April 25, 1996

All Regional Managers and
All Holders of the *Coast Appraisal Manual*

Dear Manual Holders:

I hereby approve the new *Coast Appraisal Manual*, and attach a copy of it for your use. This manual is effective May 1, 1996, and applies to all coast stumpage appraisals.

Amendments or revisions to this manual require my further approval.

Yours truly,

Dennis Streifel
Minister

Attachment: (1)

Province of
British Columbia

Minister of
Forests

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BRITISH COLUMBIA Ministry of Forests

MANUAL REVISION TRANSMITTAL

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MANUAL TITLE	
Coast Appraisal Manual	
REVISION No. New	**ISSUE DATE** May, 1996
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 TABLE OF CONTENTS	PAGE(S)	COMMENTS
INSERT	Title Page		Before Amendments Tab
INSERT	Minister's Letter, Manual Transmittal and Highlights		After Amendments Tab
INSERT	Parameters (upon receipt)		After Parameters Tab. (mailed out each quarter)
INSERT	Table of Contents and Terms of Conventions Used in this Document	i - v	After Table of Contents Tab
INSERT	Chapter 1	1 - 7	After Chapter 1 Tab
INSERT	Chapter 2	1 - 13	After Chapter 2 Tab
INSERT	Chapter 3	1 - 10	After Chapter 3 Tab
INSERT	Chapter 4	1 - 39	After Chapter 4 Tab
INSERT	Chapter 5	1 - 8	After Chapter 5 Tab
INSERT	Chapter 6	1 - 9	After Chapter 6 Tab
INSERT	Appendices	1 - 7	After Appendices Tab
INSERT	Index	A1 - A3	After Index Tab
INSERT	Data Sheet	1 - 10	After Data Sheet Tab

New Coast Appraisal Manual - Highlights

The new Coast Appraisal Manual includes clarification to policy and updating of the cost base to July 1, 1994. By section, the changes are as follows:

Section 1.2	Change "Kalum Forest District" to "Kalum Timber Supply Area".
Section 1.3	New language to clarify policy.
Section 1.4	Housekeeping
Section 1.5	General formatting.
Section 1.5, (2.)	Delete "costs" and replace with "total least cost".
Section 1.6	Housekeeping
Section 2.1	Housekeeping
Section 2.2	New language to clarify policy.
Section 2.3	New language to clarify policy.
Section 2.3 , (1.)	Update text to current legislation.
Section 2.3 , (3.)	Housekeeping
Section 2.3 , (4.)	Insert "by the licensee" after "omissions of date" in the last sentence.
Section 2.4	New language to match policy used in the *Interior Appraisal Manual.*
Section 2.5	Housekeeping
Chapter 3	New language to clarify the policy.

Section 4.1	New language to match policy used in the *Interior Appraisal Manual*.
Section 4.2	• Update list of publications. • Delete "close utilization" from net cruise volume. • Change "excluded from" to "included in" to coincide with policy change in Section 4.4.1.
Section 4.3	General formatting and housekeeping.
Section 4.3.1, (1.), (a.), (ii.)	Delete bullet "Roads traversing private land".
Section 4.3.1, (2.)	Clarify language by replacing "as part of" with "when submitting" (third paragraph on page 4-8).
Section 4.3.1, (3.)	Delete section on deactivation (moved to Section 4.5.3).
Section 4.3.1.1.1	Clarify language.
Section 4.3.1.1.2	General formatting.
Section 4.3.1.1.3	Change to policy allowing for legitimate costs to access crown timber through private land.
Section 4.3.1.1.4	Replace the word "considered" for "included" in the first sentence. Clarification only.
Section 4.3.1.1.5	General formatting and update the $7.00/m^3$ minimum cost for roads to $14.00/m^3$.
Section 4.3.2.1	Table 4-2, Subgrade Construction Cost Estimate, replaced with 1994 cost base averages.
Section 4.3.2.2	Table 4-3, Log Bridge Cost Estimate, replaced with 1994 cost base estimates.
Section 4.3.2.3, (2.)	Replace in-place unit cost estimates with 1994 cost base estimates for part a and part b.

Section 4.3.3	• Clarify language and adjust format. • Delete the need to submit cost data at the initial review of a major project. • Provide some latitude for regional procedures to establish what constitutes a major project.
Section 4.3.3.1 (3.)	Clarify language by adding 5.4 m crib height to all bullets.
Section 4.4.1	New estimate from 1994 cost base and delete extraneous language related to slope.
Section 4.4.2	New estimates for helicopter logging from 1994 cost base.
Section 4.5.1	• New constants for equation from 1994 cost base. • Add sentence to link the point of origin for towing and barging to the log hauling phase.
Section 4.5.2.1	New estimate for dump, sort, boom and scale from 1994 cost base.
Section 4.5.2.2	New tables for towing and barging from 1994 cost base.
Section 4.5.3	• New estimate for road maintenance from 1994 cost base. • Add Add estimate for all deactivation costs.
Section 4.5.4	• Change responsibility to approve road and land use charges from the Director, Revenue Branch, to the Regional Manager. This is in line with the *Interior Appraisal Manual.* • Amend wording to coincide with changes to policy on private roads.
Section 4.6.1	New estimate for overhead from 1994 cost base.
Section 4.6.2	New equation for crew transportation from 1994 cost base.
Section 4.6.3	New estimates for accommodation from 1994 cost base, housekeeping.
Section 4.8	New Table 4-7 of basic silviculture estimates from 1993 and 1994 cost base.

Section 4.9	• Delete redundant trend factor table for pre-November 1, 1992 effective dates. • Add table for trend factors effective after May 1, 1996. • All tables remaining were updated to current period trend factors.
Section 5.4	Clarified language.
Section 6.2	General formatting.
Section 6.5	General formatting.
Appendix I	Updated machine rates to 1994 cost base.
Appendix III	Amended flow chart to match policy change for private roads.
Appendix V	Deleted due to new language in Chapter 3.



Coast Appraisal Manual

Effective from May 1, 1996

(Cost Base: July 1, 1994)

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Terms and Conventions Used in this Document

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

Introduction 1

1.1 Terms of Reference

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

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

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

1.2 Area of Application

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

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

1.3 Cutting Authority

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

1. A cutting permit issued under:
   a. a forest licence,
   b. a timber sale licence,
   c. a tree farm licence (a tree farm licence cutting authority may include more than one cutting authority area),
   d. a woodlot licence, or
   e. 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.

1.4 Responsibility for Stumpage Determination

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

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

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

1.5 Comparative Value Timber Pricing

Comparative Value Pricing (CVP), subject to a minimum stumpage rate, is the basis for determining stumpage rates. Section 2.1, (2.), (3.) and (4.) provides the methods that are used for specific products and extra ordinary situations.

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

1. Estimate the selling price of the logs that can be recovered from the timber stand (see Chapter 3).

2. Estimate the total least cost necessary to harvest the timber and realize the estimated selling price (see Chapter 4).

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

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

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

   a. the greater of the indicated stumpage rate or the prescribed minimum 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 for the coast is indexed to lumber market values as explained in Chapter 5.

1.6 Stumpage Adjustments

Unless a cutting authority or the application and tender for a timber sale licence specifies that stumpage rates are fixed for a specified period or for the full term of the cutting authority, stumpage rates are adjusted quarterly on January 1, April 1, July 1, and October 1 of each year, subject to Section 6.4.

The adjusted stumpage rates reflect changes in estimated selling prices (as authorized in this manual since the previous adjustment) and the operating cost trended to the adjustment date. In addition, the adjustment reflects changes to the Statistics Canada Softwood Lumber Index for the Coast, the Coast Base Rate and the Coast Mean Value Index.

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 Order-in-Council setting stumpage rates under the *Forest Act,* Section 84.
3. Pricing under Chapter 6 of this manual.
4. The use of stumpage rates developed by regional revenue staff, and approved by the regional manager.

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 must include with the application to the district manager a completed Coast Appraisal Data Sheet and appropriate support information. When the data is provided the district manager will proceed as in Subsection 3 of this section.

