Executive Office
for Administration and Finance
Office of the Commonwealth CIO

Sustaining MassGIS for the Future:
Organization, Funding, and Governance Recommendations

Report of the MassGIS Task Force

April, 2010

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I. Executive summary

The Massachusetts Office of Geographic and Environmental Information, known as MassGIS, manages a shared repository of the state's geographic information system (GIS) data assets (including core data layers referred to in this document as the Massachusetts Spatial Data Infrastructure or MSDI) and provides strategic, technical, and operational support services to a variety of government agencies (federal, state, regional and local), authorities, public service and educational institutions, businesses, and individuals seeking to use and analyze GIS data. MassGIS currently is a unit within the Executive Office of Energy and Environmental Affairs (EOEEA).

The MassGIS database, including contributions from other agencies, is used for a broad array of essential applications, such as operational support for 911 emergency dispatch, roadway planning and maintenance, wetlands and environmental protection, zoning and land use policy development, and municipal property assessment and taxation.

MassGIS sustainability issues

Although MassGIS is highly regarded for the quality of services it provides to its customers and other stakeholders, there is wide recognition that MassGIS has many unmet needs. The 2007 *Strategic Plan for Massachusetts' Spatial Data Infrastructure* identifies several areas where MassGIS must be strengthened. These include filling vital gaps in data; completing the build out of MSDI; establishing ongoing maintenance processes to keep data sufficiently viable and up to date (including aerial photo imagery, which should be refreshed on a 3-year cycle); and enhancing services and data access for users.

However, MassGIS is neither properly funded nor organizationally positioned to meet these goals effectively. In fact, MassGIS is not adequately resourced even to sustain its current operation. Not only are funding levels insufficient, but the sources of funding do not align appropriately with the nature of expenditures or the patterns of GIS resource usage. MassGIS can neither grow to meet increasing statewide needs nor even continue to operate effectively at present levels under the current circumstances.

Recognizing the need for more sustainable support for MassGIS and its broad base of users and customers, the Commonwealth CIO appointed the MassGIS Task Force[1] in September 2009 to analyze

[1] See appendix A for list of Task Force members.

needs, review the existing financial and organizational structure, investigate alternatives, and recommend coherent organizational, funding, and governance models to sustain MassGIS for the future.

Organizational recommendation

The Task Force considered three options for MassGIS reporting lines: Keeping MassGIS in EOEEA, moving it to the Information Technology Division (ITD), or creating a hybrid with ties to both parent organizations. The Task Force determined that the best organizational placement would be the option that best supports a set of key goals that includes making MassGIS financially sustainable, promoting MassGIS as a Commonwealth-wide shared service, promulgating and enforcing standards, and facilitating collaboration across multiple state, regional, local, and federal agencies entities. After analyzing the various options against these and other goals, and also researching organizational placement of GIS departments in other states, the Task Force concluded that the best option for the Commonwealth would be to move MassGIS to ITD.

Funding recommendation

The Task Force undertook to address the closely related companion issues of funding level and mix of funding sources. Accordingly, the first task was to assess what funding resources would be required, over what period of time, to support MassGIS operations *and* to build out both the MSDI data infrastructure and the technical GIS hosting infrastructure to acceptable levels that would support current and future needs of GIS users.

The Task Force concluded that the infrastructure projects could—and should—be mostly completed over three years (the *build out period*), after which operations would transition to *steady state*. Costs for MSDI and hosting infrastructure build out are estimated at $1.89M, $1.66M, and $1.27M for fiscal years 2011, 2012, and 2013, respectively.

Even in steady state, there would continue to be a requirement for funding ongoing data acquisition, estimated at $630K per year beginning in FY 2014. There may also be requirements for new projects not presently anticipated, but the Task Force did not build funding for such contingencies into the plan.

Meanwhile, MassGIS operations need to be supported now and into the future. In addition to merely covering current costs—about $1.5M for FY 2010—MassGIS must begin a program of regular update and renewal of aerial photo imagery ($375K per year starting in FY 2012), and it must gradually phase in three new positions over three years (one FTE per year) to fill gaps in current services and to meet increasing demand.

Taking all of the above into account, the Task Force created a five-year budget plan covering FY 2011 through FY 2015 recommending the funding levels (operating and capital) shown in Table 1 below.

Table 1. Summary of Funding Recommendation

	---------- Build-Out Period ----------			----- Steady State -----	
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Operating costs	1,170,000	1,651,000	1,740,000	1,769,000	1,788,000
Capital expenditures	1,890,000	1,660,000	1,270,000	630,000	630,000
Total recommended funding	3,060,000	3,311,000	3,010,000	2,399,000	2,418,000

The second task was to identify a viable mix of funding sources—and a transitional strategy for tapping into them—that would a) be sufficient to cover the funding levels required, and b) adhere to a set of guiding principles concerning fairness, reliability/sustainability over time, and compliance with accounting rules. Accordingly, the Task Force developed a plan that matches capital sources with capital needs and, over time, shifts funding burden toward general appropriation and away from over-

reliance on any one agency, particularly EOPSS, which is a major funder of MassGIS at present. Table 2 summarizes the Task Force's recommendation on funding sources.

Table 2. Summary of Funding Source Recommendation

	---------- Build-Out Period ----------			----- Steady State -----	
	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
EOPSS / 911	1,160,000	1,276,000	1,025,000	602,000	606,000
Bond	1,215,000	750,000	700,000	490,000	490,000
Appropriation	70,000	820,000	880,000	890,000	905,000
Other Agencies	315,000	315,000	255,000	267,000	267,000
Federal	300,000	150,000	150,000	150,000	150,000
Total of funding sources	3,060,000	3,311,000	3,010,000	2,399,000	2,418,000

Governance recommendation

MassGIS is a key player within a broad community of stakeholders inside and outside of state government that both supply and use spatial data in their daily work. For some, MassGIS is an essential, integral resource for their operations, policy development, and decision making. MassGIS's advisory group, the Massachusetts Geographic Information Council (MGIC) has a long and constructive history of advocating for user needs, sharing information, and helping to guide MassGIS in its work. The Task Force recommends that MGIC continue as the MassGIS advisory body, but with a more formal structure and operation, as described later in this document.

MassGIS is an important and highly regarded resource for the Commonwealth. The Task Force urges the Secretary of Administration and Finance, the Commonwealth CIO, and other decision makers to consider the organizational, funding, and governance recommendations put forward in this report and to act favorably upon them.

II. Background

A. Task Force charge and process

The Commonwealth CIO appointed the MassGIS Task Force in September 2009 to analyze needs, review the existing financial and organizational structure, and investigate alternatives. The CIO further charged the Task Force to recommend organizational, funding, and governance models that would:

- Position MassGIS as a Commonwealth-wide shared service to:
  - Provide broad access to information resources
  - Eliminate wasteful and redundant expenditures
  - Improve communication and coordination among state agencies and with municipalities
  - Maximize value via standards and economies of scale including regionalization
  - Empower communities through technical assistance and access to data
  - Make regulatory processes more efficient
- Develop a sustainable and predictable funding model to support and grow MassGIS
- End MassGIS reliance on capital funds for operating costs

The Task Force met six times as a group, and several members as well as the two co-chairs met in subgroups and worked individually to research, analyze, and document various aspects of the Task

Force's agenda. The complete research and proceedings of the MassGIS Task Force are available (login required) on the Commonwealth state government wiki at:

https://wiki.state.ma.us/confluence/display/MassGov/MassGIS+Task+Force

B. What is MassGIS?

The name *MassGIS* applies both to an agency of state government and to the spatial database for which it is responsible. As an organizational unit, the mission of MassGIS is to serve as a:

- Strategic resource to support:
  - Policy development
  - Priority setting for investments
  - Standards definition
  - Coordination of federal, state, and municipal GIS efforts
- Technical resource to support:
  - GIS users across all levels of government and all sectors
  - Development of GIS applications
- Operations resource to support:
  - Coordinated maintenance of the Massachusetts Spatial Data Infrastructure (MSDI) by state, regional and local partners
  - Collection and storage of spatial data assets
  - Access to spatial data

MassGIS is also a platform for the core spatial database, also known as the Massachusetts Spatial Data Infrastructure (MSDI). MSDI is made up of different types of data, called "layers," each layer building successively on the underlying layer below. These major data layers are shown in Figure 1.

