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December 1, 2006

BY EMAIL

To: Vern Quaroni
A/Regional Manager
Coast Forest Region

From: The Honourable Rich Coleman
Minister of Forests and Range

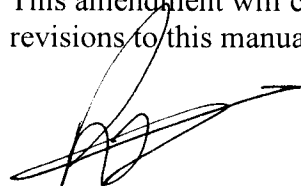
Re: Amendment No. 15 to the *Coast Appraisal Manual*

I hereby approve Amendment No. 15 to the *Coast Appraisal Manual*, and attach a copy for your use. The following sections have been amended.



Chapter 1:	Housekeeping.
Section 2.2.2:	Updated terminology for consistency.
Section 4.2.2.3.2(5)(b):	Housekeeping.
Section 5.3 and Sub-Sections, Section 5.5, 5.6 and 5.9:	Bank height road cost method replaces the tabular road cost estimates as well as minor housekeeping changes.
Table 7-1:	Clarification that Grade X only applies to coniferous species.
Appendix VI:	Incorporates changes to appraisal log dump list.
Appendix VII:	Definitions of bank height categories.
Appendix VIII:	Contains previous tabular road cost methods to be used with the detailed engineering estimates for Coast stumpage appraisals.

This amendment will come into force on December 1, 2006. Further amendments or revisions to this manual require my approval.

A handwritten signature in black ink, appearing to be "Rich Coleman", written over a horizontal line.

Rich Coleman
Minister

Attachment

Vern Quaroni

pc: Bill Howard, Director, Revenue Branch
Coast Timber Pricing Advisory Committee



FOR FURTHER INFORMATION CONTACT:

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MANUAL TITLE

Coast Appraisal Manual

REVISION No.

Amendment No. 15

ISSUE DATE

December 1, 2006

MANUAL CO-ORDINATOR

Judy Laton
Revenue Branch

AUTHORIZATION (Name, Title)

W. Howard
Director, Revenue Branch

Please make the following changes to your copy of the above Ministry manual. Please insert the following specified pages and **file this notice** immediately after the Amendments Tab.

ACTION (Remove/Insert)	(VOL.) CHAPTER-SECTION-SUBJECT	PAGE(S)	COMMENTS
REMOVE	Table of Contents	i - vi	After Table of Contents Tab
INSERT		i - vi	
REMOVE	Chapter 1	3 - 4	After Chapter 1 Tab
INSERT		3 - 4	
REMOVE	Chapter 2	3 - 4	After Chapter 2 Tab
INSERT		3 - 4	
REMOVE	Chapter 4	11 - 12	After Chapter 4 Tab
INSERT		11 - 12	
REMOVE	Chapter 5	3 - 30	After Chapter 5 Tab
INSERT		3 - 26	
REMOVE	Chapter 7	11 - 12	After Chapter 7 Tab
INSERT		11 - 12	
REMOVE	Appendices	11 - 12 21 - 28	After Appendices Tab
INSERT		11 - 12 21 - 36	
REMOVE	Index	1 - 4	After Index Tab
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INSERT	Minister's Letter and Transmittal		After Amendments Tab

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"**Director**" means director of Revenue Branch of the Ministry of Forests and Range;

"**District manager**" means district manager or district manager's designate;

"**Licensee**" means the holder of a cutting authority;

"**Manual**" means *Coast Appraisal Manual*;

"**Mature coniferous timber**" means coniferous timber that is 141 years old or older;

"**Minister**" means Minister of Forests and Range;

"**Ministry**" means Ministry of Forests and Range;

"**Net cruise volume**" means the gross volume of all species listed in section 4.2.3(1), plus alder, birch, cottonwood and maple in the cutting authority area minus the volume of decay, waste and breakage in that timber unless otherwise specified in the *Cruising Manual*;

"**Regional manager**" means regional executive director or regional executive director's designate;

"**Regulations**" means regulations under the *Act*;

"**Remaining volume**" means the total net cruise volume of a cutting authority area minus the total volume of timber in the billing history record of the cutting authority area on the effective date of the reappraisal of the cutting authority area;

"**Revenue Branch**" means Revenue Branch of the Ministry;

"**Second growth coniferous timber**" means coniferous timber that is less than 141 years old;

"**Selling price zone 51**" means the table of coast market pricing system log values for mature logs, approved by the director, Revenue Branch;

"**Selling price zone 52**" means the table of coast market pricing system log values for second growth logs, approved by the director, Revenue Branch;

"**Stumpage price**" means the market stumpage price;

"**Stumpage rate**" means market stumpage rate;

"**Skyline**" means any method of yarding where the logs are fully suspended above the ground by a short span, long span, or multi-span system using a carriage with standing or running lines;

"Total net cruise volume" of a cutting authority area (**tncv**) is the product of the net cruise volume per hectare of the cutting authority area (ncv/ha) multiplied by the total merchantable timbered area to be harvested under the cutting authority (tmta). Expressed as an equation: $tncv = \frac{ncv}{ha} \times tmta$;

"Tributary cutting authority area" means a cutting authority area from which timber must be transported over the road that is developed, or a cutting authority area to which bulk fuels, supplies, equipment and harvesting crews necessary to carry out the day-to-day harvesting activities on that area must be taken on a regular basis over the road that is developed;

"Unit cost" means cost estimate expressed in dollars per cubic metre.

2.2 Numbering System

The following exemplifies the numbering system that is used in this manual.

- 1. = Chapter
- 1.1 or 1.1.1.1 = Section
- 1.1.1.1 (2) = Subsection.
- Table 4-2 = Table 2 within chapter 4

2.2.1 Calculation Conventions

1. Every calculation required to be performed will be performed to the full capacity of a calculating machine with the results truncated at four places of decimals and rounded to two places.
2. A result from 5 to 9 will be rounded upward and a result from 1 to 4 will be rounded downward.
3. Each calculation of a tenure obligation adjustment or specified operation adjustment expressed in dollars per cubic metre will be rounded to the nearest cent.
4. Where a value is specified as a limit, for example a constraint or a requirement for an equation,
 - a. the value will be treated as an absolute value, and
 - b. an actual measurement or record will not be rounded before use unless otherwise specified in this manual.

2.2.2 Cutblocks within a Cutting Authority Area

1. All cutblocks within a cutting authority area must:
 - a. constitute a logical unit,
 - b. must be tributary to the same appraised point of origin, and
 - c. be contained within the same timber supply block, or in the case of a cutting authority area under a tree farm licence, be contained within the same forest district.
2. Helicopter single standing stem selection as described in section 4.4.5 must not be combined with any other **harvest method** within the same cutting authority area.

3. Except as provided in subsection (2) of this section, there are no other restrictions on what types of **harvest methods** may be used in or which types of timber can be contained in a cutting authority area.

authority area will be determined in accordance with the requirements of subsection 4.2.2.2(6).

- b. Where at least eighty percent of the timber in the cutting authority area is not second growth coniferous timber the person determining the stumpage rate will proceed to subsection 2 of this section.
- 2. a. Where the cutting authority area is entirely within the geographic boundaries of one or more timber licences, the person determining the stumpage rate will proceed to subsection 3 of this section.
 - b. Where the cutting authority area is not entirely within the geographic boundaries of one or more timber licences, the person determining the stumpage rate will then proceed to subsection 4 of this section.
- 3. a. Where the cutting authority area being appraised or reappraised is authorized for harvest under a cutting permit issued under a timber licence, and the species being considered has a billing history record for cutting permits issued under that timber licence and any other timber licence with which that licence has been amalgamated and approved by the district manager that meets the criteria of subsection 4.2.2.2(4), then that billing history record will be the source of the log grade percentages for that species.
 - b. Where there is no such billing history record, the person determining the stumpage rate will proceed to subsection 6 of this section.
- 4. a. Where the cutting authority area in a timber supply block being appraised or reappraised is authorized for harvest under a cutting permit issued under either a forest licence or licence to cut, and the species being considered has a billing history record for cutting permits issued under the licence authorizing harvest in that same timber supply block, and that billing history record meets the criteria of subsection 4.2.2.2(4), then that billing history record will be the source of the log grade percentages for that species.
 - b. Where there is no such billing history record, the person determining the stumpage rate will proceed to subsection 5 of this section.
- 5. a. Where the cutting authority area in a timber supply area being appraised or reappraised is authorized for harvest under a cutting permit issued under either a forest licence or licence to cut, and the species being considered has a billing history record for the cutting authorities issued under the licence authorizing harvest in that same timber supply area and that billing history record meets the criteria of subsection 4.2.2.2(4), then that billing history record will be the source of the log grade percentages for that species.
 - b. Where there is no such billing history record, the person determining the

- b. stumpage rate will proceed to subsection 6 of this section.
- 6. a. Where the cutting authority area being appraised or reappraised is authorized for harvest under a cutting permit issued under either a forest licence, timber licence or licence to cut, and the species being considered has a billing history record for all cutting authority areas that have been authorized for harvest in that timber supply block that meets the criteria of subsection 4.2.2.2(4), then that billing history record will be the source of the log grade percentages for that species.
- b. Where there is no such billing history record, the person determining the stumpage rate will proceed to subsection 7 of this section.
- 7. a. Where the cutting authority area being appraised or reappraised is authorized for harvest under a cutting permit issued under either a forest licence, timber licence or licence to cut, and the species being considered has a two year billing history record for the entire timber supply area that meets the criteria of subsection 4.2.2.2(4), then that billing history record will be the source of the log grade percentages for that species.
- b. Where there is no such billing history record, the person determining the stumpage rate will proceed to subsection 8 of this section.
- 8. a. Where the cutting authority area being appraised or reappraised is authorized for harvest under a cutting permit issued under either a forest licence, timber licence or a licence to cut, and the species being considered has a five-year billing history for cutting authority areas in a timber supply area that contains the cutting authority area being appraised or reappraised that meets the criteria of subsection 4.2.2.2(4), then that billing history record will be the source of the log grade percentages for that species.

