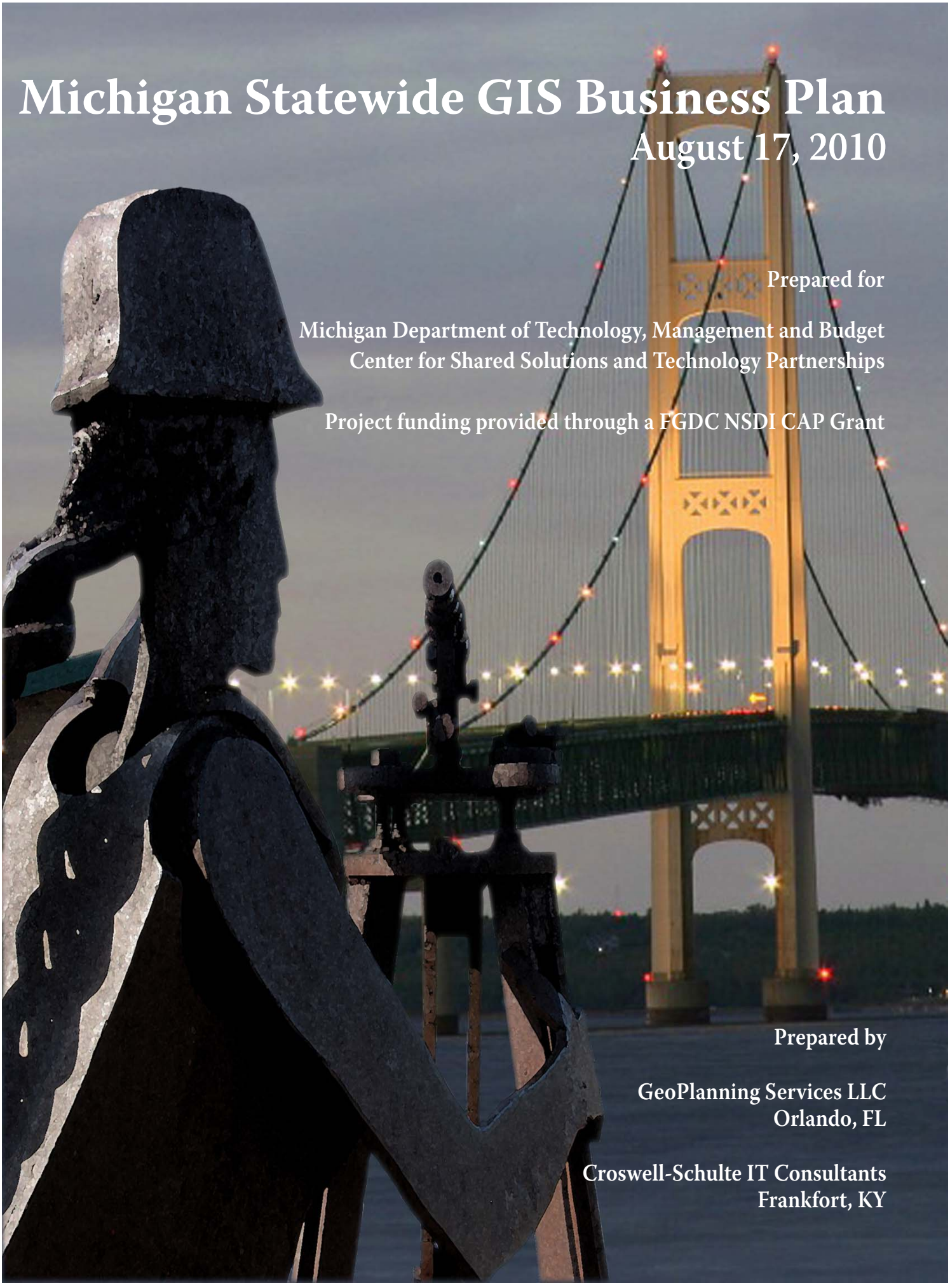

Michigan Statewide GIS Business Plan

August 17, 2010

Prepared for

Michigan Department of Technology, Management and Budget
Center for Shared Solutions and Technology Partnerships

Project funding provided through a FGDC NSDI CAP Grant

Prepared by

GeoPlanning Services LLC
Orlando, FL

Croswell-Schulte IT Consultants
Frankfort, KY

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Executive Summary: Michigan Statewide GIS Program Business Plan

Introduction and Project Background

This business plan has been accomplished under a project funded as part of the National Spatial Data Infrastructure (NSDI) Cooperative Agreement Program (CAP) Category 3—a grant program administered by the U.S. Geological Survey. It defines a framework and specific initiatives to enhance and expand the use of geographic data and GIS technology for the benefit of stakeholder organizations statewide—including all levels of government, the private sector, non-profit organizations, and the general public. Work on plan preparation began in March of 2010 and after a considerable review and comment process, it was completed in July of 2010. The project is being administered by the Center for Shared Solutions and Technology Partnerships (CSSTP) of the Michigan Department of Technology, Management, and Budget (MDTMB). The CSSTP assembled a project Steering Committee to oversee plan preparation and have engaged a consultant team from the firm GeoPlanning Services, LLC to gather information and prepare the plan. Input was gathered from the project Steering Committee, and project participants from the statewide GIS community. This Executive Summary provides a brief overview of project background and key elements of the business plan. The full business plan document may be found at: www.Michigan.gov/NSDI.

This business plan identifies specific ways to improve statewide access to geographic data and services which support the business needs of the entire GIS community in Michigan. Two fundamental assumptions have guided project work: a) plan preparation planning effort has maintained a **statewide** perspective with a focus on the needs of and coordination among all Michigan GIS stakeholder groups and b) plan objectives and implementation initiatives will support broad goals of Michigan's 2008 Information Technology Strategic Plan (www.michigan.gov/itstrategicplan).

To provide a sound foundation for business planning, the project consultants, in coordination with the project Steering Committee, gathered and evaluated information from the statewide GIS community through: a) review of documents and Web-based sources; b) a Web-based survey publicly available to all interested respondents; c) regional "listening sessions" held at 5 different locations throughout Michigan; d) interviews with selected leaders in the statewide GIS community; and e) considerable review and comment (by all interested parties) on draft reports and versions of the plan.

GIS Business Drivers and Business Objectives

A foundation of this business plan is the definition of "business drivers"—which are major program areas, needs, or challenges that GIS technology and geospatial data can help support or address. Some business drivers (e.g., improved quality and access to geographic data, reductions in cost, support for organizational partnerships and cost sharing) are overarching in nature reflecting overall goals or advantages for organizations as a whole. Other business drivers are more specific to individual organizations, business areas, or programs (e.g., public safety/emergency management, economic development, infrastructure/asset management). The implementation initiatives explained in the business plan focus on these drivers through an identification of key objectives:

1. *Make **changes in statewide GIS organizational structure and governance** to improve coordination, collaboration, and service.*
2. *Continue current **support and expand GIS services for State agencies** in areas where there are clear benefits.*
3. ***Enhance GIS coordination, collaboration, and partnerships** among government, private and non-profit organizations.*
4. *Explore and secure **new funding sources and financing strategies** to support statewide GIS initiatives.*

*5. **Expand and enhance the Michigan Geographic Framework (MGF) program** through improvements in data quality, expansion of data content, more effective stewardship, and increased participation of stakeholder organizations throughout the state.*

*6. Develop new **high-priority Web-based applications and GIS services** and make them easily accessible by the public.*

*7. Improve and expand **programs and activities for statewide outreach and communication** about the Statewide GIS program and its benefits*

*8. Prepare **template documents and tools to support GIS program planning, implementation, technical development, and services procurement** for use by any stakeholder organization.*

*9. Expand and support opportunities, programs, and tools for **better GIS education and training**.*

*10. Put in place and activate a process for **creation and approval of formal policies and standards** that impact the statewide GIS program.*

*11. Increase programs and **sources for GIS staff resources** support*

*12. **Keep track of advances in the IT and GIS industrie**s and position the statewide GIS community to take advantage of these advances*

*13. Identify and implement **changes to GIS-related software licenses and computing infrastructure** (hardware and networks) to support high-performing, secure, and cost-effective services and efficient system administration practices.*

Experiences recorded over 20 years of successful GIS deployments in the USA provide strong evidence that GIS delivers tangible benefits that can be measured in monetary or other terms, as well as many other benefits, more difficult to quantify, which result in significant improvements to organizations. Benefits from the use of GIS technology and data generally fall into the following categories which are explained in more detail in the business plan: a) Operational and Efficiency Gains, b) Cost Savings, c) Cost Avoidance, d) Revenue Enhancement, e) Difficult-to-Predict Quantitative Benefits, f) Non-quantifiable Benefits. Implementation initiatives focus on actions that will help deliver increased benefits to the GIS community.

Implementation Initiatives

Public agencies, private firms, and non-governmental organizations in Michigan depend on maps and geographically referenced information to support day-to-day operations and long-term planning and decision-making. This business plan defines actions that seek to eliminate, or at least reduce, current obstacles to effective access and use of GIS technology and data. This will be done by more efficiently leveraging existing resources and undertaking additional organizational and technical development to improve the GIS program and deliver increased benefits to the Michigan GIS community.

The business plan proposes a total of 76 implementation initiatives—specific actions and projects intended to make tangible improvement and deliver increased benefits to GIS users. These initiatives address a range of organizational, technical, and management topics organized under five main categories:

- Organizational and Management Structure, Policies, and Practices (O)
- Data Development and Stewardship (D)
- System Configuration, Software, or Application Development and Operation (S)
- Communications, Outreach, Education, and Statewide GIS Coordination (E)
- Funding, Resourcing, and Financial Management (F)

Among these implementation initiatives are those that call for improved statewide GIS program management and coordination through specific changes to the current program structure lead by CSSTP. These initiatives address important areas of GIS program governance, management practices, policy development, and outreach with the statewide

community. The plan calls for building on and enhancing the current organizational structure to better engage GIS users throughout the state and to forge effective partnerships. This includes increasing awareness of GIS resources and activities to support GIS initiatives in low population, low-resourced jurisdictions.

Multiple implementation initiatives deal with geographic database development and stewardship issues. These initiatives focus on improvements and augmentation of the current Michigan Geographic Framework (MGF) program and a range of activities to improve data content, quality, and access by GIS users.

The business plan contains a detailed examination of several initiatives considered by the project Steering Committee to be very high priority. Details on approach, outcomes, and resource requirements are provided for the following high-priority initiatives:

- Organizational and governance changes
- Statewide ortho imagery program
- Statewide parcel database development
- Statewide address point database development
- Enterprise GIS applications and Web accessible services

GIS Program Governance Structure and Management

The business plan recommends changes to the current organizational and governance structure to provide a foundation for an improved statewide GIS program. These recommendations focus on the organizational structure and management practices in the Department of Technology, Management and Budget (DTMB) building on current statewide GIS program management in the Center for Shared Solutions and Technology Partnerships (CSSTP) to address the following management challenges:

- Providing a mechanism and environment in which all GIS stakeholder organizations (particularly local governments) have an effective way to provide input on GIS program operations at DTMB
- Creating an organizational structure that encourages and enables wide participation and contributions on projects, research, and decisions of the statewide GIS program
- Keeping a focus on GIS as one part of enterprise IT and making sure IT and GIS initiatives, standards, policies, etc. are mutually supportive
- Improving and maintaining effective intergovernmental relationships (state-federal, state-local) to establish and support effective project and joint funding for GIS initiatives
- Establishing, approving, overseeing use of GIS technical standards and related IT standards that help to accomplish GIS program business objectives
- Establishing, approving, overseeing GIS and related IT policies (addressing organizational, operational, legal matters)
- Expanding the use of GIS in support of state and local business needs in areas where there are clear tangible and intangible benefits
- Forming, encouraging, and supporting regional collaboration and joint funding, cooperative GIS arrangements--inside counties (County-Township-City-Village) as well as multi-county regions.
- Enhancing the quality and availability of GIS data and putting in place effective stewardship practices

- Improving efficiency in use of existing resources and securing additional funding sources that support statewide GIS program objectives and stakeholder organizations
- Expanding, providing access to GIS data technology by the "have-nots" (low population jurisdictions and regions)
- Addressing a wide range of outreach, orientation, education, and training for GIS users. This includes creation/support of user forums that give a way for users to share information, ideas, general professional networking
- Operational support and management assistance for joint GIS projects
- Keeping a connection and awareness of the business value of GIS for senior decision makers and elected officials

The recommended statewide organizational and governance structure addresses the needs and concerns faced by Michigan. It builds on the existing structure and identifies changes and improvements that address current limitations. It is designed to integrate smoothly with state government IT governance and management while strengthening coordination and collaboration with all stakeholder groups and users statewide. In summary, the following recommendations for changes and improvements to the current statewide GIS program organizational structure and governance are proposed for implementation:

- Changes in operational focus and resources of the DTMB Center for Shared Solutions and Technology Partnerships (CSSTP) to augment outreach and support in development of partnerships with GIS stakeholders and project planning and management support
- Modifications in mission, membership, and operational role of the Cross Boundary Technical Steering Committee (CBTSC) to better define its role in statewide GIS program planning and decision making and to ensure more comprehensive representation of statewide GIS stakeholder organizations
- Formation of Standing Subcommittees and Working Groups as a means to engage the participation of all statewide GIS stakeholder organizations in important GIS technical and non-technical initiatives and decisions
- Improve the working relationship between IMAGIN and MiCAMP to better serve the statewide GIS community through supporting professional networking, education, and advocacy for GIS user needs and initiatives.
- Continuation and enhancement in the role and activities of the State GIS User Group and a name change to “State User Group Forum”
- Formalize policies that define and support the organizational and governance structure

An approach for planning and managing implementation initiatives are included in the plan. This covers practices for detailed work planning, project risk assessment, assigning resources, progress monitoring, and reporting. The business plan provides templates for reporting and suggestions for the use of automated project management tools. The business plan also contains a section with potential funding sources and financing strategies to support development and ongoing operation of GIS program activities.

Introduction

This business plan has been accomplished under a project funded as part of the National Spatial Data Infrastructure (NSDI) Cooperative Agreement Program (CAP) Category 3: 50 States Initiative. It creates a framework to move Michigan in a common and collaborative direction to improve the ortho imagery, cadastral, and address data themes statewide through a series of key initiatives. The plan also outlines the organizational structure that is needed to give the GIS community of stakeholders a voice in directing progress on these themes and a means to actively participate in the design of collaborative programs, development of standards, and crafting of policies.

This work is being carried out within a national context and adopts the principles defined as part of the National Spatial Data Infrastructure (NSDI). It follows guidelines and a planning approach supported by the "50 States Initiative" (www.nsgic.org/hottopics/fifty_states.cfm). The "50 States Initiative," is a partnership between the Federal Geographic Data Committee (FGDC) and the National States Geographic Information Council (NSGIC) under which each state realizes its spatial data infrastructure (SDI) which builds into the national map and the National Spatial Data Infrastructure (NSDI).

The main goal of this business plan is to improve statewide coordination and access to geographic data and services to support the business needs of Michigan stakeholders by building on existing institutional frameworks, GIS capabilities, and spatial data development. It is designed to support the Michigan IT Strategic Plan by building on specific goals and action items presented in that document.

1. Project Background and Strategic Foundation

1.1 Project Background and Purpose of Business Plan

The business planning project is being administered by the Center for Shared Solutions and Technology Partnerships (CSSTP) of the Michigan Department of Technology, Management and Budget (MDTMB). The CSSTP is the state government office responsible for statewide collaboration and partnerships including GIS coordination and support. CSSTP has initiated this statewide GIS business planning process to identify and provide a practical blueprint for expanding and improving GIS services, coordination, and access to GIS technology and data by all stakeholder organizations throughout the state. The business planning project is being carried out with financial assistance from a Federal government National Spatial Data Infrastructure (NSDI) Cooperative Agreement Program (CAP) Grant which is part of the "50 States Initiative" program of the Federal Geographic Data Committee (FGDC).

This business plan will identify specific ways to improve statewide access to geographic data and services which support the business needs of the entire GIS community in Michigan. It will build on existing GIS capabilities, staff resources, computing infrastructure, geographic data, and coordination practices that are currently in place and identify changes that will be made over a 3 to 4 year period. From its outset, this planning effort has maintained a **statewide** perspective with a focus on the needs of, and coordination among all Michigan GIS stakeholder groups. This statewide perspective is a fundamental theme of the statewide information technology (IT) program being administered by the MDTMB, of which GIS is acknowledged as a critical element of the overall IT architecture.

1.2 Brief History and Summary of Statewide GIS in Michigan

A summary of the history of GIS use and statewide GIS coordination in Michigan is provided here to give some perspective on business plan initiatives defined in the Plan. This brief summary only touches on some key milestones in a long and rich history going back over 35 years. For more information about the history of GIS adoption and use in Michigan visit www.michigan.gov/csstp.

GIS use in Michigan began in the 1960's when the City of Detroit and the Southeast Michigan Council of Governments (SEMCOG) became active in digital mapping. In the mid 1970's, after the launch of the first Landsat land imaging satellite, Michigan State University (MSU) played a lead role in imagery analysis to support natural resources inventory and planning. This led to the establishment of the Michigan Resource Information System (MIRIS) by the State's Department of Natural Resources (DNR) in the 1970s. The MIRIS program continued to expand and served an increasing number of users in DNR and other state agencies. In the 1980s, the DNR created CMAP a program and digital base map that supported an expanded set of GIS applications for state agencies.

Additionally in the 1970s, the Michigan Department of Transportation (MDOT) began to focus on spatial relationships within transportation planning and modeling. MDOT had several spatially related projects including the Statewide Transportation Modeling System which began linking demographic and transportation datasets through graphics and mapping. Concurrently, MDOT developed the Michigan Accident Location Index (MALI) which is the Linear Referencing System (LRS) use to link crash incidents to a location. This was a street index in a database format.

GIS use was expanded further in the late 1980s and early 1990s within the State Budget Offices' Michigan Information Center (MIC) was focusing on the use of GIS data and technology to support state redistricting. With the completion of the redistricting work, the MIC continued to operate and to pursue GIS project work throughout state government. The Michigan Department of State contracted MIC to enhance the US Census Bureau TIGER file to include jurisdictional and voting districts. This modified file would be the base for their voter registration system.

The GIS program in DNR continued to expand and serve a range of state agencies from the mid 1980s into the early 1990s but in 1992, a DNR management decision was made to limit GIS services to outside agencies and to focus only on DNR programs. In the early 1990s, the MDOT expanded its GIS technology. MDOT adopted DNR MIRIS to populate the LRS system with the intention to display the crash incidents on a map. However, this process was difficult and MDOT went looking for assistance.

For several years, GIS users from the Michigan state departments had been meeting monthly to share information. It became apparent to those users that the best way to obtain an up-to-date, accurate GIS statewide product would be to find ways to pool the state's resources to accomplish the job once for all departments. Such a product, with combined funding and support, would be much bigger and better than any one department could accomplish, and all could benefit from future joint maintenance of and enhancements to a common "Framework".

MIC provided services to MDOT in GIS implementation which led to the initiation of a major project, in 1996, for the creation of a more accurate and higher quality statewide digital base map. This MDOT funded multi-phased project, involved the conflation of the MIRIS and TIGER to form the base map. Complete population of the LRS onto the transportation network was completed in 2000. The first phase resulted in a complete base map which included transportation network, jurisdictional, administration and census boundaries, and hydrography. This new base map source created greatly expanded opportunities for GIS applications.

In 2002, the state launched a major effort of information technology consolidation which included the creation of the Michigan Department of Information Technology (MDIT). This organizational change was accompanied by the centralization

of most information technology staff and resources in MDIT. In 2003, GIS staff in multiple state agencies was assigned to the newly created Center for Geographic Information (CGI) in MDIT (former MIC).

CGI expanded their role from GIS data services to include web mapping application developments and GIS project consulting services. CGI created the Michigan Geographic Data Library in 2002. This geospatial data clearing house allowed for CGI to publish multiple State Agencies GIS datasets for free public consumption to be used without restriction. The GDL was one of the first geospatial data clearing house with an estimated 90,000 annual downloads of data per year. In addition, CGI launched its first web mapping application, Map Michigan in 2003. This was the first time that the state's GIS data was presented in a simple end user friendly form which expanded its visibility and changed the way GIS technology would support State business.

In 2009, the existing Center for Geographic Information and the Office of Technology Partnerships were merged to form the Center for Shared Solutions and Technology Partnerships (CSSTP). The CSSTP was created with two key principles that have an important impact on GIS development and coordination: 1) GIS is one important part of an overall information technology architecture and mission and 2) statewide IT and GIS coordination and partnerships, not just among state agencies, but for all public and private sector organizations will guide the work of the CSSTP. The CSSTP continues to lead statewide GIS coordination in Michigan and is putting in place improved mechanisms and resources to expand GIS use, enhance services, and improve coordination of the state's GIS user community.

It is clear that GIS use in Michigan has had a long and successful history. As described in subsequent sections of this plan, GIS users in all stakeholder groups across the state have been extensively using GIS technology and data to support their business needs and there is considerable interest in expanding the use of GIS to derive additional benefits. There is also an acknowledgement that improvements can be made that will position the GIS user community to make much more effective use of GIS in the future. This business plan identifies important technical and non-technical initiatives that will enable these changes and GIS program enhancements. The MI Spatial Data Infrastructure Business Plan is an extension of the State of Mi IT Strategic Plan supporting its mission and vision and will directly support the goals outlined within the strategic plan.

1.3 Business Plan Overview and Approach

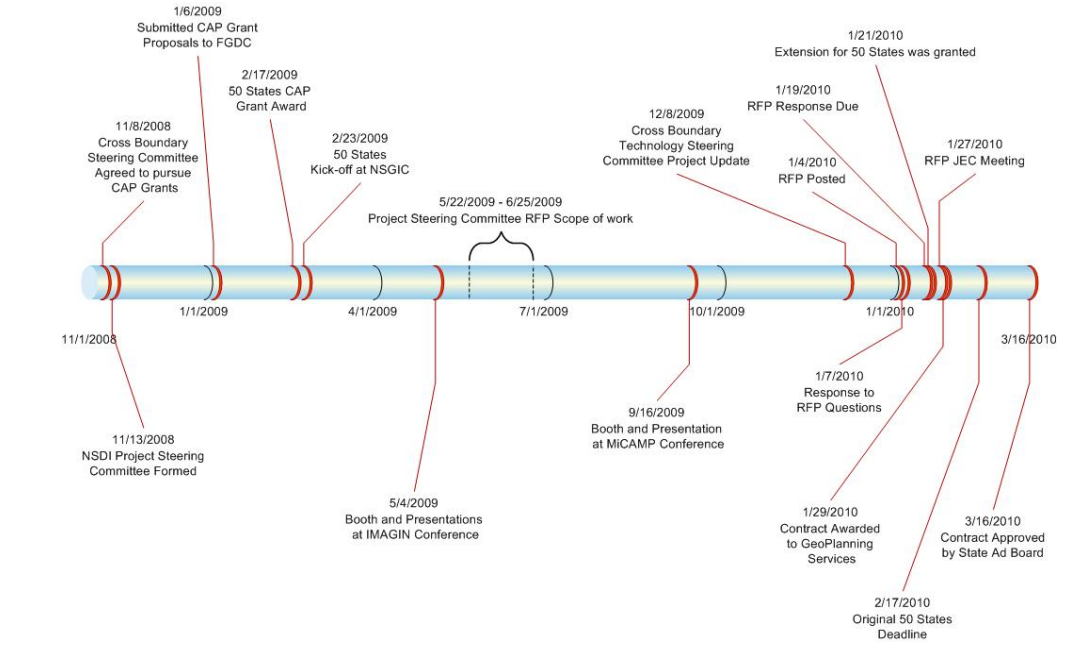
This Business Plan includes the major sections summarized below:

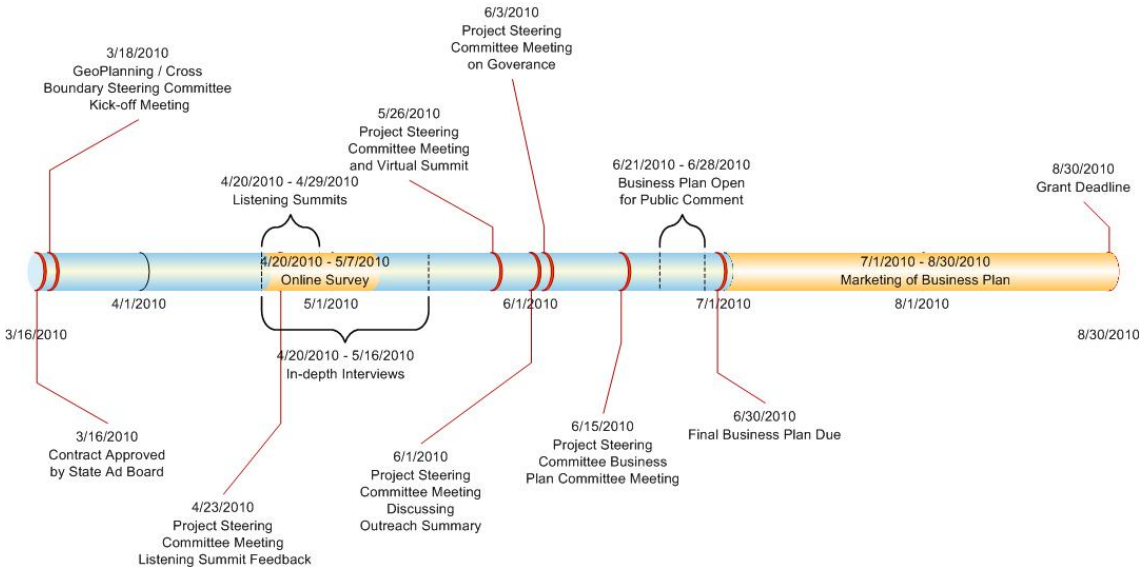
- **Section 1, Project Background and Strategic Foundation**, explains the purpose of this project, provides project background information, and describes the relationship with state IT strategic goals.
- **Section 2, Summary of the Statewide GIS User Community and Needs**, explains the organizational scope, information gathering and outreach efforts, and needs of the statewide GIS community.
- **Section 3, Statewide GIS Business Drivers and Business Plan Objectives**, presents a business foundation for statewide GIS improvements and describes high-level business objectives which will elaborate on in Section 5.
- **Section 4, GIS Benefits and Business Justification for Statewide GIS Improvements**, cites tangible and intangible benefits and sound business reasons for proceeding with statewide GIS program improvements.
- **Section 5, Implementation Initiatives, Timing, & Resource Requirements**, lays out a path for development by presenting specific implementation activities with a projection of resources and timing requirements.

- **Section 6, Implementation Management and Monitoring**, describes roles and responsibility for SDI implementation, an approach for implementation monitoring and management, and SDI program outreach.

The business planning process began in November 2008 when the state, with guidance from the State and Local Cross Boundary Technology Steering Committee applied for two grants under the USGS National Spatial Data Infrastructure (NSDI) Cooperative Agreement Program (CAP). These grants were awarded the state in 2009, an open and competitive bidding process resulted in the selection of a consulting team from GeoPlanning Services, LLC in February 2010. The work process began in March 2010.

The timeline for this project followed the timeline below:





The CSSTP created a project Steering Committee with representatives from a number of stakeholder organizations. Individuals with key roles in project management and oversight are identified below. The role of the project Steering Committee was to provide oversight and direction to the consulting team relative to project schedule and outreach mechanisms. The consultant team prepared this business plan and the recommendations it contains using information gathered from the Michigan GIS community and the consultants' familiarity with GIS programs in others states. Multiple review and comment steps with input from the project Steering Committee and a large spectrum of GIS stakeholder organizations contributed to plan revisions culminating in the final Business Plan.

Table 1. Steering Committee Members and DTMB Project Staff

Person	Title	Organization	Role
Stephen Aichele*	Michigan Geospatial Liaison	USGS	Project Steering Committee
Scott Ambs**	GIS Coordinator President	Jackson County GIS IMAGIN	Project Steering Committee
George Boersma	Director of Technology Partnerships	MDTMB	Project Steering Committee
Gil Chesbro		Michigan Department of Transportation	Project Steering Committee
Valdis Kalnins	Director of Land Information Services Secretary	Allegan County MiCAMP	Project Steering Committee
Jessica Moy	Director	Remote Sensing & Geographic Information Science Research and Outreach Services, Michigan State University	Project Steering Committee
Steve G. Perry**	Senior GIS Specialist	Southeast Michigan Council of Governments (SEMCOG)	Project Steering Committee
Rob Surber	Administrator	MDTMB-CSSTP	Project Steering Committee
Matt VanDyken	Director of IT/GIS	City of Holland	Project Steering Committee
Jeroen Wagendorp	Chair, Dept. of Geography and Planning Chairman	Grand Valley State University MiCAMP	Project Steering Committee
Laura Blastic	Geo-Framework Services Manager	DTMB-CSSTP	Project management and coordination
Paul Harmon	Project Manager	DTMB-CSSTP	Project management and coordination

*Stepped down from the Committee on June 16, 2010 due to a conflict of interest.

**These members stepped down from the Committee between June 16 and June 17, 2010.

The project has followed a process beginning with project kick-off and organization and proceeding with information gathering and input by members of Michigan's GIS user community. A number of mutually supporting information gathering steps were used including: a) a Web-accessible survey tool, b) interactive listening summit held in 5 locations around the state, c) target interviews with key GIS stakeholders, d) a virtual summit conducted on-line to allow for participation for stakeholders unable to travel to an interactive listening summit, e) follow-up email and phone discussions, and f) review of pertinent documents and Web-based resources. These information gathering steps provided a fairly comprehensive picture of the current state of GIS use in Michigan and many ideas and suggestions for improvement. Summary notes were prepared from listening sessions and interviews and project participants were given a chance to review and provide follow-up comments and clarifications. In total, over 280 individuals representing over 100 organizations of all types (all levels of government, regional agencies, universities, nonprofit organizations, public and

private utilities, private sector product and service companies, and others) provided input which was reviewed and considered in the preparation of the business plan. Section 2 provides more information about the information gathering process.

Business Plan preparation followed an iterative process beginning with an outline and moving through draft preparation, review, and revision steps in which comments and suggested changes were provided by the CSSTP staff and the project Steering Committee. After an initial review by those groups the document was made available for comments by the GIS stakeholder community via the project web site: www.mighigan.gov/nsdi. These comments and revisions eventually culminated in this Business Plan.

1.4 Strategic Foundation for GIS Business Plan

In 2008, the Michigan Department of Technology (now "Department of Technology, Management and Budget") took the lead role in a major strategic planning effort for information technology. The result of this work, the *Michigan IT Strategic Plan* addresses all areas of IT—not just for state agencies but all organizations and people in Michigan who are affected by IT systems, applications, and policies. The plan may be accessed at: www.michigan.gov/itstrategicplan. The strategic plan begins by articulating a vision for IT:

> "This strategic plan lays out the future vision for technology in Michigan government...empowering our state and expanding government accessibility for our citizens and businesses statewide".

Several guiding principles of the plan, prepared with input from stakeholders across Michigan, lay a foundation for the plan's high-level goals and the strategies designed to meet the goals:

- Effective and Efficient Customer-Based Operations and Services
- Performance, Accountability and Public Value
- Privacy, Security and Public Trust
- High Performance Worker and Workplace
- Agile Management and Infrastructure
- Shared Solutions, Standards and Flexible, Open Boundaries
- Maturation and Modernization of Solutions
- Innovation and Transformation

GIS is acknowledged as a critical piece of the state's overall IT architecture and that GIS technology and geographic data must play an important part in meeting the IT goals. Table 2 provides a general perceptive on the relationship of Michigan's statewide GIS program with the IT strategic goals.

Table 2. Michigan IT Plan Strategic Goal Relationship to GIS Program

IT Strategic Goal	Relationship to Statewide GIS Program
Goal 1: Access: Expand Michigan's services to reach citizens and businesses anytime, anywhere. Citizens and agencies alike cite the need for simpler and streamlined access points to government services	GIS has proven to be an effective tool to support e-government initiatives through tools to access geographically-referenced data (e.g., location of government offices, health care clinic location, real property information, permits, road and utility conditions, voting places, etc.). Easy access to this geographic information—including map displays help to answer questions and get needed services in a streamlined manner. The Plan mentions several applications using GIS technology and data that support this goal: a) MiDrive (access to traffic and road condition information) and b) MISWIM (access to water quality, fish stocking, and other water information). These are only two examples of a wide range of applications that can be enabled with GIS technology and data. GIS is also being used to map broadband digital access and identify locations that require improved service, CSSTP supports this effort.

Table 2. Michigan IT Plan Strategic Goal Relationship to GIS Program (con't.)

IT Strategic Goal	Relationship to Statewide GIS Program
Goal 2: Service: Deliver efficient and effective technology services and shared solutions to the agencies. Meeting and exceeding client expectations	Business needs of public sector organizations and private companies in Michigan depend upon geographic information to efficiently provide services to citizens and customers. GIS supports this goal of enhanced service in many ways such as: delineating efficient routes for service delivery; monitoring and maintaining utility and transportation services; provision of public health services; and many others. One of the stated strategies under this goal is to "create efficiencies in support of existing systems". GIS technology provides effective tools for integration of existing systems (using common geographic identifiers like address, parcel, district, facility ID). These "geographic identifiers" also provide a means for building more efficient "front-ends" to support queries and data access by location—often via a map display.
Goal 3: IT Management and Infrastructure: Improving operations, security and reliability through statewide solutions and universal standards. Enabling even more dependable, agile and leading-edge IT operations across state government.	Access and use of GIS technology and data is dependent on a robust and secure system infrastructure (hardware, software, networks, system management) like most enterprise IT tools. GIS technology also supports the design and development of improved supporting infrastructure planning and development initiatives. For instance, geographic location is a part in planning for system consolidation and reconfiguring of networks and access points. The broadband mapping project described for Goal 1 also has implications for improvements in digital communications infrastructure. There is an emerging body of GIS standards, and formal IT standards that impact GIS, which need to be applied more consistently to support this goal.
Goal 4: Great Workplace: Support a high-performance workforce. Attracting and retaining the best technology talent.	Like other elements of enterprise IT, effective use of GIS is dependent in large part on high-quality, talented staff and a work environment that engenders high productivity. Michigan is fortunate to have an extensive network of educational institutions that produce talented GIS professionals but not enough is done to keep such individuals in state, attract talent from out-of-state, and provide ongoing opportunities for professional development and enhancement. To many, GIS is an exciting and attractive profession—something which can be emphasized as a "selling point" in staff recruitment. GIS programs are good candidates for using innovative personnel options (student intern programs, integrated work teams from multiple departments of organizations, mentoring, and other staff management approaches that seek to increase productivity and job satisfaction. In some cases, GIS may be used as a tool to support recruitment and to evaluate the geographic distribution of Michigan's labor force to support jobs and retraining programs.
Goal 5: Cross-boundary Solutions: Foster partnerships across and beyond state government. Using technology as a change agent for cross-boundary innovation.	GIS is an important part of the partnerships puzzle. In fact, there are significant examples in Michigan in which GIS was the basis for government-to-government and public-private partnerships (e.g., major cost-sharing efforts for geographic database development). All levels of government and the private sector have common, often overlapping needs for geographic information (jurisdictional boundaries, address-related data, real property, transportation and utility infrastructure. Several examples cited in the Strategic Plan under this goal (e.g., public safety communications, health information network) have important implications for GIS technology. The Cross Boundary Steering Committee, cited for this goal, is being organized to play a key role in GIS partnerships. GIS professionals in Michigan understand that state-local-private partnerships are important. While supporting users in "technology rich" parts of the state, more attention needs to be focused on the needs of rural, low population areas to improve IT access and to deliver benefits. GIS is a technology that needs to be made more available and it is a tool that can support expansion of IT access around the state.
Goal 6: Innovation and Transformation: Drive innovative processes and technologies to transform Michigan's government service. Rethinking technology and processes; challenging the status quo.	The goal for applying innovative technologies and practices to improve government service impacts every area of IT including GIS. GIS technology can be seen as a stimulus for innovation because its implementation often requires an examination of new ways to solve problems—from a geographic perspective.

2. Summary of the Statewide GIS User Community and Needs

2.1 Summary of Information Gathering

The success of this Business Plan will be in direct correlation to the plan's alignment with the needs of the State of Michigan's GIS user community. Michigan is a unique state with a unique environment surrounding the historical evolution of and business drivers for GIS. In order to assure that we would have input from a broad community of users from a wide variety of application areas and organization types we reached out not only to the well known GIS user groups and professional associations in the State, we also contacted nearly 40 other organizations with the potential to have an interest in geospatial technologies. Table 3 lists the organizations contacted to provide information about the project and the variety of opportunities for input to the development of the business plan.

