



**Natural Resource
Ministries**

Schedule M BCTS GPS Specifications

File:10005-40/IM24TLH005

Attachment to the Agreement with _____ for **Summer Tree Planting
Implementation – Various Locations – Cascadia Timber Supply Areas.**

BCTS GPS Specifications

Version 2

Last Updated March 16, 2011

BC Timber Sales

Cariboo-Chilcotin Business Area

SCHEDULE TO APPLY TO ALL BCTS GPS CONTRACTS

1.0 Application

This schedule shall apply and be used as an adjunct to all contracts for surveys undertaken for BCTS by any and all contractors using the Global Positioning System (GPS).

2.0 Interpretation

2.1 For interpreting the terms of references in this Schedule, the Contractor shall consult the following document:

British Columbia Standards, Specifications and Guidelines for Control Surveys Using Global Positioning System Technology (GPS) July 2010 (hereinafter called the Standards) available at

http://www.ilmb.gov.bc.ca/risc/pubs/other/gps/gps_standard_2008.pdf. This document provides the standards, specifications and guidelines for all line and polygon traversing projects undertaken by the government of British Columbia. The Contractor and the BCTS Representative shall ensure that the most current version of the Standards is used.

2.2 This schedule shall be used in all forest resource surveys using Global Positioning System (GPS) and mixed conventional/GPS methods undertaken by or for BCTS.

3.0 BCTS Concerns in Contracting GPS

3.1 The GPS Contractor shall demonstrate or prove to BCTS Representative's satisfaction that the Contractor's GPS full system including hardware/firmware and software is capable of meeting the accuracy requirements of the Contract.

3.2 The Contractor shall supply qualified personnel that meet Provincial requirements with extensive recent experience in GPS technology. The contractor shall be certified via the RISC GPS Comprehensive Course (5-day GPS data Processor / Manager Course and RISC GPS Field Operator Course (2-day GPS Field Operator course as defined in http://archive.ilmb.gov.bc.ca/crgb/gsr/gps_val.htm

4.0 Equipment

4.1 Any GPS receiver used shall be capable of attaining optimum accuracies provided by the system as defined in the Federal Radionavigation Plan (FRP), USA.

4.2 The receiver must be capable of point and stream digitizing. It must be capable of recording each discreet fix as an individual entry.

4.3 The data collecting frequency must be adjustable in one (1)-second increments down to a one (1)-second interval between consecutive readings.

4.4 The horizon masking capability must be adjustable from the horizon in one (1) degree increments or less.

- 4.5** The receiver-recorder must be capable of being set to record three (3)-dimensional points only.

5.0 Fieldwork

- 5.1** The target accuracy for this Schedule is 10 metres in the horizontal dimension at a 95% confidence level.
- 5.2** Horizon masking shall be set to the greater of ten (10) degrees for ground collection, or one (1) degree for every one hundred (100) kilometres from the base station, plus one (1) additional degree.
- 5.3** Dilution of Precision (DOP) values for both static (point) surveys and dynamic (linear traversing) surveys shall not exceed the following values:
General DOP: 10 (used if HDOP or PDOP is not available)
Position DOP: 8 (used if HDOP is not available)
Horizontal DOP: 5 (preferred whenever possible)
Vertical DOP: 5 (used only when elevations are required)
- 5.4** During static point-mode surveys, the minimum recording duration at each survey point shall be 30 seconds with at least 15 individual position fixes during that period. High significance features, such as sample plots, map ties, PoC and PoT, shall be a minimum of 150 seconds and at least 50 individual position fixes.
- 5.5** Position fixes for linear features mapped dynamically shall be no more than 25 metres apart. Maximum speed for dynamic linear feature mapping is 100 km/h with 1-second data logging
- Position fixes for linear features mapped statically (i.e. static or point-to-point traverses) shall be no more than 50 metres apart, and be a minimum of 15 seconds long with at least 5 individual position fixes
- 5.6** Receiver masks must be set to collection three (3)-dimensional points only.
- 5.7** GPS closure requirements shall be consistently expressed in Spherical Error Probable (SEP), not in Two-dimensional Root Mean Square (2dRMS) error.
- 5.8** The base station installation, location and type shall be approved for the order of survey being conducted. Project base stations shall be tied to two (2) or more third order or better geodetic monuments. All permanent base stations shall be tied to the Provincial Base Station Network as it becomes available. The maximum separation between base station and field receiver shall be 480 kilometres.

6.0 Data Processing and Interpretation

- 6.1** All GPS positions shall be corrected by pseudorange or navigation differential GPS methods. If navigation corrections are used, the same set of GPS satellites shall be used at the GPS Reference Station as at the field receiver for all corrected position fixes.

- 6.2** All GPS Reference Stations shall be validated according to the procedures outlined in British Columbia Standards, Specifications and Guidelines For Resource Surveys Using Global Positioning System (GPS) Technology – Release4.0 (https://www.for.gov.bc.ca/hts/risc/pubs/other/gps/gps_standard_2008.pdf).
- 6.3** Real-time corrections shall use a DGPS Service, or GPS Reference Station, validated by Base Mapping and Geomatic Service, ILMB. Only pseudorange corrections which have associated range-rates and an overall latency of less than 10 seconds will be acceptable.

7.0 Project Deliverables

- 7.1** Processed data provided to BCTS shall meet the requirements in the accompanying GIS data requirements schedule. Digital files to be submitted in shape file format (four associated files making up the shape files including .SHP, .SHX, .DBF and .PRJ file defining projection and coordinate system).
- 7.2** Data shall be gathered in WGS84/NAD83 and converted by the National Transformation algorithm (version 1.1) to NAD27 if specifically requested. UTM co-ordinates, if requested, shall be converted by the Grid Transformation program.
- 7.3** The data files created by this project are the property of BCTS and access to all files created in the completion of the works shall be made available to BCTS.

8.0 Quality Assurance and Audit

- 8.1** The Contractor shall be responsible for overall quality control of all the components of a GPS survey.
- 8.2** All submitted work shall be subject to a BCTS quality assurance and audit
- 8.3** To enable BCTS to check the requirements, details of the data collection method shall be submitted in a hard copy of the printout data.
- 8.4** No payment(s) will be made to the Contractor until the minimum standards outlined have been achieved to the satisfaction of the contract co-coordinator.
- 8.5** The Contractor shall rectify at his or her own expense all deficiencies identified by quality inspection/checks and audits.