

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

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- cover over the cleared area; and
- d) provide artificial groundcover, in order to achieve 70% ground cover within the cleared area using geotextile, mulch or erosion control mats.

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

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

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- b) site-specific techniques are employed to prevent erosion of the road surface and table drain.

(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:

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- 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
 - 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

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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 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 or protection zone, 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

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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.

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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.
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, protection zone, operational zones and buffer strips 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

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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 strip, protection zones 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. 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.

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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-

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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 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.