Table 3. Outreach Organizations

Organizations
County Road Association of Michigan
Michigan Emergency Management Association
Farm Service Agency - Michigan Chapter
Federal Agencies
Land Information Access Association
Michigan Assessors Association
Michigan Association of Chamber Professionals
Michigan Association of Counties
Michigan Association of County Administrative Officers
Michigan Association of County Drain Commissioners
Michigan Association of Equalization Directors
Michigan Association of Insurance Agents
Michigan Association of Planning
Michigan Association of Public-Safety Communications Officials
Michigan Association of Realtors
Michigan Association of Regions
Michigan Association of School Administrators
Michigan Association of United Ways
Michigan Cable Telecommunications Association
Michigan Economic Development Corporation
Michigan Education Association
Michigan Electric and Gas Association
Michigan Government Finance Officers Assoc.
Michigan Municipal League
Michigan Professional Insu rance Agents Assoc.
Michigan Railroads Association
Michigan Retailers Association
Michigan Small Business & Technology Dev. Center
Michigan Society of Professional Engineers
Michigan Society of Professional Surveyors
Michigan Township Association
Michigan United Conservation Clubs
Michigan Works
Roadsoft User Group
Small Business Association of Michigan
State Agencies
Telecommunications Association of Michigan
Transportation Asset Management Council
United Tribes of Michigan

Opportunities for input included an on-line survey, five interactive listening summits, a "virtual" web based summit, and interviews with key thought leaders in GIS community.

Outreach Activity	Dates	Participants
Marquette Stakeholder Meeting	April 20, 2010	15
Gaylord Stakeholder Meeting	April 21, 2010	26
Kalamazoo Stakeholder Meeting	April 27, 2010	36
Pontiac Stakeholder Meeting	April 28, 2010	32
East Lansing Stakeholder Meeting	April 29, 2010	82
On-Line Participation		
On-line Survey	April 6 to May 11, 2010	282
Virtual Stakeholder Meeting	May 26, 2010	38
Document Publication Dates		
Outreach Summary Document	June 3, 2010	
Comprehensive Survey Findings	June 3, 2010	
Additional Public Comments	May 10, 2010	

A project web site was created (www.michigan.gov/nsdi) to provide a constant source of project information. Using e-mail addresses of those that attended a listening summit, as well as those that provided an e-mail address at the conclusion of the on-line survey, the interested stakeholder e-mail list included 240 individuals. This list was used to distribute information about the project and to notify the user community of project related activities.

Meeting summaries of each of the listening summits were distributed in a draft form to everyone that attended the meetings to offer an opportunity for clarification of comments and additions of thoughts that were not addressed during

the public meetings. These summaries, once given a one week review time by meeting attendees, were placed on the project web site for everyone to review.

A summary of the entire information gathering phase of the project was also created and placed on the web site for public comment before being finalized.

In the interest of getting a full review of all findings and recommendations from the project, all documents associated with this project were placed on the project web site for review by the GIS community.

Documents provided on the project web site: www.Michigan.gov/NSDI were:

- East Lansing Meeting Minutes
- Gaylord Meeting Minutes
- Kalamazoo Meeting Minutes
- Marquette Meeting Minutes
- Pontiac Meeting Minutes
- Post Listening Summit Comments
- "Virtual" Summit Presentation
- NSDI Listening Summits Master Presentation
- Michigan NSDI CAP Grant Outreach Findings Summary
- Michigan NSDI CAP Grant Business Plan [Draft]

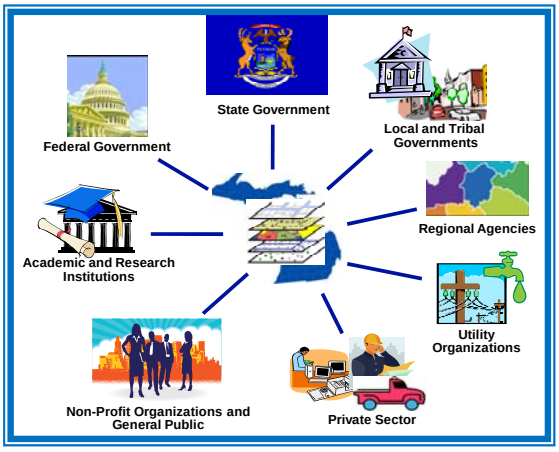
2.2 Statewide GIS Stakeholder Community

The GIS stakeholder community in Michigan is made up of a highly diverse group of organizations from a wide variety of community types. In addition to the institutional variety that would be expected in any state (local government, regional government, tribal, utilities, academic institutions, non-profit, private firms, federal government, etc.) there is a wide variety of organizations under those broad categories with unique business drivers. Finally, there is tremendous diversity in the level of technical maturity and funding for GIS using organizations in the state.

While the need of all organizations with the same mission, for example the many Drain Commissions in the State, is similar their technical and financial abilities to fully capitalize on GIS and spatial technologies may be widely different.

The information collection phase of the project had participation from a significantly diverse sample of the GIS user community to make drawing conclusions from findings applicable to the entire community. Figure 1 demonstrates the variety of organizations that participated in the project.

Figure 1. The Michigan Geospatial User Community



2.3 Overview of Current Statewide GIS organizational Structure

The State has a number of organizations and institutions that are active in facilitating collaboration, communication, and governance in the GIS community.

Among the organizations that area active in boosting communications, collaboration, and providing professional development opportunities are Improving Michigan's Access to Geographic Information Networks (IMAGIN) and Michigan Communities' Association of Mapping Professionals (MiCAMP).

IMAGIN is, according to the organization's web site (www.imagin.org), "…a professional development organization committed to providing opportunities for its members to network with professionals who are using, creating, or maintaining spatial resources within Michigan." MiCAMP's mission is, "…to encourage cost-effective and efficient local government through the coordinated practical development and utilization of geographic information systems and related technologies." Both organizations are managed by a board of directors, have bylaws, and organize an annual conference.

Table 4. Organizations Participating In Information Gathering

Organization Type	On-Line Survey Number	On-Line Survey Percentage	Listening Sessions Number	Listening Sessions Percentage
Government				
County	89	31.67%	60	31.09%
State	48	17.08%	44	22.80%
City	21	7.47%	23	11.92%
Township	20	7.12%	5	2.59%
Federal	16	5.69%	7	3.63%
Village	4	1.42%	0	0.00%
Sub-state Regional	14	4.98%	9	4.66%
Tribal	3	1.07%	4	2.07%
Private Firm	39	13.88%	15	7.77%
Utility	7	2.49%	6	3.11%
University	8	2.85%	14	7.25%
Not-for-Profit	7	2.49%	3	1.55%
Professional or Trade Association	3	1.07%	0	0.00%
Special Purpose District	1	0.36%	0	0.00%
Public School	1	0.36%	0	0.00%
Unknown	1	0.00%	3	1.55%
Total	**282**	**100.00%**	**193**	**98.45%**

There are numerous regional GIS user groups throughout the State. These groups vary in size and the level of activity but generally are associated with a specific region (for example Southeast Michigan Council of Governments (SEMCOG) and South West Michigan GIS User Group), a specific business driver (Michigan Department of Community Health GIS user group or RoadSoft user group), or a single software vendor (ESRI Northern Michigan User Group and BS&A Software user group).

The State's Department of Technology, Management and Budget Center for Shared Solutions and Technology Partnerships (CSSTP) serves as the primary GIS coordination entity in Michigan and hosts two committees that are active in communication and facilitation of collaboration.

The MI Geographic Information Users Group is an informal group that meets on a monthly basis to discuss on-going projects and opportunities for collaboration. It provides professional networking, transfer of news, discussion of GIS technology changes, and a general forum for project and technology communication. This User Group started meeting in the early 1990's and took it current form in 1994.

The CSSTP also serves as the organizing body of the Local & State Cross-boundary Technology Steering Committee (CBTSC). A pre-existing GIS Steering Committee was merged into an existing IT Cross-boundary Steering Committee to create the current Local & State Cross Boundary Technology Steering Committee. This committee has a role in developing cross boundary collaboration and coordination of statewide GIS initiatives in conjunction with statewide IT efforts. The CBTSC has responsibilities beyond GIS, however, 7 of the 18 committee members currently serving are GIS coordinators or GIS directors. In addition, 3 members of the committee are representatives from each of the large local government associations in Michigan representing members that have primary business drivers requiring the use of GIS technology.

These associations are the Michigan Township Association, the Michigan Municipal League, and the Michigan Association of Counties.

While each of these groups and committees play important roles in facilitation of professional development, communications, and collaboration, none appears to fill the role of preparing, recommending, and approving GIS standards and policies. There is a need for a coordinating group to listen and unify the diverse needs of statewide GIS community, to design, and propose the adoption of policies and standards that are required to support GIS solutions. While any standards or policies cannot be made mandatory for non-State agency organizations, GIS policies and standards should still go through a formal consensus process and approval by the GIS community so that voluntary adoption can be encouraged. This role should be assigned to an expanded Local & State Cross Boundary Technology Steering Committee.

2.4 Current Status of Coordination

The National States Geographic Information Council (NSGIC) has identified nine fundamental characteristics of effective statewide GIS coordination programs and uses those criteria as a benchmark for determining the status of coordination in each state. The council sponsors an annual survey of the status of GIS coordination in each of the fifty states.

In 2009, Michigan reported implementation of eight of the nine criteria. The complete report submitted by Michigan can be found on the NSGIC web site: http://www.gisinventory.net/summaries/. While the State has done a commendable job in the development of the Michigan Geographic Framework (MGF) and instituting a number of cooperative programs with local governments, there is feeling among many in the GIS community that more needs to be done to fully implement an effective state spatial data infrastructure.

Table 5. Michigan's 2009 Status—NSGIC Fundamental Coordination Characteristics

GIS Coordination Success Criteria	2009 Status
A full time, paid coordinator position is designated and has the authority to implement the state's business and strategic plans	Implemented
A clearly defined authority exists for statewide coordination of geospatial information technologies and data production	Implemented
A statewide coordination office has a formal relationship with the State's Chief Information Office (CIO)	Implemented
A champion (policy, or executive decisions maker) is aware and involved in the process of geospatial coordination	Implemented
Responsibilities for developing the NSDI and a State Clearinghouse are assigned	Implemented
The ability exists to work and coordinate with local governments, academia, and the private sector	Implemented
Sustainable funding sources exist to meet project needs	Implemented
GIS Coordinators have the authority to enter into contracts and become capable of receiving and expending funds	Implemented
The Federal government works through the statewide coordination authority	Currently Planning to Implement

There are several organizations and institutions currently active that have a role to play in on-going geospatial coordination. Those include:

- The Michigan Department of Technology, Management and Budget, Center for Shared solutions and Technology Partnerships
- Local & State Cross Boundary Technology Steering Committee

- GIS Professional Associations (MiCAMP and IMAGIN)
- State GIS User Group
- Regional (and County) GIS User Groups

Effective organizational structures and governance for enterprise GIS and IT programs require several important components:

- **Enabling Mandate**: A documented, officially recognized, legal or administrative action that enables, establishes, and sanctions the SDI program. The mandate may be from legislative action, an executive order (Governor), or an administrative action by an agency.
- **GIS Coordination Body:** The formally designated roles and bodies that play a high-level oversight and/or advisory role for the SDI program and the GIS management office. This body provides guidance on major GIS program planning, policy development, and regarding business plan implementation.
- **GIS Management Office**: The main office, located in an executive branch department, that has the main responsibility for implementing the statewide GIS program, working with statewide stakeholders to deliver data and services, enabling and supporting partnerships and projects, and all operational aspects of the statewide GIS program
- **Technical Support Bodies:** Formal bodies established to leverage participation and input from statewide GIS program stakeholders to provide information on a range of operational issues or support on key decisions and projects. These entities support and work closely with existing coordination bodies and the GIS management office. Such bodies are often implemented as technical committees or working groups that have a specific mission.
- **Policies and Rules of Operation:** Written rules, policies, bylaws, formal agreements, etc., that provides the structure for clear, consistent operations, communications, allocation of resources, and performance of SDI work and statewide coordination. There may be multiple sources of these rules and policies.

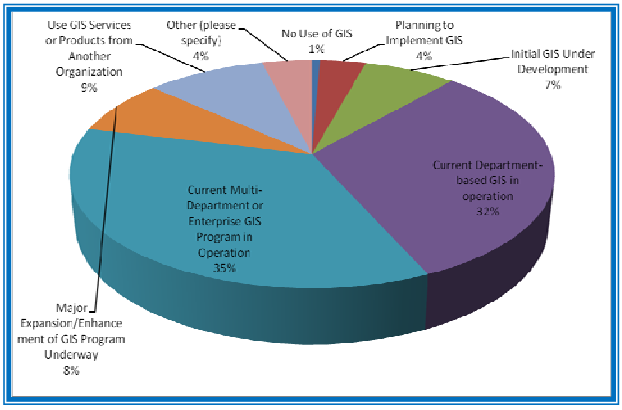
2.5 Summary of Statewide GIS Status, Limitations, and Needs

2.5.1 Statewide GIS Status

GIS is now widely used throughout Michigan. According to a survey completed in 2008 by MiCAMP (available for review at http://micamp.8m.net) 60 of Michigan's 83 counties have a some form of digital parcel base in place but the maturity of these systems and the ongoing maintenance of data area highly variable. Another five counties were planning a system and another five were investigating the possibility of implementation a GIS cadastre base. These counties represented 91.7% of the State's population, 92% of the parcels, and 66% of the area.

The number of counties with a cadastre base in place may have changed since 2008 but respondents to the on-line survey completed as part of this process seems to mirror those findings.

Figure 2. Description of Current GIS Status



Sixty individuals that identified themselves as county employees attended a listing summit and 89 participated in the on-line survey.

Respondents to the survey were asked to describe the current condition of their GIS. Figure 2 displays those results. While 67% of respondents indicated the have a GIS in operation in either a single department or a multi-departmental (enterprise) setting, there are still a fairly large group of organizations that are not yet fully enabled with the technology. There are 11% of respondents that reports their GIS was either in planning or under initial development. Another 8% reported a major expansion or enhancement underway with their GIS and only 1% reported no use of GIS.

2.5.2 Limitations and Obstacles

While GIS has become common there are still a number of obstacles to full implementation of the technology. Key obstacles are funding limitations (reported as a major or critical threat by over 61% of respondents), staffing limitations (critical or major threat to 43%), problems with data quality (32%), and insufficient senior management awareness or support (32%). Table 6 summarized these responses.

Table 6. Obstacles Ranked by Percentage Identifying as Critical or Major Impact

Obstacles	Major or Critical Threat (3 or 4)	1-Minor Impact	2-Some Impact	3-Major Impact	4-Critical Threat	Total Responses
Funding limitations	61.22%	10.26%	26.92%	35.58%	25.64%	187
Staffing limitations (number of staff or skills)	43.04%	19.29%	33.57%	27.33%	15.71%	177
Problems with data quality, currentness, updating	32.70%	34.21%	31.58%	25.47%	7.24%	171
Insufficient senior management awareness or support	32.14%	26.32%	34.59%	20.11%	12.03%	183
Inter-departmental communication and coordination obstacles	27.93%	35.06%	33.77%	20.79%	7.14%	180
Needed geospatial data does not exist or is not readily accessible	25.96%	36.99%	34.25%	16.37%	9.59%	177
Lack of or insufficient use of data or system standards	24.51%	35.86%	35.86%	17.61%	6.90%	180
System problems: software, hardware, and networks	23.86%	41.41%	30.47%	16.05%	7.81%	174
Poor program focus, direction, or plan	23.16%	47.46%	23.73%	15.53%	7.63%	165
Insufficient opportunities for training and education	20.08%	41.43%	34.29%	15.08%	5.00%	183
Difficult integration of data from different sources	19.77%	41.40%	37.58%	17.86%	1.91%	176
Lack of or insufficient external partnerships	18.80%	42.18%	36.05%	16.76%	2.04%	178
No or insufficient operational management for GIS program	18.73%	42.02%	33.61%	13.69%	5.04%	177
GIS applications are not "user-friendly" enough	14.28%	47.74%	36.13%	12.99%	1.29%	182

It will be the challenge of the business plan to address these primary institutional obstacles.

In addition to these institutional obstacles, there are also significant obstacles with the availability of data needed to complete GIS functions. For example, over 33% of respondents to the on-line survey indicated a need for various types of utility data.

2.5.3 Data Needs as Reported by GIS Users

All of the FGDC foundation data elements, as identified in Table 7 below, are used by over 85% of the GIS users in Michigan. Several of the elements identified as being most heavily used are included in the Michigan Geographic Framework (MGF) annual work plan and are currently being maintained and improved on an annual basis.

Foundation data where no statewide program exists that were identified as highly used are ortho imagery, used by over 98% of the community and cadastral parcels used by 92%. Transportation features (used by 99%) and hydrography (used by 95%) are currently being addressed as part of the MGF. Elevation, although used by 93% of the community was determined by the business plan Steering Committee to be a lower priority than high resolution ortho imagery or parcels.

Although identified as a used data element by 87% of the GIS user community the business plan Steering Committee recommended this statewide initiative be a high priority because of the critical nature of these data for emergency response, taxation, and economic development. Table 7 identifies needs for data not generally identified as meeting the requirement for foundation status.

Table 7. Detailed Foundation Data Needs and Sources

	Don't Use or Need		Produce my own		Receive and use as-is from an outside source		Receive and edit from an outside source		Need it but don't have it		Total Responses
Foundation Data	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	
Ortho imagery (high resolution)	4	1.95%	33	16.10%	127	61.95 %	28	13.66%	13	6.34%	205
Cadastral Parcels or Legal Lots	16	7.69%	72	34.62%	59	28.37%	36	17.31%	25	12.02%	208
Street Centerlines and Transportation Features	2	0.96%	75	35.89%	74	35.41%	49	23.44%	9	4.31%	209
Administrative Boundaries	9	4.41%	68	33.33%	87	42.65%	33	16.18%	7	3.43%	204
Hydrography	11	5.37%	34	16.59%	102	49.76%	46	22.44%	12	5.85%	205
Elevation	15	7.32%	35	17.07%	103	50.24%	18	8.78%	34	16.59%	205
Geodetic Control	28	14.07%	45	22.61%	72	36.18%	23	11.56%	31	15.58%	199

Table 8. Additional Data Sources and Requirements

Data Type	Don't Use or Need		Produce my own		Receive and use as-is from an outside source		Receive and edit from an outside source		Need it but don't have it		Need Data	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Addresses [Street Centerline Ranges]	19	9.84%	51	26.42%	75	38.86%	33	17.10%	15	7.77%	174	90.16%
Addresses [Point Features]	25	12.76%	64	32.65%	50	25.51%	21	10.71%	36	18.37%	171	87.24%
Bioscience-Aquatic Habitats and Features	96	52.17%	13	7.07%	38	20.65%	10	5.43%	27	14.67%	88	47.83%
Bioscience-Terrestrial Habitats/Features	90	48.65%	14	7.57%	43	23.24%	11	5.95%	27	14.59%	95	51.35%
Buildings/Structures	24	12.50%	48	25.00%	42	21.88%	21	10.94%	57	29.69%	168	87.50%
Cadastral Reference (24K PLSS)	42	24.00%	33	18.86%	69	39.43%	14	8.00%	17	9.71%	133	76.00%
Climate/Meteorological	115	63.19%	0	0.00%	41	22.53%	7	3.85%	19	10.44%	67	36.81%
Critical Facilities	47	25.27%	53	28.49%	32	17.20%	12	6.45%	42	22.58%	139	74.73%
Cultural/Historic Sites and Features	48	25.81%	44	23.66%	49	26.34%	15	8.06%	30	16.13%	138	74.19%
Demographic Enumeration Districts/Data	48	26.09%	15	8.15%	86	46.74%	16	8.70%	19	10.33%	136	73.91%
Elevation—Contours	15	7.89%	31	16.32%	85	44.74%	17	8.95%	42	22.11%	175	92.11%
Elevation—Digital Elevation Models	20	10.58%	28	14.81%	88	46.56%	16	8.47%	37	19.58%	169	89.42%
Geodetic Control	33	18.23%	35	19.34%	69	38.12%	11	6.08%	33	18.23%	148	81.77%
Geology	55	30.56%	4	2.22%	88	48.89%	7	3.89%	26	14.44%	125	69.44%
Governmental Boundaries	5	2.63%	47	24.74%	106	55.79%	24	12.63%	8	4.21%	185	97.37%
Hydrologic Unit (watershed) Boundaries	20	10.75%	24	12.90%	107	57.53%	16	8.60%	19	10.22%	166	89.25%
Land Cover	22	11.83%	30	16.13%	95	51.08%	18	9.68%	21	11.29%	164	88.17%
Land-Use/Zoning	18	9.63%	62	33.16%	67	35.83%	17	9.09%	23	12.30%	169	90.37%
Natural Hazards	49	27.53%	16	8.99%	57	32.02%	6	3.37%	50	28.09%	129	72.47%
Recreation Sites and Facilities	24	13.04%	64	34.78%	60	32.61%	12	6.52%	24	13.04%	160	86.96%
Satellite imagery	39	20.86%	4	2.14%	107	57.22%	12	6.42%	25	13.37%	148	79.14%
Soils	24	13.04%	5	2.72%	121	65.76%	16	8.70%	18	9.78%	160	86.96%
Surface Hydrography (water bodies/streams)	7	3.83%	27	14.75%	106	57.92%	31	16.94%	12	6.56%	176	96.17%
Subsurface Hydrology	58	32.95%	7	3.98%	76	43.18%	4	2.27%	31	17.61%	118	67.05%
Survey Reference Grids (e.g., PLSS)	31	17.13%	30	16.57%	87	48.07%	12	6.63%	21	11.60%	150	82.87%
Telecommunications Facilities	61	33.33%	21	11.48%	44	24.04%	6	3.28%	51	27.87%	122	66.67%
Transportation (aviation facilities)	51	27.57%	28	15.14%	62	33.51%	10	5.41%	34	18.38%	134	72.43%
Utility-Electric Transmission/Distribution	39	20.63%	16	8.47%	46	24.34%	8	4.23%	80	42.33%	150	79.37%

3. Statewide GIS Business Drivers and Business Plan Objectives

3.1 Statewide GIS Business Drivers

A GIS business driver is a major need, program, service area, or challenge faced by organizations that may be impacted or supported by GIS technology and data. Business drivers may reflect strategic or operational goals of an organization, user or customer service needs, legal or regulatory mandates, external conditions (economic, social, political) or other business factors. This section presents business drivers that establish a very strong business foundation for SDI development and operation. Business drivers for Michigan's SDI have been identified through input from the statewide geospatial user community.

A **"Business Driver"** is a major program area, need, or challenge that GIS technology and geospatial data can help support or address

Some business drivers are high-level in nature, reflecting overall goals or advantages for the organization as whole and impacting multiple departments and user groups. The main overarching business drivers impacting Michigan's SDI program identified in Table 9 with an indication of their priority and key points about benefit opportunities from the SDI.

Table 9: Overarching GIS Business Drivers Impacting Multiple Organizations Disciplines

Business Driver	Priority*	Opportunities for Michigan's SDI
Improved geographic data availability, quality, accessibility and currency	VH	GIS supports quicker and more accurate update of maps and geographic databases. GIS tools ensure data quality, adherence to standards, and reduction in redundantly maintained data. Necessary data and tools can be applied to improve business operations and enable better informed decisions. For data to be applied to decisions making it must be available, high quality, current, and accessible to the decision maker.
Basis for inter- and intra-organization coordination and partnerships	VH	GIS is a technology that naturally encourages sharing of information and resources because multiple departments and organizations share similar needs for geographic information. GIS can be used as a basis for effective partnerships, cost sharing, and project collaboration.
Response to public demand for information	VH	The demand and expectations for information from government agencies by businesses, organizations, and the general public is increasing. Much of the required information is geographically based, and GIS technology and data can support efficient response to information requests. GIS gives tools to government employees to give quicker response (permit information, property appraisal questions, jurisdiction and services) by employees and direct access by the public via Web-services.
Reduction in redundancy, labor time, and cost	VH	GIS tools and sound data management can be the basis for a reduction in the duplication and redundancy in data maintenance, thereby reducing costs and labor time in data maintenance. GIS reduces overall labor time for information access, data analysis, research, and information distribution.
Enhanced Revenue	H	With its ability to organize, integrate, map, and analyze geographic data, GIS helps to ensure effective and complete revenue generation from existing sources--tax payments, utility bills, fines/fees by finding missed revenues or cases where assessments are lower than called for by law or regulation.

Table 9: Overarching GIS Business Drivers Impacting Multiple Organizations Disciplines (con't.)

Business Driver	Priority*	Opportunities for Michigan's SDI
Energy costs and efficiency	H	The rising cost of energy is impacting all operational areas in the public and private sectors. GIS technology plays a role in supporting analysis, decisions, and policies for two key areas: a) energy efficiency and savings, b) exploring opportunities for alternate energy sources. Both of these challenges have a strong geographic component (e.g., using GIS to examine vehicle mileage and determine more efficient vehicle use, GIS applications to support exploration for wind and solar energy sources).
Enhancement of environmental quality, sustainability, and livability	H	Protection and enhancement of environmental quality of the state involves planning and regulatory programs and initiatives of the public and private sectors that are geographic in nature. Environmental quality is a factor in well-being and health of Michigan citizens, but it also directly impacts economic development and tourism factors.
Management and access to historical geographic information	M	Historical information, often with a geographical reference, is needed regularly to support legal analysis, engineering design, land use decisions, growth projections, and policy analysis. GIS technology provides effective ways to capture, organize, and provide access to this historical data.
Support for private business	M	Coordination between public sector and private company users of GIS data (title companies, land development companies, and value added resellers. Support economic development activities including site selection, development planning, and economic gardening.

* Priority: Very High (VH), High (H), Moderate (M)

Other business drivers are more specific to an individual department or organization, business area, or program. These program-specific business drivers for the Michigan SDI are explained below in Table 10.

Table 10: Program or Discipline-Specific Business Drivers

Business Driver	Priority*	Opportunities for Michigan's SDI
Public Safety/Emergency planning and management	VH	GIS provides direct support for public safety and emergency management organizations (local and state law enforcement, emergency operations, fire protection, rescue, emergency medical). GIS data supports emergency and public safety planning, and GIS data and tools support emergency event management and response. The range of applications is large and includes: preparation of emergency evacuation routes, local agency police/fire dispatch and support of Next Gen 911, better definition of jurisdictional responsibilities for response, mapping of wildland/urban interface, coordination of search and rescue operations, threat/vulnerability assessment, crime analysis and investigation.
Economic Development and Tourism Promotion	VH	GIS can provide information in map form to support the primary and secondary economic industries such as Tourism, Paper, and Manufacturing of Green Energies. It is critical to improve accessible through convenient search interface for government staff and external parties looking for development sites, improving opportunities for site location. GIS in itself is an incentive for many types of companies. GIS can support access to information on touring opportunities which can stimulate tourism.
Real Property Appraisal	VH	Support for more complete, accurate and equitable property appraisal. GIS allows more effect analysis of neighborhood variables impacting valuation and can result in increase of tax revenue through more complete, accurate appraisals. Reduction in fraud related to the principal residence property tax exemption (also called the "homestead exemption" can increase annual revenue collection for jurisdictions.

Table 10: Program or Discipline-Specific Business Drivers (con't.)

Business Driver	Priority*	Opportunities for Michigan's SDI
Infrastructure Facility Management	H	Support for facility inventory, tracking of condition and maintenance actions (transportation and utilities), and capital projects planning. The result is considerable cost savings and better service to citizens. This is of particular importance given assessments of infrastructure condition and funds that will need to be spent over the next decade to maintain a reasonable level of efficiency and safety. See "report card" from the ASCE (www.asce.org).
Facility Planning and Design	H	Use of GIS data and tools to support road and utility design, greatly reducing need and cost for collection and formatting of new information (base map, parcels, etc.). Coordination between government agencies and private engineering contractors in design projects.
Land Development Planning	H	Support for evaluation of land development scenarios by providing access to and analysis of a wide range of geographic information on land use, infrastructure, demography, infrastructure, etc. GIS saves time and cost in the planning process and supports an end result which better reflects local and regional conditions and balances issue of economic health, business growth, environmental impact, and quality of life.
Support to Elected Officials	M	GIS is an invaluable presentation tool for data visualization at meetings to support location-based decision making by elected officials and other decision making bodies.
Floodplain/Flood Event Management	M	Access to accurate floodplain mapping; use of GIS for open space planning and floodplain management to guide more effective development decisions and support emergency planning and vulnerability assessment.
Grant Application Support	M	Access and presentation of geographic information in grant applications (e.g., Homeland Security) providing effective ways to prepare grant applications with greater chance of grant approval.
Public health management	M	Support for health services planning and allocation of resources for public health programs at the state and local level. Mapping and geographic analysis tools can provide means for better program planning and more efficient allocation of resources where the need is higher. GIS provides an effective tool for evaluation of health problems and patterns, and indicators and can be used as a decision support tool.
Agricultural Productivity and Invasive Species Management	M	GIS supports efficient monitoring of agricultural productivity and planning for seasonal cultivation and agricultural improvement practices. GIS technology is also effective in helping to control invasive plant and insect species which has a huge impact on agricultural and forestry health and productivity as well as impacts on recreational lands.
Support for Improved Regulatory Decisions	M	GIS data and analysis tools can help answer questions driven by a variety of regulations impacting local and regional issues (e.g., zoning and local LU decisions, permitting requirements, Forest Practices Act decisions about private forest management, ID Water Resources water use restrictions, water rights decisions, many others). GIS can better equip government agencies to administer requirements of new regulatory requirements while reducing needs for great increases in staff and resources.
Educational Program Enhancement	M	GIS technology and the data resources and services provided through a statewide SDI support a range of educational needs at the elementary, high school, college level. The SDI will support the teaching of geographic concepts and enhance existing school programs in science, social studies, mathematics, and computer instruction. At the university level, SDI will support already active programs and research activity that result in the training of students in applying geospatial technology to a wide range of disciplines.

* Priority: Very High (VH), High (H), Moderate (M)

3.2 Statewide GIS Business Objectives

This subsection identifies high-level objectives that address specific statewide GIS program business needs. These objectives help to organize and place a focus on specific initiatives (explained in Section 5) for making improvements to Michigan's statewide GIS program and for supporting the board goals of the state's IT Strategic Plan. These objectives are a synthesis of the many observations, ideas, and suggestions voiced by members of the state GIS community as part of the information gathering parts of this business planning project.

1. Make changes in statewide GIS organizational structure and governance to improve coordination, collaboration, and service.

Objective 1 Context and Scope: Organizational elements and practices supporting statewide GIS management, coordination, and governance are currently in place. These elements include: a) the Center for Shared Solutions and Technology Partnerships (CSSTP) serving the role of statewide GIS management, b) the Cross Boundary Technology Steering Committee, c) the state GIS User Group organized by CSSTP, d) statewide GIS advocacy and professional networking groups (IMAGIN and MiCAMP), and e) regional GIS user groups. There is a feeling that changes are needed to improve communication, coordination, GIS technology access, and overall GIS management. This Business Plan identifies several specific initiatives design to make such improvements.

2. Continue current support and expand GIS services for State agencies in areas where there are clear benefits.

Objective 2 Context and Scope: State agencies represent one of the main stakeholder groups with a strong business need for GIS. With the impact that state agency programs on all public and private institutions and the general public, expanded use of GIS technology and data (often through partnerships with non-state entities) should be pursued. Initiatives addressing this objective call for the identification of specific state agency programs in which there are clear benefits and the well-planned deployment of GIS tools and applications for state agencies.

3. Enhance GIS coordination, collaboration, and partnerships among government, private, and non-profit organizations.

Objective 3 Context and Scope: The IT strategic plan has a strong focus on partnerships among all levels of government, other public sector organizations, private companies, universities, etc.—in other words, the entire GIS stakeholder community in Michigan. Changes in policies and practices that support GIS partnerships are needed and there must be concerted efforts by the CSSTP and members of the statewide GIS community to initiate effective partnerships. One important part of partnership development is expansion of support and coordination with "underserved" areas of the state—counties and municipalities that do not have sufficient resources or technology infrastructure to support effect GIS programs but which have a strong need for GIS.

4. Explore and secure new funding sources and financing strategies to support statewide GIS initiatives.

Objective 4 Context and Scope: GIS development and operations require sustained funding. While funding sources have been used effectively to support GIS programs by many organizations, the strained financial environment in Michigan puts pressure on public sectors organizations and private companies to sustain current funding levels let alone increase funding for new GIS projects. These funding concerns impact state agencies and they are pronounced in areas of the state that have seen particularly severe economic impacts. It is necessary to seek both traditional and non-traditional sources of funding—for which benefits can be demonstrated. This plan makes a business case for expanded adoption of GIS and presents ideas on funding sources and financing strategies.

5. Expand and enhance the Michigan Geographic Framework (MGF) program through improvements in data quality, expansion of data content, more effective stewardship, and increased participation of stakeholder organizations throughout the state.

Objective 5 Context and Scope: The MGF program has been very successful and regular improvements over the last 10 years place it among the top 5 state GIS clearinghouses in the Nation. The CSSTP which administers this program and organizations around the state that use it have identified potential changes and improvements that would better support the business needs of users. These improvements address data content, quality, tools for access, and stewardship practices. This business plan cites initiatives for such improvements and the accompanying *GIS data stewardship enhancement plan*, provides more detail in actions to take.

6. Develop new high-priority Web-based applications and GIS services and make them easily accessible by the public.

Objective 6 Context and Scope: The CSSTP and other organizations around the state have an opportunity to develop and deploy additional GIS applications that make use of existing GIS applications and GIS technology advances that support Web-based access. With leadership from the CSSTP and participation of the statewide GIS user community, potential high-priority applications, that address the needs of multiple user groups, should be put in place. This business plan identifies a number of applications that promise to deliver real benefits to state agencies, local governments, businesses, and other organizations.

7. Improve and expand programs and activities for statewide outreach and communication about the Statewide GIS program and its benefits

Objective 7 Context and Scope: This objective calls for specific improvements in outreach and communication with the entire statewide GIS community. It is fundamental to almost all of the objectives of this business plan. Adjustments to the current GIS program governance structure (see Objective 1) are needed. Specific GIS coordination practices, functioning of user groups, and improvements in "customer relations". Outreach and communication practices must target senior officials, program managers, technical personnel, and the broad community of GIS users in the state. While the CSSTP needs to play a major role in such improvements, the participation of all GIS stakeholders is needed. In particular, statewide and regional user groups play an important outreach role and this should be continued and augmented.

8. Prepare template documents and tools to support GIS program planning, implementation, technical development, and services procurement for use by any stakeholder organization.

Objective 8 Context and Scope: Organizations in Michigan that do not have mature GIS programs but have interest or are in the process of GIS planning or implementation need specific help to support their implementation work. A valuable asset would be a "library" of template documents based on successful projects that could be used, with modification, in the implementation process. This business plan includes initiatives that call for the development of such a library with such templates as: a) data conversion specifications or RFPs, b) GIS program implementation plans, c) GIS program organizational structure and management practices, etc. These templates, with an engaged user community to provide support, would be extremely valuable to those organizations building GIS programs.

9. Expand and support opportunities, programs, and tools for better GIS education and training.

Objective 9 Context and Scope: There is an ongoing need to increase and improve education and training for GIS managers, technical personnel, and users. This objective calls for improving access to all types of training and education—not just traditional classroom training programs but computer-based sources, in-house mentoring, and other ways to support

professional development and enhancement of job skills (participation in professional societies, conferences, special workshops, certification programs, etc.).

10. Put in place and activate a process for creation and approval of formal policies and standards that impact the statewide GIS program.

Objective 10 Context and Scope: There is a clear need to develop a formal and active process for creating and approving policies, standards, and/or guidelines that impact the development of a statewide spatial data infrastructure. This process needs to include representation from all interest groups to assure that the resulting policies and standards are truly supported by the community that ultimately will be responsible for their success or failure. A successful process must be fully open and perceived by the user community to be responsive to their needs and to hear and respond to all voiced concerns.

11. Increase programs and sources for GIS staff resources support

Objective 11 Context and Scope: Formal programs should be structured to involve all interested academic programs with entities that have active GIS processes through internship and other student experience opportunities. State procurement should establish contracts for temporary GIS service employees that would be open to any public entity in the state. Human resource policies and potential liability exposure should be reviewed so these do not impede the ability of GIS activities throughout Michigan to attract and retain staff resources.

12. Keep track of advances in the IT and GIS industries and position the statewide GIS community to take advantage of these advances

Objective 12 Context and Scope: Like other major areas of IT, GIS technology is changing rapidly and this change results in new products and methods from vendors of hardware and software and providers of technical services. While it is not recommended that GIS user organizations in Michigan stay on the "bleeding edge" of technology change, well-planned adoption of new technologies should occur. Changes in technology often require migration from existing software, database, and application environments. Effective monitoring of changes in IT and GIS can help organizations make rational decisions (based on business needs) for technology changes. Also, a well connected GIS community in Michigan provides an environment for mutual support in the adoption of and migration to newer technology environments. In addition, GIS integration and interoperability is improved when technology changes take into account potential impacts on other systems.

13. Identify and implement changes to GIS-related software licenses and computing infrastructure (hardware and networks) to support high-performing, secure, and cost-effective services and efficient system administration practices.

Objective 13 Context and Scope: With rapid advances in the power of cloud computing and web based services, there is a need to make sure that state and local procurement and contracting policies do not impede the ability to capitalize on these advances. It is also important that opportunities for volume pricing on software licensing and "pay per hit" commercial web services are available to the benefit of all public sector organizations in Michigan. While cutting edge technologies frequently are viewed as viable for the more technologically advanced and well funded GIS organizations it is important that these technology and licensing advantages be made available through the CSSTP to the "have not" areas of the state.

