

Archeology, GIS, and Urban Planning in Québec City

The initial control of archeological resources in Québec City was concentrated within the city's Historic District, listed as a UNESCO World Heritage site in 1989. Paper-based management tools assuring the protection of the city's archeological sites were consequently restricted to this territory. By the mid-1990s, the City and its partner, the provincial Culture and Communications Department, had extended their authority to all parts of the municipal territory.¹ The management tools developed to integrate historic-period archeological sites into the urban planning process were developed as a geographic information system (GIS). The new system is designed to identify potential sites² as part of the mitigation process and to formulate development strategies in the daily operations of a municipal urban planning department.

A major characteristic of the system is the method in which four computerized processes are integrated. Image correction software (Microstation Descartes 2.1[®]) is used to adjust scanned historic plans to the geodetic base plan of the modern city.³

Efforts have concentrated on three approximate scales: plans covering the municipal territory (approximately 1: 20,000); an intermediate neighborhood level scale (approximately 1: 4,000); and, large scale plans at the site level (1: 250 or greater). The individual components of scanned and corrected plans are redrawn as geographically-referenced shapes with CAD software (Microstation 95[®]). Each shape must be numbered and indexed to cross-reference it to the third component, an alphanumeric database (Microsoft Access 2.0[®]) containing two general types of information. The first of these, a classification of the individual components of each historical plan, is essentially descriptive and serves as a research tool. The latter, primarily a management tool, synthesizes this information and consigns the archeologist's observations and comments. The use of mapping software (MapInfo 4.01[®]) capable of integrating cartographic and alphanumeric data constitutes the final component of the system. This software plays a dual role serving both as a graphic interface and as a communications tool to produce edited plans. Thus, it is possible to obtain informa-

tion either geographically by selecting the desired part of the territory from the current geodetic base plan or thematically by querying the database. Results obtained by either one of these procedures can be electronically stored or printed as hard copy.

Another characteristic of the system is the intensive use of historical cartography. This is possible in an administrative and military center such as Québec City where numerous high-quality maps have been produced since the city's founding in 1608. The system is designed to be used in conjunction with

Historic plans are scanned and adjusted to the contemporary geodetic city plan with the use of image-correcting software. This adjustment will correct errors posterior to the plan's production, such as optical distortion during the photographing of an archived plan, but will not correct errors made by the original surveyor or draughtsperson. Seen here is a section of Chaussegros de Léry's 1727 plan of the Parliament Hill district. Photo by Robert Greffard, Ville de Québec.



Once adjusted, the content of the historic plan is redrawn as a series of geographically-referenced shapes indexed to a database describing each individual element. This map is part of the Parliament Hill district management plan. Drawing by Lise Grenier, Ville de Québec. Photo by Robert Greffard, Ville de Québec.

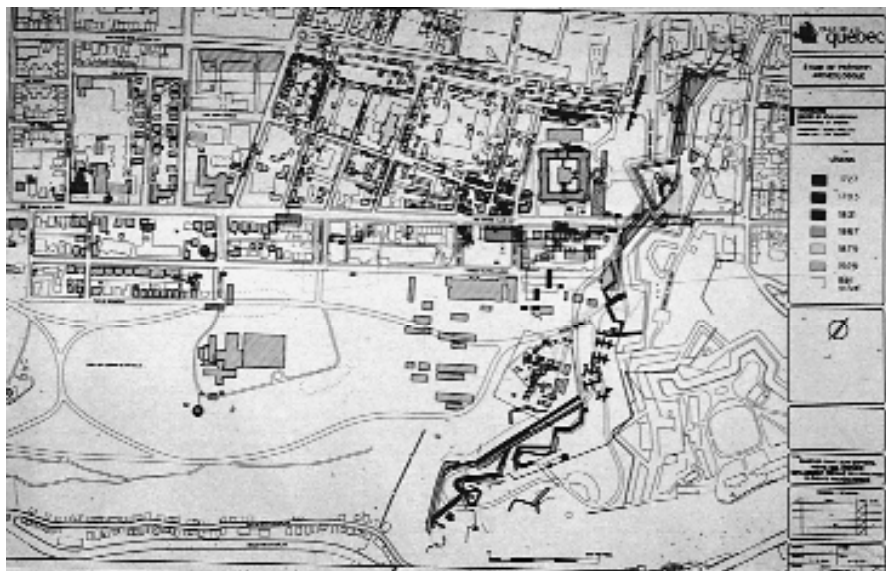
the city's built-heritage database which provides contextual information and site-specific data for individual properties. The system can be combined with other data available on the city's corporate GIS system, such as utility distribution networks, road networks, or the park system.

Conversely, the system is quite efficient as a communications tool. Data can be readily inserted into technical specifications for planning and engineering projects or rapidly edited to transmit selected information to other players in the planning process: professionals within the municipal administration, elected officials, other agencies, or rate-payers and property owners.

The system has been used in several contexts and at every possible scale with considerable success. Striking examples include the development of a management plan for the Parliament Hill district in the Upper Town and the mitigation of a sewer construction project in the Lower Town's waterfront.⁴ The system is open-ended; it is meant to be utilized in conjunction with new projects, whatever their scale or specific needs. Its use is cumulative and every new project expands the content of the general system and enriches our knowledge of the city's archeological heritage. This represents a considerable advantage over paper-based systems which are exceptionally difficult to modify or to expand upon in the face of new demands.

One point has become evident in all cases where the system has been employed: this is a tool designed to be used by qualified archeologists with proficient knowledge of the cultural resource area. For example, the analysis of the content of historic maps requires an excellent knowledge of the history and geography of the territory to select and accurately interpret plans. Professional expertise is also required in order to formulate appropriate recommendations and to ensure they are effectively applied in the specific operational context.

The flexibility, precision, and cost-effectiveness of the system have, none-the-less, proven its usefulness as both a management and research tool. In light of this, its use has been extended to the Historic District and, once completed, will cover all of the municipal territory. All current projects, managerial, mitigative, or research-oriented, both use and enrich the archeological heritage GIS.



Notes

- 1 PLURAM, Inc., *Étude de potentiel archéologique et analyse des composantes architecturales du Vieux-Québec* (Québec: Ville de Québec, Service d'urbanisme, Division du Vieux-Québec et du patrimoine, 1984).
- 2 A separate system, not described here, was developed for the Amerindian palaeohistoric occupation of the territory.
- 3 Sue Smith, "Future Tools for Managing the Past." *Microstation World 2*, no. 3, (1996): 32-35.
- 4 The management plan developed for the Parliament Hill district of the City is the most comprehensive example of the standardization of this information. See, Serge Rouleau and William Moss, *Évaluation du potentiel archéologique du quartier Saint-Jean-Baptiste, partie sud* (Québec: Ville de Québec, Service du centre de développement économique et urbain, Division design et patrimoine, 1998).

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