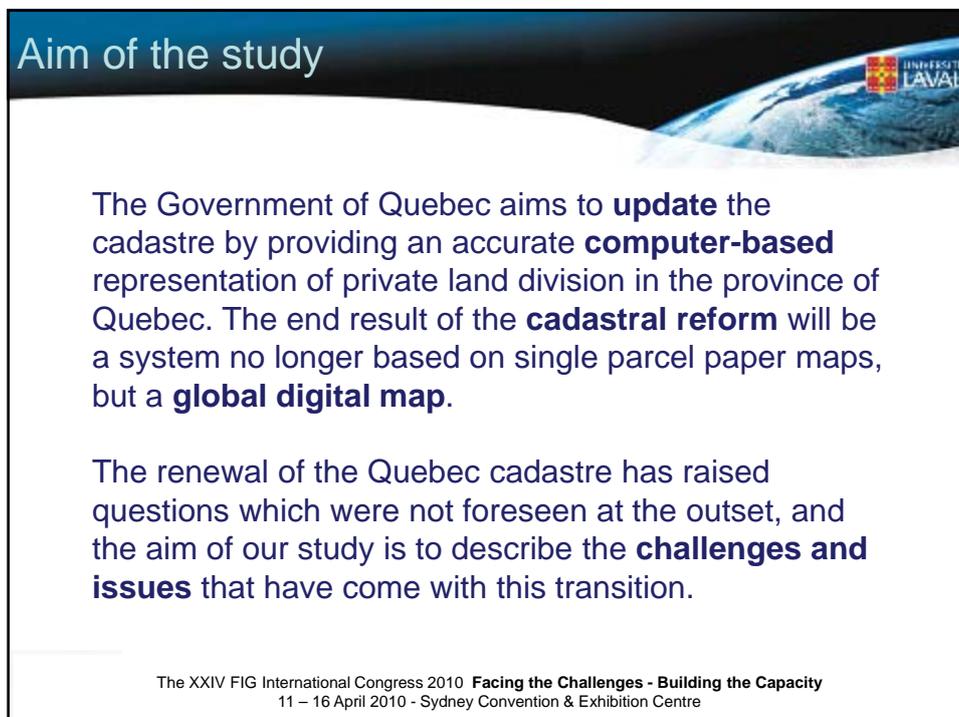


**From Parcel to Global Cadastre: Challenges and Issues of the Post-Reform Quebec Cadastre**

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### Aim of the study

The Government of Quebec aims to **update** the cadastre by providing an accurate **computer-based** representation of private land division in the province of Quebec. The end result of the **cadastral reform** will be a system no longer based on single parcel paper maps, but a **global digital map**.

The renewal of the Quebec cadastre has raised questions which were not foreseen at the outset, and the aim of our study is to describe the **challenges and issues** that have come with this transition.

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## First attempt to reform



The Quebec cadastre has existed since **1860**, but it contained inaccuracies. The Government of Quebec began to prepare a new cadastral map in **1985**. Problems concerning the fact that there were **no legal dispositions** to make the correlation between former descriptions of land in titles and the new cadastral image of the parcel arose. In **1991**, the Government of Quebec halted the reform process.

After some adjustments (particularly the decision to develop a cadastral database), **the reform resumed in 1992** under the responsibility of the Ministry of Natural Resources and Wildlife. About **3.7 million** lots are targeted for computerization on the provincial scale by the end of the reform process (previewed for **2021**).

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## Cadastral law



The new cadastral map is now based on the juridical decisions of the **Quebec Civil Code** and in particular on the article 21.3 of the **Cadastral Law**, which states that the renewed map and its modifications have to be produced in **double copy**: the first one is computerized (which is considered as the original one), while the second one is the written version of the former.

The end result of cadastral reform will consist of a **digitalized, georeferenced and constantly updated** cartographic global map of land divisions.