Figure 1. Data Layers in MSDI

- **Buildings and Address Points**
  - Geocoded infrastructure location
  - Accurately mapped using imagery and parcel owner/address info
- **Parcels**
  - Created on ortho base and road base
  - Parcel data comprising municipal tax maps
  - Boundaries and more accurate addresses
- **Roads and Geocoding**
  - Created on ortho base
  - Road centerline network with address ranges
  - Address matching (Google, Mapquest, etc.)
- **Orthophoto**
  - Photo image base maps
  - Accurate, intuitive base for all other GIS development (building footprints, etc.)

C. Why MassGIS matters

MassGIS is a vital resource for spatial data, used by federal, state, and local government agencies, regional planning authorities, other public service organizations, academic researchers, businesses, and individuals for essential functions such as 911 emergency dispatch, roadway management, and environmental protection. Table 3 below identifies examples of agencies using MassGIS resources and services. Appendix B provides a more illuminating back story on some of these applications.

Table 3. Examples of GIS Applications

Context	Examples of How MSDI Is Used
Public Safety and Security	• 911 & NextGen requirement for emergency provider assignment • MEMA operations and planning e.g. floodplain mapping, pre-disaster mitigation and critical infrastructure inventories • Incident tracking data for crime, fire etc. and for Fusion Center
Health and Human Services	• Cancer/epidemiologic studies of environmental factors • Health care outcomes analysis • Client services eg job locator, regional office locations
Transportation	• State roads inventory (prerequisite for federal highway funding) • Multi-modal transportation planning e.g. South Coast Rail • Safety analyses at crash locations • Regional transportation planning by MPO's

Context	Examples of How MSDI Is Used
Energy and Environment	• Assessment of conservation value for potential land acquisitions • Wetlands protection enforcement • Site identification for wind development • Rare species habitat
Housing and Economic Development	• "Smart growth" analysis (40B locations) • Development planning within environmental guidelines (43D)
Mass Broadband Institute	• Broadband infrastructure mapping and setting investment priorities for extending broadband in western MA
Secretary of State	• Census analysis to ensure accurate federal counting • Legislative redistricting analysis
Multi-Agency	• Climate change analysis • Coastal inundation/flood modeling • Planning for regionalization of services
Municipalities	• Town assets and land management • Crime analysis • School bus routing • Water/sewer planning • Zoning planning and enforcement

In the June 2007 document, *A Strategic Plan for Massachusetts' Spatial Data Infrastructure*, annual GIS expenditures were estimated to be $13 million statewide, with about 150 professionals involved in GIS work at state, regional, and local levels.

Table 4. Estimated Annual GIS-Related Expenditures

	Est. Annual Expenditures
State agencies	
Personnel and software	$4.8M
Contracted data acquisition and development	$1.5M
Municipalities and Regional Planning Authorities	
Personnel and software	$5.6M
Contracted data acquisition and development	$1.1M
Total	$13.0M

The Task Force compiled additional statistics that give an idea of the magnitude of the GIS enterprise in Massachusetts:

Table 5. Magnitude of GIS Enterprise

GIS professionals

in the MassGIS office	13
in other MA state government agencies	57
in Regional Planning Authorities	20
in MA cities and towns	75
Data delivered annually to users	4.5 TB
Images generated annually by web mapping service	8.7 Million
911 call centers using GIS data for emergency dispatch	278

III. The challenge

In 2007, MassGIS, members of MGIC, and many other contributors from municipal, state, business, and nonprofit entities collaborated to develop *A Strategic Plan for Massachusetts' Spatial Data Infrastructure*, which is available at http://www.mass.gov/mgis/MA_StratPlan_Final.pdf. This plan lays out a detailed roadmap of how MassGIS should develop in the future, and backs up its recommendations with a strong case. At the highest level, the key components of that roadmap are:

- Fill vital gaps in data and build out the MSDI infrastructure to complete a fully comprehensive spatial database in all its layers
- Maintain currency of data through routine, scheduled data update processes, including regular refresh of aerial photographs (orthophoto layer) on a 3-year cycle
- Support access to MSDI via data downloads and enhanced web access for all constituents, with specially tailored views for essential applications
- Provide consulting and data analysis services to policy and decision makers, and other constituent groups

However, MassGIS is neither funded nor organizationally positioned in a way that permits pursuing these goals. Indeed, the current funding and organizational reporting lines do not adequately support what already exists. By comparison with other states, MassGIS is under-resourced to satisfy the level of current demand, much less build out for the future.

Current funding for MassGIS is a mix of capital funding, budget allocation, grant funds, program funds, interagency service agreements, and "voluntary" contributions from collaborating agencies. These do not align well with the expenditure categories of the agency. For example, capital funds, which should be used for important projects like infrastructure and data development, are instead used for operating expenses like staff salaries. Over many years, funding has been ad hoc, sometimes unreliable from year to year.

A companion issue is that MassGIS is situated in a small Secretariat, away from the center of IT standards and policy development, and budgetary decision-making. While of course the Executive Office of Energy and Environmental Affairs, the current home of MassGIS, relies heavily on the services and expertise of this office, MassGIS has a broader role, serving a larger audience. Its strategic role in supporting statewide policy and decision making is sometimes hampered by organizational isolation.

More formal and sustainable models are needed for organization, funding, and governance of MassGIS to preserve and grow this valuable asset.

IV. Recommendation: Organization model

The 2007 MassGIS Strategic Plan considered the issue of organizational placement and identified what they believed to be the three most viable options along with the pros and cons of each. Summarized briefly, the options are:

- Status quo option: Keep MassGIS in EOEEA. This option recognizes the 20+ years of positive history for the organization, builds on the good will among environmental advocates already enjoyed by MassGIS, and avoids any organizational disruption that might be occasioned by change.
- ITD option: Move MassGIS to the Information Technology Division. This approach would put MassGIS "in the loop" within the broader state government IT community, giving the organization more visibility, a greater role in IT/GIS policy development, and a better forum in which to advocate for resources. Importantly, this placement would leverage the authority of the Commonwealth CIO to promote and enforce GIS policies and standards. And of course, as the state's principal supplier of information technology infrastructure and services, it would provide robust 24/7 operation for MassGIS.
- Hybrid option: Keep MassGIS in EOEEA, but formalize links with ITD. This plan would improve coordination with ITD and take advantage of ITD strengths in operations while preserving the current organization and funding authority.

The Task Force confirmed that these continued to be the most reasonable options and proceeded to evaluate them. To do this, Task Force first looked at organizational models in other states that have well-regarded GIS operations and services. Among these states, the majority had placed their GIS organizations within the domain of the state's chief information technology official. Appendix C summarizes findings about GIS in other states, including organizational placement, governance approach, funding level, staff size, and service portfolio.

The Task Force also developed a set of goals that the ideal organizational option should be able to support:

- Make GIS financially sustainable
- Secure funding to fill gaps in data
- Establish a funded program to refresh data (including imagery) regularly
- Ensure robust 24/7 service
- Assure collaboration across state agencies, regional planning authorities, municipalities, and federal agencies
- Streamline and institutionalize cross-agency data collection & maintenance
- Provide GIS data needed by all agencies
- Promote and enforce standards
- Provide value-added services, e.g., analytical input to policy development
- Serve as a resource to "have nots"
- Preserve the positive, well recognized MassGIS brand
- Maintain MassGIS flexibility, agility, responsiveness
- Empower MassGIS with legal and budgetary authority to fulfill its mission

The Task Force determined that no organizational option was best at supporting every goal across the board. However, the ITD option seemed stronger than others with respect to most of these goals and to the set of goals overall. The areas where the Task Force felt ITD has the potential to fall short compared with the other options are providing value-added analytical services, preserving the positive MassGIS brand recognition, and maintaining MassGIS flexibility to support policy goals, form partnerships, initiate data projects and pursue new technologies. Moreover, because MassGIS has many partners outside state government, the ITD option may also represent a shift in the scope and

nature of the ITD customer base.[2] However, the Task Force concluded that having identified these areas of concern, it would be possible to address them through proactive governance and management. Appendix D shows the Task Force's analysis used to surface issues across the three organizational options.

