BRITISH COLUMBIA | Ministry of Forests

Schedule A2
Phase 2
Cut-block and Road Engineering/Timber Cruising

File: 10005-40/**SD25TKN048**

CONTRACT ADMIN. NO:

10005-40/**SD25TKN048**

Attachment to Contract Dated **THE ____ DAY OF _____, 2024.**

Attachment to the Agreement with _____ for **Saunier Fire Salvage Layout - SZ**

ARTICLE 1 PHASE 2 –CUTBLOCK AND ROAD ENGINEERING

1.1 PHASE 2 CUTBLOCK AND ROAD ENGINEERING INCLUDES THE FOLLOWING ACTIVITIES:

(a) Cutblock, Wildlife tree retention area, Reserve Zone, Treatment Unit and final block boundary locating, traversing and marking, deflection analysis for cable blocks.

(b) Completion of required assessments (Windthrow, Terrain, Riparian, Forest Health, VIA, Erosion and Sediment, Wildlife, Migratory Birds, and Special Tree, etc.);

(c) Invasive Species reporting (if observed);

(d) Cruise Plan submission, Timber Cruising, and draft compilation.

(e) Updating/entry of appropriate LRM spatial and attribute data and activities.

ARTICLE 2 PHASE 2 – DRAFT ROAD LAYOUT & DESIGN

2.1 ROAD LOCATION SURVEY

(a) All road reconnaissance, layout, survey, and design shall be consistent with the best practices outlined in the FOR Engineering Manual, the Mapping and Assessing Terrain Stability Guidebook, and the Riparian Management Area Guidebook.

(b) For roads and road sections that do not require geometric road design, the Contractor shall conduct a traverse to the FOR Engineering Manual Level 1 standard or as instructed by the Ministry Representative and shall also collect data on uphill/downhill side slopes as well as estimated depth to bedrock at a minimum of every 50 metres. Creeks, road grade changes, side slope changes, ground types (wet, rock etc.), cross-drain culvert locations, end-haul sections, drainage structure locations, road junctions, spoil sites, etc., information must be collected and marked in the field.

(c) Roads will be ribboned in accordance with the Okanagan-Columbia Business Area Ribbon Standards

(d) The centreline shall be marked with the applicable winter weight ribbon with strips at least 50cm long and are to be clearly intervisible and hung at a height of 2m;

(e) The centreline is to be traversed using an appropriate GPS unit with defined standards as outlined in Schedule A4;

(f) Turning Points are to be established and marked with painted orange with a station number written on it at all control points and grade breaks;

(g) Turning Points shall be no greater than 15 metres apart in rock sections (>50%) and no greater than 50 metres generally;

(h) At approximately 100 metre intervals, the road and branch number and associated station number shall be recorded;

(i) A Control Point shall be established at the middle of each landing location and will be marked in the field by a painted tree and yellow ribbon;

(j) For all tenured roads (FSR's and RP's), reference points (RP) shall be established in the following manner, outside of block boundaries only:

  i. At all POC's, POT's, stream culverts, rock outcrops and spur junctions or at a maximum interval of 300 metres;

  ii. The RP tree must be located on the high side and outside the proposed right-of-way clearing width;

  iii. The RP tree must be flagged with ribbon and a metal tag affixed showing the RP number, road number, road station, bearing and horizontal distance to the traverse station;

  iv. The centreline traverse station must have the reference point number indicated.

(m) At all culvert locations a ribbon indicating the traverse station, proposed culvert diameter, length and type (cross-drain or stream pipe) must be shown on the centreline traverse station. This information must also be shown on a ribbon on the high side and outside the proposed R/W clearing width;

(n) Right-of-way clearing widths are determined as per the Appendix 5 (tables to establish clearing widths) of the FOR Engineering Manual and shall be marked with applicable winter weight ribbon. All tenured roads (FSR and Road Permit) will have clearing widths established;

(o) Field notes shall include general information as observed including existing roads, fences, seismic lines, overhead utility/power lines, timber types, terrain features (rock outcrops, creeks, swamps, wet areas, etc.) and side slopes. For tenured roads, R/W clearing widths distances will be shown in the field notes. The information gathered during the reconnaissance survey should also be included.

