% groundcover on the track surface within 20 metres either side of the crossing. This must be achieved at the completion of operations at each crossing.

*(For example this could be achieved by one of the following techniques, or a combination thereof:*

- a) *retain at least 70% existing ground cover using walkover techniques;*
- b) *retain or respread slash and logging debris over at least 70% of the snig track or extraction track surface within 20 metres; or*
- c) *providing a non-dispersive cover, over at least 70% of the snig track or extraction track surface within 20 metres).*

## DRAINAGE OF EXTRACTION TRACKS AND SNIG TRACKS

70. Snig track and extraction track drainage must be located and constructed to ensure that water flow or potential water flow does not occur on snig track or extraction track surfaces for distances exceeding those given in Table 3.

*(For example this could be achieved by one of the following techniques, or a combination thereof:*

- a) *retain existing ground cover using walkover techniques;*
- b) *retain or cover track surface with slash and logging debris;*
- c) *construct or maintain track with outfall drainage; or*
- d) *constructed track drainage structures).*

71. Where extraction tracks are used, existing groundcover must be retained by using walkover techniques, or cover the track surface with slash and logging debris. Where concentrated water flow or potential water flow occurs along bare ground in wheel ruts, State Forests must ensure that the distance of the water flow does not exceed those specified in Table 3.

**Table 3: Maximum distance of water flow or potential water flow along snig track or extraction track surface (metres - measured along the ground surface).**

Track Grade (degrees)	Maximum Distance (metres)
5	100
10	60
15	40
20	25
25	20
30	15

Table 3 may be interpolated to derive site-specific maximum spacings.

72. Where track drainage structures are used they must be located, constructed and maintained to:
- a) have sufficient capacity to convey the peak flow from a 1:2 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2; and
  - b) divert water onto stable surfaces capable of handling concentrated water flow and which provide for efficient sediment trapping.
73. Where crossbanks are used, State Forests may elect not to calculate the capacity of the crossbanks in accordance with condition 72(a) of this schedule. In these cases the crossbanks must be constructed to a minimum unconsolidated effective height of 35 cm or a consolidated effective bank height of 25 cm. A maximum height of 50 cm unconsolidated is recommended. Where State Forests elects to calculate the capacity of the crossbank in accordance with condition 72(a) of this schedule, the calculations must be kept on file at the Regional Office.
74. Snig tracks and extraction tracks must be drained between 5 metres and 20 metres from drainage line or watercourse crossings. This distance must be measured from the top of the bank of the incised channel, or where there is no defined bank, from the edge of the channel.

## Appendix A – Eden Region

Where this cannot be achieved between 5 metres and 20 metres from the drainage line or watercourse, site-specific techniques must be employed to prevent the pollution of waters.

75. Where practicable, constructed snig tracks must be drained between 5 metres and 20 metres from drainage depression crossings. The distance must be measured from the apparent centre of the drainage depression.
76. Where a storm event exceeding the design criteria of track drainage structures occurs within 12 months of the completion of forestry activities, State Forests must assess track drainage structures and repair any that do not comply with the requirements of condition 72 of this schedule, unless such track repair work increases the risk of water pollution. Additional track drainage structures must be constructed and soil stabilisation works undertaken, where this would reduce the risk of water pollution.
77. Crossbanks must not be constructed of bark.
78. Windrows resulting from snig track construction, upgrading or maintenance operations must be removed from the shoulders of snig tracks unless specifically constructed to prevent erosion of fill batters or where infall drainage is used. Where it is not possible to remove windrows they must be cut through at regular intervals to ensure that water flow on the track surface does not exceed the distances specified in Table 3.
79. Drainage must be effected as soon as practicable at the completion of operations on each extraction track or snig track, and in any event within two days, unless the soil is saturated. State Forests must document instances where saturated soil conditions preclude the construction of effective drains.
80. Drainage must be installed if the use of an extraction track or snig track is to be temporarily discontinued in excess of five days, unless the soil is saturated. State Forests must document instances where saturated soil conditions preclude the construction of effective drains.

### WET WEATHER RESTRICTIONS

81. Tracks must not be used where:
  - a) there is run off from the snig track surface; or
  - b) there is a likelihood of significant rutting leading to turbid runoff from the track surface.

### DOWNHILL SNIGGING

82. Where downhill snig tracks connect directly with a log dump or log landing, one of the following techniques or a combination thereof must be used:
  - a) snig tracks must enter the log dump or log landing from the side or below; or
  - b) a drainage structure must be in place immediately before a snig track enters the log dump or log landing at the end of each day's operation.

### I. STORAGE AND HANDLING OF HAZARDOUS SUBSTANCES AND WASTE

83. Fuel oils must be stored and handled in compliance with the requirements of AS1940 (1993)- "The storage and handling of flammable and combustible liquids".
84. Mobile fuel tanks must not be located within, or within 10 metres of the boundary of a filter strip.
85. The transportation and storage of fuel, and the refuelling of equipment must be carried out in a

## **Appendix A – Eden Region**

manner which prevents the pollution of waters as a result of the escape of fuel.

86. Chemicals must be stored and handled in compliance with the requirements of the Control of Workplace Hazardous Substances - National Model Regulation and National Code of Practice, June 1991, published by Worksafe Australia.
87. Plant and equipment and other substances and materials on the site of forestry activities must be handled, operated, moved and stored in a proper and efficient manner for the purposes of preventing the pollution of waters.
88. All servicing and repairs of equipment must be carried out in a manner which prevents the pollution of surface and ground waters.
89. Waste must not be buried or otherwise deposited in a compartment or roading area.
90. The general work area must be kept free of waste generated during forestry activities.
91. Waste must be properly and efficiently stored until it can be removed from the forest.
92. Waste stored for removal must be removed within seven days after completion of harvesting or roading operations in the compartment or roading area.
93. Waste must be removed from the forest and disposed of in a proper and efficient manner at an appropriate facility.
94. In conditions 89 to 93 of this Schedule, "waste" includes but is not limited to tyres, drums, wire rope, sump oil and litter, but does not include forest or logging debris.

## **SCHEDULE 5**

(Conditions 9; 11; 16; 17; 18; Schedules 1, 3 & 6)

### **Operating conditions for roads**

The following conditions must be complied with in undertaking all forestry activities commenced during this licence period and permitted by this licence. Note that the environmental outcomes specified in this schedule must be complied with and that the italicised notes are guidance only. Compliance with the guidance notes may not necessarily achieve the required environmental outcome, and site-specific techniques must be developed and applied.

