Province of British Columbia
OFFICE OF THE MINISTER

Ministry of Forests

MEMORANDUM

File: 280-30
195-30/IAPP

To: All Interior Regional Managers

From: The Honourable David Zirnhelt
Minister of Forests

Re: New *Interior Appraisal Manual*

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

This manual will come into force on October 1, 1999, and applies to all subsequent interior stumpage appraisals. Amendments or revisions to this manual require my further approval.

David Zirnhelt
Minister

Attachment

pc: Bill Howard, Director, Revenue Branch

All Subscribers, *Interior Appraisal Manual*

Printed on Recycled Paper

BRITISH COLUMBIA Ministry of Forests

MANUAL REVISION TRANSMITTAL

FOR FURTHER INFORMATION CONTACT:

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MANUAL TITLE
Interior Appraisal Manual

REVISION No.	ISSUE DATE
New	October 1, 1999

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 and New Interior Appraisal Manual Highlights		Before Amendments Tab
INSERT	Parameters (upon receipt)		After Parameters Tab (mailed out each quarter)
INSERT	Table of Contents	i - vi	After Table of Contents Tab
INSERT	Chapter 1	1 - 10	After Chapter 1 Tab
INSERT	Chapter 2	1 - 14	After Chapter 2 Tab
INSERT	Chapter 3	1 - 10	After Chapter 3 Tab
INSERT	Chapter 4	1 - 60	After Chapter 4 Tab
INSERT	Chapter 5	1 - 8	After Chapter 5 Tab
INSERT	Chapter 6	1 -12	After Chapter 6 Tab
INSERT	Chapter 7	1 - 12	After Chapter 7 Tab
INSERT	Appendices	A1 – A10	After Appendices Tab
INSERT	Index	1 - 4	After Index Tab
INSERT	Data Sheets	1 - 12	After Data Sheet Tab
INSERT	Minister's Letter and Manual Revision Transmittal		After Amendments Tab

New Interior Appraisal Manual Highlights

This new Interior Appraisal Manual has a 1997 cost base. Changes by section in this year's manual are highlighted below:

Section 2.2(10)	Wording change: the word "administrative" has been removed.
Section 2.4(2)	Wording change to clarify.
Section 2.5	Redundant portions removed.
Section 3.3.3	Tables 3-1 through 3-4 have been updated to a 1997 cost base using an interim analysis.
Section 4.2	Wording change: replacement of the word "normal" with "standard" with regard to utilization specifications and addition of a new table indicating interior standard utilization specifications.
Section 4.3.2.2(2)	Addition of the word "forest" for clarification regarding development plans.
Section 4.3.2.2(3)	Additional slope threshold of 59% for road group 1 (Kalum, Kispiox).
Section 4.3.2.2(5)	New method for determining "Wet" for soil moisture regime.
Section 4.3.2.3	New equations by road group. New snow road cost estimate. Changes to road groups 1,2, and 9.
Section 4.3.2.4	New table of culvert and log bridge cost estimates.
Section 4.3.2.5	New stabilizing material equations.
Section 4.3.3	Additional clarification to use the same definitions of

	variables as in subgrade costs.
Section 4.3.3(16)	Wording changes; addition of clarification for slope stability purposes in 4.3.3(16)(c) and removal of item 4.3.3(16)(e) "recontouring".
Section 4.3.3	Reference to Small Business Forest Enterprise Program Development Levy dropped on Page 27.
Section 4.4.2	Wording changes for additional clarification. Addition of a new "distance to support centre" and "accessible camp" variables.
Section 4.4.3	New regional constants for helicopter systems. New equations for ground skidding. Addition of partial cut variables in the new formulas for both Grapple/Highlead and Skyline Systems. New low volume/tree formula.
Section 4.5	New hauling equations and constants. New transportation cost estimates.
Section 4.6	New road maintenance and routine road maintenance cost estimates.
Section 4.8	New administration and other cost estimates.
Section 4.10	New silviculture groupings and treatment regime cost estimates.
Section 4.11	Additional wording to reflect the manufacturing cost base as being updated to 1997 with an interim analysis.
Section 4.12	Updated trend factors.
Section 6.7.1	Addition of firmwood reject to Table 6-1.
Appendix 1	New equipment and labour rates. Wording change to clarify camp costs.
Appendix IV	New soil moisture regime table for determination of "wet" for roads.
Data Sheet	New appraisal data sheet is now an integral part of the manual.

REVENUE BRANCH

Interior Appraisal Manual

Effective October 1, 1999

Cost Base
Woods: July 1, 1997
Manufacturing: July 1, 1997

BRITISH COLUMBIA

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Introduction 1

1.1 Terms of Reference

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

The *Forest Act,* Section 105, requires adherence to the policies and procedures approved for the forest regions by the Minister of Forests. This *Interior 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, silviculture, and manufacturing costs, and lumber and chip selling prices experienced by licensees in the interior.

1.2 Area of Application

This manual applies to the "Interior", which is defined as the entire province of British Columbia, excluding the Vancouver Forest Region (as established by the *Forest Act* and Regulations), and that part of the Prince Rupert Forest Region west of the Cascade Mountains Administrative Line from Tweedsmuir Park to the state of Alaska.

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

1.3 Cutting Authority

The term "cutting authority" is defined as:

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

1.3.1 Cutting Authority Area

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

1. may be harvested under a cutting authority, and
2. has a unique timber mark.

1.4 Responsibility for Stumpage

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

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

1.5 Market Pricing System

The Market Pricing System (MPS), subject to a minimum stumpage rate, is the basis for determining stumpage rates for Timber Sale Licences awarded under Sections 20 and 21 of the *Forest Act* after January 1, 1999.

1.6 Comparative Value Timber Pricing

Comparative Value Pricing (CVP), subject to a minimum stumpage rate, is the basis for determining stumpage rates for all cutting authorities except those specified under Section 1.5. Sections 2.1 (2), (3) and (4) provide the methods that are used for specific products and extraordinary situations.

One component of CVP is the determination of the average stumpage rate for the interior. The stumpage rate for a given stand of timber is more or less than the pre-set average rate (Interior Target Rate) (see Chapter 5) depending upon whether the stand is more or less valuable than the average stand. To assess the value of the stand and hence to determine a stumpage rate, the forest officer will typically:

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

2. Estimate the least total cost necessary to harvest and deliver timber to a point of appraisal then add the manufacturing cost for that point of appraisal (see Chapter 2 and 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 Interior Mean Value Index and adding the Interior Base Rate (see Chapter 5).

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

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

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

6. Determine the upset stumpage rate by adding any development and silviculture levies (see Section 6.6) 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 as specified under Section 6.7.

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

1.7 CVP 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 6.5.

Each quarter the adjusted stumpage rates reflect changes in estimated selling prices (as authorized in this manual since the previous adjustment), and the recalculated operating cost based on the appropriate trend factors shown in Section 4.12. In addition, the adjustment reflects changes in the Statistics Canada Interior Softwood Lumber Index, the Statistics Canada Pulpwood Chip Index for British Columbia, the Interior Base Rate and the Interior Mean Value Index.

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Appraisal Principles and Procedures 2

2.1 Types of Determination

Stumpage rates are determined by one of the following methods:

1. An appraisal or reappraisal under Chapters 3 and 4 of this manual.
2. An Order-in-Council directive setting rates under the *Forest Act,* Section 105.
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 or Regional Manager's designate.
5. An appraisal under Chapter 7 for timber sale licences awarded under Sections 20 or 21 of the *Forest Act* on or after January 1, 1999.

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 Interior Appraisal Data Sheet (data sheet) and appropriate support information. When the data is received, 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), which must be received by the District Manager at least 45 calendar days prior to the anniversary of the cutting authority term (effective date). If the licensee fails to provide all data, then the District Manager:

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

   b. if the data is not received within 15 calendar days, use the best data available at the district office 30 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 Subsections 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 data sheet as a result of the meeting.

6. The District Manager shall advise the licensee of any changes, made to the appraisal data sheet.

7. The District Manager shall provide an appraisal data sheet to the regional office as part of the appraisal package.

8. The regional revenue staff will advise the District Manager who will advise the licensee of any further changes made to the data sheet.

9. Regional revenue staff will notify the licensee 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 regional revenue staff, verbally or in writing, of any objection to the information contained in the stumpage advisory notice that could be resolved without 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 review or appeal under the *Forest Act* (Section 143 - 150.).

2.3 Reappraisal

A reappraisal is a re-estimation of operating cost and selling price according to the *Interior 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. If there are changes to the cutting authority, the operating cost data must be revised to reflect those changes, unless a reappraisal is exempted under Section 2.3.3.

At reappraisal, the election of quarterly adjusting or annual adjusting stumpage rate remains unchanged.

A cutting authority that has elected fixed stumpage rates is not reappraised unless Section 2.3 (1) or (5) require a reappraisal.

A cutting authority that has fixed stumpage rates because it was appraised under Section 6.2 (1) or 6.3 shall remain as fixed status.

At the time of a reappraisal, initial detailed engineering cost estimates may be re-estimated once after construction to reflect more accurate on-site field information. However, development costs originally estimated using ministry approved competitive bids or costs that have been apportioned to more than one cutting authority are not re-estimated in a reappraisal.

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

1. Sudden and Severe Damage

   If the Regional Manager is satisfied that sudden and severe damage in excess of 10 ha or 10 percent of the original volume 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 they have failed to comply with the *Forest Practices Code of British Columbia Act,* Sections 75 through 95 and relevant regulations.

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

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

2. Amendments

If a cutting authority area or cutting authority (see Section 1.3) is amended, a reappraisal may be triggered if:

a. the accumulated amendments (either addition or deletion of merchantable timbered stumpage-bearing area) equal or exceed either 10 ha or 10 percent of the merchantable area, whichever is less: the entire cruise must be recompiled and the stumpage rate redetermined, or

b. the amendment requires a specified operation or different logging method (see Sections 4.1.1 and 4.4.1) that equals or exceeds 10 percent of the cutting authority volumes: the entire cruise must be recompiled and the stumpage rate redetermined, or

c. the amendment requires major subgrade reconstruction or replacement or reconstruction of a major drainage structure. In these instances, the cost estimate is based solely upon remaining timber volume (i.e., applicable volume).

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

The fixed stumpage rate effective at the road permit anniversary date will be applied to any volume amended into the road permit until the next reappraisal. Road permits will not have a reappraisal triggered by an amendment to the area or volume.

3. Reappraisal at Anniversary Date

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

Reappraisal at the anniversary date is mandatory for all woodlot cutting authorities (Section 2.4 (2)) and road permits (Section 6.3) regardless of the volume remaining.

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

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

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

Where the above conditions have not been met, reappraisals may be made at the option of either the District Manager, Regional Manager or licensee (see Section 2.2).

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

If a reappraisal is not made, the untrended logging and silviculture cost estimates from the current appraisal will continue to be trended quarterly to determine 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 of 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 of 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 of Revenue Branch decides that an error has not been made, they shall notify the person who sent the Notice of the decision and the reasons for it,

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

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

      iii. the cutting authority or authorities under which the error was made shall be reappraised or the quarterly stumpage adjustment recalculated to correct the error unless the cutting authority, the *Interior 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 of 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 of Revenue Branch, became aware of the error or probable error,

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

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

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

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

ii. an error in a calculation made as part of the data sheet,

iii. an error in transcribing the data from an approved data sheet or in performing the calculation specified in the manual, and

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.

Omission of data by the licensee on an approved data sheet does 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 Extension of Term

1. Small Business Forest Enterprise Program

   A licensee may elect to have a fixed stumpage rate for a timber sale licence under the Small Business Forest Enterprise Program. Where the fixed election is made, the stumpage rate remains fixed for the term and all extensions (Section 6.5).

   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) or 2.3 (5).

2. Woodlots

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

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

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

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

3. Regional Manager's Rates

   If a stumpage rate was determined under Section 2.1 (4) and the term of the cutting authority is extended, the Regional Manager may either leave the stumpage rate unchanged or reappraise the cutting authority. When the term of a cutting authority is extended and that cutting authority is reappraised, the notification requirements of Section 2.2 do not apply.

4. District Average Value Index

   If the stumpage rate was determined under Section 2.1 (3) and the term of the cutting authority is extended, the Regional Manager or District Manager may either leave the stumpage rate unchanged or reappraise the cutting authority. When the term of a cutting authority is extended and that cutting authority is reappraised, the notification requirements of Section 2.2 do not apply.

   Cutting authorities that have been appraised using the District Average Value Index method, other than the Small Business Forest Enterprise Program, must be reappraised upon extension after three years.

5. Miscellaneous Stumpage Rates

   Miscellaneous stumpage rates (Section 6.7) will be based on the *Interior Appraisal Manual* in effect on the date of scale, except for those cutting authorities that specify miscellaneous stumpage rates in their cutting authority document.

6. Timber Licence

   When a cutting authority that includes the authorization to harvest timber licence volume has the term extended, the stumpage rate will be determined under Subsection 5. 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

The appraiser must select the point of appraisal, from the list below, which will produce the least total harvesting and delivery cost estimate for the cutting authority area. All species, qualities and sizes of timber must be appraised to a single point of appraisal. The appraiser must estimate the cost of transporting timber to the sawmill which is nearest the point of appraisal and produces the least total harvesting and delivery cost estimate. The appraiser must then assume manufacturing costs and average market values for the zone relative to that point of appraisal.

A sawmill is defined as a conversion facility capable of producing lumber and chips, and includes the log sorting/storage areas and satellite mill yards if applicable. A sawmill does not have to be physically capable of producing lumber and chips from all the wood appraised to that site. A sawmill is considered capable of producing lumber and chips unless it has been damaged by fire or a destructive force of nature. A damaged sawmill will not be considered a location at a point of appraisal if it has not been repaired within three months of the damage. It will be reconsidered as a location at a point of appraisal on the first day of the next stumpage quarter once it is capable of producing lumber and chips again.

The logs are deemed to have reached the point of appraisal once they have entered the site, commonly the weight scale, upon which the sawmill is located. All further log handling costs except scaling (see Section 4.8) are deemed to be part of the manufacturing cost estimate.

Table 2-1 Points of Appraisal

Northern Interior (Zone 5, 15, 25 & 35)			
Bear Lake	Fort St. James	Mackenzie	Smithers
Burns Lake	Fraser Lake	Prince George	Strathnaver
Clear Lake	Houston	Quesnel	Upper Fraser
Engen	Isle Pierre		Vanderhoof

Skeena (Zone 6, 16, 25 & 36)			
Terrace	Carnaby	Hazelton	Kitwanga

Southern Interior (Zone 7, 17, 25 & 37)			
Adams Lake	Galloway	Merritt	Thrums
Armstrong	Grand Forks	Midway	Valemount
Canal Flats	Kamloops	Okanagan Falls	Vavenby
Canoe	Kelowna	Park Siding	Westbank
Castlegar	Lavington	Princeton	Ymir
Craigellachie	Louis Creek	Radium	
Creston	Lumby	Revelstoke	
Elko	McBride	Slocan	

South Cariboo (Zone 8, 18, 25 & 38)					
100 Mile House	Chasm	Lytton	Squamish	Williams Lake	Boston Bar

Fort Nelson - Peace (Zone 9, 19 & 25)			
Chetwynd	Fort Nelson	Fort St. John	Taylor

2.5.1 Method of Transportation to be Used in Determining Point of Appraisal

The estimate of transportation costs for a cutting authority area must be determined by using the criteria for determining the transportation cost estimate as set out in this manual for the method of transportation referred in this manual to the point of appraisal that will produce the least total harvesting and transportation cost estimate unless that particular method of transportation is not permitted by the cutting authority.

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

1. Any destination referred to in the cutting authority.
2. Any enactment.
3. Any document other than the cutting authority.
4. Any other fact.

2.6 Calculation Conventions

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

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

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

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

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

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Interior Selling Prices 3

Selling price estimates are based on schedules of lumber and chip values collected and published by Revenue Branch. When the values are compiled and distributed, they become an integral part of this manual.

3.1 Lumber Average Market Values

Monthly market value information for the interior is obtained by Revenue Branch from lumber producers located in each of the recognized average market value zones. Average market values (AMV) for each species are compiled by dividing total sales value by total sales volume for each zone. When there is inadequate data to provide a reasonable average for a species in one zone, the data is adjusted and combined with other species in other zones. Separate AMVs are derived for small log, licences which require utilization of small logs, stud, and random lumber.

The volume that is manufactured to Canadian Lumber Standard/American Lumber Standard (CLS/ALS) sizes is reported in foot-board measure (fbm). Lumber manufactured in non-CLS/ALS sizes is adjusted to equivalent CLS/ALS sizes. The total volume for each species includes all sizes and grades of rough and dressed lumber in the green and dried state. Also included are railroad ties, trim blocks, finger jointed CLS/ALS lumber and machine stress rated (MSR) lumber.

The total net sales value for each species is reported in Canadian dollars, after freight, actual sales expenses incurred to a maximum of 5%, cash discounts, duty and entry charges and leased rail car costs have been deducted from the selling price.

1. Small Log AMVs

   Small log AMVs are based on dimension lumber products capable of being produced from small trees.

   Small log AMVs are used for cutting authorities with an average net volume per tree (conifers only) of less than 0.20 m^3 where the governing licence document does not require this restriction. Cutting authorities meeting this criteria will use lumber AMVs listed under "AMVs for Small Logs" which is included in the quarterly stumpage parameters published by Revenue Branch.

   The selection of a small log AMV zone (Zones 15, 16, 17, 18 and 19) will only affect AMVs and will be made at the time of appraisal or reappraisal. Lumber recovery factors (LRF) and manufacturing costs will continue to be determined by zonation based on point of appraisal.

2. AMVs for Licences which Require Utilization of Small Logs

   AMVs for licences which require utilization of small logs are based on dimension lumber products capable of being produced from trees smaller than standard timber utilization requirements. These AMVs are created by removing the effect of the LRF add-on (Section 3.1 (1)) from "Small Log AMVs."

   These AMVs are used for all cutting authorities where the governing licence document restricts harvesting to stands of timber having a net average cruise volume per tree of less than 0.20 m^3/tree. Other similarly restricted licences may also use these AMVs at the Regional Manager's discretion. Cutting authorities meeting this criteria and having a net average cruise volume/tree of less than 0.20 m^3/tree will use lumber AMVs listed under "AMVs for Licences which Require Utilization of Small Logs" (Zone 25) which is included in the quarterly stumpage parameters published by Revenue Branch.

