JUN 13 1995

All Regional Managers and
All Holders of the Coast Appraisal Manual

Dear Manual Holder:

I hereby approve Amendment 2 to the *Coast Appraisal Manual*. This amendment will come into force when Sections 2 to 4, 6 to 14 and 18 of the *Forest Amendment Act, 1995* come into force. The amendment incorporates changes to the pricing of timber on timber licences pursuant to the *Forest Amendment Act, 1995*. The following sections are amended:

Section	Nature of Amendment
1.1	Removes "royalty" from the first sentence.
1.2	Clarify wording.
1.3	Clarify wording.
1.4	Minor wording change.
1.5	Add wording to show where the percentage of the indicated stumpage is applied for appraised timber licences.
2.2 (g)	Clarify wording.
2.2(i)	Clarify wording to be consistent with Section 154 of the *Forest Act*.
2.4 (e)	Added new definition to deal with extension of prescribed rate timber licences during transition.
3.2	Clarify wording.

.../2

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4.3.1, 1(b) & 2	Adds a clarifying definition for reused bridges.
4.3.1, 3	Adds a definition for deactivation on appraised timber licences.
5.6.3	Includes wording that describes when the percentage of the stumpage rate defined in the *Forest Amendment Act, 1995* will be applied on timber licence appraisals.
6.6	Clarify section intent.
6.6.1	New sub-section to define the function of Table 6-1. Implements Dr. Scarfe's recommendation that all Crown timber sources should have miscellaneous stumpage rates applied equally for special forest products.
6.6.2	New sub-section to define function of Table 6-2, Miscellaneous Stumpage Rates for Timber Licences. Table 6-2 is required to allow a smooth transition from the *Royalty Rate Regulation* tables to appraised stumpage on timber licences.

Yours truly,

Andrew Petter
Minister

Attachment: (1)

[redacted]

Coast Appraisal Manual

Amendment Number 2

(Cost Base: July 1, 1993)

Contents

1 Introduction

1.1 Terms of Reference 1-2

1.2 Area of Application 1-3

1.3 Cutting Authority 1-4

1.3.1 Cutting Authority Area 1-4

1.4 Responsibility for Stumpage Determination 1-5

1.5 Comparative Value Timber Pricing 1-6

1.6 Stumpage Adjustments 1-7

2 Appraisal Principles & Procedures

2.1 Types of Determination 2-2

2.2 Time Schedule - New Appraisals and Reappraisals 2-3

2.3 Reappraisal 2-4

2.4 Extension of Term 2-7

2.5 Point of Appraisal 2-8

2.6 Calculation Conventions 2-9

2.7 Immature Coniferous Timber 2-10

3 Selling Price Estimation

3.1 Average Market Value (AMV) Determination 3-2

3.2 Log Grade Percentages 3-3

3.2.1 Selection of Log Grade Percentages 3-3

3.2.2 Billing Period 3-3

3.2.3 Sources of Log Grade Percentages for Each Cutting Authority 3-4

3.2.4 Damaged Timber 3-4

3.2.5 Low Volume Cypress Exception 3-5

3.3 Calculation of Stand Selling Price (SP) 3-6

4 Operating Cost Estimation

4.1 Cost Estimates 4-2

4.1.1 Specified Operations 4-3

4.2 Appraisal Data Requirements 4-4

4.3 Development 4-6
4.3.1 Development Cost Categories 4-7
4.3.1.1 Development Cost Allocation 4-10
4.3.1.1.1 Development Cost Estimates in Appraised Timber on Crown Lands 4-11
4.3.1.1.2 Development Cost Estimates for Full Appraisal on Timber Licence (TL) Cutting Authorities 4-11
4.3.1.1.3 Development Costs on Private Land 4-12
4.3.1.1.4 Existing Roads and Structures 4-12
4.3.1.1.5 Extended Road Amortization 4-13
4.3.2 Tabular Cost Estimates 4-13
4.3.2.1 Subgrade Construction 4-13
4.3.2.2 Drainage Structures 4-18
4.3.2.3 Additional Stabilizing Material 4-20
4.3.3 Detailed Engineering Cost Estimates 4-23
4.3.3.1 Data Requirements 4-23

4.4 Tree To Truck 4-25
4.4.1 Conventional Logging 4-25
4.4.2 Helicopter Logging 4-26

4.5 Log Transportation 4-28
4.5.1 Truck Hauling 4-28
4.5.2 Water Transportation 4-29
4.5.2.1 Dump, Sort, Boom and Scale 4-29
4.5.2.2 Towing or Barging 4-29
4.5.3 Routine Maintenance 4-32
4.5.4 Road and Land Use Charges 4-32

4.6 Administration and Other Costs 4-34
4.6.1 Overhead 4-34
4.6.2 Woods Run 4-34
4.6.3 Accommodation 4-36
4.6.4 Low Volume Cost Estimate Additive 4-36

4.7 Total Logging Cost Estimate 4-37

4.8 Basic Silviculture 4-38

4.9 Cost Trend 4-39

5 Stumpage Rate Determination

5.1 Indicated Stumpage Rate 5-2

5.2 Value Index 5-3

5.3 Mean Value Index 5-4

5.4 Market Value Indexing 5-5
5.5 Base Rate 5-6
5.6 Calculation of Stumpage Rate 5-7
5.6.1 Calculation of Indicated Stumpage Rate 5-7
5.6.2 Prescribed Minimum Stumpage Rate 5-7
5.6.3 Reserve Stumpage Rate 5-7
5.6.4 Upset Stumpage Rate 5-8
5.6.5 Total Stumpage Rate 5-8