#### **A. SITE-SPECIFIC CONDITIONS**

1. If prior to, or during forestry activities, it becomes apparent that the conditions of this licence are not capable of achieving the objectives of this licence, State Forests must:
  - a) formulate special site-specific conditions aimed at achieving the objectives of this licence; and
  - b) place the site-specific conditions determined in condition 1(a) of this Schedule on file at the Regional Office and produce them on request to an authorised officer of the EPA.
2. Site-specific techniques to achieve the conditions of Schedule 5 must be identified during the planning process. These site-specific techniques must be documented and placed on file at the Regional Office prior to the commencement of forestry activities, and produced on request to an authorised officer of the EPA.

#### **B. ROADS**

3. Location of roads must be marked in the field prior to construction.
4. Roads must be constructed, upgraded or maintained with a maximum grade of 10 degrees. The maximum grade may be increased to 15 degrees in the following circumstances:
  - a) to negotiate difficult terrain such as rock outcrops, unstable soils or poorly drained soils; or
  - b) to take advantage of favourable terrain such as to reach a geologically stable bench or saddle; or
  - c) to take advantage of soil which is more suitable for the construction and drainage of the road; or
  - d) to reduce the catchment area above the road.
5. Where clearing outside the road prism for road construction, upgrading or maintenance operations exceeds 3 metres either side of the road prism the following techniques or a combination thereof must be implemented within 5 days of the completion of road construction, upgrading or maintenance operations:
  - a) retaining at least 70% ground cover within the cleared area;
  - b) retaining or respreading slash and logging debris over at least 70% of the cleared area;
  - c) retaining or respreading a minimum of 5 centimetres of topsoil, seeded with appropriate grasses in order to achieve 70% ground cover over the cleared area; and
  - d) provide artificial groundcover, in order to achieve 70% ground cover within the

## Appendix A – Eden Region

cleared area using geotextile, mulch or erosion control mats.

6. Substantial tree debris resulting from road construction, upgrading or maintenance operations must be placed outside the boundary of filter strips.

### C. ROAD DRAINAGE

7. Roads must be drained in accordance with the conditions of this schedule during and upon the completion of forestry activities.
8. Road drainage structures must be located, constructed and maintained in such a way that they will have sufficient capacity to convey the peak flow from a 1:5 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2.
9. Water flow or potential water flow along a road surface or table drains, or both must not exceed the distances specified in Table 1. The maximum distance of water flow or potential water flow along roads and table drains is determined by measuring the grade of the road and referring to the maximum distances specified in Table 1.

*(For example this could be achieved by one of the following techniques or a combination thereof:*

- a) outfall drainage;*
- b) relief pipes;*
- c) mitre drains;*
- d) crossbanks; and*
- e) spoon drains)*

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

Road Grade (degrees)	Maximum Distance (metres)	Road Grade (degrees)	Maximum Distance (metres)
1	250	8	70
2	200	9	65
3	150	10	60
4	125	11	55
5	100	12	50
6	90	13	45
7	80	14 & 15	40

10. Notwithstanding condition 9 of this schedule, for existing roads that are drained using relief pipes, the maximum distance of water flow or potential water flow along roads and table drains may be increased by up to 20 per cent of the maximum distance specified in Table 1 on roads with grades less than or equal to 8 degrees, providing that:
- a) a mitre drain cannot be constructed or installed to ensure that the maximum distances specified in condition 9 of this schedule are not exceeded; and
  - b) site-specific techniques are employed to prevent erosion of the road surface and table drain.

## Appendix A – Eden Region

*(For example this could be achieved by one of the following techniques or a combination thereof:*

- a) armouring the road surface with gravel;*
- b) armouring the table drain with gravel;*
- c) ensuring that vegetated table drains are not disturbed;*
- d) covering the table drain with an erosion resistant material;*
- e) installing energy dissipators in the table drain).*

11. Where rollover crossbanks are used, State Forests may elect not to calculate the capacity of the crossbanks in accordance with condition 8 of this schedule. In these cases rollover crossbanks must be constructed to a minimum unconsolidated effective height of 30 cm or a consolidated effective bank height of 15 cm. Where State Forests elects to calculate the capacity of rollover crossbank in accordance with condition 8 of this schedule, the calculations must be kept on file at the Regional Office.
12. Where spoon drains are used, State Forests may elect not to calculate the capacity of the spoon drains in accordance with condition 8 of this schedule. In these cases the spoon drains must be constructed to a minimum effective depth of 15 cm. Where State Forests elects to calculate the capacity of spoon drains in accordance with condition 8 of this schedule, the calculations must be kept on file at the Regional Office.
13. Road drainage structures must be located, constructed and maintained in such a way that water is diverted onto a stable surface capable of handling concentrated water flow which provides for efficient sediment trapping and energy dissipation.

*(For example this could be achieved by one of the following techniques or a combination thereof:*

- a) diverting flow onto undisturbed vegetation;*
- b) diverting flow onto slash and logging debris;*
- c) diverting flow onto a natural or artificial non-erosive surface; or*
- d) installing natural or artificial sediment traps below the outlet of the road drainage structure).*

14. Notwithstanding condition 13 of this schedule, road surface drainage may be discharged onto a snig track or extraction track surface, where such a discharge point will reduce the height of the fill batter over which the road drainage is to be discharged. The length of water flow or potential water flow along the snig track or extraction track surface must not exceed 15 metres. This distance must be measured from the edge of the road surface.
15. Road drainage structures must be inspected twice weekly during haulage operations to ensure that they comply with the conditions of this schedule. Where road drainage structures do not comply with the conditions of this schedule, State Forests must repair the road and road drainage structures:
  - a) within 2 days where the repair work does not require the use of machinery; or
  - b) within 7 days where the repair work requires the use of machinery.
16. Soil erosion and sediment control measures required by this schedule must be:
  - a) properly installed and constructed; and

## **Appendix A – Eden Region**

- b) maintained in a manner so that they are in a proper and efficient condition.