4.2.2.4 Damaged Timber

Where the regional manager determines that timber in a cutting authority area is suddenly and severely damaged, then notwithstanding section 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.2.3.1 and 4.2.2.3.2 the log grade percentages for the cutting authority area being appraised or reappraised may be estimated from available site-specific information.

4.2.3 Stand Selling Price

1. The stand selling price shall be calculated in an appraisal or reappraisal by using the net cruise volumes and species selling prices of the following species of timber:

Balsam	Lodgepole Pine
Cedar	White Pine
Cypress	Sitka Spruce
Fir	Engelmann Spruce
Hemlock	

5.2 Forest Planning and Administration Cost

1. The forest planning and administration cost is based on surveyed expenses at the corporate licensee level including all aspects of executive and administrative expenses at the head office attributable to the harvest of Crown timber. The kinds of expenses that were taken into consideration to calculate this cost were:
 - a. head office general and administrative expenses (\$3.38/m³).
 - b. logging department, log trading and log supply expenses (\$3.98/m³).
 - c. fees and taxes applicable to stumpage bearing timber (\$0.83/m³).
 - d. engineering and forestry overhead expenses (\$4.77/m³).
2. The total forest planning and administration cost is \$12.96/m³.

5.2.1 Low Volume Cost

1. A low volume cost of \$7.51/m³ may be included in the tenure obligation adjustment where:
 - a. the cutting authority area being appraised or reappraised is the subject of cutting authority issued under either a licence or its parent licence prior to subdivision that provides for an allowable annual cut of not more than 10 000 m³ of Crown timber, and
 - b. the total net cruise volume of the cutting authority area is not more than 10 000 m³.

5.3 Road Development Cost

1. Except as provided in section 5.3.2, where a road development provides access to Crown timber a road development cost may be estimated for new road construction, and road reconstruction.
2.
 - a. except as provided in subsections (2)(b) and (2)(c) of this section the total net cruise volume is used to calculate the unit cost for new road construction and road reconstruction in an appraisal or reappraisal of a cutting authority area.
 - b. where a road development project was not taken into consideration in a prior appraisal or reappraisal of the cutting authority area, the remaining volume shall be used to calculate the road development unit cost for that project in the reappraisal of the cutting authority area.
 - c. where the reappraisal is because of sudden and severe damage the road development cost is calculated as follows:
 - i) the road construction project costs prior to the sudden and severe damage reappraisal are totalled,
 - ii) the sum of those project costs is the total project cost,
 - iii) from the total project cost calculated in subsection 2(c)(i) of this section is subtracted the product of the total project cost multiplied by the total volume of timber in the billing history record of the cutting authority area on the effective date of the reappraisal, divided by the total net cruise volume of the cutting authority area,
 - iv) the difference calculated in subsection (2)(c)(iii) of this section is then divided by the sum of the remaining volume plus the volume of timber that was suddenly and severely damaged,
 - v) the calculation of the road development cost expressed as an algorithm is:

$$\text{Road Development Cost} = \frac{\text{total project cost} - (\text{total project costs} \times \text{volume in the billing history record}) / \text{total net cruise volume}}{\text{remaining volume} + \text{volume suddenly and severely damaged}}$$

3. Except as further provided for in this manual the road development cost for a road development may only be used in the appraisal or reappraisal of a tributary cutting authority area.
4. A road development cost may be amortized in accordance with section 5.3.2.1.

5.3.1 Road Development Cost Proration

1. The provisions of this section apply to each of the road development categories described in sections 5.3.1.2 and 5.3.1.3.
2. Where a road development cost estimate must be prorated under this section, only the Crown share of the road development cost estimate may be used in the appraisal or reappraisal of the cutting authority area.
3.
 - a. where road development on Crown land provides access to both Crown timber and timber that is not Crown timber held by the licensee, or a company legally associated with the licensee then the development cost is prorated between Crown timber and timber that is not Crown timber in accordance with subsection (6) of this section.
 - b. where road development on private land provides access to both Crown timber and timber that is not Crown timber, then the development cost is prorated between Crown timber and timber that is not Crown timber in accordance with subsection (6) of this section.
4. Where a proration is required under subsections (3)(a) or (3)(b) of this section:

$$\text{Crown share of total estimated cost} = \text{Total Estimated Cost} \times \frac{\text{Crown Timber Volume}}{\text{Total Timber Volume}}$$

Where:

Crown share of total estimated cost	means the dollar amount to be used to determine a cost estimate for the appraisal or reappraisal of the cutting authority being appraised.
Total Estimated Cost	means the total road development cost estimate expressed in \$.
Crown Timber Volume	means the volume of Crown timber that is under the control of the licensee or a company legally associated with the licensee that may be transported over that road.
Total Timber Volume	means the total volume of Crown and privately owned timber that is under the control of the licensee or a company legally associated with the licensee and that may be transported over that road.

5. In all cases, volumes are estimated from the latest approved operational or inventory cruise data and maps of the area within the drainage to the height of land.
6. Appendix III illustrates the proration process.

5.3.1.2 New Road Construction

1. New Road Construction includes only subgrade construction, placement of additional stabilizing material, bridges, the construction and installation of drainage structures, and other necessary types of structures pertaining to the road that the regional manager authorizes to be used in the appraisal or reappraisal of a cutting authority area.
2. New road construction costs may only be used in the appraisal or reappraisal of the first tributary cutting authority.
3. Tabular road cost estimates:
 - a. where the physical dimensions and conditions of the new road construction fall within the tabular limits set out in section 5.3.3, a tabular cost estimate will be made using the applicable tables and formulas in this section of the manual.
 - b. each road section cost estimate is determined using the appropriate tables in section 5.3.3.
 - c. the tabular road unit cost is the sum of the unit cost estimates of all of the road sections.
4. Non-tabular road cost estimates
 - a. non-tabular cost estimates may be calculated in accordance with section 5.3.4 for the following kinds of new road construction:
 - i. construction and upgrading of main access roads that meet the criteria and conditions provided in the *Ministry of Forests Main Access Roads Policy*,
 - ii. road construction on uphill side slopes that are over 150 percent,
 - iii. road construction on terrain with two or more gullies over 10 m deep at centreline in a 300 m section,
 - iv. end haul construction requiring removal of excavated material to a spoil area,
 - v. overland construction to provide a roadbed by trucking in material for extensive fill sections,

- vi. switchbacks with over 10 000 m³ excavation volume to complete the designed grade percent and horizontal alignment,
 - vii. bank height road sections with rock faces exceeding 7.50 metres in vertical height, and
 - viii. projects approved by the regional manager.
- b. the non-tabular road unit cost is the sum of the non-tabular road unit cost estimates.
5. Bridge Cost Estimates
- a. except where a bridge cost estimate cannot be calculated using table 5-2 or 5-3 each bridge cost estimate must be determined using the appropriate table.
 - b. where the bridge cost estimate cannot be made using one of the appropriate tables, a non-tabular bridge cost estimate may be calculated under section 5.3.4.
 - c. where bridge materials are reused by the original purchaser at a different site, the bridge cost estimate may include the cost of dismantling the materials at the site where they were previously used, and transportation to and installation at the different site, but may not include the initial materials cost and delivery costs.
 - d. where used bridge materials are purchased by the licensee from a legally non-associated party, only the lowest possible cost of purchasing and shipping those materials may be included in the bridge cost estimate.
 - e. the bridge unit cost is the sum of the bridge unit cost estimates for all of the bridges.
6. Culvert Cost Estimates
- a. except where a culvert cost estimate cannot be calculated using table 5-4, each culvert cost estimate must be determined using that table.
 - b. where the culvert cost estimate cannot be made using table 5-4 the non-tabular culvert cost estimate may be calculated under section 5.3.4.
 - c. the culvert unit cost is the sum of the culvert unit cost estimates for all of the culverts.
7. The total of the unit costs for tabular roads, non-tabular roads, bridges and culverts is the total new road construction unit cost.

5.3.1.3 Road Reconstruction

1. road reconstruction is the:
 - a. replacement of a bridge,
 - b. major structural repair of a bridge,
 - c. redecking of an entire bridge,
 - d. reconstruction of a road,
 - e. resurfacing of a road **required because of extensive wear and tear**, with a minimum loose depth of 0.1 m over a continuous length of 0.5 km or greater, or
 - f. replacement of a pipe culvert 1.0 m or larger in diameter,
 - g. **additional resurfacing, required because** the road having been permanently deactivated, or a water or slope failure event.
2. A road reconstruction cost estimate may only be used in an appraisal or reappraisal of a cutting authority area when the district manager authorizes the use of that estimate in that appraisal or reappraisal.
3. A road reconstruction cost estimate must be made in accordance with section 5.3.4.
4. Where road reconstruction projects are associated because of one natural event the reconstruction projects should be grouped into one project cost estimate using a non-tabular cost form.
5. That part of the cost to replace or repair a bridge on a forest service road that is paid for by the Crown, may not be considered in any appraisal or reappraisal.
6. The reconstruction cost estimate of a project may be used in the appraisal or reappraisal of one existing or proposed tributary cutting authority area that is in the licensee's approved forest development plan during the construction of the project. The licensee must identify that cutting authority area when the reconstruction cost estimate is submitted in the appraisal data submission.
7. Where bridge materials are reused by the original purchaser at a different site, the bridge reconstruction cost estimate may include the cost of dismantling the materials at the site where they were previously used, and transportation to and installation at the different site, but may not include the initial materials cost and delivery costs.
8. Where used bridge materials are purchased by the licensee from a legally non-associated party, only the lowest possible cost of purchasing and shipping those materials may be included in the bridge reconstruction cost estimate.

