

Appendix I

I: GIS/Integrated Permitting Subcommittee Interim Report

The GIS/Integrated Permitting Subcommittee has submitted this interim report while it continues to consider alternative programs for some of its proposed Short-Term and Long-Term priorities. The subcommittee would like to extend its appreciation to Dr. Thomas Millette of Mount Holyoke College and Mr. Shawn Shepard of Tighe & Bond for their assistance in reviewing the GIS issues, particularly the cost to remedy the base map problems. We would also like to thank representatives of ViewPoint for their assistance in viewing the demo of their program and answering various technical questions regarding the installation and operation of an Integrated Permit Tracking System.

Background

South Hadley, like many other communities, has long been involved in permitting of various activities. Like most communities, the permitting has been undertaken using the traditional paper process which requires applicants to physically submit their documents either in person or by mail. Data in this form is cumbersome, to use for analysis or to share with other departments or the public.

Unlike many area communities, South Hadley became involved in the Geographical Information Systems (GIS) approach to mapping in the late 1980's/early 1990's. The Town Planner at that time, George Boyle, utilized the Atlas GIS program (what is now considered antiquated) and a small desktop computer to digitize the Assessors' maps to create the Town's first digital map. This approach served the Town well for some basic functions, such as zoning and analysis of some land use issues. In 2003, Mount Holyoke College, through its Geoprocessing Lab, converted this database to ArcGIS. However, even with this conversion and sharing of the database with other departments, the Town's GIS program has not been "linked" to other departments and has continued to function as a stand-alone system.

Over the past 15 years, the community has experienced substantial development and other municipal departments and entities have become involved in GIS – generally using their own base map and resources. Thus, the issue of GIS and Integrated Permitting has grown in its significance as the community and the permitting environments have changed. Accordingly, the GIS/Integrated Permitting Subcommittee was created with the following Subcommittee Charge:

Review the current utilization of GIS software and hardware and compatibility not only in town departments but the districts as well. The subcommittee will also investigate the use of current applications for permitting and interdepartmental reviews as they relate to information exchange and communication for planning and development purposes.

The subcommittee was formed with the vision of incorporating all departments that are either directly involved in permitting or mapping or are significant users of the permitting or mapping tasks. Accordingly, the following persons/departments were appointed to this subcommittee:

Richard Harris, Town Planner-Chair
Melissa Couture, Associate Assessor
Steve Reno, Building Commissioner
Sharon Hart, Health Director
Steve Parentela, Police Department
Jeffrey Cyr, Fire District #1-Water Department, Superintendent
William Selkirk, Fire District #2-Water Department, Superintendent
Wayne Doerpholtz/Andrew Orr, SHELD
Jim Reidy/Yem Lip, DPW
Janice Stone, Conservation Administrator

Survey of Activities

The initial steps of the committee's work involved a survey of the various mapping resources in use and the permitting activities of the participating departments/agencies. Currently, all of these departments invest some time and/or resources into maintaining information in a geographical referenced system. However, most of the departments maintain their maps as "hard copies" and not in a digital manner. This significantly impedes data sharing and data analysis.

Of those departments that currently utilize a digital mapping system, there are some commonalities but some significant differences:

- Utilize ArcGIS (mostly the current 9.2 version, but one department is still utilizing the older 3.2 version).
- Maintain the data on a part-time basis using existing staff.
- The maps utilized by the two water departments differs from that operated by the Planning Board which is somewhat different from the map used by the Conservation Commission. Thus, multiple mapping scenarios using different data sources are being employed.

Several departments utilize computerized permitting software, but they are not integrated and do not provide a means for electronic plan review. At present, numerous municipal departments/agencies issue a multitude of different permits. Each permit and permitting entity has their own degree of complexity and requirements and processes:

- Board of Health
- Planning Board
- Water Departments
- Fire Departments
- Building Commissioner
- DPW

- Conservation Commission
- Selectboard

Other departments do not issue permits, but have roles in the permitting process which vary from commenting on permits to using the resulting permit to update their records and undertake follow-up activities. For instance,

- The Town Clerk is responsible for receipt of notices of appeals of decisions and issuing certifications that no appeals have been filed.
- The Assessors' Office utilizes records of building permits and certificates of occupancy in scheduling assessment updates.
- The Assessors' Office utilizes records of new development plans in updating their maps.
- The Tree Warden, Fire Chiefs, Police Chief, and other departments comment on various permit applications.