Each of these GIS Business Objectives has a relationship with the Michigan IT Goals as outlined in the IT Strategic Plan for 2008 to 2012. Table 11 identifies the relationship for each business objectives to the corresponding IT Strategic Plan goal.

Table 11: GIS Business Objectives Relationship with IT Strategic Plan

	Michigan IT Strategic Goals					
Statewide GIS Business Objectives (abbreviated)	Goal 1: Access to Government Services	Goal 2: Technology Service Delivery	Goal 3: IT Management and Infrastructure	Goal 4: Workplace/high-Performance Workforce	Goal 5: Cross Boundary Solutions	Goal 6: Innovation and Transformation
1. Changes in statewide GIS organizational structure and governance to improve coordination and service		X		X	X	
2. Continue current support and expand GIS services for State agencies.	X	X				X
3. Enhance GIS coordination and partnerships among government, private, and non-profit organizations.	X	X			X	
4. Explore and secure new funding sources and financing strategies to support statewide GIS initiatives.	X	X	X	X	X	X
5. Expand and enhance the Michigan Geographic Framework (MGF) program.	X	X			X	X
6. Develop new high-priority Web-based applications and GIS services and make them easily accessible.	X	X			X	
7. Improve and expand programs and activities for statewide outreach, communication about the Statewide GIS program and its benefits	X			X	X	
8. Prepare template documents and tools to support GIS program planning, implementation, technical development, and services procurement.		X	X	X	X	
9. Expand and support opportunities, programs and tools for better GIS education and training.				X	X	X
10. Put in place and activate process for creation and approval of formal policies and standards.		X	X			
11. Increase programs and sources for GIS staff resources support				X	X	X
12. Keep track of advances in the IT and GIS industries and position the statewide GIS community to take advantage of these advances			X			X
13. Identify and implement changes to GIS-related software licenses and computing infrastructure.			X		X	X

4. GIS Benefits and Business Justification for Statewide GIS Improvements

4.1 Business Case Premise for Statewide GIS Enhancement

Public agencies, private firms, and non-governmental organizations in Michigan depend on maps and geographically referenced information to support day-to-day operations and long-term planning and decision-making. According to studies by the Geographic Information & Technology Association, at least 80 percent of the information collected and managed by

governmental bodies, utility organizations, and private companies is connected to a specific location. That is, the majority of the information they compile and use has some location keys such as address, road segment, facility location, map coordinate, or an area identifier. Despite substantial, ongoing investments in geographic information and GIS technology in Michigan, users and potential users continue to experience insufficient access to important geographic information and the technology to use it effectively. For a wide range of programs and projects, staff and program managers spend a considerable amount of time just gathering or assembling information from a wide range of sources. Geographic information is hard to find, access, and integrate in a manner that makes it useful to those who need it, when they need it.

The problem in access to data and technology is rooted largely in policy and organizational procedures and not, as often assumed, in technical obstacles. Administrative barriers, poorly defined management authority, problems in allocating available funding and finding new sources, and inadequate management controls have resulted in missed opportunities, duplication of effort, and inconsistencies in data format and quality, all of which work against effective statewide GIS coordination that the SDI will deliver.

4.2 The Case for Improved Leveraging of GIS Investments

Millions of dollars are spent on GIS development and operation in Michigan on an annual basis, and expenditures are increasing. A MiCAMP survey of Counties in 2008 found the annual budgets for GIS operations statewide was $4.48 million, with a total budget including one-time projects of $9.1 million. When federal, state, tribal, and local initiatives are considered the total investment in GIS data, data maintenance, software, hardware, and human resource likely exceeds $20 million per year.

While these investments are driving effective use of GIS technical and real benefits to users, full value is not being realized because the current environment is characterized by:

- Inadequate coordination and collaboration on GIS initiatives and projects
- Duplication, redundancy, and incompatibility in data and systems
- Insufficient technical and procedural standards that could enable better sharing of data and system resources
- Lack of an organizational structure that helps identify GIS opportunities for increased business value

4.3 Types of Benefits from GIS

Experiences recorded over 20 years of successful GIS deployments in the USA provide strong evidence that GIS delivers tangible benefits that can be measured in monetary or other terms, as well as many other benefits, more difficult to quantify, which result in significant improvements to organizations. Benefits from the use of GIS technology and data generally fall into the following categories:

- Operational and Efficiency Gains: Expected gains in current personnel efficiency and productivity allowing work to be accomplished in less time and with less expense.
- Cost Savings: Reduction in current monetary expenses such as contract costs and direct expenses.
- Cost Avoidance: Lowering or completely avoiding increased costs that would be incurred without the use of GIS technology, when new programs, regulatory requirements, or other new demands are placed on existing organizations.

- Revenue Enhancement: Use of GIS technology and data in applications and business processes that result in increased revenue collection from existing or new sources.
- Difficult-to-Predict Quantitative Benefits: Potential benefits that can be measured in monetary or other terms (time, volume, etc.) but which are not easily predictable or regular in nature and which do not easily contribute to a return on investment analysis.
- Non-quantifiable Benefits: Benefits that cannot be easily quantified but which have positive impacts on operations, decision-making, quality of service, or a range of social and long-term benefits to economic or environmental health.

Some examples of benefits that fall under these benefit types are listed below in Table 12. Some of the benefit examples are listed under multiple categories since they are subject to different levels of measurability.

Table 12. Examples of GIS Benefits

Examples of Benefits from GIS Programs	Benefits			
	Operational/Efficiency Gains	Cost Savings,/Avoidance, Revenue Enhancement	Difficult to Predict Quantifiable	Non-quantifiable
Staff productivity & labor cost savings for existing operations (reduction in labor time expressed in monetary terms)	X			
Reduction in duplication and redundancy (savings of direct costs and labor time)	X	X		
Efficiency and monetary gains in better real property transaction management (sale, lease, acquisition of land, buildings, and other real property)		X	X	
Avoidance of new costs (e.g., for responding to new regulations, legal cases, or new or expanded program requirements)		X	X	
Savings in capital project or engineering projects through use of GIS resources to reduce costs of contracts for data collection, analysis, design, and planning		X	X	
Reduction in contract costs for mapping, surveying, and field data verification		X		
More effective management/allocation of field facilities and services (allocation of services by field personnel, siting of facilities for emergency, health, social services)		X	X	X
Protection from catastrophic loss of hard copy records		X		
Public revenue increase by providing support for insurance claims (e.g. property damage) or better insurance rates for government jurisdictions and property owners		X	X	
Public revenue increase from improved fee or tax collection, (e.g., real property tax, utility billing, storm water utility assessment)		X	X	
Revenue from sale of GIS products or services		X	X	
Increase in economic development competition and decisions			X	X
Enhancement of natural/environmental quality (e.g. better planning and management results in enhancements to land, water, landscape with resulting tangible and intangible benefits)			X	X
Saving of property and life through more effective emergency response			X	X
Quicker turnaround for permit, plan and license review and approval				X

Table 12. Examples of GIS Benefits (con't.)

Examples of Benefits from GIS Programs	Benefits			
	Operational/Efficiency Gains	Cost Savings,/Avoidance, Revenue Enhancement	Difficult to Predict Quantifiable	Non-quantifiable
More efficient planning decisions and operations on resource exploration, extraction and management			X	X
Better information and service to customers and the public (e.g., support for e-gov and e-commerce)		X	X	X
Cost savings and revenue increases through improved provision of commercial and retail services (e.g., siting of new facilities, marketing to customers)		X	X	
Improved public health through accurate mapping of health data	X		X	X
Better service to human service recipients through improved tracking and delivery	X	X	X	
Economic development benefits from client distribution mapping to support business development and market evaluation	X	X	X	
Improved public safety though crime mapping and analysis	X	X	X	
Support for strategic and comprehensive planning and projections (land use, business, economic)- better planning and impacts on improve long-range decision making.			X	X
Avoidance of costs from legal claims (using geographic information to dispute claims for damages—auto accidents, property damage)		X	X	

The types of benefits described above reflect actual experiences of many government and private organizations which have realized tangible value for their GIS programs.

4.5 Actual Anticipated SDI Benefits for the Michigan GIS Community

Michigan organizations in the public and private sectors have received substantial benefits from GIS technology since the mid-1980s. The development of Michigan's SDI, through implementation initiatives described in this Business Plan, is designed to build on past successes and expand benefit opportunities for Michigan's user community. Listed below are some actual tangible cases of GIS benefits achieved by government agencies and private companies in Michigan.

- Coordination of Michigan's geospatial community has helped to enable the state (through matching funds) to take advantage of the federal NAIP program for acquisition of full state coverage of ortho imagery (including existing 2004 imagery, acquisition in 2009, and projected acquisition in 2012). Each statewide acquisition has provided over $1.2 million in funds from the federal government for imagery collection and processing. The imagery is heavily used by government and private sector users saving hundreds of thousands of dollars each year in acquisition costs.
- Most County Assessors that have deployed automated parcel mapping and GIS have achieved benefits in the property appraisal process. These benefits address several related areas: a) cutting labor time in property appraisals—especially rural properties through access to image data, b) improving the completeness and consistency of property appraisals by using GIS to evaluate and compare geographic

factors that contribute to real property valuation—resulting in more comprehensive and equitable appraisals and reducing citizen appeals, c) finding errors that result in under taxation, thereby increasing overall tax revenues and equity for property owners.

- Multiple local government jurisdiction and engineering consulting firms have used GIS data and mapping capabilities to reduce the cost (by as much as 50%) of engineering design projects for road, bridge, drainage, and utility construction projects. Cost savings comes from ready access to digital map data and imagery which would defrays costs for new data collection and compilation.
- GIS technology plays a major role in supporting the information management needs numerous military installations in Michigan that support training, testing, weapons and equipment maintenance, and other services for the National Guard (through the Division of Military Affairs) and branch services of the Department of Defense. GIS has delivered the benefits worth millions of dollars in recent years through reduced contract costs and labor for such applications as: a) design and management for new facility construction projects, b) ongoing facilities management, c) environmental studies, and d) planning for military exercises. GIS technology used for these purposes makes use of data being developed as part of the SDI and is a basis for attracting federal funds to support military facilities and Department of Defense missions.

The list above gives a selected picture of the practical impact and business value of GIS technology. What type of benefits will be achievable in the future with a strengthened, active SDI? The tangible and non-quantifiable benefits are substantial. The improved coordination and management provided by the SDI program will help Michigan organizations save money, time, improve operations, build relationships, and plan for the future. In brief, these benefits will be exhibited in the following ways:

- Cost savings by leveraging economy of scale through coordinated GIS database development and application projects
- Efficiency, time savings, and cost reductions through improved Web-based access to a wide range of high-quality GIS data that supports the business needs of a large statewide user community
- Cost savings from a consolidation and better management of computer hardware, software licenses, and associated maintenance/support contracts
- Cost savings and efficiency gains by leveraging existing applications (deployed by state agencies and local governments) and expanding their use to a larger user community through improved coordination and management enabled by the SDI program
- Cost avoidance through a more effective use of GIS technology and GIS integration with other information systems—allowing government agencies and business to respond to increased demands without significant increases in staff
- Support for critical business drivers (public safety, energy efficiency, infrastructure management, etc.) through the deployment of new, innovative applications—enabled through an improved environment of professional collaboration and partnerships
- GIS support for economic development initiatives by providing tools and geographic data that increase awareness of Michigan as a destination for visitors and its attractiveness as a location for business development

- Positive economic impacts and cost savings through GIS-based public-private partnerships with mutual benefits for government agencies and private companies (e.g., utility companies)
- Improvements in education through the promotion of GIS education and practical training in high schools and state universities in multidisciplinary educational environments which offer greater opportunities for high-technology jobs

5. Implementation Initiatives

To effectively support a statewide GIS program a number of initiatives will need to be accomplished which are closely linked to the business objectives outlined in this report.

These implementation initiatives together form a comprehensive work program which establishes a framework for specific work activities for accomplishing the Spatial Data Infrastructure (SDI) goals.

Appendix A identifies the statewide GIS implementation initiatives, their priority, and a summary of expected results—against which implementation performance will be gauged. Appendix B provides an explanation of these initiatives and their relationship to SDI goals. All document appendices may be found on the project web site: www.michigan.gov/nsdi.

Implementation initiatives are organized by the following categories:

- Organizational and Management Structure, Policies, and Practices (O)
- Data Development and Stewardship (D)
- System Configuration, Software, or Application Development and Operation (S)
- Communications, Outreach, Education, and Statewide GIS Coordination (E)
- Funding, Resourcing, and Financial Management (F)

This section presents the implementation initiatives and assigns a priority score to provide a basis for detailed planning and execution of work elements. The priority is a relative indication of the initiative's importance to goal accomplishment and the urgency for carrying out the necessary work. Priority scores are:

- **Very High (VH)**—Fundamental for the accomplishment of the designated strategic goal with most other goals dependent upon it. It is critical that major progress be made on this initiative by the end of 2011
- **High (H)**—Very important for accomplishing the overall mission with multiple goals dependent upon major progress. Work should begin as soon as possible with planned completion or major progress by the end of -2012, or sooner if possible.
- **Moderate (M)**—Significantly impacts achievement of the overall mission and other selected goals. Work should begin by the middle of Year 2 or before with planned completion or major progress by the end of 2013, or sooner if possible.
- **Low (L)**—Important for overall success of SDI development, but there is flexibility in work scheduling given resource and time limitations. These initiatives should be scheduled and work initiated as resources permit with a projected completion by the end of 2015.

5.1 Organizational and Management Structure, Policies, and Practices

The success of any statewide GIS program is largely dependent on the strength and stakeholder support of the organization and management structure that support it. Michigan, with strong institutional support for the GIS program in the

Department of Technology, Management and Budget, is well positioned to be a national leader in statewide geospatial data and systems.

One impediment to full implementation of a statewide GIS program is the small amount of active involvement in data stewardship relationships with the local jurisdictions in the state. Active involvement from all levels of government is essential to stated mission of the Center for Shared Solutions and Technology Partnerships (CSSTP), "…build once, serve many, and operate as one unit with a single entry point to reduce costs, provide more and better services to citizens and make crossing government lines seamless."

Additional organizational and management structure that encourages more active involvement from all GIS stakeholders in Michigan will greatly enhance the likelihood of success for any initiative undertaken. The initiatives outlined below in Table 13 are intended to build the environment necessary to encourage, nurture, and grow collaborative efforts.

Table 13. Implementation Initiatives—Organizational and Management Structure, Policies, and Practices

Implementation Initiative	Priority	Description
O1: Formalize/Revise Role, Membership, and Structure of Local and State Cross Boundary Technology Steering Committee (CBTSC)	VH	Committee members with input from other GIS stakeholders examine current mission and goals and make appropriate changes and elaborations to the mission statement and goals. Clarify the advisory and oversight authority of Committee on GIS management and operations in CSSTP. Formalize operational issues: membership, leadership, approach for decision making, formation of subcommittees and working groups etc. If deemed important, make changes to membership to better represent GIS and IT communities.
O2: Identify and establish initial Standing Subcommittees under Cross Boundary Technology Steering Committee	VH	Based revisions to the CBTSC established in O1, define a number of Standing Subcommittees to address key ongoing GIS and related IT issues and concerns. Form the Subcommittees as needed but begin with ones that are needed to support high priority initiatives such as: a) GIS/IT Standards Development, b) GIS Policies, c) GIS Program Outreach and Communication, d) Business Plan Monitoring, e) GIS Education and Training, f) State-Local-Tribal GIS and IT Coordination, g) GIS/IT Trend/Advances Monitoring. Note: *Standing Subcommittees* are bodies commissioned by the CBTSC that have specific missions and topics related to business plan execution. Standing Subcommittees have an ongoing role, not a fixed temporary/task oriented purview as is the case with *Working Groups*. The Subcommittees are normally chaired by a member of the CBTSC but may include members from the broader Michigan GIS and IT stakeholder community (public or private sector, academic, non-profit).
O3: Change name of State GIS User Group, enhance activities, and clarify organizational relationships	H	Take steps to enhance User Group services and activities and expand participation by members of the State GIS community. Change the name to "GIS User Forum" to avoid confusion with existing regional user groups. In coordination and sharing of resources with other statewide GIS bodies to support many of the Outreach and Communication initiatives (see Category C). Provide high-value services through regular meetings, news and information on Web Site, vendor and user demonstrations, information on training opportunities, calls for participation in CBTSC Subcommittees and Working Groups.
O4: Improve relationships between GIS and other professional networking and educational organizations.	H	IMAGIN, MiCAMP, and other professional associations play valuable roles in statewide professional networking, education, and information sharing. The missions of these bodies are similar and each has somewhat overlapping membership. A closer working relationship between these groups would better support statewide GIS coordination and support users through improved programs and services.
O5: Seek and get legislative action, Executive Order, or formal Agency action recognizing statewide GIS program.	L	Actively explore and establish formal recognition for the statewide GIS program. This could take the form of an Executive Order from the Governor's Office, a resolution from the state legislature (formal recognition) and legislative act that formally

		establishes key GIS program entities and which may allocate funding, or an Agency action formalizing GIS Coordination roles.

Table 13. Implementation Initiatives—Organizational and Management Structure, Policies, and Practices (con't.)

Implementation Initiative	Priority	Description
O6: Establish and implement a Project Management Office (PMO) in CSSTP and monitor business plan progress.	H	Using accepted best practices (from the Project Management Institute and other professional associations) create a staffed GIS/IT project management office (PMO) in CSSTP. This body would: 1) establish and support project planning and management practices for GIS projects, 2) monitor and report on progress on the business plan (and how it addresses IT Strategic goals), 3) Support GIS planning and execution by any stakeholder groups around the state.
O7: Establish and assign resources for a GIS program outreach and communication business function in CSSTP	VH	Formalize and expand current activities lead by CSSTP for external outreach and communications with the full GIS user community in Michigan. A new program or section would be established with CSSTP staff responsibilities. This group would have a lead role in many of the Implementation Initiatives in Category E. It would coordinate closely with the rest of CSSTP, other statewide GIS bodies (State User Forum, IMAGIN, MiCAMP, and regional GIS user groups), and other professional associations. This group would have an important focus on building/sustaining state-local partnerships but would be help identify and establish other partnerships with federal agencies, universities, and private companies.
O8: Define/document process for GIS standards and policy development and approval	H	Create a Working Group under the CBTSC charged with the responsibility for defining a process and workflow for the submittal of a proposed standard or policy and its evaluation and ultimate of approval as an IT and/or GIS standard or policy. Standards and policies may address any technical, operational, or administrative area including software, data architecture, database content and format, network protocols and management, system administration tools and practices, standard methodologies for GIS and IT development, organizational relationships, information distribution, etc. The standards and policy review and approval would follow a comment and consensus process with formal approval by the CBTSC. Standards compliance would be required by state agencies (with a provision for approved deviation from the standard if a business case could be made). For non-state agencies, standards compliance would be recommended and encouraged but not mandatory. Note: Short of formal standards that carry specific requirements for compliance, some topics may result in the approval of a "guideline" which is recommended for adherence for specific circumstances but which are not mandatory.
O9: Establish process for submittal and review of new GIS projects and initiatives	M	Following the draft workflow for the CBTSC, finalize and fully describe an optional process for any GIS or IT stakeholder to propose a project (e.g., database or application development, educational initiative) that involves partnership and coordination by multiple state, local, or other organizations. The process will examine scope, business benefit, costs, and funding sources and explore opportunities to leverage resources for broader benefits. If appropriate, funding sources will be identified, resources will be allocated, and a project team (Working Group) will be assigned to prepare a work plan and manage the project. The PMO (see O6) will normally be involved with the evaluation and planning process.
O10: Set up templates, practices, and procedures for detailed work plan preparation	H	Establish guidelines and templates for preparation of detailed work plans—for work on implementation initiatives defined in this Business Plan or future projects proposed to the CBTSC. Document acceptable project management practices for team development and ongoing project administration, monitoring, communications, and reporting. The recommended PMO (see O6) has the

		primary responsibility.

Table 13. Implementation Initiatives—Organizational and Management Structure, Policies, and Practices (con't.)

Implementation Initiative	Priority	Description
O11: Set up templates, practices, and procedures for business plan monitoring and reporting	H	Establish procedures and practices and create reporting format templates for overall monitoring of progress on Business Plan objectives and implementation initiatives. Put in place ongoing monitoring and reporting.
O12: Create "template" organizational structure and best management practices to support enterprise GIS development	L	Government agencies at state and local level could use "organizational models" and guidance to support their development of enterprise GIS programs that serve multiple departments. The template would provide a starting point for enterprise GIS development that provides a structure and practices that encourage collaboration and sharing of resources. This would include the creation of a "library" (Web accessible) of best practices for GIS management and operations. The PMO would have a role in creating the template and providing assistance in its use.
O13: Develop and approve formal GIS policies	L	This is an ongoing activity for the creation of formal policies, reviewed and approved according the process developed in O9. Initial policies will focus on high-priority organizational, operational, and administrative activities. Policies may be applicable to certain types of organizations (state vs. local government) or for all GIS stakeholders. High-priority policies may include: requirements for standards and policies compliance, data maintenance responsibilities, requirements for project review and approval, GIS ethics.
O14: Prepare formal records retention policy and practices (records with geographic content)	L	Examine legal and regulatory requirements for public records retention as it impacts geographic databases and products (maps) for state agencies and local governments. This involves evaluation and application of public records management requirements defined by the Michigan Department of History, Arts, and Libraries (HAL) Prepare recommendations and support development of policies for sound records management and retention to ensure compliance with applicable laws and rules.
O15: Create a Stewardship and Outreach Coordination position within the CSSTP to support implementation of this Business Plan	VH	A staff position with primary responsibilities for facilitation of the spatial data infrastructure outreach and stewardship program should be created. The individual in this role would be responsible for implementing many of the key implementation initiatives in this business plan. Position would provide staff support to the CBTSC and all associated standing subcommittees and working groups. Support would also be provided to regional user groups and professional organizations through assistance with meeting logistics and conference planning.

5.2 Data Development and Stewardship

The foundation of any statewide GIS program is the availability of high quality foundational geographic data. The CSSTP has a tradition of providing base mapping data for the GIS users of the state through the MGF. While overall the MGF is a high quality and widely used source of statewide data, at times it is not sufficient to meet local data needs from an accuracy, content, and currency standpoint.

There are other foundational data elements that will be necessary to support statewide GIS data demands. The implementation strategies included below in Table 14 are intended to enhance the quality and availability of data for Michigan and build a stewardship culture.

Table 14. Implementation Initiatives—Data Development and Stewardship

Implementation Initiative	Priority	Description
D1: Complete version 10 of the MGF and make it available to users	VH	Complete the changes and enhancements currently in progress for the delivery of Version 10 of the MGF and inform users that it is available for use. Complete implementation of Oracle Spatial model and the on-line editing toolkit.
D2: Prepare high-level logical GIS database design and source matrix	M	The high-level logical model is an identification of "data entities" (data "themes" or "layers"), summary of data content and structure, and the logical relationship between the entities. It may be presented in the form of an entity-relationship model and/or descriptive table. This logical design would include all GIS data entities needed by GIS stakeholder organizations. The purpose is to provide a comprehensive picture and context to support decisions on the future enhancement or development of GIS databases. In addition to a description of data content and relationships, information on the source(s) and development status of the data entities would be provided. The logical design would also include an identification of Framework data layers (current data in the MGF or future data layers considered to be high priority for multiple stakeholders) and Non-Framework (important GIS data but not needed by a majority of GIS stakeholder organizations.
D3: Expand on the Geographic Data Library to maintain Web-based catalog of sources of geographic data	M	Compile an index with descriptive information and links to Web sites maintained by public sector (federal, state, local) and other organizations that provide access to geographic data. This would include applicable metadata to provide prospective users with sufficient information about data content, data quality, access provisions, etc. for users to determine "fitness for use".
D4: Design and put in place a data stewardship model and practices applicable to all GIS data	VH	Prepare an overall model for stewardship (applicable to all data layers) that defines various steward management, and operational roles and a process for data update and posting for access. Designate responsibilities for maintenance of each Framework data theme and define workflows for ongoing data maintenance. Build and deploy effective applications for data update, quality control/quality assurance, posting of data for wide access.
D5: Evaluate current quality of Framework data and define actions for quality improvement for next MGF version.	H	As a basis for planning future enhancements and improvements of existing MGF data, perform a detailed assessment of current data quality. This would include the creation and/or update of metadata and would address multiple quality criteria: completeness, map accuracy, attribute accuracy, graphic integrity, etc. The results of the data quality assessment would be compared with needs expressed by MGF users to identify realistic improvements. The survey conducted as part of the NSDI CAP grant planning project is one source for this work.
D6: Develop, approve, and support the use of GIS database standards	H	Accelerate activities for developing and approving data standards for GIS data--to support development of consistent statewide data. Communicate information on the standards and provide guidance on their use to GIS stakeholders in Michigan. This initiative would begin by a focus on high-priority data standards that apply to all or most data layers (metadata, projections/coordinate systems, and data distribution licenses). Ongoing work would under this initiative would include the preparation and approval of more specific standards on data content, quality, coding/classification, attribute data schemas, etc.
D7: Recruit MGF stewardship participants	VH	As an ongoing activity, the CSSTP in coordination with professional associations and regional GIS user groups will actively recruit local government (City/Villages/Townships—CVT) partners and applicable state agencies to play a stewardship role in MGF data maintenance. The ultimate goal is to have all counties, with active GIS programs, become active stewardship participants. In cases where appropriate a regional stewardship coordinator at the State Planning and Development District should be identified to serve as an initial point of contact for MGF issues. This regional stewardship coordinator could play a very significant role in expanding the MGF in rural areas.

Table 14. Implementation Initiatives—DATA Development and Stewardship (con't.)

Implementation Initiative	Priority	Description
D8: Develop template database specifications and procurement templates for new data themes	M	Prepare template specifications for database development for use by any GIS stakeholder organization planning for database development These specifications would reference applicable data standards and include technical specifications for data conversion and capture, format of deliverables, quality criteria, and work performance criteria. These template standards would be a model (with necessary adjustments) for use by any stakeholder organization for a data conversion project or procurement of private data development services. The template would also help encourage database development partnerships for organizations (local governments) in geographic proximity.
D9: Create geospatial metadata profile and develop more effective metadata management tools	H	Create a metadata profile, based on the FGDC Content Standard for Geospatial Metadata, create templates for populating metadata fields, and enable tools for metadata query.
D10: Make enhancements in content and quality to existing MGF data	VH	Using results of the review (see D5) make quality improvements in existing MGF data. Quality improvement is particularly important for transportation centerlines (positional accuracy and update timing) and related transportation attribute and LRS. Quality improvements also impact other MGF data including political and administrative boundaries. This is a planned, ongoing activity that takes into account user needs, resource availability, and level of MGF stewardship participation.
D11: Establish program and process for ongoing repeatable statewide coverage of ortho imagery data	VH	Continue to administer the current NAIP partnership program and recently ratified agreement with Microsoft. Plan and actively solicit support for ongoing ortho imagery acquisition program. Prepare terms and agreements for cost sharing and access for imagery (see F6) and technical specifications for ortho imagery development. Get support and commitments for cost contributions (federal, state, local, private) and prepare/ratify cost sharing agreement. Establish group and practices for long-term management of the ortho imagery program.
D12: Accelerate and establish better access to digital data from the REMON initiative	H	Evaluate current management of REMON project and identify potential changes and improvements to make coordinates available to the GIS community. Help accelerate data compilation and make improved monumentation data more accessible via the Web.
D13: Load and make available GIS data layer with Census Geography and 2010 Census data	H	Take delivery and load current census geography boundary files and data from 2010 Decennial Census. Evaluate correspondence of boundary files with MGF data layers and make necessary adjustments to TIGER to improve match MGF or local government GIS data (parcel and centerlines). Make this data available for query, viewing, and download.
D14: Design, develop, and deploy statewide parcel database and establish ongoing stewardship	VH	Complete database design, build, and maintain a statewide parcel database consisting of parcel boundaries and a minimal set of parcel attributes. Data would be contributed by local governments (county, city, village, and township) and would be carried out in partnership with BS&A (contractor which has already automated data for large number of Michigan government jurisdictions). Data from multiple sources would be contributed to create a seamless statewide parcel fabric. Initially, data stewardship would call for updates on an annual basis (corresponding to the real property taxation cycle) but in the future, updates may occur more frequently with new subdivisions and parcel splits/mergers. This database development initiative to identify publicly owned parcels or parcels for which a public agency has right-of-way or easement rights. Identifying these public parcels and easements would provide data to support a “public land inventory and tracking” application (see S2 Part of this effort would involve reaching an agreement for contributions of parcel data from jurisdictions that are now generating revenue from parcel data sales.

Table 14. Implementation Initiatives—DATA Development and Stewardship (con't.)

Implementation Initiative	Priority	Description
D15: Design and develop addressable structures database	VH	Structures data include specific buildings or other facilities with a fixed location (for which a site address may be assigned) and which are deemed important for public safety planning and response and other applications. Structures data is generally consistent with feature types included in the federal Homeland Security Infrastructure Program (HSIP): schools, hospitals and other medical facilities, police/law enforcement stations, fire/EMS stations, emergency operations centers, jails/prisons. Additional important features may be included—for example, it may be expanded to include all governmental buildings and facilities to support a "public land inventory and tracking" application. Building the database will involve work with source agencies: HSIP, state agencies, and local governments. This initiative includes preparation of a database design, data loading and quality control checks, and creation of a statewide database. Building this database is followed by the establishment of a stewardship process resulting in data update at least on an annual basis.
D16: Design database and specifications for site addresses and put in place process for data population and maintenance	VH	As an extension to the "addressable structures" database described in D15, a comprehensive site address database includes point locations and attribute data for all parcels and/or buildings and facilities for which addresses can be assigned. This initiative includes the agreement of a data content and format standard, development of a database design and database development specifications to support capture of site addresses. Local governments (or contractors retained by them) would be primarily responsible for database development but technical support, and possibly financial assistance could be provided by CSSTP.
D17: Enhance accuracy/ completeness of administrative boundaries (city, townships, school districts, election districts, and other special purpose districts)	H	Administrative boundaries area foundational element of any statewide GIS and in Michigan that dataset is used by over 97% of all GIS users. To be most useful administrative boundary data should coincide with parcels, road centerline, and hydrology databases wherever possible. Boundary data for every type of taxing and public service authority in Michigan should be collected and maintained under a stewardship partnership relationship with local data custodians. These data are important to a variety of business drivers including economic development, revenue and taxation, emergency response, and asset management.
D18: National Hydrology Dataset (NHD) completion and enhancement	H	The NHD data should be completed and enhanced to fully support business drivers for asset management for drain commissions, flood management, and environmental protection. Surface hydrology was reported to be needed by over 96% of all GIS users in Michigan during the outreach portion of this project.
D19: Enhance database in support of emergency dispatch and response	M	This initiative is related to the Structures initiative in D13. It involves the improvement of data that supports local and state public safety and emergency planning and response agencies. The objective is to build and maintain a statewide database with critical public safety and emergency management data that includes (in addition to Structures), emergency service zone (ESZ) boundaries, selected "critical infrastructure" features, improved address ranges, and possibly other data. This project could be lead by CSSTP or a Working Group of the CBTSC. It would require a close partnership with local governments and appropriate state agencies (e.g., State Police).
D20: Design and develop water and sanitary sewer service area database	M	Water and sewer utility service data was identified as being important unavailable data elements for over 30% of survey respondents. While these data are not critical for many GIS applications they are important for several high profile business drivers: land use planning, economic development, emergency response. These data should be developed in partnership with regional or local governmental entities and include pertinent information on system capabilities, sources, etc.

Table 14. Implementation Initiatives—DATA Development and Stewardship (con't.)

Implementation Initiative	Priority	Description
D21: Other utility service areas—gas transmission, electric transmission, pipelines	M	These data were all highly ranked as desired but unavailable. Since the vast majority of these data are related to investor owned companies it is likely that obtaining them for use in the public domain will be difficult. However, partnerships should be explored with the leading providers of these services since in most cases these data exist for their own internal asset management and planning functions. These data can be critical to economic development, land use planning, and homeland security business functions.
D22. Create statewide current elevation data	H	Elevation data, specifically contours, was identified by over 90% of GIS users as data needed to support their enterprise application of GIS. Additional elevation data in the form of DEMs if improved will result in better spatial accuracy of ortho imagery photos. These data are important to production of quality National Flood Insurance Rate Maps (FIRM), to modeling and responding to wildfire, determination of road centerline mileage, wireless broadband and other tower location decisions, and site selection for wind power generation locations.

5.3 Communications, Outreach, and Education

Communications, outreach and education are important to a successful statewide coordination effort. Decision makers and GIS professionals in Michigan need to be connected to the statewide GIS program to insure success.

Many GIS professionals and decisions makers at levels of government beneath the state do not view contributing to a statewide program as an activity that returns value to their community. Often they view data and applications they have developed as property to be protected or sold for the benefit of their jurisdiction. While those assets are in fact valuable, their value is enhanced through multiple uses of the data to make improved public and private decisions at all levels. A tangible or intangible benefit to the local government through participation in a statewide initiative must be clearly identified and communicated.

It is the goal of these implementation strategies to build an understanding among the GIS stakeholder community that there are clear and significant benefits from participation that outweigh the costs of doing so.

Table 15. Implementation Initiatives—Communications, Outreach and Education

Implementation Initiative	Priority	Description
C1: Complete a communications and marketing plan for the state spatial data infrastructure.	VH	An effective statewide GIS coordination effort is built upon a strategic and focused communication and marketing effort. Completion of an initial plan focused on outreach communications and marketing of the state spatial data infrastructure (specifically the MGF).
C2: Actively pursue outreach with and support from professional and industry associations	VH	Build better communication with professional and industry associations that represent organizations and people that have an interest in GIS technology and data. This would include participation in meetings and conferences hosted by these groups, providing promotional and educational materials, and soliciting their support for GIS program initiatives. Groups might include County Road Association of Michigan, Michigan Emergency Management Association, Land Information Access Association, Michigan Assessors Association, Michigan Association of Chamber Professionals, Michigan Association of Counties, Michigan Association of County Administrative Officers, Michigan Association of County Drain Commissioners, Michigan Association of Equalization Directors, Michigan Association of Insurance Agents, Michigan Association of Planning, Michigan Association of Public-Safety Communications Officials, Michigan Association of Realtors, Michigan Association of Regions, Michigan Association of School Administrators, Michigan Association of United Ways, Michigan Cable Telecommunications Association, Michigan Education Association, Michigan Electric and Gas Association, Michigan Government Finance Officers Association, Michigan Municipal League, Michigan Railroads Association, Michigan Society of Professional Engineers, Michigan Society of Professional Surveyors, Michigan Township Association, Roadsoft User Group, Telecommunications Association of Michigan, Transportation Asset Management Council, and United Tribes of Michigan.
C3: Prepare materials and hold briefings to sustain support from senior officials	H	Prepare a number of explanatory and promotional materials that provides information about the needs, applications, and benefits of the GIS program and work to stimulate partnerships between state, local, and private organizations and which are aimed at senior managers and elected officials at the state and local level. Materials may include brochures and presentation materials. The CBTSC and CSSTP staff will seek opportunities to provide information and conduct executive briefings with senior officials.
C4: Reach consensus on name, logo, and other branding for Michigan's statewide GIS program	M	Overall promotion and education about the statewide GIS program will benefit from appropriate "branding' as a basis for communications and outreach—particularly for expanding interest and participation in statewide GIS initiatives. This "branding" includes a number of actions most important of which is defining a name, logo, and possible a slogan or "tag line" for the Michigan GIS. Other states that have taken this step have seen considerable success in statewide GIS promotion (e.g., North Carolina's "NC OneMap", and Oregon's GIS Utility program branded as "NavigatOR"). Reaching consensus on a name and logo could be done in the form of a contest with suggestions from the Michigan GIS community. When a name and logo is settled on, it would be used in GIS program communications, presentations, Web sites, GIS products, and hosted applications.