6 Misc. Timber Pricing Policies

6.1 Value Indexes by District and Species 6-2
6.2 Cutting Authorities With 5 000 m³ or Less Volume 6-3
6.3 Partially Harvested Timber 6-4
6.4 Small Business Forest Enterprise Program (SBFEP) Sales 6-5
6.5 Levies 6-6
6.6 Miscellaneous Stumpage Rates 6-7
6.6.1 Special Forest Products and Other Miscellaneous Rates 6-7
6.6.2 Miscellaneous Stumpage Rates for Timber Licences 6-9

7 Appendices

Appendix I Equipment and Labour Rates 7-2
Appendix II Reconstruction and Replacement 7-4
Appendix III Development Cost Allocation 7-5
Appendix IV Rock Mass Classification 7-6
Appendix V Log Grade Hierarchy 7-8

Index

Tables

Table 4-1: Construction Categories 4-14

Table 4-2: Subgrade Construction Cost Estimate 4-17

Table 4-3: Bridge Cost Estimate 4-19

Table 4-4: Additional Loose Stabilizing Material Depths 4-20

Table 4-5: Towing Cost Estimates 4-30

Table 4-6: Barging Cost Estimates 4-31

Table 4-7: District Silviculture Cost Estimates 4-38

Table 4-8: Trend Factor by Effective Date 4-39

Table 5-1 Timber Licence Stumpage Rate Adjustment Schedule 5-8

Table 6-1: Miscellaneous Stumpage Rates 6-8

Table 6-2: Miscellaneous Stumpage Rates for Timber Licences 6-9

Introduction 1

1.1 Terms of Reference

The *Forest Act,* Sections 81 to 86, and regulations provide the statutory authority for the determination of stumpage for Crown timber.

The *Forest Act,* Section 84, requires adherence to the policies and procedures approved for the forest region by the Minister of Forests. This *Coast Appraisal Manual,* approved by the Minister, contains the policies and procedures for determining stumpage rates charged for Crown timber harvested in the area described in Section 1.2.

The data used in the manual is based on a broad sampling of timber harvesting and silviculture costs experienced by licensees on the coast. Log selling prices are derived from sales data compiled by the Ministry of Forests.

1.2 Area of Application

This manual applies to the "Coast" which is defined as that geographic area included within the Vancouver Forest Region, as established by the *Forest Act* and Regulations, and that part of the Prince Rupert Forest Region west of the Cascade Mountains Administrative Line from Tweedsmuir Park to the State of Alaska.

There is one exception to the above definition. Timber in that portion of the Kalum Forest District lying west of the Cascade Mountains Administrative Line is appraised using the Interior Appraisal Manual.

1.3 Cutting Authority

The term "cutting authority" means one of the following documents authorizing the harvest of a cutting authority area:

1. a cutting permit issued under:
   a. a forest licence,
   b. a timber sale licence that provides for the issuance of cutting permits,
   c. a tree farm licence,
   d. a woodlot licence; or
   e. a timber licence.
2. a timber sale licence that does not provide for the issuance of cutting permits, not including any proposal deemed to be a part of the licence;
3. a licence to cut; or
4. a road permit.

1.3.1 Cutting Authority Area

The term "cutting authority area" means the area that:

1. is authorized for harvest under a cutting authority, and
2. has a unique timber mark.

1.4 Responsibility for Stumpage Determination

The *Forest Act,* Section 84(1), requires the rates of stumpage to be determined, redetermined and varied by the Regional Manager, or a forest officer duly authorized by the Regional Manager, in accordance with the policies and procedures approved for the forest region by the Minister of Forests.

The Regional Appraisal Coordinator is a forest officer authorized by the Regional Manager to determine stumpage rates, for both appraisals and reappraisals, and to provide interpretations of the policies and procedures approved by the Minister that are contained in the *Coast Appraisal Manual.*

Revenue Branch employees are forest officers for the purpose of adjusting stumpage rates under Section 1.6.

1.5 Comparative Value Timber Pricing

Comparative Value Pricing, (CVP) subject to a minimum stumpage rate, is the basis for determining stumpage rates with the exceptions noted in subsection 2.1 (b, c and d).

A method for determining the average stumpage rate for the Coast has been set by the provincial government. The stumpage rate for a given stand of timber is more or less than the pre-set average rate depending upon whether the stand is more or less valuable than the average stand. To make that assessment and hence to determine a stumpage rate, the Forest Officer will typically:

a. estimate the selling price of the products that can be recovered from the timber stand (see Chapter 3);

b. estimate the costs necessary to harvest the timber and realize the estimated selling price (see Chapter 4);

c. determine the Value Index (see Chapter 5) of the timber stand by subtracting the estimated operating cost from the estimated selling price;

d. determine the indicated stumpage rate by comparing the Value Index for the timber stand with the Coast Mean Value Index and adding the Coast Base Rate (see Chapter 5);

e. determine the reserve stumpage rate (see Chapter 5) by selecting:

   i. the greater of the indicated stumpage rate or the prescribed minimum rate; or

   ii. for an appraised cutting authority area containing timber licence volume,the greater of the adjusted indicated stumpage rate or the prescribed minimum stumpage rate.

f. determine the upset stumpage rate by adding any development or silviculture levies (see Section 6.5) to the reserve stumpage rate;

g. determine the total stumpage rate by adding any bonus bid to the upset stumpage rate;

One stumpage rate is determined for all appraised timber in each cutting authority area with the exception of miscellaneous stumpage rates under Section 6.6.

