BRITISH COLUMBIA

Ministry of Forests

Office of the Minister

MEMORANDUM

File: 195-30/CAPP

MAR 2 7 2000

To: Regional Managers

From: The Honourable Jim Doyle
Minister of Forests

Re: ***Coast Appraisal Manual***

I hereby approve the new *Coast Appraisal Manual*, and attach a copy of it for your use.

This manual is effective April 1, 2000, and applies to all coast stumpage appraisals.

Amendments or revisions to this manual require my further approval.

Jim Doyle
Minister

Attachment

pc: Bill Howard, Director, Revenue Branch

All Subscribers, *Coast Appraisal Manual*

BRITISH COLUMBIA Ministry of Forests

MANUAL REVISION TRANSMITTAL

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MANUAL TITLE
Coast Appraisal Manual

REVISION No.	**ISSUE DATE**
New	April 1, 2000

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
INSERT	Title Page		Before Amendments Tab
INSERT	Minister's Letter and Manual Transmital		After Amendments Tab
INSERT	Highlights		After Title Page
INSERT	Parameters dated April 1, 2000		After Parameters Tab (parameters are mailed out each quarter)
INSERT	Table of Contents	i - vi	After Table of Contents Tab
INSERT	Chapter 1	1 - 10	After Chapter 1 Tab
INSERT	Chapter 2	1 - 14	After Chapter 2 Tab
INSERT	Chapter 3	1 - 12	After Chapter 3 Tab
INSERT	Chapter 4	1 - 40	After Chapter 4 Tab
INSERT	Chapter 5	1 - 8	After Chapter 5 Tab
INSERT	Chapter 6	1 -10	After Chapter 6 Tab
INSERT	Chapter 7	1 - 12	After Chapter 7 Tab
INSERT	Appendices	1 - 8	After Appendices Tab
INSERT	Index	1 - 4	After Index Tab
INSERT	Data Sheet	1 - 10	After Data Sheet Tab

REVENUE BRANCH

Coast Appraisal Manual

Effective April 1, 2000

Cost Base: July 1, 1998

BRITISH COLUMBIA

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New Coast Appraisal Manual - Highlights

The new *Coast Appraisal Manual* includes clarification to policy and an updating of the cost base to July 1, 1998. By section, the significant changes are as follows:

Section 1.3.1	Housekeeping.
Section 1.6	Housekeeping.
Section 2.2(1)	Least cost assessment may now be required when aerial systems are proposed.
Section 2.2(10)	Grounds for an objection must now be stated.
Section 2.3	Clarifies the authority of the Minister when directing a reappraisal.
Section 2.4.2	Housekeeping.
Section 3.2.2 & 3.2.3	Billing history record must now be at least 25% of the cutting authorities net cruise volume of that species or 2 000 m^3 whichever is greater.
Section 3.2.2(7)	Licence level for billing history record has been removed from this section.
Section 4.1	Definition of least cost for the appraisal has been revised.
Table 4-2	Revised subgrade cost estimates.
Table 4-4	Updated and expanded culvert cost table.
Table 4-5	Revised Permanent or Portable Bridge Cost Table.
Section 4.3.2.3	Revised stabilizing material costs.
Section 4.4.1	Revised conventional tree-to-truck estimate.

Section 4.4.2	Revised helicopter logging cost estimate.
Section 4.5.1	Revised truck hauling equation.
Section 4.5.2.1	Revised costs for Dump, Fort, Boom and Scale.
Table 4-7	Revised towing cost estimates.
Table 4-8	Revised barging cost estimates.
Section 4.5.3	New routine road maintenance and deactivation cost estimates.
Section 4.5.4	Land uses charges are now included in Section 4.6.1.
Section 4.6	Revised crew transportation cost estimate.
Section 4.6.3.1	Definition of "accessible" has been revised.
Section 4.6.3.2	Housekeeping.
Section 4.8	Revised basic silviculture cost estimates.
Section 4.9	New cost trend factors.
Table 6-2	Revised Miscellaneous Stumpage Rates for Timber Licences.
Section 7.3.1	Housekeeping.
Appendix I	Revised Equipment and Labour Rates.

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Introduction 1

1.1 Terms of Reference and Conventions

1.1.1 Terms and Conventions

Procedures	*Italics*		Indicate the formal name of a document. e.g. *Forest Act, Coast Appraisal Manual*
	Headings	1. =	Chapter
		1.1 or 1.1.1.1 =	Section of Chapter 1
		1.1.1.1, (2) =	Section within Chapter 1, with Subsection.
		Table 4-2 =	Table 2 within Chapter 4

1.1.2 Terms of Reference

The *Forest Act,* Sections 103 to 108, and regulations provide the statutory authority for the determination of stumpage for Crown timber.

The *Forest Act*, Section 105, requires adherence to the policies and procedures approved for the forest regions 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 survey of logging and forest management costs incurred by licensees and contractors, operating in the Coast region of British Columbia in 1998. Log average market values 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 the North Coast Forest District.

1.3 Cutting Authority

The term "cutting authority" means one of the following:

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 (a tree farm licence cutting authority may include more than one cutting authority area),
    d. a community forest agreement,
    e. a woodlot licence (a woodlot licence cutting authority may include more than one cutting authority area), or
    f. a timber licence.
2. A timber sale licence under which cutting permits have not or will not be issued.
3. A licence to cut.
4. A road permit.

1.3.1 Cutting Authority Area

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

1. Timber may be harvested from, under a cutting authority, and
2. Has a unique timber mark. The exemption is a mult-mark (amalgamated) cutting permit.

1.4 Responsibility for Stumpage

For the purposes of Section 105 of the *Forest Act*, the following employees of the ministry are authorized to determine, redetermine and vary stumpage rates:

- Regional Managers, Regional Appraisal Coordinators and other employees authorized by the Regional Manager, and
- Director, Revenue Branch and employees of Revenue Branch.

1.5 Market Pricing System

Market Pricing System (MPS), subject to a minimum stumpage rate, is the basis for determining stumpage rates for timber sale licences awarded under Sections 20 and 21 of the *Forest Act* on or after January 1, 1999.

1.6 Comparative Value Timber Pricing

Comparative Value Pricing (CVP), subject to a minimum stumpage rate, is the basis for determining stumpage rates for all cutting authorities except those specified under Section 1.5. Section 2.1, (3), (4) and (5) provides the methods that are used for specific products and extraordinary situations.

The stumpage rate for a cutting authority area is more or less than the Base Rate (see Section 5.5) depending on whether or not the timber in the cutting authority area is more or less valuable than timber from the average cutting authority area. To make that assessment and hence to determine a stumpage rate, the authorized Ministry of Forests employee (see Section 1.4) will typically:

1. Estimate the Average Selling Price of the logs for the cutting authority area (see Chapter 3).

2. Estimate the least Operating Cost (see Chapter 4) for the cutting authority area.

3. Determine the Value Index (see Chapter 5) for the cutting authority area by subtracting the estimated least Operating Cost from the estimated Average Selling Price.

4. Determine the indicated stumpage rate by comparing the Value Index for the cutting authority area with the Coast Mean Value Index and adding the Coast Base Rate (see Chapter 5).

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

    a. the greater of the indicated stumpage rate or the prescribed minimum stumpage rate, or

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

6. Determine the upset stumpage rate by adding any development or silviculture levies (see Section 6.5) to the reserve stumpage rate,

7. 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 or Target Rate for the coast is calculated as a function of a coast softwood lumber price index and a provincial chip index (see Chapter 5).

The Coast Target Rate is adjusted to the Coast Base Rate as described in the publication *Specifications: Calculating Stumpage Rates for Coast Appraisals.*

1.7 Stumpage Adjustments (CVP)

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, stumpage rates are adjusted quarterly on January 1, April 1, July 1, and October 1 of each year, subject to Section 6.4.

Stumpage rates are adjusted to reflect changes in estimated Average Selling Prices based on revised average market values (as authorized in this manual since the previous adjustment) and the recalculated Operating Cost based on the appropriate trend factors in Section 4.9. In addition, the adjustment reflects changes in the Statistics Canada Coast Softwood Lumber Index, the Statistics Canada Pulpwood Chip Index for British Columbia, the Coast Base Rate and the Coast Mean Value Index (see Section 5).

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Appraisal Principles and Procedures 2

2.1 Types of Determination

Stumpage rates are determined by one of the following methods:

1. An appraisal or reappraisal under Chapters 3 and 4 of this manual.

2. An appraisal or reappraisal under Chapter 7 for timber sale licences awarded under Sections 20 or 21 of the *Forest Act* on or after January 1, 1999.

3. An Order-in-Council directive setting stumpage rates under the *Forest Act,* Section 105.

4. Pricing under Chapter 6 of this manual.

5. The use of stumpage rates developed by regional revenue staff, and approved by the Regional Manager or Regional Manager's designate.

2.2 Time Schedule - Appraisals and Reappraisals

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

1. For each new cutting authority, the licensee shall include with the application to the District Manager, a completed Coast Appraisal Data Sheet and appropriate support information as may be required by the District Manager. When an aerial system is proposed, the District Manager may require the licensee to complete and submit the appraisal least cost assessment page of the Coast Appraisal Data Sheet for both aerial and ground cable systems. A least cost assessment will not be required when the District Manager determines that an aerial system is the only harvest method that manages and conserves the forest resource in the cutting authority area or a part of the cutting authority area. When an aerial system is proposed and the licensee does not complete and submit the appraisal least cost assessment page when requested, the best appraisal information available to the District Manager will be used by the District Manager to complete the appraisal. When the data is provided, the District Manager will proceed as provided in Subsection 3 of this section.

2. For a reappraisal, the licensee shall provide all data, subject to Section 2.3 (3), and it must be received by the District Manager at least 45 calendar days prior to the anniversary of the cutting authority term (effective date). If the licensee fails to provide all data, then the District Manager:

    a. may notify the licensee, in writing, by the due date for reappraisal data (45 calendar days prior to effective date) and request that data known to have changed since the previous appraisal be submitted within 15 calendar days, and

    b. if the data is not received within 15 calendar days, use the best data available at the district office 30 calendar days prior to the effective date.

3. The District Manager or designate reviews the available data and if in agreement with the submission, signs the data sheet and advises the licensee in writing. If no data was submitted for reappraisal as requested by the District Manager, then notifying the licensee is not required and Subsection 4, 5 and 6 of this section do not apply.

4. The District Manager shall notify the licensee, in writing, of any changes made to the appraisal data sheet.

5. The District Manager or the licensee may request a meeting to discuss the appraisal data submission.

6. At the meeting, the licensee may only clarify data previously submitted. The District Manager may revise the appraisal data sheet as a result of the meeting.

7. The District Manager shall provide a signed appraisal data sheet to the regional office and the licensee.

8. Regional revenue staff will advise the licensee, and District Manager in writing, of any further changes made to the appraisal data sheet.

9. Regional revenue staff will notify the licensee, in writing, of the stumpage rate and the summary of appraisal information used in determining the stumpage rate.

10. Within twenty-one (21) days of the issue date of the stumpage advisory notice, the licensee may notify regional revenue staff, in writing, of any objection to the information contained in the stumpage advisory notice that could be resolved without a review or appeal. The written objection must state the grounds for objection as well as a statement describing the relief requested. At this point the objection is not considered a review or appeal under the *Forest Act* (Section 143 to 150).

11. Regional revenue staff will notify the licensee, in writing, if the objection referred to in Section 10 above cannot be resolved. In this notification the regional revenue staff will indicate that the 21-day time requirement for notice for review specified in Section 144 (3) of the *Forest Act*, will commence upon receipt of this notification.

2.3 Reappraisal

Except as may be directed by the Minister of Forests under this section 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 reappraisal. As explained below, a reappraisal is based upon a complete reassessment of a cutting authority area and assumes the cutting authority area being reappraised has been returned to its original condition prior to development or harvesting. If there are changes to the cutting authority area, the Operating Cost data must be revised to reflect those changes unless a reappraisal is optional (as described in Section 2.3 (3)). At the time of a reappraisal, initial detailed engineering cost estimates may be re-estimated once after construction utilizing information as specified in Section 4.3.3 of this manual. However, development costs originally estimated using ministry approved competitive bids, are not re-estimated in a reappraisal.

For those cutting authorities where the election of quarterly adjusting, or annual adjusting stumpage rate has been made, that election at reappraisal remains unchanged.

A cutting authority area that has fixed stumpage rates is not reappraised unless Section 2.3 (1) or (4) require a reappraisal.

A cutting authority area that has fixed stumpage rates because it was appraised under Section 6.2 (1) shall remain as fixed status.

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 the licensee has failed to comply with the *Forest Practices Code of British Columbia Act,* Sections 75 through 95 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 a comparable cutting authority. 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 and 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 ha or 25 percent 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.

3. Reappraisal at Anniversary Date

"Anniversary date" means the annual recurrence of the month and day when the term of the cutting authority began.

Reappraisal at the anniversary date is mandatory for all woodlot cutting authorities regardless of the volume remaining (see Section 2.4 (2)).

Reappraisals must be carried out on all adjustable stumpage rate cutting authorities with subsequent anniversary dates when the following conditions are satisfied:

a. timber from the cutting authority area is expected to be scaled under the cutting authority during the next year, and

b. there is at least 2 000 m^3 of merchantable timber remaining on the cutting authority area.

Where the above conditions have not been met, reappraisals may be made at the option of either the District Manager, Regional Manager or licensee subject to Section 2.2 Time Schedule - Appraisals and Reappraisals.

Anniversary date reappraisals are made in accordance with the *Coast Appraisal Manual* in effect on the anniversary date of the cutting authority. The effective date of the redetermined stumpage rate is the anniversary date.

If a reappraisal is not made, the untrended logging and silviculture cost estimates from the current appraisal will continue to be trended quarterly to redetermine stumpage rates.

4. Minister's Direction

The Minister of Forests may direct that a reappraisal be made at any time and that the redetermined stumpage rate be effective on any future date. A reappraisal directed by the Minister of Forests, may be a re-estimation of Operating Cost, Log Grade Percentages, or Selling Price, or any combination of them, as may be directed by the Minister of Forests.

5. Mathematical Error

   a. If a government employee or contractor in the Ministry of Forests or a licensee (or employee or contractor of a licensee) becomes aware of what is or probably is a mathematical error in a stumpage determination, that person shall give written notice of the error ("the Notice") as follows:

      i. in the case of appraisals and reappraisals, to the appropriate Regional Manager, and

      ii. in the case of quarterly adjustments, to the Director, Revenue Branch,

   b. the Notice shall describe the stumpage determination or determinations involved and shall describe the nature and cause of the error to the extent reasonably possible,

   c. upon receipt of the Notice, the Regional Manager or the Director, Revenue Branch, shall make the appropriate investigation to decide whether or not an error has, in fact, been made,

   d. if the Regional Manager or the Director, Revenue Branch decides that an error has not been made, then they shall notify the person who sent the Notice of the decision and the reasons for it,

   e. if the Regional Manager or Director, Revenue Branch decides that an error has been made, then the following shall occur:

      i. the Regional Manager or the Director, Revenue Branch shall notify the person who sent the Notice of the decision and the reasons for it,

      ii. the Regional Manager or the Director, Revenue Branch shall take reasonable steps to ensure that all licensees who have been affected by the error are informed of the Notice and of the nature and cause of the error,

      iii. the cutting authority or authorities under which the error was made shall be reappraised or the quarterly stumpage adjustment recalculated to correct the error unless the cutting authority, the appraisal manual or the application and tender for a timber sale licence, specified that the stumpage rate is fixed, and

      iv. the effective date of the redetermined rate shall be the first day of the month following the date on which the Notice was received by the Regional Manager or the Director, Revenue Branch,

f. if an error has occurred and no Notice has been given with respect to it, the Notice shall be deemed to have been given on the date on which the Regional Manager or the Director, Revenue Branch became aware of the error or probable error,

g. no person who discovers or otherwise becomes aware of a mathematical error in a stumpage determination shall be obliged to send the Notice as required herein if that person, on reasonable grounds, believes that someone else has sent the Notice with respect to the same error,

h. the redetermined rate does not apply to timber scaled before the first of the month following the date upon which the Notice was given. No remedy will be available with respect to timber scaled before the first of the month,

i. in this section, a mathematical error is any of the following:

    i. an error in transcribing or compiling approved cruise field data, or in the application of approved loss factors and taper equations,

    ii. an error in log grade source or in transcribing the log grade data from an approved appraisal datasheet,

    iii. an error in performing the calculations specified in the manual,

    iv. an error in the application of published quarterly appraisal parameters,

A difference between cruise estimates and actual timber quality or quantity does not constitute an error.

A difference between appraisal estimates of selling price or operating cost and the licensee's experience does not constitute an error.

Omissions of data by the licensee on an approved datasheet do not constitute an error.

2.4 Fixed Stumpage Rate and Extensions of Term

1. Small Business Forest Enterprise Program

   A licensee may elect to have a fixed stumpage rate for a timber sale licence under the Small Business Forest Enterprise Program. Where the fixed election is made, the stumpage rate remains fixed for the term and all extensions (Section 6.4).

   Under the Small Business Forest Enterprise Program a fixed stumpage rate means that the reserve stumpage rate, levies and bonus bids are fixed and will not change during the term of the cutting authority and all extensions. The only exceptions are if a reappraisal is done under Section 2.3 (1) - Sudden and Severe Damage or Section 2.3 (4) - Minister's Direction.

