
6. The Study Group found no evidence that the definition of boundaries by coordinates would not be accepted by the general public.

7. The Study Group found little in the experience of other Canadian or international jurisdictions which would serve to either prove or disprove the viability of a coordinate based cadastre in Alberta.

8. The Study Group finds nothing in law that would prevent the enactment of legislation enabling the creation of coordinate survey areas.

9. Significant technical development will be required to support the implementation of a coordinate based cadastre.

10. A coordinate based cadastre will not require that substantial changes be made to the cadastral system in Alberta.

11. Coordinate boundary definition potential offers a more effective, reliable and economic alternative to monumentation in urban areas.

12. The realization of the benefits of a coordinate based cadastre will depend in large part upon the implementation of an efficient and effective bureaucratic structure for the management and administration of coordinated boundary information.

To this end the ALSA should:

1. Develop accuracy and reliability standards for cadastral surveys which are consistent with the needs of end users and reflect variations in land use, property value, and the nature of the interest being defined.

2. Ensure that an accurate, reliable, accessible and effective control framework is maintained, and that a uniform and consistent implementation of the CSRS, HPN, and ACS technologies is achieved across the province.

3. Ensure that future geodetic datum revisions are effectively managed to minimize their impact on the cadastre and avoid the confusion and loss of confidence that would inevitably result from frequent or large changes in coordinate values.

4. Encourage the development of a GPS infrastructure providing accurate real-time access to the geodetic reference framework.

5. Develop standards for GPS reference stations in consultation with service providers.

6. Encourage and provide opportunities for continuing professional development to ensure cadastral surveyors are able to keep pace with technology.
4. The ALSA initiate a multi-agency steering committee to design and manage a pilot project directed toward developing a suitable working model for an urban coordinate layer, testing it under everyday working conditions, and gathering the information required to properly assess the merits of a permanent implementation.

The report of the Study Group was distributed to the ALSA membership and the cadastral community for comment and feedback. In the autumn of 1999, the Study Group was asked to prepare a proposal for a test project for submission to the membership. A proposal was submitted to Council in February of 2000, and was subsequently debated and approved by the membership at the Annual General Meeting in April of 2000.

Scope of The Test Project

The scope of work of the coordinate cadastre test project included the following elements:

1. An investigation of monument survival in urban subdivisions to quantify the extent of monument loss and the effectiveness of delayed posting.

2. A survey of land surveyors and the development community to examine current industry practices in urban subdivision development with respect to the use and effectiveness of delayed posting.

3. The collection of survey data and stakeholder feedback in two monumented and two coordinate based subdivisions over a five year period.

4. Liaison with Council and other ALSA committees to follow up on the technical, legislative, and data management issues identified in the Study Group Report.

Tasks 1 and 2 were intended to expand on the earlier investigations of the Study Group and the University of Calgary which indicated that up to half of urban monuments were destroyed in the initial subdivision development process, and that delayed posting was only marginally effective in improving monument survival.

Feedback would be sought throughout the test period from stakeholders involved in land development and surveying within either subdivision.

The purpose of Task 3 was to collect real world comparative data reflecting the costs, efficiency, and reliability of surveying under the monumented and coordinate regimes. Approval was sought from the Director of Surveys to extend the delayed posting period for the subject subdivisions to five years to allow an analysis of the impact of not monumenting parcel corners on subsequent survey and land use/development activities. Pairs of subdivisions would be sought in Calgary and Edmonton so as to encompass a representative range of survey conditions and institutional factors. Feedback would be sought throughout the test period from stakeholders involved in land development and surveying within either subdivision. These would include surveyors, the municipality, the utilities, the developer, and landowners. The goal of the information gathering process was to compare the time and resources required to complete similar types of surveys in both types of subdivisions such as building stakeouts, utility surveys, RPRs and re-subdivisions. Information would also be sought concerning the nature and frequency of occurrence of boundary uncertainty problems.

The test project was also to provide a focus for the discussion of regulatory and technical issues, and for the development of straw man standards and procedures to support survey operations in a coordinated area. Under Task 4, the CBC Test Project Steering Committee would make specific recommendations to Council concerning the issues to be addressed by ALSA committees.

Funding for the Test Project was secured in October of 2000. The project was underwritten by the Alberta Land Surveyors’ Association, the Alberta Real Estate Foundation, the Municipalities of Calgary and Edmonton, the Director of Surveys, and Natural Resources Canada Legal Survey Division.

A steering committee comprised of members from the ALSA, the Director Of Surveys Branch, and the municipalities of Edmonton and Calgary was formed to direct the project and report to Council. Dr. Brian Ballantyne and Mr. Khaleel Khan of the Cadastral Studies Group at the University of Calgary were contracted to undertake the investigations. Work commenced early in 2001. A report finalizing the outcomes of Tasks 1, 2 and 4 was submitted to Council in December 2001. Task 3, the monitoring of test subdivisions over a five year period, does not appear to be feasible at this time.