The average stumpage rate itself is indexed to lumber market values as explained in Chapter 5.

1.6 Stumpage Adjustments

Unless a cutting authority or the application and tender for a timber sale licence, specifies that stumpage rates are fixed for a specified period or for the full term of the cutting authority, the stumpage rates are adjusted quarterly on January 1, April 1, July 1, and October 1 of each year, subject to Section 6.4. The new stumpage rates reflect any changes in estimated selling prices (as authorized in this manual since the previous adjustment) and the operating cost trended to the quarterly adjustment date. In addition, the adjustment reflects changes to the Statistics Canada Softwood Lumber Index for the Coast, the Coast Base Rate and the Coast Mean Value Index.

2.2 Time Schedule - New Appraisals and Reappraisals

Timeliness is an important factor in the stumpage appraisal process. The following schedule applies:

a. For each cutting authority, the licensee must submit to the district manager an appraisal data submission (Coast Appraisal Data Sheet) at least 90 calendar days prior to the appraisal effective date for new appraisals or at least 60 calendar days prior to the anniversary date for reappraisals.

   If the licensee fails to provide an appraisal data submission as stated above, then the district manager must use the best appraisal information available at that time;

b. The district manager or designate reviews the submitted data and all other available information, signs the appraisal data sheet and notifies the licensee or;

c. The district manager or the licensee may request a meeting to discuss the appraisal data submission;

d. At the meeting, the licensee may clarify data previously submitted. The district manager may revise the appraisal data sheet as a result of the meeting;

e. The licensee is notified by the district manager of changes, if any, made to the appraisal data after the meeting;

f. The appraisal data sheet is then sent to the regional office by the district manager as part of the appraisal package;

g. The licensee and district manager are notified by the regional revenue staff of any further changes made to the appraisal data sheet;

h. The licensee is notified, by letter or facsimile transmission, of the stumpage rate and a summary of the appraisal information used in determining the stumpage rate;

i. The licensee must advise the issuing regional office in writing of any disagreement with the information contained in the stumpage advisory notice. At this point, the disagreement is not considered as an administrative review or appeal under Section 154 of the *Forest Act.*

j. After such a review, the regional revenue staff sends a letter notifying the licensee, by mail or facsimile transmission, of the results of the review and summary appraisal information.

2.3 Reappraisal

A reappraisal is a re-estimation of Operating Cost, Log Grade Percentages, and Selling Price according to the Appraisal Manual in effect on the effective date of the re-estimation. Except in the case of "sudden and severe damage" as explained below, a reappraisal is based upon a complete reassessment of a cutting authority carried out by "standing up the trees, unbuilding the roads and drainage structures and returning the stand to its original condition" before making a re-estimate of the operating costs. The operating cost data may be revised or left unchanged at the time of reappraisal. At the time of a reappraisal, initial detailed engineering cost estimates may be re-estimated once after construction to reflect more accurate on-site information.

A reappraisal is made only if one of five situations arises:

1. Sudden and Severe Damage

If the regional manager is satisfied that sudden and severe damage has occurred to the appraised timber, the cutting authority is reappraised upon the licensee's request. *The effective date of the redetermined rate is the first of the month following the occurrence of the damage*, unless otherwise specified by the regional manager. A reappraisal is not made in the case of fire damage caused by the licensee if he has failed to comply with the *Forest Act,* Part 10, and relevant regulations.

In the case of "sudden and severe damage" the redetermined stumpage rate is based upon the remaining timber only. The regional manager may approve the use of appraisal data obtained from comparable cutting authorities. The reappraisal cost estimate for development takes into account volume already removed.

This policy on "sudden and severe damage" applies to fixed rate cutting authorities as well as to adjustable rate cutting authorities. Any existing bonus bid is payable in addition to the redetermined upset stumpage rate.

2. Amendments

If accumulated amendments (either addition or deletion of area containing merchantable timber) made to the cutting authority exceed 25 hectares or 25% of the merchantable area, whichever is less, then the entire cruise must be recompiled and the stumpage rate redetermined.

The redetermined stumpage rate becomes effective on the first of the month following the notice to the licensee which approves the amendment.

2.4 Extension of Term

a. When a licensee has elected the fixed stumpage rate option for a timber sale licence in the Small Business Forest Enterprise Program, that stumpage rate remains fixed for the term and all extensions.

b. When a woodlot licensee has a cutting authority where the term is for two years or less, the licensee may elect the fixed stumpage rate option. That fixed stumpage rate shall remain in effect for the term and all extensions.

c. When the stumpage rate was fixed other than by the election of the fixed rate option and the term is extended, the regional manager may either extend that stumpage rate or reappraise the cutting authority.

d. Miscellaneous stumpage rates (see Section 6.6) will be based on the appraisal manual rate table in effect on the date of scale, except for those cutting authorities that contain miscellaneous stumpage rates specified in their cutting authority document.

e. When a cutting authority that includes the authorization to harvest timber licence volume has the term extended, the stumpage rate will be determined under d. above, if:

- the cutting authority has a term that began before May 1, 1995, and
- the cutting authority area was not appraised.