(p) If a road parallels within a RMA, stations will be taken at the point of entry and exit of that RMA. These stations will be mapped and noted within the road report including justification.

(q) Culvert location shall be identified in the traverse notes with the following information:

- Culvert diameter and length;
- Height of fill at the proposed road centreline;
- Side slopes at the culvert location;
- Culvert purpose – cross drain or stream;
- Culvert size calculations, flow calculations and stream classification;

(r) Stream crossing data collection shall be in accordance with Chapter 4 Appendix 4.3 of the FOR Engineering Manual and the Stream Assessment Field Card will be completed.

(s) Fish stream crossings shall be in accordance with the Fish Stream Crossing Guidebook (Sept. 2012). Data will be collected using Stream Assessment Field Card.

(t) Roads shall be named in accordance with TOC Road Naming Conventions.

2.2 GEOMETRIC ROAD DESIGN

2.2.1 Roads that are located in unstable or potentially unstable terrain or are located on sustained slopes of 50% or greater, or that have 50% or greater surficial or near surficial bedrock require a geometric road design. All roads determined to be built by BCTS will require a road design regardless of terrain, side slopes or rock content. Exceptions to completing geometric designs may be allowed but must be approved by the Ministry Representative. In these circumstances, the contractor must:

a) Conduct a road survey to FOR Engineering Manual Survey Level 2 or 3 Standards depending on terrain.

b) Describe soils as shown in Appendix 1 of the FOR Engineering Manual or by the Unified Soil Classification System. Depth to rock must be estimated at all traverse stations using ecological indicators.

c) Collect sufficient information to classify all streams by slope and stream width

d) Contractor shall use the “Fish-stream Crossing Guidebook” if applicable, to aid in the design of crossings.

e) Record landing/pull-out locations and size as part of the road survey.

f) Record survey notes and if requested, submit a copy for review by the Ministry Representative.

g) Stake start and finish of end haul sections.

ARTICLE 3 PHASE 2 – Road Design Criteria

3.1 MINIMUM ROAD SPECIFICATIONS:

3.1.1 The following standards apply to all roads engineered under this contract:

(a) **Road dimension:** 5.0 metres (stabilized width) for tenured roads;

(b) **Road dimension:** 5.0 metres (stabilized width) for on-block logger built roads;

(c) **Right of way clearing:** 20 metres minimum on tenured roads;

(d) **Minimum culvert length**: 9 meters;

(e) All other design criteria will be in accordance with the Engineering Manual; Note: there are no absolute rules for establishing maximum road gradient. Consider site specific conditions encountered including surfacing material, expected road life, topography and environment. Grades in excess of those listed in the Engineering Manual for Suggested Maximum Road Gradient for the road width shall be approved by BCTS prior to final layout.

3.1.2 Landings for roads shall be located logically based on terrain conditions encountered and operational needs. R/W landings should be located to serve as block landings wherever feasible. Consider pull outs for the need of subsequent landing development.

3.2 EXISTING ROAD ASSESSMENT

3.2.1 For existing roads that are used to develop blocks, a field assessment must be conducted which assesses what road works are required to make the road suitable for log hauling. Equipment and hourly cost estimates, as per appraisal manual current cost base year, are required. Items such as the following are required to be identified in the field:

- The location, number and size of culverts/bridges that are required (if any);
- Any existing culverts;
- Any reconstruction that may be required (specify if rock work is required);
- Roadside brushing works (indicate where it is required and provide an indication of whether light, medium or heavy brush is involved);
- Any ditching work

The above needs to be located with ribbon or staked in the field and GPS'd. An existing road condition report must be completed for each road that accesses the proposed UBI's which will consist of a brief report (approximately 1 page) in pdf format that describes the above items. See Schedule A - **Error! Reference source not found.**.

ARTICLE 4 PHASE 2 - DRAFT ROAD SITE PLAN

4.1 A completed Road Site Plan (RSP) using the Road Site Plan Document and associated map. The Road Site Plan must be consistent with legislation and address all Results and Strategies in the FSP and specify how the Results and Strategies apply to the site.