Based on the analyses and committee discussions, the Task Force recommends the ITD option because it:

- Aligns more closely than the others with the stated criteria
- Represents the best choice to support MassGIS as a Commonwealth-wide shared service
- Builds on the findings of the 2007 Strategic Plan analysis
- Meshes with the current IT consolidation initiative throughout Executive Department agencies
- Is similar to how other states are organized

Note that legislation will be needed to effect the move of MassGIS from EOEEA to ITD. This will require deleting the existing MassGIS enabling legislation (Ch. 21A S. 4B); passing new legislation to transfer assets, employees, etc. from EOEEA to ITD; and updating ITD enabling legislation to incorporate existing powers of MassGIS, address funding related issues (grants, out-licensing, retained revenue, expendable trust), and address budgeting language to accommodate funding of the MassGIS core group.

V. Recommendation: Funding model

Not surprisingly, funding for MassGIS is the central issue for assuring ongoing sustainability. As explained earlier, the current funding level for MassGIS is inadequate to support what needs to be done, and what funding there *is* comes from a mix of sources that do not always align well with the mission or expense pattern of the agency. Therefore, the Task Force is recommending both a five-year budget plan to fully fund required operations and projects as well as a coherent mix of sources for the necessary funding.

A. Five-year budget plan

Looking at the major project needs—building the out MSDI infrastructure (database/data development), and building out the MITC hosting infrastructure (technical environment)—as well as operating requirements, the Task Force developed an expense budget that contemplates a three-year build-out period running from FY 2011 through FY 2013 and then transitioning to steady state operations in FY 2014 and beyond. Some data development continues even in steady state. Of course, there will also be expenses for ongoing operations during the build-out period, and these are included in the plan.

Steady state is a relative term, and there may well be new projects presenting themselves in future years. If and when new capital requirements emerge after the build-out period, these will have to be evaluated on their merits and funded appropriately if they are to proceed.

Figure 2 is a graphical summary of the five-year budget plan, which is further detailed in Table 6 following below. The capital budget and operating budget components of the plan are shown in purple and green shades, respectively. Capital requirements for MSDI data acquisition and technical hosting infrastructure during the build out period run from about $1.6M in FY 2011, increasing slightly the

[2] While ITD's primary mission is to serve the IT needs of other state government agencies, we learned that it does have limited experience providing services to municipalities and others.

next year, then dropping to $1.3M in FY 2013. Steady state capital requirements for ongoing data development continue at about $630K per year. Annual operations and maintenance costs drop from the current $1.4M to $1.2M for FY 2011 then increase to a range of $1.6M to $1.8M in subsequent years as MassGIS institutes a program to maintain imagery (aerial photo updates) on a 3-year ongoing cycle, at an estimated cost of $375K per year, and as new positions phase in (see notes to detail expense table below). All together, the Task Force is recommending total funding for MassGIS at a level of $3.0M - $3.3M during the build-out period, dropping to a level of about $2.4M per year in steady state.

Figure 2. MassGIS Five-Year Budget Plan Overview

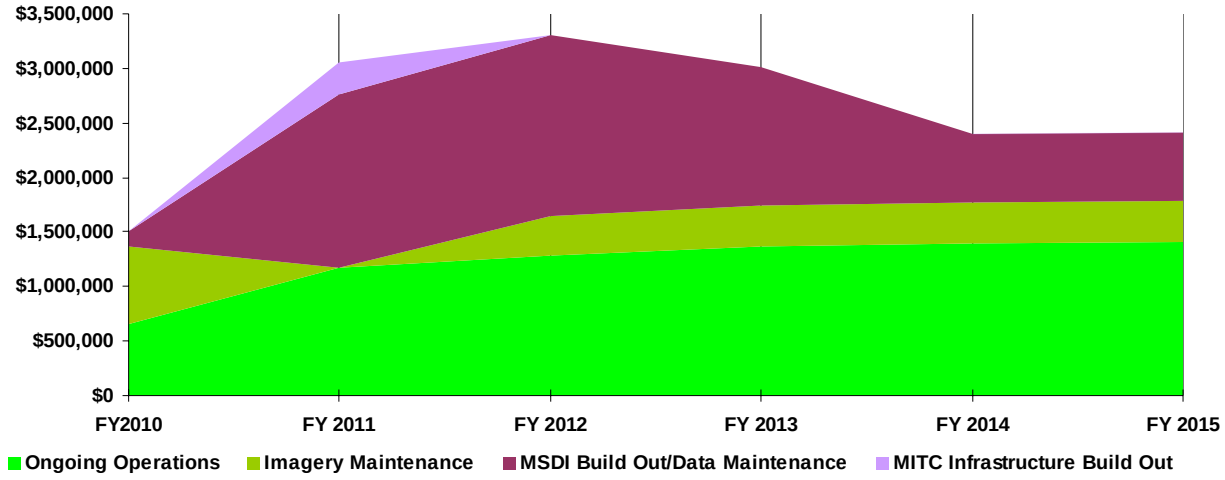


Table 6. MassGIS Five-Year Budget Plan Detail

	Current Core	Build-Out Period			Steady State	
	FY2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Operations & maintenance						
Operations						
Core staffing (1)	590,000	665,000	690,000	700,000	710,000	720,000
Phase in additional FTEs (2)			75,000	150,000	165,000	170,000
ESRI software (3)	35,000	50,000	52,000	54,000	56,000	58,000
Other software	13,000	40,000	43,000	44,000	45,000	46,000
Admin costs	15,000	15,000	16,000	17,000	18,000	19,000
Hardware/network--MITC hosting (4)		400,000	400,000	400,000	400,000	400,000
Subtotal operations	653,000	1,170,000	1,276,000	1,365,000	1,394,000	1,413,000
Imagery--annualized basis after FY11	718,000		375,000	375,000	375,000	375,000
Total operations & maintenance	1,371,000	1,170,000	1,651,000	1,740,000	1,769,000	1,788,000
Development/infrastructure spending						
MSDI build out/data acquisition						
Parcel		750,000	900,000	650,000	140,000	140,000
Elevation--LiDAR (4)		500,000	350,000	350,000	350,000	350,000
911 project contrct staff & reg. coord	100,000	200,000	270,000	270,000	140,000	140,000
MBI project contrct staff	37,000	140,000	140,000			
Subtotal MSDI build out/data acquisition	137,000	1,590,000	1,660,000	1,270,000	630,000	630,000
MITC hosting infrastructure build out (4)		300,000				
Total development/capital spending	137,000	1,890,000	1,660,000	1,270,000	630,000	630,000
GRAND TOTAL	1,508,000	3,060,000	3,311,000	3,010,000	2,399,000	2,418,000

Notes:
(1) Core staffing: Current level is 9 positions. Plan is to add one web developer position as soon as possible.
(2) Additional staff are Outreach Coordinator (FY 2012) and Spatial Data Engine Specialist (FY 2013), each required to meet increased demand associated with growth in MSDI.
(3) ESRI software maintenance is $100K/year, of which $65K is the MassGIS portion of the total EOEEA budget.