- 17. Soil erosion and sediment control measures must be inspected twice weekly during forestry activities. These inspections must ensure that such soil erosion and sediment control measures comply with the requirements of this schedule. The date and type of any remedial action required must be recorded and kept on file at the Regional Office.
- 18. Earth windrows resulting from road construction and upgrading operations must be removed from the shoulders of all roads unless specifically constructed to prevent erosion of fill batters or where infall drainage is used. Earth windrows from road maintenance must be cut through at regular intervals to ensure that water flow on road surfaces does not exceed the distances specified in Table 1.
- 19. Where a storm event exceeding the design criteria of road drainage structures occurs within the period of licence coverage then all road drainage structures and sediment control measures must be inspected within 14 days of the storm event to assess whether they comply with requirements of this Schedule.
- 20. Where a storm event exceeds the design criteria for road drainage structures and they do not comply with the requirements of this schedule, then additional road drainage structures, sediment control techniques and soil stabilisation measures must be implemented within 21 days of the storm event.
- 21. Harvesting debris and spoil which is likely to impede the flow of water in road drainage structures must be removed from such structures twice weekly.

### **D. WET WEATHER RESTRICTIONS**

- 22. Haulage on natural surface roads must cease when there is runoff from the road surface. Loaded trucks and partially loaded trucks may complete their journey.

### **E. BLADING OFF ROADS**

- 23. Blading-off of roads:
  - a) may be permitted only where damage to the road surface and road drainage structures is minimal and subsequent drainage and repair is possible; and
  - b) must be approved and documented by State Forests; and
  - c) if carried out in accordance with conditions 23(a) and 23(b) of this Schedule, must include the stockpiling, in a recoverable position, of all soil material removed, and respreading of such material, once the forestry activity is completed.

### **F. MAXIMUM SLOPES FOR ROADS**

- 24. Where an existing road traverses groundslopes in excess of 30 degrees, a suitably qualified person must verify the stability of the road and specify the site-specific conditions required to ensure the stability of the road, road drainage structures and batters.
- 25. Where an existing road traverses groundslopes in excess of 30 degrees, the investigation and specification of site-specific conditions must be documented, including the name and qualifications of the person carrying out the investigation and kept on file at the Regional Office.
- 26. Where an existing road traverses groundslopes in excess of 30 degrees, the road, road drainage structures and batters must be maintained in accordance with the site-specific

## Appendix A – Eden Region

conditions developed in accordance with condition 24 of this schedule.

27. New roads must not be constructed or existing roads must not be upgraded on groundslopes in excess of 30 degrees, unless an engineering design has been undertaken for the road and site-specific conditions have been developed to ensure stability of the road, road drainage structures and batters. This engineering design must be undertaken by a suitably qualified person.
28. The engineering design, including all associated calculations and the site-specific conditions developed in accordance with condition 27 of this Schedule, must be held on file in the Regional Office, including the name and qualifications of the person that carried out the engineering design.
29. All new and existing roads on ground slopes in excess of 30 degrees must be constructed or upgraded in accordance with the engineering design and site-specific conditions developed in accordance with conditions 27 and 28 of this Schedule.

### **G. MASS MOVEMENT HAZARD**

30. Where road construction, upgrading or maintenance is proposed in areas identified with a mass movement hazard, a suitably qualified person must design the road and develop site-specific stabilisation conditions which must be used to ensure stability of the road, road drainage structures and batters.
31. Where road construction, upgrading or maintenance is proposed in areas identified with a mass movement hazard, the investigation and specification of site-specific conditions must be documented, including the name and qualifications of the person carrying out the investigation and kept on file at the Regional Office. The assessment of mass movement hazard must be undertaken in accordance with Module 2 of Schedule 3 of this licence.
32. Where road construction, upgrading or maintenance is proposed in areas identified with a mass movement hazard, the road must be constructed in accordance with the site-specific prescriptions and soil stabilisation techniques.

### **H. ROAD BATTERS**

33. Where during road construction, the toe of a fill batter intrudes into a filter strip, site-specific mitigating techniques must be employed to prevent water pollution to the greatest extent practicable.

*(For example this could be achieved by using one of the following techniques, or a combination thereof:*

- a) *retaining or respreading a minimum of 5 centimetres of topsoil, seeded with appropriate grasses in order to achieve 70% groundcover; or*
- b) *providing artificial groundcover, in order to achieve 70% groundcover over the batter, using geotextile, mulch, erosion control mats; or*
- c) *use of retaining walls).*

34. Road batters must be constructed and maintained to prevent erosion and water pollution to the greatest extent practicable.
35. Where a stable road batter will not result through natural means, batter stabilisation measures must be undertaken within 14 days of the completion of road construction, upgrading or maintenance operations.

36. Road drainage structures which discharge onto:

- a) newly constructed fill batters greater than one metre in height; or
- b) existing fill batters greater than one metre in height and having unstable surfaces or surfaces with less than 70% ground cover;

must have a drop down structure and dissipater installed. The drop down structure and dissipater must not be constructed of bark or slash. The dissipater may be constructed of logging debris greater than 100 mm diameter.

#### **I. ROAD CROSSINGS WITHIN 30 METRES OF DRAINAGE FEATURES**

37. Roads must be drained using a crossbank, relief pipe, spoon drain or mitre drain between 5 metres and 30 metres from a watercourse, drainage line, wetland or swamp crossing. This distance must be measured from the top of the bank of the incised channel, or where there is no defined bank, from the edge of the channel.

38. Notwithstanding condition 37 of this Schedule, where a crossbank, relief pipe, spoon drain or mitre drain cannot be installed between 5 metres and 30 metres from a watercourse, drainage line, wetland or swamp crossing, site-specific techniques must be employed to prevent the pollution of water.

*(For example this could be achieved by one of the following techniques, or a combination thereof:*

- a) armouring the road surface and/or table drain;*
- b) grassing the road surface and/or table drain;*
- c) covering the surface of the table drain with an erosive resistant fabric; or*
- d) installing sediment traps or sediment fences).*

In addition, a crossbank, relief pipe, spoon drain or mitre drain must be installed at the first opportunity from the drainage feature crossing.

#### **J. DRAINAGE FEATURE CROSSINGS**

39. Drainage feature crossings must be designed, constructed, upgraded and maintained to wholly contain a peak flow from a 1:5 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2.

40. Drainage feature crossings must be designed, constructed upgraded and maintained to withstand the peak flow from a 1:10 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2.