2.5 Point of Appraisal

Cutting authorities are appraised to the point of appraisal that results in the least total operating cost estimate.

The recognized Points of Appraisal are:

Location	Code	Details
Alberni	ALBE	The head of Alberni Inlet
Chemainus	CHEM	Tie-up grounds in the vicinity of Chemainus representing the facilities from Nanaimo Harbour to Cowichan Bay
Gambier Island	GAMB	Representing all facilities in the Howe Sound area
Pitt River Bridge	PIRV	Representing the facilities near the confluence of the Fraser and Pitt Rivers.

3.2 Log Grade Percentages

Log grade percentages are obtained for each species in each cutting authority as described under Sections 3.2.1, 3.2.2 and 3.2.3. Log grade percentages are determined from the billing history record (Section 3.2.2), except for appraisals of woodlots, replaceable Timber Sale Licence (TSL) majors and appraisals of cutting authorities which meet the immature timber criteria in Section 2.7.

For a Woodlot Licence, TSL major, and for any cutting authority consisting of immature timber, unless the volume in Level 1 of Section 3.2.3 is 2 000 m^3 or greater for a given species, the log grade percentages predicted by the cruise compilation algorithm are used for that species.

Separation of cruise summary log grade data may be required for Cedar grades D and K, F and L, and I and M. These grades are separated by using the proportional grade percentages from the first qualifying level in the table in Section 3.2.3.

3.2.1 Selection of Log Grade Percentages

When selecting log grade percentages for a cutting authority, the following criteria apply:

- the source of log grade percentages may vary by species;
- the minimum acceptable billed volume for the source of log grade percentages for a species shall be 2,000 m^3; the only exception is that upon reaching the highest level of the table in Section 3.2.3 the species log grade percentage is used regardless of the billed volume (see also Appendix V).

3.2.2 Billing Period

"Billing history record" means the Ministry of Forests' record of log volume and grades for which invoices were issued during the period specified.

Log grade percentages are obtained from the two-year billing history record as follows:

Effective Date of Appraisal/Reappraisal	Two-Year Billing Period Ending on the preceding:
January 1 to March 31	November 30
April 1 to June 30	February 28/29
July 1 to September 30	May 31
October 1 to December 31	August 31

The data used are the volumes billed by species and grade during the two year period, not volumes scaled during that period.

All cutting authorities with appraisal/reappraisal dates occurring within a given quarter shall use the same billing history period.

3.2.3 Sources of Log Grade Percentages for Each Cutting Authority

The log grade percentage for each species in each cutting authority is determined from the billing history record at the level in the following table (see also Appendix V) which first meets the criteria listed in Section 3.2.1.

Level	All Cutting Authorities Within the Geographic Boundaries of a TFL	All Cutting Authorities within the Geographic Boundaries of a TSA
1	Cutting Authority	Cutting Authority
2	Timber Licence(2)	Timber Licence (1)
3	District Portion of TFL	Supply Block(1)
4	TFL	TSA(1)
5	N/A	Total TSB
6	N/A	Total TSA

Where: TFL = Tree Farm Licence and Watershed Licence TSA = Timber Supply Area. TSB = Timber Supply Block

(1) At this level, the billing history is for the licence to which the cutting authority area belongs.

(2) The Timber Licence (TL) average will be used where the cutting authority is completely within the timber licence

Note: For these purposes, the Small Business Forest Enterprise Program as defined in Section 6.4, is considered to be one "licence".

3.2.4 Damaged Timber

If the regional manager is satisfied that the timber in a cutting authority is significantly damaged, then log grade percentages are estimated on the basis of the site-specific information at hand. Section 3.2 does not apply.

Throughout Section 4.3 the term "roads" is meant to include both roads, and drainage and other pertinent structures.

4.3.1 Development Cost Categories

Development cost allocation (Section 4.3.1.1.) applies to all cost estimates made under this section.

1. New Construction

New construction is defined as the following construction phases: subgrade construction, placement of additional stabilizing material, construction and installation of drainage and other pertinent structures.

New construction costs are allocated to the first tributary cutting authority.

a. Road Cost Estimates

i. Tabular cost estimates

Each road section cost estimate is determined from the appropriate tables (section 4.3.2.1). These section costs are totalled to give a road cost estimate for each road. For each road the total approved cost estimate is divided by the total net cruise volume to give a unit cost ($/m³). The unit costs ($/m³) for all roads are then totalled to give a unit cost ($/m³) for tabular roads.

ii. Detailed engineering cost estimates

Each project cost is estimated according to Section 4.3.3. These projects may include:

- Main access roads as defined in the "Ministry of Forests Main Access Roads Policy";
- Roads traversing private land;
- Road construction on side slopes that are over 150%;
- Road construction on terrain with 2 or more gullies over 10 metres deep at centreline in a 300 metre section;
- End haul construction requiring removal of all excavated material to a spoil area;
- Overland construction to provide a roadbed by trucking in material for extensive fill sections; and

- Switchbacks with over 10 000 m^3 excavation volume to complete the designed grade percent and horizontal alignment.

