



The following clauses become an integral part of any agreement between the Licensee and the Ministry only when indicated on FS 916-1 or FS 916-5 and when attached to one of the Primary License Addendum forms (FS 517, 521).

**SECTION C-1 SITE PREPARATION, MECHANICAL/CHEMICAL**

1. General Conditions
  - (a) A work map, showing the general pattern of scarification, areas to be treated and streams or stream beds which must be avoided, shall be part of this addendum.
  - (b) Scarification shall not take place in indicated streams or stream beds and piles or windrows shall not be built in depressions, hollows, streams or stream beds.
  - (c) Where soil disturbance is continuous, treatment shall be done, where practical, along the contour.
  - (d) Equipment to be used is specified on FS 916-4 or Section A.
  - (e) Treated strip interval is specified on FS 916-4 or Section A.
  - (f) The Licensee shall:
    - (i) not allow any substance likely to cause pollution to be deposited at any time within any lake or stream;
    - (ii) not allow any damage to be done within the highwater level of any stream channel or lake;
    - (iii) not place or cause to be placed any obstruction or fill within the highwater level of any stream channel or lake.
  - (g) An assessment of \$500.00 may be made for an infraction of General Conditions (b), (c) or (f), or after a written warning, for any other infraction which, in the opinion of the District Manager, is detrimental to the conduct of operation or quality of the environment.
  - (h) Drag Scarification Treatment for natural Regeneration will be evenly distributed over the area indicated on the Work Plan map.
  - (i) Piles must not be built closer to standing timber than a minimum of twice the height of the sanding trees.
  - (j) Patch Scarification Treatment may be done across contours provided the prime mover does not create erosion channels.
2. Basis of Evaluation of Work
  - (a) Where the work is being performed to obtain natural regeneration from adjacent seed:
    - (i) Following scarification, the Licensee shall conduct a Seedbed Assessment Survey in which each plot shall be 0.0005 ha (5 m<sup>2</sup>, 1.26 m radius).
    - (ii) A plot is satisfactorily scarified if there is at least 900 cm<sup>2</sup> (17 cm radius) of mineral soil or mixed mineral/humus exposed in one patch.
    - (iii) To qualify for credit, at least 60 percent of the number of sample plots established must be satisfactorily scarified and be well distributed throughout the unit being inspected.
    - (iv) Where the percentage of plots with mineral soil or mixed mineral/humus exposed is less than 60 percent, on the written instruction of the District Manager, the Licensee shall upgrade the standard of scarification to the required 60 percent minimum at his own expense.
  - (b) Where work is being performed to obtain natural regeneration from seed on-site:
    - (i) Following scarification, the Licensee shall conduct a Seedbed Assessment Survey in which each plot shall be 0.0005 ha (5 m<sup>2</sup>, 1.26 m radius).
    - (ii) A plot is satisfactory if it contains at least 225 cm<sup>2</sup> (8.5 cm radius) of mineral soil or mixed mineral/humus.
    - (iii) To qualify for payment, at least 70 percent of the number of sample plots established must be satisfactorily scarified and be well distributed throughout the unit being inspected.
    - (iv) Where the percentage of plots with mineral soil or mixed mineral/humus exposed is less than 70 percent, on the written instruction of the District Manager, the Licensee shall upgrade the standard of scarification to the required 70 percent minimum at his own expense.
    - (v) Payment shall not be allowed for those areas which do not meet the 70 percent standard.
  - (c) Where the work done will be followed by planting:
    - (i) Following scarification, the Licensee shall conduct a Plantable Spot Survey in which each plot shall be 0.005 ha (50 m<sup>2</sup>, 3.99 m radius).
    - (ii) A plantable spot is defined as an area within which a tree can be planted with reasonable effort and with the expectation of satisfactory survival and growth. Specific requirements may vary for any particular site.
    - (iii) The number of plantable spots per hectare required on this project area is specified on FS 916-4 or in Section A.
    - (iv) For the work to qualify for payment, the Licensee shall provide a minimum of 90 percent of the specified number of plantable spots per hectare which must be well distributed throughout the unit being inspected.
    - (v) Where the number of plantable spots created is less than 90 percent of the required number of spots per hectare, as indicated by Section A or on FS 916-4, the Licensee shall, on the written instruction of the District Manager, upgrade the number of spots to the required 90 percent minimum at his own expense.
    - (vi) Payment shall not be allowed for those areas with less than 90 percent of the required number of plantable spots.
  - (d) Where work is being done for mistletoe eradication:
    - (i) Following treatment, the Licensee shall conduct a Mistletoe Eradication Survey, in which each plot shall be 0.01 ha (100 m<sup>2</sup>, 5.64 m radius).
    - (ii) A satisfactory eradicated plot shall be free of all advance regeneration and of any infected new regeneration as specified on FS 916-4 or Section A.
    - (iii) To qualify for payment, a minimum of 85 percent of the sample plots must meet the standards set out in FS 916-4 or Section A.
    - (iv) Where the number of satisfactorily eradicated plots is less than 85 percent, on the written instruction of the District Manager, the Licensee shall upgrade the standard of eradication to the required 85 percent minimum at his own expense.
    - (v) Payment shall not be allowed for those areas with less than 90 percent of the required number of plantable spots.
3. The Licensee shall provide the District Manager, in writing, supported by plot data and a map, a statement of the site preparation quality as a percent satisfactory based on the foregoing criteria for the specific treatment.
4. Other conditions (see FS 916-4).
5. Where piles, windrows or accumulations are to be burned, Clauses 1 and 2 of Section C-12 on FS 916-3 shall apply.
6. Where work involves the use or application of herbicides, appropriate clauses in Section C-8, Brushing, Conifer Release, Seed Tree Control, will apply to this addendum.