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## Reform objectives



The main objectives of this reform program were:

- **Cadastral renewal:** it is a major operation which aimed to renew the cadastral map by registering any parcels not already logged and correcting any errors or anomalies.
- **Regular updating:** the map must be updated after each operation that modifies land parcels.
- Creating a **multipurpose cadastre:** it would be useful to different users, in particular municipalities and ministries.

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## Legal presumption of concordance



The computerization of the cadastre led to the installation of the **cadastral data management system**. This system guarantees the integrity and update of the cadastral database, which consists of **descriptive and geometrical data**.

However, this gain in precision could result in **differences** between the descriptions contained in the land titles and the cadastre. To avoid the need for a legal judgement to correct the land titles, the legislator established a **legal presumption of concordance** in order to minimize the legal consequences of the reform on the ordinary citizen.

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## Coordinates



**Plane Coordinates System of Quebec (SCOPQ):** each lot (polygon) in the database is represented by a set of pairs of coordinates. The files of the cadastral map produced by the land-surveyors must respect certain **technical standards** (e.g. the coordinates must be registered in the files with a minimal resolution of 0,0001 meters).

Coordinates have **no legal value**.

These technical standards are not linked to lots limits or measurements.

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## Limits setting



The coordinates are displayed in the database only for **technical considerations**: being used as map support by allowing the lots representation. Thus they are not autonomous data.

“The limits of a property are determined by **the titles, the cadastral maps and the land occupation**” (Art. 977, Quebec Civil Code).

The coordinates obtained from the cadastral map are useful elements for the delimitation. However, they must be confronted with the physical and legal **reality** of the lands.

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## Graphic tolerance



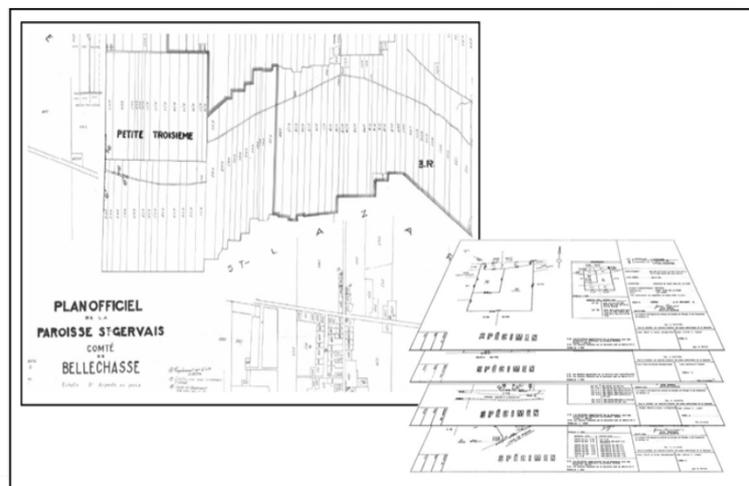
The new technical concept of **graphic tolerance** was defined. It allowed the cadastral registration of measurements differing from those shown on the map.

These differences had to respect an **order of magnitude** established according to the scale of creation of the cadastral map. E.g., the maximum difference between the registered linear measurements and those calculated using coordinates would be 21 centimetres for a scale of 1:1000.

Consequently, the **official measure is the one that appears digitally on the map**, and not the one calculated from the coordinates of each lot corner.

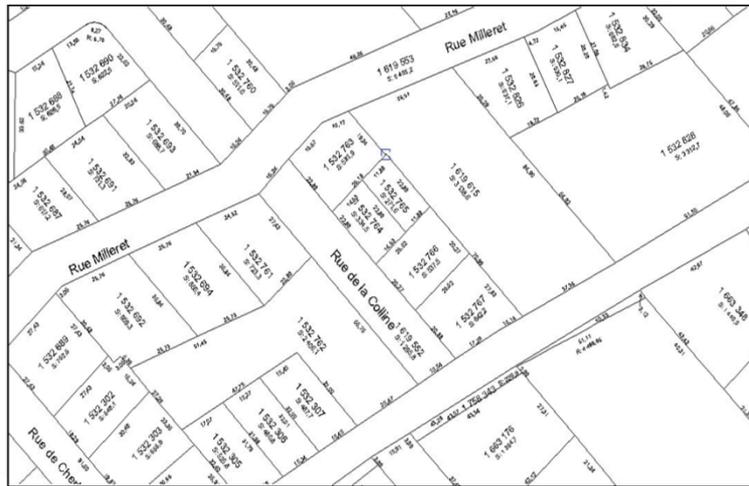
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## Original map and parcel plans