(4) Estimates of these line items subject to further refinement

B. Funding sources

The other part of the funding plan is a recommendation on funding sources. The Task Force began this part of the work by developing a set of principles that future MassGIS funding should adhere to. Specifically, funding should:

- Be sustainable over time
- Be diversified (multi-source) to improve stability
- Be predictable from year to year
- Rely on bond funds only for capital assets and projects to create them
- Ensure fair allocation of MassGIS resources and services
- Position MassGIS as a Commonwealth-wide shared service
- Enable MSDI to be built in three years, and maintained over time, to support key Administration initiatives

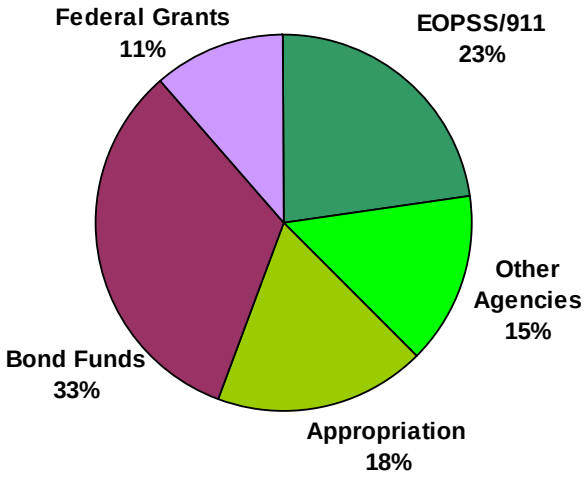
The Task Force considered many options for funding sources, including those currently in use for MassGIS as well as new options such as chargebacks, licensing, taxes, fees, and surcharges. The inquiry also included investigation of funding mechanisms used by other states. Appendix E summarizes the universe of funding options, with the pros and cons of each.

The issue of aligning sources and uses of funds is a key concept for the design of the funding model. First, the principle of using bond funds for only capital purposes is straightforward. In the MassGIS context, this means that bond funds should be used for infrastructure and data development projects. Other funding sources such as grants and partner payments for specific projects may also be used for these purposes.

Second, operating expenses preferably should be funded in a way that neither over- nor under-burdens any one source relative to the value and benefits received, nor should any one funding source be so large as to unfairly skew overall MassGIS priorities in its favor. Indeed, to properly position MassGIS as a Commonwealth-wide shared service, the ideal funding mechanism would be heavily weighted toward general appropriation, which neither favors nor burdens any particular constituency. That said, the Task Force also recognizes that practical realities must be considered in the design of the funding model. Whatever the model, achieving a different level and mix of funding will inevitably require a transition period.

Today in FY 2010, the cost for ongoing operations and maintenance as shown in Table 6 is $1.37M, representing 91% of total MassGIS expenditures, with the remaining 9% supporting the 911 and broadband capital projects. However, as shown in Figure 3, the funding sources do not align well with this spending pattern.

Figure 3. Current (FY 2010) Funding Sources



With an understanding of the funding options potentially available and with the set of funding principles in mind, the Task Force determined that a thoughtful strategy would be needed to move toward a coherent and reliable funding plan that would be sufficiently robust to cover the operating and capital funding requirements outlined above. The following strategy emerged:

- FY 2011—Transition Year
  - Continue to rely on EOPSS/911 and bond funds for operating costs during transition
  - Initiate bond funding for build-out/capital projects
  - Maintain MassGIS operations at current level
- FY 2012 and beyond
  - Increase appropriations to reduce EOPSS/911 funding and eliminate use of capital funding for operations
  - Commit bond and other funds to complete build-out/capital projects
  - Increase contributions from other agencies for services
  - With Infrastructure Services Board, explore fees, surcharges, and chargeback models to support ongoing operations

The following tables show the recommended funding plan to implement this strategy at the level needed to support the budget requirements describe above.

Table 7. Recommended Funding Sources for Operations and Maintenance Expenses

	Build-Out Period			Steady State	
Ongoing Operations and Maintenance	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Expenses from Five-Year Budget Plan	1,170,000	1,651,000	1,740,000	1,769,000	1,788,000
Recommended funding sources					
EOPSS / 911	460,000	506,000	455,000	462,000	466,000
Bond	565,000				
Appropriation	70,000	820,000	880,000	890,000	905,000
Other Agencies	75,000	175,000	255,000	267,000	267,000
Federal		150,000	150,000	150,000	150,000
Total of funding sources	1,170,000	1,651,000	1,740,000	1,769,000	1,788,000

Table 8. Recommended Funding Sources for Development/Capital Spending

	Build-Out Period			Steady State	
Development/Capital Spending	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Expenses from Five-Year Budget Plan	1,890,000	1,660,000	1,270,000	630,000	630,000
Recommended funding sources					
EOPSS / 911	700,000	770,000	570,000	140,000	140,000
Bond	650,000	750,000	700,000	490,000	490,000
Other Agencies	240,000	140,000			
Federal	300,000				
Total of funding sources	1,890,000	1,660,000	1,270,000	630,000	630,000

Table 9. Summary of Recommended Funding Sources—All Expenses

	Build-Out Period			Steady State	
Total Operations AND Capital	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Expenses from Five-Year Budget Plan	3,060,000	3,311,000	3,010,000	2,399,000	2,418,000
Recommended funding sources					
EOPSS / 911	1,160,000	1,276,000	1,025,000	602,000	606,000
Bond	1,215,000	750,000	700,000	490,000	490,000
Appropriation	70,000	820,000	880,000	890,000	905,000
Other Agencies	315,000	315,000	255,000	267,000	267,000
Federal	300,000	150,000	150,000	150,000	150,000
Total of funding sources	3,060,000	3,311,000	3,010,000	2,399,000	2,418,000

A letter of support for stable, consistent funding and transparent, inclusive governance from the Massachusetts Association of Regional Planning Authorities is included as appendix F.

VI. Recommendation: Governance

MassGIS has a long history of open dialog with stakeholders. Since the early 1990s, a broadly representative group of government and non-government entities has served as a forum for discussing issues about spatial data, sharing information about GIS projects, and advising MassGIS on user needs. Since 2006, the group has been called the Massachusetts Geographic Information Council, or MGIC. In 2007 MGIC made important contributions to the development of the MassGIS

strategic plan. The most recent available list of MGIC members, dated September 20, 2007, is included as appendix G for reference.

Going forward, the Task Force believes that such a broadly representative group should continue to advise MassGIS and the Commonwealth on matters concerning relevant policy and practice. After reviewing governance models in other states (see appendix C), the Task Force recommends that MGIC continue as the MassGIS advisory body, but with a more formal structure and operation, as follows:

Purpose

The purpose of the reconstituted MGIC should be to:

- Represent the interests and needs of GIS stakeholders
- Serve as communications channel to—and facilitate cooperation among—state, regional and local agencies and non-government partners
- Help set goals and plan future MassGIS directions
- Monitor and help guide MassGIS projects
- Advise on MassGIS operations

Membership

The Task Force proposes that membership be open to all interested parties, whether in or outside state government and recommends that MassGIS seek participation from:

- Massachusetts Association of Regional Planning Authorities
- State, local, and federal government agencies and authorities
- Massachusetts Municipal Association
- Utility companies
- GIS consultants
- Academic institutions
- Interested NGOs and professional groups, such as the Urban and Regional Information Systems Association (URISA), the Massachusetts Association of Land Surveyors and Civil Engineers (MALSCE), and others
- State legislators and staff

A chair and an Executive Committee should be selected by the membership from among the group. The Executive Committee membership should include major state agency stakeholders such as the Information Technology Division, the Department of Transportation, the Executive Office of Public Safety and Security, and the Executive Office of Energy and Environment as well as regional and municipal representation.