2. For a reappraisal, the licensee will provide all data, subject to Section 2.3, (3.), that must be received by the district manager at least 45 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 contact the licensee by the due date for reappraisal data (45 days prior to effective date) and request that data known to have changed since the previous appraisal be submitted within 15 days, and

   b. if the data is not received within 15 days, use the best data available at the district office 30 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. If no data was submitted for reappraisal, then advising the licensee is not required and Subsection 4 and 5 of this section do not apply.

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

5. 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.

6. The licensee is advised by the district manager of changes, if any, made to the appraisal data.

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

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

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

10. The licensee may advise the issuing regional office verbally or in writing of any objection to the information contained in the stumpage advisory notice that could be resolved without an administrative review or appeal. The receipt of an objection will be acknowledged verbally or in writing by the forest officer. At this point the objection is not considered an administrative review or appeal under the *Forest Act*.

2.3 Reappraisal

A reappraisal is a re-estimation of Operating Cost, Log Grade Percentages, and Selling Price according to the Appraisal Manual in effect on the effective date of the reappraisal. Except in the case of "sudden and severe damage" as explained below, a reappraisal is based upon a complete reassessment of a cutting authority and assumes the cutting authority being reappraised has been returned to its original condition prior to development or harvesting. The operating cost data may be revised or left unchanged at the time of reappraisal. At the time of a reappraisal, initial detailed engineering cost estimates may be re-estimated once after construction to reflect more accurate on-site information.

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

1. Sudden and Severe Damage

If the regional manager is satisfied that sudden and severe damage has occurred to the appraised timber, the cutting authority is reappraised upon the licensee's request. The effective date of the redetermined rate is the first of the month following the occurrence of the damage, unless otherwise specified by the regional manager. A reappraisal is not made in the case of fire damage caused by the licensee if the licensee has failed to comply with the *Forest Practices Code of British Columbia Act,* Part 5, Division 1 through 3 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.

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 either the district, regional manager's or licensee's option (see Section 2.2 Time Schedule - Appraisals and Reappraisals).

These reappraisals are made in accordance with the appraisal manual in effect on the anniversary date. In this case 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. 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 to correct the error unless the cutting authority, the appraisal manual or the application in 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 reappraised 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 a calculation made as part of the appraisal datasheet,

   iii. an error in transcribing the data from an approved appraisal datasheet or in performing the calculations specified in the manual,

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

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

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

Omissions of data by the licencee on an approved datasheet do not constitute an error in the appraisal.

5. 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. The reappraisal is made according to the appraisal manual in effect on the effective date of the reappraisal.

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.

   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, (5.). - Minister's Direction.

2. Woodlots

   A woodlot licensee may elect an annual stumpage rate. With this election the stumpage rate shall remain in effect until the anniversary date of the cutting authority, at which time the cutting authority will be reappraised. If the election is not made within the specified time, the quarterly stumpage adjustment will apply.

   The election of an annual stumpage rate becomes effective May 1, 1996, and applies as follows:

   a. All new woodlot cutting authorities will be offered an irrevocable election at the time of the initial appraisal,

   b. All existing woodlot cutting authorities that have not been offered the opportunity to make an election will now have an opportunity at the cutting permit's anniversary date,

   c. Woodlot cutting authorities that have had the opportunity to elect and have elected non-adjusting 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 remain fixed 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,

   d. There will be no change to any woodlot cutting authorities that have elected a quarterly stumpage adjustment. They will continue to adjust quarterly and be subject to annual reappraisal.

Amendments to cutting authorities with the annual stumpage adjustment option would be subject to reappraisal at the time of the amendment (as defined in Section 2.3, (2.). The new stumpage rate would then not be adjusted until the cutting authority's anniversary date.

3. 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 extend that 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.

4. 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 contain miscellaneous stumpage rates specified in the cutting authority.

5. Timber Licence

   When a cutting authority that includes the authorization to harvest timber from a timber licence has the term extended, the stumpage rate for the timber harvested on the timber licence will be determined under Subsection 4 of this section, 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.

Selling Price Estimation 3

Log 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 Market Value (AMV) Determination

Invoiced (f.o.b.) market log 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 market log 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 immature average market log values to be used for immature stumpage rate determinations.

The immature 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 the 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 forest officer does an appraisal or reappraisal of a cutting authority area will be the two year billing history record as determined in Table 3-1. 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 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

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

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 forest officer 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.) 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 include 2 000 m^3 or more of that species.

5. a. Where there is 0 m^3 of volume for a species of timber 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, the five year billing history shall end on the corresponding date in Column 2 of Table 3-1, 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, a replaceable Timber Sale Licence, or a cutting authority consisting of immature timber (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 2 000m^3 or more of that species of timber, or

   b. the cruise compilation algorithm predictions, where the two year billing history record for that cutting authority does not include 2 000 m^3 or more of that species of timber.

7. 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

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 and the cutting authority is not under the Small Business Forest Enterprise Program.

3. Section 3.2.3.3, where the cutting authority area being appraised or reappraised is entirely within the geographic boundaries of one Timber Supply Area and the cutting authority is under the Small Business Forest Enterprise Program.

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 forest officer 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 forest officer will proceed to Subsection 2. of this section.

2. a. If the cutting authority is, or is issued under, a Timber Sale Licence, the forest officer will proceed to Subsection 3. of this section.

   b. 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 forest officer will proceed to Subsection 4. of this section.

   c. If neither of Subsections 2. a. or 2. b. are applicable, the forest officer will proceed to Subsection 5. of this section.

3. a. If the species being considered has a billing history record for that Timber Sale 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 forest officer will proceed to Subsection 5. of this section.

4. 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 forest officer will proceed to Subsection 5. of this section.

5. 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 forest officer will proceed to Subsection 6. of this section.

6. a. If the species being considered has a two year billing history record for the entire Tree Farm Licence area that contains more than 0 m^3, 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 forest officer 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 (not under the Small Business Forest Enterprise Program) 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 and the cutting authority is not under the Small Business Forest Enterprise Program, the forest officer 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, or

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

2. a. If the cutting authority area is entirely within the geographic boundaries of a single Timber Licence, the forest officer will proceed to Subsection 3. of this section, or

b. if not, the forest officer 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 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 forest officer will proceed to Subsection 7. 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 forest officer 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 forest officer 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 forest officer 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 contains more than 0 m^3, 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 forest officer will determine the log grade percentages for that species in accordance with Section 3.2.2, (5.).

3.2.3.3 Log Grade Percentages for a Cutting Authority under the Small Business Forest Enterprise Program 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 and the cutting authority is under the Small Business Forest Enterprise Program, the forest officer 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, or

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

2. 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 Small Business Forest Enterprise Program 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 forest officer will proceed to Subsection 3. of this section.

3. 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 Small Business Forest Enterprise Program 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 forest officer will proceed to Subsection 4. of this section.

4. a. If the species being considered has a billing history record for the entire supply block of 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 forest officer 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 Timber Supply Area that contains more than 0 m^3, 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 forest officer 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 Sections 3.2.1, 3.2.2 and 3.2.3 will not apply to the appraisal or reappraisal of the cutting authority area. The log grade percentages for the cutting authority area being appraised or reappraised will 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:

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

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:

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

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	Spruce

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, J, K, L and M.

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

Cost estimates have been determined from comprehensive surveys of logging operations on the Coast. The surveys include both employee and contractor operations.

The surveys collect experienced costs to the licensee 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 included.

The phase cost estimating formulas and tables in this manual have been derived from those cost surveys.

Phase cost estimates are complete and reflect average conditions, operating practices, and phase accounting allocations as found in the survey data. Because of this averaging, no additions to or subtractions from these estimates to reflect site-specific conditions are permitted.

The forest officer must estimate operating costs for a cutting authority area in a manner which will produce the least total operating cost estimate for the cutting authority area. To do this, the forest officer must base estimates of harvesting and transportation costs on the operating cost estimates set out in this manual for the method, which will produce the least total cost estimate to the point of appraisal, unless that particular method of harvesting or transportation is not possible under the cutting authority. An appraisal assumes compatible operating phases.