The total of the estimated costs for each project is divided by the total net cruise volume to give a unit cost ($/m^3$) for engineered roads.

b. Bridge Cost Estimates

Each bridge cost estimate is determined either from the appropriate table (Section 4.3.2.2) or as a detailed engineering cost estimate (Section 4.3.3.). Projects eligible for detailed engineering estimates include:

- Bridges with over 5.4 m average crib height or 20.4 m span length;
- Bridges using other than log stringers;
- Pipe culverts greater than 900 mm in diameter, when specified in the cutting authority.

Where bridge materials are reused by the original purchaser at a second or subsequent location, the cost estimate will include dismantling, transport and installation at the new site, and the initial materials cost and delivery costs are excluded.

Where used bridge materials are purchased from a legally non-associated party, the cost of purchase and shipping those materials will be included in the cost estimate. The requirements of Section 4.1 still apply.

The total of the estimated costs for all bridges is divided by the total net cruise volume to give a unit cost ($/m^3$) for bridges.

The unit costs ($/m^3$) for tabular roads, engineered roads, and bridges are totalled to give a unit cost ($/m^3$) for new construction.

2. Reconstruction and Replacement

Reconstruction and Replacement are defined as replacement or repair of a major drainage structure, or major reconstruction or resurfacing of a section of road, required because of:

- extensive "wear and tear", or
- the road has been permanently deactivated previously, or
- the road has been abandoned, or
- a water or slope failure "event".

A water or slope failure "event" is the result of an irregular natural occurrence which leads to the blockage or destruction of a road or bridge making the road or bridge impassable for vehicular traffic. The repair required should be grouped, if linked by event, into one project cost estimate (see Appendix II) via a detailed engineering cost form.

The costs approved under Section 4.3.1.2 must not qualify under routine maintenance as described in Section 4.5.3 or be eligible for reporting under the routine maintenance portion of the coastal logging cost survey.

The cost estimate may be allocated, by the licensee, to any individual tributary cutting authority that is in the licensees' approved five-year development plan. However, the licensee must identify this cutting authority as part of the detailed engineering cost estimate.

Reconstruction and replacement cost estimates will be determined on an individual project basis as detailed engineering cost estimates (Section 4.3.3) and must be approved by the district manager.

These projects may include:

- Bridge structural maintenance including redecking (ties and decking) or replacement of a major drainage structure;
- Reconstruction of a road;
- Resurfacing of a road, with a minimum loose depth of 0.1 m over a continuous length of 0.5 km or greater;
- Replacing pipe culverts larger than 900 mm in diameter.

Where bridge materials are reused by the original purchaser at a second or subsequent location, the cost estimate will include dismantling, transport and installation at the new site, and the initial materials cost and delivery costs are excluded.

Where used bridge materials are purchased from a legally non-associated party, the cost of purchase and shipping those materials will be included in the cost estimate. The requirements of Section 4.1 still apply.

To determine the unit cost ($/m^3$) for reconstruction and replacement, the total approved costs are divided by the total net cruise volume at initial appraisal or the remaining volume at reappraisal.

3. Deactivation

Deactivation sites include roads, bridges, logging campsites, dryland sorts and log dumps. Deactivation is defined in the Forest Road and Logging Trail Engineering Practices (Interim) and segregated into three levels as follows (see Part C of Engineering Practices):

1. temporary (seasonal)
2. semi-permanent (rotation maintenance)
3. permanent

For appraisal purposes, temporary deactivation is recognized in the routine maintenance phase. The semi-permanent and permanent deactivation cost estimates will be calculated as detailed engineering cost estimates (Section 4.3.3).

Only specific projects required in a cutting authority document will be considered in appraisals. These projects do not include those designed exclusively for silvicultural purposes. The cost estimate may be allocated by the licensee, to any individual tributary cutting authority that is in the licensee's approved five-year development plan. However, the licensee must identify this cutting authority as part of the detailed engineering cost estimate.

Where a cutting authority area containing timber licence volume is appraised, the only roads to be included for deactivation cost estimates are those that are appraised under Section 4.3.1.1.2.

To determine the unit cost ($/m³) for deactivation, the total approved costs are divided by the total net cruise volume of the cutting authority at initial appraisal or the remaining volume when new projects and costs are added at reappraisal.

4.3.1.1 Development Cost Allocation

Where proration is required for Section 4.3.1.1.1, 4.3.1.1.2 and 4.3.1.1.3:

$$\text{Crown share} = \text{Total Estimated Cost} * \frac{\text{Appraised Timber Volume}}{\text{Total Timber Volume}}$$

Where:

Crown share ($)	=	dollar amount to be allocated to stumpage-bearing timber in the cutting authority being appraised.
Total Cost Estimate ($)	=	dollar amount of the total development cost estimate.

Appraised Timber Volume (m^3)	=	volume of appraised timber tributary to the project and under the control of the licensee or a company legally associated with the licensee, including volume in all areas contributing to the allowable annual cut determination.
Total Timber Volume (m^3)	=	total volume tributary to the project and under the control of the licensee or a company associated with the licensee.

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.

The Crown share is a dollar amount which is included in the appraisal of a tributary cutting authority, subject to Section 4.3.1.1.5.