2. Woodlots

   A woodlot licensee may elect an annual stumpage rate for a new cutting authority issued under the woodlot licence. The annual stumpage rate election is only made when the cutting authority is first approved. The annual stumpage rate will remain in effect until the anniversary date of the cutting authority, at which time the cutting authority will be reappraised and a new annual stumpage rate will be determined. If an election is not made within the time specified, the regular quarterly stumpage adjustment process will apply.

   For woodlot cutting authorities where a quarterly stumpage adjustment is applied through election or default, the stumpage rates will adjust quarterly and will be subject to annual reappraisal regardless of the volume remaining on the cutting authority.

   Amendments to cutting authorities that have elected the annual stumpage rate option are subject to reappraisal at the time of amendment (see Section 2.3(2)). The reappraised stumpage rate will remain in effect until the cutting authority's normal anniversary date or expiry date, whichever occurs first.

   For woodlot cutting authorities issued prior to August 1, 1995, where an election was made for non-adjusting rates, those rates will remain unchanged during the original term of the cutting authority. At the time of extension, the cutting authority will be reappraised and the new stumpage rate will apply until the expiry date. A reappraisal will then be required at the time of each future extension. There will be no opportunity to change the original election.

3. Regional Manager's Rates

a. If a stumpage rate was determined under Section 2.1 (5) and the term of the cutting authority is extended, the Regional Manager may either leave the stumpage rate unchanged or reappraise the cutting authority. When the term of a cutting

authority is extended and that cutting authority is reappraised, the notification requirements of Section 2.2 do not apply.

4. District Average Value Index

   When the stumpage rate was determined under Section 6.1 or 6.2 and the term of the cutting authority is extended, the regional manager may either leave the stumpage rate or reappraise the cutting authority. When the term of the cutting authority is extended and that cutting authority is reappraised, the notification requirements of Section 2.2 do not apply.

   Cutting authorities that have been appraised using the District Average Value Index method must be reappraised upon extension after three years.

5. Miscellaneous Stumpage Rates

   Miscellaneous stumpage rates (Section 6.6) will be based on the *Coast Appraisal Manual* in effect on the date of scale, except for those cutting authorities that specify miscellaneous stumpage rates in their cutting authority document.

6. Timber Licence

   When a cutting authority that includes the authorization to harvest timber licence volume has the term extended, the stumpage rate will be determined under Section 6.6, 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 Points of Appraisal are:

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

2.6 Calculation Conventions

All operating cost calculations are performed to the full capacity of the calculating machine with the results truncated at four places of decimals and rounded to two places.

Results from 5 to 9 are rounded upward and from 1 to 4 rounded downward.

After each phase cost estimate ($/m^3) (see Chapter 4) has been rounded to the nearest cent, it is summed with other estimates to obtain the total cost estimate.

Where values are specified as limits (constraints or requirements for equations), they are treated as absolute values and actual measurements or records are not rounded before use unless otherwise specified.

Stumpage rate calculations are performed according to the methods specified in the document entitled, *Specifications: Calculating Stumpage Rates for Coast Appraisals* approved by the Director, Revenue Branch.

2.7 Second Growth Coniferous Timber

Second growth coniferous timber for the purposes of timber pricing, is defined as being less than 141 years old.

The volume of mature and second growth timber will be compiled on a tree by tree basis and the percentage of the total coniferous cutting authority volume represented by the second growth timber will be calculated.

Using this calculated percentage, any cutting authority that contains 80 percent or greater second growth coniferous timber volume will be appraised as second growth timber using a Second Growth Average Market Value schedule (see Section 3.2.2 (6).).

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Average Selling Price Estimation 3

Average selling price estimates are based upon log grades and species, and schedules of log market values collected and published by Revenue Branch. These schedules, when compiled and distributed, are an integral part of this manual.

3.1 Average Log Market Value (AMV) Determination

Invoiced (f.o.b.) log market values are compiled from prime, domestic, arms-length sales reported to occur in areas adjacent to the Strait of Georgia; the Strait of Juan de Fuca and the Alberni Inlet east of a line drawn south from Amphitrite Point; Johnstone Strait; the Queen Charlotte Strait south of a line drawn west from Cape Caution; and the Fraser River west of the bridge at the confluence of the Pitt River. The cut-off date for the collected log market value input is approximately forty-five (45) days prior to the stumpage rate adjustment date.

A set of average log market values by species and log grade is developed using sales data for each one-month reporting period. The data is accumulated into a six-month schedule of average market values by species and log grade for mature timber stumpage rate determinations. The same six-month schedule is adjusted on a species grade level to create a schedule for second growth average log market values to be used for second growth stumpage rate determinations.

The second growth schedule adjustment table will be reviewed and/or updated as determined by the Director, Revenue Branch.

3.2 Log Grade Percentages

Log grade percentages are obtained for each species of timber in each cutting authority area being appraised or reappraised as described in Sections 3.2.1, 3.2.2, 3.2.3 and 3.2.4.

3.2.1 Billing History Record

The log scale data reported on stumpage invoices issued by Revenue Branch of the Ministry of Forests is the billing history record. The billing history record is kept by the Ministry of Forests.

A billing history record of a particular geographic area is a record of log scale data reported on stumpage invoices issued by the Revenue Branch of the Ministry of Forests for timber harvested in that geographic area.

Except as provided in Sections 3.2.2, 3.2.3 and 3.2.4, the part of the billing history record that will be used when the Appraisal Coordinator does an appraisal or reappraisal of a cutting authority area will be the two year billing history record as determined in Table 3-1 and Table 3-2. The date of issue on the stumpage invoice determines whether or not the log scale data is included in the two year billing history record.

Where the effective date of the appraisal or reappraisal falls within the period of the year listed in Column 1 of Table 3-1, the two year billing history record for the Licence or TSA shall end on the corresponding date in Column 2 of Table 3-1 which immediately precedes the effective date of the appraisal or reappraisal.

Table 3-1: Billing History Record for Licence or TSA

Column 1 Date of Appraisal or Reappraisal	Column 2 Billing History Record Ends 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

Where the effective date of the appraisal or reappraisal falls within the period of the year listed in Column 1 of Table 3-2, the two year billing history record for the cutting authority shall end on the corresponding date in Column 2 of Table 3-2 which immediately precedes the effective date of the appraisal or reappraisal.

Table 3-2: Billing History Record for Cutting Authority (Mark)

Date of Appraisal or Reappraisal	Billing History Record Ends on the Preceding
January 1 to 31	November 30
February 1 to 28/29	December 31
March 1 to 31	January 31
April 1 to 30	February 28/29
May 1 to 31	March 31
June 1 to 30	April 30
July 1 to 31	May 31
August 1 to 31	June 30
September 1 to 30	July 31
October 1 to 31	August 31
November 1 to 30	September 30
December 1 to 31	October 31

3.2.2 Log Grade Percentage Criteria

To determine the log grade percentages to be used for the cutting authority area being appraised or reappraised, the Appraisal Coordinator will apply the following criteria:

1. The log grade percentage is the percentage by volume that log grade is of the total volume, of the species of timber being considered.

2. Except as provided in Sections 3.2.2, (6., 7. and 8.) and 3.2.4, the log grade percentages for a species of timber are derived from the billing history record.

3. The source of log grade percentages may vary by species of timber.

4. Before a two year billing history record for a species of timber can be used in an appraisal or reappraisal, that two year billing history record must be at least 25% of the cutting authorities net cruise volume of that species or 2 000 m^3 which ever is greater.

5. a. Where there is not a least 25% of the cutting authorities net cruise volume of that species or 2 000 m^3 which ever is greater, within the two year billing history record of a Tree Farm Licence area or a Timber Supply Area, the billing history record that will be used for that species of timber will be the five year billing history record, and

   b. where the effective date of the appraisal or reappraisal falls within the period of the year listed in Column 1 of Table 3-1 or Table 3-2, the five year billing history shall end on the corresponding date in Column 2 of Table 3-1 or Table 3-2, which immediately precedes the effective date of the appraisal or reappraisal.

6. For the appraisal or reappraisal of a cutting authority area of a cutting authority issued under a Woodlot Licence the log grade percentages for each species of timber will be derived from the cruise compilation algorithm predictions.

7. For the appraisal or reappraisal of a cutting authority area of a cutting authority issued under the Small Business Forest Enterprise Program, or a replaceable Timber Sale Licence that does not consist of second growth (as defined in Section 2.7), the log grade percentages for each species of timber will be derived from:

   a. the two year billing history record, where the two year billing history record for that cutting authority includes at least 25% of the cutting authorities net cruise volume of that species or 2 000 m^3 which ever is greater, or

   b. the cruise compilation algorithm predictions, where the two year billing history record for that cutting authority does not include at least 25% of the cutting authorities net cruise volume of that species or 2 000 m^3 which ever is greater.

8. For the appraisal or reappraisal of a cutting authority area consisting:

   a. second growth (as defined in Section 2.7) and that does not meet the criteria under 6. And 7. (above), or

   b. partial harvesting where 80% of the cutting authority volume is in cut blocks having at least 30% volume retention.

   The log grade percentages for each species of timber will be derived from:

   a. the two year billing history record, where the two year billing history record for that cutting authority includes at least 25% of the cutting authorities net cruise volume of that species or 2 000 m^3 whichever is greater, or

   b. the cruise compilation algorithm preditions, where the two year billing history record for the cutting authority does not include at least 25% of the cutting authorities net cruise volume of that species or 2 000 m^3 whichever is greater.

9. 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 appropriate level in Section 3.2.3.

3.2.3 Source of Log Grade Percentage for Each Cutting Authority

Except for those cutting authorities listed under Section 3.2.2 (6., 7. and 8.), the log grade percentages for each species of timber for the cutting authority area being appraised or reappraised will be determined using:

1. Section 3.2.3.1, where the cutting authority area being appraised or reappraised is entirely within the geographic boundaries of one Tree Farm Licence.

2. Section 3.2.3.2, where the cutting authority area being appraised or reappraised is entirely within the geographic boundaries of one Timber Supply Area.

3.2.3.1 Log Grade Percentages for a Cutting Authority Within the Geographic Boundaries of a Tree Farm Licence

Where the cutting authority area being appraised or reappraised is entirely within the geographic boundaries of a single Tree Farm Licence area, the Appraisal Coordinator will determine the log grade percentages for that cutting authority area in the following manner:

1. a. If the species being considered has a billing history record for that cutting authority that meets the criteria of Section 3.2.2 (4.), then that billing history record will be the source of the log grade percentages for that species, or

   b. if there is no such billing history record, the Appraisal Coordinator will proceed to Subsection 2. of this section, or

   c. if second growth timber (as defined in Section 2.7) refer to Section 3.2.2 (8.).

2. a. If the cutting authority area is the only cutting authority area in the cutting authority and is entirely within the geographic boundaries of a single Timber Licence, the Appraisal Coordinator will proceed to Subsection 3. of this section.

   b. If Subsection 2. a. is not applicable, the Appraisal Coordinator will proceed to Subsection 4. of this section.

3. a. If the species being considered has a billing history record for that Timber Licence that meets the criteria of Section 3.2.2 (4.), then that billing history record will be the source of the log grade percentages for that species, or

   b. if there is no such billing history record, the Appraisal Coordinator will proceed to Subsection 4. of this section.

4. a. If the species being considered has a billing history record for the portion of the Tree Farm Licence area that lies within the geographic boundaries of the forest district that contains the cutting authority area and that meets the criteria of Section 3.2.2 (4.), then that billing history record will be the source of the log grade percentages for that species, or

   b. if there is no such billing history record, the Appraisal Coordinator will proceed to Subsection 5. of this section.

5. a. If the species being considered has a two year billing history record for the entire Tree Farm Licence area that contains at least 25% of the cutting authorities net cruise volume of that species or 2 000 m^3which ever is greater, then that billing history record will be the source of the log grade percentages for that species, or

   b. if there is no such billing history record, the Appraisal Coordinator will determine the log grade percentages for that species in accordance with Section 3.2.2 (5.).

3.2.3.2 Log Grade Percentages for a Cutting Authority Within a Timber Supply Area

Where the cutting authority area being appraised or reappraised is entirely within the geographic boundaries of a single Timber Supply Area, the Appraisal Coordinator will determine the source of the log grade percentages in the following manner:

1. a. If the species being considered has a billing history record for that cutting authority that meets the criteria of Section 3.2.2 (4.) then that billing history record will be the source of the log grade percentages for that species,

   b. if there is no such billing history record, the Appraisal Coordinator will proceed to Subsection 2 of this section, or

   c. second growth timber (as defined in Section 2.7) refer to Section 3.2.2 (8.).

2. a. If the cutting authority area is entirely within the geographic boundaries of a Timber Licence(s), the Appraisal Coordinator will proceed to Subsection 3. of this section, or

   b. if not, the Appraisal Coordinator will then proceed to Subsection 4. of this section.

3. a. If the species being considered has a billing history record for that Timber Licence(s) that meets the criteria of Section 3.2.2 (4.), then that billing history record will be the source of the log grade percentages for that species, or

   b. if there is no such billing history record, the Appraisal Coordinator will proceed

to Subsection 6. of this section.

4. a. If the species being considered has a billing history record for the supply block of the Timber Supply Area for the cutting authorities that were issued under the same licence as the cutting authority area being appraised or reappraised and that billing history record meets the criteria of Section 3.2.2 (4.), then that billing history record will be the source of the log grade percentages for that species, or

   b. if there is no such billing history record, the Appraisal Coordinator will proceed to Subsection 5. of this section.

5. a. If the species being considered has a billing history record for the Timber Supply Area for the cutting authorities that were issued under the same licence as the cutting authority area being appraised or reappraised and that billing history record meets the criteria of Section 3.2.2 (4.), then that billing history record will be the source of the log grade percentages for that species, or

   b. if there is no such billing history record, the Appraisal Coordinator will proceed to Subsection 6. of this section.

6. a. If the species being considered has a billing history record for the entire supply block in the Timber Supply Area that meets the criteria of Section 3.2.2 (4.), then that billing history record will be the source of the log grade percentages for that species, or

   b. if there is no such billing history record, the Appraisal Coordinator will proceed to Subsection 7. of this section.

7. a. If the species being considered has a two year billing history record for the entire Timber Supply Area that meets the criteria of Section 3.2.2 (4.), then that billing history record will be the source of the log grade percentages for that species, or

   b. if there is no such billing history record, the Appraisal Coordinator will determine the log grade percentages for that species in accordance with Section 3.2.2 (5.).

3.2.4 Damaged Timber

If the regional manager determines that the timber in a cutting authority area is significantly damaged, then notwithstanding Sections 3.2.1, 3.2.2 and 3.2.3, the log grade percentages for the cutting authority area being appraised or reappraised may be estimated from available site specific information.

3.3 Calculation of Stand Selling Price (SP)

The Species Selling Price (SSP) in $/m^3$ for each species of timber is determined using the percentage of each log grade and the corresponding average market value, as follows:

$$SSP = \frac{(\%\ grade\ B) * (AMV\ grade\ B) + (\%\ grade\ C) * (AMV\ grade\ C) + etc.}{100}$$

The selling price for each species of timber is rounded to the nearest cent and used in the formula below to determine the stand Selling Price (SP) in $/m^3$, as follows:

$$SP = \frac{(balsam\ SSP) * (balsam\ net\ cruise\ volume) + (cedar\ SSP) * (cedar\ net\ cruise\ volume) + etc.}{Total\ Net\ Cruise\ Volume\ (m^3)}$$

For appraisals and reappraisals, in all cases and without regard to utilization requirements, the stand selling price is based upon the net cruise volumes and species selling prices of the following species of timber:

Alder	Fir
Balsam	Hemlock
Cedar	Lodgepole Pine
Cottonwood	W. White Pine
Cypress	Sitka Spruce
	Engelmann Spruce

Birch and Maple

Volumes of birch and maple are added to alder when calculating stumpage rates.

Engelmann Spruce

Where Spruce is included in cruise compilations within the Pemberton, Yale, and Nahatlatch supply blocks it will be considered to be Engelmann Spruce for appraisal purposes. In order to calculate the stand selling price for spruce, average log market values for hemlock and balsam will be applied to all spruce cruise volumes for cutting authorities in these supply blocks.

Cutting authorities outside these supply blocks will use hemlock and balsam average log market values for spruce at the time of appraisal or reappraisal where Engelmann Spruce is identified as the predominant spruce species in the cruise for the cutting authority or where the district manager verifies that Engelmann Spruce is the predominant spruce species in the stand.

Log grade profiles for all types of spruce will be established in accordance with Section 3.2 of this manual.

Douglas Fir

All Douglas-fir located in the area described below will be appraised using immature Douglas-fir log AMV's.

This pricing policy will apply to Cortes Island and the Islands found between Vancouver Island and the British Columbia mainland west of a line drawn between Grief Point (Powell River) and the Tsawwassen ferry terminal, and between 50 degrees North latitude and the US border.

3.3.1 Low Volume Cypress Exception

Where the cypress cruise volume is less than 2 000 m^3, the J log grade average market value is used for cypress grades D, F, H, I, and J.

3.3.2 Salvage

The Regional Manager may approve a standardized method to adjust the selling price for cutting authorities that qualify as "salvage logging" under Section 4.1.1.