ARTICLE 5 PHASE 2 – LRM DATA ENTRY

5.1 The contractor will update LRM Attribute and Spatial data in accordance with the BCTS Data Entry Guidelines and Standards document

ARTICLE 6 PHASE 2 – CUTBLOCK ENGINEERING

6.1 MARKING AND TRAVERSING SPECIFICATIONS

6.1.1 The following areas are to be flagged with winter weight ribbon; double tied as high up the tree as possible (2m), at an interval that ensures the flagging is clearly visible, with a maximum interval of 3 meters. Ribbon will be as per the BCTS TOC Ribbon Standards.

(a) block boundaries (except along existing roads);
(b) wildlife tree retention areas (internal);
(c) internal reserve boundaries;
(d) no harvest zones;
(e) Riparian Reserve zones;
(f) Riparian Management zones – as directed by Ministry Representative.
(g) Non Classified Drainages (NCD's) (centre line and any MFZ if applicable)
(h) Treatment Units and Standards Units;
(i) Machine Free Zones;
(j) Wildlife/Individual Tree Retention.

6.1.2 Painting will only be required in certain circumstances or shall be as per direction of the Ministry Representative. The circumstances shall include, but not be limited to: painting boundary along private land, painting leave trees, painting falling corners and reference trees. Paint requirements are indicated in the TOC Ribbon Standards.

6.1.3 Falling corners shall be located at prominent changes in direction along the block boundary, a metal tag and station shall be established. At these locations the following information will be indicated:

(a) Station trees shall be painted (Hi-vis orange) on all four (4) sides and indicate the station number;
(b) Metal tags shall be placed and indicate the block and station number;
(c) Ribbon shall be hung and indicate the block and station number.

ARTICLE 7 – PHASE 2 - BLOCK LAYOUT AND DESIGN

7.1 GENERAL

7.1.1 The Contractor will develop the cutblock(s) in accordance with the BCTS TOC FSP, through use of industry standard best management practices, Articles within this document, and in keeping with the approved reconnaissance plan.

7.1.2 The Contractor shall **not** paint the block boundaries until the Ministry Representative has approved their location and the requirement for paint.

7.1.3 On blocks with multiple harvest systems, split line boundaries shall be field located with flagging, traversed with GPS, and accurately mapped as per the mapping standards in this agreement.

7.1.4 For all watercourses that are in-block, road impacted and/or adjacent to the proposed development, the Contractor shall use the following procedures for stream classification:

a) All in-block and adjacent S6 or larger streams shall have the stream centre-line ribboned with purple "Creek" ribbon and GPS traversed, and identified with an alphabetical unique label (ex. S6-A).

b) For streams gradients greater than 20%, the contractor shall provide an estimated stream classification based on stream width and the corresponding FRPA classification system.

c) For stream gradients less than 20%, the contractor shall use the applicable Local Area Agreements specified in Article 14.08 below and shall measure a minimum of 6 stream widths (to the high water mark) evenly spaced over each stream reach (as defined in the FPC-Stream Classification Guidebook). The average of these measurements shall be used to derive a stream classification.

d) A Riparian Field Report (see Sample Document "ScheduleE-2a") will be completed for each watercourse.

7.1.5 For determining the presence of Fish in small streams the following procedures will apply:

a) The *Kamloops Forest Region Local Area Agreement – Revised December 2001* (See Sample Documents) will apply to those areas that are found in the former Vernon and Salmon Arm Forest Districts.

b) The Penticton Forest District Local Area Agreement – Revised April 23, 2002 (See Sample Documents) will apply to those areas that are found in the former Penticton Forest District.

c) Any misclassification or unsatisfactory Riparian Management Zone layout must be corrected at the Contractor's expense.

7.1.6 The Contractor will conduct Windthrow Hazard Assessments, to the Standards outlined above, on all streams and wetlands within or adjacent to the cutblock boundaries and along the windward boundary of each cutblock. A FS39D Field Card must be submitted for each assessment.

7.2 GROUND BASED SYSTEMS

7.2.1 Proposed block roads, landings and skid trails are to be located to minimize disturbance.

7.2.2 Slopes greater than 35% will be mapped on the "Harvest Plan" map.

7.2.3 Recommended skidding distance to a landing should be no more than 300 meters (200m roadside) with due consideration to topography, aspect, and slope. Longer distances must be discussed with and approved by the Ministry Representative. Maximum adverse skid distance will be 200m at 8%.