Table 15. Implementation Initiatives—Communications, Outreach and Education

Implementation Initiative	Priority	Description
C5: Prepare and establish formal terms for MGF partnership program	H	This initiative is to encourage expansion in MGF program participation, including Stewardship roles for local governments and other organizations that will provide data updates for statewide data coverage. This initiative involves several major tasks including: a) clarifying the terms of participation and putting in place a formal process for enlisting data Stewards and b) active promotion and recruitment of data stewards by CSSTP, the CBTSC, the professional GIS associations, and regional GIS user groups. These steps are followed with establishment of specific procedures to provide data for import to the MGF.
C6: Design and create promotional materials for statewide GIS program	VH	This activity is carried out in coordination with other outreach initiatives (E1, E2). This involves the design and development of materials using a variety of media and distribution channels to provide information focused on potential users and partners in the statewide GIS program. This may include brochures, web site pages, and other materials which would be distributed to users and potential users. This could be a role taken on by a Standing Subcommittee or Working Group of the CBTSC. All statewide GIS stakeholders would have access to these materials and use them in connection with events, meetings, and other outreach activities.
C7: Review and improve CSSTP Website design and navigation for improved access to information, services, and resources	M	The objective of this initiative is to improve the CSSTP web site which will serve as a primary communication channel for statewide GIS users or potential users to easily find information about the statewide GIS program and also to access data and services. This initiative would involve a full Web site redesign after getting input from current users, followed by a rebuilding of Web pages and improved navigation. This is an important aspect of GIS program promotion and supports most outreach and education initiatives as well as those focused on delivery of GIS data and services.
C8: Prepare and maintain single Web-based GIS contact directory	M	Compile a directory of people and organizations--principally users and technical staff with GIS expertise who may serve as a resource for information and technical support to other GIS programs. Provide contact information to facilitate networking and build an application to GIS-enable the directory to easily identify the location of the contact.
C9: Support and encourage expanded participation in GIS events and professional associations	H	As part of statewide GIS program communications and promotion, this initiative will encourage broader participation in GIS events and related professional associations—including Michigan-based organizations and programs as well as out-of-state GIS events and organizations (URISA, GITA, ASPRS, and NSGIC). This initiative is supported by a Web-based resource with information on professional organizations and upcoming events (conferences, workshops, special meetings). Membership and participation in these professional organizations and events supports professional development, networking, and overall advancing of GIS programs. The State GIS User Forum (see O3), IMAGIN, and MiCAMP organizations (see O4) would have key roles in this initiative.
C10: Create and maintain central, web-accessible repository for GIS and related IT standards and policies	H	This initiative supports Objective 2.2 of the CBTSC. In connection with the development and approval of standards (see O8, D6, S10), this initiative includes the design and deployment of a searchable Web-based catalog of pending and approved IT and GIS standards and policies.

Table 15. Implementation Initiatives—Communications, Outreach and Education

Implementation Initiative	Priority	Description
C11: Encourage and support professional development and certification for GIS professionals in Michigan	M	This initiative will be coordinated with E8 and has the purpose of supporting the increase of technical and management skills and professional advancement of GIS professionals in all statewide stakeholder organizations. Specific objectives include completion of formal GIS educational degrees or GIS certificates in universities, continuing education course credits, and increasing the number of GIS staff with applicable GIS and related professional certifications (e.g., GISP, ASPRS-CMS, PMI-PMP, other technical IT certifications). Work would include preparing Web-based information on educational and professional programs, promotion of these opportunities at events, and possible monetary support to qualified individuals. A Standing Subcommittee of the CBTSC would take the lead role with staff support of CSSTP. This initiative could also include a review and preparation of standard, recommended GIS personnel descriptions.
C12: Design and organize training programs for use of MGF resources and other CSSTP GIS services	H	This initiative directly supports initiative E4—expansion of MGF program participation and data stewards. The CSSTP would take a lead role in designing and distribution of information about the MGF and training programs aimed at potential new stewards for MGF data maintenance. The CSSTP will prepare training materials which could be provided on-line (without the need for a trainer) and, as needed, training sessions by a CSSTP staff person or other qualified statewide GIS stakeholder.
C13. Encourage and expand participation in and programs offered by State GIS User Forum	M	This initiative directly supports initiative O3—re-organization and improvement of a State User Forum. A CBTSC Subcommittee could take a lead role with participation of IMAGIN and MiCAMP, and CSSTP staff. This initiative involves ongoing promotion through all available channels to make GIS users throughout the state aware of the User Forum and encouraging broader participation. Part of this is to solicit contributions and presentations by users for GIS User Forum meetings and Web-accessible material.
C14. Communicate GIS project initiatives, successes, lessons-learned, and best practices through media, Web site conferences, and professional meetings	M	This initiative supports Goal 1 of the CBTSC and is carried out in coordination with other outreach activities (Category C). This will result in an effective approach to distribute news about the statewide GIS program activities and user stories as a support for professional networking. Publishing of information about GIS applications and "success stories" provides a resource for other users' application deployment and support for GIS business cases.
C15: Explore and define options for providing GIS services to low-resourced jurisdictions	H	Examine the options for providing outsourced GIS services or partnerships that may allow contracted GIS services or support from CSSTP or a local government (e.g. support from a County government GIS program to a neighboring county or to CVTs in the County. The focus is finding appropriate avenues to provide GIS data and services to local governments without sufficient resources or technical expertise to support a full GIS program.

Table 15. Implementation Initiatives—Communications, Outreach and Education

Implementation Initiative	Priority	Description
C16: Design, initiate, and support "Map of the Month" Web-based gallery	L	This is an ongoing program that some other state and local government GIS programs have used as a promotional device and to encourage professional networking and communication among GIS professionals. Any member of the GIS community in the state would be given an opportunity to submit a GIS-generated map created to support a GIS program or research activity. Any GIS user could submit a digital map for consideration and one would be chosen each month. There would not be a prize of an extremely detailed set of selection criteria. Each month a new "map of the month" would be accessible through a Web link and viewed by all with brief information about the purpose of the map and how it was created as well as credits to the contributor(s) and their organization(s). Maps for previous months would also be accessible. It may even be possible to display a hard copy (at the CSSTP Office location) each month and perhaps have all the hard copies on display at an annual conference (see Ex).
C17: Plan and set-up program for mutual GIS support network	M	This initiative is related to other outreach initiatives designed to increase professional networking and exchange of information and ideas among organizations using GIS technology and data. But it goes a step further by creating a pool of in-state GIS professionals and/or their organizations which would be willing to provide GIS planning or implementation support, at no or little cost, to other organizations (particularly organizations that are planning GIS implementation efforts). This would be implemented as a Web-based clearinghouse, identifying individuals, their areas of expertise, and contact information. Groups needing such support would use this clearinghouse as a starting point to enlisting the in-state help that they need Mutual support network could also include code samples, RFP documents, and other technical resources generated by GIS professionals in the state made available for others to use.
C:18: Compile and maintain a directory of GIS training sources and opportunities	M	This would be an on-line directory, regularly updated, that gives users and technical staff in Michigan information about upcoming events and sources for training, education, and professional development. It would include training courses and seminars sponsored by government agencies, universities, vendors, professional associations, and private trainers; conferences; training materials; and on-line courses.
C19: Prepare GIS education/training plan and put in it in place	H	Prepare a formal, comprehensive education and training plan that guides GIS related education and training activities for all stakeholders. The plan will describe education and training goals and types, sources, and consumers of education and training materials and activities. This Plan will culminate in assignment of roles and clear objectives and the initiation of work to put in place plan objectives.
C20: Provide better access to educational materials and professional networking	M	Improve educational materials about GIS (improvement or increased subscriptions to Geotech Listserv); improve mechanisms and directory information for professional contacts and networking (maybe geo-coded database of people).

5.4 System Configuration, Software, and Application Development

In order to support a statewide GIS program there are fundamental systems, software, and application development initiatives that must be undertaken. The value in the statewide program and the MGF is the ability for these data and

systems to be used across all levels of government. Initiatives discussed in Table 16 are those which have been identified as important to successful statewide program implementation from a technology perspective.

Table 16. Implementation Initiatives—System Configuration, Software, and Application Development

Implementation Initiative	Priority	Description
S1: Prepare specifications and develop export tools for easy MGF data extract from Oracle Spatial to other common GIS formats	VH	The MGF database is in the process of migration from a legacy GIS proprietary format (ArcGIS coverages) to an Oracle Spatial format (for storage of map features and attributes). This provides a number of advantages for spatial data management including its ability to maintain a statewide database and ability to use robust data management tools in Oracle. It is vital however that there be flexible and easy to use tools and processes to extract selected data from Oracle and provide it to users in a form that it can used with minimal restructuring or format translations. This initiative includes the development, testing, and deployment of extract and export routines suitable for users needed Shape Files, ESRI geo-databases, AutoCAD DWG files, and possibly other formats. There may also be a need for Oracle Spatial data to be viewed directly by users with different GIS software environments.
S2: Identify, design, and develop several enterprise GIS applications	VH, H	While GIS data is the fuel upon which GIS programs operate, applications comprise the engine which delivers needed products and results to users. This initiative has an objective of delivering a richer set of GIS applications and services that can deliver business benefits to large portions of the GIS community in Michigan, through a Web-based portal. High-priority applications, which may use off the shelf tools in GIS software packages or may require additional design (map templates) or more complex programming or configuration, will provide users with needed tools in an easy to access environment. This initiative includes the design and development of several important GIS applications. This development and hosting could be the responsibility of the CSSTP or another organization in a position to host GIS applications. Selecting and designing the applications would benefit from involvement of the full statewide GIS community—possibly through a Working Group assigned by the CBTSC.
S3: Examine and develop effective tools for on-line update of MGF data	VH	The CSSTP, with input from MGF users (and potential future users) creates easy-to-use tools and submittal of updated data for import into MGF datasets and an application that allows on-line interactive update of MGF data (e.g., new road segments). These tools would incorporate basic quality control features and deliver data changes in a way that could undergo final quality checks and MGF posting by CSSTP personnel.
S4: Move toward statewide 'virtual portal' for Web-based access to spatial data and services from distributed government and commercial sources	H	Design and build an enhanced Web-based tool for geographic data and services that acts as a "virtual portal"--a Web application that can combine centrally-stored data, direct access to and integration of data on other Web sites, and a range of GIS services. This should include a tight connection and functional relationship with the MGF but also allow for access to other data sources maintained by local governments, state and federal agencies, and commercial sources (e.g., mashups with data from commercial providers like Microsoft Bing Maps and Google Earth).
S5: Examine and suggest changes to statewide broadband communication services.	H	CSSTP is providing support to the Michigan Broadband Mapping initiative being managed by the state Public Service Commission--part of the Michigan Connect program (http://connectmi.org). The CSSTP in coordination with the CBTSC should continue to provide support for this effort and use its results (with GIS technology) to evaluate more efficient and less costly ways to provide needed high-speed digital services to state agencies and other organizations.
S6: Monitor and exchange information on industry trends, new products and methodologies	M	Through ongoing professional reading, review of Web-based news and information, participation in industry events, conference attendance, etc., multiple members of the GIS community will gather information about industry trends and products. This activity could be managed through a Subcommittee of the CBTSC. GIS professionals in the state would also conduct basic evaluation of products and methodologies (often in conjunction with their job functions) and make notes about ideas for possible future use or adoption. This initiative would include Web posting of the information for easy access by GIS users.

Table 16. Implementation Initiatives—System Configuration, Software, And Application Development (con't.)

Implementation Initiative	Priority	Description
S7: Continue to monitor and identify opportunities for new applications of GIS technology	M	Continually monitor new programs, special projects, and other opportunities where geographic data and GIS services could be applied. Conduct necessary research and hold discussion with program or project managers to explore use of GIS, leading to agreements for use of GIS.
S8: Explore and design approach for archiving of and flexible access to historic data	L	Many GIS users have a need to access historical geographic information (e.g., parcels, aerial imagery, road networks, land cover) to support planning or engineering studies, and sometimes legal case research. This initiative has the purpose of defining a data model and identification of software tools and applications for easy access to the historical data.
S9: Identify and evaluate opportunities for GIS integration with non-GIS systems and databases	M	Identify business areas, not traditional for GIS, which can benefit from geographic data and GIS capability (e.g., transportation, public health, social services, financial analysis). Define technical and organizational approaches for integration and "embedded GIS" services or applications involving integration with GIS to support these business areas. Include an examination of integration and access to external Web data sources and services including Google Earth, Virtual Earth.
S10: Develop, approve, and document GIS and associated IT standards for hardware, software, networks, security, and system administration tools and practices	M	Using the process for standards development and approval, identify areas that can benefit from formal technical GIS and associated IT standards (addressing computer hardware, software, network, application development tools and methods, etc.). Assign Working Groups of the CBTSC to develop the standards and go through the review and approval process culminating in approval. Note: Short of formal standards that carry specific requirements for compliance, some topics may result in the approval of a guideline which are recommended for adherence for specific circumstances but which are not mandatory.

5.5 Funding, Resourcing, and Financial

Funding and staffing limitations were the leading identified obstacles to implementation of a GIS program. These obstacles must be addressed if a long term sustainable. The initiatives detailed below in Table 17 are intended to provide initial direction to seeking a sustainable way to overcome these obstacles.

Table 17. Implementation Initiatives—Funding, Resourcing and Financial

Implementation Initiative	Priority	Description
F1: Research and secure additional grant funding to support state and local GIS development	H	This initiative is part of Goal 3 of the CBTSC. The purpose is to establish a well organized and resourced effort to identify, apply for, and secure grant funding, from government, private, and non-profit foundation sources that will deliver funding for GIS related projects that help advance IT strategic goals and GIS business plan objectives. Grants may be directly related to IT and GIS programs (e.g., FGDC CAP program, NTIA broadband mapping). Other grants may address other program areas, not specifically citing IT and GIS topics but which can be supported by GIS technology data. The grant research and funding function may be lead by a CBTSC Subcommittee but the “legwork” would require time from CSSTP personnel and other GIS stakeholder organizations.

Table 17. Implementation Initiatives—Funding, Resourcing And Financial (con't.)

Implementation Initiative	Priority	Description
F2: Explore and pursue new funding sources for GIS development support through local land transaction registration fees	H	Establish a Working Group under the CBTSC to explore the possibility of establishing a new revenue stream for GIS development—establishment of a special fee for County Register of Deeds transactions. Fees would go to a special fund administered by a state agency. The majority of the funds would be used to support GIS development and operations at the local level (County, City, Village, Township) based on an agreed formula and a clear accounting process. This type of funding mechanism is being used by a number of states including Wisconsin, Illinois, Minnesota, and Oregon. Establishing this funding mechanism would require legislative action. This initiative begins with research on the approach taken by other states and a polling of interest by local governments. This would be followed by contact with appropriate committees in the state legislature culminating in a proposed bill and vote.
F3: Research and identify other funding sources or financing strategies for GIS programs	H	A standing Subcommittee on GIS financing strategies would be created to examine a variety of funding sources and financing strategies to support GIS initiatives at the state and local level. This Business Plan identifies in Appendix B possible financing approaches (most of which have been successfully used for GIS programs in other states). The Subcommittee would conduct research on new funding alternatives and take action to put in place new funding/financing strategies based on the results of this research.
F4: Explore, identify, and facilitate access to non-traditional staff resource options	M	The success of GIS programs depends on well-qualified and dedicated staff fulfilling a range of important roles for GIS programs (GIS technicians, analysts, application developers, database specialists, trainers, managers, and administrative personnel). The purpose of this initiative is to examine alternatives and opportunities for non-traditional staffing (approaches other than full-time salaried positions). This initiative would involve research about non-traditional approaches used by organizations in Michigan and in other states. Research would include an examination of personnel and labor laws and policies governing employment and personnel management in at the state and local level. The main result would be a guide on GIS staffing options which describes the options and how they would be implemented. Examples of how they have been used would be provided as well. Non-traditional staffing options may include: part-time or seasonal positions, student internship/coop programs, “borrowed staff” from other agencies to support GIS projects, volunteer staff, contracted labor, and others. A follow-on activity may include setting up programs that would be available for use by any organization (e.g., internship programs with state universities, a contract labor pool, and directories of personnel available for part-time work).
F5: Prepare business case for open access to government GIS data	VH	Michigan open records law allows public agencies to charge fees for the sale of GIS data and products and a number of local governments in the state currently generate revenue from GIS sales (mainly for parcel and ortho imagery data). There is concern that this practice inhibits sharing of data across government jurisdictions. This initiative would examine how wide spread this practice is (making use of the most recent survey conducted by MiCAMP). The study would evaluate both the cost and benefit side of this revenue generation as well as non-tangible impacts (e.g., potential loss of economic development opportunities). This business case would be used to develop a consistent policy on government sales of GIS data to encourage consistency and more open access to GIS data.

Table 17. Implementation Initiatives—Funding, Resourcing And Financial (con't.)

Implementation Initiative	Priority	Description
F6: Prepare template agreements and management practices for multi-organization cost sharing		Cost sharing partnerships between government jurisdictions and other organizations (state, local, utility, university, private firms) are an effective means to fund GIS database or application develop projects that provide mutual benefits for the partners—and may also reduce costs because of economy of scale conditions for service providers. Creation of a template agreement(s) with language appropriate for various types of cost sharing arrangements will streamline the establishment of cost-sharing partnerships. This initiative would make use of such agreements already in place or used in the past by Michigan organizations. The template document(s) will be Web accessible and will use specific notations that guide the use of the document in specific partnership cases—identifying language that needs entry or modification by users.
F7: Establish state-run GIS grant program for local governments to support MGF participation	H	Identify a source of funds, administered by CSSTP, or another state body, which could allocate grants to support GIS development for the "have not" areas of the state based on some formula/criteria. Funds would serve as the driving element for expansion of GIS into areas where none currently exists.
F8: Establish structure for and encourage development and use of options for GIS hosting	M	There are significant advantages in consolidated hosting of GIS data and applications. These advantages should be explored for extension from the CSSTP to local jurisdictions.

6.0 Priority Initiatives

While section 5 of this document presents a series of important inter-related initiatives necessary to support a statewide GIS program, this section is intended to provide additional justification for several high impact initiatives. These high impact initiatives are modifications to existing governance structures, development of a sustainable statewide ortho imagery program, aggregation of a statewide set of parcels, construction of a statewide address point data set, and development of several applications to leverage these data.

This section will provide additional context to these initiatives including an estimate of cost and a description of the benefits that will be realized through implementation of the initiatives.

6.1 Recommended Statewide GIS program organizational Structure and Governance

6.1.1 Introduction to Organizational Structure and Governance Recommendations

Use of the term, "governance" has become frequent in GIS and IT management circles. The Gartner Group (www.gartner.com) describes governance relative to information technology programs as "assignment of decision rights and the accountability framework to encourage desirable behavior in the use of IT." Expanding on this definition, governance to implement and sustain the SDI encompasses all aspects of organizational authority and coordination and includes the following main parts:

- Enabling Mandate: A documented, officially recognized, legal or administrative action that enables, establishes, and sanctions the SDI program. The mandate may be from legislative action, an executive order (Governor), or an administrative action by an agency.
- GIS Coordination Body: The formally designated roles and bodies that play a high-level oversight and/or advisory role for the statewide GIS program and the GIS management office. This body provides guidance on major GIS program planning, policy development, and major decisions regarding business plan implementation.
- GIS Management Office: The main office, located in an executive branch department, that has the main responsibility for leading the statewide GIS program, working with statewide stakeholders to deliver data and services, enabling and supporting partnerships and projects, and all operational aspects of the GIS program
- Technical Support Bodies: Formal bodies established to leverage participation and input from statewide GIS program stakeholders to provide information on a range of operational issues or support on key decisions and projects. These entities support and work closely with existing coordination bodies and the GIS management office. Such bodies are often implemented as technical committees or working groups that have a specific mission.
- Policies and Rules of Operation: Written rules, policies, bylaws, formal agreements, etc., that provides the structure for clear, consistent operations, communications, allocation of resources, and performance of SDI work and statewide coordination. There may be multiple sources of these rules and policies.

As explained in Section 2, some of these pieces of the governance puzzle are in place but changes and improvements are necessary if the Michigan statewide GIS community is to realize a broader range of benefits from GIS data and technology and improve statewide coordination and collaboration.

The following main challenges, relating to GIS program governance and organizational structure, provide a basis for recommendations in this section:

- Providing a mechanism and environment in which all GIS stakeholder organizations (particularly local governments) have an effective way to provide input on GIS program operations at DTMB
- Creating an organizational structure that encourages and enables wide participation and contributions on projects, research, and decisions of the statewide GIS program
- Keeping a focus on GIS as one part of enterprise IT and making sure IT and GIS initiatives, standards, policies, etc. are mutually supportive
- Improving and maintaining effective intergovernmental relationships (state-federal, state-local) to establish and support effective project and joint funding for GIS initiatives
- Establishing, approving, overseeing use of GIS technical standards and related IT standards that help to accomplish GIS program business objectives
- Establishing, approving, overseeing GIS and related IT policies (addressing organizational, operational, legal matters)
- Expanding the use of GIS in support of state and local business needs in areas where there are clear tangible and intangible benefits

- Forming, encouraging, and supporting regional collaboration and joint funding, cooperative GIS arrangements--inside counties (County-Township-City-Village) as well as multi-county regions.
- Enhancing the quality and availability of GIS data and putting in place effective stewardship practices
- Improving efficiency in use of existing resources and securing additional funding sources that support statewide GIS program objectives and stakeholder organizations
- Expanding, providing access to GIS data technology by the "have-nots" (low population jurisdictions and regions)
- Addressing a wide range of outreach, orientation, education, and training for GIS users. This includes creation/support of user forums that give a way for users to share information, ideas, general professional networking
- Operational support and management assistance for joint GIS projects
- Keeping a connection and awareness of the business value of GIS for senior decision makers and elected officials

6.1.2 SDI Organizational Structure and Management Recommendations

The recommended statewide organizational and governance structure addresses the needs and concerns faced by Michigan. It builds on the existing structure and identifies changes and improvements that address current limitations. It is designed to integrate smoothly with state government IT governance and management while strengthening coordination and collaboration with all stakeholder groups and users statewide. In summary, the following recommendations for changes and improvements to the current statewide GIS program organizational structure and governance are proposed for implementation:

- Changes in operational focus and resources of the Department of Technology, Management and Budget Center for Shared Solutions and Technology Partnerships (CSSTP) to augment outreach and support in development of partnerships with GIS stakeholders and project planning and management support
- Modifications in mission, membership, and operational role of the Cross Boundary Technical Steering Committee (CBTSC) to better define its role in statewide GIS program planning and decision making and to ensure more comprehensive representation of statewide GIS stakeholder organizations
- Formation of Standing Subcommittees and Working Groups as a means to engage the participation of all statewide GIS stakeholder organizations in important GIS technical and non-technical initiatives and decisions
- Improve the working relationship between IMAGIN and MiCAMP to better serve the statewide GIS community through supporting professional networking, education, and advocacy for GIS user needs and initiatives.
- Continuation and enhancement in the role and activities of the State GIS User Group and a name change to “State User Group Forum”
- Formalize policies that define and support the organizational and governance structure

Figure 3 depicts the details of the proposed structure and Table 18 explains the main components depicted in the figure.

Figure 3: Proposed Future Governance Structure for Michigan's Statewide GIS Program

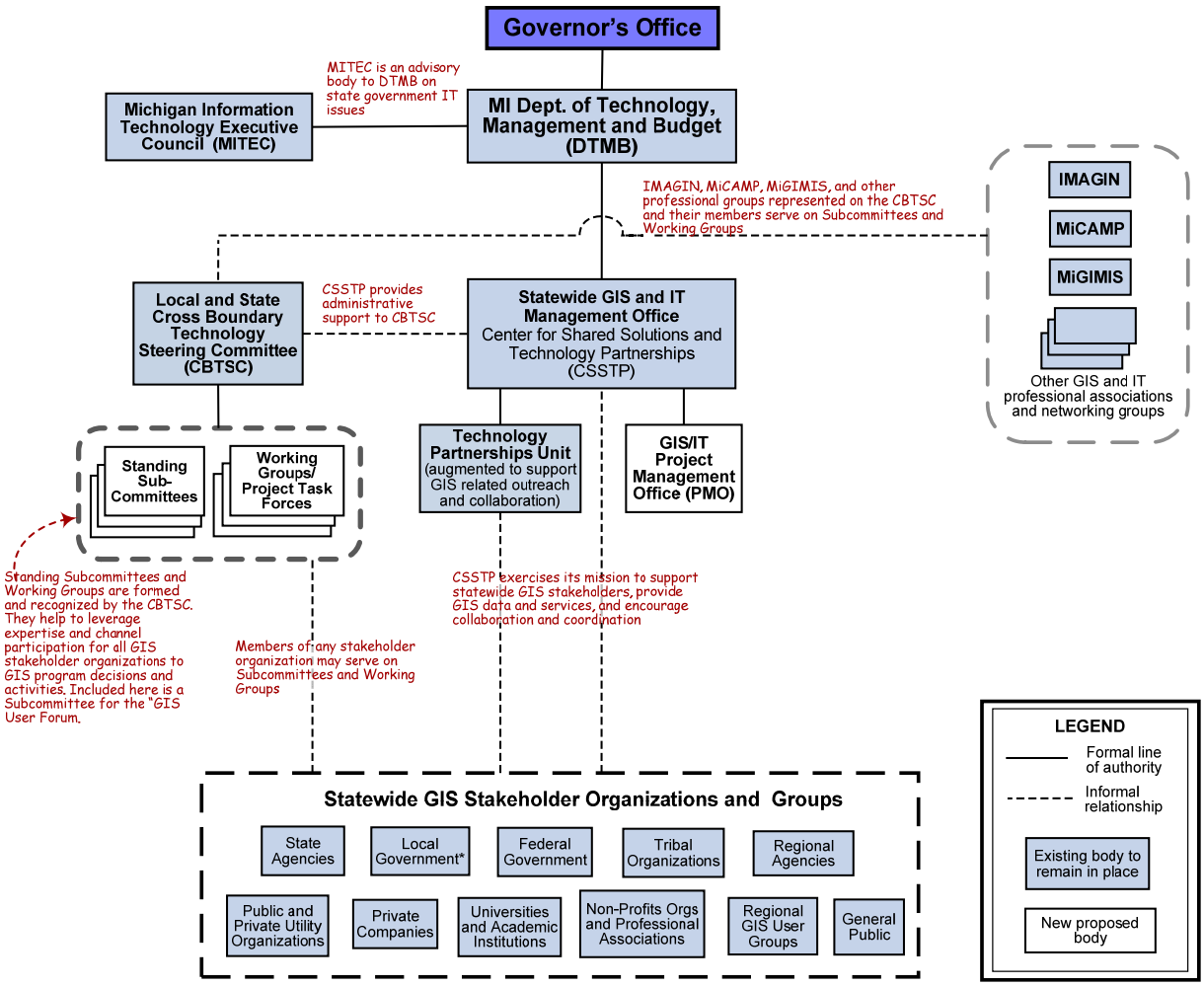


Table 18: Explanation of the Main Organizational Components of the Recommended GIS Governance Structure

Michigan Department of Technology, Management, and Budget (DTMB)	The Michigan state government executive agency which is the organizational home for management and operation of statewide IT and GIS programs. This agency has the responsibility for execution of the statewide IT Strategic Plan and the statewide GIS Business Plan and provides technical and administrative support for state IT and GIS standards, policies and operations. The Department Director also serves as the Michigan Chief Information Officer (CIO). Status and Recommended Changes: Existing. No changes suggested.
Center for Shared Solutions and Technology Partnerships (CSSTP)	This is a formal division inside the DTMB which has management and operational responsibility for the statewide GIS. The head of this office reports to the State CIO. The CSSTP has the direct role in GIS Business Plan execution and monitoring progress. The CSSTP also has responsibilities for leading and providing support for statewide GIS program outreach, partnerships, and coordination among stakeholders. Finally the CSSTP has significant technical and operational responsibilities including: a) management of the Michigan Geographic Framework (MGF) and associated data development, stewardship, and user support, b) GIS application development and deployment, and c) support and management of systems and networks supporting GIS data and services Status and Recommended Changes: Existing. Suggested changes to augment and clarify: a) its relationship with the CBTSC, b) its role in statewide outreach and support, c) its role in GIS project planning, management, and coordination
Michigan Information Technology Executive Council (MITEC)	Coordinates the strategic direction and planning of IT among the different State agencies. This Council submits its recommendations directly to the State CIOs office.
Local and State Cross Boundary Technology Steering Committee (CBTSC)	Recently formed committee with the stated Mission, "*Transform government by using IT as a catalyst to foster collaboration and improve functionality across government lines…We will do this by sharing resources to eliminate duplication of effort and reduce costs. We will build things once, and leverage to serve many*". This is an advisory body with a responsibility for IT and GIS programs and initiatives with stated roles in the areas of establishing strategies, evaluation and identification of practices and initiatives, supporting outreach and communication, engaging stakeholders. Status and Recommended Changes: Recently formed committee following dissolution of the former GIS Steering Committee. The following recommended changes to the mission, membership, structure, and role of this group will make it a more effective body to support the statewide GIS program as well as overall enterprise IT: Revise the Vision, Mission, and Scope statements to better describe the role of this body as it relates to GIS and enterprise IT and its role as GIS program oversight and advisor to GIS management (CSSTP) Formalize operating structure Change/Expand membership to include representation of additional, important stakeholder organizations Put in place an organizational structure for the establishment of Standing Subcommittees and Working Groups to address and provide recommendations on specific IT/GIS issues, initiatives, projects, etc. (see discussion of Subcommittees and Working Groups below).
Augmented CSSTP Outreach/Partnership Unit	This refers to the existing unit within CSSTP charged with outreach and development of technology partnerships. The recommendation is to augment and expand the role of this CSSTP function to support many of the recommended implementation initiatives in the Business Plan, It will support initiatives that involve increasing awareness of the statewide GIS program, getting input on needs and priorities of the GIS community, general GIS education, encouraging and enabling joint projects, and general collaboration among stakeholder organizations. There is a major focus on local governments (County, City, Village, Townships) and partnerships with state agencies. Status and Recommended Changes: Existing, augmented function in CSSTP

Table 18: Explanation of the Main Organizational Components of the Recommended GIS Governance Structure (con't.)

CSSTP Project Management Office (PMO)	The PMO is new entity to be formed inside the CSSTP. Its purpose follows industry best practices espoused by the Project Management Institute (www.pmi.org) and other organizations. The PMO will be staffed and managed inside the CSSTP but it will be a resource available for use by all stakeholder organizations to help initiate and manage GIS and IT projects. It will have the primary role: Defining effective practices for GIS project planning and management and providing education and assistance on the application of these practices Providing support in new GIS project evaluation, business case preparation, planning, budgeting, assembling teams, etc. Many of the "implementation initiatives" in this Business Plan will require new project initiation adhering to Helping to establish collaborative GIS projects and partnerships (including set-up of multi-organization initiatives, agreements, cost-sharing) Appropriate oversight on project execution, support in monitoring, conducting project audits as necessary, and assistance if problems occur (e.g., performance problems with contractor) Note: Many of the "implementation initiatives" in this Business Plan will require new project initiation that can make use of the support of the GPMO and formal project practices it defines Status and Recommended Changes: Expanded role for CSSTP Project Management Office.
CBTSC Standing Subcommittees	Formal groups established under the CBTSC (enabled through By-Laws) with (through with a designated chair and membership that may be drawn from the entire GIS community in Michigan. Each Standing Subcommittees has a defined role to investigate and oversee critical program initiatives and operational needs that are generally ongoing and therefore, the Subcommittees have a long-life. It is recommended that each Standing Subcommittee be chaired by a member of the CBTSC but members from any stakeholder organization may be assigned. The Subcommittees carry out appropriate research, evaluation, and planning and make recommendations to the CBTSC (for consensus or formal votes). The CBTSC will identify and create Standing Subcommittees as that are needed. Each will have a stated mission and requirements for reporting to the CBTSC. It is recommended that the CBTSC initially establish Standing Committees to address high-priority areas including: a) IT and GIS Standards (initially defining a process for standards development, review, and approval, b) GIS database enhancement and stewardship policies, c) GIS Education and Outreach, d) GIS Policies, e) IT/GIS Industry Trends, f) GIS Program Funding and Financing Strategies Status and Recommended: New recommended entities commissioned by the CBTSC
CBTSC Technical Working Groups (TWG)	Formal groups established under the CBTSC with a designated leadership and membership that may be drawn from the entire GIS community in Michigan. Technical Working Groups are established with a focused, time-limited research or project role with a mission to produce specific end-results. Working groups differ from Standing Subcommittees by the fact that they are temporary and are dissolved when their mission has been accomplished. Working Groups could be established by the CBTSC for the following types of activities: a) Preparation and consensus on GIS data conversion specifications for new or enhanced data, b) Research on a specific technical standard, c) evaluation and specifications for a new GIS application, . Working Groups may be established as project teams to plan and executive specific implementation initiatives in this *Business Plan*. Status and Recommended Changes: New recommended entities commissioned by the CBTSC
GIS Professional Associations	GIS professional organizations, IMAGIN and MiCAMP play an important role supporting professional networking, education, and coordination for GIS stakeholders statewide. Missions of these two organizations are similar although organizational structures and operational details vary. Closer working relationships between these groups will result in ability to better use existing resources to serve GIS users statewide and play a more effective advocacy role for statewide GIS program initiatives. Status and Recommended Changes: Drive closer relationship between IMAGIN and MiCAMP

Table 18: Explanation of the Main Organizational Components of the Recommended GIS Governance Structure (con't.)

State GIS User Forum	This informal existing group, now referred to as the state GIS User Group, is administered by CSSTP and serves a valuable role supporting professional networking, conveying news and information about statewide GIS activities, and providing a forum for exchange of ideas and forging connections between GIS professionals and stakeholder organizations. The current level of participation in meetings varies and it is recommended that the role of this group be augmented an enhanced to better serve the statewide GIS community. This group would serve as one mechanism for an enhancement of outreach and communication provided by CSSTP (through Web sites, meetings, and special programs) by supporting contact directories, news from the user community, information on events of interest to the GIS community, vendor-sponsored education programs and product demos. It is recommended that this group coordinate activities closely with GIS professional associations. Status and Recommended Changes: Existing entity with recommended enhancement and name change (to avoid any confusion with regional user groups.

6.1.3 Operational Policies and Practices

Formally defined policies and "best practices" will guide all aspects of SDI development, operations, and coordination among stakeholders. These should be consistent with, and expand on where necessary, existing information technology and organizational management policies and practices of stakeholder organizations. For the statewide GIS program, a clear, accessible set of policies will promote statewide coordination and sharing of data and resources. Currently, the necessary policies and supporting standards and practices do not exist in a comprehensive way. SDI development will include initiatives that will gather and enhance existing policies and practices and develop new ones in the following areas:

- Enterprise system architecture and administration
- Compliance with technical standards
- GIS data quality and maintenance
- Access to GIS and use of GIS data
- GIS product/service procurements
- GIS integration with external systems
- Legal and administrative rules and procedures impacting access and distribution of GIS data and products
- Technical support to GIS users
- GIS staffing and professional development
- GIS project set-up and management

The governance structure must maintain a focus on GIS as a foundational element of enterprise IT to assure that GIS and IT initiatives, strategies, and policies are mutually supportive. Current institutions and organizations should be maintained wherever possible even if the roles they fill may be modified.

All stakeholders must feel connected to the oversight "authority" since under Michigan's Home Rule structure the CBTSC will be unable to compel participation by entities outside of state government.

Relationships must be repaired and nurtured over the long term so all stakeholders see the benefit from participation and true intergovernmental partnerships and public-private partnerships can be built.

A key focus of any governance system must be to facilitate the expansion of GIS in support of state and local business needs whenever there are clear benefits to be received. The expansion of those benefits to the "have-not" communities, those that are low population and funding and that have thus far been unable to establish GIS, must be a priority for the State.

The structure must also support provision of a wide range of outreach, orientation, education, and training opportunities for GIS users and decision makers that influence the use of spatial technologies. Networking opportunities that lead to collaboration, joint funding, and cooperative arrangements must be encouraged.

The administrative mechanism in place must provide operational support and management assistance for joint GIS projects.

A clear connection and awareness of business value of GIS must be made with senior decision makers and elected officials.

6.2 Statewide Ortho Imagery Program

Ortho imagery serves as the foundation for most operational GIS programs. It is used by over 97% of GIS users in Michigan and is commonly displayed in a variety of on-line mapping tools. Imagery is used to support a wide variety of business functions related to taxation, asset management, economic development, code enforcement, and land planning. Imagery also serves as the foundation from which the vast majority of other GIS data sets are built including: road centerlines, impervious surface coverage, building footprints, hydrologic features, land cover, and crop identification.

Studies have shown that the return on investment from imagery expenditures range from 1:2.26 (forecasted for a nationwide imagery program with data collected on a three year cycle) to 1:34 (for a statewide program in Indiana). The Indiana calculations of the value of imagery were based on users reporting that they, on average, valued each image tile they downloaded to be worth $28 to their project. Since the average tile in Indiana was downloaded from the state's server 130+ times the calculated "value" of the project to users was over $7.4 million. This figure does not include the value of the data for use in improving the quality of other spatial databases (such as road centerlines, structure address points) and the use of these data in free public web services such as Google maps and other uses that did not require a tile download.

6.2.1 Current Status

Over the last several years some very progressive partnerships have allowed ortho imagery to be developed for several areas. Among these has been a multi-jurisdictional agreement in the Southeast Michigan Council of Governments (SEMCOG) region that has allowed local governments, utilities, and the USGS to develop a jointly funded project covering 7 counties for either 1 foot or 6 inch imagery over 5,000 square miles in 2010. In 2005 SEMCOG also coordinated a multi-jurisdictional project in 2005 with the same partners and additional participation from the State. The 2005 project was structured with a set of multiple deliverables to meet requirements of each partner.

Another 8 counties partnered with United States Geological Survey (USGS) to collect another 4,200 square miles in 2010. The US Forest Service collected another 2,408 square miles of 12 inch imagery in the Ottawa National Forest. In total for 2010 Federal programs assisted with the collection of 11,608 square miles of imagery.