It will be important for MGIC to have linkage to other relevant advisory groups to ensure coordination and promote sharing of information. Linkage can be achieved through overlapping membership so long as it is clear that in addition to his/her other functions on the linked advisory group, the MGIC member also recognizes that he/she is to represent the interests of the MassGIS community and serve as a conduit for information flow to and from MGIC. MGIC should seek linkage with at least the following advisory groups, and there may be others:

- Information Technology Advisory Board (ITAB)—overall guidance on IT
- Infrastructure Services Board (ISB)—chargeback and services
- Technology Governance Board (TGB)—technology planning

Method of operation

While the specific meeting schedule should be determined by the membership, the Task Force recommends that MGIC meet quarterly. Between meetings, the group's work should be conducted by subcommittees or working groups. These may come and go according to need, but at this time, MGIC should consider forming subgroups to deal with the following matters:

- New technologies/technical standards
- Specific MSDI layers/spatial data standards
- State agency GIS coordinators
- Seminar series/annual conference
- Procurement issues and Enterprise License Agreements (ELAs)

VII. Conclusion

MassGIS is an incredibly important and highly regarded resource for the Commonwealth. Many essential services at state, regional, and local levels depend on a reliable GIS resource for their operations, policy development, and decision making.

In its current state, MassGIS just manages to "make do" with "hat in hand" to provide a basic level of service to its many constituents. But its current level and mix of funding, as well as its organizational reporting line, impede its ability to maintain the Commonwealth's shared GIS assets and prevent it from keeping pace with increasing demands.

A different organizational structure and a better funding plan are needed. The Task Force has laid out—and, we hope, made a compelling case for—its recommendations to move MassGIS to ITD, increase and restructure its funding, and formalize its governance.

The Task Force urges the Secretary of Administration and Finance, the Commonwealth CIO, and other decision makers to consider these recommendations and to act favorably upon them.