41. Drainage features must only be crossed using stable structures, being either causeways, culverts or bridges.

42. Notwithstanding condition 41 of this Schedule, existing log dams and gully stuffers may be used where the stability of the structure can be ensured for the duration of the forestry activity. A suitably qualified person must determine the stability of the structures prior to the commencement of forestry activities.

43. The stability of existing log dams and gully stuffers must also be inspected twice weekly during forestry activities. Where an existing log dam or gully stuffer becomes unstable, State Forests must replace the crossing structure within five days.

## Appendix A – Eden Region

44. Clearing associated with the construction, upgrading or maintenance of drainage feature crossings must be undertaken at, or as close as practicable to, right angles to the water flow unless an angled approach reduces ground and soil disturbance.
45. Drainage feature crossing construction, maintenance and upgrading must be undertaken in a manner which prevents disturbance to the bed and banks of the drainage feature to the greatest extent practicable.
46. Disturbed areas resulting from the drainage feature crossing construction, upgrading or maintenance must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.
47. The construction and maintenance of drainage feature crossings must restrict disturbance of vegetation and groundcover in the filter strip or buffer strip to a maximum length of 3 metres upstream and downstream of the crossing. Where clearing beyond 3 metres is necessary during construction and maintenance of drainage feature crossings, State Forests may approve additional clearing and document the approval and the reasons why it is necessary.
48. Soil erosion and sediment control measures must be employed and maintained during drainage feature crossing construction, maintenance and upgrading operations that require greater than one day to complete. Soil erosion and sediment control structures and measures must:
  - a) be properly installed, constructed and maintained; and
  - b) prevent to the greatest extent practicable the flow of water from the road surface and road drainage structures entering the disturbed areas; and
  - c) prevent to the greatest extent practicable the deposition of spoil into the drainage feature.
49. Spoil from crossing construction, upgrading and maintenance operations must not be deposited into drainage features. Spoil from crossing construction, upgrading and maintenance operations must be removed from drainage features. Removal of spoil must be undertaken in a manner, which prevents disturbance to the bed and bank of the drainage feature to the greatest extent practicable.
50. Disturbed areas resulting from the removal of spoil from the drainage feature must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.
51. Spoil from road construction, upgrading and maintenance operations must not be placed in filter strips or buffer strips.
52. Soil stabilisation must be undertaken to all disturbed areas within 20 metres either side of a watercourse, drainage line, wetland or swamp. This area does not include the road surface, road drainage structures or cut batters within 20 metres of watercourses, drainage lines, wetlands or swamps. Soil stabilisation measures must be completed within five days of crossing construction, upgrading or maintenance operations, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days.

## **Appendix A – Eden Region**

Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.

53. Notwithstanding condition 52 of this schedule, where roads are constructed in dispersible soils, the road surface, batters and table drains, within 20 metres either side of a drainage feature crossing, must be covered with a stable, non-dispersible surface no more than five days after the completion of crossing construction.

### **BRIDGES**

54. Soil stabilisation measures must be used to protect bridge embankments from table drain discharge. This must be completed within five days of crossing construction, upgrading and maintenance operations.
55. Where soil or gravel is used as the pavement for the bridge surface, structures must be installed to prevent soil or gravel from entering the drainage feature. Soil or gravel deposited within the drainage feature must be removed. Removal of soil or gravel must be undertaken in a manner, which prevents disturbance to the bed and bank of the drainage feature to the greatest extent practicable.
56. Disturbed areas resulting from the removal of soil or gravel from the drainage feature must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.

### **CULVERTS**

57. Culvert recovery and removal of associated soil fill must be undertaken in a manner which prevents disturbance to the bed and banks of the drainage feature to the greatest extent practicable. Disturbed areas within the drainage feature must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.
58. Fill material, including soil or gravel, placed on pipes and used as the crossing surface must not be placed upstream of the culvert inlet or in the downstream flowpath of the culvert outlet.
59. Soil stabilisation measures must be used to protect the upstream and downstream fill batters surrounding the culvert pipe(s). This must be completed within five days of crossing construction and maintenance operations.
60. Pipe outlets must discharge onto stable surfaces capable of handling concentrated water flow. Scouring at the pipe outlet must not undermine the crossing structure or initiate gully erosion.

### **CAUSEWAYS**

61. The bed and banks of causeway crossings must consist of a stable natural surface or be constructed of an erosion resistant material. Causeway crossings must be inspected twice weekly during haulage operations to assess the stability of the crossing.
62. If the use, construction, upgrading or maintenance of a causeway crossing results in erosion or

## **Appendix A – Eden Region**

deformation of the road surface or the bed and banks of the drainage feature, then:

- a) the causeway crossing must be replaced with a bridge or pipe culvert(s); or
- b) the causeway surface and approaches must be armoured with a non-erosive material.

Repair or replacement of causeway crossings must include all sections of the crossing and crossing approaches where erosion or deformation has occurred.

## **SCHEDULE 6**

(Condition 41; Schedule 1)

### **Information that must be recorded and maintained by State Forests**

All of the information required to be recorded and documented by this schedule must be held on file in the Regional Office and provided to an EPA officer upon request.

### **Information that must be recorded during the pre-operational planning of scheduled or non-scheduled forestry activities**

1. State Forests must record and document the following information that is collected or calculated during the site-specific pre-operational planning of scheduled or non-scheduled forestry activities:

#### **Schedule 3**

- a) documentation on the inherent soil erosion and water pollution hazard assessment as required in module 1 of Schedule 3 of this licence;
- b) documentation on the mass movement assessment as required in module 2 of Schedule 3 of this licence;
- c) documentation on the soil dispersibility assessment as required in module 3 of Schedule 3 of this licence; and
- d) documentation on the seasonality procedure as required in module 4 of Schedule 3 of this licence;

#### **Schedule 4**

- e) documentation of the site specific conditions developed in accordance with condition 2 of Schedule 4 of this licence;
- f) documentation of the repair and remediation of existing log dams and gully stuffers in accordance with condition 49 of Schedule 4 of this licence;
- g) design calculations for drainage feature crossings by snig tracks or extraction tracks in accordance with conditions 50 and 51 of Schedule 4 of this licence;
- h) design calculations for snig track and extraction track drainage structures in accordance with condition 73 of Schedule 4 of this licence;