9. The total road reconstruction unit cost is the sum of all of the road reconstruction unit cost estimates for all of the reconstruction projects.

5.3.1.4 Total Road Development Cost

1. The total road development cost is the sum of the total new road construction unit cost plus the total road reconstruction unit cost.

5.3.2 Existing Roads

1. The following roads may not be considered in the appraisal or reappraisal of a cutting authority area:
 - a. a constructed road that has been previously included in an appraisal or reappraisal of another cutting authority area,
 - b. a road previously constructed to access private timber, and
 - c. a road previously constructed in whole or in part for a purpose unrelated to the harvesting of timber on the cutting authority area being appraised or reappraised.

5.3.2.1 Extended Road Amortization

1. Subject to subsection (2) of this section for new appraisals where the total road development cost calculated in an appraisal or reappraisal is greater than \$14.00/m³, the licensee and regional manager may agree that only a portion of an estimated road development cost will be used in the appraisal or reappraisal of the cutting authority area and that the balance of the estimated road development cost will be used in the appraisal or reappraisal of one or more tributary cutting authority areas.
2. Future tributary timber included in the extended road amortization agreement must be within a woodlot licence area, or in an approved cutting permit or cutblocks shown in the licensee's forest development plan or forest stewardship plan in effect on the appraisal effective date.
3. The agreement must provide that:
 - a. it may not be changed unless by mutual agreement, and
 - b. it is entered into only for the purposes of calculating a stumpage rate and confers no obligation on the Crown to compensate the licensee for any unamortized costs.

5.3.3 Tabular Cost Estimates

1. A tabular cost estimate must be calculated on the basis that the construction project will be completed using commonly used logging road construction practices and that the roads will have single lane width roads, turnouts and landings.

5.3.3.1 New Road Construction

1. **New road** construction cost estimate includes the cost of clearing and grubbing, stripping, stump removal, incidental log decking, ditch construction, landing and turnout construction.
2. The estimated cost per kilometre for **new road** construction is provided for each combination of **rock hardness and bank height category**.
3. **New road section data is recorded using appendix VII and the following criteria:**
 - a. **road section lengths are measured along the road centreline and** recorded to the nearest 0.001 km, **and**
 - b. **the bank height** is measured at right angles to the road centreline **from the road surface to the top of the rock face**.
 - c. **road sections are measured over culverts (including wood culverts with a span length less than 4 m).**
 - d. **total bridge deck length is excluded from a road section length.**
 - e. **rock face height measurement on a through-cut section is taken from the highest side of the two road cuts.**
4. **If a road section requires the trucking in of additional stabilizing material greater than 3.2 kilometres, use the non-tabular method to estimate the additional cost of trucking this distance.**
5. Rock mass classification (RMC) is based on the physical characteristics of rock encountered in forest road development and is the subject of a report commissioned by the Forest Engineering Research Institute of Canada in 1978 and prepared by Piteau & Associates/Geotechnical Consultants. **The text and tables in Appendix IV are based on this report and are used to determine the RMC-based factors required for road cost estimates.**
6. Rock can be classified into five types referred to as rock mass classification (RMC) values and identified as RMC 1, 2, 3, 4 and 5. **For the purpose of determining rock hardness, ‘soft/medium’ rock hardness category includes RMCs 1, 2, 3 and 4; ‘hard’ rock hardness category is equivalent to RMC 5.**

7. The steps taken to determine RMC values and apply these to road development cost estimates are:
 - a. examine and record surface hardness, weathering, and block diameter in the field,
 - b. determine subsurface hardness from the table in Appendix IV with this title,
 - c. determine RMC value from the table Appendix IV with this title, and
 - d. apply selected RMC values to applicable tables and formulas for road cost estimates.
8. In all circumstances where a complete interpretation of the rock mass classification system is required, the Piteau & Associates report is to be consulted directly.

Table 5-1: Road Cost Estimates Expressed in Dollars per Kilometre of Road Length

Bank Height Category	Rock Face Height (m)	Cost Estimate per Kilometre (\$/km)	
		Soft/Medium	Hard
OMLB	n/a	69 940	na
OMPR	n/a	91 600	na
OMRB	n/a	92 270	103 050
TOE	(up to 1.50)	92 270	103 050
MRK	(1.51 – 3.00)	105 030	115 620
HRK	(3.01 – 4.50)	117 270	133 580
XRK	(4.51 – 6.00)	130 750	149 560
XXRK	(6.01 – 7.50)	139 570	168 780

5.3.3.2 Bridges and Culverts

1. A cost estimate for a bridge or a culvert may only be made and used in the appraisal or reappraisal of a cutting authority area where its necessity is substantiated by field data.
2. Crib back-fills and all site preparation and bridge protection features are included, as well as material supply and erection. Except where noted below, no adjustment of table values is permitted.
3. Input data within table boundaries is rounded to fit; no interpolation of values is permitted.

5.3.3.2.1 Log Bridges

1. Cost estimates for log bridges are based on span lengths (distance between the centres of the top sill logs) and average crib height (distance from the bottom of the bottom sill log to the point where the stringer rests on the top sill log as measured along the centre line of the bridge) from Table 5-2. The average crib height is the numerical average of the crib heights on both banks of the water course.
2. Table 5-2 is used for estimating costs of all timber-decked and gravel surfaced log bridges with span lengths from 3.5 to 20.4 m and crib heights from single log to 5.4 m.

Table 5-2: Log Bridge Cost Estimates Expressed in Thousands of Dollars

Span Length (m)	Single	Multi-Log Crib				
	Log	Average Crib Height (m)				
	Sill	1	2	3	4	5
4	2.0	5.5	10.5	15.5	20.5	
5	2.3	7.3	12.4	17.4	22.4	
6	4.2	9.2	14.2	19.3	24.3	
7	6.1	11.1	16.1	21.1	26.2	
8	7.9	13.0	18.0	23.0	28.0	
9	9.8	14.8	19.9	24.9	29.9	
10	11.7	16.7	21.7	26.7	31.8	
11	13.5	18.6	23.6	28.6	33.6	
12	15.4	20.4	25.5	30.5	35.5	
13	17.3	22.3	27.3	32.4	37.4	
14	19.2	24.2	29.2	34.2	39.3	
15	21.0	26.1	31.1	36.1	41.1	
16	22.9	27.9	32.9	38.0	43.0	
17	24.8	29.8	34.8	39.8	44.9	
18	26.6	31.7	36.7	41.7	46.7	
19	28.5	33.5	38.6	43.6	48.6	
20	30.4	35.4	40.4	45.5	50.5	

5.3.3.2.2 Permanent or Portable Bridges

1. Cost estimates for permanent or portable bridges, built of any material except logs, are based on total span length and average abutment height (distance from the ground surface interface to the bottom contact point with the girders) from Table 5-3. Each bridge abutment must be measured at the mid-point, from the ground surface interface to the bottom contact point with the girders. Each measured abutment height is then added together and averaged to get a resultant abutment height.
2. Table 5-3 is used for estimating costs of permanent or portable bridges with span lengths from 2.0 to 30.4 m and abutment heights from 0 to 10.4 m.

3. Table 5-3 includes costs for supervision, design, site preparation, supply and installation, freight and haulage (excluding barging), and rip-rap to flood design. Barging costs are allowed as an add-on to the tabular cost estimate. If the barging of bridge materials is done in conjunction with other equipment/materials, then the cost of barging the bridge material should be prorated by the licensee. This table covers any bridge with L60 to L165 load rating.
4. Table 5-3 does not apply to:
 - a. multi-span bridges: A construction estimate form must be completed.
 - b. pile driving: Where piles may be driven to depths of 13 m or more, a construction estimate form must be completed for the bridge construction.
 - c. portable bridges that are reused (see section 5.3.1).
 - d. cost estimates for bridge sizes outside the table limits and pipe culverts greater than the aforementioned sizes require non-tabular cost estimates completed in accordance with section 5.3.4.
 - e. extra width bridges with one or more additional stringers and/or deck panels installed (i.e., exceeding 4.9 metres in total width between guardrails measured at mid-span).

