

# BERKSHIRE PLANNING TOOLS



One in a series of “toolbox” items to accompany the Regional Plan for the Berkshires

June 2001

## Small Town GIS

### What is GIS?

Geographic Information Systems (GIS) are quickly becoming a staple of our times. Defined broadly, GIS is a computer-based system “for capture, retrieval, analysis, and display of spatial (locationally defined) data.” The essential elements in this definition for local governments are “spatial” and “analysis”: where are things, why do we want to know about them, and how can our community use this information to make better decisions?

GIS is a system of computer software, hardware, data, and personnel to help manipulate, analyze and present information that is tied to a specific location on the earth. Aspects of GIS include:

- **spatial location** – usually a geographic location
- **information** – visualization of analysis of data
- **system** – linking software, hardware, data
- **personnel** – a thinking explorer who is key to the power of GIS

GIS applies modern computer graphics and database technology to the efficient, cost-effective management and planning of the local government’s assets. It provides enhanced capabilities for data storage, retrieval, and analysis. GIS does this by linking (1) maps and (2) databases. This marriage lets us easily

explore the relationship between (1) location and (2) information.

The real key for small town governments is that GIS quickly integrates *information with location*. Through its use of computer technology, GIS provides a better, faster, easier way for local officials to find answers to questions and carry out analyses based on spatial relationships.

### Information—the Heart of GIS

The old adage “better information leads to better decisions” is true for GIS. GIS is not just an automated decision making system but a tool to query, analyze, and map data in support of the decision making process.

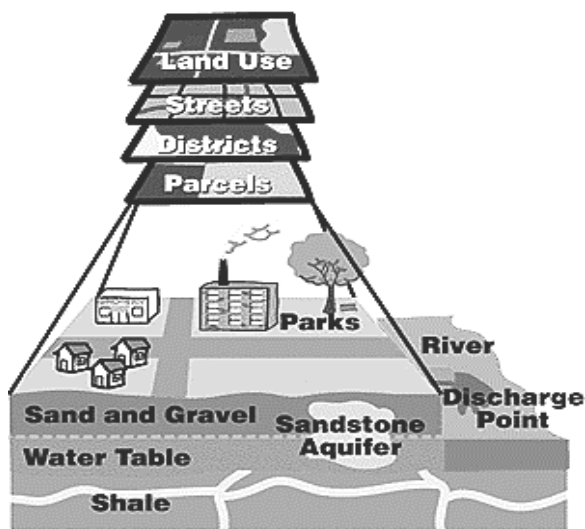


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For example, GIS can be used to help reach a decision about the location of a new housing development that has minimal environmental impact, is located in a low-risk area, and is close to a population center. The information can be presented succinctly and clearly in the form of a map and accompanying report, allowing decision makers to focus on the real issues rather than trying to understand the data. Because GIS products can be produced quickly, multiple scenarios can be evaluated efficiently and effectively.

The beauty of GIS is that it takes advantage of information that the town already has. The data that a community wish to use may already exist in a computer system—for example, the assessment of property, processing of taxes, completion of the census, or management of public safety records.

GIS operates by combining layers of data to create a view. Data layers are separate data files with unique attributes, for example roads, parcel lines, and water bodies. Other common layers include zoning, wetlands, open space, sewer and water lines, and many others.



What information can be translated into GIS? Any paper map can be converted into a GIS map, and just about any database with a spatial element can be linked to the system.

### Why Get Involved?

Local governments have hard choices about where to spend their limited resources. So why would a community choose to implement a GIS system? Small and large communities have most likely found situations where:

- ❖ The community was not able to respond to questions that arose or felt weak in advocating its position, particularly in disputed situations.
- ❖ Municipal staff simply didn't have the time available to undertake a thorough analysis of information. Think of how long it would take to go through the records of 5,000 parcels to find out which ones shared one or more attributes and then plot all of the locations by hand.

*GIS may result in a significant dollar savings to a community by saving staff time.* Consider how many requests for information are handled by the local town clerk, assessor or public works office. It is common for municipalities to exhaust staff time simply answering the public's request for information.

*Often, communities may simply be ready to take the technological "leap of faith."* In this case, the elected officials believe that the time has come to implement GIS even if they haven't had a chance to analyze the costs and benefits.

What we see here is that the benefits to a community can be real and tangible, regardless of the motivation for pursuing GIS.