#### **Schedule 5**

- i) documentation of the site specific conditions developed in accordance with condition 2 of Schedule 5 of this licence;
- j) design calculations for road drainage structures in accordance with condition 8 of Schedule 5 of this licence;
- k) documentation of the site investigation where an existing road traverses groundslopes in excess of 30 degrees in accordance with conditions 24 and 25 of Schedule 5 of this licence;
- l) documentation and engineering road design where a new road traverses groundslopes in excess of 30 degrees in accordance with conditions 27 and 28 of Schedule 5 of this licence;
- m) documentation and engineering road design where a new road or proposed road traverses an area with a mass movement hazard in accordance with conditions 30 and 31 of Schedule 5 of this licence;
- n) design calculations for drainage feature crossings by roads in accordance with conditions 39 and 40 of Schedule 5 of this licence; and

## Appendix A – Eden Region

- o) documentation of the site investigation of existing log dams and gully stuffers in accordance with condition 42 of Schedule 5 of this licence.

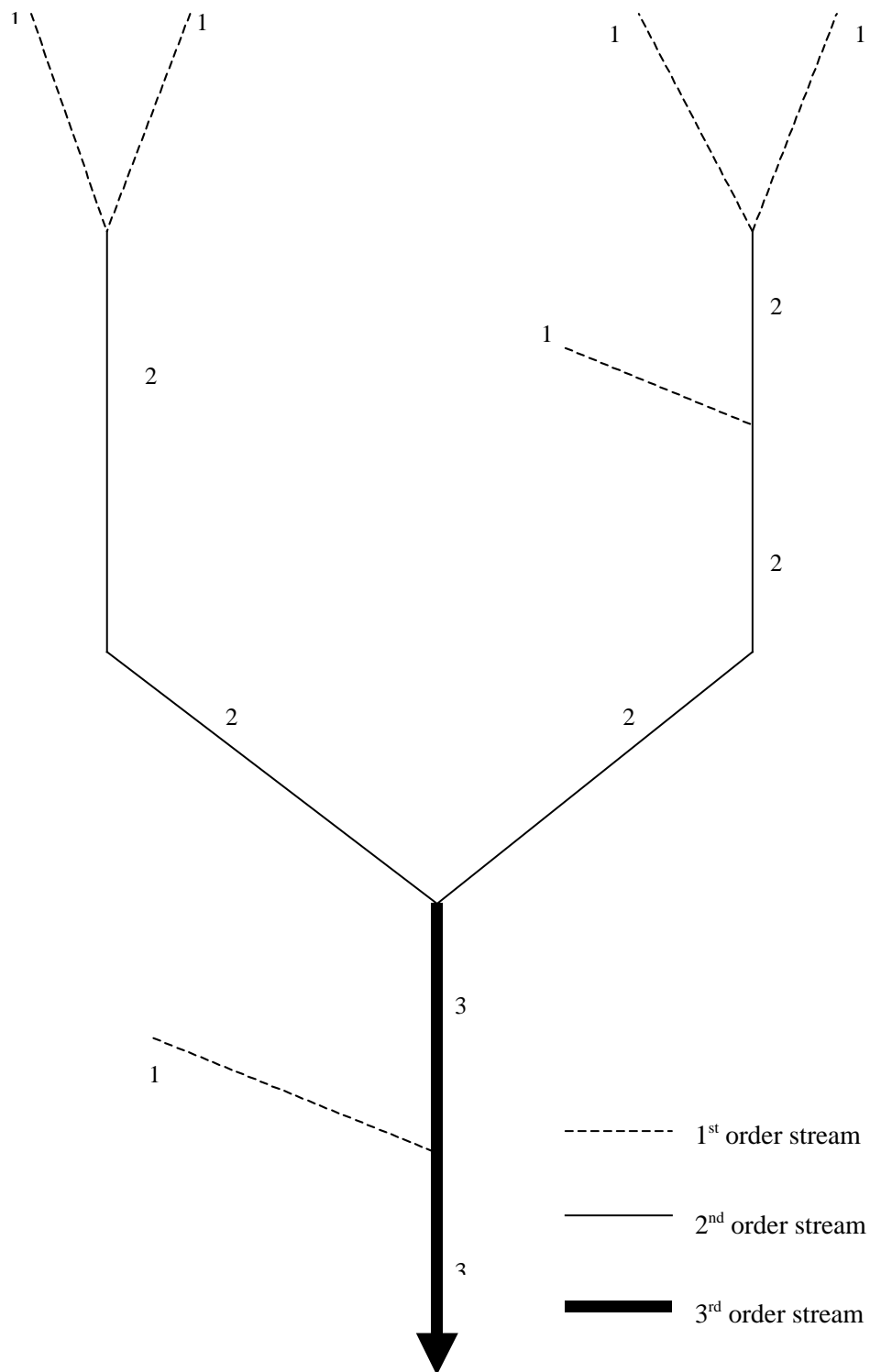
### **The dates of commencement and completion that must be recorded during scheduled or non-scheduled forestry activities**

- 2. State Forests must record the dates of commencement and completion of the following activities during scheduled or non-scheduled forestry activities approved and commenced in accordance with Part 1 of this licence (Reporting Conditions):
  - a) forestry activities in the compartment, age class or roading area;
  - b) forestry activities for each log dump and log landing;
  - c) road construction, upgrading or maintenance operations in the compartment, age class or roading area;
  - d) construction, upgrading or maintenance of drainage feature crossings by roads in the compartment, age class or roading area;
  - e) construction, upgrading or maintenance of drainage feature crossings by snig tracks or extraction tracks in the compartment or age class;
  - f) post-harvest burning;
  - g) temporary cessation of forestry activities in the compartment, age class or roading area;
  - h) implementation of soil stabilisation techniques at drainage feature crossings by roads; and
  - i) implementation of soil stabilisation techniques at drainage feature crossings by snig tracks or extraction tracks.