**SECTION C-2 PLANTING**

1. It is the Licensee's responsibility to ensure that all standards and specifications agreed to in this document and in the supporting prescription are adhered to.
2. The Licensee shall choose planting spots which are most conducive to survival and growth of the seedlings and comply with the standards specified in Section B.
3. The Licensee shall plant the seedlings in accordance with the provisions of this agreement, using spot preparation and planting techniques which will permit maximum survival and growth of the seedlings, as described in the Silviculture Manual.
4. The Licensee shall provide the District Manager with an accurate and complete Planting Report (FS 753) supported by plot data and a map of the completed project.
5. (a) Seedling Transport: Seedlings under the Licensee's care shall be transported in the following manner:
  - boxes shall be handled gently without throwing or dropping,
  - travel time shall be reduced to a minimum,
  - seedling boxes shall not be exposed to the sun,
  - transport vehicles shall be refrigerated or the cargo area shall be adequately protected from the sun and other heat sources, and be well-ventilated,
  - only reflective-type tarps which are in good repair may be used to cover the seedlings;
- (b) Seedling Transport: The Licensee may store seedlings in outdoor locations at or near the worksite provided that:
  - seedling box temperatures do not exceed levels as approved by the District Manager,
  - seedlings are protected from the sun and rain,
  - seedling boxes are separated in a manner that permits air circulation around each box.
 If these provisions cannot be met at such an on-site storage location, then the Licensee shall either transport each day's supply of seedlings to the planting site from a suitable off-site storage facility or provide a refrigerated storage unit at the site which meets the above-noted storage conditions;
- (c) Seedling Handling: Seedlings shall at all times be handled with care as specified in the Silviculture Manual, so as to maximize survival and growth. If seedling transportation, storage conditions or handling practices are found to be in contravention of these provisions, the District Manager may impose a reduction to the invoice payment of \$50 per day for each minor infraction and \$250 per day for each major infraction.
6. The District Manager shall assess the data submitted and in conjunction with Ministry inspection reports or following a thorough audit of the project, determine payment based on the number of trees issued for planting, times the agreed price per tree, less any applicable reductions as listed below. Lump sum agreements shall also be subject to these conditions:
  - If the planting quality as measured using the Ministry's Planting Quality Inspection System is less than 92.6%, the payment shall be reduced by a factor equal to the product of the following formula:  