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## Extract of the global cadastral map



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## Standards



A global cadastral system requires the establishment of geometrical and **geospatial quality standards** for the data (i.e. the shape, dimensions and positioning of the elements of the cadastre) in order to gain **coherence and fidelity**. The result is a certain rigidity, but on the other hand favours a greater overall coherence of the cadastre.

In 1999, standards for the presence and distribution of **ground control points** were developed in order to validate the correspondence of the cadastral map with the physical reality of the subdivisions.

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## Cadastral framework



A **global** cadastre represents the overall land subdivisions of a territory by modelling the lots in their relative positions.

Subsequently, modifications to one lot necessarily imply **modifications to neighbouring lots**.

In the past, nearby parcels were not accurately mapped and created in reciprocal overlapping. This anomaly could not always be detected when the lots were being defined, because the work of the land-surveyor was not based on an **overall view**.

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## Land-surveyors activity



The effects of the new cadastral system on the professional activity of **land-surveyors** were not entirely identified and estimated.

In Quebec, land-surveyors are **the only professionals who are legally qualified** to carry out cadastral operations. As a result, a future consideration will be the definition of their **role** in case of a mismatch between their opinion and a cadastral representation.

The biggest dilemma is the real **influence** that the cadastre exerts **on professional activities**.

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## Influence in professional activity



The preparation of a certificate of localization must contain land-surveyors comments and opinions on **discrepancies** between three realities: **a legal reality** (land titles), **a factual reality** (occupation) and **a cadastral reality** (the lot).

The Quebec cadastre **is not a legal cadastre** and does not set property limits. In all cases, the land-surveyor cannot ignore its existence when surveying private properties.

Indeed, the Quebec cadastre is defined in the context of the publication of property rights: the cadastral registration is an **indispensable condition** in their publication.

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## Surveyor's opinion



The surveyor's opinion about a building's delimitation can differ from the cadastral lot, as represented on the map.

Major concerns of the land-surveyors come to light:

- How to analyze the **conformity criterion** (or variance) between a professional opinion on the delimitation of a building and the corresponding cadastral lot?
- What is the **critical point of this criterion** (when to take into account or ignore the variance)?
- What are the **legal repercussions** of an opinion that notes a variance between a building and its cadastral representation?

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## Discussion



Many **debates and discussions** are foreseen in the next few years on these questions situated at the heart of the land-surveyor profession.

The problem could be summarized by the following **question**:

can the land-surveyor **arbitrarily modify** the geometrical configuration of cadastral lots in order to make them **correspond to the opinions** that he issues on the delimitation of the buildings?

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## Future perspectives



A massive operation like the cadastral reform is not perfect to the smallest detail. Political and economic requirements provide the framework for establishing quality standards for the reform. **The land-surveyors** must be the **major players** in this process.

The cadastral reform already shows promise for future challenges and correction mechanisms for the cadastral map already exist. These will have to be implemented in order to **reduce waiting periods**.

It is also necessary to foresee the possibility of an **increase in requests** over the next few years, as cadastral reform progressively advances.

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## Conclusion



Some difficulties experienced by land-surveyors are not caused by errors in the map, but by the need to obtain **higher quality cadastral data**, especially in areas affected by the use of graphic tolerances. This challenge represents a corollary in the global map, namely a **constant search for higher coherence and fidelity** between the cadastral map and land properties.

Finally, we can hope that such improvement mechanisms will make it possible for the Quebec cadastre to become an instrument that is more supportive in the activities of **land governance, protection of rights** and proper functioning of the **real estate market**.

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