Michigan is a participant in the United States Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP) which provides statewide imagery coverage during the growing season (commonly called "leaf on") at a one-meter resolution. A 4 band digital imagery data set was collected statewide in 2009. NAIP is funded and administered by the USDA Farm Service Agency and the USGS.

In 2009 the State entered into a unique public private partnership with Microsoft Bing that offers significant cost savings when compared to individual county ortho imagery projects for 12 inch color imagery. In 2010, the first year of the program, 19 counties covering just over 11,000 square miles were collected. Eight counties were part of the original program and there is growing interest from counties that have been flown that did not partner in the project now that data is being delivered.

This public private partnership comes with some restrictions on distribution of these data. Licensing requirements from Microsoft is open enough to permit use of these data by public organizations with sufficient freedom to use the data for necessary business purposes.

Initial reports of the quality of the products to be delivered from the 2010 collection have been promising. Several counties have expressed an interest in this program in 2011 and it can be assumed that if the data from 2010 is of high quality with good color balance and spatial accuracy there will be more interest in the program moving forward. The addition of a Federal partner to the program would modify the licensing terms and make all data available in the public domain one year after delivery.

While these joint efforts have generated good results and cost savings for participants they are primarily focused on benefiting local partners and are not intended to build statewide data set. As individual initiatives there is little consistency from county to county.

The business environment for imagery is changing rapidly. The Michigan GIS community must remain connected to trends in the commercial marketplace particularly the Clear30 program (from Digital Globe and Microsoft) and the Imagery for the Nation (IFTN) initiative from the National States Geographic Information Council. These initiatives have the potential to dramatically shift the funding and cost structures for image datasets.

Similarly, the technology used to collect imagery is changing. Improved sensors with higher resolution capabilities and lower operational costs are entering the marketplace every year. New sensors that collect oblique as well as orthographic data are now entering production. These technologies promise to provide both types of products at prices lower than commercially available ortho imagery today.

6.2.2 Recommendation(s)

This plan recommends building on the characteristics of the Microsoft Bing partnership and other successful collaborative imagery programs to allow for local option “buy-ups” to improve spatial resolution and to have additional data products (IR, oblique, planimetrics, etc.) available. This recommendation is based on an assumption that the state will need to fund a significant share of costs associated with collection of basic imagery for rural communities. However, cost share opportunities with private sector data providers and with private sector data users (major utilities, timber companies, and conservation groups) must continue to be developed to make the project possible for Michigan.

The price per square mile offered through the current terms of the Microsoft partnership is unlikely to be matched by any traditionally structured and procured contract for ortho imagery production. The cost share for state partners should be collected from a broad partnership involving of in-state public organizations (including counties, townships, villages, regional councils), drain and road commissions, utilities (such as electric companies), tribes, the state, and Federal agencies. With this broad group of partners the funding necessary to expand the annual coverage area to 1/3 of the state should be obtainable. For ease of organization and management the state should be divided into 3 zones for collection rather than making participation available to individual counties.

The Microsoft Bing cooperative imagery program at the present time is offering 1 foot leaf off imagery for $40/square mile as the total cost share made up by combined state, local, and other potential partners. To date the cost share has been promoted as $12 from the state and $28 from the local partners. It is our understanding that the breakdown of the State and other partner funding amounts are flexible with any partner being able to contribute more to the flight if necessary.

The cooperative program in place offers an opportunity for "buy-ups" to include 6 inch imagery and improved digital elevation models. While these potential additional services may have value to the local partners it is anticipated that the cost of any "buy ups" would be fully carried by the local partner. It is not clear if Microsoft will make the imagery available to third parties for ortho imagery compilation of planimetric layers such as building footprints, structure points, edge of pavement, etc. The creation of GIS data from imagery is often an added value to the imagery and though it appears to be unavailable at this time, it may be offered from Microsoft an additional agreement.

Imagery collected under the cooperative agreement with Microsoft is licensed, meaning that the ownership of the data remains with Microsoft and there are restrictions to the distribution of the data. The licensing appears to be flexible enough to allow partners to use the data to support all of their critical business drivers.

The Microsoft Bing agreement would allow for the data to become public domain data a year after being delivered if there is a federal partner in the project. This appears to remove a last issue with using the data and would suggest that negotiations with a Federal partner should be brought to a successful conclusion at some point in the future

Assuming that the data delivered by Microsoft during the first year of this program meets the specifications for spatial accuracy and color balancing, this project should continue for the current contract duration. The area collected on an annual basis should be expanded so that a full 1/3 of the state is collected driven by local needs and the availability of partners from local government, county government, tribes, and private firms.

When the existing agreement with Microsoft expires an ongoing structured public private partnership should be established with a vendor selected through a process that is fully supported by the CBTSC and any working groups empowered by that group to review imagery standards.

6.2.3 Investment ($2.2 Million With $817,320 from State)

The business plan recommends an ongoing program of image acquisition for the State of Michigan. Table 19 outlines the costs associated with the first three years of a statewide image acquisition program. It is expected the funding would be on-going to support collection of 1/3 of the state annually beyond the third year of this problem. Acquisition costs are estimated for budget purposes to remain at $40 per square mile currently offered by Microsoft. This is not intended to imply that the agreement with Microsoft is, over the long term, the only potential provider of this service at this price.

Budget estimates also include funding to support a quality assurance/quality control program, contract administration, relationship building, and establishing a web service to provide access to imagery for partners.

Table 19. Recommended Ongoing Statewide Imagery Program Investment

	Partnership Total Cost	Year 1	Year 2	Year 3
State area (square miles)	58,380	19,460	19,460	19,460
Acquisition Costs ($40 per square mile estimated)	$2,335,200	$ 778,400	$ 778,400	$ 778,400
QA/QC, hosting, contract management	$233,520	$ 116,760	$ 58,380	$ 58,380
Total Program Cost	**$2,568,720**	**$ 895,160**	**$ 836,780**	**$ 836,780**
State contribution (25%)	25%	$ 194,600	$ 194,600	$ 194,600
Local Public Partner(s) contribution (25%)	25%	$ 194,600	$ 194,600	$ 194,600
Federal contribution (25%)	25%	$ 194,600	$ 194,600	$ 194,600
Utility contribution (25%)	25%	$ 194,600	$ 194,600	$ 194,600
State in-kind (QA/QC, hosting, management, etc.)		$116,760	$58,380	$58,380
Effective Cost Per Sq. Mile				
State		$ 16	$ 13	$ 13
Local Public		$ 10	$ 10	$ 10
Federal		$ 10	$ 10	$ 10
Utility		$ 10	$ 10	$ 10

While it is possible that the program cost share from individual partners may not be sufficient for their small area of geography it is hoped that overall the partnership funding from all sources will be sufficient to meet the costs for acquisition for the entire state. If large contiguous blocks of the state are to be flown, areas where there is higher interest in participation may contribute overall more than the $10/square mile to subsidize more rural areas where the funding may be more difficult to raise.

6.2.4 Benefits

Ortho imagery is the base for most GIS, since it serves to demonstrate what is visible it is used to align other data so everything “looks right” to the non-professional. Since it is the base layer for GIS it is critical the imagery be of high quality and up to date. The recurring plan presented will assure users that the imagery base for the maps they view is never more than three years old.

Acquiring imagery on a master statewide contract offers great value to partners in the area of reduced contract administrative costs and the lower costs charged for the collection of relative large areas is passed along to participants.

Local governments use imagery to map property boundaries, manage infrastructure assets and efficiently review individual tax parcels for changes. For example, imagery can be used to determine if parcels currently taxed as vacant are actually improved and comparisons to previous imagery can often lead to identification of improvements that should be taxed that are not included in assessment databases. The resulting increase in revenue collected is immediate and continues into

future years. It also increases the equity in the property appraisal process by assuring that everyone is paying their share of the tax burden.

Ortho imagery is important in economic development settings because it provides businesses and site selection consultants with an immediate and obvious source of current conditions on and around a site they are considering. As an economic development tool it is important to have a quality of information that is as good as other locations under consideration. In situations where imagery is old or unavailable a community can be put at a significant disadvantage in attracting businesses.

Imagery is also used for emergency management, public safety planning and operations, economic development, land planning, and draining planning. All of these business drivers were identified early in this business planning process as key to providing efficient and effective government services.

6.3 Statewide Parcel Database

Parcels data is among the most fundamental of all GIS datasets. As a representation of property ownership it is fundamental to assure that property taxes are administered equitably and efficiently. A polygon representing the extent of an owned piece of property serves as a base for understanding land ownership characteristics and tracking permits, land use, property tax assessment, environmental conditions, and a variety of other critical business drivers of government.

6.3.1 Current Status

This project did not collect specific information related to the status of parcel mapping at the county level. The on-line survey conducted as part of the outreach process for this project identified that over 80% of GIS users use parcel data in their business operation. Another 12% need parcel data to support business drivers but it is unavailable for their needs. Comments during listening sessions suggested that in many cases where these data have been developed county policies under the “enhanced access” result in the cost for these data making them essentially unavailable.

A survey conducted by MiCAMP (http://micamp.8m.net/) in 2008 found that 60 counties were active in digital parcel mapping. These 60 represent 92% of all parcels in the state and 66% of the geography. The 60 are likely acting under highly variable standards for spatial accuracy and database content making assembling a statewide data set a difficult technical exercise.

That survey found that the total annual budgets for GIS related parcel activities was $4.48 million with a total GIS budget, including project funding not included in part of annual budgets, was $9.1 million. The survey identified that there are approximately 5.05 million parcels in Michigan.

The average start-up funding for a county undertaking a parcel development project has been $3.51 per parcel with an annual budget appropriation of an additional $2.81 per parcel. The 23 counties that reported no GIS or digital parcel efforts have a total of 214,000 parcels. Another 17 counties reported “start-up” funding of less than $1 per parcel and have combined start-up and ongoing maintenance costs per parcel less than $3. We will assume for this study that those counties have a digital parcel system that is either not effectively maintained or not in a true GIS format. Only 16 counties reported GIS based revenue over $10,000 per year. It must be assumed that a significant portion of that revenue is from the sale of parcel data and aerial imagery.

The ratio of 92% of all parcels in 66% of State’s area reinforces that more urban counties have developed this foundation data layer while rural counties with less financial resources have been unable to fund this valuable data. Any statewide

initiative will need to include a dual track approach that will provide assistance to those counties without these data to catch up with their peers.

6.3.2 Recommendations

A working group should be empowered to develop standards on parcel mapping spatial accuracy and database content and have participation from all stakeholders including the Michigan Association of Assessors, the Michigan Association of Equalization Directors, and the State Tax Commission. This group should examine standards already approved by the International Association of Assessing Officers (IAAO) and the Federal Geographic Data Committee (FGDC) to make sure they meet the needs of organizations in Michigan. The IAAO and FGDC have been active in working with the user community to establish standards that protect sensitive data on property ownership while making the information necessary to support GIS based analysis and mapping.

The working group must be careful to understand the concern of local governments that this initiative will become an "unfunded mandates" with few direct benefits to them. A program that includes incentives for migrating data toward approved standards through direct financial support, technical assistance, or preferential treatment of grant applications should be explored.

Under the "enhanced access" a mechanism for protecting the data ownership rights of local government in these data must be implemented. Local governments must see that participation in a statewide program has benefits that exceed any potential loss of revenue from participation.

This working group should also develop a proposal for a state funded cooperative grant program to support the either the migration of parcel data to the standard in jurisdictions where there is already a mature or developing an automated method for importing those existing data into a statewide parcel fabric. To assist the have not areas of the state the grant program should also support providing start-up money and technical support to those jurisdictions. The form and management of these grant programs will need to be determine in cooperation with the county equalization directors, assessors, and county land information professionals.

This program should set as a goal completion of a statewide parcel fabric within 5 years. Once the fabric has been developed the program should continue to help support data maintenance and migration toward statewide standards.

6.3.3 Investment ($6.3 Million over 5 Years)

Estimates for commercial firms to create parcel database vary widely depending on the status of source materials (does the county have plat maps), the quality of county data (do high quality plat maps and ownership data exist or are the records disorder and low quality), and the size of the project (larger project lead to lower per parcel costs). Quoted costs generally range from $4 to $12 a parcel. Clearly the creation and maintenance of a parcel data set is not an insignificant financial commitment.

The counties that reported no digital parcel activity are estimated to have 220,000 parcels. Using the mid-point for the range of parcel conversion projects ($8/parcel) this suggests that creation of a true GIS enabled digital parcel framework data for these counties will cost $1.7 million dollars. Those 17 counties we have assumed some digital parcel data exists but it may not be in a GIS ready format or not adequately maintained contain 795,000 parcels. Since some basic information and a digital representation of the parcel is assumed to exist, we estimate $2/parcel to bring these jurisdictions fully up to standards, for a total project cost of $1.59 million.

While the structure of a parcel development and maintenance grant program will be developed by the working group, we can use the above estimates to craft a general budget that should be sufficient to attain the goal of a statewide parcel database within 5 years.

The cost estimates for this initiative assume that .5 FTE will be required in CSSTP to support the program. This staff person would be responsible for outreach to counties, providing technical assistance for start-up counties and to those migrating toward the agreed upon standard, and management of acquiring updated data from mature counties.

A parcel development cost sharing cooperative grant program is recommended to provide incentive to counties to build parcel data that can be used in a statewide frame data set. For budget estimating we have used $10,000 per county per year to encourage counties with mature systems to provide their data for inclusion in the statewide data set. This funding is intended to help support migration to data standards and to purchase data from communities operating under a data sales model. This funding is recommended to provide compensation to those counties that might not participate due to concerns over lost revenue from data sales.

As counties complete their initial data sets, or bring existing parcel data sets into compliance with standards they move into the support level for mature systems. This will allow for continuing funding to them to maintain standards and make maintained data available to the statewide system.

Year one of the program represents a ramp up period and assumes 30 counties will participate in providing data and three will initiate parcel development programs. For years 2-5 the number of counties participating in the cost share program at the $10,000 per year level will increase to 74. Under this recommendation, by the end of Year 5 all 83 counties would have developed parcel based GIS and starting in year 6 the costs for the program would stabilize at $830,000 annually plus the staff support at CSSTP..

Table 20. Investment Required for a Statewide Parcel Program

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
CSSTP Staff Support	$50,000	$52,500	$55,125	$57,881	$60,775	$276,281
Support for Counties Starting Parcel Digital GIS ($8/parcel)	$170,946	$384,628	$384,628	$384,628	$384,628	$1,709,456
Support to Counties with developing parcel GIS systems ($2/parcel)	$159,100	$357,975	$357,975	$357,975	$357,975	$1,591,000
Support for mature parcel GIS programs ($10,000 per county)	$300,000	$470,000	$560,000	$650,000	$740,000	$2,720,000
Totals	**$680,046**	**$1,265,103**	**$1,357,728**	**$1,450,484**	**$1,543,378**	$6,296,737

6.3.4 Benefits

Investments in a digital parcel base will yield benefits across a broad range of users. These include:

- Identifying improperly taxed parcels that are not generating the tax collections they should be based on current development. Evidence suggests that as much as a 10% increase in property tax collections can be realized from modernizing parcel systems.

- Reducing improperly claimed primary residence tax reductions. Housing data from 2000 census identified that 5% of housing units in Michigan are seasonally occupied. There is a high potential for individuals to improperly claim primary resident tax benefits from multiple jurisdictions.
- Implementing computer aided mass appraisal systems that consider comparable land sales in adjoining counties to improve the accuracy of assessments of non-residential parcels and speed the re-assessment process.
- Providing an early warning to potential issues with tax collection by making analysis of declining property values or increasing foreclosures possible. Early understanding may make it possible to reverse decline trends.
- Improving state government planning through enabling consolidation of operations on land already owned by the state.
- Providing support for economic development through supporting site selection, identifying and aiding the disposal of surplus properties owned by government, assembling tax reverted properties to support neighborhood revitalization projects, and identifying high priority properties for natural resource protection.
- Providing a base for a statewide addressing system by identifying all locations that should have an assigned address (all improved property).
- Improving post event emergency response by providing a very quick method for identifying the potential damage from severe storms or wildfires and using that information to support a Federal Disaster declaration.

6.4 Statewide Address Points Database

Address data is fundamental to establishing the geographic location for many organizations. People generally have an understanding of their address but can provide no additional location information. The range of address driven data sets include the Qualified Voter File (QVF) and business licenses. Creation of a statewide database of address points, a specific point assigned to a particular address, was identified by the GIS community in Michigan as a high priority data development initiative to meet a variety of business drivers.

6.4.1 Current Status

The MGF has developed a statewide set of addresses based on ranges associated with road segments. While these data are frequently required for routing applications they do not support all business drivers for a variety of reasons. Address range geo-coding assumes that the range of addresses is distributed evenly along the segment. For example, if there is a range of 50 addresses in a 500 foot road segment then addresses will be assigned every 10 feet. Address range data typically is based on a hypothetical range of addresses rather than the actually assigned addresses to a road segment.

Address point databases overcome much of the pitfalls of address range data by attempting to place an address point in the center of the structure know by that specific address. In some cases where building footprint data or ortho imagery photos are unavailable, the center of individual parcels is used as a close estimate for the center of the structure. These parcel

centroid address locations have no relationship to the structure on the parcel. For large parcels, irregularly shaped parcels, or those parcels that have multiple postal address this method can introduce inaccuracies into the database. These inaccuracies can result in dispatched first responders arriving at the center or a parcel rather than a structure since the parcel centroid can be significantly different than the structure location.

6.4.2 Recommendations

Michigan should initiate a program to create a statewide address point dataset using the best available data with the ultimate goal of creating an accurate dataset with address assignment to point location suitable for the needs of the GIS community for emergency response, demographics, and economic development applications. This should be initiated using the best available data based on a clear understanding of the needs for these data to support emergency dispatch, voter re-districting, and economic development.

A working group should be established to fully address the specific needs of the user community for address data. The staff of the CSSTP will need to inventory the status of address point and parcel centroid information from each county.

To understand the quality of MGF address range the approximately 7.5 million records in the QVF should be geo-coded against the MGF. Those records should then be geo-coded to commercial address databases and the results compared for quality and quantity of match. This analysis will help identify the scale of the problem with road centerlines and the nature of those problems. For example, are they geographic in nature with a selected set of counties having particularly poor results?

Typically geo-coding to residential addresses yields better results than business address geo-coding. This may be in part due to a historical artifact of the initial development of address data to support census needs. The state of Michigan, according to the 2000 census, had just over 4.5 million housing units. Of the 4.5 million housing units there are 1.1 million multi-unit structures. This suggests that there are at least 1 million parcels in Michigan that have more than one address. The 2008 County Business Patterns survey indicated approximately 240,000 businesses in operation in the state.

6.4.3 Investment ($2.2 Million over 5 Years)

A reasonable estimate of the total number of addresses in Michigan is 5 million based on the census count of housing units (4.5 million), employers (240,000), and public facilities (estimated to be around 15,000). Several private data firms have provide a general estimate of the cost for developing an address point data set from primary field work would average $5/point. A project budget of $25 million is beyond what would be reasonable for the state at this time.

A more reasonable approach is to build this database on the “best available” data from each county with a goal of building a comprehensive data coverage. In year one of the program, a survey of current status of address data for each county should be undertaken and the quality of the MGF address data compared on a comprehensive level to know valid addresses in the State. During this first year a working group should establish standards and a detailed implementation plan for this data set.

Future year budgets should include cost shares to negotiate the ability to make parcel centroids and any pre-existing address point or building footprint data into a growing statewide database.

The working group should develop a detailed proposal for a state funded cooperative grant program to support rural “have not” communities through a collaborative data aggregation program should be structured that leverages local knowledge at the Regional Planning and Development Districts. These 14 organizations are uniquely situated to work with local addressing entities to build and maintain these data. This cooperative program would have the additional benefit of

building GIS technical capacity in the Planning and Development Regions for areas that don't have the resources to do so on their own.

Those counties where mature parcel based GIS systems are already in place have the data to support creation of parcel centroid address points. The collaborative program must include financial consideration for those counties to contribute data to a statewide dataset in the public domain.

Funding is proposed to support CSSTP staff activities related to project surveys, outreach, providing staff support to working groups developing standards, and geo-coding of QVF and other valid address data. A 5% per year increase is budgeted in this line item in anticipation of increasing human resource costs over time.

Line items for cost share with local jurisdictions that have already developed address point data or are in the process of doing so is proposed and necessary under the enhanced access policies currently in place that protect geospatial data from becoming part of the public domain. An initial budget of $75,000 increasing to $150,000 per year is proposed to create a grant program, directed toward State Planning and Development Districts, to support the creation of address data in areas where none exists.

The GIS community, through a working group, should further define standards and the mechanism for best accomplishing this goal. While costs for 5 years are presented it is anticipated that an on-going annual funding stream will be required to support the development and maintenance of this important statewide dataset. It is important to note that there is national interest and support for the development and maintenance of address point data. The USGS is actively pursuing data stewardships approaches with states to provide updated "national structures database" (NSD). The NSD initiative focuses on specific types of buildings and structures that support updating of the recently announced digital topographic map series. In addition, address points are of interest to the federal Department of Homeland Security (DHS) and data being compiled for the DHS Homeland Security Infrastructure Program (HSIP). As this recommended address point initiative in Michigan is being examined, potential federal partnerships and adherence to national standards should be pursued.

Table 21. Estimated Investment to Support a Statewide Address Point Program

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
CSSTP Staff Support	$175,000	$ 183,750	$ 192,938	$ 202,584	$ 212,714	$ 966,985
Cost Share for Mature County Base Systems	$100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 500,000
Support for "have not" communities through Planning & Development Districts	$ 75,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 675,000
Totals	**$350,000**	**$ 433,750**	**$ 442,938**	**$ 452,584**	**$ 462,714**	**$2,141,985**

6.4.4 Benefits

The benefits from a comprehensive statewide address data set are significant and varied. Among the significant advantages is a decrease in the time and effort required for re-districting of election districts in conjunction with the decennial census. The current QVF process is not liked to geography and the Department of State's Qualified Voter File Division, under the Department's Bureau of Elections, has forecasted that 25 to 50 temporary workers will be required for 6 months to complete the legally mandated re-districting/reapportionment process. The costs associated with these temporary workers may be as high as $30 per hour when equipment, office space, and full costs of employment are included. The total budget for this project may be as much as $1.4 million. A geospatially aware process could reduce those costs to a single supplemental staff person and thus a reduction in costs of 98%.

Among the benefits that will be realized once a statewide address point database is available include:

- Improved E-911 dispatch based on structure locations rather than road centerline ranges
- Enhanced efficiency in preparation for the 2020 census in building a statewide address file
- Improved range data for the MGF to support routing applications based on block to-from range information
- Expanded support for homeland security through development of HSIP structure databases

6.5 High Priority Applications

During the stakeholder outreach phase of this business planning project a number of high value applications were identified. These should become priority focus for the CSSTP and be made available for use by the entire GIS community in Michigan. These applications will leverage the investment in data to return immediate and tangible benefits to the state

Table 22. High-Priority Applications

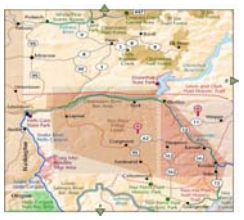
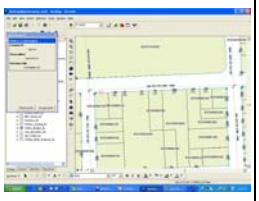
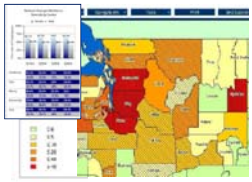
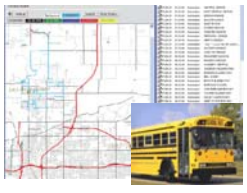
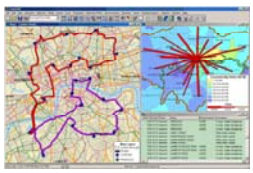
Application		Description and Impact
	Michigan Map Web Services	Web services that provide access to transportation, political boundaries, and hydrology should be established to support a variety of cartographic and on-line map viewing uses. A base map service linked to 2010 demographic and re-districting information would be a valuable and popular service to the citizens.
	State Lands and Property Management	Deploy a GIS based application to support access to information supporting decision making regarding state land and building transactions. This application will allow the state to identify efficiencies in co-location of government functions, reduce the costs for property management and maintenance associated with distributed offices, improve location decisions to make sure that target populations are efficiently served, and make disposal of surplus property possible.
	Redistricting	With the 2010 census data comes requirements to re-district all district driven elected offices. The CSSTP will be called upon to perform these functions for state legislative districts, but the needs for this service expand to local government as well. This application will support public information requests and district creation as the sub-state level.
	Emergency Management and Response	An Emergency Planning and High-level Risk Evaluation application should be created as a GIS query and viewer application to provide access to: a) location and contact information for federal, state, and local emergency management/public safety facilities (police and fire stations, etc.), b) Other "structures data points" that have significance in emergency scenarios (schools, medical facilities, shelters), c) viewing of planned evacuation routes (from county and state emergency plans), d) some very basic "gaming" to explore multiple emergency scenarios and impacts.

Table 22. High-Priority Applications (con't.)

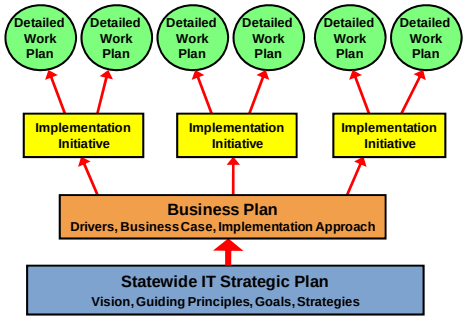
Application		Description and Impact
	Generic Permit and Inspection Application	Although there is wide variety in the permitting and inspection programs administered at the state and local level, there are fundamental geographic requirements common to all of them. A "generic" permit and inspection application that would serve the needs of state and local programs should be developed to enable efficient inspector routing, field based entry of inspection findings, and improving the quality of spatial data on permit holder locations.
	Spatially enable the Business One-Stop	The Michigan Business One-Stop provides businesses with links to critical information required to set-up and run their operation. This application should be spatially enabled so users can identify the city/county/township where they are considering locating and be linked through the geography to the specific permitting and taxing authorities they must interact with to be in full compliance with tax and environmental regulations.
	Executive Map-based Dashboard with "Geostatistics"	This application would be aimed at management personnel in government agencies and, potentially, private companies as well. It would provide an easy-to-use menu-based interface to present important statistics (economic data, contact info, program performance, and demographic data) from a geographic perspective. The application would support map views and supporting text reports and graphs
	Economic Development Site Selector	Economic development site selection is a process driven directly by spatial information. A GIS based tool should be developed that allows Michigan to market industrial and office sites and buildings, tax reverted parcels, and brownfields. This tool should recognize that site selection decisions are primarily based on demographic, labor force, surrounding services, utility availability and rates, and the access to transportation. Most GIS based economic development tools provide interactive mapping once sites have been identified based on rudimentary property characteristic or community demographics. Michigan could position itself on the cutting edge of ED GIS applications by expanding the functionality to allow for detailed demographic and labor skill/wage based searches for user defined areas (defined by radii or drive times for example).
	School Bus Allocation and Planning	Use the spatial analysis and data integration capabilities of GIS to geographically examine school locations, student populations, and road networks to support the planning of bus routes—to optimize time and trip mileage while addressing efficiency and student safety. This would have a potential impact on the cost of fuel, vehicles, labor, and maintenance. The application could be used at the local level or on a statewide scale.
	Vehicle Trip Mile Analysis	Use of standard geographic analysis tools with statewide road network data to evaluate trip miles and costs to support planning for public program administration—with the goal of reducing vehicle miles (for cost savings and lowering carbon emissions). The application could be applied to evaluation of commuting/carpooling planning, flexible work hours and telecommuting, and analysis of field services with significant vehicle use.

7. Implementation Management and Monitoring

7.1 Management Structure, Implementation Approach, and Responsibilities

The success of the statewide GIS program improvements called for in this Business Plan is dependent on an effective management structure, project planning and management, and clearly defined roles. As illustrated in Figure 4, it is critical to maintain the relationship between the implementation work, the strategic goals from the Michigan IT Strategic Plan, and the business drivers from the Business Plan. This Business Plan identifies a series of implementation initiatives each of which requires a detailed work plan with assigned resources and a specific schedule.

Figure 4: Relationship between Strategic Plan, Business Plan, and Detailed Work Plans for Implementation Initiatives



Participants in Business Plan initiative work will be drawn from the entire GIS stakeholder community in Michigan. With leadership and management support from the CSSTP, participation and support will be needed from the Cross Boundary Steering Committee, GIS user groups, and GIS users in all stakeholder organizations, and private contractors. Preparation of detailed work plans will specifically identify roles at the task level for these participants as shown in Table 23.

Table 23: Participants and Roles in SDI Development

	Participants in SDI Development (L=Lead Role, S=Secondary or Support Role)											
Main Roles in SDI Development	***Michigan Legislature***	***Governor/Senior Executives***	***DTMB***	***CSSTP Leadership***	***CSSTP Staff***	***CBTSC Members***	***CBTSC Subcommittees and Working Groups***	***Regional GIS Resource Centers AND User Groups***	***in Stakeholder Organizations (2)***	***GIS Users (3)***	***Product Vendors (4)***	***Contractors/Consultants (5)***
High-level SDI authorization and approval	***L***	***L***	***L***									
Allocation and assignment of resources for SDI implementation	**S**	**L**	**S**	**S**	**S**							
SDI promotion, education, and communication			**S**	**L**	**L**	**S**	**S**	**S**	**S**			**S**
Finding and securing funding and resources	**S**	**L**	**S**	**L**	**L**	**S**	**S**		**S**			
Overall progress tracking and work coordination		**S**	**S**	**L**	**L**	**S**			**S**			
Preparation of work plans and project organization				**L/S**	**S**	**L/S**	**S**	**S**	**L/S**			

Implementation project management and monitoring				L/S	S	L/S	S	S	L/S			
Project implementation work (participation as project team members or support in implementation)				L/S	S	L/S	S	S	L/S	S	S	S
Review and comment on implementation work				L/S	L/S	S	S	S	S	S		S
Provision of products and ongoing contracted support				S		S			S			L

(1) CSSTP Leadership includes the State CIO and other management positions within the DTMB.

(2) Includes GIS management personnel and technical staff in all stakeholder organizations participating in SDI development (e.g., federal, state, local government; regional agencies; tribal governments, universities, utility organizations, etc)

(3) All users and potential users of GIS technology or the resources available through the SDI. These users are the main recipients of the results of SDI development and some may be directly involved in implementation by providing information or in a review/comment role.

(4) Private companies providing products needed for SDI implementation (e.g., software, computer hardware) and associated services for installation, maintenance, and technical support

(5) Private companies or other parties providing contracted services for SDI implementation including database development, consulting, application development, and training

7.2 Risk Management

Risk management is an accepted practice used in any major implementation initiative, and it should be a part of the work carried out under the implementation initiatives presented in this Business Plan. Risk management is a strategy and set of techniques to help prepare for and respond to certain types of changes or events that could negatively impact an implementation. This section provides a general risk management approach that applies, at a high-level, to the overall SDI implementation. Risk management techniques should also be applied at a more detailed level in the Work Plan preparation for specific implementation initiatives and the management of those implementation activities. Risk Management has three main parts: risk identification, risk impact assessment, risk response planning.

7.2.1 Risk Identification

Risks associated with GIS development are those conditions or events that could impact work toward strategic goals—by delaying work completion, reducing quality, increasing costs, or disrupting organizational coordination of participants. Potential risks associated with Business Plan work fall into three main categories as explained in Table 24.

Table 24: Overview of Types of Risks

Risk Type and Explanation	Examples of Specific Risks
Financial Risks Includes risks associated with allocating and sustaining funding and resources for SDI implementation work. This includes internal decisions inside the organization that impacts funding streams, external economic changes that impact resources available for SDI, and potential problems with implementation planning or management resulting in over budget projects.	• Insufficient internal funding allocation or funding diverted to other projects • Expected external funding does not materialize • Dedicated staff resources not sufficient • Cost projections do not meet actual costs • Poor contractor performance results in increased costs
Organizational Risks Includes risks that have their source in organizational, political, or legal aspects of SDI development. This includes all aspects of organizational relationships, management, staff assignments, governance	• Expected legislative support is not provided • Lack of sufficient senior executive awareness and support • Expected level of participation from stakeholder groups is not delivered • Administrative delays in personnel actions and policy approval

structure, high-level legislative and executive support, legal and policy rulings, and all types of political and media influences on SDI implementation work.	• Organizational/legal obstacles in forging formal partnerships • Contract discrepancies impact timing and quality of contracted work • Poor management and coordination creates delays and obstacles to consensus • Political battles reduce level of collaboration and joint project participation • Inability to build trusted relationship with the GIS user community
Technical Risks Includes risks associated with the technological and operational aspects of the GIS program or project, including hardware and software, network configuration, and database development, security breaches, and the procedural workflows associated with technology acquisition and implementation. These risks reflect potential technical obstacles in system development that could impact costs or the schedule.	• Delays in forging technical standards to be used as basis for development work • Problems with software or hardware installation and configuration, or functionality • Insufficient technical staff and skills for required implementation work • Problems with source materials or techniques used in database development • Network communication performance limitations impact access to data and services

7.2.2 Risk Impact Assessment

Risk impact assessment is a process for assessing the likelihood of a risk event and its impact on the SDI implementation. Its purpose is to give managers a way to anticipate risk and assign priority as a basis for taking appropriate action. The risks, explained in Table x above, could impact one or more of the following: nature of the potential impact on the GIS program or project. The most common types are:

- Monetary cost or resources: impacts on the anticipated (planned or budgeted) monetary cost, staff levels, or other tangible resources for the project or program.
- Schedule/Timing: impacts on the planned schedule and timing for completion of deliverables or milestones
- Work Scope and Services: impacts on the nature, volume, contents, specifications, etc. of the products, services, and results planned for a project or defined for a GIS program
- Quality of Work and Deliverables: impacts on quality of products and services which may relate to accuracy, amount of error, reduced performance (e.g., GIS application), etc.

Risk impact assessment involves assigning a level of likelihood of the occurrence of a potential risk event and a severity level that gives a gauge on how much impact the event could have on cost, schedule, scope, or quality. While in some cases, it is possible to assign numeric measures to risk likelihood and severity, the more realistic approach for most Business Plan implementation initiatives is to use qualitative scores (e.g., High, Moderate, Low). This usually gives a sufficient indication of risk potential and impact to support risk response planning.

7.2.3 Risk Response Planning

The risk identification and risk analysis described above is the basis for monitoring risk events and taking appropriate action by applying specific risk response practices. The Project Management Institute and other sources define three major risk response strategies:

- Avoidance: Adjusting a project plan (e.g., reducing schedule or scope) or resources (using alternative staff resources or funding sources) when risk events become evident, to avoid the risk or isolate its impacts.
- Transference: Transferring the consequences or responsibility of a risk to a third party. Transference does not eliminate a risk; it only shifts responsibility. The most common strategy for risk transference is through well-designed contracts for certain elements of the work.
- Mitigation: Reduction in the probability and/or consequences of an adverse risk event to an acceptable level. Usually includes project controls for identifying risk events early in a project and taking formal action before impacts are great.

Risk response approaches should be specifically identified as a part of detailed work planning for specific implementation initiatives. At a general level, there are well-accepted project management practices that make use of the three risk response strategies:

- Prepare detailed and realistic work plans that clearly define tasks, deliverables, and schedule and use these plans as a basis for executing and monitoring work
- Establish effective project status monitoring and quality review procedures for tasks and deliverables. Use this monitoring as a basis to identify possible problems (with scope, schedule, or quality) early in the process so that corrective action can be taken
- Assign competent and well-trained project management and team members
- Use contractors effectively (as a risk transference strategy) but ensure that contract specifications, performance requirements, and legal terms are clear to all parties
- Build sufficient slack time into the project schedule to allow for adjustments to timing should delays occur
- Investigate and have options for alternate sources of funding and staff resources that can be tapped if committed resources are reduced
- Get formal commitments (written agreements or project charter) for organizations participating in an implementation initiative

7.3 Monitoring and Reporting on Progress

SDI development should be accompanied by regular tracking and reporting of development status. This includes the tracking of progress against strategic goals and individual implementation initiatives. Procedures for status monitoring and reporting are discussed in this section.

7.3.1 Business Plan Objectives Monitoring and Reporting

Monitoring and reporting on progress against business objectives is a high-level management activity that gives a picture of overall progress. The result will be a “Business Plan Objectives Progress Report” prepared on a quarterly basis. The report will be formally prepared for the State CIO but distributed to all project stakeholders and posted for Web access. The report summarizes activities relating to each Objective with summary remarks about overall progress and critical issues. The report will follow a format like that shown in the following (Exhibit 1.)