Phase cost estimates for specified operations, helicopter logging operations and conventional logging are weighted according to the applicable net cruise volume under the cutting authority for each system.

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. Manual phase cost estimates are combined with the specified operation cost estimate to determine the total operating cost.

SPECIFIED OPERATIONS	*AFFECTED PHASE*
A-frame Logging	Tree-to-Truck (Section 4.4)
Skyline Logging	Tree-to Truck (Section 4.4)
Blowdown Timber	Tree-to-Truck (Section 4.4)
Selection Logging	Tree-to-Truck (Section 4.4)
Commercial Thinning	Tree-to-Truck (Section 4.4)
Balloon Logging	Tree-to-Truck (Section 4.4)
Skidder Swinging	Log Transportation (Section 4.5)
Railway Transportation	Log Transportation (Section 4.5)
Lake Transportation	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 are not 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:

- *Forest Service Cruising Procedures & Cruise Compilation* (Cruising Manual),
- *Cruise Compilation System - Change Specification Detailed Requirements & Design,*
- *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, and

2. reconstruction and replacement.

A unit cost ($/m³) is calculated for each category of Section 4.3.1 and Section 4.3.1.1 and these unit costs are totalled to give a total development cost estimate ($/m³).

In order to calculate the unit costs ($/m³) 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, or

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.

a. Road Cost Estimates

i. Tabular cost estimates

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

ii. Detailed engineering cost estimates

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

- main access roads as defined in the "Ministry of Forests Main Access Roads Policy",
- 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 all excavated material to a spoil area,
- overland construction to provide a roadbed by trucking in material for extensive fill sections, and
- switchbacks with over 10 000 m³ 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 ($/m³) for engineered roads.

b. Bridge Cost Estimates

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

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

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

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

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

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

2. Reconstruction and Replacement

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

- of extensive "wear and tear",
- the road has been 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.

The cost estimate may be allocated, by the licensee, to any individual 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 (Section 4.3.3) and must be approved by the district manager.

These projects may include:

- Bridge structural maintenance including redecking (ties and decking) or replacement of a major drainage structure,
- Reconstruction of a road,
- Resurfacing of a road, with a minimum loose depth of 0.1 m over a continuous length of 0.5 km or greater, or
- Replacing pipe culverts larger than 900 mm 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 ($/m³) for reconstruction and replacement, the total approved costs are divided by the total net cruise volume at initial appraisal or the remaining volume at reappraisal.

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

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

4.3.1.1.5 Extended Road Amortization

Where the New Construction cost estimate exceeds $\$14.00/m^3$, a written agreement may be made which apportions the main access road cost estimate to two or more tributary cutting authorities. The main access road ends at the far boundary of the first cutting authority being appraised.

The agreement is subject to the following conditions:

1. Only main access roads serving the tributary cutting authorities (as defined in Section 4.3) may be considered.

2. Each cutting authority must be in the licensee's approved forest development plan.

3. The agreement must be signed by the licensee and the licensor.

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

5. The term of the agreement must not exceed the terms of the cutting authorities.

6. 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 occurring in the section is excluded.

4.3.2.1 Subgrade Construction

The estimated cost per kilometre for subgrade construction is provided for each combination of Construction Category and uphill side-slope for two Rock Mass Classification categories, "RMC 5 Only" and "Other RMC's".

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

   The percent rock is determined as follows:

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

   Where:

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

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

Construction Category may show a range of variation (± one CC) within any section length, and is recorded to the nearest integer. Hardpan is CC1, whether drilled and blasted or not. Rippable rock and boulders may occur in CC2 to CC6.

The following table defines the Construction Categories.

Table 4-1: Construction Categories

Construction Category (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 0.01 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. 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 900 mm) and single log abutment culverts with spans less than 3.5 m. Right-of-way felling and loading is excluded from the road construction phase but included in the tree-to-truck phase.

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	25.3	33.0	53.5	76.0	95.7	109.2
5 - 14	26.3	34.5	56.3	80.0	100.5	114.5
15 - 24	27.4	36.4	59.7	84.7	106.2	120.9
25 - 34	28.4	38.1	62.9	89.2	111.6	126.9
35 - 44	29.3	39.8	66.0	93.5	116.8	132.7
45 - 54	30.2	41.3	69.0	97.6	121.8	138.3
55 - 64	31.0	42.8	71.8	101.5	126.5	143.6
65 - 74	31.7	44.2	74.5	105.2	131.1	148.7
75 - 84	32.4	45.6	77.1	108.9	135.5	153.7
85 - 94	33.0	46.9	79.6	112.4	139.8	158.6
95 - 104	33.6	48.1	82.1	115.8	144.0	163.2
105 - 114	34.1	49.3	84.4	119.1	148.1	167.8
115 - 124	34.7	50.5	86.7	122.3	152.0	172.3
125 - 134	35.1	51.6	88.9	125.4	155.9	176.6
135 - 144	35.6	52.7	91.1	128.4	159.6	180.9
145 - 150	36.0	53.8	93.2	131.4	163.3	185.1

b) OTHER RMC's

Uphill Side Slope %	Construction Category					
	CC1	CC2	CC3	CC4	CC5	CC6
0 - 4	25.3	31.1	46.7	64.3	79.9	90.8
5 - 14	26.3	32.5	49.1	67.5	83.7	95.0
15 - 24	27.4	34.1	51.8	71.2	88.2	99.9
25 - 34	28.4	35.6	54.4	74.7	92.4	104.6
35 - 44	29.3	37.1	56.8	78.0	96.4	109.1
45 - 54	30.2	38.4	59.2	81.2	100.3	113.4
55 - 64	31.0	39.7	61.4	84.3	104.0	117.6
65 - 74	31.7	40.9	63.6	87.2	107.5	121.6
75 - 84	32.4	42.1	65.6	90.1	111.0	125.4
85 - 94	33.0	43.2	67.6	92.8	114.3	129.2
95 - 104	33.6	44.2	69.6	95.4	117.6	132.8
105 - 114	34.1	45.2	71.4	98.0	120.7	136.4
115 - 124	34.7	46.2	73.2	100.5	123.7	139.8
125 - 134	35.1	47.1	74.9	102.9	126.7	143.2
135 - 144	35.6	48.0	76.6	105.2	129.6	146.5
145 - 150	36.0	48.9	78.3	107.5	132.5	149.7

4.3.2.2 Drainage Structures

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

All pipe culverts up to and including 900 mm diameter and all single log abutment culverts up to 3.4 m span length are included in the subgrade cost estimates.

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.

Crib back-fills and all site preparation and protection features such as rip rap are included, as well as material supply and erection. No adjustment of table values is permitted.

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

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

(Thousands of Dollars)

Span Length (m)	Single Log Sill	Multi-Log Crib Average Crib Height (m)			
	1	2	3	4	5
4	1.6	3.3	8.3	13.2	18.1
5	2.0	5.0	9.9	14.9	19.8
6	2.2	6.7	11.6	16.6	21.5
7	3.4	8.4	13.3	18.2	23.2
8	5.1	10.0	15.0	19.9	24.9
9	6.8	11.7	16.7	21.6	26.5
10	8.5	13.4	18.3	23.3	28.2
11	10.1	15.1	20.0	25.0	29.9
12	11.8	16.8	21.7	26.6	31.6
13	13.5	18.4	23.4	28.3	33.3
14	15.2	20.1	25.1	30.0	34.9
15	16.9	21.8	26.7	31.7	36.6
16	18.5	23.5	28.4	33.4	38.3
17	20.2	25.2	30.1	35.0	40.0
18	21.9	26.8	31.8	36.7	41.7
19	23.6	28.5	33.5	38.4	43.3
20	25.3	30.2	35.1	40.1	45.0

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 developed in place during subgrade construction. If additional stabilizing material is required it may be obtained from the adjacent cut-bank or trucked in.