Operating Cost Estimation 4

The Operating Cost is the sum of the trended Total Logging Cost Estimate and the trended Basic Silviculture Cost Estimate as detailed in this chapter.

4.1 Cost Estimates

The phase cost estimates, predictive formulas and most of the tables in this manual are derived from data collected through surveys of logging and forest management costs incurred by licensees and contractors operating in the Coast Region of British Columbia in 1998.

The survey collects licensee costs from both company and contract operations: including wages, benefits, overtime, depreciation, fuel, supplies, repair and maintenance, moving assistance, freight, applicable licences, insurance, etc. from a representative sample of coast operations. Contract costs, including contractor profit and risk margins, overhead, crew transportation, etc., are also included.

Phase cost estimates are complete and reflect average conditions, operating practices, and phase accounting allocations as found in the survey data. With the exception of specified operations listed in Section 4.1.1, no additions to or subtractions from the phase cost estimates are permitted.

The Appraisal Coordinator must estimate total operating costs for a cutting authority area in a manner which will produce the appraisal least total operating cost estimate for the cutting authority area.

The appraisal estimate of harvesting and transportation costs must be determined by using the criteria for determining the harvesting and transportation costs as set out in this manual.

The estimate of harvesting costs must be determined for the method of harvesting referred to in this manual, other than a method that the District Manager states is unsuitable for the cutting authority area, that will produce the appraisal least total operating cost estimate.

The estimate of the transportation costs must be determined for the method of transportation referred to in this manual, other than a method that the District Manager states is unsuitable for the cutting authority area that will produce the appraisal least total operating cost estimate.

In considering whether or not a particular method of harvesting or transportation is not permitted by the cutting authority, the Appraisal Coordinator must not consider, nor take into account, nor have regard for:

1. Any destination referred to in the cutting authority.

2. Any enactment.

3. Any document other than the cutting authority.

4. Any other fact.

4.1.1 Specified Operations

In addition to the logging phases and systems that are covered by this manual, there are specified operations which require special cost estimates.

The following is a complete list of specified operations for which certain cost phase estimates are based on the information on hand rather than on the tables and formulas in this manual. Specified operation cost estimates are combined with associated *Coast Appraisal Manual* phase cost estimates to determine the total operating cost for the cutting authority being appraised.

SPECIFIED OPERATIONS	AFFECTED PHASE
A-frame Logging	Tree-to-Truck (Section 4.4)
Balloon Logging	Tree-to-Truck (Section 4.4)
Blowdown Timber	Tree-to-Truck (Section 4.4)
Partial Harvesting	Tree-to-Truck (Section 4.4)
Salvage Logging	Tree-to Truck (Section 4.4)
Skyline Logging	Tree-to Truck (Section 4.4)
Tree Crown Modification	Tree-to-Truck (Section 4.4)
Lake Transportation	Log Transportation (Section 4.5)
Skidder Swinging	Log Transportation (Section 4.5)
Towing to Tie-up Grounds (over 10 km Distance)	Log Transportation (Section 4.5)
Camp Moves (of greater than 10 km)	Administration and Other Costs (Section 4.6) except Helicopter Logging
Destumping for Root Disease Control	Administration and Other Costs (Section 4.6)

The specified operations phase costs are monitored and updated by the regional manager and may not be part of the annual cost collection and analysis process.

4.2 Appraisal Data Requirements

The cruise and all other pertinent information required for the appraisal must be submitted with the appropriate *COAST APPRAISAL DATA SHEET.*

Unless otherwise specified by the Director, Revenue Branch, cruise data must be gathered and compiled according to the approved utilization specifications and in accordance with the following Ministry of Forests publications:

- Ministry of Forests Provincial Cruising Manual,
- Cruise Compilation Design Manual,
- Forest Service Policies (e.g., Timber Utilization Policy & Procedures for the Coast of the Province), and
- Regional Publications (e.g., Operational Cruising Requirements in the Vancouver and Prince Rupert Forest Regions).

In order to verify the accuracy of the cruise compilation program, the licensee must provide, on request, photocopies of the tally sheets and a magnetic copy of the compilation in a format prescribed by the regional manager.

The appraisal uses the net cruise volume of timber. The net cruise volume (m^3) is the gross volume (m^3) less decay, waste and breakage for all the species listed in Section 3.3. The cutting authority total net cruise volume is determined by multiplying the net cruise volume per hectare (m^3/ha) by the total merchantable timbered area (ha) to be harvested under the cutting authority. The total merchantable timbered area is determined from the cruise summary if available.

If the application for a cutting authority is subsequently modified, the cruise submission must be recompiled by the applicant when more than five percent of the total number of compiled plots used in the cruise submission lie outside the boundaries established for the initial appraisal of the cutting authority.

Each reappraisal uses the net cruise volume by species determined by adjusting the original cruise volume on the basis of approved amendments since the last appraisal.

Plots located in areas requiring helicopter logging or specified operations are included in the cruise compilation calculation of conventional logging.

4.3 Development

Development costs are estimated for each of two categories:

1. New construction.

2. Reconstruction and replacement.

A unit cost ($/m^3) is calculated for each category of Section 4.3.1 and Section 4.3.1.1 and these unit costs are totalled to give a total development cost estimate ($/m^3).

In order to calculate the unit costs ($/m^3) by category, the applicable volume will be the total net cruise volume (as defined in Section 4.2) or the remaining volume.

The costs for development works may only be allocated to tributary cutting authorities. A cutting authority is considered to be tributary if:

1. Timber from the cutting authority is appraised over the development works in question.

2. The development works occur on a Main Service Road. A Main Service Road is defined as a main access road to the operation necessary to maintain and supply the day-to-day harvesting activities of the cutting authority area being appraised. To qualify, the road must be used on a regular basis for the transport of bulk fuels, supplies, equipment and harvesting crews.

Two methods of estimating development costs are used in the appraisal system:

1. Tabular cost estimates are made for new construction of roads and drainage structures using the applicable tables and formulas in Section 4.3.2 of this manual. Tabular estimates are used for an appraisal when physical dimensions and conditions fall within the tabular limitations.

2. Detailed engineering cost estimates are made when the physical dimensions and conditions of a road section or a drainage structure exceed the tabular limitations of the manual. If a tabular estimate cannot be made due to table limitations, then a detailed engineering estimate is made according to Section 4.3.3. Projects eligible for this costing method are listed by category in Section 4.3.1. Other projects approved by the regional manager also qualify.

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 and the construction and installation of drainage and other pertinent structures.

   New construction costs are allocated to the first tributary cutting authority (subject to Section 4.3.1.1.5).

   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 ($/m^3). The unit costs ($/m^3) for all roads are then totalled to give a unit cost ($/m^3) for tabular roads.

      ii. Detailed engineering cost estimates

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

         - new construction and upgrading of main access roads that meet the criteria and conditions provided in the "Ministry of Forests Main Access Roads policy",
         - road construction on uphill side slopes that are over 150 percent,
         - road construction on terrain with two or more gullies over 10 m deep at centreline in a 300 m section,
         - end haul construction requiring removal of 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. For new construction costs that occur during the term of the cutting authority, those costs are applied against the remaining cutting authority volume at reappraisal.

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).

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. 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. For new construction costs that occur during the term of the cutting authority, these costs are applied against the remaining cutting authority volume at reappraisal.

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",
- the road has been permanently or semi-permanently deactivated previously,
- the road has been abandoned, or
- of 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 repairs 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.

Bridges replaced on Forest Service Roads that are funded by the Forest Renewal B.C. five year "Bridge Replacement Program on Forest Service Roads", or are otherwise funded by the Crown, will not be included in any appraisal.

The cost estimate may be allocated, by the licensee, to any individual proposed or existing tributary cutting authority that is in the licensee's approved forest development plan at the time of the project. The licensee must identify this cutting authority when submitting the detailed engineering cost estimate.

Reconstruction and replacement cost estimates will be determined on an individual project basis as detailed engineering cost estimates (see Sections 4.3 and 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, or
- replacing pipe culverts larger than 0.9 m in diameter.

Where bridge materials are reused by the original purchaser at a second or subsequent location and they qualify as engineered estimates, the cost estimate will include dismantling, transport and installation at the new site. 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. For reconstruction and replacement projects that occur during the term of the cutting authority, those costs may be applied against the estimated remaining volume at the effective 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 ($)	=	dollar amount to be allocated to stumpage-bearing timber in the cutting authority being appraised.
Total Estimated Cost ($)	=	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 legally 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 on Crown Lands

1. Development providing access to appraised timber only:

   Total estimated costs are included in the appraisal.

2. Development providing access to non-appraised timber only:

   Cost estimates are not included in the appraisal.

3. 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. The appraised timber portion is then included in the appraisal.

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

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

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

   a. the development started after January 1, 1988,

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

   c. 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 area by:

1. Establishing the average road cost per kilometre from that appraised estimate, excluding bridges and pertinent structures.

2. Multiply that $/km by the kilometres of tributary road in the TL cutting authority area.

Cost estimates for bridges or pertinent structures will be determined according to Section 4.3.2.2, 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 Cost Estimates on Private Land

When a new or reconstructed road or structure on private land is required for Crown timber extraction, the estimated cost of the road or structure will be included in the appraisal of a tributary cutting authority according to the procedures of Section 4.3.1.1 and the following guidelines:

1. Development provides access to appraised timber only.

   The total estimated costs are included in the appraisal.

2. Development provides access to non-appraised timber only.

Cost estimates are not included in any appraisal.

3. Development provides access to both non-appraised and appraised timber.

   All cost estimates are prorated between non-appraised and appraised timber (Section 4.3.1.1) and then the Crown allocation is included in the appraisal.

4.3.1.1.4 Existing Roads and Structures

The following are defined as existing roads for the cutting authority being appraised and are not eligible for inclusion in development cost estimates:

1. Costs of constructed roads that have been previously considered in appraisals of Crown timber within another cutting authority.

2. Roads, drainage and other pertinent structures previously constructed to develop, and used to haul non-appraised timber (excluding right-of-way).

3. Roads previously constructed all or in part for purposes unrelated to logging the cutting authority area being appraised.

4.3.1.1.5 Extended Road Amortization

For new appraisals where the untrended development cost estimate exceeds $\$14.00/m^3$, a written agreement may be made which apportions a development cost estimate to two or more tributary cutting authorities.

The agreement is subject to the following conditions:

1. Each cutting authority area must be in the licensee's approved forest development plan or Woodlot Licence area.

2. The agreement must be signed by the licensee and the Regional Manager or the Regional Manager's designate.

3. The apportionment ratios will not be revisited.

4. 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 Road and Bridge 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 and end haul sections (that are appraised under Section 4.3.3) occurring in the section are 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 (CC)	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, and 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 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 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 0.9 m) 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.

Table 4-2: Subgrade Construction Cost Estimate

(Thousands of Dollars per Kilometre)

a) RMC 5 ONLY

Uphill Side Slope %	Construction Category					
	CC1	CC2	CC3	CC4	CC5	CC6
0-4	26.7	35.4	58.6	83.9	105.8	120.8
5-14	27.7	37.1	61.7	88.3	111.2	126.8
15-24	28.9	39.1	65.5	93.6	117.6	134.0
25-34	30.0	41.0	69.1	98.6	123.7	140.7
35-44	30.9	42.8	72.6	103.4	129.5	147.2
45-54	31.8	44.5	75.8	108.0	135.0	153.4
55-64	32.7	46.1	79.0	112.4	140.4	159.3
65-74	33.4	47.7	82.0	116.6	145.5	165.1
75-84	34.1	49.2	85.0	120.7	150.5	170.6
85-94	34.8	50.6	87.8	124.6	155.3	176.0
95-104	35.4	52.0	90.5	128.4	159.9	181.3
105-114	36.0	53.3	93.1	132.1	164.4	186.4
115-124	36.5	54.6	95.7	135.7	168.8	191.3
125-134	37.0	55.9	98.2	139.2	173.1	196.2
135-144	37.5	57.1	100.6	142.6	177.3	200.9
145-150	37.9	58.3	103.0	145.9	181.4	205.6

b) OTHER RMC's

Uphill Side Slope %	Construction Category					
	CC1	CC2	CC3	CC4	CC5	CC6
0-4	26.7	33.2	50.8	70.4	87.7	99.7
5-14	27.7	34.7	53.3	73.9	91.9	104.4
15-24	28.9	36.5	56.4	78.0	96.9	109.9
25-34	30.0	38.1	59.3	81.9	101.6	115.1
35-44	30.9	39.7	62.0	85.7	106.1	120.1
45-54	31.8	41.2	64.6	89.2	110.4	124.9
55-64	32.7	42.6	67.1	92.6	114.5	129.5
65-74	33.4	43.9	69.5	95.9	118.4	133.9
75-84	34.1	45.1	71.8	99.0	122.3	138.2
85-94	34.8	46.3	74.0	102.1	126.0	142.4
95-104	35.4	47.5	76.1	105.0	129.6	146.4
105-114	36.0	48.6	78.2	107.9	133.1	150.4
115-124	36.5	49.7	80.1	110.6	136.4	154.2
125-134	37.0	50.7	82.1	113.3	139.8	157.9
135-144	37.5	51.7	84.0	115.9	143.0	161.6
144-150	37.9	52.7	85.8	118.5	146.1	165.2

4.3.2.2 Drainage Structures

Cost estimates are made for bridges where their necessity is substantiated by field data.

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.

Input data within table boundaries is rounded to fit; no interpolation of values is permitted.

4.3.2.2.1 Log Bridges

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 4-3. The average crib height is the numerical average of the crib heights on both banks of the water course.

Table 4-3 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.

4.3.2.2.2 Permanent or Portable Bridges

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 4-5. 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.

Table 4-5 is used for estimating costs of permanent or portable bridges with span lengths from 2 to 30.4 metres and abutment heights from 0 to 10.4 metres.

Table 4-5 includes costs for 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.

Table 4-5 does not apply to:

1. Multi-span bridges: A Construction Estimate Form must be completed.

2. Pile driving: Where piles may be driven to depths of 13 metres or more, a Construction Estimate Form must be completed for the bridge construction.

3. Portable bridges that are reused (see Section 4.3.1).

Cost estimates for bridge sizes outside the table limits and pipe culverts greater than the aforementioned sizes require detailed engineering data as shown in Section 4.3.3.

Table 4-3: Log Bridge Cost Estimate

Span Length (m)	Single Log Sill	(Thousands of Dollars) Multi-Log Crib Average Crib Height (m)			
	1	2	3	4	5
4	2.7	7.4	12.1	16.7	21.4
5	4.5	9.2	13.9	18.6	23.3
6	6.4	11.1	15.8	20.5	25.2
7	8.3	13.0	17.6	22.3	27.0
8	10.1	14.8	19.5	24.2	28.9
9	12.0	16.7	21.4	26.1	30.8
10	13.9	18.5	23.2	27.9	32.6
11	15.7	20.4	25.1	29.8	34.5
12	17.6	22.3	27.0	31.7	36.4
13	19.5	24.1	28.8	33.5	38.2
14	21.3	26.0	30.7	35.4	40.1
15	23.2	27.9	32.6	37.3	41.9
16	25.0	29.7	34.4	39.1	43.8
17	26.9	31.6	36.3	41.0	45.7
18	28.8	33.5	38.2	42.8	47.5
19	30.6	35.3	40.0	44.7	49.4
20	32.5	37.2	41.9	46.6	51.3

4.3.2.2.3 Culverts

All pipe culverts up to and including 0.9 m diameter and all single log abutment culverts up to 3.4 m span length are included in the subgrade cost estimates.

Costs for culverts 1.0 m diameter to 1.8 m diameter are estimated using Table 4-4. Culverts less than 1.0 m diameter shown in Table 4-4 are for use in detailed engineered estimates only. Culverts greater than 2.0 m diameter require a detailed engineered estimate (see Section 4.3.3).