Table 5-3: Permanent/Portable Bridge Cost Estimates Expressed in Thousands of Dollars

Span Length (metres)	Abutment Height (metres)										
	0	1	2	3	4	5	6	7	8	9	10
2	10.9	13.5	16.2	18.8	21.5	24.2	26.8	29.5	32.1	34.8	37.4
3	16.3	19.0	21.6	24.3	26.9	29.6	32.3	34.9	37.6	40.2	42.9
4	21.8	24.4	27.1	29.7	32.4	35.0	37.7	40.3	43.0	45.7	48.3
5	27.2	29.9	32.5	35.2	37.8	40.5	43.1	45.8	48.4	51.1	53.8
6	32.6	35.3	37.9	40.6	43.3	45.9	48.6	51.2	53.9	56.5	59.2
7	38.1	40.7	43.4	46.0	48.7	51.4	54.0	56.7	59.3	62.0	64.6
8	43.5	46.2	48.8	51.5	54.1	56.8	59.4	62.1	64.8	67.4	70.1
9	49.0	51.6	54.3	56.9	59.6	62.2	64.9	67.5	70.2	72.9	75.5
10	54.4	57.0	59.7	62.4	65.0	67.7	70.3	73.0	75.6	78.3	81.0
11	59.8	62.5	65.1	67.8	70.5	73.1	75.8	78.4	81.1	83.7	86.4
12	65.3	67.9	70.6	73.2	75.9	78.5	81.2	83.9	86.5	89.2	91.8
13	70.7	73.4	76.0	78.7	81.3	84.0	86.6	89.3	92.0	94.6	97.3
14	76.1	78.8	81.5	84.1	86.8	89.4	92.1	94.7	97.4	100.1	102.7
15	81.6	84.2	86.9	89.6	92.2	94.9	97.5	100.2	102.8	105.5	108.1
16	87.0	89.7	92.3	95.0	97.6	100.3	103.0	105.6	108.3	110.9	113.6
17	92.5	95.1	97.8	100.4	103.1	105.7	108.4	111.1	113.7	116.4	119.0
18	97.9	100.6	103.2	105.9	108.5	111.2	113.8	116.5	119.2	121.8	124.5
19	103.3	106.0	108.7	111.3	114.0	116.6	119.3	121.9	124.6	127.2	129.9
20	108.8	111.4	114.1	116.7	119.4	122.1	124.7	127.4	130.0	132.7	135.3
21	114.2	116.9	119.5	122.2	124.8	127.5	130.2	132.8	135.5	138.1	140.8
22	119.7	122.3	125.0	127.6	130.3	132.9	135.6	138.3	140.9	143.6	146.2
23	125.1	127.8	130.4	133.1	135.7	138.4	141.0	143.7	146.3	149.0	151.7
24	130.5	133.2	135.8	138.5	141.2	143.8	146.5	149.1	151.8	154.4	157.1
25	136.0	138.6	141.3	143.9	146.6	149.3	151.9	154.6	157.2	159.9	162.5
26	141.4	144.1	146.7	149.4	152.0	154.7	157.4	160.0	162.7	165.3	168.0
27	146.9	149.5	152.2	154.8	157.5	160.1	162.8	165.4	168.1	170.8	173.4
28	152.3	154.9	157.6	160.3	162.9	165.6	168.2	170.9	173.5	176.2	178.9
29	157.7	160.4	163.0	165.7	168.4	171.0	173.7	176.3	179.0	181.6	184.3
30	163.2	165.8	168.5	171.1	173.8	176.5	179.1	181.8	184.4	187.1	189.7

5.3.3.2.3 Culverts

1. All pipe culverts 0.3 m diameter to 1.8 m diameter are estimated using Table 5-4.
2. All wood culverts up to 3.4 m span length are estimated at \$1000.00 each.

Table 5-4 Culvert Cost Estimate

Diameter (m)	Cost per lineal metre	Diameter (m)	Cost per lineal metre
0.3	\$42.00	0.9	\$118.00
0.4	\$49.00	1.0	\$169.00
0.5	\$67.00	1.2	\$207.00
0.6	\$83.00	1.4	\$253.00
0.7	\$95.00	1.6	\$348.00
0.8	\$106.00	1.8	\$400.00

5.3.4 Non-tabular Cost Estimates

1. The cost for any of the non-tabular projects identified in section 5.3.1.2(4)(a) will be estimated by preparing a non-tabular cost estimate. The regional manager may approve a standardized methodology to estimate the cost for the following projects:
 - a. end hauling,
 - b. road reconstruction and replacement,
 - c. stabilizing material, including:
 - i. capping,
 - ii. surfacing,
 - iii. material hauls (greater than 3.2 km),
 - iv. bridge approaches,
 - v. fords,
 - vi. culverts,
 - vii. keyed-in fills,

- d. overlanding, including:
 - i. trucked in fills,
 - ii. large fills,
 - iii. stored fills,
 - e. permanent bridge construction,
 - f. bridge structural repair.
 - g. regional manager approved tributary development projects.
2. The cost information contained in Appendix VIII is to be used in conjunction with the *Detailed Engineering Estimates for Coast Stumpage Appraisal* - February 1, 2001 and as amended to September 1, 2002.
 3. Where the cost estimate of road development project requires a non-tabular cost estimate, the district manager shall be advised by the licensee of project details prior to the commencement of construction. This notice is required to facilitate a current cost review of the project for later consideration in an appraisal.
 4. The road development project cost estimate will be based on the data that is required by the regional manager and the equipment and labour rates as specified in Appendix I. Where a piece of equipment required to complete the project is not included in Appendix I then the equipment rate may be obtained from the *2001 - 2002 Equipment Rental Rate Guide 'The Blue Book'*. All equipment rates are assumed to be for a 3 year old machine using the July 1, 2001 cost base.
 5. Where the cost of a project is the subject of a contract entered into after arms-length competitive bids have been made for the contract, the cost of completing that project may be used as the development project cost estimate where that is authorized by the regional manager.

5.3.4.1 Data Requirements

1. A project requiring a non-tabular cost estimate must be designed so as to require only the amount of materials and labour that are necessary to build a safe and functional structure.
2. The data that may be required by the district manager for non-tabular “excavation and fill” cost estimates are:
 - a. plans, profiles, cross-sections showing the ground and design grade lines,
 - b. volume summary sheets giving quantities by various soil types,

- c. time and materials, equipment and labour, repairs, drainage structures and surfacing where required, and
 - d. a cost estimate for the project.
- 3. The data that may be required by the district manager for non-tabular reconstruction cost estimates are:
 - a. a map showing details of the project including stations, drainages, and other information important to the project,
 - b. time and materials, equipment and labour, estimate for excavation, repairs, drainage structures, re-ditching, and resurfacing where required, and
 - c. a cost estimate for the project.
- 4. The data that may be required by the district manager for non-tabular bridge and culvert construction cost estimates are:
 - a. for permanent structures of 30.4 m span or greater: plans, specifications and design for the proposed structure, detailed materials cost estimate, equipment and labour, amount of timber accessed by the structure, and usage in years for harvesting all the timber,
 - b. for permanent structures of 20.4 m span or less: an economic comparison between a log structure and the permanent structure, and
 - c. for pipe culverts greater than 1.8 m in diameter: the same information as required for permanent structures of 30.4 span or greater.

5.4 Road Management Cost

1. A road management cost may be used in the calculation of a tenure obligation adjustment to take into account the licensee's performance of the following activities:
 - a. grading,
 - b. brush control,
 - c. minor surfacing repairs,
 - d. sanding,
 - e. snowplowing,
 - f. ditch maintenance and repair,
 - g. replacement of culverts ≤ 0.9 m on active roads,
 - h. slough removal,
 - i. deactivation,
 - j. minor repairs to roads due to slides, erosion and flood damage,
 - k. road use charges except those described in section 5.5.
2. A road management cost may only be included in the calculation of a tenure obligation adjustment for those parts of a cutting authority area where the logs will be transported over a road by truck.
3. Where the cutting authority area is located in the Sunshine Coast, Squamish, Campbell River, Chilliwack or South Island Forest District, the road management cost is \$1.58/m³.
4. Where the cutting authority area is located in the Queen Charlotte, North Coast or North Island - Central Coast Forest District, the road management cost is \$2.02/m³.

5.5 Road Use Charges

1. A road use charge may be used in the calculation of a tenure obligation adjustment, if:
 - a. the road to which the road use charge applies is required to transport logs from the cutting authority area to the appraisal log dump,
 - b. the road use charge is not referred to in subsection 2, or 3a or 3b of this section,
 - c. the licensee submits to the district manager with the appraisal data submission:
 - i. a completed Request for Approval of a Road Use Charge Form,
 - ii. a map showing the location of the road and a copy of the written road use agreement, and
 - iii. written confirmation by the regional manager that the road use charge specified in the application, or an amount specified by the regional manager is approved, and
 - d. the term of the road use agreement is completely within the period for which the appraisal shall apply, and
 - e. the licensee promises in writing to submit a copy of every auditable monetary transaction evidencing payment by the licensee for road use when that is requested by the regional manager.
2. Charges as a Share of Road Maintenance
 - a. These charges may not be included in an appraisal or reappraisal.
3. Miscellaneous Road Charges
 - a. Forest Service Roads

no road use charges with respect to a road that is declared, determined, built, maintained or modified by the ministry, may be included in an appraisal or reappraisal;
 - b. Permitted Road

no road use charges for roads built on Crown land, authorized by road permit or any other cutting authority document may be included in an appraisal or reappraisal;

c. Other Roads

no road use charge for a road on an Indian reserve or on private land owned by a third party at arm's length and not subject to a lease held by the licensee, its affiliate or agent of either the licensee or the third party, may be included in an appraisal or reappraisal unless there is no route capable of being built at a lower cost through Crown land and the charges are reasonable, do not exceed compensation that might be determined under the forest legislation, and are proven through the presentation of auditable documents.

4. Land Use Charges

no land use charges may be considered in an appraisal or a reappraisal.

5.6 Basic Silviculture Cost

1. Except where basic silviculture performed or to be performed on a cutting authority area is or will be funded by the Crown or an agent of the Crown a basic silviculture cost may be used in the calculation of a tenure obligation adjustment where the licensee is required to perform basic silviculture on the cutting authority area being appraised or reappraised.
2. The basic silviculture cost depends on the geographic location of the cutting authority area being appraised or reappraised as described in table 5-5.