Exhibit 1: Suggested Format for Business Plan Objectives Progress Report

MICHIGAN STATEWIDE GIS BUSINESS PLAN- PROGRESS REPORT ON OBJECTIVES

Submitted by: xxxxx

Submitted to: xxxxxx

Submittal date: xx/xx/20xx

Report period: xx/xx/20xx to xx/xx/20xx

Summary of Overall Progress:

Xxxxxx xxxx x xx xxxxx x xxx xx xxxxxxx xxx xxxxxxxxx x xxx xxxx x xxx xx xxxx x xxx xx. Xxxxxx xxxx xxxxxx x xx xxx xxxxxxx xxx xxxxx xxx xxxxx xxxxx xxx x xxx xxx xxxxxxx xxxxxx xx xxxx xxxxxxxxxx x xxx xxxxxx

Summary of Progress Against Goals:

Objective 1. xxxxxx

- Xxx
- Xxx
- xxx

Objective 2. xxxxx

- Xxx
- Xxx
- xxx

I

I [Additional Objectives]

I

I

Important Issues:

Xxx xxxxx xxxx xxxxx xx x xxxxx xxxxxxxxxx xx xxxxxxxxxxx xxx xxx xxxx xxxxxxxxxxx xx xxx x xxx xxxxx xxx. Xxx xxxxxxx xxx xxx xxxxxxx xxxxx xx xxxx xxxxxxxxx x xxx xxxxx xxxxxxxx xx xxxxxx xxx xxx

These quarterly Progress Reports are completed by the CSSTP and CBTSC. This requires an efficient bottom-up communication process in which information on specific implementation work is reported on a regular basis. The Implementation Status Report, discussed below, provides information for completion of these quarterly reports.

7.3.2 Monitoring and Reporting of Implementation Initiatives

This is a more detailed reporting, referred to as the "Business Plan Implementation Status Report" that captures summary status information about work being carried out for implementation initiatives in this Business Plan. The intended audience for these reports is management personnel directly involved in oversight of Business Plan initiatives, project managers and team members. These reports will be prepared on a quarterly basis, or more frequently if desired, using information provided by project teams and individuals assigned responsibility for work under specific implementation initiatives. The format shown in Exhibit 2 will be used.

Exhibit 2: Suggested Format for SDI Implementation Status Report

MICHIGAN STATEWIDE GIS BUSINESS PLAN-IMPLEMENTATION STATUS REPORT

Submitted by: xxxxx

Submitted to: xxxxxx

Submittal date: xx/xx/20xx

Report period: xx/xx/20xx to xx/xx/20xx

Summary of Progress on Implementation Initiatives: Xxxxx xx xxxxxxxx xx x xxx xxxxxxxxxxx xxxxx xxxxx xxxx x xxxx xxxxx xxxx xxxxxxxxxxx xxx. Xxxxxxx xx xxxxxx xxxxxxxxxxxxx xxx xxxxx xxxxx xxxxxx x xx xxxxx xxxx xx xxx x xx xxx xxxxx xxx xx xx x xxx xxxxxx xxxxx xx xxxx xxxxxxxxxxxxxxxxxxx xxxx xxxx.

IMPLEMENTATION INITIATIVES	Plan Start	Plan Finish	Actual Start	Actual Finish	Percent Complete	Comments
Organizational and Management Structure and Practices						
O1: xxxxxxxxx						
Ox: xxxxxxx						
Funding, Budgeting, Cost-benefit Evaluation, and Financial Management						
F1: xxxxxxxx						
Fx: xxxxx						
Legal or Policy Development and Management						
L1: xxxxxxxxx						
Lx: xxxxxxxx						
Geographic Data Development or Management						
D1: xxxxxxxxxx						
Dx: xxxxxxxxxxxx						
System Configuration, Software, or Application Development and Operation						
S1: xxxxxxx						
Sx: xxxxxxxxxx						
Education, Outreach, and Communications						
E1: xxxxxx						
Ex: xxxxxxxxxx						

7.3.3 Tools for Monitoring and Reporting

Compiling the Quarterly Progress Reports will make use of software packages that are part of the Microsoft Office suite—including Word, Excel, and Project. The Business Objectives Progress Report (see Exhibit 1 above) will be prepared as a Microsoft Word document. It is recommended that the Implementation Status Report (see Exhibit 2 above) use a combination of Microsoft Project and Excel.

Appendix A: Implementation Initiatives, Performance Milestones and Related Objectives

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Organizational and Management Structure, Policies, and Practices			
O1: Formalize/Revise Role, Membership, and Structure of Local and State Cross Boundary Technology Steering Committee (CBTSC)	Committee members with input from other GIS stakeholders examine current mission and goals and make appropriate changes and elaborations to the mission statement and goals. Clarify the advisory and oversight authority of Committee on GIS management and operations in CSSTP. Formalize operational issues: membership, leadership, approach for decision making, formation of subcommittees and working groups etc. If deemed important, make changes to membership to better represent GIS and IT communities.	• Refine mission statement and goals • Prepare and approve bylaws • Add to and revise membership	O2, O13
O2: Identify and establish initial Standing Subcommittees under Cross Boundary Technology Steering Committee	Based revisions to the CBTSC established in O1, define a number of Standing Subcommittees to address key ongoing GIS and related IT issues and concerns. Form the Subcommittees as needed but begin with ones that are needed to support high priority initiatives such as: a) GIS/IT Standards Development, b) GIS Policies, c) GIS Program Outreach and Communication, d) Business Plan Monitoring, e) GIS Education and Training, f) State-Local-Tribal GIS and IT Coordination, g) GIS/IT Trend/Advances Monitoring.	• Define/establish Standing Subcommittees as provided for in By-Laws (O1) • Define mission/role of each Subcommittee • Assign leadership and membership of Subcommittees	O1
	Note: *Standing Subcommittees* are bodies commissioned by the CBTSC that have specific missions and topics related to business plan execution. Standing Subcommittees have an ongoing role, not a fixed temporary/task oriented purview as is the case with *Working Groups*. The Subcommittees are normally chaired by a member of the CBTSC but may include members from the broader Michigan GIS and IT stakeholder community (public or private sector, academic, non-profit).		
O3: Change name of State GIS User Group, enhance activities, and clarify organizational relationships	Take steps to enhance User Group services and activities and expand participation by members of the State GIS community. Change the name to "GIS User Forum" to avoid confusion with existing regional user groups. In coordination and sharing of resources with other statewide GIS bodies to support many of the Outreach and Communication initiatives (see Category C). Provide high-value services through regular meetings, news and information on Web Site, vendor and user demonstrations, information on training opportunities, calls for participation in CBTSC Subcommittees and Working Groups.	• Changed name of current state GIS user group to Michigan "GIS User Forum" • Prepare mission statement and description of activities • Define relationship between other organizations • Prepare program/events calendar for first year	O2, O6
O4: Improve relationships between GIS and other professional networking and educational organizations.	IMAGIN, MiCAMP, and other professional associations play valuable roles in statewide professional networking, education, and information sharing. The missions of these bodies are similar and each has somewhat overlapping membership. A closer working relationship between these groups would better support statewide GIS coordination and support users through improved programs and services.	• Create Working Group and initiate discussions to improve organizational relationships	O2, O6, C1, C2, C3, C4, C8, C9, C10, C11, C12, C13, C14, C17, C18, C19, S6, S7, F2, F3, F6, F7

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Organizational and Management Structure, Policies, and Practices (con't)			
O5: Seek and get legislative action, Executive Order, or formal Agency action recognizing statewide GIS program.	Actively explore and establish formal recognition for the statewide GIS program. This could take the form of an Executive Order from the Governor's Office, a resolution from the state legislature (formal recognition) and legislative act that formally establishes key GIS program entities and which may allocate funding, or an Agency action formalizing GIS Coordination roles.	• Create Working Group and research options • Prepare draft wording for EO or legislative action • Conduct outreach and get senior official support Ratification of EO or legislative action	O1, O4, C2, C3, F2
O6: Establish and implement a Project Management Office (PMO) in CSSTP and monitor business plan progress.	Using accepted best practices (from the Project Management Institute and other professional associations) create a staffed GIS/IT project management office (PMO) in CSSTP. This body would: 1) establish and support project planning and management practices for GIS projects, 2) monitor and report on progress on the business plan (and how it addresses IT Strategic goals), 3) Support GIS planning and execution by any stakeholder groups around the state.	• Evaluate PMO needs prepare draft description of role and operations • Get input from MDTMB and other GIS stakeholder organizations • Prepare final PMO description and get approval for formation • Assign staff in CSSTP and initiate work	O9, O10, O11, O12, C13, most other initiatives involving new project set-up and management
O7: Establish and assign resources for a GIS program outreach and communication business function in CSSTP	Formalize and expand current activities lead by CSSTP for external outreach and communications with the full GIS user community in Michigan. A new program or section would be established with CSSTP staff responsibilities. This group would have a lead role in many of the Implementation Initiatives in Category E. It would coordinate closely with the rest of CSSTP, other statewide GIS bodies (State User Forum, IMAGIN, MiCAMP, and regional GIS user groups), and other professional associations. This group would have an important focus on building/sustaining state-local partnerships but would be help identify and establish other partnerships with federal agencies, universities, and private companies.	• Define mission and role for new Outreach/Communication "business unit" • Approve and set up new business unit • Assign leadership and personnel and initiate activities	O3, O4, C4, D3, D4, D7, F2, most Communications/Outreach initiatives (see Category C

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Organizational and Management Structure, Policies, and Practices (con't)			
O8: Define/document process for GIS standards and policy development and approval	Create a Working Group under the CBTSC charged with the responsibility for defining a process and workflow for the submittal of a proposed standard or policy and its evaluation and ultimate of approval as an IT and/or GIS standard or policy. Standards and policies may address any technical, operational, or administrative area including software, data architecture, database content and format, network protocols and management, system administration tools and practices, standard methodologies for GIS and IT development, organizational relationships, information distribution, etc. The standards and policy review and approval would follow a comment and consensus process with formal approval by the CBTSC. Standards compliance would be required by state agencies (with a provision for approved deviation from the standard if a business case could be made). For non-state agencies, standards compliance would be recommended and encouraged but not mandatory. Note: Short of formal standards that carry specific requirements for compliance, some topics may result in the approval of a "guideline" which is recommended for adherence for specific circumstances but which are not mandatory.	• Define scope of standards/policy development and approval process • Prepare, approve, and communicate procedures to CBTSC • Assign standards/policy development role to appropriate CBTSC Subcommittee	O2, O13, O14, D6, D9, C9, S10, other database and system configuration initiatives requiring development or use of formal standards and policies
O9: Establish process for submittal and review of new GIS projects and initiatives	Following the draft workflow for the CBTSC, finalize and fully describe an optional process for any GIS or IT stakeholder to propose a project (e.g., database or application development, educational initiative) that involves partnership and coordination by multiple state, local, or other organizations. The process will examine scope, business benefit, costs, and funding sources and explore opportunities to leverage resources for broader benefits. If appropriate, funding sources will be identified, resources will be allocated, and a project team (Working Group) will be assigned to prepare a work plan and manage the project. The PMO (see O6) will normally be involved with the evaluation and planning process.	• Revise/elaborate on currently defined process • Communicate process to all interested stakeholders	O1, O2, O6, O8, O10, O11, C14, all other initiatives that require new project planning and execution
O10: Set up templates, practices, and procedures for detailed work plan preparation	Establish guidelines and templates for preparation of detailed work plans—for work on implementation initiatives defined in this Business Plan or future projects proposed to the CBTSC. Document acceptable project management practices for team development and ongoing project administration, monitoring, communications, and reporting. The recommended PMO (see O6) has the primary responsibility.	• Prepare template work plan and explanatory information • Communicate availability to all stakeholder organizations •	O6, O9, O11, C7, C14 most other initiatives involving new project planning and management

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Organizational and Management Structure, Policies, and Practices (con't)			
O11: Set up templates, practices, and procedures for business plan monitoring and reporting	Establish procedures and practices and create reporting format templates for overall monitoring of progress on Business Plan objectives and implementation initiatives. Put in place ongoing monitoring and reporting.	• Monitoring procedures and practices defined in writing • Templates and tools for progress reporting created	O6, O9, O10, C6, C14
O12: Create "template" organizational structure and best management practices to support enterprise GIS development	Government agencies at state and local level could use "organizational models" and guidance to support their development of enterprise GIS programs that serve multiple departments. The template would provide a starting point for enterprise GIS development that provides a structure and practices that encourage collaboration and sharing of resources. This would include the creation of a "library" (Web accessible) of best practices for GIS management and operations. The PMO would have a role in creating the template and providing assistance in its use.	• Create organizational/policy model for enterprise GIS for state agencies and local governments • Distribute and communicate enterprise model • Support/facilitate enterprise GIS adoption	O6, O13, C7, C10, C13, C14, C16
O13: Develop and approve formal GIS policies	This is an ongoing activity for the creation of formal policies, reviewed and approved according the process developed in O9. Initial policies will focus on high-priority organizational, operational, and administrative activities. Policies may be applicable to certain types of organizations (state vs. local government) or for all GIS stakeholders. High-priority policies may include: requirements for standards and policies compliance, data maintenance responsibilities, requirements for project review and approval, GIS ethics.	• Research and prepare draft policies • Submittal to Subcommittee for review and approval • Formal policy approval • Distribute/Communicate policy to stakeholders	O9, O14, C10, C13
O14: Prepare formal records retention policy and practices (records with geographic content)	Examine legal and regulatory requirements for public records retention as it impacts geographic databases and products (maps) for state agencies and local governments. This involves evaluation and application of public records management requirements defined by the Michigan Department of History, Arts, and Libraries (HAL) Prepare recommendations and support development of policies for sound records management and retention to ensure compliance with applicable laws and rules.	• Assign team or Working Group • Review of current records retention schedules/policies (Michigan HAL) • Determine applicability to GIS and define record series and retention for GIS records • Approval of retention schedules	O9, O13, C12, C14, D3, D9
O15: Create a Stewardship and Outreach Coordination position within the CSSTP to support implementation of this Business Plan	A staff position with primary responsibilities for facilitation of the spatial data infrastructure outreach and stewardship program should be created. The individual in this role would be responsible for implementing many of the key implementation initiatives in this business plan. Position would provide staff support to the CBTSC and all associated standing subcommittees and working groups. Support would also be provided to regional user groups and professional organizations through assistance with meeting logistics and conference planning.	• Complete a position description for this role and outline performance expectations for first year.. • Establish position in state human resources system • Hire individual to perform these duties. • Evaluate performance on on-going basis	O1,O2,O3,O4. 05, 06, 07, etc.

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Data Development and Stewardship			
D1: Complete version 10 of the MGF and make it available to users	Complete the changes and enhancements currently in progress for the delivery of Version 10 of the MGF and inform users that it is available for use. Complete implementation of Oracle Spatial model and the on-line editing toolkit.	• Release of version 10 to the GIS user community	D2, D3, D5, D9
D2: Prepare high-level logical GIS database design and source matrix	The high-level logical model is an identification of "data entities" (data "themes" or "layers"), summary of data content and structure, and the logical relationship between the entities. It may be presented in the form of an entity-relationship model and/or descriptive table. This logical design would include all GIS data entities needed by GIS stakeholder organizations. The purpose is to provide a comprehensive picture and context to support decisions on the future enhancement or development of GIS databases. In addition to a description of data content and relationships, information on the source(s) and development status of the data entities would be provided. The logical design would also include an identification of Framework data layers (current data in the MGF or future data layers considered to be high priority for multiple stakeholders) and Non-Framework (important GIS data but not needed by a majority of GIS stakeholder organizations.	• Formation of Working Group • Identification of "Framework" and "non-Framework" themes • Research and preparation of draft logical design • Review, comment, and completion of logical design and source matrix	D1, D3, D4, D5, D6, D7, D8, D9, D10, C5, S4, S8, S9
D3: Expand on the Geographic Data Library to maintain Web-based catalog of sources of geographic data	Compile an index with descriptive information and links to Web sites maintained by public sector (federal, state, local) and other organizations that provide access to geographic data. This would include applicable metadata to provide prospective users with sufficient information about data content, data quality, access provisions, etc. for users to determine "fitness for use".	• Assign resources for Web development • Design Website and create prototype • Develop operational version and deploy for use • Communicate availability to user community	D2, D4, D9, C7, C8, C10, S4,
D4: Design and put in place a data stewardship model and practices applicable to all GIS data	Prepare an overall model for stewardship (applicable to all data layers) that defines various steward management, and operational roles and a process for data update and posting for access. Designate responsibilities for maintenance of each Framework data theme and define workflows for ongoing data maintenance. Build and deploy effective applications for data update, quality control/quality assurance, posting of data for wide access.	• Establish Working Group and assign members • Draft stewardship roles and program description and distribution for review • Prepare final Stewardship model • Oversee use and revise as necessary	O7, O8, O13, D3, D5, D6, D9, D10, C4, S1, S3, other database initiatives (Category D) involving ongoing data stewardship
D5: Evaluate current quality of Framework data and define actions for quality improvement for next MGF version.	As a basis for planning future enhancements and improvements of existing MGF data, perform a detailed assessment of current data quality. This would include the creation and/or update of metadata and would address multiple quality criteria: completeness, map accuracy, attribute accuracy, graphic integrity, etc. The results of the data quality assessment would be compared with needs expressed by MGF users to identify realistic improvements. The survey conducted as part of the NSDI CAP grant planning project is one source for this work.	• Research/compile recent MGF user comments • Conduct additional information gathering with users • Define and prioritize data improvements and examine time/cost impacts • Summarize/distribute evaluation to GIS user community	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, C5, C12, S3, other database initiatives (Category D) involving database improvements

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Data Development and Stewardship (con't)			
D6: Develop, approve, and support the use of GIS database standards	Accelerate activities for developing and approving data standards for GIS data--to support development of consistent statewide data. Communicate information on the standards and provide guidance on their use to GIS stakeholders in Michigan. This initiative would begin by a focus on high-priority data standards that apply to all or most data layers (metadata, projections/coordinate systems, and data distribution licenses). Ongoing work would under this initiative would include the preparation and approval of more specific standards on data content, quality, coding/classification, attribute data schemas, etc.	• Prioritize standards development efforts • Research and gather information on existing standards (inside and outside Michigan) • Develop draft standards (incrementally theme by theme) • Review and revise standards and submit for formal acceptance • Approval of standards by CBTSC Subcommittee	O8 , D2, D3, D5, D8, D9, D10, C7, C10 most database development initiatives (Category D)
D7: Recruit MGF stewardship participants	As an ongoing activity, the CSSTP in coordination with professional associations and regional GIS user groups will actively recruit local government (City/Villages/Townships—CVT) partners and applicable state agencies to play a stewardship role in MGF data maintenance. The ultimate goal is to have all counties, with active GIS programs, become active stewardship participants. In cases where appropriate a regional stewardship coordinator at the State Planning and Development District should be identified to serve as an initial point of contact for MGF issues. This regional stewardship coordinator could play a very significant role in expanding the MGF in rural areas.	• Set goals for "sign-up" of new participants by quarter • Make general appeals for participation • Sign-up new participants • Identify "stewardship coordinators" in each of the 14 State Planning and Development Regions to serve as an initial point of contact on the MGF.	O4, O7, D4, D5, D9, C5, C12, other database initiatives (Category D) involving database stewardship
D8: Develop template database specifications and procurement templates for new data themes	Prepare template specifications for database development for use by any GIS stakeholder organization planning for database development These specifications would reference applicable data standards and include technical specifications for data conversion and capture, format of deliverables, quality criteria, and work performance criteria. These template standards would be a model (with necessary adjustments) for use by any stakeholder organization for a data conversion project or procurement of private data development services. The template would also help encourage database development partnerships for organizations (local governments) in geographic proximity.	• Set priorities for database specification needs • Create draft templates for selected themes • Review and revise templates • Distribute templates and explain/promote their use • Achieve active use of templates	D2, D6, D9, D10, C10 all new database development (Category D) initiatives

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Data Development and Stewardship (con't)			
D9: Create geospatial metadata profile and develop more effective metadata management tools	Create a metadata profile, based on the FGDC Content Standard for Geospatial Metadata, create templates for populating metadata fields, and enable tools for metadata query.	• Get input on requirements for profile • Prepare draft profile and distributed for review • Prepare/reach consensus on revised profile • Submit for formal standards approval • New metadata profile is approved • Distribute/communicate revised profile and build into automated tools for metadata management • Seek grant funding for metadata training through USGS NSDI programs	D2, D3, D4, D5, D6, D8, D10, C7, S1, S2
D10: Make enhancements in content and quality to existing MGF data	Using results of the review (see D5) make quality improvements in existing MGF data. Quality improvement is particularly important for transportation centerlines (positional accuracy and update timing) and related transportation attribute and LRS. Quality improvements also impact other MGF data including political and administrative boundaries. This is a planned, ongoing activity that takes into account user needs, resource availability, and level of MGF stewardship participation.	• Review data collected during Listening Sessions and create work initiatives that address: a) quality/accuracy improvements of existing MGF data (better centerline, boundary, road centerlines) b) prepare MGF to support NextGen E911 c) potential new data (parcels, demographic data, public safety addressable structures, utility, broadband mapping, public lands/facilities, etc.) • Explore funding options for critical infrastructure and structures to be added to MGF	D1, D5, D6, D7, D9, C5, C12, S1, S3, other Category D initiatives involving data enhancement for specific data themes
D11: Establish program and process for ongoing repeatable statewide coverage of orthoimage data	Continue to administer the current NAIP partnership program and recently ratified agreement with Microsoft. Plan and actively solicit support for ongoing orthoimage acquisition program. Prepare terms and agreements for cost sharing and access for imagery (see F6) and technical specifications for orthoimage development. Get support and commitments for cost contributions (federal, state, local, private) and prepare/ratify cost sharing agreement. Establish group and practices for long-term management of the ortho program.	• Establish Working Group or project team for planning and establishing orthoimage program • Prepare cost-sharing agreement and recruit participants • Prepare technical specifications and cost estimates • Garner support and sign up participants • Launch initial orthoimage acquisition in 2012 or 2013 and monitor work • Make data available to user community	O8, O9, O10, D5, D6, D7, D8, D9, D10 C15, F1, F3, F6

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Data Development and Stewardship (con't)			
D12: Accelerate and establish better access to digital data from the REMON initiative	Evaluate current management of REMON project and identify potential changes and improvements to make coordinates available to the GIS community. Help accelerate data compilation and make improved monumentation data more accessible via the Web.	• Examine and define current REMON project status and needs for changes/improvements • Assign resources and make changes to REMON project specifications and operations • Design and deploy Web-based application for improved data access	O9, O10, D7, D9, D10, S2, F1, F3, F6
D13: Load and make available GIS data layer with Census Geography and 2010 Census data	Take delivery and load current census geography boundary files and data from 2010 Decennial Census. Evaluate correspondence of boundary files with MGF data layers and make necessary adjustments to TIGER to improve match MGF or local government GIS data (parcel and centerlines). Make this data available for query, viewing, and download.	• Design Census data layer • Resolve problems and build Census Geography boundaries • Load 2010 Census data • Create web services for users to leverage these data in their applications.	O9, O10, D7, S2, F6
D14: Design, develop, and deploy statewide parcel database and establish ongoing stewardship	Complete database design, build, and maintain a statewide parcel database consisting of parcel boundaries and a minimal set of parcel attributes. Data would be contributed by local governments (county, city, village, township) and would be carried out in partnership with BS&A (contractor which has already automated data for large number of Michigan government jurisdictions). Data from multiple sources would be contributed to create a seamless statewide parcel fabric. Initially, data stewardship would call for updates on an annual basis (corresponding to the real property taxation cycle) but in the future, updates may occur more frequently with new subdivisions and parcel splits/mergers. This database development initiative to identify publicly owned parcels or parcels for which a public agency has right-of-way or easement rights. Identifying these public parcels and easements would provide data to support a “public land inventory and tracking” application (see S2 Part of this effort would involve reaching an agreement for contributions of parcel data from jurisdictions that are now generating revenue from parcel data sales.	• Establish Working Group • Evaluate/document current status of digital parcel databases • Prepare specifications and cost estimates for statewide parcel database • Resolve issues of local parcel sales • Assign team (and contractors) and initiate development work • Complete statewide database, deploy Web access • Define ongoing stewardship	O8, O9, O10, D5, D6, D7, D8, D9, D10 C15, S2, F1, F3, F6

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Data Development and Stewardship (con't)			
D15: Design and develop addressable structures database	Structures data include specific buildings or other facilities with a fixed location (for which a site address may be assigned) and which are deemed important for public safety planning and response and other applications. Structures data is generally consistent with feature types included in the federal Homeland Security Infrastructure Program (HSIP): schools, hospitals and other medical facilities, police/law enforcement stations, fire/EMS stations, emergency operations centers, jails/prisons. Additional important features may be included—for example, it may be expanded to include all governmental buildings and facilities to support a "public land inventory and tracking" application. Building the database will involve work with source agencies: HSIP, state agencies, and local governments. This initiative includes preparation of a database design, data loading and quality control checks, and creation of a statewide database. Building this database is followed by the establishment of a stewardship process resulting in data update at least on an annual basis.	• Establish Working Group • Evaluate data needs and existing sources • Prepare specifications and cost estimates for statewide database development • Acquire data from sources and carry out additional database development (in-house or contractor work) • Complete statewide database, deploy Web access • Define ongoing stewardship • Seek grant funding from Department of Homeland Security for development and maintenance of these data. • Develop secure web services to make data available to authorized users.	O8, O9, O10, D5, D6, D7, D8, D9, D10 C15, S2, F1, F3, F6
D16: Design database and specifications for site addresses and put in place process for data population and maintenance	As an extension to the "addressable structures" database described in D15, a comprehensive site address database includes point locations and attribute data for all parcels and/or buildings and facilities for which addresses can be assigned. This initiative includes the agreement of a data content and format standard, development of a database design and database development specifications to support capture of site addresses. Local governments (or contractors retained by them) would be primarily responsible for database development but technical support, and possibly financial assistance could be provided by CSSTP.	• Establish Working Group (could be same as D15) • Evaluate data needs and existing sources • Prepare specifications and cost estimates for statewide database development • Prepare guidelines for local government site address data development	O8, O9, O10, D5, D6, D7, D8, D9, D10 C15, S2, F1, F3, F6

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Data Development and Stewardship (con't)			
D17: Enhance accuracy/ completeness of administrative boundaries (city, townships, school districts, election districts, and other special purpose districts)	Administrative boundaries area foundational element of any statewide GIS and in Michigan that dataset is used by over 97% of all GIS users. To be most useful administrative boundary data should coincide with parcels, road centerline, and hydrology databases wherever possible.	• Establish Working Group • Evaluate data needs and existing sources • Prepare specifications and cost estimates for statewide database development • Initiate development of comprehensive dataset.	O8, O9, O10, D5, D6, D7, D8, D9, D10 C15, F1, F3, F6
	Boundary data for every type of taxing and public service authority in Michigan should be collected and maintained under a stewardship partnership relationship with local data custodians. These data are important to a variety of business drivers including economic development, revenue and taxation, emergency response, and asset management.		
D18: National Hydrology Dataset (NHD) completion and enhancement	The NHD data should be completed and enhanced to fully support business drivers for asset management for drain commissions, flood management, and environmental protection. Surface hydrology was reported to be needed by over 96% of all GIS users in Michigan during the outreach portion of this project.	• Establish Working Group • Evaluate data needs and existing sources • Prepare specifications and cost estimates for statewide database development Initiate development of comprehensive dataset	O8, O9, O10, D5, D6, D7, D8, D9, D10 C15, F1, F3, F6
D19: Enhance database in support of emergency dispatch and response	This initiative is related to the Structures initiative in D13. It involves the improvement of data that supports local and state public safety and emergency planning and response agencies. The objective is to build and maintain a statewide database with critical public safety and emergency management data that includes (in addition to Structures), emergency service zone (ESZ) boundaries, selected "critical infrastructure" features, improved address ranges, and possibly other data. This project could be lead by CSSTP or a Working Group of the CBTSC. It would require a close partnership with local governments and appropriate state agencies (e.g., State Police).	• Establish Working Group • Evaluate data needs and existing sources • Prepare specifications and cost estimates for statewide database development Initiate development of comprehensive dataset	O8, O9, O10, D5, D6, D7, D8, D9, D10 C15, F1, F3, F6
D20: Design and develop water and sanitary sewer service area database	Water and sewer utility service data was identified as being important unavailable data elements for over 30% of survey respondents. While these data are not critical for many GIS applications they are important for several high profile business drivers: land use planning, economic development, emergency response. These data should be developed in partnership with regional or local governmental entities and include pertinent information on system capabilities, sources, etc.	• Establish Working Group • Evaluate data needs and existing sources • Prepare specifications and cost estimates for statewide database development Initiate development of comprehensive dataset	O8, O9, O10, D5, D6, D7, D8, D9, D10 C15, F1, F3, F6

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Data Development and Stewardship (con't)			
D21: Other utility service areas—gas transmission, electric transmission, pipelines	These data were all highly ranked as desired but unavailable. Since the vast majority of these data are related to investor owned companies it is likely that obtaining them for use in the public domain will be difficult. However, partnerships should be explored with the leading providers of these services since in most cases these data exist for their own internal asset management and planning functions. These data can be critical to economic development, land use planning, and homeland security business functions.	• Establish Working Group • Evaluate data needs and existing sources • Prepare specifications and cost estimates for statewide database development • Initiate development of comprehensive dataset Establish Working Group • Evaluate data needs and existing sources • Prepare specifications and cost estimates for statewide database development • Initiate development of comprehensive dataset	O8, O9, O10, D5, D6, D7, D8, D9, D10 C15, F1, F3, F6
D22. Create statewide current elevation data	Elevation data, specifically contours, was identified by over 90% of GIS users as data needed to support their enterprise application of GIS. Additional elevation data in the form of DEMs if improved will result in better spatial accuracy of ortho photos. These data are important to production of quality National Flood Insurance Rate Maps (FIRM), to modeling and responding to wildfire, determination of road centerline mileage, wireless broadband and other tower location decisions, and site selection for wind power generation locations.	• Establish Working Group • Evaluate data needs and existing sources • Prepare specifications and cost estimates for statewide database development • Initiate development of comprehensive dataset	O8, O9, O10, D5, D6, D7, D8, D9, D10 C15, F1, F3, F6
Communications, Outreach, and Education			
C1: Complete a communications and marketing plan for the state spatial data infrastructure.	An effective statewide GIS coordination effort is built upon a strategic and focused communication and marketing effort. Completion of an initial plan focused on outreach communications and marketing of the state spatial data infrastructure (specifically the MGF) .	• Develop an outreach plan that includes specific organizations and actions to be implements. • Craft a marketing identify for the MGF including a name, logo, and web site. • Develop marketing materials for distribution to key stakeholders and decision makers.	

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Communications, Outreach, and Education (con't)			
C2: Actively pursue outreach with and support from professional and industry associations	Build better communication with professional and industry associations that represent organizations and people that have an interest in GIS technology and data. This would include participation in meetings and conferences hosted by these groups, providing promotional and educational materials, and soliciting their support for GIS program initiatives. Groups might include County Road Association of Michigan, Michigan Emergency Management Association, Land Information Access Association, Michigan Assessors Association, Michigan Association of Chamber Professionals, Michigan Association of Counties, Michigan Association of County Administrative Officers, Michigan Association of County Drain Commissioners, Michigan Association of Equalization Directors, Michigan Association of Insurance Agents, Michigan Association of Planning, Michigan Association of Public-Safety Communications Officials, Michigan Association of Realtors, Michigan Association of Regions, Michigan Association of School Administrators, Michigan Association of United Ways, Michigan Cable Telecommunications Association, Michigan Education Association, Michigan Electric and Gas Association, Michigan Government Finance Officers Association, Michigan Municipal League, Michigan Railroads Association, Michigan Society of Professional Engineers, Michigan Society of Professional Surveyors, Michigan Township Association, Roadsoft User Group, Telecommunications Association of Michigan, Transportation Asset Management Council, and United Tribes of Michigan.	• Identify professional and industry groups and events • Pursue opportunity for communications with these groups and participation in events • Prepare outreach materials (presentations, flyers) appropriate for these bodies • Have formal communication and event participation with the groups	O4, O7, D7, C3, C5, C6, C9, C14, F2
C3: Prepare materials and hold briefings to sustain support from senior officials	Prepare a number of explanatory and promotional materials that provides information about the needs, applications, and benefits of the GIS program and work to stimulate partnerships between state, local, and private organizations and which are aimed at senior managers and elected officials at the state and local level. Materials may include brochures and presentation materials. The CBTSC and CSSTP staff will seek opportunities to provide information and conduct executive briefings with senior officials.	• Assign responsibility to project team or Working Group • Design materials and identify opportunities for senior official briefings • Create promotional materials • Distribute materials and line-up/conduct senior official briefings	O7, C5, C14, F2

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Communications, Outreach, and Education (con't)			
C4: Reach consensus on name, logo, and other branding for Michigan's statewide GIS program	Overall promotion and education about the statewide GIS program will benefit from appropriate "branding' as a basis for communications and outreach—particularly for expanding interest and participation in statewide GIS initiatives. This "branding" includes a number of actions most important of which is defining a name, logo, and possible a slogan or "tag line" for the Michigan GIS. Other states that have taken this step have seen considerable success in statewide GIS promotion (e.g., North Carolina's "NC OneMap", and Oregon's GIS Utility program branded as "NavigatOR"). Reaching consensus on a name and logo could be done in the form of a contest with suggestions from the Michigan GIS community. When a name and logo is settled on, it would be used in GIS program communications, presentations, Web sites, GIS products, and hosted applications.	• Assign to Working Group or CSSTP Outreach unit • Plan and solicit ideas (possibly through a contest) for name and logo • Design/select name and logo • Post name and logo to all applicable media sources and products (Web sites, map products, communications)	O4, O7, D7, C1, C5
C5: Prepare and establish formal terms for MGF partnership program	This initiative is to encourage expansion in MGF program participation, including Stewardship roles for local governments and other organizations that will provide data updates for statewide data coverage. This initiative involves several major tasks including: a) clarifying the terms of participation and putting in place a formal process for enlisting data Stewards and b) active promotion and recruitment of data stewards by CSSTP, the CBTSC, the professional GIS associations, and regional GIS user groups. These steps are followed with establishment of specific procedures to provide data for import to the MGF.	• Assign to Working Group or CSSTP • Prepare draft terms for partnership program and get comments • Prepare final terms and promotional materials • Post name and logo to all applicable media sources and products (Web sites, map products, communications) • Begin active recruitment of participants	O3, O7, D5, D7, D10, C2, C6, C12
C6: Design and create promotional materials for statewide GIS program	This activity is carried out in coordination with other outreach initiatives (E1, E2). This involves the design and development of materials using a variety of media and distribution channels to provide information focused on potential users and partners in the statewide GIS program. This may include brochures, web site pages, and other materials which would be distributed to users and potential users. This could be a role taken on by a Standing Subcommittee or Working Group of the CBTSC. All statewide GIS stakeholders would have access to these materials and use them in connection with events, meetings, and other outreach activities.	• Assign to Working Group or CSSTP • Prepare draft materials and get input • Prepare final materials • Make promotional materials available to statewide GIS stakeholders • Make changes to promotional materials over time as needed	O7, O12, D7, C1, C2, most other Communication/Outreach initiatives (Category C), F2, F5

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Communications, Outreach, and Education (con't)			
C7: Review and improve CSSTP Website design and navigation for improved access to information, services, and resources	The objective of this initiative is to improve the CSSTP web site which will serve as a primary communication channel for statewide GIS users or potential users to easily find information about the statewide GIS program and also to access data and services. This initiative would involve a full Web site redesign after getting input from current users, followed by a rebuilding of Web pages and improved navigation. This is an important aspect of GIS program promotion and supports most outreach and education initiatives as well as those focused on delivery of GIS data and services.	• Assign project to Subcommittee or Working Group and contractor • Evaluate current CSSTP Web Site and identify needs/specifications for improvements • Assign resources (including contracted support if needed) and prepare/test prototype • Evaluate prototype and make changes • Deploy new Web site and monitor use	O7, D7, C5, C6, C8, C10, C12, C14, C16, C17, C18, S2, S3, S4, S6, F4,
C8: Prepare and maintain single Web-based GIS contact directory	Compile a directory of people and organizations--principally users and technical staff with GIS expertise who may serve as a resource for information and technical support to other GIS programs. Provide contact information to facilitate networking and build an application to GIS-enable the directory to easily identify the location of the contact.	• Assign team and prepare work plan for directory development • Examine other GIS contact directories and design directory format and technical architecture • Develop prototype directory and test • Populate with initial set of contacts and deploy • Communicate directory availability, encourage access, and entry of revised or new contact information	O3, O4, O7, D7, C2, C7, C11, C17, S4
C9: Support and encourage expanded participation in GIS events and professional associations	As part of statewide GIS program communications and promotion, this initiative will encourage broader participation in GIS events and related professional associations—including Michigan-based organizations and programs as well as out-of-state GIS events and organizations (URISA, GITA, ASPRS, NSGIC). This initiative is supported by a Web-based resource with information on professional organizations and upcoming events (conferences, workshops, special meetings). Membership and participation in these professional organizations and events supports professional development, networking, and overall advancing of GIS programs. The State GIS User Forum (see O3), IMAGIN, and MiCAMP organizations (see O4) would have key roles in this initiative.	• Identify needs and opportunities for participation in events and associations • Design Web application to provide access to events information and opportunities for professional involvement • GIS managers and user organizations promote and encourage GIS personnel involvement	O4, O7, C2, C4, C11, C12, C13, C14
C10: Create and maintain central, web-accessible repository for GIS and related IT standards and policies	This initiative supports Objective 2.2 of the CBTSC. In connection with the development and approval of standards (see O8, D6, S10), this initiative includes the design and deployment of a searchable Web-based catalog of pending and approved IT and GIS standards and policies.	• CSSTP design and develop Web application for query and access • Communicate availability of the Web application and monitor use	O8, D3, D6, D8, D9, D10, C7, S10, most database initiatives (Category D) involving new or enhanced database development