Monument Survival in Urban Subdivisions

The Study Group concluded that the high rate of destruction of urban lot corners in new subdivisions represents a serious limitation to the effectiveness and integrity of the monumented cadastre. Task 1 of the Test Project involved a more thorough investigation of the extent of monument loss in Calgary and Edmonton. This work was to expand on an initial investigation by Dr. Ballantyne of Calgary subdivisions. The expanded investigation included subdivisions from both Edmonton and Calgary, subdivisions that were posted prior to development (immediate posting), as well as subdivisions posted at some later stage of development (delayed posting).

A total of 26 subdivisions were inspected. Fifteen of these were in Calgary, and eleven were in Edmonton. Fifteen of the subdivisions were
delayed posting subdivisions. All of the subdivision plans were registered between 1989 and 1998. The subdivisions ranged in size from a few lots to 150 lots, with most falling in the 50-100 lot range. The subdivisions were well distributed spatially, and involved several land surveyors and developers.

Approximately 750 lot corners were searched for. A typical search involved measuring to the corner location and performing an electromagnetic scan. A positive scan return was recorded as a “detected” monument. Monuments that were obviously problematic for scanning were exposed for confirmation. In addition, approximately 20-30% of the detected locations were exposed and inspected to determine monument condition and look for evidence of disturbance.

Looking first at the entire sample in aggregate, 74% of the lot corners searched for were “detected,” and 95% of the detected monuments which were exposed and inspected were judged to be “acceptable” or “intact.” Assuming that the 5% judged disturbed holds for the entire sample yields a projected global “reliability” rate of 70%.

As expected, the reliability of the delayed posting subdivisions was better than those subdivisions which were posted prior to development. The reliability rate for immediate posting subdivisions was virtually the same in Edmonton and Calgary at 59% and 62% respectively. The reliability rate for delayed posting subdivisions was 68% in Edmonton, and 78% in Calgary.

Consultation With the Survey & Development Community

Task 2 of the Test Project sought further information from land surveyors, municipalities, utilities and developers concerning their perceptions of the extent, causes and impact of urban monument destruction; their usage and practice with respect to delayed posting; and their views on monumented versus coordinate defined boundaries.

A typical search involved measuring to the corner location and performing an electromagnetic scan.

Questionnaires were distributed by e-mail to all Alberta Land Survey firms, as well as, 17 municipalities, 112 members of the Urban Development Institute, and 5 utility companies. The questionnaires were followed up by telephone. In all, responses were received from approximately 60 Alberta Land Surveyors, 4 municipalities, 8 developers, and 1 utility. The following general observations can be extracted from the responses:

Urban Monument Destruction:

• The estimates of urban monument loss provided by surveyors confirmed the findings under Task 1. The typical estimate provided was of the order of 30-40% of urban monuments are destroyed by construction activities. Delayed posting is perceived as reducing the rate of monument loss.

Delayed Posting Practices:

• Approximately 70% of ALSA respondents indicated that they employed the delayed posting provision of the Surveys Act, and that they employed delayed posting in approximately half of their subdivisions. Delayed posting was typically used in “larger” subdivisions. The principal benefits were perceived as speeding transfer of title, providing flexibility in the timing of posting to suit weather and ground conditions, and reducing the impact of major construction activities on monument destruction.

• The majority of surveyors indicated that they prefer to post lot corners after the installation of utilities and sidewalks, but before foundation staking, fencing and final landscaping. However, there are frequent exceptions. Most notably, shallow utility companies (gas, electricity, telephone, cable) often require posting prior to utility installation.

• The developer, builder, and utilities often employ different surveyors. In such cases, the surveyors for the builder and shallow utilities typically ask the developer’s surveyor to post lots prior to foundation or utility staking. A number of surveyors voiced the concern that extending the delayed posting period, or implementing a coordinate only approach, would download significant additional cost and liability onto the surveyors providing foundation or utility staking. On the other hand, several surveyors noted that they do routinely perform staking from control when working within their own subdivisions.

• Delayed posting typically occurs within 4-6 months of plan registration. The majority of surveyors responding felt the current one year limit is adequate in most circumstances, and noted that extensions are easily obtained if required.

Coordinates Versus Monuments:

• The responses received from all sectors indicated a strong preference for monumented boundaries.

• All groups voiced the concern that coordinate defined boundaries would limit the ability of landowners to determine the extent of their parcels.

• There are clear concerns within the survey community that the current control infrastructure would not support economic survey operations in a coordinate based cadastre, and that given the present cost of GPS equipment and the declining network of monumented coordinate control, an early implementation of a CBC would add a substantial integration cost to surveys.

• The majority of surveyors indicated that they felt it would still be necessary to place temporary marks at lot corners even if posting were not required.

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