Appendix A
Task Force Members

Christian Jacqz, Co-Chair, EOEEA, MassGIS

Susan Parker, Co-Chair, ITD, Mass.Gov

Tom Ashe, EOPSS

Mark Berger, DOT/OTP

Claudia Boldman, ITD, Planning & Strategy

Bryan Clain, EOPSS

John Grossman, EOPSS

Linda Hamel, ITD, Legal

Darrel Harmer, ITD, PMO

Jeff Lazarus, ITD

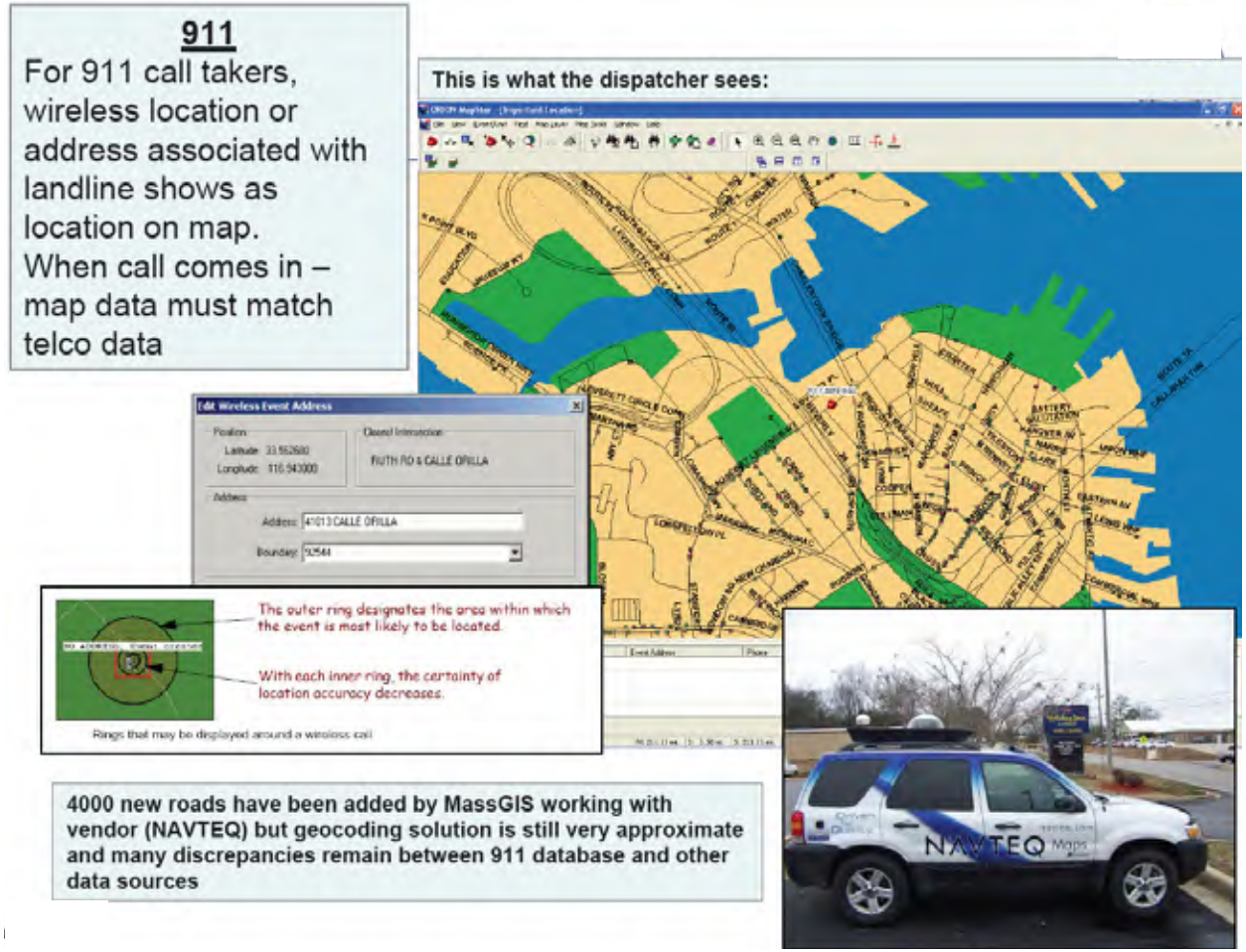
John Meroth, ITD, Finance

Holly St. Clair, MAPC

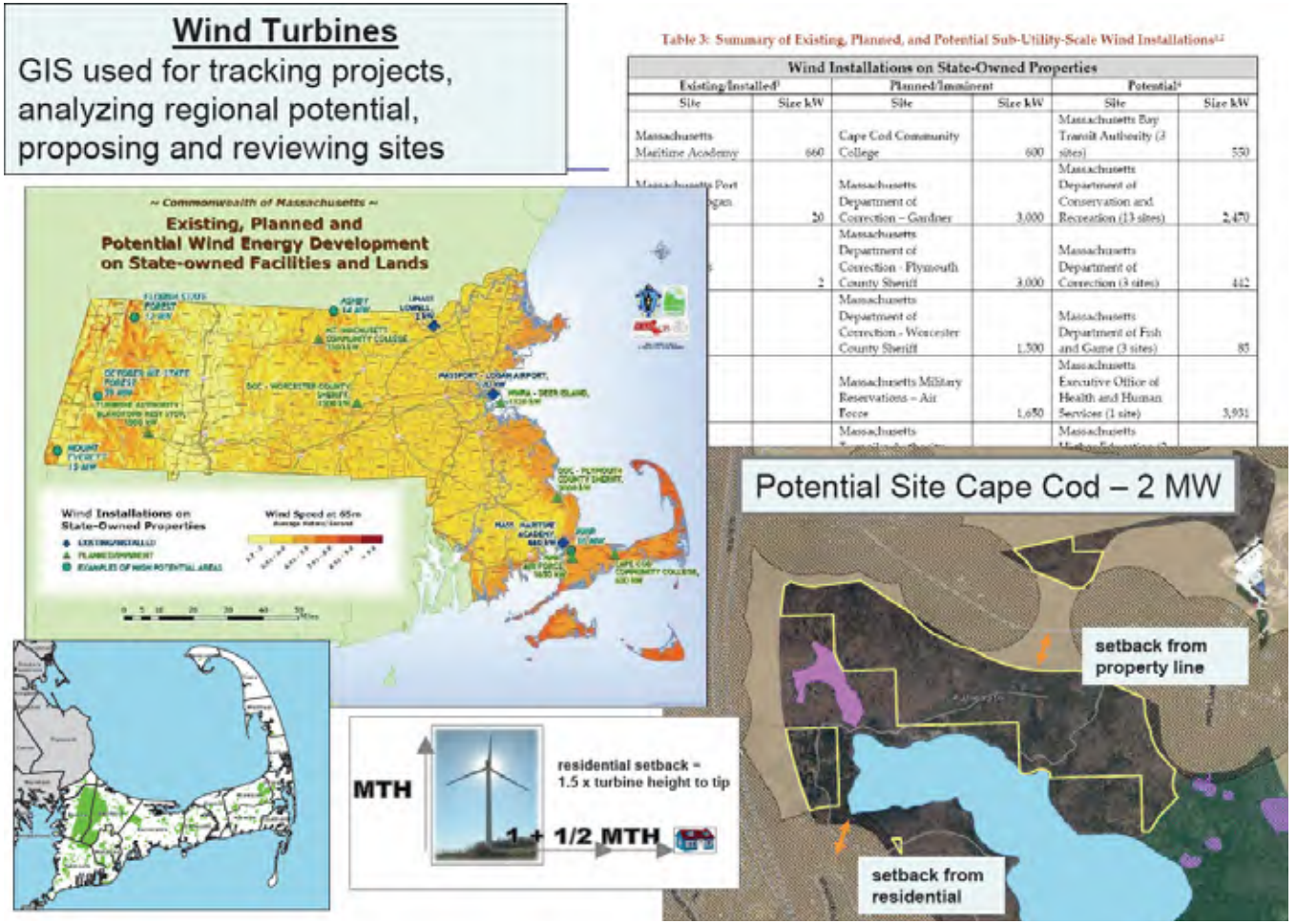
Edward Swartz, ITD

Robert Wilbur, SCIO, EOEEA

Appendix B
MassGIS User and Application Examples



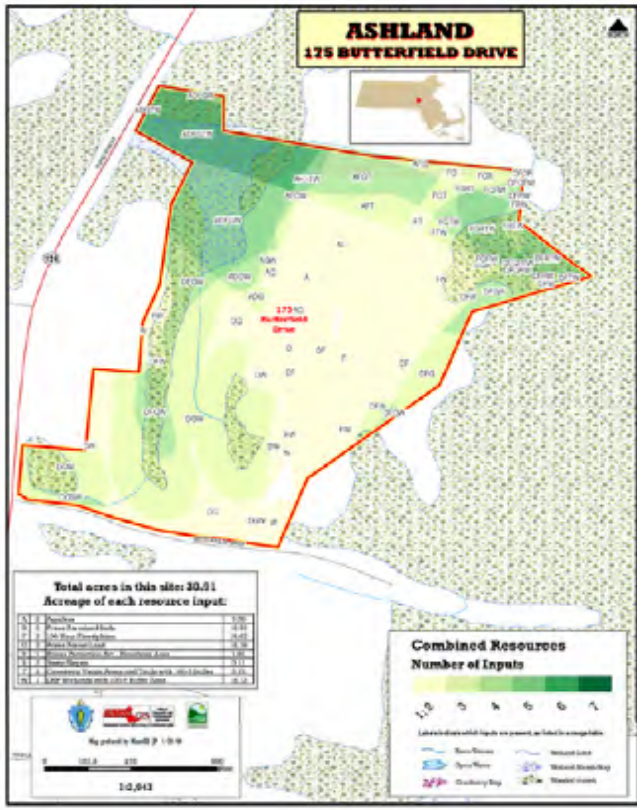
Four years ago, MassGIS brokered a cost-sharing arrangement whereby Public Safety and Transportation funded the enterprise licensing of a commercial roads dataset including address ranges. This dataset provided an immediate solution to 911's need for reverse geocoding to be able to identify an address near the x,y coordinate reported with a cellular 911 call. It also provided mapping capability for ordinary land-line calls. MassGIS has worked with the vendor to steadily improve the completeness of the dataset although issues remain with the geographic inaccuracies inherent in linear geocoding and with the lack of standardization for addresses. In the next phase of this project, MassGIS and 911 will work to address both these issues by developing a point address dataset, as recommended in the strategic plan.



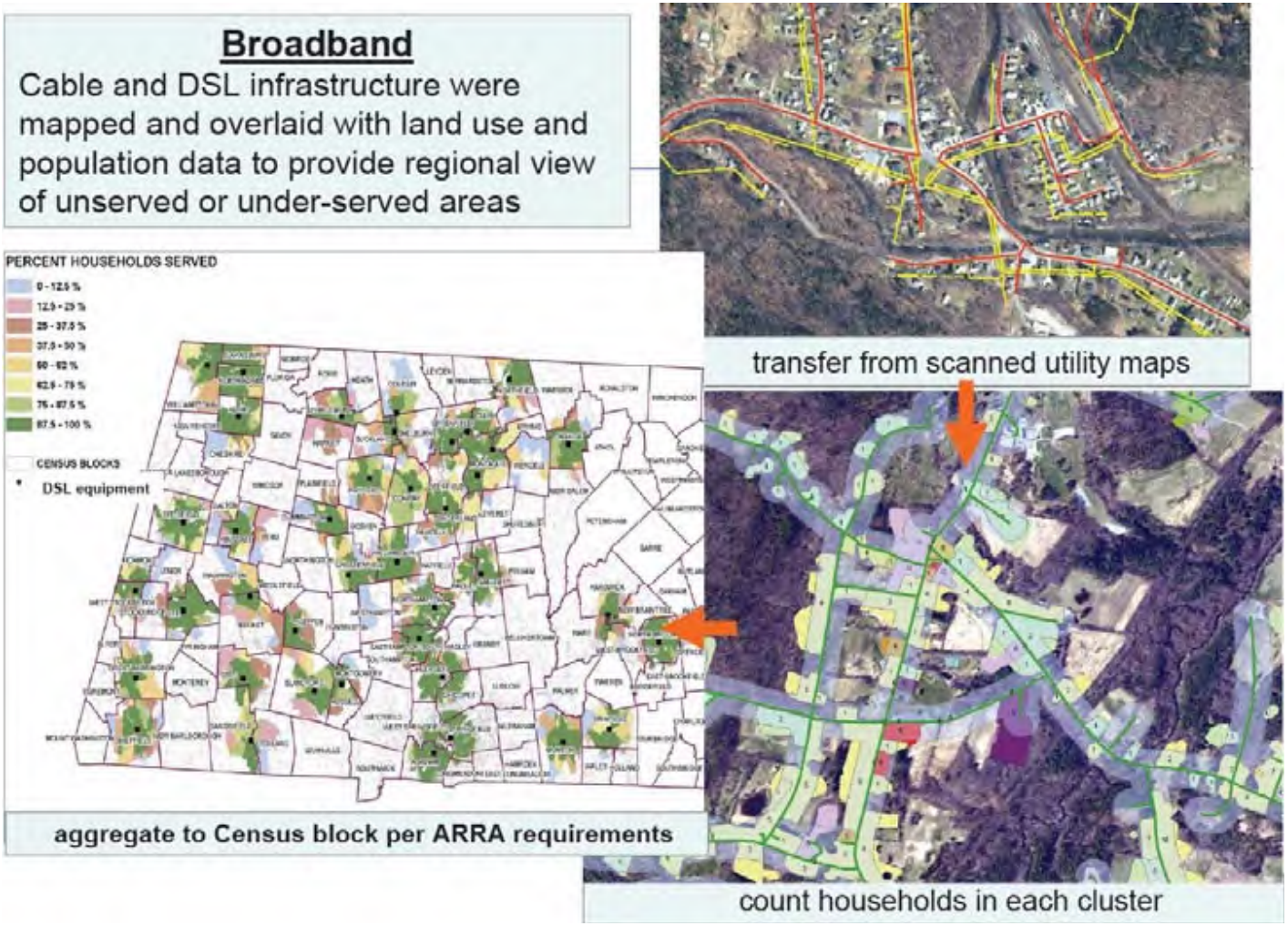
MassGIS and the Department of Energy Resources have collaborated to support the development of wind resources in the Commonwealth, including the tracking of proposed and completed projects, the dissemination of site suitability information through an innovative on-line site review tool, the analysis of regional potential for wind development, and the identification of numerous state and municipally owned sites that should be further investigated. GIS data on wind energy, when combined with data on natural resource and other constraints such as airport proximity and parcel boundary setbacks, can vastly accelerate the process of identifying appropriate sites for further site-specific screening.