$$\text{Pay \%} = (\text{PQ} \times 1.08) - (((100 - (\text{PQ} \times 1.08))^2) \div 8)$$
  - If seedlings have been lost, destroyed or wasted, or if the Licensee fails to account for at least 90% of the seedlings issued, payment shall be reduced by the addendum price per seedling plus twenty cents (20¢) per seedling, times the number of seedlings lost, destroyed, wasted or not accounted for.
  - If the excess tree calculation, as determined by the Ministry's Planting Quality Inspection System, exceeds 7% of the trees issued, payment shall be reduced by the addendum price per seedling, times the number of seedlings in excess of 7%. Where the excess exceeds 12%, payment shall be reduced by an additional amount of 20 cents (20¢) per seedling for the amount over 12%.
  - If plantable microsites are available, but the Licensee has failed to maintain the minimum density as specified, payment may be refused for those areas so affected.
  - If areas which the District Manager considers plantable have been left unplanted, payment may be reduced by \$1000.00 per hectare for those areas so affected. No such payment reduction shall be applied for areas less than one-tenth of a hectare.
  - If reusable seedling containers issued to the Licensee have not been returned, payment shall be reduced by \$25.00 for each container not returned.
  - Payment shall be disallowed for areas where the planting quality is below 85%, as measured using the Ministry's Planting Quality Inspection System, unless the Licensee can satisfy the District Manager that appropriate steps, as outlined in the Silviculture Manual, were taken to raise the planting quality and minimize the amount of planting below 85%.
7. All empty disposable seedling containers and other garbage shall be burned or buried as directed by the District Manager.
8. Prior to commencing work, a notice shall be posted at the workers' assembly point outlining approved seedling-handling procedures and listing the pesticide treatments for each batch of seedlings used on the project.
9. Other conditions are outlined on FS 916-4 attached.

**SECTION C-3 CONE COLLECTIONS**

1. The Licensee shall collect forest tree cones up to the volumes indicated in Section B of the schedule, or until the cones are no longer of an acceptable quality.
2. Only ripe cones of the current year's crop shall be collected. (Exception: Lodgepole pine - see item 3.)
3. Collections of Lodgepole pine shall contain at least 75 percent Class I or Class II cones, i.e. freshly ripened cones or cones with at least one face a bronze or golden colour.
4. Cones shall be collected only from trees exhibiting desirable phenotypic characteristics.
5. Only equipment, methods and materials approved by the District Manager shall be used in the collection.
6. The Licensee shall, at least twice daily during collection, examine the filled seed content and the degree of seed maturity within the cones being collected to ensure that the minimum standards set out below are maintained.
7. Once collected, cones shall be kept under cover in appropriately secured sacks or other approved containers and shall be stored in such a manner as to permit free air circulation about each sack or container.
8. The Licensee shall identify each sack of cones in an approved manner or as specified in the Silviculture Manual.
9. The Licensee shall contact the District Manager and arrange for the inspection of cones

COMPANY NAME

LICENCE NUMBER

**TO BE INITIALED ONLY WHEN A FINAL ADDENDUM OR AMENDMENT**

LICENSEE INITIAL	DATE	R.P.F. SIGNATURE & SEAL	DATE	MINISTRY INITIAL	DATE	LICENCE ADDENDUM NUMBER
	Y M D		Y M D		Y M D	

The following standards shall apply in the survey field work:

Item	Allowable Error
Points of commencement	± 10 metres
All bearings	± 2 degrees
All plot centres, bearing tie points, etc.	± 2% of horizontal distance (HD)
Plot radius	± 1% of HD
Closed traverse	± 1% error of closure
Estimated tree heights	± 10%
Measured tree heights	± 2%
Crown closure	± 10%

- at a mutually agreed-upon time and place. Cones shall be inspected within three (3) days of completion of collection, or earlier if convenient to both Licensee and District Manager.
- Cones to be inspected shall be examined first for filled seed content and seed maturity, and secondly for cone cleanliness (i.e. foreign material content). Only cones which meet the minimum standards set out below shall be measured for volume (i.e. for payment). Cones which do not meet the cleanliness standard may be cleaned by the Licensee and re-inspected.
  - Sample sacks of cones which meet these "quality" standards shall be physically measured using a utensil of known volumen which, when full, shall be tamped, shaken or rocked to ensure reasonable compaction of cones.
  - The Ministry Officer inspecting the cones shall provide the Licensee with written certification of those cones accepted for credit. All cones accepted for credit become the property of the Ministry of Forests.
  - The Licensee shall have completed, and shall submit at the time of shipping, the Cone Collector's Report (FS 721) for each seedlot being inspected.
  - Other specifications - see FS 916-4.