Table 4-4 Culvert Cost Estimate

Diameter (m)	Cost per lineal metre	Diameter (m)	Cost per lineal metre
0.3	$40.00	1.0	$151.00
0.4	$46.00	1.2	$184.00
0.5	$63.00	1.4	$227.00
0.6	$77.00	1.6	$312.00
0.7	$88.00	1.8	$360.00
0.8	$98.00		
0.9	$109.00		

Table 4-5: Permanent/Portable Bridge Cost Estimates

Span Length (metres)	Abutment Height (metres) Dollars x 1,000										
	0	1	2	3	4	5	6	7	8	9	10
2	9.3	12.5	15.7	18.9	22.1	25.3	28.5	31.7	34.9	38.1	41.3
3	13.9	17.1	20.3	23.5	26.7	29.9	33.1	36.3	39.5	42.7	45.9
4	18.6	21.8	25.0	28.2	31.4	34.6	37.8	41.0	44.2	47.4	50.6
5	23.2	26.4	29.6	32.8	36.0	39.2	42.4	45.6	48.8	52.0	55.2
6	27.9	31.1	34.3	37.5	40.7	43.9	47.1	50.3	53.5	56.7	59.9
7	32.5	35.7	38.9	42.1	45.3	48.5	51.7	54.9	58.1	61.3	64.5
8	37.2	40.4	43.6	46.8	50.0	53.2	56.4	59.6	62.8	66.0	69.2
9	41.8	45.0	48.2	51.4	54.6	57.8	61.0	64.2	67.4	70.6	73.8
10	46.5	49.7	52.9	56.1	59.3	62.5	65.7	68.9	72.1	75.3	78.5
11	51.1	54.3	57.5	60.7	63.9	67.1	70.3	73.5	76.7	79.9	83.1
12	55.8	59.0	62.2	65.4	68.6	71.8	75.0	78.2	81.4	84.6	87.8
13	60.4	63.6	66.8	70.0	73.2	76.4	79.6	82.8	86.0	89.2	92.4
14	65.1	68.3	71.5	74.7	77.9	81.1	84.3	87.5	90.7	93.9	97.1
15	69.7	72.9	76.1	79.3	82.5	85.7	88.9	92.1	95.3	98.5	101.7
16	74.4	77.6	80.8	84.0	87.2	90.4	93.6	96.8	100.0	103.2	106.4
17	79.0	82.2	85.4	88.6	91.8	95.0	98.2	101.4	104.6	107.8	111.0
18	83.7	86.9	90.1	93.3	96.5	99.7	102.9	106.1	109.3	112.5	115.7
19	88.3	91.5	94.7	97.9	101.1	104.3	107.5	110.7	113.9	117.1	120.3
20	93.0	96.2	99.4	102.6	105.8	109.0	112.2	115.4	118.6	121.8	125.0
21	97.6	100.8	104.0	107.2	110.4	113.6	116.8	120.0	123.2	126.4	129.6
22	102.3	105.5	108.7	111.9	115.1	118.3	121.5	124.7	127.9	131.1	134.3
23	106.9	110.1	113.3	116.5	119.7	122.9	126.1	129.3	132.5	135.7	138.9
24	111.6	114.8	118.0	121.2	124.4	127.6	130.8	134.0	137.2	140.4	143.6
25	116.2	119.4	122.6	125.8	129.0	132.2	135.4	138.6	141.8	145.0	148.2
26	120.9	124.1	127.3	130.5	133.7	136.9	140.1	143.3	146.5	149.7	152.9
27	125.5	128.7	131.9	135.1	138.3	141.5	144.7	147.9	151.1	154.3	157.5
28	130.2	133.4	136.6	139.8	143.0	146.2	149.4	152.6	155.8	159.0	162.2
29	134.8	138.0	141.2	144.4	147.6	150.8	154.0	157.2	160.4	163.6	166.8
30	139.5	142.7	145.9	149.1	152.3	155.5	158.7	161.9	165.1	168.3	171.5

4.3.2.3 Additional Stabilizing Material

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 using the road. 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.

1. Stabilizing Cost Estimate

   The total cost estimate per kilometre for the in-place stabilizing material is:

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

   Where:

   - V is the loose volume of additional stabilizing material in cubic metres per kilometre, and
   - U is in-place unit cost estimate for additional stabilizing material in dollars per loose cubic metre.

   a. Volume (V)

      The volume of rock or gravel in cubic metres required to stabilize one kilometre of roadbed is as follows:

      - V is loose volume (VR or VG) of stablizing material,

      Where:

      $$VR = 1000D\ (W + 1.0D), \text{ using rock}$$

      $$VG = 1000D\ (W + 1.5D), \text{ using gravel}$$

      Where:

      - W is stabilized road width in metres = 6.2 (includes turn outs and landings),
      - D is loose depth of stabilizing material in metres determined from the following table.

Table 4-6: Additional Loose Stabilizing Material Depths (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

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).

The quantities per kilometre and the depths by construction categories are only used in conjunction with tabular cost estimates.

b. In-place Unit Cost Estimates (U)

The in-place unit cost estimates ($\$/m^3$) for the additional stabilizing materials include:

- borrow pit preparation,
- rock drilling, explosives, loading of explosives and blasting (e.g., compacted or cemented gravel, oversize material, etc.),
- loading gravel trucks when truck haul required, or placement of materials when trucking is not required,
- truck hauling, when required, and
- spreading and compacting material.

The cost estimates assume borrow pits are located adjacent to a road right-of-way. If a new road needs to be constructed to access the borrow pit, then the access road cost estimates are required in addition to the in-place unit cost estimates.

The in-place unit cost estimates are based on two possibilities which are:

i. No trucking of stabilizing material

When a borrow pit is located adjacent to the subgrade to be stabilized and material is to be moved less than 0.1 km, no trucking of stabilizing material is assumed. The in place unit cost estimates (U) are:

Gravel	U ($/$m^3$) = 5.44
Soft and Medium Rock	U ($/$m^3$) = 8.78
Hard Rock	U ($/$m^3$) = 11.57

Definition: m^3 = cubic metres of stabilizing material

ii. Trucking of stabilizing material

When suitable ballast must be moved a distance of 0.1 km or further, trucking of stabilizing materials is assumed. The in-place unit cost estimates (U) are:

Gravel	U ($/$m^3$) = 7.46 + 0.597 (d)
Soft and Medium Rock	U ($/$m^3$) = 10.80 + 0.597 (d)
Hard Rock	U ($/$m^3$) = 13.59 + 0.597 (d)

Where:

- d is the assumed trucking distance from the source to the mid-point of the road section to be stabilized. The minimum value of d = 0.1 km.

Definitions for In-Place & Quarry rock RMC (hardness):

"Soft-Medium" less than 60% of the rock from the excavation is RMC 5

"Hard Rock" 60% or more of the rock from the excavation is RMC 5

2. Capping

   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.

4.3.3 Detailed Engineering Cost Estimates

The cost for any of the detailed engineering projects identified in Section 4.3.1 will be estimated by preparing a detailed engineering cost estimate. The Regional Manager may approve a standardized methodology to estimate the cost for the following projects:

1. End Hauling.

2. Road Reconstruction and Replacement.

3. Permanent Bridge Construction.

4. Bridge Structural Repair.

5. Regional Manager approved projects.

When development projects require detailed engineering cost estimates, 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.

In addition to the prior-to-construction requirement stated above, all cost data required for appraisals must be submitted according to the lead-time requirements of Section 2.2.

For appraisal purposes, the project costs are estimated using site specific data (as defined in Section 4.3.3.1) and the equipment and labour rates as specified in Appendix I. Where the equipment required is not recognized in Appendix I then the equipment rate can be attained from the "Province of British Columbia BC Hydro and Power Authority and BC Rail Ltd. Equipment Rental Rate Guide for 1998-1999." All equipment rates are assumed to be for a 3 year old machine using the July 1, 1998 cost base. Some projects will be completed on the basis of arms length competitive bids and may be accepted for costs at the regional manager's discretion.

4.3.3.1 Data Requirements

All detailed engineering design is based on minimizing quantities.

1. The data that may be required for "excavation and fill" cost estimates are:

   - plans, profiles, cross-sections showing the ground and design grade lines,
   - volume summary sheets giving quantities by various soil types,
   - time and materials, equipment and labour, repairs, drainage structures and surfacing where required, and
   - a cost estimate for the project.

2. The data that may be required for reconstruction and replacement cost estimates are:

   - a map showing details of the project including stations, drainage's, and other information important to the project,
   - time and materials, equipment and labour, estimate for excavation, repairs, drainage structures, reditching, and resurfacing where required, and
   - a cost estimate for the project.

3. The information and data that may be required for bridge and culvert construction cost estimates are:

   - 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,
   - for permanent structures of 20.4 m span or less: an economic comparison between a log structure and the permanent structure, and
   - for pipe culverts greater than 1.8 m in diameter: the same information as required for permanent structures of 30.4 span or greater.

4.4 Tree To Truck

The cost estimate for the tree-to-truck phase includes falling, bucking, skidding/yarding, and loading.

All pertinent labour and equipment costs are accounted for. The costs include time lost by fallers due to adverse weather conditions, contractual requirements for falling non-merchantable trees, streambank-management yarding, right-of-way logging, and construction of back spar trails, or rigging of back spars, or cost of the mobile back spar unit.

4.4.1 Conventional Logging

Conventional logging means all logging methods other than helicopter logging and those specified operations listed in Section 4.1.1.

The cost estimate for the tree-to-truck (TTT) phase for both isolated and accessible cutting authorities is:

$$(\$/m^3) = 20.18$$

4.4.2 Helicopter Logging

The cost estimate given below applies to the net cruise volume that requires helicopter yarding.

Costs include falling and bucking, helicopter yarding, logging truck loading, landing construction, choker chasing, rental/lease/depreciation costs of a barge (if required), bag booming, towing of bag boomed logs to local tie up or sorting area, crew transportation (by air, water, or land), and camp mobilization/demobilization (including barge movement). Costs for these activities may be borne by the licensee or the contractor.

The tree-to-truck cost estimate for helicopter logging is calculated as follows:

$$\$/m^3 = 57.69 + 5.66\ (D) + 0.0760\ (\text{Hembal \%})$$

Where:

D = One-way average horizontal actual flight distance in kilometres, from the setting to the 'drop zone' (e.g., landing, barge or water), rounded to the nearest 0.1 km.

$$\text{Hembal \%} = \frac{\dfrac{\text{hemlock net cruise volume}}{\text{helicopter yarded}} + \dfrac{\text{balsam net cruise volume}}{\text{helicopter yarded}}}{\dfrac{\text{Total net cruise volume}}{\text{Helicopter yarded}}} \times 100$$

Hembal % is calculated based on the species and total net cruise volume for the areas being helicopter yarded only.

In addition, the following phases, when applicable, are estimated as detailed elsewhere in this manual:

- Development (Section 4.3),
- Truck Hauling (Section 4.5.1),
- Dump, Sort, Boom and Scale (Section 4.5.2.1),
- Towing or Barging (Section 4.5.2.2),
- Routine Maintenance (Section 4.5.3),
- Road and Land Use Charges (Section 4.5.4),
- Specified Operations (Section 4.1.1),
- Overhead (Section 4.6.1), and
- Accommodation (Section 4.6.3).

A cost estimate for the crew transportation phase (Section 4.6.2) is not applicable.

4.5 Log Transportation

4.5.1 Truck Hauling

The truck hauling phase cost estimate is for the movement of logs from the roadside or landing in the woods to the appraisal final off-loading destination selected for the cutting authority. This cost estimate includes all rehaul situations except those involving lake transportation. Both on-highway and off-highway hauling are calculated with the same formula and variable.

1. Distance: The variable used to determine the truck hauling phase cost estimate is distance (km). This is the weighted average one-way haul distance from the centre of the cutting authority to the appraisal log dump where trucks are off-loaded. The weighted average haul distance (D) is estimated by:

   a. establishing the geographical centre point of each block or cutting area and projecting this point to the nearest road for measurement purposes,

   b. from this point determining the haul distance to the nearest junction serving all blocks or cutting areas,

   c. weighting the distance for each block by the volume on the block and determining the average weighted distance to the junction, and

   d. measuring the haul distance from the junction to the final appraised place of unloading and adding this to the average weighted distance to the junction as outlined above.

2. Formula: Where truck hauling is required, the cost estimate formula for the truck hauling phase for both isolated and accessible operations is:

$$(\$/m^3) = 3.61 + 0.0760\ (D)$$

Where:

D is the weighted average one-way haul distance in kilometres, rounded to the nearest 0.1 km.

When:

D = 0, then the truck hauling cost estimate is equal to zero.

The appraisal log dump selected for trucks to off load is also the point of origin for the towing or barging phase (Section 4.5.2.2).

4.5.2 Water Transportation

This phase covers all operating cost elements from the local tie-up ground to the point of appraisal. The point of appraisal policy in Section 2.5 governs the determination of the cost estimates.

4.5.2.1 Dump, Sort, Boom and Scale

Cost estimates for this phase are based on two log transportation systems:

- towing logs, and
- barging logs.

Barge transportation is recognized where part of the route from local tie-up grounds at the appraised point of origin to point of appraisal is exposed to the open ocean swell.

Only points on the West Coast of Vancouver Island north of Port Renfrew, (except those routes totally east of a line drawn from Cape Beale to Amphitrite Point, including Ucluelet Harbour), and all points north of Cape Caution on the mainland are considered to require barge transportation.

Where barge transportation is not recognized, towing of sorted logs or camp-run logs from the local tie-up ground at the appraised point of origin to point of appraisal is assumed.

All on-site and central sort costs related to dump, sort, boom, scale and re-load from dryland sorts where required, are included for the system as follows. Local towing of up to 10 km is also included.

Condition	Cost Estimate for all Operations
Towing	$8.48/m^3
Barging	$10.67/m^3

This cost estimate is also applied when neither towing nor barging is required (i.e., when point of origin and point of appraisal are the same location).

4.5.2.2 Towing or Barging

The following tables list the towing and barging cost estimates from specific points of origin. For unlisted points of origin the cost estimates from two adjacent points of origin may be averaged.

Table 4-7: Towing Cost Estimates

Code	Point of Origin	P/A	$/m3	Code	Point of Origin	P/A	$/m3
ALBE	ALBERNI	A	0.00	BUIM	M. OF BUTE INLET	G	1.71
CHCK	CHINA CREEK	A	0.55	KIIM	M. OF KINGCOME INLET	G	2.90
COCK	COLEMAN CREEK	A	0.65	KNIM	M. OF KNIGHT INLET	G	3.14
SARV	SARITA RIVER	A	0.81	LOUM	M. OF LOUGHBOROUGH	G	1.96
SPCK	SPENCER CREEK	A	0.69	TOIM	M. OF TOBA	G	1.73
TOBY	TOQUART BAY	A	0.97	NACK	NAKA CREEK	G	2.39
UCHU	UCHUCKLESIT	A	0.75	NOBY	NORTHWEST BAY	G	1.04
UCLU	UCLUELET	A	1.06	PHAR	PHILLIPS ARM	G	1.90
CHEM	CHEMAINUS	C	0.00	PTEB	PORT ELIZABETH	G	2.57
COBY	COWICHAN BAY	C	0.69	PTHD	PORT HARDY	G	3.00
JORV	JORDAN RIVER	C	1.45	PTHV	PORT HARVEY	G	2.37
LADY	LADYSMITH	C	0.57	PTMN	PORT McNEILL	G	2.74
NANA	NANAIMO	C	0.71	PTNE	PORT NEVILLE	G	2.31
SOOK	SOOKE	C	1.34	PORV	POWELL RIVER	G	1.26
VICT	VICTORIA	C	1.10	SENA	SECOND NARROWS	G	0.77
AGAM	AGAMEMNON	G	1.02	SYIN	SEYMOUR INLET	G	3.96
BECV	BEAVER COVE	G	2.64	SEBY	SOUTHWEST BAY	G	2.26
COUR	COURTENAY	G	1.43	SQUA	SQUAMISH	G	0.75
DRIN	DRURY INLET	G	3.12	STIL	STILLWATER	G	1.10
EVRV	EVE RIVER	G	2.31	TEAR	TEAKERNE ARM	G	1.57
FOHA	FORWARD HARBOUR	G	2.10	THIN	THEODOSIA INLET	G	1.57
FRAR	FREDERICK ARM	G	1.83	THSO	THOMPSON SOUND	G	2.71
BUIH	H. OF BUTE INLET	G	2.18	WASA	WAKEMAN SOUND	G	3.08
JEIH	H. OF JERVIS INLET	G	1.51	GAMB	GAMBIER ISLAND	G	0.00
KIIH	H. OF KINGCOME INLET	G	3.14	CHWK	CHILLIWACK	P	0.87
KNIH	H. OF KNIGHT INLET	G	3.14	HALF	FOOT HARRISON LAKE	P	1.10
LOUH	H. LOUGHBOROUGH	G	2.17	PILF	FOOT OF PITT LAKE	P	0.59
SEIH	H. OF SECHELT INLET	G	1.36	HABY	HARRISON BAY	P	0.93
TOIH	H. OF TOBA INLET	G	1.98	HATZ	HATZIC	P	0.77
INAR	INDIAN ARM	G	0.93	HALH	HEAD HARRISON LAKE	P	1.50
KLBY	KELSEY BAY	G	2.14	PILH	HEAD OF PITT LAKE	P	0.75
MNCK	McNAB CREEK	G	0.65	HALM	MID HARRISON LAKE	P	1.32
MEBY	MENZIES BAY	G	1.98	PIRV	PITT RIVER BRIDGE	P	0.00
MESD	MEREWORTH SOUND	G	3.55	SICK	SILVERHOPE CREEK	P	2.09
JEIM	MOUTH JERVIS INLET	G	1.06	WHON	WHONNOCK	P	0.65

P/A = Point of Appraisal as follows:

A = ALBE - ALBERNI - the head of Alberni Inlet;
C = CHEM - CHEMAINUS - tie-up grounds in the vicinity of Chemainus representing the facilities from Nanaimo Harbour to Cowichan Bay;
G = GAMB - GAMBIER ISLAND - representing all facilities in Howe Sound area;
P = PIRV - PITT RIVER BRIDGE - representing the facilities along the Fraser River and Pitt River.