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Communications, Outreach, and Education (con't)			
C11: Encourage and support professional development and certification for GIS professionals in Michigan	This initiative will be coordinated with E8 and has the purpose of supporting the increase of technical and management skills and professional advancement of GIS professionals in all statewide stakeholder organizations. Specific objectives include completion of formal GIS educational degrees or GIS certificates in universities, continuing education course credits, and increasing the number of GIS staff with applicable GIS and related professional certifications (e.g., GISP, ASPRS-CMS, PMI-PMP, other technical IT certifications). Work would include preparing Web-based information on educational and professional programs, promotion of these opportunities at events, and possible monetary support to qualified individuals. A Standing Subcommittee of the CBTSC would take the lead role with staff support of CSSTP. This initiative could also include a review and preparation of standard, recommended GIS personnel descriptions.	• Identify needs and opportunities for training, professional development, and certification programs • Design Web application to provide access to professional development opportunities • GIS managers and user organizations promote and support training, professional development, certification by GIS staff	O13, C8, C13, C14
C12: Design and organize training programs for use of MGF resources and other CSSTP GIS services	This initiative directly supports initiative E4—expansion of MGF program participation and data stewards. The CSSTP would take a lead role in designing and distribution of information about the MGF and training programs aimed at potential new stewards for MGF data maintenance. The CSSTP will prepare training materials which could be provided on-line (without the need for a trainer) and, as needed, training sessions by a CSSTP staff person or other qualified statewide GIS stakeholder.	• Design training programs • Prepare training materials and tools for Web-based and instructor-led training • Plan and schedule training events • Promote availability and encourage participation	O7, D4, D7, C7, C9, C12
C13. Encourage and expand participation in and programs offered by State GIS User Forum	This initiative directly supports initiative O3—re-organization and improvement of a State User Forum. A CBTSC Subcommittee could take a lead role with participation of IMAGIN and MiCAMP, and CSSTP staff. This initiative involves ongoing promotion through all available channels to make GIS users throughout the state aware of the User Forum and encouraging broader participation. Part of this is to solicit contributions and presentations by users for GIS User Forum meetings and Web-accessible material.	• Promote expanded access and use of GIS Forum programs • Schedule activities and encourage participation	O3, O7, D7, C7, C8, C9, C14, C15, C17

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Communications, Outreach, and Education (con't)			
C14. Communicate GIS project initiatives, successes, lessons-learned, and best practices through media, Web site conferences, and professional meetings	This initiative supports Goal 1 of the CBTSC and is carried out in coordination with other outreach activities (Category C). This will result in an effective approach to distribute news about the statewide GIS program activities and user stories as a support for professional networking. Publishing of information about GIS applications and "success stories" provides a resource for other users' application deployment and support for GIS business cases.	• Design Web-based "clearinghouse" with easy-to-use query and navigation • Gather initial information for initial posting to clearinghouse • Deploy Web-based clearinghouse and monitor use • Conduct ongoing review and research for additional content and solicit contributions • Make ongoing additions and updates to Web clearinghouse	C2, C4, C7, C8, C10, C11, C13, C14, C16, S7, S9
C15: Explore and define options for providing GIS services to low-resourced jurisdictions	Examine the options for providing outsourced GIS services or partnerships that may allow contracted GIS services or support from CSSTP or a local government (e.g. support from a County government GIS program to a neighboring county or to CVTs in the County. The focus is finding appropriate avenues to provide GIS data and services to local governments without sufficient resources or technical expertise to support a full GIS program.	• Complete research on outsource providers and options • Create directory of outsource providers • Prepare template terms for outsource arrangements • Ongoing facilitation to support outsource arrangements	O4, O7, O9, O12, D3, D7, C5, C7, C12, C13, C17, S1, S2, S4, F1, F2, F3, F4, all MGF database development initiatives (Category D)
C16: Design, initiate, and support "Map of the Month" Web-based gallery	This is an ongoing program that some other state and local government GIS programs have used as a promotional device and to encourage professional networking and communication among GIS professionals. Any member of the GIS community in the state would be given an opportunity to submit a GIS-generated map created to support a GIS program or research activity. Any GIS user could submit a digital map for consideration and one would be chosen each month. There would not be a prize of an extremely detailed set of selection criteria. Each month a new "map of the month" would be accessible through a Web link and viewed by all with brief information about the purpose of the map and how it was created as well as credits to the contributor(s) and their organization(s). Maps for previous months would also be accessible. It may even be possible to display a hard copy (at the CSSTP Office location) each month and perhaps have all the hard copies on display at an annual conference (see Ex).	• Design Web-based "Map-of-the-Month" Web based gallery • Promote program and solicit contributions • Select map each month and post to Web gallery • Announce new Map-of-the-Month postings	O4, O7, D6, C5, C7, C13, C15, S12, many database initiatives providing source data for map generation (Category D)

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Communications, Outreach, and Education (con't)			
C17: Plan and set-up program for mutual GIS support network	This initiative is related to other outreach initiatives designed to increase professional networking and exchange of information and ideas among organizations using GIS technology and data. But it goes a step further by creating a pool of in-state GIS professionals and/or their organizations which would be willing to provide GIS planning or implementation support, at no or little cost, to other organizations (particularly organizations that are planning GIS implementation efforts). This would be implemented as a Web-based clearinghouse, identifying individuals, their areas of expertise, and contact information. Groups needing such support would use this clearinghouse as a starting point to enlisting the in-state help that they need	• Assign design and set-up for consideration of working group • Establish web application clearinghouse of individuals and organizations willing to provide support.	O4, O7, D7, C8, C12, C16, F4
	Mutual support network could also include code samples, RFP documents, and other technical resources generated by GIS professionals in the state made available for others to use.		
C:18: Compile and maintain a directory of GIS training sources and opportunities	This would be an on-line directory, regularly updated, that gives users and technical staff in Michigan information about upcoming events and sources for training, education, and professional development. It would include training courses and seminars sponsored by government agencies, universities, vendors, professional associations, and private trainers; conferences; training materials; and on-line courses.	• Design and implement web based system.	O4, O7, O15, C2, C7, C8, C9, C11, C12, C15, C17, F6, F7
C19: Prepare GIS education/training plan and put in it in place	Prepare a formal, comprehensive education and training plan that guides GIS related education and training activities for all stakeholders. The plan will describe education and training goals and types, sources, and consumers of education and training materials and activities. This Plan will culminate in assignment of roles and clear objectives and the initiation of work to put in place plan objectives.	• Assign to working group to create education and training plan that addresses needs for entry level, mid-career, and senior GIS technical staff.	O4, O7, O15, C2, C7, C8, C9, C11, C12, C15, C17, F6, F7
C20: Provide better access to educational materials and professional networking	Improve educational materials about GIS (improvement or increased subscriptions to Geotech Listserv); improve mechanisms and directory information for professional contacts and networking (maybe geocoded database of people).	• Assign design and set-up for consideration of working group • Design and implement web base system	O4, O7, O15, C2, C7, C8, C9, C11, C12, C15, C17, F6, F7

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
System Configuration, Software, and Application Development			
S1: Prepare specifications and develop export tools for easy MGF data extract from Oracle Spatial to other common GIS formats	The MGF database is in the process of migration from a legacy GIS proprietary format (ArcGIS coverages) to an Oracle Spatial format (for storage of map features and attributes). This provides a number of advantages for spatial data management including its ability to maintain a statewide database and ability to use robust data management tools in Oracle. It is vital however that there be flexible and easy to use tools and processes to extract selected data from Oracle and provide it to users in a form that it can used with minimal restructuring or format translations. This initiative includes the development, testing, and deployment of extract and export routines suitable for users needed Shape Files, ESRI geodatabases, AutoCAD DWG files, and possibly other formats. There may also be a need for Oracle Spatial data to be viewed directly by users with different GIS software environments.	• Evaluate and define needs for MGF export formats • Prepare technical format specifications for export and Oracle Spatial tools • Design and develop prototype data export and formatting applications and test • Finalize and deploy data extract applications and communicate to GIS users	D4, D7, D9, C7, C10, C12, S2, S4
S2: Identify, design, and develop several enterprise GIS applications	While GIS data is the fuel upon which GIS programs operate, applications comprise the engine which delivers needed products and results to users. This initiative has an objective of delivering a richer set of GIS applications and services that can deliver business benefits to large portions of the GIS community in Michigan, through a Web-based portal. High-priority applications, which may use off the shelf tools in GIS software packages or may require additional design (map templates) or more complex programming or configuration, will provide users with needed tools in an easy to access environment. This initiative includes the design and development of several important GIS applications. This development and hosting could be the responsibility of the CSSTP or another organization in a position to host GIS applications. Selecting and designing the applications would benefit from involvement of the full statewide GIS community—possibly through a Working Group assigned by the CBTSC.	• Evaluate and select applications for initial development • Secure funding and resources for application develop • Assign team and user reviewers • Examine existing applications and design new enterprise applications • Prepare application prototypes • Get review comments, revise and deploy in operational setting • Communicate and promote use of applications	O6, O9, D1, D2, D6, D9, D10, C7, C12, C14, C15, C16, S3, S4, S7, S8, S9, S10, other database (Category D) initiatives involving database enhancement and development
S3: Examine and develop effective tools for on-line update of MGF data	The CSSTP, with input from MGF users (and potential future users) creates easy-to-use tools and submittal of updated data for import into MGF datasets and an application that allows on-line interactive update of MGF data (e.g., new road segments). These tools would incorporate basic quality control features and deliver data changes in a way that could undergo final quality checks and MGF posting by CSSTP personnel.		O7, D2, D5, D6, D7, D9, C7, S1, S2, F7

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
System Configuration, Software, and Application Development (con't)			
S4: Move toward statewide 'virtual portal' for Web-based access to spatial data and services from distributed government and commercial sources	Design and build an enhanced Web-based tool for geographic data and services that acts as a "virtual portal"--a Web application that can combine centrally-stored data, direct access to and integration of data on other Web sites, and a range of GIS services. This should include a tight connection and functional relationship with the MGF but also allow for access to other data sources maintained by local governments, state and federal agencies, and commercial sources (e.g., mashups with data from commercial providers like Microsoft Bing Maps and Google Earth).	• Prepare needs assessment and design options for "virtual portal" • Reach consensus on approach and prepare conceptual design and cost estimates • Secure funding for design and development • Organize project team • Prepare technical design and plan • Develop initial version of virtual portal and track use	D2, D3, D6, D9, C8, C12, S2, S3, S6, S7, S9
S5: Examine and suggest changes to statewide broadband communication services.	CSSTP is providing support to the Michigan Broadband Mapping initiative being managed by the state Public Service Commission--part of the Michigan Connect program (http://connectmi.org). The CSSTP in coordination with the CBTSC should continue to provide support for this effort and use its results (with GIS technology) to evaluate more efficient and less costly ways to provide needed high-speed digital services to state agencies and other organizations.	**outgrowth of broadband mapping project—to reduce costs of wide area network services.	S2, S7, F3
S6: Monitor and exchange information on industry trends, new products and methodologies	Through ongoing professional reading, review of Web-based news and information, participation in industry events, conference attendance, etc., multiple members of the GIS community will gather information about industry trends and products. This activity could be managed through a Subcommittee of the CBTSC. GIS professionals in the state would also conduct basic evaluation of products and methodologies (often in conjunction with their job functions) and make notes about ideas for possible future use or adoption. This initiative would include Web posting of the information for easy access by GIS users.	• Set up Working Group with responsibility to monitor and provide information on industry advances and impacts • Prepare position statements on technology changes and products for future adoption • Make formal recommendations for adoption of new products, technologies, and methodologies • Set up Web-accessible link for exchange of information on industry trends and products • Continue to monitor and identify opportunities for new applications of GIS technology	O3, O4, O7, D10, C7, C12, C13, C14, S1, S4, S7

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
System Configuration, Software, and Application Development (con't)			
S7: Continue to monitor and identify opportunities for new applications of GIS technology	Continually monitor new programs, special projects, and other opportunities where geographic data and GIS services could be applied. Conduct necessary research and hold discussion with program or project managers to explore use of GIS, leading to agreements for use of GIS.	• Continually monitor state and local programs, regulations, initiatives for opportunities in applying GIS technology • Explore opportunities and make "pitch" for use of GIS • Reach agreement on new projects for GIS applications and secure funding • Support design, planning, and assembling team and resources for application development	O3, O4, O7, D10, C7, C12, C13, C14, S1, S4, S7
S8: Explore and design approach for archiving of and flexible access to historic data	Many GIS users have a need to access historical geographic information (e.g., parcels, aerial imagery, road networks, land cover) to support planning or engineering studies, and sometimes legal case research. This initiative has the purpose of defining a data model and identification of software tools and applications for easy access to the historical data.	• Research and develop general data model for historical data management • Design detailed data model for historical data management • Prepare guidelines for capture and access to historical data in GIS search and query applications	D1, D2, D3, D9, S2, S4, S6, S7, other database (Category D) initiatives involving database enhancement and development
S9: Identify and evaluate opportunities for GIS integration with non-GIS systems and databases	Identify business areas, not traditional for GIS, which can benefit from geographic data and GIS capability (e.g., transportation, public health, social services, financial analysis). Define technical and organizational approaches for integration and "embedded GIS" services or applications involving integration with GIS to support these business areas. Include an examination of integration and access to external Web data sources and services including Google Earth, Virtual Earth.	• Examine and prioritize specific needs and opportunities for GIS integration • Select high-priority GIS integration projects and secure funding support • Assemble team and prepare Work Plan(s) • Prepare integration design and begin development • Prepare prototype integration applications • Review, revise and deploy integration applications • Document applications and train users	O7, D2, D9, D10, C7, C10, C15, S2, S4, S5, S6, S7, S10, F3

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
System Configuration, Software, and Application Development (con't)			
S10: Develop, approve, and document GIS and associated IT standards for hardware, software, networks, security, and system administration tools and practices	Using the process for standards development and approval, identify areas that can benefit from formal technical GIS and associated IT standards (addressing computer hardware, software, network, application development tools and methods, etc.). Assign Working Groups of the CBTSC to develop the standards and go through the review and approval process culminating in approval. Note: Short of formal standards that carry specific requirements for compliance, some topics may result in the approval of a guideline which are recommended for adherence for specific circumstances but which are not mandatory.		O8, C7, C10, C14, S2, S6, S9
Funding, Resourcing, and Financial			
F1: Research and secure additional grant funding to support state and local GIS development	This initiative is part of Goal 3 of the CBTSC. The purpose is to establish a well organized and resourced effort to identify, apply for, and secure grant funding, from government, private, and non-profit foundation sources that will deliver funding for GIS related projects that help advance IT strategic goals and GIS business plan objectives. Grants may be directly related to IT and GIS programs (e.g., FGDC CAP program, NTIA broadband mapping). Other grants may address other program areas, not specifically citing IT and GIS topics but which can be supported by GIS technology data. The grant research and funding function may be lead by a CBTSC Subcommittee but the "legwork" would require time from CSSTP personnel and other GIS stakeholder organizations.	• Assign to Working Group and establish approach for research and identification of applicable grant opportunities • Conduct ongoing work to identify and qualify grant opportunities and select those for application • Prepare selected grant applications • Secure grants and set-up administrative structure for grant project administration • Track success/failure rate for grant applications	O4, O7, O13, C2, C3, C4, C8, C9, C15, C17, S2, F3, F6
F2: Explore and pursue new funding sources for GIS development support through local land transaction registration fees	Establish a Working Group under the CBTSC to explore the possibility of establishing a new revenue stream for GIS development—establishment of a special fee for County Register of Deeds transactions. Fees would go to a special fund administered by a state agency. The majority of the funds would be used to support GIS development and operations at the local level (County, City, Village, Township) based on an agreed formula and a clear accounting process. This type of funding mechanism is being used by a number of states including Wisconsin, Illinois, Minnesota, and Oregon. Establishing this funding mechanism would require legislative action. This initiative begins with research on the approach taken by other states and a polling of interest by local governments. This would be followed by contact with appropriate committees in the state legislature culminating in a proposed bill and vote.	• Prepare and get consensus on wording for legislation (including rules on collection of fees and use of fund) • Get legislative support • Approve legislation • Prepare administrative and financial procedures and tools to operate and manage fee collection and fund	O4, O5, O13, C2, C3, C15, F3, F6, F7

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Funding, Resourcing, and Financial (con't)			
F3: Research and identify other funding sources or financing strategies for GIS programs	A standing Subcommittee on GIS financing strategies would be created to examine a variety of funding sources and financing strategies to support GIS initiatives at the state and local level. This Business Plan identifies in Appendix C possible financing approaches (most of which have been successfully used for GIS programs in other states). The Subcommittee would conduct research on new funding alternatives and take action to put in place new funding/financing strategies based on the results of this research.	• Research, identify, and prioritize sources • Make formal requests and attempts to secure funding • Secure nontraditional sources	O4, O5, O7, O13, C2, C3, C15, F1, F2, F6, F7
F4: Explore, identify, and facilitate access to non-traditional staff resource options	The success of GIS programs depends on well-qualified and dedicated staff fulfilling a range of important roles for GIS programs (GIS technicians, analysts, application developers, database specialists, trainers, managers, and administrative personnel). The purpose of this initiative is to examine alternatives and opportunities for non-traditional staffing (approaches other than full-time salaried positions). This initiative would involve research about non-traditional approaches used by organizations in Michigan and in other states. Research would include an examination of personnel and labor laws and policies governing employment and personnel management in at the state and local level. The main result would be a guide on GIS staffing options which describes the options and how they would be implemented. Examples of how they have been used would be provided as well. Non-traditional staffing options may include: part-time or seasonal positions, student internship/coop programs, "borrowed staff" from other agencies to support GIS projects, volunteer staff, contracted labor, and others. A follow-on activity may include setting up programs that would be available for use by any organization (e.g., internship programs with state universities, a contract labor pool, directories of personnel available for part-time work).	• Assign to Working Group • Survey/evaluate existing "non-traditional" staff resourcing approaches in Michigan and out-of-state • Examine legal/personnel policy impacts • Prepare guide on "innovative funding" options with examples • Post for Web access and promote use of recommended staffing options	O7, O12, O13, C3, C7, C8, C15, C17, S2, F3, specific database development initiatives (Category D) subject to cost sharing agreements.
F5: Prepare business case for open access to government GIS data	Michigan open records law allows public agencies to charge fees for the sale of GIS data and products and a number of local governments in the state currently generate revenue from GIS sales (mainly for parcel and ortho imagery data). There is concern that this practice inhibits sharing of data across government jurisdictions. This initiative would examine how wide spread this practice is (making use of the most recent survey conducted by MiCAMP). The study would evaluate both the cost and benefit side of this revenue generation as well as non-tangible impacts (e.g., potential loss of economic development opportunities). This business case would be used to develop a consistent policy on government sales of GIS data to encourage consistency and more open access to GIS data.	• Assign to Working Group • Review existing open records law and make interpretation on legal bounds on fee setting for GIS data/product sales • Evaluate current status of GIS product/data sales including cost/benefit and intangible benefits and impacts • Prepare business case and identify alternatives for local governments	O4, O7, D8, O13, D4, D7, D10, D11, D14, C2, C3, C5, C15, F6

Implementation Initiative	Description	Performance Milestone(s)	Related Initiatives
Funding, Resourcing, and Financial (con't)			
F6: Prepare template agreements and management practices for multi-organization cost sharing	Cost sharing partnerships between government jurisdictions and other organizations (state, local, utility, university, private firms) are an effective means to fund GIS database or application develop projects that provide mutual benefits for the partners—and may also reduce costs because of economy of scale conditions for service providers. Creation of a template agreement(s) with language appropriate for various types of cost sharing arrangements will streamline the establishment of cost-sharing partnerships. This initiative would make use of such agreements already in place or used in the past by Michigan organizations. The template document(s) will be Web accessible and will use specific notations that guide the use of the document in specific partnership cases—identifying language that needs entry or modification by users.	• Assign work to project team or Working Group • Obtain and review existing GIS cost sharing agreements (inside and outside Michigan) • Prepare draft template agreement and distribute for review • Prepare final template • Post template on Web and promote its use	O4, O7, O8, O13, D2, D8, C7, C13, C15, C17, F3
F7: Establish state-run GIS grant program for local governments to support MGF participation	Identify a source of funds, administered by CSSTP, or another state body, which could allocate grants to support GIS development for the "have not" areas of the state based on some formula/criteria. Funds would serve as the driving element for expansion of GIS into areas where none currently exists.	• Establish working group to develop a business case for establishing a GIS grant program. • Identify potential funding mechanism and seek out "champion" for securing this funding.	O15, D4, D5, D7, C15
F8: Establish structure for and encourage development and use of options for GIS hosting	There are significant advantages in consolidated hosting of GIS data and applications. These advantages should be explored for extension from the CSSTP to local jurisdictions.	• Assign to a working group the task of structuring a program presenting options for GIS hosting. Options would include services as well as costs for the service. •	S2, S4, S6, S8, S10

Appendix B: Implementation Initiatives Relationship to SDI Objectives

Implementation Initiative	Description	Spatial Data Infrastructure Business Objectives												
		1. Organizational an governance	2. Continue support and expand GIS services	3. Enhance GIS coordination, collaboration, and partnerships	4. Explore and secure new funding sources	5. Expand the MGF	6. Develop high-priority applications	7. Improve and expand outreach	8. Prepare Templates	9. Expand and support GIS education and training	10. Create formal standards and policies	11. Increase programs and sources for GIS staff support	12. Track technology advances	13. GIS technology infrastructure
Organizational and Management Structure, Policies, and Practices														
O1: Formalize/Revise Role, Membership, and Structure of Local and State Cross Boundary Technology Steering Committee (CBTSC)	Committee members with input from other GIS stakeholders examine current mission and goals and make appropriate changes and elaborations to the mission statement and goals. Clarify the advisory and oversight authority of Committee on GIS management and operations in CSSTP. Formalize operational issues: membership, leadership, approach for decision making, formation of subcommittees and working groups etc. If deemed important, make changes to membership to better represent GIS and IT communities.	X	-	X	-	-	-	X	-	-	X	-	X	-
O2: Identify and establish initial Standing Subcommittees under Cross Boundary Technology Steering Committee	Based revisions to the CBTSC established in O1, define a number of Standing Subcommittees to address key ongoing GIS and related IT issues and concerns. Form the Subcommittees as needed but begin with ones that are needed to support high priority initiatives such as: a) GIS/IT Standards Development, b) GIS Policies, c) GIS Program Outreach and Communication, d) Business Plan Monitoring, e) GIS Education and Training, f) State-Local-Tribal GIS and IT Coordination, g) GIS/IT Trend/Advances Monitoring.	X	-	X	-	-	-	X	-	-	X	-	-	-
	Note: *Standing Subcommittees* are bodies commissioned by the CBTSC that have specific missions and topics related to business plan execution. Standing Subcommittees have an ongoing role, not a fixed temporary/task oriented purview as is the case with *Working Groups*. The Subcommittees are normally chaired by a member of the CBTSC but may include members from the broader Michigan GIS and IT stakeholder community (public or private sector, academic, non-profit).													

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Organizational and Management Structure, Policies, and Practices (con't)														
O3: Change name of State GIS User Group, enhance activities, and clarify organizational relationships	Take steps to enhance User Group services and activities and expand participation by members of the State GIS community. Change the name to "GIS User Forum" to avoid confusion with existing regional user groups. In coordination and sharing of resources with other statewide GIS bodies to support many of the Outreach and Communication initiatives (see Category C). Provide high-value services through regular meetings, news and information on Web Site, vendor and user demonstrations, information on training opportunities, calls for participation in CBTSC Subcommittees and Working Groups.	X	-	X	-	-	-	X	-	-	X	-	-	-
O4: Improve relationships between GIS and other professional networking and educational organizations.	IMAGIN, MiCAMP, and other professional associations play valuable roles in statewide professional networking, education, and information sharing. The missions of these bodies are similar and each has somewhat overlapping membership. A closer working relationship between these groups would better support statewide GIS coordination and support users through improved programs and services.	X	-	X	-	-	-	X	-	-	X	-	-	-
O5: Seek and get legislative action, Executive Order, or formal Agency action recognizing statewide GIS program.	Actively explore and establish formal recognition for the statewide GIS program. This could take the form of an Executive Order from the Governor's Office, a resolution from the state legislature (formal recognition) and legislative act that formally establishes key GIS program entities and which may allocate funding, or an Agency action formalizing GIS Coordination roles.	X	-	-	X	-	-	-	-	-	-	-	-	-

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Organizational and Management Structure, Policies, and Practices (con't)														
O6: Establish and implement a Project Management Office (PMO) in CSSTP and monitor business plan progress.	Using accepted best practices (from the Project Management Institute and other professional associations) create a staffed GIS/IT project management office (PMO) in CSSTP. This body would: 1) establish and support project planning and management practices for GIS projects, 2) monitor and report on progress on the business plan (and how it addresses IT Strategic goals), 3) Support GIS planning and execution by any stakeholder groups around the state.	X		X	-	-	-	X	X	-	X	-	-	-
O7: Establish and assign resources for a GIS program outreach and communication business function in CSSTP	Formalize and expand current activities lead by CSSTP for external outreach and communications with the full GIS user community in Michigan. A new program or section would be established with CSSTP staff responsibilities. This group would have a lead role in many of the Implementation Initiatives in Category E. It would coordinate closely with the rest of CSSTP, other statewide GIS bodies (State User Forum, IMAGIN, MiCAMP, and regional GIS user groups), and other professional associations. This group would have an important focus on building/sustaining state-local partnerships but would be help identify and establish other partnerships with federal agencies, universities, and private companies.	X	-	X	-	-	-	X	-	-	-	X	-	-

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Organizational and Management Structure, Policies, and Practices (con't)														
O8: Define/document process for GIS standards and policy development and approval	Create a Working Group under the CBTSC charged with the responsibility for defining a process and workflow for the submittal of a proposed standard or policy and its evaluation and ultimate of approval as an IT and/or GIS standard or policy. Standards and policies may address any technical, operational, or administrative area including software, data architecture, database content and format, network protocols and management, system administration tools and practices, standard methodologies for GIS and IT development, organizational relationships, information distribution, etc. The standards and policy review and approval would follow a comment and consensus process with formal approval by the CBTSC. Standards compliance would be required by state agencies (with a provision for approved deviation from the standard if a business case could be made). For non-state agencies, standards compliance would be recommended and encouraged but not mandatory. Note: Short of formal standards that carry specific requirements for compliance, some topics may result in the approval of a "guideline" which is recommended for adherence for specific circumstances but which are not mandatory.	X	-	-	-	-	-	-	X	-	X	-	-	-
O9: Establish process for submittal and review of new GIS projects and initiatives	Following the draft workflow for the CBTSC, finalize and fully describe an optional process for any GIS or IT stakeholder to propose a project (e.g., database or application development, educational initiative) that involves partnership and coordination by multiple state, local, or other organizations. The process will examine scope, business benefit, costs, and funding sources and explore opportunities to leverage resources for broader benefits. If appropriate, funding sources will be identified, resources will be allocated, and a project team (Working Group) will be assigned to prepare a work plan and manage the project. The PMO (see O6) will normally be involved with the evaluation and planning process.	X	-	-	-	-	-	-	X	-	X	X	X	-

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Organizational and Management Structure, Policies, and Practices (con't)														
O10: Set up templates, practices, and procedures for detailed work plan preparation	Establish guidelines and templates for preparation of detailed work plans—for work on implementation initiatives defined in this Business Plan or future projects proposed to the CBTSC. Document acceptable project management practices for team development and ongoing project administration, monitoring, communications, and reporting. The recommended PMO (see O6) has the primary responsibility.	-	-	-	-	-	-	-	X	-	-	-	-	-
O11: Set up templates, practices, and procedures for business plan monitoring and reporting	Establish procedures and practices and create reporting format templates for overall monitoring of progress on Business Plan objectives and implementation initiatives. Put in place ongoing monitoring and reporting.	-	-	-	-	-	-	-	X	-	-	-	-	-
O12: Create "template" organizational structure and best management practices to support enterprise GIS development	Government agencies at state and local level could use "organizational models" and guidance to support their development of enterprise GIS programs that serve multiple departments. The template would provide a starting point for enterprise GIS development that provides a structure and practices that encourage collaboration and sharing of resources. This would include the creation of a "library" (Web accessible) of best practices for GIS management and operations. The PMO would have a role in creating the template and providing assistance in its use.	-	-	-	-	-	-	-	X	-	-	-	-	-
O13: Develop and approve formal GIS policies	This is an ongoing activity for the creation of formal policies, reviewed and approved according the process developed in O9. Initial policies will focus on high-priority organizational, operational, and administrative activities. Policies may be applicable to certain types of organizations (state vs. local government) or for all GIS stakeholders. High-priority policies may include: requirements for standards and policies compliance, data maintenance responsibilities, requirements for project review and approval, GIS ethics.	X	-	-	-	-	-	-	X	-	X	-	-	-

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Organizational and Management Structure, Policies, and Practices (con't)														
O14: Prepare formal records retention policy and practices (records with geographic content)	Examine legal and regulatory requirements for public records retention as it impacts geographic databases and products (maps) for state agencies and local governments. This involves evaluation and application of public records management requirements defined by the Michigan Department of History, Arts, and Libraries (HAL) Prepare recommendations and support development of policies for sound records management and retention to ensure compliance with applicable laws and rules.	-	-	-	-	-	-	-	X	-	-	-	X	-
O15: Create a Stewardship and Outreach Coordination position within the CSSTP to support implementation of this Business Plan	A staff position with primary responsibilities for facilitation of the spatial data infrastructure outreach and stewardship program should be created. The individual in this role would be responsible for implementing many of the key implementation initiatives in this business plan. Position would provide staff support to the CBTSC and all associated standing subcommittees and working groups. Support would also be provided to regional user groups and professional organizations through assistance with meeting logistics and conference planning.	X	-	-	-	-	-	X	X	-	-	X	-	-
Data Development and Stewardship														
D1: Complete version 10 of the MGF and make it available to users	Complete the changes and enhancements currently in progress for the delivery of Version 10 of the MGF and inform users that it is available for use. Complete implementation of Oracle Spatial model and the on-line editing toolkit.	-	X	-	-	X	-	-	-	-	-	-	-	-

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Data Development and Stewardship (con't)														
D2: Prepare high-level logical GIS database design and source matrix	The high-level logical model is an identification of "data entities" (data "themes" or "layers"), summary of data content and structure, and the logical relationship between the entities. It may be presented in the form of an entity-relationship model and/or descriptive table. This logical design would include all GIS data entities needed by GIS stakeholder organizations. The purpose is to provide a comprehensive picture and context to support decisions on the future enhancement or development of GIS databases. In addition to a description of data content and relationships, information on the source(s) and development status of the data entities would be provided. The logical design would also include an identification of Framework data layers (current data in the MGF or future data layers considered to be high priority for multiple stakeholders) and Non-Framework (important GIS data but not needed by a majority of GIS stakeholder organizations.	-	X	-	-	X	-	-	X	-	X	-	-	-
D3: Expand on the Geographic Data Library to maintain Web-based catalog of sources of geographic data	Compile an index with descriptive information and links to Web sites maintained by public sector (federal, state, local) and other organizations that provide access to geographic data. This would include applicable metadata to provide prospective users with sufficient information about data content, data quality, access provisions, etc. for users to determine "fitness for use".	-	X	-	-	X	X	X	-	-	-	-	-	-
D4: Design and put in place a data stewardship model and practices applicable to all GIS data	Prepare an overall model for stewardship (applicable to all data layers) that defines various steward management, and operational roles and a process for data update and posting for access. Designate responsibilities for maintenance of each Framework data theme and define workflows for ongoing data maintenance. Build and deploy effective applications for data update, quality control/quality assurance, posting of data for wide access.	-	-	X	-	X	-	-	-	-	X	-	-	-

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Data Development and Stewardship (con't)														
D5: Evaluate current quality of Framework data and define actions for quality improvement for next MGF version.	As a basis for planning future enhancements and improvements of existing MGF data, perform a detailed assessment of current data quality. This would include the creation and/or update of metadata and would address multiple quality criteria: completeness, map accuracy, attribute accuracy, graphic integrity, etc. The results of the data quality assessment would be compared with needs expressed by MGF users to identify realistic improvements. The survey conducted as part of the NSDI CAP grant planning project is one source for this work.	-	-	-	-	X	-	-	-	-	-	-	-	-
D6: Develop, approve, and support the use of GIS database standards	Accelerate activities for developing and approving data standards for GIS data--to support development of consistent statewide data. Communicate information on the standards and provide guidance on their use to GIS stakeholders in Michigan. This initiative would begin by a focus on high-priority data standards that apply to all or most data layers (metadata, projections/coordinate systems, and data distribution licenses). Ongoing work would under this initiative would include the preparation and approval of more specific standards on data content, quality, coding/classification, attribute data schemas, etc.	X	-	X	-	X	-	X	X	-	X	-	-	-
D7: Recruit MGF stewardship participants	As an ongoing activity, the CSSTP in coordination with professional associations and regional GIS user groups will actively recruit local government (City/Villages/Townships—CVT) partners and applicable state agencies to play a stewardship role in MGF data maintenance. The ultimate goal is to have all counties, with active GIS programs, become active stewardship participants. In cases where appropriate a regional stewardship coordinator at the State Planning and Development District should be identified to serve as an initial point of contact for MGF issues. This regional stewardship coordinator could play a very significant role in expanding the MGF in rural areas.	-	X	X	-	X	-	-	-	-	-	-	-	-

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Data Development and Stewardship (con't)														
D8: Develop template database specifications and procurement templates for new data themes	Prepare template specifications for database development for use by any GIS stakeholder organization planning for database development These specifications would reference applicable data standards and include technical specifications for data conversion and capture, format of deliverables, quality criteria, and work performance criteria. These template standards would be a model (with necessary adjustments) for use by any stakeholder organization for a data conversion project or procurement of private data development services. The template would also help encourage database development partnerships for organizations (local governments) in geographic proximity.	-	X	X	-	-	-	-	X	-	X	-	-	-
D9: Create geospatial metadata profile and develop more effective metadata management tools	Create a metadata profile, based on the FGDC Content Standard for Geospatial Metadata, create templates for populating metadata fields, and enable tools for metadata query.	-	X	X	-	-	X	-	X	-	-	-	-	-
D10: Make enhancements in content and quality to existing MGF data	Using results of the review (see D5) make quality improvements in existing MGF data. Quality improvement is particularly important for transportation centerlines (positional accuracy and update timing) and related transportation attribute and LRS. Quality improvements also impact other MGF data including political and administrative boundaries. This is a planned, ongoing activity that takes into account user needs, resource availability, and level of MGF stewardship participation.	-	X	-	-	X	-	-	-	-	-	-	-	-

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Data Development and Stewardship (con't)														
D11: Establish program and process for ongoing repeatable statewide coverage of orthoimage data	Continue to administer the current NAIP partnership program and recently ratified agreement with Microsoft. Plan and actively solicit support for ongoing orthoimage acquisition program. Prepare terms and agreements for cost sharing and access for imagery (see F6) and technical specifications for orthoimage development. Get support and commitments for cost contributions (federal, state, local, private) and prepare/ratify cost sharing agreement. Establish group and practices for long-term management of the ortho program.	-	X	X	-	X	-	-	-	-	-	-	-	-
D12: Accelerate and establish better access to digital data from the REMON initiative	Evaluate current management of REMON project and identify potential changes and improvements to make coordinates available to the GIS community. Help accelerate data compilation and make improved monumentation data more accessible via the Web.	-	X	X	-	X	-	X	-	-	-	-	-	-
D13: Load and make available GIS data layer with Census Geography and 2010 Census data	Take delivery and load current census geography boundary files and data from 2010 Decennial Census. Evaluate correspondence of boundary files with MGF data layers and make necessary adjustments to TIGER to improve match MGF or local government GIS data (parcel and centerlines). Make this data available for query, viewing, and download.	-	X	X	-	-	X	-	-	-	-	-	-	-