   The selection of AMV Zone 25 will only affect AMVs and will be made at the time of appraisal or reappraisal. Lumber recovery factors and manufacturing costs will continue to be determined by zonation based on point of appraisal.

3. Stud Lumber AMVs

   Stud AMVs are compiled for two species groups; Lodgepole Pine/Douglas-fir/Larch and Spruce/Balsam. No other species are recognized as "stud species".

4. Random Lumber AMVs

   Random AMVs are compiled for all species.

5. Mandatory Grade 4 Hemlock AMVs

   Mandatory grade 4 hemlock AMVs are used for cutting authorities where the optional utilization of grade code 4 is not provided by the cutting authority. Cutting authorities meeting this criteria will use lumber AMVs listed under "AMVs for Mandatory Grade 4 Hemlock Log Utilization" which are included in the quarterly stumpage parameters published by Revenue Branch.

   The selection of a mandatory grade 4 hemlock AMV zone (Zones 35, 36, 37 and 38) will only affect AMVs and will be made at the time of appraisal or reappraisal. Lumber recovery factors and manufacturing costs will continue to be determined by zonation based on the point of appraisal.

3.1.1 Application of Lumber Average Market Values

Application of the small log, licences which require utilization of small logs, stud and random lumber and mandatory grade 4 hemlock AMVs in appraisals for all cutting authorities are made according to the formula in Section 3.3.

3.1.2 Lumber Average Market Value Zones

Refer to Section 2.5 for a list of points of appraisal by lumber AMV zones.

3.2 Chip Average Market Values

Monthly market value information is obtained and compiled by Revenue Branch.

3.3 Calculation of Species End Product Selling Price

The total end product selling price in $\$/m^3$ is determined for each species using lumber recovery factors from the cruise compilation summary, LRF update add-ons, current applicable average market values for the species and zone and species chip yield factors. Lumber and chip prices are each calculated to the nearest cent before being totalled.

Burned Timber

In the case of burned timber, the burn percent is used to reduce the selling price of the stand by assigning a zero value to the estimated chip recovery of the burned wood. This is to compensate for an increased manufacturing cost, lower lumber and chip recovery and lower lumber and chip average market values associated with processing burned timber.

$$\text{Burn Percent} = \frac{\text{BT } m^3}{\text{Total } m^3} * 100$$

where

BT m^3 = volume of light, moderate and heavily fire-damaged timber
Total m^3 = total volume *inclusive* of burned wood

The only other adjustment to the appraisal is for heavily fire-damaged timber and is covered under Section 4.4.4 (Tree to Truck Additive for Damaged Timber).

The LRFs are determined from the following formulas and tables:

1. Zonal LRF Update Add-ons and Combined Product Recovery Factors

Table 3-1 LRF Update Add-ons and Combined Recovery Factors

Zone	Species	LRF Update Add-ons	Combined Product Recovery Factors
Northern Interior (Zone 5)	Lodgepole Pine	75	431
	Spruce	84	431
	Balsam	77	431
	Douglas Fir	34	431
	Larch	31	431
	Cedar	28	431
	Hemlock	27	431
	White Pine	30	431
Skeena (Zone 6)	Lodgepole Pine	48	390
	Spruce	58	390
	Balsam	58	390
	Cedar	6	390
	Hemlock	7	390
Southern Interior (Zone 7)	Lodgepole Pine	74	413
	Spruce	85	413
	Balsam	76	413
	Douglas Fir	32	413
	Larch	31	413
	Cedar	27	413
	Hemlock	29	413
	White Pine	30	413
	Yellow Pine	34	413

Zone	Species	LRF Update Add-ons	Combined Product Recovery Factors
Southern Cariboo (Zone 8)	Lodgepole Pine	58	429
	Spruce	67	429
	Balsam	62	429
	Douglas Fir	19	429
	Larch	18	429
	Cedar	14	429
	Hemlock	16	429
	White Pine	18	429
	Yellow Pine	19	429

Fort Nelson-Peace (Zone 9)	Lodgepole Pine	62	433
	Spruce	68	433
	Balsam	61	433

Example: (Zone 5) Lodgepole Pine	Cruise LRF		LRF Update Add-on		Appraisal LRF
All Logs	181	+	70	=	251

2. Chip Yield Derivation

   Chip Yield (BDU/m^3) = (Combined Product Recovery Factor - Appraisal LRF) * Species Chip Yield Factor

3. Chip Yield Factors

Table 3-2 Chip Yield Factors

Species	Factor (BDU/fbm)
Balsam	.00072
Cedar	.00067
Fir	.00098
Hemlock	.00089
Larch	.00119
Lodgepole Pine	.00087
Spruce	.00076
White Pine	.00078
Yellow Pine	.00095

4. Determination of Stud Log Percent

   The stud log percent is determined as follows:

   The stud log percent for each stud species (spruce, balsam, lodgepole pine, Douglas fir and larch) is determined from the cruise compilation summary. The stud log percent is defined as the net volume of 5 m logs with top diameters under 20 cm expressed as a percentage of the total net cruise volume. The stud log percent is calculated and rounded to the nearest whole percentage point.

   The percent stud AMV is determined as follows:

   - If the stud log percent is 45 or greater and less than or equal to 65:

     the percent stud AMV = (5 * stud log %) - 225,

   - If the stud log percent is less than 45, the percent stud AMV = 0, and

   - If the stud log percent is more than 65, the percent stud AMV = 100.

5. Shipping Differential

The Shipping Differential for the following points of appraisal are:

Table 3-3 Shipping Differentials

$0.58/m^3	$1.01/m^3	$5.80/m^3
Bear Lake	Adams Lake	Fort Nelson
Fort St. James	Clear Lake	
Mackenzie	Louis Creek	
Quesnel	Merritt	
Strathnaver	Midway	
	Okanagan Falls	
	Princeton	
	Thrums	
	Westbank	
	Ymir	

6. Manufacturing Cost Differential

Table 3-4 Manufacturing Cost Differential

$5.95/m^3
Fort Nelson

7. Calculation of Total Species End Product Selling Price

a. Lumber AMV = (% Stud AMV/100) * (Stud AMV/1000)
+ (1.0 - (% Stud AMV/100)) * (Random AMV/1000),

b. Lumber SP = Lumber AMV * Appraisal LRF,

c. Chip SP = Chip Value * Chip Yield, and

d. Total Species SP = Lumber SP + Chip SP - D.

Where:	SP	=	Selling Price in $\$/m^3$
	AMV	=	The Lumber Average Market Value (of the appropriate species in the appropriate zone).
	Appraisal LRF	=	The LRF for all logs from Section 3.3 (1).
	Chip Value	=	The Chip Average Market Value (of the appropriate species for the appropriate point of appraisal)
	Chip Yield	=	The Chip Yield for all logs from Section 3.3 (2).
	D	=	The Differentials for the appropriate points of appraisal from Section 3.3 (5) and 3.3 (6).

Operating Cost Estimation 4

The operating cost is the sum of the trended total logging cost estimate, the trended basic silviculture cost estimate and the trended manufacturing cost estimate as detailed in this chapter. The cost estimates in this chapter are applicable to all cutting authorities unless superseded by the procedures outlined in Section 2.1.

4.1 Cost Estimates

The Appraisal Coordinator must estimate harvesting and transportation costs for a cutting authority area using the information that the Appraisal Coordinator has at the time the estimate is made in a manner that will produce the least total harvesting and transportation cost estimate.

The estimate of harvesting costs must be determined by using the criteria for determining the harvesting cost estimates as set out in this manual for the method of harvesting referred to in this manual which will produce the least total harvesting and transportation cost estimate unless that particular method of harvesting is not permitted by the cutting authority.

The estimate of transportation costs must be determined by using the criteria for determining the transportation cost estimates as set out in this manual for the method of transportation referred to in this manual to the point of appraisal which will produce the least total harvesting and transportation cost estimate unless that particular method of transportation is not permitted by the cutting authority.

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

1. Any destination referred to in the cutting authority.
2. Any enactment.
3. Any document other than the cutting authority.
4. Any other fact.

Once the least cost point of appraisal has been established, the cost estimate of manufacturing for that point, as specified in Section 4.11, is applied.

The phase cost estimating equations and tables in this manual were derived from a survey of logging and lumber manufacturing operations in the interior. The survey includes both employee and contractor operations. The survey collects actual costs to the licensee (including wages, benefits, overtime, depreciation, fuel, supplies, repair and maintenance, moving assistance, applicable licences, insurance, etc.) from a representative sample of interior operations. Contract costs (including contractor profit and risk margins, overhead, crew transportation, etc.) are included.

The phase cost estimates are complete and reflect average conditions, operating practices, and phase accounting allocations experienced in the survey data. Additions and subtractions to phase cost estimating equations and tables to reflect specific operating conditions are not permitted. The cost estimates have an effective cost base date of July 1, 1997.

4.1.1 Specified Operations

In addition to the logging methods and phase costs that are covered by this manual, there are specified operations which require special cost estimating. Table 4-1 contains a complete list of specified operations for which certain phase cost estimates are based on the information on hand rather than on the tables and formulas in this manual. Other phase cost estimates in this manual are combined with the specified operation cost estimate to determine the total operating cost. Where appropriate, specified operations are weighted according to the applicable net cruise volume.

Specified operations shall be recognised only when the treatment is required within the Silviculture Prescription, Cutting Authority Document or the Forest Development Plan as dictated by site conditions. Where a specific treatment is not required based on these conditions, the conventional cost estimate shall apply.

Further information on specified operations may be obtained from the Regional Appraisal Coordinators.

Table 4-1 Specified Operations

Specified Operations	Affected Phase
Salvage of small patches of timber dispersed over a large area[1]	Tree-to-Truck (Section 4.4)
Kinbasket Lake Barge/Ferry not used for truck haul (private)	Special Transportation Systems (Section 4.5.4)
Root Disease Control (Pushover Logging and Stump Removal)[2]	Silviculture (Section 4.10)
Skidder Swinging (includes all ground skidding methods)[3]	Log Transportation (Section 4.5)

1. For use with ground skidding and cable logging only when salvaging diseased or damaged timber.

2. Felling of trees by pushing them over to expose the root ball for root disease control purposes. The root balls may or may not be piled and burned.

3. Skidder swing will only be considered between harvest methods listed in Section 4.4.1 (four methods), in order to deliver logs to an existing or appraised road/landing.

4.2 Appraisal Data Requirements

The cruise and all other pertinent information required for the appraisal must be submitted by the licensee with the appropriate Interior Appraisal Data Sheet to the District Manager.

Unless otherwise specified by the Director, Revenue Branch, cruise data must be gathered and compiled according to the approved interior standard timber utilization specifications in Table 4-2 below and in accordance with the following Ministry of Forests publications:

- Forest Service Cruising Procedures & Cruise Compilation (*Cruising Manual*),
- *Cruise Compilation User Manual*,
- *Cruise Compilation Design Manual*,
- Regional Publications - (e.g., *Operational Cruising Requirements in a Forest Region*), and
- Forest Service Policies - (e.g., *Timber Utilization Standards, Policies & Procedures for the Interior of the Province*).

Table 4.2 Standard Timber Utilization Requirements

Description	
The following standard timber utilization requirements must be used for all appraisals.	
Stumps (Measured on the side of the stump adjacent to the highest ground.)	
• no higher than	30.0 cm
Diameter (outside bark) at stump height	
• lodgepole pine: all timber that meets or exceeds	15.0 cm
• all other species: all timber that meets or exceeds	20.0 cm
Top diameter (inside bark or slab thickness)	
• for all species and ages, except cedar older than 141 years, all timber that meets or exceeds	10.0 cm
Top diameter (inside bark or slab thickness)	
• for cedar older than 141 years, all timber that meets or exceeds	15.0 cm
Minimum length	
• log or slab	3.0 m

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 data list in a format prescribed by the Regional Manager.

The net cruise volume (m^3) is the gross volume (m^3) less decay, waste and breakage by species. The cutting authority total net cruise volume is calculated by multiplying the net cruise volume per hectare (m^3/ha) by the total merchantable timbered area(ha) to be harvested, net cruise volume is rounded to the nearest cubic meter as required in the *Cruising Specifications*.

Each reappraisal uses a cruise volume by species which is the original net cruise volume adjusted on the basis of approved amendments to the cutting authority since the last appraisal (see Section 2.3).

4.3 Development

Development costs are estimated for each of three categories:

1. New construction.

2. Reconstruction and replacement.

3. Access management.

   Throughout this section the term "roads" includes roads, drainage and other pertinent structures.

   a. A total cost ($) is calculated for each category of Section 4.3.1, and 4.3.1.1. These category costs are summed to provide a total development cost estimate.

      In order to calculate a unit ($/m^3) cost by category, the applicable volume will be the total net cruise volume (as defined in Section 4.2) or the remaining volume (Section 4.3.1.2). Where the cutting authority document requires obligatory utilization of deciduous timber, the deciduous volume must be included in the applicable total net cruise volume.

The costs for development works may only be allocated to the first tributary cutting authority, subject to Section 4.3.1.1.5. A cutting authority is considered to be tributary:

1. If timber from the cutting authority is appraised over the development works in question, or

2. If 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 being appraised. To qualify, a main service road must be used on a regular basis for transportation of bulk fuels, supplies, equipment and the harvesting crew.

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

1. Tabular cost estimates are made for construction of roads and drainage structures using the applicable equations in Section 4.3.2 of this manual. Tabular estimates must be 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. A detailed engineering estimate is made according to Section 4.3.3. Projects eligible for this costing method are listed in Section 4.3.3.

Where applicable, these cruised volumes and development cost estimates must be segregated on the basis of legal boundaries.

4.3.1 Development Cost Categories

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

1. New Construction

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

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

   a. Road Cost Estimates

      i. Tabular cost estimates

         Each road section cost estimate is determined from the appropriate tables (Section 4.3.2). These section costs are totalled to give a road cost estimate for each road. The road costs for all roads are then totalled to give a total cost for tabular roads.

      ii. Detailed engineering cost estimates

         Each project cost is estimated according to Section 4.3.3. These projects may include: (see Section 4.3.3 for a complete listing)

   The total of the estimated costs for each project is summed to give a total cost ($) for engineered roads.

   b. Drainage Structure Cost Estimates

      Each drainage structure cost estimate is determined either from the appropriate table (Section 4.3.2.4) or as a detailed engineering cost estimate (Section 4.3.3).

      Where materials are reused by the original purchaser at a second or subsequent location, the cost estimate will include dismantling, transportion 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 are summed to give a total cost for bridges.

The total costs for tabular roads, engineered roads, and bridges are totalled and then divided by the total net cruise volume to give a unit cost ($/m^3$) for new construction.

2. Reconstruction and Replacement

Reconstruction and Replacement are defined as:

a. replacement or structural repair of a major drainage structure (e.g., replacing stringers, cross ties, or cribbing), or

b. major resurfacing, which means resurfacing sections of more than 0.3 km in length that were initially surfaced but have deteriorated due to long term wear and tear, or

c. major reconstruction, which means restoring at least 0.1 km of road (per occurrence) that requires complete rebuilding of the subgrade.

The costs approved under this section must not qualify under routine maintenance as described in Section 4.6.

Bridges replaced on forest service roads that are included in the Forest Renewal B.C. five year "Bridge Replacement Program on Forest Service Roads", or are otherwise funded by the Crown will not be included in any appraisal. Other major Forest Service road reconstruction or upgrades that are funded by the Crown will not be included in appraisals.

Reconstruction and replacement cost estimates are determined as detailed engineering cost estimates (Section 4.3.3) and must be approved in advance by the district manager. The cost estimates may be applied to remaining tributary timber (i.e., applicable volume) provided the project was not known of or planned for at the time of appraisal. If the cost estimate is not applied to the remaining tributary volume, it must be applied to the first tributary cutting authority appraised over the reconstruction or replacement. Section 4.3.1.1.5 may be applicable for main roads. Cost estimates for reconstruction are not to exceed the tabular costs for new construction under similar conditions.

Costs will not be recognized if the licensee has been negligent or has not followed approved plans or standards as defined under the *Forest Practices Code* and regulations.

3. Access Management

   Access management is defined as the temporary removal of a major drainage structure or construction of a barrier, including a gate, excavation, or placement of boulders with the purpose of temporarily eliminating all vehicle access.

   An access management cost estimate will be determined by a detailed engineered estimate.

   The access management required in the cutting authority must be based on a formal access management strategy approved in the forest development plan.

   Costs may be determined for more than one removal/replacement of the structure/barrier if the cutting authority term warrants it.

   Costs approved under this section must not qualify under routine maintenance as described in Section 4.6 or overhead as described in Section 4.8.1.

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 that 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 doing both of the following:

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

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

Cost estimates for bridges or pertinent structures will be determined according to Section 4.3.2.4, 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 4.12, but will not otherwise be revisited.

4.3.1.1.3 Development Cost Estimates on Private Land

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

1. Development provides access to appraised timber only:

   The total estimated costs are included in the appraisal.

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

   Cost estimates are not included in any appraisal.

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

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

4.3.1.1.4 Existing Roads and Structures

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

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

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

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

4. All roads, drainage and other pertinent structures previously constructed, repaired or reconstructed on private land before August 1,1996.

If the existing road requires reconstruction or replacement after August 1, 1996, 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 recognised as described in Section 4.7.

A road on private land that has previously been included in an appraisal because it was required for only short term timber extraction (as per previous policy) shall continue to be included upon reappraisal.

4.3.1.1.5 Extended Road Amortization

Where the development cost estimate exceeds $\$4.00/m^3$ 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. With exception of woodlot licences, each cutting authority must be in the licensee's approved forest development plan.

3. For woodlot licences, each cutting authority to which costs are amortized must be approved and appraised during the ten year period from the signing of the agreement. Reappraisals may continue to carry the costs until the cutting authority expires.

4. The agreement must be signed by the licensee and the licensor prior to the appraisal or reappraisal.

5. The amount apportioned will be a fixed lump sum which will be trended to the manual cost base and as provided for in Section 4.12 but not otherwise revisited.

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

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

4.3.2 Tabular Cost Estimates

These roads are generally a single lane width with turnouts. These roads may or may not be stabilized (ballasted or surfaced) with additional materials.

4.3.2.1 Subgrade Construction

The subgrade construction cost estimate includes:

- clearing,
- grubbing,
- stump removal,
- ditch construction,

- stripping,
- debris disposal,
- turnout construction (not landings),
- material costs, and
- installation of culverts with diameters up to 950 mm or the equivalent cross-section area or single log abutment culverts up to 3.4 m span.