Table 4-8: Barging Cost Estimates

Code	Point of Origin	P/A	$/m3	Code	Point of Origin	P/A	$/m3
BACK	BARR CREEK	A	5.11	BOIN	BOSWELL INLET /SECURITY BAY	G	6.30
BLBY	BLOWHOLE BAY	A	4.85	CAIS	CAMPBELL ISLAND	G	7.00
CLCK	CLEAGH CREEK	A	5.82	DIBY	DINAN BAY	G	10.47
COHA	COAL HARBOUR	A	5.99	ELHA	ELCHO HARBOUR	G	7.12
CYRV	CYPRE RIVER	A	4.32	FEBY	FERGUSON BAY	G	10.37
EAIN	EASY INLET	A	5.32	RIIH	HEAD OF RIVERS INLET	G	6.58
ESIN	ESPINOSA INLET	A	5.13	SBEH	HEAD OF SOUTH BENTINCK ARM	G	7.54
GORV	GOLD RIVER	A	4.90	HNRV	HONNA RIVER	G	9.58
HEBY	HEAD BAY	A	4.83	KMBY	KEMANO BAY	G	8.78
BESH	HEAD OF BEDWELL SOUND	A	4.40	KHIN	KHUTZEYMATEEN INLET	G	9.77
HENO	HECATE CHANNEL - NOOTKA	A	4.86				
HOLB	HOLBERG	A	6.20	KIMS	KIMSQUIT	G	7.63
HORV	HOUSTON RIVER	A	4.79	KLEM	KLEMTU	G	7.36
HUCK	HUSHAMU	A	6.07	KUIN	KUMEALON INLET	G	8.85
INGE	INGERSOLL	A	5.84	KWBY	KWATNA BAY/MINERVA CREEK	G	7.03
JELA	JEUNE LANDING	A	5.97	KWRV	KWINAMASS RIVER	G	9.73
KEIN	KENDRICK INLET	A	4.75	MCBY	McCLINTON BAY	G	10.52
KOHA	KOPRINO HARBOUR	A	5.73	MOIN	MOSES INLET/INRIG BAY	G	6.58
KUCV	KULTUS COVE	A	5.88	NAHA	NADEN HARBOUR	G	10.24
MCCK	McCURDY CREEK	A	4.87	NABY	NASS BAY	G	9.94
MORV	MOOYAH RIVER	A	4.75	NORV	NOOTUM RIVER	G	6.71
OUIN	OUOUKINSH INLET	A	5.39	OCFA	OCEAN FALLS	G	7.03
PLHA	PLUMPER HARBOUR	A	4.70	POIS	PORCHER ISLAND	G	9.08
PTEL	PORT ELIZA	A	5.00	PRRU	PRINCE RUPERT	G	9.19
RACV	RANKIN COVE	A	4.51	RESO	RENNELL SOUND	G	9.62
STCV	STEAMER COVE	A	4.42	REPA	RENNERS PASSAGE	G	9.60
TLRV	TLUPANA RIVER	A	4.81	SCRV	SCOTIA RIVER	G	10.22
TSRV	TSOWWIN	A	4.79	SWIN	SEWELL INLET	G	9.17
WIHA	WINTER HARBOUR	A	5.73	SKIN	SKIDEGATE INLET	G	9.55
ZEBA	ZEBALLOS	A	5.20	SOBY	SOUTH BAY	G	9.62
ALAR	ALICE ARM	G	10.35	STEW	STEWART	G	10.62
ALBY	ALLIFORD BAY	G	9.55	TASU	TASU SOUND	G	9.14
BEAN	BEATTIE ANCHORAGE	G	9.13	TUIN	TUCK INLET	G	9.28
BECO	BELLA COOLA	G	7.35	WECK	WEEWANIE CREEK	G	8.46
BIBY	BISHOP BAY	G	8.16	WOCH	WORK CHANNEL	G	9.77

Note: P/A = Point of Appraisal as defined on the previous page.

* Includes river towing.

4.5.3 Routine Maintenance and Deactivation

Routine maintenance includes grading, brush control, minor surfacing repairs, sanding, snowplowing, ditch maintenance and repair, replacement of culverts ≤ 0.9 m on active roads, slough removal and all deactivation costs.

Routine maintenance also includes minor repairs to roads due to slides, erosion and flood damage. All road use charges except those recognized in Section 4.5.4 are also included.

The cost estimate for all routine maintenance carried out on logging operations, including roads required for basic silviculture and protection, depends on the geographic location of the cutting authority area. Cost estimates do not apply where there are no roads to be maintained.

The routine maintenance and deactivation cost estimates ($/m^3) by Forest District are:

Zone 1 (North)

Queen Charlotte	North Coast
Mid Coast	Port McNeill
Total Cost Estimate =	$2.29/m^3

Zone 2 (South)

Sunshine Coast	Squamish
Campbell River	Chilliwack
South Island	
Total Cost Estimate =	$2.25/m^3

4.5.4 Road and Land Use Charges

Where applicable in the following options and prior to a stumpage appraisal cost estimate being used in any appraisal, the licensee must:

- submit a "Request for Approval of a Road Use Charge" form with the Appraisal Data Sheet.
- receive written approval of the road use charge from the Regional Manager.

1. Charges as a Share of Road Maintenance

   No recognition is made of such charges. The routine road maintenance cost estimate (Section 4.5.3) includes all relevant costs whether incurred directly by the licensee or by payment to another party for services performed.

2. Charges for Other than Road Maintenance

   There are three main categories of road status:

   a. Forest Service Roads

      A road that is declared, determined, built, maintained or modified by the Ministry, as defined in forest legislation. No road use charges will be considered in appraisals;

   b. Permitted Roads

      Roads built on Crown land, authorized by road permit or other cutting authority documents. No road use charges will be considered in appraisals;

   c. Other Roads

      Road use charges for roads on Indian Reserves or on private land owned by an arm's length third party and not subject to a lease held by the licensee, their affiliate or agent of either, may be considered in appraisals provided there is no lower cost route capable of development through Crown land.

      The charges recognized must be reasonable, must not exceed compensation that might be determined under the forest legislation, and must be proven through the presentation of auditable documents.

3. Land Use Charges

   No land use charges will be considered in appraisals. These costs are included in Section 4.6.1 Corporate and Forestry Overhead.

4.6 Administration and Other Costs

4.6.1 Corporate and Forestry Overhead

Corporate General and Administrative Overhead cost estimates are compiled from surveyed expenses at the corporate licensee level and include all aspects of executive and administrative support functions at the Head Office attributable to logging operations, operating and support costs of the logging and log supply departments, all right-of-way easements, foreshore and other land leases necessary for the logging function.

Corporate Forestry and Engineering is compiled from the surveyed harvesting operations and includes supervisory, administrative and vehicle support functions; it also includes cruising, environmental protection measures (including hydro and other seeding) and the cost of performing residue and waste surveys. Silviculture overheads are also included in this phase. Any costs that will be reimbursed through the *Forest Act,* Section 110, or by funding from any Crown agency are excluded except as noted in Section 6.5.

The cost estimates are:

Corporate, General and Administrative Overhead	($/m^3) =	8.09
Corporate Forestry and Engineering	($/m^3) =	5.61
Total Corporate and Forestry Overhead	($/m^3) =	13.70

4.6.2 Crew Transportation (Labour)

Crew transportation refers to the labour costs associated with moving logging crews by vehicles from the appraisal marshalling area to the centre of the work area in the cutting authority being appraised, and return.

The appraisal marshalling area is defined as follows:

1. In situations where the cutting authority area being appraised is Accessible (as determined in Section 4.6.3), the licensees' contractually binding designated marshalling area, or in the absence of one, the nearest of (a) a contractually binding designated marshalling area, (b) the camp, (c) the crew vehicle storage area, or (d) centre of the nearest community.

2. In a situation where the cutting authority area being appraised is Isolated (as determined in Section 4.6.3), the licensees' contractually binding designated marshalling area, or in the absence of one, the nearest of (a) a contractually binding designated marshalling area, (b) the camp or (c) the vehicle storage area.

The appraisal marshalling area need not be the location actually used by a given licensee.

Where more than one appraisal marshalling area or route is reasonable, the area or route chosen for appraisal purposes will be the one that yields the least total operating cost estimate according to this manual.

For the purposes of this section, a "vehicle" may be a motor vehicle or a boat. When "vehicle" is taken to mean boat, the "vehicle storage area" may be a boat dock or wharf where the crew can embark and disembark.

The formula for crew transportation is:

$$\$/m^3 = 1.20 + 0.0644\ (D)$$

Where: D is the weighted average one way distance in kilometres (rounded to the nearest 0.1 km) from the centre of the appraisal marshalling area to the centre of the work area in the cutting authority area being appraised. In situations where the appraisal marshalling area is a community, D will be measured from the post office of that community.

Where: D=0, the Crew Transportation cost estimate is equal to zero.

The crew transportation cost estimate includes both crew travel time costs and crew vehicle operator time costs.

The cost of vehicle ownership, lease, rental, maintenance and operations are included in Section 4.6.3, Camp Overhead.

4.6.3 Camp Operations and Overhead

4.6.3.1 General Camp Overhead

The General Camp Overhead phase cost estimate recognizes two types of logging operations according to the mode of access for logging crews to the highway system:

1. Accessible Cutting Authority

   An accessible cutting authority or cut block is one where the cutting authority or cut block is connected by a road suitable for crew buses, to the centre of the nearest community. The nearest community must be a city, district municipality, town or village and must have retail food and gasoline services located nearby.

   The cost estimate covers the depreciation, maintenance and operating costs of camp and crew marshalling area facilities, shop and office and other pertinent buildings; and provides for daily and/or periodical commuting costs.

The cost estimate for accessible cutting authorities is: $11.09/m^3$

2. Isolated Cutting Authority

An isolated cutting authority is one which is not "accessible". This includes all cutting authorities where a portion of the access is by water or air only and is not serviced by public ferries. The cost estimate covers the depreciation, maintenance and operating cost of camp and marshalling area facilities; the non-recoverable costs incurred for shop and office and other pertinent buildings; daily and/or periodical commuting cost from the camp to residential facilities; and camp and equipment moves of less than 10 km by water.

The cost estimate for isolated cutting authorities is: $12.13/m^3$

4.6.3.2 Accommodation

a. Crew Airfare in/out of Camp

Where logging crews must be flown in/out of camp for crew changes (i.e., a 10 on/4 off rotation, not as a daily commute).

The cost estimate is: $1.14/m^3$

b. Freight by Air or Water Only

Where all freight in/out of the camp must be shipped via air or water (not by road). If the camp is on an island, the island is not serviced by regularly scheduled public marine transportation services that can accommodate commercial vehicles.

The cost estimate is $0.80/m^3$

c. Cookhouse and Bunkhouse

The cookhouse estimate includes the camp costs described above, plus the non-recoverable costs incurred for providing the logging crews with cookhouses, family quarters and bunkhouses. These facilities must either exist, or are being constructed, and over 80 percent of the logging crew must reside in camp.

The cost estimate for camp, cookhouse and bunkhouse is: $2.27/m^3$

4.6.4 Low Volume Cost Estimate Additive

All fully appraised cutting authorities are eligible for a low volume cost estimate additive.

The cost estimate additive is: $\$/m^3 = 7.38 - [0.00246\ (V\text{-}2\ 000)]$

Where:

- V must be less than or equal to 5 000 m^3,
- V is the lesser of the cutting authority net cruise volume or the licence's allowable annual cut of Crown timber (if applicable),
- The maximum cost estimate is $\$7.38/m^3$.

4.7 Total Logging Cost Estimate

The total logging cost estimate is the sum of all phase cost estimates identified in Section 4 for the cutting authority being appraised, including specified operations and least cost methods. Subsequently, basic silviculture costs are added and a trend factor applied to derive a total weighted logging cost.

4.8 Basic Silviculture

Basic silviculture cost estimates are made for all appraised cutting authority areas where basic silviculture is required.

The cost used for basic silviculture treatment carried out on land on which the licensee is required to establish a free-growing crop of trees, as specified in the *Forest Act,* depends on the geographic location of the appraised cutting authority area.

Basic silviculture treatment may not be required on some cutting authorities (e.g., right-of-way, licence-to-cut, commercial-thinning). A basic silviculture cost estimate is not included in the appraisal where this intent has been specified in the licence document, cutting authority or by applicant's agreement. Nor is a basic silviculture cost estimate included in the appraisal if the work is funded through the *Forest Act,* Section 110, or by any Crown agency, except as noted in Section 6.5.

Table 4-9: District Silviculture Cost Estimates

Forest District	$/m^3 *	Forest District	$/m^3 *
Mid Coast	2.59	South Island	2.96
Queen Charlotte Isl.	4.83	Campbell River	2.29
Chilliwack	2.55	Port McNeill	2.34
Squamish	3.50	North Coast	1.79
Sunshine Coast	2.93		

* The dollar per cubic metre ($/m^3) cost estimates are net of overhead.

4.9 Cost Trend

A cost trend factor is separately applied to the total logging cost estimate and the basic silviculture cost estimate at the effective appraisal date and at the date of each stumpage rate adjustment. The factors cover the period from the effective date of the cost base to the effective date of the stumpage rate calculation. Cost trends are shown in the following table.

Table 4-10: Trend Factor by Effective Date

APPRAISAL EFFECTIVE DATES FROM APRIL 1, 1998 AND BEFORE APRIL 1, 1999 *(cost base July 1, 1996)*

All Stumpage Adjustment Dates (or Appraisal Effective Date)	Trend Factor
April 1 to June 30, 2000	1.000
July 1 to September 30, 2000	1.000
October 1 to December 31, 2000	1.000
January 1 to March 31, 2001	1.000

APPRAISAL EFFECTIVE DATES FROM APRIL 1, 1999
(cost base July 1, 1997)

All Stumpage Adjustment Dates (or Appraisal Effective Date)	Trend Factor
April 1 to June 30, 2000	0.973
July 1 to September 30, 2000	0.973
October 1 to December 31, 2000	0.973
January to March 31, 2001	0.973

APPRAISAL EFFECTIVE DATES FROM APRIL 1, 2000
(cost base July 1, 1998)

All Stumpage Adjustment Dates (or Appraisal Effective Date)	Trend Factor
April 1 to June 30, 2000	1.000
July 1 to September 30, 2000	1.000
October 1 to December 31, 2000	1.000
January to March 31, 2001	1.000

Stumpage Rate Determination 5

5.1 Indicated Stumpage Rate

The Indicated Stumpage Rate is determined by comparing the Value Index of the stand being appraised to the Value Index of other stands, as explained in the following sections.

5.2 Value Index

The stumpage rate charged on each cutting authority area is keyed to the estimated Value Index of the stand to be harvested. The Value Index is defined as the Selling Price less the Operating Cost, both of which are estimates expected for an average operator in that stand. The formula to be used is:

$$VI = SP - OC$$

Where:

VI = Value Index for the cutting authority.

SP = estimated stand Selling Price determined in accordance with Chapter 3.

OC = estimated Operating Cost applicable to the timber being appraised, and determined in accordance with Chapter 4.

5.3 Mean Value Index

The Coast Mean Value Index (MVI) is the benchmark against which individual stands of timber are compared. The Mean Value Index is recalculated and published by Revenue Branch at the time of each quarterly stumpage adjustment. When distributed it becomes an integral part of this manual.

Prior to January 1, 1999, the MVI does not include any timber licence marks. However, effective with the January 1, 1999 stumpage adjustment, appraised timber licence cutting permits are included in the MVI.

5.4 Market Value Indexing

At the times specified in Section 1.6, target rates are adjusted upwards or downwards to reflect changes in the value of softwood lumber and wood chips as indicated by Statistics Canada.

On the coast, softwood lumber is represented by Statistics Canada price index P2460. The price of wood chips in British Columbia is represented by Statistics Canada price index P2513.

The average lumber and chip indexes from the appropriate three month period (shown below) are combined, with lumber receiving a weight of 90.3% and chips 9.7%. The combined index is then multiplied by a normalization factor of 1.763. This factor equates the new lumber/chip composite index (1992=100) with the Statistics Canada lumber index (1981=100) at April 1, 1998. During the calculations described above, no rounding is done. The final composite index (INDEX) is rounded to one decimal place before being entered into the appropriate formula below.

New Coast Target Rate Calculation:

1. If the INDEX is less than or equal to 188.8 then,

$$TR = \frac{INDEX}{138.5} * 10.59$$

2. If the INDEX is greater than 188.8 then,

$$TR = 14.43 + \left[\frac{(INDEX - 188.8)}{49} * 7.45\right]$$

Where: TR = New Target Rate ($/m^3$)

Quarterly Stumpage Rate Adjustment Date	INDEX based on Statistics Canada price indexes for the months of:
January 1	Preceding August, September, October
April 1	Preceding November, December, January
July 1	Preceding February, March, April
October 1	Preceding May, June, July

The applicable index is published by Revenue Branch at the time of each quarterly stumpage adjustment. When distributed it becomes an integral part of this manual.

5.5 Base Rate

The Coast Base Rate is redetermined and published by Revenue Branch at the time of each quarterly stumpage rate adjustment. When distributed it becomes an integral part of this manual.

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 105 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, 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 adjustments 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.

Misc. Timber Pricing Policies 6

6.1 Value Indexes by District and Species

A new table of Value Indexes by District and Species is prepared at the time of each quarterly stumpage adjustment and becomes an integral part of this manual at that time.

This table may be used by the Appraisal Coordinator to determine the Value Index for cutting authorities of less than 2 000 m^3, as explained in Section 6.2.