Identification of Issues/Needs

The subcommittee identified the following issues/needs:

Base Map

After discussing the permitting processes and background on the GIS programs in use, the subcommittee quickly identified the condition of the Town's digital base map as a primary issue.

A Geographical Information System (GIS) is a useful and informative tool which links and displays data in a geographical fashion. It allows the user to geographically analyze the data sets. Thus, providing a basis for more informed decision-making.

- *Background on Town GIS*

The Town GIS database has been expanded and transformed over the past 15 years as more data was developed and integrated into the program. Approximately 7 years ago, Mount Holyoke College through its Geoprocessing Lab and the efforts of Dr. Thomas Millette, converted the Atlas database to ArcGIS (a much more user-friendly and adaptable program). This conversion significantly expanded the database' potential utility for in-house and general public purposes.

Since its inception, the Town's GIS program has largely been used for zoning purposes (primarily preparation and maintenance of the zoning map and related project maps). This alone has provided a more accurate and more readily updated zoning map than was used prior to the GIS program development. However, the GIS program has been used for a wide variety of other purposes and projects, for example:

- Preparation, analysis, and graphic display of development activity for consideration by bond rating companies and prospective developers

- Preparation and graphic display of ownership information for assessment purposes
- Preparation, analysis, and graphic display of housing development activity.
- Preparation, analysis, and graphically display of roadway, zoning, and open space projects for Town Meeting consideration
- Analysis of development potential
- Analysis of development limitations
- Analysis of alcoholic beverage licenses
- Review and analysis of town-owned lands
- Analysis of paper street/unaccepted roadways
- Economic Development planning
- Recreation and Open Space planning
- Identification and assessment of potential sites for a new school and affordable housing
- Historic property and district planning and analysis
- Data sharing between departments and other municipal entities

Thus, the existing GIS program has been very useful and beneficial for “in-house” purposes. Yet, this has barely touched the surface of the potential for the GIS program.

Over the past 6 years, the separate water departments of the Fire Districts have developed their own GIS programs. Their databases are based on a more accurate base map which they developed using aerial photography supplied by the state in recent years. However, their databases are foundationally based on centerlines of streets and do not include parcel data – a key consideration for other municipal uses.

Similarly, the Conservation Commission has been using GIS to review wetland permit application sites, using Commission-modified data and MassGIS data sources.

- *Need for Integration of Databases*

Integration of the water departments’ databases, MassGIS, and the municipal GIS database is essential to having a truly comprehensive GIS database. Such integration would dramatically expand the “in-house” and general public benefits of the GIS program – it would, simply put, allow those people who have paid for it to gain the benefits of it.

Even more fundamental to having a public-friendly GIS database is integration of the GIS database with the Assessors’ database. The lack of integration of these two key municipal databases imposes significant time delay in responding to citizen inquiries regarding a wide variety of issues. At present, it takes ½ hour to several days for a citizen to find out the zoning of their land if all they know is their street address. This delay arises from the fact that the Planning Board Office must physically contact the Assessors’ Office to determine the location of the property (using the Map and Parcel reference which most citizens do not have) and then contacting the resident with the information. Integration of the two databases would reduce a 4+ step process involving multiple phone

calls to a simple matter of looking up the information on the computer screen while the person is on the phone.

Once these databases are integrated, expansion to other departments will be relatively simple and result in geometrical expansion of the GIS database. It will also provide the opportunity for the Town to dramatically expand the geographical-based data accessible by the citizens and property owners; possibly through the Town's website.

- *Need for Maintainable Assessors' Maps*

Under Massachusetts General Law, the Board of Assessors is required to maintain parcel boundary maps which include individual identifiers for each parcel and the individual parcel attributes including parcel dimensions. The Associate Assessor has noted that it has become increasingly difficult to obtain consulting services to update the paper maps. Within the next few years, the Associate Assessor anticipates the Town will not be able to find a vendor to update the paper maps. Therefore, it is vital that this barrier be addressed within the next 24 months. While the DPW/Town Engineer have offered to maintain the maps, in the short term, the fact that the maps have not been maintained on mylar sheets for the past several years would significantly increase the initial level of work which would need to be undertaken and would not negate the need to invest in a new digital basemap.