### **Information that must be recorded during scheduled or non-scheduled forestry activities**

- 3. State Forests must record and document the following information during scheduled or non-scheduled forestry activities approved and commenced in accordance with Part 1 of this licence (Reporting Conditions).
  - a) the reasons why the clearing adjacent to a drainage feature crossing by a snig track or extraction track exceeds 3 metres upstream and downstream of the crossing in accordance with condition 55 of Schedule 4 of this licence;
  - b) documentation where State Forests elects to re-calculate the effective height of crossbank used on snig tracks or extraction tracks in accordance with condition 73 of Schedule 4 of this licence;
  - c) instances where the installation of snig track or extraction track drainage is precluded due to saturated soil conditions in accordance with conditions 79 and 80 of Schedule 4 of this licence;
  - d) the reasons why the clearing adjacent to a drainage feature crossing by a road exceeds 3 metres upstream and downstream of the crossing in accordance with condition 47 of Schedule 5 of this licence.

**Figure 2: Schematic Diagram of Stream Order**



After Strahler, A.N. (1964) 'Quantitative geomorphology of drainage basins and channel networks', in Chow, V.T. (ed.), *Handbook of Applied Hydrology*, New York, McGraw-Hill, section 4-11.

# **FORESTRY AND NATIONAL PARK ESTATE ACT 1998**

## **AMENDMENT NO 3 TO INTEGRATED FORESTRY OPERATIONS APPROVAL FOR THE EDEN REGION**

The Integrated Forestry Operations Approval for the Eden Region is amended as set out in the following schedules to this instrument:

**Schedule 1** - Amendments to the “non-licence” terms of the Integrated Forestry Operations Approval for the Eden Region;

**Schedule 2** – Amendments to the terms of the licence under the *Protection of the Environment Operations Act 1997* set out in Appendix A of the Approval.

This instrument commences on 31 May 2004.

Notes do not form part of this instrument. They are provided to assist understanding only.

Dated: 2004.

Craig Knowles MP  
**Minister for Natural Resources**

Michael Costa MP  
**Minister Assisting the Minister for Natural Resources (Forests)**

Bob Debus MP  
**Minister for the Environment**

Ian Macdonald MLC  
**Minister administering the Fisheries Management Act 1994**

**SCHEDULE 2 – AMENDMENTS TO THE TERMS OF LICENCE UNDER  
THE PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997  
SET OUT IN APPENDIX A OF THE APPROVAL**

**[1] Condition 10.1**

Omit condition 10.1. Insert instead:

- 10.1 State Forests must forward each summary of operations to the Manager of the Forestry Unit of the Department of Environment and Conservation at least one day prior to the date of commencement of the scheduled forestry activities or the non-scheduled forestry activities which State Forests proposes to carry out (or authorise the carrying out of) under licence authority. The summary of operations may be forwarded only by fax or by electronic transfer.

**[2] Condition 10.3**

Insert after condition 10.2:

- 10.3 State Forests must place a copy of each summary of operations on the operations register (as required by condition 33 of this licence) on the day of the commencement of the scheduled forestry activities or the non-scheduled forestry activities with respect to which licence authority applies.

**[3] Condition 14**

Omit condition 14. Insert instead:

**14. Commencement of licence authority**

- 14.1 Licence authority applies with respect to a scheduled or non-scheduled forestry activity if:
- (a) a summary of operations for that activity has been submitted to the Manager of the Forestry Unit of the Department of Environment and Conservation in accordance with Division 1; and
  - (b) a notification for the commencement of licence authority for the activity (in the form of Form 3 set out in Schedule 1 to this licence) is completed by State Forests.
- 14.2 State Forests must place a copy of the completed notification for the commencement of licence authority for the activity on the operations register (as required by condition 33 of this licence) on the day on which the activity commences.
- 14.3 On the same day as the activity commences (but not until it has actually commenced) that day's date must be inserted next to the words "Date on which licence authority commences under condition 14" on the notification for the commencement of licence authority for the activity. (The notification is not completed until a date is inserted next to the relevant words.)

14.4 Licence authority for the activity is taken to have commenced on the commencement of the day whose date is inserted on the notification for commencement of licence authority for the activity (even though, as required by condition 14.3, the insertion of that date occurs after the actual commencement of the activity in the compartment or roading area concerned). Accordingly, the conditions of this licence must be complied with in respect of the activity on and from that day.

14.5 Licence authority continues to apply to the activity unless it temporarily ceases under condition 19A or until it finally ceases under condition 20.

**[4] Condition 15.1**

Omit condition 15.1. Insert instead:

15.1 Within two weeks of commencing a scheduled or non-scheduled forestry activity in accordance with this Part, State Forests must forward the completed notification for the commencement of licence authority for the activity (in the form of Form 3 set out in Schedule 1 to this licence) to the Manager of the Forestry Unit of the Department of Environment and Conservation. The notification may be forwarded only by mail, fax or electronic transfer.

**[5] Condition 17.4**

Omit condition 17.4. Insert instead:

17.4 On the day the variation is approved, State Forests must forward to the Manager of the Forestry Unit of the Department of Environment and Conservation a revised summary of operations that accurately reflects that variation and has been signed by an officer of State Forests not below the rank of Regional Manager. The revised summary of operations may be forwarded only by fax or by electronic transfer.

**[6] Conditions 19A and 19B**

Insert after condition 19:

**19A. Licence authority temporarily ceased**

19A.1 Licence authority temporarily ceases to apply with respect to a scheduled or non-scheduled forestry activity:

- (a) if a notification for the temporary cessation of licence authority for the activity (in the form of Form 2 set out in Schedule 1 to this licence) is completed by State Forests; and
- (b) on and from the day on which the notification is signed by an officer of State Forests (being an officer not below the rank of Regional Manager).

- 19A.2 The date of the day on which the notification for the temporary cessation of licence authority is signed by the officer of State Forests (being an officer not below the rank of Regional Manager) must be inserted next to the words “Date licence authority ceases” on the notification.
- 19A.3 State Forests must place a copy of the completed notification on the operations register (as required by condition 33 of this licence) within five days of licence authority temporarily ceasing to apply with respect to the activity concerned (that is, within five days of the notification being signed).
- 19A.4 State Forests must forward the completed notification to the Manager of the Forestry Unit of the Department of Environment and Conservation within two weeks of licence authority temporarily ceasing to apply with respect to the activity concerned. The notification may be forwarded only by mail, fax or electronic transfer.
- 19A.5 Licence authority with respect to an activity temporarily ceases unless it is recommenced under condition 19B or until it finally ceases under condition 20.