43D Site Review

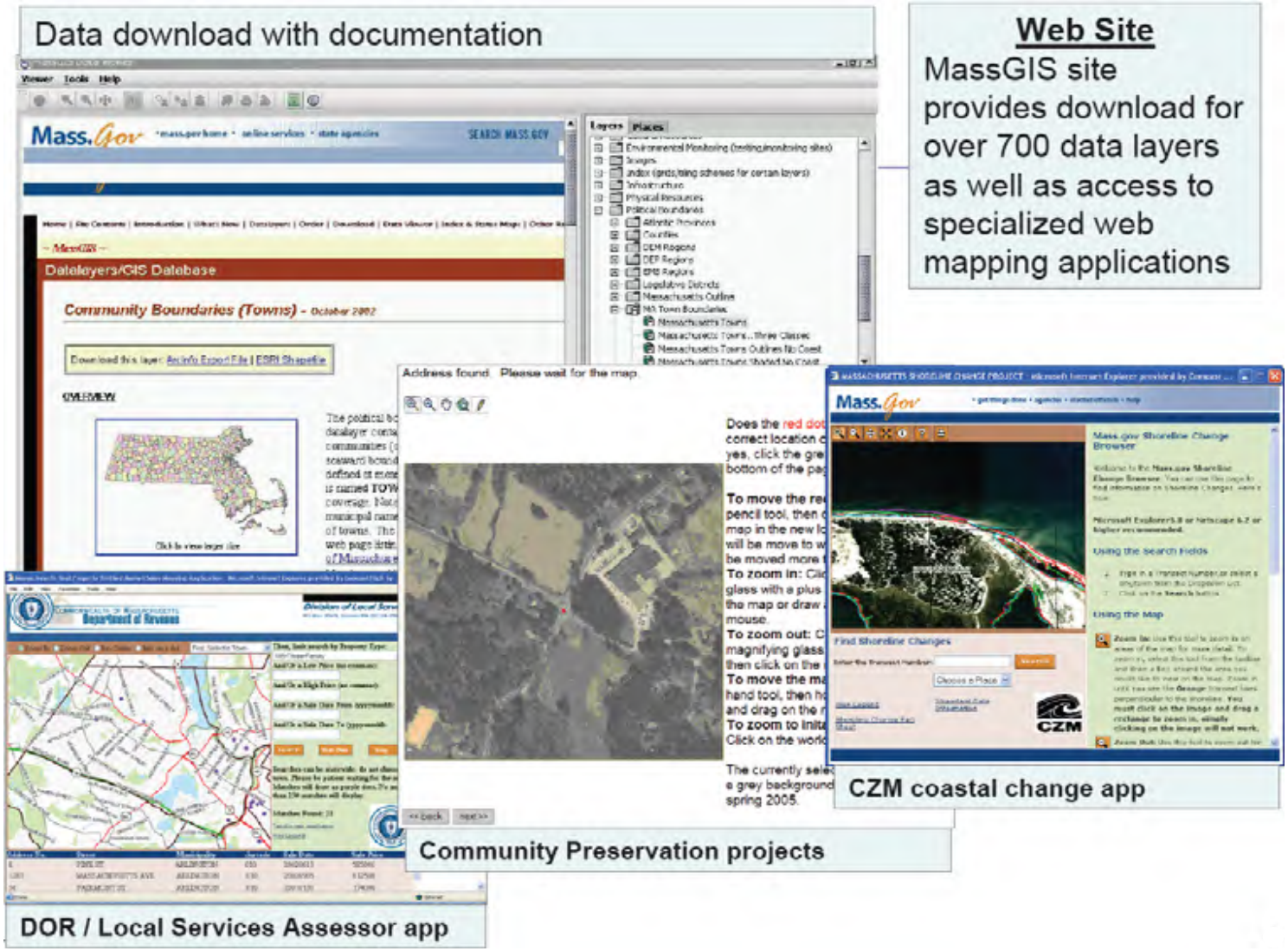
GIS-based review of proposed development sites under 43D expedited permitting program pre-empts potential controversy, delays and even litigation



An interagency permitting board, under the leadership of the Executive Office of Housing and Economic Development, reviews potential development sites proposed for expedited permitting as well as planning assistance under Chapter 43D. The graphics shown provide a concise summary of an extended environmental review, which helps to avoid future controversies and even potential litigation by early identification of any natural resource issues associated with a specific site.



MassGIS assisted the Mass Broadband Institute (MBI) by providing analysis, prior to the award of federal planning money under NTIA's Broadband Data Improvement program, to identify areas that were underserved (or unserved) by broadband. This analysis combined land use data with population and infrastructure in a way that allows MBI to prioritize investments and to move forward with the implementation of the Commonwealth's broadband strategy as Federal funding from the stimulus program becomes available for building out the infrastructure.



The MassGIS web-site is the point of entry for a great variety of resources, including data freely available for download, data descriptions and documentation, customized on-line mapping applications, as well as general purpose map-browsing, technical documentation and guidance on using web mapping services for agencies that wish to build their own on-line mapping, and standards and templates for municipal and state agency use in procurement and data development.

Appendix C
GIS in Other States—Models for Comparison

State	Reporting Line	Governance	FY 09 Budget	FTEs	Download / Data Sharing Policy	Web Services / Online Mapping
MA	Currently in EEA, reports to Undersecretary for Environment	MGIC advisory group representing all stakeholders - towns, RPAs, utilities, GIS businesses, state agencies. NGOSs, education CommGIS all executive agencies using GIS	$2.2M	12	Free and open	Both OGC and ESRI web services plus on-line mapping MassGIS unique in serving up all our data
MI	Just appointed GIO in Admin Dept	Statewide and state govt councils, like MA	$6M	40	Clip and ship for some data, clearinghouse for others	Planned
NY	Reports to CIO in cybersecurity office	Statewide group similar to MGIC	$3.75M	20	Data sharing coop for govts and NGOs	Planned
NC	Was in natural resources agency; through budget process CGIA transferred to OITS, reports to state CIO	Coordination work carried out by committees eg fed, local, state users, technical	$1.5M	20	Free download from NConeMap	NConeMap - OGC and on-line mapping
UT	AGRC reports to state CIO	Statewide group similar to MGIC	$2M	17	Free download from AGRC	ESRI ArcGIS server
WI	Geographic Info Office in Division of Enterprise Technology (equiv of ITD) but still have data at separate State cartographer's office, data repository at DNR	Many groups including statewide coord council and state govt advisory group like MA	$725K	7.5	Spatial data repository being built	No
DC	GIS reports to Chief Technology Officer	Steering committee of all city departments	$2.2M	18	Free download from DCGIS	Online mapping

Appendix D
Analysis of Organizational Models against Goals

On a scale of 1 – 5, this table shows how well each organizational option supports the goals of MassGIS reorganization in the opinion of participating Task Force members (N=8).