Table 5-5: Basic Silviculture Cost

Where the cutting authority area is located in:	The basic silviculture cost expressed in \$/m ³ is:
Queen Charlotte Island Forest District	3.09
Chilliwack Forest District	4.42
Squamish Forest District	2.69
Sunshine Coast Forest District	3.38
South Island Forest District	2.73
Campbell River Forest District	2.16
North Island - Central Coast Forest District	2.49
North Coast Forest District	3.42

5.7 'Y' Grade Number

1. The forest district 'Y' grade fractions by timber species as shown in Table 5-8 shall be used to calculate the tenure obligation adjustment to account for the 'Y' grade timber that is not subject to the appraised stumpage rate.
2. The 'Y' grade fraction for each timber species to be used in the appraisal or reappraisal of the cutting authority area shall be the fraction under the timber species which is opposite the forest district in which the cutting authority area is located.
3. The 'Y' grade number to be used in the calculation of the tenure obligation adjustment for a cutting authority area being appraised or reappraised is the sum of the products of the net cruise volume of each timber species in the cutting authority area multiplied by the 'Y' grade fraction for that species, divided by the total net cruise volume in the cutting authority area.

Table 5-6: Forest District 'Y' Grade Fractions by Timber Species

District in which the cutting authority area is located	Balsam	Hemlock	Cedar	Cypress	Fir	Spruce	Pine	Deciduous
Campbell River	0.0571	0.0457	0.0153	0.0361	0.0120	0.0189	0.0299	0.0400
Chilliwack	0.0781	0.0720	0.0139	0.0618	0.0220	0.0134	0.1138	0.1143
North Coast	0.0490	0.0869	0.0206	0.0442	0.0213	0.0516	0.0663	0.0383
North Island-Central Coast	0.0439	0.0483	0.0132	0.0505	0.0221	0.0462	0.0894	0.0194
Queen Charlotte Islands	0.0671	0.0808	0.0253	0.0853	0.0213	0.0690	0.0309	0.0383
South Island	0.0368	0.0523	0.0119	0.0375	0.0166	0.0380	0.1106	0.0358
Squamish	0.2598	0.1684	0.0129	0.0599	0.0488	0.4133	0.2730	0.1115
Sunshine Coast	0.0695	0.0519	0.0242	0.0793	0.0227	0.0370	0.1041	0.0266

5.8 Market Logger Road Cost

1. The market logger road cost expressed in \$/m³ to be used to calculate the tenure obligation adjustment in an appraisal or reappraisal of a cutting authority area is calculated as follows:
 - a. Where the entire cutting authority area is harvested by helicopter to a water drop, the market logger road cost = 0.
 - b. For all other cutting authority areas the market logger road cost = $\frac{8.14}{1 - YG}$

Where: YG = Y grade number calculated under section 5.7

5.9 Return to Forest Management (RFM)

The return to forest management factor is 1.093.

5.10 Tenure Obligation Adjustment

1. The tenure obligation adjustment is used to calculate the stumpage rate for a cutting authority other than a timber sale licence entered into under section 20 of the *Act*.
2. The tenure obligation adjustment (TOA) is calculated as follows:

$$\text{TOA} = \left[\frac{\text{FPA} + \text{LVC} + \text{RD} + \text{RM} + \text{RU} + \text{BS}}{1 - \text{YG}} * \text{RFM} \right] - \text{MLRC}$$

Where:

FPA = forest planning and administration cost

LVC = low volume cost

RD = total road development cost

RM = road management cost

RU = road use charges cost

BS = basic silviculture cost

YG = Y grade number

RFM = return to forest management

MLRC = market logger road cost

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Table 7-1: Miscellaneous Stumpage Rates

Species	Product Code	Logs	Stumpage Rate (\$/m ³)
Deciduous	N/A	All (except grades 'Y', 'Z')	\$1.00
Yew, Arbutus, Aspen, Willow	N/A	All	\$0.25
Hemlock & Balsam	N/A	Grade 'U'	\$0.25
Coniferous	N/A	Grade 'X'	\$0.25
All Species	N/A	Grade 'Y'	\$0.25
All Species	RB	Root buck	\$7.80
All Species	N/A	Beachcomb (BC)	\$0.70
All Species	N/A	Wahleach Island catchment basin (DH)	\$0.25
All Species	N/A	Deadhead logs (DH)	\$0.25

Table 7-2: Special Forest Products Stumpage Rates

Species	Product Code	Product	Stumpage Rate
All Species	CA	Cants (produced from dead and down post-logging residue)	\$9.60/m ³
All Species	FW	Firewood (round or split) - maximum length 1.2 m	\$1.00/m ³
All Species	MT	Mining Timbers - maximum length 2.4 m	\$3.00/m ³
All Species (except Cedar)	PR	Posts and Rails (split and round)	\$1.20/m ³
Cedar	PR	Posts and Rails (split and round)	\$3.00/m ³
All Species	SB	Shake and Shingle Bolts, Blocks and Blanks	\$5.30/m ³
All Species	SK	Shakes	\$6.00/m ³
All Species	SS	Stakes and Sticks (Car Stakes, Grape Stakes, Hop Poles, Lagging (split, Orchard Props, Pickets and Palings, Stakes and Stocks (sticks))	\$1.20/m ³
All Species	XM	Christmas Trees	Less than 3 m - \$0.20 each 3 m to 5 m - \$1.00 each greater than 5 m - \$1.50 each

Cants are produced from dead and down post-logging material that would not make a sawlog as determined by the regional manager.

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District: Sunshine Coast						
Location	ALD Code	Co-ordinates (Approximately)				Point of Appraisal
		Latitude		Longitude		
		Degrees	Minutes	Degrees	Minutes	
Jervis Inlet - Goliath Bay	JEGO	49	49	123	57	G
Jervis Inlet - Granville Bay DLS	JEGR	49	50	123	59	G
Jervis Inlet - Hardy Island	JEHA	49	44	124	11	G
Jervis Inlet - Hotham Sound (West)	JEHO	49	51	124	04	G
Jervis Inlet - Hunaechin River DLS	JEHU	50	12	123	58	G
Jervis Inlet - Killam Bay	JEKI	49	46	123	55	G
Jervis Inlet - Nelson Island, Annis Bay North	JENN	49	46	124	00	G
Jervis Inlet - Nelson Island, Annis Bay South	JENS	49	45	124	01	G
Jervis Inlet - Nelson Island, Vanguard Bay	JEVA	49	45	124	06	G
Jervis Inlet - Perketts Creek	JEPE	49	52	123	52	G
Jervis Inlet - Potato Creek	JEPO	50	08	123	48	G
Jervis Inlet - Queens Reach, Smanit Creek	JEQU	50	10	123	56	G
Jervis Inlet - Saltery Bay	JESA	49	46	124	10	G
Jervis Inlet - Seshal Creek	JESE	50	01	123	55	G
Jervis Inlet - St. Vincent Bay DLS	JEST	49	48	124	05	G
Jervis Inlet - Stakawus Creek DLS	JESV	50	04	123	46	G
Jervis Inlet - Treat Creek	JETC	49	50	123	52	G
Jervis Inlet - Vancouver Bay	JEVB	49	55	123	51	G
Malaspina Peninsula - Lund	MPLU	49	58	124	45	G
Malaspina Peninsula - Steamboat Bay	MPSB	50	00	124	47	G
Malaspina Peninsula East - Malaspina Inlet	MPMI	50	02	124	47	G
Malaspina Peninsula East - Okeover Inlet	MPOI	49	59	124	41	G
Malaspina Strait - Stillwater Bay - Stillwater DLS	MSSB	49	46	124	18	G
Malaspina Strait - Lang Bay	MSLB	49	46	124	21	G
Maurelle Island - East-West Bay	MIEW	50	18	125	06	G
Maurelle Island - Florence Cove (Hole in the Wall)	MIFC	50	18	125	09	G
Maurelle Island – West Side	MIWS	50	15	125	10	G
Nelson Island - Fearney Point	NIFP	49	39	124	06	G
Nelson Island - Cockburn Bay	NICB	49	41	124	11	G

District: Sunshine Coast						
Location	ALD Code	Co-ordinates (Approximately)				Point of Appraisal
		Latitude		Longitude		
		Degrees	Minutes	Degrees	Minutes	
Powell River - Powell River Mill	PLPR	49	52	124	33	G
Princess Royal Reach - Brittain River North	PRBR	49	59	123	59	G
Pryce Channel	PRYC	50	19	124	53	G
Ramsay Arm - Quatum Bay	RAQU	50	23	124	56	G
Ramsay Arm - Ramsay Head	RARH	50	26	124	59	G
Ramsay Arm - Head	RAHE	50	27	125	00	G
Ramsay Arm Head - West	RAHW	50	26	125	01	G
Raza Passage - Francis Bay	RAZA	50	21	125	02	G
Read Island - Drew Passage	RIDP	50	15	125	03	G
Read Island - Evans Bay	RIEB	50	13	125	04	G
Read Island - Frederic Point	RIFP	50	11	125	03	G
Redonda Island - Allies Island	REAI	50	13	124	49	G
Salmon Inlet - Black Bear Bluff	SIBL	49	39	123	43	G
Salmon Inlet - Camp "L" DLS	SICL	49	40	123	32	G
Salmon Inlet - Clowhom Falls DLS	SICF	49	42	123	31	G
Salmon Inlet - Kunechin Islets	SIKI	49	38	123	45	G
Salmon Inlet - Misery Creek	SIMC	49	40	123	34	G
Sechelt - Narrows Inlet - Tzoonie Narrows	SNTN	49	42	123	46	G
Sechelt - Narrows Inlet (Head) DLS	SNIH	49	47	123	43	G
Sechelt Inlet - Clipper Point (Piper Point) DLS	SICP	49	33	123	47	G
Sechelt Inlet - Doriston	SIDO	49	42	123	53	G
Sechelt Inlet - Gray Creek DLS	SIGC	49	32	123	45	G
Sechelt Inlet - Kunechin Point	SIKP	49	39	123	49	G
Sechelt Inlet - Nine Mile Point	SINM	49	36	123	46	G
Sechelt Inlet - Oyster Bay	SIOB	49	34	123	48	G
Sechelt Inlet - Porpoise Bay DLS	SIPB	49	29	123	45	G
Sechelt Inlet - Powerlines	SIPO	49	39	123	52	G
Sechelt Inlet - Skaiakos Point	SESP	49	36	123	49	G
Sechelt Inlet - Skaiakos Point South	SISS	49	35	123	49	G