6.2 Cutting Authorities With 5 000 m^3 or Less Volume

1. Total Volume of less than 2 000 m^3

   a. Average Value Indexes by District and Species (DVI)

      An indicated stumpage rate may be determined by estimating the species volumes, prorating the appropriate Average Value Indexes by District and Species according to those volumes, and then using the resulting stand value index in the stumpage rate formula as described under Section 5.6. For cutting authorities where the licensee is not required to establish a free growing crop of trees, the Value Indexes must be adjusted by adding a basic silviculture cost estimate (District Average Value Indexes are based on full appraisals of areas requiring basic silviculture). The total stumpage rate is fixed for the term of the cutting authority (for extensions see Section 2.4.4).

      The upset stumpage rate for cutting authorities with 500 m^3 or less volume, awarded under the small scale salvage initiative, will be one-half the DVI calculated stumpage rate.

   b. Full Appraisal

      Alternatively, an indicated stumpage rate may be determined through a full appraisal. The stand data may be site-specific or obtained from one or more comparable cutting authority areas (e.g., similar stand and terrain characteristics, etc.) and is recorded on a Coast Appraisal Data Sheet. The total stumpage rate is adjustable for the term of the cutting authority, except as provided in Section 6.4.

      Each full appraisal is made as described in Chapters 3, 4 and 5.

2. Total Volume of 2 000 to 5 000 m^3

   An indicated stumpage rate is determined on the basis of full appraisal data. The data may be site-specific or the data may be obtained from comparable cutting authority areas, as determined by the Regional Manager.

   Each appraisal is made as described in Chapters 3, 4 and 5.

   These sales are cruised if specified by the Regional Manager in accordance with Section 4.2 of this manual.

   The total stumpage rate is adjustable for the term of the cutting authority, except as provided in Section 6.4.

6.3 Partially Harvested Timber

In the case of decked timber, or timber which has been felled and bucked, such as on rights-of-way, and the volume exceeds 300 m^3, a full cost estimate appraisal is completed on an "as is, where is" basis.

6.4 Small Business Forest Enterprise Program (SBFEP) Sales

For appraisal purposes, the SBFEP includes:

- all Timber Sale Licences issued under the *Forest Act*, Sections 20 and 21, and
- all TSLs issued under the *Forest Act*, Section 23 except 23(1)(a) and 23(1)(b).

Fixed/Adjustable Stumpage Rates for SBFEP Cutting Authorities

The adjustable rate option can be provided to a licensee only if the upset rate has been determined by means of a full appraisal. The data for the full appraisal may be site-specific or may be obtained from one or more comparable cutting authority areas. Once a selection has been made, it remains in effect for the term and all extensions. If the District Value Index method is used, the upset and hence the total stumpage rate is fixed for the term of the cutting authority and all extensions. The only exceptions are if a reappraisal is done under Section 2.3 (1), Sudden and Severe Damage or Section 2.3 (4) Minister's Direction.

A licensee's election of fixed stumpage rates precludes any correction to the upset stumpage rate determination that would otherwise be warranted because of an error in the appraisal.

For Section 20 and 21 timber sale licences (on and after January 1, 1999) refer to Chapter 7.

Section 20 Timber Sale Licences (Prior to May 1, 1994)

A licensee who holds a timber sale licence issued under Section 20 of the *Forest Act* that was advertised or awarded prior to May 1, 1994 may elect to have the stumpage rate on that licence fixed at the April 30, 1994 level for the term and all extensions. The election must have been made prior to July 1, 1994.

Section 21 Timber Sale Licences (Prior to May 1, 1994)

For a timber sale licence issued under Section 21 of the *Forest Act*, the licensee may have elected to have the stumpage rate fixed at the April 30, 1994 level until April 30, 1996 on timber marks issued under that licence if:

- the timber sale licence was advertised or awarded prior to May 1, 1994,
- the timber mark was issued prior to May 1, 1994, and
- the election to fix rates was made before July 1, 1994.

The above timber marks with rates fixed until April 30, 1996 will be reappraised effective May 1, 1996. All subsequent reappraisals for those timber marks will be as per Section 2.3.

6.5 Levies

The amount of any levy may be redetermined at reappraisals only.

1. Basic Silviculture Levy

   A basic silviculture cost estimate is made for every cutting authority that will require basic silviculture, including those with a volume of less than 2 000 m^3.

   A basic silviculture levy may be added to the Reserve Stumpage Rate. The levy is $0.00/$m^3$ if no Crown expenditures are anticipated for basic silviculture, or the district manager may set the levy at $0.00/$m^3$ if the sale is offered under the *Forest Act,* Section 20, and the District Manager is satisfied that there will be competition for the sale. Otherwise the silviculture levy is equal to the appraisal estimate of basic silviculture costs provided by the Crown (trended at the time of the appraisal).

2. Development Levy

   A development levy may be added to the Reserve Stumpage Rate. The levy is $0.00/$m^3$ if no Crown expenditures are anticipated for road construction and other services, or the District Manager may set the levy at $0.00/$m^3$ if the sale is offered under the *Forest Act,* Section 20, and the District Manager is satisfied that there will be competition for the sale. Otherwise, the development levy is equal to the appraisal cost estimate of road construction and other extraordinary services provided by the Crown as determined by the Regional Manager (trended at the time of the appraisal).

   The amount of any levy may be re-determined at reappraisal only.

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.

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 *	$ 9.60/m^3
Yew	All	$ 0.25/m^3
Deciduous Species		
Alder & Cottonwood	Where Alder and Cottonwood are appraised in the stand as a whole reserve rate, then the lesser of the reserve rate reduced if applicable (CVP only), or $1.00.	$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 9, 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 126).	$ 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 authority areas that are not appraised and have a cutting authority term that began 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 sawlogs scaled in the indicated forest regions on and after April 1, 2000.

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	33.40	27.20	34.40
Spruce	34.90	29.00	32.80
Balsam	17.50	14.40	28.90
Cedar	31.10	25.50	49.90
Hemlock	17.00	14.20	30.80
Cypress	30.30	25.70	35.10
White pine	21.90	19.40	47.00
Yellow pine	21.90	19.40	32.50
Larch	21.90	19.40	34.40
Lodgepole pine	10.50	8.00	31.00
Other conifers	21.90	19.40	36.10
All non-conifers	1.00	1.00	0.50
All species Grades 3, 4, 5, and 6	N/A	N/A	N/A
All species Firmwood reject	Nil	Nil	Nil
All species grade Y	0.25	0.25	N/A

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Market Pricing System 7

The Market Pricing System (MPS) policy provided in this chapter is to be used only for timber sale licences awarded under Section 20 and 21 of the *Forest Act* on or after January 1, 1999.

Where a timber sale licence with stumpage rates calculated using MPS does not receive any bids and is subsequently directly awarded under the authority of Section 23 (1)(e) of the *Forest Act*, the MPS upset stumpage rate will be used.

Chapters 3, 4, 5 and 6 of this manual are only to be used for Section 20 and 21 timber sale licences where directly referenced in Chapter 7.

7.1 Market Pricing System Introduction

The Market Pricing System (MPS) is the basis for determining sawlog stumpage rates for timber sale licences awarded under Section 20 and 21 of the Forest Act, subject to a minimum stumpage rate. Sections 2.1 (3) and (4) of this manual provide the methods that are used for deriving stumpage rates for specific products and extraordinary situations.

MPS is a method of estimating the stumpage value of a cutting authority area based on the results of previous similar cutting authority areas that were sold competitively.

MPS can only be used where there is complete appraisal data available for the cutting authority area. Where data is not available, see Section 6.2.

The MPS upset stumpage rate and bonus bid applies to coniferous sawlogs only. All deciduous species, special forest products and Y grade logs have a default price listed under Section 6.6.

7.2 MPS Principles and Procedures

7.2.1 MPS Appraisals

The initial upset stumpage rate will be calculated using the *Coast Appraisal Manual* and monthly parameters (selling prices and consumer price index (CPI) in effect on the date of calculation (appraisal effective date). This rate plus the bonus bid remains in effect from the date of award of the sale until the next quarterly adjustment.

7.2.2 MPS 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, stumpage rates are adjusted quarterly on January 1, April 1, July 1, and October 1 of each year.

At the time of the quarterly adjustment, the MPS upset rate will be recalculated based on the equations applicable for the appraisal effective date and the cutting authority specific data. The monthly parameters (selling prices and CPI) effective for the month of the adjustment will be used in the calculation instead of the original values. All other data (including the estimated number of bidders) remain unchanged.

This process is repeated quarterly until the cutting authority is reappraised.

7.2.3 Reappraisals for MPS Appraisals

Revised data and revised monthly parameters will be used with the equations in effect on the reappraisal date. The original bonus bid remains in effect.

7.2.4 Calculation Conventions

Stumpage rate calculations are performed according to the methods specified in the document entitled, *Specifications: Calculating Stumpage Rates for Coast Appraisals* for *the Market Pricing System* approved by the Director, Revenue Branch.

7.2.5 Methodology

Calculation of the upset stumpage rate for Small Business Forest Enterprise Program (SBFEP) timber sale licences issued under Section 20 and 21 of the *Forest Act* after January 1, 1999, will be done using the following methodology:

1. Calculate a preliminary market stumpage price using the equation in Section 7.4.2 with the variables as defined and the average number of bidders. Apply the discount factor to the preliminary market stumpage price to calculate the preliminary upset stumpage rate.

2. Calculate the estimated number of bidders using the equation in Section 7.4.3 with the variables for the timber sale.

3. Calculate the market stumpage price using the equation in Section 7.4.4, the variables for the timber sale and the estimated number of bidders calculated in Section 7.4.3.

4. Calculate the upset stumpage price by discounting the market stumpage price calculated in Section 7.4.4 using the appropriate discount factor in Section 7.4.5.

One stumpage rate is determined for all appraised coniferous sawlogs in each cutting authority area. Other products and deciduous species are priced using miscellaneous stumpage rates as specified under Section 6.6.

7.3 Log Selling Prices

Invoiced (f.o.b.) log market values are compiled from prime, domestic, arms-length sales reported to occur in areas adjacent to the Strait of Georgia; the Strait of Juan de Fuca and the Alberni Inlet east of a line drawn south from Amphitrite Point; Johnstone Strait; the Queen Charlotte Strait south of a line drawn west from Cape Caution; and the Fraser River west of the bridge at the confluence of the Pitt River. The cut off date for the collected log market value input is approximately forty-five (45) days prior to the stumpage rate adjustment date.

For the Market Pricing System a set of average log market values by species and log grade is developed using sales data for each one-month reporting period. The one-month sales data is used to produce a schedule of average market values by species and log grade for mature timber stumpage rate determinations published monthly by Revenue Branch for stumpage rate calculations.

The same one-month schedule is adjusted on a species grade level to create a schedule for MPS second growth average log market values to be used for second growth MPS stumpage rate determinations. See Section 2.7 for the definition of second growth.

The second growth schedule adjustment table will be reviewed and/or updated as determined by the Director, Revenue Branch.

7.3.1 Log Grade Percentage

See Section 3.2. However, Section 3.3.1 Low Volume Cypress Exception does not apply to MPS.

7.3.2 Calculation of Stand Selling Price

See Section 3.3. Note that for the calculation of stand selling price under MPS the volumes and prices of Alder, Birch, Maple, and Cottonwood are omitted from the calculation.

7.4 MPS Stumpage Calculations

7.4.1 List of MPS Variables

MARKET STUMPAGE PRICE	Market Stumpage Price for the cutting authority in $/m^3.
ALP	Average log selling price estimate ($/m^3) based upon log grades and species for the cutting authority area, and schedules of log market values collected and published by Revenue Branch.
VPH	Volume per hectare in m^3/ha. Calculated by dividing the total net coniferous cruise volume (m^3) by the total merchantable area (ha).
HP	Fraction of coniferous volume that will be helicopter logged. This is calculated by dividing the coniferous volume to be harvested by helicopter by the cutting authority area's total net cruise volume.
SOR	The untrended specified operation cost estimate ($/m^3) as determined by the Regional Appraisal Coordinator.
HD	Truck haul distance (km).
ln (NB)	The natural logarithm of the number of bidders competing for the cutting authority.
VOL	Total net cruise volume of coniferous timber (m^3).
CPIF	BC Consumer Price Index (P110000) for current month divided by the base CPI of 109.3.

7.4.2 Preliminary Upset Stumpage Rate (Step 1)

Using the equations below, calculate the preliminary upset stumpage rate.

Preliminary Market Stumpage Price = [-56.1836 + 0.9916 (ALP/CPIF) + 14.6050 (VPH/1000) - 36.8188 (HP) - 6.4322 (RS) - 0.7053 (SOR/CPIF) - 0.1232 (HD) + 10.4944 * ln (NB) - FD] * CPIF

Where:

RS = 1, where the cutting authority area is accessible only by air or water and is not serviced by public ferries. Otherwise RS = 0.

FD = 9.2977 (North Coast Forest District)

16.1047 (Port McNeill Forest District)

19.1108 (Mid Coast Forest District)

15.6639 (Queen Charlotte Islands Forest District)

Otherwise FD = 0

NB = 5.3 (Coastal average number of bidders)

Preliminary Upset Stumpage Rate ($/m^3) = Preliminary Market Stumpage Price * (1-Discount Factor)

Where:

Discount factor = 0.30 or DCDF (see Section 7.4.5.2)

7.4.3 Number of Bidders (Step 2)

Using the equation below calculate the estimated number of bidders.

Number of Bidders = $2.4176 + 0.03876 (\text{Margin/CPIF}) + 0.09650 (\Delta \text{ ALP/CPIF}) + 0.1760 (\text{VOL/1000}) - 0.00247 (\text{VOL/1000})^2 - 2.2607 (\text{HP}) - 2.0634 (\text{BARGEDUM}) - 2.5571 (\text{CTDUM}) - 2.2939 (\text{SKYDUM}) - 2.9484 (\text{ADUM}) - 2.5990 (\text{BLOWD}) + \text{FD}$

If VOL is greater than 35 000, then VOL = 35 000.

If the calculated number of bidders is less than 2, then number of bidders = 2.

Where:

Margin = average log price current month - preliminary upset stumpage rate

Δ ALP = ALP current month minus ALP previous month ($/m^3)

FD = 1.0440 (South Island Forest District)

Otherwise FD = 0

The following variables take a value of 1 if the cutting authority area requires these specified operations, otherwise they are set to zero.

BARGEDUM

BARGEDUM = 1, where part of the route from local tie-up grounds at the appraised point of origin to point of appraisal is exposed to the open ocean swell. Otherwise BARGEDUM = 0.

Only points on the West Coast of Vancouver Island north of Port Renfrew, (except those routes totally east of a line drawn from Cape Beale to Amphitrite Point, including Ucluelet Harbour), and all points north of Cape Caution on the mainland are considered to require barge transportation.

CTDUM

CTDUM = 1, where the volume harvested from the cutting authority area is by commercial thinning. Otherwise CTDUM = 0.

Commercial thinning is a silviculture treatment that "thins" out overstocked second growth stands by removing trees that are large enough to be manufactured into lumber, post or pole products. It is carried out to improve the health and

	growth rate of the remaining crop trees. The cut is from "below" for the entire even-aged stand.
SKYDUM	SKYDUM = 1, where the cutting authority is harvested using a skyline system. Otherwise SKYDUM = 0. Skyline logging includes any logging method that has short span, long span, or multispan systems using standing or running lines. Logs must be a suspended clear of the ground to qualify as a skyline system and the average yarding distance must be greater than 300 m measured from the landing.
ADUM	ADUM = 1, where an A-frame is used to yard timber on the cutting authority area. Otherwise ADUM = 0. A-frame logging uses an A-frame spar with a yarder mounted on a large log float. The float is positioned along the shoreline and logs are yarded directly from the stump to the shore.
BLOWD	BLOWD = 1, where 50% or more of the net cruise volume in a cut block is blowndown. Otherwise BLOWD = 0.

7.4.4 Market Stumpage Price (Step 3)

Using the equation below enter the number of bidders calculated from Step 2.

Market Stumpage Price = [-56.1836 + 0.9916 (ALP/CPIF) + 14.6050 (VPH/1000) - 36.8188 (HP) - 6.4322 (RS) - 0.7053 (SOR/CPIF) - 0.1232 (HD) + 10.4944 * ln (NB) - FD] * CPIF

Where:

FD = 9.2977 (North Coast Forest District)

16.1047 (Port McNeill Forest District)

19.1108 (Mid Coast Forest District)

15.6639 (Queen Charlotte Islands Forest District)

Otherwise FD = 0

NB = Number of bidders calculated in Step 2. Must not be less than 2.

7.4.5 Upset Stumpage Rate (Step 4)

For each cutting authority area, the MPS upset stumpage rate is determined by selecting the greater of:

- the MPS upset stumpage rate, or
- the prescribed minimum stumpage rate.

The upset stumpage rate is calculated by taking the Market Stumpage Price result and reducing it using the discount factor or the high development cost discount factor (DCDF).