Right-of-way felling and logging is excluded.

4.3.2.2 Subgrade Construction Variables

For appraisal purposes the following subgrade construction variables are recognized:

1. Section length: (L)

   Road sections are recorded in multiples of 0.1 km. Each section should be representative of a single moisture class. Each section should be 1 km or longer, although some individual section lengths less than 1 km but greater than 0.1 km are acceptable for extreme variations of slope or percent rock. The section length includes that portion traversing through landings. For ground skidding, short roads (up to and including 100 m long) that access single landings are included in the tree-to-truck cost estimates (Section 4.4) and are not eligible for development cost estimates.

2. Road Type:

   - Operational Roads (OP): - are generally built under the authority of a road permit but portions may be constructed under the cutting authority. An operational road exists within a cut block when the road accesses timber beyond the cutblock or is intended to access timber beyond the block as shown on a forest development plan.

   - Block Roads (BLOCK): - are generally built under the cutting authority and include roads which are located completely within the cutblock.

   - Snow Roads (WINTER): - snow roads are a form of overland construction that uses clean snow and ice as fill. Suitability of materials is not an issue as all are frozen. Stripping is limited to large stumps that cannot be easily covered with snow or ice. Cuts into mineral or organic soil must not exceed 0.3 m in depth for sustained distances or 0.5 m in depth for distances up to 5 m. This road type includes operational and block road categories. Stabilizing costs are not applicable. Snow (winter) roads constructed on side slopes of greater than 15% are appraised as block roads.

3. Uphill Side Slope: (SLOPE %)

   Uphill side slope percent represents the average of all slopes in the section to a maximum of 50%, except Road Group 1 where 59% is the maximum. To derive an

average for uphill side slope percent, several representative cross-section measurements are taken along the section length and the sum of one-half of the distance on each side of the measurement is applied as a weight against the measurement at that cross-section. The uphill side slope percent is measured at right angles to the road centreline and is recorded to the nearest integer. Where the road is located on a bench, the uphill side slope of the bench is used.

4. Percent Rock: (ROCK %)

   Rock includes bed rock and large boulders. It may be rippable or may require drilling and blasting. The percent rock is determined as follows to a maximum of 50 percent, except Road Group 1 where 59 percent is the maximum:

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

   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 above the bottom of the ditch

   To determine the percent rock for roads not yet constructed, constructed roads on similar land/rock forms are used as a guide.

5. Soil Moisture Regime (SMR):

   Those biogeoclimatic zones/subzones with site series identified as "M", "VM" or "W" on the absolute soil moisture table in Appendix IV are considered "Wet" for appraisal purposes and eligible for an increased cost estimate.

6. Biogeoclimatic Zones:

CWH	-	Coastal Western Hemlock
BWBS	-	Boreal White and Black Spruce
ICH	-	Interior Cedar Hemlock
SBS	-	Sub Boreal Spruce
ESSF	-	Engelmann Spruce - Subalpine Fir
IDF	-	Interior Douglas Fir

4.3.2.3 Subgrade Cost Estimate

For each operational and block road the subgrade cost estimate in $/km is determined from the equation for the appropriate road group.

Road Group	
1	18972 + (221 * SLOPE%) + (690 * ROCK%) + (5067 * OP) + (16111 * CWH
2	11984 + (229 * SLOPE%) + (6116 * OP) – (4821 * SBS) ($7482/km set as minimum. If equation yields less than $7482/km then use $7482/km).
3	5464 + (1078 * ROCK%) + (9364 * OP)
4	4943 + (143 * SLOPE%) + (212 * ROCK%) + (4179 * SMR) + (9017 * OP) + (4362 * ICH)
5	6042 + (227 * SLOPE%) + (1144 * ROCK%) + (7616 * SMR) + (6363 * OP)
6	4040 + (249 * SLOPE%) + (259 * ROCK%) + (1683 * SMR) + (5694 *OP) + (1377 * SBS)
7	5889 + (323 * SLOPE%) + (201 * ROCK%) + (3155 * SMR) + (10520 * OP) – (5923 * BWBS) ($1337/km set as minimum. If equation yields less than $1337/km then use $1337/km).
8	1368 + (203 * SLOPE%) + (4329 * OP) + (1891 * SBS)
9	6967 + (184 * SLOPE%) + (2603 * OP) – (2666 * IDF)
10	12597 + (237 * SLOPE%)
11	24058 + (189 * SLOPE%) + (395 * ROCK%)
12	11136 + (262 * SLOPE%) + (7511 * OP) + (4681 * ESSF)

Where:

Road groups are defined in Table 4-3.

OP	=	1 if an Operational Road, otherwise = 0
SMR	=	1 if Soil Moisture Regime is "wet". Otherwise SMR = 0.
CWH	=	1 if road construction is within this biogeoclimatic zone. Otherwise CWH = 0.
ESSF	=	1 if road construction is within this biogeoclimatic zone. Otherwise ESSF = 0
ICH	=	1 if road construction is within this biogeoclimatic zone. Otherwise ICH = 0
SBS	=	1 if road construction is within this biogeoclimatic zone. Otherwise SBS = 0
IDF	=	1 if road contruction is within this biogeoclimatic zone Otherwise IDF = 0
BWBS	=	1 if road construction is within this biogeoclimatic zone Otherwise BWBS = 0

Snow roads

The subgrade cost estimate for all snow roads (winter) is $8 500/km.

Table 4-3 Road Groups

Road Group #	Districts Included	Within the Geographic Boundary of a TSA, SB and TFL
1	Kalum, Kispiox	
2	Bulkley - (Cassiar), Lillooet	
3	Lakes, Morice	
4		Williams Lake TSA, SBs J, K & L Prince George TSA, SBs G & H, TFLs 30, 53 Quesnel TSA, SBs E, F, G, H & I, TFL52 100 Mile House TSA, SBs D, G & H
5	Vanderhoof	Prince George TSA, SBs E, F & I
6	Fort St. James	Mackenzie TSA, SBs G through P
7	Dawson Creek Fort St. John Fort Nelson	Mackenzie TSA, SBs A through F
8	Chilcotin	Williams Lake TSA, SBs F, G, H & P Quesnel TSA, SBs A, B, C & D, TFL5 100 Mile House TSA, SBs A, B, C, E, F
9	Kamloops Merritt Penticton Vernon	
10	Boundary Cranbrook Invermere	
11	Arrow Columbia (Golden, Revelstoke) Kootenay Lake	
12	Clearwater Robson Valley Salmon Arm	Williams Lake TSA, SBs M & N

Woodlot and Timber Licence cutting authorities are to be assigned to the road group area in which they are geographically located.

4.3.2.4 Drainage Structures

An appraisal may include a cost estimate for large drainage structures only where their requirement is substantiated by field data. Such structures shall be placed so as to maintain the natural drainage pattern of the area crossed by the proposed road. All pipe culverts under 950 mm in diameter and all single log abutment culverts under 3.5 m span length are included in the subgrade cost estimates (see Section 4.3.2.1).

See page 39 of the *Forest Road Engineering Guidebook* for a detailed description.

See pages 85 (Pipe Culverts) and 93 (Log Culverts) of the *Forest Road Engineering Guidebook* for detailed description.

1. Culverts

   The cost estimates for the supply and installation of culverts from 0.95 m to 1.8 m in diameter are determined from Table 4-4 that follows. Detailed engineering cost estimates are required for larger metal culverts (culverts smaller than 0.95m are included in the subgrade costs). No interpolation of values is permitted. Total installation cost for culverts includes all costs of transporting the culvert to the jobsite and all costs of installation of the culvert to the final subgrade stage.

Table 4-4 Culvert Cost Estimates

INSTALLED COST ESTIMATE ($)

Circular or oval pipes

Equivalent Round Diameter (m)	1.0	1.2	1.4	1.6	1.8
X-Section Area (m^2)	0.78	1.13	1.54	2.00	2.54
Length (m)					
9	1000	1469	2239	3009	3779
10	1127	1982	2838	3693	4549
11	1555	2496	3437	4377	5318
12	1982	3009	4035	5062	6088
13	2410	3522	4634	5746	6858
14	2838	4035	5233	6430	7628
15	3265	4549	5832	7115	8398
16	3693	5062	6430	7799	9168
17	4121	5575	7029	8483	9938
18	4549	6088	7628	9168	10707
19	4976	6601	8227	9852	11477
20	5404	7115	8826	10536	12247
21	5832	7628	9424	11221	13017
22	6259	8141	10023	11905	13787
23	6687	8654	10622	12589	14557
24	7115	9168	11221	13274	15326
25	7542	9681	11819	13958	16096
26	7970	10194	12418	14642	16866
27	8398	10707	13017	15326	17636
28	8826	11221	13616	16011	18406
29	9253	11734	14214	16695	19176
30	9681	12247	14813	17379	19946

2. Log Bridges

Log Bridges are defined as structures where both the abutments and stringers use local logs and not engineered materials. The running surface can be either gravel or timber decked.

Cost estimates are made for log bridges where their necessity is substantiated by field data. Cost estimates for non-log bridges, where required, are made as detailed engineering cost estimates (Section 4.3.3).

Cost estimates for log bridges are based on span lengths (distance between the centres of the top sill logs) and average crib height (measured from the bottom of the bottom sill log to the point where the stringer rests on the top sill log at the centre line of the bridge) from Table 4-5 that follows. Cost estimates for bridge sizes greater than the table limits require detailed engineering data as described in Section 4.3.3.

Table values are for both timber-decked and gravel-surfaced bridges. Gravel-surfaced bridges have guard logs lashed to the cribs and stringers.

Bridge costs include:

- crib back-fills to a maximum distance of 15 m on either end,
- site preparation,
- protection features such as rip rap,
- material and equipment supply and delivery,
- installation.

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

Table 4-5 Log Bridge Cost Estimates

LOG BRIDGE COST ESTIMATE

(Thousands of Dollars)

Span Length (m)	Single Log Sill	Multi-Log Crib Average Crib-Height (m)			
		2	3	4	5
4	8.2	10.8	12.8	14.9	16.9
5	8.6	11.8	14.4	16.9	19.4
6	8.9	12.8	15.9	18.9	21.9
7	9.3	13.8	17.4	20.9	24.4
8	9.6	14.9	18.9	22.9	26.9
9	10.0	15.9	20.4	24.9	29.4
10	10.3	16.9	21.9	26.9	31.9
11	10.7	17.9	23.4	28.9	34.5
12	11.0	18.9	24.9	30.9	37.0
13	11.4	19.9	26.4	33.0	39.5
14	11.7	20.9	27.9	35.0	42.0
15	12.1	21.9	29.4	37.0	44.5

4.3.2.5 Additional Stabilizing Material

Road stabilization is the placement of gravel or broken rock on the road subgrade to provide stable support and a running surface for logging equipment using the road (see Section 4.3.3 (13) for cost estimates pertaining to the use of special materials). Where stabilizing material developed during the subgrade or ditch construction is insufficient, a cost estimate for additional stabilizing material to be trucked in from selected borrow pits may be included in the appraisal.

Unit Cost Estimate

The unit cost estimate ($/km) for the additional stabilizing material includes:

- borrow pit preparation,
- rock drilling, explosives, loading of explosives and blasting,
- loosening and/or pushing materials in borrow pits when required (e.g., compacted or cemented gravel, oversize material, etc.),
- loading gravel trucks,
- truck hauling, and
- spreading and compacting the material.

The cost estimates assume borrow pits are located adjacent to the road side and are not part of the subgrade excavation. If a new road needs to be constructed to access the borrow pit, then an access road cost estimate is required in addition to the in-place unit cost estimates.

For each road, the additional stabilizing material cost estimate ($/km) is determined from the equation for the appropriate road group.

Road Groups	Equation
1	13888 + (4186 * D) + (6217 * QROCK) + (13507 * CWH)
2	7178 + (436 * D)
3	19076 + (9777 * QROCK)
4	14486 + (827 * D) – (6819 * SBS)
5	11890 + (261 * D)
6	6431 + (274 * D) + (5275 *BWBS)
7	15055
8	7184
9	11768
10	7602 + (750 * D)
11	15116
12	17933

Where:

Road groups are defined in Table 4-2.

D	=	Distance in kilometres from source of ballast to the centre of the section that requires ballast (rounded to the nearest 0.1 km)
QROCK	=	1 if road is stabilized with quarry rock that requires drilling and blasting. Otherwise QROCK = 0
CWH	=	1 if road construction is within this biogeoclimatic zone. Otherwise CWH = 0
SBS	=	1 if road onstruction is within this biogeoclimatic zone. Otherwise SBS = 0
BWBS	=	1 if road construction is within this biogeoclimatic zone. Otherwise BWBS = 0

Also see Detailed Engineered Costs Section 4.3.3 (3).

> No cost estimate for additional stabilizing material is allowed for any snow roads.

4.3.2.6 Cattle Guards, Remedial Fences and Pipeline Crossings

Where the cutting authority specifies the installation of cattle guards, wing fences or remedial fences, the installed cost using new or recycled material is estimated as follows:

1.	Cattle Guards	$3177 each
2.	Remedial Fences and Wing Fences[1]	$531 per 100 m
3.	Pipeline Crossings	$3400 each

All costs include materials, transportation and installation.

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[1] Fencing that is required to remedy, reduce, or manage the impact of timber harvesting activities on range management.

4.3.2.7 Snow Road Reconstruction

Snow road reconstruction is defined as the reconstruction of previously used snow roads and seismic lines; as defined under Snow Roads (Section 4.3.2.2). These costs are included in the road maintenance cost estimate (Section 4.6).

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 shall be estimated by preparing a detailed engineering cost estimate. The Regional Manager may approve standardized procedures to generate cost estimates for use in projects as listed below.

Where specific development projects involve detailed engineering cost estimates, based on approved road layout and design plans, the District Manager shall be advised of project details no later than 60 days before the start of work on the project.

For appraisal purposes, the estimated development project costs are made on the basis of the site-specific data including the definitions found in Section 4.3.2.2 for common subgrade construction variables and the equipment and labour rates specified in Appendix I. Due consideration is given to arm's length competitive bids for any specific project. The appraisal estimate is not constrained in any way by a licensee's actual costs.

All detailed engineering costs must be adjusted to match the cost base used for the other phases of this manual. Where road sections estimated as a detailed engineered cost estimate are contiguous with tabular cost estimates, costs for mobilization and demobilization will only be allowed for special equipment not required for the construction of the tabular roads. The following specific situations are considered for detailed engineering cost estimates:

1. New construction and upgrading of forest service roads that meet the criteria and conditions provided in the *Main Access Roads Policy*.

2. Road construction on uphill side slopes greater than 50 percent (greater than 59 percent in road Group 1).

3. When rock percent exceeds 50 percent, or terrain class 4 and 5 (greater than 59 percent in road Group 1).

4. Road construction on terrain with two or more gullies over 10 m deep at centreline in a 0.3 km section.

5. End haul construction (of roads and landings) requiring removal by truck of excavated material to a separate area to avoid side casting on steep and/or sensitive sites.

6. Overland construction to provide a roadbed by trucking in material for extensive filling; see page 54 of *Forest Road Engineering Guidebook* for a more detailed description.

7. All bridges that do not meet the log bridge criteria defined in Section 4.3.2.4(2) or are not included in the subgrade cost estimates. Eligible costs include site planning and the same phases as listed in Section 4.3.2.4(2). All ice bridge construction including construction for additional logging seasons.

8. Structural maintenance of bridges, substructure and cribwork.

9. Reconstruction of roads and pertinent structures. Cost estimates for reconstruction are not to exceed the tabular cost for new construction under similar conditions.

10. Upgrade of roads and pertinent structures. Road upgrade resulting in a change in the standard of the road and structure or where the licensee was not obligated to carry out road maintenance prior to the appraisal. Where road maintenance obligations exist, road upgrade is limited to widening the running surface, vertical and horizontal realignment, and additional culverts.

11. Replacement of road running surfaces for uninterrupted lengths over 0.3 km. Lengths less than 0.3 km are included in road maintenance (Section 4.6).

12. Metal culverts greater than 1.8 m in diameter when specified in the cutting authority, or road permit. Metal culverts greater than 30 m in length regardless of diameter also qualify. The cost estimate includes all costs of transporting the culvert to the jobsite and all costs of installation of the culvert to the final subgrade stage.

13. Placement of additional stabilizing material where geo-tech fabric, corduroy, crushed and/or screened rock/gravel are used.

14. Retaining walls, railway crossings and other special structures (may include multiple culverts, baffled culverts, arched culverts and other structures determined by the appraisal coordinator).

15. Access management (as defined in Section 4.3.1 (3)).

16. Deactivation of roads defined as follows (costs may include revegetation as appropriate):

    a. Bridge removal,

    b. Major culvert removal, (i.e., over 950 mm),

    c. Pull back unstable sidecast or road fills (for slope stability purposes),

    d. Cut/fill slope stabilization (for slope stability purposes), and

    e. Deep fill removal (greater than 3 m) (for slope stability purposes).

17. Slough removal of more than 250 m^3 of material, where the slough was not caused by the negligence of the licensee.

The data which may be required for excavation and fill estimates are:

1. Plans, profiles, cross-sections showing the ground and design grade lines.

2. Volume summary sheets showing excavation quantities by various soil types, for subgrade and stabilization.

3. Type of construction equipment and quantity of material to be used, or ministry approved competitive bid costing.

4. Location of borrow and waste areas to calculate material haul distances.

The data required for bridges, culverts and for other unusual structures are:

1. Where the bridge span is 15.4 m or less and the crib height is 5.4 m or less and a permanent structure is proposed, an economic life cycle comparison between a log structure and the permanent proposal is required.

2. Where the bridge span is greater than 15.4 m, and/or the crib height is 5.4 m or more and for pipe culverts greater than 1.8 m in diameter or 30 m in length: plans, specifications and design for the proposed structure; detailed estimate of costs of materials; equipment and labour or ministry approved competitive bid pricing; amount of timber accessed by the structure and the number of years of use for harvesting all timber are required.

3. Where bridge materials are reused the cost estimate will include dismantling, transportation and reinstallation at the new site, but will exclude initial materials purchased and initial delivery costs.

Costs that may be included in the detailed engineered cost estimate are:

1. Freight (for materials).

2. Provincial sales tax (for materials).

3. Supervision of construction of complex structures by a Professional Engineer.

4. Bridge certification by a Professional Engineer (maximum of three field trips) unless otherwise approved by the Regional Appraisal Coordinator (the costs for Professional Engineers are permitted whether they are on the licensees staff or hired under contract).