1. Quantity

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

VR = 1000D (W + 1.0D), using rock

VG = 1000D (W + 1.5D), using gravel

Where:

- V is loose volume (VR or VG) of stabilizing material,
- 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 4-4: 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 ½:1 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.

2. In-place Unit Cost Estimates

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:

a. 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$) = 5.06
Soft and Medium Rock	U ($/$m^3$) = 7.94
Hard Rock	U ($/$m^3$) = 10.41

Definition - m^3 = cubic meters of stabilizing material

b. 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$) = 6.85+ 0.528 (d)
Soft and Medium Rock	U ($/$m^3$) = 9.73 + 0.528 (d)
Hard Rock	U ($/$m^3$) = 12.20 + 0.528 (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.

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

4. 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 normally trucked in from a different borrow pit than the source of the stabilizing material.

4.3.3 Detailed Engineering Cost Estimates

Where the tabular cost estimating procedures of this manual cannot be used due to their physical limitations, the cost of a project is estimated by preparing a detailed engineering cost estimate. The regional manager may approve standardized procedures to generate cost estimates for use on projects including the following:

1. End Hauling.

2. Bridge Construction.

3. Road Reconstruction and Replacement.

4. Bridge Structural Repair.

When development projects require detailed engineering estimates, the district manager shall be advised by the licensee of project physical details, for major projects, no less than 60 days prior to the commencement of construction to facilitate a review of the project for later consideration in an appraisal.

When an emergency situation arises where the 60 day advance notice to the district manager is not possible then verbal notification must be made at the earliest opportunity.

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 1 then the equipment rate can be attained from the "Province of British Columbia Equipment Rental Rate Guide for 1993-1994". All equipment rates are assumed to be for a 3 year old machine using the July 1, 1994 cost base. Some projects will be completed on the basis of arms length competitive bids and those costs may be accepted 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,
    - Type of construction equipment to be used,

- 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, type of work required, and other information important to the project,
   - Time and materials, equipment and labour, estimates for excavation, repairs to drainage structures, reditching and resurfacing where required,
   - 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 greater than 20.4 m span or 5.4 m crib height: 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 less than 20.4 m span or 5.4 m crib height: an economic comparison between a log structure and the permanent structure, and the same information as required for permanent structures of 20.4 m span or 5.4 m crib height or greater,
   - For pipe culverts greater than 900 mm in diameter: the same information as required above for permanent structures of greater than 20.4 m span or 5.4 m crib height.

4.4 Tree To Truck

The cost estimate for the tree-to-truck phase includes falling, bucking, skidding or 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:

$$(\$/m^3) = 16.42$$

4.4.2 Helicopter Logging

No variables are recognized for this system. The cost estimates given below are applied to the net cruise volume that requires helicopter yarding.

Two variations of helicopter logging are recognized:

1. Water Drop Operations

Water drop operations occur where logs are carried by helicopter to the water. This phase cost estimate includes felling and bucking, helicopter yarding, chasing, bag booming and towing to sorting area or local tie up grounds, total crew transportation and short and long distance mobilization of helicopter logging operation (e.g., camp, shop, equipment, parts, fuel, etc.).

The cost estimate for the above phase is $58.47/m^3$ for all water drop operations.

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

- 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 Woods Run phase (Section 4.6.2) is not applicable.

2. Land Drop Operations

Land drop operations occur where logs are carried by helicopter to land, rehandled on land, and hauled by logging truck. This phase cost estimate includes "Tree-to-Truck" using helicopter, total crew transportation, landing construction, and short and long distance mobilization of a helicopter logging operation (e.g., shop, equipment, parts, fuel, etc.).

The cost estimate for the above phase is $59.47/m^3$ for all land drop operations.

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 Woods Run 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:

$$(\$/m^3) = 3.8412 + .0614\ (D)$$

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	$6.63/m³
Barging	$8.22/m³

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. Where the listed point of origin is not a functional log dump it should only be used to pro-rate a cost estimate for an unlisted point.

Table 4-5: 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	1.76
CHCK	CHINA CREEK	A	0.53	KIIM	M. OF KINGCOME INLET	G	3.01
COCK	COLEMAN CREEK	A	0.64	KNIM	M. OF KNIGHT INLET	G	3.27
MTCK	MacTUSH CREEK	A	0.56	LOUM	M. OF LOUGHBOROUGH	G	2.02
SARV	SARITA RIVER	A	0.82	TOIM	M. OF TOBA	G	1.79
SPCK	SPENCER CREEK	A	0.69	NACK	NAKA CREEK	G	2.47
TOBY	TOQUART BAY	A	0.99	NOBY	NORTHWEST BAY	G	1.05
UCHU	UCHUCKLESIT	A	0.75	PHAR	PHILLIPS ARM	G	1.96
UCLU	UCLULET	A	1.07	PTEB	PORT ELIZABETH	G	2.67
CHEM	CHEMAINUS	C	0.00	PTHD	PORT HARDY	G	3.12
COBY	COWICHAN BAY	C	0.69	PTHV	PORT HARVEY	G	2.45
JORV	JORDAN RIVER	C	1.48	PTMN	PORT McNEILL	G	2.84
LADY	LADYSMITH	C	0.56	PTNE	PORT NEVILLE	G	2.39
NANA	NANAIMO	C	0.71	PORV	POWELL RIVER	G	1.29
PTRE	PORT RENFREW	C	1.79	SENA	SECOND NARROWS	G	0.77
SOOK	SOOKE	C	1.38	SYIN	SEYMOUR INLET	G	4.13
VICT	VICTORIA	C	1.12	SEBY	SOUTHWEST BAY	G	2.35
AGAM	AGAMEMNON	G	1.03	SQUA	SQUAMISH	G	0.75
BECV	BEAVER COVE	G	2.74	STIL	STILLWATER	G	1.12
COUR	COURTENAY	G	1.46	TEAR	TEAKERNE ARM	G	1.61
DRIN	DRURY INLET	G	3.25	THIN	THEODOSIA INLET	G	1.61
EVRV	EVE RIVER	G	2.39	THSO	THOMPSON SOUND	G	2.82
FOHA	FORWARD HARBOUR	G	2.17	WASA	WAKEMAN SOUND	G	3.21
FRAR	FREDERICK ARM	G	1.89	GAMB	GAMBIER ISLAND	G	0.00
BUIH	H. OF BUTE INLET	G	2.26	HOAB	ABOVE HOPE BRIDGE	P	1.44
JEIH	H. OF JERVIS INLET	G	1.55	CHWK	CHILLIWACK	P	0.88
KIIH	H. OF KINGCOME INLET	G	3.27	HALF	FOOT HARRISON LAKE	P	1.12
KNIH	H. OF KNIGHT INLET	G	3.27	PILF	FOOT OF PITT LAKE	P	0.58
LOUH	H. LOUGHBOROUGH	G	2.25	HABY	HARRISON BAY	P	0.94
SEIH	H. OF SECHELT INLET	G	1.40	HATZ	HATZIC	P	0.77
TOIH	H. OF TOBA INLET	G	2.05	HALH	HEAD HARRISON LAKE	P	1.54
INAR	INDIAN ARM	G	0.94	PILH	HEAD OF PITT LAKE	P	0.75
KLBY	KELSEY BAY	G	2.22	HALM	MID HARRISON LAKE	P	1.35
MNCK	McNAB CREEK	G	0.64	PIRV	PITT RIVER BRIDGE	P	0.00
MEBY	MENZIES BAY	G	2.04	SICK	SILVERHOPE CREEK	P	1.31
JEIM	MOUTH JERVIS INLET	G	1.07	WHON	WHONNOCK	P	0.64

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 4-6: Barging Cost Estimates