Development of a more accurate GIS base map with the Assessor required annotations would alleviate the potential problem with updating of the Assessors' maps. It would also provide the basis for effectively integrating the various GIS databases into a tool that is also usable by the public.

- *Barriers*

The Town has identified the technical aspects of integration of the databases which must be addressed. In the case of linking the Assessors' database to the Town GIS database, we believe the effort merely requires a technical alteration of the manner in which the 7,200+ parcels are identified in the Town GIS database. This will primarily require time to input the data and have the Assessors' database vendor do the final linkage.

However, the most significant barrier to a truly integrated and effective GIS database is the base map. In the GIS environment, the base map is EVERYTHING. If the base map is not accurate (or reasonably so), the resulting analysis and information which is disseminated will be skewed and inaccurate.

At the present time, the Town can reasonably tell an owner the zoning on a parcel of property. However, distortion inherent in the Assessors' maps (when the different scales are holistically meshed together) was compounded when the maps were digitized and

then converted from one program to another, resulting in various limitations on use of the base map including:

- Inability to scale distances with reasonable accuracy (critical for developing abutters' lists or planning school bus routes)
- Inability to overlay data layers from the MassGIS website (critical in assessing wetlands, floodplains, or any number of other environmental issues)
- Inability to use the GIS-generated maps as the basis for the Assessors' maps (this would save the Town several thousands of dollars annually and enhance the ability to share the maps with the community)
- Inability to integrate the Districts' maps and information with the Town's GIS map

Establishment of a Uniform GIS Program

Fortunately, all of the departments and entities in the community which utilize GIS have selected ArcGIS as their operating platform. This ensures greater consistency and eliminates one major potential barrier which has afflicted some other communities as they attempted to share GIS assets. The community should establish and maintain ArcGIS (current edition) as the GIS operating platform.

Linkage of Assessors' Database and Town GIS Database

The ArcGIS program has the ability to identify and manage data by a variety of geographical references including, but not limited to, addresses and map/parcel identifiers. The Assessors' database is the only municipal database which has the map/parcel and address identifiers for each parcel. Unfortunately, this data is not linked to the GIS database. Therefore, to access the Assessors' database, several manual steps must be taken which delay and inhibit the prompt response to inquiries (such as zoning, abutter's lists, etc.).

Linkage of these databases will dramatically enhance the ability of all municipal departments and affiliated agencies to respond to public inquiries regarding particular parcels. It will also expedite the Assessors' Office's ability to prepare and certify abutter's lists.

Training of Personnel

Operation and maintenance of the GIS databases requires training of personnel as to the use of the ArcGIS programs which change periodically. In recent years, private vendors (locally, Tighe & Bond) have developed new training programs. As the Town and other community entities progress in the use and development of the GIS program, annual training of personnel needs to be undertaken utilizing one or more of the private-vendor programs.

Commitment of Adequate Personnel

Investment in the GIS program is a significant commitment for the community. This commitment entails hardware, software, development of data, many work hours to compile and organize the databases, etc. The initial and annualized costs are valued at an

amount far in excess of \$100,000. Updating the databases is essential to ensure that they maintain their usability. Development of the new base map will be meaningless if the map is not maintained. Similarly, an updated database is useless if it cannot be used to quickly respond to a department's need for particular mapping.

At present, the Town's database is maintained on a part-time basis as the Town Planner has time to do so. Similarly, the water departments' databases are maintained as the Water Superintendents have time. The DPW is in the process of updating the Town's sewer and drainage maps.

With the proposed expenditure of \$60,000 to develop a new base map and other capital and operating expenditures as well as reliance on the GIS database to provide the Assessors' maps for property assessment purposes, the Town will need to ensure that the GIS database is maintained properly. Commitment of adequate personnel whose primary task is GIS will be necessary to ensure that these expenditures are maintained and don't have to be repeated on a frequent basis.