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Data Development and Stewardship (con't)														
D14: Design, develop, and deploy statewide parcel database and establish ongoing stewardship	Complete database design, build, and maintain a statewide parcel database consisting of parcel boundaries and a minimal set of parcel attributes. Data would be contributed by local governments (county, city, village, township) and would be carried out in partnership with BS&A (contractor which has already automated data for large number of Michigan government jurisdictions). Data from multiple sources would be contributed to create a seamless statewide parcel fabric. Initially, data stewardship would call for updates on an annual basis (corresponding to the real property taxation cycle) but in the future, updates may occur more frequently with new subdivisions and parcel splits/mergers. This database development initiative to identify publicly owned parcels or parcels for which a public agency has right-of-way or easement rights. Identifying these public parcels and easements would provide data to support a "public land inventory and tracking" application (see S2 Part of this effort would involve reaching an agreement for contributions of parcel data from jurisdictions that are now generating revenue from parcel data sales.	-	X	X	-	-	X	-	-	-	-	-	-	-
D15: Design and develop addressable structures database	Structures data include specific buildings or other facilities with a fixed location (for which a site address may be assigned) and which are deemed important for public safety planning and response and other applications. Structures data is generally consistent with feature types included in the federal Homeland Security Infrastructure Program (HSIP): schools, hospitals and other medical facilities, police/law enforcement stations, fire/EMS stations, emergency operations centers, jails/prisons. Additional important features may be included—for example, it may be expanded to include all governmental buildings and facilities to support a "public land inventory and tracking" application. Building the database will involve work with source agencies: HSIP, state agencies, and local governments. This initiative includes preparation of a database design, data loading and quality control checks, and creation of a statewide database. Building this database is followed by the establishment of a stewardship process resulting in data update at least on an annual basis.	-	X	X	-	X	X	-	X	-	-	-	-	-

Implementation Initiative	Description	Spatial Data Infrastructure Business Objectives												
		1. Organizational an governance	2. Continue support and expand GIS services	3. Enhance GIS coordination, collaboration, and partnerships	4. Explore and secure new funding sources	5. Expand the MGF	6. Develop high-priority applications	7. Improve and expand outreach	8. Prepare Templates	9. Expand and support GIS education and training	10. Create formal standards and policies	11. Increase programs and sources for GIS staff support	12. Track technology advances	13. GIS technology infrastructure
Data Development and Stewardship (con't)														
D16: Design database and specifications for site addresses and put in place process for data population and maintenance	As an extension to the "addressable structures" database described in D15, a comprehensive site address database includes point locations and attribute data for all parcels and/or buildings and facilities for which addresses can be assigned. This initiative includes the agreement of a data content and format standard, development of a database design and database development specifications to support capture of site addresses. Local governments (or contractors retained by them) would be primarily responsible for database development but technical support, and possibly financial assistance could be provided by CSSTP.	-	X	-	-	X	-	X	X	-	-	-	-	-
D17: Enhance accuracy/ completeness of administrative boundaries (city, townships, school districts, election districts, and other special purpose districts)	Administrative boundaries area foundational element of any statewide GIS and in Michigan that dataset is used by over 97% of all GIS users. To be most useful administrative boundary data should coincide with parcels, road centerline, and hydrology databases wherever possible.	-	X	X	-	X	-	X	-	-	-	-	-	-
	Boundary data for every type of taxing and public service authority in Michigan should be collected and maintained under a stewardship partnership relationship with local data custodians. These data are important to a variety of business drivers including economic development, revenue and taxation, emergency response, and asset management.													
D18: National Hydrology Dataset (NHD) completion and enhancement	The NHD data should be completed and enhanced to fully support business drivers for asset management for drain commissions, flood management, and environmental protection. Surface hydrology was reported to be needed by over 96% of all GIS users in Michigan during the outreach portion of this project.	-	X	X	-	X	-	X	-	-	-	-	-	-

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Data Development and Stewardship (con't)														
D19: Enhance database in support of emergency dispatch and response	This initiative is related to the Structures initiative in D13. It involves the improvement of data that supports local and state public safety and emergency planning and response agencies. The objective is to build and maintain a statewide database with critical public safety and emergency management data that includes (in addition to Structures), emergency service zone (ESZ) boundaries, selected "critical infrastructure" features, improved address ranges, and possibly other data. This project could be lead by CSSTP or a Working Group of the CBTSC. It would require a close partnership with local governments and appropriate state agencies (e.g., State Police).	-	X	X	-	X	-	X	-	-	-	-	-	X
D20: Design and develop water and sanitary sewer service area database	Water and sewer utility service data was identified as being important unavailable data elements for over 30% of survey respondents. While these data are not critical for many GIS applications they are important for several high profile business drivers: land use planning, economic development, emergency response. These data should be developed in partnership with regional or local governmental entities and include pertinent information on system capabilities, sources, etc.	-	X	X	-	X	-	X	-	-	-	-	-	-
D21: Other utility service areas—gas transmission, electric transmission, pipelines	These data were all highly ranked as desired but unavailable. Since the vast majority of these data are related to investor owned companies it is likely that obtaining them for use in the public domain will be difficult. However, partnerships should be explored with the leading providers of these services since in most cases these data exist for their own internal asset management and planning functions. These data can be critical to economic development, land use planning, and homeland security business functions.	-	X	-	-	X	X	-	-	-	-	-	-	-

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Data Development and Stewardship (con't)														
D22. Create statewide current elevation data	Elevation data, specifically contours, was identified by over 90% of GIS users as data needed to support their enterprise application of GIS. Additional elevation data in the form of DEMs if improved will result in better spatial accuracy of ortho photos. These data are important to production of quality National Flood Insurance Rate Maps (FIRM), to modeling and responding to wildfire, determination of road centerline mileage, wireless broadband and other tower location decisions, and site selection for wind power generation locations.	-	X	-	-	X	X	-	X	-	-	-	-	-
Communications, Outreach, and Education														
C1: Complete a communications and marketing plan for the state spatial data infrastructure.	An effective statewide GIS coordination effort is built upon a strategic and focused communication and marketing effort. Completion of an initial plan focused on outreach communications and marketing of the state spatial data infrastructure (specifically the MGF) .	-	X	X	-	-	-	X	-	-	-	-	-	-

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Communications, Outreach, and Education (con't)														
C2: Actively pursue outreach with and support from professional and industry associations	Build better communication with professional and industry associations that represent organizations and people that have an interest in GIS technology and data. This would include participation in meetings and conferences hosted by these groups, providing promotional and educational materials, and soliciting their support for GIS program initiatives. Groups might include County Road Association of Michigan, Michigan Emergency Management Association, Land Information Access Association, Michigan Assessors Association, Michigan Association of Chamber Professionals, Michigan Association of Counties, Michigan Association of County Administrative Officers, Michigan Association of County Drain Commissioners, Michigan Association of Equalization Directors, Michigan Association of Insurance Agents, Michigan Association of Planning, Michigan Association of Public-Safety Communications Officials, Michigan Association of Realtors, Michigan Association of Regions, Michigan Association of School Administrators, Michigan Association of United Ways, Michigan Cable Telecommunications Association, Michigan Education Association, Michigan Electric and Gas Association, Michigan Government Finance Officers Association, Michigan Municipal League, Michigan Railroads Association, Michigan Society of Professional Engineers, Michigan Society of Professional Surveyors, Michigan Township Association, Roadsoft User Group, Telecommunications Association of Michigan, Transportation Asset Management Council, and United Tribes of Michigan.	-	-	X	-	-	-	X	-	X	-	-	-	-
C3: Prepare materials and hold briefings to sustain support from senior officials	Prepare a number of explanatory and promotional materials that provides information about the needs, applications, and benefits of the GIS program and work to stimulate partnerships between state, local, and private organizations and which are aimed at senior managers and elected officials at the state and local level. Materials may include brochures and presentation materials. The CBTSC and CSSTP staff will seek opportunities to provide information and conduct executive briefings with senior officials.	-	X	X	X	-	-	X	-	-	-	-	-	-

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Communications, Outreach, and Education (con't)														
C4: Reach consensus on name, logo, and other branding for Michigan's statewide GIS program	Overall promotion and education about the statewide GIS program will benefit from appropriate "branding' as a basis for communications and outreach—particularly for expanding interest and participation in statewide GIS initiatives. This "branding" includes a number of actions most important of which is defining a name, logo, and possible a slogan or "tag line" for the Michigan GIS. Other states that have taken this step have seen considerable success in statewide GIS promotion (e.g., North Carolina's "NC OneMap", and Oregon's GIS Utility program branded as "NavigatOR"). Reaching consensus on a name and logo could be done in the form of a contest with suggestions from the Michigan GIS community. When a name and logo is settled on, it would be used in GIS program communications, presentations, Web sites, GIS products, and hosted applications.	-	X	-	-	X	-	X	-	-	-	-	-	-
C5: Prepare and establish formal terms for MGF partnership program	This initiative is to encourage expansion in MGF program participation, including Stewardship roles for local governments and other organizations that will provide data updates for statewide data coverage. This initiative involves several major tasks including: a) clarifying the terms of participation and putting in place a formal process for enlisting data Stewards and b) active promotion and recruitment of data stewards by CSSTP, the CBTSC, the professional GIS associations, and regional GIS user groups. These steps are followed with establishment of specific procedures to provide data for import to the MGF.	-	X	X	-	X	-	X	-	-	-	-	-	-
C6: Design and create promotional materials for statewide GIS program	This activity is carried out in coordination with other outreach initiatives (E1, E2). This involves the design and development of materials using a variety of media and distribution channels to provide information focused on potential users and partners in the statewide GIS program. This may include brochures, web site pages, and other materials which would be distributed to users and potential users. This could be a role taken on by a Standing Subcommittee or Working Group of the CBTSC. All statewide GIS stakeholders would have access to these materials and use them in connection with events, meetings, and other outreach activities.	-	X	X	-	X	-	X	-	-	-	-	-	-

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Communications, Outreach, and Education (con't)														
C7: Review and improve CSSTP Website design and navigation for improved access to information, services, and resources	The objective of this initiative is to improve the CSSTP web site which will serve as a primary communication channel for statewide GIS users or potential users to easily find information about the statewide GIS program and also to access data and services. This initiative would involve a full Web site redesign after getting input from current users, followed by a rebuilding of Web pages and improved navigation. This is an important aspect of GIS program promotion and supports most outreach and education initiatives as well as those focused on delivery of GIS data and services.	-	X	X	-	-	X	X	-	-	-	-	-	-
C8: Prepare and maintain single Web-based GIS contact directory	Compile a directory of people and organizations--principally users and technical staff with GIS expertise who may serve as a resource for information and technical support to other GIS programs. Provide contact information to facilitate networking and build an application to GIS-enable the directory to easily identify the location of the contact.	-	X	X	-	-	X	X	-	-	-	-	-	-
C9: Support and encourage expanded participation in GIS events and professional associations	As part of statewide GIS program communications and promotion, this initiative will encourage broader participation in GIS events and related professional associations—including Michigan-based organizations and programs as well as out-of-state GIS events and organizations (URISA, GITA, ASPRS, NSGIC). This initiative is supported by a Web-based resource with information on professional organizations and upcoming events (conferences, workshops, special meetings). Membership and participation in these professional organizations and events supports professional development, networking, and overall advancing of GIS programs. The State GIS User Forum (see O3), IMAGIN, and MiCAMP organizations (see O4) would have key roles in this initiative.	-	X	X	-	-	-	X	-	-	-	-	-	-
C10: Create and maintain central, web-accessible repository for GIS and related IT standards and policies	This initiative supports Objective 2.2 of the CBTSC. In connection with the development and approval of standards (see O8, D6, S10), this initiative includes the design and deployment of a searchable Web-based catalog of pending and approved IT and GIS standards and policies.	-	X	X	-	-	X	X	X	X	X	-	X	-

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Communications, Outreach, and Education (con't)														
C11: Encourage and support professional development and certification for GIS professionals in Michigan	This initiative will be coordinated with E8 and has the purpose of supporting the increase of technical and management skills and professional advancement of GIS professionals in all statewide stakeholder organizations. Specific objectives include completion of formal GIS educational degrees or GIS certificates in universities, continuing education course credits, and increasing the number of GIS staff with applicable GIS and related professional certifications (e.g., GISP, ASPRS-CMS, PMI-PMP, other technical IT certifications). Work would include preparing Web-based information on educational and professional programs, promotion of these opportunities at events, and possible monetary support to qualified individuals. A Standing Subcommittee of the CBTSC would take the lead role with staff support of CSSTP. This initiative could also include a review and preparation of standard, recommended GIS personnel descriptions.	-	X	-	-	-	-	X	-	-	-	-	-	-
C12: Design and organize training programs for use of MGF resources and other CSSTP GIS services	This initiative directly supports initiative E4—expansion of MGF program participation and data stewards. The CSSTP would take a lead role in designing and distribution of information about the MGF and training programs aimed at potential new stewards for MGF data maintenance. The CSSTP will prepare training materials which could be provided on-line (without the need for a trainer) and, as needed, training sessions by a CSSTP staff person or other qualified statewide GIS stakeholder.	-	-	X	-	-	-	-	-	X	-	-	-	-
C13. Encourage and expand participation in and programs offered by State GIS User Forum	This initiative directly supports initiative O3—re-organization and improvement of a State User Forum. A CBTSC Subcommittee could take a lead role with participation of IMAGIN and MiCAMP, and CSSTP staff. This initiative involves ongoing promotion through all available channels to make GIS users throughout the state aware of the User Forum and encouraging broader participation. Part of this is to solicit contributions and presentations by users for GIS User Forum meetings and Web-accessible material.	-	-	X	-	-	-	X	-	X	X	X	-	-

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Communications, Outreach, and Education (con't)														
C14. Communicate GIS project initiatives, successes, lessons-learned, and best practices through media, Web site conferences, and professional meetings	This initiative supports Goal 1 of the CBTSC and is carried out in coordination with other outreach activities (Category C). This will result in an effective approach to distribute news about the statewide GIS program activities and user stories as a support for professional networking. Publishing of information about GIS applications and "success stories" provides a resource for other users' application deployment and support for GIS business cases.	-	-	X	-	-	-	X	X	-	-	X	-	-
C15: Explore and define options for providing GIS services to low-resourced jurisdictions	Examine the options for providing outsourced GIS services or partnerships that may allow contracted GIS services or support from CSSTP or a local government (e.g. support from a County government GIS program to a neighboring county or to CVTs in the County. The focus is finding appropriate avenues to provide GIS data and services to local governments without sufficient resources or technical expertise to support a full GIS program.	-	X	-	-	X	X	X	X	X	-	X	-	X
C16: Design, initiate, and support "Map of the Month" Web-based gallery	This is an ongoing program that some other state and local government GIS programs have used as a promotional device and to encourage professional networking and communication among GIS professionals. Any member of the GIS community in the state would be given an opportunity to submit a GIS-generated map created to support a GIS program or research activity. Any GIS user could submit a digital map for consideration and one would be chosen each month. There would not be a prize of an extremely detailed set of selection criteria. Each month a new "map of the month" would be accessible through a Web link and viewed by all with brief information about the purpose of the map and how it was created as well as credits to the contributor(s) and their organization(s). Maps for previous months would also be accessible. It may even be possible to display a hard copy (at the CSSTP Office location) each month and perhaps have all the hard copies on display at an annual conference (see Ex).	-	-	X	-	-	X	X	-	X	-	-	-	-

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Communications, Outreach, and Education (con't)														
C17: Plan and set-up program for mutual GIS support network	This initiative is related to other outreach initiatives designed to increase professional networking and exchange of information and ideas among organizations using GIS technology and data. But it goes a step further by creating a pool of in-state GIS professionals and/or their organizations which would be willing to provide GIS planning or implementation support, at no or little cost, to other organizations (particularly organizations that are planning GIS implementation efforts). This would be implemented as a Web-based clearinghouse, identifying individuals, their areas of expertise, and contact information. Groups needing such support would use this clearinghouse as a starting point to enlisting the in-state help that they need	-	X	X	-	-	-	X	-	X	-	X	X	X
	Mutual support network could also include code samples, RFP documents, and other technical resources generated by GIS professionals in the state made available for others to use.													
C:18: Compile and maintain a directory of GIS training sources and opportunities	This would be an on-line directory, regularly updated, that gives users and technical staff in Michigan information about upcoming events and sources for training, education, and professional development. It would include training courses and seminars sponsored by government agencies, universities, vendors, professional associations, and private trainers; conferences; training materials; and on-line courses.	-	-	X	-	-	-	X	-	X	-	X	X	-
C19: Prepare GIS education/training plan and put in it in place	Prepare a formal, comprehensive education and training plan that guides GIS related education and training activities for all stakeholders. The plan will describe education and training goals and types, sources, and consumers of education and training materials and activities. This Plan will culminate in assignment of roles and clear objectives and the initiation of work to put in place plan objectives.	-	-	X	-	-	-	X	-	X	-	X	-	-
C20: Provide better access to educational materials and professional networking	Improve educational materials about GIS (improvement or increased subscriptions to Geotech Listserv); improve mechanisms and directory information for professional contacts and networking (maybe geocoded database of people).	-	-	X	-	-	-	X	-	X	-	X	-	-

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System Configuration, Software, and Application Development														
S1: Prepare specifications and develop export tools for easy MGF data extract from Oracle Spatial to other common GIS formats	The MGF database is in the process of migration from a legacy GIS proprietary format (ArcGIS coverages) to an Oracle Spatial format (for storage of map features and attributes). This provides a number of advantages for spatial data management including its ability to maintain a statewide database and ability to use robust data management tools in Oracle. It is vital however that there be flexible and easy to use tools and processes to extract selected data from Oracle and provide it to users in a form that it can used with minimal restructuring or format translations. This initiative includes the development, testing, and deployment of extract and export routines suitable for users needed Shape Files, ESRI geodatabases, AutoCAD DWG files, and possibly other formats. There may also be a need for Oracle Spatial data to be viewed directly by users with different GIS software environments.	-	X	-	-	X	X	-	-	-	-	-	-	-
S2: Identify, design, and develop several enterprise GIS applications	While GIS data is the fuel upon which GIS programs operate, applications comprise the engine which delivers needed products and results to users. This initiative has an objective of delivering a richer set of GIS applications and services that can deliver business benefits to large portions of the GIS community in Michigan, through a Web-based portal. High-priority applications, which may use off the shelf tools in GIS software packages or may require additional design (map templates) or more complex programming or configuration, will provide users with needed tools in an easy to access environment. This initiative includes the design and development of several important GIS applications. This development and hosting could be the responsibility of the CSSTP or another organization in a position to host GIS applications. Selecting and designing the applications would benefit from involvement of the full statewide GIS community—possibly through a Working Group assigned by the CBTSC.	-	X	X	-	-	X	-	-	-	-	-	-	-

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System Configuration, Software, and Application Development (con't)														
S3: Examine and develop effective tools for on-line update of MGF data	The CSSTP, with input from MGF users (and potential future users) creates easy-to-use tools and submittal of updated data for import into MGF datasets and an application that allows on-line interactive update of MGF data (e.g., new road segments). These tools would incorporate basic quality control features and deliver data changes in a way that could undergo final quality checks and MGF posting by CSSTP personnel.	-	X	X	-	X	X	X	-	-	-	-	-	-
S4: Move toward statewide 'virtual portal' for Web-based access to spatial data and services from distributed government and commercial sources	Design and build an enhanced Web-based tool for geographic data and services that acts as a "virtual portal"--a Web application that can combine centrally-stored data, direct access to and integration of data on other Web sites, and a range of GIS services. This should include a tight connection and functional relationship with the MGF but also allow for access to other data sources maintained by local governments, state and federal agencies, and commercial sources (e.g., mashups with data from commercial providers like Microsoft Bing Maps and Google Earth).	-	X	X	-	-	X	-	-	-	-	-	-	-
S5: Examine and suggest changes to statewide broadband communication services.	CSSTP is providing support to the Michigan Broadband Mapping initiative being managed by the state Public Service Commission--part of the Michigan Connect program (http://connectmi.org). The CSSTP in coordination with the CBTSC should continue to provide support for this effort and use its results (with GIS technology) to evaluate more efficient and less costly ways to provide needed high-speed digital services to state agencies and other organizations.	-	X	X	-	-	X	-	-	-	-	-	-	-
S6: Monitor and exchange information on industry trends, new products and methodologies	Through ongoing professional reading, review of Web-based news and information, participation in industry events, conference attendance, etc., multiple members of the GIS community will gather information about industry trends and products. This activity could be managed through a Subcommittee of the CBTSC. GIS professionals in the state would also conduct basic evaluation of products and methodologies (often in conjunction with their job functions) and make notes about ideas for possible future use or adoption. This initiative would include Web posting of the information for easy access by GIS users.	-	-	X	-	-	-	X	-	-	-	-	X	X

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System Configuration, Software, and Application Development (con't)														
S7: Continue to monitor and identify opportunities for new applications of GIS technology	Continually monitor new programs, special projects, and other opportunities where geographic data and GIS services could be applied. Conduct necessary research and hold discussion with program or project managers to explore use of GIS, leading to agreements for use of GIS.	-	-	X	-	-	-	X	-	-	-	-	X	X
S8: Explore and design approach for archiving of and flexible access to historic data	Many GIS users have a need to access historical geographic information (e.g., parcels, aerial imagery, road networks, land cover) to support planning or engineering studies, and sometimes legal case research. This initiative has the purpose of defining a data model and identification of software tools and applications for easy access to the historical data.	-	X	-	-	X	X	-	-	-	-	-	-	-
S9: Identify and evaluate opportunities for GIS integration with non-GIS systems and databases	Identify business areas, not traditional for GIS, which can benefit from geographic data and GIS capability (e.g., transportation, public health, social services, financial analysis). Define technical and organizational approaches for integration and "embedded GIS" services or applications involving integration with GIS to support these business areas. Include an examination of integration and access to external Web data sources and services including Google Earth, Virtual Earth.	-	X	X	-	X	-	-	-	-	-	-	-	-
S10: Develop, approve, and document GIS and associated IT standards for hardware, software, networks, security, and system administration tools and practices	Using the process for standards development and approval, identify areas that can benefit from formal technical GIS and associated IT standards (addressing computer hardware, software, network, application development tools and methods, etc.). Assign Working Groups of the CBTSC to develop the standards and go through the review and approval process culminating in approval. Note: Short of formal standards that carry specific requirements for compliance, some topics may result in the approval of a guideline which are recommended for adherence for specific circumstances but which are not mandatory.	-	X	-	-	-	-	-	X	-	-	-	X	X

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Funding, Resourcing, and Financial														
F1: Research and secure additional grant funding to support state and local GIS development	This initiative is part of Goal 3 of the CBTSC. The purpose is to establish a well organized and resourced effort to identify, apply for, and secure grant funding, from government, private, and non-profit foundation sources that will deliver funding for GIS related projects that help advance IT strategic goals and GIS business plan objectives. Grants may be directly related to IT and GIS programs (e.g., FGDC CAP program, NTIA broadband mapping). Other grants may address other program areas, not specifically citing IT and GIS topics but which can be supported by GIS technology data. The grant research and funding function may be lead by a CBTSC Subcommittee but the "legwork" would require time from CSSTP personnel and other GIS stakeholder organizations.	-	X	-	X	-	-	-	-	-	-	-	-	-
F2: Explore and pursue new funding sources for GIS development support through local land transaction registration fees	Establish a Working Group under the CBTSC to explore the possibility of establishing a new revenue stream for GIS development—establishment of a special fee for County Register of Deeds transactions. Fees would go to a special fund administered by a state agency. The majority of the funds would be used to support GIS development and operations at the local level (County, City, Village, Township) based on an agreed formula and a clear accounting process. This type of funding mechanism is being used by a number of states including Wisconsin, Illinois, Minnesota, and Oregon. Establishing this funding mechanism would require legislative action. This initiative begins with research on the approach taken by other states and a polling of interest by local governments. This would be followed by contact with appropriate committees in the state legislature culminating in a proposed bill and vote.	-	X	-	X	-	-	-	-	-	-	-	-	-

Implementation Initiative	Description	Spatial Data Infrastructure Business Objectives												
		1. Organizational an governance	2. Continue support and expand GIS services	3. Enhance GIS coordination, collaboration, and partnerships	4. Explore and secure new funding sources	5. Expand the MGF	6. Develop high-priority applications	7. Improve and expand outreach	8. Prepare Templates	9. Expand and support GIS education and training	10. Create formal standards and policies	11. Increase programs and sources for GIS staff support	12. Track technology advances	13. GIS technology infrastructure
Funding, Resourcing, and Financial (con't)														
F3: Research and identify other funding sources or financing strategies for GIS programs	A standing Subcommittee on GIS financing strategies would be created to examine a variety of funding sources and financing strategies to support GIS initiatives at the state and local level. This Business Plan identifies in Appendix C possible financing approaches (most of which have been successfully used for GIS programs in other states). The Subcommittee would conduct research on new funding alternatives and take action to put in place new funding/financing strategies based on the results of this research.	-	X	-	X	-	-	-	-	-	-	-	-	-
F4: Explore, identify, and facilitate access to non-traditional staff resource options	The success of GIS programs depends on well-qualified and dedicated staff fulfilling a range of important roles for GIS programs (GIS technicians, analysts, application developers, database specialists, trainers, managers, and administrative personnel). The purpose of this initiative is to examine alternatives and opportunities for non-traditional staffing (approaches other than full-time salaried positions). This initiative would involve research about non-traditional approaches used by organizations in Michigan and in other states. Research would include an examination of personnel and labor laws and policies governing employment and personnel management in at the state and local level. The main result would be a guide on GIS staffing options which describes the options and how they would be implemented. Examples of how they have been used would be provided as well. Non-traditional staffing options may include: part-time or seasonal positions, student internship/coop programs, "borrowed staff" from other agencies to support GIS projects, volunteer staff, contracted labor, and others. A follow-on activity may include setting up programs that would be available for use by any organization (e.g., internship programs with state universities, a contract labor pool, directories of personnel available for part-time work).	-	X	-	X	-	-	-	-	-	-	-	-	-

Implementation Initiative	Description	Spatial Data Infrastructure Business Objectives												
		1. Organizational an governance	2. Continue support and expand GIS services	3. Enhance GIS coordination, collaboration, and partnerships	4. Explore and secure new funding sources	5. Expand the MGF	6. Develop high-priority applications	7. Improve and expand outreach	8. Prepare Templates	9. Expand and support GIS education and training	10. Create formal standards and policies	11. Increase programs and sources for GIS staff support	12. Track technology advances	13. GIS technology infrastructure
Funding, Resourcing, and Financial (con't)														
F5: Prepare business case for open access to government GIS data	Michigan open records law allows public agencies to charge fees for the sale of GIS data and products and a number of local governments in the state currently generate revenue from GIS sales (mainly for parcel and ortho imagery data). There is concern that this practice inhibits sharing of data across government jurisdictions. This initiative would examine how wide spread this practice is (making use of the most recent survey conducted by MiCAMP). The study would evaluate both the cost and benefit side of this revenue generation as well as non-tangible impacts (e.g., potential loss of economic development opportunities). This business case would be used to develop a consistent policy on government sales of GIS data to encourage consistency and more open access to GIS data.	-	X	X	-	X	-	X	X	-	-	-	-	-
F6: Prepare template agreements and management practices for multi-organization cost sharing	Cost sharing partnerships between government jurisdictions and other organizations (state, local, utility, university, private firms) are an effective means to fund GIS database or application develop projects that provide mutual benefits for the partners—and may also reduce costs because of economy of scale conditions for service providers. Creation of a template agreement(s) with language appropriate for various types of cost sharing arrangements will streamline the establishment of cost-sharing partnerships. This initiative would make use of such agreements already in place or used in the past by Michigan organizations. The template document(s) will be Web accessible and will use specific notations that guide the use of the document in specific partnership cases—identifying language that needs entry or modification by users.	-	X	X	-	-	-	X	X	-	-	-	-	-

Implementation Initiative	Description	Spatial Data Infrastructure Business Objectives												
		1. Organizational an governance	2. Continue support and expand GIS services	3. Enhance GIS coordination, collaboration, and partnerships	4. Explore and secure new funding sources	5. Expand the MGF	6. Develop high-priority applications	7. Improve and expand outreach	8. Prepare Templates	9. Expand and support GIS education and training	10. Create formal standards and policies	11. Increase programs and sources for GIS staff support	12. Track technology advances	13. GIS technology infrastructure
Funding, Resourcing, and Financial (con't)														
F7: Establish state-run GIS grant program for local governments to support MGF participation	Identify a source of funds, administered by CSSTP, or another state body, which could allocate grants to support GIS development for the "have not" areas of the state based on some formula/criteria. Funds would serve as the driving element for expansion of GIS into areas where none currently exists.	-	X	X	X	X	-	-	-	-	-	-	-	-
F8: Establish structure for and encourage development and use of options for GIS hosting	There are significant advantages in consolidated hosting of GIS data and applications. These advantages should be explored for extension from the CSSTP to local jurisdictions.	-	X	X	-	-	-	-	-	-	-	-	X	-

Appendix C: Potential SDI Funding Sources and Financing Strategies

This Appendix provides an overview of nontraditional funding sources and financing strategies that are possible approaches to be examined for financial support to the SDI initiative. Many of these approaches have been successfully used for information technology and GIS programs in other states.

Allocation from Non-General Fund Budgets or Special Funds

Brief Description:	Designation of portions of non-General Fund budgets to support GIS development and/or operations.
Constraints:	Designated GIS expenditure must be aligned closely with the mandated purpose of the special fund. Requires budget submittal, justification, and approval. Subject to financial pressures, internal competition for fund use, and political factors that impact budget approvals. Non-general fund sources are not always applicable for ongoing operations costs (e.g., many capital budget items used specifically for GIS development purposes).
Frequency/ Importance:	Very frequently used by government agencies and public utilities.

Joint Funding/Project Partnerships with Outside Organizations

Brief Description:	Up-front, joint funding for common GIS development work (usually database development) by multiple agencies. Each agency contributes an amount based on agreed cost-allocation and shares in ownership of the product.
Constraints:	Considerable consensus-building and negotiation. Requires formal agreement among parties and designation of lead management agency. Requires administration of joint ownership and use.
Frequency/ Importance:	Used frequently for GIS database development (at least 20% of public agency programs) and for wide area network development.

Data Licensing or Subscriptions

Brief Description:	An organization which has ownership of a database (licenser) extends rights to user agencies (licensees) to use data under specified terms documented in a license agreement. License agreement has terms that define the data product and mode of delivery, limitations of use, and fees (optional).
Constraints:	Licenser agency must fund database development effort and establish data ownership. May be limitations in State Open Records or FOIA law that limit charging of fees. Other legal constraints may govern terms included in license agreement.
Frequency/ Importance:	Frequent—by roughly 25% of public agency GIS programs which are owners of commonly used GIS data sets. Not all of these license agreements involve monetary fees. Some may involve in-kind contributions of data or services by licensee.

Special Transaction Fees

Brief Description:	May include a fee or allocation of part of a fee collected on a government transaction (e.g., permit application, filing fee). Recorder or Register of Deeds filing fees have been used successfully in a number of other states to fund GIS programs.
Constraints:	May require local ordinance or State legislation. Must be placed in special fund designated for use in development or operation directly tied to the specific program under which the transaction falls.
Frequency/ Importance:	Often used—by roughly 10% of public agency GIS programs. Amount of revenue varies widely among different jurisdictions and can be subject to economic variability (e.g., weather factors, economic downturns).

Grants

Brief Description:	Money provided to a public agency for a specific purpose based on meeting certain criteria documented in a grant application. Grants for GIS and information technology typically come from federal and state government agencies but may also come from private or not-for-profit sources.
Constraints:	Requires sometimes time-consuming research and grant application work and often a competitive selection process. Grant acceptance sometimes requires matching funds. Use of grant money has restrictions on use and well-defined tracking and accounting procedures must be used.
Frequency/ Importance:	Often used by government agencies—roughly 30% of GIS programs have used grant funding. In many cases the amount of grants are small.

Bonds

Brief Description:	Funding approach supplying up-front costs for development project through sale of bonds. "General Obligation Bonds" are most common and involve public agency pledge to pay off bonds over specific period of time using its taxing or other revenue generating powers. Revenue bonds have also used in some cases. Most appropriate for providing major funding for large database and system development efforts, not ongoing operations.
Constraints:	Requires legislative approval and secure pay-back mechanism. Significant administrative overhead in managing bond sales and pay-back.
Frequency/ Importance:	Not extremely frequent for GIS projects but have been a major source of development funding in a number of important cases.

User Fees

Brief Description:	GIS lead agency provides system access and associated support services to user offices and charges fees. Fee may be a fixed "assessment" or "metered use" based on monitoring of usage and tabulation of defined metrics (staff hours used, access to Web-based services, data downloads). User office is "billed" for time and/or system usage based on agreed-upon rates.
Constraints:	Requires formal policy and user-Department acceptance.
Frequency/ Importance:	Used in many cases by government agencies for general IT services and support (charge back arrangements) but used only infrequently for GIS programs.

Standard Public Project Fee or Assessment

Brief Description:	Standard fee assessed and collected from private submitter for infrastructure or land development project (e.g., plan submittal) with justification that GIS supports private sector land development design. This is similar to the use of permit fees but expands this concept to apply a significant but reasonable fee for major development projects.
Constraints:	May require local ordinance or State legislation. Must be placed in special fund designated for use in GIS development and support directly tied to support for private land development work.
Frequency/ Importance:	Infrequent. Could be significant annual revenue source.

Service Agreement to Support Major Infrastructure Development

Brief Description:	Contractual relationship with another public, private, or not-for-profit entity managing a major infrastructure development project that makes use of GIS data and services. The contract would specify specific products and services and terms for providing them in return for payment.
Constraints:	Requires contract and potentially complex negotiations. Legal restrictions or governmental policies may impose limits for entering into service agreements with non-public entities.
Frequency/ Importance:	Infrequent.

Advertising/Promotion/Sponsorship

Brief Description:	Revenue generated through payments or other tangible support (donation of software) by private or other non-governmental organizations in return for a promotional or advertising exposure to a GIS or IT user audience. May include posted logos, links, or pop-up ads on Web pages or sponsorship of events (conferences or training events).
Constraints:	Company promotion through public agency computer networks may be limited by existing policies.
Frequency/ Importance:	Infrequent for IT or GIS organizations with exception of material support for conferences. Used frequently to support government-owned enterprises (e.g., municipally owned zoos, golf courses).

Royalties for Value-added GIS Products

Brief Description:	Revenues based on a percentage of the sale of products or services by Value Added Reseller (VAR) which is licensed to use GIS data from a public agency and which sells products generated from the data based on a mutual agreement.
Constraints:	Requires a formal agreement between the public agency and VAR (usually a private company). May involve legal conflicts (unfair competition) if agreement is exclusive. Success of venture depends on strength of market for custom value-added products.
Frequency/ Importance:	Infrequent use and generally not an important revenue generator. Where market exists, does have the advantage of off-loading risk and product generation, marketing, and distribution costs to an outside party—but means reducing potential royalty revenue to a small percentage of overall sales totals by the VAR.

In addition to the funding sources described above, there are a number of "financial management strategies" that might be used to support the SDI. These are innovative accounting approaches that are subject to particular policies in place and the willingness by senior management and political leadership to apply nontraditional financing and accounting techniques. These approaches, while not routine, are becoming more common for public sector financing of information technology initiatives and other major projects. They include:

- Reassignment of Unused Funds (a.k.a. "diverted reversion"): Funds in agency budgets that would normally revert and be unavailable at the end of a fiscal year are diverted in whole or in part to IT or GIS investments. Would involve establishing a reserved fund to place the surplus amounts. Most applicable to support clearly defined technology development projects rather than routine operational expenses. Public agency budget policies may prohibit fund carryover or transfer at the end of a FY. Requires formal policy and new accounting procedures for fund transfer.
- Sale of Intellectual Assets: Sale of "intellectual property" developed by an IT or GIS organization to other external organizations (public or private). This could include a

packaged software product or system application, training materials, or other product that has value to other organizations.

- Cost Savings or Offset through Staff Resource Sharing/Nontraditional Staff Use: Not a direct funding source but strategy to save cost for internal staff—mainly administrative or technical personnel. Includes the GIS organization sharing or using staff resources of other organizations without incurring full cost. Also includes use of nontraditional staff resources (temporary, part-time, volunteer, paid student intern). Objective is to provide needed staff resources at costs significantly below full-time employee positions. Policies must be in place that provide for these resourcing options. Student intern programs benefit from local source of skilled students. Operational management and supervision practices must accommodate for nontraditional resourcing approaches.
- Gain Sharing (a.k.a. "benefits funding"): Portion of increased revenues (or in some cases documented cost savings) resulting from services or a new application provided by the GIS or IT organization is transferred to the GIS or IT organization. Work would be performed with the intent of recovering money or increasing revenue connected with a system, application, or program, based on reasonable certainty that additional revenue can be recovered or generated from GIS or IT services. May be limited by agency budgeting and financial management policies. Requires formal agreement and possible upfront funding to carry out work (public or potentially non-public) program (utility billing, fines, fraud detection, and documented cost savings).
- Computing Infrastructure Sharing: Strategy for cost reduction and possible revenue through joint use of computing infrastructure or applications with another department, agency, or organization. Cost reduction is possible if the IT or GIS organization is able to use systems (e.g., servers, scanners, output devices) or networks of another agency at low cost (avoiding separate purchase and maintenance costs). Revenue is possible for allowing use of the computing infrastructure or software owned by the IT or GIS organization by another agency for a fee. Dependent on high-speed reliable network links and sufficient computing or network capacity to support joint use. Also requires a formal agreement and monitoring of service.