Development cost estimate is allocated according to the outline below (see also Appendix III).

4.3.1.1.1 Development Cost Estimates in Appraised Timber on Crown Lands

a. Development providing access to appraised timber only.

   Total estimated costs by tabular or detailed engineering methods are included in the appraisal.

b. Development providing access to non-appraised timber only.

   Cost estimates are not included in the appraisal.

c. Development in appraised timber areas providing access to both appraised and non-appraised timber held by the licensee or a company legally associated with the licensee.

   All costs are prorated between appraised and non-appraised timber, and then included in the appraisal.

4.3.1.1.2 Development Cost Estimates for Full Appraisal on Timber Licence (TL) Cutting Authorities

a. New development will be allocated as in Section 4.3.1.1.1.

b. Unamortized development on the TL that is required for access to the cutting authority will be included in the appraisal of that cutting authority. Unamortized development is defined as:

i. the development started after January 1, 1988;

ii. development cost estimates were not included in any prior appraisal calculation for Crown timber (or were considered as zero), and

iii. having had no non-appraised timber transported over the development (excluding Right of Way timber).

Costs for this type of existing development are exempt from Section 4.3.1.1.4.

Cost estimates for these existing roads will be derived from the nearest appraised cutting authority by:

i. establishing the average road cost per kilometre from that appraisal estimate, excluding bridges and pertinent structures, and

ii. multiply that $/km by the kilometres of tributary road in the TL cutting authority.

Cost estimates for bridges or pertinent structures will be derived from Table 4-3, Bridge cost estimate or from the detailed engineering estimates as defined in Section 4.3. At reappraisal, these initial cost estimates for existing development will be trended as provided for in Section 4.9, but will not otherwise be revisited.

4.3.1.1.3 Development Costs on Private Land

A part of a new or reconstructed road may lie on private land and may have a reasonable probability of being required on a major or long term basis for either timber extraction, future management of Crown forest land and/or present or future public use. In order to be considered in stumpage appraisal cost estimates, the right-of-way ownership must first be transferred to the Crown, except as stated below.

When a road on private land is required for only short term timber extraction, the estimated cost of the road is included in the appraisal according to the procedures of Sections 4.3.1.1 and 4.5.4.

4.3.1.1.4 Existing Roads and Structures

The costs of previously constructed roads that have been considered in appraisals of Crown timber, roads constructed to develop non-appraised timber and roads constructed all or in part for purposes unrelated to logging the cutting authority being appraised, are defined to be "existing roads" and are not eligible for inclusion in development cost estimates. If the "existing road" requires reconstruction or permanent deactivation, the cost estimate is made as described in Section 4.3.1. If the "existing road" is on private land, road and land use charges may be recognized as described in Section 4.5.4.

4.3.1.1.5 Extended Road Amortization

Where the New Construction cost estimate exceeds $7.00/m^3, a written agreement may be made which apportions the main access road cost estimate to two or more tributary cutting authorities. The main access road ends at the far boundary of the first cutting authority being appraised.

The agreement is subject to the following conditions:

a. only main access roads serving the tributary cutting authorities (as defined in Section 4.3) may be considered. The roads must be on Crown land;

b. each cutting authority must be in the licensee's approved five year development plan;

c. the agreement must be signed by the licensee and the licensor;

d. the amount apportioned will be a fixed lump sum which will be trended as provided for in Section 4.9 but not otherwise revisited;

e. the term of the agreement must not exceed the terms of the cutting authorities;

f. the agreement will only be valid under CVP and confers no obligation on the Crown to compensate licensees for any unamortized costs.

4.3.2 Tabular Cost Estimates

Tabular road cost estimates are based on average logging road construction practices, generally single lane width roads with turnouts and landings. These roads may or may not require placement of additional stabilizing materials.

Weighted averages for each variable (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. The length of bridges occurring in the section is excluded.

4.3.2.1 Subgrade Construction

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 RMC's".

1. *Construction Category* (CC) is determined on the basis of the percent rock in relation to the total volume of all materials.

   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

Construction Category may show a range of variation (± 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.

The following table defines the Construction Categories.

Table 4-1: Construction Categories

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

2. *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.

   Rock can be classified into five types referred to as Rock Mass Classification (RMC) values and identified as RMC 1, 2, 3, 4, 5.

   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.

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.

In all circumstances where a complete interpretation of the Rock Mass Classification system is required, the Piteau & Associates report is to be consulted directly.

3. *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 '3.b.' Lengths are recorded to the nearest 0.01 km;

   b. In general *each section* should consist of a length of road wherein:

      i. variations in slope percentage measurement are within $\pm$ 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. Where the road is located on a bench, the slope of the bench is used;

      ii. construction categories vary by no more than $\pm$ 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 RMC's is applied to all roads in the appraisal.

The subgrade construction cost estimate includes clearing and grubbing, stripping, stump removal, incidental log decking, ditch construction, landing and turnout construction, material costs and installation of pipe culverts (with diameters up to and including 900 mm) and single log abutment culverts with spans less than 3.5 m. Right-of-way felling and loading is excluded from the road construction phase but included in the tree-to-truck phase.