Code	Point of Origin	P/A	$/m3	Code	Point of Origin	P/A	$/m3
BACK	BARR CREEK	A	5.09	BOIN	BOSWELL INLET /SECURITY BAY	G	6.54
BLBY	BLOWHOLE BAY	A	4.78	CAIS	CAMPBELL ISLAND	G	7.39
CLCK	CLEAGH CREEK	A	5.95	DIBY	DINAN BAY	G	11.62
COHA	COAL HARBOUR	A	6.16	ELHA	ELCHO HARBOUR	G	7.54
CYRV	CYPRE RIVER	A	4.13	FEBY	FERGUSON BAY	G	11.49
EAIN	EASY INLET	A	5.35	RIIH	HEAD OF RIVERS INLET	G	6.85
ESIN	ESPINOSA INLET	A	5.12	SBEH	HEAD OF SOUTH BENTINCK ARM	G	8.05
GORV	GOLD RIVER	A	4.83	HNRV	HONNA RIVER	G	10.52
HEBY	HEAD BAY	A	4.75	KMBY	KEMANO BAY	G	9.56
BESH	HEAD OF BEDWELL SOUND	A	4.23	KHIN	KHUTZEYMATEEN INLET	G	10.76
HENO	HECATE CHANNEL - NOOTKA	A	4.79	KIMS	KIMSQUIT	G	8.16
HOLB	HOLBERG	A	6.42	KLEM	KLEMTU	G	7.83
HORV	HOUSTON RIVER	A	4.70	KUIN	KUMEALON INLET	G	9.65
HUCK	HUSHAMU	A	6.26	KWBY	KWATNA BAY/MINERVA	G	7.43
INGE	INGERSOLL	A	5.98	KWRV	KWINAMASS RIVER	G	10.71
JELA	JEUNE LANDING	A	6.13	MCBY	McCLINTON BAY	G	11.67
KEIN	KENDRICK INLET	A	4.65	MOIN	MOSES INLET/INRIG BAY	G	6.88
KOHA	KOPRINO HARBOUR	A	5.85	NAHA	NADEN HARBOUR	G	11.33
KUCV	KULTUS COVE	A	6.03	NABY	NASS BAY	G	10.97
MCCK	McCURDY CREEK	A	4.81	NORV	NOOTSUM RIVER	G	7.04
MORV	MOOYAH RIVER	A	4.65	OCFA	OCEAN FALLS	G	7.43
OUIN	OUOUKINSH INLET	A	5.43	POIS	PORCHER ISLAND	G	9.92
PLHA	PLUMPER HARBOUR	A	4.60	PRRU	PRINCE RUPERT	G	10.05
PTEL	PORT ELIZA	A	4.96	RESO	RENNELL SOUND	G	10.58
RACV	RANKIN COVE	A	4.36	REPA	RENNERS PASSAGE	G	10.55
STCV	STEAMER COVE	A	4.26	SCRV	SCOTIA RIVER *	G	10.72
TLRV	TLUPANA RIVER	A	4.73	SWIN	SEWELL INLET	G	10.03
TSRV	TSOWWIN	A	4.70	SKIN	SKIDEGATE INLET	G	10.50
WIHA	WINTER HARBOUR	A	5.85	SOBY	SOUTH BAY	G	10.58
ZEBA	ZEBALLOS	A	5.20	STEW	STEWART	G	11.80
ALAR	ALICE ARM	G	11.46	TASU	TASU SOUND	G	9.99
ALBY	ALLIFORD BAY	G	10.50	TUIN	TUCK INLET	G	10.16
BEAN	BEATTIE ANCHORAGE	G	9.98	WECK	WEEWANIE CREEK	G	9.17
BECO	BELLA COOLA	G	7.82	WOCH	WORK CHANNEL	G	10.76
BIBY	BISHOP BAY	G	8.81				

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, 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 cost estimates ($/m³) by Forest District are:

Zone 1 (North)

- Queen Charlotte
- Mid Coast
- North Coast
- Port McNeill

Routine Maintenance	2.15	
Deactivation	.64	
Total Cost Estimate =	$2.79	/m³

Zone 2 (South)

- Sunshine Coast
- Campbell River
- Duncan
- Squamish
- Chilliwack
- Port Alberni

Routine Maintenance	2.96	
Deactivation	.80	
Total Cost Estimate =	$3.76	/m³

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:

1. submit a "Request for Approval of a Road Use Charge" form with the Appraisal Data Sheet.

2. receive written approval of the road or land use charge from the Regional Manager.

a. 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.

b. Charges for Other than Road Maintenance

There are three main categories of road status:

i. 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;

ii. Permitted Roads

Roads built on Crown land, authorized by road permit or other cutting authority documents. This category also includes foreshore leases, camp areas and dryland sorts. No road use charges will be considered in appraisals;

iii. 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, his 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.

c. Other Land Use Charges

Only non-governmental land use charges will be considered in appraisals.

4.6 Administration and Other Costs

4.6.1 Overhead

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, 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, and the consolidated corporate Forest Management and Engineering functions.

Operational Overhead 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 88, or by funding from any Crown agency are excluded except as noted in Section 6.5.

The cost estimates are:

General and Administrative Overhead	($/m³) =	5.26
Operational Overhead	($/m³) =	11.11
Total Overhead	($/m³) =	16.37

4.6.2 Woods Run

Woods Run refers to moving crews from the appraisal marshalling area, on roads suitable for crew buses, to the centre of the work area in the cutting authority being appraised, and return. The appraisal marshalling area is defined for accessible cutting authorities (Section 4.6.3, (1.) and isolated cutting authorities (Section 4.6.3, (2.)).

1. Accessible Cutting Authorities

   The appraisal marshalling area is specified by the Appraisal Co-ordinator as the most logical place for the crew to assemble, considering the location of the timber being appraised, the existing roads, and the nearest communities. The appraisal marshalling area need not be the location actually used by a given licensee.

2. Isolated Cutting Authority

   The appraisal marshalling area is the camp location, or where there is no camp, it is the vehicle storage area.

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

Included in the cost estimate are:

- driver or labour costs,
- crew travel-time labour costs, and
- vehicle owning and operating costs (depreciation, leases, rentals).

The formula for woods run is:

$$\$/m^3 = 0.1827 + 0.1394\ (D) - 0.0015\ (D^2)$$

Where: D is the weighted average one-way distance in kilometres (rounded to the nearest 0.1) from the appraisal marshalling area to the centre of the cutting authority. The method of calculation of D is similar to Section 4.5.1 except the words "marshalling area" replace "appraisal log dump where trucks are off-loaded".

Where: D is greater than or equal to 47 km, 47 is used in the formula.

Where: D=0, the Woods Run estimate is equal to zero.

4.6.3 Accommodation

The accommodation phase cost estimate recognizes two types of logging operations according to the mode of access to the highway system:

1. Accessible Cutting Authority

   An accessible cutting authority is one where the appraisal marshalling area is connected, by a road suitable for crew buses, to the centre of the nearest community, provided that the one way travel time for crew buses, on the average would be less than 75 minutes. The nearest community must be incorporated as a city, district municipality, town or village and must have retail food and gasoline services located nearby. The centre of the nearest community, used for measurement purposes only, is deemed to be the main post office.

The cost estimate covers the depreciation, maintenance and operating costs of camp and crew marshalling area facilities; provides for the non-recoverable costs incurred for cookhouses, family quarters, bunkhouses, shop and office and other pertinent buildings; and provides for daily and/or periodical commuting costs.

The cost estimate for accessible cutting authorities is: $1.31/m^3$.

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.

The cost estimate covers the depreciation, maintenance and operating cost of camp and marshalling area facilities; the non-recoverable costs incurred for cookhouses, family quarters and bunkhouses, 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: $4.60/m^3$.

4.6.4 Low Volume Cost Estimate Additive

All replaceable and non-replaceable fully appraised cutting authorities are eligible for a low volume cost estimate additive.

The cost estimate additive is: $\$/m^3 = 4.52 - [0.0015 *(V-2\ 000)]$

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 $4.52/m^3$.

4.7 Total Logging Cost Estimate

The Total Logging Cost estimate is the sum of all previous phase cost estimates.

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 88, or by any Crown agency, except as noted in Section 6.5.