## MINIMUM STANDARDS

### A. Filled Seed Content

The average filled-seed content of not less than 10 cones randomly selected from each sample sack shall not be less than the value shown below:

Species	Minimum Average Number of Filled Seeds		
	Per 1/2 Cone	Per Whole Cone	Percent Sound Seed
Douglas-fir ( <i>P. menziesii</i> )	5	-	-
Spruces ( <i>Picea</i> spp.)	7	-	-
Western Hemlock ( <i>T. heterophylla</i> )	3	-	-
Larch ( <i>L. occidentalis</i> )	6	-	-
Yellow Cedar ( <i>C. nootkatensis</i> )	2*	-	-
Western Red Cedar ( <i>T. plicata</i> )		4-6	-
Lodgepole pine ( <i>P. contorta</i> )	-	20	-
White pine ( <i>P. monticola</i> )	-	90	-
Ponderosa pine ( <i>P. ponderosa</i> )	-	75	-
Amabilis fir ( <i>A. amabilis</i> )	8-12	-	25
Grand fir ( <i>A. grandis</i> )	12-14	-	30
Alpine fir ( <i>A. lasiocarpa</i> )	4-6	-	25

\* cut transversely at one-third cone length from the base.

### B. Seed Maturity

Not less than two-thirds of the total of three whole seeds taken from each of the above sample cones shall exhibit the following degree of seed maturity:

- embryo-occupying at least 90 percent of the embryonic cavity (in length) and pale yellow in colour.
- endosperm: firm, not lustrous, and white in colour.

### C. Cone Cleanliness

Sacks of cones shall not contain more than a total of five percent (by volume) of unacceptable material such as open cones, cone scales and cores, cones of other species, needles, bark, litter, lichens, moss, branchlets, twigs, rocks, stones, pebbles, dirt lumps, garbage or other debris. Lodgepole pine collections shall not contain more than 25 percent Class III and/or Class IV cones as defined in the Guidelines to Collecting Cones of B.C. conifers; R.C. Dobbs, D.G.W. Edwards, J. Konishi, D. Wallinger, B.C.F.S./C.F.S. Joint Report No. 3, 1976.

## SECTION C-4 SILVICULTURE SURVEYS

### Stocking Surveys, Plantability Surveys, Survival Surveys and Free-Growing Surveys

- Plots/lines shall be established in the manner specified in the Silviculture Manual and current Regional guidelines as in force at the date of this addendum.
- The Licensee shall provide the District Manager with a written statement supported by plot/line data and a map of the results of the survey which was approved under this addendum. all plot/line data must be summarized on the appropriate Ministry of Forests summary form (or an approved Licensee form), i.e. stocking, plantability and free-growing surveys are summarized on an FS 659, survival surveys are summarized on an FS 716 Survival Summary form. The number of copies of forms and maps to be provided will be specified by the District Manager.
- Stocking and survival surveys are to be conducted prior to leaf-out in the spring or after leaf-fall in the autumn, unless otherwise authorized by the District Manager.
- Free-growing surveys are to be conducted after leaf-out in the spring and before leaf-fall in the autumn, unless an opening is obviously free of brush competition. In areas where mechanical or chemical brush control has been carried out, the free-growing survey shall not be done until two full growing seasons after the treatment.
- Inventory labels and Forest cover Attribute Lists for each unit are to be completed as per instructions in the Ministry of Forests Inventory Manual. Mapping standards are to be carried out to Ministry of Forests Cartographic and Regional guidelines. Silviculture Stocking Standards for each survey unit are to be based on the FS 1072, the Regional Stocking Standards guidelines, or FS 711.
- On a portion of the Licensee projects the Ministry will conduct check surveys. Where the Ministry Officer checks the actual plots established by the Licensee in a unit, he will inspect the total of all plots established or 10 plots, whichever is less. The Ministry Officer will tally all the observations he has made on the appropriate field cards. The Ministry Officer will compare the total he has obtained for the following assessments with those collected by the Licensee for the same plots:
  - well-spaced trees;
  - free-growing trees;
  - plantable spots;
  - identification of planted trees in survival plots.

Where there is a difference of more than 10% between the Licensee's and Ministry's assessment in any one of the totals, the Licensee's survey will be considered unsatisfactory. A unit shall automatically be considered unsatisfactorily surveyed if any of the following errors were made by the Licensee:

- incorrect identification of biogeoclimatic zone and subzone for the unit;
- incorrect identification of acceptable tree species for the unit;
- incorrect declaration of stocking status for a stratum within the unit (i.e. a SR stratum declared as NSR);
- incorrect identification of the order of the leading species and secondary species in the inventory label for a stratum within the unit;
- difference of more than 10% in the Licensee's and Ministry Officer's assessment of height of the inventory component.