5.6 Calculation of Stumpage Rate

5.6.1 Calculation of Indicated Stumpage Rate

The Indicated Stumpage Rate for a cutting authority is defined as:

$$IR = BR + (VI - MVI)$$

Where:

IR = Indicated Rate
BR = Base Rate as defined in Section 5.5
VI = Value Index for the cutting authority as defined in Section 5.2
MVI = Mean Value Index, as defined in Section 5.3

5.6.2 Prescribed Minimum Stumpage Rate

The Minimum Stumpage Rate is prescribed by the Minimum Stumpage Rate Regulation (B.C. Reg. 354/87). The current Minimum Stumpage Rate is $0.25 per cubic metre.

5.6.3 Reserve Stumpage Rate

For each cutting authority area, except those containing timber licence volume, the Reserve Stumpage Rate is determined by selecting the greater of:

- the indicated stumpage rate, or
- the prescribed minimum stumpage rate.

For each cutting authority area that contains timber licence volume, the Reserve Stumpage Rate is determined by selecting the greater of:

- the indicated stumpage rate adjusted according to Table 5-1 (Section 84 of the *Forest Act*), or
- the prescribed minimum stumpage rate.

Table 5-1 Timber Licence Stumpage Rate Adjustment Schedule

Time Period	Percentage of ① Stumpage Rate
on and after April 1, 1995 to and including March 31, 1996	60
on and after April 1, 1996 to and including March 31, 1997	67
on and after April 1, 1997 to and including March 31, 1998	73
on and after April 1, 1998 to and including March 31, 1999	80
on and after April 1, 1999 to and including March 31, 2000	87
on and after April 1, 2000 to and including March 31, 2001	93
on and after April 1, 2001	100

① The percentage of stumpage rate opposite the time period will be applied to appraisals, reappraisals and stumpage adustments that fall within the time period.

5.6.4 Upset Stumpage Rate

The Upset Stumpage Rate is the total of the Reserve Stumpage Rate plus any silviculture and development levies which may be charged as defined in Section 6.5.

5.6.5 Total Stumpage Rate

The Total Stumpage Rate is the Upset Stumpage Rate plus any Bonus Bid.

6.6 Miscellaneous Stumpage Rates

For the purpose of determining stumpage rates for certain special forest products, including deciduous species, low grade logs and timber in specified areas listed under this section, the miscellaneous stumpage rates tables are to be used.

6.6.1 Special Forest Products and Other Miscellaneous Rates

Table 6-1 is to be used for determining stumpage rates for the specified products when scaled:

1. before July 1, 1995 - all non-appraised timber licence cutting authorities must use Table 6-2 for all products.

2. on and after July 1, 1995 - all sources of Crown timber, including all timber licences will use Table 6-1 for the products specified.

Table 6-1: Miscellaneous Stumpage Rates

Vancouver Forest Region and North Coast Forest District

CONIFEROUS SPECIES	PRODUCT	RESERVE RATE
Cedar & other	Shake and Shingle Bolts and Blocks	$ 5.30/m^3
Cedar	Shakes - Handsplit	$ 6.00/m^3
Cedar	Shakes - Blanks	$ 7.20/m^3
Cedar	Fence Posts and Fence Rails	$ 3.00/m^3
Cedar	Sticks and Stakes (round or split)	$ 2.00/m^3
Cedar	Hop Poles	$ 1.30/m^3
Cedar & other	Cants *	$ 9.60/m^3
Cypress	Cants *	$37.00/$m^3$
Yew	All	$ 0.25/m^3
Deciduous Species		
Alder & Cottonwood	The lesser of the appraised stand as a whole reserve rate (reduced if applicable) or	$1.00/$m^3$
All other Deciduous Species	The reserve rate is	$1.00/$m^3$
All Species		
All Species	Grade Y	$ 0.25/m^3
All Species	Firewood	$ 1.00/m^3
All Species	Christmas Trees: less than 3m 3 to 5m More than 5m	$ 0.20 each $ 1.00 each $ 1.50 each
All Species	Logs salvaged in the Vancouver Log Salvage District under the *Forest Act*, Part 11, and stray logs salvaged elsewhere in coastal waters below the high tide mark (unless logs are salvaged from an area while it is under closure under the *Forest Act*, Section 139).	$ 0.70/m^3
All Species	Logs salvaged at Wahleach Island catchment basin operated by B.C. Debris Control Board.	$ 0.25/m^3

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

6.6.2 Miscellaneous Stumpage Rates for Timber Licences

The stumpage rates in Table 6-2 apply only to timber licence cutting authorities that are not appraised and have a cutting authority term that begins before May 1, 1995.

For each species of timber in column 1 of Table 6-2, the stumpage rate immediately opposite that species in columns 2, 3 and 4 respectively, apply to:

- all products scaled in the indicated forest regions before July 1, 1995,
- sawlogs scaled in the indicated forest regions on and after July 1, 1995.