5. Site plans, designs and layouts.

6. Where equipment is not, or will not be already on site for adjoining tabular road, bridge or culvert construction, then the costs of mob and demob may be included in the engineered cost estimate.

GST and supervision costs other than as stated above, are not to be included in the engineered estimate.

Where different timber volumes are used for separate cost estimates, the unit costs are rounded to the nearest cent before totalling.

In some cases, the detailed engineering cost estimates may be apportioned to two or more licensees' tributary cutting authorities, as described under Section 4.3.1.1.5.

4.4 Tree-to-Truck

Cost estimates recognized in the tree-to-truck phase of the logging operation include, but are not limited to, expenses incurred for:

- felling
- skidding
- yarding
- bucking
- sorting (bush, dryland, and water)
- loading
- landing construction, rehabilitation and reconstruction (excluding end haul)
- fuel and equipment moves
- pest control
- grass seeding
- crew accommodation for accessible operations
- contractor overhead and profit, fringe benefits
- tree marking
- three metre knockdown
- lop & scatter
- landing burning (includes fireguards)
- roadside debris piling and disposal
- skid and back spar trail construction and rehabilitation/slashing
- slashing
- pheromone treatment
- crew transport
- spur roads for ground skidding of less than or equal to 100m length (See Section 4.3.2.2 (1))

4.4.1 Harvesting Methods

Certain harvesting methods are recognized only when required by the cutting authority document (inclusive of logging plan).

- Helicopter,
- Horse,
- Ground Skidding, and
- Overhead Cable Logging.

4.4.2 Tree-to-Truck Variables

For appraisal purposes the following variables are recognized, based on all compiled cruise plots segregated by logging method where applicable (see Section 4.4.5). Where the utilization of deciduous is mandatory, all applicable variables are to include the deciduous component.

1. Biogeoclimatic Zone

   A separate biogeoclimatic zone may be recognized for each harvest method (Section 4.4.1) as part of the regional constant.

2. Slope (SLOPE%)

   The average side slope percent is derived from an area weighted average of the maximum side slope percentage on all cruise plots, rounded to the nearest whole percentage point.

3. Volume per Hectare (VOLHA)

   The average net cruise volume per hectare (m^3/ha), rounded to the nearest cubic metre. For partial cutting, it is based on the actual volume per hectare being harvested.

4. Percent Blowdown (BD%)

   The percentage of the net cruise volume classified as blowdown.

5. Percent Partial Cut (PCUT)

   The term partial cut includes all forms of variable retention harvesting and commercial thinning where the volume removed is less than 90 percent of the total net cruise volume.

   The percent partial cut is determined as:

$$\text{PCUT} = \frac{\text{Net cruise volume required to be removed}}{\text{Total net cruise volume on the area where Partial Cut System is required}} * 100\%$$

   (except if partial cut percent > = 90% then PCUT = 0). All partial cut percent from 90 – 100 percent are to be appraised as clear cut.

   Partial cut dummy variable (DPCUT)

   DPCUT = 1 if partial cut percent is greater than 0 and less than 90, otherwise DPCUT = 0.

6. Distance to Support Centre (DS)

Accessible cutting authorities: (see Section 4.8.2), the one-way distance to support centre is the distance over continuous road access from the geographic centre of the cutting authority to the main post office (or other location designated by the Regional Appraisal Coordinator) in a community from the following list. The distance to support centre includes the distance covered by a daily barge or ferry service. Where there is more than one block in the cutting authority, the weighted average distance to support centre must be calculated using the individual distances and the individual block volumes. Where more than one alternative is possible, the least cost alternative is used. The distance is measured to the nearest kilometre. The following is a list of communities by forest region.

Prince Rupert

Burns Lake	Kitwanga	Smithers	Terrace
Houston	New Hazelton	Stewart	
Kitimat			

Kamloops

Boston Bar	Kamloops	Merritt	Princeton
Clearwater	Kelowna	Pemberton	Salmon Arm
Hope	Lillooet	Penticton	Vernon

Prince George

Chetwynd	Fort St. James	Mackenzie	Valemount
Dawson Creek	Fort St. John	McBride	Vanderhoof
Fort Nelson	Fraser Lake	Prince George	

Nelson

Canal Flats	Creston	Grand Forks	Nakusp
Castlegar	Fernie	Greenwood	Nelson
Cranbrook	Golden	Invermere	Revelstoke

Cariboo

100 Mile House	Quesnel	Williams Lake

For isolated cutting authorities (see Section 4.8.2), the distance to support centre is the one-way road distance from the geographic centre of the cutting authority to the isolated camp or where there is no isolated camp, to a community from the list above. Where more than one alternative is possible, the least cost alternative is used. The distance is measured to the nearest kilometre.

The following distance dummy variables are included:

- DISTC125 = (DS-125) if CAMP = 1 *and* DS>125 otherwise DISTC125 = 0,
- DISTNC125 = (DS-125) if CAMP = 0 *and* DS>125 otherwise DISTNC125 = 0.
- DISTC150 = (DS-150) if CAMP = 1 and DS>150 otherwise DISTC150 = 0.

7. Volume per Tree (VOLTREE)

   The average net cruise volume per tree (m^3), rounded to two decimals. For partial cutting, it is based on the trees to be harvested.

8. Gross Volume per Tree (GVOL)

   Gross volume per tree (m^3) is computed as: VOLTREE/(1 - defect %/100).

   Where:

   Defect is the estimate of decay, waste and breakage (DWB) percent of the coniferous gross volume from the cruise summary for the trees to be harvested. Where utilization of deciduous volume is mandatory under the license, defect% is taken from the stand volume of the cruise summary. Defect% is recorded to the nearest whole percentage point for appraisal calculation purposes.

9. Accessible Camp (CAMP)

   A camp is defined as a permanent structure(s) where capital assets were incurred to establish the camp. There must be both a cookhouse and a bunkhouse.

   - CAMP = 1 if cutting authority has an accessible camp, otherwise CAMP = 0,

10. FNP = Fort Nelson, Peace River area consiting of the Fort Nelson, Fort St. John and Dawson Creek Forest Districts.

4.4.3 Tree-to-truck Cost Estimate

Tree-to-truck costs estimates are determined for each harvesting method as follows:

1. Helicopter Logging

   Only partial cut and clear-cut logging variables are recognized. The cost estimates are applied to the volume of timber which is required to be logged by helicopter.

   Two variations are recognized:

   a. Clear Cut (defined as volume removal of 90% or greater of the total net cruise volume)

Region	Kamloops	Nelson	Prince Rupert	Other
$/m^3	63.33	66.35	74.00	69.37

   b. Partial Cut (see Section 4.4.2 (5))

Region	Kamloops	Nelson	Prince Rupert	Other
$/m^3	68.20	71.22	78.87	74.24

2. Horse Logging

   No variables are recognized for this method. The cost estimates are applied to the volume of timber to be clear cut or partial cut.

$$\$/m^3 = 30.00$$

3. Ground Skidding

   The ground skidding equipment options include, but are not limited to, rubber tired skidder, crawler tractor, soft track skidder, small cat skidding, hoe chucking, long line skidding, clambunk forwarders, low ground pressure skidders, harvester forwarders and cut-to-length processors. A system does not have to skid wood all the way from the stump to the landing to be included. Some wood may be moved part way by longlining or hoechucking before being skidded by some other system to the landing. Two variations are recognized:

   a. Clear Cut,

   b. Partial Cut

The Tree-to-truck cost estimate for both variations is determined from the equation as follows:

$\$/m^3 =$ CONSTANT + ((7.37 * SLOPE%)/100) – (6.77 * VOLHA/1000) + (6.07 * BD%/100) + (2.51 * DEFECT%/100) + (5.39 * DPCUT) – (4.13 * PCUT/100) + (1.55 * CAMP) + (0.80 * DISTC125/100) + (2.22 * DISTNC125/100)

Where CONSTANT =

REGION	Biogeoclimatic Zone						
	BWBS	CWH/MH	ICH	IDF	MS	ESSF	Other
Cariboo	15.84	20.97	20.35	18.46	19.06	19.77	17.14
Kamloops	14.13	19.26	18.64	16.75	17.35	18.06	15.43
Prince George*	15.23	20.36	19.74	17.85	18.45	19.16	16.53
Prince Rupert	15.19	20.32	19.70	17.81	18.41	19.12	16.49
Other including (FNP)	17.76	22.89	22.27	20.38	20.98	21.69	19.06

* Excluding FNP.

When the volume per tree is less than 0.20 m^3, an additional cost estimate will apply to the Ground Skidding Tree-to-truck cost estimates in all Forest Regions. The small tree cost estimate is determined as follows:

$$\$/m^3 = 2.04 - 4.16 * VOLTREE$$

4. Overhead Cable Logging

   Overhead cable logging cost estimates will be recognized when required in the cutting authority document. The method includes both highlead (spar) mobile (grapple) yarders and skyline yarders, but variations in machine size, spar/boom height, winch line capacity and yarding technique are not recognized.

   Variations recognized within the method are:

   a. Highlead and Grapple

      The tree-to-truck cost estimate for clear cut and partial cut is determined from the equation as follows:

$\$/m^3$ = CONSTANT + (10.72 * SLOPE%/100) – (7.33 * VOLHA/1000) – (3.68 * GVOL) + (0.49 * GVOLSQR) + (4.91 * BD%/100) + (2.29 * DPCUT) + (2.12 * CAMP) + (10.29 * DISTC150/100)

Where CONSTANT =

	Biogeoclimatic Zone	
Region	**SBS**	**Other**
Cariboo	28.22	31.03
Kamloops	28.91	31.72
Prince George *	29.15	31.96
Prince Rupert	30.43	33.24
Other (including FNP)	32.43	35.24

* Excluding FNP

b. Skyline and Intermediate Support Skyline

Skyline yarding estimates will be recognized where the average yarding distance is greater than 300 m, or intermediate supports are required.

The Average Yarding Distance is determined by:

1. Drawing a series of transects (minimum four) with their origin at the landing, being equi-angle apart and measured to the back-line. This is done for each block; blocks will not be amalgamated for the purpose of Average Yarding Distance Calculation. The volume for the system is the sum of the volumes of qualifying blocks.

2. Yarding distance will be measured as slope distance from the centre of the landing to the falling boundary.

3. The sum of transect lengths divided by the number of transects equals the Average Yarding Distance.

4. The exception to the above; where the ministry and the licensee agree that Forest and Land Management is better served by the use of a skyline system in a particular logging chance, then the Average Yarding Distance greater than 300 meters requirement is waived.

The tree-to-truck cost estimate is determined from the equation as follows:

$\$/m^3 =$ CONSTANT - (7.53 * VOLHA/1000) - (7.64 * GVOL) + (2.51 * GVOLSQR) + (5.21 * DPCUT)

Where CONSTANT =

	Biogeoclimatic Zone	
Region	**CWH/MH**	**Other**
Kamloops	52.53	44.62
Nelson	56.41	48.50
Other	47.36	39.45

4.4.4 Tree-to-Truck Additive for Damaged Timber

The following cost estimate additives are recognized for heavy fire damage (HFD), and dead/live useless snags (DUS). The data is collected as specified by the Forest Service *Cruising Manual*. The additional costs incurred to harvest blowdown timber are recognized in the Tree-to-truck ground skidding and overhead cable logging equations (Sections 4.4 (3), 4.4 (4)).

The following additive is determined for all cable and ground skidding harvesting methods and is added to the Tree-to-truck cost estimate.

$$\$/m^3 = 0.04 * (DT - 15)$$

Where: DT is the Damaged Timber percent

$$DT = HFD + DUS$$

If: DT is less than 15 percent, DT = 15

If: DT is more than 100 percent, DT = 100

$$\text{Heavy Fire Damage \%} = \frac{\text{Conifer HFD Volume}(m^3)*100}{\text{Total Net Conifer Volume}(m^3)}$$

$$\text{Dead / Live Useless Snags \%} = \frac{\text{Conifer DUS Snags / ha} * 100}{\text{Net Merchantable Conifer Stems / ha} + \text{Conifer DUS Snags / ha}}$$

4.4.5 Prorating Tree-to-Truck Cost Estimates

Where more than one harvesting method is required, a proration of costs is necessary.

The variables for each required harvesting method must be based on a cruise compilation of only those plots located within the area to be harvested by the method.

The additive for damaged timber is also determined for each applicable method.

The final prorated tree-to-truck cost estimate is determined according to the following equation where each component is rounded to the nearest cent before totalling:

$$\$/m^3 = \frac{({}^{Cost}\text{Heli(C)})({}^{V}\text{Heli(C)})}{(\text{TNCV})} + \frac{({}^{Cost}\text{Heli(P)})({}^{V}\text{Heli(P)})}{(\text{TNCV})} + \frac{({}^{Cost}\text{Horse})({}^{V}\text{Horse})}{(\text{TNCV})} + \frac{({}^{Cost}\text{OC(C)})({}^{V}\text{OC(C)})}{(\text{TNCV})} +$$

$$\frac{({}^{Cost}\text{OC(P)})({}^{V}\text{OC(P)})}{(\text{TNCV})} + \frac{({}^{Cost}\text{GS(C)})({}^{V}\text{GS(C)})}{(\text{TNCV})} \quad \frac{({}^{Cost}\text{GS(P)})({}^{V}\text{GS(P)})}{(\text{TNCV})} \quad \frac{({}^{Cost}\text{SK(C)})({}^{V}\text{SK(C)})}{(\text{TNCV})} +$$

$$\frac{({}^{Cost}\text{SK(P)})({}^{V}\text{SK(P)})}{(\text{TNCV})}$$

Where:

Cost	=	cost estimate ($/m3) including any damaged timber additive
V	=	volume (m3) required to be logged by each system
Heli (C)	=	helicopter logging (clear-cut)
Heli (P)	=	helicopter logging (partial cut)
Horse	=	horse logging
GS (C)	=	ground skidding (clear-cut)
GS (P)	=	ground skidding (partial cut)
OC(C)	=	overhead cable logging (clear cut)
OC(P)	=	overhead cable logging (partial cut)
SK(C)	=	skyline logging (clear cut)
SK(P)	=	skyline logging (partial cut)
TNCV	=	Total Net Cruise Volume (m3)

4.5 Log Transportation

The log transportation phase covers all aspects of log movement from the place of initial loading to the point of appraisal, including truck haul, rail, water and other specialized transportation.

4.5.1 Truck Haul Variables

For appraisal purposes, the following variables are recognized:

1. Weighted Average Cycle Time (CT): the estimated time in hours (rounded to the nearest 0.1 hour) from the centre of a cutting authority area to the point of appraisal or the appraisal place of unloading (water or rail transport).

   To determine weighted average cycle time:

   a. establish the geographical centre point of each cut block and project this point to the nearest road for measurement purposes,

   b. from this centre point, determine the cycle time to the nearest junction serving all cut blocks,

   c. weight the cycle time for each cut block by the volume on the cut block and determine the average weighted cycle time to the junction. If the cut block volume is not available, the cut block area is used, and

   d. determine the cycle time from the junction to the point of appraisal or the first place of unloading and add this to the average weighted cycle time.

   The cycle consists of loading, hauling, weighing, unloading, return time, and unavoidable delays. The cycle time will normally be determined by taking into consideration all the factors that may affect it: distance, expected rate of speed, necessary delays, expected standard of roads and their maintenance, traffic density, and seasonal weather conditions.

> In many cases standard cycle time schedules from specific road junctions to the point of appraisal have been developed and should be used (Sector times).

Unavoidable delays are periods when the truck is on the job but not operating due to unpredictable delays such as; tightening binder chains, minor repairs made by driver, checking and adjusting brakes, minor delays prior to loading and unloading, refuelling, etc. Unavoidable delay time does not include any breakdown which requires shop repair, the services of a skilled mechanic, or a spilled load of logs. The time for load, unload and unavoidable delay is set at 75 minutes for cable yarding systems (see Section 4.4.3 (4)) and 60 minutes for all other systems (see Section 4.4.3 (1), (2), & (3)).

2. Haul Method

Cost estimates do not recognize different types of logging trucks. The estimate is based upon the possible haul method, either highway or off-highway and not specifically on the licensee's particular method.

Highway hauling is assumed when loaded logging trucks must travel in part over roads administered under the *Highway Act*, without truck-to-truck transfer, to the point of appraisal, or on roads administered under the *Highway (Industrial) Act* where prolonged known road restrictions prevent the use of oversize loads, or in all instances where the volume per tree (Section 4.4.2) is less than 0.20 m^3.

Off-highway hauling is assumed when loaded logging trucks can travel over roads administered under the *Highway (Industrial) Act* to the point of appraisal, or to a recognized reload. Where prolonged known restrictions (e.g., bridge load limit, narrow road, through rock cut, WCB Regulations, etc.) prevent the use of oversize loads, highway haul is assumed.

4.5.2 Truck Haul Cost Estimates

4.5.2.1 Primary Haul

The primary truck haul cost estimate is determined from the following equation.

1. Highway Haul

For all highway haul equations if the CT is greater than 0 then the minimum is $1.00/$m^3$. If CT = 0 then $/$m^3$ = 0.

$$\$/m^3 = \text{CONSTANT} + (1.97 * CT) - (1.54 * CE/100) + (2.64 * HE/100) + (1.38 * LA/100) - (0.98 * SP/100) - (0.79 * WH/100)$$

Where:

REGION	:	Cariboo	Kamloops	Pr. George*	Pr. Rupert	Other (including FNP)
CONSTANT	=	- 0.11	- 0.30	0.07	0.60	0.34

* Excluding FNP

2. Off-Highway Haul

For all off-highway haul equations if CT is greater than 0 then the minimum is $1.20/m^3. If CT = 0 then $/m^3 = 0.

$$\$/m^3 = \text{CONSTANT} + (1.49 * CT) - (0.01 * (CT)^2) - (0.59 * SP/100)$$

Where:

REGION	:	Cariboo	FNP	Kamloops	Nelson	Other*
CONSTANT	=	0.74	1.52	0.96	1.10	0.31

* Excluding FNP

For both highway and off highway.

CT	Cycle time to the nearest 0.1 hours		
CE =	% Cedar	SP =	% Spruce
HE =	% Hemlock	WH =	%White Pine
LA =	% Larch		

For both hauling equations, the species listed are the species percents taken from the appraisal data sheet to the nearest 1.0%.