7.2.4 The Contractor will maximize the potential for random skidding and avoid the designation of permanent skid trails wherever possible.

Steep Slope Harvesting

7.2.5 In locations where planned road cuts and adjacent side slopes are not conducive to safe steep slope operation and roadside decking of wood, suitable landings must be identified and verified.

7.2.6 Steep slope harvest landings must be located on suitable grades to allow log landing and safe operation of machinery (i.e. ≤ 12%).

7.2.7 An optimum number of landings must be located to safely accommodate all accessible timber and minimize phase congestion.

7.2.8 Grapple yarding distances will be 200m or less. Where distances are greater than 200m, it must be discussed with the Ministry Representative.

7.2.9 Ensure there is sufficient distance between roads and falling boundary/retention patches to allow for safe machine clearance, guy line and tail hold establishment.

7.2.10 Where a mobile back spar is proposed, the back-spar trail must be marked in the field and must be identified and shown on the Harvest Plan Map.

7.2.11 Designated stream crossings for mobile back spars/skid/forward trails must be identified, marked in the field with a ribbon gate labelled SKID TRAIL, and shown on the Harvest Plan Map.

7.3 CABLE BASED SYSTEMS

7.3.1 Proof of deflection on each cable block will be required. Maximum spacing of deflection lines will be 100 meters. Deflection lines based on LiDAR will be accepted.

7.3.2 Grade breaks on ground profile greater than 10% must be shown, as well as roads and stream crossings.

7.3.3 Obstacles to yarding (ground lead, rock bluffs, draws) must be mapped.

7.3.4 Areas under 6% deflection or where there are obstacles to yarding should have a higher density of deflection lines run in order to accurately represent areas that may contain more challenging harvest conditions.

7.3.5 The block design must consider and include areas below landings for debris disposal and guy line clearings relative to the tower size proposed.

7.3.6 The Contractor shall consider the use of intermediate supports and elevated tail rigging where feasible, and shall mark a minimum of two (2) intermediate support trees per setting in the field.

7.3.7 For partial cutting, the Contractor must run a minimum of one (1) deflection line per yarding corridor from each tower setting.

7.3.8 All deflection/profile lines shall be clearly identified and ribboned in the field, where LiDAR is not available.

7.3.9 Where roadside yarding is specified, the Contractor shall traverse deflection lines perpendicular to the contour. For fixed yarders, deflection lines shall be run radially from each fixed yarder landing location. Landing and road locations must be numbered and referenced to appropriate landings and deflection profiles (for stationary yarders).

7.3.10 For the purposes of deflection analysis, the Contractor shall use a tower height and yarding system determined by the Ministry Representative.

7.3.11 Deflection lines will be plotted on LOGGERPC or a similar program, with plans and profiles. In addition, payloads and tension reports and rigging length reports will be generated for each deflection line.

7.3.12 For blocks that have both uphill and downhill yarding, the split line will be clearly marked, traversed with GPS, and accurately mapped.

7.3.13 For downhill yarding, the Contractor must consider the post road construction cut slopes to ensure there is adequate landing area and that all wood can be safely landed.

7.3.14 Forwarding trails, backspar trails, jump-up tower set-ups must be field marked if suitable and/or required.

7.3.15 Potential tailholds, rooting medium, intermediate supports trees and guy line stumps must be of suitable specifications for the planned cable system. Additional supporting information must be collected such as species, tree diameter & height and poor rooting medium especially in situations where small diameter timber is involved.

ARTICLE 8 PHASE 2 – BLOCK ASSESSMENTS

8.1 RIPARIAN ASSESSMENT

8.1.1 All riparian features within or adjacent to the cut block must have a Stream Assessment Field Card completed.

8.1.2 If previously unidentified Riparian features or new information regarding riparian features is discovered in Phase 2 then a Stream Assessment Field Card or NCD Field Card will be completed and submitted.