7.4.5.1 Discount Factor

For cutting authorities where the development is the responsibility of the Crown or the test for high development costs from Section 7.4.5.2 is not met, then the upset stumpage rate is:

Upset Stumpage Rate ($/m^3) = Market Stumpage Price (From Step 3) * (1 - Discount Factor)

Where:

Discount Factor = 0.30 or DCDF (see Section 7.4.5.2)

7.4.5.2 High Development Cost Discount Factor

For cutting authorities appraised with MPS where some or all of the development is the responsibility of the TSL holder, a revised discount factor will be used where the test for a high development cost discount factor (DCDF) is proven below:

If:

DCDF > 0.30

Where:

DCDF = (DC-3.10)/MSP, (round to nearest 0.01)

DC = Estimated development cost borne by the licensee, using Section 4.3 of this manual

MSP = Market Stumpage Price calculated using discount factor of 0.30 (Section 7.4.4)

The upset stumpage rate is now calculated by using the DCDF as the discount factor and recalculating Steps 1 to 4 (Sections 7.4.2 through 7.4.5.1).

7.4.6 Prescribed Minimum Stumpage Rate

The minimum stumpage rate is prescribed by the Minimum Stumpage Rate Regulation (BC Reg. 354/87). The current minimum stumpage rate is $0.25 per cubic metre.

7.4.7 Total MPS Stumpage Rate

The total stumpage rate is the upset stumpage rate plus any bonus bid.

7.5 Deciduous and Miscellaneous Forest Products

The stumpage rate for deciduous sawlogs, all species grade "Y" and other miscellaneous forest products are found in Section 6.6.

Appendices

Appendix I Equipment and Labour Rates

(Cost Base July 1, 1998)

MACHINE DESCRIPTION	TYPICAL MODEL	$/HOUR
Crawler Tractor	Cat D9N, Komatsu D155	182.00
Crawler Tractor	Cat D8, Komatsu D135	165.25
Crawler Tractor	Cat D7H, Liebherr PR742	145.25
Crawler Tractor	Komatsu D75A, D65EX	129.00
Crawler Tractor	Cat D6, JD 850C, Komatsu D60/D65/D68	124.25
Rock Drill (includes labour)	Compressor: 750 cfm on tank chassis	191.10
Grader	Cat 14G, Komatsu GD705,725	104.50
Front End Loader (Gravel)	Cat 970F, Komatsu WA470-1, JD844	129.75
Front End Loader (Logs)	Cat 980C, Komatsu WA500-1	140.50
Hydraulic Excavator incl. Brush Guard & Thumb	Cat 235C, Hitachi EX400, Komatsu PC400	219.18
Hydraulic Excavator incl. Brush Guard & Thumb	Cat 231, Cat 330L/N/R, Hitachi WX350	180.68
Hydraulic Excavator incl. Brush Guard & Thumb	Cat 229D/EL300/330, Komatsu PC300L	159.50
Hydraulic Excavator incl. Brush Guard & Thumb	Cat 225, Hitachi EX270/300, JD 792/892D	146.30
Hydraulic Excavator incl. Brush Guard & Thumb	Cat EL240, Komatsu PC200/220, JD 790	135.30
Hydraulic Excavator incl. Brush Guard & Thumb	Cat EL200B/320L/219, Hitachi EX200	126.50
Gradall	Gradall G1000	146.00
Logging Truck (Highway)	All Triaxle	88.50
Logging Truck (Off Highway)	All	$134.66
Self Loading Log Truck	Highway log truck + 4.5 t deck crane	101.15
Gravel Truck	10.7 m^3	73.43
Gravel Truck Articulated (labour included)	20 - 30 tonne: Cat D250, Terex 2366	114.25
Lowbed	5 axle unit: tandem tractor and lowbed	79.75
Lowbed	150 tonne *** Same as Off-Hwy Truck	$134.66
Concrete Mix Truck	6.1 m^3	84.00
Concrete Vibrator (labour not included)	5 m^3	4.00
Concrete Mixer (labour not included)	0.17 m^3	6.33
Crane - Truck Mounted	18 tonne	87.00
Soft Track Skidder	KMC 2100/2400	120.25
Rubber Tired Skidder	Clark Ranger F68, Franklin 595	82.50
Vibrator Compactor	Clark 668 + 2.7 to 3.6 tonne roller	94.50
Tractor and Grid Roller	Clark 668 + grid roller	94.75
Labourer	Includes 40% payroll loading	28.42
Roadman	Includes 40% payroll loading	28.65
Crib/Culvert Maker, Powderman	Includes 40% payroll loading	30.09
Landingman	Includes 40% payroll loading	30.48
Rockdriller & Powderman (for load & blast only)	Includes 40% payroll loading	65.51
Bridgeman	Includes 40% payroll loading	36.14
Powersaw (labour not included)	All	4.50
Faller, including powersaw cost	Includes 40% payroll loading	55.28

NOTES

1998 cost surveys, Province of British Columbia Hydro and Power Authority and B. C. Rail Equipment Rental Rate Guide, (rates based on a 3 year old machine), and IWA agreement rates including payroll loading.

Notes:

All equipment rates include labour for operators and swampers unless otherwise noted,

Labour components include all payroll loading, and

Lowbedding cost estimates for tracked equipment only may be recognized for Detailed Engineering Cost Estimates (Section 4.3.3).

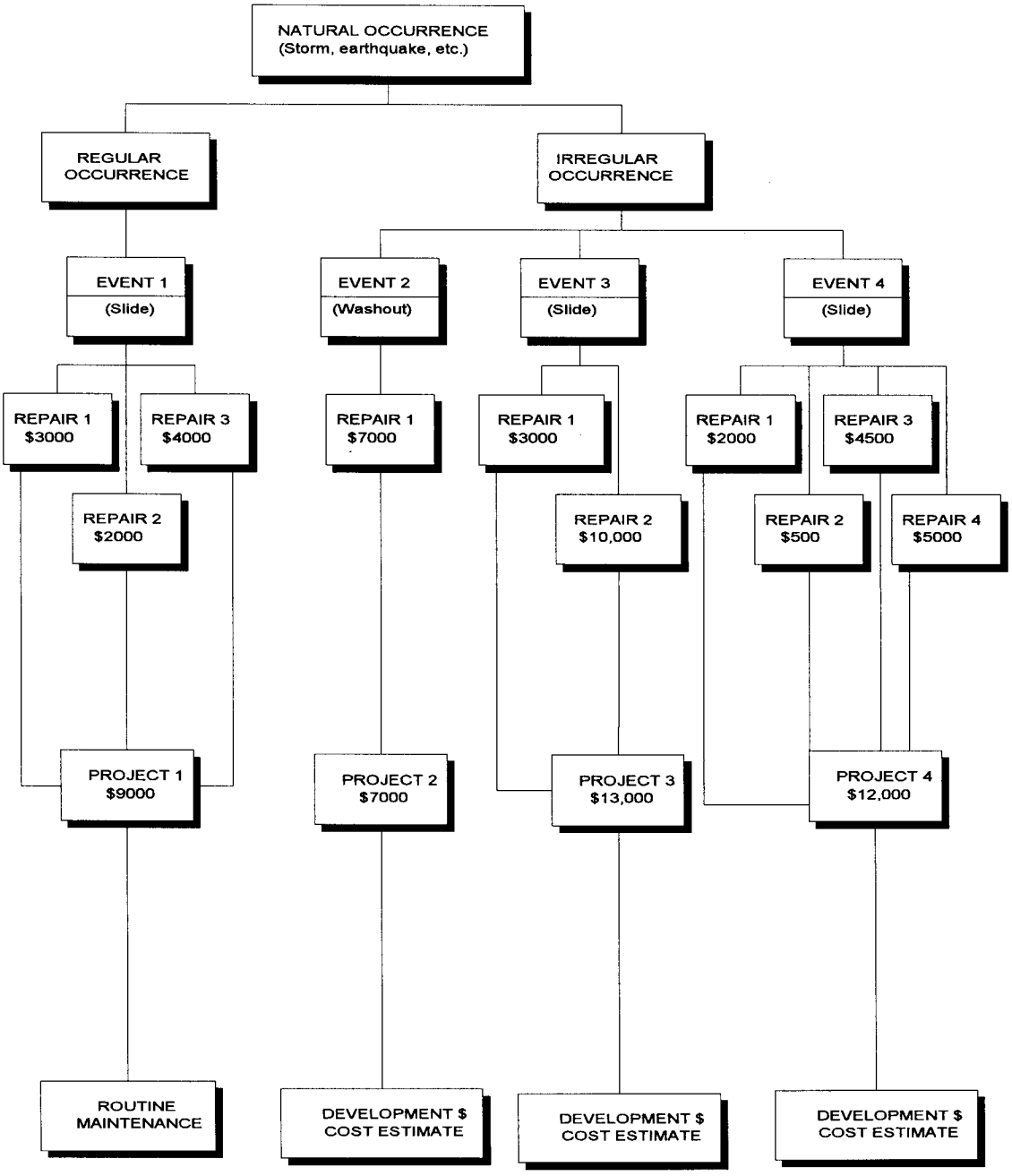
The degree of recognition of lowbedding costs varies by the estimated number of hours of each machine usage as follows:

1. 1 - 40 hours: to and from the site (mobilization and demobilization),

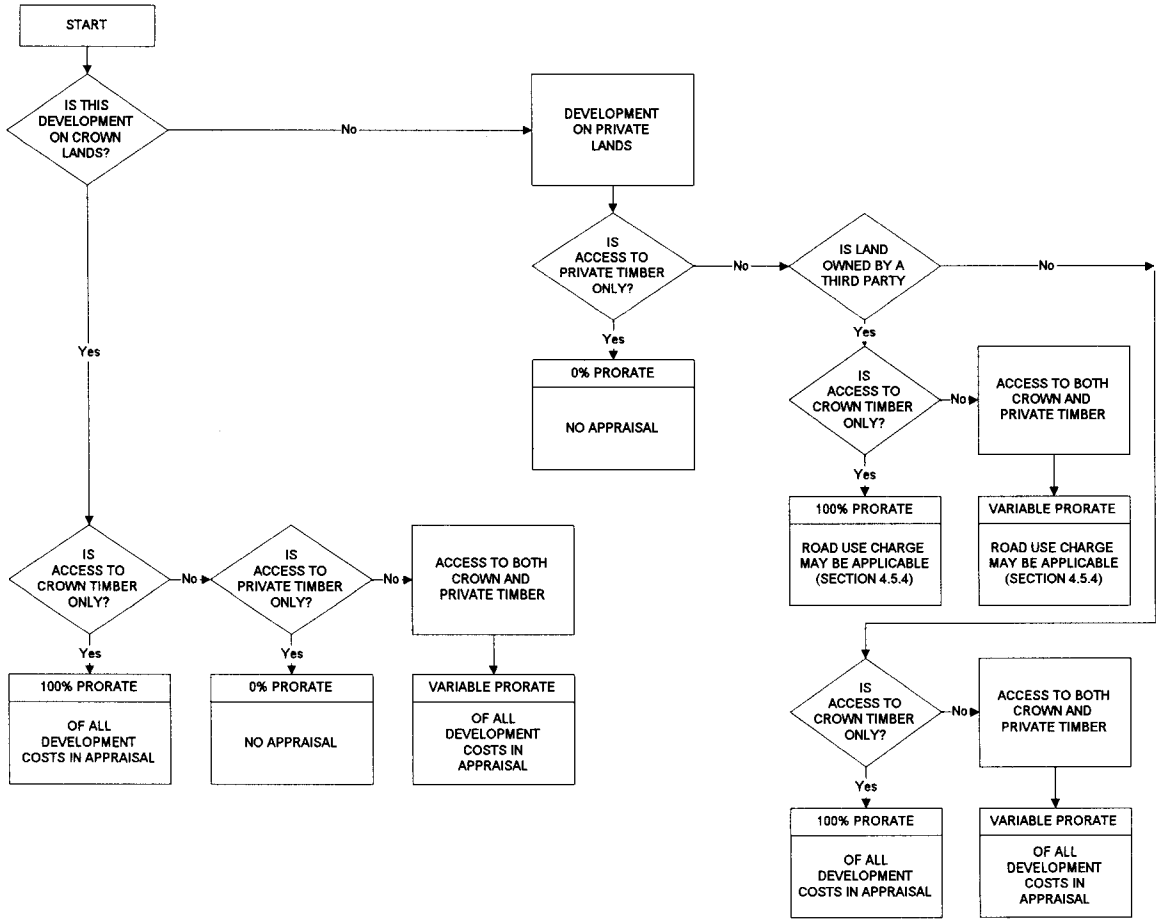
2. 41 - 80 hours: to the site (mobilization) only, and

3. 81 plus hours: nil.

Appendix II Reconstruction and Replacement



Appendix III Development Cost Allocation



Crown Timber = Appraised timber including appraised Timber Licences

Private Timber = Non-appraised timber

Variable Prorate = A tributary-volume type prorate between appraised and non-appraised timber

Appendix IV Rock Mass Classification

Surface Hardness	Weathering on Surface				
	W1	W2	W3	W4	W5
H2	R2	R2	R2, R3	R3, R4	R4, R5
H3	R3	R3	R3, R4	R4, R5	
H4	R4	R4	R4, R5		
H5	R5	R5			

Hardness Factors:

H2 Can be scraped and peeled by a pocket knife with difficulty. Shallow indentations (i.e., 1/16 inch to 1/8 inch) made by firm blow of geological pick.

H3 Cannot be scraped or peeled with a pocket knife. Hand-held specimen can be fractured with single firm blow of hammer end of geological pick.

H4 Hand-held specimen requires more than one blow with hammer end of geological pick to fracture it.

H5 Hand-held specimen is very hard and requires many blows of hammer end of geological pick to fracture it.

Weathering Factors:

W1 The rock shows no loss of strength or any other effect of weathering other than slight staining on a few discontinuities*.

W2 The intact rock is slightly discoloured but not noticeably lower in strength than the fresh rock. The discontinuities are discoloured and some discolouration extends into the rock.

W3 The intact rock is discoloured and noticeably weakened. Discontinuities are stained and/or contain filling comprising altered material.

W4 Discolouration and weakening extends throughout rock mass and rock mass tends to crumble somewhat. Rock can be excavated with geological pick.

W5 The rock is totally discoloured and decomposed and is entirely changed to a soil but the original structure of the rock is mostly preserved.

* The term discontinuities refers to natural breaks, shears or faults in the bedrock.

Surface Hardness	Average Block Diameter				
	0 to 3"	3" to 6"	6" to 1'	1' to 4'	4'+
R2	RMC1	RMC2	RMC2	RMC2	RMC2
R3	RMC2	RMC2	RMC3	RMC3	RMC3
R4	RMC2	RMC3	RMC4	RMC4	RMC4
R5	RMC3	RMC4	RMC5	RMC5	RMC5

Description of RMC Values:

RMC1 Rock crumbles under firm blows with the point of a geological pick and can be peeled by a pocket knife (R1). The average block diameter is not important. The rock may be harder (R2) but must have an average block diameter of less than 3 inches. This rock can be excavated by free digging or ripping.

RMC2 Rock can be scraped and peeled by a pocket knife with difficulty and shallow indentations (i.e., 1/16 inch to 1/8 inch) can be made by a firm blow of a geological pick (R2) and has an average block diameter greater than 3 inches. The rock may be somewhat harder (R3) but must have an average block diameter less than 6 inches or hard (R4) and have an average block diameter less than 3 inches. The rock is usually rippable.

RMC3 Rock cannot be scraped or peeled with a pocket knife. Hand-held specimen can be fractured with a single firm blow of the hammer end of a geological pick (R3) and has an average block diameter greater than 6 inches. Rock may be harder (R4) but must have an average block diameter of 3 to 6 inches or very hard (R5) and have an average block diameter of less than 3 inches. The rock is usually not rippable.

RMC4 Hand-held specimen requires more than one blow with hammer end of geological pick to fracture (R4) and has an average block diameter greater than 6 inches. Rock may be very hard (R5) but must have an average block diameter of 3 to 6 inches. The rock must be blasted.

RMC5 Hand-held specimen is very hard and requires many blows of the hammer end of a geological pick to fracture it (R5) and has an average block diameter greater than 6 inches. The rock must be blasted.

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BRITISH COLUMBIA

Ministry of Forests

COAST APPRAISAL DATA SHEET

Licence _____ Permit _____ Mark _____

ACKNOWLEDGEMENTS

Licensee or Licensee's Agent

By signing I certify this Appraisal Data Sheet is a true statement of timber stand, site conditions and/or harvesting, development, silviculture and any other requirements for the documents named herein.

Name:	Licensee:	
E-mail Address:		
Licensee's Representative: (Signature)	Date:	Phone:
		Fax:

The information contained in this package may be released under the *Freedom of Information and Protection of Privacy Act.*

Forest District Appraisal Staff

This Data Sheet must be signed by at least two Forest District Staff. Entries on the Appraisal Data Sheet have been reviewed for accuracy and completeness, and revised where necessary by the Ministry of Forests Staff.