4.5.2.2 Secondary Haul

The secondary haul cost estimate is made when logs must be truck hauled between the dewater and reload site to the appraisal point.

$$\$/m^3 = 1.887 * CT$$

CT for the secondary haul is determined using the method described in Section 4.5.1(1).

4.5.3 Water Transportation Cost Estimate

A water transportation cost estimate is made when logs must be transported by water between the cutting authority and the point of appraisal or reload. The estimate includes the costs of strapping logs on the truck, dumping, booming, developing and operating dumping and booming grounds, and towing. The cost estimate for reservoir lakes applies to all marine appraisals and to Arrow, Kinbasket, Ootsa, Revelstoke and Williston Lakes. All other lakes receive the natural lake cost estimate.

1. Dump and Boom:

   Reservoir Lakes and Marine: $\$/m^3 = \$4.77$

   Natural Lakes: $\$/m^3 = \$2.37$

2. Tow:

   All $\$/m^3 = 0.4167 + 0.006815 * d$

   Where; d = one-way tow distance in kilometres

3. Dewater and Reload:

   All $\$/m^3 = \$2.52$

   Only considered if the mill infeed is not located on the same lake, or a dam transfer is required. Otherwise dewatering is part of the manufacturing cost estimate.

4.5.4 Special Transportation Systems

A special transportation system is recognized in the appraisal where geographic conditions dictate its use.

The cost estimates include all costs associated with servicing the appropriate cutting authorities, excluding all on-site costs of owning and operating a camp facility.

The recognized special transportation systems are as follows:

1. Railway

   a. Truck to Rail Transfer

      When logs are appraised by railway for part of the way between the cutting authority and the point of appraisal, the cost estimate for the truck-to-rail transfer part of the phase is:

      B.C. Rail - Dease Lake Extension: $\$/m^3 = \$6.48$

All Other Railways: $/m^3 = $3.31

b. Railway Transportation

The railway transportation cost estimate is based on the following table for the points of origin shown. Otherwise, the best information on hand is used.

Table 4-6 BC Rail Log Transportation

Origin	Cost Estimate ($/m^3)	Point of Appraisal
Leo Creek	8.77	Fort St. James
Lovell	11.66	Fort St. James
Bear Lake	16.64	Fort St. James
Minaret Creek	18.12	Fort St. James
Niteal	15.79	Fort St. John

2. Barge/Ferry Used for Truck Haul (Private)

When a truck haul road is interrupted by a body of water and the operation of a barge system is feasible to provide the road link for logging trucks, the cost estimate for this phase, regardless of ownership is:

Reservoir Lakes $/m^3 = $3.81

Natural Lakes $/m^3 = $1.92

3. Barge/Ferry Not Used for Truck Haul (Private)

The cost estimate includes all costs associated with the operation of the systems and includes bubble systems where applicable.

When a cutting authority can be served only by water, and daily (operating days only) ferry/barge services are feasible for crew transportation, the cost estimate for this phase, regardless of ownership is:

All lakes $/m^3 = $0.87

4.6 Road Maintenance

Where the licensee is obliged to carry out road maintenance, routine road maintenance includes but is not limited to, the following:

- grading
- snowplowing and freezing in
- sanding
- spot gravelling (< 0.3 km distance)
- culvert repairs and thawing
- culvert removal (< 950 mm)
- culvert replacement (< 950 mm)
- non-structural maintenance of bridges
- bridge re-decking/wearing surface replacement
- ditching
- snow road reconstruction
- road use charges paid to other licensees
- seasonal erosion control
- roadside treatments
- sign maintenance
- dust control
- brushing
- minor flood and storm damage repair
- slough removal (restricted to 250 m^3 or less material volume per slough)
- water bar construction (seasonal)
- road ripping
- cross ditch construction
- grass seeding

The cost estimate for all routine maintenance carried out on logging operations depends on the geographic location of the cutting authority area.

For a management unit, other than Timber Supply Areas or Tree Farm Licence (for example Woodlot Licences), the routine road maintenance cost estimate is $\$2.36/m^3$.

The geographic location is recognized by Forest Region, Timber Supply Area and Supply Block, and Tree Farm Licence as follows.

Table 4-7 Road Maintenance Cost Estimates

Region	TFL #	TSA	TSA #	Supply Block	$/m3
Prince Rupert		Bulkley	3	All	3.58
		Cassiar	4	All	2.55
		Cranberry	42	All	2.55
		Kalum	10	All	2.55
		Kispiox	12	All	2.24
		Lakes	14	All	1.89
		Morice	20	All	1.64
		Nass	43	All	2.55
	1				2.55
	41				2.55

Region	TFL #	TSA	TSA #	Supply Block	$/m3
Kamloops		Kamloops	11	1	2.92
		Kamloops	11	2, 3, 4	1.11
		Lillooet	15	All	2.62
		Merritt	18	All	1.56
		Okanagan	22	1, 2, 3	2.84
		Okanagan	22	4, 5	2.53
		Okanagan	22	6, 7, 8, 9	3.26
	15				2.84
	18				2.92
	33				3.26
	35				1.11
	49				2.53

Region	TFL #	TSA	TSA #	Supply Block	$/m3
Prince George		Dawson Creek	41	All	2.37
		Fort Nelson	8	All	3.02
		Fort St. John	40	All	3.18
		Mackenzie	16	All	3.30
		Prince George	24	A, B, C	1.43
		Prince George	24	D	1.35
		Prince George	24	E, F, I	2.17
		Prince George	24	G, H	3.42
		Robson Valley	17	All	6.44
	48				2.37
	30				3.42
	53				3.42
	42				1.43

Region	TFL #	TSA	TSA #	Supply Block	$/m3
Nelson		Arrow	1	All	3.97
		Boundary	2	All	3.07
		Cranbrook	5	All	2.91
		Golden	7	All	6.36
		Invermere	9	All	2.92
		Kootenay Lake	13	All	3.29
		Revelstoke	27	All	3.95
	3				3.97
	23				3.97
	8				3.07
	13				2.91
	14				2.92
	55				3.95
	56				3.95

Region	TFL #	TSA	TSA #	Supply Block	$/m3
Cariboo		Quesnel	26	A, B, C, D	0.61
		Quesnel	26	E, F, G, H, I	1.53
		Williams Lake	29	A, B, C, D, E, I	1.20
		Williams Lake	29	F, G, H, J,	1.64
		Williams Lake	29	K, L	1.73
		Williams Lake	29	M, N	2.36
		100 Mile House	23	All	1.52
	5				0.61
	52				1.53

4.7 Road and Land Use Charges

Prior to a road or land use charge being included in an appraisal, the licensee must:

a. submit a "Request for Approval of a Road Use Charge" form with the data sheet; and

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

1. Charges as a Share of Road Maintenance

a. No recognition is made of such charges. The routine road maintenance cost estimate, Section 4.6, includes all relevant costs whether incurred directly by the licensee or by payment to another party for services performed.

1. Charges Other Than for Road Maintenance

There are three main categories of road status:

a. Forest Service Roads

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

b. Permitted Roads

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

c. Other Roads

Road use charges for roads on Indian Reserves or on private land owned by an arm's length third party and not subject to a lease held by the licensee, their affiliate or an 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 forest legislation and must be proven through the presentation of auditable documents.

3. Other Land Use Charges

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

4.8 Administration and Other Costs

4.8.1 Overhead

Overhead cost estimates are for the related administration and supervisory activities attributed to development, tree-to-truck, transportation and basic silviculture that occur at the head office, branch office and camp or operation.

Overhead costs include:

- Office Operations,
- Scaling,
- Cruising,
- Environmental Protection,
- Consultants fees (Section 4.3.3), and
- Engineering (road layout, survey (including geotechnical surveys), and design), other than those applicable as Engineered Cost Estimate.
- Archaeological surveys,
- Waste and Residue surveys,
- Right-of-way easements,
- Foreshore and other land leases,

Cost estimates by forest district are shown in the following table:

Table 4-8 Administration Cost Estimates

District	$/m^3	District	$/m^3
100 Mile House	7.57	Kispiox	9.15
Arrow	12.28	Kootenay Lake	11.82
Boundary	8.89	Lakes	6.50
Bulkley (Cassiar)	7.33	Lillooet	12.23
Chilcotin	6.40	Mackenzie	7.21
Clearwater	10.38	Merritt	8.48
Columbia (Golden, Revelstoke)	13.79	Morice	6.95
Cranbrook	9.85	Penticton	8.65
Dawson Creek	7.97	Prince George	7.57
Fort Nelson	5.04	Quesnel	7.05
Fort St. James	6.86	Robson Valley	10.45
Fort St. John	5.97	Salmon Arm	10.36
Horsefly	7.58	Vanderhoof	5.94
Invermere	12.13	Vernon	8.52
Kalum	12.11	Williams Lake	7.60
Kamloops	8.00		

4.8.2 Isolated Cutting Authority Areas

An isolated cutting authority area has no continuous road access to the nearest support centre (listed in Section 4.4.2(7)). Continuous road access includes public ferry service, private daily ferry and daily barge service. The exception is where there is continuous road access, but the route is not routinely used to transport people, equipment or supplies to the cutting authority area.

For isolated cutting authorities not serviced by camps the isolation cost estimate covers, the costs of moving people, equipment and supplies to and across the non-road portions of the route to the camp (or cutting authority area where there is no camp) whether by crew boat, periodic barge service, air, or rail. Also covered are the depreciation, maintenance and operating costs of any camp facilities and the non-recoverable costs incurred for a cookhouse, family quarters, bunk houses, shop, office and other pertinent buildings.

For isolated cutting authorities serviced by camps, the costs of moving people, equipment or supplies by road from the isolated camp location to the cutting authority are covered by the distance variable in the tree-to-truck equation.

The cost estimates for isolated cutting authorities at the following locations are:

Rail access:	$\$/m^3 = 6.46$
Lake/ocean access:	$\$/m^3 = 6.22$

4.8.3 Low Volume Cost Estimate

All fully appraised cutting authorities are eligible for a specific low volume cost estimate in addition to all other phase cost estimates.

1. Where the licence to which the cutting authority belongs has an Allowable Annual Cut of Crown timber greater than 0 m^3 and less than 3 000 m^3;

   $\$/m^3 = 10.94$

2. Where the licence to which cutting authority belongs has an AAC of 3 000 m^3 or greater and the net cruise volume for the cutting authority is less than 3 000 m^3;

The cost estimate is: (prorated by volume)	Ground Skidding(clearcut & partial)	$\$0.79/m^3$
	Cable Yarding	$\$1.30/m^3$
	All Other	$\$0.00/m^3$

3. Where the licence to which cutting authority belongs has no AAC and the cutting authority net cruise volume is less than 3 000 m^3;

   $\$/m^3 = 4.05$

4.9 Post-Logging Treatment Costs

Post-logging costs are those which are incurred after logging because of treatments specified in the cutting authority. All post-logging requirements are included in the tree-to-truck phase.

4.10 Basic Silviculture Cost Estimate

Basic silviculture cost estimates are made for all cutting authorities where basic silviculture is required.

Basic silviculture treatment regime(s) cost estimates include all treatment costs that are required to achieve the free-growing stocking standards, as referred to in the *Silviculture Practices Regulation* (B.C. Reg. 108/98).

The following table lists the treatment regimes and associated cost estimates ($/ha) for each group of forest districts.

Table 4-9 District Silviculture Groupings

Group 1	Group 2	Group 3	Group 4
Columbia	Arrow Kalum Lillooet	Clearwater Invermere Kootenay Lake Robson Valley Salmon Arm	Boundary Cranbrook Kispiox Merritt Penticton Vernon

Group 5	Group 6
100 Mile House Bulkley (Cassiar) Dawson Creek Fort St. James Horsefly Kamloops Lakes Mackenzie Morice Prince George Quesnel Williams Lake	Chilcotin Fort Nelson Fort St. John Vanderhoof

Table 4-10 Treatment Regime Cost Estimates

Regime	Group 1 $/ha	Group 2 $/ha	Group 3 $/ha	Group 4 $/ha	Group 5 $/ha	Group 6 $/ha
A	4666	3200	2923	2320	2540	2378
B	4026	2750	2466	2056	2139	1952
C	2653	2084	1661	1425	1445	1223
D	2305	2249	1496	1313	1285	908
E	3436	2307	1989	1730	1762	1565
F		2176	1935	1655	1712	1550
G	1327	1449	1027	903	901	717
H	3131	2247	2216	1698	2030	2040
I		1509	1512	1265	1423	1428
J				294	308	291
K			79	67	91	
M	2499	1394	1540	1003	1392	1581

All regimes assume a combination of manual and chemical brushing and weeding (i.e., a blended cost estimate).

Where stump removal for root disease control is required, a cost estimate may be determined as a specified operation as described in Section 4.1.1.

The area requiring basic silviculture treatment includes only the portion of the land on which the licensee is required to establish a free-growing crop of trees, as specified in the *Forest Practices Code of British Columbia Act*. Basic silviculture treatment may not be required on some cutting authorities (e.g., right-of-way, licence-to-cut (gravel pit)).

Basic silviculture cost estimates will not be included in the appraisal where silviculture is specified as not required in the licence document, cutting authority or by applicant's agreement.

If available, the net area to be reforested is to be taken from the "Silviculture Prescription" (SP); otherwise the best information at hand (i.e., cruise area with appropriate net down factors) will be used.

Individual areas of non-commercial brush (NCBR) of less than four hectares growing on productive forest land are included in the applicable treatment regime(s) used to calculate the basic silviculture cost estimate. Subject to approval by the District Manager, these areas are eligible for a cost estimate of 1.2 times the applicable treatment regime(s) cost. Individual areas of NCBR greater than 4 ha in size must not be included in the appraisal.

In the case of mixed stands where the cutting authority document requires mandatory utilization of deciduous timber, the deciduous area is included in the applicable treatment regime(s) used to calculate the basic silviculture cost estimate and the deciduous volume is included in the total net merchantable volume for the calculation of silviculture cost estimates.

Each treatment regime cost estimate is determined as follows:

($) = treatment regime cost ($/ha) * [Net merchantable area + (NCBR * 1.2)]* R

Where:

Net merchantable area = Net area to be reforested - NCBR

NCBR = individual areas of non-commercial brush of 4 hectares or less in size.

R = volume removal factor and is calculated for each treatment regime area.

$$R = \frac{\text{Volume Required to be Harvested}}{\text{Total Net Cruise Volume}}$$

Where:

R = 1 if the entire volume is required to be harvested (i.e., clear-cut).

R = 1 for treatment regime G in all cases.

The Basic Silviculture Cost Estimate is determined as follows:

$$\$/m^3 = \frac{\text{Summation of Treatment Regime Cost Estimates}}{\text{Total Net Cruise Volume}(m^3)}$$

Each portion, by area, of a cutting authority that requires less than 90 percent volume removal must have one or more separate treatment regime cost estimates (i.e., partial cut areas and clear-cut areas may not be combined). Any areas with 90 percent or more removed will be considered a clearcut and deemed equal to 100%.

4.11 Manufacturing Cost Estimates

In the interior, appraisal calculations include estimates of the cost of manufacturing lumber and chips. Manufacturing cost estimates are developed from a survey of sawmills and encompass all phases of manufacturing beginning with the dewatering of logs or unloading of logging trucks at the mill log yard, (land or water or satellite log yards), and ending when the lumber and chips have been loaded on rail cars or trucks for transport to market.

The survey collects actual costs to the licensee, including wages, benefits, overtime, depreciation, fuel, supplies, repair, maintenance, applicable licences, insurance, etc. from a representative sample of interior operations.

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

The estimates have an effective cost base date of July 1, 1997.

Table 4-11 Untrended Manufacturing Cost Estimates

Untrended Manufacturing Cost Estimates ($/m^3) 1997 Cost Survey Base		
	Species	**Manufacturing cost ($/m^3) 0% Decay**
Northern Interior (Zone 5)	LO	37.31
	SP	33.97
	BA	38.81
	FI, LA, WH, YE	49.88
	CE	47.54
	HE	45.61
Skeena (Zone 6)	LO	32.75
	SP	29.52
	BA	34.54
	CE	41.77
	HE	39.03
Southern Interior (Zone 7)	LO	41.01
	SP	36.44
	BA	41.82
	FI, LA, WH, YE	53.84
	CE	52.25
	HE	50.45

Untrended Manufacturing Cost Estimates ($/m^3) 1997 Cost Survey Base		
	Species	**Manufacturing cost ($/m^3) 0% Decay**
Southern Cariboo (Zone 8)	LO	34.90
	SP	31.45
	BA	36.20
	FI, LA, WH, YE	45.88
	CE	40.57
	HE	39.00
Fort Nelson/Peace (Zone 9)	LO	35.70
	SP	32.39
	BA	36.56

To derive the manufacturing cost estimate for decay % from 1 to 50, use the above table values in the following equation:

The cost estimate is calculated to four decimal places, then rounded to the nearest cent. Where decay exceeds 50 percent, the manufacturing cost estimate for 50 percent decay is used.

Manufacturing cost ($/m^3) = decay% * 0.1819 + base value from table.

For a list of points of appraisal by zone, refer to Section 2.5.

4.12 Cost Trend

Cost trend factors are separately applied to the total logging, silviculture and manufacturing cost estimates. The factors cover the period from the effective date of the cost base to the effective date of the rate calculation. Cost trend factors are applied at the appraisal effective date and at the date of each stumpage adjustment.

