The Alleyway Project

By David Lamont, O.L.S. and Dasha Page, O.L.S.

Overview of Problem:

In 2001, the City of Hamilton amalgamated with the historic centers of Ancaster, Dundas, Flamborough, Glanbrook and Stoney Creek and became the tenth largest municipality, by population, in the country. This merger provided for a single administration of sustainable services and municipal infrastructure over 112,000 hectares of property between the beautiful Niagara Escarpment and the bay of Hamilton.

An Asset Management solution provided by Hansen Technologies was adopted to manage the linear infrastructures, such as water, sewers and road maintenance in 2002. This improved the delivery of public services to residents of the newly formed city. Hansen was developed to give city employees the capability to access work orders, customer service requests and asset groups, which allowed quicker response to customer requests and built a larger inventory of assets. All the assets in Hansen are assigned an identification number and are tracked based on that unique ID number. Each feature has a spatial component, either point line or polygon.

However, alleyways seemed to be orphaned and in many cases were left completely unaccounted for. Prior to amalgamation, the six communities all had different approaches to tracking or recording the status of alleyway maintenance. Some had created individual files for specific alley projects. Others marked up maps with references to by-laws passed to maintain certain alleyways and the status of surface conditions existed yet again somewhere else, spread across multiple departments and office locations around the city.

The City of Hamilton needed the same one stop source to answer all the questions that pertain to public alleyways that Hansen already provides for other assets. The challenge was to assemble all this data into a single database that could be placed on the City website or imported into the Hansen system. Having a central database would allow different departments within the City access to all the available information resulting in increased productivity and better maintenance decisions.

The City of Hamilton consulted with Mackay Mackay & Peters Limited (MMP) to determine the scope of the work and processes required to assemble the alleyway data in the most efficient way, while maintaining data accuracy and the City of Hamilton's applications. A unique solution was designed in a few meetings between the City of Hamilton, MMP and MMP's GIS specialist TTB Consultants.

Solution Opportunity:

As a starting point, a custom Land Registry data extract was obtained from Teranet. This extract included title information related to all potential "Roads, Alleyways or Lanes" within the City, accompanied by the parcel polygon data for the related parcels. However, the raw data provided too many false positives, identifying some 13,000 parcels as having met the criteria. Effort was exerted to parse information from the legal description to note instruments or documents which may reference by-laws, closures or restrictions related to the Alley. As detailed research on a parcel by parcel basis would take the project well past its delivery commitment, it became clear that a further prioritization and categorization of the affected parcels would be required to focus energies only on those parcels requiring physical research.
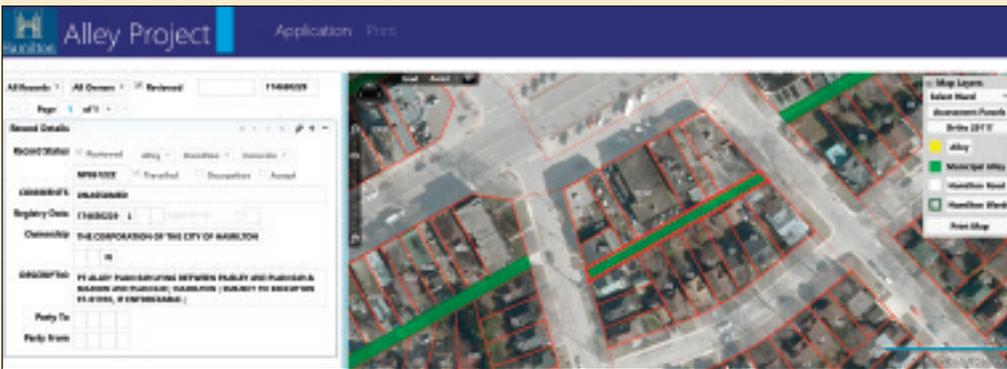
Method:

The Land Registry information was combined with data from the City of Hamilton's GIS system (Road Layer, Parcel Layer) and incorporated into a Microsoft SQL Azure cloud environment. The environment allowed data mining and data correlation techniques to be applied to the data using both attribute and spatial processes which categorized the data. The categorization took the 13,000 records down to a manageable 600 records. These 600 records were potentially Alleys within the City but more detailed research and analysis needed to be done to authoritatively define their status.

To review and analyze the records, a web application was created that facilitated field editing over the web. The City deployed a web interface to support updating or modifying the records in the field through a set of basic mapping functions. This online database was accessed by MMP to update the records while the City's staff were able to view the

pooling their efforts and devoting their unique expertise to the task while still maintaining a mutual approach to its completion. A surveying company pressed into action to achieve satisfactory results without performing field work, combined with a technology-based company that could quickly assimilate data from multiple sources and modify their application to facilitate viewing and updating information on the fly, was the perfect combination supported by City staff who were more than capable of sourcing raw data to actualize qualitative precision.

The net result is 530 City-owned alleys and 89 privately owned alleyways. The next steps are to load all of these features into Hansen's system and finalize the attributes and start processing work orders.

We are all happy to say that this project was completed in a timely manner and within budget.

changes and monitor the progress of the project in real time. By providing both the information and mapping in a read/write environment, it allowed those involved in the research and information gathering process to take advantage of GIS technology.

Results:

Key to the success of the project was the filtering of the initial record set to fewer than 600 candidate alleys and the rapid inspection and update 'feedback' provided by MMP. By combining the Assessment Parcel with the Ownership Parcel that is tied to the City's own Roads index allowed the City to create and distribute the work with a healthy dose of automated analysis against the legal description. The application was customized in an iLOOKABOUT GeoViewPort[i] environment with the data records, available orthoimagery and StreetScape[ii] imagery, to create a desktop review platform that provided the City and MMP with the necessary tools to expedite and validate the project. The StreetScape imagery proved to be an excellent tool in reducing the number of site inspections required. MMP subsequently accessed supporting information such as By-Law maps, title registers and title documents from within Hamilton's environment to complete the database.

The project is a successful example of a creative collaboration. All of the companies played an important role in this consortium by

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Aiding in the project was MMP's GIS consultant, **Tim Hu,** the principal of TTB Consultants Inc. Tim's role was to organize the data and design the web application around the project. Contact Tim at **tim.hu@ttbconsultants.ca**

[i] iLOOKABOUT is a geo-coded image product that helps any commercial enterprise explore, map and manage their world with visual data they can trust for accuracy and integrity and has also launched GeoViewPort™, a web-based Geographic Information System (GIS) application that enables the federation of additional value added data such as validated addresses, aerial imagery, property values, property attributes, etc. with StreetScape imagery.

[ii] iLOOKABOUT is a pioneer in visual and data intelligence with its StreetScape™.