**19B. Recommencement of licence authority**

- 19B.1 If licence authority with respect to a scheduled or non-scheduled forestry activity has temporarily ceased (in accordance with condition 19A), State Forests may recommence licence authority with respect to that activity by completing a notification for the recommencement of licence authority for the activity (in the form of Form 3 set out in Schedule 1 to this licence).
- 19B.2 Licence authority with respect to a scheduled or non-scheduled forestry activity recommences on and from the date inserted next to the words “Date on which licence authority recommences under condition 19B” on the notification. Licence authority continues to apply with respect to the activity unless it temporarily ceases again under condition 19A or until it has finally ceased under condition 20.
- 19B.3 Within two weeks of licence authority recommencing with respect to a scheduled or non-scheduled forestry activity, State Forests must forward the completed notification for the recommencement of licence authority for the activity to the Manager of the Forestry Unit of the Department of Environment and Conservation. The notification may be forwarded only by mail, fax or electronic transfer.
- 19B.4 State Forests must place a copy of the completed notification for the recommencement of licence authority for the activity on the operations register (as required by condition 33 of this licence) on the day on which licence authority recommences with respect to the activity concerned.

**[7] Heading to Part 2 of the operating conditions and condition 20**

Omit the heading to Part 2 and condition 20. Insert instead:

## **Part 2: Final cessation of licence authority**

### **20. When licence authority finally ceases to apply**

- 20.1 Licence authority finally ceases to apply with respect to a scheduled or non-scheduled forestry activity:
- (a) if a notification for the final cessation of licence authority for the activity (in the form of Form 2 set out in Schedule 1 to this licence) is completed by State Forests; and
  - (b) on and from the day on which the notification is signed by an officer of State Forests (being an officer not below the rank of Regional Manager).
- 20.2 The date of the day on which the notification for the final cessation of licence authority is signed by the officer of State Forests (being an officer not below the rank of Regional Manager) must be inserted next to the words “Date licence authority ceases” on the notification.
- 20.3 State Forests must place a copy of the completed notification on the operations register (as required by condition 33 of this licence) within five days of licence authority finally ceasing to apply with respect to the activity concerned (that is, within five days of the notification being signed).
- 20.4 State Forests must forward the completed notification to the Manager of the Forestry Unit of the Department of Environment and Conservation within two weeks of licence authority finally ceasing to apply with respect to the activity concerned. The notification may be forwarded only by mail, fax or electronic transfer.

*Note: Where licence authority for a scheduled or non-scheduled forestry activity has finally ceased under condition 20, it cannot be “recommended” under condition 19B. If, after licence authority has finally ceased for forestry activities in a particular compartment, State Forests subsequently proposes, for example, to carry out further forestry activities in the same compartment under licence authority, it must prepare a new summary of operations for those activities and complete a new notification for the commencement of licence authority for those activities.*

### **[8] Condition 24.1**

Insert “period” after “reporting” in condition 24.1.

### **[9] Condition 25.1**

Omit condition 25.1. Insert instead:

- 25.1 The Annual Return for a reporting period must be forwarded to the EPA by registered post and electronically (in a format approved by the EPA) not later than 60 days after the end of the reporting period.

### **[10] Condition 33.2**

Omit condition 33.2. Insert instead:

- 33.2 The register must include copies of all of the following documents that are prepared under the Operating Conditions of this licence:
- (a) summaries of operations for scheduled and non-scheduled forestry activities;
  - (b) revised summaries of operations for scheduled and non-scheduled forestry activities;
  - (c) notifications for the commencement of licence authority for scheduled or non-scheduled forestry activities;
  - (d) notifications for the temporary cessation of licence authority for scheduled or non-scheduled forestry activities;
  - (e) notifications for the recommencement of licence authority for scheduled or non-scheduled forestry activities;
  - (f) notifications for the final cessation of licence authority for scheduled or non-scheduled forestry activities.

*Note: The register that is referred to in condition 33.2 is the same register that was required to be kept by each Regional Office before condition 33.2 was substituted by amendments to the operating conditions of the licence made in 2004. Accordingly, the documents that were included on the register before those amendments commenced are to continue to be kept on the register.*

**[11] Condition 37A**

Insert after condition 37:

**37A. Electronic transfer of data**

*Note: This condition applies to electronic transfer of documents to the EPA. The term “electronic transfer” is defined in the dictionary for this licence as “a data transfer between State Forests’ Harvest Tracking System (HTS) system server and the EPA’s Forestry Notification and Audit Tracking System (FNATS) system server”.*

- 37A.1 Where this licence permits a document to be forwarded to the Manager of the Forestry Unit of the Department of Environment and Conservation by electronic transfer, the following requirements apply to the electronic transfer:
- (a) the file must be in XML format or such other format as may be approved in writing by the EPA;
  - (b) the file must contain the same data fields as those shown on the relevant form set out in Schedule 1 to this licence;
  - (c) the file must be sent over a secure protocol as agreed to in writing by the EPA and State Forests.
- 37A.2 Where a document that is required to be signed by an officer of State Forests is forwarded to the Manager of the Forestry Unit of the Department of Environment and Conservation by electronic transfer, then another method (as agreed to in writing by the EPA and State Forests) is to be used to identify the

officer and his or her approval of the contents of the document when it is forwarded.

**[12] Dictionary**

Insert the following definitions into the Dictionary in appropriate alphabetical order:

**“electronic transfer”** means a data transfer between State Forests’ Harvest Tracking System (HTS) system server and the EPA’s Forestry Notification and Audit Tracking System (FNATS) system server.

*Note: See condition 37A for requirements relating to the electronic transfer of data.*

**“event ID”** means a unique identification number generated by State Forests’ Harvest Tracking System (HTS) that exclusively represents a forestry activity.