For trend factors applicable prior to July 1, 1998, refer to earlier *Interior Appraisal Manuals.*

Appraisal Effective Dates From January 1, 1990 to May 31, 1992 Inclusive

Appraisal Effective Date or Stumpage Adjustment Date	Trend Factor	
	Logging and Silviculture	Manufacturing
July 1 to September 30, 1999	1.503	1.460
October 1 to December 31, 1999	1.503	1.460
January 1 to March 31, 2000	1.503	1.460
April 1 to June 30, 2000	1.503	1.460
July 1 to September 30, 2000	1.503	1.460

Appraisal Effective Dates From June 1, 1992 to October 31, 1992 Inclusive

Appraisal Effective Date or Stumpage Adjustment Date	Trend Factor	
	Logging and Silviculture	Manufacturing
July 1 to September 30, 1999	1.503	1.407
October 1 to December 31, 1999	1.503	1.407
January 1 to March 31, 2000	1.503	1.407
April 1 to June 30, 2000	1.503	1.407
July 1 to September 30, 2000	1.503	1.407

Appraisal Effective Dates From November 1, 1992 to September 30, 1993 Inclusive

Appraisal Effective Date or Stumpage Adjustment Date	Trend Factor	
	Logging and Silviculture	Manufacturing
July 1 to September 30, 1999	1.463	1.368
October 1 to December 31, 1999	1.463	1.368
January 1 to March 31, 2000	1.463	1.368
April 1 to June 30, 2000	1.463	1.368
July 1 to September 30, 2000	1.463	1.368

Appraisal Effective Dates From October 1, 1993 to September 30, 1994

Appraisal Effective Date or Stumpage Adjustment Date	Trend Factor	
	Logging and Silviculture	Manufacturing
July 1 to September 30, 1999	1.443	1.290
October 1 to December 31, 1998	1.443	1.290
January 1 to March 31, 2000	1.443	1.290
April 1 to June 30, 2000	1.443	1.290
July 1 to September 30, 2000	1.443	1.290

Appraisal Effective Dates From October 1, 1994 to July 31, 1995

Appraisal Effective Date or Stumpage Adjustment Date	Trend Factor	
	Logging and Silviculture	Manufacturing
July 1 to September 30, 1999	1.403	1.288
October 1 to December 31, 1999	1.403	1.288
January 1 to March 31, 2000	1.403	1.288
April 1 to June 30, 2000	1.403	1.288
July 1 to September 30, 2000	1.403	1.288

Appraisal Effective Dates From August 1, 1995 to July 31, 1996

Appraisal Effective Date or Stumpage Adjustment Date	Trend Factor	
	Logging and Silviculture	Manufacturing
July 1 to September 30, 1999	1.303	1.206
October 1 to December 31, 1999	1.303	1.206
January 1 to March 31, 2000	1.303	1.206
April 1 to June 30, 2000	1.303	1.206
July 1 to September 30, 2000	1.303	1.206

Appraisal Effective Dates From August 1, 1996 to November 30, 1997

Appraisal Effective Date or Stumpage Adjustment Date	Trend Factor	
	Logging and Silviculture	Manufacturing
July 1 to September 30, 1999	1.183	1.082
October 1 to December 31, 1999	1.183	1.082
January 1 to March 31, 2000	1.183	1.082
April 1 to June 30, 2000	1.183	1.082
July 1 to September 30, 2000	1.183	1.082

Appraisal Effective Dates From December 1, 1997 to August 31, 1998

Appraisal Effective Date or Stumpage Adjustment Date	Trend Factor	
	Logging and Silviculture	Manufacturing
July 1 to September 30, 1999	1.083	1.045
October 1 to December 31, 1999	1.083	1.045
January 1 to March 31, 2000	1.083	1.045
April 1 to June 30, 2000	1.083	1.045
July 1 to September 30, 2000	1.083	1.045

Appraisal Effective Dates From September 1, 1998 to September 30, 1999

Appraisal Effective Date or Stumpage Adjustment Date	Trend Factor	
	Logging and Silviculture	Manufacturing
July 1 to September 30, 1999	1.023	1.023
October 1 to December 31, 1999	1.023	1.023
January 1 to March 31, 2000	1.023	1.023
April 1 to June 30, 2000	1.023	1.023
July 1 to September 30, 2000	1.023	1.023

Appraisal Effective Dates On or After October 1, 1999

Appraisal Effective Date or Stumpage Adjustment Date	Trend Factor	
	Logging and Silviculture	Manufacturing
October 1 to December 31, 1999	0.948	0.970
January 1 to March 31, 2000	0.948	0.970
April 1 to June 30, 2000	0.948	0.970
July 1 to September 30, 2000	0.948	0.970

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 is tied 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 interior mean value index (MVI) is the benchmark against which individual stands of timber are compared. The interior mean value index is recalculated and published by Revenue Branch at the time of each quarterly stumpage adjustment and becomes an integral part of this manual.

Effective with the January 1, 1999 stumpage adjustment all appraised timber licence cutting authorities will be included in the MVI calculation.

Effective with the January 1, 1999 stumpage adjustment, cutting authorities that contain predominately burnt timber originating from the large fires of 1998, in the Kamloops and Nelson Regions, will not be included in the MVI calculation.

5.4 Market Value Indexing

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

In the interior, softwood lumber is represented by Statistics Canada price index P2459. The price of wood chips in British Columbia is represented by Statistics Canada price index P2513.

The average lumber and chip indexes from the appropriate three month period (shown below) are combined, with lumber receiving a weight of 88.0 percent and chips 12.0 percent. The combined index is then multiplied by a normalization factor of 1.520. This factor equates the new lumber/chip composite index (1992=100) with the Statistics Canada lumber index (1981=100) at April 1, 1998. During the calculations described above, no rounding is done. The final composite index (INDEX) is rounded to one decimal place before being entered into the appropriate formula below.

New Interior Target Rate Calculation

1. If the INDEX is less than or equal to 161 then,

$$TR = \frac{INDEX}{139.0} * 8.59$$

2. If the INDEX is greater than 161, but less than or equal to 169.9 then,

$$TR = 9.95 + \left[\frac{(INDEX - 161)}{25} * 9.35\right]$$

3. If the INDEX is greater than 169.9 then,

$$TR = 13.28 + \left[\frac{(INDEX - 169.9)}{49} * 6.74\right]$$

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

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

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

5.5 Base Rate

The interior base rate is redetermined and published by Revenue Branch at the time of each quarterly stumpage rate adjustment and 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 Stumpage Rate
BR	=	Interior Base Rate as defined in Section 5.5
VI	=	Value Index for the cutting authority as defined in Section 5.2
MVI	=	Interior Mean Value Index, as defined in Section 5.3

5.6.2 Prescribed Minimum Stumpage Rate

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

5.6.3 Reserve Stumpage Rate

For each cutting authority area, except those containing timber licence volume, the reserve stumpage rate is determined by selecting the greater of:

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

For each cutting authority area that contains timber licence volume, the reserve stumpage rate is determined by selecting the greater of:

- the indicated stumpage rate adjusted according to Table 5-1 (Section 105 of the *Forest Act*), or
- the prescribed minimum stumpage rate.

Table 5-1 Timber Licence Stumpage Rate Adjustment Schedule ❶

Time Period	Percentage of ❷ 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

❶ Forest Act, Section 105(4)(6).

❷ 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 6.6.

5.6.5 Total Stumpage Rate

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

Miscellaneous Timber Pricing Policies 6

6.1 Average Value Indexes by District and Species

A new table of average 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 Forest Officer to determine the value index for cutting authorities of less than 2 000 m^3, as explained in Section 6.2.

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

1. Total coniferous volume of less than 2 000 m^3:

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

      An indicated stumpage rate may be determined by estimating the species volumes, prorating the appropriate average value indexes by district and species according to those volumes, and then using the resulting stand value index in the stumpage rate formula as described under Section 5.6. For cutting authorities where the licensee is not required to establish a free growing crop of trees, the value indexes must be adjusted by adding a basic silviculture cost estimate (district average value indexes are based on full appraisals of areas requiring basic silviculture.). The total stumpage rate is fixed for the term. For extensions of the cutting authority see Section 2.4 (4).

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

   b. Full Appraisal

      Alternatively, an indicated stumpage rate may be determined through a full appraisal. The stand data may be site-specific (i.e., timber cruised or scaled) or obtained from one or more comparable cutting authorities (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 6.5.

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

2. Total coniferous volume of 2 000 m^3 to 5 000 m^3.

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

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

   These cutting authorities 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 6.5.

6.3 Right-of-way Cutting Authorities

All road permits issued for the purpose of harvesting right-of-way timber during the construction of roads will be appraised under one of the following scenarios.

1. As required, Revenue Branch will provide the regional appraisal staff, a district average stumpage rate for each licensee to be used for the licensee's road permit. This rate will be calculated as a cruise volume weighted average of the licensee's adjustable total stumpage rates in the applicable district, from the stumpage adjustment quarter that includes the effective date of the cutting authority. The Ministry of Forests data records will provide the average stumpage rate. The data will come from the first available source, in the following order:

    a. Stumpage Adjustment and Reporting, Company SA Report,

    b. Stumpage Adjustment and Reporting, District SA Report, and

    c. other data records as specified by the Director, Revenue Branch or his designate.

2. For road permits where no licensee average stumpage rate is available, the average stumpage rate for the district issuing the cutting authority will be used. This rate will be calculated as a cruise volume weighted average of all the adjustable total stumpage rates in the applicable district, from the stumpage adjustment quarter that includes the effective date of the cutting authority. The Ministry of Forests data records will provide the average total stumpage rate. The data will come from the first available source, in the following order:

    a. Stumpage Adjustment and Reporting, District SA Report, and

    b. other data records as specified by the Director, Revenue Branch or his designate.

The road permit stumpage rate will remain fixed until the anniversary date of the cutting authority.

The costs of roads constructed under road permits are recognized in the appraisal of the first tributary cutting authority. These roads are considered as excluded to the existing roads and structures policy (Section 4.3.1.1.4 (2)).

6.4 Partially Harvested Timber

Where decked timber, or timber which has been felled and bucked, such as on right-of-way, is sold without competition; 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.

Phase costs may be based on borrowed data from a representative cutting permit, adjusted for partial phase.

If the timber volume is being sold competitively, the timber may be priced according to the procedures in Section 6.2.

6.5 Small Business Forest Enterprise Program (SBFEP) Sales

For appraisal purposes, the SBFEP includes:

- All timber sale licenses (TSL) issued under the *Forest Act,* Sections 20 and 21, and
- all TSLs issued under the *Forest Act*, Section 23 except 23 (1) (a) and 23 (1) (b).

Fixed/Adjustable Stumpage Rates for SBFEP Cutting Authorities

The adjustable stumpage rate option can be provided to a licensee only if the upset rate has been determined by means of a full appraisal. The data for the full appraisal may be site-specific or may be obtained from a comparable cutting authority. Once a selection has been made, it remains in effect for the term and all extensions. If the district average value index method is used, the upset and hence the total stumpage rate must be fixed for the term of the cutting authority and all extensions. The only exceptions are if a reappraisal is done under Section 2.3 (1) or Section 2.3 (5).

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.

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

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

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

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

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

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

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

6.6 Levies (CVP only)

1. Basic Silviculture Levy:

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

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

2. Development Levy:

A development cost estimate is made for every cutting authority that requires development.

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

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

6.7 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.

6.7.1 Special Forest Products and Other Miscellaneous Rates

Table 6-1 is to be used for determining stumpage rates for the specified products from all sources of Crown timber when scaled.

Table 6-1 Miscellaneous Stumpage Rates

All Forest Regions

Species	Product	Reserve Stumpage Rate
Cedar	Shakes	$6.00/m^3
Cedar	Blanks	$7.20/m^3
Cedar	Fence Posts	$3.00/m^3
Cedar	Mining Timbers & Fence Rails	$3.00/m^3
All Species	Firewood	$0.50/m^3
All Species	Bolts/Blocks	$5.30/m^3
Yew	All	$0.25/m^3
All Species	Grades: 3, 4, 5 and 6	$0.25/m^3
All Deciduous	All (except grades 3, 4, 5 and 6)	$0.50/m^3
All Species (except Cedar)	Fence Rails, Mining Timbers, Fence Posts	$1.20/m^3
All Species	Pickets & Palings, Mine Cribbing, Car Stakes, Round Stakes & Sticks, Rails (Split), Lagging (Split), Orchard Props	$1.20/m^3
All Species	Christmas Tree: under 3m 3-5 m over 5 m	$0.20/each $1.00/each $1.50/each
All Species	Logs salvaged below the high water levels of Reservoir Lakes and the Slocan, Kootenay, Mineral Babine and Ootsa Lakes	$0.25/m^3
All Species	Trees classified as "Dead Potential" on Cruise-based cutting authorities	$0.25/m^3
All Coniferous	For logs harvested from the Alex Fraser (UBC), Aleza Lake (UBC and UNBC) and Fort St. James (UNBC) Research Forests	$0.25/m^3
All Species	Firmwood Reject	NIL

Forest District Specific

Description	District	Reserve Stumpage Rate
Gross area cleared for seismic lines, gas or oil well sites and right-of-way to well sites	Cranbrook Dawson Creek Ft. Nelson Ft. St. John	$1,147/ha $1,540/ha $1,540/ha $1,540/ha

* For pipe line rights-of-way a stumpage rate may be determined by using the above rates for cutting authorities containing less than 1 000 m^3, of merchantable volume. For cutting authorities of 1 000 m^3 and over see Section 6.2.

6.7.2 Miscellaneous Stumpage Rates for Timber Licences

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

For each species of timber in column 1 of Table 6-2, the stumpage rate immediately opposite that species in columns 2, 3 and 4 respectively, apply to sawlogs scaled in the indicated forest regions on and after April 1, 1999.

Table 6-2 Miscellaneous Stumpage Rates for Timber Licences

Column 1 Species of timber	*Forest Region*		
	Column 2 Vancouver except the Mid-Coast and Queen Charlotte Forest Districts (that part west of the Cascades Mountains) $/cubic metre	Column 3 Prince Rupert and the Mid-Coast and Queen Charlotte Forest Districts (that part west of the Cascades Mountains) $/cubic metre	Column 4 All forest regions and those parts of regions east of the Cascade Mountains $/cubic metre
Fir	33.90	25.70	25.10
Spruce	39.00	30.50	24.20
Balsam	15.80	12.70	21.30
Cedar	24.20	19.00	36.00
Hemlock	15.30	12.00	22.50
Cypress	26.70	21.80	25.90
White pine	18.80	16.00	32.00
Yellow pine	18.80	16.00	22.40
Larch	18.80	16.00	25.10
Lodgepole pine	8.60	6.40	22.90
Other conifers	18.80	16.00	25.90
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

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Market Pricing System 7

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

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

Chapters 3, 4, 5 and 6 of this manual are only to be used, for Section 20 and 21 Timber Sale Licences (TSL), where directly referenced in Chapter 7.

7.1 MPS Introduction

The Market Pricing System is the basis for determining sawlog stumpage rates for timber sale licences issued under Section 20 and 21 of the *Forest Act*, subject to a minimum stumpage rate. Sections 2.1 (2) and (3) of this manual provide the methods that are used for deriving stumpage rates for specific products and extraordinary situations.

MPS is a method of estimating the stumpage value of a stand of timber based on the results of previous similar timber stands that were sold competitively.

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

The MPS upset rate and bonus bid applies to coniferous sawlogs only. All deciduous species, special forest products and grade 3, 4, 5 or 6 logs have a default price listed under Section 6.7.

7.2 MPS Principles and Procedures

7.2.1 MPS Appraisals

The initial upset stumpage rate will be calculated using the *Interior Appraisal Manual* and monthly parameters (Selling Prices and Consumer Price Index (CPI)) in effect on the date of calculating (appraisal effective date). This rate plus the bonus bid remains in effect from the date of award of the sale until the next quarterly adjustment.

7.2.2 MPS Stumpage Adjustments

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

At the time of the quarterly adjustment, the MPS upset rate will be re-calculated based on the equations applicable for the appraisal effective date and the cutting authority data. The monthly parameters effective for the month of the adjustment will be used in the calculation instead of the original values. All other data remain unchanged.

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

7.2.3 Reappraisals for MPS Appraisals

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

7.2.4 Calculation Conventions

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

7.2.5 Methodology

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

1. Calculate a Selling Price (SP) of the products that can be recovered from the stand using Sections 7.3.1 and 7.3.2 with the variables as defined.

2. Calculate the stand Quality Index (QI) for produts that can be recovered form the stand using Section 7.3.3 with the variables as defined.

3. Calculate the market stumpage price using the equation in Section 7.4.2, the variables for the stand, the QI calculated in Section 7.3 and the SP calculated in Section 7.3.

4. Calculate the upset stumpage rate by discounting the market stumpage price calculated in Section 7.4.2 using the discount factor in Section 7.5.

One stumpage rate is determined for all appraised coniferous sawlogs in each cutting authority area. Other products and deciduous species are priced using miscellaneous stumpage rates as specified under Section 6.7.

7.3 MPS Selling Prices

Selling prices for MPS are based on three month averages of schedules of lumber values collected and published monthly by Revenue Branch. When the MPS values are compiled and distributed they become an integral part of this manual.

7.3.1 MPS Lumber Average Market Values

Monthly market value information for the interior is obtained by Revenue Branch from lumber producers located in each average market value zone. The zones are defined by point of appraisal (see Section 2.5). Average market values (AMV) for each species are compiled by dividing total sales value by total sales volumes for each zone.

The volume that is manufactured to Canadian Lumber Standard/American Lumber Standard (CLS/ALS) sizes is reported in foot board measure (fbm). Lumber manufactured in non-CLS/ALS sizes is adjusted to equivalent CLS/ALS sizes. The total volume for each species includes all sizes and grades of rough and dressed lumber in the green and dried state. Also included are finger jointed lumber and machine stress rated lumber.

The total net sales value for each species or species group is reported in Canadian dollars FOB mill. These sales values are rolled up into three month averages each month. There is approximately a one month lag in reporting.

7.3.2 Calculation of Species Lumber Selling Price

The total lumber selling price (SP) in $\$/m^3$ is determined for each species using lumber recovery factors (LRF) from the cruise compilation summary, LRF update add-ons and current applicable lumber average market values (AMV) for the species and zone.

1. Zonal LRF update add-ons are found in Table 3-1, by species.
2. Lumber AMVs as published every month.
3. Calculation of Total Species Lumber Selling Price.
    a. Appraisal LRF = Cruise LRF + LRF update add-on
    b. Species SP ($/m3) = Species AMV($/mbm)/1000 * Appraisal LRF
4. The stand SP is the volume prorated sum of the species SP.

7.3.3 Calculation of Stand Log Quality Index

The stand log quality index (QI) is relative term used to judge the potential to produce lower or higher quality/value products from different stands. The stand log quality index is a species volume weighted number.

It is determined using each species lumber recovery factor (LRF) from the cruise compilation summary, the Zonal LRF update add-ons by species from Chapter 3 and the average appraisal LRF.

1. Zonal LRF update add-ons are found in Table 3-1, by species.

2. Appraisal LRF = Cruise LRF + LRF update add-on, by species.

3. Calculate a species volume weighted total stand appraisal LRF.

4. The stand QI is the volume prorated sum of the species LRF divided by the average appraisal LRF of 229.5.

7.4 Market Stumpage Price Calculation

The market stumpage price is calculated as detailed in this section. It is assumed that the market stumpage price will approximate the final stumpage rate, including the bonus bid, based on the variables used.