		Date Y	M	D
Receipt of Submission				
Data Sheet Checked By: (Name)	Position			
Data Sheet Field Checked By: (Name)	Position			
Reviewed by Supervisor: (Name)	Position			

Forest Region Staff

	Date Y	M	D
Received by Region on:			

COAST APPRAISAL DATA SHEET

Reference Information

(must be completed for all appraisal submissions)

Administrative Forest District

Geographic Forest District

Management Unit Type (TSA, TFL, WL, TL, WSL)

TSA Name (Mandatory)

TSB Name (Mandatory)

Location

Licensee

Effective Date CCYY/MM/DD)

(1) Initial Merchantable Area (record to nearest 0.1 ha)

ha

Check One

☐ New Appraisal

☐ Reappraisal

☐ Extension

Appraisal Expiry Date (CCYY/MM/DD)

Total Net Cruise Volume

m^3

Amendments Since First Appraisal

Block	Approval Date	Additions	Deletions	
				ha
				ha
				ha
				ha
				ha
Totals				ha

Point of Appraisal

ALBE = Alberni PIRV = Pitt River Bridge
GAMB = Gambier Isl CHEM = Chemainus

(2) Net Amendments

ha

Is There Specified Operation(s)

☐ Yes ☐ No

See Section 4.11, Coast Appraisal Manual

(3) Total Merchantable Area (0.1) (1) +/- (2):

ha

REMOTE (Isolated) MPS only

☐ Yes ☐ No

(4) Area Logged *

ha

Rate Calculation Method

☐ CVP ☐ MPS

Area Unlogged (3 minus 4)

ha

Attach Additional Data Requested on Specified Operations Data Sheet

***Projected estimate as of Reappraisal Date**

COAST APPRAISAL DATA SHEET

LOG GRADE SHEET

LICENCE:	PARTIAL HARVEST CRUISE GRADES ☐ YES ☐ NO	NET VOLUME MATURE CONIFEROUS m^3
PERMIT:		NET VOLUME SECOND GROWTH CONIFEROUS m^3
MARKS:	PARTIAL HARVEST BLOCK VOLUME(S) (Sum where block retention level >30%) m^3	BILLING PERIOD

GRADE SOURCE ☐ CRUISE ☐ HISTORIC

IS SECOND GROWTH CONIFEROUS VOLUME ≥ 80% OF TOTAL ☐ YES ☐ NO

GRADE (%)
(Region to Complete)

GRADE (%) (Region to complete)

Species	Peeler		Lumber				Sawlog			Shingle			Util.		Chip	Total Net Cruise Volume By Species (nearest 1.0 m^3) (m^3) (Licensee)	Grade Source Level (Region)	Competitive Indicator (Y/N) (Region)
	B	C	D	E	F	G	H	I	J	K	L	M	U	X	Y			
Alder *													100					
Balsam																		
Cedar																		
Cottonwood													100					
Cypress																		
Fir																		
Hemlock																		
Lodgepole																		
Spruce																		
White Pine																		
TOTAL NET VOLUME																		

SELLING PRICE ZONE	VOLUME Maple _____ m^3 Birch _____ m^3	* ADD MAPLE AND BIRCH VOLUME TO ALDER ** NO DECIDUOUS IN MPS

COAST APPRAISAL DATA SHEET

TREE TO TRUCK COST ESTIMATES

CONVENTIONAL LOGGING (C.A.M. SECTION 4.4.1)

AVERAGE SIDE SLOPE %

CABLE YARDING	GROUND SYSTEMS
m^3	m^3

HELICOPTER LOGGING (C.A.M. SECTION 4.4.2)

LAND DROP	m^3	WATER DROP	m^3

VOLUME	ONE WAY AVERAGE FLIGHT DISTANCE (0.1 km)	HEMLOCK/ BALSAM %
m^3	km	%

SPECIFIED OPERATIONS

SKYLINE

m^3	$/m^3

COMMERCIAL THINNING

m^3	$/m^3

A-FRAME		BLOWDOWN	
m^3	$/m^3	m^3	$/ m^3

OTHER SPECIFIED OPERATIONS

DESCRIPTION

$/m^3

LOG TRANSPORTATION

TRUCK HAULING (C.A.M. SECTION 4.5.1)

AVERAGE HAUL DISTANCE (NEAREST 0.1 km)

km

WATER TRANSPORTATION (C.A.M. SECTION 4.5.2.2)

(Estimate based on Point of Origin)

1) CODE

IF AVERAGING

2) CODE

NAME (1)

NAME (2)

ROAD USE CHARGE (C.A.M. SECTION 4.5.4)

DESCRIPTION

ROUTINE ROAD MAINTENANCE AND DEACTIVATION (C.A.M. SECTION 4.5.3)

IS MAINTENANCE REQUIRED?

☐ YES ☐ NO

IF CLAIMED, PROVIDE DESCRIPTION OF ROAD (LENGTH AND LOCATION) AND COPIES OF INVOICES/AGREEMENTS DETAILING CHARGES. TOTAL CHARGES $/m3

ROAD – USE CLAIMS MUST BE SUBMITTED ON PAGE 12 WITH MAP AND AGREEMENT ATTACHED, FOR THE APPROVAL OF THE **REGIONAL MANAGER. PLEASE SUBMIT TO REGIONAL OFFICE AS SOON AS POSSIBLE TO ALLOW TIME FOR APPROVALS.**

LOG TRANSPORTATION SPECIFIED OPERATION (Description)	COST $/m^3

COAST APPRAISAL DATA SHEET

ADMINISTRATION AND OTHER COST ESTIMATES

CREW TRANSPORTATION

ONE WAY DISTANCE (nearest 0.1 KM)

(C.A.M. SECTION 4.6.2) km

LOCATION DESCRIPTION

(Designated marshalling area, community, camp, vehicle storage area or wharf).

AIRFARE ALLOWANCE?

☐ YES ☐ NO

Where logging crews must be flown in/out of camp for crew changes.

(C.A.M. SECTION 4.6.3)

☐ ACCESSIBLE
☐ ISOLATED

FREIGHT BY AIR/WATER?

☐ YES ☐ NO

Where all freight in/out of the camp must be shipped via air or Water (not by road).

SPECIFIED OPERATION (Description)	COST
	$/m^3$

BUNKHOUSE/COOKHOUSE

☐ YES ☐ NO

Facilities must either exist or be under construction and over 80% of the logging crew must reside in the camp.

DEVELOPMENT

NEW CONSTRUCTION – TABULAR ROADS
(C.A.M. SECTION 4.3)

IS THERE TABULAR ROAD CONSTRUCTION?

☐ YES ☐ NO

If yes, complete details on Page 8. Attach extra pages if required.

TOTAL ROAD LENGTH

(sum of all tabular road section lengths, to nearest 0.001 km)

km

H – LENGTH AS A PERCENT OF TOTAL ROCK LENGTH

GREATER THAN 90% ☐
90% OR LESS ☐

COAST APPRAISAL DATA SHEET

Development – New Construction – Drainage Structures

* Bridge Types: L = Log P = Permanent or Portable
** Appraisal Year – First year the cost was put in an appraisal/reappraisal.

BRIDGES (See Section 4.3.2.2.1 and 4.3.2.2.2, Coast Appraisal Manual)

Road I.D.	Stn #	Bridge Type *L/P	Crib Height (m)	Span Length (m)	Total Cost ($)	Crown Portion		Applicable Volume m^3 (Region)	Appraisal Year **	Comments	Section Built Y/N
						%	$				
Barging (if applicable)											
				Total $							

COAST APPRAISAL DATA SHEET

Development – Drainage Structures (Culverts)

* Appraisal Year – First year the cost was put in an appraisal or reappraisal.

CIRCULAR TYPE		CROWN PORTION		Applicable		Unit Cost		
Diameter (m)	Total Length For Diameter	Percent (%)	Cost ($)	Volume (m^3) (REGION)	Appraisal Year *	Lineal Metre ($/m)	Total Cost ($)	Comments
0.3								
0.4								
0.5								
0.6								
0.7								
0.8								
0.9								
1.0								
1.2								
1.4								
1.6								
1.8								
Wooden	#							
0.3								
0.4								
0.5								
0.6								
0.7								
0.8								
0.9								
1.0								
1.2								
1.4								
1.6								
1.8								
Wooden	#							

COAST APPRAISAL DATA SHEET

Development – Tabular Roads

(Exclude Detailed Engineered Roads and any Bridges)

Licence								C.P.							
Identity	Subgrade				Stabilizing Material			Capping Material							
Block # Road Name and Station Locations	Section Length (.001 km)	Uphill Side Slope (percent)	Const Category (1 to 6)	RMC H = Hard S = Soft/Med	Trucking Distance (0.1 km)	Type G = Gravel R = Rock	RMC H = Hard S = Soft/Med	Trucking Distance (0.1 km)	Type G = Gravel R = Rock	RMC H = Hard S = Soft/Med	Crown Allocation	Applicable Volume m^3 (Region)	Appraisal Year	Show Bridge Section, EndHaul Section & Borrow Pit Location	Section Built Y/N

Total Page	km	Total Length cc 2 - 6 Sections			Total Length H Sections	% H	- Refer to Manual for Details on Capping and Rock Mass Class (RMC) - Uphill slide slope = Average for the section length - If RMC = 5 for more than 60% of the section, then section = H (hard) - Trucking Distance if less than 100 m = zero - If stabilizing material trucked in, then RMC is for the Source material
Total Roads	Km						

COAST APPRAISAL DATA SHEET

Development (attach Cost Estimate Form)

* Appraisal Year – First year the cost was put in an appraisal / reappraisal

New Construction

Identity Road Name and Road Stn	Length (km)	Total Cost $	Crown		Applicable Volume (m^3) (Region)	Appraisal Year *	Comments	Section Built Y/N	Cost Estimate Applicable Attachment #
			% Portion	$					
	Total	$	$						

Development – Reconstruction and Replacement Roads and Bridges (Tabular and Engineered)
(attach Construction Estimate Form)

Identity Road Name And Road Stn	Reconstruction Project Description	Bridges		Total Cost ($)	Crown Portion		Applicable Volume (m^3) (Region)	Appraisal Year *	Comments	Section Built Y/N	Cost Estimate Applicable Attachment #
		Crib Height (m)	Span Length (m)		%	$					
			Total	$		$					

Note: For bridge structural repair, complete crib height and span length.
List in project description (bridge structural repair, road construction, etc.).

COAST APPRAISAL DATA SHEET

Total Road Length to be Constructed by Licensee (S.B.F.E.P. only)

(Nearest .001 km)

Small Business Forest Enterprise Program Only

COMPLETE THE FOLLOWING TO ESTIMATE DEVELOPMENT PROJECT COSTS
PROVIDE DATA FROM ROAD PROJECT SUBMISSION SHEET FORM IN DISTRICT RECORDS

Year 1 = Fiscal Year	Road Name
Road Project No.	Length km
Total Timber Volume Developed m^3 Volume Allocation $\frac{\text{(TSL Vol)}}{\text{(Total Vol)}} \times 100$ %	Total Appraisal Road Cost Estimate (July 1/98) $ Allocated Road Cost for Cutting Authority (transfer to Allocated Development Table below) $

S.B.F.E.P. DEVELOPMENT PROJECT

Project Identity	Length km	Total Cost July 1/98 $	Volume Allocation %	Allocated Development Cost $	Comments

COMPLETE FOR ALL S.B.F.E.P. SALES

Development Levy Applicable ☐ Yes ☐ No	District Manager

If no, require approval by District Manager or designate to set Levy for Section 20 sales to equal zero.
Note: Levies are not applicable under the Market Pricing System.

SILVICULTURE

(C.A.M. SECTION 4.8)

Is Basic Silviculture Required? ☐ Yes ☐ No	District Manager
Silviculture Levy Applicable ☐ Yes ☐ No	

If no, require approval by District Manager or designate to set Levy for Section 20 sales to equal zero.
Note: Levies are not applicable under the Market Pricing System.

COAST APPRAISAL DATA SHEET

Attachment No.

CONSTRUCTION ESTIMATE FORM

Licence	C.P.	Check One ☐ Initial Estimate ☐ Updated Estimate Year
Location C.P. *	Appraisal Year **	
Location Name and Road Station		Development Category ☐ New ☐ Recon/Replacement ☐ Bridge
Description		

	Item	Machine Type	Function	Hours ***	Rate/Hour	Cost	Totals
1.	Machine Cost						
2.	Labour Cost						
	Materials Cost (July 1/98)						
3.	Freight + Haulage for Material only						
4.	Engineering (If applicable)						
	Total Cost (July 1/98)						

APPROVAL

Dist. Eng.

Dist. Tbr.

1. List each machine employed and work performed.
2. Rate/hour is from Equipment and Labour rates table as per current appraisal manual.
3. Freight and haulage allowed for permanent type bridges (i.e., steel, concrete or glu-lam).
4. Cost of design and engineering for log bridges not allowed. Cost of design inspection for other more complex structures by a professional engineer not on salary may be allowed.

Note: Transfer total cost to appropriate data sheet section. If more space needed, attach another construction estimate form page.

* Location CP is cutting permit where actual work occurred and the cost is allocated to this tributary cutting authority.

** Appraisal Year = First year the cost was put in an Appraisal/Reappraisal.

*** Use actual machine working hours recorded, not actual cost of project for cost update.

COAST APPRAISAL DATA SHEET

Request for Approval of Road Use Charge

(CAM Section 4.5.4)

Licensee		District	
Location			

Current Cutting Authority Appraisal Information

Licence		Cutting Permit		Total Volume	m^3

Fill in the licence, cutting permit and total volume of the cutting permit that is being submitted.

Total Cost for current Cutting Permit	$	Cost per cubic metre	$/$m^3$

Fill in the total cost and amount per cubic metre for the cutting permit that is being submitted.

Summary of Agreement Information

One Time Cost	$	Cost per km per m^3	$/m3/km	Total Cost (1)	$
Cost per Year	$/yr	Cost per m^3	$/$m^3$	Length of Agreement	yrs

Fill in the appropriate cost methods from the Road Use Agreement as well as the total value and the length of the signed Road Use Charges agreement.

Associated Cutting Permit Information (Cover full term of the Road Use Agreement)

a. Fill in each cutting permit that already has a portion of the Road Use Charge.
b. Fill in this cutting permit's portion of the Road Use Charge.
c. Fill in any known future cutting permits that will have a portion of this Road Use Charge.
d. If the future cutting permits are not know then place the remaining cost in as an "Unknown" cutting permit.
e. The 'Total (2)' of the table below must match Total Cost (1)' of the Summary of Agreement Information.
f. Enter Yes or No as to whether the cutting authority has been appraised or not.

Licence	Cutting Permit	Cost	Appraised
	Total (2)		

COAST APPRAISAL DATA SHEET

Request for Approval of Road Use Charge

(CAM Section 4.5.4)

Determination of Cost Estimates

Provide details of how the per cubic metre charge that will be entered onto page 4 of the Coast Appraisal Data Sheet (CADS) was determined. This calculation must show the steps from the costs agreed to in the Road Use Charge (and entered on page one of this appendix) to the per cubic metre charge that is to entered onto page 4 of CADS.

Attachments	It is mandatory to attach a copy of maps showing the agreement and a copy of the signed agreement.		Map		Agreement for Charges

Approval

Approved by (Regional Manager or designated official)		Date	

Comments

This appendix and a copy of the Road Use Agreement must be submitted in advance of the cutting permit/ appraisal package submission!

COAST APPRAISAL DATA SHEET

Cutblock Blending

* If isolated then cookhouse & bunkhouse, air transportation or freight air/water may be applicable.

Block #	Block Volume	Point of Origin 1	Point of Origin 2	Tran Type	Truck Haul Distance	Road Maint	Road Use	Crew Transportation		Accommodation			
								Distance	Marshall Point	Accessible/ Isolated *	Cookhouse & Bunkhouse	Air Transportation	Air Freight

Total Volume

District Code _____

Weighted Transportation Cost

_____ Cost

_____ Point of Origin code

_____ Point of Origin Additive

_____ Road Maintenance Additive

_____ Log Transportation Specified Operation

Weighted Haul Distance

Weighted Crew Transportation Distance

Weighted Accessible/Isolated Cost

Weighted Airfare Cost

Weighted Allowance Freight by Air/Water

Weighted Camp Cost

_____ Administration Additive

Weighted Road Use Charges

COAST APPRAISAL DATA SHEET

LEAST COST ASSESSMENT

Description of Options (Note differences by phase)

OPTION 1:

OPTION 2:

Phases (do not complete for phases that are the same for both options)	Option 1 ($/m^3)	Option 1 Applicable Volume(m^3)	Option2 ($/m^3)	Option2 Applicable Volume(m^3)	
Development Costs: New Construction					- as per Section 4.3
Reconstruction/Replacement					- as per Section 4.3
Tree-to-Truck: Conventional Logging					- as per Section 4.4.1
Helicopter Logging					- as per Section 4.1.1
Specified Operation					- as per Section 4.1.1
Log Transportation: Truck Hauling					- as per Section 4.5.1
Water Transportation: Dump, Sort, Boom and Scale					- as per Section 4.5.2.1
Towing/Barging					- as per Section 4.5.2.2
Road Use Charges					- as per Section 4.5.4
Administration and Other Costs: Crew Transportation					- as per Section 4.6.2
Camp Overhead					- as per Section 4.6.3
TOTAL ($/m^3)					

Comments Regarding Physical/Economic Feasibility:

Comments Regarding Legislative Requirements:

Option Selected: ☐ Option 1 ☐ Option 2

ACKNOWLEDGEMENTS

BY SIGNING I VERIFY THIS ASSESSMENT IS CONSISTENT WITH SECTION 4.1 OF THE COAST APPRAISAL MANUAL

Name: (Please Print)	Licensee: (Please Print)	
Licensee's Representative: (Signature)	Date:	Phone:
Approved by (District Manager)	Date:	
Comments		