*Note: Each form set out in Part A of Schedule 1 requires an event ID to be provided for the relevant forestry activity. An event ID must also be provided in monthly advance notices, and monthly reports, of harvesting operations under the “non-licence” terms of the approval.*

**[13] Schedule 1**

Omit the matter after the heading, “Schedule 1”, relating to Part A. Insert instead:

(Conditions 8-10, 14, 15, 19A, 19B, 20)

**Part A: Forms required to be used under operating conditions**

<b>Form 1:</b>	Summary of operations for scheduled and non-scheduled forestry activities
<b>Form 2:</b>	Notification for the cessation of licence authority for scheduled or non-scheduled forestry activities
<b>Form 3:</b>	Notification for the commencement of licence authority for scheduled or non-scheduled forestry activities

**[14] Schedule 1, Part A, Forms 1-3**

Omit the forms in Part A of Schedule 1. Insert instead the following forms:

## **Part A – Form 1**

### **SUMMARY OF OPERATIONS FOR SCHEDULED AND NON-SCHEDULED FORESTRY ACTIVITIES**

#### **1. General Information**

Event ID: \_\_\_\_\_

Amendment: **Yes/No** (please select one)

Type of Amendment: **Correction/Variation** (please select one)

Licence Number: \_\_\_\_\_

Type of activity: **Scheduled/Non scheduled** (please select one)

Operation  
Type: \_\_\_\_\_

#### **2. Forestry Operation Location Details**

State Forest Region: \_\_\_\_\_

State Forest Name: \_\_\_\_\_

State Forest Number: \_\_\_\_\_

Compartment: \_\_\_\_\_

Age Class: \_\_\_\_\_  
(If applicable)

Total Area: \_\_\_\_\_ (ha)      Net Harvest Area: \_\_\_\_\_ (ha)

#### **3. Soil Erosion and Water Pollution Hazard Assessment**

<b>Slope Class (degrees)</b>	<b>% Total Compartment</b>
<10	%
10-20	%
20-25	%
25-30	%
30+	%

Rainfall Zone: \_\_\_\_\_  
 Rainfall Erosivity: \_\_\_\_\_  
 Soil Regolith Class(es): \_\_\_\_\_  
 Soil Regolith verified by: \_\_\_\_\_  
 Inherent Hazard Level: \_\_\_\_\_

Seasonality Restrictions apply: \_\_\_\_\_ Yes/No (please select one)

#### 4. Dispersible Soil Assessment

Dispersible soil present within the compartment: Yes/No (please select one)  
 Dispersible soil identified by: \_\_\_\_\_

#### 5. Mass Movement

Mass movement hazard within the compartment (actual or potential): Yes/No (please select one)  
 Mass movement identified by: \_\_\_\_\_

### Site-Specific Operational Conditions

#### 6. Road Construction/Maintenance

Road Name	New/Existing	Max Road Grade (Degrees)	Length (m)

#### 7. Road Drainage Feature Crossings to be Constructed

Number of new drainage line, watercourse, swamp and wetland road crossings to be constructed: \_\_\_\_\_

Number of new drainage line, watercourse, swamp and wetland road crossings where the road cannot be drained with a crossbank, mitre drain, relief pipe or spoon drain within 30 metres on either side of the crossing: \_\_\_\_\_

#### 8. Existing Roads Drainage Feature Crossings

Number of existing drainage line, watercourse, swamp and wetland road crossings to be used: \_\_\_\_\_

Number of existing drainage line, watercourse, swamp and wetland crossings where the road cannot be drained with a crossbank, mitre drain, relief pipe or spoon drain within 30 metres on either side of the crossing: \_\_\_\_\_

#### 9. Snig & Extraction Tracks

Estimated number of snig track & extraction track crossings of watercourses and drainage lines: \_\_\_\_\_

Is sidecut snig track construction proposed (>1m in height): \_\_\_\_\_ Yes/No (please select one)

#### 10. Borrow Pits & Gravel Pits

Number of borrow pits or gravel pits to be used: \_\_\_\_\_

#### 11. Post-harvest Burning

Is post-harvest burning proposed:

Yes/No (please select one)

Preferred season of burn: \_\_\_\_\_

Method of ignition: \_\_\_\_\_

#### 12. Compliance

I certify that this is a true and accurate record of this proposed scheduled or non-scheduled forestry activity and that the following requirements have been fulfilled:

- a) the planning of this proposed scheduled or non-scheduled forestry activity has been undertaken in accordance with Schedule 2 of the Environment Protection Licence;
- b) the site assessments for dispersibility, mass movement and the determination of the inherent hazard level have been undertaken in accordance with Schedule 3 of the Environment Protection Licence; and
- c) site-specific prescriptions have been identified and developed in accordance with Schedules 2, 3, 4, 5 and 6 of the Environment Protection Licence.

Regional Manager's Name: \_\_\_\_\_  
(Block letters)

Regional Manager's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## Part A - Form 2

## **NOTIFICATION FOR THE CESSATION OF LICENCE AUTHORITY FOR SCHEDULED OR NON-SCHEDULED FORESTRY ACTIVITIES**

On behalf of State Forests I hereby notify the EPA that the licence authority ceases to apply to the land identified below:

**Event ID:**

**Type of Cessation:** **Temporary/Final**  
(Please select one)

**State Forests' Region:** \_\_\_\_\_

**State Forest Name:** \_\_\_\_\_

**State Forest Number:** \_\_\_\_\_

**Compartment:** \_\_\_\_\_

**Age Class (if applicable):** \_\_\_\_\_

Operation Type: \_\_\_\_\_

**Commencement date of licence authority:** \_\_\_\_\_ \*

(\*please note this is the commencement date not the recommencement date)

**Road Name(s)** (if applicable):

**Regional Manager's Name:** \_\_\_\_\_  
(Block letters)

Regional Manager's Signature: \_\_\_\_\_

**Date licence authority ceases:**

**Part A - Form 3**

**NOTIFICATION FOR THE COMMENCEMENT OF LICENCE AUTHORITY FOR  
SCHEDULED OR NON-SCHEDULED FORESTRY ACTIVITIES**

On behalf of State Forests I hereby notify the EPA that licence authority commences on the land identified below:

**Event ID:** \_\_\_\_\_

**Type of Commencement:** **Commencement/Recommencement**  
(Please select one)

**State Forests' Region:** \_\_\_\_\_

**State Forest Name:** \_\_\_\_\_

**State Forest Number:** \_\_\_\_\_

**Compartment(s):** \_\_\_\_\_

**Age Class (if applicable):** \_\_\_\_\_

**Operation Type:** \_\_\_\_\_

**Date on which licence authority commences under condition 14: \*\*** \_\_\_\_\_  
(not to be filled in until operation commences)

**Date on which licence authority recommences under condition 19B: \*\*** \_\_\_\_\_

**\*\* Please select appropriate one**