8.1.3 Assessed streams and their associated riparian management will be flagged as per BCTS TOC Ribbon Standards.

8.2 SITE PLAN PLOTS AND DATA COLLECTION

8.2.1 The contractor shall collect all SP field data as per the most current version of the Ministry of Forests' Silviculture Prescription Data Collection Field Handbook: Interpretative Guide for Data Collection, Site Stratification, and Sensitivity Evaluation for Silviculture Prescriptions and any directives from the Timber Sales Manager. This guide can be obtained at the following link. http://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh47.htm

8.2.2 The SP field data collection will be completed using the FS39A field card for each plot in each block.

8.2.3 The SP field data collection plots shall be marked, GPS located and identified in the field with yellow and pink ribbon.

8.2.4 At each plot, a minimum of two (2) digital photos which are representative of the Standards Unit will be taken from the plot.

8.3 DROUGHT RISK KEY

8.3.1 Cut blocks proposed in the PP, BG, IDFxh and IDFdk must have a drought risk key completed.

8.4 WINDTHROW ASSESSMENT

8.4.1 The Contractor will conduct Windthrow Hazard Assessments on all streams and wetlands within or adjacent to the cutblock boundaries and along the windward boundary of each cutblock. A FS712 Field Card must be submitted for each assessment.

8.5 INVASIVE SPECIES REPORTING

8.5.1 Invasive species encountered during any phase of timber development must be reported to https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/reporting-invasive-species or reported via the Invasive Species mobile app.

8.6 FOREST HEALTH ASSESSMENTS

8.6.1 Forest Health assessments may be required as part of this contract and will be completed at the direction of the Ministry Representative. The report must describe the extent of the forest health issue, the species affected, and any prescribed management actions, including those that extend to silviculture (i.e., stumping). A map delineating affected areas and treatment areas must accompany this report.

ARTICLE 9 PHASE 2 – TIMBER CRUISING, FINAL CRUISE AND DRAFT APPRAISAL SUBMISSION

9.1 TIMBER CRUISE PLANS

9.1.1 Cruise Plans shall be submitted following the approval of the Ministry Representative.

9.1.2 One (1) copy of the Cruise Plan shall be submitted to the Ministry Representative prior to the commencement of cruising in the following manner:

(a) One Cruise Plan must be produced for each block or as otherwise approved under Phase I;

(b) The letter must be addressed to the Ministry Representative and must label each block or TSL that the plan applies to;

(c) Cruise plans must meet most current standards under the Provincial Cruising Manual;

(d) A completed FS 693 and FS 694 form (both pages);

(e) A LRM template map (Cruise Plan map) that includes all requirements as indicated in the Interior Cruise manual. Mapping should follow standards in template maps or as determined by the Ministry Representative;

(f) The Cruise Plan must be signed and dated by an accredited timber evaluator, RFT or RPF.

9.2 TIMBER CRUISING

9.2.1 The Contractor agrees to perform all timber cruising works under this contract to meet the requirements and standards set out in the current Ministry of Forests' Provincial Cruising Manual and as per any current Southern Interior Forest Region cruising policies and district policies unless additional standards are required under this Schedule.

9.2.2 Base lines and cruise strips must be flagged with winter weight ribbon as per the BC Timber Sales Ribbon Standards TOC Business Area. Tie points, plot centres and stations must be marked.

9.2.5 All cruising will be recorded with an electronic data logger. Use of paper cruise cards is not accepted.

9.3 FINAL CRUISE SUBMISSION/DRAFT COMPILATION

9.3.1 Final cruise submissions shall be submitted to the Ministry Representative in the following manner:

(a) A letter must be signed off by a professional (RPF, RFT) that the cruise has been reviewed and completed to the standard of the Interior Cruising Manual;

(b) The electronic cruise cards (CMF file);

(c) A written statement of justification for any changes in actual locations as compared to the original Cruise Plan Map;

(d) A LRM template Final Cruise Plan map that includes all requirements as indicated in the Cruise Manual, or as determined by the Ministry Representative;

(e) Cruise compilations must be imported into LRM;

(f) draft cruise compilations shall be submitted in the following manner:

i. Must be compiled using one of the Valid Compilation Programs as specified in the Provincial Cruise Manual;

ii. An electronic copy of the following compilations will be required:

Full Volume Report – (Filename: fullcomp)

iii. Electronic compilations shall be submitted in .pdf format (bookmarked) and include dat or cct, ccp, cmf, ckf

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