



Regional Chapter No. 2020-02

The *National Standards for the Survey of Canada Lands* provides professional Canada Lands Surveyors with the technical standards that apply to surveys undertaken on Canada Lands. Canada Lands are diverse, both geographically and administratively; therefore it is a challenge to create common standards that meet the detailed requirements of all jurisdictions.

Regional Notices published by SGB are official statements on administrative procedures and regional technical standards to support the *National Standards* for specific local requirements. Unless otherwise specified, they are not meant to overlap or conflict with the *National Standards*, and they shall be effective on the date of the publication.

SCOPE

This *Regional Chapter No. 2020-02* is specific for the Province of Ontario.

SUBJECT: SURVEYS UTILIZING AERIAL IMAGERY PRODUCTS

BACKGROUND

The information provided in this Regional Chapter provides additional information to supplement the *National Standards for the Survey of Canada Lands* in order to provide the boundary certainty and data required by Canada.

General

1. **Mapping Natural Boundaries:** Any mapping must meet the specifications in Chapter 5 of the National Standards for the Survey of Canada Lands (NS). The surveyor will be required to ground truth and control any shoreline or contour extraction at intervals of approximately two kilometres (2 km). Where required the extracted shoreline should be adjusted to better fit the physical shoreline.
2. The surveyor is also required to establish photo identifiable points in the vicinity of the shoreline. These points are to be tied in by GPS (or conventional means). The observed coordinates will be compared with the imagery-extracted coordinates shown in tabular format on all plans.
3. **Benchmarks:** A minimum of two vertical Benchmarks are to be established along the shoreline of each water body. The benchmarks are to be easily accessible for confirming elevations and established where they will be protected from damage by erosion, ice, etc. Elevations must be recorded for each benchmark and nearby water levels. The benchmark must be properly and permanently referenced to at least two survey or reference monuments. The orthometric (sea level) elevation of this benchmark must be determined to an accuracy of 15 cm. or better at 95% confidence with respect to the Canadian Geodetic Vertical Datum of 2013 (CGVD2013). The benchmarks will be shown on the plan. The water elevation should be recorded in the report.
4. **Survey Report and Field Notes:** In addition to the requirements of Chapter 4 of the NS, include:
 - Supporting rationale and detailed information regarding the establishment of the reserve limit abutting the adjacent water body;
 - Photographs per C.5 of the NS, along with a map indicating the direction and location of the images;

- Include any associated data not found in the CLSR, such as imagery;
- A statement on the positional accuracy deduced for the imagery;
- A listing of coordinates (UTM Zone 15 - NAD83 CSRS) used in the accuracy determination;
- Analytical steps employed and statistical findings;
- Findings on the accuracy achieved with a clearly stated confidence level for both the orientation data and for features that can be extracted from the image. There must be independent checks of the positional accuracy;
- A statement regarding any deficiencies in the imagery or accuracies, their causes and the specific steps taken to mitigate those deficiencies. Where the statistical analysis identifies an area of the natural boundary that exceed the stated specifications, these findings are to be reported immediately to the project authority for review and direction as to how to proceed further with this project.

Returns – Imagery:

1. **Report:** A report and associated data will be required from the contractor including:
 - Source and parameters surrounding the digital aerial photography;
 - Photo Control;
 - Data collected during acquisition of the digital imagery to provide direct georeferenced exterior orientation parameters;
 - Base Station(s) monitored;
 - Method of Aerial Triangulation;
 - Elevation data;
 - Orthorectification of Imagery;
 - Camera calibration report;
 - Details on method used for extraction of shoreline;
 - Statement of Accuracy for imagery and shoreline extraction;
 - Metadata;
 - A complete listing of all deliverables;
 - Contractor’s signature certifying the correctness of the deliverables;
2. Colour Orthoimagery in uncompressed GeoTIFF format, no larger than 1km x 1km tiles suitable for use in ArcMap and AutoCAD, including a tile index in ESRI shp format.
3. Overall orthomosaic in MrSID and ECW formats.
4. Extraction of the shoreline delivered in digital format, i.e. dwg and shp.

Metadata: Geospatial metadata in compliance with Government/ISO/Industry standards is also required.

Provide metadata in accordance with the Treasury Board Secretariat Standard on Geospatial Data:

- At a minimum, the mandatory elements defined in the North American Profile of ISO 19115 - Geographic information - Metadata standard (NAP-Metadata);
- The metadata must be provided in a text XML file format, based upon ISO/TS19139 Metadata - XML schema implementation;
- Meets ICAS specifications: ftp://ftp.nrcan.gc.ca/ess/topo/ICAS-CILA/E-ICAS_spec_2000.pdf;

- The metadata delivered with the imagery must include a copy of the License Agreement either embedded or as an attached file.

The Report shall be prepared in a manner suitable for recording in the Canada Lands Surveys Records (CLSR).

Returns – Survey:

If imagery is used for the survey, it is the responsibility of the surveyor to assess (i.e. ground truth) the accuracy and reliability of the photogrammetrically derived data and whether or not to accept all or portions of the data in forming an opinion about the location of the natural boundary. Note that at a final plan scale of 1:10,000, the surveyor will need to ensure that the position of the photogrammetrically derived shoreline was within +/- 5 metres of what was believed to be the position of the actual shoreline at the time of the imagery.

The surveyor shall clearly indicate on his plan, digital file and in the report which parts of the boundary were derived from the photogrammetric data (if used) and which parts of the boundary were positioned using other techniques (i.e. RTK). The surveyor must document any modifications to the photogrammetric data (i.e. docks and jetties) in the survey report.

Note that the plan must illustrate the cadastral fabric in those areas where survey evidence was used to support the survey.

This Regional Chapter will come into force on the date of its publication on NRCan`s Website.

(Original signed on June 18, 2020)

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