District: Campbell River						
Location	ALD Code	Co-ordinates (Approximately)				Point of Appraisal
		Latitude		Longitude		
		Degrees	Minutes	Degrees	Minutes	
Quadra Island - Plumper Bay	QIPB	50	09	125	20	G
Royston	ROYS	49	39	124	57	G
Sonora Island - Barnes Bay	SIBA	50	19	125	15	G
Sonora Island - Horn Bay, North of Sonora Island	SIHB	50	25	125	12	G
Sonora Island - Innes	SIIN	50	23	125	10	G
Sonora Island - Nutcracker Bay	SINB	50	18	125	17	G
Sunderland Channel - Bessborough Bay	SCBB	50	29	125	46	G
Sunderland Channel - Forward Harbour, East of Hardwicke Island	SCFH	50	28	125	44	G
Sunderland Channel - Jackson Bay, Topaze Harbour	SCJB	50	31	125	45	G
Sunderland Channel - McLeod Bay	SCMB	50	28	125	57	G
Sunderland Channel - Shaw	SCSH	50	28	125	54	G
Sunderland Channel - Topaze Harbour, Jackson Bay	SCTH	50	31	125	49	G
Tahsis Inlet - Tsowwin River	TITR	49	46	126	38	A
Tahsis Inlet - West Tahsis	TIWT	49	52	126	40	A
Tahsish Inlet - Artlish River DLS	TIAR	50	06	127	05	A
Thurston - Sonora Island	THUR	50	22	125	18	G
Tlupana Inlet - Head Bay	TLHB	49	47	126	29	A
Tlupana Inlet - Deserted Lake	TLDL	49	46	126	28	A
Tlupana Inlet - Nesook Bay	TLNB	49	45	126	25	A
Union Bay - Union Bay DLS	UBUB	49	35	124	53	G
Wellbore Channel - Darcy Point, East of Hardwicke Island	WCDP	50	25	125	43	G
West Thurlow North	WTNO	50	26	125	33	G
West Thurlow Island - Butterfly Bay	WTBB	50	24	125	33	G
West Thurlow Island - Knox Bay DLS	WTKB	50	23	125	37	G
Zeballos Inlet - Little Zeballos	ZILZ	49	57	126	49	A
Zeballos Inlet - South (Ciriaco)	ZISC	49	55	126	48	A
Zeballos Inlet - Zeballos	ZIZE	49	59	126	51	A

South Island Forest District

District: South Island						
Location	ALD Code	Co-ordinates (Approximately)				Point of Appraisal
		Latitude		Longitude		
		Degrees	Minutes	Degrees	Minutes	
Alberni Inlet - China Creek	ALCH	49	9	124	47	A
Alberni Inlet - Coleman Creek	ALCO	49	00	124	52	A
Alberni Inlet - Shoemaker Bay	MISB	49	13	124	50	A
Alberni Inlet - Spencer Creek DLS	ALSP	48	58	124	56	A
Barkley Sound - Cataract Lake DLS	BACA	48	58	125	16	A
Barkley Sound - Sarita DLS	BASA	48	54	125	00	A
Barkley Sound - Skull Lake DLS	BASK	49	02	125	09	A
Barkley Sound - Toquart Bay DLS	BATO	49	01	125	21	A
Barkley Sound - Tzartus Island	BATZ	48	56	125	04	A
Chemainus	CHEM	48	55	123	43	C
Coastland	COAS	49	10	123	56	C
Cypre River DLS, Hecate Bay	CYPR	49	14	125	56	A
Duke Point	DUKE	49	09	123	53	C
Effingham Inlet	EFIN	49	05	125	12	A
Flores Island - Steamer Cove	FLSC	49	22	126	11	A
Galiano Island	GALI	48	53	123	20	C
Great Central Lake - Dorothy	GCDO	49	21	125	23	A
Great Central Lake - Lakeside	GCLA	49	21	125	13	A
Great Central Lake - McBride	GCMC	49	23	125	25	A
Great Central Lake - Mercks	GCME	49	21	125	18	A
Great Central Lake - View	GCVI	49	21	125	15	A
Herbert Inlet - Beddingfield Bay DLS	HEBE	49	21	125	59	A
Jordan River	JORD	48	25	124	02	C
Ladysmith DLS	LADY	48	59	123	48	C
Ladysmith Head	LADH	49	01	123	51	C
Mayne Island - Horton Bay	MIHB	48	49	123	15	C
Mud Bay, Fanny Bay DLS	MUDB	49	27	124	47	G
Mooyah	MOOY	49	37	126	27	A
Nootka Sound - Zuciarte Channel, Mooyah Bay	NSZC	49	38	126	27	A
Northwest Bay, Parksville	NBPA	49	17	124	12	G

District: South Island						
Location	ALD Code	Co-ordinates (Approximately)				Point of Appraisal
		Latitude		Longitude		
		Degrees	Minutes	Degrees	Minutes	
Otter Point Log Sort	OPLS	48	22	123	51	C
Saltspring Island, Burgoyne Bay	SIBU	48	47	123	31	C
Shoal Island DLS	SHOA	48	52	123	38	C
Stewardson Inlet	STEW	49	25	126	19	A
Stewardson Inlet (Mouth)	STEM	49	27	126	17	A
Strait of Georgia - Valdes Island	SGVI	49	03	123	39	C
Tofino Inlet - Rankin Cove	TIRC	49	10	125	42	A
Uchuklesit Inlet - Silverside DLS	UISI	49	00	125	02	A
Uchuklesit Inlet - Snug Cove	UISC	49	00	125	01	A
Ucluelet (East)	UCLU	48	58	125	34	A
Vargas Island	VARG	49	12	125	58	A

North Island - Central Coast Forest District

District: North Island - Central Coast						
Location	ALD Code	Co-ordinates (Approximately)				Point of Appraisal
		Latitude		Longitude		
		Degrees	Minutes	Degrees	Minutes	
Actaeon Sound	ACSD	50	59	127	02	G
Beaver Cove	BEAV	50	32	126	51	G
Bella Coola	BECO	52	23	126	45	G
Bonwick Island, Grebe Cove	BOGR	50	42	126	37	G
Boswell Inlet DLS	BOIN	51	22	127	27	G
Boughey	BOUG	50	31	126	10	G
Briggs Inlet	BRIN	52	20	128	01	G
Burke Channel, Doc Creek	BUDO	51	57	127	40	G
Burke Channel, Twin Creeks DLS	BUTW	52	15	127	16	G
Chief Nollis Bay	CHNO	51	11	127	06	G
Clayton Falls DLS	CLFA	52	22	126	49	G
Cleagh Creek DLS	CLCR	50	28	127	45	A
Cousins Inlet	COUS	52	17	127	47	G
Creasy Bay	CREA	50	57	127	04	G
Cutter Cove	CUTT	50	37	126	15	G
Dawsons Landing	DALA	51	34	127	35	G
Dean Channel, Parker Creek	DEPA	52	15	127	43	G
Denny Island, Kliktsoatli Harbour	DEKL	52	08	128	04	G
Disco Bluff - South Bentinck Arm	DISB	52	07	126	45	G
Don Peninsula - Tom Bay	DOTB	52	23	128	15	G
Draney Inlet	DRIN	51	26	127	25	G
Drury Inlet	DRUR	50	55	127	05	G
Drury Inlet - Caviar Cove DLS	DRCA	50	53	127	02	G
Fish Egg Inlet DLS	FISH	51	35	127	46	G
Forward	FORW	50	29	125	43	G
Frederick Bay DLS	FRBA	51	02	127	14	G
Frederick Sound - Snowdrift Mt. DLS	FSSM	51	04	126	44	G
Frenchman Creek - Dean Channel	FRDC	52	20	127	32	G
Gilford Island - Duck Cove	GIDU	50	39	126	31	G
Gilford Island - Shoal Harbour	GISH	50	44	126	29	G
Gilford Island - Scott Cove DLS	GISC	50	46	126	28	G
Harbledown Island, DLS	HARB	50	35	126	34	G