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### How to Get Started

As communities begin to wrestle with the idea of implementing a GIS system, they must first ask themselves a few questions about what they are attempting to accomplish. An important first step should always be a *needs analysis*. The needs analysis identifies the community's functional requirements related to GIS and puts in place a specific plan by which the community will address these requirements. Some communities will be able to conduct their own assessments. However, the majority of communities hire consultants, which can be costly. BRPC can offer forms for communities that wish to conduct their own analysis. *BRPC supports completing a needs analysis before buying any equipment or implementing a system.*

### Questions to Address in a Needs Analysis

Basic questions should include:

- ❖ What level of accuracy is needed?
- ❖ How much information should be included?
- ❖ What are the short-term/long-term costs?
- ❖ How will the system be maintained?
- ❖ Who will administer the system?

*Level of Accuracy* – In trying to determine the level of accuracy required for a GIS, an administrator must decide on the future use of the product being developed. For example, a community may decide to digitize wetland limits from a town wide map in lieu of field investigations to determine exact limits. While the latter is much more accurate, the former may be sufficient for the needs of the community. Generally, the level of accuracy is related to the amount of funds a community is willing to invest.

*What to Include* – Communities can include as much as they wish in a system. However, the amount of information will most likely be directly proportional to the funds available.

Potential new users should start small and add information as they go to get a better idea of implementation and maintenance costs. Communities who are starting to think about implementing a database may want to research what information is being requested the most by the public. For example, if a community is being asked to provide property mapping and ownership information more often than sewer and waterline mapping, it would make sense to use the most requested data as a starting point. Examples of basic map data communities can readily acquire (from BRPC or MassGIS) includes roads, wetlands, zoning districts, open space, and land use.

*System Costs* – Potential users need to complete an in-depth analysis of what the short- and long-term costs will be to start up and maintain a GIS. Short-term costs include research and purchase of hardware and software, training of personnel, consultant fees (if using one), and actual transfer of data and mapping into the system. Long-term costs include software updates, system administrator salary, continuous input of updated data and hardware upgrades. Municipalities wishing to implement a system may wish to contact other municipalities or hire a consultant to help accurately determine costs. To reduce those costs, *communities may want to consider joint projects* for some of that development. For example, joint aerial photography projects, shared staff support, or even shared systems are some ways keeping costs down.

*System Maintenance* – Once a system is initiated, there must be a plan for how new and updated information will be entered into the system. Certain information may need to be entered into the system on a daily basis, while other, noncritical data be delayed.

*System Administration* – All users need to assign at least one person who will serve as the system administrator for the GIS. This person must be knowledgeable in both the hardware and software requirements of the system. This

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position could be handled by a municipal employee or could be an on-call outside consultant. The administrator would also oversee the daily input of information into the system.

### Using GIS: Some Examples

Communities are constantly striving to make better decisions or deliver better, more cost-effective services. Here are a few examples of how GIS can help reach that goal:

- ❖ An industry is interested in moving to a community and wants to know where it can find a tract of land, maybe involving adjacent lots with different owners, which meets the industry's criteria for zoning, aggregate acreage, roads, and utility service.
- ❖ The community needs to see if it can change the boundaries of elementary school districts in order to avoid costly construction associated with expanding existing schools or building new schools. If the community does need to build a new school, determine the location and size given: 1) where is land remaining for residential development and 2) expectations of the community's build-out population.

These are only a few examples, intended to spur creative thinking about how communities are using GIS today and how they can use it tomorrow.

### GIS at work in the Berkshires

GIS systems are at work in several communities in the Berkshire region. Here are some ways they are being used.

- *Tax (Parcel) Map Maintenance:* As property boundaries change, the Assessor's tax maps need to be updated. Once property boundaries are part of the GIS database, they can be edited using the GIS software.
- *Producing Mailing Labels for Abutter Notifications:* Zoning board of appeals hearings or proposed actions by a town/city require notifying abutting property owners. A GIS application for producing abutter mailing labels enables easy identification of abutting property owners in different ways ("within 300 feet", "abutters and abutters-to-abutters", "abutters on a Main Street between house numbers 23 and 77"). Once the properties are identified this kind of GIS application can produce mailing labels and be integrated with a word processing "mail merge" capability.
- *Providing Basic Information for A Building Permit:* At its simplest level this involves using the GIS to find a property location using an address. Once the property to which the permit applies is identified, the GIS can be used to provide some of the essential information (e.g., address, property ID, zoning classification, lot area, street frontage) needed for filling out the permit.

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*This publication is one in a series of "toolbox" items to support the Regional Plan for the Berkshires. If you would like to receive additional copies of this or other toolbox items, please contact the Berkshire Regional Planning Commission, 33 Dunham Mall, Pittsfield, MA 01201 or call (413) 442-1521. Copies of the toolbox items are also available on the web. Visit [www.berkshireplanning.org](http://www.berkshireplanning.org)*

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