Trimble (GPS) Units (and Training in their use)

With the development of a more accurate base map, it will be necessary to ensure that the data that is used to maintain the map is at least as accurate. The water departments have been using Trimble Units to locate the elements of the water systems for mapping purposes. Similarly, the DPW will be using a Trimble Unit as a surveying tool, to prepare road/sewer/drainage construction plans, to update and field verify Town sewer and drainage systems, landfill inspections, and similar other Town projects. These handheld Global Positioning System (GPS) devices provide an effective means to collect point location data and transfer that data to the GIS database. Acquisition of such a device for Town Hall personnel and training of personnel in use of the device will enhance the ability to properly locate data points (such as, new houses, wells, septic systems, etc.) on to the GIS database.

ArcGIS Licenses

At present, each water department, the DPW, Planning Board, and Conservation Commission have licensed ArcGIS programs. All town departments do not need an ArcGIS license. However, more departments (those who will be inputting and manipulating data) will need to acquire such licenses. The Town needs to identify which departments need a licensed program in the short-term and long-term.

Web-Based GIS

As the Town upgrades the base map and links the base map with the Assessors' Office database and integrates other data sources, the Town will have a data source that many residents, businesses, and prospective investors could utilize. Conversion of the Town's website to Virtual Town Hall will provide a more user-friendly and informative website. The upgraded map and integration of the data sources will be readily adaptable to a web-based GIS.

Integrated Permit Tracking System

The Town has a wide array of departments and agencies involved with various permits. These range from a simple building permit to a complex subdivision or Special Permit. Fortunately, the Town has managed to maintain an efficient approach to processing most of the permits. Very few permits take months to be processed.

Numerous departments are involved in different aspects of the review process and subsequent inspection and management activities. Over time, results of these permit actions impact other departments and subsequent owners of properties.

An integrated permit tracking system would provide better coordination of permitting activities and enhance the community's ability to track the permit and finalization activities. Integrating the system with the GIS program would also allow for mapping of permit activities to highlight problem areas or future infrastructure issues.

Incorporating the Integrated Permit Tracking System into the Town's website would enhance public access and monitoring of their permits or permits in their neighborhood. Such activities would make the functions more transparent and enhance public participation.

New Large Format Printer

The Town's GIS program currently utilizes an inkjet printer for production of oversized maps. Large (24" x 36" or larger) maps are essential for displaying zoning and other data used by groups and for legal display purposes. While currently functional, the quality of the productions is variable and should be upgraded. Current technology utilizes laser printing which is a far superior quality. The current printer is in excess of 8 years old and should be replaced. However, it is essential that a color printer be available due to the wide variety of data layers which must be displayed at varying times.

Prioritization of Issues/Needs

Each of the aforementioned issues/needs was categorized as either *immediate*, *short term*, or *long term priorities* as follows.

Immediate:

- Designation of ArcGIS (current version) as a uniform operating system
- Linkage of the Assessors Database with the Planning Board ArcGIS database
- New digital base map
- Training/continued training in use and operation of ArcGIS
- Trimble Unit for Town Hall
- Training in use/operation of trimble units

Short Term:

- Establishment of an Integrated Digital Permitting System

- New large format printer
- Web-based GIS

Long Term:

- Acquisition/installation of ArcGIS for other departments (need to identify whom)
- Professional GIS staff person

Cost Estimates:

To provide a measure for financial planning, the subcommittee attempted to identify costs associated with each of the aforementioned recommendations. The figures provided below are current year (2008) estimates. An estimate for several recommendations is not provided as further research needs to be undertaken as noted:

FY09:

- New digital base map: \$60,000
- Training in ArcGIS: \$2,300
- Trimble Unit for Town Hall: \$6,000
- Training in Trimble units: \$500

Total FY09: \$68,800

Short Term Estimates (not fy09)

- Integrated Digital Permitting System: \$80,000 to \$100,000
- New large format printer: *must be researched*
- Web-based GIS: *must be researched*

Long Term Estimates

- GIS staff person: Must be researched. The assumption is that this will be a half time position.

Next Steps

The subcommittee has not completed its assigned tasks yet. Due to the long-term nature of the recommendations of this subcommittee, it is further recommended that the following steps be taken:

- This subcommittee needs to be an ongoing committee to 1.) manage the development of the new base map, 2.) continue the work of integrating the various databases, and 3.) manage the maintenance, integration, and operation of the GIS programs and serve as a Technical GIS committee.
- Conduct further research into the various Integrated Permit Tracking Systems

- Further review the equipment and training needs associated with the GIS and Integrated Permit Tracking System programs.