7.4.1 Market Stumpage Price Variables

MSP	=	Market Stumpage Price for the cutting authority in ($/$m^3$).
CPIF	=	B.C. Consumer Price Index (P110000) for current month divided by the base CPI of 109.3.
QI	=	Stand Log Quality Index. See Section 7.3.
SP	=	Lumber Selling Price ($/$m^3$). See Section 7.3.
DC	=	Estimated Development Cost Borne by the Licensee ($). Calculated using Section 4.3.
VOL	=	Total net cruise volume of coniferous timber (m^3).
S%	=	Average cruise side slope for ground and cable yarding systems (does not include the area for horses and helicopter yarding systems).
VPT	=	Prorated net cruise coniferous volume per tree (m^3) for ground and cable yarding systems. Plus horse and helicopter systems use average VPT = 0.4705.
VPH	-	Net cruise coniferous volume per hectare (m^3/ha).
BWDN%	=	Blowdown as a percent of net cruise coniferous volume for ground and cable yarding systems. Does not include the volume for horse and helicopter yarding systems).
BURN%	=	Species volume prorated total burn percent.
CY%	=	Overhead cable yarding coniferous volume (includes skyline) as a percent of VOL.
HP%	=	Helicopter yarding coniferous volume as a percent of VOL.
HORSE%	=	Horse yarding coniferous volume as a percent of VOL.
CYCLE	=	Hauling round trip cycle time from the landing to the point of appraisal or water dump site and return (hrs). See Section 4.5.1.

DUS%	=	Dead Useless Snags as a percent of net cruise coniferous volume for ground and cable yarding systems. Does not include the volume for horses and helicopter yarding systems.
HEM	=	Combined hemlock and balsam dummy variable.
Z9	=	Fort Nelson Peace selling price zone, dummy variable.

7.4.2 Market Stumpage Price Equation

Using the variables defined in Section 7.4.1, the selling price calculated in Section 7.3.2 and the equation below, calculate the market stumpage price (MSP).

$$MSP = [8.5469 + 43.0570 * QI + 0.1431 * SP/CPIF - 0.9216* (DC/VOL)/CPIF + 0.1663 * (VOL/1000) - 0.0860 * S\% + 11.1877 * \ln(VPT) + .007877 * VPH - 16.6309 * (BWDN\%/100) - 14.0790 * (CY\%/100) - 36.7619 * (HP\%/100) - 13.7335 * (HORSE\%/100) - 22.3433 *(BURN\%/100) - 2.4250 * CYCLE - 8.9936 * HEM - 8.7153 * (DUS\%/100) - 9.4184 * Z9] * CPIF$$

For the above equation the following definitions apply:

- if the percentage of Hemlock and Balsam volume in the cutting authority is greater than or equal to 60 percent of VOL, then HEM = 1, otherwise enter 0,
- if the selling price zone is Fort Nelson Peace (9) then Z9 = 1, otherwise enter 0,
- if VOL is greater than 50 000, then VOL = 50 000, or
- if horse and helicopter log appraisals use VPT = 0.4705.

7.5 Calculation of MPS Stumpage Rate

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

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

7.5.1 Upset Stumpage Rate Calculation

The upset stumpage rate is calculated by taking the Market Stumpage Price and reducing it using the discount factor (DF).

USR = MSP * (1-DF)

Where:

USR = Upset stumpage rate
MSP = Market Stumpage Price as defined in Section 7.4.2
DF = 0.30

7.5.2 Prescribed Minimum Stumpage Rate

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

7.5.3 Total MPS Stumpage Rate

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

7.6 Deciduous and Miscellaneous Forest Products

The stumpage rates for deciduous sawlogs, all species grade 3, 4, 5 and 6 logs and other miscellaneous forest products are found in Section 6.7.

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Appendices

Appendix I Equipment and Labour Rates

(Cost Base July 1, 1997)

MACHINE DESCRIPTION	TYPICAL MODEL	$/HOUR
Crawler Tractor	Cat D9N, Komatsu D155	178.50
Crawler Tractor	Cat D8, Komatsu D135	162.00
Crawler Tractor	Cat D7H, Liebherr PR742	142.50
Crawler Tractor	Komatsu D75A, D65EX	126.50
Crawler Tractor	Cat D6, JD 850C, Komatsu D60/D65/D68	121.75
Rock Drill (includes labour)	Compressor: 750 cfm on tank chassis	189.00
Grader	Cat 14G, Komatsu GD705, 725	102.50
Front End Loader (Gravel)	Cat 970F, Komatsu WA470-1, JD844	127.25
Front End Loader (Logs)	Cat 980C, Komatsu WA500-1	137.75
Heel Boom Loader	All Cable	184.08
Heel Boom Loader	All Hydraulic	171.87
Hydraulic Excavator incl. Brush Guard & Thumb	Cat 235C, Hitachi EX400, Komatsu PC400	214.78
Hydraulic Excavator incl. Brush Guard & Thumb	Cat 231, Cat 330L/N/R, Hitachi WX350	177.10
Hydraulic Excavator incl. Brush Guard & Thumb	Cat 229D/EL300/330, Komatsu PC300L	156.48
Hydraulic Excavator incl. Brush Guard & Thumb	Cat 225, Hitachi EX270/300, JD 792/892D	143.55
Hydraulic Excavator incl. Brush Guard & Thumb	Cat EL240, Komatsu PC200/220, JD 790	132.55
Hydraulic Excavator incl. Brush Guard & Thumb	Cat EL200B/320L/219, Hitachi EX200	124.03
Gradall	Gradall G1000	143.25
Logging Truck (Highway)	All Triaxle	87.50
Logging Truck (Off Highway)	All	134.66
Self Loading Log Truck	Highway log truck + 4.5 t deck crane	100.00
Gravel Truck	9.9 m^3 +	72.82
Gravel Truck Articulated (labour included)	20 - 30 tonne: Cat D250, Terex 2366	113.00
Lowbed	5 axle unit: tandem tractor and lowbed	79.00
Lowbed	150 tonne ***Same as Off-Hwy Truck	134.66
Concrete Mix Truck	6.1 m^3	83.00
Concrete Vibrator (labour not included)	5 m^3	3.96
Concrete Mixer (labour not included)	0.17 m^3	6.25
Crane - Truck Mounted	18 tonne	86.00
Soft Track Skidder	KMC 2100/2400, Cat D5H, 480BT	118.00
Rubber Tired Skidder	Clark Ranger F68, Franklin 595	81.00
Vibrator Compactor	Clark 668 + 2.7 - 3.6 t roller	92.90
Tractor and Grid Roller	Clark 668 + grid roller	93.10
Labourer	Includes 40% payroll loading	28.00
Roadman	Includes 40% payroll loading	28.23
Crib/Culvert Maker, Powderman	Includes 40% payroll loading	29.65
Landingman	Includes 40% payroll loading	30.03
Rockdriller & Powderman (for load & blast only)	Includes 40% payroll loading	64.54
Bridgeman	Includes 40% payroll loading	35.61
Powersaw (labour not included)	All	4.50
Faller, including powersaw cost	Includes 40% payroll loading	54.53

NOTES

1997 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.

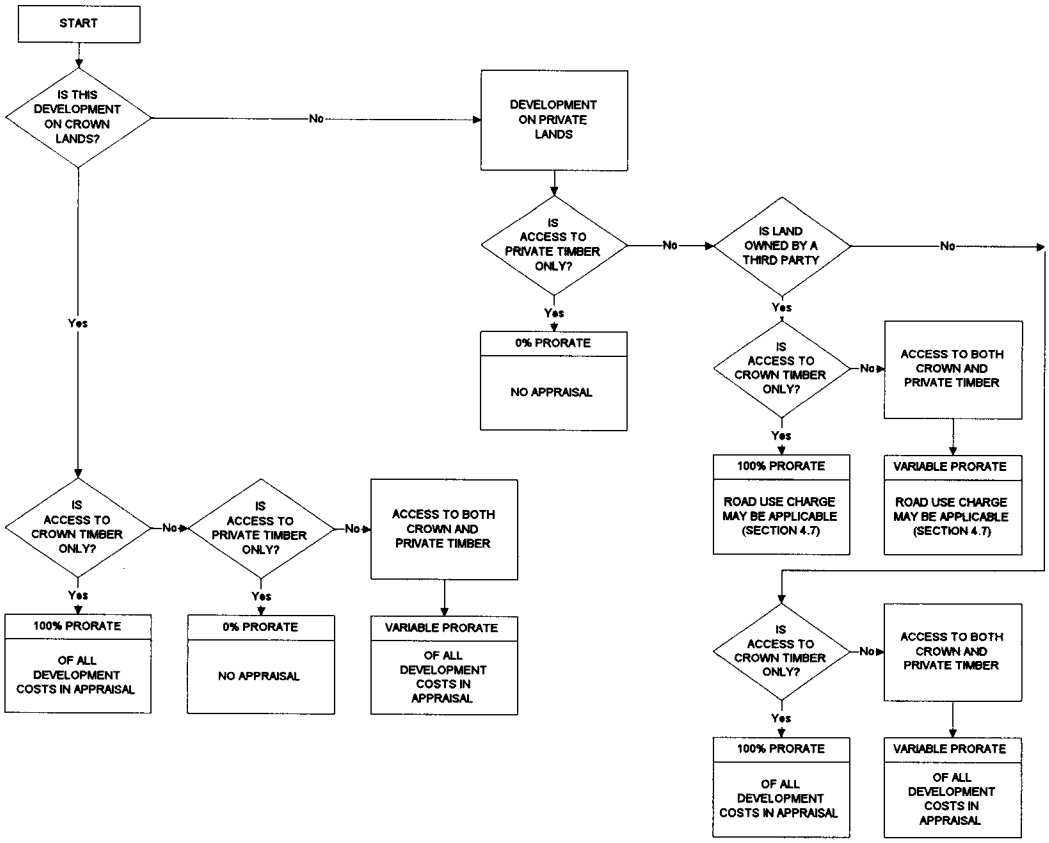
- The above rates will be used for all engineered estimates made under this manual,
- The machine rate includes labour for the operator (all found). There are no additions,
- Crew transportation, supervision, and camp/cookhouse costs, where applicable, are included in the standard phase costs of the manual. No additions are required, however, those licensees that incur camp costs (a camp is defined as a permanent structure(s) where capital costs were incurred to establish the camp that must have a cookhouse and a bunkhouse) and recovers the said camp costs from the contractor, and credits an account, in the books of the licensee; is permitted an additive of $50.00 per "person day" for staying at the camp; and
- Use of equipment rates not listed in this appendix must be approved by the Regional Appraisal Co-ordinator.

Appendix II Lumber Recovery Factors (board feet/cubic metre)

Species

Log Top Diameter (cm)	Cedar	Hemlock, Cypress, White Pine, Dry Belt Fir	All Others
4.5 - 5.49	91	91	91
5.5 - 6.49	97	102	103
6.5 - 7.49	103	111	113
7.5 - 8.49	108	120	123
8.5 - 9.99	115	129	134
10.0 - 14.9	132	151	158
15.0 - 19.9	156	172	185
20.0 - 24.9	177	187	202
25.0 - 29.9	197	199	217
30.0 - 34.9	215	210	226
35.0 - 39.9	227	217	234
40.0 - 44.9	235	222	240
45.0 - 49.9	238	228	246
50.0 - 54.9	239	233	252
55.0 - 59.9	239	237	258
60.0 - 64.9	237	240	263
65.0 - 69.9	233	241	266
70.0 - 74.9	228	240	267
75.0 - 79.9	223	237	265
80.0 - 84.9	217	234	263
85.0 - 89.9	210	231	261
90.0 - 94.9	201	227	259
95.0 - 99.9	193	224	257
100.0 +	184	221	254

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 Relative Soil Moisture to Absolute Soil Moisture Conversion Table

Region	BEC		Relative Soil Moisture Regime Class (from field guide)							
	Zone	Subzone	0	1	2	3	4	5	6	7
CAR	BG	xh3	ED	ED	ED	ED	ED	SD	M	W
CAR	BG	xw2	ED	ED	ED	ED	ED	SD	M	W
CAR	IDF	xm	ED	ED	VD	VD	MD	SD	M	W
CAR	IDF	xw	ED	ED	VD	VD	MD	SD	M	W
CAR	IDF	dk3	ED	VD	VD	VD	MD	F	M	W
CAR	IDF	dk4	ED	VD	VD	VD	MD	F	M	W
CAR	IDF	u	ED	VD	VD	MD	MD	F	VM	W
CAR	IDF	mw2	VD	VD	VD	MD	SD	F	VM	W
CAR	MS	xk	VD	VD	VD	VD	MD	F	M	W
CAR	MS	xv	VD	VD	VD	MD	SD	F	VM	W
CAR	ICH	dk	VD	VD	VD	MD	SD	M	VM	W
CAR	ICH	mk3	VD	MD	MD	SD	F	M	VM	W
CAR	ICH	wk2	VD	MD	SD	F	F	M	VM	W
CAR	ICH	wk4	VD	MD	SD	F	F	M	VM	W
CAR	SBPS	xc	ED	ED	VD	VD	MD	SD	M	W
CAR	SBPS	dc	ED	ED	VD	MD	SD	F	M-VM	W
CAR	SBPS	mk	ED	VD	VD	MD	SD	F	M-VM	W
CAR	SBPS	mc	VD	VD	VD	MD	SD	F	M-VM	W
CAR	SBS	dw1	VD	MD	MD	SD	SD	F	M	W
CAR	SBS	dw2	VD	MD	MD	SD	SD	F	M	W
CAR	SBS	mh	VD	MD	MD	SD	SD	M	VM	W
CAR	SBS	mw	VD	MD	MD	SD	F	M	VM	W
CAR	SBS	mc1	VD	MD	MD	SD	F	M	VM	W
CAR	SBS	mc2	VD	MD	MD	SD	F	M	VM	W
CAR	SBS	wk1	VD	MD	SD	F	F	M	VM	W
CAR	ESSF	xv	VD	VD	MD	MD	SD	F	M	W
CAR	ESSF	dc2	VD	MD	MD	SD	SD/F	M	VM	W
CAR	ESSF	wc3	MD	MD	SD	F	M	M	VM	W
CAR	ESSF	wk1	MD	MD	SD	F	M	M	VM	W
KAM	BG	xh1	ED	ED	ED	ED	ED	SD	M	W
KAM	BG	xh2	ED	ED	ED	ED	ED	SD	M	W
KAM	BG	xw1	ED	ED	ED	ED	ED	SD	M	W
KAM	PP	xh1	ED	ED	ED	ED	VD	SD	M	W
KAM	PP	xh2	ED	ED	ED	ED	VD	SD	M	W
KAM	IDF	xh1	ED	ED	VD	VD	MD	SD	M	W
KAM	IDF	xh2	ED	ED	VD	VD	MD	SD	M	W

Region	BEC		Relative Soil Moisture Regime Class (from field guide)							
	Zone	Subzone	0	1	2	3	4	5	6	7
KAM	IDF	xw	ED	ED	VD	VD	MD	SD	M	W
KAM	IDF	dk1	ED	VD	VD	VD	MD	F	M	W
KAM	IDF	dk2	ED	VD	VD	VD	MD	F	M	W
KAM	IDF	dm1	ED	VD	VD	VD	MD	F	M	W
KAM	IDF	mw1	VD	VD	VD	MD	SD	F	VM	W
KAM	IDF	mw2	VD	VD	VD	MD	SD	F	VM	W
KAM	IDF	ww	VD	VD	VD	MD	SD	F	M	W
KAM	MS	xk	VD	VD	VD	VD	MD	F	M	W
KAM	MS	dc	VD	VD	VD	MD	SD	M	VM	W
KAM	MS	dm1	VD	VD	VD	MD	SD	M	VM	W
KAM	MS	dm2	VD	VD	VD	MD	SD	M	VM	W
KAM	ICH	mk1	VD	MD	MD	SD	F	M	VM	W
KAM	ICH	mk2	VD	MD	MD	SD	F	M	VM	W
KAM	ICH	mw2	VD	MD	MD	SD	F	M	VM	W
KAM	ICH	mw3	VD	MD	MD	SD	F	M	VM	W
KAM	ICH	wk1	VD	MD	SD	F	F	M	VM	W
KAM	ICH	vk1	MD	MD	SD	F	M	M	VM	W
KAM	SBS	mm	VD	MD	MD	SD	F	M	VM	W
KAM	ESSF	xc	VD	VD	MD	MD	SD	M	VM	W
KAM	ESSF	dc1	VD	MD	MD	SD	SD/F	M	VM	W
KAM	ESSF	dc2	VD	MD	MD	SD	SD/F	M	VM	W
KAM	ESSF	dv	VD	MD	MD	SD	SD/F	M	VM	W
KAM	ESSF	mw	VD	MD	MD	SD	F	M	VM	W
KAM	ESSF	wc1	MD	MD	SD	F	M	M	VM	W
KAM	ESSF	wc2	MD	MD	SD	F	M	M	VM	W
KAM	ESSF	wc4	MD	MD	SD	F	M	M	VM	W
KAM	ESSF	vc	MD	SD	SD	F	M	VM	VM	W
KAM	ESSF	vv	MD	SD	SD	F	M	VM	VM	W
NEL	PP	dh1	ED	ED	ED	VD	VD	SD	M	W
NEL	PP	dh2	ED	ED	ED	VD	VD	SD	M	W
NEL	IDF	xh1	ED	ED	VD	VD	MD	SD	M	W
NEL	IDF	dm1	ED	VD	VD	VD	MD	F	M	W
NEL	IDF	dm2	ED	VD	VD	VD	MD	F	M	W
NEL	MS	dk	VD	VD	VD	MD	SD	M	VM	W
NEL	MS	dm1	VD	VD	VD	MD	SD	M	VM	W
NEL	ICH	xw	VD	VD	VD	MD	SD	M	VM	W
NEL	ICH	mk1	VD	MD	MD	SD	F	M	VM	W
NEL	ICH	mw1	VD	MD	MD	SD	F	M	VM	W