District: North Island - Central Coast						
Location	ALD Code	Co-ordinates (Approximately)				Point of Appraisal
		Latitude		Longitude		
		Degrees	Minutes	Degrees	Minutes	
Hardy Inlet	HARD	51	41	127	32	G
Hardy Inlet - MacNair DLS	HAMA	51	42	127	33	G
Holberg	HOLB	50	38	128	59	A
Holberg Inlet - Hushamu Creek	HOHU	50	36	127	42	A
Holberg Inlet - Michelsen Point	HOMI	50	35	127	41	A
Hopetown Passage	HOPE	50	55	126	50	G
Jennis Bay DLS	JENB	50	54	127	01	G
Jenny Inlet DLS - King Island	JNKI	52	14	127	35	G
Kimsquit DLS	KIMS	52	52	127	05	G
Kingcome Inlet DLS	KIDL	50	56	126	11	G
Kingcome Inlet - Anchorage Cove	KIAC	50	54	126	12	G
Knight Inlet – Head	KIHD	51	04	125	35	G
Knight Inlet, Blind Creek	KIBC	50	41	125	42	G
Knight Inlet, Escape Point	KIEP	50	52	125	41	G
Knight Inlet, Glendale Cove	KIGC	50	40	125	44	G
Knight Inlet, Hoeya Sound	KIHS	50	42	125	58	G
Knight Inlet, Lull Bay	KILB	50	42	126	01	G
Knight Inlet, Matsui Creek	KIMC	50	42	125	49	G
Knight Inlet, Prominent Point	KIPP	50	40	126	01	G
Knight Inlet, Protection Point	KIPR	50	39	126	10	G
Knight Inlet, Sallie Creek	KISC	50	43	125	43	G
Knight Inlet, Tsakonu Cove	KITC	50	30	126	10	G
Kokish	KOKI	50	32	126	51	G
Koprino Harbour	KOPR	50	30	127	52	A
Kwatna Bay DLS	KWAT	52	06	127	23	G
Kwatna Inlet, Quatlana	KWQU	52	02	127	35	G
MacKenzie Sound DLS	MKSD	50	56	126	39	G
Mahatta River	MAHA	50	27	127	47	A
Malcolm Island, Mitchell Bay	MALC	50	38	126	51	G
Mathieson Channel, Tom Bay	MATB	52	23	128	16	G
Mereworth Sound DLS	MESD	51	12	127	21	G
Moses Inlet	MOIN	51	52	127	21	G

District: North Island - Central Coast						
Location	ALD Code	Co-ordinates (Approximately)				Point of Appraisal
		Latitude		Longitude		
		Degrees	Minutes	Degrees	Minutes	
Neroutsos Inlet - Thurburn Bay	NETB	50	23	127	28	A
North Broughton Island, Tracey Harbour	NBTH	50	51	126	52	G
Nimpkish DLS	NIMP	50	32	126	52	G
Ocean Falls, Link Lake DLS	OFLI	52	21	127	43	G
Owikeno Lake, Macmell, Neechanz DLS	OLMN	51	40	126	41	G
Owikeno Lake, Sheemahant DLS	OLSH	51	44	126	38	G
Pack Lake	PACK	51	10	127	28	G
Pooley Island - James Bay	PIJB	52	42	128	13	G
Quatsino DLS	QUAT	50	27	127	31	A
Quatsino Sound - Ingersoll	QUSI	50	29	127	41	A
Port Hardy - Shushartie DLS	PHSH	50	42	127	28	G
Port McNeill	PTMN	50	35	127	05	G
Port McNeill - WFP DLS	PMWF	50	35	127	06	G
Rivers Inlet - Kilbella Bay	RIKB	51	42	127	20	G
Rivers Inlet - Owikeno First Nations DLS	RIOW	51	41	127	15	G
Rivers Inlet - Ripon Island	RIRP	51	29	127	38	G
Roderick Island - Griffen Passage, DLS	ROGP	52	45	128	21	G
Sargeaunt Pass	SARG	50	41	126	11	G
Seaforth Channel	SEAF	52	14	128	19	G
Seymour Inlet - East Head	SEEH	51	11	126	39	G
Seymour Inlet, Warner Bay	SEWB	51	02	127	06	G
Seymour Inlet, Wigwam Bay	SEWI	51	08	126	43	G
Seymour Inlet - Woods Lagoon	SEWO	51	00	127	18	G
Shearwater DLS	SHEA	52	08	128	05	G
Simoon Sound	SISO	50	51	126	32	G
Smith Inlet, Walkum Bay	SIWB	51	21	127	07	G
South Bentinck Arm, Bentinck Narrows	SBBN	51	59	126	40	G
South Bentinck Arm, Larso Bay	SBLB	52	10	126	51	G
South Bentinck Arm, Noeick River	SBNR	52	03	126	41	G
South Bentinck Arm, Taleomy	SBTA	52	00	126	40	G
South Bentinck Arm - West Side	SBWS	52	06	126	47	G
Strachan Bay	STRA	51	10	127	28	G

District: North Island - Central Coast						
Location	ALD Code	Co-ordinates (Approximately)				Point of Appraisal
		Latitude		Longitude		
		Degrees	Minutes	Degrees	Minutes	
Thompson Sound DLS	THSD	50	48	126	01	G
Tribune Channel, London Point	TCLP	50	46	126	06	G
Wakeman Sound	WAKE	50	59	126	29	G
Walbran Island, Taylor Bay	WITB	51	30	127	36	G
Wallace Bay - Cousins Inlet	WBCI	52	17	127	45	G
Watson Island - Turnbull Cove	WITC	50	57	126	50	G
West Cracroft Island - Port Harvey	WCPH	50	34	126	16	G
West Cracroft Island - Potts North	WCPN	50	34	126	27	G
West Cracroft Island - Potts South	WCPS	50	33	126	28	G
Yeo Cove, Yeo Island	YCYI	52	18	128	10	G

Appendix VII Definition of 'Bankheight' Tabular Road Categories

OMLB:	Other Material – Local Ballast Other material and rock/hardpan that does not require drilling and blasting - ballast/surface with local material (i.e., no truck haul) - includes patch ballasting and surfacing with endhaul material.
OMPR	Other Material – Pit Run Ballast Other material that does not require drilling and blasting and surfacing is pit run material (i.e., not drilled and blasted) requiring truck haul.
OMRB	Other Material – Rock Ballast Other material that does not require drilling and blasting and surfacing is quarried (i.e., drilled and blasted) rock.
TOE	Low rock face height. Rock (including hardpan) that must be drilled and blasted and results in up to 1.50 metre inside rock face. Includes ditchlines or boulders less than 1.50 metres in height that require drilling and blasting.
MRK	Medium rock face height. Rock (including hardpan) that must be drilled and blasted and results in a 1.51 to 3.00 metre inside rock face. Includes boulders between 1.51 and 3.00 metres in height that require drilling and blasting.
HRK	High rock face height. Rock (including hardpan) that must be drilled and blasted and results in a 3.01 to 4.50 metre inside rock face. Includes boulders between 3.01 and 4.50 metres in height that require drilling and blasting.
XRK	Rock (including hardpan) that must be drilled and blasted and results in a 4.51 to 6.00 metre inside rock face. Includes boulders between 4.51 and 6.00 metres in height that require drilling and blasting.
XXRK	Rock (including hardpan) that must be drilled and blasted and results in a 6.01 to 7.50 metre inside rock face. Includes boulders between 6.01 and 7.50 metres in height that require drilling and blasting.

Appendix VIII Non-Tabular Cost Estimates

VIII.1 Non-Tabular Cost Estimates

1. The cost information contained in this appendix are to be used in conjunction with the Detailed Engineering Estimates for Coast Stumpage Appraisal – February 1, 2001 and as amended to September 1, 2002.
2. A non-tabular cost estimate must be calculated on the basis that the construction project will be completed using commonly used logging road construction practices and that the roads will have single lane width roads, turnouts and landings.
3. Weighted averages for each variable (e.g., uphill side slope, rock, etc.) are applied to each road section. Averages are obtained by weighting the cross-section measurements taken at representative points along the road by the applicable road section length.

VIII.2 Subgrade Construction

1. The estimated cost per kilometre for subgrade construction is provided for each combination of construction category and uphill side-slope for two rock mass classification categories, 'RMC 5 Only' and 'Other RMCs'.
2. Construction category (CC) is determined on the basis of the percent rock in relation to the total volume of all materials.
3. The percent rock is determined as follows:

$$\% \text{rock} = \frac{h^2}{H^2} * 100\%$$

Where:

h = the vertical cut height of all rock measured from the bottom of the ditch

H = the total vertical cut height of all materials including organic layers, glacial till and hardpan measured from the bottom of the ditch

4. Construction category may show a range of variation ($\pm$ one CC) within any section length, and is recorded to the nearest integer. Hardpan is CC1, whether drilled and blasted or not. Rippable rock and boulders may occur in CC2 to CC6.
5. The following table defines the construction categories.