Table 4-7: District Silviculture Cost Estimates

Forest District	$/m³ *	**Forest District**	$/m³ *
Mid Coast	1.72	Duncan	1.38
Queen Charlotte Isl.	0.97	Port Alberni	1.88
Chilliwack	1.38	Campbell River	1.39
Squamish	1.58	Port McNeill	1.33
Sunshine Coast	2.90	North Coast	1.21

* The dollar per cubic metre ($/m³) cost estimates are net of overhead.

4.9 Cost Trend

A cost trend factor is separately applied to the total logging and the basic silviculture cost estimates. 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 4-8: Trend Factor by Effective Date

APPRAISAL EFFECTIVE DATES FROM JANUARY 1, 1994 AND BEFORE JANUARY 1, 1995 (cost base July 1, 1992)

Stumpage Adjustment Date (or Appraisal Effective Date)	**Trend Factor**
July - September, 1996	1.440
October - December, 1996	1.468
January - March, 1997	1.500
April - June 1997	1.523

APPRAISAL EFFECTIVE DATES FROM JANUARY 1, 1995 AND BEFORE MAY 1, 1996 (cost base July 1, 1993)

Stumpage Adjustment Date (or Appraisal Effective Date)	**Trend Factor**
July - September, 1996	1.330
October - December, 1996	1.358
January - March, 1997	1.390
April - June 1997	1.413

APPRAISAL EFFECTIVE DATES FROM MAY 1, 1996 *(cost base July 1, 1994)*

Stumpage Adjustment Date (or Appraisal Effective Date)	**Trend Factor**
April - June, 1996	1.193
July - September, 1996	1.220
October - December, 1996	1.248
January - March, 1997	1.275
April - June 1997	1.303

The trend factor is 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.

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.

The MVI does not include appraisals from timber licences.

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 as indicated by the Statistics Canada British Columbia Softwood Lumber Index (INDEX) for the Coast, number D693601 (1986 = 100) adjusted back to the base of 1981 = 100.

New Coast Target Rate Calculation:

1. If the INDEX is less than or equal to 160 then, $$TR = \frac{INDEX}{138.5} * 10.59$$

2. If the INDEX is greater than 160, but less than or equal to 185 then, $$TR = 12.23 + \left[\frac{(INDEX - 160)}{25} * 9.73\right]$$

3. If the INDEX is greater than 185 then, $$TR = 21.96 + \left[\frac{(INDEX - 185)}{49} * 7.45\right]$$

Where: TR = New Target Rate ($/m³)

Quarterly Stumpage Rate Adjustment Date	**New Statistics Canada Index based on index values 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 Statistics Canada 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 84 of the *Forest Act*), or
- the prescribed minimum stumpage rate.

Table 5-1 Timber Licence Stumpage Rate Adjustment Schedule

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

① The percentage of stumpage rate opposite the time period will be applied to appraisals, reappraisals and stumpage 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 regional manager 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 m³ or Less Volume

1. Total Volume of less than 2 000 m³

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.

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.). 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 m³

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 where the stumpage value is over $3,000 or volume exceeds 300 m^3, a full cost estimate appraisal is completed upon 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 16 and 16.1; and
- all TSLs issued under the *Forest Act*, Section 18 except 18 (1)(b) and 18(1)(c).

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 may be site-specific or may be obtained from one or more comparable cutting authority areas. 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.

During the term of the cutting authority, a licensee's election of fixed stumpage rates also precludes any correction to the upset stumpage rate determination that would otherwise be warranted because of an error in the appraisal.

Section 16 Timber Sale Licences (Prior to May 1, 1994)

A licensee who holds a timber sale licence issued under Section 16 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 16.1 Timber Sale Licences (Prior to May 1, 1994)

For a timber sale licence issued under Section 16.1 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 16, 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 (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 16, 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).

6.6 Miscellaneous Stumpage Rates

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

6.6.1 Special Forest Products and Other Miscellaneous Rates

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

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

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

Table 6-1: Miscellaneous Stumpage Rates

Vancouver Forest Region and North Coast Forest District

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

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

6.6.2 Miscellaneous Stumpage Rates for Timber Licences

The stumpage rates in Table 6-2 apply only to timber licence cutting 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:

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

Table 6-2: Miscellaneous Stumpage Rates for Timber Licences

Column 1 Species of timber	*Forest Region* Column 2 Vancouver except the Mid-Coast and Queen Charlotte forest districts (that part west of the Cascades Mountains) $/cubic metre	Column 3 Prince Rupert and the Mid-Coast and Queen Charlotte forest districts (that part west of the Cascades Mountains) $/cubic metre	Column 4 All forest regions and those parts of regions east of the Cascade Mountains $/cubic metre
Fir	36.80	28.40	20.90
Spruce	40.70	32.90	20.00
Balsam	20.60	17.20	17.60
Cedar	18.30	14.70	22.00
Hemlock	19.90	16.00	19.40
Cypress	37.30	29.10	20.20
White pine	20.10	17.10	24.90
Yellow pine	20.10	17.10	21.30
Larch	20.10	17.10	20.90
Lodgepole pine	13.00	10.10	18.20
Other conifers	20.10	17.10	20.20
All non-conifers	1.00	1.00	0.50
All species Grades 3, 4, 5, and 6	N/A	N/A	0.25
All species Firmwood reject	Nil	Nil	Nil
All species Grade Y	0.25	0.25	N/A

Appendices

Appendix I Equipment and Labour Rates

(Cost Base July 1, 1994)

MACHINE DESCRIPTION	*TYPICAL MODEL*	*$/HOUR*
Bulldozer	Cat D-9N, Flat aLLIS FD30B	169.25
Bulldozer	Cat D-8, TD25, Komatsu D155A-1	159.25
Bulldozer	Cat D-7, TD20, Komatsu D85	130.25
Bulldozer	Cat D-6, TD15, Komatsu D65	111.50
Rock Drill (includes labour)	All	163.88
Grader	Cat 14G, Komatsu GD705,725	97.50
Front End Loader (Gravel)	Cat 980B, Komatsu WA470-1	119.00
Front End Loader (Logs)	Cat 980C, Komatsu WA500-1	129.00
Heel Boom Loader	All Cable	164.78
Heel Boom Loader	All Hydralic	161.11
Hydralic Excavator inc. Brush Guard & Thumb	Cat 235C, Hitachi EX400.	205.15
Hydralic Excavator inc. Brush Guard & Thumb	Cat 235B, Hitachi UH171 etc.	169.40
Hydralic Excavator inc. Brush Guard & Thumb	Rate Factor: 27.4 - 37.0 Cat 229	149.60
Hydralic Excavator inc. Brush Guard & Thumb	Cat 225, Hitachi EX270, UH09	137.23
Hydralic Excavator inc. Brush Guard	JD 690A, Hitachi EX150, etc.	93.19
Gradall	54,100 - 62,300 kg - m	136.00
Logging Truck (Highway)	All Triaxle	86.50
Logging Truck (Off Highway)	All	150.91
Self Loading Log Truck	Highway log truck + 4.5 t deck crane	98.80
Gravel Truck	9.9 m^3 +	71.50
Gravel Truck Articulated	20 - 30 tonne	109.82
Lowbed	36 tonne	78.00
Lowbed	150 tonne	150.91
Concrete Mix Truck	6 m^3	82.00
Concrete Vibrator (labour not included)	5 m^3	3.88
Concrete Mixer (labour not included)	.17 m^3	6.13
Crane - Truck mounted	18 tonne	85.00
Soft Track Skidder	KMC 200	112.00
Rubber Tired Skidder	Clark 668	76.75
Vibrator Compactor	Clark 668 + 2.7 - 3.6 tonne roller	88.45
Tractor and Grid roller	Clark 668 + grid roller	88.55
Labourer		25.96
Roadman		26.17
Crib/Culvert Maker, Powderman		27.49
Landingman		27.85
Rockdriller & Powderman (for load & blast only)		5987
Bridgeman		32.74
Powersaw (labour not included)	All	4.25
Faller, including powersaw coast		50.77

NOTES

1994 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:

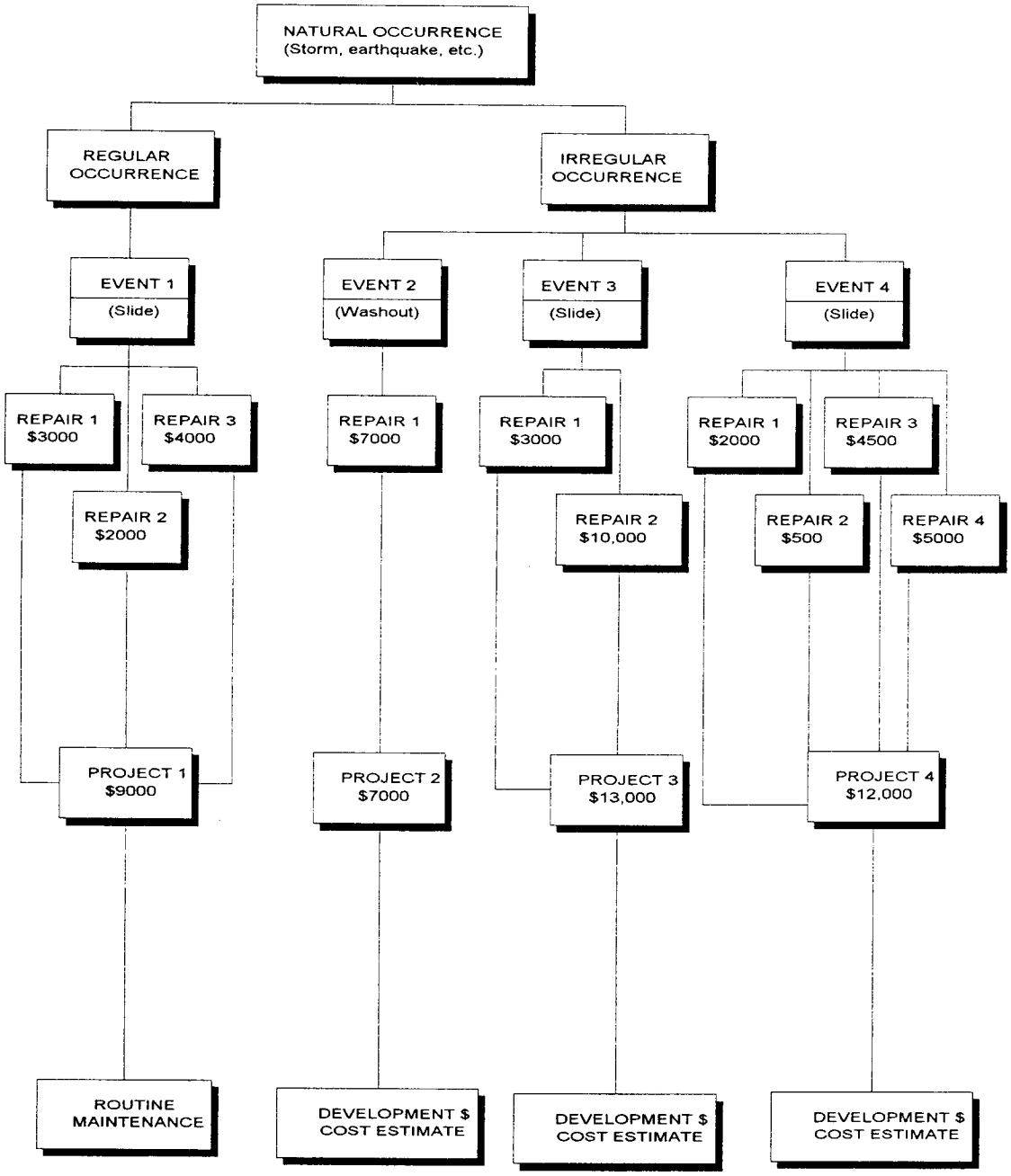
- All equipment rates include labour for operators and swampers unless otherwise noted,
- Labour components include all payroll loading, and
- Lowbedding cost estimates for tracked equipment only may be recognized for Detailed Engineering Cost Estimates (Section 4.3.3).

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

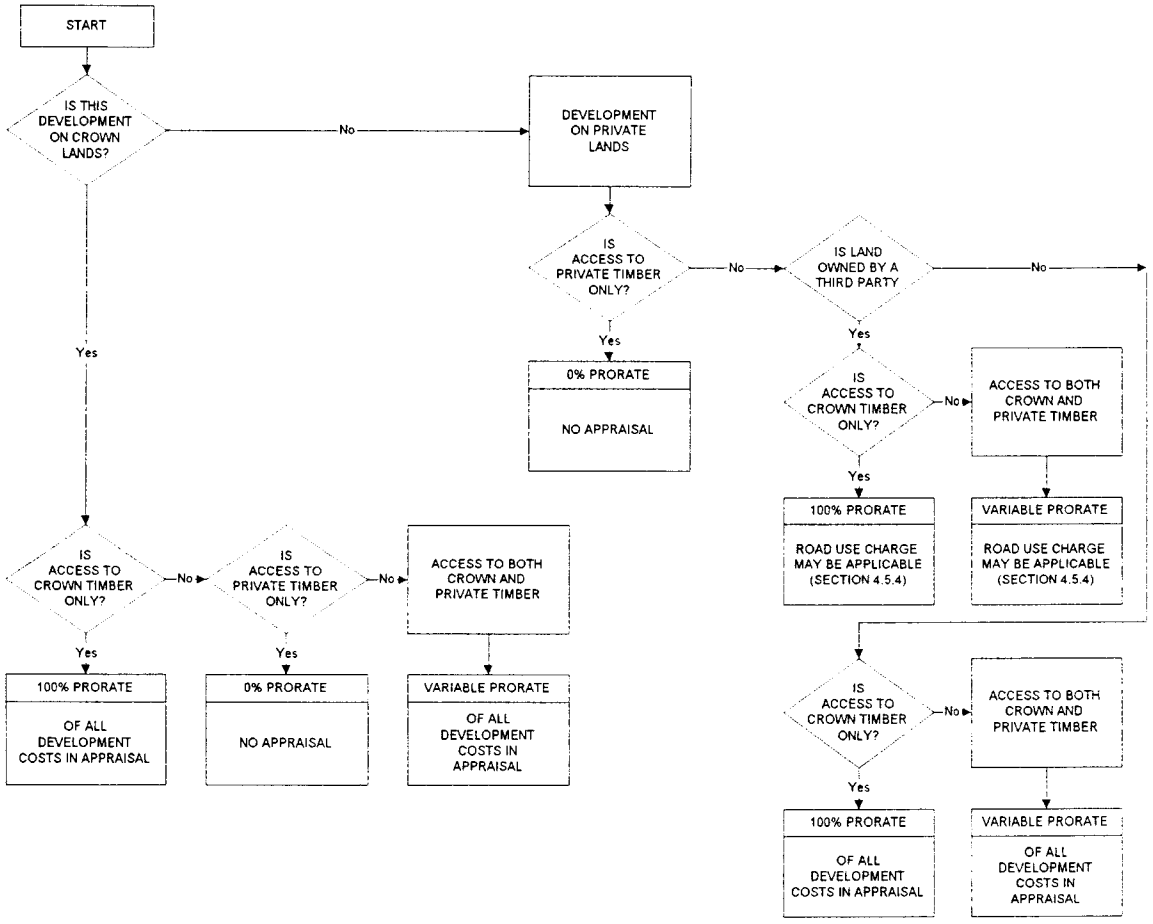
1. 1 - 40 hours: to and from the site (mobilization and demobilization),
2. 41 - 80 hours: to the site (mobilization) only, and
3. 81 plus hours: nil.

The equipment hourly rate fully includes lowbedding costs (interphase transfer in) for projects of longer duration (i.e., tabular cost estimated roads).

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.

BRITISH COLUMBIA

Ministry of Forests

COAST APPRAISAL DATA SHEET

Licence _____ Permit _____ Mark _____

ACKNOWLEDGMENTS

Licensee or Licensee's Agent

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: _____
(Please print)

Representing: _____
(Licensee name)

Date: _____ Phone # _____

Forest District Appraisal Staff (This data sheet must be signed by at least two Forest District staff)

Entries on this appraisal data sheet have been reviewed for accuracy and completeness, and revised where necessary.