Table 6-2: Miscellaneous Stumpage Rates for Timber Licences

Column 1 Species of timber	*Forest Region* Column 2 Vancouver except the Mid-Coast and Queen Charlotte forest districts (that part west of the Cascades Mountains) $/cubic metre	Column 3 Prince Rupert and the Mid-Coast and Queen Charlotte forest districts (that part west of the Cascades Mountains) $/cubic metre	Column 4 All forest regions and those parts of regions east of the Cascade Mountains $/cubic metre
Fir	37.10	28.80	21.80
Spruce	38.70	31.30	20.60
Balsam	19.10	15.60	18.10
Cedar	20.50	16.50	24.40
Hemlock	18.10	14.60	20.00
Cypress	43.60	34.50	21.10
White pine	20.30	17.00	27.80
Yellow pine	20.30	17.00	22.20
Larch	20.30	17.00	21.80
Lodgepole pine	10.10	8.90	19.00
Other conifers	20.30	17.00	21.10
All non-conifers	1.00	1.00	0.50
All species Grades 3, 4, 5, and 6	n/a	n/a	0.25
All species Firmwood reject	nil	nil	nil
All species Grade Y	0.25	0.25	n/a

Index I

A

Accessible Cutting Authority, 4-35, 4-37
Accommodation, 4-37
Additional Stabilizing Material, 4-20
Administration and Other Costs, 4-35
Amendments, 2-4
Appendices, 7-1
Appraisal Data Requirements, 4-4
Appraisal data submission (Coast Appraisal Data Sheet), 2-3
Appraisal Principles & Procedures, 2-1
Area of Application, 1-3
Average Market Value (AMV) Determination, 3-2

B

Barge transportation, 4-30
Barging Cost Estimates, 4-32
Base Rate, 5-6
Basic Silviculture, 4-40
Billing Period, 3-3
Bridge Cost Estimate, 4-19
Bridge Cost Estimates, 4-8

C

Calculation Conventions, 2-9
Calculation of Indicated Stumpage Rate, 5-7
Calculation of Stand Selling Price (SP), 3-6
Calculation of Stumpage Rate, 5-7
Capping, 4-22
Charges as a Share of Road Maintenance, 4-34
Charges for Other than Road Maintenance, 4-34
Comparative Value Timber Pricing, 1-6
Conventional Logging, 4-26
Cost Estimates, 4-2
Cost Trend, 4-41
Cutting Authorities With 5 000 m^3 or Less Volume, 6-3
Cutting Authority, 1-4
Cutting Authority Area, 1-4

D

Damaged Timber, 3-4
Data Requirements, 4-23
Deactivation, 4-10
Definitions for In-Place & Quarry rock RMC (hardness), 4-22
Detailed engineering cost estimates, 4-6, 4-7, 4-23
Development Cost Allocation, 7-5
Development Cost Categories, 4-7
Development Costs on Private Land, 4-12
Development works, 4-6
Distance, 4-29
district manager, 2-3
Drainage Structures, 4-18
Dump, Sort, Boom and Scale, 4-30

E

Error in Appraisal, 2-5
Existing Roads and Structures, 4-12
Extended Road Amortization, 4-13
Extension of Term, 2-7

F

Fixed rate cutting authorities, 2-4
Forest Service Roads, 4-34

G

General and Administrative Overhead, 4-35

H

Helicopter Logging, 4-27

I

Immature Coniferous Timber, 2-10

In-place Unit Cost Estimates, 4-21
Indicated Stumpage Rate, 5-2
Isolated Cutting Authority, 4-37

L

Land Drop, 4-27
Least total operating cost estimate, 4-2
Levy, Basic Silviculture, 6-6
Levy, Development, 6-6
Log Transportation, 4-29
Low Volume Cost Estimate Additive, 4-37
Low Volume Cypress Exception, 3-5

M

Main Service Road, 4-6
Market Value Indexing, 5-5
Mean Value Index, 5-4
Minister's Direction, 2-6
Misc. Timber Pricing Policies, 6-1
Miscellaneous stumpage rates, 6-7

N

Nearest community, 4-36
New Construction, 4-7
No trucking of stabilizing material, 4-21

O

Operating Cost Estimation, 4-1
Operational Overhead, 4-35
Operations Roads, 4-34
Other Land Use Charges, 4-34
Other Roads, 4-34
Overhead, 4-35

P

Partially Harvested Timber, 6-4
Percentage of the indicated stumpage rate, 5-8
Point of Appraisal, 2-8

R

Reappraisal, 2-4
Reappraisal at Anniversary Date, 2-5
Reconstruction and Replacement, 4-8, 7-4
Rock Mass Classification, 4-14, 7-6
Routine Maintenance, 4-33

S

Selling Price Estimation, 3-1
Small Business Forest Enterprise Program (SBFEP) Sales, 6-5
Special Forest Products, 6-7
Specified Operations, 4-3
Stabilizing Cost Estimate, 4-22
Stumpage Determination, 1-5
Stumpage Rate Adjustments, 1-7
Stumpage Rate Determination, 5-1
Subgrade cost estimates, 4-15
Sudden and severe damage, 2-4

T

Tabular cost estimates, 4-6, 4-7, 4-13
Terms of Reference, 1-2
Time Schedule, 2-3
Total Logging Cost Estimate, 4-39
Total Overhead, 4-35
Total Volume of 2 000 to 5 000 m^3, 6-3
Total Volume of less than 2 000 m^3, 6-3
Towing Cost Estimates, 4-31
Towing or Barging, 4-30
Tree To Truck, 4-26
Tributary, 4-6
Truck Hauling, 4-29
Trucking of stabilizing material, 4-22
Types of Determination, 2-2

V

Value Index, 5-3
Value Indexes by District and Species, 6-2

W

Water Drop Operations, 4-27
Water Transportation, 4-30
Woods Run, 4-35