

HOW CAN MUNICIPALITIES USE GIS? GIS has been in use at municipalities for several decades providing accurate parcel mapping to city planners, tax assessors, and engineers. While GIS was seen as a purely internal resource for many years, municipalities are now using their GIS to communicate spatial information to a growing number of constituents. Municipal leaders are constantly seeking to attract new commercial ventures and new developments, with the aim of generating additional tax revenue. An accurate, up-to-date, intelligent city model can assist city leaders in their efforts. And, of course, a GIS can form the basis of an accurate cadastral fabric for raising city taxes. A new trend with 3D city GIS is to use the GIS to provide a virtual environment in which to explore the city – this helps attract tourists and therefore enhances revenue generation within a city, e.g. taxes on hotel stays and sales taxes on food.

DATA MANAGEMENT IS A KEY ISSUE WITH MUNICIPALITIES. WHAT SOLUTIONS DOES BENTLEY OFFER? Data management is a key issue in many areas of business. Particularly in a municipal government, managing large volumes of legal documents, drawings, and other miscellaneous data can be an extremely daunting task. Many municipalities have tried to use a GIS independent of content management systems but this brings many problems

Snehal Kumar Bokare shares his thoughts on how GIS solutions can make a difference to municipalities and shape them to perform better

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Empowering municipalities to perform better

with data accessibility. With Bentley's ProjectWise, the gap is bridged. All data, regardless of the type or format can be safely managed using an easy-to-use, familiar user environment. Utilising ProjectWise, municipalities can spend less time searching for information and more time in more critical areas of business. Also, Bentley's GIS solutions leverage existing data such as Oracle Spatial or ArcGIS. There's no need to create new data or transform data which makes these products

highly cost-effective. Data can be used in its native format in most cases, including popular formats like GML and CityGML. With Bentley Map's newly announced integration with Safe Software's FME product, it is possible to access almost any form of data with complete fidelity. Bentley follows a strategy of interoperability which means that we expect Bentley software to coexist with other software platforms and data formats – and interoperability means cost-effectiveness because

you can leverage your existing investments, avoid data silos and challenges with the fidelity of data used in the GIS.

HOW CAN MUNICIPALITIES USE GIS TO MEET THE NEEDS OF A GROWING POPULATION, AGEING INFRASTRUCTURE AND EXPANDING CITIES? A GIS can help city planners identify areas that can support additional population growth. Smart growth requires a comprehensive investigation into the existing infrastructure, current

zoning configuration, transportation system, and more. In many instances, a municipality can quickly review and analyse all of these considerations using a single, thematic map. These maps can uncover preferred locations for city expansion.

Just as important as population growth, infrastructure management is a leading concern for many established municipal governments. While roads and bridges can be visually monitored and maintained, underground infrastructure is often considered "out of sight, out of mind". Maintaining these subsurface assets requires a more complex approach to ensuring that they are operating optimally. A GIS can be used to map and document infrastructure assets, both above and below ground, which aids in identifying and maintaining all infrastructure. One of the most powerful features of a GIS is the ability to easily search and locate assets based upon an attribute. One such attribute used frequently in infrastructure management is "install date". GIS queries can be run against this criterion to determine which assets should be replaced first. Other attributes that contribute information to a maintenance schedule can be found in the asset's performance history, customer complaints records, and past inspection reports. GIS can tie all this information together to responsibly maintain a city's ageing infrastructure.

Bentley's GIS solutions support not only 3D city GIS implementations, but also the management of water, wastewater, electricity and gas infrastructure in an integrated manner.

WHAT ISSUES ARE ENCOUNTERED WHILE IMPLEMENTING MUNICIPAL GIS IN A DEVELOPING COUNTRY LIKE INDIA?

The fundamental challenges include both asset identification and system management or maintenance. GIS adopters have typically taken one of two approaches to system creation: convert existing paper records to GIS using scanned drawings or text descriptions, or create a GIS slowly over time adding new data as it becomes available. Mostly commonly, a hybrid approach to these methods is employed due to inaccuracies found in historical data or compatibility issues. Regardless, the challenges faced in developed regions have been successfully overcome and the rewards have been proven. In other regions of the world, advanced GIS implementations have been achieved using a combination of photogrammetry and ground surveys to quickly acquire data and to build a working GIS.

A ONE-SIZE-FITS-ALL SOLUTION CANNOT BE OFFERED FOR ALL MUNICIPALITIES. HOW DOES BENTLEY TAILOR ITS SOLUTIONS TO MEET THE VARYING REQUIREMENTS OF DIFFERENT USERS? We have several unique products, solutions, and

subscription packages available to support any size of organisation, from the small municipalities to large national governments. Bentley treats each client opportunity individually and proposes the appropriate products and solutions that make sense for each need. Several considerations are taken into account when proposing a Bentley solution. Our goal is to help organisations engineer and manage their infrastructure by providing the right software and configurations for our users. One innovative programme that is available to municipalities is our Enterprise License Subscription for Municipalities (ELSM) which gives a municipality access to the entirety of Bentley's software for a fixed annual fee based solely on the size of the population. This makes it very cost-effective to use Bentley software, even for small organisations. More than 50 municipalities around the world take advantage of this program.

HOW CAN AN ENTERPRISE GIS APPROACH BENEFIT MUNICIPALITIES? The days of departmental data are coming to an end. It is just not an efficient way of sharing data within larger organisations. Enterprise GIS solutions from Bentley enable multiple departments and users to access information on a permissions-based basis. Bentley's approach is to give access both to structured data such as enterprise spatial data repositories and also to support access to

unstructured data such as Microsoft Office and PDF files. Bentley has been working with Oracle for over a decade and we also support ESRI's ArcGIS through the Bentley Geospatial Server and our ProjectWise Connectors. The key here is to ensure that the municipality can leverage their existing investment in data stores without having to re-create data.

WHAT ARE THE CRITICAL SUCCESS FACTORS FOR A MUNICIPAL GIS IMPLEMENTATION?

Most municipalities are looking for the same thing – a well-managed and properly executed GIS implementation that covers all the bases with interoperable software. With Bentley, all of the main functions of a GIS are well supported for data capture (Bentley PowerMap Field), data editing (Bentley Map), image management and document conversion (Bentley Descartes), access to enterprise data repositories (Bentley Geospatial Server) and web publishing (Bentley Geo Web Publisher). Frequent communication among project team members and senior executives reduces project risk and promotes the visibility. In addition to the training provided during a project rollout, Bentley continually provides users access to training and professional product support. A successful GIS project implementation requires a through transfer of knowledge. 