Receipt of Submission: _____
(YEAR/MM/DD)

Data Sheet Prepared By: _____ (Name) _____ (Position) Date: _____ (YEAR/MM/DD)

Data Sheet Checked By: _____ (Name) _____ (Position) Date: _____ (YEAR/MM/DD)

and

Reviewed by Supervisor: _____ (Name) _____ (Position) Date: _____ (YEAR/MM/DD)

Forest Region Staff

Received by Region on: _____
(YEAR/MM/DD)

COAST APPRAISAL DATA SHEET

Reference Information

(Complete for all appraisals)

Administrative Forest District _____

Georgraphic Forest District _____

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

TSA name _____

TSB name _____

Location _____

Licensee _____

Effective Date: _____ (1) Initial Merchantable Area (0.1) _____ ha

(YEAR/MM/DD)

New Appraisal, Reappraisal or Extension
(Circle one)

Expiry Date:

_____
(YEAR/MM/DD)

Total Net Cruise Volume _____ m^3

Point of Appraisal ☐☐☐☐

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

Is this a Specified Operation Yes/No

If Yes, give description from manual:

Amendments Since First Appraised				
Block	Approval Date	Additions	Deletions	ha
				ha
				ha
				ha
				ha
Totals				ha
(2) Net Amendments				ha

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

(4) Area Logged * ____ha

AREA UNLOGGED (3 MINUS 4) ____ha

Attach additional data requested on
Specified Operations Data Sheet.

Is this operation remote Yes/No (access by air or water only)

* Projected estimate as of reappraisal date.

COAST APPRAISAL DATA SHEET

LOG GRADE SHEET

LICENCE: _____ BILLING PERIOD: _____

PERMIT: _____ NET VOLUME MATURE CONIFEROUS: _____ m^3

MARKS: _____ NET VOLUME IMMATURE CONIFEROUS: _____ m^3

GRADE SOURCE: Cruise/Historic IS IMMATURE CONIFEROUS VOLUME ≥ 80% OF TOTAL YES/NO

Species	GRADE (%) (Region to complete)															Total Net Volume By Species (m^3)	New Appraisal only	
	Peeler		Lumber				Sawlog			Shingle			Util.		Chip		Grade Source Level (Region)	Competitive Indicator (Y/N)
	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																		

COAST APPRAISAL DATA SHEET

TREE TO TRUCK

Conventional Logging

Average Side Slope _____ %

Does this Cutting authority consist of immature coniferous: YES / NO

Helicopter Logging

Water Drop Cruise Volume _____ m^3

Land Drop Cruise Volume _____ m^3

LOG TRANSPORTATION

TRUCK HAULING

Average Haul Distance (0.1 km): _____ km

WATER TRANSPORTATION (Estimate based on Point of Origin)

1) Code | | | | | Name _____

if averaging: 2) Code | | | | | Name _____

ROUTINE ROAD MAINTENANCE AND DEACTIVATION

Is maintenance required? YES / NO

ROAD AND LAND USE CHARGE

If claimed, provide description of road (length and location) and copies of invoices/agreements detailing charges. Total charges ($/$m^3$): [ ]
Road-use claims must be submitted on a Request form 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**. For further information refer to the Coast Appraisal Manual Section 4.5.4.

COAST APPRAISAL DATA SHEET

ADMINISTRATION & OTHER

WOODS RUN

Is woods run required? YES / NO

One-way woods run distance (0.1 km) _____km

Marshalling Point Location _____

Camp Location _____

ACCOMMODATION

Is marshalling point connected to a highway by a road suitable for crew buses, resulting in a one-way trip from the nearest community to the marshalling area of less than 75 minutes?

YES / NO

DEVELOPMENT

NEW CONSTRUCTION

TABULAR ROADS

Is there tabular road construction? YES / NO

If yes, complete details on page 7. Attach extra pages if required.

Total road length (sum of all tabular road section lengths) (0.01 km) _____km

H - Length as a percent of Total Rock Length Greater than 90% ☐
90% or less ☐

COAST APPRAISAL DATA SHEET

Development - New Construction - attach Construction Cost Estimate Form

** E = Engineered; T = Tabular from Appraisal Manual.

 *** Appraisal year - first year the cost was put in an Appraisal/Reappraisal.

Identity Road Name & Road Stn.	Crib Ht (m)	Span L (m)	Total Cost ($)	Crown Portion		Estimate E/T **	Appraisal Year ***	Comments	Section Built	
				%	$				Y/N	Update date
Bridges:										
	Total		$	$						
Engineered Roads:	**Length (km)**									
						E				
						E				
						E				
						E				
						E				
						E				
						E				
						E				
						E				
	Total		$	$						

COAST APPRAISAL DATA SHEET

Development - Tabular Roads (Exclude Detailed Engineered Roads)

Page ___ of ___ **LICENCE** _____ **C.P.** _____

IDENTITY	SUBGRADE				STABILIZING MATERIAL			CAPPING MATERIAL			COMMENTS			
Block # Road Name and Station Locations	Section Length (0.01 km)	Uphill Side-Slope (percent)	Const. Category (1 to 6)	RMC H = RMC 5>60% S = Soft/Med	Trucking Distance (0.1 km)	Type G = Gravel R = Rock	RMC H = RMC 5>60% S = Soft/Med	Trucking Distance (0.1 km)	Type G = Gravel R = Rock	RMC H = RMC 5>60% S = Soft/Med	Crown Allocation	Show: bridge section end haul section borrow pit location	Section Built Y/N	Section Built Update data
Total Page	km	Total Length cc 2 - 6 Sections			Total Length H Sections	% H								
Total Roads	km													

- Refer to Manual for Details on Capping and Rock Mass Class (RMC)
- Uphill slide slope = Average for the section length
- RMC - 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. Also indicate pit location.

COAST APPRAISAL DATA SHEET

Development - Reconstruction and Replacement (R/R)

Page ___ of ___ *** Appraisal year - first year the cost was put in an Appraisal/Reappraisal.

Identity Road Name & Road Stn.	R/R Project Description	Total Cost ($)	Crown Portion		Volume Remaining m^3 (Region)	Appraisal Year ***	Comments	Section Built	
			%	$				Y/N	Update date
		Total	$		$				

COAST APPRAISAL DATA SHEET

DEVELOPMENT PROJECT

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

Total appraisal road cost estimate (July 1/94) ($) _____

Volume Allocation $\frac{(TSL\,Vol)}{(Total\,Vol)} \times 100$ (%) _____

Allocated Road Cost for this Cutting authority ($) _____
(transfer to Allocated Development table below)

Allocated Development Table:

SBFEP Development Project					
Project Identity	Length km	Total Cost July 1/94 $	Volume Allocation %	Allocated Development Costs $	Comments

COMPLETE FOR ALL SBFEP SALES

Silviculture Levy Applicable Yes / No _____
District Manager

Development Levy Applicable Yes / No _____
District Manager

If no, require approval by District Manager to set Levy(s) for Section 16 sales to equal zero.

SILVICULTURE (Section 4.8 of Manual)

Is Basic Silviculture Required? Yes / No

COAST APPRAISAL DATA SHEET

Construction Estimate Form

Licence: _____ C.P.: _____ Estimate or as built (circle one):
Location C.P. *: _____ Development Category: New, Recon/Repl, Bridge
Location Name and Road Station _____
Description: _____ Appraisal Year ** _____

Item	Machine type	Function	Hours	Rate/Hour	Sub Total	Totals
1. Machine Cost:						
2. Labour Cost:						
Materials Cost: (July 1/94)						
3. Freight + Haulage for materials only						
4. Engineering if applicable:						
TOTAL COST (July 1/94)						

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 + haulage allowed for permanent type bridges (i.e. steel, concrete, or glu-lam).
4) Cost of design + 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 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.