Region	BEC Zone	Subzone	Relative Soil Moisture Regime Class (from field guide) 0	1	2	3	4	5	6	7
NEL	ICH	mw2	VD	MD	MD	SD	F	M	VM	W
NEL	ICH	mw3	VD	MD	MD	SD	F	M	VM	W
NEL	ICH	wk1	VD	MD	SD	F	F	M	VM	W
NEL	ICH	vk1	MD	MD	SD	F	M	M	VM	W
NEL	ESSF	dc1	VD	MD	MD	SD	SD/F	M	VM	W
NEL	ESSF	dk	VD	MD	MD	SD	SD/F	M	VM	W
NEL	ESSF	wc1	MD	MD	SD	F	M	M	VM	W
NEL	ESSF	wc2	MD	MD	SD	F	M	M	VM	W
NEL	ESSF	wc4	MD	MD	SD	F	M	M	VM	W
NEL	ESSF	wm	MD	MD	SD	F	F	M	VM	W
NEL	ESSF	vc	MD	SD	SD	F	M	VM	VM	W
PG	ICH	mm	VD	MD	MD	SD	F	M	VM	W
PG	ICH	wk1	VD	MD	SD	F	F	M	VM	W
PG	ICH	wk3	VD	MD	SD	F	F	M	VM	W
PG	ICH	wk4	VD	MD	SD	F	F	M	VM	W
PG	ICH	vk2	MD	SD	SD	F	M	M	VM	W
PG	BWBS	dk1	VD	MD	MD	SD	SD	F	M-VM	W
PG	BWBS	dk2	VD	MD	MD	SD	SD	F	M-VM	W
PG	BWBS	mw1	VD	MD	MD	SD	F	M	VM	W
PG	BWBS	mw2	VD	MD	MD	SD	F	M	VM	W
PG	BWBS	wk1	VD	MD	SD	SD	F	M	VM	W
PG	BWBS	wk2	VD	MD	SD	SD	F	M	VM	W
PG	BWBS	wk3	VD	MD	SD	SD	F	M	VM	W
PG	SBPS	mc	VD	VD	VD	MD	SD	F	M-VM	W
PG	SBS	dw1	VD	MD	MD	SD	SD	F	M	W
PG	SBS	dw2	VD	MD	MD	SD	SD	F	M	W
PG	SBS	dw3	VD	MD	MD	SD	SD	F	M	W
PG	SBS	dh	VD	MD	MD	SD	SD	F	M	W
PG	SBS	dk	VD	MD	MD	SD	SD	F	M-VM	W
PG	SBS	mh	VD	MD	MD	SD	SD	M	VM	W
PG	SBS	mw	VD	MD	MD	SD	F	M	VM	W
PG	SBS	mc2	VD	MD	MD	SD	F	M	VM	W
PG	SBS	mc3	VD	MD	MD	SD	F	M	VM	W
PG	SBS	mk1	VD	MD	MD	SD	F	M	VM	W
PG	SBS	mk2	VD	MD	MD	SD	F	M	VM	W
PG	SBS	wk1	VD	MD	SD	F	F	M	VM	W
PG	SBS	wk2	VD	MD	SD	F	F	M	VM	W
PG	SBS	wk3	VD	MD	SD	F	F	M	VM	W

Region	BEC Zone	Subzone	Relative Soil Moisture Regime Class (from field guide) 0	1	2	3	4	5	6	7
PG	SBS	vk	MD	SD	SD	F	M	M	VM	W
PG	ESSF	mm1	VD	MD	MD	SD	F	M	VM	W
PG	ESSF	mv1	VD	MD	SD	SD	F	M	VM	W
PG	ESSF	mv2	VD	MD	SD	SD	F	M	VM	W
PG	ESSF	mv3	VD	MD	SD	SD	F	M	VM	W
PG	ESSF	mv4	VD	MD	SD	SD	F	M	VM	W
PG	ESSF	wc2	MD	MD	SD	F	M	M	VM	W
PG	ESSF	wc3	MD	MD	SD	F	M	M	VM	W
PG	ESSF	wk1	MD	MD	SD	F	M	M	VM	W
PG	ESSF	wk2	MD	MD	SD	F	M	M	VM	W
PR	ICH	mc1	VD	MD	SD	SD	F	M	MV	W
PR	ICH	mc1a	VD	MD	SD	SD	F	M	MV	W
PR	ICH	mc2	VD	MD	SD	SD	F	M	MV	W
PR	ICH	wc	MD	MD	SD	F	F	M	VM	W
PR	ICH	vc	MD	SD	SD	F	M	M	VM	W
PR	BWBS	dk1	VD	MD	MD	SD	SD	F	M-VM	W
PR	BWBS	dk2	VD	MD	MD	SD	SD	F	M-VM	W
PR	SBPS	mc	VD	VD	VD	MD	SD	F	M-VM	W
PR	SBS	dk	VD	MD	MD	SD	SD	F	M-VM	W
PR	SBS	mc2	VD	MD	MD	SD	F	M	VM	W
PR	ESSF	mk	VD	MD	MD	SD	F	M	VM	W
PR	ESSF	mc	VD	MD	SD	SD	F	M	VM	W
PR	ESSF	wv	MD	SD	SD	F	F	M	VM	W
PR	CWH	ws1	VD	MD	MD	SD	F	M	VM	W
PR	CWH	ws2	VD	MD	MD	SD	F	M	VM	W
PR	CWH	vm1	MD	SD	SD	F	F	M	VM	W
PR	CWH	vm2	MD	SD	SD	F	F	M	VM	W
PR	CWH	wm	SD	SD	SD	F	F	M	VM	W
PR	CWH	vh2	SD	SD	F	F	M	VM	W	W
PR	MH	mm1	SD	SD	F	F	F	M	VM	W
PR	MH	mm2	SD	SD	F	F	F	M	VM	W
PR	MH	wh	SD	SD	F	F	F	M	VM	W
VAN	IDF	ww	VD	VD	VD	MD	SD	F	M	W
VAN	ESSF	mw	VD	MD	MD	SD	F	M	VM	W
VAN	CDF	mm	VD	VD	MD	MD	MD	SD	F	W
VAN	CWH	xm	VD	MD	MD	SD	F	M	VM	W
VAN	CWH	dm	VD	MD	MD	SD	F	M	VM	W
VAN	CWH	ds1	VD	MD	MD	SD	F	M	VM	W

Region	BEC Zone	Subzone	Relative Soil Moisture Regime Class (from field guide) 0	1	2	3	4	5	6	7
VAN	CWH	ds2	VD	MD	MD	SD	F	M	VM	W
VAN	CWH	ms1	VD	MD	MD	SD	F	M	VM	W
VAN	CWH	ms2	VD	MD	MD	SD	F	M	VM	W
VAN	CWH	ws2	VD	MD	MD	SD	F	M	VM	W
VAN	CWH	mm1	MD	SD	SD	F	F	M	VM	W
VAN	CWH	mm2	MD	SD	SD	F	F	M	VM	W
VAN	CWH	vm1	MD	SD	SD	F	F	M	VM	W
VAN	CWH	vm2	MD	SD	SD	F	F	M	VM	W
VAN	CWH	wh1	SD	SD	SD	F	F	M	VM	W
VAN	CWH	wh2	SD	SD	SD	F	F	M	VM	W
VAN	CWH	vh1	SD	SD	F	F	M	VM	W	W
VAN	CWH	vh2	SD	SD	F	F	M	VM	W	W
VAN	MH	mm1	SD	SD	F	F	F	M	VM	W
VAN	MH	mm2	SD	SD	F	F	F	M	VM	W
VAN	MH	wh	SD	SD	F	F	F	M	VM	W

NOTES: ED = Extremely Dry (0, extreme xeric)
VD = Very Dry (1, xeric)
MD = Moderately Dry (2, sub-xeric)
SD = Slightly Dry (3, sub-mesic)
F = Fresh (4, mesic)
M = Moist (5, sub-hygric)
VM = Very Moist (6, hygric)
W = Wet (7, sub-hydric)

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BRITISH COLUMBIA

Ministry of Forests

INTERIOR APPRAISAL DATA SHEET

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

Region _____

Licence _____ Permit _____ Mark _____

ACKNOWLEDGEMENTS

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: _____

Representing: _____

Date: _____

Forest District Appraisal Staff

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

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

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

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

Entries Field Checked? Y ☐ N ☐ By _____

Forest Region Staff Received by Region On: Date: _____ (YEAR/MM/DD)

INTERIOR APPRAISAL DATA SHEET

Mark: _____ Ref Mark: _____

Effective Date: _____ Expiry Date: _____

Appraisal Type (Check one): New ☐ Reappraisal ☐ Advertise (SBFEP only) ☐

Tenure Type _____ TSA _____ Supply Block _____

Total Net Cruise Volume _____ m^3 Total Merchantable area of licence/CP _____ ha

Volume for Roads & Landings _____ m^3 Area removed for roads & landings _____ ha

Volume for Reserved Area(s) (Riparian, lakeshore, etc.) _____ m^3 Area removed for Reserved Area(s) _____ ha

Volume to be Partial Cut _____ m^3 Area of Partial Cut _____ ha

Volume of Clear Cut _____ m^3 Area of Clear Cut _____ ha

Point of Appraisal (Section 2.5) _____ Actual Destination _____

Geographical Location _____

Specified Operation? (Section 4.1.1) Y ☐ N ☐ Cruise Base? Y ☐ N ☐

F.I. Reg. No. _____ F.I. Compt. No. _____ F.I. Zone _____ Wet or Dry? _____

Species	Volume	Decay	Stud Log	LRF	Burn	Revenue Office Use Only	
	m^3	%	%		%	Comp. Ind.	S.P. Zone
BA							
CE							
FI							
HE							
LA							
LO							
SP							
YE							
WH							
TOTAL *		Other species tied to:					

* To be harvested.

Check cruised? Y ☐ N ☐ Standard Error? N ☐ Y ☐ _____

INTERIOR APPRAISAL DATA SHEET

Tree to Truck Data

Support Centre _____ Distance to Support Centre _____ km

(Section 4.4.2(6)) one way

Accessible Camp (Section 4.4.2(9)) Yes/No (Circle One)

Specified Logging Operation * (Section 4.1.1)

Description

Volume (m^3) _____ Cost ($) * _____

* Attach detailed estimates.

HARVEST METHOD

	GROUND SKIDDING		OVERHEAD CABLE			
			GRAPPLE/HIGHLEAD		SKYLINE	
Variable (Section 4.4.2(4))	**Clearcut**	**Partial Cut ***	**Clearcut**	**Partial Cut ***	**Clearcut**	**Partial Cut ***
Vol. To be harvested (m^3)						
Biogeoclimatic zone						
Volume/tree (m^3)						
Volume/hectare (m^3)						
Stand defect (%)						
Partial cut (%)						
Average slope (%)						
Blowdown (%)						
Heavy fire damage (%)						
Dead useless snags (%)						

* Partial Cut

1. Partial Cut % > = 90 are to be appraised as Clear Cut.
2. See Section 4.4.2(5))

OTHER SYSTEMS	Clear Cut Volume (m^3)	Partial Volume (m^3)
Helicopter		
Horse Logging		

INTERIOR APPRAISAL DATA SHEET

Log Transportation Data (Section 4.5)

Primary Hauling: Highway ☐ Off Highway ☐ Primary Cycle Time _____ hours

If Secondary Haul Secondary Cycle Time _____ hours

COMMON JUNCTION CALCULATION				
Cut Block	Volume (m3) (A)	Distance (km)	Time (minutes)	M3 x minutes (B)

Water Transportation

Lake Name Code

Dump & Boom Yes ☐ No ☐

Lake Tow Distance _____ km

Dewater/Reload Yes ☐ No ☐

Road Maintenance Yes ☐ No ☐

Road Use Charges _____ ($/m^3)

PRIMARY CYCLE TIME CALCULATION							
Road			Distance	Speed (km/hr)		Time (nearest 1.0 min)	
Identifier	Primary	Secondary	D (km)	Loaded	Empty	Loaded	Empty
				SUBTOTAL		L =	E =

Load Handling, Delay in minutes _____

Total Cycle Time, Minutes (L + E + D) _____ Divided by 60 = _____ hrs (0.1)

INTERIOR APPRAISAL DATA SHEET

Log Transportation Data

Special Transportation Systems (Section 4.5.4)

Description		Location	Code		* Applicable Volume (m^3)
a. Railway:					
Truck to Rail Transfer	No ☐	- BC Rail Dease Lk Extension	Yes ☐	RTD	
		- All other railways	Yes ☐	RTA	
Rail Transportation	No ☐	Leo Creek	Yes ☐	RLE	
		Lovell	Yes ☐	RLO	
		Bear Lake	Yes ☐	RBL	
		Minaret Lake	Yes ☐	RMT	
		Niteal	Yes ☐	RNL	
b. Barge Ferry Used for Truck Haul:					
	No ☐	- Reservoir Lakes	Yes ☐	BUK	
				BUO	
				BUR	
				BUW	
		- Natural Lakes	Yes ☐	BUA	
c. Barge Ferry Used for Crew Transportation					
	No ☐	All Lakes	Yes ☐	BFA	
Specified Logging Operation * (Section 4.1.1)					
Kinbasket Lake Barge/Ferry not used for truck haul (private)			Cost $/$m^3$		

* Complete only when different from cutting authority.

INTERIOR APPRAISAL DATA SHEET

Administration and Other Costs (Section 4.8)

Isolated Cutting Authority (Section 4.8.2) No ☐ Yes ☐ Rail (Code 4)
Yes ☐ Lake or Ocean (Code 3)

Basic Silviculture (Section 4.10)

Treatment Regime	Net Merchantable (ha)	Treatment Area (hectares) NCBR ** (individual areas of 4 ha or less)	Removal Factor

Specified Operation (Root Disease Control) (Section 4.1.1)

Area (ha) _____ Total Cost ($) _____ Cost Estimate ($/m^3) _____

** If more than 4 ha confirm that individual areas are smaller than 4 ha in size.

INTERIOR APPRAISAL DATA SHEET

Road and Drainage Structures (New, Reconstruction & Upgrade)

1. Culverts (Tabulated) (Section 4.3.2.4)

Applicable Volume * _____ (m^3)

Circular Pipe Diameter (m)	Circular Pipe Length (m)	Number

2. Bridges (Tablular & Engineered) (include pipeline crossings) (Section 4.3.2.4)

Applicable Volume * _____ (m^3)

Bridge Identifier	Average Crib Height (m)	Span Length (m)	Cost ($) (Engineered Only)

* Applicable Volume: Complete only when different from Cutting Authority Volume.

Note: Tabular = Table in manual for spans 15.4 m and under

Note: Engineered = For all other spans, provide details on Construction Estimate Form.

INTERIOR APPRAISAL DATA SHEET

3. Tabular Road Construction Data (New Construction Only) (Section 4.3.2.2)

Road Identifier: _____

Road Group : (see Table 4-3) _____

Biogeoclimatic Zone: _____ Applicable Volume: _____ (m^3)

			Subgrade			Stabilizing Material		
Road Section Number	Road ❶ Type O, B, W	Section Length (km)	Soil ❷ Moisture (blank, W)	Side Slope (%)	Rock (%)	Stab. Length (km)	Mat. ❸ Type (blank, Q)	Ballast ❹ Haul Distance (km)
Total Length			Attach additional pages where necessary.					

❶ Road Type - Must enter one of "O" = operational road, "B" = block road, or "W" = snow (winter) road.

❷ Soil Moisture (SMR) - If the road section is wet (Section 4.3.2.2(5)) enter "W". Otherwise leave blank.

❸ Material Type - If the stabilizing material is quarried rock enter "Q". Otherwise leave blank.

❹ Ballast Haul Distance - One way.

INTERIOR APPRAISAL DATA SHEET

4. Other Structures (Section 4.3.2.6)

Type	Number	Distance
Fencing (in 100's metres)		
Cattle Guards		
Pipeline Crossings		

5. Allocated Development (SBFEP)

Identifier	Cost ($)	Applicable Volume (m^3)	Applicable Cost ($)

6. Engineered Development

Identifier	Cost ($)	Applicable Volume (m^3)	Applicable Cost ($)

INTERIOR APPRAISAL DATA SHEET

Engineered Construction Cost Estimates

Licence: _____ C.P.: _____ Estimate Date: _____

Name and/or Location: _____

Description: _____

Effective date of Engineered Estimate: _____

	Type	Function	Hours	Rate/Hour	Total
1. Comp. Bid Costs:	N/A	N/A	N/A	N/A	
2. Machine Cost:					
3. Labour Cost:					
4. Materials Cost:					
5. Freight & Haulage for materials only:					
6. Engineering (if applicable)					
Total Cost (July 1, 1996)					

1. Refer to Appendix 1 of the *Interior Appraisal Manual* for further information on equipment, labour and material rates.
2. List each machine employed and work performed.
4. Freight and haulage is allowed for permanent type bridges (i.e., steel, concrete, or glu-lam).
5. Cost of design and engineering for log bridges is not allowed. Cost of design inspection and supervision for other more complex structures by a professional engineer not on salary may be allowed.
6. No GST to be included, PST is allowed on materials.

INTERIOR APPRAISAL DATA SHEET

Ministry of Forests

Request for Approval
Road and Land Use Charge in Appraisals

Region _____ Right-of-way Acquisition
District _____ Request Form
Location _____ File No. _____ (FS 959)
Licensee _____
Private Land Owner _____

Cutting Authorities Affected (Volumes and Time Frame):
Reason for Request::
Determination of Cost Estimates (provide details of Calculation):

Mandatory Attachments: Map ☐ And Agreement for Charges ☐

Is this Road Use Agreement made at 'arms length'? Yes ☐ No ☐

Requested by: Licensee _____ Date _____

_____ _____

Requested by: District _____ Date _____

_____ _____

Region _____ Date _____

Approved _____ Date _____

Comments

_____

INTERIOR APPRAISAL DATA SHEET

Small Business Forest Enterprise Program

		Sawlogs	Grade 3	Grades 4, 5, 6
Include Levy for Basic Silviculture? *	(Y/N)	_____	_____	_____
Include Levy for Development? *	(Y/N)	_____	_____	_____
"Developed" Levy (if applicable)		_____		
Bonus Bid (if applicable)		_____		
Deciduous and Special Products		Bonus Bid?		
_____		_____		

* **Levies**: District Manager may waive either levy, or both, where no Crown expenditure is required and/or the timber will be sold through competition. Levies added if no choice made.

Mandatory Utilization (for Residue and Waste Billing, **SPFEP ONLY)**

Identify from the following list **only** those species, grades and products that are **non-competitive**, but subject to mandatory utilization.

Species	**Grade** (Circle all Applicable)				**Miscellaneous Product** (List all Applicable)
CE	S/L	3	4	5	
HE	S/L	3	4	5	
LO	S/L	3	4	5	
Deciduous		AS	BI	CO	
All Others	S/L	3	4	5	

Remarks: