Muskoka Wharf – A Collaborative Approach to Client Needs

By Tom Bunker, OLS, CLS, OLIP, P. Eng., CA

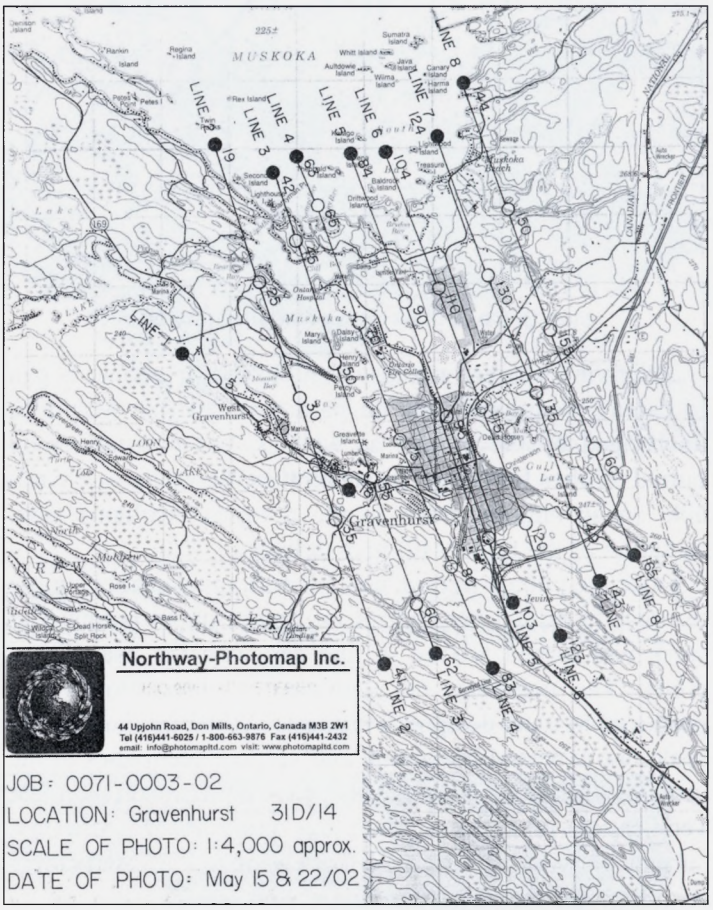
Muskoka Wharf is the name of a shoreline development that is taking shape in Gravenhurst Bay on Lake Muskoka. The wharf was a railway terminal from the 1870's to the 1950's that brought tourists and connected to steamships that plied the waters of Lakes Muskoka, Rosseau and Joseph.

The era of the automobile caused the area to fall into general deterioration. In the 1980's, the Town of Gravenhurst's Council decided to begin a program to acquire land and to resurrect the area as a Themed Destination, which would include a heritage centre and related commercial facilities, such as a hotel, residential condominiums and recreational areas. The project is a Private/Public Partnership between the Town of Gravenhurst, Muskoka Steamship and Historical Society, and Evanco/Forrec companies. Combined with Federal and Provincial funding, the project total expenditure is estimated at $100,000,000.

In April 2002, T.A. Bunker Surveying Limited was asked for a proposal to provide a 0.5 metre contour topographic survey to support the master plan development. The company had carried out several property acquisition surveys for the Town on the site and identified that over the course of development several related projects could evolve, namely: Pre-engineering Surveys, Cadastral Surveys, Construction Layout, Quantity Determination, Location of Poor Soils/Test Pits, Water Depths, Utility Relocation and Easements.

The request for the topographic data, over the 45-hectare site, was received in mid April and required a delivery date of May 25. It was decided that aerial photogrammetric mapping would best meet the project needs if new low-level photography could be obtained. The mapping was recommended to Council because it provided for coverage well outside the project limits, allowed for analysis of storm water and servicing impacts on adjoining lands and was able to capture more detail on rock ridges and built-up areas for a lower cost.

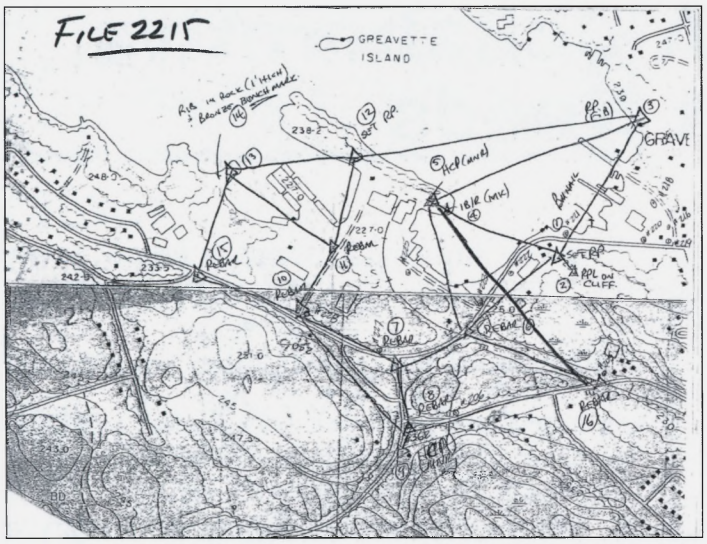
We collaborated with Northway-Photomap Inc. for the photography and mapping. Aerial photography in the scale of 1:4000 was ordered. In response to enquiries from Town staff, arrangements were made to fly the whole built-up area (Map 1), which has provided additional service opportunities as the Town's engineering consultants have requested mapping of the downtown core for streetscape and new highway entrance design and private individuals and other government agencies have required mapping for development design.



Map 1: Aerial Photo Index

The time constraints for the project were short so we carried out our preliminary ground reconnaissance and control survey while waiting for the photos to be taken. Our monumentation selection created a network of sixteen points, which were distributed to provide adequate coverage for pre-engineering detail and layout as may be required and to ensure that enough points (9) were set in rock to maintain network recoverability. (Map 2) All stations were observed in three dimensions with redundant reverse observations. Our raw data yielded horizontal positional errors less than 1 cm and no adjustment was applied. A series of engineering level loops were run to all horizontal points and to every operational fire hydrant on the site.

We adopted GSC datum vertically and located two MTO horizontal control points within proximity of the site. We adopted the UTM NAD83 value fixed for our station No.5 and held reported grid bearings and ground distances. Coordinates were reported as only thousands of metres (xxxx.xxx, xxxx.xxx) although internally we had an integrated UTM file that proved useful when extending photo control to other project sites.



Map 2: Control Network Reconnaissance

The flying weather was less than satisfactory, so we began to capture positional data on hard surfaces that would be unchanged by the project as well as 3-D positioning on buried utilities for design consideration. This data was available on an ongoing basis to the design consultants from initiation of the project till map delivery.

Once the photos were in hand, it was a reasonably simple exercise to extend our control to capture photo points. The work was turned around in one day with the use of two crews. The mapping was delivered in three blocks and produced to meet designer's requests. At the nominal photo scale, we expected horizontal and vertical accuracies in the order of 0.1 metres. These results were confirmed by on-site verification of features from our preliminary work and subsequently when contour densification to 0.25 metres was requested for watercourse re-alignment design.

The collaborative effort by Paul Francis, O.L.S., and the staff at Northway-Photomap ensured that the deliverable was produced on time and within budget.

To assist in dock design, we had conducted some preliminary level rod and "fish-finder" soundings in the bay. One of the theme aspects is the addition of a large boathouse for one of the three steamships operated by the Muskoka Steamship and Historical Society. To ensure adequate bottom clearance, we were asked to provide bottom detail to an accuracy of better than 30 cm. We discussed our requirements with John Halsall, O.L.S., whose hydrographic expertise was brought to the project. We provided a 10 metre grid control system to direct data capture on the basis that information between the observed lines would not be material for these design purposes. (Map 3) Observations were made over two days using profile data that was provided to us in a coordinate spreadsheet (.xls) that we were able to import into our base drawing. John incorporated acoustic sounding equipment that had a frequency and beam pattern, which allowed us to obtain reliable depth positioning as well as identify general and specific bottom characteristics. (fig 1)

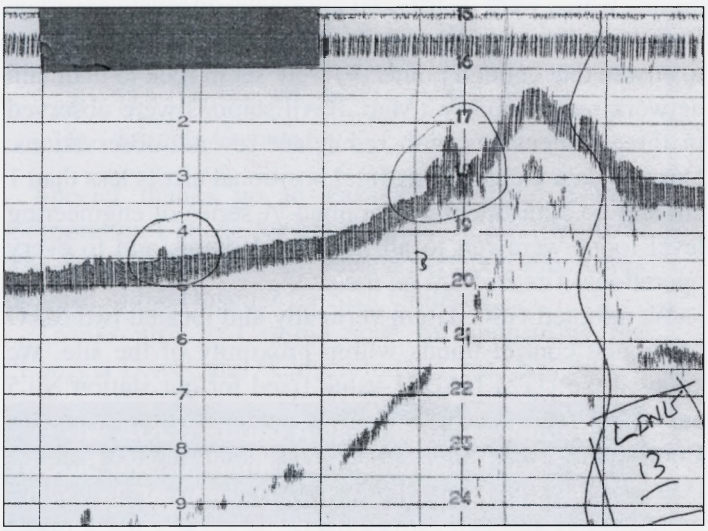
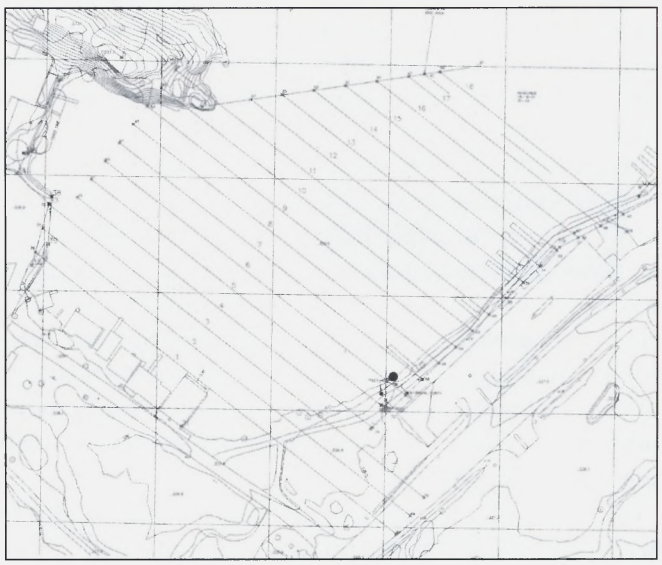


Figure 1: Example Bottom Profile

In early 2001, a contract had been awarded to bring the lands into Land Titles by way of First Application. Due to several flaws in titles and surveys dating from 1870's, the process was not completed by the spring of 2004 when the



Map 3: Hydrographic Control Grid

Town was planning to sell sites. We advised the Town that the insertion of a commercial condominium for the whole site was likely unwarranted since the Town did not require planning approval and the condominium was only contemplated as an on-going cost management process that could be accomplished by other means. After several meetings with lawyers, planners, Town managers and engineering consultants, the First Application was abandoned.

In July 2004, the first of part of the site was automated under the Registry Office modernization program, with the balance being automated in August. The aforementioned title and description issues resulted in more than a dozen PINs on the site in a variety of titles, namely Registry non-converts, LTCQ and Land Titles Absolute. As might have been expected, the PIN boundaries were in the most disad-

vantageous places for new property surveys and as this article is being prepared, we have collaborated with the Town's lawyer, Registry Office staff and the Regional Surveyor to identify and address issues that will allow the consolidation of PINs as much as possible. It was determined to be unreasonable to make LTPlus applications for the whole site as such ownership is unnecessary for the planned development and would delay construction till next season.

We have worked with the site planners to identify access and servicing easement requirements, consulting engineers and contractors to identify borehole requirements, servicing layout and as-built requirements, architects and structural engineers to identify building pile locations (150 in one building) and consulting biologists to evaluate stream re-alignment survey requirements.

Muskoka Wharf

Even though it was considered a "small town project," Muskoka Wharf required the expertise of three professional surveyors and more than a dozen professional firms, a truly collaborative approach to client needs.

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