

CONTRACT SPECIFICATIONS

FOR A

HYDROGRAPHIC SURVEY

OF

CHENAL de l'ILE d'ORLÉANS

(ST. LAWRENCE RIVER)

1974

CANADIAN HYDROGRAPHIC SERVICE
CENTRAL REGION
MARINE SCIENCES DIRECTORATE
DEPARTMENT OF THE ENVIRONMENT

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APPENDIX A: SKETCH OF SURVEY AREA

APPENDIX B: C.H.S. STANDING ORDERS

SUPPORTING DOCUMENTS: C.H.S. CHART NO. 1
C.H.S. CHART NO. 1208 -
C.H.S. TIDAL MANUAL -
C.H.S. HYDROGRAPHIC MANUAL -

1. SUMMARY

For a survey in 1974, the Canadian Hydrographic Service invites bids for a contract to provide a complete hydrographic survey of the section of the St. Lawrence River which lies below Québec City and to the north of Ile d'Orléans (a portion of CHS Chart 1208).

The area of the Contractor's responsibility may be summarized under the following headings:

- (a) One field sheet, scale 1:20,000, "Chenal de l'Ile d'Orléans".
- (b) One wharf plan, scale 1:1,000, "Ste. Anne de Beaupré Wharf".
- (c) One wharf plan, scale 1:1,000, "Abitibi Ste. Anne Paper Co. Wharf"
(at Beaupré)
- (d) Horizontal Control; Aids to Navigation.
- (e) Vertical Control; Water Level Data; Bench Marks.

2. CANADIAN HYDROGRAPHIC SERVICE INVOLVEMENT

The C.H.S. will supply to the Contractor:

- (1) One base copy of the 1:20,000 Field Sheet, "Chenal de l'Ile d'Orléans", including Universal Transverse Mercator (UTM) grids and graticules.
- (2) One shoreline plot of the 1:20,000 Field Sheet.
- (3) One contract print each of the latest aerial photography of the area.
- (4) One CHS Chart 1208.
- (5) One CHS Tidal Manual.
- (6) Bench Mark and Rock Post markers, as necessary.
- (7) One copy of pertinent CHS Standing Orders.
- (8) One CHS Hydrographic Manual.
- (9) Data pertaining to existing Horizontal and Vertical Control.

2.2. C.H.S. Supervision

The C.H.S. will continually monitor the Contractor's work. The Contractor must at all times be able to provide sufficient evidence to the satisfaction of the C.H.S. Contract Supervisor, that all Specifications and Standards are being maintained.

During the course of the survey, the Contractor may be required to re-survey areas that are not initially surveyed to these standards.

At all times, the Contractor is required to allow the C.H.S. Contract Supervisor, or his representative, access to the Contractor's premises, equipment, notes, documents, and other data.

2.3. Order of Authority

In the event of discrepancies or conflicts among documentary authorities, the following order of priority will apply:

2.3.1. Contract Specifications for a Hydrographic Survey of Chenal de l'Ile d'Orléans.

2.3.2. C.H.S. Standing Orders: 70-5 (See Appendix B)

70-4

70-2

70-1

69-1

68-4

68-3

65-20

65-19

65-18

65-17

65-16

65-13

65-11

61-2

2.3.3 C.H.S. Tidal Manual.

2.3.4. Chart No. 1

2.3.5. C.H.S. Hydrographic Manual.

2.3.6. Admiralty Manual of Hydrographic Surveying.

3. UNITS AND DATUMS

3.1. Units

All measurements must be collected, recorded, and presented in metric units. (With the exception of angular measurements, which must be in degrees, minutes, seconds and decimals of a second, where necessary).

3.1.1. Soundings

Soundings must be recorded in metres and even decimetres for depths between zero and 31 metres. Below 31 metres soundings must be recorded to the nearest metre. Drying soundings must be recorded in metres and even decimetres.

3.1.2. Elevations, Heights, Clearances

Elevations, Heights and Clearances must be recorded in metres and decimetres for values between 0 and 30. For values greater than 30, these data will be recorded to the nearest metre.

3.1.3. Control

Horizontal and Vertical Control data must be recorded in metric units to a precision consistent with 2nd Order accuracy standards (S.O. 65-13). Angular measurements will be degrees, minutes, seconds and decimals of seconds where necessary.

3.2. Datums

3.2.1. Horizontal Datum

Horizontal Datum is North American 1927.

3.2.2. Vertical Datum for Soundings

Sounding datum is Lower Low Water, Large Tides, International Great Lakes Datum 1955, as defined by Bench Mark data (2.1.9).

Sounding datum is also the reference plane for all drying soundings.

Elevations and Clearances of features that do not cover will be referenced to a datum defined as Higher High Water, Large Tides.

4. FIELD SHEET PARAMETERS

4.1. Chenal de l'Ile d'Orléans

4.1.1. Natural Scale 1:20,000.

4.1.2. Projection, Universal Transverse Mercator, Zone 18.

4.1.3. Limits of Survey;

The S.W. limit is the south edge of the bridge which crosses this channel from Montmorency to Ile d'Orléans. The N.E. limit is the meridian 70°50' West Longitude. Excluded are the areas covered by Wharf Plans (4.2 and 4.3 below).

4.2. Wharf Plan, Ste. Anne de Beaupré

4.2.1. Natural Scale 1:1,000.

4.2.2. Projection: Universal Transverse Mercator.

4.2.3. Limits of Survey: The area with 200 metres of the wharf including drying area and shoreline but excluding inshore detail.

4.3. Wharf Plan, Abitibi Ste. Anne Paper Co. at Beaupré

4.3.1. Natural Scale 1:1,000.

4.3.2. Projection: Universal Transverse Mercator.

4.3.3. Limits of Survey: The area within 200 metres of the wharf including drying areas and shoreline, but excluding shore detail.

5. FIELD SHEET SPECIFICATIONS

5.1. S.O. 70-1

C.H.S. Standing Order 70-1 shall be the standard for drafting the Field Sheets.

5.2. Wharf Plans

Wharf Plans are Field Sheets.

5.3. Prompt Inking of Soundings

The inking of soundings must not lag more than two weeks behind the sounding operation.

5.4. Location

During the course of the survey, the Field Sheet must be maintained and inked in the survey area.

6. HORIZONTAL CONTROL

6.1. Existing Horizontal Control

The C.H.S. will supply position co-ordinates and descriptions of the existing control in the area.

6.2. New Horizontal Control

The Contractor shall be responsible for establishing any new control required. It must meet second order standards (S.O. 65-13).

7. VERTICAL CONTROL

7.1. Existing Vertical Control

The C.H.S. will supply descriptions and elevations (in feet) of existing Bench Marks in the area.

7.2. New Vertical Control

The Contractor shall be responsible for establishing any new vertical control required. It must meet first order standards (S.O. 65-13).

8. WATER LEVEL DATA AND NEW BENCH MARKS

8.1. Tide Gauges and Tide Staves

During the survey operation, the Contractor shall supply, install, operate and maintain sufficient automatic recording tide gauges to ensure that the tidal reduction for any sounding or elevation is not in error by more than one decimetre.

Adjacent to each tide gauge the Contractor must establish a tide staff. Where established Bench Marks are used, the tide staff shall be established with its zero on sounding datum (± 0.01 M).

8.2. New Bench Marks

If the gauge site is not within 500 metres of three previously established Bench Marks, then the Contractor is responsible for establishing three new Bench Marks within 500 metres of the gauge, and tying the gauge, staff, and new Bench Marks together with level lines of first order accuracy (S.O. 65-13).

The Contractor is responsible for establishing elevations for these new Bench Marks by water level transfer as described in the C.H.S. Tidal Manual.

8.3. Daily Comparisons

For gauges that are being used for sounding reductions, daily comparisons must be made between graph and staff readings.

9. HYDROGRAPHY

9.1. Sounding Equipment

9.1.1. Sounder

The Contractor shall employ electronic sounding equipment of quality acceptable to the C.H.S. (approximately comparable in resolution to the Raytheon DE-719 or EDO 9040).

9.1.2. Bar Check

The Bar Check apparatus shall be constructed to provide a sharp echo return from depths of 2, 5, 10, 15 and 20 metres.

The sounders must be calibrated at least twice daily by bar check to a depth of 20 metres or the maximum depth being sounded, whichever is less. Both bar checks are to be preserved on the sounding record. The first bar check of the day is to be made prior to the sounding operation. At this time, the sounder must be adjusted to fit the bar check.

The last bar check of the day is to be made subsequent to the termination of sounding. No adjustment is to be made to the sounder prior to the completion of this bar check.

Any malfunctions or adjustments which affect the calibration of the sounder must be followed by a documented bar check.

9.1.3. Lead-Line

A lead-line, calibrated in metres and even decimetres is to be used to confirm shoal examination depths. Suitably armed with tallow, it may also be used for obtaining bottom samples on the shoals.

9.1.4. Sounding Pole

A sounding pole, calibrated in metres and even decimetres, may be used in lieu of the lead-line for confirming shallow shoal depths.

9.2. Spacing of Sounding Lines

9.2.1. Spacing of Sounding Lines

Principal sounding lines must be no more than 0.5 cm. apart at survey scale.

Check sounding lines must be no more than 5 cm. apart at survey scale.

Sounding lines must be run on range lines over the usable portion of the range. One sounding line is to be run 0.5 cm. at survey scale on each side of the range line in addition to the line exactly on range.

9.3. Orientation of Sounding Lines

9.3.1. Principal Sounding Lines

Principal sounding lines must be oriented approximately perpendicular to the shoreline.

9.3.2. Check Lines

Check lines must be oriented approximately perpendicular to the principal sounding lines.

9.4. Spacing of Fixes

The spacing of position fixes on the survey lines should be within every 2 to 4 centimetres at survey scale.

9.5. Spacing of Soundings on the Sounding Line

Soundings on a sounding line, on the Field Sheet, shall be spaced about 0.5 centimetres apart.

9.6. Bottom Samples

9.6.1. Spacing of Bottom Samples

For the 1:20,000 Field Sheet, the Contractor is responsible for obtaining bottom samples on an approximate spacing of 5 cm. (at survey scale) in the direction of the flow of the river and about 3 cm. perpendicular to it.

For the 1:1,000 Field Sheets, the spacing will be about 5 cm. in any direction.

9.6.2. Presentation of Bottom Samples

The Contractor shall ink the bottom sample data on the field sheet using Chart No. 1 symbols.

9.7. Shoal Examinations

9.7.1. Number of Shoals

The number of shoals or shoal indications requiring examination will not be known until the sounding lines are completed. The Contractor is responsible for examining all shoals and shoal indications up to a maximum number of 50. The C.H.S. Contract Supervisor shall be the authority for determining which shoals or shoal indications require a shoal examination.

9.7.2. Shoal Examination Procedure

The Contractor may use any procedure necessary to ensure that in each case the shoalest sounding has been measured, and the exact position determined and the surrounding bathymetry fully developed. On each shoal, a lead-line reading must be taken and recorded in agreement with the sounder reading. On each shoal a bottom sample must be taken (9.1.3.)

9.7.3. Inking of Shoals

The shoal sounding must be neatly inked in black ink on the Field Sheet. Directly below it the bottom characteristic must be inked in upright letters as in Chart No. 1. Directly above will be inked a small blue upright capital "E".

Sufficient soundings adjacent to the shoal must be inked to ensure that the surrounding bathymetry is fully and accurately developed.

9.8. Submerged Cables

The Contractor will fix the location of the shore end of submerged cables and plot them on the Field Sheet as per Chart No. 1 symbols.

10. SHORELINE

The Canadian Hydrographic Service will supply a separate plot of the shoreline, drawn on the Field Sheet scale and projection. The Contractor shall be responsible for confirming the accuracy of this plot from visual field inspection (notably new construction) and correcting it if necessary. The Contractor shall draw the shoreline on the Field Sheet with a fine, solid, black line.

Drying areas and foreshore details are to be shown in accordance with S.O. 70-1.

11. ELEVATIONS, HEIGHTS, CLEARANCES

11.1. Elevations

The Contractor is responsible for measuring the elevation above Higher High Water, Large Tides, of all bare islands, islets, isolated rocks, bridges, wharves and fixed aids to navigation (centre of light).

11.2. Heights

The Contractor is responsible for measuring the height of all fixed aids to navigation above the ground (to centre of light).

11.3. Clearances

The Contractor is responsible for measuring the clearance of all overhead wires, cables and bridges above H.H.W.L.T.

11.4. Presentation

The Contractor will present these data on the Field Sheet using Chart No. 1 conventions.

11.5. Units

From 0 to 30, metres and decimetres must be used. Over 30, the measurement may be rounded to the nearest metre.

12. AIDS TO NAVIGATION

12.1. Fixed Aids

12.1.1. Positions of Fixed Aids

All fixed aids to navigation must be positioned to second order accuracy standards (S.O. 65-13).

Range bearings must be determined in accordance with S.O. 69-1.

12.1.2. Descriptions of Fixed Aids

All fixed aids to navigation must be described as to light, color and characteristic, daymark colour and shape, structure colour and type, elevation of light above H.H.W.L.T. and height of light above ground level.

12.1.3. Presentation of Fixed Aids

Fixed aids must be drawn on the field sheet in the same manner as secondary stations (i.e., a red circle, radius 0.07").

Elevations, descriptions and characteristics must be printed alongside the symbol with Chart No. 1 conventions.

Range lines must be portrayed as on Chart No. 1. The true bearing from downstream, determined at the front range, must be printed along each line.

12.2. Floating Aids

12.2.1. Position of Floating Aids

All floating aids to navigation must be positioned and plotted to the accuracies stated in Section 13 for Soundings (i.e., within one millimetre of the true position).

12.2.2. Description and Presentation of Floating Aids

All floating aids must be portrayed on the field sheet in black ink with Chart No. 1 symbols, with one exception: red ink shall be used for the teardrop light symbol regardless of the colour of the light.

The letters designating the colour of the aid are to be printed immediately below them. (e.g. R, B, W, etc.) Where necessary, further identification shall be printed alongside (e.g. FI R, Bell, Whistle, etc.). If applicable, the numbers or names of buoys shall also be printed alongside (e.g. Whaleback).

13. ACCURACIES

13.1. Horizontal Control Accuracy

New horizontal control required for the survey must meet second order standards as described in S.O. 65-13.

13.2. Vertical Control Accuracy

New vertical control required for this survey must meet first order standards as described in S.O. 65-13.

13.3. Water Level Data Accuracy

Water level height data may be in error by no more than ± 0.05 metre.

The time for water level data may be in error by no more than ± 5 minutes.

13.4. Elevation, Height and Clearance Accuracy

For values less than 30 meters, elevation, height, and clearances may be in error by ± 0.1 metres.

For values over 30 metres, these measurements may be in error by ± 0.5 metres.

13.5. Sounding Position Accuracy

The position accuracy of any sounding, referred to shore control, combined with the plotting error, shall be less than 1 millimetre at survey scale.

13.6. Depth Accuracy

Acceptable errors in sounding depth measurements are as follows:

- (a) 0-20 metres, ± 0.2 metres
- (b) 20-100 metres, ± 0.5 metres
- (c) deeper than 100 metres, $\pm 1\%$ of depth

14. CLEAN-UP

At the end of the survey, the Contractor is responsible for removing all his survey stations, sounding marks, tide staves, etc., from the survey area.

15. SUBMISSION OF DATA

All data collected by the Contractor during the course of the survey must be presented in approved format to the C.H.S., with the submission of the Field Sheets. All original notes, sounding rolls, boatboards, etc., must also be submitted in original form. These data will include field notes,

computations, boatboards, sounding rolls, light descriptions, control diagrams, Bench Mark descriptions, station descriptions, tide gauge records, etc.

All data must be submitted at the same time.

16. COMPLETION DATE

The Contractor must complete the survey and submit all data to the Regional Hydrographer, Central Region, Canadian Hydrographic Service, no later than December 31, 1974.

17. OWNERSHIP OF DATA

All survey data become the property of the Crown on acceptance of the survey.

18. SUB-CONTRACT RESTRICTION

Neither this contract nor any portion of it may be sub-let.

19. PERSONNEL

19.1. Qualifications

The Contractor's personnel must hold technical qualifications approximately equal to those of C.H.S. personnel in similar positions.

19.2. Acceptability

The C.H.S. may, on presentation of documented cause, require the removal of any of the Contractor's personnel from the Contract. (Possible causes may include un-cooperative behaviour, incompetence, etc.).

APPENDIX A