Table Appendix VIII-1: Construction Categories

Construction Category (CC)	1	2	3	4	5	6
% rock	0	1-12	13-37	38-62	63-87	88+

6. Rock mass classification (RMC) is based on the physical characteristics of rock encountered in forest road development and is the subject of a report commissioned by the Forest Engineering Research Institute of Canada in 1978 and prepared by Piteau & Associates/Geotechnical Consultants.
7. Rock can be classified into five types referred to as rock mass classification (RMC) values and identified as RMC 1, 2, 3, 4, and 5.
8. The steps taken to determine RMC values and apply these to road development cost estimates are:
 - a. examine and record surface hardness, weathering, and block diameter in the field,
 - b. determine subsurface hardness from the table in Appendix IV with this title,
 - c. determine RMC value from the table Appendix IV with this title, and
 - d. apply selected RMC values to applicable tables and formulas for road cost estimates.
9. The text and tables in Appendix IV have been derived from the report prepared by Piteau & Associates. These tables are used to determine the RMC-based factors required for road cost estimates.
10. In all circumstances where a complete interpretation of the rock mass classification system is required, the Piteau & Associates report is to be consulted directly.
11. Subgrade cost estimates are determined as follows:
 - a. all section lengths must be 0.3 km or longer, with the exception of short spurs and those sections which do not qualify under Subsection 3.b. Lengths are recorded to the nearest 0.001 km,
 - b. In general each section should consist of a length of road wherein:
 - i. variations in slope percentage measurement are within ± 15 percent of the average slope measured in the section. The uphill slope percent is measured at right angles to the road centreline, parallel to the ground of the uphill slope and recorded to the nearest percent (no rounding permitted). Where the road is located on a bench, the slope of the bench is used,

- ii. construction categories vary by no more than ± 1 construction category about the average construction category in the section,
 - iii. one rock mass class predominates,
 - iv. all stabilizing material is trucked or no stabilizing material is trucked,
 - v. stabilizing material is either all gravel or all rock.
- c. All sections with 60 percent or more (by length) of RMC 5 are designated as 'hard'.
 - d. If the total length of all 'hard' sections is greater than 90 percent of the total length of sections containing rock (i.e., CC 2-6), then the cost table for RMC 5 Only is applied to all roads in the appraisal.
 - e. If the roads do not qualify under 'c.' and 'd.' above, then the subgrade construction cost estimate table for other RMCs is applied to all roads in the appraisal.
12. The subgrade construction cost estimate includes the cost of clearing and grubbing, stripping, stump removal, incidental log decking, ditch construction, landing and turnout construction, and single log abutment culverts with spans less than 3.5 m. All pip culverts 0.3 m diameter to 1.8 m diameter are estimated using Table 5-4.

Table Appendix VIII-2: Subgrade Construction Cost Estimates Expressed in Thousands of Dollars per Kilometre

a) RMC 5 ONLY						
Uphill Side Slope %	Construction Category					
	CC1	CC2	CC3	CC4	CC5	CC6
0-4	27.3	36.2	59.9	85.8	108.1	123.4
5-14	28.3	37.9	63.1	90.3	113.6	129.5
15-24	29.6	40.0	67.0	95.7	120.1	136.8
25-34	30.7	42.0	70.7	100.8	126.3	143.7
35-44	31.7	43.8	74.2	105.7	132.2	150.3
45-54	32.6	45.5	77.5	110.3	137.9	156.3
55-64	33.4	47.2	80.8	114.8	143.3	162.6
65-74	34.2	48.8	83.9	119.1	148.5	168.4
75-84	35.0	50.3	86.8	123.3	153.6	174.1
85-94	35.6	51.8	89.7	127.3	158.4	179.5
95-104	36.3	53.2	92.5	131.1	163.2	184.9
105-114	36.8	54.6	95.2	134.9	167.8	190.0
115-124	37.4	55.9	97.8	138.5	172.2	195.1
125-134	37.9	57.2	100.4	142.1	176.6	200.0
135-144	38.4	58.4	102.8	145.5	180.8	204.8
145-150	38.8	59.6	105.3	148.9	185.0	209.5

b) OTHER RMC's						
Uphill Side Slope %	Construction Category					
	CC1	CC2	CC3	CC4	CC5	CC6
0-4	27.3	34.0	51.9	72.0	89.6	101.9
5-14	28.3	35.5	54.5	75.5	93.9	106.6
15-24	29.6	37.3	57.6	79.7	98.9	112.2
25-34	30.7	39.0	60.6	83.7	103.7	117.5
35-44	31.7	40.6	63.4	87.5	108.3	122.6
45-54	32.6	42.1	66.0	91.1	112.7	127.5
55-64	33.4	43.5	68.6	94.6	116.9	132.1
65-74	34.2	44.9	71.0	97.9	120.9	136.7
75-84	35.0	46.2	73.3	101.2	124.8	141.0
85-94	35.6	47.4	75.6	104.2	128.5	145.2
95-104	36.3	48.6	77.8	107.2	132.2	149.3
105-114	36.8	49.7	79.9	110.1	135.7	153.3
115-124	37.4	50.8	81.9	112.9	139.2	157.2
125-134	37.9	51.9	83.9	115.7	142.5	161.0
135-144	38.4	52.9	85.8	118.3	145.8	164.7
145-150	38.8	53.9	87.7	120.9	149.0	168.3

VIII.3 Additional Stabilizing Material

1. Stabilizing material is gravel or broken rock which is placed on the road subgrade to provide stable support and a running surface for logging related equipment. Some stabilizing material may be created on site during subgrade construction. If additional stabilizing material is required it may be obtained from the adjacent cut-bank or trucked in.

VIII.4 Additional Stabilizing Material Cost Estimate

1. The total cost estimate per kilometre for the stabilizing material is:

$$\text{Cost Estimate (\$/km)} = V \text{ multiplied by } U$$

Where:

- a. V is the loose volume of additional stabilizing material expressed in cubic metres of material per kilometre of road, and
 - b. U is the cost estimate of the additional stabilizing material expressed in dollars per loose cubic metre of material.
2. The volume of rock or gravel expressed in cubic metres required to stabilize one kilometre of road which includes the length of turnouts and landings is calculated as follows:
 - a. Where rock is used, $VR = 1000D (W + 1.0D)$,
 - b. Where gravel is used, $VG = 1000D (W + 1.5D)$,

Where:

- i. W is the stabilized road width and has the value of 6.2 metres,
- ii. D is the loose depth of stabilizing material measured in metres determined from the table 5-6,
- iii. VR is the volume of rock, and
- iv. VG is the volume of gravel.

Table Appendix VIII-3: Additional Loose Stabilizing Material Depths Expressed in Metres

Side Slope	Construction Category					
	1	2	3	4	5	6
0-4	0.8	0.8	0.7	0.6	0.6	0.5
5-14	0.7	0.7	0.7	0.6	0.5	0.4
15-24	0.7	0.6	0.6	0.5	0.4	0.4
25-34	0.6	0.6	0.5	0.4	0.3	0.3
35-44	0.5	0.5	0.4	0.3	0.3	0.2
45-54	0.4	0.4	0.3	0.3	0.2	0.1
55-64	0.3	0.3	0.3	0.2	0.1	0.0
65-74	0.2	0.2	0.2	0.1	0.0	0.0
75-84	0.2	0.1	0.1	0.0	0.0	0.0
85-94	0.1	0.1	0.0	0.0	0.0	0.0
95-104	0.0	0.0	0.0	0.0	0.0	0.0
105-114	0.0	0.0	0.0	0.0	0.0	0.0
115+	0.0	0.0	0.0	0.0	0.0	0.0

3. The factors of 1.0 and 1.5 relate to the slope of the fill material. More gravel than rock is required to stabilize a given kilometre of road (i.e., 1.5:1 fill slopes for gravel and 1:1 fill slopes for rock).
4. The quantities per kilometre and the depths by construction categories are only used in conjunction with tabular cost estimates.
5. a. A cost estimate may be calculated for the cost of additional stabilizing material and associated labour including:
 - i. borrow pit preparation,
 - ii. rock drilling, explosives, loading of explosives and blasting (e.g., compacted or cemented gravel, oversize material, etc.),
 - iii. loading gravel trucks when truck haul required, or placement of materials when trucking is not required,
 - iv. truck hauling, when required, and
 - v. spreading and compacting material.

- b. The cost estimates assume borrow pits are located adjacent to a road right-of-way. If an access road must be constructed to a borrow pit to build a road to a cutting authority area (the cutting authority area road), then a road cost estimate may be calculated for that access road and included as part of the road development adjustment in the appraisal of the first cutting authority area accessed by the cutting authority area road.
- c. Where the material to be used to stabilize the subgrade will be moved less than 0.1 km, the cost estimate for each material is:

i.	Gravel	\$5.65/m ³
ii.	Soft and Medium Rock	\$9.03/m ³
iii.	Hard Rock	\$11.86/m ³

Where: m³ = cubic metre of stabilizing material

- d. Where the material to be used to stabilize the subgrade must be moved a distance of 0.1 km or further, the cost estimate for each material is:

i.	Gravel	\$(7.74 + 0.616 d)/m ³
ii.	Soft and Medium Rock	\$(11.11 + 0.616 d)/m ³
iii.	Hard Rock	\$(13.94 + 0.616 d)/m ³

Where:

‘d’ is the distance that the material must be moved from the source of the material to the mid-point of the road section to be stabilized.

- e. In this section:
- ‘Soft-medium-Rock’ is rock where less than 60 percent of the rock from the excavation is RMC 5.
 - ‘Hard Rock’ is rock where 60 percent or more of the rock from the excavation is RMC 5.

VIII.5 Capping

1. Where the available material consists of large round or broken rock or 'dirty' or fine gravel which is unsuitable for normal traffic conditions, the appraisal may include a cost estimate for 'capping' of 0.2 m (loose depth) of suitable rock or gravel surfacing on road sections where required and providing the application is substantiated. This material is trucked in from a different borrow pit than the source of the stabilizing material unless the material has been sorted in the pit.
2. For further information, refer to the surfacing section in the regional manager's standardized methodology (i.e., *Detailed Engineering Estimates for Coast Stumpage Appraisal*, February 1, 2001).

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