Where the Ministry Officer conducts an independent survey he will complete the statistical test to determine if both survey estimates are drawn from the same population. No payment for the unit will be made when the test indicates the survey estimates are drawn from different populations at the 95% confidence level.

- Surveys will be conducted to ensure complete and uniform coverage of all strata. The P.O.C., base and strip line must be flagged and numbered with flagging tape to make identification obvious.

- The minimum number of plots shall be established as detailed in Section B of this addendum. Additional plots may be required, depending upon the outcome of the following decision rules:
  - If the estimate of well-spaced stems per hectare and its lower confidence limit (90%) are greater than the minimum stocking standard, the stratum is considered SR. No further plots are required.
  - If the estimate of well-spaced stems per hectare is less than the minimum stocking standard, the area is considered NSR. No further plots are required.
  - If the estimate of well-spaced stems per hectare is less than the minimum stocking standard, but its lower confidence limit is less, then sufficient plots must be established to obtain an estimate within ± 100 stems per hectare or ± 10% if greater than 1000 stems per hectare with a 90% confidence interval. Where statistical calculations indicate that more plots are required to meet the above confidence intervals, the maximum number of plots that the Licensee will be required to establish will be the number of hectares times 1 1/2 plots per hectare. The total number of plots will be rounded up to the nearest whole number (i.e. a five-hectare unit will require a maximum of eight plots).
  - For survival surveys, the estimate of percentage survival must be within ± 10% at 95% confidence. When using the staked tree system for survival assessment, a minimum of 100 staked trees per strata must be used. Stratification is on the basis of species, seedlot stock type, nursery and method of site preparation. The staked trees (in lines or plots) must be distributed throughout the plantation to survey a representative portion of the plantation.

### 9. Standards for Forms and Maps

Survey information will be recorded and reported on the specified forms and maps. A separate FS 659 card shall be completed for each stratum (map type) identified during the survey of a unit. All non-productive types identified in a unit shall be totalled and recorded on the Silviculture Survey Summary card. Where a survival survey has been performed, the Licensee will summarize the information on a Survival Surveys Summary form (FS 716). Silviculture recommendations shall state a specific action (treatment) or sequence of actions that is (are) required along with the season(s) and year(s) of that (those) action(s). All maps submitted to the District must be accurate post-harvesting maps. The maps must specify the total area of each unit surveyed and the area of each distinct inventory stratum within the unit. The Licensee will provide for each survey unit a map which consists of a good photocopy of the Forest Cover mylar map showing the location of the unit and the inventory stratum within the unit. To this map the Licensee will also attach a completed Forest Cover Attribute form (FS 922) for the unit.

The Licensee shall also provide the following project map(s) at the specified scale(s) in conjunction with the survey, as specified by the District Manager:

- a project map for each unit shall be submitted at the scale of the District Forest Cover Maps showing the survey point of commence, strip lines with numbers, plot centres and plot numbers where a change in bearing has occurred on the strip line.
  - a project map for each unit showing treatment units and recommended treatments at the scale of the District Forest Cover Maps.
- Where the Licensee subcontracts the survey work, the Licensee shall ensure that at least one (1) of every two (2) persons working in a unit is a Certified Silviculture Surveyor. Where one person is working alone in a unit, that person shall be a Certified Silviculture Surveyor.
  - Other Conditions are outlined in FS 916-4.

## SECTION C-5 SILVICULTURE TRIALS

- Silviculture Trials shall be established, assessed and reported on according to a Working Plan approved in advance by the District Manager.
- Upon approval of the Working Plan by the District Manager, the Licensee will obtain an SX Trial number from the Silviculture Trial Coordinator. The Licensee will submit all required reports to the Coordinator for inclusion in the SX Trial Catalogue.
- The Licensee shall provide the District Manager with a written report(s), including trial data, illustration, photographs, maps, etc. as required, at the interval(s) specified in the Working Plan.
- The payments to the Licensee under this addendum will be made upon the acceptance of the written report(s) specified in the Working Plan by the District Manager.
- Other Conditions are outlined in FS 916-4.