Goal	------ Organizational Options ------ Keep GIS at EEA	Move GIS to ITD	Hybrid: GIS at EEA, Ties to ITD
Make GIS financially sustainable	1.8	4.0	2.8
Secure funding to fill gaps in data	1.9	3.8	3.0
Establish funded program to refresh data (including imagery) regularly	1.4	4.0	2.4
Ensure robust 24/7 service	1.5	4.4	2.8
Assure collaboration across state agencies, RPAs, municipalities, feds	2.9	3.5	3.3
Streamline and institutionalize cross-agency data collection & maintenance	2.4	3.6	2.8
Service GIS data needs across all agencies	2.1	4.0	2.8
Promote and enforce standards	2.1	4.4	2.9
Provide value-added services, e.g., analytical input to policy development	3.1	2.6	3.3
Serve as a resource to "have nots"	2.6	2.5	2.8
Preserve the positive, well recognized MassGIS brand	3.9	2.6	3.3
Maintain MassGIS flexibility, agility, responsiveness	3.8	2.3	2.8
Empower MassGIS with legal and budgetary authority to fulfill its mission	1.5	4.4	2.8
Average (N=8)	2.4	3.5	2.9

Appendix E
Pros and Cons of Funding Source Options

Funding Source	Pros	Cons
"Collaborative" or "hat-in-hand" funding for data projects	• Adaptive, nimble, opportunistic • "Voluntary" • Based on trust	• Unpredictable, hard for partners to plan • High risk, not sustainable • Informality = lack of accountability
Chargeback for "custom" staff services	• Equitable, beneficiary pays • Efficient • If negotiated, willing customer	• No mechanism except ISA • Soft funding is high risk, not sustainable
Chargeback for core program operations	• Isolates from budget vagaries • Spreads cost broadly • Top-down= no argument, coordination • consistent with consolidation	• If "involuntary" perceived as inequitable • Difficult to develop usage metrics • May discourage use of GIS
Licensing of state data for non-commercial use	• Business user pays, preserves "public" access, meets state needs	• Legal grey area, copyright v. PRL • SEC guidance negative
Licensing of commercial data by state	• Cost savings, but compromise on product	• Limitations on use
Bond	• Ideal for "building" MSDI • Competition for "cap"	• Not appropriate for staff or recurring costs like imagery
Appropriation	• Reflects exec & leg priorities • Ideal for maintaining MSDI	• Advocacy for tech is challenge • Fiscal and project lifecycle mismatch • Limited and in downturn, can be cut
Federal grants	• Efficient to cost-share, ensures coordination, economy of scale	• Administratively time consuming • Not sustainable and predictable • May not align with program goals
Public/private partnership	• User pays, politically attractive • Economy of scale • Complementary contributions	• Administratively time consuming • Requires long lead time
Taxes, fees, surcharges eg MSA, registry, gas tax	• Justification, funds externality • May grow • Incremental (painless?)	• Small unless base is large • Politically difficult

Massachusetts Association of Regional Planning Agencies

Secretary Jay Gonzalez
Executive Office of Administration and Finance
State House, Room 373
Boston MA, 02133

December 14, 2009

Dear Secretary Gonzalez:

We were recently invited to participate in the discussions of an interagency Task Force which will recommend moving the state's Office of Geographic and Environmental Information (MassGIS) from its current position within the Executive Office of Energy and Environmental Affairs to the Information Technology Department (ITD) within Executive Office of Administration and Finance (A&F). We appreciate the careful deliberation of the MassGIS Task Force and applaud A&F's willingness to shepherd this valuable resource. **We are writing to outline our concerns with regard to three key issues: funding, stakeholder participation, and transparency.**

Geographic information systems are a critical component of the Commonwealth's infrastructure in this modern age. State agencies, municipalities, businesses, and residents all use GIS information to plan investments, to establish policies, and to conduct a wide array of other activities. MassGIS is the Commonwealth's official agency for the collection, storage, and dissemination of geographic data, with a legislative mandate to set standards for geographic data and to ensure compatibility across the Commonwealth. The Massachusetts Association of Regional Planning Agencies (MARPA) agrees with the Task Force that moving MassGIS to ITD will place these activities closer to the center of state government, within a department focused primarily on information technology infrastructure.

Funding

Developing and maintaining information infrastructure requires a stable funding source; just as with roadways, bridges, reservoirs, or schools, datasets that are half-completed or unmaintained have little utility. Ensuring sufficient, stable, and transparent funding for MassGIS is a critical MARPA concern. We recognize that the most likely funding scenario will involve a diversity of sources (legislative appropriation, agency contribution, fee-for-service), but consistency in funding is paramount. Specifically, the 2007 MassGIS Strategic Plan defined priorities for the Massachusetts State Data Infrastructure (MSDI), five critical datasets of great use to nearly every state agency and municipality. Any plan to move MassGIS to ITD should include a funding plan to develop the MSDI within a three-year timeline and maintain it into the future. **The funding should include an appropriate mix of capital funds and a line item appropriation in the Governor's FY2011 budget.**

Stakeholder Participation

We also want to stress the importance of stakeholder engagement in the future of MassGIS. End users of MassGIS products can be found across state agencies, RPAs, municipalities, academic institutions, and the private sector. Unlike conventional infrastructure, GIS end users are also critical participants in the creation and maintenance of geographic data. Many core datasets are created from information submitted by state agencies RPAs or municipalities. Historically a statewide GIS advisory group has existed and was found to be of mutual benefit for both its participants and MassGIS. **Because of this "two-way" relationship between MassGIS and end users, it is critical to establish an ongoing advisory board to facilitate communication, coordination, and transparency with representation from outside the state government, including two seats for MARPA.**

RPAs play an important role as intermediaries; we compile data for MassGIS and also provide technical assistance and training to cities, towns and non-governmental organizations (NGOs). We think it would be valuable to develop a common understanding of how MassGIS and RPAs will work to support each other's work, perhaps formalized in a Memorandum of Understanding.

Transparency

We cannot overstate the importance of transparency and openness when it comes to geographic information. Large investments in new datasets are only beneficial when the information is readily available to users across the public and private sector. Barriers to information make it harder for state agencies and businesses to make wise policy decisions and investments. We strongly urge A&F, ITD and MassGIS to uphold a commitment to "open data"- data that is understood within the GIS field as being open and free to everyone, free of copyrights, and treated as civic capital. Certainly there may be instances in which a particular dataset cannot be made public in its entirety due to concerns about confidentiality or public safety. However, such decisions should not be made lightly or in secret. **ITD should develop a transparent "embargo" process with clear procedures for determining when access to a certain dataset should be restricted and whether less sensitive elements of the dataset can be selectively released.**

MARPA stands ready to advocate for MassGIS funding and implementation of the strategic plan for MSDI. We see an opportunity for the Patrick Administration to take a visionary leadership role in the stewardship of our Commonwealth's geographic information systems. The results will be greater economic development, civic transparency, and a healthier environment for Massachusetts residents.

Sincerely,

William Constable
Executive Committee,
Metropoltian Area Planning Council
MARPA President

Timothy W. Brennan
Executive Director
Pioneer Valley Planning Commission
MARPA Secretary

Appendix G
MGIC Members as of September 2007

First Name	Last Name	Title	Affiliation	Affiliation Type	Phone	E-mail
Dave	Beck	Chair	MAAO GIS Committee	NGO	781-925 2205	maaogis@yahoo.com
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Joan	Gardner	Principle	Gardner Associates	PRIV		jngardner37@comcast.net
Christian	Jacqz	Director	MassGIS - EOEA	STATE	617-626-1056	Christian.Jacqz@state.ma.us
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Johanna	Meyer [b]	GIS Coordinator	Mass. Emergency Management Agency	STATE	508-820-2005	johanna.meyer@state.ma.us
Nigel	Pickering[c]	Sr. Engineer	Charles River Watershed Association	NGO	617-965-5975	npickering@crwa.org
Mike	Terner	Vice President	AppGeo, Inc.	PRIV	617-292-2001	mgt@appgeo.com
Feng	Yang	GIS Manager	MIS Department, Town of Brookline	LOCAL	617-730-2005	feng_yang@town.brookline.ma.us

Notes:
[a] For Marc Draisen, Executive Director
[b] For John Tommaney, Director of Operations
[c] For Robert Zimmerman, Executive Director